

**ENVIRONMENTAL PROTECTION AGENCY**

**40 CFR Parts 148, 260, 261, 262, 264, 265, 268, 270 and 271**

[FRL-4132-4]

RIN 2050-AD36

**Land Disposal Restrictions for Newly Listed Wastes and Hazardous Debris**

**AGENCY:** Environmental Protection Agency (EPA).

**ACTION:** Final rule.

**SUMMARY:** The Environmental Protection Agency (EPA) is finalizing treatment standards under the land disposal restrictions (LDR) program for certain hazardous wastes listed after November 8, 1984, pursuant to a proposed consent decree filed with the District Court that established a promulgation date of June 1992 (*EDF v. Reilly*, Civ. No. 89-0598, D.D.C.). EPA is also finalizing revised treatment standards for debris contaminated with listed hazardous waste or debris that exhibits certain hazardous waste characteristics (hereinafter referred to as hazardous debris), and several revisions to previously promulgated standards and requirements. These actions are being taken as part of the RCRA Reform Initiative, and are expected to facilitate implementation of the LDR program.

**EFFECTIVE DATES:** This final rule is effective on June 30, 1992, except for §§ 148.17(a), 260.10, 261.3(c)(2)(ii)(C), 268.2, 268.5, 268.7, 268.9, 268.36(a), 268.40, 268.41, 268.42, 268.43, 268.45, 268.46, 268.50, 270.14, 270.42, 270.72, and 271.1, which are effective November 16, 1992; and §§ 262.34, 264.110, 264.111, 264.112, 264.140, 264.142, part 264 subpart DD, 265.110, 265.111, 265.112, 265.140, 265.142, 265.221, and part 265 subpart DD, which are effective February 18, 1993.

**ADDRESSES:** The official record for this rulemaking is identified as Docket Number F-92-CD2F-FFFFF, and is located in the EPA RCRA Docket, room 2427, 401 M Street SW., Washington, DC 20460. The docket is open from 9 a.m. to 4 p.m., Monday through Friday, except on Federal holidays. The public must make an appointment to review docket materials by calling (202) 260-9327. A maximum of 100 pages from the docket may be copied at no cost. Additional copies cost \$.15 per page.

**FOR FURTHER INFORMATION CONTACT:** For general information, contact the RCRA Hotline at (800) 424-9346 (toll free) or (703) 920-9810 locally. For information on treatment standards for newly listed wastes or hazardous

debris, contact the Waste Treatment Branch, Office of Solid Waste (OS-322W), U.S. Environmental Protection Agency, 401 M St., SW., Washington, DC 20460, (703) 308-8434. For information on capacity determinations or national capacity variances, contact the Capacity Programs Branch, Office of Solid Waste (OS-321W), U.S. Environmental Protection Agency, 401 M Street, SW., Washington, DC 20460, (703) 308-8440.

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**I. Background**

*A. Summary of the Hazardous and Solid Waste Amendments of 1984*

The Hazardous and Solid Waste Amendments (HSWA) to the Resource Conservation and Recovery Act (RCRA), enacted on November 8, 1984, allow hazardous wastes to be land disposed only if they satisfy either of two conditions: (1) They can either be treated, or otherwise satisfy, the requirement of section 3004(m), which provision requires EPA 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; or (2) they can be land disposed in units satisfying the so-called no-migration standard in sections 3004(d)(1), (e)(1), and (g)(5). Land disposal includes any placement of hazardous waste in a landfill, surface impoundment, waste pile, injection well, land treatment facility, salt dome formation, salt bed formation, or underground mine or cave. RCRA section 3004(k).

EPA was required to promulgate land disposal prohibitions and treatment standards by May 8, 1990 for all wastes that were either listed or identified as hazardous at the time of the 1984

amendments, a task EPA completed within the statutory timeframes. RCRA section 3004 (d), (e), and (g). EPA is also required to promulgate prohibitions and treatment standards for wastes identified or listed after the date of the 1984 amendments (wastes referred to in this notice as "newly listed and identified wastes") within six months after the listing or identification takes effect. RCRA section 3004(g)(4). EPA has filed with the District Court a proposed consent decree that would put the Agency on a schedule for adopting prohibitions and treatment standards for newly identified and listed wastes. The promulgation date for the newly identified and listed wastes dealt with in this rule is set for June 1992. (*EDT v. Reilly*, Civ. No. 89-0598, D.D.C.)

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

In addition to prohibiting 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). The provision applies, of course, only to storage which is not also defined as land disposal in section 3004(k).

#### *B. Pollution Prevention (Waste Minimization) Benefits*

EPA's progress over the years in improving environmental quality through its media-specific pollution control programs has been substantial. Over the past two decades, standard industrial practice for pollution control concentrated to a large extent on "end-of-pipe" treatment or land disposal of hazardous and nonhazardous wastes. EPA believes that reducing or eliminating discharges and/or emissions to the environment through the

implementation of environmentally sound recycling and source reduction practices sometimes offer more cost effective ways of achieving environmental goals.

The Agency has identified a number of waste streams where environmentally sound recycling has been identified as BDAT. For example, we are promulgating today in section IV.C alternate treatment standards for electroplating sludges (F006) and spent pickle liquor (K062), based on high temperature metals recovery (HTMR). The Agency has determined that many of these wastes have sufficient concentrations of metals (nickel and chromium), with low concentrations of interfering chemicals, to be amenable for recovery in HTMR units. Moreover, the Agency is granting a generic exclusion for F006 and K062 HTMR nonwastewater residuals, provided that these residuals meet designated concentration levels, are disposed of in Subtitle D units, and exhibit no characteristics of hazardous waste. (This exclusion is similar to the one that was promulgated on August 8, 1991 for K061. See 56 FR 41164, August 19, 1991.) The Agency expects that these provisions will encourage more generators to choose treatment technologies for their wastes which also recover some materials for reuse. In addition, treatment standards for the newly listed petroleum refining wastes (F037 and F038) are based on some recovery technologies (critical fluid extraction and thermal desorption), as well as on incineration.

#### **II. Summary of Final Rule**

Today's final rule is the first rulemaking adopting treatment standards for newly identified and listed wastes as outlined in the consent decree described above.

Before discussing the final rule, EPA notes that certain aspects of the rule could be affected by the recently proposed rule (57 FR 21450, May 20, 1992) dealing with the question of when wastes are hazardous, concentration levels and circumstances when wastes are not hazardous, as well as circumstances when land disposal prohibitions might and might not apply. At present, however, the mixture and derived from rules remain in effect (57 FR 7628, March 3, 1992), and so apply to the rule adopted today. In addition, as explained in more detail later in the preamble, the Agency is codifying the so-called contained-in policy with respect to contaminated debris, and the preamble likewise explains how and when debris can be a hazardous waste based on application of this principle.

#### *A. Newly Listed Wastes*

EPA has promulgated a number of hazardous waste listings since enactment of HSWA in 1984. Section III of today's rule describes the treatment and/or recycling technologies that have been identified as BDAT for 20 of these listings and finalizes LDR treatment standards based on BDAT. Wastes included in today's rule include petroleum refining wastes (F037 and F038), wastes from the production of unsymmetrical dimethylhydrazine (K107-K110), wastes from the production of dinitrotoluene and toluenediamine (K111 and K112), wastes from the production of ethylene dibromide (K117, K118, and K136), wastes from the production of ethylenebisdithiocarbamic acid (K123-K126), wastes from the production of methyl bromide (K131 and K132), and several organic U wastes (U328, U353, and U359). Future proposals will include newly listed wastes not covered in today's rule. Soil contaminated with the newly listed wastes for which standards are finalized today will be addressed in a future proposal.

#### *B. Changes to Current Regulations*

The Agency is finalizing revisions to the existing treatment standards for organic constituents in F001-F005 wastes, involving conversion from TCLP standards to standards based on total concentrations. In addition, the Agency is finalizing the conversion of wastewater standards for 24 F and K waste codes based on wastewater treatment data for the constituents of concern.

EPA is also finalizing alternate treatment standards for F006 and K062, and is also extending the K061 generic exclusion published on August 19, 1991 (56 FR 41164) to certain F006 and K062 wastes. The generic exclusion levels have been slightly revised to reflect a somewhat different fate and transport model, the EPA Composite Model for Landfills (EPA CML).

EPA is also revising the notification and certification for prohibited characteristic wastes and clarifying existing rules regarding the status under part 268 of wastes listed solely because they exhibit a characteristic.

Finally, EPA is establishing a new waste management unit known as a containment building. EPA is indicating that containment buildings are not land disposal units, so that hazardous wastes may be managed in such units without first meeting treatment standards.

### C. Hazardous Debris

Debris contaminated with listed prohibited wastes is already subject to the LDR treatment standards for those wastes, as is debris exhibiting a hazardous waste characteristic for which EPA has promulgated treatment standards. Today, the Agency is revising the treatment standards for such debris. The Agency is also finalizing treatment standards for debris that is contaminated with those newly listed wastes for which standards are promulgated in this rule. This rule does not identify or list any debris as hazardous, and so does not bring any additional debris into the subtitle C management system. Only hazardous debris that is currently subject to subtitle C standards is covered by today's rule. The Agency is requiring hazardous debris to be treated prior to land disposal, using specific technologies from one or more of the following families of debris treatment technologies: Extraction, destruction, or immobilization. In the alternative, hazardous debris may continue to be handled in accordance with the Agency's contained-in policy, and so may be land disposed if it no longer "contains" a hazardous waste.

To ensure effective treatment of debris (i.e., treatment sufficient to constitute BDAT), treatment must be performed in accordance with specified performance standards (see new Table 1 in today's rule). The consequence of performing this treatment would be two-fold. Not only would the debris no longer be prohibited from land disposal, but EPA would consider the treated debris to no longer be or contain a hazardous waste provided a destruction or extraction technology is used for all debris types/contaminant combinations and provided that the treated debris does not exhibit any characteristic of hazardous waste. Such treated debris could, therefore, be reused, returned to the natural environment, or disposed of in a subtitle D facility.

Residuals generated from the treatment of debris contaminated with listed wastes would still be hazardous wastes by virtue of the derived-from rule and would be subject to the hazardous waste management system. The Agency is today requiring that residuals generated from the treatment of hazardous debris be subject to the numerical treatment standards for the wastes contaminating the debris. A detailed discussion is provided in section V.G.

Finally, the Agency considered and rejected proposing numerical standards for hazardous debris because of the

difficulty of sampling hazardous debris. However, based on numerous comments to the proposed rule, EPA is allowing people the option of treating debris to meet the existing treatment standards. Such debris would remain hazardous waste under the derived-from rule, unless delisted.

### III. Detailed Discussion of Final Rule: Newly Listed Wastes

Since the enactment of HSWA in 1984, EPA has promulgated a number of hazardous waste listings under 40 CFR part 261 subpart D and has expanded the number of wastes covered under 40 CFR part 261 subpart C. This section of today's rule describes the treatment and/or recycling technologies that have been identified as BDAT for 20 of these "newly listed" wastes. The Agency is finalizing treatment standards under 40 CFR 268.41, .42, and .43 for these wastes based on the transfer of performance data from treating other hazardous wastes that have been determined to be similar or more difficult to treat than these wastes.

This section does not, however, finalize treatment standards for the following newly identified or listed hazardous wastes: Those recently identified under the TC rule (D018-D043); characteristic wastes generated by mineral processing activities; spent potliners from aluminum manufacturing (K088); and listed wastes from wood preserving (F032, F034, and F035). These wastes, as well as wastes from coking operations and chlorotoluene production, will be addressed in subsequent Federal Register notices.

Before discussing these new treatment standards, the Agency wishes to clarify one point as to its methodology in establishing treatment standards. The Agency has explained in a number of past preambles that it accounts for treatment process variability in establishing treatment standards, and does so by applying a statistically derived variability factor to the mean concentration of constituent concentrations in treatment residues from the model BDAT technologies (see 55 FR 22539 as an example). This variability factor, EPA has explained, is derived through a quantitative procedure that determines the statistical 99th percentile for the treatment standard.

Some commenters have inferred from this explanation that the treatment standards can only be achieved 99 percent of the time even by properly operated treatment units. This is an incorrect inference, although EPA acknowledges that some of its preamble language has promoted this reading. In

fact, EPA expects the treatment standards to be achievable 100 percent of the time by properly operating facilities. Data points above the 99th percentile of the statistical model would in fact represent extreme departures from the mean and almost certainly reflect quality control problems in operation of the treatment technology. All of the data used in establishing treatment standards are actually much lower than 99th percentile values, as well as values in excess of that 99th percentile. (In addition, as EPA has already explained, for standards based on combustion technology, the technology routinely reduces waste concentrations to lower than detection values, yet the treatment standards nevertheless apply a variability factor to a numerical detection limit, resulting in treatment standards that are "greater than the achievable levels (which are at or below the detection limits) and should be easily met by a well-designed, well-operated incineration system."

#### A. Recent Petroleum Refining Wastes (F037 and F038)

F037—Any sludge generated from the gravitational separation of oil/water/solids during the storage or treatment of process wastewaters and oily cooling wastewaters from petroleum refineries. Such sludges include, but are not limited to, those generated in: Oil/water/solids separators; tanks and impoundments; ditches and other conveyances; sumps; and stormwater units receiving dry weather flow. Sludge generated in storm water units that do not receive dry weather flow, sludges generated from non-contact once-through cooling waters segregated for treatment from other process or oily cooling waters, sludges generated in aggressive biological treatment units as defined in 40 CFR § 261.31(b)(2) (including sludges generated in one or more additional units after wastewaters have been treated in aggressive biological treatment units) and K051 wastes are not included in this listing.

F038—Any sludge and/or float generated from the physical and/or chemical separation of oil/water/solids in process wastewaters and oily cooling wastewaters from wastewaters from petroleum refineries. Such wastes include, but are not limited to, all sludges and floats generated in: Induced air flotation (IAF) units, tanks and impoundments, and all sludges generated in DAF units. Sludges generated in storm water units that do not receive dry weather flow, sludges generated from non-contact once-through cooling waters segregated for treatment from other process or oily cooling waters, sludges and floats generated in aggressive biological treatment units as defined in § 261.31(b)(2) (including sludges and floats generated in one or more additional units after wastewaters have been treated in aggressive biological treatment units) and

F037, K048, and K051 wastes are not included in this listing

F037 and F038 are hazardous wastes generated by facilities in the petroleum refining industry. Detailed technical descriptions of the specific processes or operations that generate these two wastes can be found in 45 FR 74884, May 19, 1980; 55 FR 46354, November 2, 1990; 56 FR 21955, May 13, 1991; and the associated listing background document.

EPA is today promulgating treatment standards for F037 and F038; these standards are the same as those proposed on January 9, 1992 (57 FR 958). (The specific regulated constituents and treatment standards for these wastes are listed in the tables at the end of this section). Since EPA is promulgating concentration levels as the treatment standards for wastewater and nonwastewater forms of F037 and F038, any treatment technology capable of reaching the treatment standards can be used except for impermissible dilution.

EPA's rationale and technical details for promulgating today's treatment standards can be found later in this section of the preamble and in the Final BDAT Background Document for F037 and F038. However, in summary, commenters to the January 9, 1992, proposal generally concurred with EPA's assertion that F037 and F038 have similar treatment characteristics to those of K051 and K048 (as well as other petroleum wastes). Most commenters also supported the transfer of available K048-K052 performance data from K048 to F038 and from K051 and K049 to F037. In fact, new data submitted to EPA in response to the May 30, 1991, Advance Notice of Proposed Rulemaking (ANPRM) and the January 9, 1992, proposal corroborates EPA's transferring of existing K048-K052 performance data to F037 and F038. These new data show that there are other technologies in addition to incineration and solvent extraction that are capable of achieving the treatment standards for the regulated constituents of concern in petroleum wastes believed as difficult to treat as F037 and F038.

The majority of commenters also supported EPA's proposal for regulating the same constituents in F037 and F038 that are regulated in K051 and K048. These commenters agreed with EPA that adoption of the proposal should reduce the administrative requirements and compliance efforts required for the petroleum wastes.

#### 1. Regulated Constituents

EPA proposed regulating up to 18 BDAT List hazardous constituents that are known to be present in wastewater

or non-wastewater forms of F037 or F038 as well as additional hazardous constituents likely to be present in F037 and F038 because they are known to be present in K048 and K051. (See discussion in January 9, 1992, proposed rule, 57 FR 962.)

One commenter who generates petroleum wastes such as API and DAF sludges, submitted data characterizing "four K sludges and five potential refinery F waste sludges from five surface impoundments." The commenter believes that these data do not support the inclusion of most of the constituents of concern associated with the LDRs.

EPA is not persuaded to change its proposed approach. The fact that the commenter's presumably untreated K or F sludges do not show certain constituents at or above detection levels should not be construed as an indication that those undetected constituents were absent. EPA's treatment studies on petroleum wastes have shown, in fact, that it is not unusual for hazardous constituents to go undetected in untreated wastes due to analytic matrix interferences and, later on, be measured in the treated wastes when the interferences are removed by treatment. In addition, several members of the regulated community responding to the ANPRM of May 30, 1991, commented that F037 and F038 wastes are likely to show variabilities in chemical and physical composition and in the treatment characteristics for the same K or F wastes from one refinery to another.

EPA is therefore promulgating treatment standards for all those constituents proposed for regulation. Regulating the same constituents present in K048 and K051 should reduce the administrative requirements and compliance efforts for all of these petroleum wastes. (See Response to Technical Comments Background Document for additional discussion.)

#### 2. Treatment Standards for Wastewaters

EPA proposed to transfer the treatment standards for organics in wastewater forms of F037 and F038 from the F039 wastewater treatment standards (multi-source leachate). These F039 wastewater treatment standards were also proposed as a revision to K048 and K051. All commenters supported this proposal. As a result, EPA is promulgating these wastewater treatment standards for F037 and F038.

For metals in wastewater forms of F037 and F038, the treatment standards are based on chromium reduction followed by lime and sulfide precipitation and vacuum filtration. For cyanides in wastewater forms of F037

and F038, the treatment standards are based on incineration. Levels of cyanide were measured; in fact, in K048 incineration scrubber waters. EPA does not expect any constituents in F037 and F038 to interfere or behave differently from those constituents in K048-K052 or from the other wastes from which performance data were transferred.

#### 3. Treatment Standards for Nonwastewaters

EPA is promulgating the treatment standards for F037 and F038 nonwastewaters that were proposed. In particular, the treatment standards proposed for the metals in nonwastewater forms of F037 and F038 were based on stabilization of K048-K052 solvent extraction residuals; thus, these standards are set as concentrations measured in waste extracts (as measured by the TCLP). Similarly, EPA proposed for cyanide in nonwastewater forms of F037 and F038 treatment standards based on incineration of K048 and K051. Owing to the similarities in waste composition of F037 and F038 to K048-K052, stabilization is considered BDAT for the metals in F037 and F038 nonwastewaters and incineration is considered BDAT for cyanide in F037 and F038 nonwastewaters.

The proposed treatment standards for the organics in nonwastewater forms of F037 and F038 were based on the incineration and solvent extraction of K048-K052. Owing to the similarities in waste composition of F037 and F038 to K048-K052, EPA has determined that incineration and solvent extraction are also BDAT for F037 and F038. The majority of the commenters supported this determination by EPA. In doing so, EPA is applying the same approach as used to develop treatment standards for the K048-K052 wastes in the Third Third rule. In essence, allowing somewhat more lenient treatment standards than those based on performance of incineration alone, which standards nevertheless result in substantial reductions in waste toxicity and also allow for hydrocarbon recovery, furthering statutory resource recovery objectives.

EPA's modified methodology of June 1, 1990, incorporates protocols that take into account several concerns that were expressed by members of the regulated community and hazardous waste treatment industry at that time with regard to the use and the applicability of hydrocarbon recovery technologies for the whole spectrum of petroleum refining wastes. EPA also adopted the modified statistical analysis for

determining which technology performs best so as not to preclude the use of one or more hydrocarbon recovery technologies that can significantly reduce levels of toxic organics in these wastes, and also recover some of the wastes' hydrocarbon values.

After evaluating comments on the Third Third proposal, EPA determined that it was appropriate to promulgate treatment standards based on both incineration and hydrocarbon recovery technologies. EPA concluded further that although treatment standards based on solvent extraction may be somewhat higher (i.e., less stringent) than those based on incineration, solvent extraction was still providing substantial treatment to the organics of concern. In addition, EPA determined that solvent extraction provided the benefit of recovering valuable oil, and this benefit could also be provided by other available hydrocarbon recovery technologies such as thermal distillation. (See 55 FR 22596, June 1, 1990). This same reasoning applies to the F037/F038 wastes that are the subject of today's rule.

#### 4. Response to Major Comments

The Agency is responding in this preamble to a number of the major comments received in response to the January 9, 1992, proposal. The major issues raised and addressed in this section are:

- Grab versus Composite Samples.
- Must the Treatment Standards for Nonwastewater Organics be More Stringent?

Other comments received by the Agency, including the review of new performance data, are addressed by the Agency in the Response to Technical Comments Background Document that is available in the docket associated with this rulemaking.

a. *Grab versus Composite Samples.* The American Petroleum Institute (API) and the National Petroleum Refiners Association (NPRA) are both trade associations that represent most members of the petroleum refining regulated community. API and NPRA support EPA's proposed treatment standards for the organics in wastewater forms of F037 and F038. Since the majority of the treatment performance data are based on composite samples from wastewater treatment processes, API and NPRA urged the Agency to enforce the applicable treatment standards for wastewater forms based on composite samples and not on grab samples.

EPA in fact, enforces treatment standards based on the sampling analysis protocol used (i.e., grab or

composite) to support promulgation of the standard, §§ 268.41(a), 268.43(a). EPA's proposal mistakenly stated in the preamble tables that enforcement of these wastewater treatment standards would be based solely on grab samples for all the regulated constituents. EPA is correcting this error in the final rule. (See 268.41 and 268.43).

b. *Should the Treatment Standards for Nonwastewater Organics be More Stringent?* TDI Thermal Dynamics (formerly Southdown Thermal Dynamics) resubmitted comments on a thermal process that enables the recovery of valuable organics from petroleum wastes while reducing the volume of wastes needing land disposal. TDI's data are based on the treatment of K048, K049, and K051 by a thermal distillation patented process referred to by the commenter as "HT-5 Process." TDI's data show that all the proposed organic treatment standards can be achieved, indeed, potentially surpassed, through use of this technology.

Another treatment company, Retec, also submitted comments in support of the proposed treatment standards. Retec's comments include performance data from an "8,000 gallon prototype unit" and some "field data" that have treated sludges of K048, K050, K051, F037, and F038 by biological treatment. Retec refers to its biological treatment process as the "bioslurry process." These data show that most of the constituents of concern can be treated to achieve (or, in some cases, surpass) the treatment standards.

The two commenters' ultimate point is that their technologies remove more toxics than the proposed levels and should therefore be the basis for the promulgated standards.

Comments submitted by TDI and the Natural Resources Defense Council (NRDC) also state that EPA's proposed F037 and F038 treatment standards are not protective of human health and the environment and so do not satisfy the RCRA section 3004(m) criteria requiring substantial reduction in the toxicity of the waste so that threats to human health and the environment are minimized. TDI believes, in fact, that their "HT-5 Process", the CF Systems' five-path process, and fluidized incineration meet the 3004(m) criteria and that data from these three processes should support promulgation of more stringent standards. TDI and NRDC also urged EPA to promulgate treatment standards that are pursuant to EPA's protocols to establish "best" treatment and that conform to Congressional intent in section 3004(m).

EPA has reviewed comments from TDI and NRDC. Based on this review,

EPA is not persuaded to promulgate more stringent standards. EPA also believes (contrary to TDI's and NRDC's positions) that today's promulgated treatment standards provide substantial treatment of F037 and F038 wastes.

First, EPA is not persuaded by NRDC's comments that, by setting treatment standards for F037 and F038 based on "less effective treatment technologies such as incineration (and solvent extraction), (EPA) may diminish the market and the availability of HT-5 for mixed wastes." Even if this were a relevant consideration, which it most likely is not, today's promulgated treatment standards are expressed as a concentration-based level for all of the (organic) constituents regulated in nonwastewater forms of F037 and F038. EPA has clearly emphasized that today's standards do not preclude the use of other treatment or recovery technologies.

The actual issue is whether the statute requires that technology-based treatment standards be optimized, i.e., be technology-forcing, in all cases (always assuming that the jurisdictional minimize threat level is not yet reached), or whether treatment that results in substantial reduction of waste toxicity is sufficient.

Technology-based treatment standards are permissible as a means of achieving the statutory objective of treatment that minimizes threats given the current uncertainty in determining what that level is (see 55 FR 6641, February 26, 1990) and *HWTC v. EPA*, 886 F. 2d 355, 362 (D.C. Cir. 1989). (However, technology standards are not the only means to achieve the statutory objectives. For example, the Agency recently proposed concentration levels that could serve as "minimize threat levels", which could require modification of a purely technology-based approach to establishing treatment standards (57 FR 21450, May 20, 1992.)) However, these technology-based standards need not be technology forcing. Rather, the Agency has stated that treatment standards are to be based on the use of available technologies that are capable of substantially reducing the threats that the wastes may pose when they are land disposed (55 FR 6641).

The legislative history confirms that Congress did not necessarily envision section 3004(m) treatment standards to be technology-forcing, such as these the commenters advocate. Rather, such standards were intended to require the use of generally available effective types of treatment (see 125 Cong. Rec. S9178, July 25, 1984, statement of Senator Chaffee introducing the

amendment that became section 3004 (m)):

The requisite levels [or] methods of treatment established by the Agency should be the best that has [sic] been demonstrated to be available. This does not require a BAT-type process as under the Clean Air or Clean Water Acts which contemplates technology-forcing standards. The intent here is to require utilization of available technologies in lieu of continued land disposal without prior treatment. (Congressional Record of July 25, 1984, S9178).

Thus, standards based on use of "best" treatment technologies need not be limited to optimally performing treatment (as under the Clean Water Act), but include available types of treatment that substantially reduce wastes' toxicity and short-term and long-term threats the wastes could pose when land disposed.

In light of this legislative intent, and the fact that BDAT for F037 and F038 wastes is based on the performance of two commercially available treatment technologies that provide substantial treatment to petroleum wastes that are as difficult to treat as F037 and F038, EPA believes that the BDAT Methodology adopted in this rulemaking is justified and allowed under 3004(m). Detailed discussions of EPA's data analysis and rationale can be further found in the Final BDAT Background Document for F037 and F038.

TDI also argued that EPA's approach is inconsistent with the Agency's own promulgated methodology for establishing treatment standards. To some extent, this argument reprises the point just addressed. (For example, the commenter's point that use of Analysis of Variability protocols show that performance of its technology to be superior really raises the further question of whether treatment standards must therefore be based on performance of that technology). In any case, EPA used the same revised methodology it adopted in developing the treatment standards for K048-K052 wastes in the Third Third rule.

TDI submitted comments regarding EPA's Methodology and Protocols for Developing BDAT Treatment Standards for F037/F038 wastes. TDI disputes EPA's evaluation of their performance data and, in particular, EPA's determination of the proposed treatment standards for organics in nonwastewater forms of F037 and F038. TDI submitted a report entitled Analysis of U.S. EPA's Proposed Land Disposal Restrictions for F037 and F038 Newly Listed Petroleum Refining Wastes. On the basis of this report, TDI believes EPA has violated its own "standard protocol procedures", and, after

reanalyzing all the performance data, TDI urged EPA to withdraw the proposed treatment standards. TDI's comments (and TDI's technical report) seem to indicate that TDI analyzed the F037 and F038 proposal's performance data based on EPA's protocols and statistical procedures found in the Final Best Demonstrated Available Technology (BDAT) Background Document for Quality Assurance/Quality Control Procedures and Methodology of October 23, 1991. TDI reviewed the available performance data based on analyses and methodologies that EPA employs when developing treatment standards that are based on destruction or immobilization treatment technologies.

However, the QA/QC document clearly states that when EPA identifies the potential for developing treatment standards based on recovery or recycling technologies, EPA may choose to modify its methodology in developing BDAT treatment standards (EPA also used modified methodologies in the promulgation of amended organic treatment standards for K048-K052, in the Third Third final rule, and the recent final rule for K061, High Zinc Subcategory nonwastewaters. A brief description of each of EPA's modified approaches is presented in the October 23, 1991, document (see pp. 3-12-3-17, of the October 23, 1991, Quality Assurance/Quality Control Document)). This is exactly what EPA is doing here; see the Proposed BDAT Background Document for F037 and F038 for the explanation.

**BDAT TREATMENT STANDARDS FOR F037**

[Nonwastewaters]	
Regulated constituent	Maximum for any single grab sample—Total composition (mg/kg)
Anthracene.....	26
Benzene.....	14
Benzo(a)anthracene.....	20
Benzo(a)pyrene.....	12
Bis(2-ethylhexyl)phthalate.....	7.3
Chrysene.....	15
Di-n-butyl phthalate.....	3.6
Ethylbenzene.....	14
Naphthalene.....	42
Phenanthrene.....	34
Phenol.....	3.6
Pyrene.....	36
Toluene.....	14
Xylenes (total).....	22
Cyanides (total).....	1.8

**BDAT TREATMENT STANDARDS FOR F037—Continued**

[Nonwastewaters]

Regulated constituent	Maximum for any single grab sample—Total composition (mg/kg)
Regulated constituent	Maximum for any single grab sample—TCLP (mg/l)
Chromium (total)	1.7
Nickel.....	0.20

**BDAT TREATMENT STANDARDS FOR F037**

[Wastewaters]

Regulated constituent	Maximum for any 24 composite sample—Total composition (mg/l)
Acenaphthene.....	0.059
Anthracene.....	0.14
Benzene.....	0.14
Benzo(a)anthracene.....	0.059
Benzo(a)pyrene.....	0.061
Bis(2-ethylhexyl)phthalate.....	0.26
Chrysene.....	0.059
Di-n-butyl phthalate.....	0.057
Ethylbenzene.....	0.057
Fluorene.....	0.059
Naphthalene.....	0.059
Phenanthrene.....	0.059
Phenol.....	0.039
Pyrene.....	0.067
Toluene.....	0.060
Xylenes (total).....	0.32

Regulated constituent	Maximum for any single grab sample—Total composition (mg/l)
Cyanides (total)	0.028
Chromium (total)	0.20
Lead.....	0.037

**BDAT TREATMENT STANDARDS FOR F038**

[Nonwastewaters]

Regulated constituent	Maximum for any single grab sample—Total composition (mg/kg)
Benzene.....	14
Benzo(a)pyrene.....	12
Bis(2-ethylhexyl)phthalate.....	7.3
Chrysene.....	15
Di-n-butyl phthalate.....	3.6
Ethylbenzene.....	14
Naphthalene.....	42
Phenanthrene.....	34

**BDAT TREATMENT STANDARDS FOR F038—Continued**

(Nonwastewaters)

Regulated constituent	Maximum for any single grab sample—Total composition (mg/kg)
Phenol.....	3.6
Pyrene.....	36
Toluene.....	14
Xylenes (total).....	22
Cyanide (total).....	1.8
Regulated constituent	Maximum for any single grab sample—TCLP (mg/l)
Chromium (total)	1.7
Nickel.....	0.20

**BDAT TREATMENT STANDARDS FOR F038**

(Wastewaters)

Regulated constituent	Maximum for any 24 composite sample—Total composition (mg/l)
Benzene.....	0.14
Benzo(a)pyrene.....	0.061
Bis(2-ethylhexyl)phthalate.....	0.28
Chrysene.....	0.059
Di-n-butyl phthalate.....	0.057
Ethylbenzene.....	0.059
Fluorene.....	0.059
Naphthalene.....	0.059
Phenanthrene.....	0.039
Phenol.....	0.067
Pyrene.....	0.080
Toluene.....	0.32
Xylenes (total).....	0.32
Regulated constituent	Maximum for any single grab sample—Total composition (mg/l)
Cyanides (total)	0.026
Chromium (total).....	0.20
Lead.....	0.037

**B. Wastes from the Production of Unsymmetrical**

Dimethylhydrazine (K107, K108, K109, and K110)

**K107**—Column bottoms from product separation from the production of 1,1-dimethylhydrazine from carboxylic acid hydrazides

**K108**—Condensed column overheads from product separation and condensed reactor vent gases from the production of 1,1-dimethylhydrazides from carboxylic acid hydrazine

**K109**—Spent filter cartridges from product purification from the production of 1,1-dimethylhydrazides from carboxylic acid intermediates

**K110**—Condensed column overheads from intermediate separation from the production of 1,1-dimethylhydrazine from carboxylic acid hydrazide intermediates

EPA proposed on January 9, 1992 (57 FR 965) to establish treatment standards for these wastes expressed as required methods of treatment. As was discussed in the preamble to the proposed rule, these wastes are being regulated despite the fact that EPA is not aware of facilities generating them. For nonwastewater forms of these wastes, the required method of treatment was incineration. For wastewater forms, the required methods of treatment were incineration or, alternatively, chemical oxidation followed by carbon adsorption. The basis for expressing the proposed treatment standards as required methods of treatment was that these wastes are relatively unstable in water resulting in difficulties in accurate quantification in treatment residues. (See 57 FR 965.)

The wastewater standards promulgated today for these wastes differ from the proposed standards in that EPA is adding biodegradation followed by carbon adsorption, (BIODEG fb CARBN) to the methods designated as method-of-treatment standards for K107–K110 wastewaters in tables 1 and 2 of 40 CFR 268.42. The Agency is adding this standard to be consistent with other sections of this rulemaking, where in response to comments supporting the use of biodegradation as an alternative method of treatment, the Agency is promulgating biological treatment as equivalent to chemical oxidation. The Agency is including biodegradation plus carbon adsorption for these hydrazine wastes based on hydrolysis data indicating that hydrazines break down rapidly in water.

The definition of BIODEG as a technology-based standard for listed wastewaters calls for operating the unit such that "a surrogate compound or indicator parameter has been substantially reduced in concentration in the residuals." EPA believes that this provision allows permitting and compliance authorities enough control over the BIODEG unit so that biodegradation can be designated BDAT for these wastes, which are known to hydrolyze rapidly to compounds amenable to biological degradation.

EPA received no comments on its proposed treatment standards for the nonwastewater forms of these wastes. Therefore, the Agency is promulgating the treatment standards for K107–K110

nonwastewaters as proposed: incineration (INCIN) as a method of treatment.

**C. 2-Ethoxyethanol Wastes (U359)**

EPA is promulgating methods of treatment for 2-ethoxyethanol wastes (U359), whose generation and characteristics are described in the proposed rule preamble (57 FR 968). The promulgated standards differ somewhat from the proposed standards; first, EPA is adding biodegradation followed by carbon adsorption, (BIODEG fb CARBN) to the methods designated as method-of-treatment standards for U359 wastewaters in Tables 1 and 2 of 40 CFR 268.42. The proposed wastewater treatment standard was incineration or chemical oxidation followed by biological treatment or carbon adsorption. Second, EPA is promulgating also fuel substitution (FSUBS) as an alternative standard to incineration (INCIN) for U359 nonwastewaters. (See 57 FR 969.)

EPA had proposed methods-of-treatment as standards, rather than concentration-based numerical standards, because this waste is relatively unstable in water, resulting in difficulties in accurate quantification in treatment residuals. Several commenters, however, requested that the Agency set concentration-based standards for 2-ethoxyethanol wastes and suggested several innovative analytical methods to quantify 2-ethoxyethanol. EPA acknowledges that 2-ethoxyethanol can be quantified by direct injection methods (i.e. those not requiring a purge step in the analytical procedure). EPA is, nevertheless, promulgating methods of treatment as standards because EPA has only limited treatability data for 2-ethoxyethanol to serve as a basis for calculating numerical treatment standards. EPA's decision to change the wastewater standards to include biodegradation followed by activated carbon adsorption is consistent with the revision in this rule of the K107–K110 wastewater standards allowing BIODEG as a method-of-treatment based on the waste components' extreme instability in water.

The definition of BIODEG as a technology-based standard for listed wastewaters calls for operating the unit such that "a surrogate compound or indicator parameter has been substantially reduced in concentration in the residuals." EPA believes that this provision allows permitting and compliance authorities adequate control over the BIODEG unit so that biodegradation can be designated BDAT

for these wastes since 2-ethoxyethanol is known to hydrolyze rapidly to ethanol, which is known to be amenable to biological treatment.

EPA is promulgating incineration (INCIN) as a method-of-treatment standard for U359 nonwastewaters as proposed, but is also including fuel substitution (FSUBS) as an alternative. EPA is adding FSUBS because 2-ethoxyethanol is a readily oxidizable carbon, hydrogen, and oxygen compound that will not release undesirable combustion products such as halogen acids, nitrogen, or sulfur dioxides.

**D. Wastes From the Production of Dinitrotoluene and Toluenediamine (K111 and K112, U328 and U353)**

**K111**—Product wash waters from the production of dinitrotoluene via nitration of toluene

**K112**—Reaction byproducts from the drying column in the production of toluenediamine via hydrogenation of dinitrotoluene

**U328**—Ortho-toluidine

**U353**—Para-toluidine

EPA proposed on January 9, 1992, to establish treatment standards for these wastes expressed as required methods of treatment. The proposed rule discussed the generation and characteristics of these wastes in greater detail (57 FR 965). For nonwastewater forms of these wastes, the required method of treatment was incineration. For wastewater forms, the required methods of treatment were incineration or, alternatively, chemical oxidation followed by carbon adsorption. The basis for expressing the proposed treatment standards as required methods of treatment was that many constituents of these wastes are relatively unstable in water resulting in difficulties in accurate quantification in treatment residues. (See 57 FR 965)

The Agency is finalizing the proposed standards with two substantive changes for K111, K112, U328, and U353: First, EPA is replacing the proposed methods-of-treatment standards for K111 wastewaters and nonwastewaters with concentration-based standards numerically equal to the F039 standards for 2,4-dinitrotoluene and 2,6-dinitrotoluene. Second, EPA is adding biodegradation followed by carbon adsorption (BIODEG fb CARBN) to the methods of treatment specified as treatment standards for K112, U328, and U353 wastewaters in Tables 1 and 2 of 40 CFR 268.42.

In particular, data from one commenter indicated that the concentrations of 2,4-dinitrotoluene and 2,6-dinitrotoluene in K111 wastewaters and nonwastewaters are sufficiently

high such that treating the K111 wastes to the F039 treatment standards for these constituents should be an acceptable surrogate to ensure that the other constituents are treated to acceptably low levels.

The other constituents include nitroresols, nitrophenols, and nitrobenzoic acid; since reliable analytical methods are not available to quantify these constituents in waste matrices, the Agency will not set concentration-based treatment standards for them. By setting concentration-based standards for the quantifiable components of K111 wastewaters and nonwastewaters, EPA is allowing the use of any treatment system (other than impermissible dilution) that meet these numbers for the dinitrotoluenes.

Data from this same commenter also indicated that biological treatment can achieve significant reductions in the concentration of toluenediamines in K112 wastewater streams. Based on the commenter's data demonstrating substantial reductions in K112 wastewater toluenediamine concentrations in the course of biological treatment, EPA is adding biodegradation (BIODEG) to the set of methods-of-treatment designated as treatment standards for K112 wastewaters.

EPA believes, in addition, that o-toluidine and p-toluidine, the listing components of U328 and U359, are sufficiently chemically similar to toluenediamines that the treatment standards for K112 should also apply to U328 and U359 wastes. EPA is, therefore, including BIODEG among the methods-of-treatment standards promulgated for U328 and U359 wastewaters.

The definition of BIODEG as a technology-based standard for listed wastewaters calls for operating the unit such that "a surrogate compound or indicator parameter has been substantially reduced in concentration in the residuals." EPA believes that this provision allows permitting and compliance authorities adequate control over the BIODEG unit so that biodegradation can be designated BDAT for these wastes, which have been documented to amenable to biological treatment.

EPA is promulgating treatment standards for K112, U328 and U359 nonwastewaters as proposed: incineration (INCIN) as a method of treatment.

**BDAT TREATMENT STANDARDS FOR K111**

[Nonwastewaters]

Regulated constituent	Maximum for any single grab sample—Total composition (mg/kg)
2,4-Dinitrotoluene.....	140
2,6-Dinitrotoluene.....	26

**BDAT TREATMENT STANDARDS FOR K111**

[Wastewaters]

Regulated constituent	Maximum for any single grab sample—Total composition (mg/l)
2,4-Dinitrotoluene.....	0.32
2,6-Dinitrotoluene.....	0.55

**E. Wastes From the Production of Ethylene Dibromide (K117, K118 and K136) and Wastes From the Production of Methyl Bromide (K131 and K132)**

**K117**—Wastewater production from the reactor vent gas scrubber in the production of ethylene dibromide via bromination of ethylene.

**K118**—Spent adsorbent solids from purification of ethylene dibromide via bromination of ethylene dibromide via bromination of ethylene.

**K136**—Still bottoms from the purification of ethylene dibromide in the production of ethylene dibromide via bromination of ethylene.

**K131**—Wastewater from the reactor and spent sulfuric acid from the acid dryer from the production of methyl bromide.

**K132**—Spent adsorbent and wastewater separator solids from the production of methyl bromide.

With one exception, today's rule promulgates the treatment standards for ethylene dibromide wastes (K117, K118 and K136) and methyl bromide wastes (K131 and K132) that the Agency proposed in the January 9, 1992 proposed rule, where it discussed the generation and characteristics of these wastes (57 FR 966-967). These are concentration-based standards numerically equal to the F039 standards for the constituents of these wastes; the BDAT Background Document for U and P Wastes and Multi-Source Leachate (F039) (volumes A and C) describes how each standard was calculated. The nonwastewater standards (volume C) are based on the results of a series of incineration tests performed by the Agency in the course of developing treatment standards for earlier land disposal restrictions rulemakings. The wastewater standards (volume A) are based on data collected by EPA's Office



of Water and Office of Research and Development and reflect a variety of industrial wastewater technologies. Technologies used to develop the wastewater numbers promulgated here include steam stripping, activated sludge, and air stripping.

The one change that EPA is making is as follows: EPA proposed treatment standards for "1,1,2-tribromomethane" in the January 9, 1992, notice (57 FR 996 and 997). (This was a misprint for 1,1,2-tribromoethane, a constituent present in the ethylene dibromide process waste stream K118). At the time of the proposed rule, EPA was considering adding 1,1,2-tribromoethane to its BDAT List of constituents known to be amenable to quantification in waste matrices with existing SW-846 methods. EPA has since decided not to add 1,1,2-tribromoethane to the BDAT List and is consequently not promulgating treatment standards for this compound.

As a result of soliciting data on the proposed standards in the May 30, 1991, Advance Notice of Proposed Rulemaking and then in the January 9, 1992, Proposed Rule, EPA received comments from the two facilities believed to generate all of these waste streams. Both supported the use of steam stripping for treating brominated wastewaters. One of the two commenters submitted data characterizing the results of steam stripping groundwater that had become contaminated with ethylene dibromide and several other brominated and chlorinated compounds. Because these data did not clearly identify corresponding influent and effluent streams, they could not be used to evaluate the performance of the system in terms of contaminant removal.

This commenter also endorsed the incineration-based numerical treatment standards for nonwastewater forms of these wastes. A second commenter objected, however, to the incineration-based nonwastewater standards. In particular, the commenter claimed that bromine forms corrosive hydrogen bromide in incinerator combustion chambers. This commenter, the sole generator of K118, reported difficulties in incinerating a batch of K118 nonwastewater at a commercial facility and requested that EPA base all treatment standards for organobromine wastes on steam stripping.

The Agency acknowledges that there may be difficulties in incinerating brominated wastes (even though one commenter explicitly endorses incineration-based standards for K117, K118, K131, and K132 nonwastewaters). In the absence of performance data on an alternative process for

nonwastewaters, EPA is promulgating the incineration-based nonwastewater standards that were originally proposed. Steam stripping, and any other forms of waste treatment other than impermissible dilution, may also be used to achieve the numerical treatment standards regardless of which technology served as the basis of the standards. Furthermore, the regulated community has options, including applying for treatability or capacity variances, for overcoming technical difficulties in treating especially problematic batches of wastes.

**BDAT TREATMENT STANDARDS FOR K117, K118, AND K136**

[Nonwastewaters]

Regulated constituent	Maximum for any single grab sample—Total composition (mg/kg)
Ethylene dibromide .....	15.0
Bromomethane .....	15.0
Chloroform .....	5.6

**BDAT TREATMENT STANDARDS FOR K117, K118, AND K136**

[Wastewaters]

Regulated constituent	Maximum for any single grab sample—Total composition (mg/l)
Ethylene dibromide .....	0.028
Bromomethane .....	0.11
Chloroform .....	0.046

**BDAT TREATMENT STANDARDS FOR K131 AND K132**

[Nonwastewaters]

Regulated constituent	Maximum for any single grab sample—Total composition (mg/kg)
Bromomethane (methyl bromide) ....	15

**BDAT TREATMENT STANDARDS FOR K131 AND K132**

[Wastewaters]

Regulated constituent	Maximum for any single grab sample—Total composition (mg/l)
Bromomethane (methyl bromide) ....	0.11

**F. Wastes From the Production of Ethylenebisdithiocarbamic Acid (K123, K124, K125, and K126)**

K123—Process wastewater (including supernatants, filtrates and wash waters) from the production of ethylenebisdithiocarbamic acid and its salts.

K124—Reactor vent scrubber water from the production of ethylenebisdithiocarbamic acid and its salts.

K125—Purification solids (including filtration, evaporation and centrifugation solids) from the production of ethylenebisdithiocarbamic acid and its salts.

K126—Baghouse dust and floor sweepings in milling and packaging operations from the production of ethylenebisdithiocarbamic acid and its salts.

EPA is promulgating the treatment standards as proposed for ethylenebisdithiocarbamic acid wastes (EDBC) (K123–K126). The preamble in the proposed rule describes the generation and characteristics of these wastes in greater detail (57 FR 967). The Agency proposed incineration (INCIN) as a method of treatment as the treatment standard for K123–K126 nonwastewaters and incineration or chemical oxidation followed by biological treatment or carbon adsorption (INCIN or CHOXD) for K123–K126 wastewaters. EPA received no comments challenging these treatment standards.

Although EPA is expanding the set of methods of treatment as standards to include BIODEG by itself for the methyl hydrazine wastes K107–K110, the toluenediamine waste K112, the toluidine wastes U328 and U353, and 2-ethoxyethanol U359, EPA is not adding BIODEG alone to the set of methods of treatment for the EDBC wastewaters. For each of the cases where EPA is today adding BIODEG to the list of promulgated methods of treatment as standards, EPA has either treatability data documenting successful treatment of these wastes or their close analogues in a biological unit or data demonstrating that these wastes readily hydrolyze to simple, relatively nontoxic compounds known to be readily amenable to biological degradation. In the absence of any such data about EDBC waste amenability to hydrolysis or biodegradation, EPA chooses not to include BIODEG as a primary method of treatment for EDBC wastewaters.

#### IV. Detailed Discussion of Final Rule: Changes to Existing Regulations

##### A. Revisions to the F001-F005 Spent Solvents Treatment Standards

**F001**—The following spent halogenated solvents used in degreasing: Tetrachloroethylene, trichloroethylene, methylene chloride, 1,1,1-trichloroethane, carbon tetrachloride, and chlorinated fluorocarbons; all spent solvent mixtures/blends used in degreasing containing, before use, a total of 10 percent or more (by volume) of one or more of the above halogenated solvents or those solvents listed in F002, F004, and F005 and still bottoms from the recovery of these spent solvents and spent solvent mixtures.

**F002**—The following spent halogenated solvents: Tetrachloroethylene, methylene chloride, trichloroethylene, 1,1,1-trichloroethane, chlorobenzene, 1,1,2-trichloro-1,2,2-trifluoroethane, ortho-dichlorobenzene, trichlorofluoromethane, and 1,1,2-trichloroethane; all spent solvent mixtures/blends containing, before use, a total of 10 percent or more of the above halogenated solvents or those listed in F001, F004, or F005; and still bottoms from the recovery of these spent solvents and spent solvent mixtures.

**F003**—The following spent nonhalogenated solvents: Xylene, acetone, ethyl acetate, ethyl benzene, ethyl ether, methyl isobutyl ketone, n-butyl alcohol, cyclohexanone, and methanol; all spent solvent mixtures/blends containing, before use, only the above spent nonhalogenated solvents; and all spent solvent mixtures/blends containing, before use, one or more of the above nonhalogenated solvents, and a total of 10 percent or more (by volume) of one or more of those solvents listed in F001, F002, F004, and F005; and still bottoms from the recovery of these spent solvents and spent solvent mixtures.

**F004**—The following spent nonhalogenated solvents: Cresol and cresylic acid and nitrobenzene; all spent solvent mixtures/blends containing, before use, a total of 10 percent or more (by volume) of one or more of the above nonhalogenated solvents or those solvents listed in F001, F002, and F005; and still bottoms from the recovery of these spent solvents and spent solvent mixtures.

**F005**—The following spent nonhalogenated solvents: Toluene, methyl ethyl ketone, carbon disulfide, isobutanol, pyridine, benzene, 2-ethoxyethanol, and 2-nitropropane; all spent solvent mixtures/blends containing, before use, a total of 10 percent or more (by volume) of one or more of the above nonhalogenated solvents or those solvents listed in F001, F002, or F004; and still bottoms from the recovery of these spent solvents and spent solvent mixtures.

The Agency is promulgating revised treatment standards for solvent wastewaters of F001-F005 wastes as proposed in the January 9, 1992 notice (57 FR 969-971).

##### 1. Regulatory Background

a. *Listing Definitions.* On May 19, 1980 (45 FR 33119), the Environmental Protection Agency (EPA) listed 26 commonly used organic solvents as hazardous wastes when spent or discarded. The solvents were listed as EPA Hazardous Waste Nos. F001, F002, F003, F004, and F005. These listed wastes included certain spent halogenated and nonhalogenated solvents, including still bottoms from the recovery of these solvents.

On December 31, 1985 (50 FR 53315), the Agency promulgated an amendment to the listings to include mixtures containing a total of 10 percent or more (by volume) of one or more of the listed solvents (the 10 percent threshold always applied to solvent mixtures before use). The Agency believed that establishing a threshold level below the minimum solvent concentration typically used in solvent formulations would bring the majority of solvent mixtures used in commerce into the hazardous waste management system, while excluding dilute mixtures. The Agency also clarified in the December 31, 1985, *Federal Register* (50 FR 53315), that the listings cover only those solvents that are used for their "solvent" properties, i.e., to solubilize (dissolve) or mobilize other constituents. Manufacturing process wastes where solvents were used as reactants or ingredients in the formulation of commercial chemical products are not covered by the listing.

The definition of the spent solvents listing did not include four solvents that were added to the F001-F005 listing on February 25, 1988 (51 FR 40607): Benzene, 2-ethoxyethanol, 2-nitropropane, and 1,1,2-trichloroethane.

b. *F001-F005 Treatment Standards.* The Agency promulgated treatment standards for the F001-F005 spent solvent wastes on November 7, 1988 (51 FR 40593). The Agency also promulgated a requirement that compliance with the treatment standard be measured in the waste extract as measured by the Toxicity Characteristic Leaching Procedure (TCLP).

This approach was taken because useful data were not available on total constituent concentrations in treated residuals, and as a result, the TCLP data were considered to be the best measure of performance.

Since that time EPA has based treatment standards for all organic constituents on the total constituent concentration analysis found in the treated waste. EPA has based this decision on the fact that the best demonstrated available treatment

(BDAT) for organic wastes generally destroy the hazardous organic constituents. Accordingly, treatment should reflect the extent to which the various organic compounds have been destroyed or the total amount of constituent remaining after treatment.

c. *Methylene Chloride Standard Revised.* As part of the First Third Rule, the Agency revised and promulgated the treatment standard for methylene chloride in F001-F005 wastewaters from the pharmaceutical industry (53 FR 31152). The revised treatment standard was based on the transfer of wastewater treatment data from steam stripping of methylene chloride. Compliance with this treatment standard is measured by a total constituent analysis.

d. *Setting Treatment Standards for Four (4) "Newly Listed" Constituents (51 FR 6737, February 25, 1986).* In the Third Third rule (55 FR 22576), the Agency promulgated treatment standards for 1,1,2-trichloroethane, benzene, 2-ethoxyethanol, and 2-nitropropane in F002 and F005 spent solvents. (EPA did not amend the previously promulgated treatment standards for the other solvent constituents in F002 and F005). The concentration-based treatment standards for 1,1,2-trichloroethane and benzene in wastewater forms were based on performance data generated from: biological treatment, steam stripping, carbon adsorption, liquid extraction, and others. The concentration-based treatment standards promulgated for 1,1,2-trichloroethane and benzene in nonwastewater forms were based on performance data from incineration. These treatment standards are measured by total constituent analysis. EPA had also determined that the available data were insufficient to establish concentration-based treatment standards for wastewater and nonwastewater forms of F005 containing 2-nitropropane and 2-ethoxyethanol and instead promulgated methods of treatment as the treatment standards. Again, EPA is not revising this previously promulgated treatment standard.

##### 2. Overlap Between F001-F005 Solvents and Other BDAT Standards.

Many of the solvent constituents that are regulated in F001-F005 wastes are also regulated in the First, Second, and Third Third rules, as discussed in the preamble to the January 9, 1992 proposed rule (57 FR 970).

In the November 22, 1989 proposed rule for the Third Third wastes, EPA proposed two alternative sets of

concentration-based treatment standards for wastewater forms for the majority of the U and P listed wastes, many of which are solvent constituents found in F001-F005 wastes. One set of treatment standards was based on the concentration of each constituent in incinerator scrubber water; whereas, the second set of treatment standards was based on wastewater treatment performance data for each constituent. On the basis of comments received, the Agency promulgated treatment standards based on wastewater treatment performance data. These treatment standards were promulgated on June 1, 1990 (55 FR 22601).

The Agency also proposed treatment standards for nonwastewater forms of U and P listed wastes on November 22, 1989 (54 FR 48372). In the final Third Third rule, the Agency promulgated treatment standards for approximately 75 constituents, establishing either concentration-based standards, or incineration as a method of treatment as BDAT.

Treatment standards for several F and K listed wastes containing the same solvent constituents as are present in F001-F005 solvent wastes were also promulgated in the Third Third rule as discussed in the January 9, 1992 proposed rule (57 FR 970).

### 3. Comments Received on the January 9, 1992 Proposed Rule

The Agency received a number of generally favorable comments on the proposed approach—that is, most commenters supported revising the nonwastewater treatment standards from the existing TCLP standards to standards based on total concentrations. Hazardous Waste Treatment Council (HWTC) expressed concerns, however, with regard to meeting concentration based standards for five constituents: chlorobenzene, n-butyl alcohol, o-cresol, ethyl acetate, and nitrobenzene. EPA acknowledges HWTC's concerns with regard to potential analytical difficulties in the analysis of these five constituents. EPA has, in fact, addressed this issue in the June 1, 1990 final rule (55 FR 22541). If the treater uses incineration to treat these wastes and achieves a non-detect level within an order of magnitude of the promulgated treatment standards, then they are considered to have achieved the standard (see 55 FR 22541, June 1, 1990).

Most of HWTC's problem constituents would be able to comply with the treatment standard after the order of magnitude allowance is taken into account. One constituent, o-cresol, according to the data submitted by HWTC, appears to exceed the proposed

treatment standard. After reviewing available incineration and combustion data for this constituent, EPA believes the proposed treatment standards (and the one order of magnitude allowance) are reasonable and achievable. In fact, the Agency has promulgated treatment standards for o-cresol in K019, F039 and U052 at a level of 5.6 ppm with detection limits of less than 2.0 ppm. Also, o-cresol is a regulated constituent in K052, whose treatment standard of 6.2 ppm is based on a detection limit of 2.2 ppm which was based on treatment data submitted from industry (55 FR 22594). EPA is therefore, promulgating today, treatment standards for each one of the five constituents as proposed on January 9, 1992 (57 FR 971).

### 4. Final Approach

The Agency is promulgating revised treatment standards for both nonwastewater and wastewater forms of F001-F005 wastes as proposed. (See the Table at end of this section for specific treatment levels.) The methodology used to develop the treatment standards for both nonwastewater and wastewater forms of F039 (multisource leachate) was used to determine the revised treatment standards for the F001-F005 spent solvents. These revisions do not, however, include the four solvents that were added to the solvents listings: benzene, 2-ethoxyethanol, 2-nitropropane, and 1,1,2-trichloroethane. Treatment standards for these constituents were promulgated in the Third Third final rule in accordance with the previously mentioned methodology.

Today's rule does not include revised treatment standards for nonwastewater forms of carbon disulfide, cyclohexanone, or methanol based on total constituent analysis. These three constituents are not well suited for total constituent analysis, and, in fact, are more appropriately analyzed by the TCLP methodology. The Agency did not propose to revise the existing TCLP treatment standards, for these three constituents, in the January 9, 1992 rulemaking. The Agency is retaining the existing TCLP standards for these three constituents in F001-F005 nonwastewaters in today's rulemaking. (TCLP treatment standards for these three constituents appear in a table at the end of this section).

Because the Agency does not want to require unnecessary and burdensome testing, the TCLP test will only have to be performed if the waste includes only one, two or all three of these constituents. If the waste contains any of these three constituents along with

any of the other 26 constituents found in F001-F005 for which the Agency is promulgating treatment standards based on total constituents analysis, only the total analysis need be performed. It is assumed that after treatment is performed, for these organic constituents, and the total constituent standards are achieved, that these three constituents will also have been treated.

a. *Revisions to the Standards for Cresols.* In the Solvents and Dioxins rule, the Agency promulgated BDAT treatment standards for "cresols." At that time, the Agency did not distinguish between the various isomers that are present in cresols. As a result, the Agency promulgated a concentration-based treatment standard for cresol wastewaters of 2.82 mg/l based on the performance of activated carbon adsorption. For nonwastewaters, the Agency had no data on TCLP extracts of residues from the incineration of cresols (cresylic acid) to use in the development of the treatment standard. EPA, instead, used chemical structure as the basis for transferring the treatment data from methyl ethyl ketone to cresols (cresylic acid) in spent solvents. The treatment standard of 0.75 mg/l for nonwastewaters is based on the transferred data.

In the Third Third rule, EPA promulgated treatment standards for U052. U052 is listed as "cresols (Cresylic acid). U052 typically contains various levels of ortho-cresol, meta-cresol, and para-cresol. Analytical methods are usually reported for o-cresol (CAS No. 95-48-7) and a combination of m- and p-cresols, because m-cresol and p-cresol cannot generally be distinguished by analytical methods. Thus, the Agency promulgated concentration-based standards for U052 based on an analysis for o-cresol and the mixture of m-cresol and p-cresol.

Based on this, the Agency is today modifying the current treatment standards for the constituent "cresols" in F001-F005 wastes as proposed. (57 FR 970, January 9, 1992).

b. *Modification to the Regulatory Placement of F001-F005 Standards.* In today's rule, EPA is promulgating revised treatment standards for solvent wastewaters (F001-F005) in Table CCW (40 CFR 268.43) as proposed. (The following treatment standards for wastewaters are based on F039 wastewater data, and for nonwastewater is based on incineration data).

**PROMULGATED BDAT TREATMENT STANDARDS FOR F001-F005 SPENT SOLVENT WASTES**

[Wastewater; Total Concentration]

Regulated constituent	Wastewater (mg/l)
Acetone.....	0.28
n-Butyl alcohol.....	5.6
Carbon disulfide.....	0.014
Carbon tetrachloride.....	0.057
Chlorobenzene.....	0.057
Cresol(m- and p- isomers).....	0.77
o-Cresol.....	0.11
Cyclohexanone.....	0.36
1,2-Dichlorobenzene.....	0.088
Ethyl acetate.....	0.34
Ethyl benzene.....	0.057
Ethyl ether.....	0.12
Isobutyl alcohol.....	5.6
Methanol.....	5.6
Methylene chloride.....	0.089
Methyl ethyl ketone.....	0.28
Methyl isobutyl ketone.....	0.14
Nitrobenzene.....	0.068
Pyridine.....	0.014
Tetrachloroethylene.....	0.056
Toluene.....	0.08
1,1,1-Trichloroethane.....	0.054
Trichloroethylene.....	0.054
1,1,2-Trichloro-1,2,2-trifluoroethane.....	0.057
Trichloromonofluoromethane.....	0.02
Xylenes (total).....	0.32

<sup>1</sup> The methylene chloride treatment standard for wastewaters generated from pharmaceutical plants is 0.44 mg/l.  
NA: Not applicable.

**PROMULGATED BDAT TREATMENT STANDARDS FOR F001-F005 SPENT SOLVENT WASTES**

[Nonwastewater; Total Concentration]

Regulated constituent	Nonwastewater (mg/kg)
Acetone.....	160
n-Butyl alcohol.....	2.6
Carbon disulfide.....	NA
Carbon tetrachloride.....	5.6
Chlorobenzene.....	5.7
Cresol(m- and p- isomers).....	3.2
o-Cresol.....	5.6
Cyclohexanone.....	NA
1,2-Dichlorobenzene.....	6.2
Ethyl acetate.....	33
Ethyl benzene.....	6.0
Ethyl ether.....	160
Isobutyl alcohol.....	170
Methanol.....	NA
Methylene chloride.....	33
Methyl ethyl ketone.....	36
Methyl isobutyl ketone.....	33
Nitrobenzene.....	14
Pyridine.....	16
Tetrachloroethylene.....	5.6
Toluene.....	28
1,1,1-Trichloroethane.....	5.6
Trichloroethylene.....	5.6
1,1,2-Trichloro-1,2,2-trifluoroethane.....	28
Trichloromonofluoromethane.....	33
Xylenes (total).....	28

<sup>1</sup> These treatment standards are based on TCLP, not total constituent concentration (see following table with TCLP treatment standards).  
NA: Not applicable.

**PROMULGATED BDAT TREATMENT STANDARDS FOR F001-F005 SPENT SOLVENT WASTES**

[Nonwastewater; Toxicity Characteristic Leaching Procedure]

Regulated constituent	Nonwastewater (mg/l)
Carbon disulfide.....	4.8
Cyclohexanone.....	0.75
Methanol.....	0.75

**B. Conversion of Wastewater Standards Based on Scrubber Water**

- K015—Still bottoms from the distillation of benzyl chloride
- K016—Heavy ends or distillation residues from the production of carbon tetrachloride
- K018—Heavy ends from the fractionation column in ethyl chloride production
- K019—Heavy ends from the distillation of ethylene dichloride in ethylene dichloride production
- K020—Heavy ends from the distillation of vinyl chloride in vinyl chloride production
- K023—Distillation light ends from the production of phthalic anhydride from naphthalene
- K024—Distillation bottom tars from the production of phthalic anhydride from naphthalene
- K028—Spent catalyst from the hydrochlorinator reactor in the production of 1,1,1-trichloroethane
- K030—Column bottoms or heavy ends from the combined production of trichloroethylene and perchloroethylene
- K048—Dissolved air flotation (DAF) float from the petroleum refining industry
- K049—Slop oil emulsion solids from the petroleum refining industry
- K050—Heat exchanger bundle cleaning sludge from the petroleum refining industry
- K051—API separator sludge from the petroleum refining industry
- K052—Tank bottoms (lead) from the petroleum refining industry
- K087—Decanter tank tar sludge from coking operations
- 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 (measured as Phthalic acid)

On November 22, 1989 (54 FR 48372), EPA proposed as part of the Third Third rule concentration-based treatment standards for numerous listed wastes based on the performance of incineration. For the wastewaters, the treatment standards were based on the concentration of the constituents of concern in incineration scrubber waters.

In the final rule (55 FR 22520), however, EPA altered its approach to setting these standards and promulgated treatment standards for wastewaters based on actual wastewater treatment data for the constituents of concern. This change was adopted for a number of reasons.

First, it was stated in the final rule for the Second Third wastes (54 FR 26629) and reiterated in the final rule for Third Third wastes (55 FR 22577) that when the Agency had appropriate wastewater treatment data from well-designed and well-operated wastewater treatment units it preferred to use those data rather than scrubber water data to develop wastewater treatment standards. This is because incineration is not a normal treatment method for wastewaters. In addition, alternative standards were proposed in the Third Third notice for multisource leachate (F039) wastewaters based on a transfer of performance data from various sources. Second, commenters on the proposed Third Third rule had urged the Agency to develop treatment standards for wastewater forms based on residues from wastewater treatment technologies rather than incineration scrubber waters. Commenters on previous rules had also stated that when EPA had performance data from technologies treating wastewaters containing the same or similar constituents that EPA should use it to develop treatment standards.

The Agency reviewed all of the aforementioned data during the Third Third comment period and promulgated constituent-specific concentration-based standards. Detailed information on the development of the wastewater treatment standards can be found in the background document titled Final Best Demonstrated Available Technology (BDAT) Background Document for U and P Wastes and Multi-Source Leachates (F039), Volume A: Wastewater Forms of Organic U and P Wastes and Multi-Source Leachates (F039) for Which There Are Concentration-Based Treatment Standards. (This document can be found in the RCRA docket for the Third Third final rule).

As part of the First Third and Second Third rules, EPA promulgated treatment standards for wastewater forms of 23 K and U wastes (i.e., K015, K016, K018, K019, K020, K023, K024, K028, K030, K048, K049, K050, K051, K052, K067, K093, K094, U028, U069, U088, U102, U107, and U190). These wastewater treatment standards were based on data from incineration scrubber waters. Upon review of all available data and comments, the Agency believes that

BDAT for these wastewaters is better represented by concentration-based treatment standards based on actual wastewater treatment technologies rather than scrubber waters generated from incineration. Therefore, the Agency is today promulgating concentration-based treatment standards for these wastewaters as proposed. The wastes affected by this change come primarily from three general treatability groups: chlorinated organics, petroleum wastes, and phthalate wastes. The Agency believes that this change is consistent with the changes made to the wastewater standards in the final Third Third rule. It should be noted, however, that any technology not otherwise prohibited (e.g., impermissible dilution) may be used to meet the concentration-based treatment standards for these wastewaters, including incineration.

Finally, during the development of the Third Third rule, the Agency determined that for pentachloroethane (a regulated constituent in K018, K028, and K030), complications arose in terms of how reliably the constituent could be quantified (55 FR 22611). As such, the Agency made a decision to promulgate a method (or methods) of treatment, rather than a constituent-specific standard. Today, EPA is deleting pentachloroethane from further regulation in the wastewater forms of K018, K028, and K030, as discussed in the January 9, 1992 proposed rule. Treatment of other constituents will act as reliable surrogates for the treatment of pentachloroethane in these wastes.

**PROMULGATED TREATMENT STANDARDS FOR VARIOUS F AND K WASTEWATERS**

Waste code and regulated organic constituent	Revised standard (mg/l)
<b>K015:</b>	
Anthracene.....	0.059
Benzal chloride.....	0.28
Benzo(b and/or k)fluoranthene.....	0.055
Phenanthrene.....	0.059
Toluene.....	0.080
<b>K016:</b>	
Hexachlorobenzene.....	0.055
Hexachlorobutadiene.....	0.055
Hexachlorocyclopentadiene.....	0.057
Hexachloroethane.....	0.055
Tetrachloroethene.....	0.056
<b>K018:</b>	
Chloroethane.....	0.27
Chloromethane.....	0.19
1,1-Dichloroethane.....	0.059
1,2-Dichloroethane.....	0.21
Hexachlorobenzene.....	0.055
Hexachlorobutadiene.....	0.055
Pentachloroethane.....	NA
1,1,1-Trichloroethane.....	0.054
Hexachloroethane.....	0.055
<b>K019:</b>	
bis(2-chloroethyl)-ether.....	0.033
Chlorobenzene.....	0.057
Chloroform.....	0.046

**PROMULGATED TREATMENT STANDARDS FOR VARIOUS F AND K WASTEWATERS—Continued**

Waste code and regulated organic constituent	Revised standard (mg/l)
1,2-Dichloroethane.....	0.21
p-Dichlorobenzene.....	0.09
Fluorene.....	0.059
Hexachloroethane.....	0.055
Naphthalene.....	0.059
Phenanthrene.....	0.059
1,2,4,5-Tetrachlorobenzene.....	0.055
Tetrachloroethene.....	0.056
1,2,4-Trichlorobenzene.....	0.055
1,1,1-Trichloroethane.....	0.054
<b>K020:</b>	
1,2-Dichloroethane.....	0.21
1,1,2,2-Tetrachloroethane.....	0.057
Tetrachloroethene.....	0.056
<b>K023: Phthalic anhydride (measured as phthalic acid)</b>	0.069
<b>K024: Phthalic anhydride (measured as phthalic acid)</b>	0.069
<b>K028:</b>	
1,1-Dichloroethane.....	0.059
Trans 1,2-Dichloroethane.....	0.054
Hexachlorobutadiene.....	0.055
Hexachloroethane.....	0.055
Pentachloroethane.....	NA
1,1,1,2-Tetrachloroethane.....	0.057
1,1,2,2-Tetrachloroethane.....	0.057
Tetrachloroethene.....	0.056
1,1,1-Trichloroethane.....	0.054
1,1,2-Trichloroethane.....	0.054
<b>K030:</b>	
o-Dichlorobenzene.....	0.088
p-Dichlorobenzene.....	0.09
Hexachlorobutadiene.....	0.055
Hexachloroethane.....	0.055
Pentachloroethane.....	NA
1,2,4,5-Tetrachlorobenzene.....	0.055
Tetrachloroethene.....	0.056
1,2,4-Trichlorobenzene.....	0.055
<b>K048:</b>	
Benzene.....	0.14
Benzo(a)pyrene.....	0.061
Bis(2-ethylhexyl)-phthalate.....	0.28
Chrysene.....	0.059
Di-n-butyl phthalate.....	0.057
Ethylbenzene.....	0.057
Fluorene.....	0.059
Naphthalene.....	0.059
Phenanthrene.....	0.059
Phenol.....	0.039
Pyrene.....	0.067
Toluene.....	0.080
Xylenes (total).....	0.32
<b>K049:</b>	
Anthracene.....	0.059
Benzene.....	0.14
Benzo(a)pyrene.....	0.061
Bis(2-ethylhexyl)-phthalate.....	0.28
Carbon disulfide.....	0.014
Chrysene.....	0.059
2,4-Dimethylphenol.....	0.036
Ethylbenzene.....	0.057
Naphthalene.....	0.059
Phenanthrene.....	0.059
Phenol.....	0.039
Pyrene.....	0.067
Toluene.....	0.080
Xylenes (total).....	0.32
<b>K050:</b>	
Benzo(a)pyrene.....	0.061
Phenol.....	0.039
<b>K051:</b>	
Acenaphthene.....	0.059
Anthracene.....	0.059
Benz(a)anthracene.....	0.059
Benzene.....	0.14

**PROMULGATED TREATMENT STANDARDS FOR VARIOUS F AND K WASTEWATERS—Continued**

Waste code and regulated organic constituent	Revised standard (mg/l)
Benzo(a)pyrene.....	0.061
Bis(2-ethylhexyl)-phthalate.....	0.28
Chrysene.....	0.059
Di-n-butyl phthalate.....	0.057
Ethylbenzene.....	0.057
Fluorene.....	0.059
Naphthalene.....	0.059
Phenanthrene.....	0.059
Phenol.....	0.039
Pyrene.....	0.067
Toluene.....	0.080
Xylenes (total).....	0.32
<b>K052:</b>	
Benzene.....	0.14
Benzo(a)pyrene.....	0.061
o-Cresol.....	0.11
p-Cresol.....	0.77
2,4-Dimethylphenol.....	0.036
Ethylbenzene.....	0.057
Naphthalene.....	0.059
Phenanthrene.....	0.059
Phenol.....	0.039
Toluene.....	0.080
Xylenes (total).....	0.32
<b>K087:</b>	
Acenaphthalene.....	0.059
Benzene.....	0.14
Chrysene.....	0.059
Fluoranthene.....	0.068
Indeno(1,2,3-cd)pyrene.....	0.055
Naphthalene.....	0.059
Phenanthrene.....	0.059
Toluene.....	0.080
Xylenes (total).....	0.32
<b>K093: Phthalic anhydride (measured as Phthalic acid)</b>	0.069
<b>K094: Phthalic anhydride (measured as Phthalic acid)</b>	0.069
<b>U028: Bis(2-ethylhexyl)-phthalate</b>	0.28
<b>U069: Di-n-butyl phthalate</b>	0.057
<b>U088: Diethyl phthalate</b>	0.2
<b>U102: Dimethyl phthalate</b>	0.047
<b>U107: Di-n-octyl phthalate</b>	0.017
<b>U190: Phthalic anhydride (measured as phthalic acid)</b>	0.069

NA: Not applicable.

**C. Revisions to Treatment Standards for K061, K062, and F006**

With two exceptions, the Agency is promulgating as proposed the treatment standards for the iron and steel process wastes K061 and K062 and the electroplating waste F006. The January 9, 1992, proposed rule (57 FR 975-977) contained three major provisions for K061, K062, and F006: (1) Removing the Low Zinc and High Zinc subcategories for K061 electric arc furnace dust wastes and establishing the high zinc subcategory nonwastewater standards for all K061 nonwastewaters regardless of zinc level; (2) setting alternative treatment standards for K062 and F006 nonwastewaters with recoverable amounts of nickel and chromium; and (3) excluding from regulation as a hazardous waste nonwastewater

residues generated from high-temperature metals recovery (HTMR) treatment of F006 and K062 provided the residues meet the designated generic exclusion levels, they are disposed of in a subtitle D unit, and they do not exhibit one or more of the hazardous waste characteristics.

One of the two changes the Agency has made between proposal and promulgation consists of basing the promulgated generic exclusion on a different fate-and-transport model than the proposed exclusion and thus promulgating different exclusion levels for several contaminants. The second change is that EPA is promulgating neither treatment standards nor exclusion levels for vanadium, thus effectively deleting vanadium from the K061, K062, and F006 rulemaking.

The August 19, 1991 (56 FR 41164), final rule for K061 (electric arc dust) set numerical treatment standards for high-zinc K061 nonwastewaters based on the performance of high-temperature metals recovery units. This final rule also promulgated a generic exclusion from the derived-from rule for nonwastewater residues generated from HTMR processing of K061 wastes.

Today's rule extends both the HTMR-based treatment standards and the generic exclusion criteria for HTMR residues to K062 (steel finishing pickle liquor) and F006 (electroplating wastewater treatment sludges) nonwastewaters.

#### 1. Removal of the Low Zinc Subcategory for K061 Wastes

The Agency is today transferring the treatment standards promulgated for high-zinc (greater than 15 percent) K061 nonwastewaters (56 FR 41164, August 19, 1991) to low-zinc K061 nonwastewaters; by doing this, the Agency eliminates the low- vs. high-zinc categories and regulates all K061 nonwastewaters with the same numerical treatment standards and generic exclusion levels. The promulgated treatment standards are based on the performance of high-temperature metals recovery (HTMR); however, since these are concentration-based standards, any technology, including stabilization, that meets the treatment standards can be used.

#### 2. Alternative Treatment Standards for F006 and K062 Nonwastewaters Based on High Temperature Metals Recovery (HTMR)

The Agency is promulgating alternative treatment standards for K062 and F006 nonwastewaters as proposed. These treatment standards, based on HTMR, are the same as those

promulgated in August 1991 for "high-zinc" nonwastewaters and the standards promulgated in this rule for all K061 nonwastewaters.

EPA is also promulgating a new regulatory section (40 CFR 268.46) for any treatment standards serving as alternates for compliance with standards in 40 CFR 268.41, 268.42 and 268.43.

The alternative treatment standards for F006 includes standards for cyanides. Although the Agency has no HTMR performance data for cyanide, EPA believes (as discussed in the proposed rule at 57 FR 975) that HTMR treats cyanide to a level comparable to incineration. Since no commenters challenged this belief and there is no reason to believe HTMR units will not destroy cyanide as efficiently as incineration, EPA is promulgating alternative cyanide standards for F006 developed from incinerator performance. The HTMR-based alternative treatment standards are higher numerically for several constituents (chromium in K062; cadmium, nickel and silver in F006) than the original stabilization-based standards. These higher numbers are acceptable to the Agency as alternative treatment standards because the HTMR-based alternatives regulate more constituents than the original stabilization-based standards, and also because they express the Agency's preference for recycling methods.

#### 3. Generic Exclusion of F006 and K062 HTMR Nonwastewater Residues

EPA is promulgating generic exclusion levels for nonwastewater residues generated from HTMR of F006 and K062 in rotary kilns, flame reactors, electric furnaces, plasma arc furnaces, slag reactors, rotary hearth furnace/electric furnace combinations, or industrial furnaces. These residues can go into subtitle D units if the residues meet the generic exclusion levels for all constituents and these residues that do not exhibit any of the hazardous characteristics. The Agency received a variety of comments on the generic exclusion for all K061, K062, and F006 HTMR residues. Some of the comments supported this extension of the generic exclusion: Others objected to the exclusion levels and to the Agency's decision to limit the generic exclusion to HTMR residues.

Although the vertical and horizontal spread (VHS) model was the basis for calculating the proposed generic exclusion levels, EPA indicated in the January 9, 1992 proposed rule preamble that it also was considering basing exclusion levels on an alternative

model, the EPA Composite Model for Landfills (EPACML) (see 57 FR 976; see also 56 FR 67197, December 30, 1991 for adopting use of the model in site specific delistings). Most commenters discussed the EPACML alternative and urged the Agency to use it rather than the VHS model to develop generic exclusion levels for this rule.

The most salient consequence of the change in models from VHS to EPACML is that EPACML generic exclusion levels for arsenic and zinc are higher than the BDAT standards in the HTMR-based alternative treatment standards for K062 and F006 and in the HTMR-based BDAT standards for K061. EPA retained the EPACML-based generic exclusion numbers regardless of their values relative to HTMR BDAT standards because the generic exclusion is independent from BDAT in such a way that EPA has no reason to adjust generic exclusion levels in order to reconcile them with BDAT standards when the numerical values differ significantly for a particular compound. The different, and occasionally overlapping, sets of numbers for BDAT standards and generic exclusion levels reflect the fact that these are two different sets of regulatory controls on HTMR residues from K061, K062, F006. BDAT standards apply to residuals from treatment of hazardous waste—which are themselves still hazardous wastes because of the derived-from rule intended for land disposal. They reflect the best level of performance that treatment technology can provide and they apply to hazardous wastes concentrations of contaminants determined (by the model) to pose minimal health risks when the waste is disposed in a unit permitted under RCRA Subtitle D. A generic exclusion takes a waste out of the hazardous-waste universe because when a waste meets generic exclusion levels the exclusion essentially exempts it from subtitle C management.

The Agency also received a number of significant comments on the proposal to grant a generic exclusion for residues from HTMR processing of F006 and K062 nonwastewaters. Many commenters favored the proposed exclusion. Waste Management Inc., (WMI) and the Hazardous Waste Treatment Council (HWTC) objected, however, on several grounds.

WMI submitted comments similar to those it previously submitted for the K061 high-zinc subcategory rule. In particular, the commenter objected to the generic exclusion for a number of reasons: First, there are relatively few HTMR treaters of F006 and K062; site-specific delistings are a more

appropriate alternative. Second, excluding slag to be used as a road-base material is an inappropriate application of the VHS. Third, EPA based the exclusion decision on inadequate data regarding the different types of HTMR processes that are potentially subject to the exclusion and on inadequate data on the fate of organic species that may be present in the feedstocks. Fourth, the VHS model to exclude K061 did not consider exposures from runoff or wind dispersion. Fifth, there is concern about unaddressed air emissions problems with the HTMR processes themselves.

The Agency responded to the substantive issues in these comments in the K061 high-zinc subcategory final rulemaking. EPA's position remains that, although the generic exclusion may affect a small number of facilities at the time of promulgation, other HTMR facilities may be constructed in the future. More important, however, EPA's generic exclusion decision in regard to these wastes depends on the potential hazard (e.g., waste volume, composition) of the waste generated, not on the number of facilities generating the waste.

In today's final rule, the Agency is using EPACML instead of the VHS model to represent more accurately the groundwater hydraulics at landfills. EPACML predicts the potential for groundwater contamination from wastes that are co-disposed with municipal solid waste in an unlined land disposal unit and is, therefore, an appropriately conservative methodology for evaluating the risk from landfilled HTMR residue. In addition, as in the August 19, 1991 rule for K061, the Agency is limiting the generic exclusion to F006 and K062 HTMR residues, among other things, disposed of in a subtitle D unit and thus is not evaluating the appropriateness of EPACML for quantifying the safety of any use constituting a disposal scenario such as use as roadbase. Consequently, this generic exclusion does not cover material to be used as a product.

The Agency disagrees with the comment that inadequate data were collected from the different types of HTMR processes that are potentially subject to exclusion. In determining the BDAT treatment levels, the Agency reviewed all the treatment performance data available from various HTMR processes. (These data are available in the Background Document supporting this rulemaking). EPA then calculated the final treatment standards based on the data from well-designed and well-operated HTMR processes. Thus, EPA believes that it has adequately characterized the performance of the

major HTMR processes with respect to achieving the BDAT treatment levels. EPA notes further that since the exclusion levels are essentially risk-based numbers (i.e., the numbers are based either on the model or are the slightly lower technology-based numbers), the issue of the sufficiency of treatment performance characterization data does not affect the validity of the generic exclusion standards. To address the Agency's intent to establish "minimize threat levels" which could require modification of the purely technology-based BDAT standards, EPA is evaluating the alternatives proposed in the Hazardous Waste Identification Rule (HWIR) (see 57 FR 21450, May 20, 1992).

In response to the commenter's concern about the fate of organic species in the feed to HTMR processes, the Agency remains convinced that, considering that HTMR units operate at higher temperatures and longer residence times than incinerators, that HTMR units will destroy organic constituents as well as incinerators. All available data showed no quantifiable levels of organic constituents in treated residues, confirming EPA's engineering opinion; nor do the processed wastes typically contain appreciable concentrations of organics. (The Agency notes that while developing the BDAT treatment standards for nonwastewater HTMR K061 residues it investigated whether toxic organic constituents were present in the HTMR residues. The available treatment performance data did not indicate the presence of BDAT list organic constituents at detectable levels). In addition, as part of its delisting petition request for residual slag from treatment of K061 waste by HTMR, Horsehead Resource and Development Company (HRD) analyzed residual slag samples for sixteen polycyclic aromatic hydrocarbon (PAHs) constituents most likely to be products of incomplete combustion. None of the sixteen PAHs was detected in any of the samples generated from coke-fired and coal-fired processing.

WMI objected that using the VHS model to generate generic exclusion levels for K061, K062, and F006 is not appropriate because it only considered contaminant transport in groundwater and excludes exposures from run-off or wind dispersion.

As already indicated, the Agency has chosen to limit the scope of the current generic exclusion to slag disposed of in a subtitle D unit. The Agency is confident that the EPACML is appropriate for a land disposal scenario and is therefore finalizing the generic

exclusion for F006 and K062 residues from HTMR processes with the condition that such disposal occur. See the discussion of the EPACML model at 56 FR 32993, July 18, 1991.

The Hazardous Waste Treatment Council (HWTC) also objected to the Agency's proposal to include F006 and K062 residues resulting from HTMR processing in the generic exclusion. HWTC was concerned that the exclusion was an automatic, self-implementing process requiring neither analytical verification nor review by EPA or the public. Section IV.E. of today's rule describes EPA's revised recordkeeping requirements for generically excluded HTMR K061, K062, and F006 residues (and characteristic wastes). This section explains EPA's choice of a tracking and handling system for generically excluded wastes.

With respect to the issue concerning air emissions, the Agency notes that all existing HTMR units use baghouses, wet scrubbers, or some other form of air pollution control device (APCD) to capture particulate matter present in the off-gases. These units may also be addressed pursuant to amended section 112 of the Clean Air Act. The amended section 112 requires the application of maximum achievable control technology (MCAT) controls to major sources of hazardous air pollutants, plus further risk-based controls (if necessary) at a later time. Therefore, EPA does not believe that these units need also be subject to the BIF regulations (see 56 FR 7142, February 21, 1991 for further discussion on EPA's basis for not regulating air emissions from these units under subtitle C).

Another issue was HWTC's objection to EPA's granting a generic exclusion for HTMR residuals from processing F006 and K062 while denying the exclusion for other non-HTMR recycling and treatment technologies treating F006 and K062.

The Agency based the decision to grant a generic exclusion for HTMR residues only for the following reasons: The generic exclusion will only apply to those nonwastewater residues generated by HTMR processes and not to other non-HTMR processes, such as hydrometallurgical processes or stabilization. The Agency currently lacks sufficient data to evaluate the residues from hydrometallurgical processes or to develop an appropriate sampling and analysis methodology for residues from hydrometallurgical processes.

The Agency presented the reasons for not generically excluding stabilized residues in the August 19, 1991 K061

high zinc final rule (56 FR 41173). The HTMR residues demonstrate consistent leaching behavior whereas stabilized matrices do not. The chemical bonding that occurs in the high temperature and oxidation/reduction conditions within the HTMR units is inherently different from the bonding that forms the basis of cementitious and pozzolanic stabilization. In addition, the kinetics of the reaction forming the bonds in these HTMR processes are superior in terms of immobilizing metals to the kinetics of bond formation in cementitious reactions because they are faster. (Common forms of cement are not typically considered set until after a minimum of 72 hours and often not considered fully cured until after 28 days). Furthermore, stabilization is highly matrix-dependent and prone to chemical interference. Most commercial stabilization facilities develop special mixes to control curing time and/or product integrity.

EPA reminds the regulated community that it is not prohibiting stabilization as treatment for K061, K062, and F006 waste, and that facility-specific delisting remains an option for stabilized K061, K062, and F006 wastes. Because of the inherent differences between HTMR and stabilization stated above and because existing data do not support a generic exclusion for stabilized K061, K062, and F006 wastes, the Agency chooses not to extend generic exclusion to these stabilized residues.

*D. Vanadium: Treatment Standards and Appendix VIII*

The Agency is deferring the expansion of the list of inorganic constituents in appendix VIII and is not including vanadium in the treatment standards. These remain technical issues that EPA has not yet resolved in the brief time allocated in promulgating today's regulations. The proposed HWIR (57 FR 21450, May 20, 1992) identified exclusion criteria for Vanadium, and the Agency is continuing to assess how to address Vanadium in HWIR and future Land Disposal Restrictions.

Because of concerns about Vanadium's low volatility and consequent tendency to accumulate in slag residual, the August 19, 1991, rule for high-zinc K061 nonwastewaters reserved vanadium rather than set a numerical treatment standard. Data reviewed by the Agency for the high-zinc rule since that time does not support setting a treatment standard for vanadium. EPA is therefore not promulgating treatment standards for vanadium in K061 nor promulgating vanadium standards in alternative standards for K062 and F006 wastes in

this rule.

**FINAL GENERIC EXCLUSION LEVELS FOR K061 AND K062 HTMR RESIDUES**

[Nonwastewaters]

Regulated constituent	Maximum for any single composite sample—TCLP (mg/l)
Antimony.....	0.10
Arsenic.....	0.50
Barium.....	7.6
Beryllium.....	0.010
Cadmium.....	0.050
Chromium (total).....	0.33
Lead.....	0.15
Mercury.....	0.009
Nickel.....	1.0
Selenium.....	0.16
Silver.....	0.30
Thallium.....	0.020
Zinc.....	70

**FINAL GENERIC EXCLUSION LEVELS FOR F006 HTMR RESIDUES**

[Wastewaters]

Regulated constituent	Maximum for any single composite sample—TCLP (mg/l)
Antimony.....	0.10
Arsenic.....	0.50
Barium.....	7.6
Beryllium.....	0.010
Cadmium.....	0.050
Chromium (total).....	0.33
Lead.....	0.15
Mercury.....	0.009
Nickel.....	1.0
Selenium.....	0.16
Silver.....	0.30
Thallium.....	0.020
Zinc.....	70

Regulated constituent	Maximum for any single composite sample—(mg/kg)
Cyanide (Total).....	1.8

**FINAL TREATMENT STANDARDS FOR K061**

[Low and high zinc subcategories, nonwastewaters]

Regulated constituent	Maximum for any single composite sample—TCLP (mg/l)
Antimony.....	2.1
Arsenic.....	0.055
Barium.....	7.6
Beryllium.....	0.014
Cadmium.....	0.19
Chromium (Total).....	0.33
Lead.....	0.37
Mercury.....	0.009
Nickel.....	5.0
Selenium.....	0.16
Silver.....	0.30
Thallium.....	0.078
Zinc.....	5.3

**TREATMENT STANDARDS FOR K062**

[Nonwastewaters]

Regulated constituent	Alternative treatment standards based on HTMR performance maximum for any single composite sample—TCLP (mg/l)	Treatment standards based on stabilization maximum for any single grab sample—TCLP (mg/l)
Antimony.....	2.1	NA
Arsenic.....	0.055	NA
Barium.....	7.6	NA
Beryllium.....	0.014	NA
Cadmium.....	0.19	NA
Chromium (Total).....	0.33	0.094
Lead.....	0.37	0.37
Mercury.....	0.009	NA
Nickel.....	5.0	NA
Selenium.....	0.16	NA
Silver.....	0.30	NA
Thallium.....	0.078	NA
Zinc.....	5.3	NA

NA—Not Applicable.

**TREATMENT STANDARDS FOR F006**

[Nonwastewaters]

Regulated constituent	Alternative treatment standards based on HTMR performance maximum for any single composite sample—TCLP (mg/l)	Treatment standards based on stabilization maximum for any single grab sample—TCLP (mg/l)
Antimony.....	2.1	NA
Arsenic.....	0.055	NA
Barium.....	7.6	NA
Beryllium.....	0.014	NA
Cadmium.....	0.19	0.068
Chromium (Total).....	0.33	5.2
Lead.....	0.37	0.51
Mercury.....	0.009	NA
Nickel.....	5.0	0.32
Selenium.....	0.16	NA
Silver.....	0.30	0.072
Thallium.....	0.078	NA
Zinc.....	5.3	NA

Regulated constituent	Alternative treatment standards based on HTMR performance maximum for any single composite sample (mg/kg)	Treatment standards based on alkaline chlorination maximum for any single grab sample (mg/kg)
Cyanides (Total).....	1.8	590
Cyanides (Amenable).....	NA	30

NA—Not Applicable.



### *E. Notification and Certification for Characteristic Wastes*

The Agency is finalizing a revision to the recordkeeping requirements for certain wastes that meet LDR standards and are treated to nonhazardous levels. The change in notification and certification requirements affects two groups of wastes: characteristic wastes that meet LDR standards and are treated below the regulatory levels established for characteristic wastes, and K061, K062, and F006 residues from high temperature metal recovery that meet the generic exclusion levels and do not exhibit any hazardous waste characteristics. As proposed (see 57 FR 977), the Agency will no longer require the generator or treater to submit to EPA or an authorized state a notification and certification for each off-site shipment of these wastes. Instead, amended § 268.9(d) and § 261.3(c)(2)(ii)(C) now require that the generator or treater prepare the notification and certification for the initial shipment only, place one copy in the generator's or treater's own files, and send another copy to the appropriate EPA region or authorized state. The documentation must be retained by the generator or treater for at least five years. The generator's or treater's records must be updated if the process or operation generating the waste changes and/or if the subtitle D facility receiving the waste changes; however, the generator or treater need only notify EPA or an authorized state on an annual basis (at the end of the calendar year but no later than December 31) if the process or operation generating the waste changes or if the subtitle D facility receiving the waste changes. The document must include the name and address of the subtitle D facility receiving the waste, a waste description, applicable treatment standards, and a certification that the standards have been met. For K061, K062, and F006 residues from high temperature metal recovery, the recordkeeping requirements in § 261.3(c)(2)(ii)(C) supersede those in § 268.7(a)(6).

The Agency proposed this change because the existing requirements appeared to pose an unnecessary paperwork burden. It did not appear necessary for EPA or the states to be notified concerning every shipment of characteristic wastes and K061, K062, and F006 residues treated to nonhazardous levels; yet, at the same time, EPA and the states still need to be able to verify such treatment when conducting inspections of waste management operations. The Agency requested comment on the paperwork

burden of the existing requirements, on its proposal, and on several alternative requirements that would also reduce the recordkeeping burden (see 57 FR 977).

Several commenters described the existing burden as "significant" or "onerous." One commenter said the requirement is especially burdensome for facilities with multiple shipments per day and is unnecessary since the waste is deemed nonhazardous. Another commenter stated that one of its plants had submitted over 1300 identical notification and certification documents in an eighteen-month period as a result of the § 268.9(d) requirement. Still other commenters said the existing requirement is not onerous, since facilities can use fill-in-the-blank type forms.

The majority of commenters, however, supported the requirement being finalized today. Those who supported the requirement promulgated today interpreted it to require a reasonable level of recordkeeping while providing readily available information to allow identification of the subtitle D facilities receiving the waste. Several of these commenters said the alternative proposals were overly burdensome without providing attendant benefits.

Commenters who supported the existing recordkeeping requirements argued that submittal of a certification to EPA is the only incentive for generators to ensure that excluded waste going to subtitle D units is properly treated. One commenter argued that the new proposal would weaken the RCRA system of cradle-to-grave protection. Another commenter advocated notification to the subtitle D facility receiving the waste, because only the generator or treater has sufficient information to determine if it meets the land disposal restrictions.

After considering all comments, EPA is finalizing the proposed revision because it is confident that there is little need for documentation of every shipment of the identical nonhazardous waste, nor is there a need for EPA or states to be informed of each shipment for disposal, as long as the information is available to inspectors. As for requiring notification of subtitle D facilities receiving the waste, EPA remains concerned that such a requirement would be counterproductive (see discussion at 55 FR 22662 to 22663).

### *F. Wastes Listed Because They Exhibit a Characteristic*

In the January 9, 1992 proposed rule, EPA proposed a clarifying change to the existing regulations dealing with the applicability of land disposal prohibitions to wastes that are listed

solely because they exhibit a non-toxic characteristic of hazardous wastes (see 57 FR 978). An example are the non-chlorinated solvents listed as F003 for which EPA promulgated numerical treatment standards in 1986. EPA had previously stated that such wastes cannot be diluted to meet the treatment standards and that these wastes must be treated to meet the part 268 treatment standards (56 FR 3871, January 31, 1991; 57 FR 978). Put another way, the land disposal prohibitions would apply at the point of generation for such wastes. EPA's proposed clarification was that the same principles apply with respect to mixtures of wastes listed because they exhibit a characteristic and other solid wastes (57 FR 978).

Upon reviewing this issue further, however, EPA realized that the principle appeared inconsistent (or could be read to be inconsistent), with respect to wastewaters listed because they exhibit a characteristic, with the rules adopted in the Third Third regulation regarding management of characteristic wastewaters. In the Third Third regulation, EPA applied prohibitions at the point of disposal for wastes that are hazardous because they exhibit a characteristic and are disposed in non-hazardous Class I injection wells; the Agency also applied dilution prohibitions at the point of disposal for most characteristic wastewaters managed in wastewater treatment systems ultimately discharging pursuant to sections 307 or 402 of the Clean Water Act. See §§ 148.1(d), 268.3(b); and 55 FR 22656-22659 (June 1, 1990). This would indicate that wastewaters which are listed because they exhibit a characteristic would not be prohibited from disposal by underground injection provided they do not exhibit a characteristic when they are injected. In addition, such wastewaters can permissibly be diluted to meet the treatment standards before management in surface impoundments, provided the impoundments are part of treatment systems that are discharging pursuant to Clean Water Act requirements and provided the waste does not exhibit a characteristic when placed in an impoundment.

After considering this issue, and after soliciting and receiving further public comment on the point, EPA is interpreting its rules so as to be consistent with the approach of the Third Third rule with respect to wastewaters that exhibit a characteristic for the reasons set out in that rule. Thus, prohibitions for wastewaters that are listed solely because they exhibit a characteristic

will apply at the point of disposal as explained above. Put another way, EPA is reading the existing rules in §§ 148.1 and 268.3(b) as applying to wastewaters that are listed solely because they exhibit a non-toxic characteristic.

The Agency is not reconsidering, or reopening, the issue of treatment standards for nonwastewaters that are listed because they exhibit a characteristic. Thus, such wastes cannot be land disposed until treated to meet the applicable treatment standards, and cannot be diluted to meet those treatment standards (56 FR 3871). This would also be true of mixtures involving such listed wastes, since otherwise the prohibitions would have no real meaning.

Finally, with respect to wastewaters, the Agency recognizes that the issue of the legality of the Agency's application of prohibitions for characteristic wastewaters at the point of disposal has been submitted for judgment to a panel of the District of Columbia Circuit Court as part of the litigation over the Third Third rule (*Chemical Waste Management v. EPA*, No. 90-1230). The Agency's action today clarifying that the same rules apply to wastewaters listed because they exhibit a characteristic and other characteristic wastewaters thus would be subject to the decision reached in this litigation.

### G. Storage and Treatment in Containment Buildings

In some cases, hazardous wastes prohibited from land disposal must be stored for short periods of time to facilitate recycling, recovery, treatment, or transport off site to meet LDR standards; treatment may also be performed while these materials are being stored. Some of these non-liquid hazardous wastes are generated in large volumes (often in batches), and may not be amenable to management in RCRA tanks or containers. These wastes are sometimes stored or treated on concrete pads or similar floors inside buildings.

EPA currently classifies this type of management unit as an indoor waste pile, which EPA considers to be a land disposal unit based on the statutory definition of land disposal in section 3004(k). See 52 FR 40605 (November 7, 1986). Lead slags and spent potliners from primary aluminum production are examples of hazardous wastes that are amenable to management in such units because of their volume or bulk; contaminated debris may also be managed in such units. EPA believes that management of a hazardous waste inside a unit designed and operated to contain the hazardous waste within the unit—akin to storage in a RCRA tank or

container—does not pose the types of potential harms or uncertainties Congress sought to address in defining land disposal, as it did in RCRA section 3004(k). These include uncertainties regarding containment of hazardous constituents placed on the land and the potential for persistence, toxicity, mobility and bioaccumulation of hazardous wastes placed on the land. A unit designed, constructed, and operated to contain the hazardous waste within it may, moreover, fulfill the congressional goal of waste management that is protective of human health and the environment. See section 3004(d)(1)(A)-(C) and 1003(a)(5).

EPA is today promulgating standards allowing management of hazardous wastes, including but not limited to lead slags, spent potliners, and contaminated debris within units, to be termed "containment buildings", which will not be considered placement on the land and thus not constitute land disposal as defined in section 3004(k) of RCRA. To allow storage and treatment of prohibited wastes in containment buildings, EPA today is establishing a new definition of containment building, amending the existing definition of pile to exclude containment buildings, and including containment buildings within those units covered by § 268.50 as permissible for storage of prohibited wastes (since these buildings are no longer land disposal units), albeit subject to the prohibition on extended storage. EPA is also establishing specific design and operating standards for such units under §§ 264 and 265, and allowing generators' containment buildings to be eligible under § 262.34 for the 90-day generator provisions if their unit(s) meets all of the technical requirements for containment buildings (refer to discussion on 90-day applicability upcoming in this section).

Under today's rule, all containment buildings—both permitted and unpermitted—must achieve the same level of performance. Accordingly, EPA today is promulgating standards that require containment buildings operating under the part 265, subpart DD interim status standards to be designed, operated, and maintained to meet the same design and operating requirements as permitted containment buildings. These are either the design and operating standards in subparts DD of parts 264 or 265.

Virtually all public comments supported the establishment of this new type of management unit. The rule promulgated today incorporates only minor changes from the proposed rule.

To provide adequate time for design and construction of containment

buildings, the effective date for these provisions shall be February 18, 1993. However, owner/operators who wish to begin operating containment buildings under these provisions prior to the effective date may do so provided that they notify the Regional Administrator of their intent, and they comply with the requirements of subpart DD prior to beginning operation.

### 1. Containment Buildings Are Not Land Disposal Units

The final rule indicates that containment buildings are not land disposal units. Thus, prohibited wastes can be stored in containment buildings without first meeting a treatment standard.

We explain below in detail how containment buildings are defined. However, the key features for determining that they are not land disposal units are that wastes are stored indoors in a secure structure (securely walled, roofed, and floored) that is designed to provide containment comparable to that provided by tanks or containers. EPA sees no statutory command precluding Agency discretion to define such units as not involving land disposal, nor did any commenter suggest that the Agency was barred from this determination. Moreover, storage in such units does not raise the types of environmental concerns and uncertainties (see section 1002(b)(7) and 3004(d)(1)(A)-(C)) that Congress sought to address in requiring hazardous wastes to be pretreated before being land disposed. Also, by defining containment buildings as not involving land disposal, the Agency is preventing the anomaly of bulk hazardous wastes not amenable to tank storage, yet requiring storage before treatment, being unable to be legally stored because non-tank or container storage would be defined as land disposal. An example is battery parts and groups that must be staged before being smelted. (55 FR 22637.) Accordingly, EPA is exercising its discretion to define containment buildings as not being land disposal units.

### 2. Definition of Containment Building

EPA today defines in § 260.10 a new unit, "containment building," as a "hazardous waste management unit that is used to store or treat hazardous waste under the provisions of subpart DD of parts 264 and 265." Subpart DD of parts 264 and 265 enumerates the design and operating standards for these units that ensure containment comparable to that of a RCRA tank or container. EPA is

also modifying the definition of "waste pile" to exclude these units.

Under today's rule, a containment building unit is not defined as land disposal pursuant to RCRA section 3004(k) if the unit meets the requirements of § 264.1100 and § 265.1100. The unit must, among other things, be completely enclosed and have self-supporting walls, a primary barrier, designed to be sufficiently durable to withstand the movement of personnel, wastes, and handling equipment in the unit, a secondary containment system (unless the unit manages non-liquid wastes only or has obtained a variance from the secondary containment standard), a liquid collection system, and controls for fugitive dust. The floors, walls, and roof of the unit must be constructed of man-made materials with sufficient structural strength to support themselves, the waste contents, and any personnel and heavy equipment that operate within the unit. The unit also must be designed and operated to prevent tracking of materials out of the unit.

### 3. Applicability of the 90-Day Accumulation Exclusion in § 262.34

a. *Containment Buildings Are Eligible for 90-Day Status.* Under § 262.34, a generator may accumulate hazardous waste on-site for 90 days or less without a permit or without having interim status provided he complies with the requirements of subpart I, J, or W of 40 CFR part 265, among other requirements. To date, EPA has limited applicability of this 90-day provision to generators' containers, tanks, or drip pads (see 55 FR 50450, December 6, 1990). EPA today is extending the 90-day generator exemption in § 262.34 to include containment buildings. The extension of the 90-day generator exemption to containment buildings is consistent with the application of the 90-day generator exemption to similar types of hazardous waste storage units, e.g., tanks and containers.

Commenters to the proposed rule overwhelmingly supported the extension of the 90-day generator exemption to these units. Some commenters also suggested that EPA extend this exemption to all containment buildings; others suggested extending this exemption beyond 90 days. The 90-day generator provision is premised on the need to avoid undue interference with generators' production processes (45 FR 2730, February 26, 1980) and stands as a narrow exception to otherwise applicable permitting requirements. This rationale does not appear to apply to off-site facilities. Therefore, the Agency is not extending its applicability in

today's rule. However, EPA notes that extensions may be granted to the 90-day time period under existing rules when certain specific circumstances apply (see 55 FR 50450, December 6, 1990).

Specific to the comments suggesting that EPA extend the 90-day generator provision to all containment buildings including off-site facilities, EPA is not taking action in today's rule. EPA will, however, take comment on a proposal to expand the 90-day generator exemption to all containment buildings in the upcoming proposal for petroleum contaminated debris to be deferred from the TC. At that time, the Agency will evaluate whether the Agency's narrow exemption for 90-day units to generators should be expanded to off-site units for all tanks, containers, and containment buildings.

b. *Documenting Compliance with 90-Day Limitations.* In the proposed rule, EPA requested comment on whether generators who store or treat hazardous waste in containment buildings pursuant to the 90-day accumulator provisions should be required to maintain on site, for the operating life of the containment building, a description of the procedures ensuring that no waste remains in the containment building for more than 90 days. EPA proposed that documentation of each waste removal be required in the generator's on-site files recording, at a minimum, the quantity of waste removed and the date and time of removal. EPA also noted that certain operations, for example, the continuous processing of wastes or blending of wastes, might complicate the generator's ability to determine when a particular waste volume ceased to be present within the containment building. EPA requested public comment on how best to ensure and document generator compliance with the requirement limiting the time waste may be accumulated within the containment building to 90 days or less.

Several commenters suggested a "mass balance" approach wherein the volume removed from a containment building over the course of 90 days would be required to be at least equal to the amount placed in the unit during that period to ensure compliance with the time limit. EPA does not believe that this would be adequate. While such an approach might ensure that the average residence time of wastes in the unit is less than 90 days, it could not assure that all wastes reside in the unit for less than that period.

Instead, EPA agrees with commenters who suggested that documented procedures ought to assure that each volume of waste resides in the unit for

no more than 90 days. This requirement could be met in two ways: (1) By documenting that the unit is emptied at least once every 90 days, or (2) by having and documenting (in writing) the procedures in place to ensure that wastes in the unit are segregated by age and that no portion of the stored wastes is allowed to remain beyond the time limit. As part of that latter demonstration, owner/operators must document that the nature of their hazardous waste management operation is consistent with respecting that 90-day limit. For example, a generator who plans to use such a unit to accumulate waste for off-site shipment on a monthly basis should be able to meet this test; one who ships waste off site semi-annually could not do so. Given the statute's normal permitting scheme as well as the constraints on extended storage in section 3004(j), EPA believes this degree of assurance of actual waste turnover is justified.

EPA does not seek to require documentation of each individual addition or removal of waste from the unit; rather, the required written documentation must show that procedures are in place to ensure that individual additions and removals of wastes are consistent with the 90-day time limit for each portion of the wastes managed in the unit. However, if the generator cannot meet the 90-day time limit or if a hazardous waste is stored or treated in an off-site containment building, the unit must have interim status or a permit in accordance with existing regulations.

c. *Reclassification of Regulated Units to 90-Day Status.* EPA anticipates that some currently operating units that have been previously classified as waste piles will be converted to containment buildings as a result of today's rule. It is possible that there may be (or have been) releases of hazardous wastes from such units. When this rule was proposed, EPA raised the issue of whether unit-specific corrective action authority under RCRA should be retained for new units and for existing interim status or permitted units that subsequently become 90-day generators with containment buildings as their only RCRA activity. EPA pointed out that, even without RCRA corrective action authority, generators would still be liable for any releases under CERCLA.

Several commenters suggested that some or all units converted to containment buildings should not be subject to corrective action. While the Agency understands these commenters' concerns, the Agency believes that unit-specific corrective action is an

appropriate part of the standards for containment buildings to remediate releases that conceivably occur or may occur from the unit. Such standards are a routine part of every standard for a RCRA hazardous waste management unit, including 90-day generator units. See, e.g. § 265.196 (corrective action for tanks including 90-day tanks) and § 265.443(m) (corrective action for drip pads including 90-day drip pads). The Agency knows of no legal or policy justification for excluding these units from corrective action requirements (i.e., not redressing hazardous waste releases from such units).

However, new units operating under the 90-day generator provision will not trigger facility-wide corrective action under RCRA by themselves under the terms of today's rule, because no permit is required for their operations and the units have never had interim status or permits (see RCRA sections 3004(u) and 3008(h)). These units, however, must remediate unit-specific releases as just discussed, and also would be solid waste management units if the facility requires a RCRA permit for other units.

For previously regulated units, EPA expects that the "unit" for the purpose of corrective action will include the entire structure, or the entire portion of the structure operated, when the containment building is a part of a larger structure.

As noted above, 90-day containment buildings must meet the same substantive standards as permitted and interim status units. This includes a requirement of obtaining certification by a professional engineer that the unit is designed and constructed to meet the requirements for containment buildings and must maintain such certification at the facility (§ 262.34(a)(1)(iv)). The subject of such certifications is discussed at greater length below. Generators planning to convert to or install containment buildings in advance of the effective date for these requirements are required to place certifications for these units in the facility's operating record no later than 60 days from the date of initial operation of the unit as a containment building. After February 18, 1993, PE certification is required prior to operation of the unit.

#### 4. Containment Building Requirements

The specific requirements for a containment building restrict the types of hazardous wastes that may be stored or treated in the unit and specify performance standards for the design and operation of the unit to ensure a measure of protection of human health and the environment greater than that provided by an indoor waste pile, and

substantially equivalent to that provided by a RCRA tank or container. See subpart DD, parts 264 and 265.

a. *Acceptable Wastes.* Many commenters supported EPA's proposal to allow dry wastes or wastes with "very small quantities" of free liquids to be managed in containment buildings. Comments were divided on whether the term "very small" used in the proposal required an explicit definition or implied an unnecessary and arbitrary limit on the amount of liquid included in a hazardous waste to be managed in a containment building. Today's rule states that wastes managed in containment buildings not be liquid in form (i.e., flow under their own weight to fill the vessel in which they are placed, or contain so much liquid that they are readily pumpable) or release such large quantities of liquid into the unit that liquid removal systems cannot prevent accumulation of liquid to significant depths. (These liquid wastes can, of course, be managed in tanks and containers that are inside containment buildings.)

EPA developed the containment building standards so that owner/operators could store or treat hazardous wastes that are not liquid in form, and which are not amenable to management in tanks or containers (perhaps because the waste occurs in a bulky form, or because it is produced in great volume.) This can facilitate owner/operator compliance with the prescribed BDAT standards. However, any waste that is non-liquid in form can also be stored/treated in containment buildings even if the waste already comply with the land disposal restriction standards. The standards discussed below will ensure that these wastes will not pose a hazard to human health or the environment when managed in containment buildings.

Prior to incorporating these concepts into this rule, EPA considered developing a Policy Directive whereby certain hazardous wastes, i.e., aluminum spent potliners, recycled lead batteries, and possibly electric arc furnace dusts, were definitively identified as candidates for management within containment buildings. Although EPA believed wastes that are non-liquid in form could also be managed more practicably in containment buildings rather than tanks or containers, information on such wastes remained lacking. EPA considered two options regarding hazardous wastes eligible for management in these units: (1) All hazardous wastes, including contaminated debris; and (2) only contaminated debris and certain additional bulky, high volume hazardous

wastes that EPA currently understands cannot be practicably stored/treated in tanks or containers. Public comments on the proposed rule stated that EPA should not limit eligibility to debris and certain bulky, high volume hazardous wastes or to specific waste codes, and that a specific limitation on the amount of liquid included in the waste was also not appropriate.

EPA sees no reason to restrict eligibility to only those hazardous wastes for which EPA has data available or to only prohibited wastes. When designed, constructed, and operated in accordance with the standards being promulgated today, a containment building managing hazardous waste that is non-liquid in form will ensure protection of human health and the environment.

*Example:* A secondary lead smelting facility recovers lead from battery plates and groups taken from lead-acid batteries. One of the steps involved in this process, battery cracking, necessarily generates wet lead-bearing materials. For process efficiency, among other reasons, free liquids are removed to the extent feasible prior to staging the materials for furnace feed. However, some residual free liquid remains and cannot be removed easily. In this example, the overall form of the material is non-liquid, even though some amount of free liquid remains despite attempts to remove it. These wastes are eligible for management in containment buildings.

*Example:* A facility is cleaning up an area containing contaminated soil. The excavated soil contains water in the soil matrix, and is at or near the point of saturation. Visual inspection of the soil reveals that the amount of free liquid expected to be released in a containment building is very small in comparison with the total volume of the waste and the liquids management capacity of the unit. This material may be managed in a containment building.

b. *Acceptable Activities.* Containment buildings can be used to store hazardous waste for such activities as treatment (including recovery or other recycling) or transport off site to meet LDR treatment standards. As noted elsewhere in today's rule, wastes may be treated in containment buildings as well as stored in them. Examples of such treatment could include some of the technologies discussed in appendix I to this preamble for treatment of contaminated debris. Many of these technologies require the use of liquid. In many cases, such treatment would be conducted in tanks or containers within such buildings, and the existing

standards for tanks and containers would apply. For example, a method for treating hazardous debris could include treatment in a tank within a containment building followed by storage for a short-period in the containment building. In this example, treatment in the tank would be regulated under the RCRA tank standards, while subsequent storage of the treated waste would be regulated under the containment building standards.

In other cases, treatment in tanks and containers as such may not be possible. For example, personnel may not be able to apply safely some of the prescribed debris treatment technologies to large bulky debris within a tank or container. Therefore, EPA is also allowing treatment that utilizes the addition of liquid as part of BDAT treatment in designated areas within containment buildings. Any drainage or accumulation of liquids applied to hazardous debris must comply with relevant regulations. EPA is requiring that liquids be removed from the containment building at the earliest practicable time in order to preserve the effectiveness of liquid containment systems (§ 264.1101(b)(2)(ii) and § 265.1101(b)(2)(ii)).

*c. Design and Operating Standards.* EPA is promulgating the following design and operating standards for permitted units, units operated under interim status, and units under the 90-day accumulation exemption. In general, the design and operating standards are intended to ensure containment of waste equivalent (or, with regard to air emissions superior) to the containment achieved by tanks. Thus, the units must be designed to contain releases to land through primary and in some cases secondary containment systems, and to contain potential particulate emissions as well. The unit is also to be designed to prevent exposure of waste to precipitation and wind. As noted above, EPA is determining that these units are not engaged in land disposal based on designs for this level of containment. Moreover, the design and operating standards should ensure protection of human health and the environment (as do the tank standards).

Thus, to distinguish these units from waste piles—i.e., land disposal units—hazardous wastes managed in these units must be fully contained within the unit. As such, the unit must be completely enclosed with a floor, walls and a roof to prevent exposure to precipitation and wind (§ 264.1101(a)(1) and § 265.1101(a)(1)). Many of the hazardous wastes currently managed in these waste piles may have significant volumes of fine particulates. EPA

believes that enclosure within a structure, in conjunction with other measures to control fugitive dust emissions, will prevent the escape of these fine particulates from the unit. Although a number of commenters to the proposed rule did not believe complete enclosure to be necessary, EPA continues to regard this as key to ensuring complete containment of wastes managed in these units, and thus distinguishing these units from land disposal units such as piles.

i. Floors, Walls, and Roof. The floor, walls, and roof of the unit must be constructed of man-made materials with sufficient structural strength to support themselves, the waste contents, and any personnel and heavy equipment that operate within the unit. Fragile barriers that would not withstand repeated contact with handling equipment used in the unit thus are not suitable, and units designed with such ineffective barriers would not be containment buildings. Operating events such as deliberate or accidental placement of materials against containment walls must be taken into account in designing and constructing the unit. Factors such as settlement, frost-heave, and exposure to wind force must also be considered. All surfaces to be in contact with hazardous wastes must be chemically compatible with those wastes. Because the intended use for these units is short-term storage or treatment, the unit must be designed to accommodate appropriate levels of loading and unloading activity during its operating lifetime. (See § 264.1101(a)(2) and § 265.1101(a)(2).)

ii. Primary and Secondary Containment. EPA is requiring several measures to ensure that hazardous wastes are managed in a fashion that ensures containment of contaminants and prevents releases into the environment. All containment buildings must be equipped with a primary barrier designed and constructed of materials to prevent hazardous wastes from being accidentally or deliberately placed on the land beneath or outside the unit. The design and construction of the primary barrier will vary depending on the type of waste to be managed in the unit. For containment buildings used to manage wastes without free liquids, the primary barrier may be a concrete floor if the wastes to be managed will not migrate into the concrete matrix. Containment buildings used to manage wastes with even small amounts of free liquids must be provided with a primary barrier designed and constructed of materials to prevent migration of hazardous constituents into the barrier and a liquid collection and removal system that will

minimize the accumulation of liquid on the primary barrier (§ 264.1101(b)(2) and § 265.1101(b)(2)). In this case, the primary barrier might be a steel or flexible membrane liner covered by a concrete wear surface. The liquid collection and removal system above the primary barrier should be designed, constructed, and operated to minimize the accumulation of liquids above the primary barrier. EPA expects that a minimum one degree slope for the primary barrier combined with appropriate means for collecting and removing liquids (e.g. troughs, drains, dikes, or sumps and/or pumps as necessary) will meet this goal. The determination of the presence of free liquids must be made using, for example, the paint filter test [EPA test method SW-86] if applicable, a visual examination, or other appropriate means.

The primary barrier must be sloped to drain liquids or other wastes to the collection system, and to ensure that liquids are not released into any portions of the unit that are not provided with secondary containment. This latter requirement for separation between "wet" and "dry" areas of a containment building is discussed below in greater detail.

In all cases, the primary barrier must be designed to withstand the movement of personnel, wastes, and handling equipment in the unit. (See § 264.1101(a)(4) and § 265.1101(a)(4).) By this, EPA means that coatings or membranes that might be exposed to abrasion or tearing by personnel, wastes, or equipment must be sufficiently durable to withstand that activity, be protected from it, or be scheduled for replacement on a regular basis as needed as part of the design of the unit. The primary barrier must be maintained to be free of cracks, gaps, corrosion, or other deterioration that could result in the significant release of hazardous waste.

Portions of containment buildings used to manage hazardous wastes containing free liquids must, in addition, be provided with secondary containment systems including (1) a secondary barrier and (2) a leak detection system. The secondary barrier must be designed and constructed of materials to prevent the migration of hazardous constituents into this barrier. The leak detection system, which lies below the primary barrier and above the secondary barrier, must be capable of detecting, collecting, and removing leaks of hazardous constituents through the primary barrier at the earliest practicable time. In keeping with the

design standards for liners and leak detection systems (57 FR 3462), this may be achieved by installation of a system that is, at a minimum: (1) Constructed with a bottom slope of 1 percent or more; and (2) constructed of a granular drainage material with a hydraulic conductivity of  $1 \times 10^{-2}$  cm/sec or more and a thickness of 12 inches (30.5 cm) or more, or constructed of synthetic or geonet drainage materials with a transmissivity of  $3 \times 10^{-3}$  m<sup>2</sup>/sec or more. The secondary containment system must be constructed of materials that are chemically resistant to the waste managed in the containment building and of sufficient strength and thickness to prevent collapse under the pressure exerted by overlaying materials and by any equipment used in the containment building.

If only portions of a containment building are equipped with secondary containment, then "dry" areas (those without secondary containment) and "wet" areas (those areas with secondary containment) must be hydraulically separate. By this, EPA means that the containment building must be designed and operated so that liquids managed in "wet" areas are prevented from draining into "dry" areas by measures such as dikes, walls, trenches, differences in grade, etc. (See § 264.1101(b)(3)(i) and § 265.1101(b)(3)(i).) Wastes entering a "dry" area of the containment building, from a "wet" area of the unit must not contain more than de minimis amounts of free liquids (and a paint filter or equivalent test could be passed, if the physical form of the material would allow such a test to be performed).

In addition, today's rule clarifies that treatment of hazardous wastes within containment buildings may involve the addition of free liquids. As with any "wet" containment building areas, portions of containment buildings where wastes are treated with liquids must meet design standards that the Agency is promulgating today and that are equivalent to those applicable to tanks. These areas thus must be designed to prevent any release of liquids, wet materials, or liquid aerosols to other portions of the unit. In particular, treatment technologies involving liquids under high pressure such as high pressure washing must be restricted to dedicated cells or areas within the containment buildings designed and operated to prevent such releases. Barriers to such releases should be designed and constructed to be appropriate to the nature of the physical and chemical nature of the treatment to be performed, and should ensure proper control of wastes and moisture

throughout the operating life of the unit. EPA notes that use of a number of treatment technologies including technologies specified elsewhere in today's rule may require barriers to movement of moisture into unit walls equivalent to those generally required to prevent migration of hazardous constituents into the primary barrier.

For example, soil washing may be conducted in a treatment area of the containment building. After treatment, the soil is allowed to drain. While significant quantities of free liquid remain, the soil must be managed in "wet" areas with secondary containment. When only de minimis quantities free liquids remain the materials may be managed in "dry" areas without secondary containment.

EPA recommends, but is not requiring, that owner/operators of containment buildings consider providing the entire unit with secondary containment in order to guard against contaminant releases and their associated costs in the event of operator error, equipment failure, or other unanticipated circumstance.

EPA believes containment buildings can serve as secondary containment systems for tanks placed within the building under certain conditions. A containment building can serve as an external liner system for a tank, provided it meets the requirements of § 264.193(d)(1), i.e. that it is designed and operated to contain 100 percent of the capacity of the largest tank within its boundary, designed and operated to prevent run-on or infiltration of precipitation into the secondary containment system, free of cracks or gaps, and designed and installed to surround the tank completely and to cover all surrounding areas likely to come into contact with the waste. In addition, the containment building must meet the requirements of § 264.193(b) and § 264.193(c)(1) and (2) to be considered an acceptable secondary containment system for a tank.

iii. Waiver from and Delay of Compliance with Secondary Containment. Under today's rule, the Regional Administrator has the discretion to waive the secondary containment requirement for containment buildings or areas of containment buildings where the only liquids to be used in the unit are liquids that will be used to control dust or to otherwise protect worker health and safety in accordance with OSHA requirements. Thus, in some cases, the Regional Administrator may determine on a case-by-case basis that secondary containment is not necessary where

liquids are used in this fashion. For 90-day units where owner/operators wish to use liquids to control dust or otherwise protect worker health and safety and do not believe that secondary containment is necessary, the owner or operator must make a demonstration that the use of liquids in such a manner will not result in the release of contaminants and have a professional engineer certify to the fact.

EPA is also allowing the option of a delayed compliance date for the secondary containment requirement. Existing units converting to containment buildings and which are equipped with a primary barrier and a liquid collection system may be granted up to a two-year delay for compliance with the secondary containment requirement if these units substantially meet all other standards spelled out in today's rule. This may be the case for some existing buildings currently surpassing the design requirements applicable to indoor waste piles but not having secondary containment.

To avail themselves of this extension, owner/operators must provide a written request to the Regional Administrator by February 18, 1993. This request must include a description of the unit and its operating practices with special reference to the design and performance of any existing barrier layer(s), liquid collection and removal systems. Existing data and/or reports on materials, permeability, and drainage characteristics must be included, together with existing available quality assurance data on how the existing unit was constructed. It must describe specific plans including a schedule for retrofitting these units to meet the standards promulgated today.

The Regional Administrator will review this plan, and approve or provide comments. If owner/operators receive comments from the Regional Administrator, they will have 30 days to revise their submissions and respond to comments. The Regional Administrator will review the revised submission, and decide whether to grant up to a 2-year delay for secondary containment and may specify conditions for its approval. This decision will be based on whether the Regional Administrator has confidence that substantially meets the other standards in the rule, so that the unit will not release contaminants to the land prior to the required retrofit.

iv. Height of Waste in Unit. Another measure to ensure containment of hazardous waste managed in these units is today's requirement that the level of the waste inside the unit cannot exceed the height of the containment walls

intended to come in contact with the hazardous waste. (See § 264.1101(c)(1)(ii) and § 265.1101(c)(1)(ii).) EPA considers it a necessary good housekeeping practice to prevent stored/treated hazardous waste from spilling over the walls of the unit and, in the case of certain hazardous wastes, to be able to contain any potential "landsliding" of material out of the unit. It is important to note that the walls referred to in this provision are those containment walls, or parts thereof, designed and constructed to be in contact with the hazardous waste and to support its weight. The following example highlights this distinction.

*Example:* A facility has constructed a containment building to accumulate its hazardous waste prior to conducting treatment to meet LDR standards. The unit has a reinforced concrete floor and 10-foot high reinforced concrete walls. The remainder of the sidewalls, built atop the concrete wall and extending to the roof, are constructed of steel framing with fiberglass panels. In this example, the hazardous waste stored/treated inside the unit must not be piled any higher than the 10-foot reinforced concrete walls. The remainder or upper portion of the walls are not designed to support the weight of the waste and may not provide adequate containment of the waste in the event of an unexpected shift in the position of a portion of the waste, i.e., hazardous waste could escape through the panel joints.

A number of commenters to the proposed rule had concerns with the prohibition on piling wastes above the height of the walls intended to contain them, noting correctly that many wastes can be formed into conical piles extending substantially above the height of walls which may be supporting a portion of their weight. EPA's reason for including this requirement is to assure that there was no possibility of accidentally overtopping the containment walls. Accordingly, today's rule retains this requirement. EPA notes, however, that this requirement is intended to apply only to those walls that could come into contact with the waste and are intended to contain the waste. The examples below clarify EPA's intent.

*Example:* If waste is stored in a room within the containment building, where the interior walls, i.e., the walls of that room, are designed to support and/or contain hazardous wastes, those walls must meet the standards for containment walls. Exterior walls that could not come into contact with the

waste would not have to meet those requirements in this case.

*Example:* If waste is stored in "stalls" within the containment building, where the walls that define the stalls are not designed and constructed to meet the requirements for containment walls, then the exterior walls must do so. Note, however, if the stalls are intended to separate wet and dry areas or to document that wastes are accumulated for less than 90 days, the stalls must be constructed to fulfill their function under normal operating conditions.

v. Standards for Doors and Other Openings. A related set of issues in the proposed rule refers to specifications for door and other wall openings used for equipment and personnel. EPA proposed that these doors and openings should be capable of providing the same level of structural support and containment as the rest of the wall, and invited public comment on specific standards for doors and openings that are part of a wall otherwise providing support and containment of hazardous waste managed within a containment building.

Today's rule departs somewhat from the proposed rule on these issues. In response to many public comments, EPA is clarifying that doors and other openings do not necessarily need to meet the same structural standards as walls. Depending on the nature of the wastes and the operations to be carried out in a particular unit, a relatively light-weight door may be adequate if: (1) It provides an effective barrier that controls fugitive dust emissions from the unit to meet the no visible emissions standard (see § 264.1101(c)(1)(iv) and § 265.1101(c)(1)(iv)), and (2) the unit is designed and operated in a fashion that assures that wastes will not actually come in contact with the door. This latter requirement could be satisfied, in many cases, by a set-back of wastes stored in the unit. As noted above, these requirements may be satisfied by either interior or exterior walls, subject to constraints posed by the way the waste is managed.

vi. Measures to Prevent Tracking. EPA believes routine handling of hazardous waste within many of these units demands the frequent, if not constant, presence of personnel and handling equipment, e.g., front-end loaders, cranes. As such, particularly when the hazardous waste includes small particulates or where handling of the hazardous waste generates dust, the potential for tracking hazardous waste out of the unit may be significant. Therefore, EPA is requiring that the owner/operator ensure the containment of hazardous waste within the unit with

appropriate measures to prevent this. (See § 264.1101(c)(1)(iii) and § 265.1101(c)(1)(iii).) Wash-down of vehicles and equipment prior to exiting the unit and dedicating vehicles and equipment for the sole purpose of operating within the unit are examples of measures that owners/operators of these units could take when the potential exists for tracking of hazardous waste out of the unit. In addition, owner/operators must prevent tracking of water or wet materials from "wet" areas to "dry" areas.

vii. Control of Fugitive Dust Emissions. Because of the dusty nature of many of the hazardous wastes that may be managed in these units and the dusty conditions that can be caused by the handling of these wastes within the unit, EPA also is requiring that owner/operators control fugitive dust emissions during normal operating conditions. (See § 264.1101(c)(1)(iv) and § 265.1101(c)(1)(iv).) EPA has revised these requirements from the proposed rule based on extensive public comment. Today's rule provides substantial additional flexibility to owner/operators in how they may achieve the required degree of control. However, EPA is also specifying the standard more rigorously, and clarifying the presumption that owner/operators must install and operate systems to control fugitive dust emissions unless they can demonstrate that the wastes to be managed in the unit will not release significant amounts of fine particulates from the building as they are handled or treated.

The proposed rule required a system whereby a negative pressure was maintained within the unit and particulates collected, e.g., by fabric filter or electrostatic precipitator. In response to public comments, today's rule provides greater flexibility in controlling fugitive dust, but more specificity in the degree of control that must be attained.

The final rule requires that there be no visible emissions through any unit openings. This state of no visible emissions must be maintained effectively at all times during routine and operating and maintenance conditions, including when vehicles and personnel are entering and exiting the containment building. This standard is based on current standards required by EPA's Air Office. A test method found in 40 CFR part 60 appendix A, Method 22—Visual Determination of Fugitive Emissions from Material Sources and Smoke Emissions from Flares—can be used to determine compliance with the no visible emissions requirement. It is a timed method where an observer, using

a stopwatch, determines if for a given period of time a source has visible emissions. If used to meet these standards, negative pressure dust control systems should assure that the air flow through openings such as windows and doors is inward at all times. All dust control systems must be operated and maintained in accordance with sound air pollution control practices (these practices are described in more detail in 40 CFR part 60, subpart 292).

Techniques other than the maintenance of negative pressure may be utilized where they can be shown to maintain no visible emissions from openings in the unit. The owner or operator of a containment building is required to maintain control of fugitive dust emissions such that any unit openings (e.g., doors, windows, seams, vents, cracks, etc.) exhibit no visible emissions outside the containment building. Compliance with this requirement may include such measures as double door (airlock-type) entry designs. All units must have the certification of a professional engineer that any dust control system is designed to achieve the no visible emissions standard.

Notwithstanding any other requirements of subpart DD of parts 264 and 265, if the method of controlling fugitive dust emissions includes the application of liquids, the Regional Administrator has the discretion to waive the secondary containment requirement for containment buildings or areas of containment buildings where liquids will be used to control dust or to otherwise protect worker health and safety in accordance with OSHA requirements. (See § 264.1101(e) and § 265.1101(e).) EPA notes that the application of free liquids alone may not be sufficient to control fugitive dust emissions.

viii. Inspection Plan. To ensure the unit is operating as designed, EPA is requiring all owner/operators to have an inspection plan for all containment buildings that establishes an inspection program that ensures maintenance of the structural integrity of the unit and prompt detection of any leaks or releases to the air, ground, or water. EPA is requiring an inspection schedule for these units whereby, at least every seven days, monitoring/leak detection equipment, the containment building, and the area surrounding the containment building is checked to ensure the unit is being properly operated and that no leaks/releases have occurred to the air, ground, or water. (See § 264.1101(c)(4) and

§ 265.1101(c)(4).) This is consistent with the existing inspection requirements for drip pads and for liner and leak detection systems. These observations must be recorded in the facility's operating record. In the event that a condition is detected that has led or could lead to a release of hazardous waste, the owner or operator must repair the condition within a reasonably prompt time following discovery in accordance with the standard procedures for similar units. (See § 264.1101(c)(3) and § 265.1101(c)(3).)

In response to comments on these inspection requirements, EPA points out in today's rule that these weekly inspections need not be unduly burdensome. Electronic monitoring of liquid in secondary containment systems or of air pressure differentials between the inside and outside of a containment building are examples of relatively cost-effective monitoring techniques.

ix. Engineering Certification. In the proposed rule, EPA identified that it was considering but was not proposing a requirement for written certification by an independent registered professional engineer (e.g., one who is not an employee of the company, or of its parent or subsidiary.) The benefit of such a certification would be to ensure that any new or existing containment building is designed and constructed with sufficient structural integrity to safely manage and contain the hazardous waste. Public comment was divided on the appropriateness of requiring independent certification. EPA has decided not to require that this certification be made by an independent professional engineer. Since professional engineers are certified and licensed by States and thus have a substantial incentive to maintain their professional reputation, a professional engineer must certify that the containment building has been designed with sufficient structural integrity and is acceptable for storing and treating hazardous waste according to the standards specified by EPA. The assessment must show that the foundation, structural support, primary barrier, secondary containment system (where required), fugitive dust control system, and leak detection system are designed to meet today's standards and that the containment building has sufficient structural strength and compatibility with the waste to be stored or treated. (See § 264.1101(c)(2) and § 265.1101(c)(2).)

x. Temporary Containment Buildings. Finally, EPA is aware that in situations such as hazardous waste site

remediation efforts, appropriately designed and operated containment buildings could serve to enhance the performance of bioremediation treatment technologies. It may not always be appropriate for containment buildings intended for temporary use to be constructed or operated in exactly the fashion outlined in today's rule. EPA plans to address temporary containment buildings in a future rulemaking.

d. Closure Requirements. Today's rule promulgates requirements for closure of containment buildings that are consistent with the closure requirements that apply to waste piles (§§ 264.258 and 265.258) and tanks (§§ 264.197 and 265.197). At closure, owners or operators of both permitted and 90-day containment buildings will be required to clean close the units by removing all hazardous waste from the containment building and by removing or decontaminating all hazardous waste residues, contaminated containment system components, contaminated subsoils, and structures and equipment contaminated with waste, and managing them in accordance with the Subtitle C regulations. If the unit containment building cannot be clean closed, the unit must satisfy the requirements for closure that apply to landfills under § 264.310 or 265.310. For a discussion of the requirements for clean closure and the "remove or decontaminate" standard, see 52 FR 8504, March 19, 1987.

Owner/operators of interim status waste piles who wish to convert these units to interim status containment buildings need not necessarily clean close their units prior to conversion; closure requirements applicable to these units may be deferred until closure of the containment building.

#### 5. Revised Definition of Pile

EPA today is revising the regulatory definition of pile to exclude containment buildings. Specifically, EPA is revising the definition of "pile" to explicitly exclude containment buildings that accumulate or treat prohibited wastes under the proposed requirements of Parts 264 and 265. Although EPA has previously classified all roofed structures used to manage dry wastes as indoor waste piles, EPA believes that there are distinctions between indoor waste piles that constitute land placement and containment buildings.

Most commenters generally supported these changes as proposed, although a limited number of commenters suggested that EPA revise the definitions of "pile" and "tank" more extensively. EPA may refine those definitions further in separate action at



a later date, but EPA believes that the definitions in today's rule (which are substantially similar to those in the proposed rule) identify the distinctions between the various types of units with sufficient clarity to indicate which are land disposal and which aren't.

Under existing § 264.250, indoor waste piles are required to exclude liquids or material containing free liquids, be protected from surface water run-on, control dispersal of waste by means other than wetting, and not generate leachate through decomposition or other reactions. In contrast, the containment building design and operating standards provide a higher level of containment and are in many ways comparable to RCRA tanks—that is, the hazardous waste is contained during storage or treatment. For example, containment buildings must be fully enclosed, have weight-bearing walls and floor systems designed and constructed of materials to prevent migration of hazardous constituents, be equipped with a secondary containment system in areas where the hazardous waste contains significant quantities of free liquids, and be provided with fugitive dust emission controls. Whereas containment buildings are designed to manage moisture associated with non-liquid wastes, indoor waste piles are precluded from including any water whatsoever.

#### 6. Amendment of § 268.50 Storage Prohibition and Permit Requirements

Under existing § 268.50, the storage of hazardous wastes prohibited from land disposal is also prohibited unless, among other requirements, the waste is stored in tanks or containers on site solely for the purpose of the accumulation of such quantities of hazardous waste as are necessary to facilitate recovery, treatment, or disposal. At the time EPA adopted this provision, tanks and containers were the only types of storage units that did not also involve land disposal. Under today's rule, there will also be other types of storage units (i.e., containment buildings, subpart X storage units) not involving land disposal. There may also be other types of miscellaneous storage units in the future, which units would be regulated under subpart X. EPA is thus promulgating this rule to conform § 268.50 to include these units.

#### 7. Amendments to the Permit Modification Procedures in § 270.42

Today's rule also amends appendix I of § 270.42 by adding section M which will classify permit modifications involving containment buildings. In addition, today's rule amends the

modifications for waste piles by adding an item which classifies a modification to a waste pile to meet the standards for a containment building as a Class 2 modification. EPA believes that many facilities will make modifications to their permitted waste piles to meet the standards for containment buildings. For more information on these permit modification procedures, see 53 FR 37912, September 28, 1988.

EPA is also amending section I of appendix I of § 270.42 to add item I.6, which allows permitted facilities to convert existing waste piles to containment buildings by submitting a Class 2 modification to the Agency. EPA believes that the public should have the opportunity to comment on the modification request, which the Class 2 procedures provide. However, EPA believes that this modification is not significant enough to warrant the Class 3 procedures because the unit is an existing unit, and the technical standards are more stringent for containment buildings than for waste piles.

Some of the hazardous debris treatment processes that were proposed as BDAT under § 268.45 would take place in units that EPA proposed to define as containment buildings. To assist in the development of treatment capacity by permitted facilities to meet the requirements of this rule, the Agency proposed to change the criteria that must be met to grant a temporary authorization. The existing regulation at § 270.42(e)(3)(ii)(B) allows approval of the request if the activity is necessary to treat or store restricted wastes in tanks or containers in accordance with part 268. Today's rule amends these criteria to include the treatment or storage of hazardous debris in containment buildings meeting the requirements in proposed subpart DD, parts 264 and 265.

#### 8. Amendments to the Change During Interim Status Procedures in § 270.72

Section 270.72(b)(6) lifts the reconstruction limit for changes to treat or store in tanks and containers hazardous waste subject to land disposal restrictions imposed by part 268, provided that such changes are made solely for the purpose of complying with part 268. EPA believes that this change should also apply to treatment or storage of hazardous wastes in containment buildings. Today's rule amends § 270.72(b)(6) to make treatment or storage in containment buildings as regulated under subpart DD, parts 264 and 265, exempt from the reconstruction limit.

#### 9. Amendment of § 268.7 Waste Analysis and Recordkeeping Requirements

Today's rule amends § 268.7 Waste Analysis and Recordkeeping requirements to include the management or treatment of prohibited waste in containment buildings.

#### 10. Revision of § 260.10 Definition of Miscellaneous Unit

Today's rule also makes a conforming change to the § 260.10 definition of a miscellaneous unit by excluding containment buildings from that definition.

### H. Retrofitting Surface Impoundments Under Land Disposal Restrictions

#### 1. Regulatory Background

On February 4, 1992, EPA proposed a rule reconciling apparent conflicts in statutory language regarding surface impoundments receiving newly identified and listed prohibited hazardous wastes that have not been treated to meet a treatment standard (57 FR 4170). EPA is taking final action on that proposal in this FR Notice because the issue is relevant to wastes (particularly F037/F038) for which standards are being adopted today. (EPA also discussed this issue in the proposal to this rule at 57 FR 999-1000.)

a. *Issue.* EPA has identified a conflict in the Resource Conservation and Recovery Act (RCRA) concerning the deadline by which surface impoundments managing wastes that are both newly identified or listed as hazardous (i.e., identified or listed after the date of enactment of HSWA) and prohibited from land disposal must come into compliance with the minimum technological requirements (MTRs) of section 3004 (o)(1)(A) and 3005(j)(1). The MTRs require surface impoundments to have a double liner with a leak detection system, and a ground-water monitoring system.<sup>1</sup> In a typical situation, an impoundment will be receiving a hazardous, prohibited wastewater or generating a hazardous, prohibited sludge in the impoundment. These wastes typically will not meet treatment standards when placed in impoundments. The statutory conflict arises because one set of provisions states that impoundments can receive

<sup>1</sup> EPA has stated that land disposal facilities newly regulated under subtitle C of RCRA as a result of a newly identified or listed hazardous waste must install a ground-water monitoring system within one year of the effective date of the listing or characteristic rule (55 FR 39409, September 27, 1990). This deadline will not change as a result of this final rule.

untreated prohibited wastes only if they meet MTRs. Moreover, it is assumed that the lack of MTR impoundments creates a shortage of treatment capacity, justifying a variance. A further potential problem exists because normally only MTR impoundments are allowed to receive restricted wastes subject to capacity variances. On the other hand, a different statutory provision allows impoundments up to four years to achieve compliance with MTRs (or to close). The conflict arises if the LDR prohibitions come into play before this four-year period expires.

We now describe the relevant statutory provisions in more detail. Section 3005(j)(6) allows a four-year compliance period for meeting the surface impoundment MTRs after the promulgation of additional listings or characteristics of hazardous waste. At the end of the four-year period, the impoundment must either meet MTRs or cease receiving, treating, or storing hazardous waste (referred to as "closing" in this discussion). (Thus impoundments newly in the system are given the same four years to retrofit or close that existing impoundments receive. Section 3005(j)(1).) Congress thus acknowledged that retrofitting or closure is not a quick process, but rather one that requires time, thus tempering the need to protect the environment with an acknowledgement that there must be a reasonable period for changing operations.<sup>2</sup>

Section 3004(g)(4) requires EPA to prohibit newly identified or listed hazardous wastes from land disposal (i.e., promulgate treatment standards for all such wastes not disposed in no migration units) within six months of the date of the new listing or characteristic. Section 3004(h)(4), which also deals with land disposal restrictions, states that during a national capacity variance (which EPA issues if sufficient treatment capacity is unavailable nationwide) or case-by-case extension period (for individual facilities demonstrating that they are unable to find existing treatment but have a binding contractual commitment to provide treatment capacity), wastes not meeting the treatment standards may be placed

in a surface impoundment only if the impoundment is in compliance with the MTRs.<sup>3</sup> *Mobil Oil Corp. v. EPA*, 871 F.2d 149 (D.C. Cir. 1989). Finally, section 3005(j)(11) states that only surface impoundments meeting MTRs, and that are dredged annually, may receive prohibited wastes that have not yet met a treatment standard.

As noted above, these provisions raise two sources of potential conflict. The first is how long non-MTR impoundments can continue to receive prohibited wastes (i.e., wastes not meeting a treatment standard and for which there is no capacity variance). Section 3005(j)(6) indicates four years while section 3005(j)(11) does not allow it. A second conflict occurs for impoundments managing wastes granted a national capacity variance or case-by-case extension when treatment standards are promulgated, because it is unclear whether surface impoundments must be in compliance with the MTRs at that time (per section 3004(h)(4)) or four years after the promulgation of the new listing or characteristic.

b. History. This conflict was not apparent when Congress enacted the Hazardous and Solid Waste Amendments of 1984 (HSWA) or when EPA first implemented the land disposal restrictions, even though the earliest land disposal restrictions dates (24 months from the enactment of HSWA for solvents and dioxins and 36 months for the California list wastes) would appear to cut short the November 8, 1988 retrofit deadline (four years after HSWA enactment) for interim status surface impoundments if they received wastes for which EPA granted a capacity variance. The issue did not arise because EPA interpreted section 3004(h) differently at that time; rather than requiring an individual unit receiving restricted waste to meet the MTRs, EPA required only those units within the same facility that were otherwise subject to the MTRs to be in compliance. As a practical matter, that meant that only new, replacement, or expansion units had to meet the MTRs.

In the August 17, 1988 rule promulgating the land disposal restrictions for the First Third Scheduled Wastes (53 FR 31138), EPA changed its interpretation to require individual units to comply with the MTRs. That reinterpretation became effective four years after the enactment of HSWA and was upheld in *Mobil Oil Corp. v. EPA*,

871 F.2d 149 (D.C. Cir. 1989). There was no conflict at that time because the four-year retrofitting period ended at the same time that the revised interpretation took effect.

The conflict was mentioned in the Third Third proposal (54 FR 48499, November 22, 1989), which stated that if EPA issues a capacity variance for newly identified or listed hazardous wastes, it would have to reconcile the differences in sections 3005(j)(6) and 3004(h)(4). (The notice did not allude to potential conflicts with section 3005(j)(11) because it was assumed that the lack of MTR impoundments would give rise to circumstances justifying capacity variances, triggering the potential conflict with section 3004(h)(4).) Several commenters responded to this issue. Some stated that section 3005(j)(6) explicitly afforded four years to retrofit surface impoundments newly brought under subtitle C regulation. Another commented that the four years provided to retrofit surface impoundments managing regulated mineral processing wastes may not be adequate, and that the schedule should be determined site-specifically.

Others disagreed, however, that a conflict exists between sections 3004(h)(4) and 3005(j)(6). They argued that: (1) EPA's interpretation of section 3004(h)(4), rather than any inherent flaw in the statute, led to the apparent "conflict," and (2) the general language of section 3004(h)(4) cannot override the specific language of section 3005(j)(6), wherein the issue of newly identified or listed hazardous waste is addressed directly. EPA did not resolve this issue in the final Third Third land disposal restrictions rule, but rather left it for later resolution. EPA is taking this opportunity to resolve the conflict.

## 2. Agency Interpretation

a. *How long can impoundments continue to be used to receive or generate newly identified or listed hazardous wastes?* The first set of provisions potentially in conflict are 3005(j)(6) and 3005(j)(11). As noted above, one provision allows four years to retrofit or close an impoundment, the other says that only MTR impoundments can receive prohibited wastes not meeting a treatment standard. Once EPA promulgates a treatment standard, the question is whether a non-MTR impoundment can receive prohibited wastewaters, and continue to generate prohibited sludges, i.e., whether these wastes can continue to be land disposed (section 3004(k)) within the non-MTR impoundment, assuming, as is almost

<sup>2</sup> Section 3005(j) is actually a series of deadlines connected with the retrofitting of surface impoundments. For those units that undoubtedly have to retrofit, the time period is four years, while those that may qualify for variances are subject to interim deadlines for application and action on the variance request, and then a period, if the variance is denied, to retrofit within the time remaining in the four-year period. There are also retrofit deadlines for units initially granted variances, but later found to be leaking. These units are given shorter periods (two or three years depending on the variance), but this is appropriate where there is an actual leak.

<sup>3</sup> RCRA sections 3004(h)(2) and 3004(h)(3) restrict the duration of national capacity variances and case-by-case extensions to a maximum of four years. If capacity becomes available sooner, it must be used.

certain, that the wastes do not meet the treatment standard when they are disposed in the impoundment.<sup>4</sup>

As noted below, the same question arises if one assumes that lack of existence of MTR impoundments triggers capacity variances, because § 268.5(h) (codifying section 3004(h) (4)) indicates that only MTR impoundments are eligible to receive the restricted wastes subject to the variance (assuming impoundments disposal).

EPA believes that this set of provisions is in conflict, since any other reading means that Congress gave a four-year window for continued non-MTR impoundment use with one hand, and snatched it away with the other by means of section 3005(j)(11).<sup>5</sup> The Agency is resolving this conflict by allowing interim status surface impoundments a four-year period (from the effective date of the waste identification or listing) to continue using the impoundment to receive prohibited wastewaters and generate prohibited sludges. This allows the period Congress appeared to deem typically necessary to close or retrofit an impoundment (see also section 3005(j)(1) where Congress provided the same four-year period for impoundments managing wastes identified or listed as

hazardous on the date of enactment of the 1984 amendments).

Although Congress goal is not to put untreated wastes into non-MTR-compliant surface impoundments, it recognized that MTR compliance cannot be achieved immediately. Although the legislative history does not expressly articulate it, the structure of section 3005(j) shows that Congress thought that the goal of environmental protection (served by retrofitting) needed to be balanced against the goal of avoiding sudden disruptions and capacity losses in waste treatment and disposal that a six-month deadline could cause. Congress felt that four years struck an appropriate balance.

Although EPA recognizes that not all impoundments will take four years to close or retrofit (see 57 FR at 4173-74 (Feb. 4, 1992)), an interpretation that would allow EPA to review individual determinations of whether a full four-year period is needed to close or retrofit (for example, through review of applications for case-by-case capacity extensions) appears unduly disruptive of plant waste management determinations (i.e., EPA or State officials second-guessing determinations of the necessary length of time to close or retrofit), and wasteful of Agency resources as well. In addition, Congress indicated that a four-year window was appropriate. Thus, the Agency is interpreting these provisions to state that non-MTR impoundments can remain operating for four years after the effective date of the waste identification or listing notwithstanding that they are receiving prohibited waste not meeting a treatment standard.<sup>6</sup>

This same potential conflict is raised in duplicative fashion during the period of a national or case-by-case capacity variance. Not only is there the conflict with section 3005(j)(11) as discussed above, but a conflict with section 3004(h)(4) as well, since under that provision (as implemented in section 268.5(h)) only MTR impoundments can receive wastes during the period of a capacity variance. EPA is resolving this conflict by allowing a four-year retrofit period for the same reasons given above. Thus, the Agency reads section 3005(j)(6) as an exception to the general rule of section 3004(h)(4) (and

3005(j)(11)); that is, surface impoundments newly brought into the subtitle C system by a new listing or characteristic have four years to retrofit even if they receive wastes subject to a national capacity variance or case-by-case extension. However, EPA notes that the potential conflict between statutory provisions exists whether or not treatment capacity exists outside of the surface impoundment (see fn. 6).<sup>7</sup>

b. Resolution where treatment capacity exists outside the surface impoundment. If treatment capacity exists outside the surface impoundment, however, a further issue exists with respect to sludges generated within a surface impoundment, since these sludges can be removed for treatment elsewhere. In the January 9, 1992 proposed rule, the Agency proposed to resolve these issues by requiring annual dredging of F037 and F038 sludges, plus requiring clean closure of the unit (assuming the unit would be closed rather than retrofitted). The proposal was premised on the logic that if retrofitted impoundments receiving wastes not meeting a treatment standards had to be dredged annually (because of section 3005(j)(11)), unretrofitted impoundments should be subject to the same standard if there was a means of treating the waste being removed. The proposed clean closure requirement was based on the notion that if treatment capacity exists, it should be used in preference to disposal in a non-MTR impoundment. In the Feb. 4 proposal, EPA also noted a general principle of requiring use of treatment capacity for wastes in section 3005(j)(6) impoundments where such treatment capacity exists. (57 FR 4170.)

Commenters noted that aspects of the proposal did not necessarily make environmental sense. They noted that an annual dredging requirement was unlikely to provide significant environmental benefit because the impoundments were likely to be closed in a short time in any event, when some sludge removal was likely. Before closure, the impoundment would be monitored and subject to corrective action requirements. In addition, an annual dredging requirement could interfere with on-going use of the impoundment. With respect to clean

<sup>4</sup> The Agency adheres to its consistently held view that wastes generated in surface impoundments are land disposed within the meaning of section 3004(k). The Land Disposal Restrictions for Solvents and Dioxins final rule, which laid the foundation for future Land Disposal Restriction rules, stated that "residuals that exceed the treatment standards must be removed at least annually from the time the waste is first placed in the impoundment" (51 FR 40601, Nov. 7, 1986). Hence, it presupposed that sludges generated in surface impoundments would be regulated by the rule. This presupposition is also apparent at 53 FR 17581, Aug. 17, 1988, and 54 FR 26598, June 23, 1989. Certainly, generation of a sludge in an impoundment fits the definition of land disposal in section 3004(k): "any placement of such hazardous waste in a surface impoundment \* \* \*". In addition, since sludges are virtually never generated outside of impoundments and then put into them, any construction that sludges generated in impoundments are not also disposed in them would result in the overwhelming majority of impoundments managing hazardous wastes being outside the scope of the land disposal restrictions. This would undermine a principal Congressional purpose, since impoundments are singled out as the most environmentally adverse form of hazardous waste management unit. See, e.g., RCRA section 1002(b)(7); *CMA v. EPA*, 9 F.2d 158 (D.C. Cir. 1990). EPA has consistently taken into account the volumes of sludges generated in surface impoundments in the capacity determinations required for RCRA section 3004(h) (53 FR 17607, May 17, 1988; 53 FR 31191, Aug. 17, 1988; 54 FR 26636, June 23, 1989; 54 FR 46471, Nov. 22, 1989; and 55 FR 22632, June 1, 1990).

<sup>5</sup> The Agency does not believe it fruitful to argue about which provision is more specific. One is more specific with regard to dealing with newly listed waste, but the other is more specific in addressing the relationship of impoundments and the land disposal restriction provisions.

<sup>6</sup> As noted above, another way of viewing this question is to say that the conditions for some form of treatment capacity variance are satisfied because even if treatment capacity exists outside the surface impoundment, wastes must continue to be land disposed in the impoundment for some period of time while the impoundment is closed or retrofitted. EPA would give the same answer (i.e., four years of continued use) if the question were conceptualized in terms of capacity variances.

<sup>7</sup> Of course, prohibited sludges generated outside of impoundments could not be managed in a non-MTR impoundment in any case. If treatment capacity is available for such sludges, it must be utilized. If treatment capacity is unavailable (i.e., there is a capacity variance in place for such wastes), the wastes must be disposed in an MTR landfill, or impoundment, or some other type of land disposal units such as land treatment (§ 268.5(h)).

closure, commenters pointed out (correctly) that this would entail removal not only of accumulated sludges but subsurface contaminated soils as well which are not the focus of the treatment requirements, and that forcing clean closure could interfere with otherwise available and potentially more cost-effective types of closure options.

EPA finds many of these comments persuasive and believes that the following interpretation best resolves these issues. First, EPA is not interpreting these provisions as necessitating annual dredging of accumulated sludges. Either the impoundment will close in a short time (no more than four years), or it will be retrofitted and become subject to the annual dredging requirement in section 3005(j)(11) (as implemented by § 268.4(a)(2)(ii)). If the impoundment closes, EPA is interpreting the provisions to allow closure with wastes in place (unless the unit operator chooses to clean close the impoundment). Thus, under this reading, continued use of the impoundment would be allowed during the four-year retrofit/closure period (as explained in section 1 above), use of the impoundment during that time would not be disrupted by a dredging requirement, and the impoundment would be allowed to close with wastes in place. These are the same options that were available to impoundments in 1984 managing wastes already identified or listed as hazardous.

### 3. Technical Analysis

*a. Introduction.* Owners or operators of surface impoundments managing newly listed or characteristic hazardous wastes have several options for complying with the minimum technological requirements. Facilities may retrofit the surface impoundments with liners and leak detection systems in compliance with the requirements of section 3004(o)(1)(A)(i). Alternatively, facilities may replace their treatment surface impoundments with wastewater treatment tanks regulated under the Clean Water Act or may opt to close the surface impoundments and send the waste off-site.

EPA believes that very few facilities managing newly regulated wastes in surface impoundments will choose to retrofit their impoundments. For example, the Chemical Manufacturers Association (CMA) conducted an informal survey of 582 chemical manufacturing facilities in the fall of 1989 to obtain information about the management of "non-hazardous wastes" in surface impoundments. Twenty-seven

facilities reported that 85 surface impoundments would be newly regulated as a result of the Toxicity Characteristic rule (55 FR 11798, March 29, 1990); of these 85, only 9 would be retrofitted with liners and leak detection systems. Replacing surface impoundments with tank systems was the most frequently planned method of compliance for the respondents to this survey. Past experience also indicates that surface impoundment owners or operators are more likely to replace their surface impoundments with tank systems than to retrofit the impoundments. RCRA section 3005(j)(1) required surface impoundments that were in existence and that qualified for interim status on the date of enactment of HSWA to come into compliance with the MTRs by November 8, 1988. Most facilities with surface impoundments replaced their impoundments with tanks in response to this deadline. Less than five percent of these facilities actually retrofitted their surface impoundments.

To support today's rulemaking, EPA undertook an analysis to determine how much time is needed for owners or operators of newly regulated surface impoundments to comply with the MTRs either by replacing the impoundments with wastewater treatment tanks exempt from RCRA subtitle C standards, or by retrofitting the surface impoundments with liners and leak detection systems according to the requirements of section 3004(o)(1)(A)(i). EPA collected information from a variety of sources, including facilities that have implemented these practices in the past or plan to do so in the future (e.g., in response to the TC), tank manufacturers, and engineers. The results were summarized in the proposed rule (57 FR 4170), and are available in the background document.<sup>8</sup>

### 4. Conclusion

EPA found that the time needed to comply with the MTRs varies considerably based on case-by-case factors (e.g., current waste management practices, land availability) and regional factors (e.g., climate). According to

<sup>8</sup> It should be noted that the potential statutory conflict at issue in this rulemaking is most immediately relevant to wastes newly regulated as a result of the Toxicity Characteristic (TC) rule (55 FR 11798, March 29, 1990). According to the regulatory impact analysis for the TC, about 730,000,000 metric tons per year of wastewaters managed in surface impoundments at over 2,000 facilities are estimated to exhibit the TC (U.S. EPA, OSW. U.S. EPA Background Document, Toxicity Characteristic Regulatory Impact Analysis, Final Report, March 1990). This potential conflict will also arise with respect to all future newly identified or listed hazardous wastes; however, the TC rule is used as an example throughout this section.

EPA's information sources, six months appears not to be enough time to either retrofit a surface impoundment or replace the impoundment with a wastewater treatment tank. Replacing a surface impoundment with a tank frequently takes two to four years, and retrofitting a surface impoundment frequently takes two to three years.

EPA believes that most interim status surface impoundments managing wastes newly identified or listed as hazardous will be able to comply with the surface impoundment MTRs within four years of the date promulgating the listing or characteristic. Thus, the four-year period allowed in section 3005(j)(6) is a reasonable period within which to come into compliance.

## V. Detailed Discussion of Final Rule: Hazardous Debris

### A. Overview

The Agency is today promulgating a final rule for the treatment of hazardous debris. Until today, debris destined for land disposal that was contaminated with a prohibited RCRA hazardous waste or that exhibited a prohibited RCRA hazardous characteristic was subject to the treatment standard for that listed waste or characteristic. See, e.g., 55 FR 22649 and RCRA sections 3004 (d)(3) and (e)(3). Although hazardous waste debris (as well as contaminated media) is subject to the LDR prohibitions, there is no requirement that it have the same treatment standards as the wastes with which it is contaminated. Indeed, because hazardous debris may be a matrix significantly different from the underlying prohibited waste, it is appropriate as a technical matter to determine whether different treatment standards were appropriate.

Today, EPA is promulgating treatment standards for hazardous debris prohibited from land disposal. Under today's rule, hazardous debris must be treated by specified technologies based on the type of debris and type of contaminant(s) present or, as an alternative, meet the LDRs for the specified prohibited listed or characteristic waste with which it is contaminated.

EPA has specified a number of BDAT technologies for hazardous debris, with the choice of technology left up to the generator and/or treater managing the waste. The technologies include widely used treatment methods. EPA thus believes that it is preserving in this rule as much flexibility for the treatment of hazardous debris as possible.

Prohibited hazardous debris is defined generally as solid material (that is not a process waste) having a particle size of 60 mm or larger and that is intended for land disposal and exhibits a prohibited characteristic of hazardous waste or that is contaminated with a prohibited listed hazardous waste. Hazardous debris must be treated by one of the specified treatment technologies for each "contaminant subject to treatment" defined as: (1) The BDAT constituents for the listed waste that are subject to land disposal restriction standards (as found in § 268.41 and 268.43); and (2) the RCRA hazardous waste constituent(s) for which the hazardous debris fails the Extraction Procedure toxicity characteristic, in addition to any other characteristic which causes the debris to be hazardous (i.e., ignitability, reactivity). As an alternative, the generator of the hazardous debris may choose to treat the hazardous debris to the existing waste-specific treatment standards for the waste contaminating the debris. However, in choosing this alternative, the generator or treater would be required to sample and analyze the treated debris to ensure compliance with the treatment standards prior to disposal in a Subtitle C land disposal unit.

To ensure effective treatment, the treatment unit would be required to meet performance standards or design and operating conditions specified in the rule. In addition, the treatment unit would generally be subject to the Part 264 and 265 standards for treatment facilities to ensure protection of human health and the environment.

The rule addresses not only the issue of when hazardous debris is sufficiently treated, but the further question of when it is a hazardous waste. Under the rule, treated hazardous debris would be excluded from the definition of hazardous waste provided that: (1) The debris is treated to the performance or design and operating standards by an extraction or destruction technology rather than an immobilization technology<sup>9</sup>; and (2) the treated debris does not exhibit a characteristic of hazardous waste. If an immobilization technology is used, the treated debris would not be automatically deemed a nonhazardous waste. In addition, the Agency could determine on a case-by-case basis under today's rule that debris no longer "contains" hazardous waste

and is excluded from Subtitle 6 regulation.

Residuals generated by the treatment of hazardous debris are subject to the numerical treatment standards for the waste contaminating the debris.

#### B. Definitions of Debris and Hazardous Debris

##### 1. Definition of Debris

EPA is today defining debris as solid material exceeding 60 mm (2.5 inch) particle size that is: (1) A manufactured object; or (2) plant or animal matter; or (3) natural geologic material (e.g., cobbles and boulders), except that any material for which a specific treatment standard is provided in Subpart D, part 268, is not debris.<sup>10</sup> A mixture of debris and other material such as soil or sludge is also subject to regulation as debris if the mixture is comprised primarily of debris by volume, based on visual inspection. Process residuals such as smelter slag and residues from the treatment of waste (e.g., incinerator ash), wastewater, sludges, or air emissions residues (e.g., collected particulate matter) are not debris. We discuss below that debris must be intended for discard (i.e., rather than continued use), that debris must be a solid material, the rationale for selecting a 60 mm particle size criterion for debris (i.e., as opposed to the 9.5 mm particle size proposed) and for applying the size criterion to all debris (i.e., not just to geologic materials as proposed), the rationale for regulating as debris mixtures of primarily debris and other materials, the rationale for not regulating process residuals as debris, and the rationale for regulating nonempty containers as hazardous waste subject to existing LDRs rather than as debris.

a. *Debris Must Be Discarded or Intended for Discard.* Debris must of course be either a solid waste or media (e.g., boulders) that is discarded or intended for discard to be subject to the treatment standards in today's rule. Those commenters on the proposed rule expressing concern that the proposed rule in some way vitiated (or was intended to vitiate) this basic principle were mistaken. This means that such materials that might at some later time become debris, such as equipment or building structures, but that are still in use are not subject to the treatment standards. Such in-use material is not a solid waste because it has not been discarded or intended for discard, as

these terms are used in § 261.33 (i.e., likely abandoned, as defined in § 261.2 (a)(2)(i) and (b))

Media debris (e.g., boulders) is also not subject to regulation as solid waste unless discarded or intended for discard and so is not automatically subject to the treatment standards.

Once debris becomes a solid waste by virtue of being discarded (including media debris that becomes subject to regulation as solid waste by virtue of being discarded), it is not necessarily subject to the treatment standards. For example, contaminated debris that is not actively managed after the effective date of the prohibitions (i.e., the effective date of the LDRs for the hazardous waste contaminating the debris) would not be subject to the standards. See 53 FR 31148 (Aug. 17, 1988). On the other hand, debris which is contaminated with hazardous waste disposed before the hazardous waste listing effective date and which is actively managed is subject to the prohibitions and so would have to be treated to satisfy the treatment standards promulgated today before the debris could be land disposed (assuming disposal will not occur in a no-migration unit). *Chemical Waste Management v. EPA*, 869 F. 2d 1526 (D.C. Cir. 1989).

b. *Debris Must Be a Solid Material.* The rule defines debris as a "solid material." This means solid in a literal sense as defined in a common dictionary. A solid material is a material that retains its volume at room temperature without the need for support by a container. Examples of solid materials that are debris if intended for discard and if their particle size is 60 mm (2.5 inches) or greater include: (1) Glass; (2) concrete (excluding cementitious or pozzolanic stabilized hazardous wastes); (3) masonry and refractory bricks; (4) nonintact containers<sup>11</sup> e.g., crushed drums; (5) tanks; (6) pipes, valves, appliances, or industrial equipment; (7) scrap metal (as defined in 40 CFR 261.1(c)(6)); (8) animal carcasses; (9) tree stumps and other plant matter; (10) rock (e.g., cobbles and boulders); and (11) paper, plastic, and rubber. Not only is defining debris as solid material in accord with the common-sense view of what debris is, but, more importantly, it is geared to the treatment standards adopted today that ensure effective decontamination of solid materials by removal or destruction of hazardous waste. Clearly, if a liquid could be

<sup>9</sup> In the Phase II land disposal restrictions rule, the Agency will reopen and request comment on the issue of whether immobilized debris should be excluded from Subtitle C regulation. (See discussion in Section V.D.2.)

<sup>10</sup> For example, lead acid or cadmium batteries are not debris because they are subject to specific treatment standards under § 268.42.

<sup>11</sup> See discussion in section V.B.1.f of the text regarding regulation of intact and nonintact containers.

considered debris, the concept of cleaning off the outer surface to remove contamination does not make sense.<sup>12</sup>

Even though debris must be a solid material, it may contain or be mixed with free liquids.<sup>13</sup> The liquids may be waste or ground or surface water that may be entrapped in the debris (e.g., in partially crushed containers (see discussion below on regulation of containers)) or may be still oozing from the debris if the debris was newly generated or newly excavated from a remediation site. (If liquids separate from hazardous debris prior to treatment of the debris, they must be managed as hazardous waste.) Liquids that are entrapped in debris will be effectively treated under today's treatment standards for extraction or destruction technologies. If an extraction technology is used, the toxic constituents in the liquid will be removed from the debris as a treatment residue and is subject to the LDRs for the waste contaminating the debris. If a destruction technology is used, the toxic constituents in the liquid should be destroyed.

We note, however, that debris that is immobilized prior to land filling may not contain free liquids as provided by §§ 264.314 and 265.314. Thus, free liquids (including liquids in crushed containers) cannot be present in debris that is macroencapsulated or sealed, and cannot be present in debris that has been microencapsulated.

*c. Debris Has a Particle Size Larger Than 60 mm.* Today's rule defines debris as solid material with a particle size of 60 mm (2.5 inches) or greater. We discuss below the rationale for increasing the particle size to 60 mm from the proposed 9.5 mm particle size, the rationale for applying the size criterion to all debris, not just to geologic matter as proposed, the rationale for defining 60 mm or larger clumps of fine-grained materials (e.g., clumps of compacted clay) as nondebris material, and how the particle size criterion is to be implemented.

(1) Rationale for Increasing the Particle Size of Debris From 9.5 mm to

60 mm. The Agency is today defining debris as solid material with a particle size of 60 mm (2.5 inches) or greater for a number of reasons: (a) Fine grain materials (e.g., soil, glass cullet) are not amenable to the surface removal technologies specified in today's rule and are not commonly thought of as debris; (b) fine grain materials are likely to be amenable to the treatment technologies that were the basis for the LDRs for the waste contaminating the material; (c) fine grain materials, unlike large particle size materials, can be reasonably sampled for analysis to document compliance with the concentration-based LDRs for the waste contaminating the material; (d) material normally considered to be soil should be subject to the Agency's planned LDRs for contaminated soil rather than defined as debris<sup>14</sup>; (e) the selection of a 60 mm particle size criterion is within the range of reasonable particle sizes the Agency could have selected for defining debris; and (f) many commenters suggested a larger particle size, and the only commenters that suggested a particular size suggested 60 mm.

We note that a number of commenters suggested that the Agency consider raising the particle size breakpoint as the Agency is doing here. Two commenters suggested an alternative sieve size of 60 mm, stating that existing soil-washing equipment such as rotary screens and wet vibratory screens are capable of handling particles sizes of several inches, and the suggested 60 mm cut-off size would result in more soil being subject to the existing LDRs which require sampling and analysis to document compliance with concentration-based treatment standards.

While the Agency believes that it could have selected other particle sizes, the Agency selected the 60 mm (2.5 inch) particle size from the range of 9.5 mm (3/8 inch) to 200 mm (8 inches) because: (1) It is a commonly used sieve size that is commercially available, (2) it would define as soil pebbles and smaller particles, and define as debris cobbles

<sup>14</sup> We note that numerous commenters were concerned that the proposed particle size criterion of 9.5 mm would inappropriately define most soil as debris. (We note further that the proposed rule could have been interpreted to define as debris geologic material that was comprised of only one particle (e.g., a rock) with a particle size of 9.5 mm or greater. Thus, fine grain soil containing one 9.5 mm or greater sized rock could have been considered debris. The final rule addresses mixtures by defining as debris mixtures of primarily debris with other materials. See discussion in the text in Section V.B.1.d.)

and boulders<sup>15</sup> in accord both with common understanding and with materials most amenable to effective treatment by the methods adopted today; and (3) it meets the criteria discussed above (e.g., smaller particle size material can be readily sampled to document compliance with the numerical LDR treatment standards for the waste contaminating the material).<sup>16</sup> In addition, this size object is normally readily amenable to effective treatment by the methods specified in today's rule.

(2) Rationale for Applying the Particle Size Criterion to All Debris. The Agency has broadened the particle size test to apply to all debris, not just to geologic debris as proposed. We believe that the reasons enumerated above for increasing the particle size to 60 mm apply equally to applying the particle size to all debris (e.g., small particle size objects—e.g., glass, metal fragments—can be readily sampled representatively to document compliance with the LDRs for the waste contaminating the material).

(3) Compacted Clumps of Fine Grained Materials are not Defined as Debris. The Agency is basing the size criterion on the particle size of the solid material rather than the sieve size to ensure that 60 mm (or larger) compacted clumps of materials with a particle size less than 60 mm are not defined as debris. The most common example is clayey soil. Clay particles are extremely cohesive and can form clumps during normal excavation and handling operations. The contaminated debris treatment methods are not intended to clean clumps of clay. Clumps of agglomerated clay soil are subject to the treatment standards for the waste contaminating the soil.

In addition, the Agency is concerned that generators may have the incentive to intentionally agglomerate small particle size materials (e.g., soil or even manufactured materials) so that they would meet the definition of debris and so be excluded from regulation under subtitle C upon treatment by an extraction or destruction technology. If such contaminated materials were not

<sup>12</sup> While most of the debris treatment methods are extraction methods, some methods destroy the hazardous constituents; although these would be applicable to liquid material, most of the treatment methods simply remove the contamination from the debris for subsequent detoxification treatment.

<sup>13</sup> To determine otherwise would result in large quantities of solid materials being subject to the existing LDRs for the waste contaminating the materials. These solid materials would be very difficult to sample representatively to document compliance with the LDRs. Further, the solid materials would be readily amenable to the debris treatment standards promulgated today notwithstanding the presence of free liquids, and hence appropriately classified as debris.

<sup>15</sup> See the May 11, 1992, memorandum from Kerry Rice, Radian to Mark Mercer, EPA, entitled "Particle Size Definitions and Sieve Sizes"; and the May 18, 1992, memorandum from Peter Shields, Radian, to Mark Mercer, EPA, entitled "Sieves with Openings Greater than Four Inches".

<sup>16</sup> We note that the Agency is considering proposing Phase II land disposal restrictions that would establish treatment standards for contaminated soil. In that proposal, the Agency is considering requesting comment in particular on whether soils with a particle size between 9.5 mm and 60 mm can be effectively treated under those proposed standards.

regulated as debris, they would be subject to the LDRs for the waste contaminating them and would remain subject to subtitle C regulation after treatment. Basing the size criterion on particle size rather than sieve size precludes the potential for such sham activities.

(4) **Implementation of the Particle Size Criterion.** To make today's rule workable, equipment operators need to be able to determine quickly whether material being remediated is debris or nondebris (e.g., soil, waste). In some cases, the determination will vary from one front end loader bucketfull of material to another. Accordingly, the Agency intends for the size criterion to be implemented by visual observation. Screening is not required. If screening is used, however, the screen may be either a square grid with openings 60 mm on a side or a circular grid with circles with a 60 mm diameter.

(d) **Waste for Which a Specific Treatment Standard Has Been Established is not Debris.** There is one further exception to this definition of debris. EPA is indicating that debris-like material for which the Agency has promulgated a specific treatment standard is not considered to be debris. The reason is that the Agency will have determined that specific treatment standards are appropriate for the material, rather than the assortment of technologies adopted for debris generally. See 57 FR 983 c.3 (Jan. 9, 1992).

The chief examples of a material subject to a specific treatment standard rather than the general debris standards are lead acid batteries and cadmium batteries. EPA has promulgated a treatment standard of metal recovery for each of these materials. See § 268.42. Thus, this more specific treatment standard takes precedence over the more general debris standard adopted today.<sup>17</sup>

d. **Mixtures of Debris with Other Materials are Subject to Regulation as Debris if Debris is the Primary Material Present.** A further issue needing to be addressed is the status of mixtures of debris and other materials such as soils or sludge. This situation arises often, particularly in remedial situations where debris is rarely present in a pristine state. Since the treatment standards for debris and other materials—sludge or contaminated soil—differ, the issue of

classification is an important one. In developing a means of classification, the Agency on the one hand is seeking to prevent the debris classification from invariably overriding the treatment standards for other hazardous wastes. On the other hand, it is important to have a means of classification that is easy to apply by equipment operators in the field.

The Agency has therefore decided to classify<sup>18</sup> as debris any mixture where the debris portion comprises the largest amount of material present by volume, to be determined by visual inspection.<sup>19</sup> Thus, for example, if upon examination, a mixture of cobbles (i.e., with a particle size of 60 mm or more), soil, and sludge is comprised mostly of cobbles, the mixture is classified as debris. After being treated by one of the treatment methods for debris promulgated in today's rule, it could then be land disposed. (Residues from applying the treatment method could be land disposed after being treated to meet the treatment standards for the prohibited waste contaminating the debris.)

The definition of debris encompasses this classification principle by stating that "A mixture of debris and other material such as soil or sludge is also debris if the mixture is comprised primarily of debris by volume, based on visual inspection." It should be clear from this discussion that the rule does not require debris and nondebris materials to be separated prior to treatment (an unintended implication of the proposed rule). Rather, mixtures are either classified as debris or some other type of waste treatability group according to the classification test discussed above.

We note that the "primary material" test for classifying debris does not apply to intact, nonempty containers. Given that such containers are not debris (see discussion below in section V.B.1.f) and can be readily separated from debris (or

<sup>18</sup> We note that although such mixtures are classified as debris and are subject to the debris treatment standards, if the nondebris materials are separated from the debris prior to treatment by a specified technology, the separated material is no longer classified as debris. If the separated material is a hazardous waste (or soil contaminated with a hazardous waste), it is subject to the waste-specific treatment standards. When treatment residue (i.e., soil, waste, or other nondebris material) is separated from treated debris as required by today's debris standards for extraction or destruction technologies, the residue is subject to the waste-specific standards for the waste contaminating the debris.

<sup>19</sup> Some materials (e.g., soil) mixed with debris may contain free liquids that may still be oozing from the material. The volume of such entrapped liquids need not be considered in determining whether the mixture is primarily debris because it is impracticable to determine the volume of such liquids by visual inspection.

mixtures of debris and other materials), they are not considered in applying the "primary material" test. Consequently, intact, nonempty containers must not be included in making the volume determinations to classify mixtures of debris.

There is one further point to be made. Although EPA is classifying mixtures that are predominantly debris as debris, this does not mean that debris can be deliberately mixed with other wastes in order to change their treatment classification. Such mixing is impermissible dilution under § 268.3 since it is a substitute for adequate treatment. See also 53 FR 31145 (Aug. 17, 1988); dilution to change treatability groups is ordinarily impermissible. In addition, such situations where debris is used merely to dilute another prohibited waste, the mixture would remain subject to the most stringent treatment standard of any waste that is part of the mixture. See § 268.41(b).

e. **Process Residuals Are Not Debris.** Today's definition of debris explicitly excludes process residuals by stating: "Process residuals such as smelter slag and residues from the treatment of waste (e.g., incinerator ash), wastewater, sludges, or air emissions residues (e.g., collected particulate matter) are not debris." The Agency believes that debris should be limited to manufactured objects (e.g., metal, glass) and naturally occurring objects (e.g., boulders, tree stumps). The Agency developed the treatment standards generally to ensure effective treatment of hazardous waste contaminating an object, rather than effective treatment of a large particle size hazardous waste such as slag.<sup>20</sup>

Several commenters requested clarification as to what the Agency meant in the proposed rule by excluding from the definition of debris "solids that are listed wastes or can be identified as being residues from treatment of wastes and/or wastewaters." The commenters felt that it was unclear whether this phrase exempts from the definition of debris only pollution control residues, or material such as metal filters, ceramic column packing, or discarded pollution control equipment. Commenters suggested that EPA clarify, through examples, that discarded industrial equipment (such as filters, pumps, etc.) would be included in the definition of

<sup>20</sup> We note that previous debris definitions (see § 268.2(g)) considered "slag" as debris. The Agency has reconsidered this issue and has determined the slag is not debris because it is not the type of material for which today's debris treatment standards were developed—objects contaminated (generally superficially) with hazardous waste.

<sup>17</sup> A number of commenters questioned the jurisdictional basis for regulating battery plates and groups from lead acid batteries as "solid wastes" subject to subtitle C regulation. EPA adheres to the response set out at 57 FR 960-961 in the proposed rule.

debris even if the equipment was used to treat wastes or wastewaters. The commenters are correct. A discarded pump or filter used to treat a waste is debris, but the waste pumped or filtered is not debris. Although some filtered or pumped waste will contaminate the pump or filter (indeed, that is the basis for subjecting the filter or pump to the treatment standards), the contaminated pump or filter will virtually always be comprised primarily of debris rather than waste and so would be classified as debris.

f. *Intact Containers Are Not Debris.* A number of commenters requested comment on the relationship between the proposed treatment standards for debris and the so-called empty container rule in § 261.7. That rule states in essence that with respect to containers holding hazardous waste, what is regulated is the hazardous waste in the container and not the container itself. Thus, empty containers are not regulated, and the hazardous wastes in nonempty containers are. An empty container is one from which all hazardous wastes have been removed using practices commonly utilized for waste removal, and in which not more than 2.5 centimeters of waste remains. (Slightly different tests apply to containers holding acutely hazardous wastes.)

Since containers are potentially a form of debris, there is a question whether either empty or nonempty containers are subject to the treatment standards for debris notwithstanding § 261.7. EPA is indicating in this rule that the debris treatment standards do not override the empty container rule, so that rule remains in effect. EPA is taking this step largely because it did not propose the issue for comment, and any fundamental changes to the empty container rule merit fuller public participation than afforded here. In addition, EPA has not fully studied the implications of making changes in the empty container rule to accommodate regulations under the land disposal prohibitions program.

Today's final rule thus indicates that intact containers are never considered to be debris, and thus would never be subject to treatment standards for debris. Intact containers are either empty or nonempty. If empty they are not subject to regulation, as provided by § 261.7(a)(1). If nonempty, the hazardous waste within the container is subject to the land disposal prohibitions (as well as the rest of subtitle C regulations). EPA also does not consider intact tanks to be debris, so that any hazardous wastes in tanks would be subject to the

standards for those wastes, not (potentially) to treatment standards for debris.

It should be noted, however, that EPA is reading the empty container rule in § 261.7 to apply to intact containers. The Agency is doing so because the rule was clearly intended for devices that function as containers, not for crumpled drums that are not easily emptied by normal means. See § 261.7(b)(1)(i). Nonfunctional containers are more naturally classifiable as debris and the treatment standards adopted today are appropriate for such damaged containers being disposed.

By "intact container", the Agency means a container that can still function as a container. The Agency believes that a container that is unbroken and still retains at least 75% of its original holding capacity (i.e., has not been crushed more than 25%) is still intact. The Agency selected the 75% criterion because: (1) It is within a reasonable range of 50% to 90%; (2) selecting an original volume criterion on the high end of the range (e.g., 90%) would result in containers containing large quantities of waste being considered debris even though the containers could be readily separated from debris; and (3) selecting an original volume criterion on the low end of the range (e.g., 50%) would subject the waste in containers that have been severely crushed to the treatment standards for the waste. This would require removal of the waste from the container for treatment which may be impracticable for severely crushed containers.

Finally, it should be noted that by observing the empty container rule, EPA is creating a limited exception to the nonsegregation principle discussed above. In situations where intact containers are mixed with true debris (i.e., materials classified as debris under today's rule), the intact containers thus would have to be removed and managed separately.

The following example indicates how these principles would apply. At a remediation site, ruptured drums are discovered still containing some prohibited hazardous waste. Mixed in with these drums are other drums some of which are not significantly damaged or crumpled and all still contain prohibited hazardous wastes. All of these drums are going to be disposed of off site.

Under today's rule, the ruptured drums are debris (broken or ruptured containers are always debris if contaminated with prohibited waste) and cannot be land disposed until they are treated by one of the debris

treatment methods. If hazardous waste is removed from the drums during treatment, the waste, like all treatment residues, is subject to the treatment standards for the prohibited waste. With respect to the unruptured drums, those that are intact (i.e., those that retain at least 75% of their original volume) are nonempty containers under § 261.7. The waste in these drums is subject to the treatment standards for the prohibited waste. Those that are not intact (i.e., those that retain less than 75% of their original volume) are debris.

## 2. Definition of Hazardous Debris

a. *Which Debris is Hazardous, and of this Debris, Which is Prohibited?* This rule applies only to debris that is subject to subtitle C regulation when it is generated. As EPA proposed, this means: (1) Debris that contains listed hazardous wastes (either on the debris surface, or in its interstices, such as pore structure); or (2) debris that exhibits a characteristic of hazardous. See 57 FR 983. To be prohibited, and hence subject to the treatment standards adopted today, the debris would have to be contaminated with listed wastes that are also prohibited, or exhibit a prohibited characteristic. Thus, only debris that is contaminated with a listed waste for which EPA has established a treatment standard, and debris exhibiting the characteristics of ignitability, corrosivity, reactivity, or EP toxicity (plus exhibiting the TC characteristic, since the debris must still be a hazardous waste) are subject to the treatment standards adopted today. (Most of these debris wastes, of course, are already prohibited by virtue of previous rulemakings; only debris contaminated exclusively with the newly listed wastes for which EPA is adopting treatment standards today would be newly prohibited under today's rule.)

b. *Codification of Contained in Principle for Debris.* In adopting the definition that debris containing listed hazardous waste is regulated under subtitle C, EPA is codifying the "contained in" principle, which has heretofore served as an interpretive gloss on the existing mixture and derived from rules. See 57 FR 983, *CMA v. EPA*, 869 F.2d 1526 (D.C. Cir. 1989). As explained at proposal, *id.* at 986, the contained in concept will apply to both media and nonmedia debris (an approach with unanimous support in the public comments).

Furthermore, EPA is also codifying the corollary part of the contained in principle: That debris which no longer "contains" listed hazardous waste



would no longer be subject to subtitle C regulation, provided that it does not exhibit any hazardous waste characteristic. This involves a case-by-case determination by EPA, made upon request, that debris does not contain hazardous waste at significant levels, taking into consideration such factors as site hydrogeology and potential exposure pathways, but excluding management practices.<sup>21</sup> Debris found not to contain hazardous waste (and not exhibiting a hazardous waste characteristic) would not be subject to further subtitle C regulation, and so could be land disposed without further treatment. In addition, these levels could be achieved by any form of treatment other than impermissible dilution, and thus need not result from application of the debris treatment methods adopted today. *Id.* at 983-84.

### 3. Relation of Today's Rule to the Hazardous Waste Identification Rule

On May 20, 1992, EPA proposed comprehensive revisions to the regulatory definition of hazardous waste, asking for comment on a series of options for redefining what a hazardous waste is. See 57 FR 21450. These rules could affect which debris is considered to be hazardous when it is generated (both through modifications to the hazardous waste definitions and the contained in principle), and so could affect both the definition of hazardous debris used in this rule, and possibly the extent such debris must be treated by prescribed methods of treatment. EPA has attempted to note in each of the sections below the potential overlap of this proposed rule on the rules adopted today.

Although the Hazardous Waste Identification Rule (HWIR) when promulgated will affect the definition of hazardous debris subject to today's treatment standards, the Agency believes that it is nonetheless appropriate to make the treatment standards effective immediately upon promulgation. The Agency does not believe that today's rule will place an unreasonable burden on generators of hazardous debris that may subsequently be determined by HWIR not to be hazardous because the Agency has provided a national, case-by-case capacity variance for hazardous debris that defers the effective date of today's treatment standards until May 8, 1993. By that time, the Agency believes that the final HWIR will be promulgated and

the treatment of debris that HWIR determines is no longer hazardous will be precluded.

### C. Treatment Standards for Hazardous Debris

#### 1. Overview

In this section, we discuss: (1) The treatment technologies proposed as BDAT; (2) the contaminants subject to treatment; (3) the debris treatment standards; (4) alternative LDR standard; (5) performance standards that must be met to ensure effective treatment and to comply with the BDAT standards; (6) contaminant restrictions for certain treatment methods; (7) use of treatment trains for multiple contaminants and debris types; (8) treatment of characteristic debris; (9) standards for debris that is inherently toxic (i.e., it fails the TC and EP for metal contamination because it is fabricated from a toxic metal); (10) relationship of TSCA PCB rules to today's rule; (11) relationship of existing agency standards for asbestos to today's rule; (12) special requirements for radioactive debris; and (13) implementation of treatment standards.

#### 2. BDAT Debris Treatment Technologies

a. *Identification of BDAT Treatment Technologies.* The Agency considered a treatment technology to be "available" if the technology itself or the services of the technology are able to be purchased, and the technology substantially diminishes the toxicity of the waste or reduces the likelihood of migration of the waste's hazardous constituents. The technologies that the Agency has identified as best demonstrated available technologies (BDAT) have been used to treat hazardous debris at Superfund sites, to remove radioactive metals from debris, to treat debris-like material contaminated with compounds similar to one or more of the compounds in the debris contaminant categories or, based on engineering judgment, are applicable to debris.

The Agency considered a technology to be demonstrated for a particular waste if the technology currently is in commercial operation for treatment of the waste or constituent of interest or similar wastes or constituents of interest, including wastes not regulated under RCRA, such as PCBs and radioactive waste. The Agency identified demonstrated technologies either through a review of the literature in which current waste treatment practices were discussed, or through information provided by specific facilities currently treating the waste or similar wastes. EPA also considered as

demonstrated technologies those used to separate or otherwise process chemicals and other materials which are similar to the waste or constituent of interest.

The Agency also reviewed the properties of debris which may directly affect the efficiency of treatment technologies. Debris characteristics which may affect the performance or effectiveness of treatment technologies to clean various types of debris include:

- Destructibility;
- Hardness and brittleness;
- Moisture content;
- Permeability;
- Size, homogeneity, and location (in situ versus ex situ);
- Surface texture; and
- Total organic carbon (TOC).

Under today's rule, the Agency has identified the following 17 treatment technologies as BDAT for hazardous debris:

- Extraction Technologies:
  - Physical Extraction
    - Abrasive blasting
    - Scarification, grinding, and planing
    - Spalling
    - Vibratory finishing
    - High pressure steam and water sprays
  - Chemical Extraction
    - Water washing and spraying
    - Liquid phase solvent extraction
    - Vapor phase solvent extraction
  - Thermal Extraction
    - High temperature metals recovery
    - Thermal desorption
  - Destruction Technologies
    - Biodegradation
    - Chemical oxidation
    - Chemical reduction
    - Thermal destruction
      - Immobilization Technologies
  - Macroencapsulation
  - Microencapsulation
  - Sealing

Summary descriptions of these technologies are presented in Appendix I of today's preamble and treatment performance standards for each technology are prescribed in Table I, § 268.45. Further, detailed information on the various treatment technologies is presented in the Hazardous Debris Final Rule Technical Support Document.

b. *Changes in Identification of BDAT Technologies From Proposal.* Based on public comment and the Agency's further evaluation, the Agency has determined that two debris treatment technologies proposed as BDAT—electropolishing and ultraviolet radiation—are not BDAT, and an additional technology not proposed as BDAT—high temperature metal recovery—is, in fact, BDAT for

<sup>21</sup> We note that consideration of management practices for exclusion from subtitle C is being evaluated through the proposed Hazardous Waste Identification Rule discussed below in the text.

hazardous debris. The basis for these determinations is discussed below.

(1) Electropolishing Is Not BDAT. The Agency has determined that electropolishing is not BDAT for hazardous debris because of concerns that the technology is intended primarily for smoothing clean metal parts. Painted or contaminated metal parts might not be effectively treated by this method. A contaminating organic waste or paint could electrically insulate the surface from the solution and prevent surface removal of contaminants.

(2) Ultraviolet Radiation Is Not BDAT. The Agency deleted ultraviolet radiation treatment from the list of BDAT technologies for hazardous debris because of difficulties of specifying performance standards that would ensure effective treatment in all cases. This technology is primarily intended for liquid waste treatment where the fluid is passed by a ultraviolet radiation source in a thin stream. This approach is designed to ensure that the ultraviolet light reaches all of the toxic molecules and detoxifies them. If the technology were to be applied to hazardous debris, it would be virtually impossible to ensure that all toxic molecules contaminating the debris were adequately radiated. Sludge and soil caked onto debris would preclude radiation of both inner layers of caked material and the debris surface. Further, even for debris that is relatively free of caked-on materials, the debris would have to be systematically turned to expose all contaminated surfaces to the radiation. The use of sunlight to provide the ultraviolet radiation as proposed as an alternative to an artificial source poses even greater problems of ensuring exposure to ultraviolet radiation at levels that would ensure effective treatment. The Agency's effort to provide for innovative debris treatment at proposal simply went too far.

(3) High Temperature Metal Recovery Is BDAT. The Agency has added high temperature metal recovery (HTMR) to the list of acceptable debris treatment technologies. It is a very effective method for treatment of recoverable metal values in both metal debris and debris that is contaminated with metal-bearing hazardous waste. The Agency did not include HTMR as BDAT at proposal simply because of oversight. Several commenters suggested that we include this method, and the Agency agrees.

We note that HTMR can also effectively treat toxic organic contaminants. If the debris contains more than a total of 500 ppm of toxic organic compounds listed in appendix VIII, part 261, the HTMR facility is

subject to the Boiler and Industrial Furnace (BIF) Rule. See § 266.100. The HTMR would be subject to the same controls on organic emissions<sup>22</sup> as other BIFs burning hazardous waste. When the total concentration of toxic organic compounds in the waste is less than 500 ppm, the Agency believes that any emissions of organic compounds attributable to those organic compounds will not pose a hazard to human health and the environment.

### 3. Contaminants Subject to Treatment

Today's rule requires hazardous debris to be treated by one of the specified technologies<sup>23</sup> for each "contaminant subject to treatment" defined as: (1) the BDAT constituents identified in §§ 268.41 and 268.43 for the listed waste contaminating the debris that are present at detectable levels;<sup>24</sup> (2) the constituents for which the debris exhibits Extraction Procedure toxicity; and (3) cyanide or sulfide if debris exhibits reactivity due to the presence of those constituents. As discussed in section V.C.5 below, although debris may contain several contaminants subject to treatment, the treatment standards generally do not require treatment by multiple technologies (i.e., a treatment train). This is because many of the specified technologies effectively treat various types of contaminants (e.g., metals, aromatic and aliphatic organic compounds, halogenated and nonhalogenated organic compounds).

In the proposed rule, the Agency proposed a broader definition of "contaminants subject to treatment" that would have included constituents on appendix VIII, part 261, that the generator could reasonably know may contaminate the debris at detectable levels. Further, the Agency requested comment on whether the rule should require that debris that is hazardous solely because it exhibits a characteristic (i.e., toxicity, ignitability, or reactivity) be treated for all constituents on appendix VIII, part 261,

<sup>22</sup> Emissions of metals, HCl, Cl<sub>2</sub>, and particulate matter are also controlled by the BIF rule.

<sup>23</sup> Unless EPA determines the hazardous debris no longer contains hazardous waste (see discussion in section V.B.2 of the text) or unless the generator elects to comply with the waste-specific treatment standards for the waste contaminating the debris (see discussion in section V.C.4 of the text).

<sup>24</sup> We note that the generator may presume that the BDAT constituents for the listed waste are present at detectable levels and is not required to sample and analyze the debris to make that determination. If, however, the generator elects to sample and analyze the debris, the Agency acknowledges that this may be a difficult task for many types of debris and debris mixtures. In this situation, the generator must use best engineering judgement to obtain samples that are as representative as practicable.

that the generator could reasonably know may contaminate the debris at detectable levels. The Agency addressed these provisions at proposal because of concern that all toxic constituents present be effectively treated given that debris treated by an extraction or destruction technology and that does not exhibit a characteristic is excluded from subtitle C regulation.

We have determined, however, that neither of these provisions is likely to be necessary to ensure effective treatment of hazardous debris for a number of reasons. Thus, these provisions are not included in today's rule. First, we believe that enough contaminants subject to treatment will be identified for most debris to ensure effective treatment of other toxic contaminants that may be present. Given that most debris is generated by remediation, the debris is often associated with a variety of wastes that will result in a number of contaminants being designated contaminants subject to treatment—either because listed wastes or known to be present, or more likely, because the debris fails the EP<sup>25</sup> for one or more constituents. For example, it is highly unlikely that debris will exhibit only ignitability or reactivity and not fail the TC or be contaminated with a listed waste (and thus, require only deactivation of the ignitability or reactivity characteristic under today's rule) if, in fact, toxic constituents are present at significant levels. Given that most of the debris treatment technologies specified in today's rule are not restricted to specific contaminants other than metal vs. nonmetal contaminants and that many technologies (e.g., surface removal, incineration) have no contaminant restrictions (see section V.C.5 below), the designation of a few contaminants subject to treatment should be sufficient to ensure effective treatment of other toxic contaminants that may be present.

Further, commenters argued, and the Agency agrees, that it would be difficult to implement and enforce a rule that required generators to treat toxic constituents that they have reason to know are present at detectable levels. First, whether the generator, in fact, could have reason to know that a toxic constituent is present is highly

<sup>25</sup> We note that the Agency is considering proposing treatment standards for TC wastes and debris contaminated with TC wastes. If that rule is promulgated, debris will be identified as hazardous debris if it exhibits the TC for an additional 26 organic compounds many of which are commonly found at remediation sites. Thus, over time, additional debris contaminants will become designated contaminants subject to treatment.

subjective and difficult to enforce. Second, the Agency upon additional consideration believes that, if treatment of such additional toxic constituents were to be required, treatment should only be required if the constituent is present at significant levels, not merely at detection levels. This raises the issue of what is a significant level. Possible criteria include a level of potential health significance or the F039 treatment levels. (We note that the Agency, in fact, requested comment on using these criteria to determine when these other (i.e., other than BDAT constituents for listed waste contaminating the debris and the constituents for which the debris fails the ED) toxic constituents known to be present would be contaminants subject to treatment. See 57 FR 984, n. 11.) Not only is the Agency unsure which approach would be more appropriate, but under either approach—i.e., health-based levels or F039 levels—sampling and analysis would be required if the generator did not want to presume that a toxic constituent known to be present was present at the trigger level. Since it is particularly difficult to take representative samples of untreated debris, EPA considers this approach to be inadvisable.

#### 4. Debris May Be Treated to the Existing Waste-Specific LDRs in Lieu of Today's Debris Treatment Standards

Today's rule gives generators the option of treating hazardous debris to the existing waste-specific treatment standards for the waste contaminating the debris. The treated debris, however, must continue to be managed under subtitle C. If land disposed, the debris must be disposed in a subtitle C landfill. However, such debris would be excluded from subtitle C regulation if the Agency determined that it no longer contained hazardous waste (see discussion above in section V.B.2) or if the treater determined that the debris no longer contained hazardous constituents at levels that may be established under a final Hazardous Waste Identification Rule (see discussion above in section V.B.3).

The Agency is providing this option in today's rule based on the request of numerous commenters. For example, one commenter routinely adds the tyvek suits and rubber gloves worn by facility operators to the waste stream leaving his factory, and wishes to continue doing so. The proposed rule would have required the tyvek suits and rubber gloves (as debris) to be separated from the waste for treatment by the specified technology. The commenter preferred to treat the waste/debris mixture to the

waste-specific standards and the Agency believes that this practice is appropriate to provide an additional means of treating debris that substantially reduces toxicant mobility or concentration.

The Agency developed special treatment standards for hazardous debris because of concern that, in most cases, the waste-specific standards would not be practicable for debris given the difficulty in obtaining representative samples of treated debris to document compliance with the concentration-based waste-specific standards. The Agency acknowledges, however, that some types of debris may be amenable to representative sampling and therefore compliance with the waste-specific standards may be workable.<sup>26</sup>

Debris that is treated to the waste-specific treatment standards rather than today's debris treatment standards remains subject to subtitle C regulation because toxic constituents may continue to be present at levels that could pose a hazard to human health and the environment. EPA believes that this position is appropriate for two reasons. First, there is no reason to exclude from subtitle C regulation hazardous debris treated to the waste-specific standards when the waste itself is not excluded when treated to those standards. Second, and moreover, the Agency believes that today's treatment standards will treat debris to levels resulting in minimum threat to human health and the environment. See discussion below. Although meeting the waste-specific standards may result in some cases in levels of toxic constituents in the treated debris that do not pose a hazard to human health and the environment, the Agency is not certain that this will be the case in all situations (and in any case, the issue is more appropriate for resolution in the context of the May 20, 1992, proposed rule, 57 FR 21450).

#### 5. Treatment Standards

In this section, we provide the rationale for the treatment standards for each technology and explain how the standards work, and we explain how the final treatment standards differ from those proposed.

<sup>26</sup> We note that commenters may have requested this option out of frustration that the proposed rule did not effectively address the issue of debris mixtures. The proposed rule appeared to require either separation of debris types prior to treatment or the extensive use of treatment trains to treat different debris types. This problem has been remedied in today's final rule by acknowledging the ability of the treatment technologies to treat a greater variety of debris types than proposed. See discussion in section V.C.5 of the text.

a. *Overview.* Today's rule establishes performance and/or design and operating requirements for 17 treatment technologies that the Agency has designated as BDAT for hazardous debris. See Table I of § 268.45. Although any technology may be used to treat any debris, the treatment standards vary for many technologies according to the type of debris treated.<sup>27</sup> In addition, the rule prohibits the use of some technologies to treat specific types of contaminants. For example, the physical extraction technologies (e.g., abrasive blasting) have no contaminant type restrictions, while thermal desorption may not be used to treat metals other than mercury. Generators (and owners and operators of treatment facilities) may select any treatment technology that is not restricted for the contaminant subject to treatment.

The Agency has attempted to establish performance or design and operating requirements for each of the extraction and destruction technologies that will optimize treatment effectiveness such that hazardous contaminants would not be present at residual levels in the debris that could pose a hazard to human health and the environment. Thus, the treated debris could be excluded from subtitle C regulation. Unfortunately, the Agency was not able to develop objective performance or design and operating standards for all extraction and destruction technologies that would ensure treatment to minimum threat levels (e.g., thermal desorption, biodegradation, and chemical destruction; see discussion below). For these technologies, the Agency is concerned that residual levels of hazardous contaminants may remain in the debris at levels that could pose a hazard to human health and the environment. Consequently, today's rule requires for these technologies that the owner or operator of the treatment unit must make an "Equivalency Demonstration" to the Agency under existing § 268.42(b), that documents that the technology treats contaminants subject to treatment to a level equivalent to that required by the performance and design and operating standards for the other technologies in

<sup>27</sup> In addition, although the rule does not prohibit treatment of specific debris types by a technology, the treatment standards cannot be met as a practical matter for certain debris/technology combinations (e.g., high pressure steam and water sprays cannot remove 0.6 um of the surface layer of brick, concrete, etc.). In other situations, the definition of the technology as a practical matter precludes the use of some technologies for some debris types (e.g., the definition of spalling cannot be met when applied to treat cloth).

Table 1, § 268.45, such that residual levels of hazardous contaminants will not pose a hazard to human health and the environment absent subtitle C control.

Today's treatment standards establish performance standards rather than design and operating standards where supporting data were available. The Agency believes that performance standards will better ensure effective treatment given the variability in contaminant and debris types and properties that affect treatability. Further, performance standards give the owner and operator of the treatment unit the flexibility to tailor the design and operation of the unit to the specific debris/contaminant(s) being treated. An example of a performance standard is the standard for physical extraction technologies (e.g., abrasive blasting) used to treat a metal object where the standard requires decontamination to a "clean metal finish" as defined in the regulation. An example of a design and operating standard is the standard for thermal desorption that limits the thickness of porous debris to 10 cm (4 inches).

EPA recommends that the generator or owner or operator of the treatment facility consider the thermal, chemical, and physical properties of the debris and the contaminants on the debris before selecting a treatment technology to ensure that the performance or design and operating requirements can be achieved. The Agency plans to develop a nonregulatory implementation assistance document to provide assistance on how to select the most appropriate technologies for a given debris/contaminant combination.

Although hazardous debris treatment operations are generally subject to regulation under the interim status or permit standards of parts 270 and 264, 265, or 266,<sup>28</sup> today's hazardous debris performance or design and operating standards are neither interim status nor permit standards. The hazardous debris treatment standards are adopted pursuant to section 3004(m) of RCRA to ensure that debris is treated to minimize the hazardous constituents' toxicity or mobility during future management, while the interim status and permit

standards are designed to protect human health and the environment from the operation of the storage, treatment, or disposal facility itself. It is for this reason that today's treatment standards do not address control of emissions that can occur from debris treatment; the Agency is relying on the applicable interim status and permit standards to control treatment emissions. See discussion below in section V.F.

The Agency has grouped the various treatment technologies into categories of like treatment type. Each category is based on the same (or similar) performance or design and operating standards. See Table 1 of § 268.45. We discuss below for each group of treatment technologies the basis for the standards and how the standards will work. Note that the performance or design and operating standards must be met for all debris surfaces that are contaminated with hazardous waste. Thus, if a pipe or pump was used to manage hazardous waste, the performance standards must be met for the inside surfaces of the pipe or pump. Decontamination of the outer surfaces only does not constitute compliance with the debris treatment standards.

*b. Extraction Technologies.* The Agency has classified the extraction technologies as physical extraction, chemical extraction, and thermal extraction.

(1) *Physical Extraction Technologies.* The physical extraction technologies are: abrasive blasting; scarification, grinding, and planing; spalling; vibratory finishing; and high pressure steam and water sprays. For these technologies, the rule establishes performance standards based on removal of the contaminated layer of the debris. Any contaminant subject to treatment may be treated by these technologies,<sup>29</sup> because the contaminants are removed as residue<sup>30</sup>

<sup>28</sup> As discussed below in the text, today's rule establishes additional requirements for certain technologies in order to exclude the treated debris from subtitle C when the debris is contaminated with waste that is listed for dioxins (EPA Hazardous Waste Numbers F020, F021, F022, F023, F026, or F027). The Agency did establish such additional requirements for treatment of debris contaminated with dioxin-listed waste when treated by the physical extraction technologies, however, because the Agency believes that it is highly unlikely that compliance with the rigorous performance standards for these physical extraction technologies will allow significant residual levels of contaminants such that even highly toxic contaminants could pose a hazard to human health and the environment absent subtitle C control.

<sup>30</sup> Except that for spalling, the spalled material is considered untreated debris, not residue, and must be treated before land disposal. See additional discussion in the text.

subject to the treatment standards for the waste contaminating the debris.

In addition, any debris type (e.g., metal, concrete, wood, paper, cloth) may be treated by these technologies. The Agency reasoned that any debris type would be effectively treated provided that the contaminated layer of the debris is removed. We note that, although the rule allows the use of physical extraction technologies on any debris type, it will be impracticable to use these technologies on some debris types and the performance standards cannot be met for some technology/debris combinations. For example, it is impracticable to spall paper or cloth. However, we realize that debris often is comprised of a mixture of debris types, and physical extraction may be the most reasonable technology for the predominate debris type while other types of debris present would be removed as residue. An example is large chunks of concrete that have paper labels adhered to them. Spalling or another physical extraction technology may be practicable for the concrete and the paper labels will be removed as residue. An example of where the performance standard cannot be met for a technology/debris combination is high pressure steam and water spray used to treat brick or concrete. As discussed below, because these debris types are porous and toxic contaminants may be adsorbed below the surface of the debris, the performance standard requires removal of at least the outer 0.6 centimeter surface layer. This technology cannot meet that performance standard for those types of debris. Rather than explicitly prohibiting such practices, however, such practices will be precluded because of the inability to comply with the standards.

To ensure that the contaminated layer of debris is removed and to account for the physical properties of different types of debris, the rule establishes different performance standards for different types of debris.

(a) *Metal Objects.* Metal objects must be treated to remove foreign matter adhering to the metal to produce a "clean debris surface". The rule defines a "clean debris surface" as a surface that, when viewed without magnification, shall be free of all visible contaminated soil and hazardous waste, except that residual staining caused by soil and waste consisting of light shadows, slight streaks, or minor discolorations, and soil and waste in cracks, crevices, and pits may be present provided that such staining and soil and waste in cracks, crevices, and

<sup>29</sup> Unless treatment occurs in an on-site container, tank, or containment building, the hazardous debris is treated within 90 days of generation, and the unit complies with the appropriate standards of part 265, or unless the treatment occurs within the Area of Containment (AOC) at a Superfund remediation site and the generator complying with today's treatment standards in order to remove the treated debris from the AOC and manage it as debris excluded from subtitle C. See discussion in section V.F. of the text.

pits shall be limited to no more than 5% of each square inch of surface area.

The rule allows minor residual staining caused by soil and waste and soil and waste to remain in cracks, crevices, and pits of up to 5% of each square inch of surface area<sup>31</sup> because of the impracticability of cleaning metal debris to a "white metal finish" as proposed. The Agency selected the 5% surface area criterion because: (1) it is within the range of reasonable levels—1% to 10%—that could have been selected; (2) it is generally equivalent to the Steel Structures Painting Council's specification for "Near-White Blast Cleaning" for cleaning steel surfaces by the use of abrasives;<sup>32</sup> and (3) it should not allow toxic contaminants to remain at levels that could pose a hazard to human health and the environment absent subtitle C regulation, and should remove contaminants so that threats posed by disposal of the debris are minimized.

(b) Brick, Cloth, Concrete, Paper, Rock, Pavement, and Wood. The performance standard for these types of debris requires: (1) Removal of at least 0.6 centimeters of the surface layer; and (2) treatment to a "clean debris surface." Removal of 0.6 centimeters of the surface layer is required for these types of debris because they may be porous and toxic contaminants may be absorbed within the debris. (The Agency recognizes that, as a practical matter, the 0.6 cm surface removal requirement precludes the use of this technology for most porous debris.) To ensure removal of contaminants that may be absorbed to depths beyond 0.6 centimeters, the rule requires removal of virtually all staining that could be indicative of the presence of toxic contaminants. The rule allows minor residual staining and foreign matter in cracks and crevices on up to 5% of the surface area (on a square inch basis) as a reasonable and practicable method to help ensure that the standards do not require treatment to a level beyond that necessary to ensure that the treated debris does not pose a hazard to human health and the environment absent subtitle C regulation. We note that staining that is not indicative of the potential presence of hazardous waste or contaminated soil

(e.g., rust stains on concrete adjacent to steel reinforcing bars) need not be removed and is not considered in determining compliance with the maximum 5% surface area limit on residual staining. The basis for the 5% surface area limit (on a square inch basis) on residual staining and foreign matter in cracks and crevices is the same as the basis discussed above for the definition of clean metal finish.

(c) Class, Rubber, Plastic. The physical extraction performance standards for these types of debris are the same as for brick, concrete, etc., except that removal of at least 0.6 centimeters of the surface layer is not required. Removal of the surface layer for glass, rubber, or plastic is not required because glass is nonporous and will not absorb contaminants below the surface, and rubber and plastic, although permeable, are not likely to leach absorbed contaminants at substantial rates.

(2) Chemical Extraction. The technologies classified as chemical extraction are water washing and spraying; liquid phase solvent extraction; and vapor phase solvent extraction. The performance standards for these technologies are based on dissolution of the contaminants into the cleaning solution. Removal of the outer debris layer is not intended.

(a) Water Washing and Spraying. Water sprays or water baths will effectively treat debris when sufficient temperature, pressure, residence time, agitation, surfactants, acids, bases, and/or detergents are used to meet the performance standards in accord with the contaminant restrictions. The rule requires that the debris must be treated to a "clean debris surface" (see discussion above) to ensure effective treatment to levels of hazardous contaminants that are not likely to pose a hazard to human health and the environment absent subtitle C control.

For porous debris—brick, cloth, concrete, paper, pavement, rock, and wood—the rule provides two other requirements. The thickness (i.e., one dimension) of each piece of porous debris may not be more than 1.2 cm (i.e., ½ inch), and the contaminants must be soluble to at least 5% by weight in the water solution or 5% by weight in the emulsion, as applicable. The Agency is applying these standards for porous debris to ensure effective extraction of toxic contaminants that may be absorbed below the surface layer of the debris.

If reducing the thickness of debris to 1.2 cm to meet the treatment standards results in debris that no longer meets the

60 mm minimum particle size limit for debris, such material is subject to the waste-specific treatment standards for the waste contaminating the material, unless the debris has been cleaned and separated from contaminated soil and hazardous waste before size reduction. This is consistent with the Agency's position that material with a particle size less than 60 mm is amenable to conventional treatment for process waste and small particle-sized material (i.e., as opposed to large debris objects) and that such material can be reasonably sampled for analysis to document compliance with the concentration-based treatment standards for the waste contaminating the material.

If the debris has been cleaned and separated from contaminated soil and hazardous waste before size reduction, the material remains classified as debris subject to today's treatment standards even if it no longer has a 60 mm particle size. The Agency believes that cleaning and separation of contaminated soil and hazardous waste will substantially reduce the concentration of toxic constituents such that the debris should contain minimum threat levels subsequent to treatment by an extraction or destruction technology. The level of cleaning and separation that is required is the same as required for separation of treatment residue from treated debris. See Note 9 to Table 1, § 268.45. At a minimum, simple physical or mechanical methods must be used such as vibratory or trommel screening or water washing. The debris surface need not be cleaned to a "clean debris surface" as defined in Table 1; rather, the surface must be free of caked soil, waste, or other nondebris material. Nondebris materials so separated are subject to the waste-specific treatment standards for the waste contaminating the material.

Porous debris (i.e., brick, cloth, concrete, paper, pavement, rock, or wood) that is contaminated with a waste listed for dioxin—EPA Hazardous Waste Numbers F020, F021, F022, F023, F026, or F027—is subject to additional controls. Because of the potential toxicity of the constituents in these wastes, the Agency believes that it is prudent to require additional controls to ensure that the potentially highly toxic constituents in these wastes are extracted from below the debris surface and that the treated debris poses minimum threat to human health and the environment absent subtitle C control. Accordingly, the rule requires the treater to make an "Equivalency Demonstration" to the Agency under

<sup>31</sup> Note that the 5% surface area criterion is applied to each square inch of the debris surface that has been contaminated with hazardous waste. The area covered by large stains cannot be averaged against large unstained areas. Only 5% of the area within any square inch can contain a residual stain.

<sup>32</sup> See the May 18, 1992, memorandum from Peter Shields, Radian, to Mark Mercer, EPA, entitled "Industry Standards for Cleanliness of Metal Surfaces".

existing § 268.42(b) that documents that the technology treats contaminants subject to treatment in these dioxin-listed wastes to a level equivalent to that required for these contaminants by the performance and design and operating standards for other technologies in Table 1, § 268.45, such that residual levels of hazardous contaminants will not pose a hazard to human health and the environment absent subtitle C control.

(b) **Liquid Phase Solvent Extraction.** This technology decontaminates debris surfaces by applying a nonaqueous liquid or liquid solution which causes the toxic contaminants to enter the liquid phase and be flushed away from the debris along with the liquid or liquid solution using agitation, temperature, and residence time sufficient to meet the performance standards. The treatment standards for this technology are the same as for water washing and spraying because the technologies use the same principles to extract toxic contaminants from debris.

(c) **Vapor Phase Solvent Extraction.** This technology decontaminates debris surfaces by applying an organic vapor which causes the toxic contaminants to enter the vapor phase using sufficient agitation, residence time, and temperature and to be flushed away with the organic vapor such that the performance standards are achieved. The treatment standards for this technology are the same as for water washing and spraying, except that porous debris surfaces must be in contact with the organic vapor for more than 60 minutes. This treatment time is consistent with state-of-the-art practices and is necessary to ensure effective extraction of contaminants.

(3) **Thermal Extraction.** The Agency has classified two technologies as thermal extraction: High temperature metals recovery and thermal desorption.

(a) **High Temperature Metals Recovery (HTMR).** HTMR furnaces are smelting, melting, or refining furnaces (including pyrometallurgical devices such as cupolas, reverberator furnaces, sintering machines, roasters, and foundry furnaces (see § 260.10 definition of "industrial furnace")) that use sufficient heat, residence time, mixing, fluxing agents, and/or carbon to extract metals from debris. HTMR furnaces are potentially subject to regulation under the Boiler and Industrial Furnace (BIF) Rule (subpart H, part 266) when they burn hazardous debris.<sup>33</sup>

<sup>33</sup> See § 266.100(c) that states generally that a smelting, melting, or refining furnace that burns a hazardous waste with a heating value of 5,000 Btu/lb or more or that contains a total concentration of

Today's rule requires that, for nonslagging furnaces (e.g., refining furnaces), treatment residuals must be separated from the debris. In addition, such separated residue must meet the waste-specific treatment standards for organic compounds in the waste contaminating the debris prior to further treatment. Further, those residues must meet the waste-specific treatment standards for all BDAT constituents in the waste contaminating the debris prior to land disposal. Finally, if debris is contaminated with a dioxin-listed waste, HTMR is not BDAT and the treated debris is not excluded from subtitle C unless the treater makes an "Equivalent Technology" demonstration to the Agency under § 268.42(b) that documents that the technology treats contaminants subject to treatment to a level equivalent to that required by the performance and design and operating standards for other technologies in Table 1, § 268.45, such that residual levels of hazardous contaminants will not pose a hazard to human health and the environment absent subtitle C control.

Today's rule does not establish performance or design and operating standards for slagging HTMR furnaces (other than the requirements inherent in the definition—a melting or smelting furnace must melt metals and extract the metals from debris) because a slagging furnace is likely to provide effective treatment for all contaminants, except perhaps for chlorinated dioxins as discussed below, and for all debris types.

For nonslagging (i.e., refining furnaces such as roasters) HTMR furnaces, the rule ensures treatment of both metal and organic contaminants. First, the definition of HTMR furnaces requires that metals must be separated from the debris. Thus, not only will metals be removed, but temperatures hot enough to separate metals from debris should also remove organic contaminants from the debris (with perhaps the exception of dioxins, as discussed below). Second, to help ensure that the HTMR unit has effectively removed organic contaminants in the debris the rule requires that the residue be separated from the treated debris and that the separated residue must meet the waste-specific treatment standards for the BDAT organic contaminants in the waste contaminating the debris prior to further treatment.

In addition, the Agency is concerned that potentially extremely toxic

toxic organic compounds exceeding 500 ppm by weight is subject to the BIF Rule.

contaminants may not be destroyed (or removed with the residue) to levels that would not pose a hazard to human health and the environment absent subtitle C control. Consequently, if debris is contaminated with a dioxin-listed waste, HTMR is not BDAT for the debris and the debris is not excluded from subtitle C after treatment unless the treater obtains approval from the Director under an equivalent technology demonstration provided by § 268.42(b) for the design and operating conditions of the HTMR unit. The rule provides this restriction for dioxin-listed waste because of concern that if such contaminants remained undestroyed even at low concentrations in the residue and were not completely removed from the treated debris, that the debris could pose a health or environmental hazard absent subtitle C control.

(b) **Thermal Desorption.** Thermal desorption is heating in an enclosed chamber under either oxidizing or nonoxidizing atmospheres at sufficient operating temperature and residence time such that the contaminants subject to treatment are vaporized and removed from the heating chamber in a gaseous exhaust stream.<sup>34</sup> The rule establishes operating and performance standards and contaminant restrictions, and requires the treater to make a demonstration of "Equivalent Technology" under § 268.42(b) to document that the technology treats contaminants subject to treatment to a level equivalent to that required by the performance and design and operating standards for other technologies in Table 1, § 268.45, such that residual levels of hazardous contaminants will not pose a hazard to human health and the environment absent subtitle C control.

The Agency attempted to develop objective treatment standards that would obviate the need for an equivalency demonstration (see discussion above). The Agency determined, however, that it was very difficult to establish universal operating

<sup>34</sup> We note that a thermal desorber is regulated either as an incinerator (if the device is direct-fired or if the off-gas is burned in an afterburner) under subpart D of part 264 or 265, or as a thermal treatment unit under subpart X, part 264 or subpart P, part 265. To distinguish between thermal desorption and thermal destruction (for which separate debris treatment standards are provided) for purposes of complying with this rule, the primary purpose of thermal desorption is to volatilize contaminants and to remove them from the treatment chamber for subsequent destruction or treatment. We note that the treatment standards in Table 1, § 268.45 for thermal destruction specifically excludes thermal desorbers.

limits for the key operating parameters that affect treatment efficiency—temperature, residence time, size of porous debris, bed depth, and volatility of the contaminant—that would strike a balance between ensuring treatment to minimum threat levels and establishing requirements that could grossly over-regulate in many situations. Rather, the Agency believes that operating requirements can best be determined on a case-by-case basis (i.e., under an equivalent technology demonstration under § 268.42(b)) considering the parameters listed above. In addition, the Agency believes that the performance standard used for physical and chemical extraction—treatment to a clean debris surface—is not practicable for thermal desorption because treated debris surfaces will continue to have a dusting of residue after separation of the debris from the residue by simple, physical or mechanical means (unless water washing is used). See discussion below regarding the requirement for separation of debris from residue.

The treatment standards for thermal desorption require, in addition to the case-by-case Agency approval of design and operating conditions, that hazardous contaminants be vaporized (by virtue of the definition of thermal desorption), and restricts the use of the technology for metal contaminants other than mercury (i.e., thermal desorption is not BDAT for metals other than mercury). In addition, to help ensure extraction of contaminants from below the surface of porous debris, the rule establishes a maximum thickness (in one dimension) for porous debris of 10 cm (4 inches).<sup>35</sup> The 4 inch maximum thickness limit is consistent with state-of-the-art practices. The restriction on metals other than mercury is provided because they are not likely to be extracted from below the debris surface at normal desorption temperatures and residence times.

We note that we considered restricting the use of thermal desorption for only porous debris that is contaminated with a metal other than mercury. We reasoned that metal contaminants in soil or waste on the surface of nonporous debris will be physically separated from the debris along with the soil or waste during or after desorption, and thus a restriction

would not be necessary. However, we are also concerned about metal contaminants that may remain on the surface of nonporous (and porous) debris after desorption and after separation of the treated debris from the residue. An example is a piece of steel contaminated with a metal-bearing paint that causes the steel to fail the TC. The metal may not be desorbed and the paint would not be separated from the steel during the simple physical or mechanical separation of residue from debris. Although the steel would continue to fail the TC, it would have been treated to meet BDAT and could be land disposed in a subtitle C facility. This is inconsistent with the Agency's view that BDAT for a TC waste must cause the waste to no longer exhibit the TC.

The treatment standard for thermal desorption also requires separation of the treated debris from treatment residuals and soil, waste, or other nondebris material (collectively referred to as residuals) because residuals are subject to the treatment standards for the waste contaminating the debris. See discussion in Section V.E. Not only will these residuals contain unvolatilized metals that require further treatment, but the Agency is using the residue separated from debris as a surrogate means to ensure effective debris treatment. The rule achieves this objective by requiring that the residue separated from the treated debris must meet the waste-specific treatment standards for organic compounds in the waste contaminating the debris. If the residue (prior to further treatment) does not meet applicable treatment standards for organic compounds, it is an indication that the desorption process did not effectively extract the organic contaminants subject to treatment. Thus, the treatment is not BDAT, the treated debris is not excluded from subtitle C, and both the residues and the debris cannot be land disposed without further treatment.

Separation of the desorbed debris from treatment residuals (i.e., soil, waste, or other nondebris materials) must be accomplished using simple physical or mechanical means such as vibratory or trommel screens or water washing. The separation process need not produce a "clean debris surface"<sup>36</sup>

as discussed above, however; rather the debris surface must be free of caked residuals or nondebris materials such as soil or waste. For example, debris need not be water washed after trommel screening to remove dust from residuals or nondebris material. (Note that the use of water washing to separate thermally desorbed debris from residuals and nondebris materials need not comply with the treatment standards for water washing (e.g., treatment to a "clean debris surface") because the debris has already been treated by an alternative technology.)

*c. Destruction Technologies.* The Agency has identified two classifications of destruction technologies: chemical destruction and thermal destruction. These technologies are designed and operated to destroy hazardous contaminants on debris surfaces and in surface pores.

(1) Biodegradation. Biodegradation is the removal of hazardous contaminants from debris surfaces and surface pores in an aqueous solution and biodegradation of organic or nonmetallic inorganic compounds (i.e., inorganics that contain phosphorus, nitrogen, or sulfur) in units operated under either aerobic or anaerobic conditions. The rule establishes operating and performance standards and contaminant restrictions, and requires the treater to make a demonstration of "Equivalent Technology" under § 268.42(b) to document that the technology treats contaminants subject to treatment to a level equivalent to that required by the performance and design and operating standards for other technologies in Table 1, § 268.45, such that residual levels of hazardous contaminants will not pose a hazard to human health and the environment absent subtitle C control.

The Agency attempted to develop objective treatment standards that would obviate the need for an equivalency demonstration (see discussion above). The Agency determined, however, that it was very difficult to establish universal operating limits for the key operating parameters that affect treatment efficiency—type of matrix contaminating the debris, biological properties of the contaminant, temperature, pH, treatment time, biomass concentration, moisture level, and for aerobic biodegradation, oxygen concentration—that would strike a balance between ensuring treatment to minimum threat levels and establishing requirements that could

limited to no more than 5% of each square inch of surface area.

<sup>35</sup> See previous discussion in the text that, if size reduction of debris to meet the treatment standards reduces the particle size to below the minimum 60 mm size limit for the definition of debris, such nondebris material is subject to the waste-specific treatment standards for the waste contaminating the material, unless the debris has been cleaned and separated from contaminated soil and waste prior to size reduction.

<sup>36</sup> "Clean debris surface" means the surface, when viewed without magnification, shall be free of all visible soil, waste, paint, or other foreign (i.e., nondebris) matter, except that residual staining consisting of light shadows, slight streaks, or minor discolorations, and foreign matter in cracks and crevices may be present provided that such staining and foreign matter in cracks and crevices shall be

grossly over-regulate in many situations. Rather, the Agency believes that operating requirements can best be determined on a case-by-case basis (i.e., under an equivalent technology demonstration under § 268.42(b)) considering the parameters listed above.

In addition, the Agency believes that the performance standard used for physical and chemical extraction—treatment to a clean debris surface—is not practicable for biodegradation because treated debris surfaces are likely to fail that standard even though organic contaminants may have been destroyed and metal contaminants may have been extracted. Further, the Agency could not identify a generic standard that would ensure effective treatment of organic contaminants that may be beneath the surface of porous debris.

In addition to the requirement to make an equivalency demonstration, the treatment standards establish a maximum thickness (in one dimension) for porous debris of 1.2 cm (½ inch).<sup>37</sup> These requirements will help ensure extraction of contaminants from below the surface of porous debris.

The rule also restricts the use of biodegradation for metal contaminants because metals are not destroyed by the biomass (i.e., biodegradation is not BDAT for metals). Further, the performance and design and operating standards would not ensure that undestroyed metal would partition to the biomass for treatment to the numeric standards for the waste contaminating the debris. This is because the performance standard does not require treatment to a "clean debris surface" as discussed above, so that neither the performance standard nor the requirement to separate treated debris from residuals (see discussion below) would ensure that metal contaminants would partition to the residue.

The treatment standard for biodegradation requires separation of the treated debris from treatment residuals (i.e., soil, waste, or other nondebris material) because residuals are subject to the numerical treatment standards for the waste contaminating the debris. See discussion in section V.E. Not only will these residuals contain metal contaminants that require further treatment, but the Agency is using the

residue separated from debris as a surrogate means to ensure effective debris treatment. Accordingly, the debris treatment standard also requires that the residue separated from the treated debris must meet the waste-specific treatment standards for organic compounds in the waste contaminating the debris prior to further treatment. If the residue (prior to further treatment) does not meet applicable treatment standards for organic compounds, it is an indication that the biodegradation process did not effectively destroy the organic contaminants subject to treatment. Thus, the treatment is not BDAT, treated debris is not excluded from subtitle C, and both the residues and the debris cannot be land disposed without further treatment.

Separation of the biodegraded debris from treatment residuals, soil, waste, or other nondebris materials (collectively referred to as residuals and subject to the treatment standards for residuals) must be accomplished using simple physical or mechanical means such as vibratory or tumbling screens or water washing. The separation process need not produce a "clean debris surface" as discussed above, however; rather the debris surface must be free of caked biomass or nondebris materials such as soil or waste. For example, the use of water to wash off the biomass or other foreign matter from the debris after removal from the treatment process does not subject the debris to the treatment standards for water washing (e.g., treatment to a "clean debris surface"). This is because the debris has already been treated by an alternative technology.

(2) Chemical Destruction. The rule establishes two chemical destruction technologies as BDAT: Chemical oxidation and chemical reduction.

(a) Chemical Oxidation. Chemical oxidation is chemical or electrolytic oxidation utilizing the following oxidation reagents (or waste reagents) or combination of reagents: Hypochlorite (e.g., bleach); chlorine; chlorine dioxide; ozone or UV (ultraviolet light) assisted ozone; peroxides; persulfates; perchlorates; permanganates; and/or other oxidizing reagents of equivalent destruction efficiency. Chemical oxidation specifically includes what is referred to as alkaline chlorination.

The Agency was not able to develop objective performance or design and operation standards because of the variety of oxidation reagents that could be used and the variety of chemical and physical properties of debris and hazardous contaminants. In addition,

the Agency believes that the performance standard used for physical and chemical extraction—treatment to a clean debris surface—is not practicable for chemical oxidation because treated debris surfaces are likely to fail that standard even though organic contaminants may have been destroyed and metal contaminants may have been extracted. Further, the Agency could not identify a generic standard that would ensure effective treatment of organic contaminants that may be beneath the surface of porous debris. Consequently, the primary treatment standard for chemical oxidation requires the treater to make a demonstration of "Equivalent Technology" under § 268.42(b) to document that the technology treats contaminants subject to treatment to a level equivalent to that required by the performance and design and operating standards for other technologies in Table 1, § 268.45, such that residual levels of hazardous contaminants will not pose a hazard to human health and the environment absent subtitle C control. See discussion above.

The rule also restricts the use of chemical oxidation for metal contaminants because metals are not destroyed by the chemical reagents (i.e., chemical oxidation is not BDAT for metals). Further, the performance and design and operating standards would not ensure that undestroyed metal would partition to the residue for treatment to the numeric standards for the waste contaminating the debris. This is because the performance standard does not require treatment to a "clean debris surface" as discussed above, so that neither the performance standard nor the requirement to separate treated debris from residuals (see discussion below) would ensure that metal contaminants would partition to the residue.

In addition, to help ensure effective treatment, the treatment standard requires that porous debris—brick, cloth, concrete, paper, pavement, rock, and wood—cannot have a thickness exceeding 1.2 cm (½ inch)<sup>38</sup> prior to treatment to ensure effective treatment of contaminants absorbed beyond the debris surface.

Finally, the rule requires that the treated debris must be separated from

<sup>37</sup> See previous discussion in the text that, if size reduction of debris to meet the treatment standards reduces the particle size to below the minimum 60 mm size limit for the definition of debris, such nondebris material is subject to the waste-specific treatment standards for the waste contaminating the material, unless the debris has been cleaned and separated from contaminated soil and waste prior to size reduction.

<sup>38</sup> See previous discussion in the text that, if size reduction of debris to meet the treatment standards reduces the particle size to below the minimum 60 mm size limit for the definition of debris, such nondebris material is subject to the waste-specific treatment standards for the waste contaminating the material, unless the debris has been cleaned and separated from contaminated soil and waste prior to size reduction.



treatment residues, and that such separated residue must meet the waste-specific treatment standards for organic compounds for the waste contaminating the debris. See discussion above for rationale and information on how this provision works.

(b) **Chemical Reduction.** Chemical reduction is a chemical reaction utilizing the following reducing reagents (or waste reagents) or a combination of reagents: Sulfur dioxide; sodium, potassium, or alkali salts of sulfites, bisulfites, and metabisulfites, and polyethylene glycols (e.g., NaPEG and KPEG); sodium hydrosulfide; ferrous salts; and/or other reducing reagents of equivalent efficiency. The treatment standards for chemical reduction are identical to those for chemical oxidation because the technologies are based on similar chemical reactions.

(3) **Thermal Destruction.** Thermal destruction is treatment in an incinerator operating in accordance with subpart O of part 264 or 265, a boiler or industrial furnace operating in accordance with subpart H of part 266, or other thermal treatment unit operated in accordance with subpart X, part 264 (permit standards) or subpart P, part 265 (interim status standards).

As noted above in the discussion of treatment standards for thermal desorption, a thermal desorber is regulated either as an incinerator (if the device is direct-fired or if the off-gas is burned in an afterburner) under subpart O of part 264 or 265, or as a thermal treatment unit under subpart X, part 264 or subpart P, part 265. To distinguish between thermal desorption and thermal destruction (for which separate debris treatment standards are provided) for purposes of complying with this rule, the primary purpose of thermal desorption is to volatilize contaminants and to remove them from the treatment chamber for subsequent destruction or treatment. The definition of thermal destruction in Table 1, § 268.45, specifically excludes thermal desorbers.

Today's rule requires that treatment residuals be separated from the debris and restricts the use of thermal destruction (i.e., thermal treatment is not BDAT) for inorganic debris contaminated with a metal other than mercury. In addition, if debris is contaminated with a dioxin-listed waste, thermal destruction is not BDAT and the treated debris is not excluded from subtitle C unless the treater makes an "Equivalent Technology" demonstration to the Agency under § 268.42(b) that documents that the technology treats contaminants subject to treatment to a level equivalent to that required by the performance and design

and operating standards for other technologies in Table 1, § 268.45, such that residual levels of hazardous contaminants will not pose a hazard to human health and the environment absent subtitle C control. (Note as discussed below that these restrictions do not apply to vitrification.)

Given that thermal destruction uses substantially higher temperatures and often longer residence times than thermal desorption, the Agency believes that thermal destruction will destroy all but the most toxic hazardous nonmetal contaminants to minimum threat levels. Although metal contaminants will not be destroyed, metal contaminants in organic debris (e.g., wood, paper) will be removed from the treated debris. Metals in organic debris will partition to the residue (i.e., the material resulting from treatment that remains subject to numerical treatment standards) because the organic debris will be destroyed. Given that the treatment standards require separation of treated debris from the residue, the metals from the organic debris will partition to the residue for subsequent treatment to the waste-specific treatment standards for the waste contaminating the debris.<sup>39</sup> Thus, only metals contaminating inorganic debris (e.g., concrete, bricks) may remain untreated if they are not volatilized. To ensure treatment of such metals, the rule restricts the use of thermal destruction (i.e., thermal treatment is not BDAT) for inorganic debris contaminated with a metal other than the highly volatile mercury.

The treatment standards also require that the residue separated from the treated debris must meet the waste-specific treatment standards for the BDAT organic contaminants in the waste contaminating the debris prior to further treatment. This will help ensure that the thermal destruction unit has effectively destroyed organic contaminants in the debris.

In addition, the Agency is concerned that extremely toxic contaminants may not be destroyed (or removed with the residue) to levels that would not pose a hazard to human health and the environment absent subtitle C control. Consequently, if debris is contaminated with a dioxin-listed waste, incineration is not BDAT for the debris and the debris is not excluded from subtitle C after treatment unless the treater obtains approval from the Director of

<sup>39</sup> Although metals in soil or waste contaminating the debris may be removed by separation of the treated debris from these materials as the rule requires, metals in metal-bearing, heat resistant coatings on inorganic debris may neither be volatilized nor separated from the treated debris.

the design and operating conditions of the thermal destruction unit. We considered applying this restriction only to porous, inorganic debris under the reasoning that the contaminants in dioxin-listed waste would partition to the residue for nonporous debris (e.g., metal) and organic, porous debris (e.g., wood). We were concerned, however, that if such contaminants remained undestroyed even at low concentrations in the residue and were not completely removed from the treated debris, that the debris could pose a health or environmental hazard absent subtitle C control. Given that the requirements for separation of residue and treated debris do not require a "clean debris surface" but, rather allow a dusting of residue to remain on the debris, we believe that it is prudent to establish this restriction on dioxin-listed waste.

Finally, we note that vitrification is a type of thermal destruction and that the rule establishes special (i.e., reduced) requirements for vitrification. Although the Agency classified vitrification as both thermal destruction and an immobilization technology at proposal (57 FR 1036), the Agency believes that the regulation is more easily understood if vitrification is classified only as thermal destruction with appropriate consideration given to the fact that vitrification heats the debris to extremely high temperatures resulting in the formation of nonasbestiform glass. The fact that vitrification transforms debris into a glass-like residue is the basis for the special requirements established for vitrification: (1) The restriction on metal contaminants for porous, inorganic debris does not apply; and (2) the requirement for Agency approval of design and operating conditions to treat debris contaminated with dioxin-listed waste does not apply. Nonetheless, the vitrified residue, like all debris treatment residue, is subject to the waste-specific treatment standards for the waste contaminating the debris.

d. **Immobilization Technologies.** The Agency has identified three immobilization technologies as BDAT for hazardous debris: macroencapsulation, microencapsulation, and sealing. Immobilized debris must be land disposed in a subtitle C facility;<sup>40</sup> it is not excluded from subtitle C regulation because the contaminants have not been destroyed or removed but rather contained indefinitely. Today's rule

<sup>40</sup> In the Phase II land disposal restrictions rule, the Agency will reopen and request comment on the issue of whether immobilized debris should be excluded from subtitle C regulation.

establishes only general, nonobjective performance standards for these technologies rather than the more prescriptive standards that were proposed (57 FR 1035-1036) because, based on public comment and the Agency's re-evaluation, the Agency is concerned that the proposed prescriptive standards may be overly restrictive (i.e., by requiring conditions that are more than necessary to ensure immobilization prior to subtitle C management)<sup>41</sup> in some cases and ineffective in others. Nonetheless, the Agency believes that the performance standards promulgated will substantially reduce the likelihood of migration of hazardous constituents from the debris as required by RCRA section 3004(m)(1).

(a) Macroencapsulation.

Macroencapsulation is the application of surface coating materials such as polymeric organics (e.g., resins and plastics) or the use of a jacket of inert inorganic materials to substantially reduce surface exposure to potential leaching media. The treatment standard requires that the encapsulating material must completely encapsulate the debris (i.e., the encapsulant must completely surround the debris and be unbroken). Further, the encapsulating material must be resistant to degradation by the debris and its contaminants and materials into which it may come into contact after placement (leachate, other waste, microbes) to ensure that the likelihood of migration of toxic contaminants has been substantially reduced.

(b) Microencapsulation.

Microencapsulation is stabilization of the debris with the following reagents (or waste reagents) such that the leachability of the hazardous contaminants is reduced: Portland cement; or lime/pozzolans (e.g., fly ash and cement kiln dust). Reagents (e.g., iron salts, silicates, and clays) may be added to enhance the set/cure time and/or compressive strength, or to reduce the leachability of the hazardous constituents. The performance standard for microencapsulation requires that the leachability of the hazardous contaminants must be reduced.

We note that the proposed rule would have prohibited the presence of free liquids in the microencapsulated debris. Today's rule does not provide this explicit prohibition because free liquids are prohibited from land disposal facilities under existing requirements—§ 264.314 or 265.314.

<sup>41</sup> For example, by requiring a minimum 7 day cure time for microencapsulation when some reagents can adequately stabilize some debris types in much less time.

If the treater reduces the particle size of debris to make it amenable to microencapsulation so that the debris no longer meets the 60 mm minimum particle size limit for debris, such material is subject to the waste-specific treatment standards for the waste contaminating the material, unless the debris has been cleaned and separated from contaminated soil and waste before size reduction. This is consistent with the Agency's position that material with a particle size less than 60 mm is amenable to conventional treatment for process waste and small particle-sized material (i.e., as opposed to large debris objects) and that such material can be reasonably sampled for analysis to document compliance with the concentration-based treatment standards for the waste contaminating the material.

If the debris has been cleaned and separated from contaminated soil and hazardous waste<sup>42</sup> before size reduction, the material remains classified as debris subject to today's treatment standards even if it no longer has a 60 mm particle size. The Agency believes that cleaning and separation of contaminated soil and hazardous waste will substantially reduce the concentration of toxic constituents such that, upon microencapsulation and placement in a subtitle C unit, the toxic constituents should not pose a hazard to human health and the environment.

The level of cleaning and separation that is required is the same as required for separation of treatment residue from treated debris. See Note 9 to Table 1, § 268.45. At a minimum, simple physical or mechanical methods must be used such as vibratory or trommel screening or water washing. The debris surface need not be cleaned to a "clean debris surface" as defined in Table 1; rather, the surface must be free of caked soil, waste, or other nondebris material. Nondebris materials so separated are subject to the waste-specific treatment standards for the waste contaminating the material.

(c) Sealing. Sealing is the application of an appropriate material which adheres tightly to the debris surface to avoid exposure of the surface to potential leaching media. When necessary to effectively seal the surface, sealing entails pretreatment of the debris surface to remove foreign matter and to clean and roughen the surface. Sealing materials include epoxy,

silicone, and urethane compounds; paint may not be used as a sealant.

The performance standard requires that the sealing must be performed to avoid exposure of the debris surface to potential leaching media—that is, the sealant must completely enclose the debris. Further, the sealant must be resistant to degradation by the debris and its contaminants and materials into which it may come into contact after placement (leachate, other waste, microbes) to ensure that the likelihood of migration of toxic contaminants has been substantially reduced.

e. *Changes to the Proposed Rule.* In addition to the changes from proposal discussed above, today's final rule greatly simplifies presentation of the treatment standards. Proposed Table 1 (indicating by YES or NO which technologies would be BDAT for which debris types when specific contaminant categories were present) and Table 2 (classifying contaminants by category) are not promulgated. Nonetheless, the final rule will operate essentially as the Agency had intended for the proposal rule. Rather than explicitly identifying acceptable technology/debris/contaminant combinations in two tables and providing the performance or design and operating standards in a third table as proposed, the final rule establishes the treatment standards in a single table—Table 1 of § 268.45. Not only was the proposed approach confusing, but proposed Table 1 forced unintended consequences.

Proposed Table 1 would have prohibited the use of particular technologies to treat certain debris types contaminated with certain hazardous constituents. In most cases, the proposed prohibition was based on the impracticability of applying the technology to the debris type rather than a determination as to whether the technology would effectively treat the debris if it was (or could be) applied. An example is the proposed prohibition on using abrasive blasting for paper, cloth, rubber, and plastic. The Agency has determined that abrasive blasting should be allowed for these types of debris because they may be mixed with debris that is amenable to the technology and would be converted to a treatment residue. An example is a steel I-beam that has paper labels on it. If abrasive blasting was used to treat the I-beam, the performance standards would ensure that the paper labels became part of the treatment residual subject to the treatment standard for the waste contaminating the debris.

We note, however, that depending on the type of contaminants subject to

<sup>42</sup> We note that mixtures of contaminated soil, waste, and debris are regulated as debris if the mixture is at least 50% debris by volume. Thus, materials regulated as debris may contain high concentrations of toxic constituents.

treatment and the technology selected to treat the debris, more than one treatment technology may be required to meet the standards. For example, if water washing was used as an extraction technology for a porous debris (e.g., concrete) with a contaminant subject to treatment that was not soluble to at least 5% by weight in the water solution, another technology (e.g., thermal desorption) must be used to treat that contaminant.

In summary, today's final rule uses the definition of the technology, the performance or design and operating standards, and the contaminant restrictions provided by Table 1 of § 268.45 to ensure effective treatment of hazardous debris.

#### 6. Treatment of Characteristic Debris

EPA proposed that debris that exhibits a characteristic of ignitability or reactivity, or that is contaminated with wastes that are ignitable, reactive, or corrosive, be treated to deactivate the waste. See 57 FR 1021. The Agency solicited comment on the question of whether such debris should also be treated for all Appendix VIII constituents that could reasonably be expected to be contaminating the debris (see 57 FR 984-85), and whether simple dilution should be allowed as a means of achieving deactivation, *id.* at 990.

In the third final rule, EPA established deactivation as a treatment standard for certain ignitable, corrosive, and reactive wastes, and allowed dilution as a means of achieving this standard. In large part, this was due to the enormous diversity of wastes exhibiting these characteristics and the difficulty of ascertaining the existence or extent of contamination not attributable to the characteristic property itself for this enormously disparate group of wastes. See 55 FR 22654. These concerns are less apparent for debris exhibiting ignitability or reactivity, or contaminated with ignitable, corrosive or reactive wastes, because there appears to be much less of it (almost no debris could be ignitable, given that most ignitable wastes must be liquids (see § 261.21(a) (1) and (2)), none is corrosive (only liquids can be corrosive wastes), and also because a large proportion of debris would likely be contaminated with hazardous constituents because most hazardous debris comes from remediation sites. *Id.* at 985.

Most commenters opposed requiring treatment for specific hazardous contaminants. They also urged that all dilution be allowed as a form of treatment. Some commenters argued that this result was compelled by the

statute. (This issue is presently awaiting decision by a panel of the District of Columbia Circuit Court of Appeals.) Others expressed concern with the practical difficulties inherent in sampling for hazardous constituents, or otherwise ascertaining their presence.

After considering the record, the Agency has decided to adopt the same treatment standards for ignitable, corrosive, or reactive (ICR) debris as for other hazardous debris because ICR debris is just as likely to be contaminated with hazardous constituents. See 55 FR 22654. (EPA will subcategorize ICR wastes and develop specific treatment standards, rather than allowing all types of dilution as treatment when a specific toxicity threat is apparent.) We are adopting a treatment standard of deactivation for these wastes but are requiring that the standard be achieved by use of the treatment methods adopted for other debris, unless the generator or treater demonstrates to the Agency that the debris does not contain toxic constituents. See discussion on codification of the contained-in principle above in Section V.B.2.b. (If necessary, petitioners could also make an equivalency demonstration under § 268.42(b) if they wish to treat by some means other than one of the methods set out in the rule.) This will result in some treatment of hazardous constituents that are present, rather than allowing simple dilution to be used. (Many treatment methods for debris involve some type of dilution, and are permissible under today's rule. The effect of today's rule is to prohibit dilution other than that occurring as a result of a designated treatment method. An example of impermissible dilution could be packing ignitable, corrosive, or reactive debris in sand.) In addition, the types of concerns voiced by the Agency in the third rule against adopting this type of standard for all ignitable, corrosive, and reactive wastes are not present for debris. The Agency is not requiring identification of hazardous contaminants that may be present, as proposed, in part due to the practical concerns voiced by commenters, in part because the Agency is not adopting this approach for other debris, and because most of the treatment methods will provide some treatment of most if not all hazardous contaminants.

EPA is not providing the option of treating by existing treatment standards for these wastes. This is because the existing treatment standard for most ignitable, corrosive, or reactive wastes can be achieved by deactivation involving any type of dilution. Since this is the very result that the Agency is

seeking to avoid, EPA is indicating in the rule that this option is not available for this one class of debris.

EPA noted at proposal that special rules would be needed for debris that is reactive due to presence of cyanide in order that cyanide be treated adequately. See 57 FR 990. We are adopting this approach in the final rule. Any such debris must therefore be treated by one of the specified technologies for which the treatment standards can be achieved for cyanide. In addition, any residues of such treatment may not be disposed until cyanide is treated to levels established in existing Table CCW of § 268.43 (the treatment standard for waste that is reactive because of cyanide). This approach is consistent with that adopted for reactive cyanide wastes in the third rule and should ensure that the cyanide known to be present is treated adequately before land disposal.

#### 7. Special Requirements for Inherently Hazardous Debris

The proposed rule also considered the regulatory status of debris that is itself hazardous because it is fabricated with toxic constituents. Because such debris will continue to exhibit the toxicity characteristic after treatment by an extraction or destruction technology, today's rule requires treatment by an immobilization technology to reduce the likelihood of migration of hazardous contaminants. See § 268.45(b)(4). Examples are lead pipe, or refractory brick containing chromium. See 57 FR 990. (This debris is referred to in this preamble discussion as "inherently hazardous debris".) Such debris can also be contaminated with listed wastes. In the proposed rule, the Agency discussed how the land disposal restrictions would apply if such debris were disposed of, and also indicated that an alternative for much of this debris would be to recycle it as scrap metal, in which case an existing regulatory exemption could apply. *id.* EPA also solicited comment on what standards should apply to residues from treating inherently hazardous debris, and also requested comment on whether there were situations when immobilization would not be an appropriate treatment technology for such debris. *Id.* at n. 26 and 990-91.

The Agency is essentially adopting the proposed approach in the final rule. However, some of the issues raised in the proposal require additional clarification, which is provided below.

a. *Inherently Hazardous Debris that Is Disposed.* When recycling of inherently hazardous debris is not

practicable and it is to be disposed, today's rule requires treatment by an immobilization technology to reduce the likelihood of migration of hazardous contaminants, followed by disposal in a subtitle C facility. In response to commenters' concerns about the need for size reduction for immobilization, we note that the treatment standards for macroencapsulation and sealing may be achieved in some cases without size reductions.<sup>43</sup>

A number of commenters questioned whether any treatment was needed to be performed on inherently hazardous debris or whether it could simply be disposed directly. The statute forecloses that option. Section 3004(m)(1) indicates that the Agency is to establish "levels or methods of treatment, if any" which substantially reduce waste toxicity and mobility and minimize threats. If there are not such methods, the situation EPA believes contemplated by the clause "if any" in section 3004(m), the waste cannot be land disposed. See section 3004 (d), (e), and (g); see also *API v. EPA*, 906 F. 2d 729, 738 (D.C. Cir. 1990) (use of comparative risk assessment to compare safety of treatment methods versus land disposal of untreated wastes is unnecessary given that the statute forecloses land disposal as an option). Thus, some treatment of inherently hazardous debris is needed in order for it to be land disposed. As indicated above, the Agency believes that such methods exist (i.e., immobilization).

If inherently hazardous debris is also contaminated with listed wastes, then that waste also must be treated by one of the prescribed treatment methods, the same approach adopted for all other debris. Note that the contaminants in the waste contaminating the debris need not be treated prior to immobilization of the debris if the performance standards for the immobilization technology can be achieved without such prior treatment.

Residues from treating inherently hazardous debris would not require further treatment unless the residues also exhibited a prohibited hazardous waste characteristic. However, if the inherently hazardous debris is contaminated with a listed waste, residues from treating the debris would remain subject to the numerical standards applicable to that listed waste. Furthermore, if the debris were treated first to remove or destroy the listed waste (i.e., treated by an extraction or destruction technology

prescribed in today's rule) and subsequently treated again by immobilization due to its inherent content, the Agency would not consider the debris to be contaminated any longer with a listed waste, since the initial treatment would have removed or destroyed it. Thus, any residues from subsequent immobilization would not be subject to treatment standards unless those residues exhibited a characteristic. For example, if lead pipe contaminated with listed solvents was first treated to remove the solvent and then treated to immobilize the lead, only residues from removing the solvent would have to meet the numerical solvent treatment standards. This approach mirrors that adopted for all other hazardous debris.

b. *Inherently Hazardous Debris that Is Scrap Metal and Is Recycled.* EPA's rules provide for an exemption from regulation for scrap metal that is recycled. See § 261.6(a)(3)(iv); scrap metal is defined at § 261.1(c)(6). EPA consequently indicated at proposal that the land disposal prohibitions would not apply to inherently hazardous debris that was also scrap metal being recycled. EPA adheres to that approach, which simply restates current rules (and was not reopened for reconsideration). The only obligation for generators handling such scrap metal is to keep a record of the scrap and its subsequent disposition or recycling by metal reclamation. See § 268.7(a)(6). If the scrap metal is also contaminated with listed waste, the exemption continues to apply since the material would still meet the regulatory definition of scrap metal. However, any residues from processing the waste would remain hazardous by the derived from rule, and would require treatment to meet the standard for that listed waste before it could be land disposed. Thus, persons treating such scrap metal would become hazardous waste generators, and would also incur responsibilities under the land disposal restriction rules (see § 268.7(a) (1) and (2)). As explained in the previous section, however, if the scrap metal were to be treated first by a prescribed removal or destruction technology, it would no longer be considered to be contaminated with a listed waste, and any residues generated subsequently would not be hazardous wastes unless they exhibited a hazardous waste characteristic. Thus, it may be advantageous to arrange for pretreatment of contaminants before this type of scrap metal is recycled.

c. *Status of Stainless Steel Debris.* The Agency provided an example in the proposed rule of demolition of a building

containing stainless steel fixtures and indicated that if a representative sample of the demolition debris exhibited a characteristic debris would be hazardous waste. The Agency noted that stainless steel could also be removed before demolition and managed separately, perhaps by recycling it as scrap metal. See 57 FR 990.

In providing this example, the Agency was not stating that discarded stainless steel artifacts are hazardous wastes, and in fact has no information indicating that such materials, much less demolition debris containing small bits of stainless steel, would exhibit a characteristic. Although it may be worthwhile (for environmental and economic reasons) to remove metal artifacts for recycling rather than destroying them when demolition occurs, today's rule does not mandate any such conduct.

#### 8. Relationship of the TSCA PCB Rules to Today's Rule

As proposed, the final rule requires that hazardous debris that is also a waste PCB under 40 CFR part 761 must comply with both the applicable PCB requirements and today's debris treatment standards, by satisfying the more stringent applicable requirements.

The treatment standards for hazardous debris also apply to debris contaminated with both PCBs and RCRA hazardous wastes. See § 268.45(a)(5). This is consistent with the approach taken in the third final rule. See 55 FR 22678 (June 1, 1990). Debris treated to today's performance standards by an extraction or destruction technology (and that does not exhibit a hazardous characteristic) remains subject only to TSCA rules because it is excluded from subtitle C regulation, whereas debris treated by an immobilization technology remains subject to applicable requirements under both statutes.

Under the Toxic Substances Control Act (TSCA), disposal of debris contaminated with PCBs is regulated under 40 CFR 761.60. In addition, disposal of debris and materials resulting from the cleanup of certain PCB spills is subject to the PCB Spill Cleanup Policy, as provided under 40 CFR 761.125.

#### 9. Relationship of Existing Agency Standards for Asbestos to Today's Rule

As proposed, the Agency is today requiring that the treatment standards for hazardous debris also apply to debris subject to standards for asbestos

<sup>43</sup> Certainly, size reduction to that normally achieved prior to microencapsulation is not necessary.

under OSHA, TSCA, and NESHAPs.<sup>44</sup> EPA acknowledges that many of the treatment technologies specified in today's rule for hazardous debris would not be practicable for asbestos debris because of the potential for occupational exposure or environmental release of asbestos. However, the Agency believes that several technologies could be used to treat hazardous debris in compliance with the applicable OSHA, NESHAPs, and TSCA by using filtration devices on air and water emissions to control asbestos—water washing and spraying; liquid phase solvent extraction; vapor phase solvent extraction; biodegradation; chemical oxidation; chemical reduction; and macroencapsulation.

The Agency considered the argument made by several commenters that asbestos-contaminated hazardous debris and hazardous debris contaminated with asbestos should be managed according to existing EPA and OSHA regulations (i.e., bagging) and placing the bagged material in a subtitle C facility. The Agency agrees with the commenters that, if bagging meets the performance standard for macroencapsulation, such debris may then be disposed of in a subtitle C facility.

#### 10. Special Requirements for Radioactive Debris

The Agency is today requiring that hazardous debris that is subject to regulations under the Atomic Energy Act (AEA) because of its radioactivity (i.e., mixed waste) is also subject to today's debris treatment standards.<sup>45</sup> This is consistent with the Agency's regulation of the waste that is confaminate the debris—if a prohibited waste is also a mixed waste, it is nonetheless subject to the treatment standards for the waste.

Commenters expressed concern that the treatment of certain radioactive mixed waste debris may pose an unreasonable risk to human health and the environment due to the radiological nature of the waste. The Agency understands commenters' concerns but believes that there is sufficient flexibility in the debris treatment standards to enable generators or treaters to select a technology that will

effectively treat the hazardous contaminants without posing an unreasonable risk to human health and the environment because of the radiological nature of the waste.

#### 11. Documentation of Compliance With the Treatment Standards

When hazardous debris is treated to today's treatment standards, treaters must comply with the applicable residue analysis, notification, certification, and recordkeeping and requirements of revised § 268.7. In today's rule, the Agency has revised several paragraphs in § 268.7 and added one paragraph to accommodate hazardous debris.

Paragraph (a)(1) is revised to require generators who ship their hazardous debris to a storage or treatment facility to provide a notice that includes the information already required for restricted wastes as well as a listing of the contaminants subject to treatment. This will assist the treater in determining which treatment technology is appropriate for the debris. In addition, the notice must inform the treater that the debris is subject to (i.e., eligible for) the alternative treatment standards of Table 1; § 268.45.

Paragraph (a)(2) is revised to exempt generators of hazardous debris who obtain a determination from the Agency that the debris does not contain hazardous waste (see § 261.3(e)(2)) from the notification requirements of that paragraph for facilities receiving the shipment. Given that such debris is no longer hazardous waste, the notification requirement is not necessary.

Paragraph (a)(3) is revised to require generators whose restricted hazardous debris is not yet prohibited debris (because of, for example, the capacity variance discussed in section V.G below) to provide a notice that includes the information already required for restricted wastes as well as a listing of the contaminants subject to treatment and a statement that the debris is subject to (i.e., eligible for) the alternative treatment standards of Table 1, § 268.45. See discussion above for the rationale for requiring that this additional information be submitted to the receiving facility.

Paragraph (a)(4) is revised to exempt generators who treat their debris by one of the technologies specified in Table 1, § 268.45, from the waste analysis requirements of that paragraph. As discussed elsewhere in today's notice, the debris treatment standards are technology-specified standards rather than numerical concentration standards. Thus, analysis of the debris is generally not necessary (except to determine

where knowledge about the debris is not available whether the debris exhibits a characteristic of hazardous waste).

Paragraph (b)(4) is revised to exempt facilities that treat hazardous debris so that it is excluded from the definition of hazardous waste under § 261.3(e) (i.e., debris treated by an extraction or destruction technology provided by Table 1, § 268.45, and debris that the Agency has determined does not contain hazardous waste) from the notification requirements of that paragraph. Paragraph (b)(4) requires treaters of prohibited waste to notify the land disposal facility receiving each shipment of waste of information including the treatment standards applicable to the waste. We revised this requirement because notification of receiving facilities is not necessary for debris that is excluded from subtitle C regulation. We note, however, that treaters of excluded debris are subject to the new notification (to EPA) and certification requirements provided by paragraph (d), as discussed below.

Paragraph (b)(5) is revised to exempt facilities that treat hazardous debris so that it is excluded from the definition of hazardous waste under § 261.3(e) from the certification requirements of that paragraph. Such facilities are subject to the new certification requirements, however, provided by paragraph (d), as discussed below.

Finally, paragraph (d) is added to subject generators and treaters who first claim that their debris is excluded from the definition of hazardous waste under § 261.3(e) to notification and certification requirements. Such generators and treaters are required to submit to EPA a one-time notice identifying the name and address of the subtitle D facility receiving the excluded debris, a description of the debris before treatment (i.e., as-generated), and, if the debris is excluded because it was treated by an extraction or destruction technology specified in Table 1, § 268.45 (i.e., it is not excluded as a result of a contained-in determination), the treatment technology used. The Agency will use this information for enforcement purposes. Not only will the notification identify those facilities that claim that hazardous debris is excluded from regulation, but the information on the type of debris treated and the technology used will enable the Agency to establish a priority for inspections taking into account how difficult it may be to treat the debris to the performance and design and operating standards with the selected technology.

In addition, for debris treated by a technology specified in Table 1, § 268.45

<sup>44</sup> For a summary of OSHA, TSCA, and NESHAP controls on asbestos, see the proposed rule at 57 FR 993-994.

<sup>45</sup> We note that the Agency has established treatment standards in § 268.42 for several types of radioactive wastes (e.g., D008: Radioactive lead solids subcategory) that may be generated in particle sizes greater than 60 mm, the minimum size limit for debris. Nonetheless, such wastes are excluded from the definition of debris (see § 268.2(g)) and are subject to the waste-specific treatment standards.

(i.e., debris not excluded as a result of a contained-in determination), the treater must document and certify compliance with the treatment standards specified in Table 1. The rule requires the treater to record in the facility's files all inspections, evaluations, and analyses (e.g., determinations that a physical extraction technology has removed at least 0.6 cm of the debris surface and that the debris is treated to a "clean debris surface") of the treated debris that the treater made to determine compliance with the standards, as well as any data or information pertaining to key operating parameters the treater may have generated during treatment of the debris (e.g., exit gas temperature and feed rate, of a thermal desorber). The rule also requires the treater to place a certification in the facility's files for each shipment of excluded debris that the debris has been treated in accordance with the standards specified in Table 1. These requirements will enable the Agency to enforce the debris treatment standards.

#### *D. Exclusion of Hazardous Debris From Subtitle C Regulation*

Under today's rule, hazardous debris may be excluded from subtitle C regulation either by: (1) the Agency's determination that the debris no longer contains hazardous waste (i.e., the contained-in policy discussed in section V.B.2) as provided by new § 261.3(e) (2); or (2) by compliance with the debris treatment standards for extraction or destruction technologies for exclusion from subtitle C provided in Table 1 of § 268.45 (and provided the debris does not exhibit a hazardous characteristic after treatment). The basis for excluding debris determined to no longer contain hazardous waste is discussed above in section V.B.2. We discuss here the basis for excluding from subtitle C regulation debris that is treated to meet today's performance standards requisite to such exclusion.

#### **1. Basis for Excluding Debris Treated by Extraction or Destruction Technologies and That Is Not Characteristic**

Debris treated by a prescribed extraction or destruction technology and that does not exhibit a hazardous characteristic is excluded from subtitle C regulation. As discussed in section V.C.5 above, the Agency has given careful consideration as to whether each debris/contaminant type would be effectively treated by each BDAT technology to levels that present minimum risk (i.e., would no longer pose a hazard to human health or the environment). The Agency believes that debris treated to those standards would

pose minimum risk for a number of reasons. First, the Agency has deleted two technologies (i.e., electropolishing and ultraviolet radiation) from the proposed list of BDAT technologies because they are not likely to provide effective treatment. Second, the final rule requires separation of nonempty intact containers of hazardous waste from debris for treatment to the waste-specific treatment standards. Thus, containerized waste that is readily amenable to separation from debris by equipment operators in the field and that may have high concentrations of toxic constituents will be subject to concentration-based, waste-specific treatment standards rather than to the debris standards. Third, the final rule raises the particle size used to define debris from 9.5 mm to 60 mm and applies the size limit to all debris, not just geologic matter. Thus, materials that should be amenable to treatment methods for process waste are subject to the waste-specific treatment standards rather than to the debris standards. Fourth, the final rule specifically excludes process waste of any particle size (e.g., slag) from the definition of debris. Thus, process wastes with potentially high concentrations of hazardous constituents will be subject to the waste-specific treatment standards rather than to the debris standards.

Most important, the performance and design and operating standards that the rule establishes for exclusion of treated debris from subtitle C are rigorous standards. Examples are the requirements that physical extraction technologies treat metal to a "clean metal finish" and other debris surfaces to a "clean debris surface". A minimum of 0.6 cm of the surface layer of porous debris must be removed as well. Another example is the maximum thickness standard for porous debris that is to be treated by chemical extraction.

For several technologies, the Agency was concerned that the performance and design and operating standards may not ensure treatment to minimum risk levels. Consequently for these technologies—thermal desorption, biodegradation, chemical oxidation and reduction and thermal destruction of debris contaminated with dioxin-listed waste<sup>46</sup>—treated debris would be excluded only after the treater successfully makes an equivalent technology demonstration to the Agency under § 268.42(b) documenting that the

<sup>46</sup> Note that the standards provide other restrictions for debris contaminated with dioxin-listed waste.

technology treats a particular type of debris/contaminant combination as effectively as the other BDAT technologies to residual levels of hazardous contaminants that would not pose a hazard to human health and the environment absent management controls.

Finally, the rule requires separation of the treated debris from all treatment residues, including soil, waste, or other nondebris material that could remain adhered to the debris surface. This will ensure that metal contaminants in the residue will not continue to contaminate the treated debris and that any waste or contaminated soil in a primarily debris mixture as it was generated is separated from the treated debris prior to exclusion from subtitle C.

The philosophy underlying this approach is similar to that contained in principle: It is not normally the debris itself that is hazardous, but rather hazardous waste that is contaminating the debris. Thus, the goal of treatment should be to destroy or remove the contamination (if possible) and if this is achieved, to dispose of the cleaned debris as a nonhazardous waste. The removed residues from this treatment contain the contamination, and must meet numerical concentration levels before they can be land disposed.

Not only are the treatment methods developed to achieve this objective, but the various separation requirements (both before and after treatment) forcing removal of all nondebris materials such as soil and other wastes, and the definition of debris itself (which limits the debris classification to materials most amenable to the treatment methods, and classifies materials most amenable to meaningful sampling as nondebris subject to numerical treatment standards) are intended to achieve the same goal. As discussed above, the debris treatment standards are written wherever possible as performance standards to ensure that contamination is in fact removed from the debris. In addition, the rule specifies which contaminants are unsuitable for certain of the treatment methods. In short, the Agency believes that treatment of contaminated debris by the methods established here will result in clean debris which may then be land disposed, and should also no longer be regulated as a hazardous waste.

EPA notes, however, that the notion of excluding wastes from subtitle C regulation without sampling for hazardous constituent concentration levels is potentially at odds with many of the approaches recently proposed for public comment in the Hazardous Waste

Identification Rule (HWIR). See 57 FR (May 20, 1992). In that rule, the Agency asked for comment on means of identifying and excluding hazardous wastes from subtitle C regulation that potentially take into account presence of a majority of the hazardous constituents listed in appendix VIII of part 261. If these approaches are adopted, they could provide a principled means of evaluating wastes heretofore excluded from subtitle C regulation without requiring analysis of hazardous constituent concentrations, such as the debris being excluded in today's rule, or residues from "empty containers" discussed above in Section V.B.2. EPA expects that hazardous constituent levels in debris treated by the methods adopted today will be consistent with levels resulting from the May 20 proposal, and in addition, for many types of treated debris there remain difficulties in obtaining representative samples necessary to make hazardous waste identification and listing determinations, and for this reason is finalizing the rule today rather than delaying action pending the results of the May 20 rulemaking. Nevertheless, the Agency believes it an appropriate issue for comment in the HWIR rulemaking the extent to which those standards should be used to replace exclusions from the definition of hazardous waste that are established without requiring analysis of hazardous constituent levels in the excluded waste.

## 2. Rationale for Continued Subtitle C Regulation of Debris Treated by Immobilization

Debris treated by an immobilization technology would remain subject to subtitle C regulation. EPA currently has insufficient data to demonstrate generically that debris which can be contaminated with both organic and inorganic constituents would be nonhazardous when treated by any of the immobilization technologies. Until the Agency gathers further data, EPA is concerned that, absent subsequent subtitle C management, hazardous contaminants may migrate from certain immobilized debris at levels that could pose a hazard to human health and the environment. Thus, EPA believes it inappropriate to promulgate a self-implementing exclusion at this time. Nonetheless, in the Phase II land disposal restrictions rule, the Agency will reopen and request comment on the issue of whether immobilized debris should be excluded from subtitle C regulation. The Agency plans to investigate this issue further and will publish in the Phase II proposed rule any information or data that are available.

In addition, the Agency will specifically explore the potential of using the TCLP, and if so, under what circumstances, in determining whether immobilized hazardous debris should be excluded from subtitle C control. To assist the Agency in this effort, we ask for data on the performance of specific immobilization technologies and short- or long-term leachability studies. Based on past experiences, the Agency has found that uncertainty over the technical performance of immobilization precludes a general exemption from subtitle C for all types of immobilized hazardous debris. However, the Agency will continue to evaluate all available and new information about the performance of immobilization technologies which could limit the technical uncertainty. To the extent that sufficient information that meets proper quality assurance/quality control procedures is available, the Agency plans to propose in the Phase II LDR rule an exclusion from subtitle C for those immobilized hazardous debris.

## E. Regulation of Treatment Residuals

### 1. Overview

In this section, we discuss: (1) The rationale for subjecting treatment residues to the waste-specific treatment standards for the waste contaminating the debris; (2) separation of treated debris from treatment residue; (3) special requirements for debris treated by spalling; (4) special requirements for residue from the treatment of debris contaminated with cyanide reactive waste; and (5) special requirements for ignitable wastewater residue.

### 2. Treatment Residues Are Subject to the Waste-Specific Treatment Standards for the Waste Contaminating the Debris

Residuals from the treatment of hazardous debris are subject to the waste-specific treatment standards for the waste contaminating the debris. The residual must be treated to those standards for all BDAT constituents specified in §§ 268.41, 268.42 and 268.43 for the waste.

The Agency had proposed to require treatment of nonsoil residuals to the multi-source leachate F039 levels and soil residuals to the waste-specific treatment standards for the waste contaminating the debris. Based on public comment and the Agency's re-evaluation of this issue, the Agency had determined that it is more appropriate to subject all treatment residues—soil, wastewater, and nonwastewater—to the waste-specific treatment standards for the waste contaminating the debris for a number of reasons. First, the waste-

specific treatment standards currently apply to treatment residuals, and the Agency does not know of a compelling reason to change that position. Second, requiring compliance with the waste-specific treatment standards rather than the F039 standards may be somewhat easier to understand and implement because the treatment standards for the BDAT constituents in the residue can be determined at the same time that the BDAT constituents are identified as contaminants subject to treatment (i.e., the contaminants subject to treatment in the contaminated debris are the same contaminants that must be treated in treatment residuals). Third, the Agency is considering simplifying and revising the treatment standards for all prohibited waste to "universal standards" in the Phase II proposed land disposal restrictions rule.

Several commenters suggested that the thermal destruction process of vitrification should be considered immobilization of debris. Thus, commenters argued that such vitrified debris could be land disposed under subtitle C without being subject to the waste-specific treatment standards for the waste contaminating the debris. The Agency disagrees with this view. Vitrification is a type of thermal destruction that produces a residue that is vitrified. Thus, the vitrified residue is subject to the same treatment standards as any debris treatment residue—the waste-specific standards for the waste contaminating the debris. This is consistent with the Agency's position that slag from high temperature metals recovery is residue, not debris, subject to the waste-specific treatment standards.

### 3. Treated Debris Mixed With Treatment Residue Is Subject to Regulation as Residue

As discussed above in section V.C.5, treatment residues generally contain high levels of toxic contaminants removed from the debris. Examples are residue from thermal desorption or incineration of debris contaminated with metal-bearing waste, and residue from water washing of debris. As discussed below, treatment residuals are subject to the waste-specific treatment standards for the waste contaminating the debris. Thus, to ensure that treatment residuals are treated effectively before land disposal and to ensure that treated debris is not contaminated with the treatment residue, the treatment standards require that the treated debris must be separated from the treatment residue. If the debris is not separated from the

treatment residue, it remains a prohibited waste and may not be land disposed. It also remains subject to all other subtitle C standards.

The Agency defines treatment residuals as residuals such as biomass from biodegradation and ash from incineration as well as soil, waste, or other nondebris material that may remain adhered to the treated debris. We note further that slag from a high temperature metals recovery furnace and vitrified residue from a thermal destruction unit are treatment residues rather than debris. In both cases, the original debris no longer exists and the residuals from soil or waste contaminating the debris are integral components of the slag and vitrified residue.

Separation of the treated debris from treatment residuals must be accomplished using simple physical or mechanical means such as vibratory or trommel screens or water washing. The separation process need not produce a "clean debris surface"<sup>47</sup> as discussed above, however; rather the debris surface must be free of caked residuals or nondebris materials such as soil or waste. For example, thermal desorption debris need not be water washed after trommel screening to remove dust from residuals or nondebris material. (Note that the use of water washing to separate thermally desorbed debris from residuals and nondebris materials need not comply with the treatment standards for water washing (e.g., treatment to a "clean debris surface") because the debris has already been treated by an alternative technology.)

#### 4. Special Requirements for Debris Treated by Spalling

As proposed and as discussed in Section V.C.5, debris removed by spalling remains debris subject to the debris treatment standards. Debris surfaces removed by spalling are, by definition of the technology, large pieces of debris. The Agency believes that such pieces of spalled debris are more debris-like than waste or residual-like and are more amenable to treatment by the debris treatment standards than the waste-specific treatment standards.

<sup>47</sup> "Clean debris surface" means the surface, when viewed without magnification, shall be free of all visible contaminated soil and hazardous waste, except that residual staining consisting of light shadows, slight streaks, or minor discolorations, and soil and waste in cracks, crevices, and pits may be present provided that such staining and soil and waste in cracks, crevices, and pits shall be limited to no more than 5% of each square inch of surface area.

#### 5. Special Requirements for Residue From the Treatment of Debris That Is Cyanide-Reactive

As proposed, the final rule requires that residues from the treatment of debris that is reactive because of cyanide is subject to the waste-specific treatment standards for cyanide under § 268.43. As with cyanide-reactive waste, EPA believes that BDAT for cyanide-reactive debris requires treatment of cyanide because of its toxicity.

#### 6. Special Requirements for Ignitable Nonwastewater Residue

As proposed, the final rule requires that ignitable nonwastewater residue containing greater than or equal to 10% total organic carbon be subject to the technology-based standards for D001: "Ignitable Liquids based on 261.21(a)(1)" under § 268.42. This residue must be treated by fuel substitution (i.e., burning as fuel in a boiler or industrial furnace), recovery of organic constituents (e.g., distillation, carbon adsorption), or incineration. EPA has established these technologies as BDAT for high total organic carbon ignitable liquids because they will effectively remove or destroy the toxic organic constituents.

#### F. Permit Requirements for Treatment Facilities

Treatment of hazardous debris (except as discussed below for 90-day on-site treatment in a container, tank, or containment building) is currently subject to the applicable interim status and permit standards of parts 264, 265, 266, and 270 that ensure protection of human health and the environment from the operation of the treatment unit. (We note that, for containment buildings, interim status and permit standards and requirements for 90-day on-site treatment are promulgated in today's rule as discussed elsewhere in this notice.) Today's debris treatment standards to implement the land disposal restrictions of section 3004(m) of the statute do not affect those existing facility standards. For example, today's treatment standards do not reopen interim status eligibility for debris treatment facilities. (We note, however, that today's rule does establish the interim status eligibility date for containment buildings given that these units are newly regulated by this rule, assuming that such buildings are located at facilities containing no other regulated units.) Rather, today's debris treatment standards subject generators and treaters to additional requirements to ensure effective treatment of hazardous debris prior to exclusion from

subtitle C (for debris treated by an extraction or destruction technology and that does not exhibit a hazardous characteristic) or land disposal in a subtitle C facility (for debris treated by an immobilization technology).

As information for the reader, we note that the existing facility standards for the following common debris treatment operations (other than for 90-day on-site treatment in a container, tank, or containment building) are:

- Debris treatment technologies conducted in tanks such as high pressure steam and water spraying, chemical extraction, and biodegradation are subject to the standards for tank facilities in subpart J of part 264 (permit standards) and part 265 (interim status standards).

- Storage or treatment in containment buildings is subject to the subpart DD, parts 264 and 265, standards also promulgated today (see discussion elsewhere in today's notice).

- Physical extraction technologies such as abrasive blasting or spalling used to treat debris in place but that is intended for discard (e.g., treatment of a contaminated building prior to demolition) are subject to the permit standards of subpart X, part 264 for miscellaneous units or the interim status standards for chemical, physical, or biological treatment in subpart Q, part 265.

- Incinerators are subject to subpart O, part 264 (permit standards) and part 265 (interim status standards).

- High temperature metal recovery furnaces are conditionally exempt from the rules for boilers and industrial furnaces burning hazardous waste in subpart H, part 266.

- Thermal desorbers are subject either to the incinerator or thermal treatment standards, depending on whether the unit meets the incinerator definition. Thermal treatment units are subject to subpart X, part 264 (permit standards for miscellaneous units) and subpart P, part 265 (interim status standards).

#### 1. Adding Capacity for Debris Treatment to Existing Facilities

Today's rule amends the permit and interim status standards of part 270, as proposed, to facilitate the expansion of existing debris treatment capacity and the addition of new debris treatment capacity at existing facilities currently subject either to permit or interim status standards for managing hazardous waste. However, if an owner or operator of a facility that is not currently managing hazardous waste under the permit or interim status standards wants



to construct a debris treatment facility, he must first obtain a RCRA permit.

*a. Facilities With a RCA Permit.*

Facilities with a RCRA permit may add new treatment processes and additional capacity by applying for a permit modification under § 270.42. See 53 FR 37912 (Sept. 28, 1988). Although regulations at § 270.42 were promulgated under pre-HSWA authority, EPA may use these regulations in authorized States when necessary to implement HSWA provisions such as the land disposal restrictions. See 53 FR 37933.

The types of modifications needed to add new capacity or processes would likely require submittal of a Class 2 or 3 modification. The Class 2 modification process requires Agency action on the request within 120 days. This action would consist of approval or denial, reclassification as a Class 3 modification, or authorization to conduct activities (in containers, tanks, and containment buildings, as discussed below) for up to 180 days pending Agency action. Further, for Class 2 modifications, construction to implement the requested facility change may commence 60 days after submission of the request. There is no deadline for Agency action for Class 3 modifications, which apply to more substantial changes.

Permitted facilities may apply under existing § 270.42(e)(3)(ii)(B) for a temporary authorization to initiate necessary activities to treat or store restricted wastes (e.g., hazardous debris) in tanks or containers while a Class 2 or 3 permit modification is undergoing review, or to undertake a treatment or storage activity which will be of short duration (e.g., decontamination of a building intended for demolition). Today's rule revises that section to enable the Agency also to grant a temporary authorization for containment buildings meeting the requirements promulgated today in subpart DD of parts 264 and 265.

Any request for a temporary authorization must demonstrate compliance with the part 264 standards and also meet the criteria of § 270.42(e) for approval. Interested members of the public (i.e., those that have previously expressed interest in any permitting action for the facility) will receive notice by mail of a facility's request for a temporary authorization. The temporary authorization may be renewed once if the additional procedures of § 270.42(e) are followed, including submission of appropriate permit modification information and the initiation of public meetings and public comment period. See 53 FR 37919.

*b. Facilities Operating Under Interim Status.* Facilities managing hazardous waste under interim status may add new treatment processes or additional treatment or storage capacity by using the existing procedures for changes during interim status in § 270.72. Under these procedures, a facility must submit to EPA a revised Part A permit application and justification explaining the need for the change. The change must then be approved by EPA.

Such changes must meet one of several criteria specified in § 270.72, such as being necessary to comply with a Federal, State, or local requirement. However, changes generally may not be made if they amount to reconstruction of the facility. The Agency considers the facility to be "reconstructed" if the capital investment for the changes to the facility exceed 50% of the capital cost of a comparable entirely new facility.

Existing § 270.72(b)(6) lifted the reconstruction limit for changes to treat or store in tanks and containers hazardous waste subject to land disposal restrictions imposed by part 268, provided that such changes are made solely for the purpose of complying with part 268 land disposal restrictions. Today's rule revises that paragraph to lift the reconstruction limit for containment buildings as well. See the the new subpart DD, part 264 and 265, standards for containment buildings that are also promulgated today.

**2. On-Site Treatment of Debris in Containers, Tanks, and Containment Buildings**

Existing § 262.34 exempts from permit requirements generators who store or treat hazardous debris on-site in tanks or containers for a period not exceeding 90 days provided that the tank or container is designed and operated in compliance with subpart I (for containers) and subpart J (for tanks) of part 265. Today's rule revises § 262.34, as proposed, to also provide this exemption to containment buildings designed and operated in compliance with the subpart DD, part 265, standards also promulgated today.

*G. Capacity Variance for Hazardous Debris*

In the May 15, 1992, Notice to Approve Hazardous Debris Case-By-Case Capacity Variance, the Agency approved a generic, one year extension of the LDR effective date applicable to all persons managing hazardous debris (57 FR 20766). For the purpose of the extension, the term "debris" was defined as set out in the preamble to the June 1, 1990 Third Third final rule. See 55 FR 22650 and § 268.2(g). Furthermore,

the Agency indicated that it will explain in the debris rule how a change in definition will affect the case-by-case extensions.

Although in general, both definitions will identify the same materials as debris, there are differences that may result in situations where either definition could include debris not included by the other. Of concern is the situation where someone has entered into contracts for, or actually initiated the process of, removing for disposal debris which met the old definition but does not meet the current definition. To avoid possible disruption of on-going activities, which have relied on the previous definition of debris, the Agency will allow the extension to apply to materials meeting either definition through May 8, 1993.

*H. Other Issues*

**1. Applicability of Standards to Contaminated Structures and Equipment**

*a. Structures and Equipment Contaminated With Hazardous Waste and Intended for Discard Are Regulated Debris.* As discussed above in section V.B.1.a of the preamble, structures and equipment contaminated with hazardous waste and that are intended for discard are hazardous debris subject to today's treatment standards. Thus, if a contaminated tank or building is decontaminated before demolition, the debris may not be land disposed unless the tank or building was decontaminated in compliance with today's treatment standards. (We note that, as discussed above in section F.2, such treatment is subject to the permit standards unless conducted in a tank, container, or containment building.)

If the contaminated structure or equipment is being decontaminated for subsequent use, however, the structure or equipment is not debris and the decontamination is neither subject to today's debris treatment standards nor the permit standards for hazardous waste management facilities. Thus, cleaning a building that is in use is not treatment of debris.

*b. Treatment Standards for Concrete Pads and Walls Intended for Discard.*

The Agency believes that concrete pads and walls are typically decontaminated using "water washing" techniques. These techniques include the following technologies specified in today's rule: Abrasive blasting using water to propel abrasive media, high pressure steam or water sprays, and water washing and spraying.

We note that the performance standards for abrasive blasting and high

pressure water sprays require removal of 0.6 cm of the surface because these are physical extraction technologies designed to remove the surface layer of the debris. The performance standards for water washing and spraying limits the thickness of the concrete to 3/8 inch because this technology relies on chemical extraction (i.e., dissolving or removing with surfactants) of contaminants below the concrete surface. If the treater believes that treatment to these performance standards is not necessary to ensure effective treatment to residual levels of hazardous constituents that will not pose a hazard to human health and the environment absent management controls, the treater may: (1) Obtain a waiver of the standards (e.g., the thickness limit for water washing) under an equivalent technology demonstration under § 268.42(b); or (2) demonstrate to the Agency that the debris upon alternative treatment does not contain toxic constituents under the contained-in principle codified in today's rule. See discussion in section V.B.2.b above.

*c. Relation of Debris Standards to Closure Rules.* Existing closure standards for hazardous waste management facilities require "decontamination" of contaminated structures and equipment. See, e.g., §§ 264.114 and 265.114. The precise meaning of decontamination presently is determined on a case-by-case basis through review of the facility's closure plan. However, if such structures or equipment is also debris which is going to be land disposed, which could often be the case, an issue arises regarding the relationship of the "decontamination" standard in the closure rule and the treatment methods adopted in today's rule.

The Agency believes that the treatment methods in today's rule would always satisfy the decontamination standard in the closure provisions. After all, the purpose of these treatment methods is to decontaminate. EPA also interprets the land disposal and closure rules to require that all hazardous debris be treated to meet the debris treatment standards, even if the debris is generated during closure. (Put another way, the debris standards normally would be appropriate for any debris generated as a result of closure.)

If the debris treatment standards appear to be inappropriate for debris (such as contaminated structures or equipment) generated during closure, a site-specific treatability variance pursuant to § 268.44(h) may be available. The Agency believes that such a variance could be processed

administratively as part of the closure procedures.

## 2. Mixing of Hazardous Waste or Contaminated Soil With Debris To Avoid the Waste-Specific Treatment Standards Is Prohibited

Today's rule prohibits the intentional mixing of hazardous waste or contaminated soil with debris to avoid the concentration-based treatment standards for the waste or soil. The Agency is prohibiting such sham mixing to ensure that hazardous waste and contaminated soil are treated to the existing treatment standards given that the waste<sup>48</sup> is amenable to treatment to those levels and that the waste and soil are likely to be much more heavily contaminated with hazardous constituents than debris and, thus, should be subject to such concentration-based treatment levels.

The prohibition on mixing applies to debris treated by any technology: Immobilization as well as extraction or destruction. Although the debris treatment standards require separation of the waste or contaminated soil from debris treated by an extraction or destruction technology and that the residue must meet the waste-specific treatment standards for the waste contaminating the debris, the treatment process itself could enable the residue to meet the concentration-based waste treatment standards by virtue of dilution during treatment. An example is water washing of debris intentionally mixed with a prohibited listed waste. The water residue may easily meet the waste-specific treatment standard by virtue of dilution rather than treatment.

We note that this prohibition on sham mixing does not affect implementation of the principle discussed above in section V.B.1 to classifying mixtures of debris with contaminated soil or waste as debris. That principle says that if debris is the primary material in a mixture by volume based on visual observation, the mixture is subject to regulation as debris. Thus, for example, when debris is initially excavated in a mixture of debris and nondebris materials, and debris is the primary material present, the mixture is appropriately regulated as debris and sham mixing has not occurred. However, if debris is intentionally mixed with contaminated soil or hazardous waste (e.g., after excavation), and the mixture is regulated as debris

<sup>48</sup> We note that the Agency is concerned that the waste treatment standards may not be appropriate for soil contaminated with the waste and, consequently is considering proposing in summer 1992 treatment standards for contaminated soil.

by the application of the mixture principle and subsequently immobilized, prohibited sham mixing has occurred.

## 3. Procedures for Demonstrating Equivalency of Alternative Technologies

As discussed at proposal, existing § 268.43(b) provides the generator or treater an opportunity to demonstrate to the Agency than an alternative technology can achieve the equivalent level of performance as that of the specified treatment method. We note that this variance procedure can also be used to demonstrate that one of the technologies specified in today's rule can be designed or operated under conditions other than those established in Table 1, § 268.45, to provide equivalent treatment (i.e., meet the performance standard for the technology) or that a specified technology can treat hazardous contaminants to levels that do not pose a hazard to human health and the environment absent subtitle C control without achieving the performance and design and operating standards established in Table 1.

In addition, the Agency is requiring in the treatment standards of Table 1, § 268.45, that treaters must make an Equivalency Demonstration under § 268.43(b) in order for certain technologies to be considered BDAT. See discussion above for thermal desorption, biodegradation, and chemical destruction.

## VI. Capacity Determinations

This section presents the data sources, methodology, and results of EPA's capacity analysis for today's newly listed wastes. Specifically, section VI summarizes the results of the capacity analysis for petroleum refining wastes and other organic wastes; wastes mixed with radioactive contaminants; and debris contaminated with the newly listed wastes. Soil and debris contaminated with newly listed wastes for which standards are finalized today will be addressed in future proposals.

The capacity analysis for the newly listed wastes for which the Agency is today promulgating treatment standards relied on information obtained from several sources. Primary data sources include the National Survey of Hazardous Waste Treatment, Storage, Disposal, and Recycling Facilities (the TSDR Survey), the National Survey of Hazardous Waste Generators (the Generator Survey), data received in response to the proposed rule (57 FR 957), data received in response to the ANPRM for the Newly Identified and

Listed Wastes (56 FR 24444), data received in voluntary data submissions, and information requests authorized under section 3007 of RCRA.

EPA conducted the TSDR Survey during 1987 and 1988 to obtain comprehensive data on the nation's capacity for managing hazardous waste and on the quantities of hazardous waste being land disposed. For the capacity analysis, EPA used the TSDR Survey information on the quantities of waste streams managed in land-disposal units and requiring alternative treatment/recovery due to the land disposal restrictions and on available capacity of hazardous waste management technologies.

EPA conducted the Generator Survey in 1987. This survey requested information on waste quantities and waste characteristics of hazardous waste generated, and provided capacity information for facilities not included in the TSDR Survey.

**A. Capacity Analysis Results Summary**

Table VI.A.1 lists each waste code for which EPA is finalizing LDR standards today. For each code, this table indicates whether EPA is granting a national capacity variance for surface-disposed or deepwell disposed wastes. As indicated in this table, the Agency is granting two-year national capacity variances only for petroleum refining wastes generated as a result of cleanouts or closures of surface impoundments, debris contaminated with newly listed wastes, and mixed radioactive wastes. EPA is granting a one-year national capacity variance for routinely-generated petroleum refining wastes. EPA is also granting a 3-month national capacity variance, extending the effective date to November 9, 1992, for compliance with the treatment standards for all newly regulated waste codes, F001-F005 revised treatment standards, converted wastewater standards that had been based on scrubber water, and the HTMR generic

exclusion standards. This extension would not apply to wastes with a specified longer national capacity variance. EPA is delaying the effective date for all newly regulated waste codes because the Agency realizes that even where data indicate that sufficient treatment capacity exists, it is not immediately available. Additional time may be required to determine what compliance entails, redesign tracking documents, possibly adjust facility operations, and possibly segregate wastestreams which heretofore had been centrally treated. EPA believes these legitimate delays are encompassable within a short-term capacity variance because part of the notion of available capacity is the ability to get wastes to the treatment capacity in a lawful manner. The Agency is dating this capacity extension from November 9, 1992, rather than date of signature due to unanticipated delays in the publication of this rule in the Federal Register.

TABLE VI.A.1.—SUMMARY OF CAPACITY VARIANCE DECISIONS FOR NEWLY LISTED WASTES

Waste code	Variance for surface-disposed wastes?	Variance for deepwell-disposed wastes?
F037—removed from S.I. <sup>a</sup>	2-year	No.
F038—removed from S.I. <sup>a</sup>	2-year	No.
F037—managed in S.I. <sup>b</sup>	2-year	No.
F038—managed in S.I. <sup>b</sup>	2-year	No.
F037—Routine	1-year	No.
F038—Routine	1-year	No.
K107	No	No.
K108	No	No.
K109	No	No.
K110	No	No.
K111	No	No.
K112	No	No.
K117	No	2-year.
K118	No	2-year.
K123	No	No.
K124	No	No.
K125	No	No.
K126	No	No.
K131	No	2-year.
K132	No	2-year.
K136	No	No.
U328	No	No.
U353	No	No.
U359	No	No.
Mixed Rad. Waste	2-year	No
Hazardous Debris	2-year	No.

<sup>a</sup> F037 and F038 wastes from cleanout and closure of surface impoundments.  
<sup>b</sup> F037 and F038 managed in surface impoundments.

**B. Available Capacity**

The analysis of commercial capacity for newly listed wastes is based primarily on data from the TSDR Survey capacity data set, data received in response to previous LDR notices and regulations, and data received in voluntary data submissions. Analysis of data from these sources indicates that sufficient commercial capacity is

currently available for newly identified wastes requiring wastewater treatment, stabilization, and combustion of liquids with exception of deepwell injected K117, K118, K131 and K132. However, commercial capacity for combustion of sludges, solids, and debris is limited for some newly identified wastes. The analysis of commercial combustion capacity discussed in this section focuses on F037 and F038 sludges and

solids because these wastes represent the majority of the waste volumes affected by today's rule. Specific capacity issues for the newly listed K and U wastes being regulated today are discussed in section VI.C.2 of this preamble. Debris is amenable to some, but not all types of sludge and solid combustion capacity, and is discussed in greater detail in section VI.E. Table VI.B.1 summarizes available commercial

treatment capacity for newly listed wastes.

EPA's analysis of commercial combustion capacity for sludges and solids has historically focused on the broad capacity categories of liquids, sludges, and solids. Several commenters felt that these capacity categories do not adequately represent the diversity of combustion systems included in each category. Therefore, to improve the precision of its combustion capacity analysis, EPA has divided sludge/solid combustion capacity into seven categories. EPA's capacity analysis for fixed site commercial hazardous waste incinerators separately addresses capacity from pumpable sludge, nonpumpable sludge, containerized solid, and bulk solid feed systems. EPA's capacity analysis for cement kilns that burn hazardous wastes as fuel separately addresses capacity from sludge, containerized solid, and dry solid feed systems.

EPA recognizes that this type of categorization is increasingly important as the commercial combustion industry matures and firms employ different combustion and fuel substitution technologies (i.e., cement kilns) to accommodate different types of wastes entering the commercial market. EPA also recognizes that individual feed system capacity constraints must also be consistent with overall system capacity constraints, such as heat release from a kiln. The relationship between overall system constraints and individual feed system constraints is complicated by the fact that, within the overall system limits, limits for one type of feed system (e.g., containerized solids) may be raised by reducing the amount of another type of feed (e.g., bulk solids). EPA emphasizes that its capacity analysis is conducted on a national level, and that though the Agency speaks generally about which systems are more likely to be used for newly identified petroleum refining wastes, this rule does not preclude these wastes from going through other systems.

TABLE VI.B.1.—AVAILABLE COMMERCIAL TREATMENT CAPACITY FOR NEWLY LISTED WASTES

Technology	Available capacity (Tons/year)
Biological Treatment .....	188,000
Chemical Precipitation .....	813,000
Combustion of Liquids .....	526,000
Combustion of Sludges and Solids .....	
Cement Kilns: Sludges .....	14,000
Cement Kilns: Containerized Solids .....	83,000
Cement Kilns: Dry Solids .....	24,000

TABLE VI.B.1.—AVAILABLE COMMERCIAL TREATMENT CAPACITY FOR NEWLY LISTED WASTES—Continued

Technology	Available capacity (Tons/year)
Incineration: Pumpable Sludges .....	51,000
Incineration: Nonpumpable Sludges .....	1,000
Incineration: Containerized Solids .....	41,000
Incineration: Bulk Solids .....	23,000
Stabilization .....	1,204,000

This section discusses EPA's assessment of capacity in each of the seven categories, the waste characteristics that affect whether a waste is generally amenable to the category, and pretreatment processing that is generally required. A comparison of available and required capacity for F037 and F038 sludges and solids can be found in section VI.C.

I. Incineration Capacity

In response to the proposed rule, EPA received comments relating to the high demand for incineration capacity and a general shortage of incineration capacity. However, EPA's analysis of detailed data from specific incinerators revealed that there is some commercial incineration capacity available. One commenter remarked that incinerators have less capacity for high BTU wastes. EPA recognizes that the heating value of a waste affects an incinerator's throughput capacity for the waste when the incinerator is constrained by its heat input to the unit (e.g., if an incinerator is limited to 10 million BTU/hr, it could either feed 10,000 lb/hr of waste with a heating value of 1,000 BTU per pound or 5,000 pounds per hour of a waste with a heating value of 2,000 BTU per pound). EPA believes that wastes with heating values above about 5,000 BTU per pound will increasingly be sent to cement kilns for use as fuel. This issue is particularly important for bulk solid systems that are designed for soils, which have very low heating values. To the extent that mass throughput limits are based on the incinerators heat release limits, using mass throughput estimates (e.g., for bulk solids) based on large amounts of soil in the feed mix, could overestimate the mass throughput capacity for wastes with higher heating values than soil, such as F037 and F038. For this reason, EPA has revised its capacity estimate for certain incinerators whose estimates in the proposed rule were based on a waste feed blend with a very low heating value. EPA believes that a significant portion of routinely generated F037 and F038, and an even larger portion of F037 and F038 from

surface impoundment cleanouts, will require incineration (as opposed to cement kiln) capacity.

EPA has identified 51,000 tons per year of pumpable sludge capacity available at incinerators. Pumpable sludge systems rely on wastes with sufficient liquid content to facilitate the flow of materials. Pumpable sludge systems use direct injection, sludge lances, positive displacement pumps and cement pumps to feed sludges to the incinerator. EPA is aware of at least one facility processing K048-K052 in this manner. In general, F037 and F038 would have to be reslurried, or would have to bypass dewatering at the point of generation to be handled through pumpable sludge systems. The primary constraints on use of this capacity for F037 and F038 are the viscosity, particle size, ash content, and abrasiveness of the sludges. Therefore, EPA does not believe that pumpable sludge systems will receive a large portion of the nation's F037 and F038 waste streams, because of the problems discussed above. Additional technical developments and operational experience are needed to allow these systems to routinely handle F037 and F038 wastes. Based on EPA's experience observing the progress at commercial combustion facilities, EPA believes obtaining permit modifications and developing the technical and operational experience to routinely handle new wastes will take six to twelve months.

EPA has identified 1,000 tons per year of nonpumpable sludge capacity available at incinerators. Nonpumpable sludge systems use ram feed systems to feed sludges to the incinerator. Wastes fed in this manner are limited by extremely high or low BTU, tramp object size, and the presence of free liquids. The primary constraints are overall availability, aggravated by generally high maintenance requirements. Again, EPA does not believe that nonpumpable sludge systems will receive a large portion of the nation's F037 and F038 waste streams because there are few of them and they will require time to develop the technical and operational experience needed to handle routinely-generated F037 and F038 petroleum refining wastes.

EPA has identified 34,000 tons per year of containerized solids capacity available at incinerators. Containerized solids systems use ram, elevator or drop feed systems to feed metal drums and fiber packs to incinerators. Metal drum systems generally require shredders. Wastes appropriate for this capacity are limited by water content and high or low BTU extremes. Utilization of this

capacity depends on wastes being packaged into drums, which is technically feasible, but systems for packaging petroleum refining wastes for incinerators are not widely available. Containerization capacity could be added at generators, incinerators or intermediate processors. EPA believes obtaining storage and operating permits, as well as construction and startup of packaging units will take six months to one year. Therefore, EPA believes that containerized solids systems will not receive a large portion of the nation's F037 and F038 waste streams because of the time needed to bring these systems on line and operate them routinely on petroleum refining wastes F037 and F038.

EPA has identified 23,000 tons per year of bulk solids capacity available at incinerators. Bulk solids systems generally use clamshell cranes or drop feed systems (possibly with shredders) to feed bulk solids into incinerators. EPA is aware of four incinerators currently burning petroleum refining wastes as bulk solids. The primary constraints on the bulk solids system are extremes of high and low BTU, object size, abrasiveness, the presence of free liquids, high system maintenance and limited number of installed systems. F037 and F038 would have to be dewatered in order to be amenable to this type of capacity. The ability for bulk solids feed systems to process large quantities of wastes directly from roll-off bins makes bulk solids capacity the most suitable for petroleum refining wastes with low to moderate BTU values.

Much of the nation's bulk solids incineration capacity has come on line fairly recently and continues to face some technical and regulatory obstacles. Two of the incinerators that provide bulk solids capacity have entered that market in the past year, and another is still modifying its system to bring its actual throughput capacity closer to its design capacity. Historical experience with new commercial incineration capacity and the unique technical challenges posed by bulk solids feed systems make commissioning and maintaining new commercial bulk solids incineration capacity highly uncertain. Based on the uncertainty of final permit approval, EPA revised its capacity estimates to exclude an incinerator which has not yet received final approval to continue full operation and needs a permit modification for F037 and F038 wastes. EPA estimates it will take six to twelve months for this facility to be fully operational for handling F037 and F038 wastes. EPA

also considered the uncertainty in its estimates of current capacity in its variance decision for F037 and F038 wastes.

## 2. Cement Kiln Capacity

Several commenters were concerned about EPA's intention to consider cement kiln combustion capacity, citing the low BTU content of F037 and F038. Cement kilns generally require that their solid wastes contain more than 5,000 or 6,000 BTU per pound. Based on available information, EPA estimates that roughly half of the routinely generated F037 and F038 sent off site will have a BTU value sufficient for combustion in cement kilns. On the other hand, EPA believes that F037 and F038 generated from the removal of hazardous wastes from surface impoundments will have a lower BTU value and are more likely to be treated in incinerators.

EPA has identified 14,000 tons of sludge capacity available per year at two cement kilns. One commenter reported that no cement kilns are accepting sludges, but EPA is aware of these two. Cement kiln sludge systems rely on slurrying wastes and feeding them through primary fuel ports. F037 and F038 would have to be reslurried, or bypass dewatering. The primary constraint on the use of this capacity for petroleum refining wastes is the difficulty of suspending large amounts of solids in liquid while maintaining high BTU. However, EPA recognizes the limitations of this capacity for petroleum refining sludges, and believes that cement kiln sludge capacity will not receive a large portion of the national F037 and F038 waste streams. Additional technical developments and operational experience are needed to allow these systems to routinely handle F037 and F038 wastes. EPA believes these changes will take six to twelve months.

EPA has identified 83,000 tons of containerized solids capacity, primarily at four cement kilns. Cement kiln containerized solids systems use drop feed systems to feed pails and bags containing hazardous wastes into the "cold" midsection of the kiln (the calcining zone). Wastes packaged into bags must generally be thermally dried to a water content of 5 to 25 percent. As is generally true for cement kilns, wastes are limited by BTU value. The primary constraints on the use of this capacity appear to be dewatering and packaging capacity. One commenter is concerned that the facilities identified by EPA as having containerized solids capacity are close to 100 percent utilized. After further analysis, EPA

stands by the estimates prepared for the proposed rule. Three of the facilities included in this estimate routinely accept petroleum refining wastes, and as of September 1991, one was pursuing a permit modification to be able to burn K048-K052 and F037 and F038. EPA believes that containerized solids systems at cement kilns will be the preferred route for most routinely generated petroleum refining wastes, and has relied heavily on these systems in its capacity analysis for F037 and F038.

Cement kilns are continuing to increase their capacity to burn hazardous wastes, and technical advancements in feed systems are producing especially significant increases in capacity for solids. Estimated containerized solids capacity has roughly doubled since the Third Third rule. Because much of the available capacity for F037 and F038 wastes is new capacity, EPA is concerned that additional technical developments and operational experience are needed to allow these systems to handle routinely generated F037 and F038 wastes. Additionally, there is considerable uncertainty whether cement kilns will continue to provide the same capacity as they modify their equipment and operations to meet interim status requirements of the BIF rule (56 FR 7134, February 21, 1991). To comply with BIF rule interim status requirements, cement kilns must meet a 20 ppm hydrocarbon emission limit or establish an alternative limit based on baseline hydrocarbon emission rates when the facility is not burning hazardous wastes. Based on information from the cement industry, EPA believes that some cement kilns will have trouble meeting the 20 ppm limit or establishing a baseline due to variable hydrocarbon levels in their raw materials. If one of the major cement facilities providing containerized solids capacity is forced to cease operations, it would cause a major disruption to the commercial hazardous waste combustion system, by removing as much as 35,000 tons per year of capacity, leaving the net available capacity close to the amount of routinely generated F037 and F038 that are amenable to cement kilns. As discussed in Section VI.C., nearly half the routinely generated F037 and F038 wastestream is not amenable to cement kilns, and there is insufficient bulk solids capacity to handle this quantity. Due to these potential problems, EPA is reluctant to set the LDR effective dates such that large quantities of new wastes would be

introduced into the combustion systems immediately.

EPA has identified 24,000 tons of dry solids capacity available primarily at two cement kilns. Dry solids systems use pneumatic systems that convey dried materials to the "hot" end of the kiln. Wastes going through this feed mechanism are generally limited by their BTU value, moisture content, and ability to form freeflowing solid particles. The primary constraint on the use of this capacity for combustion of F037 and F038 is the availability of thermal drying capacity, which is necessary to reduce the moisture content to between 5 and 25 percent water. Commenters on the proposed rule noted that petroleum refining sludges, even if dried, may be too "tacky" for this type of feed system. EPA agrees that some F037 and F038 wastes may not be amenable to dry solids systems, and believes that dry solids systems will not receive a large portion of the nation's F037 and F038 waste streams. EPA is aware of several refineries that are using or planning to use thermal desorption and solvent extraction to meet BDAT standards for F037 and F038 wastes, and has accounted for existing on-site units by decreasing its estimates of demand for commercial treatment technologies. While these technologies are not currently commercially available, EPA is aware of other refineries exploring the possibility of building them on-site. The one-year national capacity variance will allow time for on-site development of these technologies.

#### *C. Petroleum Refining Wastes and Other Organic Wastes*

This section presents the capacity analysis for today's newly listed petroleum refining wastes and other organic wastes.

##### **1. Required Capacity for Petroleum Refining Wastes (F037 and F038)**

EPA is promulgating concentration levels as the treatment standards for wastewater and nonwastewater forms of F037 and F038. F037 and F038 nonwastewater standards are based on a transfer of the existing performance data for K048-K052 (55 FR 22520, June 1, 1990). Nonwastewater treatment standards for F037 and F038 wastes are based on solvent extraction and incineration for organic constituents, and stabilization for metals. EPA is also promulgating standards for wastewater forms of F037 and F038 based on the standards for multi-source leachate (F039). That is, for F037 and F038 wastewaters, the standards are based on biological treatment; or, wet air or

chemical oxidation followed by carbon adsorption for organics; and chemical precipitation for metals.

The capacity analysis for the F037 and F038 petroleum refining wastes was conducted using information collected from a number of data sources. The primary data sources include data submitted voluntarily from refineries, the F037 and F038 Regulatory Impact Analysis (RIA) for the listing of the F037 and F038 wastes, the Petroleum Refinery Data Base (PRDB), the TSDR Survey, the Generator Survey, and the public comments submitted in response to the proposed rule (57 FR 958, January 9, 1992).

The RIA was prepared by EPA in 1990 in support of the listing rule for F037 and F038 wastes (55 FR 46354). The RIA includes an industry overview and profile of facilities affected by the listings, an analysis of baseline waste management practices, and regulatory compliance scenarios. The PRDB is based on a mail survey conducted by EPA in 1983 and has been updated to contain 1985 refining information. The TSDR Survey and Generator Survey were discussed previously (in the introduction to Section VI). Public comments submitted in response to the proposed rule present an overview of how industries would be affected by the land disposal restriction of newly listed F037 and F038 wastes.

EPA also used several supplemental data sources: two reports prepared by Midwest Research Institute (MRI), which support the F037 and F038 listing and the Toxicity Characteristic (TC) rule and which summarize sampling and analysis data collected by EPA for 16 petroleum refining facilities; no-migration petitions submitted by petroleum refineries for land treatment units; and the California Hazardous Petroleum Waste Data Base, which contains information on wastes that fit the F037 and F038 definition.

Using the available data and the Agency's best engineering judgment, EPA estimated F037 and F038 waste quantities based on current management practices and identified options for alternative management due to the LDR requirements. EPA derived demand estimates for two sources of F037 and F038 wastes: (1) Quantities from routine generation of F037 and F038 wastes, and; (2) quantities from the cleanout or closure of remaining surface impoundments. The Agency also developed estimates of available on-site treatment/recovery capacity and evaluated information submitted by refineries and treatment technology vendors on the viability of constructing

on-site treatment/recovery capacity and the time that would be required to make such additions.

In the proposed rule (57 FR 958, January 9, 1992), EPA assumed that all F037 and F038 wastes would be removed from surface impoundments prior to May 1992. Wastes that remain in surface impoundments after May 8, 1992 would not be removed, but would be disposed of in place—that is, the surface impoundment would close as a landfill. Commenters on the proposed rule agreed with estimates of routine generation. However, many commenters provided data that surface impoundments would not be cleaned out by May 1992. Additionally, many comments indicated that many surface impoundments would not close as landfills after May 8, 1992, but would be cleaned out. Upon reassessment, EPA agrees with the commenters that F037 and F038 wastes are still being generated from surface impoundment cleanouts and closures. For today's final rule, therefore, EPA conducted separate capacity analyses for F037 and F038 generated routinely and F037 and F038 wastes from surface impoundments.

*a. Routine Generation.* For the purpose of the F037 and F038 capacity analysis, routinely generated F037 and F038 wastes are wastes generated from tanks, including wastes from equalization tanks and oil/water/solids separators (such as CPI separators and IAF units) that are not API separators or DAF units. EPA estimates that approximately 69,000 tons per year of dewatered F037 and F038 wastes (nonwastewaters) from routine treatment of petroleum refinery wastewaters will require alternative treatment due to the LDRs. Based on information from public comments and engineering judgement, EPA estimates that 41,000 tons of per year of this 69,000 tons will be high heat content wastes (i.e., equal to or greater than 5,000 Btu/lb) and would likely be managed at cement kilns as containerized solids, and 28,000 tons per year of low heat content wastes (i.e., less than 5,000 Btu/lb) would be managed in the form of bulk solids at incinerators. For the reasons described in section VI.B., EPA believes that cement kilns and incinerators will not have sufficient capacity to treat the quantity of routinely generated F037 and F038 wastes; therefore, the Agency is granting a one-year national capacity variance to all routinely generated F037 and F038 waste. This variance allows time for cement kilns to comply with interim status requirements of the BIF rule, and for additional bulk solids incineration

capacity and capacity of other treatment and recycling technologies (e.g., solvent extraction and thermal desorption) to come online to meet the demand for treatment from routinely generated F037 and F038.

b. *Generation from Surface Impoundment Cleanouts and Closures.* The Agency also considered the accumulated sludge quantities in surface impoundments. Many of these wastes are generated in unretrofitted impoundments (i.e., impoundments not satisfying the minimum technology requirements specified in sections 3004(o) and 3005(j)(11)), and would thus be land disposed in a prohibited manner. These impoundments can be retrofitted or replaced with tank systems, but according to many commenters, petroleum refineries may not be able to do so by the effective date of this rule, or for some time thereafter. See RCRA section 3005(j)(6), which allows four years from promulgation date of the rule identifying or listing the wastes to retrofit or close impoundments receiving newly identified or listed wastes (and no other hazardous wastes). Since most of these surface impoundments also accumulate organic toxicity characteristic (TC) wastes, identified as hazardous in March 1990, the refineries have to retrofit or close the impoundments by March 1994. Some impoundments may be granted a delay of closure (see 40 CFR 265.113 and 40 CFR 264.113) and thus will be allowed to remain in operation, providing that hazardous wastes (e.g., F037 and F038 wastes) are removed and the impoundment is used for non-hazardous wastes. For surface impoundments that do not close by May 1992, EPA estimates that 173,000 tons of dewatered F037 and F038 wastes will be generated from impoundment closure or cleanout between June 1992 and June 1993, and 99,000 tons between June 1993 and June 1994. These quantities will require alternative treatment to meet the LDR treatment standards.

Commenters indicated that F037 and F038 wastes generated from surface impoundment closures are generally of lower heat content than routinely generated F037 and F038 wastes. EPA agrees with this comment; therefore, a larger proportion of surface impoundment generated wastes would require incineration. Based on a follow-up analysis of public comments and engineering judgement, EPA estimates that of the total 173,000 tons generated between 1992 and 1993, 112,000 tons will be low heat content waste requiring incineration for nonpumpable sludge or bulk solids. Of the 99,000 tons generated

between 1993 and 1994, 64,000 tons will be low heat content waste requiring incineration for bulk solids. Because incineration capacity for bulk solids that could accommodate these wastes before they are land disposed is not adequate, EPA is granting a two-year national capacity variance for F037 and F038 wastes from surface impoundments.

The lack of alternative storage/treatment capacity raises two issues. The first is that during the period of a national capacity variance, restricted wastes disposed in surface impoundments can only be placed in impoundments meeting the minimum technology requirements of section 3004(o). See § 288.5(h), RCRA section 3004(h)(4) and *Mobil Oil v. EPA*, 871 F.2d 149 (D.C. Cir. 1989). The second issue is that section 3005(j)(6) states that impoundments receiving newly identified or listed hazardous wastes have up to four years from the date of promulgation of the rule to retrofit or close the impoundment. As was described in section IV.H. of today's preamble, EPA believes that these provisions are in irreconcilable conflict, and, accordingly, EPA has significant discretion in determining how best to interpret them. The Agency is promulgating that in the case of wastes subject to a national capacity variance, that impoundments managing such wastes (and no other wastes subject to an earlier prohibition) have four years from the date of the identification or listing (i.e., the date identifying or listing of the wastes is promulgated, not the effective date of the rule, see section 3005(j)(11)) to retrofit or close.

Although land disposal in impoundments remains necessary during the four-year period allowed by statute for retrofitting, the Agency proposed that these surface impoundment wastes be removed and sent for the mandated treatment if adequate treatment capacity existed (section 3005(j)(5)). Some comments received in response to this proposal indicate that some refineries may not be able to remove waste from surface impoundments without first removing the impoundment from service, which would interrupt refinery operations and possibly affect oil and solids loading on the wastewater treatment system, potentially exceeding NPDES permit limits. EPA agrees with these comments and is therefore not requiring such annual cleaning of surface impoundments.

In addition, EPA proposed that impoundments must be clean closed. EPA's intent was to mandate removal of prohibited wastes at closure to be

consistent with the statutory intent to treat wastes where capacity is available and not to dispose of untreated wastes in surface impoundments. (Where there is available treatment capacity, the strong statutory policy is to treat hazardous wastes rather than allow them to be land disposed. See RCRA sections 1002(7) and 1003 (4), (5), and (6).)

EPA received comments opposing the requirement of clean closure, citing acceptable alternative to clean closure, such as closure in place (40 CFR 265.228(a)(2) and 40 CFR 264.228(a)(2)), delay of closure (40 CFR 265.113(d)(e) and 40 CFR 264.113(d)(e)), and other closure options. EPA has considered these alternative closure practices and is allowing owners and operators of petroleum refineries the same flexibility available to other surface impoundment owners and operators. Therefore, EPA is not requiring that owners and operators of surface impoundments remove wastes when they close. If owners or operators remove wastes from surface impoundments after the expiration of the two-year national capacity variance, and they are unable to identify adequate treatment capacity, they may seek a case-by-case extension to the effective date of the LDR prohibition as stipulated under 40 CFR 268.5.

One commenter disagreed with EPA's proposal to allow owners and operators to generate F037 and F038 in unretrofitted impoundments. This commenter mentioned that their member companies had received a large number of inquiries concerning the closure and replacement of leaking surface impoundments, but that this interest declined as it became clearer that EPA was likely to allow them the maximum amount of time to retrofit. The commenter believes that owners and operators will take as much time as they are given to comply with the minimum technology requirements. The commenter therefore believes that no capacity shortfall exists, just a perceived "difficult" burden exists for closing surface impoundments. EPA disagrees with this comment. As indicated in today's preamble, EPA believes that four years from the date of promulgation of the listing or characteristic is a reasonable period within which owners and operators can come into compliance with the minimum technology requirements.

c. *Capacity Analysis Summary for F037 and F038 Wastes.* As stated earlier in this section, the capacity analysis was conducted separately for F037 and F038 wastes routinely generated and for F037 and F038 wastes from surface

impoundments. The estimate for routinely generated F037 and F038 waste generation requiring alternative treatment is 69,000 tons per year (nonwastewaters). EPA has no data indicating that any land-disposed wastewaters will require alternative treatment, and therefore EPA assumed this quantity to be zero. Based on the estimate that 69,000 tons per year of dewatered routinely generated F037 and F038 wastes will require alternative treatment, and the determination that insufficient capacity exists to treat these wastes in the next year, EPA is granting routinely generated F037 and F038 wastes a one-year national capacity variance. This variance expires on June 30, 1993, one year from promulgation of the LDR prohibition for these wastes (RCRA 3004(h) (1) and (2)). (EPA notes that it is dating the national capacity variance for these wastes from the date the prohibition took effect, rather than the date of publication, since the record does not support any longer extension).

EPA has estimated that cleanouts and closures of surface impoundments will generate 100,000 tons of low heat content wastes generated between 1992 and 1993 and 91,000 tons generated between 1993 and 1994. Because existing capacity at bulk solid incineration systems is insufficient to treat F037 and F038 wastes from surface impoundments, EPA is granting a two-year national capacity variance for these wastes. This variance expires on June 30, 1994, two years from promulgation of the LDR prohibition, the maximum extent allowed by law (RCRA 3004(h)(2)).

## 2. Required Capacity for Other Newly Listed Organic Wastes

This section presents EPA's analysis of required capacity for other newly listed organic wastes (surface disposed) including organic U waste, unsymmetrical dimethylhydrazine (UDMH) wastes, toluene diisocyanate (TDI) wastes, ethylene dibromide (EDB) wastes, ethylenebisdithiocarbamic (EBDC) wastes, and methyl bromide wastes.

### a. *Unsymmetrical Dimethylhydrazine (UDMH) Production Wastes (K107, K108, K109, K110).*

**K107**—Column bottoms from product separation from the production of 1,1-dimethylhydrazine from carboxylic acid hydrazides

**K108**—Condensed column overheads from product separation and condensed reactor vent gases from the production of UDMH from carboxylic acid hydrazines

**K109**—Spent filter cartridges from product-purification from the production of UDMH from carboxylic acid hydrazines

**K110**—Condensed column overheads from intermediate separation from product purification from the production of UDMH for carboxylic acid hydrazines

For UDMH wastes, EPA is promulgating incineration as the method of treatment for nonwastewaters, and incineration, or chemical oxidation or biodegradation followed by carbon adsorption as methods of treatment for the wastewaters.

EPA listed four UDMH wastes (K107, K108, K109, K110) that are generated from the production of UDMH (unsymmetrical dimethylhydrazine, or 1,1-dimethylhydrazine) from carboxylic acid hydrazides. Also, some of these wastes are ignitable or corrosive and as such are currently subject to LDR standards.

Generation and management information concerning the UDMH wastes was collected by EPA during 1990 and early 1991 under the authority of section 3007 in RCRA. This capacity analysis incorporates data from that section 3007 information request.

The response to the section 3007 request noted that the only manufacturer who used the proprietary process generating UDMH wastes has ceased UDMH production. Therefore, the Agency assumes that no UDMH will require treatment prior to land disposal.

Based on available data, EPA believes that sufficient capacity exists for treatment of the UDMH wastes; therefore, EPA is not granting a national capacity variance for K107, K108, K109, and K110 wastewaters and nonwastewaters.

b. *2-Ethoxyethanol (U359).* For U359, EPA is promulgating incineration or fuel substitution as methods of treatment standards for the nonwastewaters, and incineration, or chemical oxidation followed by biological treatment, carbon adsorption, or biodegradation followed by carbon adsorption for the wastewaters.

Generation and management information concerning the U359 wastes was collected by EPA during 1990 and early 1991 under the authority of section 3007 in RCRA. This capacity analysis incorporates data from that section 3007 information request.

The Agency estimates that less than 500 tons of U359 wastewaters are being land disposed and will require further treatment as a result of the LDRs. Most of the U359 waste generated in 1989 was incinerated on-site, and the remainder (less than one percent) was incinerated off-site. In addition, unspecified and variable quantities of untreated wastewater contaminated with U359 are reportedly generated on occasion at one generator's facility; however, this

wastewater undergoes biological treatment on site. Because these wastes are rejected products, and the product has a market value, the Agency believes these wastes would be generated in small quantities.

Based on the available data (see Section VI.B), EPA believes that sufficient capacity exists for treatment of U359 wastes; therefore, EPA is not granting a national capacity variance for U359 wastewaters or nonwastewaters.

### c. *Dinitrotoluene and Toluenediamine Production Wastes (K111-K112, U328 and U353).*

**K111**—Product washwaters 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

U328—Ortho-toluidine

U353—Para-toluidine

For K111 wastewaters and nonwastewaters, EPA is promulgating concentration-based standards based on a transfer of the standards for F039 wastes. EPA is promulgating incineration as the method of treatment for K112 nonwastewaters; and incineration, or chemical oxidation followed by carbon adsorption, or biodegradation followed by carbon adsorption as methods of treatment for K112 wastewaters. For U328 and U353 wastes, EPA is promulgating incineration as the method of treatment for nonwastewaters; and incineration, or chemical oxidation followed by carbon adsorption, or biodegradation followed by carbon adsorption as methods of treatment for wastewaters.

During 1990 and early 1991, EPA collected generation and management information concerning these wastes under the authority of section 3007 in RCRA. This capacity analysis incorporates data from that section 3007 information request. In addition, the Agency has contacted other facilities in order to obtain further information concerning K111 and K112 waste generation, management practices, and residuals. Finally, the Agency reviewed information provided in response to the proposed rule (57 FR 967, January 9, 1992).

The Agency has identified approximately 3,500 tons of K111 nonwastewaters and no K112 nonwastewaters and no K111 or K112 wastewaters requiring alternative treatment. The majority of the K111 and K112 wastes generated are currently treated using a variety of alternative treatment or recovery methods and discharged through NPDES. The data



indicate that the residuals from treatment of K111 and K112 were further treated before being land disposed.

The Agency estimates that less than 500 tons of U328 and U353 nonwastewaters are being land disposed and will require further treatment as a result of the LDRs. EPA identified no U328 and U353 wastewaters requiring alternative treatment.

Based on the available data (see section VI.B), EPA believes that sufficient capacity exists for treatment of these wastes. Therefore, EPA is not granting a national capacity variance for K111, K112, U328, and U353 wastewaters or nonwastewaters.

*d. Ethylene Dibromide (EDB) Production Wastes (K117-K118, K136) and Methyl Bromide Production Wastes (K131 and K132).*

K117—Wastewaters from the reactor vent gas scrubber in the production of ethylene dibromide via the bromination of ethylene

K118—Spent adsorbent solids from the purification of EDB produced by bromination of ethylene

K136—Still bottoms from the purification of EDB

K131—Wastewater from the reactor and acid dryer from the production of methyl bromide

K132—Spent adsorbent and wastewater separator solids from the production of methyl bromide

For K117, K118, K136, K131, and K132 wastes, EPA is promulgating concentration-based standards based on a transfer of data used to calculate the U029 (bromomethane), U030 (4-bromophenyl phenyl ether), U066 (1,2-dibromo-3-chloropropane), U067 (ethylene dibromide, EDB), U068 (dibromomethane) and U225 (bromoform) Third Rule standards for nonwastewaters; and multisource leachate (F039) performance for wastewaters. EPA is promulgating standards based on incineration for nonwastewaters; and incineration, or chemical or wet air oxidation followed by carbon adsorption, or biological treatment, or steam or air stripping for wastewaters.

During 1990 and early 1991, EPA collected generation and management information concerning these wastes under the authority of section 3007 in RCRA. This capacity analysis incorporates data from that section 3007 information request. In addition, the Agency reviewed information provided in response to the ANPRM (56 FR 24444) and the proposed rule.

Based on new information received in response to the proposed rule, EPA estimates that less than 100 tons of currently land-disposed K118

nonwastewaters will require alternative treatment. EPA has identified no K117 or K136 waste generation and no K118 wastewaters currently being surface disposed.

EPA has identified no K131 or K132 wastes currently being land disposed and requiring alternative treatment or recovery. All identified K131 wastes currently generated are sent off site for acid reclamation.

Based on available data and using incineration as the treatment technology (see Section VI.B), the Agency believes that sufficient treatment capacity exists for treatment of these wastes; therefore, EPA is not granting a national capacity variance for K117, K118, K136, K131 and K132 wastewaters or nonwastewaters. EPA is granting a two-year national capacity variance to underground injected K117, K118, K131, and K132 wastes (see Section VI.F).

*e. Ethylenedisithiocarbamic (EBDC) Production Wastes (K123, K124, K125, and K126).*

K123—Process wastewater (including supernates, filtrates, and washwaters) from the production of ethylenedisithiocarbamic acid (EBDC) and its salts

K124—Reactor vent scrubber water from the production of EBDC and its salts

K125—Purification solids (including filtration, evaporation, and centrifugation solids) from the production of EBDC and its salts

K126—Baghouse dust and floor sweepings in milling and packaging operations from the production or formulation of EBDC and its salts

For EBDC wastes, EPA is promulgating incineration as the method of treatment for nonwastewaters; and incineration, or chemical oxidation followed by biological treatment or carbon absorption as methods of treatment for wastewaters.

During 1990 and early 1991, EPA collected generation and management information concerning the EBDC wastes under the authority of section 3007 in RCRA. This capacity analysis incorporates data from that section 3007 information request.

The Agency has identified less than 100 tons of K125 nonwastewaters that are currently land disposed and will require alternative treatment, and has identified no quantities of K123, K124, or K126 wastes that are currently being land disposed. No generation of K125 wastewaters, K124 wastes, or K126 wastes has been identified.

Based on available data, EPA believes sufficient capacity exists for treatment of the EBDC wastes; therefore, EPA is not granting a national capacity variance for K123, K124, K125, and K126 wastewaters or nonwastewaters.

*D. Required and Available Capacity for Newly Listed Wastes Mixed With Radioactive Contaminants*

EPA has defined a mixed RCRA/radioactive waste as any matrix containing a RCRA hazardous waste and a radioactive waste subject to the Atomic Energy Act (53 FR 37045, 37046, September 23, 1988). Regardless of the type of radioactive constituents that these wastes contain (e.g., high-level, low-level, or transuranic), they are subject to the RCRA hazardous waste regulations, including the land disposal restrictions.

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

The Department of Energy (DOE) is the primary generator of mixed RCRA/radioactive wastes. A variety of non-DOE facilities also generate mixed RCRA/radioactive wastes, including nuclear power plants, academic and medical institutions, and industrial facilities. Based upon a review of the available data, including data submitted by DOE under several rulemakings, the quantities of mixed RCRA/radioactive wastes containing newly listed wastes regulated by this rulemaking appear to be small.

Although DOE is in the process of increasing its capacity to manage mixed RCRA/radioactive wastes, information supplied by DOE under other rulemakings indicates that a significant capacity shortfall currently exists for the treatment of mixed RCRA/radioactive wastes, much of which is in storage facilities awaiting treatment. EPA's review of non-DOE data sources also showed a significant lack of commercial treatment capacity as well.

Any new commercial capacity for mixed RCRA/radioactive wastes that becomes available will be needed for mixed wastes that were regulated in previous land disposal restriction rulemakings and whose variances have already expired (i.e., radioactive wastes mixed with solvents, dioxins, California list wastes, or First Third, Second Third, or Third wastes). In addition, DOE has indicated that it will generally give treatment priority to mixed wastes that are already restricted under previous

LDR rules. Thus, EPA has determined that sufficient alternative treatment capacity is not available and is granting a two-year national capacity variance for mixed RCRA/radioactive wastewaters and nonwastewaters contaminated with newly listed wastes whose standards are being promulgated today.

One commenter on the proposed rule suggested that EPA not rely on DOE to develop the capacity needed to manage the largest quantities of mixed RCRA/radioactive wastes because of DOE's reportedly poor record of handling radioactive materials. EPA disagrees with this comment. DOE is responsible for managing many radioactive wastes and has a Federal statutory obligation to develop needed capacity. In addition, DOE is subject to regulations designed to ensure that its mixed RCRA/radioactive wastes are properly managed. EPA and authorized states regulate the hazardous components of these wastes under RCRA and the Nuclear Regulatory Commission (NRC) and agreement states regulate the radioactive components under the Atomic Energy Act and other statutes. DOE is generally self-regulating with respect to the radioactive component and is generally exempt from NRC regulations, except for DOE facilities that accept commercial high level wastes which are to be licensed by NRC.

The same commenter also suggested that EPA require that all non-DOE mixed RCRA/radioactive wastes be stored and managed under "emergency permits" at known commercial and on-site facilities, rather than allowing them to be generated, managed, and disposed "at an unknown number of unidentified generator sites." This commenter appears to be confused about the RCRA regulatory program. Mixed RCRA/radioactive wastes are not generated, managed, and disposed at "unidentified generator sites." All generators of more than 100 kilograms/month of RCRA hazardous wastes, including mixed wastes, must obtain an EPA identification number. Mixed RCRA/radioactive wastes, like other RCRA wastes, can be stored at the site of generation for greater than 90 days only if the generator has a permitted or interim status storage facility that is specifically allowed to handle mixed wastes. (In the case of generators of 100-1000 kilograms per month, the limit is 180 days, or 270 days in certain cases.) Furthermore, treatment or disposal of mixed RCRA/radioactive wastes is allowed only at permitted or interim status treatment or disposal

facilities specifically authorized to handle mixed wastes. EPA believes that the current RCRA regulatory program is adequate to ensure proper management of the hazardous component of mixed waste and that "emergency permits" are unnecessary.

#### *E. Required and Available Capacity for Debris Contaminated With Newly Listed Wastes*

This capacity analysis focuses on debris contaminated with wastes whose treatment standards are being promulgated in this rule.<sup>49</sup> An estimated 80 percent of all debris contaminated with previously regulated wastes is presently disposed in hazardous waste landfills without prior treatment.<sup>50</sup> In today's rule, EPA is specifying that hazardous debris be treated prior to land disposal using one or more of the following families of debris treatment: extraction, destruction, or immobilization. (The availability of each of these treatments is discussed in greater detail in another section of this preamble.)

EPA used several data sources to estimate the total quantity of land-disposed hazardous debris. These sources include: comments received in response to the proposed rule (57 FR 958); responses to the ANPRM for the newly listed and identified wastes (56 FR 24444); information provided during a series of roundtable meetings held by the Agency in May and June of 1991 with representatives of companies involved in the management and disposal of hazardous debris; Records of Decision (RODs) of Superfund sites; the National Survey of Treatment, Storage, Disposal and Recycling Facilities (TSDR Survey); and the National Survey of Hazardous Waste Generators (Generator Survey).<sup>51</sup>

<sup>49</sup> UDMH (K107-K110), dinitrotoluene (K111), toluene diamine (K112), ortho and para toluidine, ethylene dibromide, methyl bromide, 2-ethoxy ethanol (U359), ethylene bis-dithiocarbamic acid, and F037 and F038 petroleum refining wastes.

<sup>50</sup> Previously regulated wastes include solvents and dioxin wastes, California list wastes, and First Third, Second Third, and Third Third wastes. EPA has granted national capacity variances to soil and debris contaminated with First Third, Second Third, and Third Third wastes. The national capacity variances for debris contaminated with Third Third wastes expired on May 8, 1992. However, the Agency has extended this variance for one year (see section VI. of the preamble).

<sup>51</sup> EPA conducted the surveys during 1987 and 1988 to obtain comprehensive data on the nation's capacity for managing hazardous waste and the volumes of hazardous waste being land disposed as well as data on waste generation, waste characterization, and hazardous waste treatment capacity in units exempt from RCRA permitting.

In general, EPA found severe limitations in estimating the total quantity of hazardous debris because the available data are incomplete and poorly defined. The reason for this lack of comprehensive data is several-fold: First, the regulated community reported that their data generally are not classified by debris but rather by waste code and waste description; second, the data from the TSDR and Generator Surveys were not collected and categorized specifically for debris; and debris were often mixed with soils,<sup>52</sup> and were frequently contaminated with more than one waste, thereby making the hazardous debris matrix and quantity determinations difficult; third, TSDR and Generator Surveys do not include data on debris contaminated with newly listed and identified wastes because they were not considered hazardous wastes in 1986; and fourth, debris that have been cleaned [decontaminated] are generally not reported as hazardous wastes because they are no longer considered hazardous debris. Commenters to the proposed rule agreed with the Agency's assessment of data limitations.

#### 1. Waste Generation

The capacity analysis in today's rule is based on the data sources described above. For the total of currently land-disposed debris contaminated with RCRA hazardous wastes, EPA estimates that approximately one million tons are generated per year based on the reported percentage of the total of all hazardous waste land disposed. EPA also has estimated lower and upper bounds of 700,000 to 2.8 million tons per year, respectively, based on adjustment factors to the TSDR survey data. Some commenters to the proposed rule suggested that the Agency's estimate of the quantities of debris requiring treatment is low. However, no commenter provided national estimates of land-disposed hazardous debris.

The largest quantity of routinely generated debris contaminated with newly listed wastes is debris contaminated with F037 and F038 petroleum refining wastes. EPA's estimate for this quantity is 8,000 tons per year. In addition, EPA received information indicating that additional quantities of debris contaminated with F037 and F038 wastes may be generated from modernization of petroleum

<sup>52</sup> Data submitted by TSDFs in roundtable meetings sometimes combine hazardous debris with soil. Furthermore, TSDFs have stated that historical waste data are generally not kept by debris classifications.

refinery sewer and wastewater systems. EPA's estimate for debris contaminated with the remainder of wastes covered by today's rulemaking is less than 2,000 tons per year.

One commenter indicated that EPA's estimate of the quantity of debris contaminated with F037 and F038 wastes was low. However, this commenter provided no data that could serve as a basis for updating EPA's estimate. In the proposed rule, EPA acknowledged that decommissioning of large chemical plants and increasing remediation activities can significantly increase the estimated quantity of hazardous debris.

## 2. Current Management Practices

Waste generators and TSDFs report that most hazardous debris is currently landfilled without prior treatment. Stabilization or incineration are the reported treatment technologies for the small amounts of hazardous debris that are treated prior to landfilling. However, EPA has received information that materials-handling problems may limit the quantity of hazardous debris that currently can be treated by stabilization and incineration. Specifically, the size of many types of debris must be reduced before they can be treated (e.g., by shredding or grinding). Heavy duty equipment such as shredders and grinders are generally not part of the treatment process at hazardous waste treatment facilities and are not generally available. Consequently, the available capacity to treat hazardous debris is currently limited. In addition, large quantities of materials that are currently cleaned (decontaminated) and then managed as nonhazardous wastes may require additional management as hazardous debris. Commenters to the proposed rule agreed with EPA's assessment that there are materials-handling limitations in managing hazardous debris.

## 3. Available Capacity and Capacity Implications

EPA is promulgating that hazardous debris be treated prior to land disposal using one or more of the following families of debris treatment: Extraction, destruction, or immobilization. While materials-handling problems may limit the available destruction (e.g., incineration) and immobilization (e.g., stabilization) capacities, inadequate capacity exists for many of the promulgated technologies in the extraction family. Much of the capacity of extraction technologies currently used to decontaminate hazardous debris, such as water washing and steam cleaning, is not currently permitted,

although EPA is proposing to expedite the permitting of these technologies. In conclusion, EPA believes that the current capacity available to treat hazardous debris is limited.

Therefore, EPA is today granting a two-year national capacity variance for debris contaminated with newly listed wastes covered in this rule. This variance would allow sufficient time for the installation and permitting of the treatment systems necessary to handle the quantities of hazardous debris affected by this rule. Existing commercial capacity and any new commercial capacity for debris that becomes available will be needed for debris contaminated with wastes listed in previous land disposal restriction rulemakings and not granted a capacity variance (i.e., debris contaminated with solvents, dioxins, or California list wastes). Commenters to the proposed rule generally agreed with EPA's analysis and the need for a national capacity variance for debris contaminated with newly listed wastes covered in this rule.

### F. Capacity Determination for Underground Injected Wastes

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

#### 1. Newly Listed Wastes With Treatment Standards Which Current Data Indicate Are Not Being Underground Injected

The wastes K107, K108, K109, K110, K123, K124, K125, K126, K136, U328, U353, and U359 are the newly listed wastes for which numerical standards or specified methods are being promulgated, and which current data indicate are not being underground injected. Therefore, EPA is prohibiting these wastes from underground injection upon the effective date of this rule.

#### 2. Newly Listed Wastes With Treatment Standards Which Current Data Indicate Are Being Underground Injected

The wastes F037, F038, K111, K112, K117, K118, K131, and K132 are the newly listed wastes for which current data indicate are being underground injected by Class I hazardous waste injection wells.

For K111 and K112 waste from the production of dimethyltoluene or toluenediamine, pretreatment includes neutralization and filtration. Only a small amount of this waste is being disposed of in a Class I hazardous waste injection well which has received a non-migration petition.

The treatment standards for F037 and F038, petroleum refining wastes, are based upon transfer of the performance of technologies previously established for K048-K052 wastes. Based on the Hazardous Waste Injection Well Inventory data base, EPA believes that a small volume of F037 and F038 wastes are being underground injected annually by permitted injection wells. No new data, indicating that larger injected volumes of these wastes, were received by the Agency during the comment period for the proposed rule. Therefore, as adequate alternative treatment capacity appears to be available, the Agency is not granting a two-year national capacity variance for any injected F037, F038, K111, and K112 waste, and is prohibiting these wastes from underground injection upon the effective date of this rule.

The treatment standards for K117, K118, K131, and K132 wastes are based upon liquid incineration. One comment received from the proposed rule indicated that a large volume of these wastes, which are in a mixed non-segregable waste stream exceeding 300 million gallons annually, were being underground injected. The Agency's current data indicate that there is inadequate available commercial treatment capacity for these wastes. Therefore, EPA is granting a two-year national capacity variance for injected K117, K118, K131, and K132 wastes in today's rule.

### G. Revisions to Treatment Standards for K061, F006, and K062

In today's rule, the Agency is removing the low and high zinc subcategories for K061 and establishing the same numeric treatment standards based on HTMR for all K061 nonwastewaters. EPA also is establishing alternative treatment standards based on HTMR for K062 and T006. Today's rule does not preclude the use of any treatment technology that can meet these standards nor does it preclude the use of any technology that can meet the previously promulgated treatment standards for K062 and F006. The Agency received several comments questioning the availability of HTMR capacity to treat these wastes. Although commenters also questioned whether stabilization could meet the treatment

standards, one commenter submitted information that their stabilization process does meet the numeric treatment standards for K061. Since any technology that can meet the numeric standards for K061 can be used to treat those wastes, the Agency believes that there is sufficient treatment capacity for K061. Similarly, since the treatment standards based on HTMR for K062 and F006 are alternative standards and any technology currently used to treat K062 and F006 to the previously promulgated standards may continue to be used, the Agency believes that there is sufficient treatment capacity for K062 and F006.

## VII. Implementation

As described in section VIII. of this preamble, State Authority, today's rule is being promulgated under HSWA authority. Therefore, until states receive authorization to implement today's rule, the Federal procedures and standards will be used for its implementation. The following sections describe some of the relevant generator and permitting procedures that apply to waste handlers as they comply with today's rule.

### A. Facilities Qualifying for Interim Status Due to Storage of Prohibited Wastes

As discussed elsewhere in today's preamble, EPA has determined that adequate treatment capacity for hazardous debris will not be available following the expiration of the national capacity variance for these wastes on May 8, 1992, and has therefore granted a one-year national case-by-case extension to the LDR effective date for hazardous debris, provided certain recordkeeping and other requirements are met. However, even by May 1993 there will likely be generators who will still have difficulty obtaining treatment for these wastes. To a lesser degree, there may also be situations where generators of the newly listed wastes—for which treatment standards are prescribed in today's rule—are unable to initially arrange for appropriate treatment. Therefore, EPA believes that some generators without permits or interim status will need to accumulate wastes restricted from land disposal by today's rule for more than 90 days in order to acquire treatment required by part 268. Although 90 days is the maximum period allowed for accumulation storage at generator sites, if the wastes must remain on-site longer due to unforeseen, temporary, or uncontrollable circumstances, an extension of up to 30 days may be granted at the Regional Administrator's discretion. (See 40 CFR 262.34.) If, despite the best efforts of the generator,

waste accumulation will exceed the 90 day limit (or 120 day limit, if an extension is granted), then the generator must obtain interim status for continued storage.

Section 3005(e) of RCRA establishes the criteria for obtaining interim status, and 40 CFR 270.70(a) codifies that provision. This section provides that facilities "in existence on the effective date of statutory or regulatory changes \* \* \* that render the facility subject to the requirement to have a permit" may qualify for interim status if they make the appropriate application. A generator who is accumulating hazardous wastes in tanks or containers before the effective date of today's rule is "in existence" and may qualify for interim status provided that the continued storage is necessary to comply with the land disposal restrictions. Section 3005(e)(1) allows interim status only where new regulatory requirements subject an existing facility to permitting requirements. It is not intended to provide an opportunity for a facility to newly engage in hazardous waste management.

Generators who need to obtain interim status should submit a part A permit application to the Agency as provided in part 270. (Part A application instructions can be found at § 270.13.) In the part A application, the generator must demonstrate that the additional accumulation time is necessary as a result of the land disposal restrictions of part 268.

The part A must be submitted to the Agency by the deadline specified in § 270.10(e). Note that the § 270.10(e) deadline is the earlier of the following two alternative dates: (1) Six months after publication of regulations which first require the facility to comply with part 265, or (2) thirty days after the date they first become subject to the standards in part 265. It is expected that the deadline for most, if not all, of the large quantity generators will be established by the second alternative. By operation of 40 CFR 270.10(e)(ii), the generator first becomes subject to the permitting requirements when he exceeds the generator accumulation time limit. For example, after the 90-day accumulation period ends, the generator would be required to submit the part A within 30 days. Therefore, it is critical that any generator who will be newly subject to the interim status requirements become familiar with the part 270 requirements and submit the part A application on time.

Generators applying for interim status must comply with the applicable requirements of part 265. These new

interim status facilities are also subject to corrective action orders under section 3008(h) of RCRA. Furthermore, if requested by the Administrator, the facility will be required to submit its part B permit application.

EPA anticipates that some of these new interim status facilities managing debris may find containment buildings more suitable for the storage or treatment of their restricted wastes than their existing tanks or containers. These facilities may request certain changes during interim status by following the procedures described below.

### B. Containment Buildings at Generator Sites

As explained in section IV.G.3. of this preamble, generators who want to add a containment building for accumulation (including treatment) of waste for less than 90 days, can do so without obtaining a RCRA permit, provided the conditions in § 262.34 are met. These conditions include compliance with the containment building standards in subpart DD of part 265 and certain recordkeeping and reporting requirements. Such containment buildings can be used indefinitely, provided the generator ensures that each volume of waste remains in the unit for 90 days or less. When the generator has no further need to manage hazardous waste in the unit, then the building must be closed in accordance with § 265.1102.

### C. Addition of Waste Management Capacity at Permitted and Interim Status Facilities

#### 1. Permitted Facilities

Permitted treatment, storage, and disposal facilities may add new treatment processes and additional capacity pursuant to today's rule by applying for a permit modification under the Federal regulations at § 270.42 (see 53 FR 37912, September 28, 1988, for a full explanation of the permit modification procedures). Although the regulations at § 270.42 were promulgated under pre-HSWA authority, EPA may use these regulations in authorized States when necessary to implement HSWA provisions such as the land disposal restrictions (see 53 FR 37933).

The types of modifications needed to add new capacity or processes would likely require the submittal of a Class 2 or 3 modification. For containment buildings the permit modification type can be determined by consulting new section M in appendix I of § 270.42. The Class 2 modification process requires

Agency action on the request within 120 days. This action would consist of approval or denial, reclassification as a Class 3 modification, or authorization to conduct the activities for up to 180 days pending Agency action. Furthermore, for Class 2 modifications, construction to implement the requested facility change may commence 60 days after submission of the request. There is no deadline for Agency action for Class 3 modifications, which apply to more substantial facility changes.

Permitted facilities may also apply for a temporary authorization to initiate necessary activities while a Class 2 or 3 permit modification request is undergoing review, or to undertake a treatment or storage activity which will be of short duration. EPA may grant a temporary authorization for a term of up to 180 days. Any request for a temporary authorization must demonstrate compliance with the part 264 standards and also meet the criteria of § 270.42(e) for approval. Today's rule amends § 270.42(e)(3)(ii)(B) to allow temporary authorizations for containment buildings where necessary to treat or store restricted waste, including hazardous debris, in accordance with part 268. Interested members of the public (i.e., those that have previously expressed interest in any permitting action for the facility) will receive notice by mail of a facility's request for a temporary authorization, and another mail notice if EPA approves the request. The temporary authorization may be renewed once if the additional procedures of § 270.42(e) are followed, including the submission of appropriate permit modification information and the initiation of public meetings and public comment period. (See 53 FR 37919, September 28, 1988 for additional discussion of temporary authorizations.)

## 2. Interim Status Facilities

Treatment, storage, and disposal facilities managing hazardous waste under interim status may add new treatment processes or additional treatment or storage capacity by using the existing procedures for changes during interim status in § 270.72. Under these procedures, a facility must submit to EPA a revised part A permit application and justification explaining the need for the change. The change may then be approved by EPA.

In order for the change to be approved by EPA, it must meet one of several criteria, such as being necessary to comply with a Federal, State, or local requirement. Note that changes may not be made if they amount to reconstruction of the facility. This occurs when the capital investment for

the changes to facility exceed 50 percent of the capital cost of a comparable entirely new facility. However, § 270.72(b)(6) in today's rule lifts the reconstruction limit for changes to treat or store in containment buildings hazardous waste subject to land disposal restrictions imposed by part 268, provided that the changes are made solely for the purpose of complying with part 268.

### *D. Conversion of Enclosed Waste Piles to Containment Buildings at Permitted and Interim Status Facilities*

EPA expects that many permitted and interim status facilities will make changes to existing enclosed waste piles to meet the technical standards for containment buildings. These facilities may either continue the operation of the containment building under its permit or interim status, or may wish to operate the containment building in accordance with the 90-day generator accumulation provision in § 262.34.

### *I. Conversion of Enclosed Waste Piles to Interim Status or Permitted Containment Buildings*

Permitted facilities may convert their enclosed waste piles to containment buildings by submitting a Class 2 permit modification, as provided in Item I.6. in appendix I to § 270.42. Facilities under interim status may amend their part A permit applications to convert an enclosed waste pile to a containment building under § 270.72(a)(3) as a change in process. Interim status facilities must submit a revised part A permit application and a justification explaining the need for the change to the Agency. The Agency must then approve the change before it can be implemented. After the conversion, the containment building standards of part 265 subpart DD would apply to the unit instead of the waste pile standards of subpart L. Closure of the enclosed waste pile is not triggered by the conversion process since hazardous waste will continue to be managed in the unit and the unit remains fully subject to the requirements of the permit or interim status.

### *2. Conversion of Permitted or Interim Status Enclosed Waste Piles to Accumulation Units Under Section 262.34*

Section 262.34 allows generators to accumulate wastes on-site in certain units for 90 days or less without having a permit or interim status provided that they meet the requirements of that section. Today's rule extends the applicability of § 262.34 to accumulation in containment building units.

Owners and operators of new containment buildings that have not operated under interim status or a permit can accumulate wastes under § 262.34 provided they meet the requirements of that section. Owners and operators of enclosed waste piles that are permitted or operating under interim status can convert those units to generator status and continue accumulating wastes under the provisions of § 262.34 if they first meet the requirements for closure of the unit under § 264.1102 or § 265.1102.

In the case of tanks, the Agency has encountered many owners and operators that have sought conversion from permitted or interim status to generator status but have been unable to satisfy the closure requirements of § 264.197 or 265.197 without ceasing operation of the unit. While the Agency does not seek to require owners and operators to take these units out of operation as part of the conversion to generator status, the Agency does not allow conversion to generator status to serve to exempt permitted and interim status units from the applicable closure and financial responsibility requirements. The Agency seeks to assure that all units that have operated under the requirements of part 264 or 265 satisfy the applicable closure requirements of those parts, and that funds be available to do so. Thus, permitted or interim status tanks that convert to 90-day generator status must undergo full closure before they are released from financial assurance requirements. However, closure requirements are triggered by the final receipt of hazardous waste—not by conversion to 90-day generator status. Therefore, the tank may defer RCRA closure until it is taken out of hazardous waste service.

Similarly, where owners and operators of interim status or permitted containment buildings seek to convert to 90-day generator status but cannot close the unit without taking it out of operation, the owner or operator may accumulate waste as a generator under the provisions of § 262.34 (without a permit requirement) and close the unit at a later date. However, it should be noted that unless the owner or operator satisfies all applicable closure requirements prior to conversion, the unit remains subject to the requirements of subparts G (closure) and H (financial responsibility) until closure of the unit is complete. Furthermore, if the facility is in interim status, it retains interim status until a permit application is denied or interim status is lost. Permitted facilities would retain any corrective action

requirements, but could seek permit amendments to eliminate 40 CFR part 264 standards to which they were no longer subject (e.g., waste analysis plan).

### VIII. 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 3006, 3013, and 7003 of RCRA, although authorized States have primary enforcement responsibility. The standards and requirements for authorization are found in 40 CFR part 271.

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

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

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

also modified to indicate that this rule is a self-implementing provision of HSWA.

EPA is also finalizing a new management unit, containment buildings, which involves redefinition of the term "pile," pursuant to HSWA. This provision assures an adequate means of implementing the treatment standards, either by providing a means that treatment can occur without constituting impermissible land disposal, or by providing a safe staging area that would not constitute land disposal before best treatment. Cf. 56 FR 41175 (August 19, 1991) (portion of rule assuring availability of capacity adopted pursuant to HSWA). Thus, this portion of the rule is adopted pursuant to HSWA and takes effect immediately in authorized States.

#### B. Effect on State Authorization

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

Section 271.21(e)(2) requires that States with final authorization must modify their programs to reflect Federal program changes and to subsequently submit the modification to EPA for approval. The deadline by which the State would have to modify its program to adopt these regulations is specified in § 271.21(e). The deadline is July 1, 1993 if this rulemaking is finalized on or before June 30, 1992. This deadline 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 finalized today to determine whether they meet the tests for authorization. Thus, a State is not authorized to implement these requirements in lieu of EPA until the State program modifications are approved. Of course, States with

existing standards could continue to administer and enforce their standards as a matter of State law. In implementing the Federal program, EPA will work with States under agreements to minimize duplication of efforts. In many cases, EPA will be able to defer to the States in their efforts to implement their programs rather than take separate actions under Federal authority.

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

The regulations being finalized today need not affect the State's Underground Injection Control (UIC) primacy status. A State currently authorized to administer the UIC program under the Safe Drinking Water Act (SDWA) could continue to do so without seeking authority to administer the amendments that will be promulgated at a future date. However, a State which wished to implement part 148 and receive authorization to grant exemptions from the land disposal restrictions would have to demonstrate that it had the requisite authority to administer sections 3004(f) and (g) of RCRA. The conditions under which such an authorization may take place are discussed in a July 15, 1992 final rule (50 FR 28729).

### IX. Regulatory Requirements

#### A. Economic Impact Screening Analysis Pursuant to Executive Order 12291

Executive Order No. 12291 requires that a regulatory agency determine whether a new regulation will be "major" and, if so, that a Regulatory Impact Analysis (RIA) be conducted. A major rule is defined as a regulation likely to result in an annual effect to the economy of \$100 million or more; a major increase in costs or prices for consumers, individuals, industries, Federal, State, and local government agencies, or geographic regions; or significant adverse effects on competition, employment, investment, productivity, innovation, or the ability of United States-based enterprises to

compete with foreign-based enterprises in domestic or export markets. An RIA is a quantification of the potential benefits, costs, and economic impacts of a rule.

The Agency estimated the costs of today's rule to determine if it is a major regulation as defined by Executive Order 12291. The Agency expects today's rule to have an incremental annual cost below \$100 million. Also, the Agency does not believe the rule will significantly increase costs for consumers, individuals, industries, Federal, State and local government agencies, or geographic regions, or have significant adverse effects on competition, employment, investment, innovation, or international trade.

The Agency has performed an Economic Impact Screening Analysis for this rule. The Agency has not assessed benefits but has rather focused its analyses on the costs and economic impacts attributable to today's rule.

#### 1. Cost Methodology

To assess the cost of today's rule, EPA developed a cost methodology with four major analytical concerns: (a) Petroleum refining wastes, (b) remaining wastes affected by the rule, (c) hazardous debris, and (d) storage and treatment in containment buildings. In this section, the Agency summarizes the methodology it adopted for each of these concerns. In addition, at the end of the cost methodology section, EPA also lists several wastes included in today's rule which are not expected to be associated with any regulatory impacts.

a. *Approach for Petroleum Refining Wastes (F037 and F038)*. In the analysis of the compliance costs for the treatment standards being set for petroleum refining wastes, the Agency first reviewed the work completed for the listing of F037 and F038, which EPA promulgated in October 1990 (see 55 FR 46386, subsequently referred to as the Listing Rule or Listing RIA).<sup>53</sup> EPA estimated in the Listing RIA that 470,000 tons of F037 and F038 nonwastewaters (with an average water content of 55 percent) were generated annually. The Agency assessed compliance costs for this volume under a compliance scenario that included LDR treatment before land disposal because it believed that the realistic post-regulatory management practice after listing will include treatment. The LDR treatment

scenario consisted of dewatering of the waste followed by either incineration (on-site or off-site) or solvent extraction (on-site).

For today's rule, the Agency updated the F037 and F038 volume estimates used in the Listing RIA based on additional generation information obtained as part of the capacity determination (see section VI.C for the capacity analysis of F037 and F038). Based on this updated information, the Agency estimated that 223,000 tons of F037 and F038 nonwastewaters are generated annually (with an average water content of 30 percent). EPA estimated that 56,000 tons per year of F037 and F038 wastes were treated to meet the treatment standards in the baseline and that the industry will incur incremental costs in treating the remaining 167,000 tons.

Of the 167,000 tons of land disposed F037 and F038 requiring treatment, EPA estimated that roughly 17,000 tons (i.e., 10 percent) is land disposed in California. California has its own LDR program, under which F037 and F038 waste are restricted from land disposal as of May 8, 1992. The California land ban standards are substantively equivalent to those standards in today's rule. Thus, even if the Federal regulations are not promulgated, F037 and F038 waste will be restricted in this State. Therefore, EPA estimated that only 150,000 tons annually of F037 and F038 will require additional treatment prior to land disposal as a result of today's rule. For its cost analysis, EPA is ignoring the effect of the one-year national capacity variance being granted for this volume and rather estimates the expected annualized cost several years after the listing decision.

For the baseline scenario, the Agency estimated that 96,000 tons per year (i.e., 64 percent) of the F037 and F038 waste requiring additional treatment is managed on-site, and the remaining 54,000 tons (i.e., 36 percent) is sent off-site. Of the waste managed on-site, the Agency estimated that 91,000 tons per year (i.e., 95 percent) is managed using land treatment, and 5,000 tons per year (i.e., 5 percent) is landfilled. All wastes disposed off-site were assumed to go to landfills.

For the post-regulatory scenario, the Agency assumed that 130,000 tons (i.e., 87 percent) of the 150,000 tons requiring additional treatment will be treated on-site. Although the Listing RIA did not project any volume of waste going to on-site cokers, information indicates that in the post-regulatory scenario 34,000 tons per year (i.e., 26 percent) of the F037 and F038 volume managed on-site will be

disposed of in such a manner, at a cost of \$200 per ton. The remainder of the F037 and F038 volume managed on-site was assumed to be split evenly between solvent extraction (48,000 tons per year, or 37 percent, at a cost of \$500 per ton) and incineration (48,000 tons per year, or 37 percent, at a cost of \$400 per ton). The post-regulatory scenario assumed disposal of residuals in subtitle C landfills.

The Agency assumed that 20,000 tons per year (i.e., 13 percent) of the 150,000 tons requiring additional treatment will be treated off-site. The Agency estimated that 2,000 tons per year (i.e., 10 percent) of this volume will go to incineration, at a cost of \$1,600 per ton, and the remaining 18,000 tons per year (i.e., 90 percent) will go to cement kilns, at a cost ranging from \$700 per ton to \$1,200 per ton. Although the Agency doesn't expect large increases in cement kiln capacity, there is uncertainty about future prices charged by cement kilns for hazardous waste.

b. *Approach for Remaining Wastes*. To determine the cost and economic impacts of the rule for newly listed wastes other than F037 and F038, EPA first identified the industries that will be affected. The Agency analyzed these industries to determine the amounts of the affected wastes that they generate, how these wastes are currently managed, and how these wastes will have to be managed to comply with LDR treatment standards.

The incremental cost of today's rule for each waste was estimated by comparing post-regulatory costs with the costs of current, or baseline, conditions. EPA lacked site-specific waste generation data for this screening analysis. Accordingly, the Agency developed costs for the baseline and post-regulatory scenarios assuming off-site commercial treatment for all wastes included in the cost analysis, even though off-site treatment may not be used by all generators since it generally is more expensive than on-site treatment.

The following paragraphs explain the approach used to evaluate costs for wastes besides F037 and F038 affected by today's rule.

(i) *Newly Listed Organic Wastes*. All newly listed organic chemical wastes affected by today's rule—unsymmetrical dimethylhydrazine production wastes, 2-ethoxyethanol, dinitrotoluene and toluenediamine production wastes, ethylene dibromide production wastes and methyl bromide production wastes, and ethylenebisdithiocarbamic acid production wastes—are land disposed in relatively small quantities. The

<sup>53</sup> Regulatory Impact Analysis for the Listing of Primary and Secondary Oil/Water/Solids Separation Sludges from the Treatment of Petroleum Refinery Wastewaters, prepared for U.S. EPA, Office of Solid Waste, Economic Analysis Staff, by DPRA, October 1990.

baseline for all newly listed wastes was defined as continued land disposal in units meeting minimum technological requirements.

(ii) K061, F006, K062. Today's rule eliminates the low zinc subcategory for K061 wastes and establishes numeric treatment standards for all K061 based on high temperature metals recovery (HTMR). Wastes previously included in the high zinc subcategory of K061 already had to meet treatment standards based on HTMR; they are unaffected by this change. Wastes previously included in the low zinc subcategory of K061 had to meet numeric treatment standards based on stabilization, although in some cases HTMR was being used.

EPA's cost analysis for the regulatory changes to K061 considered only the low zinc subcategory since wastes in the high zinc subcategory are not affected by the rule. The Agency assumed the baseline for wastes previously included in the low zinc subcategory K061 is stabilization. The Agency assumed that in the post-regulatory scenario managers of these wastes will use HTMR.

Today's rule establishes numeric treatment standards based on HTMR as an alternative treatment standard for K062 and F006. The Agency did not quantify the cost impact of the rule for these two wastes; it believed that any operator using HTMR for K062 and F006 will be using the technology only because it is more cost-effective than current management practices.

c. Approach for Hazardous Debris. (i) Previously Regulated Hazardous Debris. The majority of hazardous debris is already regulated under the Solvents and Dioxins, California list, and the First Third, Second Third, and Third Third LDR rules due to the waste code-carry-through principle. The waste code-carry-through principle, or mixture rule, states that a solid waste mixed with a listed hazardous waste bears the waste code of the listed hazardous waste.

For this hazardous debris, which is already restricted under the LDR program, the standards in today's rule are expected to be easier to implement and less costly than the previous standards. As one commenter stated, by specifying multiple acceptable BDAT technologies for a given hazardous contaminant category and debris class, EPA has given the generators and treaters a number of options to allow more cost-effective and efficient treatment of hazardous debris. In addition, the Agency is allowing hazardous debris to be treated to meet the existing LDR standards established for the listed wastes if the managers of hazardous debris so desire.

To estimate the incremental annual cost of treating previously regulated hazardous debris, EPA constructed probabilistic distributions of both the volume of previously regulated hazardous debris and the unit costs of treating various subsets of this volume before and after the rule takes effect. EPA relied on the expert judgment of its technical staff to collect the data necessary for this step. EPA considered three sources of generation of previously regulated hazardous debris: routinely generated debris (approximately 20 percent of all previously regulated hazardous debris), debris generated at remedial actions required by Federal and State regulations (approximately 30 percent), and debris generated at demolition and construction sites (approximately 50 percent). The volumes associated with each of these sources were further divided based on other considerations that would determine the type and cost of the technology used to treat the debris.

EPA's approach for previously regulated hazardous debris did not focus on volume and cost estimates for specific wastes or facilities. For this set of debris, estimates of total volume and costs were apportioned to sets of facilities with different debris generation characteristics and different treatment patterns. EPA assumed that in the baseline, incineration would always be used for debris contaminated with organic wastes (estimated to be 20 percent of previously regulated hazardous debris, on average, for all sets of facilities); immobilization always would be used for debris contaminated with organic wastes (estimated to be 20 percent of previously regulated hazardous debris, on average, for all sets of facilities); and incineration followed by immobilization always would be used for debris contaminated with both organic and inorganic wastes (estimated to be 60 percent of previously regulated hazardous debris, on average, for all sets of facilities). In the post-regulatory scenarios, EPA assumed that debris contaminated with organics would be treated using incineration 20 percent of the time and washing the remaining 80 percent of the time, debris contaminated with inorganics always would be treated using immobilization (i.e., no change from the baseline treatment), and debris contaminated with both organics and inorganics would be treated using incineration followed by immobilization 20 percent of the time and washing followed by immobilization 80 percent of the time. Cost information, presented in appendix C of the ELA was gathered for the Phase I analysis based on industry contacts and professional

judgment. The ranges used for the costs of incineration and washing reflected that some debris treated with the technologies in the post-regulatory scenario would be exempted from subtitle C management.

(ii) Newly Regulated Hazardous Debris. To gather information for its cost estimate of treating debris contaminated with wastes newly restricted under today's rule, EPA used an approach involving structured interviews with recognized experts in the area of hazardous debris volumes and treatment technologies. An integral part of these interviews was identifying the uncertainties associated with estimates of future hazardous debris generation rates and treatment costs.

EPA first identified individuals with expert knowledge of the industries generating and managing newly regulated hazardous debris. EPA identified nine experts. Four of these experts were senior environmental managers associated with several of the 14 organic chemical facilities that potentially could generate debris contaminated with organic chemical production wastes regulated by today's rule. The remaining five experts were senior environmental managers associated with several of the over 190 petroleum refineries that could potentially generate debris contaminated with F037 and F038.

The Agency then developed protocols for structured interviews with the experts who had been identified. The Agency's protocol was similar in structure to those used by Stanford/SRI<sup>54</sup> and Morgan and Henrion,<sup>55</sup> although it was substantially abbreviated due to time constraints. The protocol involved five basic stages. These stages could be described as: (1) Motivating, (2) structuring, (3) debasing, (4) encoding, and (5) verifying.

Two individuals conducted each interview, one a professional facilitator and the other an engineer with expertise in the industry being regulated. Interviews typically lasted one hour, during which time information on hazardous debris volumes and incremental treatment costs was solicited. Interviewers stressed that ranges should be supplied rather than

<sup>54</sup> See: Spetzler, C.S. and Staal Von Holstein, C.-A.S., "Probability Encoding in Decision Analysis", Management Science, Vol. 22, No. 3, and Staal Von Holstein, C.-A.S. and Matheson, J.E., A Manual for Encoding Probability Distributions, SRI International, Palo Alto, CA., 1979.

<sup>55</sup> Morgan, M.G. and Henrion, M., Uncertainty: A Guide to Dealing with Uncertainty in Quantitative Risk and Policy Analysis, Cambridge: Cambridge University Press, 1990.



point estimates, and they requested that experts provide percentile probabilities for these ranges.

After the Agency had collected information from experts, it aggregated data and generated cost results in terms of ranges that reflected the uncertainty of the analysis. EPA used a probabilistic model to develop volume and cost estimates. The Agency produced overall volume and cost estimates for the newly regulated debris treatment standards based on the medians of data; it also generated ranges of volumes and costs that have a 98 percent likelihood of containing the true values. EPA analyzed volumes and costs separately for the petroleum refining industry, which will generate debris contaminated with F037 and F038, and the organic chemicals industry, which will generate the remainder of debris effected by the rule.

d. *Methodology for Assessing Regulatory Impact Due to Storage and Treatment in Containment Buildings.* As a result of today's rule, containment buildings could be used as a method of waste management. They potentially could provide regulatory relief to the regulated community. Accordingly, the Agency assessed the potential cost implications of using these units. In its assessment, EPA considered industries that will use containment buildings for storage of bulk wastes and treatment of contaminated debris.

(i) *Industries and Wastes Potentially Using Containment Buildings for Storage of Bulk Wastes.* EPA believes that two primary categories of facilities currently use structures very similar to containment buildings for storage and are likely to convert to use of containment buildings in the future: mineral processing and metal recycling facilities. Within the mineral processing category, the Agency believes that generators of aluminum potliners will be particularly affected by the provision. Within the metal recycling category, the Agency believes that brokers of batteries, battery recyclers (i.e., lead smelters), and generators and recyclers of dust and ash from primary steel producers will be particularly affected. The Agency bases these beliefs on a review of the waste volumes these industries generate and comments that it has received on industrial practices. In addition, the Agency received extensive public comment from representatives of the three industries, thus enabling the Agency to perform a more detailed analysis of these industries than of other industries.

In the case of aluminum potliners, EPA is assuming that aluminum facilities already have Subtitle C storage

permits, since potliners are currently being stored on-site in waste piles pending bulk shipment off-site. Because waste piles are a form of land disposal, if there was no containment building provision, in order to comply with the LDRs EPA believes that large facilities will have revert to sending potliners off-site at the time of generation. This change in practices would result in higher transportation and disposal costs, given the increased frequency of shipments. Today's containment building provision will allow large generators of spent aluminum potliners to continue their present management methods even after treatment standards are set for K088.

In the case of the lead acid battery recovery industry, the Agency believes that brokers of lead acid batteries and recyclers of lead acid batteries will be the primary parties affected by the containment building provision. Attempts to handle furnace feed materials differently have proven unsuccessful and to date remain infeasible. Because EPA considers the staging of furnace feed materials in the furnace feed areas as land disposal under the LDRs, bulk storage would be prohibited unless the materials are first treated. Thus, if containment buildings were not excluded from LDR regulation, generators would have to seek treatment alternatives, such as off-site stabilization, that might be more expensive than lead recycling and that do not promote resource recovery. Today's provision will allow brokers and secondary smelting facilities to accumulate sufficient quantities to allow for more efficient shipment and processing.

Lastly, with regard to the primary steel production industry, steel facilities store, and sometimes treat, production dust, primarily K061, in order to lower the cost of waste management through waste accumulation. As in the lead smelting industry, attempts to handle furnace feed materials differently are infeasible. If generators are not able to store waste to facilitate transportation and treatment, they would have to seek management alternatives, such as off-site stabilization, that would remain feasible if waste had to be sent off-site immediately after generation. These alternatives might be more expensive than HTMR. The Agency believes that both generators of K061 and HTMR facilities could take advantage of the containment building provision and continue to store wastes in the present manner.

The Agency recognizes the possibility that small generators and recyclers of bulk hazardous waste may not recognize

as significant regulatory relief from the containment buildings provision as larger generators. Small generators are less likely than larger generators to have existing structures which are similar in design to containment buildings, and small generators may not generate enough waste to fully capitalize a containment building. The Agency believes that many small generators and recyclers of all types of bulk hazardous waste presently use concrete storage bins that are regulated under RCRA as tanks (and thus are granted a 90-day storage exclusion from the LDRs). Storage in concrete bins is possible for small generators and recyclers because they do not need the large areas to store and monitor their hazardous waste. For example, a small generator of aluminum smelting waste may store its spent potliners, each weighing about 10 tons, in a tank-like concrete bin. Because of this use of concrete bins, the Agency believes that many small generators already enjoy the exclusion from the LDRs that use of containment buildings would provide.

On the other hand, the industrial practices of large generators and recyclers often necessitate the use of large containment buildings. Large aluminum smelting facilities are likely to generate spent potliners weighing an order of magnitude more than those of small generators (e.g., 150 tons versus 10 tons) and thus they could take advantage of the increased storage capabilities of large containment buildings. Large recyclers often require large areas for proper monitoring and preparation of waste, and also could benefit from the containment building provision. For example, large recyclers of lead smelting require substantial staging areas to achieve time-efficient and proper draining of lead waste from "cracked" batteries. Large facilities are the primary facilities likely to gain economies of scale in the transportation, treatment, and disposal costs from the containment building provision. As a result, the Agency believes that large volume managers of wastes, such as those found in the three industries being analyzed, will realize significant benefits from the provision, while small volume managers will not.

For this reason, as well as the fact that the scarcity of data on smaller facilities does not permit a meaningful analysis, the Agency has focused its analysis on large generators. The Agency acknowledges that other industries besides the three being considered could profit from the containment building provision. The Agency, however, is using the analysis

of these three industries to gain an understanding of the economic implications of containment buildings in use for storage of wastes.

(ii) Facilities Potentially Using Containment Buildings for Treatment of Hazardous Debris. In addition to analyzing the use of containment buildings in the aluminum smelting, secondary lead smelting, and steel production industries, the Agency assessed the effects of the provision on facilities generating hazardous debris. To analyze the potential cost savings associated with treatment in containment buildings, EPA assumed in lieu of the today's rule, that facilities would treat hazardous debris off-site; the Agency assumed that under the containment building provision in today's rule, facilities will treat debris on-site inside containment buildings. The Agency used a weighted average of commercial on-site and off-site extraction and immobilization costs for its cost comparison and took into account the cost of constructing and operating a containment building.

e. Wastes Not Considered. The costs associated with two groups of wastes—F001 through F005 spent solvents and 24 K- and U-wastes with wastewater standards based on scrubber waters—

were not quantified by the Agency in this screening analysis. The Agency has regulated these wastes previously and is revisiting them in the rule only to modify the basis for concentration standards. The modifications are for the purpose of standardization in testing procedures and in the basis for treatment standards and for the purpose of clarification to ensure appropriate placement in the Code of Federal Regulations. These modifications will not change the required management practices for any of these wastes significantly. Thus, the Agency expects such changes to have no significant cost impacts.

2. Cost Estimates

a. Total Cost Estimate. The estimate for the incremental annual cost of the standards promulgated in today's rule is \$57 million to \$65 million per year.<sup>56</sup> Table IX-1 presents quantities of the wastes affected by today's rule. The

<sup>56</sup> Wastewaters account for none of the cost of today's rule. No compliance costs are expected for treatment of wastewaters because wastewaters are typically discharged to publicly owned treatment works (POTWs) or to coastal and inland waterways under National Pollution Discharge Elimination System (NPDES) permit provisions. When wastewaters are discharged in this manner, they are not subject to the treatment standards required by the LDRs under RCRA.

estimated cost of compliance with the rule for each waste is presented in Table IX-2. Neither table includes F001 through F005 spent solvents or the 24 K- and U-wastes covered by today's rule because the effect of the rule on these wastes is negligible, as explained in Section IX.1.e.

b. Waste Code Cost Estimates. (i) Petroleum Refining Wastes (F037 and F038). The Agency estimates the total incremental annual cost for treatment of F037 and F038 nonwastewaters to range between \$40 million and \$47 million. This figure is based on an annual F037 and F038 land disposed volume of 130,000 tons per year in States other than California. In the upper bound of the cost range shown for F037 and F038, 35 percent of the post-regulatory cost are from off-site treatment. The high cement kiln price used in this analysis, \$1,200 per ton, is expected to be an overestimate of the long-term price for treatment in cement kilns. Presently, cement kilns appear to be charging rates slightly below those charged by incinerators; as more cement kilns are able to handle wastes their prices should decrease. Because of the high prices charged by cement kilns, the Agency has analyzed the costs for F037 and F038 in a range, as shown above.

TABLE IX-1.—SUMMARY OF ANNUAL QUANTITIES OF WASTES AFFECTED BY THE LDRS

Waste	Annual land disposal rate	Form of waste affected	Generation type	Assumed management method
Petroleum refining sludges (F037 and F038).....	130,000 tons of routinely generated waste currently land disposed, excluding waste generated in California.	Dewatered sludge.....	Routine.....	Solvent extraction; incineration; cement kilns.
Unsymmetrical dimethylhydrazine production wastes (K107-K110).	No longer produced.....			
2-Ethoxyethanol (U359).....	<500 tons.....	Nonwastewater.....	Routine.....	Incineration or fuel substitution.
Dinitrotoluene and toluenediamine production wastes (K111 and K112, U328 and U353).	3,500 tons—K111, 0 tons—K112, <500 tons of U328 and U353.	Nonwastewater.....	Routine.....	Incineration.
Ethylene dibromide (EDB) production wastes (K117, K118, and K136) and methyl bromide production wastes (K131 and K132).	<100 tons—K118, <100 tons—K132.	Nonwastewater.....	Routine.....	Incineration.
Ethylenebisdithiocarbamic acid (EBDC) production wastes (K123, K124, K125, and K126).	<100 tons—K125.....	Nonwastewater.....	Routine.....	Incineration.
Electric arc furnace dust (K061).....	67,000 tons of low zinc K061 <sup>a</sup> .	Solid.....	Routine.....	High temperature metals recovery.
Debris contaminated with newly listed wastes <sup>b</sup> .....	XXX tons.....	Solid.....	Routine and intermittent.	Destruction; immobilization; extraction.
Previously regulated debris.....	1,000,000 tons.....	Solid.....	Routine and intermittent.	Destruction; immobilization; extraction.

<sup>a</sup> Of the set of wastes potentially affected by a new BDAT for wastes with high chromium and high nickel content (including K061, K062, and F006), the Agency is considering K061 only. The quantity given for K061 is based on the generation quantity instead of on the quantity that is land disposed.

<sup>b</sup> The quantity presented here for newly regulated debris is an estimate pending completion of the Agency's analysis for hazardous debris.

TABLE IX-2.—SUMMARY OF ANNUAL COSTS OF LDR PHASE I WASTES

[In millions of dollars per year]

Waste	Post regulatory costs	Baseline costs *	Incremental costs
<b>Wastes with Positive Incremental Cost:</b>			
Petroleum refining sludges (F037 and F038) .....	<sup>b</sup> 58 to 66	<sup>b</sup> 18	40 to 47
Unsymmetrical dimethylhydrazine production wastes (K107-K110) .....	0	0	0
2-Ethoxyethanol (U359) .....	0.4	0.1	0.3
Dinitrotoluene and toluenediamine production wastes (K111 and K112, U328 and U353) .....	7	1	6
Ethylene dibromide (EDB) production wastes (K117, K118, and K136) and methyl bromide production wastes (K131 and K132) .....	0.3	<0.1	0.3
Ethylenebisdithiocarbamic acid (EBDC) production wastes (K123, K124, K125, and K126) .....	0.2	0.1	0.2
Debris contaminated with newly listed wastes .....	15	5	10
<b>Total for newly listed wastes .....</b>	<b>81 to 89</b>	<b>24</b>	<b>57 to 65</b>
<b>Wastes with Negative Incremental Cost:</b>			
Electric arc furnace dust (K061) .....	19	30	(11)
Previously regulated debris .....	970	1,800	(560)

\* Baseline assumes all waste is landfilled, except for previously regulated debris.

<sup>b</sup> The range of costs shown represents a unit price for cement kilns of between \$700 per ton and \$1200 per ton. This range is reflected in the total costs shown for each column as well.

(ii) Wastes from the Production of Unsymmetrical Dimethylhydrazine (K107-K110). The Agency did not calculate costs of treatment standards for wastes from the production of unsymmetrical dimethylhydrazine (UDMH) (K107, K108, K109, and K110). This decision was made based on information that these wastes are no longer generated.

(iii) 2-Ethoxyethanol Wastes (U359). The Agency estimated an incremental annual cost of \$700,000 for the standards developed for these wastes. This cost is based on an upper bound assumption of incineration of 500 tons annually.

(iv) Wastes from Production of Dinitrotoluene and Toluenediamine (K111 and K112, U328 and U353). The Agency estimated an incremental annual cost of \$8.1 million for the standards developed for these wastes. This figure is based on an annual land disposal estimate of 3,500 tons of K111 nonwastewater, an upper bound assumption of 100 tons of K112 nonwastewater, and an upper bound assumption of 500 tons of U328 and U353 combined.

(v) Wastes from Production of Ethylene Dibromide (EDB) (K117, K118, and K136). The standards for these wastes have an estimated incremental annual cost of \$300,000. This figure is based on upper bound assumptions of 100 tons of K118 nonwastewater and 100 tons of K132 nonwastewater requiring incineration.

(vi) Wastes from Production of Ethylenebisdithiocarbamic Acid (EBDC) (K123-K126). The incremental annual cost estimated for these wastes is \$150,000. This figure is based on an upper bound assumption of 100 tons of K125 nonwastewater requiring incineration.

(vii) K061, F006, K062. The only previously regulated wastes revisited in today's rule for which the Agency developed cost estimates are K061 low-zinc wastes. (As discussed above, the standards for F006 and K062 are expected to have no incremental costs associated with them.) The standards for K061 wastes are based on high temperature metals recovery (HTMR). These standards, as applied to K061, could save industry up to approximately \$11 million annually (i.e., The standards in today's rule are potentially less costly than the existing standards.) This figure is based on an annual generation estimate of 67,000 tons. The Agency has used a generation estimate rather than a land disposal estimate for this waste because of the high level of uncertainty regarding the quantity of low zinc K061 that is currently treated using HTMR. The effect of using a generation estimate of the K061 volume is that the cost savings presented is likely to be an over-estimate of the true cost savings for these standards.

*c. Results for Hazardous Debris.* There are two groups of hazardous debris in this rule. The first group includes all previously regulated hazardous debris: Debris contaminated with wastes regulated under the previous HSWA land disposal restriction rules (i.e., Solvents and Dioxins, California List, First Third, Second Third, Third Third rules). The second group of hazardous debris includes debris contaminated with wastes newly regulated under today's rule (e.g., F037).

(i) *Previously Regulated Hazardous Debris.* As of May 8, 1992, all of the national capacity variances for the debris regulated in the HSWA land disposal restriction scheduled waste rules will expire. (If the Agency

proceeds with the planned national case-by-case variance, this date would be extended to May 8, 1993.) All previously regulated hazardous debris would then be required to meet the existing standards for debris established in the scheduled waste rules. Since the Agency is interested in long-term treatment costs, its analysis does not take into account the effect of the national capacity variance on treatment of hazardous debris.

Standards for debris established in today's rule allow considerably more flexibility in debris treatment than did the standards established in the LDR scheduled waste rules. In addition, today's standards provide for the use of many more extraction technologies for treatment than the HSWA standards; extraction technologies often can be cheaper to use than the destruction and immobilization technologies that are required under current regulations. Furthermore, today's treatment standards allow debris treated by destruction and extraction technologies to be excluded from subtitle C disposal. Therefore, EPA estimates that today's standards for previously regulated debris will result in a potential regulatory relief to industry. The Agency estimates baseline costs, costs of debris treatment and the prior land disposal restrictions rules after all variances are expired to be \$1,600 million per year; under this rule the costs would be reduced by \$560 million per year to \$970 million. It should be noted that if there is a portion of the previously regulated debris volume which would be generated and managed only during the period of the national capacity variance, to the degree that this portion is reflected in the cost savings presented, these savings would be over-estimated.

One issue should be noted, however, regarding the baseline for previously regulated debris. The standard baseline in cost analysis is formulated as the scenario of existing management requirements in the absence of a new rule. In today's rule, the volume of previously regulated debris is currently under a capacity variance. In the absence of today's rule, once the variance expires, treatment according to existing standards is required. Therefore, the baseline used in the cost analysis is the existing standards.<sup>57</sup> However, since most hazardous debris is currently under the national capacity variance, treatment of hazardous debris is not generally occurring. Therefore, the baseline being used does not reflect current debris management practices. Yet, in keeping with standard regulatory analysis procedures, the Agency believes it to be appropriate to analyze costs for the volume of previously regulated debris based on a baseline of compliance with existing standards.

(ii) **Newly Regulated Hazardous Debris.** The results of EPA's analysis indicate that the volume of hazardous debris newly regulated by today's rule has a 98 percent likelihood of falling between 18,000 and 119,000 tons per year and the corresponding incremental cost of managing this waste has a 98 percent likelihood of falling between \$3.8 million and \$120 million per year. The median annual incremental cost for treating newly regulated debris was \$10 million. For purposes of determining whether today's rule is a major rule as defined by Executive Order 12291, EPA has used the median volume and cost results from its analysis.

The volume of debris contaminated with F037 and F038 has a 98 percent likelihood of falling between 13,000 tons per year and 24 million tons per year in the long term future (i.e., more than five years after promulgation of today's rule). The incremental annual cost of treating this debris has a 98 percent likelihood of falling between \$1.2 million and \$5.8 million. The median incremental cost of treating F037 and F038-contaminated debris in EPA's analysis was \$3.1 million. EPA acknowledges that in the short-term future (i.e., in the first five years after promulgation), the compliance costs of treating debris

contaminated with F037 and F038 will be much higher.

The volume of debris contaminated with newly regulated organic chemical wastes has a 98 percent likelihood of falling between 3,400 tons and 98,000 tons per year in the long term future. The incremental annual cost of treating this debris has a 98 percent likelihood of falling between \$1.4 million and \$120 million. The median incremental cost of treating debris contaminated with newly regulated organic waste was \$7.1 million.

d. *Cost Savings From Storage and Treatment in Containment Buildings.* The Agency lacked information with which to infer the typical dimensions of a containment building used to treat contaminated debris; therefore, the same size containment buildings were used for the analysis of treatment containment buildings as were used for the storage containment building analysis. The calculations indicate that use of containment buildings designed to store the typical waste quantities associated with the three industries considered and to treat contaminated debris could result in significant cost savings. Please see the EIA for complete results from the Agency's analysis.

To arrive at the estimates of cost savings, the Agency calculated the annualized costs of containment buildings. All costs were estimated as the present value of the capital and recurring costs incurred by facilities over an assumed 20-year operating life. The present value costs was then annualized over 20 years to arrive at equal annual payments. Implicit in this approach is the assumption that facilities will be able to smooth out anticipated costs with some form of financing over a 20-year period. Three and seven percent social discount rates, assumed constant for 20 years, were used to calculate the annualized costs.

In addition to estimating the overall incremental cost savings of the containment building provision, the Agency addressed three other issues associated with containment buildings: the costs of retaining corrective action authority of the containment buildings, costs of recordkeeping, and costs of engineered barriers required for liquids and dust.

Under today's rule, corrective action authority will be extended to permitted containment buildings; corrective action authority will not be extended to unpermitted containment buildings (i.e., those buildings under the 90-day generator exemption from permitting). The Agency assumes that only facilities that already have RCRA permits will

choose to construct permitted containment buildings and that all containment buildings constructed at facilities without existing RCRA permits will be unpermitted (i.e., they will not be affected by the corrective action provisions in today's rule). Based on these assumptions, the Agency does not believe that today's provision will produce any incremental costs or benefits with regard to corrective action authority.

The Agency believes the recordkeeping requirements of today's provision will have little impact on industries choosing to use containment buildings. The Agency assumed that annual recordkeeping costs range from \$1100 to \$33,000/facility, depending on the volume of waste managed.

In addition to quantitative estimates of recordkeeping costs, the Agency qualitatively assessed the benefits of recordkeeping requirements for containment buildings. The Agency believes the costs are justified given the potential benefits that the public may incur.

Recordkeeping establishes adequate inspection plans to ensure that the unit is operating as designated. This goal is achieved through the establishment of an inspection program that ensures the structural integrity of the unit and prompt detection of any leaks or releases. As discussed in section IV.G, the Agency is requiring an inspection schedule for these units whereby, at least once each week, monitoring and leak detection equipment, the containment building, and the area surrounding the containment building is checked to ensure the unit is being properly operated and that no leaks or releases have occurred.

The Agency believes such controls are key to providing simple, yet adequate, maintenance of facilities to prevent detrimental releases of hazardous waste. In addition, monitoring buildings and wastes releases facilitates the Agency's enforcement actions.

The Agency does not believe that facilities will be significantly affected by these requirements. It is the Agency's understanding that the majority of facilities already have, or could easily, modify their existing operations to add these recordkeeping measures. The Agency notes that large facilities are the most likely to use containment buildings and believes that these facilities will be able to incorporate additional recordkeeping into their present operations with relatively little cost.

The final issue the Agency analyzed with regard to containment buildings was costs associated with engineered

<sup>57</sup> It should be noted that due to the limited data available for the cost analysis for the previous LDR rules, the hazardous debris volumes estimated by the Agency were small in comparison to the previously regulated contaminated debris volume estimated for today's rule. EPA believes that it underestimated compliance costs for hazardous debris treatment under the previous LDR rules due to this lack of data.

barriers and fugitive dust emission controls. The annualized cost (i.e., assuming social discount rate of three percent and cost annualized over 20 years) for secondary containment ranged from \$7,000 to \$23,000 per year for systems for 50' x 30' containment building and 340' x 200' buildings, respectively. Fugitive dust control ranged from approximately \$3,000 for a 50' x 30' building to \$30,000 per year for a 340' x 200' structure. (The building dimensions are representative of possible containment structures for all of the three industries.)

Given the results of the analysis presented in this section, the Agency believes that the containment building provision will provide regulatory relief to large facilities, while having little to no impact on small facilities. The Agency believes that facilities in the mineral processing and recycling industries are particularly likely to benefit from this provision.

### 3. Economic Impacts

A full economic impacts analysis was not performed because of a lack of data in many areas. The Agency, however, qualitatively assessed the economic impacts attributable to today's rule.

a. *Petroleum Refining Wastes (F037 and F038)*. The Listing RIA considered the economic impact of the F037 and F038 listing in light of anticipated land disposal restrictions on these wastes. The impacts estimated in the Listing RIA were driven by facility costs and the economic viability of facility owners. The results of the Listing RIA's economic impacts analysis are summarized below.

In the Listing RIA, two to five percent of the refineries (depending on the cost scenario) had cost impacts greater than one percent of sales. (Cost impacts exceeding one percent of sales can be viewed as an indicator of potentially significant economic impact.) Slightly under two percent of the refineries had cost impacts that exceeded two percent of sales under the high-cost scenario, indicating more severe economic impacts. Nine out of ten affected refineries in the high-cost scenario had costs below 0.5 percent of sales, and over three-quarters of the refineries fell below 0.25 percent, indicating no significant impacts.

The analysis of small entities presented in the Listing RIA indicated that there were potentially seven non-integrated refineries (i.e., refineries that did not produce their own crude and market their own products) with cost-to-sales ratios greater than one percent under the high-cost scenario. A further analysis of employment effects and

potential closures was not possible because of insufficient financial data for individual refineries.

EPA compared the incremental compliance cost for the F037 and F038 standards in today's rule with that of the Listing Rule. The Agency found that today's rule will have an incremental compliance cost for F037 and F038 waste, including both nonwastewater and hazardous debris, of between \$49 million and \$58 million, while the Listing RIA estimated an incremental annual compliance cost of \$53 million to \$102 million. Based on its qualitative analysis, EPA believes that the economic impacts of today's rule will be less than the impacts estimated by the Listing RIA.

b. *Remaining Wastes*. Considering the economic impacts of LDRs for the newly listed organic wastes other than F037 and F038, the Agency estimated the costs associated with all wastes to be insignificant, with the possible exception of dinitrotoluene and toluenediamine production wastes. The Agency, however, did not have the data to examine these economic impacts.

A quantitative assessment of the economic impacts associated with the hazardous debris standards was not possible because of data limitations. The Agency does not have comprehensive site-specific information on the volumes of previously regulated or newly listed hazardous debris.

The Agency expects that the impacts for previously regulated debris will not be significant since the revised standards are likely to be no more costly, and in some cases less costly, than the standards which currently exist. The impacts of the rule on newly regulated hazardous debris are uncertain. The estimated incremental cost for these standards is expected to range between \$3.8 million and \$120 million annually. If a relatively large number of facilities bear the burden of this cost, it is likely that these standards will not have a significant impact.

### B. Regulatory Flexibility Analysis

Pursuant to the Regulatory Flexibility Act of 1980, 5 U.S.C. 601 et seq., whenever an agency publishes a notice of rulemaking, it must prepare and make available for public comment a Regulatory Flexibility Analysis (RFA) that describes the effect of the rule on small entities (i.e., small businesses, small organizations, and small governmental jurisdictions). This analysis is unnecessary, however, if the rule is estimated not to 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 entities is likely to experience financial distress based on the costs of the rule, then the Agency considers that the rule will have a significant impact on a substantial number of small entities, and must perform an RFA. The Agency has virtually no data on small entities affected by today's rule. Because of the low incremental costs incurred for the newly listed waste standards, the Agency believes that the only area of potential importance is the hazardous debris treatment standards. The previously regulated debris standards, being potentially a regulatory relief, are, for this analysis, considered to not have an effect on small entities. For the debris contaminated with newly listed wastes, the impacts to small facilities are uncertain, although may be significant. Therefore, although insufficient data was available to make a determination, the Agency estimates that there are not significant impacts on over 20 percent of the population of small entities based on the costs of the rule, so the Agency has not conducted an RFA for today's rule.

### C. Paperwork Reduction Act

The information collection requirements for newly listed wastes were promulgated in previous land disposal restriction rulemakings and approved by the Office of Management and Budget (OMB) under the Paperwork Reduction Act (PRA), 44 U.S.C. 3501 et seq. and have been assigned OMB control number 2050-0085. A copy of the Information Collection Request (ICR) document (ICR #1442.03) may be obtained from Sandy Farmer, Information Policy Branch, EPA, 401 M Street SW. (PM-223Y), Washington, DC 20460 or by calling (202) 260-2740.

The new information collection requirements and revisions to existing requirements in this rule will be submitted for approval to OMB under the PRA. These requirements are not effective until OMB approves them and a technical amendment to that effect is published in the *Federal Register*.

Send comments regarding the burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Chief, Information Policy Branch, PM-223Y, U.S. Environmental Protection Agency, 401 M Street SW., Washington, DC 20460; and to the Office of Information and Regulatory Affairs, Office of Management and Budget, Washington, DC 20503, marked "Attention: Jonathan Gledhill."

List of Subjects

40 CFR Part 148

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

40 CFR Part 260

Administrative practice and procedure, Confidential business information, Hazardous waste.

40 CFR Part 261

Hazardous waste, Recycling, Reporting and recordkeeping requirements.

40 CFR Part 262

Exports, Hazardous materials transportation, Hazardous waste, Imports, Labeling, Packaging and containers, Reporting and recordkeeping requirements.

40 CFR Part 264

Air pollution control, Hazardous waste, Insurance, Packaging and containers, Reporting and recordkeeping requirements, Security measures, Surety bonds.

40 CFR Part 265

Air pollution control, Hazardous waste, Insurance, Packaging and containers, Reporting and recordkeeping requirements, Security measures, Surety bonds, Water supply.

40 CFR Part 268

Hazardous waste, Reporting and recordkeeping requirements.

40 CFR Part 270

Administrative practice and procedure, Confidential business information, Hazardous materials transportation, Hazardous waste, Reporting and recordkeeping requirements, Water pollution control, Water supply.

40 CFR Part 271

Administrative practice and procedure, Confidential business information, Hazardous materials transportation, Hazardous waste, Indians—land, Intergovernmental relations, Penalties, Reporting and recordkeeping requirements, Water pollution control, Water supply.

Dated: June 30, 1992.  
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 148.17 is added to subpart B of part 148 to read as follows:

**§ 148.17 Waste specific prohibitions; newly listed wastes.**

(a) Effective November 9, 1992, the wastes specified in 40 CFR part 261 as EPA hazardous waste numbers F037, F038, K107, K108, K109, K110, K111, K112, K117, K118, K123, K124, K125, K126, K131, K136, U328, U353, and U359 are prohibited from underground injection.

(b) Effective June 30, 1995, the wastes specified in 40 CFR part 261 as EPA Hazardous waste numbers K117, K118, K131, and K132 are prohibited from underground injection.

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

(1) If the wastes meet or are treated to meet the applicable standards specified in subpart D of part 268; or

(2) If an exemption from a prohibition has been granted in response to a petition under subpart C of this part; or

(3) During the period of extension of the applicable effective date, if an extension has been granted under § 148.4 of this part.

**PART 260—HAZARDOUS WASTE MANAGEMENT SYSTEM: GENERAL**

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

**Authority:** 42 U.S.C. 6905, 6912(a), 6921-6927, 6930, 6934, 6935, 6937, 6938, 6939, and 6974.

4. In § 260.10, a definition for "containment building" is added in alphabetical order and the definitions of "miscellaneous unit" and "pile" are revised to read as follows:

**§ 260.10 Definitions.**

*Containment building* means a hazardous waste management unit that is used to store or treat hazardous waste under the provisions of subpart DD of parts 264 or 265 of this chapter.

*Miscellaneous unit* means a hazardous waste management unit where hazardous waste is treated, stored, or disposed of and that is not a container, tank, surface impoundment, pile, land treatment unit, landfill, incinerator, boiler, industrial furnace, underground injection well with

appropriate technical standards under 40 CFR part 148, containment building, or unit eligible for a research, development, and demonstration permit under § 270.05 of this chapter.

*Pile* means any non-containerized accumulation of solid, nonflowing hazardous waste that is used for treatment or storage and that is not a containment building.

**PART 261—IDENTIFICATION AND LISTING OF HAZARDOUS WASTE**

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

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

6. In § 261.3 paragraphs (a)(2)(iii) and (c)(2)(ii)(C) are revised and paragraph (f) is added to read as follows:

**§ 261.3 Definition of hazardous waste.**

- (a) \* \* \*
- (2) \* \* \*

(iii) It is a mixture of a solid waste and a hazardous waste that is listed in subpart D of this part solely because it exhibits one or more of the characteristics of hazardous waste identified in subpart C of this part, unless the resultant mixture no longer exhibits any characteristic of hazardous waste identified in subpart C of this part, or unless the solid waste is excluded from regulation under § 261.4(b)(7) and the resultant mixture no longer exhibits any characteristic of hazardous waste identified in subpart C of this part for which the hazardous waste listed in subpart D of this part was listed. (However, nonwastewater mixtures are still subject to the requirements of part 268 of this chapter, even if they no longer exhibit a characteristic at the point of land disposal).

- (c) \* \* \*
- (2) \* \* \*
- (ii) \* \* \*

(C)(1) Nonwastewater residues, such as slag, resulting from high temperature metals recovery (HTMR) processing of K061, K062 or F006 waste, in units identified as rotary kilns, flame reactors, electric furnaces, plasma arc furnaces, slag reactors, rotary hearth furnace/ electric furnace combinations or industrial furnaces (as defined in paragraphs (6), (7), and (8) of the definition for "industrial furnace" in 40 CFR 260.10), that are disposed in subtitle D units, provided that these residues meet the generic exclusion levels

identified in the tables in this paragraph for all constituents, and exhibit no characteristics of hazardous waste. Testing requirements must be incorporated in a facility's waste analysis plan or a generator's self-implementing waste analysis plan; at a minimum, composite samples of residues must be collected and analyzed quarterly and/or when the process or operation generating the waste changes. Persons claiming this exclusion in an enforcement action will have the burden of proving by clear and convincing evidence that the material meets all of the exclusion requirements.

Constituent	Maximum for any single composite sample—TCLP (mg/l)
<b>Generic exclusion levels for K061 and K062 nonwastewater HTMR residues</b>	
Antimony.....	0.10
Arsenic.....	0.50
Barium.....	7.6
Beryllium.....	0.010
Cadmium.....	0.050
Chromium (total).....	0.33
Lead.....	0.15
Mercury.....	0.009
Nickel.....	1.0
Selenium.....	0.16
Silver.....	0.30
Thallium.....	0.020
Zinc.....	70
<b>Generic exclusion levels for F006 nonwastewater HTMR residues</b>	
Antimony.....	0.10
Arsenic.....	0.50
Barium.....	7.6
Beryllium.....	0.010
Cadmium.....	0.050
Chromium (total).....	0.33
Cyanide (total) (mg/kg).....	1.8
Lead.....	0.15
Mercury.....	0.009
Nickel.....	1.0
Selenium.....	0.16
Silver.....	0.30
Thallium.....	0.020
Zinc.....	70

(2) A one-time notification and certification must be placed in the facility's files and sent to the EPA region or authorized state for K061, K062 or F006 HTMR residues that meet the generic exclusion levels for all constituents and do not exhibit any characteristics that are sent to subtitle D units. The notification and certification that is placed in the generators or treaters files must be updated if the process or operation generating the waste changes and/or if the subtitle D unit receiving the waste changes. However, the generator or treater need only notify the EPA region or an authorized state on an annual basis if such changes occur. Such notification

and certification should be sent to the EPA region or authorized state by the end of the calendar year, but no later than December 31. The notification must include the following information: The name and address of the subtitle D unit receiving the waste shipments; the EPA Hazardous Waste Number(s) and treatability group(s) at the initial point of generation; and, the treatment standards applicable to the waste at the initial point of generation. The certification must be signed by an authorized representative and must state as follows: "I certify under penalty of law that the generic exclusion levels for all constituents have been met without impermissible dilution and that no characteristic of hazardous waste is exhibited. I am aware that there are significant penalties for submitting a false certification, including the possibility of fine and imprisonment."

(f) Notwithstanding paragraphs (a) through (d) of this section and provided the debris as defined in part 268 of this chapter does not exhibit a characteristic identified at subpart C of this part, the following materials are not subject to regulation under 40 CFR parts 260, 261 to 266, 268, or 270:

(1) Hazardous debris as defined in part 268 of this chapter that has been treated using one of the required extraction or destruction technologies specified in Table 1 of § 268.45 of this chapter; persons claiming this exclusion in an enforcement action will have the burden of proving by clear and convincing evidence that the material meets all of the exclusion requirements; or

(2) Debris as defined in part 268 of this chapter that the Regional Administrator, considering the extent of contamination, has determined is no longer contaminated with hazardous waste.

**PART 262—STANDARDS APPLICABLE TO GENERATORS OF HAZARDOUS WASTE**

8. The authority citation for part 262 continues to read as follows:

Authority: 42 U.S.C. 6906, 6912, 6922, 6923, 6924, 6925, and 6937.

9. In § 262.34, paragraph (a)(1)(iii) introductory text is amended by removing the semicolon at the end and replacing it with a colon, paragraph (a)(1)(iii)(B) and the concluding text of paragraph (a)(1) are revised, and paragraph (a)(1)(iv) is added to read as follows:

**§ 262.34 Accumulation time.**

(a) \* \* \*

(1) \* \* \*  
(iii) \* \* \*

(B) Documentation of each waste removal, including the quantity of waste removed from the drip pad and the sump or collection system and the date and time of removal; and/or

(iv) The waste is placed in containment buildings and the generator complies with subpart DD of 40 CFR part 265, has placed its professional engineer certification that the building complies with the design standards specified in 40 CFR 265.1101 in the facility's operating record no later than 60 days after the date of initial operation of the unit. After February 18, 1993, PE certification will be required prior to operation of the unit. The owner or operator shall maintain the following records at the facility:

(A) A written description of procedures to ensure that each waste volume remains in the unit for no more than 90 days, a written description of the waste generation and management practices for the facility showing that they are consistent with respecting the 90 day limit, and documentation that the procedures are complied with; or

(B) Documentation that the unit is emptied at least once every 90 days.

In addition, such a generator is exempt from all the requirements in subparts G and H of 40 CFR part 265, except for §§ 265.111 and 265.114.

\* \* \* \* \*

10. In § 262.34(a), the first paragraph designated (a)(2) and the undesignated paragraph following (a)(2)(ii) are removed.

**PART 264—STANDARDS FOR OWNER AND OPERATORS OF HAZARDOUS WASTE TREATMENT, STORAGE, AND DISPOSAL FACILITIES**

11. The authority citation for part 264 continues to read as follows:

Authority: 42 U.S.C. 6905, 6912(a), 6924, and 6925.

12. Section 264.110 is amended by removing the word "and" from the end of paragraph (b)(1), by adding a semicolon in place of the period at the end of paragraph (b)(2), by adding "; and" in place of the period at the end of paragraph (b)(3), and by adding a new paragraph (b)(4) to read as follows:

**§ 264.110 Applicability.**

\* \* \* \* \*

(b) \* \* \*

(4) Containment buildings that are required under § 264.1102 to meet the requirement for landfills.

13. Section 264.111 is amended by revising paragraph (c) to read as follows:

**§ 264.111 Closure performance standard.**

(c) Complies with the closure requirements of this subpart, including, but not limited to, the requirements of §§ 264.178, 264.197, 264.228, 264.258, 264.280, 264.310, 264.351, 264.601 through 264.603, and 264.1102.

14. Section 264.112 is amended by revising paragraph (a)(2) to read as follows:

**§ 264.112 Closure plan; amendment of plan.**

(a) \* \* \*

(2) The Director's approval of the plan must ensure that the approved closure plan is consistent with §§ 264.111 through 264.115 and the applicable requirements of subpart F of this part, §§ 264.178, 264.197, 264.228, 264.258, 264.280, 264.310, 264.351, 264.601, and 264.1102. Until final closure is completed and certified in accordance with § 264.115, a copy of the approved plan and all approved revisions must be furnished to the Director upon request, including requests by mail.

15. Section 264.140 is amended by adding a semicolon in place of ", and" at the end of paragraph (b)(1), by adding a semicolon in place of the period at the end of paragraph (b)(2), by adding "; and" in place of the period at the end of paragraph (b)(3), and by adding a new paragraph (b)(4) to read as follows:

**§ 264.140 Applicability.**

(b) \* \* \*

(4) Containment buildings that are required under § 264.1102 to meet the requirements for landfills.

16. Section 264.142 is amended by revising the introductory text of paragraph (a) to read as follows:

**§ 264.142 Cost estimate for closure.**

(a) The owner or operator must have a detailed written estimate, in current dollars, of the cost of closing the facility in accordance with the requirements in §§ 264.111 through 264.115 and applicable closure requirements in §§ 264.178, 264.197, 264.228, 264.258, 264.280, 264.310, 264.351, 264.601 through 264.603, and 264.1102.

17. Subpart DD is added to part 264 to read as follows:

**Subpart DD—Containment Buildings**

- Sec.  
 264.1100 Applicability.  
 264.1101 Design and operating standards.  
 264.1102 Closure and post-closure care.  
 264.1103–264.1110 [Reserved]

**Subpart DD—Containment Buildings**

**§ 264.1100 Applicability.**

The requirements of this subpart apply to owners or operators who store or treat hazardous waste in units designed and operated under § 264.1101 of this subpart. These provisions will become effective on February 18, 1993, although owner or operator may notify the Regional Administrator of his intent to be bound by this subpart at an earlier time. The owner or operator is not subject to the definition of land disposal in RCRA section 3004(k) provided that the unit:

(a) Is a completely enclosed, self-supporting structure that is designed and constructed of manmade materials of sufficient strength and thickness to support themselves, the waste contents, and any personnel and heavy equipment that operate within the unit, and to prevent failure due to pressure gradients, settlement, compression, or uplift, physical contact with the hazardous wastes to which they are exposed; climatic conditions; and the stresses of daily operation, including the movement of heavy equipment within the unit and contact of such equipment with containment walls;

(b) Has a primary barrier that is designed to be sufficiently durable to withstand the movement of personnel, wastes, and handling equipment within the unit;

(c) If the unit is used to manage liquids, has:

(1) A primary barrier designed and constructed of materials to prevent migration of hazardous constituents into the barrier;

(2) A liquid collection system designed and constructed of materials to minimize the accumulation of liquid on the primary barrier; and

(3) A secondary containment system designed and constructed of materials to prevent migration of hazardous constituents into the barrier, with a leak detection and liquid collection system capable of detecting, collecting, and removing leaks of hazardous constituents at the earliest practicable time, unless the unit has been granted a variance from the secondary containment system requirements under § 264.1101(b)(4);

(d) Has controls sufficient to prevent fugitive dust emissions to meet the no

visible emission standard in § 264.1101(c)(1)(iv); and

(e) Is designed and operated to ensure containment and prevent the tracking of materials from the unit by personnel or equipment.

**§ 264.1101 Design and operating standards.**

(a) All containment buildings must comply with the following design standards:

(1) The containment building must be completely enclosed with a floor, walls, and a roof to prevent exposure to the elements, (e.g., precipitation, wind, runoff), and to assure containment of managed wastes.

(2) The floor and containment walls of the unit, including the secondary containment system if required under paragraph (b) of this section, must be designed and constructed of materials of sufficient strength and thickness to support themselves, the waste contents, and any personnel and heavy equipment that operate within the unit, and to prevent failure due to pressure gradients, settlement, compression, or uplift, physical contact with the hazardous wastes to which they are exposed; climatic conditions; and the stresses of daily operation, including the movement of heavy equipment within the unit and contact of such equipment with containment walls. The unit must be designed so that it has sufficient structural strength to prevent collapse or other failure. All surfaces to be in contact with hazardous wastes must be chemically compatible with those wastes. EPA will consider standards established by professional organizations generally recognized by the industry such as the American Concrete Institute (ACI) and the American Society of Testing Materials (ASTM) in judging the structural integrity requirements of this paragraph. If appropriate to the nature of the waste management operation to take place in the unit, an exception to the structural strength requirement may be made for light-weight doors and windows that meet these criteria:

(i) They provide an effective barrier against fugitive dust emissions under paragraph (c)(1)(iv); and

(ii) The unit is designed and operated in a fashion that assures that wastes will not actually come in contact with these openings.

(3) Incompatible hazardous wastes or treatment reagents must not be placed in the unit or its secondary containment system if they could cause the unit or secondary containment system to leak, corrode, or otherwise fail.



(4) A containment building must have a primary barrier designed to withstand the movement of personnel, waste, and handling equipment in the unit during the operating life of the unit and appropriate for the physical and chemical characteristics of the waste to be managed.

(b) For a containment building used to manage hazardous wastes containing free liquids or treated with free liquids (the presence of which is determined by the paint filter test, a visual examination, or other appropriate means), the owner or operator must include:

(1) A primary barrier designed and constructed of materials to prevent the migration of hazardous constituents into the barrier (e.g., a geomembrane covered by a concrete wear surface).

(2) A liquid collection and removal system to minimize the accumulation of liquid on the primary barrier of the containment building:

(i) The primary barrier must be sloped to drain liquids to the associated collection system; and

(ii) Liquids and waste must be collected and removed to minimize hydraulic head on the containment system at the earliest practicable time.

(3) A secondary containment system including a secondary barrier designed and constructed to prevent migration of hazardous constituents into the barrier, and a leak detection system that is capable of detecting failure of the primary barrier and collecting accumulated hazardous wastes and liquids at the earliest practicable time.

(i) The requirements of the leak detection component of the secondary containment system are satisfied by installation of a system that is, at a minimum:

(A) Constructed with a bottom slope of 1 percent or more; and

(B) Constructed of a granular drainage material with a hydraulic conductivity of  $1 \times 10^{-2}$  cm/sec or more and a thickness of 12 inches (30.5 cm) or more, or constructed of synthetic or geonet drainage materials with a transmissivity of  $3 \times 10^{-5}$  m<sup>2</sup>/sec or more.

(ii) If treatment is to be conducted in the building, an area in which such treatment will be conducted must be designed to prevent the release of liquids, wet materials, or liquid aerosols to other portions of the building.

(iii) The secondary containment system must be constructed of materials that are chemically resistant to the waste and liquids managed in the containment building and of sufficient strength and thickness to prevent collapse under the pressure exerted by overlaying materials and by any

equipment used in the containment building. (Containment buildings can serve as secondary containment systems for tanks placed within the building under certain conditions. A containment building can serve as an external liner system for a tank, provided it meets the requirements of § 264.193(d)(1). In addition, the containment building must meet the requirements of § 264.193(b) and §§ 264.193(c) (1) and (2) to be considered an acceptable secondary containment system for a tank.)

(4) For existing units other than 90-day generator units, the Regional Administrator may delay the secondary containment requirement for up to two years, based on a demonstration by the owner or operator that the unit substantially meets the standards of this subpart. In making this demonstration, the owner or operator must:

(i) Provide written notice to the Regional Administrator of their request by November 16, 1992. This notification must describe the unit and its operating practices with specific reference to the performance of existing containment systems, and specific plans for retrofitting the unit with secondary containment;

(ii) Respond to any comments from the Regional Administrator on these plans within 30 days; and

(iii) Fulfill the terms of the revised plans, if such plans are approved by the Regional Administrator.

(c) Owners or operators of all containment buildings must:

(1) Use controls and practices to ensure containment of the hazardous waste within the unit; and, at a minimum:

(i) Maintain the primary barrier to be free of significant cracks, gaps, corrosion, or other deterioration that could cause hazardous waste to be released from the primary barrier;

(ii) Maintain the level of the stored/ treated hazardous waste within the containment walls of the unit so that the height of any containment wall is not exceeded;

(iii) Take measures to prevent the tracking of hazardous waste out of the unit by personnel or by equipment used in handling the waste. An area must be designated to decontaminate equipment and any rinsate must be collected and properly managed; and

(iv) Take measures to control fugitive dust emissions such that any openings (doors, windows, vents, cracks, etc.) exhibit no visible emissions (see 40 CFR part 60, appendix A, Method 22—Visual Determination of Fugitive Emissions from Material Sources and Smoke Emissions from Flares). In addition, all

associated particulate collection devices (e.g., fabric filter, electrostatic precipitator) must be operated and maintained with sound air pollution control practices (see 40 CFR part 60 subpart 292 for guidance). This state of no visible emissions must be maintained effectively at all times during routine operating and maintenance conditions, including when vehicles and personnel are entering and exiting the unit.

(2) Obtain certification by a qualified registered professional engineer that the containment building design meets the requirements of paragraphs (a) through (c) of this section. For units placed into operation prior to February 18, 1993, this certification must be placed in the facility's operating record (on-site files for generators who are not formally required to have operating records) no later than 60 days after the date of initial operation of the unit. After February 18, 1993, PE certification will be required prior to operation of the unit.

(3) Throughout the active life of the containment building, if the owner or operator detects a condition that could lead to or has caused a release of hazardous waste, must repair the condition promptly, in accordance with the following procedures.

(i) Upon detection of a condition that has lead to a release of hazardous waste (e.g., upon detection of leakage from the primary barrier) the owner or operator must:

(A) Enter a record of the discovery in the facility operating record;

(B) Immediately remove the portion of the containment building affected by the condition from service;

(C) Determine what steps must be taken to repair the containment building, remove any leakage from the secondary collection system, and establish a schedule for accomplishing the cleanup and repairs; and

(D) Within 7 days after the discovery of the condition, notify the Regional Administrator of the condition, and within 14 working days, provide a written notice to the Regional Administrator with a description of the steps taken to repair the containment building, and the schedule for accomplishing the work.

(ii) The Regional Administrator will review the information submitted, make a determination regarding whether the containment building must be removed from service completely or partially until repairs and cleanup are complete, and notify the owner or operator of the determination and the underlying rationale in writing.

(iii) Upon completing all repairs and cleanup the owner or operator must notify the Regional Administrator in writing and provide a verification, signed by a qualified, registered professional engineer, that the repairs and cleanup have been completed according to the written plan submitted in accordance with paragraph (c)(3)(i)(D) of this section.

(4) Inspect and record in the facility's operating record, at least once every seven days, data gathered from monitoring equipment and leak detection equipment as well as the containment building and the area immediately surrounding the containment building to detect signs of releases of hazardous waste.

(d) For containment buildings that contain areas both with and without secondary containment, the owner or operator must:

(1) Design and operate each area in accordance with the requirements enumerated in paragraphs (a) through (c) of this section;

(2) Take measures to prevent the release of liquids or wet materials into areas without secondary containment; and

(3) Maintain in the facility's operating log a written description of the operating procedures used to maintain the integrity of areas without secondary containment.

(e) Notwithstanding any other provision of this subpart the Regional Administrator may waive requirements for secondary containment for a permitted containment building where the owner operator demonstrates that the only free liquids in the unit are limited amounts of dust suppression liquids required to meet occupational health and safety requirements, and where containment of managed wastes and liquids can be assured without a secondary containment system.

**§ 264.1102 Closure and post-closure care.**

(a) At closure of a containment building, the owner or operator must remove or decontaminate all waste residues, contaminated containment system components (liners, etc.) contaminated subsoils, and structures and equipment contaminated with waste and leachate, and manage them as hazardous waste unless § 261.3(d) of this chapter applies. The closure plan, closure activities, cost estimates for closure, and financial responsibility for containment buildings must meet all of the requirements specified in subparts G and H of this part.

(b) If, after removing or decontaminating all residues and making all reasonable efforts to effect

removal or decontamination of contaminated components, subsoils, structures, and equipment as required in paragraph (a) of this section, the owner or operator finds that not all contaminated subsoils can be practicably removed or decontaminated, he must close the facility and perform post-closure care in accordance with the closure and post-closure requirements that apply to landfills (§ 264.310). In addition, for the purposes of closure, post-closure, and financial responsibility, such a containment building is then considered to be a landfill, and the owner or operator must meet all of the requirements for landfills specified in subparts G and H of this part.

**§ 264.1103-264.1110 [Reserved]**

**PART 265—INTERIM STATUS STANDARDS FOR OWNERS AND OPERATORS OF HAZARDOUS WASTE TREATMENT, STORAGE, AND DISPOSAL FACILITIES**

18. The authority citation for part 265 continues to read as follows:

Authority: 42 U.S.C. 6905, 6912(a), 6924, 6925, 6935, and 6936.

19. Section 265.110 is amended by removing the word "and" from the end of paragraphs (b)(1) and (b)(2), by adding "; and" in place of the period at the end of paragraph (b)(3), and by adding a new paragraph (b)(4) to read as follows:

**§ 265.110 Applicability.**

(b) \* \* \*  
(4) Containment building that are required under § 265.1102 to meet the requirement for landfills.

20. Section 265.111 is amended by revising paragraph (c) to read as follows:

**§ 265.111 Closure performance standard.**

(c) Complies with the closure requirements of this subpart, including, but not limited to, the requirements of §§ 265.197, 265.228, 265.258, 265.280, 265.310; 265.351, 265.381, 265.404, and 264.1102.

21. In § 265.112 (d)(4), the last two sentences are revised to read as follows:

**§ 265.112 Closure plan; amendment of plan.**

(d) \* \* \*  
(4) \* \* \* The Regional Administrator must assure that the approved plan is consistent with §§ with 265.111 through 265.115 and the applicable requirements of subpart F of this part, §§ 265.197,

265.228, 265.258, 265.280, 265.310, 265.351, 265.381, 265.404, and 264.1102. A copy of the modified plan with a detailed statement of reasons for the modifications must be mailed to the owner or operator.

22. Section 265.140 is amended by revising paragraph (b) to read as follows:

**§ 265.140 Applicability.**

(b) The requirements of §§ 265.144 and 265.146 apply only to owners and operators of:

- (1) Disposal facilities;
- (2) Tank systems that are required under § 264.197 of this chapter to meet the requirements for landfills; and
- (3) Containment buildings that are required under § 265.1102 to meet the requirements for landfills.

23. Section 265.142 is amended by revising the introductory text of paragraph (a) to read as follows:

**§ 265.142 Cost estimate for closure.**

(a) The owner or operator must have a detailed written estimate, in current dollars, of the cost of closing the facility in accordance with the requirements in §§ 265.111 through 265.115 and applicable closure requirements in §§ 265.178, 265.197, 265.228, 265.258, 265.280, 265.310, 265.351, 265.381, 265.404, and 265.1102

24. In § 265.221, a new paragraph (h) is added to read as follows:

**§ 265.221 Design and operating requirements.**

(h) Surface impoundments that are newly subject to RCRA section 3005(j)(1) due to the promulgation of additional listings or characteristics for the identification of hazardous waste must be in compliance with paragraphs (a), (c) and (d) of this section not later than 48 months after the promulgation of the additional listing or characteristic. This compliance period shall not be cut short as the result of the promulgation of land disposal prohibitions under part 268 of this chapter or the granting of an extension to the effective date of a prohibition pursuant to § 268.5 of this chapter, within this 48-month period.

25. Subpart CC is added and reserved and subpart DD is added to part 265 to read as follows:

**Subpart DD—Containment Buildings**

- Sec. 265.1100 Applicability.
- 265.1101 Design and operating standards.

## Sec.

265.1102 Closure and post-closure care.

265.1103 -265.1110 [Reserved]

**Subpart DD—Containment Buildings****§ 265.1100 Applicability.**

The requirements of this subpart apply to owners or operators who store or treat hazardous waste in units designed and operated under § 265.1101 of this subpart. These provisions will become effective on February 18, 1993, although the owner or operator may notify the Regional Administrator of his intent to be bound by this subpart at an earlier time. The owner or operator is not subject to the definition of land disposal in RCRA section 3004(k) provided that the unit:

(a) Is a completely enclosed, self-supporting structure that is designed and constructed of manmade materials of sufficient strength and thickness to support themselves, the waste contents, and any personnel and heavy equipment that operate within the units, and to prevent failure due to pressure gradients, settlement, compression, or uplift, physical contact with the hazardous wastes to which they are exposed; climatic conditions; and the stresses of daily operation, including the movement of heavy equipment within the unit and contact of such equipment with containment walls;

(b) Has a primary barrier that is designed to be sufficiently durable to withstand the movement of personnel and handling equipment within the unit;

(c) If the unit is used to manage liquids, has:

(1) A primary barrier designed and constructed of materials to prevent migration of hazardous constituents into the barrier;

(2) A liquid collection system designed and constructed of materials to minimize the accumulation of liquid on the primary barrier; and

(3) A secondary containment system designed and constructed of materials to prevent migration of hazardous constituents into the barrier, with a leak detection and liquid collection system capable of detecting, collecting, and removing leaks of hazardous constituents at the earliest possible time, unless the unit has been granted a variance from the secondary containment system requirements under § 265.1101(b)(4);

(d) Has controls as needed to permit fugitive dust emissions; and

(e) Is designed and operated to ensure containment and prevent the tracking of materials from the unit by personnel or equipment.

**§ 265.1101 Design and operating standards.**

(a) All containment buildings must comply with the following design standards:

(1) The containment building must be completely enclosed with a floor, walls, and a roof to prevent exposure to the elements, (e.g., precipitation, wind, runoff), and to assure containment of managed wastes.

(2) The floor and containment walls of the unit, including the secondary containment system if required under paragraph (b) of this section, must be designed and constructed of materials of sufficient strength and thickness to support themselves, the waste contents, and any personnel and heavy equipment that operate within the unit, and to prevent failure due to pressure gradients, settlement, compression, or uplift, physical contact with the hazardous wastes to which they are exposed; climatic conditions; and the stresses of daily operation, including the movement of heavy equipment within the unit and contact of such equipment with containment walls. The unit must be designed so that it has sufficient structural strength to prevent collapse or other failure. All surfaces to be in contact with hazardous wastes must be chemically compatible with those wastes. EPA will consider standards established by professional organizations generally recognized by the industry such as the American Concrete Institute (ACI) and the American Society of Testing Materials (ASTM) in judging the structural integrity requirements of this paragraph. If appropriate to the nature of the waste management operation to take place in the unit, an exception to the structural strength requirement may be made for light-weight doors and windows that meet these criteria:

(i) They provide an effective barrier against fugitive dust emissions under paragraph (c)(1)(iv); and

(ii) The unit is designed and operated in a fashion that assures that wastes will not actually come in contact with these openings.

(3) Incompatible hazardous wastes or treatment reagents must not be placed in the unit or its secondary containment system if they could cause the unit or secondary containment system to leak, corrode, or otherwise fail.

(4) A containment building must have a primary barrier designed to withstand the movement of personnel, waste, and handling equipment in the unit during the operating life of the unit and appropriate for the physical and chemical characteristics of the waste to be managed.

(b) For a containment building used to manage hazardous wastes containing free liquids or treated with free liquids (the presence of which is determined by the paint filter test, a visual examination, or other appropriate means), the owner or operator must include:

(1) A primary barrier designed and constructed of materials to prevent the migration of hazardous constituents into the barrier (e.g. a geomembrane covered by a concrete wear surface).

(2) A liquid collection and removal system to prevent the accumulation of liquid on the primary barrier of the containment building:

(i) The primary barrier must be sloped to drain liquids to the associated collection system; and

(ii) Liquids and waste must be collected and removed to minimize hydraulic head on the containment system at the earliest practicable time that protects human health and the environment.

(3) A secondary containment system including a secondary barrier designed and constructed to prevent migration of hazardous constituents into the barrier, and a leak detection system that is capable of detecting failure of the primary barrier and collecting accumulated hazardous wastes and liquids at the earliest practicable time.

(i) The requirements of the leak detection component of the secondary containment system are satisfied by installation of a system that is, at a minimum:

(A) Constructed with a bottom slope of 1 percent or more; and

(B) Constructed of a granular drainage material with a hydraulic conductivity of  $1 \times 10^{-2}$  cm/sec or more and a thickness of 12 inches (30.5 cm) or more, or constructed of synthetic or geonet drainage materials with a transmissivity of  $3 \times 10^{-5}$  m<sup>2</sup>/sec or more.

(ii) If treatment is to be conducted in the building, an area in which such treatment will be conducted must be designed to prevent the release of liquids, wet materials, or liquid aerosols to other portions of the building.

(iii) The secondary containment system must be constructed of materials that are chemically resistant to the waste and liquids managed in the containment building and of sufficient strength and thickness to prevent collapse under the pressure exerted by overlaying materials and by any equipment used in the containment building. (Containment buildings can serve as secondary containment systems for tanks placed within the building under certain conditions. A

containment building can serve as an external liner system for a tank, provided it meets the requirements of § 265.193(d)(1). In addition, the containment building must meet the requirements of § 265.193 (b) and (c) to be considered an acceptable secondary containment system for a tank.)

(4) For existing units other than 90-day generator units, the Regional Administrator may delay the secondary containment requirement for up to two years, based on a demonstration by the owner or operator that the unit substantially meets the standards of this Subpart. In making this demonstration, the owner or operator must:

(i) Provide written notice to the Regional Administrator of their request by February 18, 1993. This notification must describe the unit and its operating practices with specific reference to the performance of existing containment systems, and specific plans for retrofitting the unit with secondary containment;

(ii) Respond to any comments from the Regional Administrator on these plans within 30 days; and

(iii) Fulfill the terms of the revised plans, if such plans are approved by the Regional Administrator.

(c) Owners or operators of all containment buildings must:

(1) Use controls and practices to ensure containment of the hazardous waste within the unit; and, at a minimum:

(i) Maintain the primary barrier to be free of significant cracks, gaps, corrosion, or other deterioration that could cause hazardous waste to be released from the primary barrier;

(ii) Maintain the level of the stored/treated hazardous waste within the containment walls of the unit so that the height of any containment wall is not exceeded;

(iii) Take measures to prevent the tracking of hazardous waste out of the unit by personnel or by equipment used in handling the waste. An area must be designated to decontaminate equipment and any rinsate must be collected and properly managed; and

(iv) Take measures to control fugitive dust emissions such that any openings (doors, windows, vents, cracks, etc.) exhibit no visible emissions. In addition, all associated particulate collection devices (e.g., fabric filter, electrostatic precipitator) must be operated and maintained with sound air pollution control practices. This state of no visible emissions must be maintained effectively at all times during normal operating conditions, including when vehicles and personnel are entering and exiting the unit.

(2) Obtain certification by a qualified registered professional engineer that the containment building design meets the requirements of paragraphs (a) through (c) of this section. For units placed into operation prior to February 18, 1993, this certification must be placed in the facility's operating record (on-site files for generators who are not formally required to have operating records) no later than 60 days after the date of initial operation of the unit. After February 18, 1993, PE certification will be required prior to operation of the unit.

(3) Throughout the active life of the containment building, if the owner or operator detects a condition that could lead to or has caused a release of hazardous waste, must repair the condition promptly, in accordance with the following procedures.

(i) Upon detection of a condition that has led to a release of hazardous waste (e.g., upon detection of leakage from the primary barrier) the owner or operator must:

(A) Enter a record of the discovery in the facility operating record;

(B) Immediately remove the portion of the containment building affected by the condition from service;

(C) Determine what steps must be taken to repair the containment building, remove any leakage from the secondary collection system, and establish a schedule for accomplishing the cleanup and repairs; and

(D) Within 7 days after the discovery of the condition, notify the Regional Administrator of the condition, and within 14 working days, provide a written notice to the Regional Administrator with a description of the steps taken to repair the containment building, and the schedule for accomplishing the work.

(ii) The Regional Administrator will review the information submitted, make a determination regarding whether the containment building must be removed from service completely or partially until repairs and cleanup are complete, and notify the owner or operator of the determination and the underlying rationale in writing.

(iii) Upon completing all repairs and cleanup the owner or operator must notify the Regional Administrator in writing and provide a verification, signed by a qualified, registered professional engineer, that the repairs and cleanup have been completed according to the written plan submitted in accordance with paragraph (c)(3)(i)(D) of this section.

(4) Inspect and record in the facility's operating record, at least once every seven days, data gathered from

monitoring equipment and leak detection equipment as well as the containment building and the area immediately surrounding the containment building to detect signs of releases of hazardous waste.

(d) For containment building that contains both areas with and without secondary containment, the owner or operator must:

(1) Design and operate each area in accordance with the requirements enumerated in paragraphs (a) through (c) of this section;

(2) Take measures to prevent the release of liquids or wet materials into areas without secondary containment; and

(3) Maintain in the facility's operating log a written description of the operating procedures used to maintain the integrity of areas without secondary containment.

(e) Notwithstanding any other provision of this subpart, the Regional Administrator may waive requirements for secondary containment for a permitted containment building where the owner or operator demonstrates that the only free liquids in the unit are limited amounts of dust suppression liquids required to meet occupational health and safety requirements, and where containment of managed wastes and liquids can be assured without a secondary containment system.

#### § 265.1102 Closure and post-closure care.

(a) At closure of a containment building, the owner or operator must remove or decontaminate all waste residues, contaminated containment system components (liners, etc.), contaminated subsoils, and structures and equipment contaminated with waste and leachate, and manage them as hazardous waste unless § 261.3(d) of this chapter applies. The closure plan, closure activities, cost estimates for closure, and financial responsibility for containment buildings must meet all of the requirements specified in subparts G and H of this part.

(b) If, after removing or decontaminating all residues and making all reasonable efforts to effect removal or decontamination of contaminated components, subsoils, structures, and equipment as required in paragraph (a) of this section, the owner or operator finds that not all contaminated subsoils can be practicably removed or decontaminated, he must close the facility and perform post-closure care in accordance with the closure and post-closure requirements that apply to landfills (§ 265.310). In addition, for the purposes of closure,

post-closure, and financial responsibility, such a containment building is then considered to be a landfill, and the owner or operator must meet all of the requirements for landfills specified in subparts G and H of this part.

§§ 265.1103—265.1110 [Reserved]

**PART 268—LAND DISPOSAL RESTRICTIONS**

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

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

27. In § 268.2 paragraph (g) is revised and paragraph (h) added to read as follows:

§ 268.2 Definitions applicable in this part.

(g) *Debris* means solid material exceeding a 60 mm particle size that is intended for disposal and that is: A manufactured object; or plant or animal matter; or natural geologic material. However, the following materials are not debris: Any material for which a specific treatment standard is provided in subpart D, part 268; Process residuals such as smelter slag and residues from the treatment of waste, wastewater, sludges, or air emission residues; and Intact containers of hazardous waste that are not ruptured and that retain at least 75% of their original volume. A mixture of debris that has not been treated to the standards provided by § 268.45 and other material is subject to regulation as debris if the mixture is comprised primarily of debris, by volume, based on visual inspection.

(h) *Hazardous debris* means debris that contains a hazardous waste listed in subpart D of part 261 of this chapter, or that exhibits a characteristic of hazardous waste identified in subpart C of part 261 of this chapter.

28. Section 268.5 is amended by adding “; or” in place of the semicolon at the end of paragraph (h)(2)(ii), by redesignating paragraph (h)(2)(v) as paragraph (h)(2)(vi), by revising paragraph (h)(2)(iv) and by adding new paragraph (h)(2)(v) to read as follows:

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

- (h) \* \* \*
- (2) \* \* \*

(iv) The surface impoundment, if permitted, is in compliance with the requirements of subpart F of part 264 and § 264.221 (c), (d) and (e) of this chapter; or

(v) The surface impoundment, if newly subject to RCRA section 3005(j)(1) due

to the promulgation of additional listings or characteristics for the identification of hazardous waste, is in compliance with the requirements of subpart F of part 265 of this chapter within 12 months after the promulgation of additional listings or characteristics of hazardous waste, and with the requirements of § 265.221 (a), (c) and (d) of this chapter within 48 months after the promulgation of additional listings or characteristics of hazardous waste. If a national capacity variance is granted, during the period the variance is in effect, the surface impoundment, if newly subject to RCRA section 3005(j)(1) due to the promulgation of additional listings or characteristics of hazardous waste, is in compliance with the requirements of subpart F of part 265 of this chapter within 12 months after the promulgation of additional listings or characteristics of hazardous waste, and with the requirements of § 265.221 (a), (c) and (d) of this chapter within 48 months after the promulgation of additional listings or characteristics of hazardous waste; or

29. Section 268.7 is amended by revising paragraphs (a)(1)(iii), (a)(1)(iv), (a)(2) introductory text, (a)(3)(iv), (a)(3)(v), (a)(4) introductory text, (b)(4) introductory text, and (b)(5) introductory text, and by adding paragraphs (a)(1)(v), (a)(3)(vi), and (d) to read as follows:

§ 268.7 Waste analysis and recordkeeping.

- (a) \* \* \*
- (1) \* \* \*
- (iii) The manifest number associated with the shipment of waste;
- (iv) For hazardous debris, the contaminants subject to treatment as provided by § 268.45(b) and the following statement: “This hazardous debris is subject to the alternative treatment standards of 40 CFR 268.45”; and

(v) Waste analysis data, where available.

(2) If a generator determines that he is managing a restricted waste under this Part, and determines that the waste can be land disposed without further treatment, with each shipment of waste he must submit, to the treatment, storage, or land disposal facility, a notice and a certification stating that the waste meets the applicable treatment standards set forth in subpart D of this part and the applicable prohibition levels set forth in § 268.32 or RCRA section 3004(d). Generators of hazardous debris that is excluded from the definition of hazardous waste under § 261.3(e)(2) of this chapter (i.e., debris that the Director has determined does not contain hazardous waste), however,

are not subject to these notification and certification requirements.

\* \* \* \* \*

(3) \* \* \*

(iv) Waste analysis data, where available;

(v) For hazardous debris, the contaminants subject to treatment as provided by § 268.45(b) and the following statement: “This hazardous debris is subject to the alternative treatment standards of 40 CFR 268.45”; and

(vi) The date the waste is subject to the prohibitions.

(4) If a generator is managing prohibited waste in tanks, containers, or containment buildings regulated under 40 CFR 262.34, and is treating such waste in such tanks, containers, or containment buildings to meet applicable treatment standards under subpart D of this part, the generator must develop and follow a written waste analysis plan which describes the procedures the generator will carry out to comply with the treatment standards. (Generators treating hazardous debris under the alternative treatment standards of Table 1, § 268.45, however, are not subject to these waste analysis requirements.) The plan must be kept on site in the generator’s records, and the following requirements must be met:

\* \* \* \* \*

(b) \* \* \*

(4) A notice must be sent with each waste shipment to the land disposal facility which includes the following information, except that debris excluded from the definition of hazardous waste under § 261.3(e) of this chapter (i.e., debris treated by an extraction or destruction technology provided by Table 1, § 268.45, and debris that the Director has determined does not contain hazardous waste) is subject to the notification and certification requirements of paragraph (d) of this section rather than these notification requirements:

\* \* \* \* \*

(5) The treatment facility must submit a certification with each shipment of waste or treatment residue of a restricted waste to the land disposal facility stating that the waste or treatment residue has been treated in compliance with the applicable performance standards specified in subpart D of this part and the applicable prohibitions set forth in § 268.32 or RCRA section 3004(d). Debris excluded from the definition of hazardous waste under § 261.3(e) of this chapter (i.e., debris treated by an extraction or destruction technology provided by

Table 1, § 268.45, and debris that the Director has determined does not contain hazardous waste), however, is subject to the notification and certification requirements of paragraph (d) of this section rather than the certification requirements of this paragraph (b)(5).

(d) Generators or treaters who first claim that hazardous debris is excluded from the definition of hazardous waste under § 261.3(e) of this chapter (i.e., debris treated by an extraction or destruction technology provided by Table 1, § 268.45, and debris that the Director has determined does not contain hazardous waste) are subject to the following notification and certification requirements:

(1) A one-time notification must be submitted to the Director or authorized State including the following information:

(i) The name and address of the Subtitle D facility receiving the treated debris;

(ii) A description of the hazardous debris as initially generated, including the applicable EPA Hazardous Waste Number(s); and

(iii) For debris excluded under § 261.3(e)(1) of this chapter, the technology from Table 1, § 268.45, used to treat the debris.

(2) The notification must be updated if the debris is shipped to a different facility, and, for debris excluded under § 261.2(e)(1) of this chapter, if a different type of debris is treated or if a different technology is used to treat the debris.

(3) For debris excluded under § 261.3(e)(1) of this chapter, the owner or operator of the treatment facility must document and certify compliance with the treatment standards of Table 1, § 268.45, as follows:

(i) Records must be kept of all inspections, evaluations, and analyses of treated debris that are made to determine compliance with the treatment standards;

(ii) Records must be kept of any data or information the treater obtains during treatment of the debris that identifies key operating parameters of the treatment unit; and

(iii) For each shipment of treated debris, a certification of compliance with the treatment standards must be signed by an authorized representative and placed in the facility's files. The certification must state the following: "I certify under penalty of law that the debris has been treated in accordance with the requirements of 40 CFR 268.45. I am aware that there are significant penalties for making a false

certification, including the possibility of fine and imprisonment."

30. In § 268.9, paragraph (d) is revised to read as follows:

**§ 268.9 Special rules regarding wastes that exhibit a characteristic.**

(d) Wastes that exhibit a characteristic are also subject to § 268.7 requirements, except that once the waste is no longer hazardous, a one-time notification and certification must be placed in the generators or treaters files and sent to the EPA region or authorized state. The notification and certification that is placed in the generators or treaters files must be updated if the process or operation generating the waste changes and/or if the subtitle D facility receiving the waste changes. However, the generator or treater need only notify the EPA region or an authorized state on an annual basis if such changes occur. Such notification and certification should be sent to the EPA region or authorized state by the end of the calendar year, but no later than December 31.

(1) The notification must include the following information:

(i) Name and address of the Subtitle D facility receiving the waste shipment;

(ii) A description of the waste as initially generated, including the applicable EPA Hazardous Waste Number(s) and treatability group(s);

(iii) The treatment standards applicable to the waste at the point of generation.

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

31. Section 268.14 is added to subpart B of part 268 to read as follows:

**§ 268.14 Surface impoundment exemptions.**

(a) This section defines additional circumstances under which an otherwise prohibited waste may continue to be placed in a surface impoundment.

(b) Wastes which are newly identified or listed under section 3001 after November 8, 1984, and stored in a surface impoundment that is newly subject to subtitle C of RCRA as a result of the additional identification or listing, may continue to be stored in the surface impoundment for 48 months after the promulgation of the additional listing or characteristic, not withstanding that the waste is otherwise prohibited from land disposal, provided that the surface impoundment is in compliance with the requirements of subpart F of part 265 of this chapter within 12 months after

promulgation of the new listing or characteristic.

(c) Wastes which are newly identified or listed under section 3001 after November 8, 1984, and treated in a surface impoundment that is newly subject to subtitle C of RCRA as a result of the additional identification or listing, may continue to be treated in that surface impoundment, not withstanding that the waste is otherwise prohibited from land disposal, provided that surface impoundment is in compliance with the requirements of subpart F of part 265 of this chapter within 12 months after the promulgation of the new listing or characteristic. In addition, if the surface impoundment continues to treat hazardous waste after 48 months from promulgation of the additional listing or characteristic, it must then be in compliance with § 268.4.

32. Section 268.36 is added to subpart C of part 268 to read as follows:

**§ 268.36 Waste specific prohibitions—newly listed wastes.**

(a) Effective November 9, 1992, the wastes specified in 40 CFR 261.32 as EPA Hazardous Waste Numbers K107, K108, K109, K110, K111, K112, K117, K118, K123, K124, K125, K126, K131, K132, and K136; and the wastes specified in 40 CFR 261.33(f) as EPA Hazardous Waste numbers U328, U353, and U359 are prohibited from land disposal.

(b) Effective June 30, 1993, the wastes specified in 40 CFR 261.31 as EPA Hazardous Waste Numbers F037 and F038 that are not generated from surface impoundment cleanouts or closures are prohibited from land disposal.

(c) Effective June 30, 1994, the wastes specified in 40 CFR 261.31 as EPA Hazardous Waste Numbers F037 and F038 that are generated from surface impoundment cleanouts or closures are prohibited from land disposal.

(d) Effective June 30, 1994, radioactive wastes that are mixed with hazardous wastes specified in 40 CFR 261.31 as EPA Hazardous Waste Numbers F037 and F038; the wastes specified in 40 CFR 261.32 as EPA Hazardous Waste Numbers K107, K108, K109, K110, K111, K112, K117, K118, K123, K124, K125, K126, K131, K132, and K136; or the wastes specified in 40 CFR 261.33(f) as EPA Hazardous Waste Numbers U328, U353, and U359 are prohibited from land disposal.

(e) Effective June 30, 1994, debris contaminated with hazardous wastes specified in 40 CFR 261.31 as EPA Hazardous Waste Numbers F037 and F038; the wastes specified in 40 CFR 261.32 as EPA Hazardous Waste

Numbers K107, K108, K109, K110, K111, K112, K117, K118, K123, K124, K125, K126, K131, K132, and K136; or the wastes specified in 40 CFR 261.33(f) as EPA Hazardous Waste Numbers U328, U353, and U359; and which is not contaminated with any other waste already subject to a prohibition are prohibited from land disposal.

(f) Between June 30, 1992 and June 30, 1993, the wastes included in paragraph (b) of this section may be disposed of in a landfill, only if such unit is in compliance with the requirements specified in § 268.5(h)(2), and may be generated in and disposed of in a surface impoundment only if such unit is in compliance with either § 268.5(h)(2) or § 268.14.

(g) Between June 30, 1992 and June 30, 1994, the wastes included in paragraphs (d) and (e) of this section may be disposed of in a landfill only if such unit is in compliance with the requirements specified in § 268.5(h)(2), and may be generated in and disposed of in a surface impoundment only if such unit is in compliance with either § 268.5(h)(2) or § 268.14.

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

(1) The wastes meet the applicable standards specified in subpart D of this part;

(2) Persons have been granted an exemption from a prohibition pursuant to a petition under § 268.6, with respect

to those wastes and units covered by the petition;

(3) The wastes meet the applicable alternate standards established pursuant to a petition granted under § 268.44;

(4) Persons have been granted an extension to the effective date of a prohibition pursuant to § 268.5, with respect to the wastes covered by the extension.

(i) To determine whether a hazardous waste identified in this section 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 levels in subpart D of this part, the waste is prohibited from land disposal, and all requirements of part 268 are applicable, except as otherwise specified.

33. In § 268.40, paragraph (b) is revised and paragraph (d) is added to read as follows:

**§ 268.40 Applicability of treatment standards.**

\* \* \* \* \*

(b) A restricted waste for which a treatment technology is specified under § 268.42(a) or hazardous debris for which a treatment technology is

specified under § 268.45 may be land disposed after it is treated using that specified technology or an equivalent treatment method approved by the Administrator under the procedures set forth in § 268.42(b).

\* \* \* \* \*

(d) If a treatment standard has been established in §§ 268.41 through 268.43 for a hazardous waste that is itself hazardous debris, the waste is subject to those standards rather than the standards for hazardous debris under § 268.45.

34. In § 268.41, paragraph (a) text preceding table is revised, and Table CCWE is amended by revising the entry for "F001-F005 spent solvents," by removing the entries for "K061 (Low Zinc Subcategory—less than 15% Total Zinc)" and "K061 (High Zinc Subcategory—greater than 15% Total Zinc)—Effective until August 7, 1991, by adding entries for "F037", "F038", and "K061", and by adding paragraph (c) to read as follows:

**§ 268.41 Treatment standards expressed as concentrations in waste extract.**

(a) Table CCWE identifies the restricted wastes and the concentrations of their associated constituents which may not be exceeded in the extract of a waste or waste treatment residual extracted using the test method in appendix I of this part for the allowable land disposal of such wastes. Compliance with these concentrations is required based upon grab samples.

268.41 TABLE CCWE.—CONSTITUENT CONCENTRATIONS IN WASTE EXTRACT

Waste code	Commercial chemical name	See also	Regulated hazardous constituent	CAS No. for regulated hazardous constituent	Wastewaters	
					Concentration (mg/l) Notes	Non-wastewaters Concentration (mg/l) Notes
F001-F005 spent solvents	NA	Table CCW in 268.43	Carbon disulfide	75-15-0	NA	4.8
			Cyclohexanone	108-94-1	NA	0.75
			Methanol	67-56-1	NA	0.75
F037	NA	Table CCW in 268.43	Chromium (Total)	7440-47-32	NA	1.7
			Nickel	7440-02-0	NA	0.20
F038	NA	Table CCW in 268.43	Chromium (Total)	7440-47-32	NA	1.7
			Nickel	7440-02-0	NA	0.20
K061	NA	Table CCW in 268.43	Antimony	7440-36-0	NA	2.1
			Arsenic	7440-38-2	NA	0.055
			Barium	7440-39-3	NA	7.6
			Beryllium	7440-41-7	NA	0.014
			Cadmium	7440-43-9	NA	0.19
			Chromium (Total)	7440-47-32	NA	0.33
			Lead	7439-92-1	NA	0.37
			Mercury	7439-97-6	NA	0.009
			Nickel	7440-02-0	NA	5
			Selenium	7782-49-2	NA	0.16
			Silver	7440-22-4	NA	0.3
			Thallium	NA	NA	0.078
			Zinc	7440-66-6	NA	5.3

(c) The treatment standards for the constituents in F001-F005 which are listed in Table CCWE only apply to wastes which contain one, two, or all three of these constituents. If the waste contains any of these three constituents

along with any of the other 20 constituents found in F001-F005, then only the treatment standards in § 268.43 Table CCW are required.

35-36. In § 268.42, Table 2 of paragraph (a) is amended by adding entries for K107, K108, K109, K110, K112,

K123, K124, K125, K126, U328, U353, and U359 in alphabetical order and paragraphs (b) and (d) are revised to read as follows:

§ 268.42 Treatment standards expressed as specified technologies.

268.42 TABLE 2.—TECHNOLOGY-BASED STANDARDS BY RCRA WASTE CODE

Waste code	See also	Waste descriptions and/or treatment subcategory	CAS No. for regulated hazardous constituents	Technology codes	
				Wastewaters	Nonwastewaters
K107		Column bottoms from product separation from the production of 1,1-dimethylhydrazine (UDMH) from carboxylic acid hydrazides.	NA	INCIN; or CHOXD fb, CARBN; or BIODG fb CARBN.	INCIN.
K108		Condensed column overheads from product separation and condensed reactor vent gases from the production of 1,1-dimethylhydrazine (UDMH) from carboxylic acid hydrazides.	NA	INCIN; or CHOXD fb, CARBN; or BIODG fb CARBN.	INCIN.
K109		Spent filter cartridges from product purification from the production of 1,1-dimethylhydrazine (UDMH) from carboxylic acid hydrazides.	NA	INCIN; or CHOXD fb, CARBN; or BIODG fb CARBN.	INCIN.
K110		Condensed column overheads from intermediate separation from the production of 1,1-dimethylhydrazine (UDMH) from carboxylic acid hydrazides.	NA	INCIN; or CHOXD fb, CARBN; or BIODG fb CARBN.	INCIN.
K112		Reaction by-product water from the drying column in the production of toluenediamine via hydrogenation of diisotoluene.	NA	INCIN; or CHOXD fb, CARBN; or BIODG fb CARBN.	INCIN.
K123		Process wastewater (including supernates, filtrates, and washwaters) from the production of ethylenebisdithiocarbamic acid and its salts.	NA	INCIN; or CHOXD fb (BIODG or CARBN).	INCIN.
K124		Reactor vent scrubber water from the production of ethylenebisdithiocarbamic acid and its salts.	NA	INCIN; or CHOXD fb (BIODG or CARBN).	INCIN.
K125		Filtration, evaporation, and centrifugation solids from the production of ethylenebisdithiocarbamic acid and its salts.	NA	INCIN; or CHOXD fb (BIODG or CARBN).	INCIN.
K126		Baghouse dust and floor sweepings in milling and packaging operations from the production or formulation of ethylene bisdithiocarbamic acid and its salts.	NA	INCIN; or CHOXD fb (BIODG or CARBN).	INCIN.
U328		o-toluidine	95-53-4	INCIN; or CHOXD fb, (BIODG or CARBN); or BIODG fb CARBN.	INCIN; or Thermal Destruction.
U353		p-toluidine	106-48-0	INCIN; or CHOXD fb, (BIODG or CARBN); or BIODG fb CARBN.	INCIN; or Thermal Destruction.
U359		2-ethoxy-ethanol	110-80-5	INCIN; or CHOXD fb, (BIODG or CARBN); or BIODG fb CARBN.	INCIN; or FSUBS.

(b) Any person may submit an application to the Administrator demonstrating that an alternative treatment method can achieve a measure of performance equivalent to that achieved by methods specified in paragraphs (a), (c), and (d) of this section for wastes or specified in Table 1 of § 268.45 for hazardous debris. The applicant must submit information demonstrating that his treatment method is in compliance with federal, state, and local requirements and is protective of human health and the environment. On the basis of such information and any other available information, the Administrator may approve the use of the alternative treatment method if he finds that the alternative treatment

method provides a measure of performance equivalent to that achieved by methods specified in paragraphs (a), (c), and (d) of this section for wastes or in Table 1 of § 268.45 for hazardous debris. Any approval must be stated in writing and may contain such provisions and conditions as the Administrator deems appropriate. The person to whom such approval is issued must comply with all limitations contained in such a determination.

(d) Radioactive hazardous mixed wastes with treatment standards specified in Table 3 of this section are not subject to any treatment standards specified in §§ 268.41 or 268.43, or Table 2 of this section. Radioactive hazardous

mixed wastes not subject to treatment standards in Table 3 of this section remain subject to all applicable treatment standards specified in §§ 268.41, 268.43, and Table 2 of this section. Hazardous debris containing radioactive waste is not subject to the treatment standards specified in Table 3 of this section but is subject to the treatment standards specified in § 268.45.

37. In § 268.43(a) Table CCW is amended by revising the entries for F001-F005 spent solvents, K015, K016, K018, K019, K020, K023, K024, K028, K030, K043, K048, K049, K050, K051, K052, K087, K093, K094, U028, U069, U088, U102, U107, and U190, by removing the entry for U042, and by



adding the entries for F037, F038, K117, K118, K131, K132, and K136 in alphanumerical order to read as follows: (a) \* \* \*

**268.43.—TABLE CCW.—CONSTITUENT CONCENTRATIONS IN WASTES**

Waste code	Commercial chemical name	See also	Regulated hazardous constituent	CAS number for regulated hazardous constituent	Wastewaters		Nonwastewaters				
					Concentration (mg/l)	Notes	Concentration (mg/l)	Notes			
F001–F005 spent solvents.	NA.....		Acetone.....	67–64–1	0.28		160				
			Benzene.....	71–43–2	0.070		3.7	(1)			
			n-Butyl alcohol.....	71–36–3	5.6		2.6				
			Carbon tetrachloride.....	56–23–5	0.057		5.6				
			Chlorobenzene.....	108–90–7	0.057		5.7				
			Cresol (m- and p-isomers).....		0.77		3.2				
			o-cresol.....		0.11		5.6				
			o-Dichlorobenzene.....	95–50–1	0.088		6.2				
			Ethyl acetate.....	141–7–6	0.34		33				
			Ethyl benzene.....	100–41–4	0.057		6.0				
			Ethyl ether.....	60–29–7	0.12		160				
			Isobutyl alcohol.....	78–83–1	5.6		170				
			Methylene chloride.....	75–9–2	0.089		33				
			Methyl ethyl ketone.....	78–93–3	0.28		36				
			Methyl isobutyl ketone.....	108–10–1	0.14		33				
			Nitrobenzene.....	98–95–3	0.068		14				
			Pyridine.....	110–86–1	0.014		16				
			Tetrachloroethylene.....	127–18–4	0.056		5.6				
			Toluene.....	108–88–3	0.08		28				
			1,1,1-Trichloroethane.....	71–55–6	0.054		5.6				
			1,1,2-Trichloroethane.....	79–00–5	0.030		7.6	(1)			
Trichloroethylene.....	79–01–6	0.054		5.6							
1,1,2-Trichloro-1,2,2-trifluoromethane.	76–13–1	0.057		28							
Trichloromono-fluoromethane.	75–69–4	0.02		33							
Xylenes (total).....		0.32		28							
F037.....	NA.....	Table CCWE in 268.41.	Acenaphthene.....	208–96–8	0.059	(2)	NA				
			Anthracene.....	120–12–7	0.059	(2)	28	(1)			
			Benzene.....	71–43–2	0.14	(2)	14	(1)			
			Benzo(a)anthracene.....	50–32–8	0.059	(2)	20	(1)			
			Benzo(a)pyrene.....	117–81–7	0.061	(2)	12	(1)			
			Bis(2-ethylhexyl) phthalate ...	75–15–0	0.28	(2)	7.3	(1)			
			Chrysene.....	218–01–9	0.059	(2)	15	(1)			
			Di-n-butyl phthalate.....	105–67–9	0.057	(2)	3.6	(1)			
			Ethylbenzene.....	100–41–4	0.057	(2)	14	(1)			
			Fluorene.....	86–73–7	0.059	(2)	NA				
			Naphthalene.....	91–20–3	0.059	(2)	42	(1)			
			Phenanthrene.....	85–01–8	0.059	(2)	34	(1)			
			Phenol.....	108–95–2	0.039	(2)	3.6	(1)			
			Pyrene.....	129–00–0	0.067	(2)	36	(1)			
			Toluene.....	108–88–3	0.08	(2)	14	(1)			
			Xylene(s).....		0.32	(2)	22	(1)			
			Cyanides (Total).....	57–12–5	0.028	(1)	1.8	(1)			
			Chromium (Total).....	7440–47–32	0.2		NA				
			Lead.....	7439–92–1	0.037		NA				
F038.....	NA.....	Table CCWE in 268.41.	Benzene.....	71–43–2	0.14	(2)	14	(1)			
			Benzo(a)pyrene.....	50–32–8	0.061	(2)	12	(1)			
			Bis(2-ethylhexyl) phthalate ...	117–81–7	0.28	(2)	7.3	(1)			
			Chrysene.....	218–01–9	0.059	(2)	15	(1)			
			Di-n-butyl phthalate.....	84–74–2	0.057	(2)	3.6	(1)			
			Ethylbenzene.....	100–41–4	0.057	(2)	14	(1)			
			Fluorene.....	86–73–7	0.059	(2)	NA				
			Naphthalene.....	91–20–3	0.059	(2)	42	(1)			
			Phenanthrene.....	85–01–8	0.059	(2)	34	(1)			
			Phenol.....	108–95–2	0.039	(2)	3.6	(1)			
			Pyrene.....	129–00–0	0.067	(2)	36	(1)			
			Toluene.....	108–88–3	0.080	(2)	14	(1)			
			Xylene(s).....		0.32	(2)	22	(1)			
			Cyanides (Total).....	57–12–5	0.026	(1)	1.8	(1)			
			Chromium (Total).....	7440–47–32	0.2		NA				
			Lead.....	7439–92–1	0.037		NA				
			K015.....	NA.....	Table CCWE in 268.41.	Anthracene.....	120–12–7	0.059		3.4	(1)
						Benzal Chloride.....	98–87–3	0.28		6.2	(1)

268.43.—TABLE CCW.—CONSTITUENT CONCENTRATIONS IN WASTES—Continued

Waste code	Commercial chemical name	See also	Regulated hazardous constituent	CAS number for regulated hazardous constituent	Wastewaters		Nonwastewaters	
					Concentration (mg/l)	Notes	Concentration (mg/l)	Notes
			Sum of Benzo(b) fluoranthene and Benzo(k) fluoranthene.	207-08-9	0.055		3.4	
			Phenanthrene.....	85-01-8	0.059		3.4	(1)
			Toluene.....	108-88-3	0.08		6.0	(1)
			Chromium (Total).....	7440-47-32	0.32		NA	
			Nickel.....	7440-02-0	0.44		NA	
K016	NA		Hexachlorobenzene.....	118-74-1	0.055		28	(1)
			Hexachlorobutadiene.....	87-68-3	0.055		5.6	(1)
			Hexachlorocyclopentadiene.....	77-47-4	0.057		5.6	(1)
			Hexachloroethane.....	67-72-1	0.055		28	(1)
			Tetrachloroethene.....	127-18-4	0.056		6.0	(1)
K018	NA		Chloroethane.....	76-00-3	0.27		6.0	(1)
			Chloromethane.....	74-87-3	0.19		NA	
			1,1-Dichloroethane.....	75-34-3	0.059		6.0	(1)
			1,2-Dichloroethane.....	107-06-2	0.21		6.0	(1)
			Hexachlorobenzene.....	118-74-1	0.055		28	(1)
			Hexachlorobutadiene.....	87-68-3	0.055		5.6	(1)
			Pentachloroethane.....	76-01-7	NA		5.6	
			1,1,1-Trichloroethane.....	71-55-6	0.054		6.0	
			Hexachloroethane.....	67-72-1	0.055		28	(1)
K019	NA		Bis(2-chloroethyl) ether.....	111-44-4	0.033		5.6	(1)
			Chlorobenzene.....	108-90-7	0.057		6.0	(1)
			Chloroform.....	67-66-3	0.046		6.0	(1)
			p-Dichlorobenzene.....	106-48-7	0.09		NA	
			1,2-Dichloroethane.....	107-06-2	0.21		6.0	(1)
			Fluorene.....	86-73-7	0.059		NA	
			Hexachloroethane.....	67-72-1	0.055		28	(1)
			Naphthalene.....	91-20-3	0.059		5.6	(1)
			Phenanthrene.....	85-01-8	0.059		5.6	(1)
			1,2,4,5-Tetrachlorobenzene.	95-94-3	0.055		NA	
			Tetrachloroethene.....	127-18-4	0.056		6.0	(1)
			1,2,4-Trichlorobenzene.....	120-82-1	0.055		19	(1)
			1,1,1-Trichloroethane.....	71-55-6	0.054		6.0	(1)
K020	NA		1,2-Dichloroethane.....	106-93-4	0.21		6.0	(1)
			1,1,2,2-Tetrachloroethane.....	79-34-6	0.057		5.8	(1)
			Tetrachloroethene.....	127-18-4	0.056		6.0	(1)
K023	NA		Phthalic anhydride (measured as Phthalic acid).	85-44-9	0.069		28	(1)
K024	NA		Phthalic anhydride (measured as Phthalic acid).	85-44-9	0.069		28	(1)
K028	NA	Table CCWE in 268.41.	1,1-Dichloroethane trans-1,2-.	75-34-3	0.059		6.0	(1)
			Dichloroethane.....		0.054		6.0	(1)
			Hexachlorobutadiene.....	87-68-3	0.055		5.6	(1)
			Hexachloroethane.....	67-72-1	0.055		28	(1)
			Pentachloroethane.....	76-01-7	NA		5.6	(1)
			1,1,1,2-Tetrachloroethane.....	630-20-8	0.057		5.6	(1)
			1,1,2,2-Tetrachloroethane.....	79-34-6	0.057		5.6	(1)
			1,1,1-Trichloroethane.....	71-55-6	0.054		6.0	(1)
			1,1,2-Trichloroethane.....	79-00-5	0.054		6.0	(1)
			Tetrachloroethylene.....	127-18-4	0.056		6.0	(1)
			Cadmium.....	7440-43-9	6.4		NA	
			Chromium (Total).....	7440-47-32	0.35		NA	
			Lead.....	7439-92-1	0.037		NA	
			Nickel.....	7440-02-0	0.47		NA	
K030	NA		o-Dichlorobenzene.....	95-50-1	0.088		NA	
			p-Dichlorobenzene.....	106-46-7	0.09		NA	
			Hexachlorobutadiene.....	87-68-3	0.055		5.6	(1)
			Hexachloroethane.....	67-72-1	0.055		28	(1)
			Hexachloropropene.....	1888-71-7	NA		19	(1)
			Pentachlorobenzene.....	608-93-5	NA		28	(1)
			Pentachloroethane.....	76-01-7	NA		5.6	(1)
			1,2,4,5-Tetrachlorobenzene.	95-94-3	0.055		14	(1)
			Tetrachloroethene.....	127-18-4	0.056		6.0	(1)
			1,2,4-Trichlorobenzene.....	120-82-1	0.055		19	(1)
K030	NA		2,4-Dichlorophenol.....	120-83-2	0.044		0.38	(1)
			2,6-Dichlorophenol.....	187-65-0	0.044		0.34	(1)
			2,4,5-Trichlorophenol.....	95-95-4	0.18		8.2	(1)
			2,4,6-Trichlorophenol.....	88-06-2	0.035		7.6	(1)

268.43.—TABLE CCW.—CONSTITUENT CONCENTRATIONS IN WASTES—Continued

Waste code	Commercial chemical name	See also	Regulated hazardous constituent	CAS number for regulated hazardous constituent	Wastewaters		Nonwastewaters	
					Concentration (mg/l)	Notes	Concentration (mg/l)	Notes
			Tetrachlorophenols (Total).....		NA		0.68	(1)
			Pentachlorophenol.....	87-86-5	0.089		1.9	(1)
			Tetrachloroethene.....	79-01-6	0.056		1.7	(1)
			Hexachlorodibenzo-p-dioxins.....		0.000063		0.001	(1)
			Hexachlorodibenzofurans.....		0.000063		0.001	(1)
			Pentachlorodibenzo-p-dioxins.....		0.000063		0.001	(1)
			Pentachlorodibenzo furans.....		0.000063		0.001	(1)
			Tetrachlorodibenzo-p-dioxins.....		0.000063		0.001	(1)
			Tetrachlorodibenzofurans.....		0.000063		0.001	(1)
K048.....	NA.....	Table CCWE in 268.41.	Benzene.....	71-43-2	0.14	(2)	14	(1)
			Benzo(a)pyrene.....	50-32-8	0.061	(2)	12	(1)
			Bis(2-ethylhexyl) phthalate.....	117-81-7	0.28	(2)	7.3	(1)
			Chrysene.....	218-01-9	0.059	(2)	15	(1)
			Di-n-butyl phthalate.....	84-74-2	0.057	(2)	3.6	(1)
			Ethylbenzene.....	100-41-4	0.057	(2)	14	(1)
			Fluorene.....	86-73-7	0.059	(2)	NA	(1)
			Naphthalene.....	91-20-3	0.059	(2)	42	(1)
			Phenanthrene.....	85-01-8	0.059	(2)	34	(1)
			Phenol.....	108-95-2	0.039	(2)	3.6	(1)
			Pyrene.....	129-00-0	0.067	(2)	36	(1)
			Toluene.....	108-88-3	0.080	(2)	14	(1)
			Xylene(s).....		0.32	(2)	22	(1)
			Cyanides (Total).....	57-12-5	0.028	(1)	1.8	(1)
			Chromium (Total).....	7440-47-32	0.2		NA	(1)
			Lead.....	7439-92-1	0.037		NA	(1)
K049.....	NA.....	Table CCWE in 268.41.	Anthracene.....	120-12-7	0.059	(2)	28	(1)
			Benzene.....	71-43-2	0.14	(2)	14	(1)
			Benzo(a)pyrene.....	117-81-7	0.061	(2)	12	(1)
			Bis(2-ethylhexyl) phthalate.....	75-150-0	0.28	(2)	7.3	(1)
			Carbon disulfide.....	75-15-0	0.014	(2)	NA	(1)
			Chrysene.....	2218-01-9	0.059	(2)	15	(1)
			2,4-Dimethyl phenol.....	105-67-9	0.036	(2)	NA	(1)
			Ethylbenzene.....	100-41-4	0.057	(2)	14	(1)
			Naphthalene.....	91-20-3	0.059	(2)	42	(1)
			Phenanthrene.....	85-01-8	0.059	(2)	34	(1)
			Phenol.....	108-95-2	0.039	(2)	3.6	(1)
			Pyrene.....	129-00-0	0.067	(2)	36	(1)
			Toluene.....	108-88-3	0.08	(2)	14	(1)
			Xylene(s).....		0.32	(2)	22	(1)
			Cyanides (Total).....	58-12-5	0.028	(1)	1.8	(1)
			Chromium (Total).....	7440-47-32	0.2		NA	(1)
K050.....	NA.....	Table CCWE in 268.41.	Lead.....	7439-92-1	0.037		NA	(1)
			Benzo(a)pyrene.....	50-32-8	0.061	(2)	12	(1)
			Phenol.....	108-95-2	0.039	(2)	3.6	(1)
			Cyanides (Total).....	57-12-5	0.028	(1)	1.8	(1)
			Chromium (Total).....	7440-47-32	0.2		NA	(1)
			Lead.....	7439-29-1	0.037		NA	(1)
K051.....	NA.....	Table CCWE in 268.41.	Acenaphthene.....	83-32-9	0.059	(2)	NA	(1)
			Anthracene.....	120-12-7	0.059	(2)	28	(1)
			Benzene.....	71-43-2	0.14	(2)	14	(1)
			Benzo(a) anthracene.....	50-32-8	0.059	(2)	20	(1)
			Benzo(a)pyrene.....	117-81-7	0.061	(2)	12	(1)
			Bis(2-ethylhexyl) phthalate.....	75-15-0	0.28	(2)	7.3	(1)
			Chrysene.....	2218-01-9	0.059	(2)	15	(1)
			Di-n-butyl phthalate.....	105-67-9	0.057	(2)	3.6	(1)
			Ethylbenzene.....	100-41-4	0.057	(2)	14	(1)
			Fluorene.....	86-73-7	0.059	(2)	NA	(1)
			Naphthalene.....	91-20-3	0.059	(2)	42	(1)
			Phenanthrene.....	85-01-8	0.059	(2)	34	(1)
			Phenol.....	108-95-2	0.039	(2)	3.6	(1)
			Pyrene.....	129-00-0	0.067	(2)	36	(1)
			Toluene.....	108-88-3	0.08	(2)	14	(1)
			Xylene(s).....		0.32	(2)	22	(1)
			Cyanides (Total).....	57-12-5	0.028	(1)	1.8	(1)
			Chromium (Total).....	7440-47-32	0.2		NA	(1)
			Lead.....	7439-92-1	0.037		NA	(1)
			Benzene.....	71-43-2	0.14	(2)	14	(1)
			Benzo(a)pyrene.....	50-32-8	0.061	(2)	12	(1)

268.43.—TABLE CCW.—CONSTITUENT CONCENTRATIONS IN WASTES—Continued

Waste code	Commercial chemical name	See also	Regulated hazardous constituent	CAS number for regulated hazardous constituent	Wastewaters		Nonwastewaters	
					Concentration (mg/l)	Notes	Concentration (mg/l)	Notes
K052	NA	Table CCWE in 268.41.	o-Cresol	95-48-7	0.11	(2)	6.2	(1)
			p-Cresol	106-44-5	0.77	(2)	6.2	(1)
			2,4-Dimethylphenol	105-67-9	0.036	(2)	NA	
			Ethylbenzene	100-41-4	0.057	(2)	14	(1)
			Naphthalene	91-20-3	0.059	(2)	42	(1)
			Phenanthrene	85-01-8	0.059	(2)	34	(1)
			Phenol	108-95-2	0.039	(2)	3.6	(1)
			Toluene	108-88-3	0.08	(2)	14	(1)
			Xylenes		0.32	(2)	22	(1)
			Cyanides (Total)	56-12-5	0.028	(1)	1.8	(1)
			Chromium (Total)	7440-47-32	0.2		NA	
Lead	7439-92-1	0.037		NA				
K087	NA	Table CCWE in 268.41.	Acenaphthalene	208-96-8	0.059	(2)	3.4	
			Benzene	71-43-2	0.14	(2)	0.071	(1)
			Chrysene	218-01-9	0.059	(2)	3.4	(1)
			Fluoranthene	206-44-0	0.068	(2)	3.4	(1)
			Indeno (1,2,3-cd) pyrene	193-39-5	0.0055	(2)	3.4	(1)
			Naphthalene	91-20-3	0.059	(2)	3.4	(1)
			Phenanthrene	85-01-8	0.059	(2)	3.4	(1)
			Toluene	108-88-3	0.08	(2)	0.65	(1)
			Xylenes		0.32	(2)	0.07	(1)
			Lead	7439-92-1	0.037		NA	
			Phthalic anhydride (measured as Phthalic acid)	85-44-9	0.069		28	(1)
K093	NA		Phthalic anhydride (measured as Phthalic acid)	85-44-9	0.069		28	(1)
K094	NA		Phthalic anhydride (measured as Phthalic acid)	85-44-9	0.069		28	(1)
K111	NA		2,4-Dinitrotoluene	121-14-2	0.32		140	(1)
			2,6-Dinitrotoluene	606-20-2	0.55		28	(1)
K117	NA		Ethylene dibromide	106-93-4	0.028		15	(1)
			Methyl bromide	74-83-9	0.11		15	(1)
			Chloroform	67-66-3	0.046		5.6	(1)
K118	NA		Ethylene dibromide	106-93-4	0.028		15	(1)
			Methyl bromide	74-83-9	0.11		15	(1)
			Chloroform	67-66-3	0.046		5.6	(1)
K131	NA		Methyl bromide	74-83-9	0.11		15	(1)
K132	NA		Methyl bromide	74-83-9	0.11		15	(1)
K136	NA		Ethylene dibromide	106-93-4	0.028		15	(1)
			Methyl bromide	74-83-9	0.11		15	(1)
			Chloroform	67-66-3	0.046		5.6	(1)
U028	Bis(2-ethylhexyl) phthalate		Bis(2-ethylhexyl) phthalate	117-81-7	0.28		28	(1)
U069	Di-n-butyl phthalate		Di-n-butyl phthalate	84-74-2	0.057		28	(1)
U088	Diethyl phthalate		Diethyl phthalate	84-66-2	0.2		28	(1)
U102	Dimethyl phthalate		Dimethyl phthalate	131-11-3	0.047		28	(1)
U107	Di-n-octyl phthalate		Di-n-octyl phthalate	117-84-0	0.017		28	(1)
U190	Phthalic anhydride (measured as Phthalic acid)		Phthalic anhydride (measured as Phthalic acid)	85-44-9	0.069		28	(1)

<sup>1</sup> Treatment standards for this organic constituent were established based upon incineration in units operated in accordance with the technical requirements of 40 CFR 264 Subpart O or Part 265 Subpart O, or based upon combustion in fuel substitution units operating in accordance with applicable technical requirements. A facility may certify compliance with these treatment standards according to provisions in 40 CFR Section 268.7.  
<sup>2</sup> Based on analysis of composite samples.

NOTE: NA means Not Applicable.

38. In subpart D, § 268.45 with Table 1 is added to read as follows:

**§268.45 Treatment standards for hazardous debris.**

(a) *Treatment standards.* Hazardous debris must be treated prior to land

disposal as follows unless EPA determines under § 261.3(e)(2) of this chapter that the debris is no longer contaminated with hazardous waste or

the debris is treated to the waste-specific treatment standard provided in this subpart for the waste contaminating the debris:

(1) *General*. Hazardous debris must be treated for each "contaminant subject to treatment" defined by paragraph (b) of this section using the technology or technologies identified in Table 1 of this section.

(2) *Characteristic debris*. Hazardous debris that exhibits the characteristic of ignitability, corrosivity, or reactivity identified under §§ 261.21, 261.22, and 261.23 of this chapter, respectively, must be deactivated by treatment using one of the technologies identified in Table 1 of this section.

(3) *Mixtures of debris types*. The treatment standards of Table 1 in this section must be achieved for each type of debris contained in a mixture of debris types. If an immobilization technology is used in a treatment train, it must be the last treatment technology used.

(4) *Mixtures of contaminant types*. Debris that is contaminated with two or more contaminants subject to treatment identified under paragraph (b) of this section must be treated for each contaminant using one or more treatment technologies identified in Table 1 of this section. If an immobilization technology is used in a treatment train, it must be the last treatment technology used.

(5) *Waste PCBs*. Hazardous debris that is also a waste PCB under 40 CFR part 761 is subject to the requirements of either 40 CFR part 761 or the

requirements of this section, whichever are more stringent.

(b) *Contaminants subject to treatment*. Hazardous debris must be treated for each "contaminant subject to treatment." The contaminants subject to treatment must be determined as follows:

(1) *Toxicity characteristic debris*. The contaminants subject to treatment for debris that exhibits the Toxicity Characteristic (TC) by § 261.24 of this chapter are those EP constituents for which the debris exhibits the TC toxicity characteristic.

(2) *Debris contaminated with listed waste*. The contaminants subject to treatment for debris that is contaminated with a prohibited listed hazardous waste are those constituents for which BDAT standards are established for the waste under §§ 268.41 and 268.43.

(3) *Cyanide reactive debris*. Hazardous debris that is reactive because of cyanide must be treated for cyanide.

(c) *Conditioned exclusion of treated debris*. Hazardous debris that has been treated using one of the specified extraction or destruction technologies in Table 1 of this section, and that does not exhibit a characteristic of hazardous waste identified under subpart C, part 261, of this chapter after treatment is not a hazardous waste and need not be managed in a subtitle C facility.

Hazardous debris contaminated with a listed waste that is treated by an immobilization technology specified in

Table 1 is a hazardous waste and must be managed in a subtitle C facility.

(d) *Treatment residuals*—(1) *General requirements*. Except as provided by paragraphs (d)(2) and (d)(4) of this section:

(i) Residue from the treatment of hazardous debris must be separated from the treated debris using simple physical or mechanical means; and

(ii) Residue from the treatment of hazardous debris is subject to the waste-specific treatment standards provided by subpart D of this part for the waste contaminating the debris.

(2) *Nontoxic debris*. Residue from the deactivation of ignitable, corrosive, or reactive characteristic hazardous debris (other than cyanide-reactive) that is not contaminated with a contaminant subject to treatment defined by paragraph (b) of this section, must be deactivated prior to land disposal and is not subject to the waste-specific treatment standards of subpart D of this part.

(3) *Cyanide-reactive debris*. Residue from the treatment of debris that is reactive because of cyanide must meet the standards for D003 under § 268.43.

(4) *Ignitable nonwastewater residue*. Ignitable nonwastewater residue containing equal to or greater than 10% total organic carbon is subject to the technology-based standards for D001: "Ignitable Liquids based on § 261.21(a)(1)" under § 268.42.

(5) *Residue from spalling*. Layers of debris removed by spalling are hazardous debris that remain subject to the treatment standards of this section.

TABLE 1.—ALTERNATIVE TREATMENT STANDARDS FOR HAZARDOUS DEBRIS <sup>1</sup>

Technology description	Performance and/or design and operating standard	Contaminant restrictions <sup>2</sup>
<b>A. Extraction Technologies:</b>		
<b>1. Physical Extraction</b>		
a. <i>Abrasive Blasting</i> : Removal of contaminated debris surface layers using water and/or air pressure to propel a solid media (e.g., steel shot, aluminum oxide grit, plastic beads).	<i>Glass, Metal, Plastic, Rubber</i> : Treatment to a clean debris surface. <sup>3</sup> <i>Brick, Cloth, Concrete, Paper, Pavement, Rock, Wood</i> : Removal of at least 0.6 cm of the surface layer; treatment to a clean debris surface. <sup>3</sup>	<i>All Debris</i> : None.
b. <i>Scarification, Grinding, and Planing</i> : Process utilizing striking piston heads, saws, or rotating grinding wheels such that contaminated debris surface layers are removed.	Same as above.....	Same as above.
c. <i>Spalling</i> : Drilling or chipping holes at appropriate locations and depth in the contaminated debris surface and applying a tool which exerts a force on the sides of those holes such that the surface layer is removed. The surface layer removed remains hazardous debris subject to the debris treatment standards.	Same as above.....	Same as above.
d. <i>Vibratory Finishing</i> : Process utilizing scrubbing media, flushing fluid, and oscillating energy such that hazardous contaminants or contaminated debris surface layers are removed. <sup>4</sup>	Same as above.....	Same as above.

TABLE 1.—ALTERNATIVE TREATMENT STANDARDS FOR HAZARDOUS DEBRIS <sup>1</sup>—Continued

Technology description	Performance and/or design and operating standard	Contaminant restrictions <sup>2</sup>
<p>e. <i>High Pressure Steam and Water Sprays:</i> Application of water or steam sprays of sufficient temperature, pressure, residence time, agitation, surfactants, and detergents to remove hazardous contaminants from debris surfaces or to remove contaminated debris surface layers.</p>	Same as above.....	Same as above.
<p>2. Chemical Extraction                      a. <i>Water Washing and Spraying:</i> Application of water sprays or water baths of sufficient temperature, pressure, residence time, agitation, surfactants, acids, bases, and detergents to remove hazardous contaminants from debris surfaces and surface pores or to remove contaminated debris surface layers.</p>	<p><i>All Debris:</i> Treatment to a clean debris surface;<sup>3</sup>  <i>Brick, Cloth, Concrete, Paper, Pavement, Rock, Wood:</i> Debris must be no more than 1.2 cm (½ inch) in one dimension (i.e., thickness limit),<sup>3</sup> except that this thickness limit may be waived under an "Equivalent Technology" approval under § 268.42(b);<sup>3</sup> debris surfaces must be in contact with water solution for at least 15 minutes</p>	<p><i>Brick, Cloth, Concrete, Paper, Pavement, Rock, Wood:</i> Contaminant must be soluble to at least 5% by weight in water solution or 5% by weight in emulsion; if debris is contaminated with a dioxin-listed waste,<sup>4</sup> an "Equivalent Technology" approval under § 268.42(b) must be obtained.<sup>4</sup></p>
<p>b. <i>Liquid Phase Solvent Extraction:</i> Removal of hazardous contaminants from debris surfaces and surface pores by applying a nonaqueous liquid or liquid solution which causes the hazardous contaminants to enter the liquid phase and be flushed away from the debris along with the liquid or liquid solution while using appropriate agitation, temperature, and residence time.<sup>4</sup></p>	Same as above.....	<p><i>Brick, Cloth, Concrete, Paper, Pavement, Rock, Wood:</i> Same as above, except that contaminant must be soluble to at least 5% by weight in the solvent.</p>
<p>c. <i>Vapor Phase Solvent Extraction:</i> Application of an organic vapor using sufficient agitation, residence time, and temperature to cause hazardous contaminants on contaminated debris surfaces and surface pores to enter the vapor phase and be flushed away with the organic vapor.<sup>4</sup></p>	Same as above, except that brick, cloth, concrete, paper, pavement, rock and wood surfaces must be in contact with the organic vapor for at least 60 minutes.	Same as above.
<p>3. Thermal Extraction                      a. <i>High Temperature Metals Recovery:</i> Application of sufficient heat, residence time, mixing, fluxing agents, and/or carbon in a smelting, melting, or refining furnace to separate metals from debris.</p>	<p>For refining furnaces, treated debris must be separated from treatment residuals using simple physical or mechanical means,<sup>5</sup> and, prior to further treatment, such residuals must meet the waste-specific treatment standards for organic compounds in the waste contaminating the debris.</p>	<p><i>Debris contaminated with a dioxin-listed waste:</i><sup>6</sup> Obtain an "Equivalent Technology" approval under § 268.42(b).<sup>6</sup></p>
<p>b. <i>Thermal Desorption:</i> Heating in an enclosed chamber under either oxidizing or nonoxidizing atmospheres at sufficient temperature and residence time to vaporize hazardous contaminants from contaminated surfaces and surface pores and to remove the contaminants from the heating chamber in a gaseous exhaust gas.<sup>7</sup></p>	<p><i>All Debris:</i> Obtain an "Equivalent Technology" approval under § 268.42(b);<sup>8</sup> treated debris must be separated from treatment residuals using simple physical or mechanical means,<sup>9</sup> and, prior to further treatment, such residue must meet the waste-specific treatment standards for organic compounds in the waste contaminating the debris.  <i>Brick, Cloth, Concrete, Paper, Pavement, Rock, Wood:</i> Debris must be no more than 10 cm (4 inches) in one dimension (i.e., thickness limit),<sup>8</sup> except that this thickness limit may be waived under the "Equivalent Technology" approval</p>	<p><i>All Debris:</i> Metals other than mercury.</p>
<p>B. Destruction Technologies:</p>		
<p>1. <i>Biological Destruction (Biodegradation):</i> Removal of hazardous contaminants from debris surfaces and surface pores in an aqueous solution and biodegradation of organic or nonmetallic inorganic compounds (i.e., inorganics that contain phosphorus, nitrogen, or sulfur) in units operated under either aerobic or anaerobic conditions.</p>	<p><i>All Debris:</i> Obtain an "Equivalent Technology" approval under § 268.42(b);<sup>8</sup> treated debris must be separated from treatment residuals using simple physical or mechanical means,<sup>9</sup> and, prior to further treatment, such residue must meet the waste-specific treatment standards for organic compounds in the waste contaminating the debris.  <i>Brick, Cloth, Concrete, Paper, Pavement, Rock, Wood:</i> Debris must be no more than 1.2 cm (½ inch) in one dimension (i.e., thickness limit),<sup>8</sup> except that this thickness limit may be waived under the "Equivalent Technology" approval</p>	<p><i>All Debris:</i> Metal contaminants.</p>
<p>2. Chemical Destruction</p>		
<p>a. <i>Chemical Oxidation:</i> Chemical or electrolytic oxidation utilizing the following oxidation reagents (or waste reagents) or combination of reagents—(1) hypochlorite (e.g., bleach); (2) chlorine; (3) chlorine dioxide; (4) ozone or UV (ultraviolet light) assisted ozone; (5) peroxides; (6) persulfates; (7) perchlorates; (8) permanganates; and/or (9) other oxidizing reagents of equivalent destruction efficiency.<sup>4</sup> Chemical oxidation specifically includes what is referred to as alkaline chlorination.</p>	<p><i>All Debris:</i> Obtain an "Equivalent Technology" approval under § 268.42(b);<sup>8</sup> treated debris must be separated from treatment residuals using simple physical or mechanical means,<sup>9</sup> and, prior to further treatment, such residue must meet the waste-specific treatment standards for organic compounds in the waste contaminating the debris.  <i>Brick, Cloth, Concrete, Paper, Pavement, Rock, Wood:</i> Debris must be no more than 1.2 cm (½ inch) in one dimension (i.e., thickness limit),<sup>8</sup> except that this thickness limit may be waived under the "Equivalent Technology" approval</p>	<p><i>All Debris:</i> Metal contaminants.</p>

TABLE 1.—ALTERNATIVE TREATMENT STANDARDS FOR HAZARDOUS DEBRIS <sup>1</sup>—Continued

Technology description	Performance and/or design and operating standard	Contaminant restrictions <sup>2</sup>
<p>b. <i>Chemical Reduction</i>: Chemical reaction utilizing the following reducing reagents (or waste reagents) or combination of reagents: (1) sulfur dioxide; (2) sodium, potassium, or alkali salts of sulfites, bisulfites, and metabisulfites, and polyethylene glycols (e.g., NaPEG and KPEG); (3) sodium hydrosulfide; (4) ferrous salts; and/or (5) other reducing reagents of equivalent efficiency.<sup>4</sup></p> <p>3. <i>Thermal Destruction</i>: Treatment in an incinerator operating in accordance with Subpart O of Parts 264 or 265 of this chapter; a boiler or industrial furnace operating in accordance with Subpart H of Part 266 of this chapter, or other thermal treatment unit operated in accordance with Subpart X, Part 264 of this chapter, or Subpart P, Part 265 of this chapter, but excluding for purposes of these debris treatment standards Thermal Desorption units.</p>	<p>Same as above.....</p> <p>Treated debris must be separated from treatment residuals using simple physical or mechanical means,<sup>9</sup> and, prior to further treatment, such residue must meet the waste-specific treatment standards for organic compounds in the waste contaminating the debris.</p>	<p>Same as above.</p> <p><i>Brick, Concrete, Glass, Metal, Pavement, Rock, Metal</i>: Metals other than mercury, except that there are no metal restrictions for vitrification.</p> <p><i>Debris contaminated with a dioxin-listed waste.</i><sup>6</sup> Obtain an "Equivalent Technology" approval under § 268.42(b),<sup>8</sup> except that this requirement does not apply to vitrification.</p>
<p>C. Immobilization Technologies:</p> <p>1. <i>Macroencapsulation</i>: Application of surface coating materials such as polymeric organics (e.g., resins and plastics) or use of a jacket of inert inorganic materials to substantially reduce surface exposure to potential leaching media.</p> <p>2. <i>Microencapsulation</i>: Stabilization of the debris with the following reagents (or waste reagents) such that the leachability of the hazardous contaminants is reduced: (1) Portland cement; or (2) lime/pozzolans (e.g., fly ash and cement kiln dust). Reagents (e.g., iron salts, silicates, and clays) may be added to enhance the set/cure time and/or compressive strength, or to reduce the leachability of the hazardous constituents.<sup>5</sup></p> <p>3. <i>Sealing</i>: Application of an appropriate material which adheres tightly to the debris surface to avoid exposure of the surface to potential leaching media. When necessary to effectively seal the surface, sealing entails pretreatment of the debris surface to remove foreign matter and to clean and roughen the surface. Sealing materials include epoxy, silicone, and urethane compounds, but paint may not be used as a sealant.</p>	<p>Encapsulating material must completely encapsulate debris and be resistant to degradation by the debris and its contaminants and materials into which it may come into contact after placement (leachate, other waste, microbes).</p> <p>Leachability of the hazardous contaminants must be reduced.</p> <p>Sealing must avoid exposure of the debris surface to potential leaching media and sealant must be resistant to degradation by the debris and its contaminants and materials into which it may come into contact after placement (leachate, other waste, microbes).</p>	<p>None.</p> <p>None.</p> <p>None.</p>

<sup>1</sup> Hazardous debris must be treated by either these standards or the waste-specific treatment standards for the waste contaminating the debris. The treatment standards must be met for each type of debris contained in a mixture of debris types, unless the debris is converted into treatment residue as a result of the treatment process. Debris treatment residuals are subject to the waste-specific treatment standards for the waste contaminating the debris.

<sup>2</sup> Contaminant restriction means that the technology is not BDAT for that contaminant. If debris containing a restricted contaminant is treated by the technology, the contaminant must be subsequently treated by a technology for which it is not restricted in order to be land disposed (and excluded from Subtitle C regulation).

<sup>3</sup> "Clean debris surface" means the surface, when viewed without magnification, shall be free of all visible contaminated soil and hazardous waste except that residual staining from soil and waste consisting of light shadows, slight streaks, or minor discolorations, and soil and waste in cracks, crevices, and pits may be present provided that such staining and waste and soil in cracks, crevices, and pits shall be limited to no more than 5% of each square inch of surface area.

<sup>4</sup> Acids, solvents, and chemical reagents may react with some debris and contaminants to form hazardous compounds. For example, acid washing of cyanide-contaminated debris could result in the formation of hydrogen cyanide. Some acids may also react violently with some debris and contaminants, depending on the concentration of the acid and the type of debris and contaminants. Debris treaters should refer to the safety precautions specified in Material Safety Data Sheets for various acids to avoid applying an incompatible acid to a particular debris/contaminant combination. For example, concentrated sulfuric acid may react violently with certain organic compounds, such as acrylonitrile.

<sup>5</sup> If reducing the particle size of debris to meet the treatment standards results in material that no longer meets the 60 mm minimum particle size limit for debris, such material is subject to the waste-specific treatment standards for the waste contaminating the material, unless the debris has been cleaned and separated from contaminated soil and waste prior to size reduction. At a minimum, simple physical or mechanical means must be used to provide such cleaning and separation of nondebris materials to ensure that the debris surface is free of caked soil, waste, or other nondebris material.

<sup>6</sup> Dioxin-listed wastes are EPA Hazardous Waste numbers FO20, FO21, FO22, FO23, FO26, and FO27.

<sup>7</sup> Thermal desorption is distinguished from Thermal Destruction in that the primary purpose of Thermal Desorption is to volatilize contaminants and to remove them from the treatment chamber for subsequent destruction or other treatment.

<sup>8</sup> The demonstration "Equivalent Technology" under § 268.42(b) must document that the technology treats contaminants subject to treatment to a level equivalent to that required by the performance and design and operating standards for other technologies in this table such that residual levels of hazardous contaminants will not pose a hazard to human health and the environment absent management controls.

<sup>9</sup> Any soil, waste, and other nondebris material that remains on the debris surface (or remains mixed with the debris) after treatment is considered a treatment residual that must be separated from the debris using, at a minimum, simple physical or mechanical means. Examples of simple physical or mechanical means are vibratory or trommel screening or water washing. The debris surface need not be cleaned to a "clean debris surface" as defined in note 3 when separating treated debris from residue; rather, the surface must be free of caked soil, waste, or other nondebris material. Treatment residuals are subject to the waste-specific treatment standards for the waste contaminating the debris.

39. In subpart D, § 268.46 is added to read as follows:

**§ 268.46 Alternative treatment standards based on HTMR.**

Table 1 identifies alternative treatment standards for F006 and K062 nonwastewaters.

TABLE 1.—ALTERNATIVE TREATMENT STANDARDS

Waste code	See also	Regulated hazardous constituent	CAS No. for regulated hazardous constituent	Non-wastewaters concentration (mg/l) TCLP
F006	Table CCWE in 268.41 and Table CCW in 268.43	Antimony	7440-36-0	2.1
		Arsenic	7440-38-2	0.055
		Barium	7440-39-3	7.6
		Beryllium	7440-41-7	0.014
		Cadmium	7440-43-9	0.19
		Chromium (total)	7440-47-32	0.33
		Cyanide (mg/kg) (total)	57-12-5	1.8
		Lead	7439-92-1	0.37
		Mercury	7439-97-6	0.009
		Nickel	7440-02-0	5.0
		Selenium	7782-49-2	0.16
		Silver	7440-22-4	0.30
		Thallium		0.078
		Zinc	7440-66-6	5.3
K062	Table CCWE in 268.41 and Table CCW in 268.43	Antimony	7440-36-0	2.1
		Arsenic	7440-38-2	0.055
		Barium	7440-39-3	7.6
		Beryllium	7440-41-7	0.014
		Cadmium	7440-43-9	0.19
		Chromium (total)	7440-47-32	0.33
		Lead	7439-92-1	0.37
		Mercury	7439-97-6	0.009
		Nickel	7440-02-0	5.0
		Selenium	7782-49-2	0.16
		Silver	7440-22-4	0.30
		Thallium		0.078
		Zinc	7440-66-8	5.3

40. In § 268.50, paragraph (a)(1) and the introductory text of paragraph (a)(2) are revised to read as follows:

**§ 268.50 Prohibitions on storage of restricted wastes.**

(a) \* \* \*

(1) A generator stores such wastes in tanks, containers, or containment buildings on-site solely for the purpose of the accumulation of such quantities of hazardous waste as necessary to facilitate proper recovery, treatment, or disposal and the generator complies with the requirements in § 262.34 and parts 264 and 265 of this chapter.

(2) An owner/operator of a hazardous waste treatment, storage, or disposal facility stores such wastes in tanks, containers, or containment buildings solely for the purpose of the accumulation of such quantities of hazardous waste as necessary to facilitate proper recovery, treatment, or disposal and:

\* \* \* \* \*

41. In Part 268, appendix II is revised to read as follows:

**Appendix II—Treatment Standards (As Concentrations in the Treatment Residual Extract)**

Note: The treatment standards for F001–F005 Spent Solvent Wastes appear in §§ 268.41, 268.42, 268.43.

**PART 270—EPA ADMINISTERED PERMIT PROGRAMS: THE HAZARDOUS WASTE PERMIT PROGRAM**

42. The authority citation for part 270 continues to read as follows:

Authority: 42 U.S.C. 6905, 6912, 6924, 6925, 6927, 6939, and 6974.

43. In § 270.13, paragraph (n) is added to read as follows:

**§ 270.13 Contents of Part A of the permit application.**

\* \* \* \* \*

(n) For hazardous debris, a description of the debris category(ies) and contaminant category(ies) to be treated, stored, or disposed of at the facility.

44. In § 270.14, paragraph (b)(2) is revised to read as follows:

**§ 270.14 Contents of Part B: General requirements.**

\* \* \* \* \*

(b) \* \* \*

(2) Chemical and physical analyses of the hazardous waste and hazardous debris to be handled at the facility. At a minimum, these analyses shall contain all the information which must be known to treat, store, or dispose of the wastes properly in accordance with part 264 of this chapter.

\* \* \* \* \*

45. In § 270.42, paragraph (e)(3)(ii)(B) is revised to read as follows:

**§ 270.42 Permit modification at the request of the permittee.**

\* \* \* \* \*

(e) \* \* \*

(ii) \* \* \*

(B) To allow treatment or storage in tanks or containers, or in containment buildings in accordance with 40 CFR part 268;

\* \* \* \* \*

46. In § 270.42, appendix I is amended by adding entry 6 to section I., and by adding new section M. to read as follows:

**APPENDIX I TO § 270.42—CLASSIFICATION OF PERMIT MODIFICATION**

Modifications	Class
I. Enclosed Waste Piles. * * *	
6. Conversion of an enclosed waste pile to a containment building unit	2
M. Containment Buildings.	
1. Modification or addition of containment building units:	
a. Resulting in greater than 25% increase in the facility's containment building storage or treatment capacity	3
b. Resulting in up to 25% increase in the facility's containment building storage or treatment capacity	2
2. Modification of a containment building unit or secondary containment system without increasing the capacity of the unit...	2
3. Replacement of a containment building with a containment building that meets the same design standards provided:	
a. The unit capacity is not increased	1



APPENDIX I TO § 270.42—CLASSIFICATION OF PERMIT MODIFICATION—Continued

Modifications	Class
b. The replacement containment building meets the same conditions in the permit.....	1
4. Modification of a containment building management practice.....	2
5. Storage or treatment of different wastes in containment buildings:	
a. That require additional or different management practices.....	3
b. That do not require additional or different management practices.....	2

47. In § 270.72, paragraph (b)(6) is revised to read as follows:

§ 270.72 Changes during interim status.

\* \* \* \* \*

(b) \* \* \*

(6) Changes to treat or store, in tanks, containers, or containment buildings, hazardous wastes subject to land disposal restrictions imposed by part 268 of this chapter or RCRA section 3004, provided that such changes are made solely for the purpose of complying with part 268 of this chapter or RCRA section 3004.

\* \* \* \* \*

**PART 271—REQUIREMENTS FOR AUTHORIZATION OF STATE HAZARDOUS WASTE PROGRAMS**

48. 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**

49. Section 271.1(j) is amended by adding the following entries to Table 1 in chronological order by date of publication in the **Federal Register**, and by adding the following entries to Table 2 in chronological order by effective date to read as follows:

§ 271.1 Purpose and scope.

\* \* \* \* \*

TABLE 1.—REGULATIONS IMPLEMENTING THE HAZARDOUS AND SOLID WASTE AMENDMENTS OF 1984

Promulgation date	Title of regulation	Federal Register reference	Effective date
August 18, 1992	Land disposal restrictions for newly listed wastes in § 268.36 (b)-(g).	[Insert <b>Federal Register</b> (FR) page number].	June 30, 1992.
Do	Land disposal restrictions for newly listed wastes in § 268.36(a), hazardous debris, and generic exclusion for K062 and F006 non-waste-waters.	Do	November 9, 1992.

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

Effective date	Self-implementing provision	RCRA citation	Federal Register reference
June 30, 1992	Surface Impoundment Retrofit.....	[Insert <b>Federal Register</b> (FR) page numbers].	August 18, 1992, 57 FR
November 9, 1992	Prohibition on land disposal of hazardous debris and newly listed wastes.	Do	August 18, 1992, 57 FR
February 18, 1993	Containment buildings.....	Do	August 18, 1992, 57 FR

\* \* \* \* \*

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