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Background Document for Capacity Analysis for Land Disposal Restrictions Phase III - Decharacterized Waste-waters, Carbamate Wastes, and Spent Potliners (Final Rule)

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Volume 1: Capacity Analysis and Methodology

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CHAPTER 1
INTRODUCTION

This document presents the capacity analysis that EPA conducted to support the Land Disposal Restrictions (LDRs) -- Phase III: Decharacterized Wastewaters, Carbamate Wastes, and Spent Potliners. EPA conducts capacity analyses to evaluate the need for national capacity variances from the land disposal prohibitions.[1] The capacity analysis provides estimates of the quantities of wastes that will require alternative commercial treatment prior to land disposal as a result of the LDRs and estimates alternative commercial treatment capacity available to manage wastes restricted from land disposal. In this rule, EPA is finalizing LDRs for certain wastes listed and identified since November 1984 that were not covered in previous LDR rulemakings as well as ignitable, corrosive, and organic wastes managed in CWA or CWA-equivalent treatment systems.[2] The wastes covered by this rule are summarized in Exhibit 1-1.

1.1 LEGAL BACKGROUND

The Hazardous and Solid Waste Amendments (HSWA) to the Resource Conservation and Recovery Act (RCRA), enacted on November 8, 1984, set basic new priorities for hazardous waste management. Land disposal, which had been the most widely used method for managing hazardous waste, is now the least preferred option. Under HSWA, EPA must promulgate regulations restricting the land disposal[3] of hazardous wastes according to a strict statutory schedule. As of the effective date of each regulation, land disposal of untreated wastes covered by that regulation is prohibited unless it can be demonstrated that there will be no migration of hazardous constituents from the disposal unit for as long as the waste remains hazardous.

Under the LDR Program, EPA must identify levels or methods of treatment that substantially reduce the toxicity of a waste or the likelihood of migration of hazardous constituents from the waste. Whenever possible, the Agency prefers to define treatment in terms of performance (i.e., levels of treatment, expressed as a concentration of hazardous constituents in residuals from treatment) rather than in terms of specific treatment methods and thus provide the regulated community with flexibility in complying with the LDRs. EPA's standards are generally based on the performance of

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[1] The LDRs are effective when promulgated unless the Administrator grants a national capacity variance from the otherwise applicable date and establishes a different date (not to exceed two years beyond the statutory deadline) based on: "... the earliest date on which adequate alternative treatment, recovery, or disposal capacity which protects human health and the environment will be available" (RCRA section 3004(h)(2)).

[2] This document only addresses surface disposed wastes. Wastes managed in Safe Drinking Water Act (SWDA), underground injection wells are addressed in a separate document.

[3] RCRA defines land disposal "to include, but not be limited to, any placement of such hazardous waste in a landfill, surface impoundment, waste pile, injection well, land treatment facility, salt dome formation, salt bed formation, or underground mine or cave" (RCRA section 3004(k)).

EXHIBIT 1-1

WASTES FOR WHICH TREATMENT STANDARDS ARE BEING PROPOSED IN THE PHASE III LDR RULE

Waste Code	Description
Ignitable Wastes (D001)	All wastes that: (a) at the point of generation exhibit the characteristic of ignitability (D001) and contain underlying hazardous constituents above UTS; (b) currently have a treatment standard of deactivation; and (c) are decharacterized and subsequently managed in: (1) land-based disposal units regulated under the Clean Water Act (CWA); (2) CWA-equivalent systems prior to ultimate land disposal; or (3) Class I underground injection wells regulated under the Safe Drinking Water Act (SDWA).
Corrosive Wastes (D002)	Wastes that: (a) at the point of generation exhibit the characteristic of corrosivity (D002) and contain underlying hazardous constituents above UTS; (b) currently have a treatment standard of deactivation; and (c) are decharacterized and subsequently managed in: (1) land-based disposal units regulated under CWA; (2) CWA-equivalent systems prior to ultimate land disposal; or (3) Class I underground injection wells regulated under SDWA.
Reactive Wastes (D003)	Wastes that: (a) at the point of generation exhibit the characteristic of reactivity (D003) and contain underlying hazardous constituents above UTS; (b) currently have a treatment standard of deactivation; and (c) pose a risk of violent reaction when they are diluted.
Newly Identified Pesticide Wastes (D012-D017)	Wastes that (a) at the point of generation contain Endrin (D012), Lindane (D013), Methoxychlor (D014), Toxaphene (D015), 2,4-D (D016), or 2,4,5-TP Silvex (D017); (b) are identified as hazardous by the Toxicity Characteristic Leaching Procedure (TCLP) but were not previously hazardous under the Extraction Procedure (EP) test; and (c) are subsequently managed in: (1) land-based disposal units regulated under CWA; or (2) CWA-equivalent systems prior to ultimate land disposal.

EXHIBIT 1-1 (Continued)

WASTES FOR WHICH TREATMENT STANDARDS ARE BEING PROPOSED IN THE PHASE III LDR RULE

Waste Code	Description
Newly Identified TC Organic Wastes (D018-D043)	Wastewaters and nonwastewaters that: (a) at the point of generation contain benzene (D018), carbon tetrachloride (D019), chlordane (D020), chlorobenzene (D021), chloroform (D022), *ortho*-cresol (D023), *meta*-cresol (D024), *para*-cresol (D025), cresol (D026), 1,4-dichlorobenzene (D027), 1,2-dichloroethane (D028), 1,1-dichloroethylene (D029), 2,4-dinitrotoluene (D030), Heptachlor and Heptachlor epoxide (D031), hexachlorobenzene (D032), hexachloro-1,3-butadiene (D033), hexachloroethane (D034), methyl ethyl ketone (D035), nitrobenzene (D036), pentachlorophenol (D037), pyridine (D038), tetrachloroethylene (D039), trichloroethylene (D040), 2,4,5-trichlorophenol (D041), 2,4,6-trichlorophenol (D042), or vinyl chloride (D043); (b) are identified as hazardous by the TCLP; and (c) are subsequently managed in: (1) land-based disposal units regulated under CWA; (2) CWA-equivalent systems prior to ultimate land disposal; or (3) Class I underground injection wells regulated under SDWA.
Carbamate Production Wastes (K156-161, P127-128, P185, P188-192, P194, P196-199, P201-205, U271, U277-280, U364-367, U372-373, U375-379, U381-387, U389-396, U400-404, U407, U409-411)	Off-specification products, process wastes, and treatment wastes from the production of carbamates, carbamoyl oximes, thiocarbamates, and dithiocarbamates.
Spent Aluminum Potliners K088	Spent potliners removed from electrolytic cells at primary aluminum reduction facilities.
Mixed Radioactive Wastes	Any matrix containing a radioactive waste subject to the Atomic Energy Act and a RCRA hazardous waste from one of the following categories: (1) ICR or TC wastes managed in CWA or CWA-equivalent systems; (2) carbamate production wastes; (3) organobromine production wastes; or (4) spent aluminum potliners.

the best demonstrated available technology (BDAT), as documented by treatment data collected at well-designed and well-operated systems using that technology, or are based on data derived from the treatment of similar wastes that are as difficult or more difficult to treat.

The LDRs are effective immediately upon promulgation unless the Agency grants a national capacity variance from the statutory date because of a lack of available treatment capacity (see RCRA section 3004(h)(2). For every waste EPA considers, on a national basis, both the capacity of commercially available treatment technologies and the quantity of restricted wastes currently sent to land disposal for which on-site treatment capacity is not available. If EPA determines that adequate alternative commercial treatment capacity is available for a particular waste, the land disposal restriction goes into effect immediately. If not, the Agency establishes an alternative effective date based on the earliest date on which adequate treatment capacity will be available, or two-years, whichever is less. Once the variance expires, the wastes must meet the LDR treatment standards prior to being placed on the land.

RCRA also allows generators to apply for extensions to the LDRs on a case-by-case basis for specific wastes generated at a specific facility (RCRA section 3004(h)(3)). EPA may grant case-by-case extensions to applicants who can demonstrate that: (1) no capacity currently exists anywhere in the U.S. to treat a specific waste, and (2) a binding contractual commitment is in place to construct or otherwise provide alternative capacity, but due to circumstances beyond the applicant's control, such alternative capacity cannot reasonably be made available by the effective date (40 CFR 268.5).

HSWA's schedule divided hazardous wastes into three broad categories: solvent and dioxin wastes; California list wastes;[4] and "scheduled" wastes. EPA restricted surface disposed solvents and dioxins from land disposal on November 7, 1986 and deep well injected solvents and dioxins from land disposal on July 26, 1998. The final rule for California List wastes, which was issued on July 8, 1987, covers wastes originally listed by the State of California and adopted intact within HSWA. The "scheduled" wastes consist of all wastes that were identified or listed as hazardous prior to November 8, 1984 but were not included in the first two categories listed above. HSWA's statutory timetable required that EPA restrict one-third of these wastes by August 8, 1988, two-thirds by June 8, 1989, and the remaining third by May 8, 1990. For hazardous wastes that are newly identified or listed after November 8, 1984, EPA is required to promulgate land disposal prohibitions within six months of the date of identification or listing (RCRA section 3004(g)(4)). However, the statute does not provide an automatic prohibition of

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[4] The "California list" comprises the following classes of wastes: liquid hazardous wastes with a pH of less than or equal to 2.0 (acidic corrosive wastes); all liquid hazardous wastes containing free cyanides, various metals, and polychlorinated biphenyls (PCBs) exceeding statutory concentration levels; and all wastes (liquid, sludge, or solid) containing halogenated organic compounds (HOCs) in concentrations greater than or equal to specified statutory levels.

land disposal of such wastes if EPA fails to meet this deadline. Exhibit 1-2 summarizes the previous LDR rulemakings and their respective promulgation dates.

EXHIBIT 1-2

SUMMARY OF PREVIOUS LAND DISPOSAL RESTRICTIONS RULEMAKINGS

Rulemaking	Federal Register Notice	Promulgation Date
Solvents and Dioxins (surface disposed)	51 *FR* 40572	November 7, 1986
Solvents and Dioxins (deep well injected)	53 *FR* 28188	July 26, 1988
California List (surface disposed)	52 *FR* 25760	July 8, 1987
California List (deep well injected)	53 *FR* 30908	July 26, 1988
First Third Rule	53 *FR* 31138	August 8, 1988
First Third Rule (deep well injected)	54 *FR* 25416	June 7, 1989
Second Third Rule	54 *FR* 26594	June 8, 1989
Third Third Rule	55 *FR* 22520	May 8, 1990
Newly Listed and Identified Wastes (Phase I)	57 *FR* 37194	June 30, 1992
Interim Final Rule for Vacated Treatment Standards	58 *FR* 29860	May 24, 1993
Organic TC Wastes and Newly Listed Wastes (Phase II)	59 *FR* 47982	September 19, 1994

1.2 CAPACITY ANALYSIS METHODOLOGY

In evaluating the need for national capacity variances, EPA estimates the quantities of waste requiring alternative commercial treatment as a result of the land disposal restrictions and the capacity available at commercial treatment facilities to manage the restricted wastes.[5] By comparing the capacity demand with the available commercial capacity, EPA can identify capacity shortfalls and make determinations concerning national capacity variances. This section provides an overview of EPA's methodology in estimating required commercial treatment capacity, briefly summarizes the capacity analysis conducted for today's rule, and highlights the national capacity variances that EPA is granting in today's rule.

1.2.1 Determination of Required Commercial Treatment Capacity

Required commercial treatment capacity represents the quantity of wastes currently being land disposed that cannot be treated on site and, consequently, will need commercial treatment to meet the LDR treatment standards. Required commercial capacity also includes the residuals generated by treatment of these wastes (i.e., the quantity of generated residuals that will need treatment prior to land disposal).

EPA identifies the waste streams potentially affected by the LDRs by types of land disposal units, including surface impoundment, waste pile, land treatment unit, landfill, and underground injection well. Salt dome formations, salt bed formations, and underground mines and caves are additional methods of land disposal that are affected by the LDRs. Since insufficient information is available to document the quantity of wastes disposed of by these three methods, they are not addressed in the analysis of required alternative capacity.

To determine the type of alternative capacity required to treat the affected wastes, EPA conducts a "treatability analysis" of each waste stream. Based on the waste's physical and chemical form and information on prior management practices, EPA assigns the quantity of affected waste to the appropriate best demonstrated available technology (BDAT). Mixtures of RCRA wastes (i.e., waste streams described by more than one waste code) present special treatability concerns because they often contain constituents

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[5] EPA also derived estimates of affected facilities and waste quantities for the regulatory impact analysis (RIA). Both the RIA and the capacity analysis examined wastes in the industrial sectors likely to generate most of the Phase IV wastes. However, the goals of a capacity analysis and an RIA are very different, which often results in some differences in methodologies, data, and results. A first step to satisfying the goals of a capacity analysis is to make a "threshold" determination concerning whether a national treatment capacity variance is needed for the two years following promulgation of a waste's LDR treatment standards. Thus, EPA estimates the required and available commercial treatment capacity for all affected wastes and facilities, but often only to the extent needed to make this threshold determination. For example, when upper-bound estimates of required capacity are well below lower-bound estimates of available capacity, then generally a variance is not needed and the analysis can stop. Similarly, when lower-bound estimates of required capacity far exceed the upper-bound estimates of available capacity, then often the two-year maximum capacity variance is needed. Results that are between these two extremes generally require EPA to conduct further analyses. In contrast to the capacity analysis' focus on required and available capacity during the next two years and its initial focus on threshold determinations, the RIA concentrates on estimating specific potential long-term costs and benefits of the LDR treatment standards. Typically, only the significant (or dominant) costs and benefits are assessed during the RIA. In summary, therefore, differences between the goals of the capacity analysis and the RIA are expected to result in reasonable differences in the methodologies, data, and results.

(e.g., organics and metals) requiring different types of treatment. To treat these wastes, EPA develops a treatment train that can treat all waste types in the group (e.g., incineration followed by stabilization of the incinerator ash). In these cases, the Agency estimates the amount of residuals that would be generated by treatment of the original quantity of waste and includes these residuals in the quantities requiring alternative treatment capacity.

EPA identifies the quantities of waste requiring alternative treatment on a facility level basis; if the appropriate treatment technology is not available on site, or if adequate available capacity is not present to manage the waste, then the appropriate quantity of waste requiring alternative treatment is aggregated into a national demand for commercial capacity. EPA excludes from the estimates of required commercial capacity those wastes that are managed in on-site treatment systems. A more detailed discussion of the methodology for determining the required commercial capacity for each group of wastes covered in this rule is presented in Chapters 3 through 6.

EPA collected generation and management information concerning the wastes covered in today's rule (Phase III wastes) from a number of sources. For the analysis of ICR and TC wastes managed in CWA and CWA-equivalent systems, the major data sources that EPA used include: the 1991 Biennial Reporting System (BRS); the 1992 Survey of Organic Toxicity Characteristic Wastes Managed in Land Disposal Units (TC Survey); the Permit Compliance System (PCS); the Toxics Release Inventory (TRI); Effluent Guidelines Background Documents; and comments to several *Federal Register* notices dealing with TC and ICR wastes including a Notice of Data Availability (58 *FR* 4972), Interim Final Rule (58 *FR* 29860), and the Phase II LDRs Proposed Rule (58 *FR* 48092).

For the newly listed wastes, EPA used a variety of sources including RCRA 1990-1991 §3007 Surveys of the carbamate production industry and the organobromine production industry, and a 1991 EPA study on spent aluminum potliners. Data on RCRA wastes mixed with radioactive wastes was primarily obtained from DOE's comment in response to the ANPRM and the Phase II proposed rule, from the National Profile of Commercially Generated Low-Level Radioactive Mixed Wastes, and from the Department of Energy's (DOE's) report on its mixed waste inventory. This capacity analysis also incorporates data from 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), and voluntary capacity data from several facilities in response to the Advance Notice of Proposed Rulemaking (ANPRM) (56 *FR* 55160, October 24, 1991) and the Phase II proposed rule (58 *FR* 48092, September 14, 1993).

1.2.2 Determination of Available Commercial Treatment Capacity

The analysis conducted to determine available commercial treatment capacity focuses on treatment capacity projected to be available in 1996, starting from the baseline capacity identified in the promulgated Phase II final LDR rule (59 *FR* 47892, September 19, 1994).[6] Capacity estimates obtained from the Phase I rule were adjusted, using two different approaches, to account for new treatment facilities expected to come on line. The first approach used an evaluation of planned capacity for facilities in the advanced stages of the permitting process. The second approach used data submitted by interested parties. These available capacity estimates then were adjusted to reflect the utilization of treatment capacity by Phase II wastes.

The determination of available capacity focuses on commercial facilities. Consequently, all estimates of capacity presented in this document represent commercially available (not private) capacity.[7] In order to determine whether to grant a national capacity variance for newly listed and identified wastes regulated in today's rule, EPA analyzed available commercial capacity for alternative treatment technologies capable of meeting the LDR treatment standards. This capacity analysis generally included estimating the maximum or design capacity for appropriate waste management systems and the amount of waste currently going to these systems (utilized capacity). Available capacity was estimated as the difference between maximum and utilized capacity. For today's rule, EPA analyzed commercial capacity for wastewater treatment systems, hazardous waste combustion (including incineration and reuse as fuel), and stabilization.

1.3 SUMMARY OF CAPACITY ANALYSIS FOR TODAY'S RULE

To estimate the need for national capacity variances, EPA estimated the quantities of waste requiring alternative commercial treatment as a result of the land disposal restrictions and the capacity available at commercial treatment facilities to manage the restricted wastes. Exhibit 1-3 indicates the total quantities of surface disposed wastes that will require alternative commercial treatment capacity as a result of the rule. The quantities of deep well disposed wastes that will require alternative commercial treatment capacity as a result of this rule are discussed in a separate document.

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[6] EPA, *Background Document for Capacity Analysis for Land Disposal Restrictions -- Phase II, Universal Treatment Standards, and Treatment Standards for Organic Toxicity Characteristic Wastes and Other Newly Listed Wastes (Final Rule)*, August 1994.

[7] Available treatment capacity can be categorized by facility status into four groups: (1) commercial capacity - capacity at facilities that manage waste from any facility; (2) on-site (private capacity) - capacity at facilities that manage only waste generated on-site; (3) captive capacity - capacity at facilities that manage only waste from other facilities under the same ownership; and (4) limited commercial capacity - capacity at facilities that manage waste from a limited number of facilities not under the same ownership. For all capacity analyses, estimates on available capacity reflect available commercial capacity.

EXHIBIT 1-3

QUANTITIES REQUIRING COMMERCIAL TREATMENT AS A RESULT OF THE LDRS

	Surface Disposed	
Waste Type	Quantities Requiring Alternative Capacity (tons/year)	Adequate Alternative Capacity Available? (Yes/No)
Ignitable, Corrosive, Reactive, and Newly Identified TC Organic Wastes Managed in CWA or CWA-Equivalent Systems	85,000,000 - 500,000,000[a]	No
Reactive Wastes Not Managed in CWA or CWA-Equivalent Systems[b]	<30,000	Yes
Newly Identified Pesticide Wastes	0	Yes
Carbamate Production Wastes	4,500	Yes
Spent Aluminum Potliners	100,000 - 125,000	No
Phase III Mixed Radioactive Wastes	2,500[c]	No

[a] These quantities are aggregated "end of pipe" quantities and are not the quantities of wastes prior to decharacterization.
[b] Non-sulfide and non-cyanide reactive (D003) wastes only.
[c] This estimate includes annual generation only and does not include any amount of currently stored wastes.

Exhibit 1-4 presents the quantities of required and available capacity, by treatment technology. As shown, EPA estimates that there will not be adequate commercial capacity for ignitable, corrosive, reactive, and newly identified TC organic wastes that will require treatment as a result this rule. Also, EPA estimates that there will not be adequate commercial capacity for mixed radioactive wastes containing newly listed and identified wastes that will require treatment as a result this rule. Any new commercial capacity that becomes available will be needed for mixed wastes that were regulated in previous LDR rulemakings, and whose variances have already expired.

Exhibit 1-5 summarizes the wastes for which EPA is granting a national capacity variance. EPA is granting a two-year national capacity variance for ignitable, corrosive, reactive, and newly identified TC organic wastes managed in CWA or CWA-equivalent treatment systems. EPA is granting a nine-month national capacity variance for all forms of K088 wastes. EPA is also granting a two-year national capacity variance for mixed RCRA/radioactive wastewaters and nonwastewaters contaminated with newly listed and identified wastes whose standards are being finalized in this rule.

EXHIBIT 1-4

QUANTITIES OF REQUIRED AND AVAILABLE TREATMENT CAPACITY, BY TECHNOLOGY (TONS)

Treatment Technology	Required Capacity	Available Capacity
Wastewater Treatment	85,000,000 - 500,000,000[a]	47,000,000
Liquid Combustion	0[b]	1,145,000
Sludge/Solid Combustion	4,500	120,500
Stabilization	0[c]	>1,000,000
K088 Thermal Treatment	100,000 - 125,000	111,000
High-Level Waste Treatment	1,300[d]	0[e]
Mixed Transuranic Waste Treatment	10[d]	0[e]
Low-Level Mixed Waste Treatment	400[d]	0[e]
Mixed Radioactive Soil Treatment	10[d]	0[e]
Mixed Radioactive Debris Treatment	1,000[d]	0[e]

[a] These quantities are aggregated "end of pipe" quantities and are not the quantities of wastes prior to decharacterization.

[b] EPA recognizes that some facilities could aggregate their wastewaters from the treatment train and send these wastes to liquid combustion, and therefore this quantity is known to be greater than zero.

[c] Stabilization may be required to treat underlying hazardous metal constituents in organic TC wastes, reactive wastes, or some K161 wastes after combustion.

[d] This estimate includes annual generation only and does not include any amount of currently stored wastes.

[e] Any capacity that is or will become available will be required for mixed wastes regulated in previous LDR rulemakings.

EXHIBIT 1-5

SUMMARY OF NATIONAL CAPACITY VARIANCES FOR PHASE III WASTES

Waste	Effective Date of Land Disposal Prohibition
Ignitable, Corrosive, Reactive, Newly Identified TC Organic Wastes Managed in CWA or CWA-Equivalent Systems	Two Years from Promulgation of Final Rule
Reactive Wastes not Managed in CWA or CWA-Equivalent Systems[a]	Three Months from Promulgation of Final Rule
Newly Identified Pesticide Waste	Three Months from Promulgation of Final Rule
Carbamate Production Wastes	Three Months from Promulgation of Final Rule
Spent Aluminum Potliners	Nine Months from Promulgation of Final Rule
Phase III Mixed Radioactive Wastes	Two Years from Promulgation of Final Rule

[a] The variance determinations listed here apply only to non-sulfide and non-cyanide reactive wastes (D003).

1.4 ORGANIZATION OF BACKGROUND DOCUMENT SUPPORTING THE CAPACITY ANALYSIS

EPA has prepared this background document to present the capacity analysis conducted for the LDRs for newly listed and identified wastes, mixed radioactive wastes, and contaminated soil and debris. This document is organized into six chapters and four appendices, as described below:

- **Chapter 1: Introduction.** Provides background, general methodology, and a summary of the analysis.

- **Chapter 2: Available Treatment Capacity.** Describes the methodology and data used to determine available capacity for wastewater treatment, combustion of liquids and solids, and stabilization.

- **Chapter 3: Capacity Analysis for ICR Wastes and TC Organic Wastes that are Managed in CWA or CWA-Equivalent Systems.** Discusses the methodology and data used to conduct the capacity analysis for ICR wastes and TC organic wastes that are managed in CWA or CWA-equivalent systems.

- **Chapter 4: Capacity Analysis for Other Newly Listed Wastes.** Describes the capacity analysis for carbamate production wastes (K156-161, P127-128, P185, P188-192, P194, P196-199, P201-205, U271, U277-280, U364-367, U372-373, U375-379, U381-387, U389-396, U400-404, U407, U409-411), organobromine production wastes (K140, U408), and spent aluminum potliners (K088).

- **Chapter 5: Capacity Analysis for Mixed Radioactive Wastes.** Discusses the methodology used for the capacity analysis of radioactive wastes mixed with newly listed and identified wastes for which LDRs are being promulgated in today's rule.

- **Chapter 6: Capacity Analysis for Non-Sulfide and Non-Cyanide Reactive (D003) Wastes Not Managed in CWA or CWA-Equivalent Systems.** Discusses the methodology and data used to conduct the capacity analysis for non-sulfide and non-cyanide reactive wastes not managed in CWA or CWA-equivalent systems for which LDRs are being promulgated in today's rule.

- **Appendices: Appendix A** presents the industry analyses conducted for the capacity analysis for ICR wastes and TC organic waste that are managed in CWA or CWA-equivalent systems. **Appendix B** presents a summary of the Office of Water's Waste Treatment Industry Questionnaire and data from the 1991 Biennial Reporting System on wastewater treatment capacity. **Appendix C** presents the telephone logs for the commercial combustion capacity analysis. **Appendix D** presents information on spent potliner treatment capacity. **Appendix E** presents wastewater and nonwastewater quantities of D003 wastes. **Appendix F** presents a report on case studies performed by EPA to assess the overlap between NPDES permits and the UTS for decharacterized ICRT wastewaters.

CHAPTER 2
AVAILABLE TREATMENT CAPACITY

This chapter presents EPA's estimates of available commercial treatment capacity for newly listed and identified wastes. Section 2.1 summarizes the results of EPA's analysis of the available wastewater treatment system capacity. Section 2.2 summarizes the results of EPA's analysis of commercial combustion capacity at incinerators and boilers and industrial furnaces (BIFs). Section 2.3 summarizes the results of EPA's analysis of the available commercial capacity for other treatment systems.

2.1 WASTEWATER TREATMENT SYSTEMS CAPACITY SUMMARY

This section summarizes the results of EPA's analysis of wastewater treatment systems for newly identified and newly listed wastewaters. This analysis used two data sources. The primary source was an Office of Water questionnaire specifically targeted to wastewater treatment systems. The second source, the 1991 Biennial Reporting System, was used to confirm the estimate provided by the first source.

In 1991, EPA's Office of Water (OW) developed the Waste Treatment Industry Questionnaire to collect information on centralized wastewater treatment capacity.[8] The information collected during this effort represents 1989 data and includes maximum and available treatment capacity. Exhibit 2-1 presents the information provided by individual facilities. All of the listed facilities have a final or interim RCRA permit. As shown, approximately 40 million tons (9.7 billion gallons) of wastewater treatment capacity are available each year at these facilities. In addition, there are 11 other treatment facilities that were not included in this estimate because they did not supply the requested capacity information. By assigning the average available capacity (630,000 tons per year) to each of the non-reporting facilities, EPA estimates a total available wastewater treatment capacity of 47 million tons each year.

EPA used the 1991 Biennial Reporting System (BRS) to confirm available wastewater treatment capacity. The BRS is a system by which RCRA-regulated treatment, storage, and disposal facilities (TSDFs) and large quantity generators provide EPA with information on their hazardous waste activities. The BRS contains information on the waste treatment systems, including both maximum and utilized capacity. EPA determined the available wastewater treatment capacity[9] reported in the BRS at facilities representing approximately 90 percent of the total operational capacity reported in the Waste Treatment Industry Questionnaire. According to the BRS, in total these facilities have 33 million tons of available capacity (7.9 billion gallons). (Appendix B presents the BRS data used to derive this estimate.) If this estimate is adjusted to reflect

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[8] Memorandum from Debra DiCianna, Engineering and Analysis Division, Office of Water, U.S. EPA to Bengie Carroll, Capacity Programs Branch, Office of Solid Waste, U.S. EPA, April 20, 1993. See Appendix B.

[9] Specifically, the estimate includes all aqueous organic and/or inorganic treatment systems.

EXHIBIT 2-1

AVAILABLE WASTEWATER TREATMENT CAPACITY

Name	EPA ID Number	Maximum Capacity (gallons)	% Used in 1989	Available Capacity (gallons)
Sloss Industries Corporation		548,000,000	33	367,160,000
Crosby and Overton, Inc.		2,340,000	100	0
Oil Process Co.	CADO5O806850	1,894,000	81	363,000
Southern California Chemical Co., Inc.		21,350,000	60	8,589,000
Romic Chem. Corp.		4,983,000	59	2,043,000
CP Chemicals		5,808,000	74	1,510,000
Chem-Tech Systems	CAT080033681	0	0	0
H&H Ship Service		0	0	0
Norris Industries, Inc.		477,791,000	45	262,355,000
Appropriate Technologies II, Inc.		8,943,000	18	7,333,000
Solvent Service Co., Inc.	CAD059494310	0	0	0
American Chemical & Refining Co.	CTD001184894	2,375,000	79	499,000
Envirite Corporation (CT)		53,500,000	30	37,552,000
Pratt & Whitney Aircraft Group MD & CPD.	CTD000844399	1,760,669,000	2	1,312,578,000
United Oil Recovery, Inc.		13,140,000	50	6,570,000
Cecos Treatment Corp.		62,500,000	6	58,738,000
Environmental Waste Resources, Inc.	CTD072138969	38,536,000	78	8,478,000
Alternate Energy Resources, Inc.		1,867,200,000	20	1,493,387,000
Pearl Hbr. Navy Public Works Ctr.		0	0	0
Maytag Co.		390,000,000	73	105,300,000
John Deere-Component Works		43,212,000	63	15,989,000
Envirite Corp. (IL)	ILD000666206	10,620,000	67	3,516,000
Peoria Disposal Co.-Pottstown		50,000,000	49	25,625,000

EXHIBIT 2-1 (Continued)

AVAILABLE WASTEWATER TREATMENT CAPACITY

Name	EPA ID Number	Maximum Capacity (gallons)	% Used in 1989	Available Capacity (gallons)
Chem-Clear, Inc.		36,000,000	47	19,080,000
Beaver Oil Co., Inc.	ILD064418353	14,000,000	20	11,200,000
Heritage Environmental Services, Inc.	IND093219012	299,290,000	30	209,443,000
Eli Lilly & Co. Tippecanoe Labs	IND006050967	0	0	0
Clean Harbors, Inc.	MDD980555189	44,100,000	12	38,808,000
American Waste Oil Corp.		6,240,000	80	1,248,000
Environmental Waste Control, Inc		60,000,000	30	42,000,000
Cyanokem		30,865,000	34	20,371,000
Dynecol, Inc.		36,320,000	50	18,291,000
Edwards Oil Co.		21,600,000	80	4,320,000
Metro Recovery Systems	MND981098478	15,130,000	50	7,565,000
Heritage Environmental Services, Inc	NCD121700777	7,500,000	72	2,100,000
Brunswick Corp.	NED043534635	244,000	3	237,000
Dupont E I De Nemours, Chamber Works	NJD002385730	14,600,000,000	78	3,212,000,000
CP Chemicals, Inc.	NJD002141950	54,000,000	90	5,400,000
Remtech Environmental Group		0	0	0
Chemical Waste Management of New Jersey	NJD089216790	52,560,000	23	40,471,000
Eticam	NVD980895338	750,000	14	647,000
Chemical Waste Management of New York		21,024,000	73	5,676,000
Cecos International	NYD080336241	0	0	0
Chemical Management, Inc.	NYD000691949	7,800,000	44	4,368,000
Envirite Corp.		63,963,000	44	35,909,000
Clark Processing, Inc.		6,500,000	86	910,000
Research Oil Co.	OHD004178612	86,300,000	49	44,013,000
Brush Wellman, Inc.		0	0	0

EXHIBIT 2-1 (Continued)

AVAILABLE WASTEWATER TREATMENT CAPACITY

Name	EPA ID Number	Maximum Capacity (gallons)	% Used in 1989	Available Capacity (gallons)
Cecos International, Inc.	OHD087433744	23,400,000	12	20,592,000
Clean Harbors	OHD000724153	63,000,000	65	22,050,000
Conoco, Inc. Ponca City	OKD007233836	720,000,000	92	57,600,000
US Pollution Control, Inc.		6,000,000	50	3,000,000
Tektronix, Inc.	ORD009020231	407,788,000	13	353,675,000
Waste Conversion, Inc.	PAD085690592	35,986,000	80	7,197,000
Envirite Corporation (PA)	PAD010154045	30,000,000	79	6,300,000
Mill Service, Inc.	PAD059087072	74,200,000	57	32,129,000
Mill Service, Inc. Yukon Plt.		164,000,000	44	91,840,000
Eticam	RID980906986	6,000,000	42	3,480,000
CP Chemicals, Inc.		45,602,000	61	17,785,000
Tricil Environmental Services, Inc.		89,712,000	9	81,638,000
TN Eastman Div. Eastman Kodak	TND003376928	8,710,000	88	1,045,000
Osco Incorporated		0	0	0
Intercontinental Terminals Co.		100,000,000	17	83,000,000
Encycle/Texas, Inc.		120,500,000	30	84,892,000
Empac, Inc. Deer Park		316,411,000	35	205,636,000
Treatment One, Div. of Set Environmental, Inc.		2,000,000	2	1,960,000
Belpar Environmental of Virginia, Inc.		390,000	70	117,000
Boeing Co.-Auburn	WAD041337130	371,935,000	42	214,123,000
Crosby and Overton, Inc. Plant 2		20,752,000	1	20,646,000
Chemical Processors, Inc.		13,142,000	40	7,830,000
Chemical Processors, Inc.		0	0	0
Chemical Processors, Inc.		17,001,000	41	10,102,000
Petroleum Reclaiming Service, Inc.		15,750,000	11	14,018,000

EXHIBIT 2-1 (Continued)

AVAILABLE WASTEWATER TREATMENT CAPACITY

Name	EPA ID Number	Maximum Capacity (gallons)	% Used in 1989	Available Capacity (gallons)
Northwest Enviroservice, Inc.		35,640,000	62	13,458,000
Union Carbide AGR. Prod. Co., Inc.	WVD004325353	2,102,000,000	57	903,860,000
Inco Alloys International, Inc.	WVD076826015	0	0	0
Total		**25,616,967,000**		**9,699,612,000**

the fact that it only represents 90 percent of the total operational capacity, approximately 37 million tons (33 million tons divided by 0.9) of available wastewater treatment capacity are available. This estimate is within 22 percent of the estimate obtained from the OW Questionnaire.

2.2 COMMERCIAL COMBUSTION CAPACITY SUMMARY

Commercial capacity for combustion is available at both incinerators and boilers and industrial furnaces (BIFs) (primarily cement kilns that are authorized to burn hazardous wastes as fuel). This section summarizes the results of EPA's analysis of commercial combustion capacity at incinerators and BIFs. It includes an analysis of incinerator and BIF combustion capacity information received from the Hazardous Waste Treatment Council (HWTC) and the Cement Kiln Recycling Coalition (CKRC) in 1993 and the Environmental Technologies Council (ETC) in 1994.[10]

2.2.1 General Methodology

In 1993, the HWTC and CKRC surveyed their membership to obtain data on combustion capacity, which was then submitted to EPA. Subsequent to the original HWTC survey, members also received a supplemental questionnaire regarding the burning of soils. In 1994, ETC submitted updates to the HWTC Survey from its members. Survey responses received from incinerators are classified as confidential business information (CBI). Following the receipt of the original surveys, the Agency reviewed the data submitted by each facility to evaluate the completeness, consistency, and accuracy of the information. The Agency identified and reconciled data gaps and anomalies by contacting the respective HWTC or CKRC coordinators and the individual facilities in question.

[10] In 1994, HWTC became the Environmental Technologies Council (ETC). ETC provided EPA with a 1994 update to the commercial incinerator survey.

Concurrent with the receipt of surveys received from the member groups, the Agency developed a data base to track and process major data elements for the capacity analysis. The data base contains facility information (e.g., location, EPA identification number of burner, number of units currently on-line), unit specific information (e.g., type of incinerator/kiln unit, operating hours per year, types of hazardous waste feed systems, types of hazardous waste burned in 1992), and waste-type specific information (e.g., tons of hazardous waste burned in 1992, average hazardous waste feed rate, maximum practical capacity, maximum permit capacity). Subsequent updates to the original survey submissions have also been entered into this database.

The information received from facilities participating in these surveys does not lend itself to simple summation and tabulation of results because facilities sometimes differed in their approach to reporting quantities burned or burning capacity. Incineration systems can generally accept multiple waste forms (e.g., pumpable sludges and aqueous liquids) and accepting larger amounts of one waste form may reduce the capacities for others. In responding to the HWTC survey (and ETC updates), facilities sometimes grouped waste types for their capacity-related responses. For example, if a feed system can accommodate both liquids and pumpable sludges, a facility may report a capacity for both forms grouped together. To address this interchangeability of waste forms, the Agency's LDR capacity database accommodated the reported waste groupings (e.g., one capacity estimate for liquids and pumpable sludges combined).

A second issue also relating to the interchangeability of waste forms required more extensive consideration. In the HWTC survey (and ETC update), some facilities reported the maximum combustion capacity for individual waste forms that together exceed the reported overall capacity of the unit. As a result, summing these individual capacities results in a total capacity that far exceeds what a facility may practically accommodate. The Agency developed the following algorithm to address this situation.

The waste apportionment algorithm focuses on three primary variables: the quantity of waste burned during the year, the maximum practical capacity of the unit, and the available capacity for burning hazardous waste. The available capacity for a waste form (e.g., aqueous liquids, dry solids) is obtained by taking the difference between the quantity of the form burned (hazardous and non-hazardous waste) and the maximum capacity for the waste form. The Agency's approach assumes that a facility will not stop burning non-hazardous waste if it is currently burning non-hazardous waste but all unutilized capacity will be used for hazardous waste. Difficulties arise, however, because facilities report maximum capacities for each waste form without regard to capacity accounted for by other waste forms. Consequently, the sum of maximum capacities for all waste forms may exceed the total capacity.

In these cases, the Agency distributed the total maximum hazardous waste capacities reported by each facility to individual waste forms based on burning practices. The utilization rate for each waste form was calculated by dividing the larger of the quantity of hazardous waste burned or total waste burned for that waste form by the sum of the quantities burned for all waste forms. A new maximum hazardous waste capacity for each waste form was then calculated by multiplying the utilization rate for that waste form by the maximum practical capacity for the incineration unit as a whole.

If the calculated maximum capacity for a waste form exceeded the reported value for that form, EPA used the reported value. In this case, the difference between the calculated and reported value was then redistributed to other waste forms using a hierarchy based on the types of wastes in this rule for which capacity has historically been most limited relative to demand. The Agency used the following order for redistributing capacity:

- Soils;
- Bulk Solids;
- Containerized Solids;
- Nonpumpable Sludges;
- Pumpable Sludges;
- Compressed Gases;
- Non-aqueous liquids; and
- Aqueous Liquids.

Cement kiln capacity for hazardous waste is limited by air emission limits (e.g. boiler and industrial furnace (BIF) limits under 40 CFR 266 Subpart H), feed system limitations (e.g., particle size and viscosity limits), and product (i.e., cement clinker) quality considerations. For instance, cement quality considerations may require that wastes burned in cement kilns have a heating value of at least 5,000 BTU/lb to ensure adequate temperatures in the kiln. (Comments received by EPA, however, indicate that some kilns accept wastes below this heating value.) Incineration capacity is also limited by air emission limits and other permit limits (such as heat release limits), and feed system limits. EPA has taken these limitations into account in its estimates of available commercial combustion capacity.

Once the baseline available combustion estimates were calculated using the above methodology, EPA subtracted the required combustion capacity for any previously regulated wastes that are not accounted for in the data received from the incinerators or BIFS (e.g., Phase I wastes under variance and Phase II wastes) to derive the available combustion capacity for Phase III wastes. The capacity required for Phase II wastes is not reflected in the estimates of utilized capacity because the Phase II rule, promulgated on September 19, 1994 (59 *FR* 47982), was not in effect when the estimates were submitted to EPA. In addition, some Phase I wastes (F037 and F038 in particular) were under a variance for at least part of the period of time for which EPA received capacity estimates.

2.2.2 Commercial Incineration Capacity

This section focuses on the combustion capacity of the nation's commercial hazardous waste incinerator facilities. Exhibit 2-2 summarizes the status of incineration capacity at each the facilities included in the HWTC survey. To preserve the confidentiality of this survey (and the ETC updates) confidential business information (CBI) is not disclosed. Aggregated results for CBI data are provided at the end of Exhibit 2-2. Section 2.2.2.1 profiles each of the individual facilities summarized in Exhibit 2-2. Section 2.2.2.2 discusses several operating facilities that were not considered in the capacity analysis. Section 2.2.2.3 discusses planned additions to incineration capacity.

2.2.2.1 Individual Incineration Facility Capacity Analysis

Facility profiles are provided below for each of the incinerators included in the commercial combustion capacity estimate. These profiles are based on data provided in the HWTC survey, the 1994 ETC survey update, and data received as a result of telephone contacts. The telephone logs for these updates are included in Appendix C.

Aptus, Coffeyville, Kansas

Aptus, a Westinghouse company, has both TSCA and RCRA Part B permits. The incinerator unit is a slagging rotary kiln with a thermal input of 61.9 mmBtu/hour. This facility can accept liquids, pumpable sludges, nonpumpable sludges, containerized solids, bulk solids, and soils. Liquids are directly injected into the rotary kiln and containerized solids are ram-fed. Recycle feed and drop feed systems are used to feed bulk solids into the incinerator unit. Aptus is seeking permit modifications to expand the facility's treatment and storage capacity.

Confidential capacity information provided by the facility included quantities of waste burned in 1993 and maximum practical burning capacity. These estimates are included in the aggregated estimate in Exhibit 2-2. This facility does accept K088 wastes.

Aptus, Tooele, Utah

This facility has RCRA and TSCA permits and operates one slagging rotary kiln incinerator unit. The facility accepts liquids, pumpable sludges, containerized solids, bulk solids, and soils. The incinerator system at this facility is a slagging rotary kiln with an afterburner. This system has a thermal input of 140 mmBtu/hour.

This facility is equipped with several mechanisms for feeding waste into the slagging rotary kiln. Liquids are injected directly from a storage tank into the kiln and/or afterburner chamber. Pumpable sludges, having a viscosity lower than 10,000 centipoise, are fed via a cement pump. Bulk solids and nonpumpable sludges are placed into holding tanks. From these tanks, the wastes are moved by a clamshell to an apron

Exhibit 2-2

Summary of Commercial Incineration Capacity

Facility Name	Unit Type	Waste Type	Utilized Capacity (Tons/Yr)	Reported Maximum Capacity (Tons/Yr)	Adjusted Maximum Capacity (Tons/Yr)	Adjusted Estimated Available Capacity (Tons/Yr)
Aptus, Inc., Salt Lake City, UT UTD981552177	IF	liq (aq) liq (naq) pump sl cont solids bulk solids soils	CBI	CBI	CBI	CBI
	*****	TOTAL	CBI	CBI	CBI	CBI
Aptus, Inc. - Environmental Services, Coffeyville, KS KSD981506025	RK	liq (aq) liq (naq) pump sl npump sl cont solids bulk solids comp gases soils	CBI	CBI	CBI	CBI
	*****	TOTAL	CBI	CBI	CBI	CBI
CWM - Port Arthur, Port Arthur, TX TXD000838896	RK	liq (aq) liq (naq) pump sl cont solids bulk solids	CBI	CBI	CBI	CBI
	*****	TOTAL	CBI	CBI	CBI	CBI
CWM Chemical Services, Chicago, IL ILD000672121	RK*	liq (aq) liq (naq) cont solids	CBI	CBI	CBI	CBI
	*****	TOTAL	CBI	CBI	CBI	CBI
ENSCO, Inc., El Dorado, AR	RK	liq (aq) liq (naq)	CBI	CBI	CBI	CBI

1) CBI = CONFIDENTIAL BUSINESS INFORMATION
2) * = Planned or Not Operating
3) Unit Type abbreviations: FH = Fixed Hearth; LI = Liquid Injection; RK = Rotary Kiln; RR = Rotary Reactor; IF = Industrial Furnace; UK = Unknown

Exhibit 2-2(Continued)

Summary of Commercial Incineration Capacity

Facility Name	Unit Type	Waste Type	Utilized Capacity (Tons/Yr)	Reported Maximum Capacity (Tons/Yr)	Adjusted Maximum Capacity (Tons/Yr)	Adjusted Estimated Available Capacity (Tons/Yr)
ARD069748192		pump sl npump sl cont solids bulk solids comp gases soils				
	RK	liq (aq) liq (naq) pump sl npump sl cont solids bulk solids comp gases soils	CBI	CBI	CBI	CBI
	RK	liq (aq) liq (naq) pump sl npump sl cont solids bulk solids comp gases soils	CBI	CBI	CBI	CP
	*****	TOTAL	CBI	CBI	CBI	CBI
LWD, Inc., Calvert City, KY KYD088438817	LI	all liqs	CBI	CBI	CBI	CBI
	RK	pump sl cont solids bulk solids all liqs	CBI	CBI	CBI	CBI

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Exhibit 2-2(Continued)

Summary of Commercial Incineration Capacity

Facility Name	Unit Type	Waste Type	Utilized Capacity (Tons/Yr)	Reported Maximum Capacity (Tons/Yr)	Adjusted Maximum Capacity (Tons/Yr)	Adjusted Estimated Available Capacity (Tons/Yr)
	RK	pump sl cont solids bulk solids all liqs	CBI	CBI	CBI	CBI
	*****	TOTAL	CBI	CBI	CBI	CBI
Laidlaw Environmental Services, Inc., Roebuck, SC SCD981467616	LI	liq (aq) liq (naq)	CBI	CBI	CBI	CBI
	*****	TOTAL	CBI	CBI	CBI	CBI
Norlite Corporation, Cohoes, NY NYD080469935	RK	liq (naq) pump sl	CBI	CBI	CBI	CBI
	RK	liq (naq) pump sl	CBI	CBI	CBI	CBI
	*****	TOTAL	CBI	CBI	CBI	CBI
Rhone-Poulenc (RPBC), Baton Rouge, LA LAD008161234	LI	liq (aq) liq (naq) pump sl	CBI	CBI	CBI	CBI
	LI	liq (aq) liq (naq) pump sl	CBI	CBI	CBI	CBI
	*****	TOTAL	CBI	CBI	CBI	CBI
Rhone-Poulenc Basic Chemicals Co., Hammond, IN	IF	liq (aq) liq (naq) pump sl	CBI	CBI	CBI	CBI

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Exhibit 2-2(Continued)

Summary of Commercial Incineration Capacity

Facility Name	Unit Type	Waste Type	Utilized Capacity (Tons/Yr)	Reported Maximum Capacity (Tons/Yr)	Adjusted Maximum Capacity (Tons/Yr)	Adjusted Estimated Available Capacity (Tons/Yr)
IND001859032						
	*****	TOTAL	CBI	CBI	CBI	CBI
Rhone-Poulenc Basic Chemicals Co., Houston, TX TXD008099079	LI	liq (aq) liq (naq) pump sl	CBI	CBI	CBI	CBI
	*****	TOTAL	CBI	CBI	CBI	CBI
Rollins Environmental Services (LA) Inc., Baton Rouge, LA LAD010395127-P	RK	liq (aq) liq (naq) pump sl cont solids soils	CBI	CBI	CBI	CBI
	*****	TOTAL	CBI	CBI	CBI	C[illegible]
Rollins Environmental Services (NJ) Inc., Bridgeport, NJ NJD053288299	RK	liq (aq) liq (naq) pump sl cont solids comp gases soils	CBI	CBI	CBI	CBI
	*****	TOTAL	CBI	CBI	CBI	CBI
Rollins Environmental Services (TX) Inc., Deer Park, TX TXD055141378	RK	liq (aq) liq (naq) pump sl cont solids comp gases soils	CBI	CBI	CBI	CBI
	RK	liq (aq)	CBI	CBI	CBI	CBI

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Exhibit 2-2(Continued)

Summary of Commercial Incineration Capacity

Facility Name	Unit Type	Waste Type	Utilized Capacity (Tons/Yr)	Reported Maximum Capacity (Tons/Yr)	Adjusted Maximum Capacity (Tons/Yr)	Adjusted Estimated Available Capacity (Tons/Yr)
		liq (naq) pump sl cont solids soils				
	RR	liq (aq) liq (naq) pump sl bulk solids soils	CBI	CBI	CBI	CBI
	*****	TOTAL	CBI	CBI	CBI	CBI
Ross Incineration Services, Inc., Grafton, OH OHD048415665	RK	liq (aq) liq (naq) pump sl npump sl cont solids bulk solids comp gases soils	CBI	CBI	CBI	CBI
	*****	TOTAL	CBI	CBI	CBI	CBI
ThermalKEM Inc., Rock Hill Plant, Rock Hill, SC SCD044442333	FH	liq (aq) liq (naq) pump sl npump sl cont solids bulk solids comp gases soils	CBI	CBI	CBI	CBI
	*****	TOTAL	CBI	CBI	CBI	CBI
Trade Waste Incineration,	FH	cont solids	CBI	CBI	CBI	CBI

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Exhibit 2-2(Continued)

Summary of Commercial Incineration Capacity

Facility Name	Unit Type	Waste Type	Utilized Capacity (Tons/Yr)	Reported Maximum Capacity (Tons/Yr)	Adjusted Maximum Capacity (Tons/Yr)	Adjusted Estimated Available Capacity (Tons/Yr)
Sauget, IL ILD098642424		all liq/ps				
	FH	cont solids all liq/ps	CBI	CBI	CBI	CBI
	RK	all liq/ps all sol/nps	CBI	CBI	CBI	CBI
	*****	TOTAL	CBI	CBI	CBI	CBI
USPCI, Lakepoint, UT UTD982595795	RK	liq (aq) liq (naq) pump sl npump sl cont solids bulk solids soils	CBI	CBI	CBI	CBI
	*****	TOTAL	CBI	CBI	CBI	CBI
Aggregated Results		liq (aq)	97,664	290,569	189,901	92,237
(Operating Units Only)		liq (naq)	187,667	399,439	346,252	158,585
		pump sl	50,422	213,752	116,315	65,893
		npump sl	15,145	44,038	32,095	16,950
		cont solids	129,082	302,389	231,015	101,933
		bulk solids	63,081	183,604	133,145	70,064
		dry solids	0	0	0	0
		comp gases	2,184	64,707	5,084	2,900

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3) Unit Type abbreviations: FH = Fixed Hearth; LI = Liquid Injection; RK = Rotary Kiln; RR = Rotary Reactor; IF = Industrial Furnace; UK = Unknown

Exhibit 2-2(Continued)

Summary of Commercial Incineration Capacity

Facility Name	Unit Type	Waste Type	Utilized Capacity (Tons/Yr)	Reported Maximum Capacity (Tons/Yr)	Adjusted Maximum Capacity (Tons/Yr)	Adjusted Estimated Available Capacity (Tons/Yr)
		all liq/ps	12,064	31,906	31,906	19,842
		all sol/nps	14,217	52,500	52,500	38,283
		all liqs	25,616	82,080	82,080	56,464
		soils	12,348	346,269	169,324	156,976
Total (Operating Units Only)			609,490	2,011,253	1,389,617	780,127

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feeder where the waste is fed directly into the kiln feed chute. Containerized solids that do not require shredding (e.g., lab packs) are fed directly into the kiln via an elevator feed system. Containerized solids and bulk solids that require shredding are processed through a shredder prior to being placed into storage tanks.

Confidential capacity information provided by the facility included waste quantities burned in 1993 and maximum practical burning capacities. These estimates are included in the aggregated CBI estimate in Exhibit 2-2. This facility does accept K088 wastes.

Trade Waste Incineration (Chemical Waste Management), Sauget, Illinois

This RCRA Part B permitted facility operates three dry scrubber incineration units. Two are fixed hearths and one is a rotary kiln. Each fixed hearth unit has a maximum permitted heat release of 16 mmBtu/hour. The rotary kiln has a maximum permitted heat release of 50 mmBtu/hour.

This facility can accept most physical forms of wastes. Liquids are blended in tanks and transferred to atomizers for direct injection into the incinerator unit(s). Pumpable sludges are injected into the incinerator unit(s) via a sludge lance. Nonpumpable sludges and containerized solids are repackaged into burnable containers and ram-fed into the incinerator units. Bulk solids are unloaded into pits and transported via clamshell into the rotary kiln unit.

This facility submitted its survey independent of the set provided by HWTC. For each unit and physical form of waste, this facility reported waste quantities burned during 1992 and maximum practical burning capacities. These estimates are included in the aggregated CBI estimate in Exhibit 2-2.

CWM Chemical Services, Chicago, Illinois

This RCRA interim status facility is not currently operating and is awaiting EPA authorization for TSCA and RCRA Part B permits. The incinerator unit at this facility is a rotary kiln with a thermal input of 30 mmBtu/hour. This facility is not included in EPA's commercial combustion capacity estimate.

The feed mechanism for the single unit at CWM consists of a drum conveyor and ram-feed for containerized solids. In general, bulk solids and pumpable sludges are not accepted at this facility. Nonpumpable sludges are generally accepted only when containerized.

This facility submitted its survey independent of the set provided by HWTC. The facility reported confidential maximum current practical burning capacity for liquids and containerized solids. Because this facility is not currently operating and CWM has announced its intention to not open this facility, EPA did not include it in the national capacity estimates.

CWM-Port Arthur, Port Arthur, Texas

This RCRA Part B permitted facility operates a rotary kiln system that has a thermal input of 175 mmBtu/hour. The facility has applied for a TSCA permit to burn PCB-contaminated wastes.

This facility accepts liquids, pumpable sludges, containerized solids, and bulk solids. Several feed mechanisms exist for feeding waste into the rotary kiln. Positive displacement pumps are used to feed pumpable sludges. Containerized solids are fed into the unit via a ram-feed system. Bulk solids are shredded and charged to the kiln by a chute.

The facility reported waste quantities burned in 1992 and maximum practical burning capacities as CBI. These estimates are included in the aggregated CBI estimate in Exhibit 2-2. CWM indicated this facility anticipated increasing operating hours by 50 percent in 1993-1994, and planned various process improvements for the third quarter of 1993 that would have improved on-line time and allow the facility to accept CERCLA wastes.

ENSCO, El Dorado, Arkansas

ENSCO operates three rotary kiln incinerators at this RCRA Part B permitted facility. Each kiln can burn liquids, pumpable sludges, nonpumpable sludges, containerized solids, bulk solids, compressed gases, and soils. Two of the kilns feed into one secondary chamber with a permitted combined feed rate of 29,718 pounds per hour. The third kiln has a permitted feed rate of 12,912 pounds per hour.

ENSCO submitted confidential business information on quantities burned in 1993 and maximum practical burning capacities. These estimates are included in the aggregated CBI estimate in Exhibit 2-2. ENSCO does accept K088 wastes.

L.W.D. Inc., Calvert City, Kentucky

This facility is currently operating under interim status. L.W.D. Inc. has three incinerators at this facility: one liquid injection unit and two rotary kilns. The liquid injection incinerator only burns liquids. The rotary kilns burn liquids, bulk solids, containerized solids, and pumpable sludges. The liquid injection unit has a thermal input of 40 mmBtu/hour. The rotary kilns have thermal inputs of 50 mmBtu/hour and 100 mmBtu/hour.

This facility submitted its survey independent of the set submitted by HWTC. The facility provided information on quantities burned in 1992 and maximum practical burning capacities. These estimates are included in the aggregated CBI estimate in Exhibit 2-2.

Laidlaw Environmental Services, Inc., Roebuck, South Carolina

This facility is fully permitted by the EPA but is under interim status with the state regulatory agency. Laidlaw operates one hazardous waste liquid injection incinerator that injects and burns pumpable liquids. The CBI provided included quantities of waste burned in 1993 and maximum current practical burning capacity. These estimates are included in the aggregated CBI estimate in Exhibit 2-2.

Norlite Corporation, Cohoes, New York

This RCRA Part B permitted incineration facility operates two rotary aggregate kilns that burn liquids and pumpable sludges. The kilns are RCRA-permitted as incinerators. Liquids are injected and sludges are pumped into the kiln. Each kiln has a thermal input of 62 mmBtu/hour. New York officials are considering a permit modification to increase Norlite's solid feed capacity.

Norlite submitted confidential information on quantities of waste burned in 1992 and maximum practical burning capacities. These estimates are included in the aggregated CBI estimate in Exhibit 2-2.

Rhone-Poulenc Basic Chemicals Company, Hammond, Indiana

This facility submitted confidential information on quantities burned in 1993 and maximum practical burning capacity. It is operating with an interim status BIF permit. The industrial furnace at this facility burns liquid wastes only.

Rhone-Poulenc Basic Chemicals Company, Baton Rouge, Louisiana

This RCRA Part B permitted facility operates two liquid injection incinerators. These incinerators have permitted thermal inputs of 170 mmBtu/hour and 234 mmBtu/hour. This facility can accept liquids and pumpable sludges. The pumpable sludges must either be slurried or have a sufficiently low viscosity to be injected into the furnace.

Rhone-Poulenc submitted confidential information on quantities burned in 1993 and maximum practical capacity. These estimates are included in the aggregated CBI estimates in Exhibit 2-2.

Rhone-Poulenc Basic Chemicals Company, Houston, Texas

This RCRA Part B permitted facility burns liquids in one liquid injection incinerator. The incinerator has a thermal input of 205 mmBtu/hour.

Rhone-Poulenc reported waste quantities burned in 1993 and maximum practical burning capacities as CBI. These estimates are included in the aggregated CBI estimate in Exhibit 2-2.

Rollins Environmental Services, Baton Rouge, Louisiana

This RCRA Part B permitted facility consists of an ashing rotary kiln, liquid burner, and an afterburner. The thermal input to the unit is rated at 95.6 mmBtu/hour.

Several mechanisms are used to feed waste into the incinerator system. Liquids are atomized under air pressure and injected into the liquid burner and afterburner chamber. A positive displacement pump feeds pumpable sludges into the rotary kiln. Containerized solids are fed into the unit via a conveyor system. There is also a free-standing drum shredder used for repackaging solids.

Confidential capacity information provided by the facility included the waste quantities burned during 1993 and the maximum practical burning capacity. These estimates are included in the aggregated CBI estimate in Exhibit 2-2. This facility indicated that it does accept K088 wastes.

Rollins plans to replace its rotary kiln with two new units by 1997. This modification should increase the capacity of the facility by twenty percent.

Rollins Environmental Services, Bridgeport, New Jersey

This RCRA Part B permitted facility operates one slagging rotary kiln with an afterburner. The thermal input to the system is rated at 135 mmBtu/hour.

Several mechanisms are used to feed liquids, pumpable sludges, containerized solids, compressed gases, and soils into the incinerator system. Liquids are atomized under air pressure and injected into the Loddby liquid burner and afterburner chamber. A positive displacement pump feeds pumpable sludges into the rotary kiln. This facility generally does not accept bulk solids.

This facility reported quantities of waste burned in 1993 and maximum practical burning capacities as CBI. These estimates are included in the aggregated CBI estimate in Exhibit 2-2.

Rollins Environmental Services, Deer Park, Texas

This RCRA Part B permitted facility has three incineration units--two rotary kilns with afterburners, and one rotary reactor. Each rotary kiln system has a thermal input of 180 mmBtu/hour. The rotary reactor has a thermal input of 33.5 mmBtu/hour. Each train has several feed mechanisms that utilize concrete pumps to feed pumpable sludges and an elevator feed for containers. A clamshell/crane feeds bulk solids into the rotary reactor.

Rollins reported confidential information on quantities burned in 1993 and maximum practical capacity. These estimates are included in the aggregated CBI estimates in Exhibit 2-2. This facility does accept K088 wastes.

Ross Incineration Services, Grafton, Ohio

This incineration facility has a RCRA Part B permit. Ross's rotary kiln incinerator burns liquids, nonpumpable sludges, containerized solids, bulk solids, compressed gases, and soils. Solids and containerized waste are fed to the kiln via four feed mechanisms that feed into a gravity feed chute.

CBI provided in the survey included waste quantities burned during 1993 and maximum practical burning capacities. These estimates are included in the aggregated CBI estimate in Exhibit 2-2.

ThermalKEM, Rock Hill, South Carolina

This RCRA Part B permitted facility uses a fixed hearth incinerator with a thermal input of 42 mmBtu/hour. This facility can accept liquids, pumpable sludges, nonpumpable sludges, containerized solids, bulk solids, compressed gases, and soils. Metered pumps feed liquid and sludge wastes and rams feed containerized solids. Separate machinery feeds aerosol cans directly to the incinerator.

Confidential capacity data provided by the facility include waste quantities burned during 1992 and maximum practical burning capacities. These estimates are included in the aggregated CBI estimate in Exhibit 2-2.

In 1992, the facility indicated that it planned to increase sludge/solid capacity by adding an additional unit, a waste-fired boiler, and additional storage areas. No such changes in capacity were reported in the 1993 survey.

USPCI, Clive, Utah

This new facility is RCRA and TSCA permitted. This facility is included in EPA's commercial combustion capacity estimate. However, EPA will continue to monitor the facility's availability and will adjust its future capacity estimates accordingly. The unit has a permitted thermal capacity of 200 mmBtu/hour. This facility will accept liquids, pumpable sludges, containerized solids, bulk solids, and soils.

USPCI did not burn wastes in 1993. Factors assumed in estimating hazardous waste burning capacity were provided as confidential business information, including hourly average waste feed rate, and maximum practical burning capacities. These estimates are included in the aggregated CBI estimate presented in Exhibit 2-2.

2.2.2.2 Other Incinerators Not Included in the Capacity Estimate

In addition to the facility discussed above that is not included in the national capacity estimate (CWM-Chicago), three incinerators are not included in the analysis because they burn a narrow range of waste types: Allied-Signal Tar (Fairfield, Alabama), ICI Explosives (Joplin, Missouri), Laidlaw Environmental, Inc. (Clarence, New York), and Waste Research and Reclamation Co. (Eau Claire, Wisconsin). The Allied-Signal Tar Products incinerator is an on-site incinerator that burns a limited amount of hazardous waste on a commercial basis. The facility is only permitted to burn K001, K035, K087, U165, and U051. The ICI Explosives incinerator is permitted to receive explosive wastes and propellants, but has not yet commenced operations. The BDT facility burns highly specialized, difficult-to-treat materials such as elemental lithium and sodium. Finally, Waste Research and Reclamation Co. burns primarily still bottoms resulting from the company's solvent recovery operations.

2.2.2.3 Future Incineration Capacity

The incineration capacity update presented in the previous section focused on commercial incinerators that are currently operating commercially. Some planned commercial incinerators appear to be sufficiently advanced in the permitting process. EPA contacted state regulatory agencies for information regarding these facilities:

- Clean Harbors, Inc., Kimball, Nebraska, received a Part B Permit to begin constructing a fluidized bed incineration facility. The estimated total capacity for this facility is 45,000 tons per year, of which 5,000 tons are for sludges and solids.

- Waste-Tech, East Liverpool, Ohio, has its RCRA Part B permit. Following successful trial burns in March 1992, the facility began limited commercial operation in 1993 with an annual capacity for sludges and solids of 52,000 tons. Total capacity is expected to be 88,000 tons per year. Due to ongoing negotiations regarding permit restrictions, this facility has not yet entered full-scale commercial operation.

- Ogden has a RCRA permit to construct a facility in Texas with a thermal input of 260 mmBtu/hour and a total capacity of 155,000 tons per year.

2.2.3 Commercial BIF Hazardous Waste Capacity

This section focuses on the combustion capacity of the nation's commercial BIFs. Exhibit 2-3 summarizes the status of combustion capacity at each the facilities included in the analysis. Section 2.2.3.1 discusses capacity at each of the individual facilities that submitted CKRC surveys. Section 2.2.3.2 discusses facilities that are included in the national capacity estimate but did not respond to the CKRC survey. Section 2.2.3.3 discusses combustion capacity for soils.

2.2.3.1 Individual BIF Facility Capacity Analysis

Facility profiles are provided below for each of the BIFs included in the commercial combustion capacity estimate. These profiles have been created based on data provided in the CKRC survey. The estimates included in this section do not take into account the capacity that is required for Phase I wastes for which the capacity variance granted to routinely generated F037 and F038 expired in June 1993. Also, please note that EPA's capacity analysis focussed primarily on sludges and solids, and does not include all commercial BIFs that receive only liquids.

Ash Grove, Chanute, Kansas

The Ash Grove Chanute facility currently operates two BIFs, both of which burn liquid and containerized solid hazardous wastes. The kilns operate 7,500 hours per year. Based on reported maximum practical feed rates, and 1992 utilized capacity, EPA estimates the facility's available liquid waste capacity to be 17,775 tons per year and its available solids capacity to be 39,499 tons per year. All Ash Grove facilities report that their liquids contain up to 20 percent entrained solids.

Ash Grove, Foreman, Arkansas

There are three wet process rotary BIFs currently burning hazardous waste at this facility. They all inject liquid hazardous waste fuel into the hot end of the kiln, and charge containerized solids to the calcining zone. The kilns operate for 7,800 hours per year. EPA estimates that together the three kilns have 38,286 tons of liquid capacity available per year and 46,737 tons of containerized solids capacity available. This

estimate is based on the reported maximum practical feed rates and 1992 utilized capacity estimates. All Ash Grove facilities report that as burned, their liquids contain approximately 20 percent solids.

Exhibit 2-3

Summary of Commercial BIFs Burning Capacity

Facility Name	Unit Type	Waste Type	Utilized Capacity (Tons/Yr)	Reported Maximum Capacity (Tons/Yr)	Adjusted Maximum Capacity (Tons/Yr)	Adjusted Estimated Available Capacity (Tons/Yr)
Ash Grove Chanute Cement Plant, Chanute, KS KSD031203318	WR	cont solids all liqs	5,560 19,674	24,960 28,080	24,960 28,080	19,400 8,406
	WR	cont solids all liqs	4,861 18,711	24,960 28,080	24,960 28,080	20,099 9,369
	*****	TOTAL	48,806	106,080	106,080	57,274
Ash Grove Foreman Cement Plant, Foreman, AR ARD981512270	WR	cont solids all liqs	8,225 10,766	22,656 25,320	22,656 25,320	14,431 14,554
	WR	cont solids all liqs	7,250 17,306	22,656 28,320	22,656 28,320	15,406 11,014
	WR	cont solids all liqs	5,756 15,602	22,656 28,320	22,656 28,320	16,900 12,718
	*****	TOTAL	64,905	152,928	149,928	85,023
Ash Grove Louisville Cement Plant, Louisville, NE NED007260672	AC*	cont solids all liqs	1,337 1,181	9,360 24,960	9,360 24,960	8,023 23,779
	PC	cont solids all liqs	2,945 3,892	12,480 24,960	12,480 24,960	9,535 21,068
	*****	TOTAL	9,355	71,760	71,760	62,405
Carolina Solite, Albemarle, NC NCD000773655	CM	all liqs	0	22,000	22,000	22,000

1) * = Planned or Not Operating.
2) Unit Type abbreviations: AC = Allis Chalmers - Preheater; WP = Wet Process; LD = Long Dry; LW = Long Wet; CM = Cement; RT = Rotary; PC = Precalciner; TR = Traylor; WR = Wet Process Rotary

Exhibit 2-3(Continued)

Summary of Commercial BIFs Burning Capacity

Facility Name	Unit Type	Waste Type	Utilized Capacity (Tons/Yr)	Reported Maximum Capacity (Tons/Yr)	Adjusted Maximum Capacity (Tons/Yr)	Adjusted Estimated Available Capacity (Tons/Yr)
	*****	TOTAL	0	22,000	22,000	22,000
Citadel Cement Co., Demopolis, AL ALD067119966	AC	pump sl all liqs	3,250 33,743	6,000 40,000	6,000 40,000	2,750 6,257
	*****	TOTAL	36,993	46,000	46,000	9,007
Continental Cement Co., Hannibal, MO MODO54018288	LW	bulk solids dry solids all liqs	7,636 2,603 63,089	142,963 142,963 112,478	25,410 5,075 112,478	17,774 2,472 49,389
	*****	TOTAL	73,328	142,963	142,963	69,635
Dixie Cement Company, Knoxville, TN TND106203375	PC	unreported				
	*****	TOTAL	0	0	0	
ESSROC, Logansport, IN IND005081542	CM	all sol/nps all liqs	20,000 50,000	24,000 61,000	24,000 61,000	4,000 11,000
	*****	TOTAL	70,000	85,000	85,000	15,000
Florida Solite, Green Cove Springs, FL FLD000737312	CM	all liqs	0	11,000	11,000	11,000
	*****	TOTAL	0	11,000	11,000	11,000
Giant Cement Co., Harleyville, SC SCD003351699	CM	dry solids all liqs	4,700 89,300	18,200 111,800	18,200 111,800	13,500 22,500
	*****	TOTAL	94,000	130,000	130,000	36,000

1) * = Planned or Not Operating
2) Unit Type abbreviations: AC = Allis Chalmers - Preheater; WP = Wet Process; LD = Long Dry; LW = Long Wet; CM = Cement; RT = Rotary; PC = Precalciner; TR = Traylor; WR = Wet Process Rotary

Exhibit 2-3(Continued)

Summary of Commercial BIFs Burning Capacity

Facility Name	Unit Type	Waste Type	Utilized Capacity (Tons/Yr)	Reported Maximum Capacity (Tons/Yr)	Adjusted Maximum Capacity (Tons/Yr)	Adjusted Estimated Available Capacity (Tons/Yr)
Heartland Cement Co., Independence, KS KSD980739999	CM	dry solids	1,550	25,000	25,000	23,450
	*****	TOTAL	1,550	25,000	25,000	23,450
Holnam, Inc., Artesia, MS MSD077655876	WP	all liqs	0	46,300	46,300	46,300
	*****	TOTAL	0	0	46,300	46,300
Holnam, Inc., Holly Hill, SC SCD003368891	TR	all liqs	30,000	45,000	45,000	15,000
	AC	all liqs	49,000	72,000	72,000	23,000
	*****	TOTAL	79,000	0	117,000	38,000
Holnam/Safety Kleen Corp., Clarksville, MO MOD029729688	RT	all liq/ps	102,878	150,357	150,357	47,479
	*****	TOTAL	102,878	150,357	150,357	47,479
Kentucky Solite, Brooks, KY -----------	CM	all sol/nps	4,000	11,000	11,000	7,000
	*****	TOTAL	4,000	11,000	11,000	7,000
Keystone Cement Company, Bath, PA PAD002389559	WR	all liqs	5,760	18,900	18,900	13,140
	WR	all liqs	29,805	56,700	56,700	26,895

1) * = Planned or Not Operating
2) Unit Type abbreviations: AC = Allis Chalmers - Preheater; WP = Wet Process; LD = Long Dry; LW = Long Wet; CM = Cement; RT = Rotary; PC = Precalciner; TR = Traylor; WR = Wet Process Rotary

Exhibit 2-3(Continued)

Summary of Commercial BIFs Burning Capacity

Facility Name	Unit Type	Waste Type	Utilized Capacity (Tons/Yr)	Reported Maximum Capacity (Tons/Yr)	Adjusted Maximum Capacity (Tons/Yr)	Adjusted Estimated Available Capacity (Tons/Yr)
	*****	TOTAL	35,565	75,600	75,600	40.035
Lafarge, Alpena, MI MID005379607	LD	all liqs	48,000	56,000	56,000	8.000
	LD	all liqs	48,000	56,000	56,000	8,000
	*****	TOTAL	96,000	0	112,000	16,000
Lafarge Corp., Fredonia, KS KSD007148034	WP	dry solids all liq/ps	788 36,503	788 37,410	788 36,619	0 116
	WP	dry solids all liq/ps	263 48,387	263 49,590	263 49,322	0 935
	*****	TOTAL	85,941	87,000	86,992	1,0[illegible]
Lafarge Corporation, Paulding, OH OHD987048733	CM	pump sl all liqs	1,727 27,566	2,500 30,000	2,500 30,000	773 2,434
	CM	pump sl all liqs	1,727 27,566	2,500 30,000	2,500 30,000	773 2,434
	*****	TOTAL	58,586	65,000	65,000	6,414
Lone Star Alternate Fuel Co., Cape Girardeau, MO MO981127319	PC	cont solids all liqs	354 25,543	2,700 57,000	2,700 57,000	2,346 31,457
	*****	TOTAL	25,897	59,700	59,700	33,803
Lone Star Industries, Inc., Greencastle, IN IND006419212	RT	cont solids all liqs	5,332 45,556	13,000 45,556	13,000 45,556	7.668 0

1) * = Planned or Not Operating

2) Unit Type abbreviations: AC = Allis Chalmers - Preheater; WP = Wet Process; LD = Long Dry; LW = Long Wet; CM = Cement; RT = Rotary; PC = Precalciner; TR = Traylor; WR = Wet Process Rotary

Exhibit 2-3(Continued)

Summary of Commercial BIFs Burning Capacity

Facility Name	Unit Type	Waste Type	Utilized Capacity (Tons/Yr)	Reported Maximum Capacity (Tons/Yr)	Adjusted Maximum Capacity (Tons/Yr)	Adjusted Estimated Available Capacity (Tons/Yr)
	*****	TOTAL	50,888	58,556	58,556	7,668
Medusa Cement Co., Wampum, PA PAD083965897	CM	pump sl npump sl all liqs	2,500 500 7,000	6,400 1,200 32,400	6,400 1,200 32,400	3,900 700 25,400
	*****	TOTAL	10,000	40,000	40,000	30,000
National Cement Company Lebec Plant, Lebec, CA CAD982444887	LD	all liqs	22,500	30,200	30,200	7,700
	*****	TOTAL	22,500	0	30,200	7,700
North Texas Cement, Midlothian, TX TXunknown	CM	all liqs	1,000	50,000	50,000	49,000
	*****	TOTAL	1,000	50,000	50,000	49,000
River Cement, Festus, MO MOD050232560	CM	pump sl npump sl all liqs	16,250 3,250 45,500	20,000 4,000 56,000	20,000 4,000 56,000	3,750 750 10,500
	*****	TOTAL	65,000	145,000	80,000	15,000
Safety Kleen Envirosystems Co., Dorado, PR PRD0980526115	LD	all liqs	4,863	49,410	49,410	44,547
	*****	TOTAL	4,863	49,410	49,410	44,547
Solite Corp., Cascade, VA VAD077942266	CM	all liqs	15,000	33,000	33,000	18,000

1) * = Planned or Not Operating

2) Unit Type abbreviations: AC = Allis Chalmers - Preheater; WP = Wet Process; LD = Long Dry; LW = Long Wet; CM = Cement; RT = Rotary; PC = Precalciner; TR = Traylor; WR = Wet Process Rotary

Exhibit 2-3(Continued)

Summary of Commercial BIFs Burning Capacity

Facility Name	Unit Type	Waste Type	Utilized Capacity (Tons/Yr)	Reported Maximum Capacity (Tons/Yr)	Adjusted Maximum Capacity (Tons/Yr)	Adjusted Estimated Available Capacity (Tons/Yr)
	*****	TOTAL	15,000	33,000	33,000	18,000
Solite Corp., Arvonia, VA VAD098443443	CM	all liqs	15,000	22,000	22,000	7,000
	*****	TOTAL	15,000	22,000	22,000	7,000
Southwestern Portland Cement Co., Fairborn, OH OHD981195779	CM	unreported				
	*****	TOTAL	0	0	0	0
Texas Industries, Inc., Midlothian, TX TXD0007349327	RT	all liqs	19,000	60,000	60,000	41,000
	RT	all liqs	19,000	60,000	60,000	41,000
	RT	all liqs	19,000	60,000	60,000	41,000
	RT	all liqs	19,000	60,000	60,000	41,000
	*****	TOTAL	76,000	0	240,000	164,000
Aggregated Results		liq (aq)	0	0	0	0
(Operating Units Only)		liq (naq)	0	0	0	0
		pump sl	25,454	37,400	37,400	11,946
		npump sl	3,750	5,200	5,200	1,450
		cont solids	40,283	146,068	146,068	105,785

1) * = Planned or Not Operating
2) Unit Type abbreviations: AC = Allis Chalmers - Preheater; WP = Wet Process; LD = Long Dry; LW = Long Wet; CM = Cement; RT = Rotary; PC = Precalciner; TR = Traylor; WR = Wet Process Rotary

Exhibit 2-3(Continued)

Summary of Commercial BIFs Burning Capacity

Facility Name	Unit Type	Waste Type	Utilized Capacity (Tons/Yr)	Reported Maximum Capacity (Tons/Yr)	Adjusted Maximum Capacity (Tons/Yr)	Adjusted Estimated Available Capacity (Tons/Yr)
		bulk solids	7,636	142,963	25,410	17,774
		dry solids	9,904	187,214	49,326	39,422
		comp gases	0	0	0	0
		all liq/ps	187,768	237,357	236,298	48,530
		all sol/nps	24,000	35,000	35,000	11,000
		all liqs	845,742	1,547,824	1,547,824	702.082
		soils	0	0	0	0
Total (Operating Units Only)			1,144,537	2,339,026	2,082,526	937,989

1) * = Planned or Not Operating

2) Unit Type abbreviations: AC = Allis Chalmers - Preheater; WP = Wet Process; LD = Long Dry; LW = Long Wet; CM = Cement; RT = Rotary; PC = Precalciner; TR = Traylor; WR = Wet Process Rotary

Ash Grove, Louisville, Nebraska

The Ash Grove Louisville facility currently burns liquid and containerized solid waste fuel in two rotary preheater BIFs. Liquid hazardous waste fuel is injected into the hot end of the kiln, and containerized solids are charged to the calcining zone. Both kilns operate 7,500 hours a year, slightly less than the "total operating time" of the kilns. Based on the reported maximum practical capacity and 1992 utilized capacity, EPA estimates that the facility has 44,847 tons of liquid combustion capacity available per year, and 17,558 tons of containerized solids capacity available per year. Ash Grove reports that as burned, their liquids contain approximately 30 percent solids.

Citadel Cement Company, Demopolis, Alabama

This facility burns liquid and pumpable sludge hazardous waste fuels in one preheater kiln. Canisters are injected into the burning zone by compressed air cannons. This kiln is operational for 1,784 hours a year. The facility reported that as burned, their liquids contain an average of 25 percent solids. Based on reported maximum practical burning capacity and 1992 capacity utilization estimates, EPA estimates that the facility has 6,257 tons per year liquids capacity available, and 2,750 tons per year pumpable sludge capacity available.

Continental Cement Company, Hannibal, Missouri

Continental Cement currently operates one long wet BIFs, which burns liquid and bulk solid, and dry solid hazardous wastes. The kiln operates 7,600 hours per year. Based on reported maximum practical capacity, and 1992 utilized capacity, EPA estimates the facility's adjusted available liquid waste capacity to be 49,389 tons per year, its available bulk solids capacity to be 17,774 tons per year, and its available dry solids capacity to be 3,472 tons per year. The facility reports that their liquids, as burned, contain an average of 25 percent entrained solids.

Dixie Cement Company, Knoxville, Tennessee

This facility burns liquid and containerized solid hazardous waste fuel in one four-stage cement kiln with preheater and precalciner. The facility reported that as burned, their liquids contain an average of 30 to 40 percent solids. The kiln operates 7,850 hours per year. Based on reported maximum practical feed rates and 1992 waste quantities, EPA estimates that the facility has 18,219 tons per year solids capacity available, and 10,062 tons per year liquids capacity available. However, Dixie has stopped accepting hazardous waste. EPA is not including its capacity in its estimate of available capacity.

Holnam, Artesia, Mississippi

This Holnam facility is new, and was not operational in 1992. It burns liquid hazardous wastes in one wet kiln, which is projected to operate 90 percent of the time, beginning in August of 1993. The hazardous waste fuel is injected into the hot end of the kiln. There was no hazardous waste utilization during 1992, but based on the reported projected maximum practical capacity, EPA estimates that the facility has 46,300 tons per year available capacity.

Holnam, Holly Hill, South Carolina

The Holnam facility in Holly Hill burns liquid hazardous waste fuels in two long wet kilns. Liquid hazardous waste fuel is injected into the hot end of the kiln. The larger kiln operated 7,400 hours in 1992, however, operation of the smaller kiln was discontinued during 1992 due to difficulties in meeting the hydrocarbon/carbon monoxide standard under the BIF rule. EPA estimates that the larger kiln has 23,000 tons per year liquids capacity available.

Holnam/Safety Kleen Corporation, Clarksville, Missouri

This facility burns liquid hazardous waste fuels in one long wet rotary kiln. Liquid hazardous waste fuel is injected into the hot end of the kiln. The kiln operates 7,500 hours a year. The facility reported the average solid content of liquids as burned, is 20 percent. Based on reported maximum practical burning capacity and 1992 capacity utilization estimates, EPA estimates that the facility has 47,479 tons per year liquids capacity available.

Keystone Cement Company, Bath, Pennsylvania

Keystone Cement Company burns liquid hazardous waste in two wet process rotary BIFs. These kilns operate 7,850 hours per year. The hazardous waste fuel is injected into the hot end of the kiln. The facility reported that as burned, their liquids contain less than 15 percent solids. EPA estimates that the facility has 40,035 tons per year available capacity.

Lafarge Corporation, Alpena, Michigan

This facility operates five rotary BIFs, but only two are currently burning hazardous waste. These kilns burn liquids only, and each operates 7,500 hours per year. The facility reported that as burned, their liquids have a 15 percent solid content. EPA estimates that together the kilns have 8,000 tons of capacity available per year. Lafarge intends to burn hazardous waste in the three kilns that are not currently burning hazardous waste, but must first satisfy numerous construction and regulatory requirements. The facility also plans to install a sludge handling system at some unspecified point in the future.

Lafarge Corporation, Fredonia, Kansas

This facility operates two rotary BIFs. Both burn liquid hazardous waste streams. The facility reported that as burned, their liquids contain an average of 25 percent solids. The smaller kiln operates about 7,800 hours per year, while the larger one averages 7,600 hours. EPA estimates this facility is utilizing all of its dry solids combustion capacity and has about 1,000 tons of liquids capacity available. The facility is authorized to burn K088 wastes.

Lafarge Corporation, Paulding, Ohio

This facility burns liquid and pumpable sludge hazardous waste fuel in two rotary BIFs. Lafarge reports that this facility's liquids, as burned, contain approximately 10 percent solids. One of the kilns operates approximately 8,100 hours per year, the other 7,800 hours. EPA estimates this facility has 4,868 tons per year of available liquid capacity and 1,546 tons of available pumpable sludge capacity. Lafarge has indicated in the past that dry solids capacity would be added. Although the 1993 survey did not include mention of dry solids capacity, additional containers and bulk solids capacity were indicated for the future.

Lone Star Alternate Fuel Company, Cape Girardeau, Missouri

This facility burns liquid hazardous waste fuels and containerized solids in one precalciner kiln. Pumpable liquids are injected at the hot end, and containerized solids are fed via air cannon. The kiln is operational for 7,440 hours per year. Lone Star reported that as burned, this facility's liquids contain an average of 25 percent solids. EPA estimates that the facility has 31,457 tons per year liquids capacity available and 2,346 tons per year containerized solids capacity available.

Lone Star Industries, Green Castle, Indiana

This facility burns liquid and containerized solid hazardous waste fuel in one long, wet process rotary cement kiln. The facility reported that as burned, their liquids contain an average of 20 percent solids. The liquid waste fuel is injected into the hot end of the kiln, and solids are reground with bulk liquid and fed as pumpable liquid at hot end (one gallon plastic jugs are injected at hot end). The kiln burns liquid waste fuel for 5,500 hours a year, and burns containerized solids for 2,350 hours a year. EPA estimates that Lone Star has no liquid combustion capacity available, and 7,668 tons per year capacity available for containerized solids.

National Cement Company, Lebec, California

This facility burns liquid hazardous waste in one long, dry process cement kiln. Waste fuel is injected into the hot end of the kiln. The facility reported that as burned, their liquids contain an average of 10 percent solids. National Cement operates an average of 6,796 hours per year. EPA estimates that the facility has 7,700 tons of capacity available per year.

Safety Kleen Envirosystems, Dorado, Puerto Rico

This facility burns liquid hazardous waste in one dry process kiln. Hazardous waste feed is pumped into the hot end of the kiln. This kiln operates an average of 6,000 hours per year. The facility has two more kilns, but did not indicate if these other kilns are expected to burn hazardous wastes. EPA estimates that the kiln has 44,547 tons per year of available capacity.

Texas Industries, Incorporated, Midlothian, Texas

This facility burns liquid hazardous waste fuels in four rotary kilns. Each of these kilns operates 8,300 hours per year. The facility reported that as burned, their liquids contain an average of 8 percent solids (maximum 30 percent suspended solids). EPA estimates that the facility has 164,000 tons per year liquids capacity available.

2.2.3.2 Commercial BIFs Not Included in the CKRC Survey

EPA is aware that additional BIFs are burning hazardous waste that did not submit 1993 CKRC surveys. These facilities include Carolina Solite (Albemarle, NC), ESSROC (Logansport, IN), Florida Solite (Green Cove Springs, FL), Giant Cement (Harleyville, SC), Heartland Cement (Independence, KS), Kentucky Solite (Brooks, KY), Medusa (Wampum, PA), North Texas Cement (Midlothian, TX), River Cement (Festus, MO), Solite (Arvonia, VA), Solite (Cascade, VA), and Southdown (Fairborn, OH).[11] An additional facility, Holnam (Ada, Oklahoma), is not operating but it does have interim status. It is currently negotiating with state officials for final approval. This facility is not included in the capacity analysis.

To present a complete picture of available commercial combustion capacity, the Agency supplemented the analysis with information contained during a literature review. Brief individual facility profiles are presented below based on information contained in the 1992 CKRC Survey and this literature review.

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[11] Marine Shale Processors (Amelia, LA) is not included in the analysis due to ongoing enforcement actions. In 1992, the reported liquids capacity was 200,000 tons and 80,000 tons of waste were burned.

Carolina Solite, Albemarle, North Carolina

This lightweight aggregate facility has an interim status BIF permit. It burns liquid wastes in four kilns. The facility did not burn waste in 1992. EPA estimates their current liquid waste burning capacity as 22,000 tons.

ESSROC, Logansport, Indiana

This facility burns liquid hazardous waste fuel in two wet process BIFs. The Agency estimates that this facility has 11,000 tons per year of available capacity for liquids and 4,000 tons per year available for containerized solids.

Florida Solite, Green Cove Springs, Florida

This lightweight aggregate facility has an interim status BIF permit. Florida Solite is currently operating one of its three kilns for burning liquid wastes. The facility did not burn waste in 1992. EPA estimates their current available capacity at 11,000 tons of liquid wastes.

Giant Cement Company, Harleyville, South Carolina

This facility burns liquid and dry solid hazardous waste in four wet process BIFs. Both types of wastes are fed into the hot end of the kiln. The facility reports that their liquids, as burned, contain an average of 20 percent entrained solids. EPA estimates that together the kilns have 22,500 tons per year liquid combustion capacity available, and 13,500 tons per year available capacity for dry solids.

Heartland Cement Company, Independence, Kansas

This facility burns dry solids in four dry process BIFs. They each feed dry solid hazardous waste into the hot end of the kiln. EPA estimates that together the four kilns have 23,450 tons per year available capacity for dry solids. This facility is authorized to burn K088 wastes.

Kentucky Solite, Brooks, Kentucky

Kentucky Solite has an interim status BIF permit. This facility burns solid wastes in three aggregate kilns. EPA estimates that the facility has 7,000 tons of available solid waste burning capacity.

Medusa Cement, Wampum, Pennsylvania

This facility burns liquid and sludge hazardous waste in three long dry process BIFs. Solids are ground and mixed into the liquid stream, before being injected into the kilns. The facility reported that as burned, their liquids contain an average of 25 percent solids. EPA estimates that the facility has 25,400 tons per year liquid capacity available, 3,900 tons per year pumpable sludge capacity, and 700 tons per year nonpumpable sludge capacity available.

North Texas Cement, Midlothian, Texas

This facility burns liquid wastes. The facility has an interim status BIF permit, and has not burned commercially since April 1991. EPA estimates that North Texas has 49,000 tons of available liquids burning capacity.

River Cement, Festus, Missouri

River Cement burns liquid and sludge hazardous waste fuel in two dry process BIFs. The facility reports that their liquids, as burned, contain an average of 20 percent entrained solids. The facility filters liquid hazardous waste and grinds sludges, before blending the two and pumping the hazardous waste fuel into the hot end of the kiln. EPA estimates that the two kilns have 10,500 tons per year liquid hazardous waste capacity available, 3,750 tons per year pumpable sludge capacity available, and 750 tons per year nonpumpable sludge capacity available.

Solite-Arvonia, Arvonia, Virginia

This Solite facility has an interim status BIF permit. It operates four kilns that burn liquid wastes. Solite-Arvonia's available liquids burning capacity is estimated by EPA to be 7,000 tons.

Solite-Cascade, Cascade, Virginia

Solite-Cascade has an interim status BIF permit. The facility burns liquid wastes in four kilns. EPA estimates its available liquid burning capacity at 18,000 tons.

Southwest Portland Cement Co., Inc., Fairborn, Ohio

Southwest's Fairborn, Ohio facility burns liquid hazardous wastes in one dry process cement kiln with preheater. The facility reported in the 1991 CKRC survey that their liquids, as burned, contain less than 5 percent entrained solids. The waste fuel is injected into the hot end of the kiln. Based on reported maximum practical feed rates and 1991 waste quantities, EPA estimates that the facility has 19,370 tons per year of liquid combustion capacity available. However, this facility has announced its intention to stop receiving hazardous waste, so it is not included in the estimate of required capacity.

2.2.3.3 Commercial BIF Capacity for Soils

The CKRC survey did not specifically request capacity data for the combustion of soils. However, facilities were asked if soils could be accepted for burning. Of the 18 facilities that responded to the CKRC survey, 16 explicitly indicated that they do not accept hazardous soils. Two facilities, Continental Cement (Hannibal, MO) and Southdown (Knoxville, TN), reported that they could accept hazardous soils, and that this capacity can be considered part of their solids capacity. The Agency believes that, because soil alone generally has a very low heating value, facilities are blending soils with other hazardous wastes having high heating values, or are using contaminated soil as an ingredient rather than for energy recovery. The Agency's evaluation of heating value limits provided by Continental and Southdown supports the contention that BIFs generally cannot accept soil as a large percentage of their feed (i.e., without extensive blending).

2.2.4 Available Combustion Capacity

Exhibit 2-4 summarizes EPA's estimates of commercial hazardous waste capacity by waste form for incinerators and BIFs. Combustion capacity for liquid hazardous wastes has historically been more readily available than capacity for sludges and solids. EPA estimates that the available commercial combustion capacity for liquids to be about 1,156,000 tons per year. In the Phase II rule (59 *FR* 47982, September 19, 1994), EPA estimated that 11,000 tons of waste required liquid combustion capacity. Therefore, the available liquid combustion capacity for Phase III wastes is 1,145,000 tons.

As shown in Exhibit 2-4, the available sludge/solid commercial combustion capacity is 560,000 tons. In the Phase I rule (57 *FR* 37195, August 18, 1992) EPA promulgated treatment standards for F037 and F038 wastes and granted a one-year capacity variance to these wastes. In its capacity analysis, EPA estimated that 69,000 tons of F037 and F038 would require commercial combustion capacity. Due to BTU considerations, EPA estimated that 41,000 tons would be burned in cement kilns and 28,000 tons would be burned in incinerators. Because the capacity variance for these wastes did not expire until July, 1993 and the capacity data for cement kilns are for 1992, required capacity for F037/38 wastes is not reflected in the available capacity estimate for cement kilns. The capacity data for incinerators includes both 1992 and 1993 data. Since the variance expired in July, 1993, the 1993 utilized capacity data does reflect some F037/38 wastes. To determine the quantity of F037/38 wastes accounted for in these incinerator estimates, EPA assumed that 14,000 tons of F037/38 was incinerated in

Exhibit 2-4

Commercial Hazardous Waste Combustion Capacity Summary

Waste Form	Incinerators			BIFs			Total Available (1000 tpy)
	Maximum (1000 tpy)	Available (1000 tpy)	Percent Utilized	Maximum (1000 tpy)	Available (1000 tpy)	Percent Utilized	
Liquids (aqueous)	190	92	51	NA	NA	NA	92
Liquids (non-aqueous)	346	159	54	NA	NA	NA	159
Reported as All Liquids (aqueous & non-aqueous)	82	56	31	1,548	702	55	759
Reported as Liquids & Pumpable Sludges Grouped	32	20	38	236	49	79	68
Pumpable Sludges	116	66	43	37	12	68	78
Nonpumpable Sludges	32	17	47	5	1	72	18
Reported as Solids & Nonpumpable Sludges Grouped	53	38	27	35	11	69	49
Bulk Solids	133	70	47	25	18	30	88
Dry Solids	NA	NA	NA	49	39	20	39

1) Numbers may not add due to rounding.
2) This Report Only Includes Capacity for Currently Operating Units. The following units are not included in the roll-ups: Waste-Tech (Kimball, NE), Waste-Tech (East Liverpool, OH), CWM (Chicago, IL), and Ash Grove (Louisville, NE).
3) The following BIFs have been included in these figures based on data obtained from the September 1993 EI Digest: North Texas Cement (Midlothion, TX), Florida Solite (Green Cove Springs, FL), Carolina Solite (Albermarle, NC), Solite Co. (Arvonia, VA), Solite Co. (Cascade, VA), Essroc (Logansport, IN), Giant (Harleyville, SC), Heartland Cement Co. (Independence, KS), Medusa Cement Co. (Wampum, PA), River Cement (Festus, MO) and Southdown (Fairborn, OH).

Exhibit 2-4(Continued)

Commercial Hazardous Waste Combustion Capacity Summary

Waste Form	Incinerators			BIFs			Total Available (1000 tpy)
	Maximum (1000 tpy)	Available (1000 tpy)	Percent Utilized	Maximum (1000 tpy)	Available (1000 tpy)	Percent Utilized	
Containerized Solids	231	102	56	146	106	28	208
Compressed gases	5	3	43	NA	NA	NA	3
Soils	169	157	7	NA	NA	NA	157
TOTAL LIQUIDS & PUMPABLE SLUDGES	766	393	49	1,822	763	58	1,156
TOTAL SOLIDS & NON-PUMPABLE SLUDGES	618	384	38	261	175	33	560
TOTAL	1,390	780	44	2,083	938	55	1,718

1) Numbers may not add due to rounding.

2) This Report Only Includes Capacity for Currently Operating Units. The following units are not included in the roll-ups: Waste-Tech (Kimball, NE), Waste-Tech (East Liverpool, OH), CWM (Chicago, IL), and Ash Grove (Louisville, NE).

3) The following BIFs have been included in these figures based on data obtained from the September 1993 EI Digest: North Texas Cement (Midlothion, TX), Florida Solite (Green Cove Springs, FL), Carolina Solite (Albermarle, NC), Solite Co. (Arvonia, VA), Solite Co. (Cascade, VA), Essroc (Logansport, IN), Giant (Harleyville, SC), Heartland Cement Co. (Independence, KS), Medusa Cement Co. (Wampum, PA), River Cement (Festus, MO) and Southdown (Fairborn, OH).

1993.[12] Since EPA has 1993 data for facilities representing approximately two-thirds of the total sludge/solid capacity, EPA assumed that the utilized capacity estimates reflect approximately 9,500 tons of F037/38. Therefore, EPA estimates that 59,500 tons (69,000 - 9,500) of sludge/solid capacity will be required for F037/38 wastes. In the Phase II rule (59 *FR* 47982, September 19, 1994), EPA estimated that 380,000 tons of waste required sludge/solid combustion capacity. Therefore, the available sludge/solid combustion capacity for Phase III wastes is estimated to be 120,500 tons.

2.3 OTHER TREATMENT SYSTEM CAPACITIES

This section discusses commercial treatment capacity other than those discussed above. Specifically, it presents EPA's capacity analysis for stabilization. In addition, it discusses the treatment capacity of Reynolds Aluminum's dedicated K088 thermal treatment facility.

Section 2.3.1 summarizes the available stabilization capacity, and Section 2.3.2 summarizes the available K088 thermal treatment capacity.

2.3.1 Available Stabilization Capacity

Stabilization is the other primary conventional commercial treatment technology for the newly identified and listed wastes besides combustion. EPA estimates that over 1 million tons of stabilization capacity are currently available. In analyzing alternative treatment capacity for stabilization for wastes covered in this rule, the Agency built on the capacity analysis conducted for the Third Third LDR rule. This analysis was based on data contained in the May 1990 TSDR Capacity Data Set.[13] The TSDR Capacity Data Set contains results from the National Survey of Hazardous Waste Treatment, Storage, Disposal and Recycling Survey (the TSDR Survey). The TSDR Survey was administered in 1987 to 2,500 facilities and was designed to provide comprehensive information on current and planned hazardous waste management, and practices at RCRA-permitted and interim status treatment, storage, recycling, and disposal facilities. The TSDR Survey collected projections of capacity changes from 1986 through 1992. The TSDR Capacity Data Set includes the amount of hazardous and nonhazardous waste entering each treatment system in 1986, the maximum hazardous waste capacity, and the maximum total waste capacity.

For prior LDR rulemakings, EPA updated the TSDR Capacity Data Set for critical technologies based on confirmation of planned capacity changes, and other information received since the survey (e.g., comments on proposed rules). Updated

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[12] Given constant generation of F037/38 wastes, one-half of the total quantity requiring incineration (i.e. 28,000 x 0.5) would be sent to incinerators during the period of July 1993 to December 1993.

[13] U.S. EPA, *Commercial Treatment/Recovery Data Set*, May 1990.

information was obtained by contacting facilities and verifying critical projected capacities reported in the TSDR Survey. Based on the information provided by facility contacts, EPA determined whether planned facility capacity had come on line as projected. For a more detailed explanation of the TSDR Survey and of the Third Third Rule refer to U.S. EPA, *Background Document for Third Third Wastes to Support 40 CFR Part 268 Land Disposal Restrictions*, May 1990.

2.3.2 Summary of Available K088 Treatment Capacity

Reynolds Metal Company operates a thermal treatment unit that is capable of meeting the treatment standards for K088. According to Reynolds' description of this process, K088 is blended with limestone and brown sand and then thermally treated in a rotary kiln. Cyanides are destroyed by the oxidation at the elevated temperatures and the soluble fluoride salts react with the limestone to form calcium fluoride. Since this treatment unit is permitted to receive only K088 wastes, the facility is dedicated solely to the treatment of K088. Reynolds received delisting for the residuals from treatment in this unit on December 30, 1991 (56 *FR* 67197). The delisting for treatment residues from this process effectively limits the K088 content of the treated waste. Therefore, although the total operating throughput for this facility is 300,000 tons per year, Reynolds estimates that it can accept approximately 121,500 tons of K088 per year.[14]

In a comment submitted in response to the Phase III LDR proposal, Reynolds stated that it would make decisions regarding whether to treat K088 wastes generated in Canada at its Gum Springs facility based on the prevailing business climate and available treatment capacity, and that it was committed to providing and maintaining sufficient capacity to meet the needs of its U.S. customers.[15] In light of this comment, EPA assumes that the Gum Springs facility will not treat K088 waste generated by other companies in Canada if there are U.S. companies that require treatment capacity. However, EPA believes that for economic reasons Reynolds will treat the K088 generated by its own Canadian plant at the Gum Springs facility. Therefore, EPA estimates that 10,500 tons of capacity will be required for Reynolds' Canadian-generated K088 wastes, leaving 111,000 tons of available capacity for treatment of U.S.-generated K088 wastes.

[14] This information was provided by Reynolds in a comment to the Phase III proposed rule. The estimate accounts for all limits imposed by Reynolds' delisting and operating permits and assumes 15% downtime.

[15] Reynolds Metals Company comment dated July 12, 1995, number PH3P-L0015, page 2.

CHAPTER 3
CAPACITY ANALYSIS FOR ICR AND TC WASTES THAT ARE MANAGED IN CWA OR CWA-EQUIVALENT SYSTEMS

This chapter discusses the treatment capacity analysis conducted for ignitable (D001), corrosive (D002), and reactive (D003) wastes (ICR wastes); newly identified toxicity characteristic (TC) pesticide wastes (D012-D017); and newly identified TC organic wastes (D018-D043) that are managed in Clean Water Act (CWA) or CWA-equivalent systems.[16] Section 3.1 provides background information on the regulatory history of these wastes, the treatment standards being considered for this rule, and an overview of how EPA assessed the required treatment capacity for these wastes. Section 3.2 describes the data sources that were consulted and developed to collect the information required for the capacity analysis. Section 3.3 explains the detailed methodology used for the analysis of required treatment capacity for D001-D003 and D018-D043 wastes and provides estimates of the quantities of these wastes requiring commercially available treatment. Section 3.4 summarizes the results of the capacity analysis for D001-D003 and D018-D043 wastes. Section 3.5 presents the results of the capacity analysis for D012-D017 wastes.

Today's rule establishes treatment standards for all ICR and TC organic wastes that are managed in: (1) wastewater treatment systems that include surface impoundments and whose ultimate discharge is subject to CWA; (2) "zero dischargers" who, before land disposal of the wastewater, treat the wastewater in a CWA-equivalent system; or (3) Class I non-hazardous underground injection wells subject to the Safe Drinking Water Act (SDWA) Underground Injection Control (UIC) program. The ICR wastes are being regulated today due to the D.C. Circuit Court decision issued September 25, 1992 (*Chemical Waste Management v. EPA*, 976 F. 2d 2). This court decision addressed the regulation of characteristically hazardous ignitable, corrosive, and reactive wastes under the Third Third Land Disposal Restrictions (LDRs) rule (55 *FR* 22520, June 1, 1990). The court decision responded to several challenges to the Third Third LDR Rule that were brought by various petitioners,[17] including challenges to provisions

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[16] Wastes managed in Safe Drinking Water Act (SWDA) underground injection wells are addressed in a separate document.

[17] This court decision consolidated 13 separate cases before the court. The court grouped the petitioners into several groups. The "NRDC petitioners" were comprised of the Hazardous Waste Treatment Council, The Environmental Defense Fund, the Sierra Club, and the Natural Resources Defense Council. The "Industry petitioners" were comprised of the Chemical Manufacturers Association, The Fertilizer Institute, Chemical Waste Management, the American Petroleum Institute, RSR Corporation, the American Mining Congress, the American Iron and Steel Institute, the Dow Chemical Company, the American Paper Institute, the National Forest Products Association, the Specialty Steel Industry of the United States, and the Edison Electric Institute. Other petitioners included the Exide Corporation, Horsehead Resource Development Company, Inc., the Zinc Corporation of America, the Aluminum Association, the Secondary Lead Smelters, the Association of Battery Recyclers, the National Association of Metal Finishers, the Battery Council International, the Lead Industries Association, Inc., the Cadmium Council, E.I. du Pont de Nemours & Company, Allied-Signal Corporation, the Institute of Makers of Explosives, Thiakol Corporation, and Olin Corporation.

allowing dilution as a treatment to remove some hazardous characteristics.[18] The decision remanded the dilution provisions at 40 CFR 268.1 for wastes managed in Class I deep injection wells subject to the requirements of the SDWA, and at 40 CFR 268.3 for wastes managed in centralized wastewater treatment systems subject to CWA.[19] Consequently, TC wastewaters and other liquid wastes are also being addressed in this rulemaking if the wastes are (1) managed in surface impoundments regulated under the Clean Water Act, (2) managed in CWA-equivalent systems[20] prior to ultimate land disposal, or (3) disposed of in Class I underground injection wells regulated under the SDWA.

3.1 BACKGROUND

On May 8, 1990, EPA promulgated regulations addressing the last of the five congressionally-mandated prohibitions on land disposal for the "Third Third" wastes (see 55 *FR* 22520, June 1, 1990). In the Third Third Rule, the Agency promulgated treatment standards and prohibitions for hazardous wastes that exhibited one or more of the following characteristics at the point of waste generation: ignitability (D001), corrosivity (D002), reactivity (D003), or Extraction Procedure (EP) toxicity (D004-D017). The Third Third Rule established treatment standards for the characteristic wastes in one of four forms, depending on the waste: (1) a concentration level for hazardous constituents equal to, or greater than, the characteristic level; (2) a concentration level for hazardous constituents less than the characteristic level; (3) a specified treatment technology (e.g., for ignitable wastes containing high levels of total organic carbon); and (4) a treatment standard of "deactivation," which allowed the use of any technology, including dilution, to remove the characteristic property. For ignitable, corrosive, or reactive wastes, consideration was given to the hazardous constituents in the waste only when the Agency had information that such constituents were present (e.g., reactive cyanide wastes);

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[18] In part, the NRDC petitioners asserted that the rule violated the intent of RCRA because (1) the rule's deactivation standard allowed impermissible dilution in some cases, rather than treatment with specific technologies; and (2) the rule allowed placement of untreated formerly characteristic wastes into surface impoundments regulated under the Clean Water Act, or into Class I non-hazardous underground injection wells regulated under the Safe Drinking Water Act.

[19] The court decision vacated some parts of the Third Third rule and remanded others. Vacated rule are no longer in effect (once the court's mandate issues), whereas remanded rules remain in force until EPA acts to replace them. This distinction has considerable significance with respect to LDR treatment standards. If a previously promulgated treatment standard for a waste is vacated, that waste is now effectively prohibited from land disposal because any waste that would be land disposed would be land disposed without having first been treated to the standard previously established by EPA (assuming that the waste is not being land disposed in a land disposal unit with an approved no-migration petition). A remanded treatment standard, on the other hand, remains in effect, and disposal of wastes treated to the remanded treatment standard is legal until the standard is amended.

[20] CWA-equivalent treatment includes biological treatment for organics, alkaline chlorination or ferrous sulfate precipitation for cyanide, precipitation/sedimentation for metals, reduction of hexavalent chromium, or other treatment technology that can be demonstrated to perform equally or greater than these technologies (see 58 *FR* 29864, May 24, 1993).

otherwise, only the characteristically hazardous property of the waste had to be addressed.

3.1.1 Integration of the Third Third Rule with CWA and SDWA

For characteristic wastes regulated under CWA and SDWA, the Agency also evaluated the applicability of certain provisions of the LDRs' framework to ensure the successful integration of all of these programs. Section 1006(b) of RCRA states that "the Administrator shall integrate all provisions of [RCRA] for purposes of administration and enforcement and shall avoid duplication, to the maximum extent practicable, with the appropriate provisions of the CWA... and SDWA..." Specifically, the Agency considered the appropriateness of the dilution prohibition for each of the characteristic waste streams, the applicability of treatment standards expressed as specified methods, and whether the LDRs should attach to a waste at the point of waste generation.

There are generally no overlapping provisions between RCRA and CWA for the treatment of listed wastewaters that are ultimately discharged to a surface water of the United States or to a Publicly Owned Treatment Works (POTW). The overlap occurs when treating characteristically hazardous wastewaters. Some facilities generate wastes that initially exhibit one or more hazardous characteristics. Yet, after mixing with other waste streams, these characteristic wastes cease to exhibit some or all of their hazardous characteristics prior to their placement in a RCRA Subtitle D surface impoundment that is part of the wastewater treatment train. This practice of mixing, or aggregation, could potentially trigger the LDR dilution prohibition. Similarly, operators of Class I injection wells often mix waste streams, and through this mixing, remove the characteristic(s) prior to disposal.

In the Third Third rulemaking, the Agency generally found that mixing waste streams to eliminate certain characteristics was appropriate and permissible for non-toxic corrosive wastewaters and, in some cases, reactive or ignitable wastewaters. In particular, the Agency stated that the treatment requirements and associated dilution rules under the CWA are generally consistent with the dilution rules under RCRA, and therefore decided to regulate these wastes exclusively under the existing CWA provisions. However, the Agency did single out certain particularly toxic wastewaters, and waste-waters not amenable to centralized wastewater management, to which the dilution prohibition still applies.

EPA stated that, in general, dilution is not a permissible form of treatment for toxic constituents. However, EPA also stated that the dilution prohibition did not normally apply to toxic characteristic wastewaters that are managed in CWA systems as long as EPA had not promulgated a specific method of treatment or treatment technology as the LDR treatment standard. If the treatment standard was concentration-based, then wastes could be managed in these systems even though dilution was occurring.

EPA further stated in the Third Third rulemaking that the dilution prohibition did not normally apply to characteristically hazardous wastes that are decharacterized prior to underground injection, regardless of whether a method of treatment had been promulgated as the LDR treatment standard. EPA determined that the regulatory program for Class I wells under the SDWA adequately protects drinking water sources because Class I deep wells inject below the lowermost geologic formation containing an underground drinking water source and are subject to federal location, construction, and operation requirements. The Agency stated that application of the dilution prohibition to these wastes would not further minimize threats to human health and the environment, and therefore, it was permissible to inject wastes that were decharacterized by dilution into Class I wells.

The timing and degree of treatment were also relevant to the interaction between the RCRA Subtitle C and CWA, SDWA, or RCRA Subtitle D rules. LDR standards that required wastes to be treated to below characteristic levels would attach at the point of waste generation, and would apply to wastes that were destined for RCRA Subtitle D facilities. Many of these affected Subtitle D units were surface impoundments that contained wastes that were managed in part under the National Pollutant Discharge Elimination System (NPDES) and pretreatment programs of the CWA and the UIC program of the SDWA. The NPDES program already had a series of technology-based requirements for the treatment of wastewater prior to discharge, and many of the LDR standards were based on data used to set the CWA standards. EPA asserted that it had the discretion to require treatment to at or below the characteristic level and to determine whether treatment would occur at the point of waste generation or at the point of waste disposal. Thus, based on available information, EPA found that the difficulties of integrating the CWA and SDWA programs with RCRA outweighed the limited benefit gained by additional LDR-required treatment. EPA chose not to apply the strict point of generation principle to characteristic wastes in these instances in order to harmonize RCRA with the CWA and SDWA.

3.1.2 Third Third Rule Court Decision

Several petitions for judicial review were brought to challenge the Third Third Rule. Several environmental organizations, as well as the Hazardous Waste Treatment Council (HWTC), raised numerous objections to the Third Third Rule. In part, they asserted that:

- The rule's deactivation standard impermissibly allowed dilution in some cases, rather than treatment with specific technologies; and

- The rule allowed placement of untreated formerly characteristic wastes into surface impoundments regulated under CWA, or into Class I non-hazardous underground injection wells regulated under SDWA, thereby violating the intent of RCRA.

On September 25, 1992, the United States Court of Appeals for the District of Columbia Circuit delivered its decisions to these challenges in *Chemical Waste Management vs. EPA*, 976 F. 2d 2. The court held that the widespread practice of diluting wastes to remove their characteristics of ICR or EP toxicity, and then managing these decharacterized wastes in surface impoundments regulated under CWA or in Class I nonhazardous underground injection wells regulated under SDWA, may be impermissible. In these situations, the waste may have failed to undergo full scale RCRA treatment before land disposal (i.e., treatment that satisfies RCRA section 3004(m) criteria before placement of the decharacterized wastes in the impoundment or the injection well). Such practices are permissible, the court held, only if treatment equivalent to RCRA LDR standards is performed before discharge of the wastes into the environment. The court also held that EPA can attach the LDRs at the point of waste generation, but that EPA cannot apply this principle selectively.

Because RCRA section 3004(m) requires treatment to destroy or remove hazardous constituents, the court held that dilution of characteristic wastes may constitute treatment only for those wastes that do not contain hazardous constituents in sufficient concentrations to pose a threat to human health and the environment. For characteristic wastes that do contain hazardous constituents in sufficient concentrations to pose a threat, the court vacated the deactivation treatment standard. The court held that the deactivation standard could be achieved by diluting these wastes to remove their characteristic property; however, dilution does not destroy or remove the hazardous constituents in the wastes, and therefore violates RCRA section 3004(m).

3.1.3 EPA's Response to the Court Decision

In response to the court decision, EPA first published a Notice of Data Availability (NODA) (58 *FR* 4972, January 19, 1993), which presented the information the Agency currently had on the wastes covered by the court decision, discussed possible options for integrating RCRA and the CWA and SDWA, and requested comment.

On May 24, 1993, EPA issued an Interim Final Rule (58 *FR* 29860) for wastes whose treatment standards were expressly vacated by the *Chemical Waste Management v. EPA* court decision. This rule created new treatability groups for ignitable and corrosive (IC) wastes. These new treatability groups distinguish from all TC wastes those IC wastes that are (1) managed in centralized wastewater treatment systems regulated under CWA, (2) ultimately land disposed in underground injection wells regulated under SDWA, or (3) managed in wastewater treatment systems performing CWA-equivalent treatment.[21] Having defined these new treatability groups, the Interim Final Rule

[21] CWA-equivalent treatment means biological treatment for organics, alkaline chlorination or ferrous sulfate precipitation for cyanide, precipitation/sedimentation for metals, reduction of hexavalent chromium, or other treatment technology that can be demonstrated to perform equally or greater than these technologies (see 58 *FR* 29864, May 24, 1993).

promulgated revised treatment standards for decharacterized IC wastes that are not managed in CWA, SDWA, or CWA-equivalent systems. The revised standards retained the requirement to remove the hazardous characteristic (i.e., deactivation remained applicable), and added a requirement that the waste be treated so that each underlying hazardous constituent in the waste meets the same concentration-based treatment standard promulgated for that constituent in the treatment standards for F039 wastewaters and nonwastewaters.

EPA's reading of the court decision was that the treatment standards regarding centralized wastewater management involving land disposal (40 CFR §§ 268.1(c)(3) and 268.3(b)) were remanded to EPA for further study rather than vacated (see 58 *FR* 29863, May 24, 1993). Consequently, these remanded provisions of the Third Third LDR Rule are still in effect until the Agency issues a new rule.

After the May 24, 1993 Interim Final Rule, EPA promulgated the Phase II LDR Rule on September 19, 1994 (59 *FR* 47982). This rule established constituent-specific "universal treatment standards" (UTS) to replace waste code-specific treatment standards that had been established by earlier LDR rules. EPA established these universal standards in an effort to simplify and streamline the LDR program, and to establish a consistent set of concentration limits on a constituent-by-constituent basis.[22] EPA established universal standards for metals and organic constituents–one set for wastewaters and a different set for nonwastewaters–that replace most existing limits in previously promulgated treatment standards for listed hazardous wastes. In the Phase II rule, however, the universal standards applied only to wastes that are not managed in CWA, SDWA, or CWA-equivalent systems.

3.1.4 Today's Rule

For the purposes of this capacity analysis, EPA has organized facilities into one or more of the following three categories:

- Direct discharger – a facility that discharges wastewater into a navigable water;

- Indirect discharger – a facility that discharges wastewater to a POTW; and

- "Zero" discharger – a facility that uses methods such as wastewater reuse, evaporation ponds, incineration, contract hauling, land application, and off-site privately owned treatment works.

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22 Facilities that treat hazardous waste typically must comply with the LDR treatment standards for many listed and characteristic hazardous waste codes. Prior to the Phase II LDR rule, in some cases a constituent regulated for more than one waste code had treatment standards set at different concentration levels, depending on the waste code.

Thus, today's rule sets treatment standards for all ICR and TC organic wastes that are managed in: (1) wastewater treatment systems that include surface impoundments and whose ultimate discharge is subject to the CWA (includes both direct and indirect dischargers); (2) zero dischargers who, before land disposal of the wastewater, treat the wastewater in a CWA-equivalent system; or (3) Class I non-hazardous underground injection wells subject to the SDWA's UIC program. Facilities with underground injection wells are considered in a separate background document.

3.2 DATA SOURCES

EPA used many different data sources to determine the number of facilities and quantity of wastewaters affected by today's rule. No single data source provided all the information necessary to assess the potential impact of this rule, however. The data sources used for the analysis include:

- Effluent Guidelines Documents;
- Report to Congress on the Discharge of Hazardous Wastes to POTWs;
- Toxic Release Inventory;
- Permit Compliance System;
- Industrial Subtitle D Screening Survey;
- Industry Studies Database;
- TC Regulatory Impact Analysis;
- Biennial Reporting System;
- TC Survey; and
- Industrial Facilities Discharge Database.

Sections 3.2.1 through 3.2.10 present a description of each of these data sources, the overall use of the data in the capacity analysis, and the limitations of these data sources. Numerous other data sources were examined for this analysis, but were not used for various reasons; these other data sources are briefly discussed in Section 3.2.11. Additional capacity data obtained from the comments received by EPA on the proposed Phase III LDR rule are described in Section 3.2.12 of this document.

3.2.1 Effluent Guidelines Documents

EPA's Office of Water (OW) collected data, under Section 308 of the Clean Water Act (CWA), in support of the effluent guidelines and pretreatment standards development process. These data are presented in the effluent limitations guidelines and standards documents for each industry. These documents generally provided the most comprehensive information on the wastewater generation and management practices of each industry.

The core of the effluent guidelines development project is the data collection effort. Data of increasing levels of detail are collected from individual facilities in the industry sector being examined through the use of telephone surveys, industry screener letters, and detailed questionnaires. The data collected focus on a number of elements including the processes employed at the facility (including process flow diagrams), quantity of wastewater generated, wastewater management practices (including treatment flow diagrams), types of discharges, and the concentrations of the constituents present in the wastewaters. These data, primarily from the detailed questionnaire, are routinely managed in database files to allow for manipulation of the data and study of the industry. Most of the background information on the specific industries analyzed in this study were obtained from these documents. The concentration data for different underlying hazardous constituents, information on the number of direct, indirect, and zero dischargers, and information on the technology standards were also obtained from these documents.

One of the limitations of this data source is that the effluent limitations guidelines were developed for some industries in the early 1970's. In the past 20 years, some manufacturing processes and wastewater management practices have undergone significant changes. These changes may not be reflected in the development documents. Also, the presence of ICRT wastes was not explicitly identified in the development documents and information on whether waste streams are managed in surface impoundments was not clear. The constituent concentration data primarily focused on constituents that are regulated by CWA and did not include concentration data for all pollutants with UTS. Also, the concentration data were generally sampled at facilities prior to the application of BAT standards. Although some of the industries had facility-specific data, these data were classified as Confidential Business Information (CBI), which precluded their use other than in an aggregated manner.

3.2.2 Report to Congress on the Discharge of Hazardous Wastes to POTWs

In 1986, EPA submitted a Report to Congress on the Discharge of Hazardous Wastes to Publicly Owned Treatment Work's (POTWs).[23] The Report is also referred to as the Domestic Sewage Study and responds to Section 3018(a) of the Hazardous and Solid Waste amendments of 1984 (HSWA). This study evaluated 47 industrial categories and identified approximately 160,000 industrial facilities that discharge wastewaters containing hazardous constituents to POTW's. This report provided information on the sources, types, and quantities of 165 selected hazardous constituents discharged to sewers including concentration data for some industries. This report also provided information on the total number of facilities in several industrial sectors and the number of direct, indirect, and zero dischargers.

One of the limitations of this document is that not all industries selected for the Phase III analysis are included in the study. Also, the concentration data often could not

[23] U.S. EPA, February 1986, *Report to Congress on the Discharge of Hazardous Waste to Publicly Owned Treatment Works*, Office of Water Regulations and Standards.

be used to extrapolate to the entire industry because it is unclear how many facilities were sampled for the given constituents. The report also does not include information regarding the use of land-based units and the data provided was primarily for indirect dischargers.

3.2.3 Toxic Release Inventory (TRI)

EPA's Office of Pollution Prevention and Toxics collects toxic release data, under Section 313 of the Emergency Planning and Community Right-to-know Act (EPCRA) of 1986. Industries are required to report information on the releases of listed toxic chemicals in their communities and to provide EPA with release information to assist the Agency in determining the need for future regulations. Information received from all the industries is compiled in a database. This database contains information on toxic constituent releases to air, land, and water in terms of total mass per year. For the present study, information on the mass loadings of constituents present in the wastewaters discharged by the industries were obtained from the TRI database. Discharge data from other sources were used to calculate constituent concentrations, based on the mass loadings. This information was used to estimate the number of facilities that discharged wastewaters with hazardous waste constituent concentrations above UTS.

One of the limitations of the TRI data is the lack of facility-specific flowrate data to compare the mass loadings of constituents with UTS. EPA attempted to address this data gap by using flowrate data from other sources; however, the actual flowrates may be higher or lower than the flowrates used in the analysis. Also, the TRI does not provide information regarding the use of land-based units or the generation of ICRT wastes. The TRI only requires information from facilities that generate over 10,000 pounds annually of specific constituents, and therefore not all facilities in a particular industry are included in the database.

3.2.4 Permit Compliance System (PCS)

PCS is a computerized management information system that contains data on the National Pollutant Discharge Elimination System (NPDES) permit-holding facilities. It keeps records on more than 65,000 active water-discharge permits (i.e., facilities) throughout the nation. PCS tracks POTWs and direct dischargers to surface water bodies but not indirect dischargers (i.e., dischargers to POTWs). PCS contains data on treatment trains used as part of CWA treatment systems. PCS also contains mass loadings of concentrations and flow data. Not all facilities reported treatment train information, however, and concentration data were only available for certain facilities (POTWs and other facilities deemed "major" according to CWA definitions).

EPA used the 1991 PCS data to determine the frequency with which facilities in various industries that are discharging to surface waters have a treatment component that may involve land placement. Using this information, EPA was able to identify specific industries that were likely to use land-based wastewater treatment systems as part of their waste management operations.

There are some important limitations to the PCS data. Because some of the treatment types can either involve land-based units or tank-based units, EPA attempted to account for this uncertainty in the analysis. However, it is possible that more or fewer of the facilities actually use land-based units for the above treatment types. Also, many sites did not report their treatment type in the PCS and not all potentially affected facilities are included. As stated above, the PCS data does not include whether the treatment systems manage decharacterized ICRT wastes or the concentrations of hazardous constituents in the wastewater potentially placed on the land during or after the treatment process. In order to better understand how facilities will be affected by the Phase III LDR rule, EPA used the PCS data and ICRT waste characterization data in a few case studies to assess the overlap between industrial NPDES permits and the UTS (see Appendix F).

3.2.5 Industrial Subtitle D Screening Survey

The Subtitle D Industrial Non-Hazardous Waste Survey provided information regarding whether wastes are managed on site in Subtitle D land-based units at industrial facilities. This survey was conducted between November 1986 and April 1987 and included 18,051 facilities in 17 industrial sectors. This survey provided information on the quantities of total waste generated each year by industry sector and the distribution of these wastes among surface impoundments, landfills, waste piles, and land application units. The industry sectors are identified primarily by the two-digit SIC code.

One of the limitations of this database is that the industries and SIC codes included in this database do not always match the industries selected for the Phase III analysis. Also, these data are relatively old, and therefore, are likely not accurately representative of current practices.

3.2.6 Industry Studies Database (ISDB)

The ISDB was developed primarily to support the listing of specific waste streams under RCRA. ISDB provides data for 16 specific industries. The ISDB data include information on waste generation, management, and constituent concentrations of ICR wastes that are managed in CWA systems, CWA-equivalent systems, and SDWA systems. The sources of information in the ISDB include RCRA 3007 questionnaires, plant visit reports, sampling and analysis site visit reports, and engineering analysis reports. EPA merged data for the 16 industries into 10 broader industrial categories in a separate report.[24] The relevant data from this report are presented in each of the industry profiles.

One of the limitations of the ISDB data is the age of the data. ISDB data have been collected by EPA over the past 14 years with periodic updates. Given the age of the data, it is important to note that many of the formerly ICR-only wastes in the ISDB currently have treatment standards. Also, NESHAPs, and stricter effluent guidelines, have generally moved facilities away from the use of surface impoundments for on-site wastewater treatment processes. Furthermore, the data do not directly identify whether wastes are characteristic for toxic organics. Data for only selective subsectors within industries are included in the ISDB and the concentration data are primarily from the point of generation and not at end-of-pipe.

3.2.7 TC RIA Database

The TC RIA characterizes the universe affected by the TC Rule by identifying the industries potentially affected, providing information on the wastes generated by these industries, and identifying the current management practices for these wastes. The primary data sources for this RIA were a series of industry studies. These industry studies were in turn primarily based on development documents used by the Effluent Guidelines Program.

In general, the industry studies include an industry overview, industry characterization, industry structure, process description, and descriptions of waste generation and disposal. The descriptions of waste generation include information on quantity, waste form, and constituent concentration. It is important to note that some of the data compiled in these reports are very dated, since the sources used for the industry studies go back to 1976. The RIA also used information from the Screening Survey of Industrial Subtitle D Establishments and ISDB to characterize baseline management practices for the wastes in the analysis.

The TC RIA data are limited because the waste stream data are aggregated by industry and are not facility-specific. Also, the data do not include all UTS constituents.

3.2.8 Biennial Reporting System (BRS)

The 1991 BRS provides recent summaries available on waste management practices at the individual waste stream and facility level. The BRS is a system by which RCRA-regulated treatment, storage, and disposal facilities (TSDFs) and large quantity generators provide EPA with information on their hazardous waste activities. The BRS contains information on the waste streams generated on site and received from off site,

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[24] U.S. EPA, November 30, 1994, *Summary Data From Industry Studies Database For Use in Phase III Capacity Determinations (Draft)*, prepared by SAIC.

waste physical form, waste codes, waste quantity, and the treatment systems used to treat each hazardous waste stream.

While the information provided by the BRS was not sufficient to provide comprehensive facility-specific estimates of affected wastes, it did provide useful information on selected facilities that may be representative of industry sectors and that was used to guide additional investigations. For example, of the more than 350 steam-electric utilities contained in the BRS database, 20 sites reported generating 29 ignitable or corrosive (IC) waste streams. Most of these waste streams were corrosive wastes produced during the regeneration of ion exchange resin beds. While this waste stream was reported at only a small portion of the facilities, EPA believes that these wastes are common to almost all steam-electric plants. However, most sites probably did not report this waste because they believed decharacterized wastes to be non-hazardous. For facilities that did report IC wastes, the BRS contained data on quantities and management and treatment practices, as well as a description of the waste streams. This finding is consistent with several comments submitted to EPA by the regulated community stating that these decharacterized wastes were generally not reported in the BRS because the facilities did not consider them to be hazardous (e.g., see comment TTCA-00021 in the comments to the Third Third remand notice of data availability).

As stated above, the BRS does not provide sufficient information regarding decharacterized ICRT wastes. Also, even in cases where ICRT wastes are reported, the BRS does not contain sufficient data to determine if the waste contains underlying hazardous constituents, and if additional treatment of underlying constituents would be necessary. Finally, the treatment systems identified in the BRS are generally used for hazardous waste management and are thus subject to regulation under Subtitle C and not subject to today's rule. Therefore, any land-based units identified are likely to be Subtitle C or interim status units.

3.2.9 TC Survey

The TC Survey was conducted by EPA in 1992 to obtain estimates of the quantities of newly identified organic TC wastes (D018-D043) that would be managed in land disposal units (i.e., landfills, land treatment units, surface impoundments, waste piles, and underground injection wells) from 1991 to 1995. Because of other related data collected, the survey also can be used to provide estimates on waste quantities that are not currently disposed, yet would require alternative treatment (e.g., tank cleanout sludge).

Because the survey was specifically designed to collect data on land-disposed TC organic wastes, it provides relatively comprehensive facility-specific data only on this portion of the universe of TC organic wastes affected by the Phase III rule. However, most potentially affected TC organic wastes (e.g., wastes that have been treated and decharacterized prior to land placement) are not covered by the TC Survey.

3.2.10 Industrial Facilities Discharge (IFD) Database

This database contains facility-specific information on indirect dischargers to POTWs, including SIC code and total flow. The IFD was used to prioritize industries that may potentially be affected because of discharges to POTWs. The data elements that EPA used from this database (total flow and facility SIC codes) provide facility-specific information on indirect dischargers to POTWs. However, no constituent or waste characteristic information is contained the IFD. Furthermore, the IFD database does not contain sufficient information to determine the number of facilities that use land-based units. Also, the IFD data are limited to facilities that are indirect dischargers.

3.2.11 Other Data Sources

Numerous other data sources were also examined for this analysis, but were not used in the final estimates. Some of these data sources include:

- Treatment, Storage, Disposal, and Recycling Facility (TSDR) Survey;
- Generator Survey;
- Resource Conservation and Recovery Information System (RCRIS);
- Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS);
- F037/F038 Capacity Database;
- OPPE Analysis of Industrial Discharges to Publicly Owned Treatment Works (POTWs) and Surface Waters Using the TRI;
- Department of Energy (DOE) Mixed Waste Inventory;
- California Hazardous Waste Database;
- Corrective Action RIA Database;
- Superfund Record of Decision (ROD) Database;
- Chemical Waste Treaters Program Database;
- Water and Hazardous Waste Treatability Database (WHWTD);
- Wastewater Treatment and Information Exchange Bulletin Board System (WTIE BBS);
- 40 CFR 403.12(p) POTW Notifications;
- Ground Water Protection Council (GWPC) Class I Injection Well Surveys; and
- Data and background documents used for the 1990 TC rule (55 *FR* 11798; March 29, 1990), the technical correction (55 *FR* 26986; June 29,2990), and the 1990 Third Third rule (55 *FR* 22520; June 1, 1990).

These other data sources were not used because they either provided data that were redundant with the primary data sources, these sources were older than the above data sources, and/or the data were not sufficient for this analysis.

3.2.12 Capacity Data Obtained from the Comments on the Proposed Rule

In the capacity analysis background document to the Phase III proposed rule, EPA presented estimates of the quantities of ICR wastes and TC organic wastes managed in CWA or CWA-equivalent systems in 16 of the industries that would be affected by the LDRs. EPA did not receive any comments on the Phase III proposed rule that disputed EPA's estimates of the quantities of wastes in the selected industries. However, some comments received by EPA provided new data on existing CWA or CWA-equivalent systems at specific industrial facilities that may be affected by the LDRs. EPA has used these new data, as appropriate, to revise its analysis of the required capacity for alternative on-site treatment.

EPA found that the new data obtained from the comments were useful in verifying some of the key assumptions that had been made in EPA's capacity analysis to support the Phase III LDR rule. Summaries of the data obtained from comments on the proposed rule are provided in Appendix A as attachments to the chapters describing the required capacity analyses for relevant industries. EPA's use of these data is also described in the relevant chapters in Appendix A, as well as in this chapter.

3.3 METHODOLOGY AND ASSUMPTIONS

This section provides an overall description of the methodology and assumptions used to conduct the required treatment capacity analysis. In general, EPA decided that no one data source provided sufficient information to conduct the analysis,[25] and that therefore a "patchwork" approach utilizing several data sources would be needed. EPA also realized that the data sources used would be very industry-specific. Therefore, to structure the approach to the resources available for the analysis, EPA first prioritized and selected the industries to be analyzed. EPA then developed industry-specific estimates of required treatment capacity for these selected industries. Section 3.3.1 discusses the methodology EPA used to select the industries for this analysis. Section 3.3.2 discusses EPA's general methodology and assumptions for estimating required treatment capacity.

3.3.1 Industry Selection

EPA used two basic criteria to determine which industries generate the majority of the wastewaters that would be affected by today's rule: (1) the industries that are more likely to use land-based units, and (2) the industries that are more likely to generate

[25] For example, EPA discovered that most of the affected wastes are not reported in the Biennial Reporting System.

ICRT wastes. EPA relied on several data sources to prioritize the industries based on these criteria:

- Permit Compliance System;
- 1991 Biennial Reporting System;
- Industrial Facilities Discharge Data Base;
- Industrial Subtitle D Screening Survey; and
- TC Regulatory Impact Analysis Database.

The PCS, BRS, IFDB, and Subtitle D Screening Survey data sources were used primarily to determine those industries that generate the highest proportion of wastewaters that are managed in land-based units. EPA analyzed the PCS data based on the SIC codes to determine what industries used the highest proportion of land-based units. The analysis conducted used a methodology similar to that described in Section 3.3.2 for the individual industry profiles. Based on the PCS data, EPA estimated that the following four industries represent a proportionally large number of all facilities discharging directly to surface water that use land-based units: electric/combined utilities; petroleum refining and products; chemical manufacturing; and food products.

EPA analyzed the BRS to develop a preliminary estimate of the industries that reported using the highest percentage of treatment systems that are land-based. The industries that represented a proportionally large number of facilities with land-based units were estimated to be: petroleum refining and products; chemical manufacturing; electrical equipment; fabricated metals; combined transportation; primary metals; and electrical utilities.

EPA analyzed the IFDB to estimate the number of facilities in each two-digit SIC industry category that discharge to a POTW. EPA then used information from the PCS that indicated the percentage of facilities within each SIC that had land-based units. This step relied on the assumption that waste management practices tend to be similar within the entire industry and that the ultimate decision to discharge to surface water or to a POTW depends primarily on the geographical location of the facility (i.e., whether it is near a surface water body). Based on this methodology, EPA determined the industries that represent a proportionally large number of facilities that discharge to POTWs and use land-based units to be: fabricated metals; primary metals; chemical manufacturing; food products; pulp and paper; electrical equipment; and leather treating.

EPA analyzed the Industrial Subtitle D Screening Survey data, based on the industrial SIC code, to determine the percentage of facilities that use surface impoundments and the percentage of facilities that use land application units. Based on these data, EPA was able to determine which industries are more likely to use land-based units and confirmed the results of the above analyses.

The TC RIA data source was used primarily to determine the industries that generate the highest proportion of organic toxicity characteristic wastes. EPA used the database to identify the industries that generate the highest quantity of TC waste that is discharged to POTWs, discharged under NPDES, or discharged to an underground injection well: textile mills; plastics materials and resins; synthetic rubber; cellulosic man-made fiber; organic fibers, noncellulosic; petroleum refining; rubber and miscellaneous plastic products; pipeline, except natural gas; and wholesale trade, petroleum and petroleum products. Most of these industries are within either the chemical or petroleum industry sectors, which were also identified by the above analyses.

Based on these data sources, EPA selected the following 16 industries for detailed analyses:

- Chemicals, Inorganic;
- Chemicals, Organic;
- Electric Power Generation;
- Electrical and Electronic Components;
- Electroplating/Metal Finishing;
- Federal Facilities;
- Food;
- Industrial Laundries;
- Iron and Steel;
- Leather Treating;
- Metal Products & Machinery;
- Pesticides;
- Petroleum Refining;
- Pharmaceutical;
- Pulp and Paper;[26] and
- Transportation Equipment Cleaning.

EPA requests comments on other industries that may be affected by Phase III.

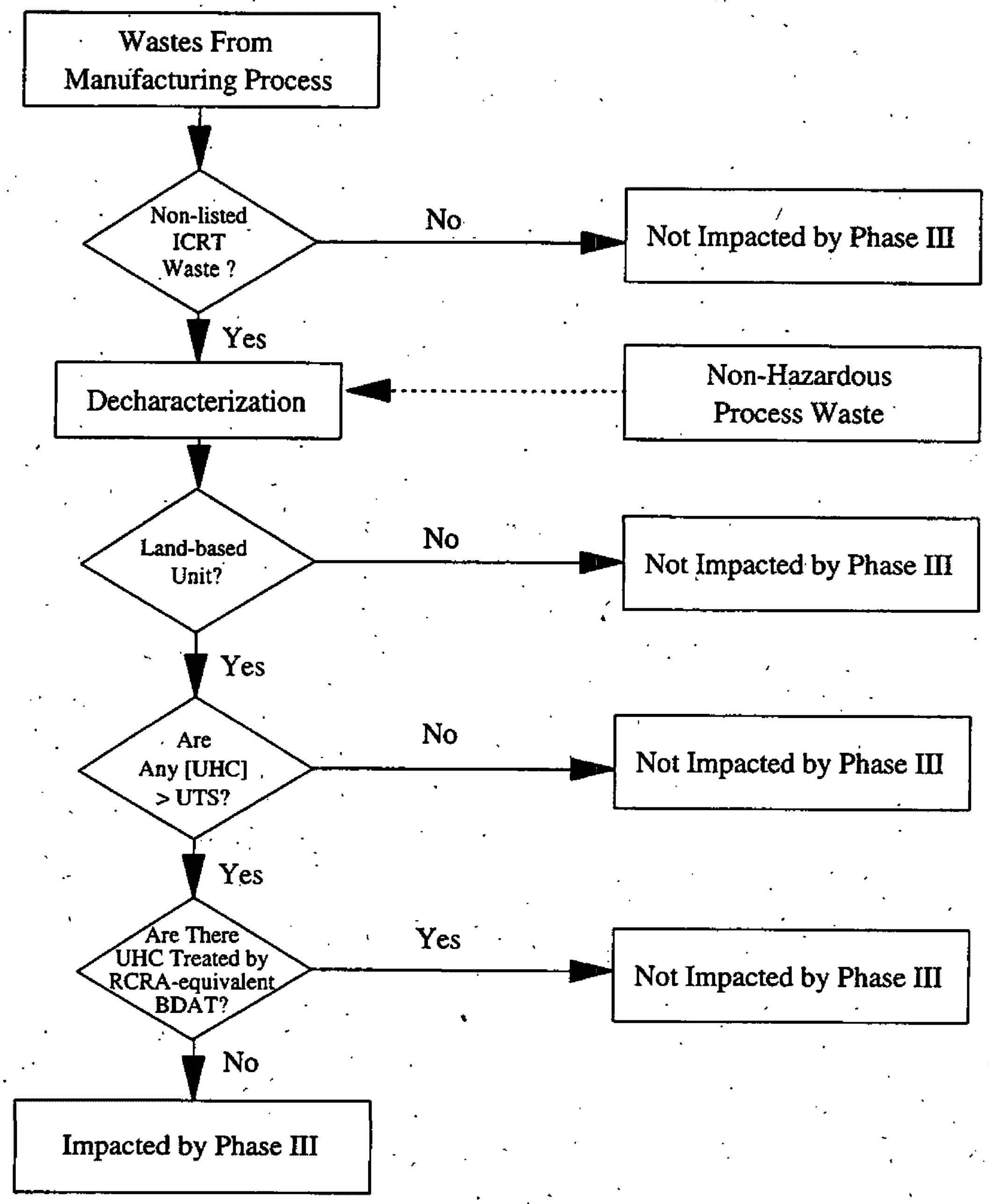
3.3.2 Determination of Required Treatment Capacity

Once the 16 major industries were identified, EPA conducted detailed capacity analyses on them in order to estimate the number of facilities and quantities of wastes that may be affected by today's rule. EPA developed the methodology and the assumptions to use in the analysis based on the model of the universe of impacted wastes shown in Exhibit 3-1. As this model shows, a facility's waste must pass through several "tests" before the waste is considered to require alternative treatment. These tests address the following questions:

[26] As described in Section 3.4.15, EPA is not applying today's rule to the pulp and paper industry at this time.

EXHIBIT 3-1

UNIVERSE OF IMPACTED ICRT WASTES



ICRT = Ignitable, Corrosive, Reactive, and/or Toxicity (Organic) Characteristic
UHC = Underlying Hazardous Constituents
UTS = Universal Treatment Standards
BDAT = Best Demonstrated Available Technology
[ ] = Concentration

- Is the waste ICRT?
- Does the decharacterized ICRT waste enter a land-based unit?
- Are the concentrations of the underlying hazardous constituents above UTS?
- Are the constituents regulated by a standard that is considered a RCRA BDAT-equivalent standard?

The following sections (3.3.2.1 through 3.3.2.4) address these questions, including the data sources and the methodologies used to answer each of these questions. A simplified hypothetical industry example (Industry X) is provided throughout to help clarify the analysis.

Several general (i.e., non-industry-specific) caveats exist concerning these analyses that may have resulted in an underestimate of affected facilities and quantities of waste:

- The Agency recognizes that the impact of today's rule will not be confined only to these 16 industries, and thus the quantities of affected wastes may be larger.
- Concrete-lined sumps and lagoons were not included as land-based units in the analysis. However, EPA believes that many such units exist that do not satisfy the definition of tank.
- POTWs with land-based units were not included in this analysis. Some of these facilities, however, may be impacted by the Phase III LDRs.
- *De minimis* losses, where the release may contact the land, have not been included in this analysis. Some losses, however, may result in the facility being impacted by the Phase III LDRs.

Two key general caveats contribute an overall uncertainty to the analysis:

- Due to the large number of facilities and quantities of wastewaters generated within these industries, the capacity estimates do not include large amounts of site-specific data.
- There is no single comprehensive data source on industrial waste generation, waste management practices, and waste characteristics.

Therefore, EPA relied on several data sources–some of which are somewhat dated–and used many assumptions to analyze the available data.

Specific assumptions described in Sections 3.3.2.1 through 3.3.2.4 include the following:

- All industries generate at least small quantities of ICRT wastes;
- If the wastewater is also a RCRA-listed waste, then it is managed appropriately consistent with existing LDR standards and will not be affected by the this rule;
- All facilities decharacterize their ICRT wastes (e.g., by aggregating them with non-hazardous process wastewaters) prior to discharging them via CWA or CWA-equivalent systems;
- Any facility that manages its wastes in a land-based unit is affected by this rule, if the remaining criteria are met;
- Pollutants specified in the effluent guidelines limitations and standards development document for that industry are regulated by a RCRA BDAT-equivalent standard and, therefore, wastewaters containing only these pollutants above UTS are not affected; and
- Existing permits do not have adequate treatment standards to address underlying hazardous constituents that are not among the pollutants addressed by the industry-specific CWA regulations.

Given the various uncertainties, the Agency developed ranges of affected facilities and waste quantities within which the actual numbers likely reside.

3.3.2.1 Is the Waste ICRT?

The manufacturing processes of each industry were analyzed to determine the processes that are likely to generate affected wastewaters. Based on the BRS data, development document information, and comments to the NODA, unless otherwise mentioned in the industry profiles, all facilities are assumed to generate at least small quantities of ICRT wastewaters and to decharacterize these wastes prior to discharge via CWA or CWA-equivalent systems. However, if the wastewater is a RCRA-listed waste, EPA assumed that the wastewaters are managed appropriately under existing LDRs and will not be affected by today's rule.

The development documents also provided information regarding the types of wastes generated in each industry and were used to confirm the presence of ICRT wastes. The industry comments to the NODA also confirmed the generation of decharacterized ICRT wastes by industry.

> **Hypothetical Industry X:**
> **Is the Waste ICRT?**
>
> According to the Effluent Guidelines Development Document and several industry contacts, the 1,000 facilities in Industry X are believed to routinely use a highly caustic solution to clean equipment. The wash and rinse wastewaters (D002) then generally enter tanks, where the waste is neutralized. This wastewater then is ultimately discharged either to surface waters, POTWs, underground injection wells, etc. Total end-of-pipe quantities are estimated at 100 million tons per year.

3.3.2.2 Does the Decharacterized ICRT Waste Enter a Land-based Unit?

> **Hypothetical Industry X:**
> **Are Wastes Discharged to Land-based Units?**
>
> According to the Subtitle D Screening Survey, approximately 25 percent of Industry X – or 0.25 x 1,000 = 250 facilities – uses Subtitle D surface impoundments and land application units. The PCS, however, indicates that only 10 percent – or 0.1 x 1,000 = 100 facilities – uses these land-based units. Thus, between 100 to 250 facilities in Industry X use land-based units.

The use of land-based units in each industry was determined from a variety of data sources, as indicated in the industry profiles. EPA assumed that any facility that manages its wastes in a land-based unit may potentially be affected by this rule if the remaining criteria are met. EPA primarily used the PCS and Industrial Subtitle D Survey to determine the number of facilities that use land-based units. For example, EPA analyzed the Industrial Subtitle D Screening Survey data, based on the industrial SIC code, to determine the percentage of facilities that use surface impoundments and the percentage of facilities that use land application units.

3.3.2.3 Are the Concentrations of the Underlying Hazardous Constituents Above UTS?

In order to determine the presence of underlying hazardous constituents, EPA relied on many different data sources. The primary data sources used to answer this question include the development documents, Report to Congress, ISDB report, and TRI. When these data sources only included constituent concentration data at a few facilities, EPA extrapolated the results to the entire industry.

The development documents for some industries included data regarding the concentration of constituents at facilities that were sampled. The Report to Congress

> **Hypothetical Industry X:**
> **Are UHC Concentrations > UTS?**
>
> According to recent Effluent Guidelines Development Document data, approximately 50 percent of Industry X facilities – or 0.5 x 1,000 = 500 facilities – generate end-of-pipe wastewaters with at least one UHC concentration greater than the UHC's corresponding UTS.

included data regarding the concentration of constituents at a few facilities that discharge to POTWs. The ISDB report contained data regarding the concentration of constituents for several industries. EPA compared the concentrations of these underlying hazardous constituents with the universal treatment standards.

3.3.2.4 Are the Constituents Regulated by a Standard That is Considered a RCRA BDAT-equivalent Standard?

EPA developed a model to identify those pollutants that are likely to be regulated by a RCRA BDAT-equivalent standard and therefore would not be affected by this rule (shown in Exhibit 3-2). This model is based on how pollutants in wastewaters generally are categorized, as described below, and how facilities are categorized (i.e., direct discharger, indirect discharger, or zero discharger), as described in Section 3.1.

EPA promulgates industry-specific standards based on the information described in the development document for each industry. There are three categories of pollutants that are regulated by CWA:

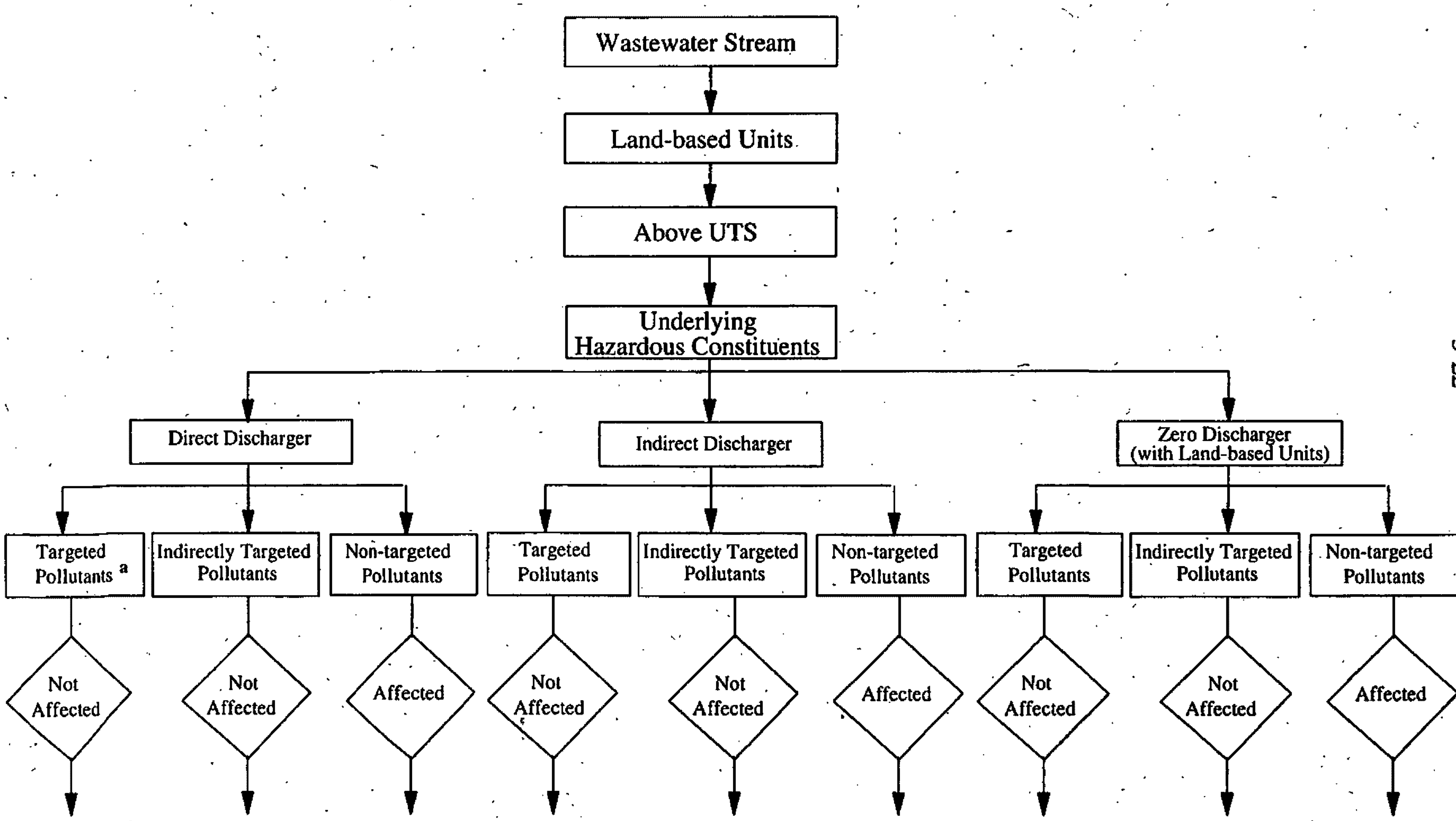
- Priority pollutants - These are the 126 pollutants, including 65 pollutants identified as toxic, that are listed in 40 CFR Part 423, Appendix A. This category is also referred to as the priority toxic pollutants and are considered for regulation in the effluent limitations guidelines and standards developed for each industry.

- Conventional pollutants - These are the pollutants of wastewater as defined by Section 304(a)(4) of the Clean Water Act, including, but not limited to, the biological oxygen demand, suspended solids, oil and grease, fecal coliform, and pH. These pollutants are also considered for regulation in the effluent limitations guidelines and standards developed for each industry.

- Non-conventional pollutants - These are pollutants that have not been previously designated as either conventional pollutants or priority pollutants. A limited number of these pollutants are considered for

EXHIBIT 3-2

MODEL TO IDENTIFY RCRA BDAT-EQUIVALENT STANDARDS



[a] Targeted by CWA as pollutants of concern in the Effluent Guidelines Document (Federal Categorical Standards).

regulation in the effluent limitations guidelines and standards developed for each industry. (In this background document, these pollutants are referred to as non-priority pollutants.)

Those pollutants that are regulated by EPA are listed in the development document for that industry and are referred to as "targeted pollutants" in the model in Exhibit 3-2. When a standard is applied for targeted pollutants, standards for other pollutants may also be met. These pollutants are referred to as "indirectly targeted." The standards developed by EPA include:

- Best Conventional Pollutant Control Technology (BCT) - BCT is established for discharges of conventional pollutants from existing industrial point sources.

- Best Available Technology Economically Achievable (BAT) - BAT is established as the principal national means of controlling the direct discharge of priority pollutants and nonconventional pollutants to navigable waters. BAT effluent limitations represent the best existing economically achievable performance of plants in the industrial subcategory or category.

- Best Practicable Control Technology Currently Available (BPT) - BPT effluent limitations guidelines are generally based on the average of the best existing performance by plants of various sizes, ages, and unit processes within the category or subcategory for control of pollutants. Total cost of achieving effluent reductions in relation to the effluent reduction benefits is also considered in setting the BPT standard.

- Pretreatment Standards for Existing Sources (PSES) - PSES are designed to prevent the discharge of pollutants that pass through, interfere with, or are otherwise incompatible with the operation of publicly owned treatment works. Pretreatment Standards are technology-based and analogous to the BAT standards.

- Pretreatment Standards for New Sources (PSNS) - Like PSES, PSNS are designed to prevent the discharges of pollutants that pass through, interfere with, or are otherwise incompatible with the operation of POTWs. PSNS are issued at the same time as NSPS.

- New Source Performance Standards (NSPS) - NSPS are based on the best available demonstrated treatment technology. NSPS represents the most stringent numerical values attainable through the application of the best available control technology for conventional, nonconventional, and priority pollutants.

Hypothetical Industry X: Is Treatment Considered RCRA-equivalent?

According to the Effluent Guidelines Development Document, many of the UHC that are above UTS are addressed by RCRA-equivalent standards. When these UHC are removed from the analysis, only about 40 percent (analysis not shown) of the facilities identified by the previous step do not have RCRA-equivalent treatment. Thus, approximately 0.4 x 0.5 = 0.2 (or 20 percent) of the original 1,000 facilities, or 0.2 x 1,000 = 200 facilities, do not have RCRA-equivalent treatment.

When all of the percentages from the previous steps are applied to Industry X's 1,000 facilities, the affected facilities are estimated as follows: (1) lower bound = 1,000 x 0.1 (for land-based units) x 0.2 (for facilities w/o RCRA treatment) = 20; and (2) upper bound = 1,000 x 0.25 (for land-based units) x 0.2 (for facilities w/o RCRA treatment) = 50. Affected waste quantities are estimated by calculating a per facility quantity for the entire industry -- 100 million tons/yr / 1,000 facilities = 100,000 tons/yr/facility -- and then multiplying the per facility quantity by the number of facilities affected, as follows: (1) lower bound = 20 facilities x 100,000 tons/yr/facility = 2 million tons/yr; and (2) upper bound = 50 facilities x 100,000 tons/yr/facility = 5 million tons/yr. Thus, the "bottom line" of the summary table for this industry would be as follows:

Number of Facilities	Total Wastewaters Mixed With ICRT Wastes (million tons/yr)	Facilities Without RCRA-equivalent Treatment	Facilities With Land-based Units	Affected Facilities	Affected Wastewater (million tons/yr)
1,000	100	200	100 - 250	20 - 50	2 - 5

EPA assumes that the above standards are all RCRA BDAT-equivalent standards and, thus, wastewaters generated by direct, indirect, and zero dischargers with only these constituents above UTS are not affected by today's rule. EPA also assumes that state and local permit standards are not RCRA BDAT-equivalent standards. A review of NPDES permit monitoring data performed by EPA (see Appendix F) showed that a significant portion of contaminants with UTS as designated under the Phase III LDR rule are already controlled under CWA. Furthermore, an application of ICRT waste characterization knowledge by the facility would reduce the number of newly controlled pollutants with UTS to a very few per facility. This point is illustrated in several case studies.

3.4 RESULTS OF CAPACITY ANALYSIS FOR ICR WASTES AND TC ORGANIC WASTES THAT ARE MANAGED IN CWA OR CWA-EQUIVALENT SYSTEMS

This section presents the results of the capacity analysis for ICR and TC organic wastes that are managed in CWA or CWA-equivalent systems. Based on the methodology and assumptions described above, EPA estimated the number of affected facilities and the quantity of impacted wastewater for each of the 16 industries. The results of this analysis are summarized in Exhibit 3-3. The results of the individual analyses for each industry are also presented in Sections 3.4.1 to 3.4.16. As shown in Exhibit 3-3, from 329 to 1,041 facilities and from 84.7 million to 519.5 million tons of decharacterized wastes would require alternative treatment.

The quantities of wastes shown in Exhibit 3-3 are the aggregated quantities of the affected ICRT wastes and not the individual quantities of ignitable, corrosive, reactive, and organic toxicity characteristic wastes that are affected. Therefore, EPA developed rough estimates for each type of waste. To do this, EPA first reviewed several data sources to estimate the proportion of the generation of each of these wastes. According to TSDR data and TC RIA data, the sum of the ICRT wastes generated (prior to aggregation) is approximately 1.23 billion tons of wastes. TSDR data provide an estimate of 435 million tons of ICR wastewaters and nonwastewaters generated per year (35 percent of all ICRT wastes) and TC RIA data provide an estimate of 803 million tons of TC organic wastewaters and nonwastewaters generated per year (65 percent of all ICRT wastes). To further estimate the proportion of ICR wastes, EPA reviewed the generation of these wastes as reported in the BRS. The BRS indicated that approximately 1.8 percent of ICR wastes are ignitable, 89.1 percent are corrosive, and 9.1 percent are reactive wastes. Based on these data, approximately 0.6 percent of ICRT wastes are ignitable wastes, 31.2 percent are corrosive, 3.2 percent are reactive, and 65 percent are TC organic. However, EPA did not use these proportions to estimate the quantities of the individual ICRT wastes that are affected. EPA estimated the quantities of affected wastes only on an aggregated basis, and these aggregated wastes may include one or all of the types of ICRT wastes.

As listed below, there are several alternatives available for facilities to comply with the Phase III LDR rule:

- Alternative 1: Reduce the generation of ICRT wastewaters prior to mixing and aggregation with other wastewaters;
- Alternative 2: Segregation of ICRT wastewaters from other wastewaters;
- Alternative 3: Replacement of surface impoundments and other land-based units with tank systems;
- Alternative 4: Improvements in the existing wastewater treatment systems to achieve UTS for all UHCs;
- Alternative 5: Permit review and possible modifications for CWA or CWA-equivalent systems; and
- Alternative 6: Case-by-case variances from specific Phase III LDRs.

The cost of the above compliance alternatives, as well as the time required for implementing them, will vary with the type and size of the industrial facility affected by

EXHIBIT 3-3

REQUIRED CAPACITY FOR ICR AND TC ORGANIC WASTES MANAGED IN CWA OR CWA-EQUIVALENT SYSTEMS[a]

Industry	Estimated Number of Facilities	Estimated Number of Facilities Affected by Phase III	Estimated Quantity of Waste Affected (million tons/year)
Chemicals, Inorganic	1,393	16 - 19	4 - 5
Chemicals, Organic	1,512	43 - 105	20.2 - 84.0
Electric Power Generation	842	24 - 55	4.8 - 11
Electrical and Electronic Components	373	33 - 122	4 - 16
Electroplating and Metal Finishing	228	0 - 2	0 - 0.9
Federal Facilities[b]	NA	NA	NA
Food and Kindred Products	11,353	195 - 390	0.2 -0.6
Industrial Laundries	1,000	25 - 121	1.9 - 9.3
Iron and Steel	1,020	3 - 7	26 - 60
Leather Treating	160	3 - 25	0.8 - 7.5
Metal Products and Machinery	30,600	0 - 32	0 - 16
Pesticides	43[c]	2 - 6	0.2 - 0.6
Petroleum Refining	187	10 - 85	22 - 290
Pharmaceuticals	560	0 - 17	0 - 17
Pulp and Paper[d]	565	0	0
Transportation Equipment Cleaning	707	76 - 213	0.6 - 1.6
Total	**49,978**	**329 - 1,041**	**84.7 - 519.5**

[a] These quantities are aggregated quantities and do not represent the quantities of wastes prior to decharacterization.
[b] These facilities and quantities are assumed to be included in the estimates for the other industries.
[c] There are a total of 75 facilities in this industry; however, EPA assumes that the 32 facilities that co-treat organic chemical wastewaters with pesticide manufacturing wastewaters and are accounted for in the organic chemicals industry.
[d] As described in Section 3.4.15, EPA is not applying today's rule to the pulp and paper industry at this time.

today's rule. For example, some commenters to the proposed Phase III LDR rule reported that it may take two to four years to replace their existing surface impoundments with tank systems or improve the existing wastewater treatment systems. EPA has estimated that it will take approximately one to two years for most of the facilities to seek reviews and obtain modifications of existing permits for CWA or CWA-equivalent systems (see Appendix F). It will take a similar period of time for implementing any of the other alternatives. EPA also notes that industrial facilities discharging large quantities of wastewater (e.g., 250,000 gallons per day or more) may take the longest time to evaluate their alternatives and change their operations to comply with today's rule. These facilities will probably belong to one of the following industries:

- Chemicals, Organic;
- Electroplating and Metal Finishing;
- Metal Products and Machinery;
- Petroleum Refining; and
- Pharmaceuticals.

EPA notes other industries that will have large numbers of facilities (e.g., more than 10 percent of the facilities within the industry) potentially affected by today's rule. These industries could include:

- Electrical and Electronic Components;
- Industrial Launders;
- Leather Treating; and
- Transportation Equipment Cleaning.

Given all of these factors, the Agency believes that the Phase III decharacterized wastewaters require a two-year national capacity variance.

The remainder of this section presents the results of the individual analyses for each of the 16 industries examined in the capacity analysis.

3.4.1 Inorganic Chemicals Industry

The inorganic chemicals industry (SIC 2812-2819) is composed of four subsectors: alkalies and chlorine; industrial gases; inorganic pigments; and industrial inorganic chemicals, not elsewhere classified. There are approximately 1,393 inorganic chemicals facilities.[27] EPA has categorized the industry into 184 subcategories based primarily on the dominant product manufactured. Exhibit 3-4 summarizes the major findings of this analysis.

[27] U.S. Department of Commerce, 1987, *Census of Manufacturers*.

EXHIBIT 3-4

MAJOR FINDINGS FOR THE INORGANIC CHEMICALS INDUSTRY

Discharge Mode	Number of Facilities	Total Wastewaters Mixed with ICRT Wastes (million tons/yr)[a]	Facilities Without RCRA-equivalent Treatment[a]	Facilities with Land-Based Units[a]	Affected Facilities[a]	Affected Wastewater (million tons/yr)[a]
Direct	1,062	276	51	255 - 297	12 - 14	3 - 4
Indirect	224	58	11	54 - 63	3	0.7
Zero	107	28	5	25 - 30	1 - 2	0.3 - 0.5
Total	**1,393**	**362**	**67**	**334 - 390**	**16 - 19**	**4 - 5**

[a] The numbers or quantities in this column were determined on an aggregated basis and apportioned to the direct, indirect, and zero dischargers based on the percentage of each discharge mode.

Key Data Sources

Effluent Guidelines Development Document.[28] The development document contains data regarding the constituents that are regulated by the Clean Water Act and concentration data. All of the constituents found above UTS are regulated by CWA. According to this document, the average flow of this industry is estimated to be 260,000 tons per year.

Report to Congress on the Discharge of Hazardous Wastes to POTWs.[29] The 1986 Report to Congress data regarding several constituents shows that chromium, cyanide, lead, silver, and zinc are present in concentrations above UTS levels. Except for silver, these constituents are regulated by CWA. According to the Report, about 76 percent of the facilities are direct dischargers, about 16 percent are indirect dischargers and 7.7 percent are zero dischargers.

Biennial Reporting System (BRS). EPA extracted data from the 1991 BRS to determine what types of affected wastes are generated by the inorganic chemicals industry. The BRS indicates that this industry does generate ICRT wastes.

[28] The data presented in this section is based primarily on U.S. EPA, 1982 (June) and 1984 (August, Phase II), *Development Document for Effluent Limitations Guidelines and Standards for the Inorganic Chemicals Manufacturing Point Source Category* (Development Document), Office of Water, Effluent Guidelines Division.

[29] U.S. EPA, February 1986, *Report to Congress on the Discharge of Hazardous Waste to Publicly Owned Treatment Works*, Office of Water Regulations and Standards.

Toxic Release Inventory. TRI data included information on the loadings of contaminants at 685 facilities for this industry (SIC 281x). EPA compared the concentrations of non-priority pollutants using a high flowrate scenario of 1,000,000 gallons per day and a low flowrate scenario of 50,000 gallons per day. At the high flowrate scenario, 19 facilities were found to have concentrations above UTS. At the low flowrate scenario, 33 facilities were found to have concentrations above UTS.

Permit Compliance System (PCS). The Permit Compliance System (PCS) provides data to determine the number of land-based units in this industry (indicated by SIC codes 2812-2819). The number of inorganic chemicals facilities that are included in the PCS is 488. Of these 488 facilities, 89 facilities reported the type of treatment systems used at these facilities. About 22 facilities (24 percent) reported using treatment systems that are most likely land-based units.

Industrial Subtitle D Screening Survey. The Industrial Subtitle D Screening Survey also provides data regarding the management of wastes at industrial facilities. These data estimate that there are 1,305 inorganic chemical facilities. Of these facilities, 345 facilities have surface impoundments and 16 facilities have land application units (approximately 28 percent of all inorganic facilities).

Census of Manufactures.[30] The 1987 census estimates that there are 1,393 facilities in this industry.

Comments on the Proposed Phase III Rule. According to comments received on the Phase III LDR proposed rule, the chemical manufacturing industry does appear to be using land-based units and has concentrations of UHCs above UTS in decharacterized ICRT wastewaters at some facilities. These commenters also believe that if a "battery limits" approach was implemented to define the point of generation for these waste streams, it would simplify the procedure for sampling and analyzing wastewaters and minimize the economic burdens of modifying the land-based units that are being used for treatment of the decharacterized wastewaters; however, EPA is not addressing this issue in this rulemaking.

Key Assumptions

There are significant data limitations in assessing the extent of the impact of this rule due to a high variability in the waste generation and management practices within an industry and across all industrial sectors. To bridge these data gaps, EPA had to make some assumptions based on the industry knowledge and professional judgment. The key assumptions specific to the inorganic chemicals industry are stated below:

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[30] U.S. Department of Commerce, 1987, *op. cit.*

- All 1,393 inorganic chemical manufacturing facilities generate ICRT wastes that are aggregated and decharacterized prior to any treatment.

- About 334 to 390 facilities use land-based units as part of their wastewater treatment system. This estimate is based on the PCS and Subtitle D data.

- About 67 facilities generate wastewaters with underlying hazardous constituents above UTS that are not regulated by CWA. This estimate is based on the extrapolation of TRI data to the entire industry.

- The average flowrate is 260,000 tons per year, based on the development document data.

3.4.2 Organic Chemicals, Plastics, and Synthetic Fibers (OCPSF) Industry

The OCPSF industry is large and diverse, with approximately 1,512 facilities. Of these, 75 percent are considered primary producers and 25 percent are secondary producers of OCPSF products. Secondary OCPSF plants may be part of the other chemical producing industries such as the petroleum refining, inorganic chemicals, pharmaceuticals, and pesticides industries as well as the chemical formulation industries. The OCPSF industry SIC includes: 2821-2824, 2865, and 2869. Although, over 25,000 different organic chemicals, plastics, and synthetic fibers are manufactured, less than half of these products are produced in excess of 1,000 pounds per year. Exhibit 3-5 summarizes the major findings of this analysis.

EXHIBIT 3-5

MAJOR FINDINGS FOR THE OCPSF INDUSTRY

Discharge Mode	Number of Facilities	Total Wastewaters Mixed with ICRT Wastes (million tons/yr)[a]	Facilities Without RCRA-equivalent Treatment[a]	Facilities with Land-Based Units[a]	Affected Facilities[a]	Affected Wastewater (million tons/yr)[a]
Direct	499	735	10 - 64	359	7 - 46	10 - 68
Indirect	635	179	106 - 178	89	15 - 25	4 - 7
Zero	378	102	64 - 106	121	21 - 34	6 - 9
Total	**1,512**	**1,016**	**180 - 348**	**569**	**43 - 105**	**20 - 84**

[a] The numbers or quantities in this column were determined on an aggregated basis and apportioned to the direct, indirect, and zero dischargers based on the percentage of each discharge mode.

Key Data Sources

Effluent Guidelines Development Document. In 1983, EPA obtained detailed information regarding individual plant characteristics, and wastewater treatment efficiency through a comprehensive Clean Water Act - Section 308 Questionnaire.[31] Of the 940 facilities surveyed, 33 percent were direct dischargers, 42 percent were indirect dischargers, and 25 percent were zero dischargers. Of the 25 percent zero dischargers, 73 facilities (32 percent) reported discharging through land application, evaporation, and/or surface impoundments. The average process wastewater flow rate is 1.31 MGD for direct dischargers, 0.25 MGD for indirect dischargers, and 0.24 MGD for zero dischargers. On average 1,473,750 tons per year of wastewater is discharged from each facility through direct discharge, and 281,250 tons per year through indirect discharge. A wide variety of pollutants including conventional, non-conventional, and toxic priority pollutants are present in the wastewaters discharged by this industry. The following is a summary of the wastewater treatment/discharge practices in this industry:

Direct dischargers:

- 9 percent provide either no treatment or no treatment beyond equalization and/or neutralization;
- 19 percent provide only physical/chemical treatment; and
- 72 percent utilize biological treatment.

Indirect dischargers:

- 39 percent provide either no treatment or no treatment beyond equalization and/or neutralization;
- 47 percent provide some physical/chemical treatment; and
- 14 percent utilize biological treatment.

Report to Congress on the Discharge of Hazardous Wastes to POTWs. The 1986 Report to Congress[32] indicated that there are 537 facilities in the OCPSF industry. Of these 32 percent are direct dischargers, 42 percent are indirect dischargers, and 26

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[31] U.S. EPA, 1987, *Development Document for Effluent Limitations Guidelines and Standards for the Organic Chemicals, Plastics and Synthetic Fibers Point Source Category, Volume I,* Industrial Technology Division, EPA-440/1-87/009.

[32] U.S. EPA, February 1986, *Report to Congress on the Discharge of Hazardous Waste to Publicly Owned Treatment Works,* Office of Water Regulations and Standards.

percent are zero dischargers. These data also indicated the presence of priority and non-conventional pollutants in the wastewaters discharged by the OCPSF industry. Many priority pollutants and one non-conventional pollutant (acetone) were present in concentrations above the UTS levels.

Biennial Reporting System. EPA extracted data from the 1991 BRS to determine what types of affected wastes are generated by the OCPSF industry. EPA obtained data for the top 25 waste generators who treat their wastes on site. Few facilities were selected for follow-up on their BRS data submissions and telephone interviews were conducted to collect more information on the waste generation and management practices followed by these facilities. The information obtained is summarized in the telephone logs included in the industry profiles in Chapter 3 of Appendix A.

Toxic Release Inventory (TRI). The TRI data provides mass loading information that is used to calculate the concentration of constituents. The mass loadings of non-conventional pollutants obtained from this database was used to calculate the concentration of pollutants discharged at two different flow rates for the direct and indirect dischargers. These values were then compared with the UTS values to determine if the pollutant concentration in the wastewaters discharged exceeded the UTS levels. This analysis was conducted for 48 non-conventional pollutants and the results indicate that:

- At high flow rates, 10 direct dischargers and 106 indirect dischargers could have exceedences for at least one UTS constituent;
- At low flow rates, 64 direct dischargers and 178 indirect dischargers could have exceedences for at least one UTS constituent; and

Constituent concentrations were not available for zero dischargers. Therefore, EPA estimated the number of facilities that have constituents exceeding the UTS levels by applying the ratio of indirect discharging facilities that had exceedences for UTS constituents. By this method, approximately 64 to 106 zero discharging facilities were found to have exceedences for at least one UTS constituent.

Permit Compliance System. According to the PCS data there are 653 facilities in the OCPSF industry. Of these, 189 facilities (29 facilities) use land-based units as part of the wastewater treatment system.

Industrial Subtitle D Screening Survey. According to this data source there are 2,994 facilities in the OCPSF industry. Of these 221 facilities have surface impoundments, and 54 facilities have land application units. Total waste quantity managed in land based units (includes surface impoundments and land application units) at large facilities (generators of 100 kg or more of waste) is approximately 275 million tons per year. The Subtitle D Screening Survey included facilities from SIC 2851 and

2891 categories, which are not included in the present study, which explains the high number of facilities compared to the 940 facilities reported in the effluent guidelines document.

Industrial Studies Database (ISDB). Analysis of the ISDB[33] provides ranges of constituent concentrations in the ICR wastes managed in CWA, SDWA, or CWA-equivalent systems. ISDB addresses the OCPSF industry under six industry groups: brominated organics; chlorinated chemicals; dyes and pigments; organometallics; industrial organics; and plastics. Approximately 50 percent of the facilities are included in this database. These data indicate that the concentrations of many underlying constituents exceed the UTS levels. Many of these constituents are nonpriority pollutants.

Industry Contacts. In order to better understand the generation and management of wastewaters in the OCPSF industry, EPA contacted staff from different facilities. These facilities were selected for follow-up on their BRS data submissions and telephone interviews were conducted to collect more information on the waste generation and management practices followed by these facilities. This follow-up information indicate that majority of the facilities are direct dischargers. All the facilities contacted reported generating ICRT wastes. Of these, three facilities reported using land-based units and two of these three facilities reported presence of underlying hazardous constituents above UTS levels in the wastewaters discharged from their facilities. Detailed information obtained from the facilities is summarized in the telephone logs in the industry profiles in Chapter 3 of Appendix A.

Comments on the Proposed Phase III Rule. According to comments received on the Phase III LDR proposed rule, the chemical manufacturing industry does appear to be using land-based units and has concentrations of UHCs above UTS in decharacterized ICRT wastewaters at some facilities. These commenters also believe that if a "battery limits" approach was implemented to define the point of generation for these waste streams, it would simplify the procedure for sampling and analyzing wastewaters and minimize the economic burdens of modifying the land-based units that are being used for treatment of the decharacterized wastewaters; however, EPA is not addressing this issue in this rulemaking.

Key Assumptions

There are significant data limitations in assessing the extent of the impact of the Phase III rule due to a high variability in the waste generation and management practices in the OCPSF industry. The PCS data were not used in this analysis because the PCS included fewer than 50 percent of the total facilities in the OCPSF industry. The Subtitle

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[33] U.S. EPA, November 30, 1994, *op.cit.*

D survey data were not used in this analysis because the survey included facilities from other subcategories that are not considered in the present analysis. Of all the data sources, the effluent guidelines document provided the most comprehensive data. Therefore, EPA extrapolated data from the 940 facilities surveyed in the Section 308 Questionnaire to the 1,512 facilities, reported by the 1987 Census of Manufacturers, in the OCPSF industry. The land-based units were estimated based on the number of facilities using biological treatment in this industry. (The numbers of facilities using land-based units, as estimated from PCS and Subtitle D survey data, were similar.) The affected facilities were estimated by calculating the probability of the number of facilities with constituents above UTS that also have land-based units. To bridge other data gaps, EPA made assumptions based on industry knowledge and professional judgment. These key assumptions specific to the OCPSF industry are listed below:

- Based on the data reviewed and process knowledge, EPA assumes that all 1,512 OCPSF facilities are likely to generate some amount of ICR and TC organic wastes that are aggregated and decharacterized prior to any treatment.

- Based on industry knowledge and information obtained from several data sources, EPA assumed that all biological treatments are likely to be conducted in land-based units.

- EPA estimated the number of facilities with constituents above UTS based on the mass loadings provided in the TRI data and the wastewater flow rate provided in the effluent guidelines document.

3.4.3 Electric Generation Industry

The electrical services industry (SIC codes 4911 and 4931) consists of companies engaged in the generation, transmission, and/or distribution of electrical energy for sale. Steam-electric power plants, estimated to number 842 facilities, compose one section of the electrical services industry affected by this rule. Exhibit 3-6 summarizes the major findings of this analysis.

Key Data Sources

Effluent Guidelines Development Document.[34] This document presents information regarding the 842 active facilities that were operating at the time of the compilation of the document. This document also presents data regarding the

[34] U.S. EPA, November, 1982, *Development Document for Final Effluent Limitations Guidelines, New Source Performance Standards, and Pretreatment Standards for the Steam Electric Point Source Category*, Office of Water, Effluent Guidelines Division, EPA-440/1-82/029.

EXHIBIT 3-6

MAJOR FINDINGS FOR THE ELECTRIC GENERATION INDUSTRY

Discharge Mode	Number of Facilities	Total Wastewaters Mixed with ICRT Wastes (million tons/yr)[a]	Facilities Without RCRA-equivalent Treatment[a]	Facilities with Land-Based Units[a]	Affected Facilities[a]	Affected Wastewater (million tons/yr)[a]
Direct	472	94	82	76 - 175	14 - 30	2.8 - 6.0
Indirect	253	51	44	41 - 94	7 - 17	1.4 - 3.4
Zero	117	23	21	19 - 44	3 - 8	0.6 - 1.6
Total	**842**	**168**	**147**	**135 - 312**	**24 - 55**	**4.8 - 11.0**

[a] The numbers or quantities in this column were determined on an aggregated basis and apportioned to the direct, indirect, and zero dischargers based on the percentage of each discharge mode.

concentration of constituents that were used in the Regulatory Impact Analysis for the Toxicity Characteristic Rule (TC RIA).

Biennial Reporting System (BRS). EPA analyzed BRS data and found that only 33 out of the 350 electric generating facilities registered in the system reported generating and managing ICRT waste streams on site. However, the BRS data may have been incomplete, for reasons discussed previously and as evidenced by the fact that only 350 out of 842 facilities were registered. Furthermore, the 33 facilities reporting generation and management of ICRT waste streams were from only 12 states. These facilities reported the generation and management of 734,000 tons of ICRT wastes (averaging 22,242 tons per facility per year). Most of the waste streams generated at these facilities were corrosive wastewaters (87 percent by volume) produced by the regeneration of ion-exchange resin beds. The BRS data also indicated that 56 percent (by volume) of the treated wastes is discharged under NPDES, 30 percent is discharged to POTWs, and 14 percent is managed at zero discharge facilities.

Report to Congress on the Discharge of Hazardous Wastes to POTWs.[35] The 1986 Report to Congress (RTC) data identified only three priority pollutants (lead, nickel, and zinc) to be present in wastewaters discharged to POTWs by two facilities in the electric power generating industry. The maximum concentrations of these pollutants were found to be below UTS. The average flowrate was estimated to be 82,100 gallons per day (125,000 tons per year, assuming 365 operating day and 240 gallons per ton).

[35] U.S. EPA, February 1986, *Report to Congress on the Discharge of Hazardous Waste to Publicly Owned Treatment Works,* Office of Water Regulations and Standards.

Permit Compliance System (PCS). EPA found that 1,450 utilities (with SIC codes 4911 and 4931) were in the PCS database. Of the 344 facilities that reported treatment trains, approximately 56 (16 percent) use treatment systems that are likely to be land-based units.

Industrial Subtitle D Screening Survey. According to the survey, there were 1,338 generators covered under SIC code 4911. About 27 percent of these facilities are estimated to use land-based units.

Toxicity Characteristic Regulatory Impact Analysis (TC RIA).[36] A report prepared for the RIA of the Toxicity Characteristic Final Rule (55 *FR* 11798; March 29, 1990) provided data on several waste streams, the concentrations of organic UHCs, and the use of land-based units by the electric generating industry. First, it seems likely that if the cooling water is non-hazardous and mixed with other ICRT wastewaters generated at an electric generating facility, the total effluent will probably have UHCs below UTS even without any treatment of the aggregated wastewaters. Of three plants sampled, the concentration of at least one UHC in the samples of ion exchange demineralizer and boiler blowdown taken at one plant was found to be above UTS. Although the once-through cooling water and recycling cooling water were also found to have the concentrations of some UHCs above UTS, these wastewater streams and pollutants are currently regulated by CWA. The TC RIA also indicated that approximately 70 percent of the wastes managed at steam-electric utilities are managed on site. At 580 facilities with on-site management, the TC RIA indicated that 303 facilities use un-lined surface impoundments (assumed to be non-hazardous). Based on these data, EPA estimates that up to 37 percent of the facilities use land-based units.

Industry Contacts. EPA contacted the Edison Electric Institute (EEI) regarding the generation and management of wastewaters at steam-electric utilities. EEI confirmed the generation and management of ICRT wastewaters on site and the use of land-based units at some facilities in the industry. EEI also indicated that UHCs may be present in the wastewaters in concentrations ranging from non-detectable to above UTS. These wastewaters included: boiler chemical cleaning wastes (90 million gallons per year); deionized regenerant (6 to 20 billion gallons per year); boiler blowdown (16.5 billion gallons per year); cooling water (2.6 trillion gallons per year); and wastewaters such as coal pile runoff (with generation volumes that are very site-specific). EEI also noted that large volume wastes from coal-fired electric facilities were determined by EPA to be low risk wastes and are exempt from being managed as hazardous waste under RCRA Subtitle C. Other wastes generated at coal-fired electric facilities are also exempted from today's rule. However, the electric generating industry is moving away from co-management of ICR wastewaters with other large volume wastes. EPA also contacted some of the facilities the submitted BRS data in 1991. All the facilities confirmed the

[36] U.S. EPA, *Estimates of Waste Generation by the Electrical Services Industry*, Final Draft Report, prepared by Midwest Research Institute, November 17, 1987.

generation and management of ICRT wastes on site. The facilities also confirmed that some mixing of the ICRT wastewaters with other wastewaters takes place prior to treatment. However, the facilities did not confirm the use of land-based units, or the presence of UHCs above the UTS in their effluents.

Comments on the proposed Phase III Rule. In comments received on the Phase III LDR proposed rule, 13 utility companies addressed the generation and management of ICRT wastewaters at their facilities. These commenters indicated that at least two corrosive wastes (boiler chemical cleaning wastes and ion exchange regeneration wastes) are being generated as individual batches or rinses, but then decharacterized when the entire process of waste generation is completed at the facility.

Key Assumptions

There are significant data limitations in assessing the extent of the impact of the Phase III rule due to a high variability in the waste generation and management practices within an industry and across all industrial sectors. To bridge these data gaps, EPA had to make some assumptions based on the industry knowledge and professional judgment. The key assumptions specific to the electric power generation industry are stated below:

- Most (90 percent) of 842 steam-electric facilities generate ICRT wastes that are aggregated with other wastewaters. However, only one-third of these mixed wastewaters will probably have UHCs exceeding UTS prior to discharge of effluent. EPA based this assumption on data from the development documents, BRS, RTC, TC RIA, and industry contacts.

- None of the 352 coal-fired power plants are assumed to be affected by this rule. These facilities are likely to aggregate their ICRT wastes with wastes that are exempt from RCRA Subtitle C regulation due to the Bevill Amendment. Thus, out of the remaining 490 non coal-fired facilities, 147 facilities (one-third of 490 multiplied by 0.90) are assumed to generate wastewaters with UHCs above UTS that are not regulated by CWA. This assumption is based on applying the observations made in BRS data and the TC RIA data.

- About 135 to 312 facilities (16 to 37 percent of 842) use land-based units as part of their wastewater treatment system, based on the range indicated by the PCS, Industrial Subtitle D Screening Survey, and TC RIA data.

- The maximum quantity of wastewater affected at a facility due to the aggregation and decharacterization of ICRT wastes, assuming UHCs do not fall below UTS, is estimated to be 200,000 tons per year. This estimate is based on an assumption that the two main ICRT waste streams of concern -- boiler cleaning wastewater and ion-exchange regenerant -- may be mixed and decharacterized, at their maximum flow rates of 20.09 billion gallons per year, with equal amounts of other wastewaters prior to discharge. Any additional mixing and decharacterization of ICRT waste generated in the steam electric generation industry will probably result in the effluent meeting with UTS and not being affected by today's rule.

3.4.4 Electrical and Electronics Components Industry

The electrical and electronic components industry is primarily composed of manufacturers of luminescent materials, cathode ray tubes, semiconductors, and electronic crystals. The electrical and electronic components industry consists of facilities within SIC 3571-3579 and 3612-3699. Exhibit 3-7 summarizes the major findings of this analysis.

EXHIBIT 3-7

MAJOR FINDINGS FOR THE ELECTRICAL AND ELECTRONIC COMPONENTS INDUSTRY

Discharge Mode	Number of Facilities	Total Wastewaters Mixed with ICRT Wastes (million tons/yr)[a]	Facilities Without RCRA-equivalent Treatment[a]	Facilities with Land-Based Units[a]	Affected Facilities[a]	Affected Wastewater (million tons/yr)[a]
Direct	90	11.7	47	15 - 57	8 - 29	1 - 3.9
Indirect	280	36.4	146	47 - 176	25 - 92	3 - 12
Zero	3	0.4	1	1 - 2	0 - 1	0.03 - 0.13
Total	**373**	**48.5**	**194**	**63 - 235**	**33 - 122**	**4 - 16**

[a] The data presented in this column were obtained on an aggregated basis. Thus, the data are proportioned among the direct, indirect, and zero discharge facilities based on their percentages of the total number of facilities.

Key Data Sources

Effluent Guidelines Development Document.[37] This document presents information on the 373 active facilities in this industry that were operating at the time of the compilation of the document. There are estimated to be 90 direct dischargers, 280

[37] U.S. EPA, *Development Document for Effluent Limitations Guidelines and Standard for the Electrical and Electronic Components Point Source Categories*, U.S. EPA, Office of Water Regulations and Standards, July 1982 and February 1983.

indirect dischargers, and 3 zero dischargers. The average discharge rates for each industry category were given in the development document for a total of 48,483,000 tons of wastewater generated per year (about 130,000 tons per facility per year). Data regarding the use of land-based units is available for two of the subcategories. Approximately 33 percent (2 of 5 facilities) of the luminescent materials category use land-based units and approximately 67 percent (15 of 22 facilities) of the cathode ray tubes category use land-based units. Based on these data, the development document data indicate that approximately 63 percent use land-based units. Concentration data indicate that up to one-half of the facilities have constituents above UTS that are not regulated by CWA.

Report to Congress on the Discharge of Hazardous Wastes to POTWs.[38] The 1986 Report to Congress (RTC) indicated that there are 379 electrical and electronic components facilities. The RTC also included constituent concentration information for priority pollutants in wastes discharged to POTWs. Cyanide and nickel were the constituents above UTS that are not regulated by CWA.

Biennial Reporting System (BRS). EPA extracted data from the 1991 BRS to determine what types of affected wastes are generated by the electrical and electronic components industry. EPA obtained data on wastes managed on site at electrical and electronic components facilities. The data indicate that the electrical and electronic components industry does generate and manage ICRT wastes, including ignitable wastes from maintenance parts cleaning.

Toxic Release Inventory. EPA compared the concentrations reported in the TRI of non-priority pollutants to UTS using a high flow rate scenario of 1 million gallons per day and a low flow rate scenario of 100,000 gallons per day (these flow rates are based on data provided in the development document). In the high flow rate scenario, one facility exceeded UTS and in the low flow rate scenario, 12 facilities (about three percent) exceeded UTS with constituents that are not regulated by CWA.

Permit Compliance System (PCS). The Permit Compliance System (PCS) includes 502 facilities with SIC codes of 3571-3579 and 3612-3699. Of these facilities, 29 reported what treatment systems are at their facilities. About 5 of them reported using treatment systems that are likely to be land-based (approximately 17 percent).

Key Assumptions

There are significant data limitations in assessing the extent of the impact of the Phase III rule due to a high variability in the waste generation and management practices within an industry and across all industrial sectors. To bridge these data gaps, EPA had

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[38] U.S. EPA, February 1986, *Report to Congress on the Discharge of Hazardous Waste to Publicly Owned Treatment Works*, Office of Water Regulations and Standards.

to make some assumptions based on the industry knowledge and professional judgment. The key assumptions specific to the electrical and electronic components industry are stated below:

- All 373 electrical and electronic components manufacturing facilities generate ICRT wastes that are aggregated and decharacterized prior to any treatment.
- About 33 to 122 facilities use land-based units as part of their wastewater treatment system. These numbers are based on the percentages given by the data in the PCS and the development document.
- About 194 facilities generate wastewaters with underlying hazardous constituents above UTS that are not regulated by CWA, based on the development document data and the TRI data.
- An average of 130,000 tons of wastewater are generated per year, based on the development document data.

3.4.5 Electroplating/Metal Finishing Industry

The electroplating/metal finishing industry includes all facilities that conduct any one of the following six types of unit operations: electroplating, electroless plating, anodizing, conversion coating, chemical etching, or printed circuit board manufacturing. Facilities that conduct one of the six types of core unit operations and are in the seven industries covered by the metal products and machinery (MP&M) Effluent Guidelines Phase I group are covered under the MP&M category. Facilities that conduct one of the six unit operations and are in the eight industries covered by the MP&M Effluent Guidelines Phase II group are covered under the E/MF category until the MP&M Effluent Guidelines Phase II rulemaking is promulgated. All other facilities performing these six types of core unit operations are covered under the E/MF category.

Using the data and assumptions mentioned below, EPA found that (1) only 228 facilities of the approximately 13,500 facilities conducting metal plating operations are exclusively E/MF facilities (the other facilities being covered by the MP&M category) and (2) several facilities have priority pollutants at concentrations higher than the UTS levels set by the Phase II LDRs. None of the facilities appear to have any non-priority pollutants with end-of-pipe concentrations being above the UTS levels set by the Phase II LDR rule.

The estimates provided in the POTW Report to Congress on the number of direct, indirect, and zero dischargers were proportionately scaled down to obtain a total of 228 facilities that are covered in the E/MF category for the Phase III LDR analysis. Similarly, the estimate for the total wastewater flow at indirect dischargers was scaled down to obtain a total of 14.7 millions tons per year. All other estimates were obtained from the analysis done for the MP&M industry.

Exhibit 3-8 summarizes the major findings of this analysis. However, if the existing rule on effluent limitations guidelines adequately addresses the priority pollutants that were found to exceed their UTS levels, this category may not be affected by the Phase III LDR rule.

EXHIBIT 3-8

MAJOR FINDINGS FOR THE ELECTROPLATING/METAL FINISHING INDUSTRY

Discharge Mode	Number of Facilities	Total Wastewaters Mixed With ICRT Wastes (million tons/yr)[a]	Facilities Without RCRA-equivalent Treatment[a]	Facilities with Land-Based Units[a]	Affected Facilities[a]	Affected Wastewater (million tons/yr)[a]
Direct	50	39	2	8	0 - 1	0.78
Indirect	178	14.7	8	2	0 - 1	0 - 0.08
Zero	0	0	0	0	0	0
Total	**228**	**40.4**	**10**	**10**	**0 - 2**	**0 - 0.86**

[a] The numbers or quantities in this column were determined on an aggregated basis and apportioned to the direct, indirect, and zero dischargers based on the percentage of each discharge mode.

Key Data Sources

The key data sources used for the capacity analysis for this industry are the MP&M data (see Section 3.4.11) and the POTW Report to Congress.[39]

Key Assumptions/Methodology

Since the operations conducted by the MP&M Effluent Guidelines Phase I facilities and E/MF facilities are similar, EPA assumed that the E/MF facility wastewaters affected by the Phase III rule are similar in type (i.e., similar constituents and concentrations) and quantity to those generated by MP&M Effluent Guidelines Phase I

[39] U.S. EPA, 1986 (February), *Report to Congress on the Discharge of Hazardous Wastes to Publicly Owned Treatment Works*, Office of Water.

facilities. Hence, the results of the MP&M Effluent Guidelines Phase I facility data review were extrapolated to the E/MF facilities. Section 3.4.11 on the MP&M industry provides details on the data sources used and the procedures and assumptions used in the analysis for the MP&M category.

The queries and assumptions used to estimate the number of affected facilities and wastewater volumes in the E/MF industry are described below:

- Exclude from the scope of the E/MF analysis all MP&M Effluent Guidelines Phase I facilities that conduct one of the six types of core E/MF unit operations. Query the MP&M database to determine the number of facilities that reported at least one of the six types of core E/MF unit operations.

- Exclude from the scope of the E/MF analysis all MP&M Effluent Guidelines Phase II facilities that conduct one of the six types of core E/MF unit operations. *Assumption:* Because Effluent Guidelines Phase I and Phase II of MP&M are expected at this time to be very similar, this analysis assumes that the same percentage of facilities removed from E/MF due to MP&M Effluent Guidelines Phase I will be removed as a result of MP&M Effluent Guidelines Phase II.

- Estimate the number of facilities with land disposal units and the number of facilities that have constituents with end-of-pipe concentrations above the UTS levels. *Assumption:* The wastewaters generated by the MP&M and E/MF industries are very similar in type (i.e., constituents and concentrations above UTS) and quantity, as illustrated by the significant overlap in operations covered by each category. Consequently, EPA applied the same percentage of facilities in MP&M Effluent Guidelines Phase I group that are affected by the Phase III LDR rule to the facilities in the E/MF category. Refer to Section 3.4.12 for details on the procedures and assumptions used in the analysis for the MP&M category.

3.4.6 Federal Facilities

Federal facilities include all operations and facilities owned or managed by the U.S. federal government. These facilities cover a wide range of services and processes, including electric power generation, electrical and electronics components, electroplating and metal finishing, industrial laundries, metal products and machinery, and transportation equipment cleaning. Within the SIC code system, federal facilities are classified according to the operation of the facility and thus do not have a separate code designating them as federal facilities. For example, a steam-electric plant that is operated by the federal government is classified under SIC 4911, the same SIC code as a privately-owned facility. See Sections 3.4.3, 3.4.4, 3.4.5, 3.4.8, 3.4.11, and 3.4.16 for additional background on the industrial processes used at federal facilities.

Because federal facilities report wastes according to the industrial processes used, federal facilities are already included within the analyses of the other industries. Therefore, the estimates presented below have not been added to the total number of facilities and quantity of waste requiring alternative treatment that are presented at the beginning of Section 3.4.

Key Data Sources

This analysis of federal facilities is based on the 1992 Inventory of Federal Agency Hazardous Waste Activities[40] (also called the Federal Facility Inventory). The Federal Facility Inventory is a requirement of RCRA section 3016. EPA compiles the Inventory every two years based on information submitted from each federal agency on its treatment, storage, and disposal facilities.

The 1992 Federal Facility Inventory contains information on three types of land-based units that could be used in managing ICRT wastewaters:

- Surface impoundments (SIs);
- Land treatment units (LTUs); and
- Underground injection wells (UIWs).

For each federal site, the 1992 Inventory identifies the number of SIs, LTUs and UIWs that have been classified as (1) hazardous waste management units (HWMUs); and/or (2) solid waste management units (SWMUs).

Because the focus of the Inventory is to track federal facilities, very limited capacity-specific data are included. Nevertheless, EPA analyzed the 1992 Federal Facility Inventory in detail in order to obtain an estimate on the extent to which nonhazardous land-based units, such as Subtitle D surface impoundments, are being used at federal sites.

Key Assumptions/Methodology

Because federal facilities are already included within the analyses of the other industries, EPA has developed only rough estimates of the number of affected federal facilities and the quantity of affected wastes. The key assumptions and methodological steps used by EPA are as follows:

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[40] U.S. EPA, 1993, *Inventory of Federal Agency Hazardous Waste Activities: 1992 Report*, Office of Solid Waste.

- EPA subtracted the number of HWMUs from SWMUs at each facility for each unit type (i.e., SIs, LTUs, and UIWs). This resulted in the number of nonhazardous waste management units at the facility that could potentially be managing affected characteristic wastewaters.

- In response to the question on SWMUs, several facilities appear to have provided information only on nonhazardous waste units rather than on both hazardous waste and nonhazardous waste units. Some of these facilities were identified by the larger number of HWMUs reported compared to SWMUs. (The number of HWMUs should always be less than or equal to the number of SWMUs.) For these facilities, EPA assumed that the number of nonhazardous waste units at the facility was equal to the number of SWMUs reported.

- For facilities that reported the same number of SWMUs as HWMUs, EPA could not determine whether the facility considered SWMUs synonymous with nonhazardous waste management units (rather than as both hazardous waste and nonhazardous waste management units). EPA assumed that these facilities correctly reported their HWMUs and SWMUs, and thus no nonhazardous waste units were assumed to be present at these sites. (Only two facilities were found in this category.)

- Because the Inventory does not focus on waste generators, EPA believes that the actual number of federal facilities managing decharacterized ICRT wastewaters in land-based units may be higher than the number of federal facilities in the Inventory that reported land-based units. Nevertheless, because only a portion of these facilities are believed to generate wastes that actually are subject to today's rule (i.e., after accounting for whether the end-of-pipe concentrations of underlying constituents are above UTS, and the constituents are adequately addressed by RCRA-equivalent standards), this estimate obtained from the Inventory is believed to be the maximum number of federal facilities requiring alternative treatment because of this rule.

- The percentage of federal facilities generating wastes with underlying hazardous constituents above the UTS, and for which RCRA-equivalent treatment is not conducted, could be as low as the lowest percentage among the related industries. The industry with the lowest such percentage is the metal products and machinery industry, with only about 650 of its 30,600 facilities (2 percent) appearing to generate inadequately (i.e., non-RCRA-equivalent) treated ICRT wastes with end-of-pipe constituent concentrations above the UTS (see Section 3.4.11).

- EPA estimated waste quantities that could be affected by today's rule by assuming that each potentially affected federal facility generates approximately the same quantity of wastewater as the affected facilities from the industries to which federal facilities are most closely associated. That is, EPA first summed the estimates of affected waste for the relevant industries, and then divided this by the sum of the estimates of affected facilities for these industries. This resulted in a per-facility average for federal facilities of approximately 72,000 to 88,000 tons per year.

Major Findings

According to the 1992 Federal Facility Inventory, approximately 941 federal facilities manage or have managed hazardous waste. From 2 to 69 of these facilities, generating from 144,000 to 6.1 million tons per year of waste, may require alternative treatment due to today's rule. Note, however, that because federal facilities report wastes according to the industrial processes used, these facilities are already included within the analyses of the other industries. Therefore, these estimates have not been added to the total number of facilities and quantity of waste requiring alternative treatment that are presented at the beginning of Section 3.4.

3.4.7 Food and Kindred Products Industry

The food and kindred products industry includes six subsectors: dairy products; fruits and vegetables; grain mill products; meat products; sugar processing; and seafood processing. Facilities from the following SIC codes were included in this study: 2011, 2013, 2015, 2021-2024, 2026, 2032-2035, 2037, 2038, 2041, 2043-2048, 2061, 2062, 2063, 2077, 2091, and 2092. There are approximately 11,353 facilities in this industry. Exhibit 3-9 summarizes the major findings of this analysis.

Key Data Sources

Effluent Guidelines Development Documents. Data from the following development documents were examined for the six subsectors in the food and kindred products industry:

- U.S. EPA, May 1974, *Development Document for Effluent Limitations Guidelines and New Source Performance Standards for the Dairy Product Processing Point Source Category*, Office of Water and Waste Management, PB-238 835.

- U.S. EPA, October 1975, *Development Document for Interm Final and Proposed Effluent Limitations Guidelines and New Source Performance Standards for the Fruits, Vegetables and Specialties Segment of the Canned*

EXHIBIT 3-9

MAJOR FINDINGS FOR THE FOOD AND KINDRED PRODUCTS INDUSTRY

Discharge Mode	Number of Facilities	Total Wastewaters Mixed with ICRT Wastes (million tons/yr)[a]	Facilities Without RCRA-equivalent Treatment[a]	Facilities with Land-based Units[a]	Affected Facilities[a]	Affected Wastewater (million tons/yr)[a]
Direct	1,135	3	23 - 45	182 - 341	4 - 14	.01 - .04
Indirect	6,811	17	136 - 272	1,090 - 2,043	22 - 82	.06 - .2
Zero	3,406	9	68 - 136	3,406	68 - 136	.2 - .3
Total	**11,353**	**29**	**227 - 453**	**4,678 - 5,790**	**94 - 232**	**.2 - .6**

[a] The numbers or quantities in this column were determined on an aggregated basis and apportioned to the direct, indirect, and zero dischargers based on the percentage of each discharge mode.

and Preserved Fruits and Vegetables Point Source Category, Office of Water and Waste Management, EPA 440/1-75/046.

- U.S. EPA, December 1974, *Development Document for Effluent Limitations Guidelines and New Source Performance Standards for the Animal Feed, Breakfast Cereal, and Wheat Starch Segments of the Grain Mills Point Source Category,* Office of Water and Waste Management, PB-240 861.

- U.S. EPA, February 1974, *Development Document for Effluent Limitations Guidelines and New Source Performance Standards for the Red Meat Processing Segments of the Meat Products and Rendering Processing Point Source Category*, Office of Water and Waste Management, PB-238 836.

- U.S. EPA, February 1975, *Development Document for Interim Final Effluent Limitations Guidelines and Proposed New Source Performance Standards for the Raw Cane Sugar Processing Segment of the Sugar Processing Point Source Category,* Office of Water, EPA 440/1-75-044.

- U.S. EPA, September 1975, *Development Document for Effluent Limitations Guidelines and New Source Performance Standards for the Fish Meal, Salmon, Bottom Fish, Clam, Oyster, Sardine, Scallop, Herring, and abalone segment of the Canned and Preserved Fish and Seafood Processing Industry Point Source Category,* Office of Water, EPA-440/1-75/041a.

These data indicate that large amounts of wastewater are being treated in surface impoundments and other land-based units. Land treatment/application is a preferred method of wastewater treatment in this industry. The mode of wastewater discharge differs significantly among the subsectors in this industry. EPA averaged the direct, indirect, and zero dischargers across all the six subsectors. According to this estimate, approximately 60 percent of the facilities discharge their wastewaters to POTWs, and 30 percent of the facilities discharge the wastewaters through land application, and the remaining 10 percent of the facilities discharge directly to surface waters. Data from the development documents indicate little ICR or TC organic wastes generated by this industry. Corrosive wastes, which are generated in some food processing stages, appears to be the largest quantities of these wastes. However, most of the facilities neutralize these wastewaters by aggregating them with other process wastewaters.

Report to Congress on the Discharge of Hazardous Wastes to POTWs.[41] The 1986 Report to Congress indicated that there are 22,130 facilities in the food and kindred products industry. These data include all the industries in the two digit SIC code 20xx, however, and not the more limited list of industries that are the focus of the Phase III LDR rule. These data also indicate the presence of priority, toxic, and non-conventional pollutants in the wastewaters discharged by the food processing facilities. Many underlying hazardous constituents are present in concentrations above the UTS levels.

Biennial Reporting System (BRS). EPA extracted data from the 1991 BRS to determine what types of affected wastes are generated by the food processing facilities. BRS data indicated that none of these treat hazardous wastes on site. However, BRS data identified one facility that treats hazardous waste off site.

Permit Compliance System (PCS). The PCS data identified 1,783 direct discharging facilities in the food processing sector. Of these, 16 percent (279 facilities) appear to treat their wastes on site in land-based units.

Industrial Subtitle D Screening Survey. The Industrial Subtitle D Screening Survey indicated that there are 14,277 facilities. These data include all the industries in the two digit SIC code 20xx, however, and not the more limited list of industries that are the focus of the Phase III LDR rule. These data indicate that 22 percent of the facilities manage approximately 328 million tons of wastewater in surface impoundments or land application units.

Industry Contacts. In order to better understand the generation and management of wastewaters in the food processing sector, EPA contacted staff from six different facilities. EPA selected these six facilities at random from the Million Dollar Industrial Directory, and contacted them to get information on general industrial practices for

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[41] U.S. EPA, February 1986, *Report to Congress on the Discharge of Hazardous Waste to Publicly Owned Treatment Works*, Office of Water Regulations and Standards.

wastewater management. This information indicated that some facilities generate ICRT wastes and aggregate them with other wastewaters. Many facilities reported using land-based units. Detailed information obtained from these facilities is summarized in the telephone logs included in the industry profiles in Chapter 8 of Appendix A.

Key Assumptions

There are significant data limitations in assessing the extent of the impact of the Phase III rule in this industry due to fairly old data and due to high variability in the waste generation and management practices. The wastewater flow data reported in the effluent development documents were almost 20 years old, and therefore EPA relied on recently published data to estimate an average wastewater use of 2,562 tons per year per facility in the industry.[42] Based on this flow rate and the TRI loadings, EPA calculated the concentrations of underlying hazardous constituents, and found that the wastewaters discharged by at least a few facilities may have concentrations exceeding the UTS for xylenes, acetone, barium, and ethylene oxide. The number of affected facilities were estimated by calculating the probability of the number of facilities with constituents above UTS that also have land-based units. To bridge other data gaps, EPA made few assumptions based on industry knowledge and professional judgment. The key assumptions specific to the food and kindred products industry are listed below:

- The end-of-pipe pH concentrations of the wastewaters average between 4 and 12. This indicates that there could be significant quantities of corrosive wastes generated. Therefore, EPA believes that all food processing facilities are likely to generate ICRT wastes that are aggregated and decharacterized prior to treatment or discharge.

- Data on the percentage of facilities using land-based units varied among different data sources. The effluent guidelines document indicated 30 percent of the facilities use land application and are thus considered to be zero dischargers. Of the direct and indirect dischargers, EPA assumes that at most 30 percent use land-based units. The PCS data indicated 16 percent, and the Subtitle D survey indicated 22 percent. Therefore, EPA used these data to set the upper bound at 30 percent and lower bound at 16 percent to estimate the number of facilities with land-based units.

- Based on professional judgment and limited available data on the constituent concentrations in the wastewaters, EPA believes that approximately 2 to 4 percent of the food processing facilities may have constituent concentrations that exceed the UTS levels.

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[42] *The Water Encyclopedia*, Table 5-39 (Water Use in Food Industry), p.346.

3.4.8 Industrial Laundries

The industrial laundries industry is a subcategory of the auto and other laundries point source category. Industrial laundry facilities (SIC 7218) are primarily engaged in supplying laundered or, to a limited extent, dry-cleaned work uniforms, wiping towels, safety equipment (e.g., gloves, flame-resistant clothing), dust covers and cloths, and similar items to industrial or commercial users. These items may belong to the industrial laundry and supplied to users on a rental basis, or they may be the customer's own goods. Exhibit 3-10 summarizes the major findings of this analysis.

EXHIBIT 3-10

MAJOR FINDINGS FOR THE INDUSTRIAL LAUNDRIES INDUSTRY

Discharge Mode	Number of Facilities	Total Wastewaters Mixed with ICRT Wastes (million tons/yr)[a]	Facilities Without RCRA-equivalent Treatment[a]	Facilities with Land-Based Units[a]	Affected Facilities[a]	Affected Wastewater (million tons/yr)[a]
Direct	1	.08	1	1	1	.08
Indirect	999	76	800 - 999	30 - 120	24 - 120	1.8 - 9.2
Zero	0	0	0	0	0	0
Total	**1,000**	**76**	**801 - 1000**	**31 - 121**	**25 - 121**	**1.9 - 9.3**

[a] The numbers or quantities in this column were determined on an aggregated basis and apportioned to the direct, indirect, and zero dischargers based on the percentage of each discharge mode.

Key Data Sources

Effluent Guidelines Development Document. In 1980, there were approximately 1,000 industrial laundries operating in the United States.[43] Most of these facilities operated their own laundry facilities. The rest of the facilities are mostly sales establishments, administrative centers, or distribution centers. The average wastewater flow was approximately 68,000 GPD per facility. Since the laundry facilities are almost exclusively confined to urban and suburban areas where their customers are located, almost all the facilities discharge their wastewaters to POTWs. Only one facility was found to be a direct discharger. EPA studies indicate that very few facilities pretreat the wastewaters before discharging to the POTWs. However, in cases where treatment

[43] U.S. EPA, October 1980, *Development Document for Effluent Limitations Guidelines and Standards for the Auto and Other Laundries Point Source Category,* Office of Water and Waste Management.

systems have been installed, dissolved air flotation has been selected as providing the best treatment.

In 1994, in preparation for new effluent guidelines, EPA conducted a survey of 1,751 facilities in the industrial laundries category (including some facilities from other subcategories). This new study confirmed that most industrial laundries do not conduct on-site treatment of wastewaters prior to discharging to a POTW. However, the study also shows that treatment methods including lint screens, oil skimmers, and heat reclaimers are used by few facilities in this industry. Sampling and analysis of discharges from this industry showed underlying hazardous constituents in the wastewaters discharged.

Report to Congress on the Discharge of Hazardous Wastes to POTWs. The 1986 Report to Congress indicated that there are 68,535 facilities in the industrial and commercial laundries industry.[44] The focus of the present study is only on the industrial laundries, however, and so these data are not very applicable since it includes facilities from all other sectors not included in this capacity analysis. Nevertheless, these data also indicate the presence of priority, toxic, and non-conventional pollutants in the wastewaters discharged by the industrial laundries. Many priority pollutants and one non-conventional pollutant (acetone) were present in concentrations above the UTS levels.

Biennial Reporting System. Data from the 1991 BRS was extracted to determine what types of affected wastes are generated by the industrial laundries sector. BRS data indicated no industrial laundries to treat their hazardous waste on site. However, eight facilities reported sending their wastes to off-site treatment facilities. These facilities were contacted for follow-up on their BRS data submissions and telephone interviews were conducted to collect more information on the waste generation and management practices followed by these facilities. The information obtained is summarized in the telephone logs included in the industry profiles in Chapter 9 of Appendix A.

Permit Compliance System (PCS). The PCS data showed only seven direct discharge laundry facilities that indicated the type of treatment or treatment unit used. However, none of these facilities reported using any potential land-based treatment units for treating the wastewaters.

Industrial Subtitle D Screening Survey. The Industrial Subtitle D Screening Survey did not include the industrial laundry facilities. Therefore, EPA used data from this survey to calculate the average percentage of land-based units used across all the industries for which data were available. Based on these data, EPA estimates that approximately 12 percent of the facilities in all industrial sectors use land-based units as

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[44] U.S. EPA, February 1986, *Report to Congress on the Discharge of Hazardous Waste to Publicly Owned Treatment Works,* Office of Water Regulations and Standards.

part of the wastewater treatment system. EPA applied this value in calculating the number of facilities with land-based units in the industrial laundries category, which resulted in 120 facilities.

Industry Contacts. In order to better understand the generation and management of wastewaters in the industrial laundries sector, EPA contacted staff from different facilities. These facilities were selected for follow-up on their BRS data submissions and telephone interviews were conducted to collect more information on the waste generation and management practices followed by these facilities. This follow-up information indicate that most of the facilities discharge their wastewater indirectly to POTWs under a local city or county agreement. This information also indicates that some organic pollutants present in the wastewaters are not addressed by the POTW agreement. Detailed information obtained from the facilities is summarized in the telephone logs in the industry profiles in Chapter 9 of Appendix A.

Key Assumptions

There are significant data limitations in assessing the extent of the impact of the Phase III LDR rule due to high variability in the waste generation and management practices in this industry. For the purpose of this rule, EPA extrapolated the data from the Effluent Guidelines Document to estimate the total ICRT wastewaters mixed with other wastewaters, based on the average flow rate. The land-based units were estimated based on the Industrial Subtitle D Screening Survey data. To bridge other data gaps, EPA made assumptions based on industry knowledge and professional judgment. The key assumptions specific to the industrial laundries sector are provided below:

- Based on industry knowledge, EPA believes that all industrial laundries are likely to generate at least some ICRT wastes that are aggregated with other wastes and decharacterized prior to further treatment or discharge.

- Given that most industrial laundries are in urban and suburban areas, EPA believes that the estimate of facilities with land-based units (12 percent from the PCS data) may be somewhat high. Therefore, EPA chose 3 percent (one forth of 12 percent) as a lower bound estimate and 12 percent as an upper bound estimate.

- Based on process knowledge and information obtained from several data sources discussed above, EPA believes that several underlying hazardous constituents are likely to be present in wastewaters discharged by more than 80 percent of the indirect dischargers at a level greater than the UTS. Therefore, EPA chose 80 percent as a lower bound and 100 percent as an upper bound estimate of facilities with constituents above UTS.

3.4.9 Iron and Steel Industry

The iron and steel manufacturing industry (SIC 3312-3325) is composed of twelve subsectors based on the different manufacturing processes. EPA estimates that there are approximately 1,020 iron and steel manufacturing facilities with 73 percent direct dischargers, 16 percent indirect dischargers, and 11 percent zero dischargers. Exhibit 3-11 summarizes the major findings of this analysis.

EXHIBIT 3-11

MAJOR FINDINGS FOR THE IRON AND STEEL INDUSTRY

Discharge Mode	Number of Facilities	Total Wastewaters Mixed with ICRT Wastes (million tons/yr)[a]	Facilities Without RCRA-equivalent Treatment[a]	Facilities with Land-Based Units[a]	Affected Facilities[a]	Affected Wastewater (million tons/yr)[a]
Direct	741	6,300	23	81 - 164	2 - 5	17 - 43
Indirect	162	1,400	5	18 - 36	1	8.5
Zero	117	1,000	3	13 - 24	1	8.5
Total	**1,020**	**8,700**	**31**	**112 - 224**	**3 - 7**	**26 - 60**

[a] The numbers or quantities in this column were determined on an aggregated basis and apportioned to the direct, indirect, and zero dischargers based on the percentage of each discharge mode.

Key Data Sources

Effluent Guidelines Development Document.[45] The development document presents information regarding the 1,020 active plants that were operating at the time of the compilation of the document. This document presents data regarding the use of land-based units in the treatment system (lagoons and ponds were assumed to be surface impoundments), and the concentration of constituents. Approximately 122 of 704 (17 percent) are estimated to use land-based units. Approximately three percent of the facilities are estimated to have constituents above UTS.

[45] The primary source of information for Sections 10.3 and 10.4 is the U.S. EPA, *Development Document for Effluent Limitations Guidelines and Standard for the Iron and Steel Manufacturing Point Source Category* (Development Document), Office of Water Regulations and Standards, 1982.

Report to Congress on the Discharge of Hazardous Wastes to POTWs.[46] The 1986 Report to Congress (RTC), indicated that there are 1,020 iron and steel facilities with 733 direct dischargers, 162 indirect dischargers, and 125 zero dischargers. The RTC also indicated constituents in wastes discharged to POTWs above UTS, however, they are all regulated by CWA.

Biennial Reporting System (BRS). EPA extracted data from the 1991 BRS to determine what types of affected wastes are generated by the iron and steel industry. EPA obtained data regarding wastes managed on site at iron and steel facilities for the facilities that generated the highest quantities of potentially affected wastes. These data confirmed that the industry generates ICRT wastes.

Permit Compliance System (PCS). In the PCS, 460 facilities were reported with SIC codes 3312-3325. Of these facilities, 106 reported their treatment systems and only approximately 23 (22 percent) of these facilities reported using land-based units.

Industrial Subtitle D Screening Survey. The Industrial Subtitle D Screening Survey indicated that 11 percent of the facilities use land-based units.

Industry Studies Database (ISDB). The ISDB only contains reliable facility information for coke facilities. The data includes the total wastewater volume generated by this sector of the industry (33 million tons per year) and the number of land-based units (9 of 44 facilities). Constituents were found above UTS, however, they are all regulated by CWA.

Key Assumptions

There are significant data limitations in assessing the extent of the impact of the Phase III rule due to a high variability in the waste generation and management practices within an industry and across all industrial sectors. To bridge these data gaps, EPA had to make some assumptions based on the industry knowledge and professional judgment. The key assumptions specific to the iron and steel industry are stated below:

- All 1,020 iron and steel facilities generate ICRT wastes that are aggregated and decharacterized.
- About 112 to 224 facilities use land-based units as part of their wastewater treatment system. This estimate is based on PCS, development document, and Industrial Subtitle D Survey data.

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[46] U.S. EPA, February 1986, *Report to Congress on the Discharge of Hazardous Waste to Publicly Owned Treatment Works,* Office of Water Regulations and Standards.

- About 31 facilities generate wastewaters with underlying hazardous constituents above UTS that are not regulated by CWA. This estimate is based on development document, ISDB, and TRI data.

- The average facility discharge rate is 8.5 million tons per year. This number is based on the development document and ISDB data.

3.4.10 Leather Tanning and Finishing Industry

The leather tanning and finishing industry is primarily engaged in tanning, currying, and finishing raw or cured hides and skins into leather. In addition, the industry includes converters and dealers that buy hides and skins or leather and contract with tanners or finishers to process these products. Most tanneries operate on a small-scale basis, are located in urban areas, and use tanks for wastewater treatment. The vast majority of the tanning facilities are family-owned and closely-held corporations, with a few facilities that are divisions of large conglomerates. Approximately 30 percent of these facilities have less than 50 employees and generate less than 100,000 gallons of wastewater per day. Most of the facilities are housed in buildings that are more than 50 years old. Only a few of these facilities, typically the larger facilities, use modern processing methods and equipment. Exhibit 3-12 summarizes the major findings on this analysis. Most of the available data is several years old with some of the data being more than 20 years old. The Phase III LDRs may, in reality, have a very low impact on the leather tanning and finishing industry. Several practices may have changed in light of the RCRA program. For example, facilities may be segregating their wastewaters and treating them separately in tanks.

EXHIBIT 3-12

MAJOR FINDINGS FOR THE LEATHER TANNING AND FINISHING INDUSTRY

Discharge Mode	Number of Facilities	Total Wastewaters Mixed With ICRT Wastes (million tons/yr)[a]	Facilities Without RCRA-equivalent Treatment[a]	Facilities with Land-Based Units[a]	Affected Facilities[a]	Affected Wastewater (million tons/yr)[a]
Direct	17	4.9	17	17	3 - 17	0.8 - 4.9
Indirect	141	46.5	141	6	0 - 6	0 - 2.0
Zero	2	0.6	2	2	0 - 2	0 - 0.6
Total	**160**	**52**	**160**	**25**	**3 - 25**	**0.8 - 7.5**

[a] The numbers or quantities in this column were determined on an aggregated basis and apportioned to the direct, indirect, and zero dischargers based on the percentage of each discharge mode.

Key Data Sources

Effluent Guidelines Development Document.[47] The development document for the leather industry covered the 158 tanneries that were operating at the time of the compilation of the document. This document characterized the wastewaters primarily for the pollutants regulated by the CWA. The document, however, also presented waste characterization data on other toxic pollutants that were measured in the wastewaters. With only a few exceptions, the raw wastewaters are treated prior to discharge. Less than 7 percent of the facilities send their wastewaters directly to POTWs without any treatment. These processes are generally conducted in tanks and hence may not trigger the LDRs. The data indicate that there are 17 direct dischargers and 141 indirect dischargers and that the industry generates 325,000 tons of wastewater per year.

Most tanneries only conduct preliminary treatment of their wastewaters and then discharge their wastes to POTWs. Some of the preliminary treatment may be conducted in land-based units. In general, the end-of-pipe treatment, involving primary and biological treatment processes, is conducted in land-based units. All of the 17 direct dischargers (under NPDES) perform end-of-pipe treatment in land-based units. The development document also indicated that up to 25 facilities use land-based units to handle or treat wastewaters.

POTW Report to Congress.[48] The report indicated that there were a total of 160 facilities, of which 17 facilities were direct dischargers, 141 facilities were indirect dischargers, and 2 facilities were zero dischargers. The number of direct and indirect dischargers match those indicated by the development document.[49] The POTW report also indicated that spent solvents accounted for 90 percent of the hazardous wastes generated by small quantity generators.

Subtitle D Screening Survey.[50] In April 1989, EPA analyzed the data in the Subtitle D Industrial Non-hazardous Waste Screening Survey and other data to further characterize the industrial Subtitle D universe.[51] The EPA analysis indicated that of the 1,586 facilities in the leather industry (SIC code 31) there are 27 facilities

[47] U.S. EPA, 1982 (November), *Development Document for Effluent Limitations Guidelines and Standards for the Leather Tanning and Finishing, Point Source Category*, Office of Water, Document No. 440/1-82/016.

[48] U.S. EPA, 1986 (February), *Report to Congress on the Discharge of Hazardous Wastes to Publicly Owned Treatment Works*, Office of Water, Regulations and Standards.

[49] U.S. EPA, 1982, *op. cit.*

[50] ICF Inc., 1989 (April 3), *Characterization of the Industrial Subtitle D Universe, Results of First Task*, memorandum to EPA.

[51] ICF Inc., 1989 (April 3), *Characterization of the Industrial Subtitle D Universe, Results of First Task*, memorandum to EPA.

(approximately 2 percent) that use land-based units to treat approximately 168 million tons of wastewater. SIC code 31 encompasses more than just the leather tanning and finishing industry. However, EPA believes that most or all of these facilities that use land-based units are likely to be leather tanning and finishing facilities since the other industries in the leather sector manufacture specific leather goods and generally do not generate significant quantities of wastewaters to require the use of land-based units. Hence, considering the data provided in the development document[52] and the Subtitle D Screening Survey, EPA estimates that there are a total of 25 leather tanning facilities that use land-based units.

Key Assumptions/Methodology

The exact number of facilities in this industry is unclear. According to the effluent limitations guidelines development document[53] and the POTW Report to Congress,[54] as of November 1982, there were approximately 160 facilities in the leather tanning and finishing industry. According to another data source, in 1987, there were 311 facilities in the leather tanning and finishing industry.[55] However, according to an industry expert, the number of leather tanning and finishing establishments is now estimated to be less than 100.[56] In this analysis, EPA used the effluent guidelines development document and POTW report estimates of 160 facilities.

EPA used the following assumptions to estimate the number of facilities and wastewater volumes that may be affected by the Phase III LDRs:

- EPA assumed that most facilities aggregate their characteristic wastewaters with other non-hazardous wastewaters prior to treatment.

- The characterization data presented in the development document[57] and the POTW Report to Congress[58] indicated that all wastewaters generated by this industry contain pollutants above UTS and that most of these pollutants are not addressed by technology-based standards.

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[52] U.S. EPA, 1982, *op. cit.*

[53] U.S. EPA, 1982, *op. cit.*

[54] U.S. EPA, 1986, *op. cit.*

[55] U.S. Department of Commerce, 1990 (January), *1987 Census of Manufacturers*, Industry Series, MC87-1-31A.

[56] Personal communication with Frank Rutland, Director of the Leather Association, University of Cincinnati, September 20, 1994.

[57] U.S. EPA, 1982, *op. cit.*

[58] U.S. EPA, 1986, *op. cit.*

- The POTW report[59] indicated that spent solvents accounted for 90 percent of the hazardous wastes generated by small quantity generators. Since the manufacturing processes used by all the leather tanning facilities are similar, EPA extrapolates and assumes that 90 percent of all raw wastewaters generated by the leather tanning and finishing industry would contain spent solvents and carry the listed F001 through F005 codes for the solvents. Qualitatively, this is highly likely since most tanning facilities use solvents in their operations. Also, this assumption is supported by the data presented in the 1991 BRS.[60]

- The Phase III rule may not impact all the wastewaters at these facilities. EPA believes that the large volumes of wastewaters that carry the RCRA listed codes are segregated from other characteristic wastes and are treated appropriately under the existing RCRA regulations for listed wastes. The remaining raw wastewaters (10 percent of the total generation) that are managed in land-based units may be affected by the Phase III rule.

- All wastewater volumes were estimated using average wastewater flows given in the development document[61] with the assumption that the tanneries operate at their 100 percent daily capacity for 250 days a year.

3.4.11 Metal Products and Machinery Industry

The metal products and machinery (MP&M) industry (formerly the Machinery Manufacturing and Rebuilding Industry) is engaged in the manufacturing of a variety of products that are constructed primarily by using metals. The MP&M facilities manufacture, rebuild, or maintain machinery, including transportation, office machines, electronic and electrical equipment and machinery, laboratory and medical instruments, household appliances, and industrial tools and equipment. The MP&M industry includes the following SIC codes: SIC Code 34: Fabricated Metal Products, Except Machinery and Transportation Equipment; SIC Code 35: Industrial and Commercial Machinery and Computer Equipment; SIC Code 36: Electronic and Other Electrical Equipment and Components, Except Computer Equipment; and SIC Code 37: Transportation Equipment.

The MP&M industry includes 15 industrial groups. Due to the size of this category and based on differences/similarities between the groups within this category,

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[59] U.S. EPA, 1986, *op. cit.*

[60] U.S. EPA, 1991 (August), *1991 Hazardous Waste Report: Instructions and Forms*, OMB # 2050-0024, EPA Form 8700-13 A/B (5-80).

[61] U.S. EPA, 1982, *op. cit.*

the facilities in the category have been divided into two groups for the purposes of the effluent guidelines program: MP&M Effluent Guidelines Phase I and Phase II. The MP&M Phase I group includes seven industrial categories: aircraft, aerospace vehicles, hardware, ordnance, stationery industrial equipment, mobile industrial equipment, and electronic equipment. The MP&M Phase II group includes eight industrial categories: motor vehicles, bus and truck, railroad, ships and boats, office machines, household equipment, instruments, and precious and nonprecious metals.[62]

Using the data and assumptions mentioned below, EPA found that several facilities have pollutants at concentrations higher than the UTS levels set by the Phase II LDRs. All of these pollutants were found to be priority pollutants. However, EPA is currently developing revised effluent limitations guidelines for the MP&M Effluent Guidelines Phase I facilities and expects to finalize the rule in 1996. EPA expects to finalize the rule for MP&M Effluent Guidelines Phase II facilities in 1997. If the upcoming rule on revised effluent limitations guidelines addresses all pollutants that exceed their UTS, then this category may not be affected by the Phase III LDR rule. Exhibit 3-13 summarizes the major findings of this analysis.

EXHIBIT 3-13

MAJOR FINDINGS FOR THE METAL PRODUCTS AND MACHINERY INDUSTRY

Discharge Mode	Number of Facilities	Total Wastewaters Mixed With ICRT Wastes (million tons/yr)[a]	Facilities Without RCRA-equivalent Treatment[a]	Facilities with Land-Based Units[a]	Affected Facilities[a]	Affected Wastewater (million tons/yr)[a]
Direct	3,060	2,380	130	460	0 - 20	0 - 15.6
Indirect	21,420	170	940	210	0 - 9	0 - 0.1
Zero	6,120	50	270	60	0 - 3	0 - 0.02
Total	**30,600**	**2,600**	**1,340**	**730**	**0 - 32**	**0 - 15.7**

[a] The numbers or quantities in this column were determined on an aggregated basis and apportioned to the direct, indirect, and zero dischargers based on the percentage of each discharge mode.

[62] Note that, for the Phase III LDR capacity analysis, the facilities manufacturing electrical and electronic equipment (SIC Codes 3571-3579 and 3612-3699) are covered separately under "Electrical and Electronic Components."

Key Data Sources

Dun & Bradstreet. To determine the universe of facilities included in the MP&M category for the effluent guidelines program, EPA began with Dun & Bradstreet (D&B) information. Based on SIC codes, EPA estimated that there were 970,000 facilities in the MP&M category. Through further analysis, it was determined that 270,000 facilities were in the MP&M Effluent Guidelines Phase I group and 700,000 facilities were in the MP&M Effluent Guidelines Phase II group.

Preliminary Data Summary for the Machinery Manufacturing and Rebuilding Industry.[63] The preliminary data summary for the Machinery Manufacturing and Rebuilding Industry was developed by EPA for deciding whether to develop national effluent limitations guidelines and standards for these facilities. The report covered the 970,000 MP&M facilities that were operating at the time of the compilation of the information. The report estimated that 10 percent of the MP&M facilities are direct dischargers, 70 percent are indirect dischargers, and 20 percent are zero dischargers. The total reported wastewater flow for the MP&M industry was 630 billion gallons per year (2,620 million tons per year). The report also indicated that the average facility wastewater discharge in the MP&M industry varies widely from 150 tons per year to 350 million tons per year.

Facility Questionnaires. For the effluent guidelines development process, two-page facility "screener" questionnaire was sent to 8,000 statistically-selected facilities, including all facilities identified in MP&M Effluent Guidelines Phase I and manufacturing facilities in MP&M Effluent Guidelines Phase II. The overlap of phases during the screener mailing is because MP&M Effluent Guidelines Phase I and Phase II were still being defined at that time. The focus of the screener questionnaire was to identify the industrial group of the facility, the unit operations at the facility, and the processes that involve or use water. Over 47 different unit operation types that potentially include water rinses were identified by EPA based on the screener responses. It was also determined from screener responses that the number of facilities in MP&M Effluent Guidelines Phase I was significantly smaller than that estimated by D&B. Screener responses indicated that less than half of the original 270,000 facilities performed the identified operations on metals (i.e., many were wood, warehouse, or non-manufacturing operations) and that less than half of the remaining operations used water. As a result, the estimate of the number of facilities in MP&M Effluent Guidelines Phase I was reduced from 270,000 to 10,600 facilities. Assuming that the wastewaters generated by the MP&M Effluent Guidelines Phase II facilities are similar to those generated by the MP&M Effluent Guidelines Phase I facilities, EPA adjusted the number of facilities in the MP&M Effluent Guidelines Phase II group from 700,000 to 20,000.

[63] U.S. EPA, 1989 (October), *Preliminary Data Summary for the Machinery Manufacturing and Rebuilding Industry*, Office of Water, Document No. 440/1-89/106.

A detailed questionnaire was then sent to 1,000 statistically identified MP&M Effluent Guidelines Phase I facilities that responded to the screener questionnaire. The 65-page detailed questionnaire was sent in January 1991 for the calendar year 1989 information. The purpose of the questionnaire was to gather specific data and information on the unit operations and treatment trains, wastewater generation and flow rates, and contaminants in the waste streams. The data collected from the 800 facilities responding to the detailed questionnaire are maintained in the Data Collection Portfolio (DCP) Database on the EPA mainframe.

Sampling Data. A sampling program was implemented during 1986-1993, with most data collected between 1991 and 1993, at 27 selected facilities. The facilities were selected to fill data holes or gaps in industry sector or unit operations data received on the detailed questionnaires mentioned above. As a result, the emphasis of the sampling program addressed the major unit operations and wastewater treatment operations at these facilities.

EPA's Metal Products and Machinery Database. Originally, the focus of the MP&M effluent guideline effort and the associated data collection (the questionnaires and sampling data mentioned above) was to develop facility-specific information. However, due to the size of the industry, statistically representative facilities were identified and used for all regulatory efforts. A total of 446 facilities were selected to undergo a modelling process and become representative of the entire MP&M Effluent Guidelines Phase I group. The modelling process included use of actual questionnaire responses as the basis for the model facility and use of the sampling and analysis data and site-visit information to fill in missing information. As a result, each of the 446 facilities represents a portion of the industry. Scale-up factors for each facility were then developed to allow the 446 facilities to be expanded to the 10,600 facilities identified in the MP&M Effluent Guidelines Phase I group. Of the 446 facilities, 50 have a scale-up factor of zero. These 446 model facilities are considered representative of the MP&M Effluent Guidelines Phase I group and were utilized in this capacity analysis.

Permit Compliance System. The Permit Compliance System (PCS) indicated that approximately 50 of the 328 MP&M direct dischargers providing information on their treatment types used one of the treatment types that indicated the potential use of a land-based unit. Extrapolating the information provided in the PCS, EPA estimates that approximately 400 facilities (or 15 percent) of the MP&M direct dischargers use land-based units. More than 67 percent of the MP&M facilities are small (i.e., they have less than 10 employees[64]). Most of these facilities are small job shops located in urban areas that either discharge their wastewaters to POTWs or are zero dischargers. Considering that these facilities typically do not use land-based units, EPA estimates that

[64] U.S. EPA, 1989, *op. cit.*

up to 210 and 60 facilities (or 1 percent each) of the MP&M facilities indirect and zero dischargers, respectively, use land-based units to manage or treat wastewaters.

Key Assumptions/Methodology

The average facility wastewater discharge in the MP&M industry varies widely from 150 tons per year to 350 million tons per year.[65] EPA used the following assumptions to estimate the wastewater flows of direct, indirect, and zero discharges:

- Considering that 67 percent of the MP&M facilities have less than 10 employees and that most of these facilities are indirect dischargers, EPA estimates that the average wastewater flow for indirect dischargers is 100 times lower than that for direct dischargers, which typically are facilities with large wastewater flows.

- Furthermore, EPA assumes that the MP&M zero dischargers typically have low wastewater flows, and estimates that the average wastewater flow for zero dischargers is similar to that for indirect dischargers.

The primary sources of data used in the analysis for estimating facilities and wastewaters affected by the Phase III LDRs are the DCP and EPA's MP&M databases. The approach for identifying facilities in the MP&M category that would likely be affected by the Phase III LDR rule was developed based on numerous discussions with the effluent guidelines development project teams regarding the data that were collected and how they are currently managed in the numerous files of the MP&M database. The discussions resulted in an approach consisting of a series of queries and assumptions based on industry knowledge designed to define the affected universe. The queries and assumptions utilized are described below:

- Query the database to identify facilities generating wastewaters that are corrosive or contain a TC organic constituent. *Assumptions:* Ignitable, reactive, or TC pesticide wastewaters are not generated to a large extent by the MP&M industry. All wastewaters that contain one of the TC organic constituents at the point of generation are considered TC organic wastewaters.

- For all facilities, compare all end-of-pipe constituents and their concentrations to the UTS list.

- Identify all facilities that use land-based units and have end-of-pipe concentrations above the UTS levels. *Assumptions:* All facilities with

[65] U.S. EPA, 1989, *op. cit.*

wastewater flows greater than 100,000 gallons per day use land-based units. EPA used this conservative assumption to capture the upper bound for affected facilities and wastewater volumes. The detailed questionnaire asked for information regarding the treatment performed but not for the unit in which the treatment is performed. For facilities with wastewater flows lower than 100,000 gallons per day, the list of treatment codes in the DCP Dictionary was reviewed to identify the treatments that would likely occur in a land-based unit.

- Apply the industry scale-up factors for MP&M Effluent Guidelines Phase I and Phase II groups. *Assumption:* The MP&M Effluent Guidelines Phase I and Phase II groups generate similar wastewaters from similar processes.

- The above analysis indicated that up to 32 MP&M facilities may be affected by the Phase III LDRs. EPA lacks the data to differentiate which of the estimated 32 upper bound affected MP&M facilities are direct, indirect, or zero dischargers. The distribution of the total number of MP&M facilities between direct, indirect, and zero dischargers (i.e., 10, 70, and 20 percent, respectively) cannot be used to differentiate the 32 affected facilities, since direct dischargers typically generate larger volumes of wastewater and, consequently, have more land-based units and will be more affected by the Phase III LDRs. Considering that the type of operations and characteristics of generated wastewaters at all MP&M facilities are similar, EPA assumes, as in the other industries, that the distribution between the direct, indirect, and zero dischargers for facilities affected by the Phase III LDRs is the same as that for facilities with land-based units.

3.4.12 Pesticides Industry

The pesticides industry includes both pesticide manufacturers and formulators/packagers. Pesticide manufacturing facilities produce pesticide active ingredients (PAIs), while formulators/packagers process active ingredients with other ingredients into pesticide formulations and then package them for sale. Facilities manufacturing PAIs may be included in one or more of the following SIC groups: 2831, 2833, 2834, 2842, 2843, 2861, 2865, 2869, 2879, and 2899. There are approximately 75 facilities in this industry; however, 32 facilities co-treat OCPSF wastewaters with pesticide manufacturing wastewaters. Over half of the pesticide manufacturing facilities also conduct pesticide formulating and/or packaging activities. In addition, more than half of the pesticide manufacturing facilities generate wastewater discharges that are currently regulated under the OCPSF point source category. Exhibit 3-14 summarizes the major findings of this analysis.

EXHIBIT 3-14

MAJOR FINDINGS FOR THE PESTICIDES INDUSTRY

Discharge Mode	Number of Facilities	Total Wastewaters Mixed with ICRT Wastes (million tons/yr)[a]	Facilities Without RCRA-equivalent Treatment[a]	Facilities with Land-Based Units[a]	Affected Facilities[a]	Affected Wastewater (million tons/yr)[a]
Direct	12	2.2	12	1 - 3	1 - 3	.18 - .55
Indirect	12	.17	12	1 - 3	1 - 3	.01 - .04
Zero	20	.64	20	0	0	0
Total	**43[b]**	**3.0**	**43**	**2 - 6**	**2 - 6**	**.20 - .59**

[a] The numbers or quantities in this column were determined on an aggregated basis and apportioned to the direct, indirect, and zero dischargers based on the percentage of each discharge mode.
[b] One facility discharges both directly and indirectly. Therefore, summing the direct, indirect, and zero dischargers will result in 44 facilities.

Key Data Sources

Effluent Guidelines Development Document. The effluent guidelines development document[66] provided the most recent data on the pesticide manufacturing facilities. According to this data source, there are 75 pesticide manufacturing facilities in the United States. These 75 facilities generate approximately 6.14 million tons of wastewater per year, and discharge approximately 5.1 million tons per year directly, and 0.4 million tons per year indirectly to surface waters. Of these 75 facilities, 32 facilities co-treat OCPSF wastewater with pesticide manufacturing wastewaters. Of the 75 facilities, 28 are direct dischargers, and 28 are indirect dischargers. Of these, one facility discharges both directly and indirectly. Of the remaining 20 facilities, seven facilities do not generate any ICRT wastewater, 3 facilities practice incineration, and 10 facilities discharge through deep well injection. Some type of treatment is provided to over 99 percent of the wastewaters discharged directly and to approximately 92 percent of the wastewaters that are discharged indirectly.

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[66] U.S. EPA, 1993, *Development Document for Effluent Guidelines, Pretreatment Standards for the Pesticide Chemicals Manufacturing Point Source Category*, Office of Water, Effluent Guidelines Division, EPA-821-R-93-016, September, 1993.

Report to Congress on the Discharge of Hazardous Wastes to POTWs. The 1986 Report to Congress[67] indicated that there were 119 facilities in the pesticide industry with 45 direct dischargers, 38 indirect dischargers, and 25 zero dischargers. The discharging status of the remaining facilities was unknown. This report also provided concentrations of underlying constituents present in the wastewaters discharged from pesticide manufacturing facilities. According to these data, many constituents are present in concentrations several magnitudes higher than the UTS levels.

Biennial Reporting System (BRS). Data from the 1991 BRS was extracted to determine what types of affected wastes are generated by the pesticide manufacturing industry. EPA obtained data for the top 25 waste generators who treated their wastes on site. Five facilities were selected for follow-up on their BRS data submissions and telephone interviews were conducted to collect more information on the waste generation and management practices followed by these facilities. The information obtained is summarized in the telephone logs included in the industry profiles in Chapter 13 of Appendix A.

Permit Compliance System (PCS). According to the PCS data, 255 direct discharging facilities are in the pesticides category, and 56 (22 percent) of these facilities appear to use land-based units as part of the wastewater treatment system. (The PCS data include many organic chemical manufacturing facilities, which explains the high number of facilities compared to the 75 reported in the effluent guidelines development document).

Industrial Subtitle D Screening Survey. The Industrial Subtitle D Screening Survey did not include the pesticide manufacturing industry. Therefore, EPA used data from this survey to calculate the average percentage of land-based units used across all the industries for which data were available. EPA found that approximately 12 percent of the facilities in all industrial sectors use land-based units as part of the wastewater treatment system.

Industry Studies Database (ISDB). An analysis of the ISDB[68] provides ranges of constituent concentrations in the ICR wastes managed in CWA, SDWA, or CWA-equivalent systems. According to this data, there are 96 facilities in the pesticides industry, and 52 facilities (54 percent) were reported to generate ICR wastes. These data also indicate that the concentrations of many underlying constituents exceed the UTS levels. Many of these constituents are nonpriority pollutants. The ISDB also

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[67] U.S. EPA, February 1986, *Report to Congress on the Discharge of Hazardous Waste to Publicly Owned Treatment Works,* Office of Water Regulations and Standards.

[68] U.S. EPA, November 30, 1994, *Summary Data from Industry Studies Database for Use in Phase III Capacity Determinations,* Draft, Submitted by Science Applications International Corporation.

indicates that eight facilities (approximately 8 percent) in the pesticides industry manage their ICR wastes in surface impoundments.

Industry Contacts. In order to better understand the generation and management of wastewaters in the pesticide manufacturing industry, EPA contacted staff from five different facilities. These five facilities were selected for follow-up on their BRS data submissions and telephone interviews were conducted to collect more information on the waste generation and management practices followed by these facilities. None of the facilities contacted reported manufacturing pesticides. One facility reported manufacturing pesticides, but this facility also manufactures organic and inorganic chemicals. This facility reported generating ICRT wastes that are aggregated with other wastes prior to treatment. Detailed information obtained is summarized in the telephone logs in the industry profiles in Chapter 13 of Appendix A.

Key Assumptions

There are significant data limitations in assessing the extent of the impact of the Phase III rule due to high variability in the waste generation and management practices in this industry. For this analysis, EPA excluded the 32 facilities that co-treat OCPSF wastewaters with pesticide manufacturing wastewater, assuming that these facilities will be covered under the OCPSF industry. Of the remaining 43 facilities, 20 facilities are zero dischargers. EPA estimated the number of direct and indirect dischargers, by applying the ratio reported for all 75 facilities. Thus, EPA estimates that there are 12 direct dischargers and 12 indirect dischargers. One facility which discharges both directly and indirectly is accounted as two facilities. The average wastewater flow rate obtained from the effluent guidelines document was used to estimate the quantity of wastewaters for these 43 facilities. To bridge other data gaps, EPA made assumptions based on industry knowledge and professional judgment. These key assumptions specific to the pesticide industry are listed below:

- Based on the pesticide manufacturing process knowledge, EPA believes that all 43 pesticide manufacturing facilities could generate ICRT wastes that are aggregated and decharacterized prior to any treatment. The ISDB data indicated that 55 percent of the facilities reported generating ICR wastes. Therefore, EPA chose an average of these values and estimates that approximately 80 percent of the facilities are likely to generate at least some ICR and TC organic wastes that are mixed with other wastewaters.

- Data on the number of facilities using land-based units varies among different sources. For example, the PCS data indicated 22 percent, and the Subtitle D survey indicated 12 percent, and the ISDB data indicated 8 percent. Therefore, EPA used these data to set the upper bound at 22 percent and the lower bound at 8 percent to estimate the number of facilities with land-based units.

- Of the 20 zero dischargers, 7 facilities do not generate ICRT wastewaters, and 3 facilities treat their wastewaters through incineration. These facilities are excluded from this analysis. The remaining 10 facilities use deep well injection and are not included in estimating the affected facilities.

- The ISDB data indicate that several underlying hazardous constituents are present at higher than UTS levels. Based on this data and process knowledge, EPA believes that several underlying hazardous constituent are likely to be present at a level greater than the UTS in all the wastewaters discharged by this industry.

3.4.13 Petroleum Refining Industry

The petroleum refining industry includes establishments that are primarily engaged in producing gasoline, kerosene, distillate fuel oils, residual fuel oils, lubricants, and other products from crude petroleum and its fractionation products, through straight distillation of crude oil, redistillation of unfinished petroleum derivatives, cracking, or other processes.

Petroleum refining involves several manufacturing operations and processes including crude desalting, atmospheric and vacuum distillation, hydrotreating, catalytic cracking, thermal processing and residual upgrading, light hydrocarbon processing, hydrocracking, catalytic reforming, extraction, isomerization, lube processing, sulfur removal and recovery, and product blending and inventory. EPA has identified over 150 distinct processes that are conducted in the petroleum refineries. The primary raw material of this industry is crude oil.

This industry generates large volumes of wastewaters and uses land-based units extensively. The available characterization data[69,70,71,72] appear to indicate that most, and possibly all, wastewaters generated by this industry contain pollutants above UTS levels and that most of these pollutants are not addressed adequately by technology-based standards (e.g., NPDES permits). In the recent past, however, rules such as the primary sludges (F037, etc.), TC, and benzene NESHAP have resulted in several changes in the wastewater handling and treatment practices of the petroleum refining industry.

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[69] U.S. EPA, 1986 (February), *Report to Congress on the Discharge of Hazardous Wastes to Publicly Owned Treatment Works*, Office of Water.

[70] U.S. EPA, 1994 (November 30), *Summary Data from Industry Studies Database for Use in Phase III Capacity Determinations*, Draft, submitted by Science Applications International Corporation.

[71] U.S. EPA, 1982 (October), *Development Document for Effluent Limitations Guidelines New Source Performance Standards and Pretreatment Standards for Petroleum Refining*, Point Source Category, Office of Water.

[72] U.S. EPA, 1994 (June), *op. cit.*

Thus, it is difficult to ascertain the facilities and wastewaters that are affected by the Phase III rule.

Using the data and assumptions outlined below, EPA estimated the number of petroleum refining facilities and wastewater volumes that may be affected by the Phase III LDR rule. Exhibit 3-15 summarizes the major findings of this analysis.

EXHIBIT 3-15

MAJOR FINDINGS FOR THE PETROLEUM REFINING INDUSTRY

Discharge Mode	Number of Facilities	Total Wastewaters Mixed With ICRT Wastes (million tons/yr)[a]	Facilities Without RCRA-equivalent Treatment[a]	Facilities with Land-Based Units[a]	Affected Facilities[a]	Affected Wastewater (million tons/yr)[a]
Direct	127	440	127	86	6 - 58	19 - 200
Indirect	21	70	21	14	4 - 10	3 - 32
Zero	39	135	39	27	0 - 17	0 - 58
Total	**187**	**645**	**187**	**127**	**10 - 85**	**22 - 290**

[a] The numbers or quantities in this column were determined on an aggregated basis and apportioned to the direct, indirect, and zero dischargers based on the percentage of each discharge mode.

<u>Key Data Sources</u>

U.S. Industrial Outlook 1994.[73] The number of petroleum refineries have been steadily decreasing in recent times. In 1981, there were 324 operable petroleum refineries, while in 1993, the number of operable petroleum refineries decreased to 187. Of these operable facilities, only 175 petroleum refineries were actually operating in 1993.

TC RIA.[74] A TC RIA report presented estimates of waste generation by the petroleum refining industry. This document is part of a series of background documents for the rule on toxicity characteristic wastes. This report characterized the 220 refineries

[73] U.S. Department of Commerce, 1994 (January), *U.S. Industrial Outlook 1994, Forecasts for Selected Manufacturing and Service Industries*, International Trade Administration.

[74] U.S. EPA, 1987 (November 13), *Estimates of Wastes Generation by the Petroleum Refining Industry*, Final Draft Report, Office of Solid Waste.

that were operating at the time of the compilation of the report. The report estimated that the petroleum refining industry generates approximately 760 million tons of wastewater per year. Scaling this estimate to the current number of facilities in the industry, EPA estimates that currently the petroleum refining industry generates approximately 645 million tons of wastewater per year.

Effluent Limitations Special Study Review of the Petroleum Refining Industry.[75] The effluent limitations special study review provided information for determining whether the current effluent limitations guidelines and standards for the petroleum industry should be revised or updated. As of 1990, only 22 of the 192 existing facilities were indirect dischargers. The data also indicated that in 1992, approximately 137 of the 202 petroleum refineries were direct dischargers. Scaling these numbers to the current number of facilities in the industry, EPA estimates that currently there are 127 direct dischargers, 21 indirect dischargers, and 39 zero dischargers in the petroleum industry.

TRI and ISDB Data. EPA used data in the Toxic Release Inventory (TRI) data base and the Industry Studies Database (ISDB) to conduct a preliminary analysis of the impact of the Phase III rule on the petroleum refining industry. This analysis, however, focused only on non-priority pollutants, based on the assumption that all priority pollutants are addressed by technology-based standards. The analysis indicated that 137 of the 202 petroleum refineries (or 68 percent) use land-based units for treating wastewaters. Using the same percentage on the more recent number of facilities (187) discussed previously, EPA estimates that currently there are 127 petroleum refineries that use land-based units. Furthermore, according to the ISDB data, flow rates among facilities range from 12,000 gallons per day to 24 million gallons per day. From these data EPA estimated low, average, and high flow rates of wastewaters for direct and indirect dischargers:

- For direct dischargers, a low flow rate of 250,000 gallons per day, an average flow rate of 3.22 million gallons per day, and a high flow rate of 10 million gallons per day.

- For indirect dischargers, a low flow rate of 200,000 gallons per day, an average of 720,000 gallons per day, and a high flow rate of 1.77 million gallons per day.

The high and low flow rates represent the 95th percentile and 5th percentile values for the facilities listed under each category of effluent dischargers.

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[75] U.S. EPA, 1994 (June), *Summary Report of Results of Effluent Limitation Guidelines and Standards Special Study Review of the Petroleum Refining Industry*, Office of Water.

Comments to the Proposed Phase III Rule. In comments received on the Phase III LDR proposed rule, the American Petroleum Institute (API) and seven companies operating large petroleum refineries confirmed the presence of oil and hydrocarbons in high concentrations (up to 10,000 ppm of oil) in the wastewaters originally generated and discharged to process sewers at their facilities. These commenters also confirmed the use of non-hazardous waste surface impoundments and the presence of UHCs at levels above their corresponding UTS. All refineries, however, make an attempt to recover and reuse these pollutants before the wastewaters are treated and finally discharged. At the same time, API commented that many facilities have started segregating highly concentrated wastewaters even before discharging them to process sewers due to the recent promulgation of the Benzene Waste NESHAP (BWN).

Because of these waste management practices, the petroleum refining industry believes that LDRs on decharacterized wastewaters should be applied at the last point of aggregation of wastewaters at each refinery. Furthermore, API and some of these companies have provided data to confirm the effectiveness of Aggressive Biological Treatment (ABT) systems installed at their facilities. Some companies also confirmed the generation and discharge of large quantities of stormwater (with low risk) through "wet-weather" surface impoundments at their facilities.

Key Assumptions/Methodology

Using the estimated waste generation rates and TRI data, EPA calculated the constituent concentrations in the effluent from direct and indirect dischargers. EPA found that:

- Four indirect dischargers could have UTS level exceedences for xylenes, methyl ethyl ketone, and cresols; and
- Six direct dischargers could have UTS level exceedences for xylenes, methyl ethyl ketone, cresols, and methanol.

EPA multiplied the number of affected direct and indirect dischargers affected by the average daily discharge for both types of facilities and estimated that at least 22 million tons of waste could be affected each year.

The primary limitations of the analysis conducted using the TRI and ISDB data bases for the purposes of the Phase III LDR analysis are: (1) the analysis did not attempt to identify wastes that are characteristic for toxic organics (e.g., benzene); and (2) wastewaters such as desalter brine, process sour waters, ballast water, pump gland water, tank farm waters, boiler water blowdown, sanitary wastes, storm water, cooling tower blowdown, and oils sent to slop oil system were not addressed. Also, the ISDB report used in the analysis mentioned the following factors that affect the current applicability of the data set:

- The industry has restructured significantly over the past 10 years. The number of small less-efficient refineries have reduced significantly. Consequently, the number of facilities using improper or out-dated management practices may have reduced.

- Several rules such as the TC rule, benzene NESHAP, sludge listings, and EPA fuel standards have changed or been promulgated in the last 10 years. These rules have caused the petroleum refineries to change or reduce practices such as land disposal.

Some of these unknowns have been addressed in the comments received by EPA on the Phase III LDR proposed rule. In response to these comments, EPA has clarified that stormwater surface impoundments will not be affected by today's rule. (Nevertheless, these impoundments were not included in the proposed rule capacity analysis, and therefore no reduction in the estimates of affected facilities in this final rule analysis is warranted.) EPA is also promulgating in this rule a reduction in the frequency of monitoring requirements for the facilities operating ABT systems. However, EPA is not specifying ABT as a new technology-specific standard for decharacterized wastewaters in petroleum refineries. EPA is also retaining the standard definition of point of generation for applying LDRs promulgated in today's rule. For the purpose of the capacity analysis to support this rule, EPA has also decided to use the TRI and ISDB data, as well as the assumptions based on these data, only to estimate the minimum number of facilities and wastewater volumes that may be affected by today's rule. EPA has used the following assumptions to estimate the maximum number of facilities and wastewater volumes that may be affected by the Phase III LDRs:

- EPA conservatively estimates that up to two-thirds of the petroleum refining facilities have priority or non-priority constituents above UTS levels and thus may be affected by the Phase III rule. EPA lacks the data to develop more accurate estimates.

- EPA lacks the data to differentiate which of the estimated 127 petroleum refining facilities with land-based units are direct, indirect, or zero dischargers. Considering that (i) the type of operations and characteristics of generated wastewaters and (ii) the average wastewater generation at all petroleum refining facilities are similar, EPA assumes that the distribution between the direct, indirect, and zero dischargers for facilities with land-based units is the same as the overall distribution of petroleum refining facilities between direct, indirect, and zero dischargers (i.e., 68, 11, and 21 percent, respectively). EPA used this same distribution to differentiate between the estimated 85 upper bound affected petroleum refining facilities.

EPA multiplied the number of direct, indirect, and zero dischargers affected by the wastewater flow rates obtained from *TC RIA* and *POTW Report to Congress* and estimated that up to 290 million tons of waste per year could be affected by today's rule.

3.4.14 Pharmaceutical Industry

The pharmaceutical industry includes facilities that are primarily engaged in manufacturing, fabricating, or processing medicinal chemicals and pharmaceutical products. This industry also includes facilities that are primarily engaged in the grading, grinding, and milling of botanicals or the preparation of cosmetics that function as skin treatment. This industry does not include facilities that are only engaged in pharmaceutical research.

EPA expects to propose a new rule on revised effluent limitations guidelines for the pharmaceutical manufacturing industries. Assuming that, at a minimum, all priority pollutants will be addressed by this revised rule on effluent guidelines limitations, EPA assessed the maximum impact of the Phase III LDR rule by estimating the number of facilities with land-based units that may process non-priority pollutants with end-of-pipe concentrations above UTS levels.

A recent public meeting on the pharmaceutical industry[76] indicated that, in addition to the priority pollutants, several non-priority pollutants that may be found in the effluents will also be addressed by the upcoming rule on revised effluent limitations guidelines. Hence, if the revised effluent limitations guidelines also address all the non-priority pollutants that exceed their UTS levels, then the pharmaceutical industry may not be affected by the Phase III LDR rule. Exhibit 3-16 summarizes the major findings of this analysis.

Key Data Sources

Public Meeting on Effluent Limitations Guidelines and Standards.[77] Effluent guidelines summary statistics for the pharmaceutical industry were developed for a pharmaceutical manufacturing industry public meeting. There are approximately 560 facilities in the pharmaceutical industry. Approximately 60 percent of the pharmaceutical facilities are indirect dischargers. Only 6 percent of the pharmaceutical facilities are direct dischargers and the remaining facilities (34 percent) are zero dischargers. The public meeting also indicated that, in addition to the priority pollutants, several non-priority pollutants that may be found in the effluents will also be addressed by the upcoming rule on revised effluent limitations guidelines.

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[76] U.S. EPA, 1994, *op. cit.*

[77] U.S. EPA, 1994 (June 15), "Pharmaceutical Manufacturing Industry, Effluent Limitations Guidelines and Standards," handout distributed for public meeting on May 23, 1994.

EXHIBIT 3-16

MAJOR FINDINGS FOR THE PHARMACEUTICAL INDUSTRY

Discharge Mode	Number of Facilities	Total Wastewaters Mixed With ICRT Wastes (million tons/yr)[a]	Facilities Without RCRA-equivalent Treatment[a]	Facilities with Land-Based Units[a]	Affected Facilities[a]	Affected Wastewater (million tons/yr)[a]
Direct	34	42	4	24	0 - 3	0 - 12.0
Indirect	336	88	44	47	0 - 6	0 - 1.6
Zero	190	80	25	61	0 - 8	0 - 3.4
Total	**560**	**220**	**73**	**132**	**0 - 17**	**0 - 17**

[a] The numbers or quantities in this column were determined on an aggregated basis and apportioned to the direct, indirect, and zero dischargers based on the percentage of each discharge mode.

Effluent Guidelines Development Document.[78] The development document for the effluent limitations guidelines for the pharmaceutical industry covered the 466 pharmaceutical manufacturing facilities that were operating at the time of the compilation of that document. Of these facilities, 55 were direct dischargers, 277 were indirect dischargers, and 134 were zero dischargers. The total direct and indirect discharge flows indicated by the development document were 68 million and 72 million tons per year, respectively. EPA modified these using data developed for a public meeting (see above) to estimate that the current direct and indirect discharge flows are 42 million and 87 million tons per year, respectively. EPA then estimated the total zero discharge flow to be 80 million tons per year based on average direct and indirect discharge flows.

1989 Pharmaceutical Screener Questionnaire, 1991 Detailed Questionnaire, and Sampling Data. EPA had conducted a limited analysis of the impact of the Phase III LDR rule using questionnaires and sampling data (13 facilities were sampled between 1986 and 1991). These data were obtained as part of a data collection effort for the effluent limitations guidelines program. The approach for identifying facilities in the pharmaceutical category that would likely be affected by the Phase III LDR rule was developed as a result of numerous discussions with the effluent guidelines development project teams regarding the data that were collected and how they are currently managed in the CBI and non-CBI versions of the pharmaceutical database. Due to the type of data collected/available, point-of-generation information on the constituents present and

[78] U.S. EPA, 1983 (September), *Development Document for Effluent Limitations Guidelines and Standards for the Pharmaceutical Manufacturing Point Source Category,* Office of Water, Document No. 440/1-83/084.

the physical parameters of the wastewaters were not available. This analysis was mainly used for estimating the percentage of facilities with land-based units that have wastewaters with underlying hazardous constituents at concentrations above the UTS levels.

The discussions with the effluent guidelines development project teams resulted in a series of queries and assumptions being applied to the data based on industry knowledge designed to estimate the number of facilities in the affected universe. The queries and assumptions used are described below:

- Identify the treatment steps that could occur in a land-based unit and query the database for those facilities that use those treatment steps. *Assumption:* Aerated stabilization basins and wastewater stabilization ponds are the treatment steps likely to occur in a land-based unit.

- Query end-of-pipe data to identify the constituents present that are not priority pollutants, but are a UTS constituent. For each pollutant identified, calculate the end-of-pipe concentration (mg/l) and end-of-pipe flow rate. *Assumption:* All priority pollutants will be addressed in the upcoming rule on revised effluent guidelines limitations.

- Compare end-of-pipe concentration to UTS levels.

Using the data and assumptions mentioned above, EPA found that several facilities have non-priority pollutants at concentrations higher than the UTS levels. This analysis indicated that there are approximately 15 pharmaceutical facilities that use treatment types indicating the presence of land-based units. Of these, two pharmaceutical facilities (or approximately 13 percent of the facilities with land-based units) with a total wastewater volume of 10.8 million tons per year may be affected by the Phase III LDR rule.

Comments on the Proposed Phase III Rule. According to comments received on the Phase III proposed LDR rule, the pharmaceutical industry generates wastewaters with similar UHCs (e.g., organic solvents) from different manufacturing processes at the same facility. The industry believes that it is more appropriate to be able to aggregate these wastes streams and evaluate them for hazard characteristics and the applicability of LDRs at the point that the aggregated stream leaves the manufacturing process. Nevertheless, EPA has not addressed this issue in this rule.

Key Assumptions/Methodology

EPA believes that the analysis conducted using the questionnaire and sampling data may underestimate the actual number of pharmaceutical facilities that use land-based units. This is because one of the assumptions used in this analysis that aerated stabilization basins and wastewater stabilization ponds are the only treatment systems likely to occur in a land-based unit -- to identify facilities that use land-based units, would exclude facilities (e.g., zero dischargers) that may use land-based units for purposes other than treatment (e.g., evaporation).

EPA used the following assumptions and steps to estimate the number of facilities and wastewater volumes that may be affected by the Phase III LDRs:

- To estimate the number of facilities that may use land-based units, EPA assumes that the general type of units used in the pharmaceutical industry are similar to those in the organic chemicals manufacturing facilities (see Section 3.4.3). Using this assumption, EPA estimates that approximately 24 direct dischargers, 47 indirect dischargers, and 61 zero dischargers use land-based units.

- As indicated by the analysis conducted using the questionnaire and sampling data, 13 percent of the facilities with land-based units may be affected by the Phase III LDRs. Accordingly, EPA estimates that up to 17 facilities (or 13 percent of the 132 facilities using land-based units) will be affected by the Phase III LDR rule. EPA used the same percentage to estimate the direct, indirect, and zero dischargers that may be affected by the Phase III LDRs.

- Considering that the wastewaters generated at facilities without land-based units are similar to those generated at facilities with land-based units, EPA assumes that 13 percent of the pharmaceutical facilities have constituents above UTS levels.

- The limited analysis conducted on the questionnaire and sampling data indicated that up to two facilities with 10.8 million tons of wastewater may be affected by the Phase III LDRs. Considering the volume of wastewaters generated, EPA assumes that both these facilities are direct dischargers. While estimating the total volume of wastewaters at direct dischargers affected by the Phase III LDRs, EPA used this volume estimate for two facilities; and for the rest of the facilities, EPA used average wastewater flows to estimate the affected volumes of wastewater.

3.4.15 Pulp and Paper Industry

EPA agrees with commenters that regulation of the Phase III wastes generated by the pulp and paper industry should be deferred to the Pulp and Paper Cluster Rule that has been developed over the past five years. Therefore, EPA is not applying today's rule to the pulp and paper industry at this time.

3.4.16 Transportation Equipment Cleaning

The transportation equipment cleaning (TEC) industry is primarily a service industry consisting of companies that clean the interiors of material transport vehicles (i.e., tank trucks, rail tanks, and barges) for the transportation industry. The category also includes some aircraft industry operations, such as aircraft exterior washing, deicing and anti-icing, and pavement deicing and anti-icing (see the appendices to the capacity analyses for the electroplating/metal finishing and metal products/machinery industries for other aircraft-related processes that generate decharacterized ICRT wastes).

The facilities that conduct TEC operations do not necessarily share a single SIC code. This is primarily because many TEC operations use the SIC code of the primary industry they support. TEC facilities that clean truck, rail, and barge tanks may identify themselves in the SIC categories of:

- Transportation Equipment (3731, 3732, 3743, 3795, 3799);
- Railroad Transportation (SIC codes 4011 and 4013);
- Trucking and Warehousing (SIC codes 4212-4215, 4221, 4222, 4225, 4226, and 4231); or
- Water Transportation (SIC codes 4412, 4424, 4432, 4449, 4481, 4482, 4489, 4492, 4493, and 4499).

Exhibit 3-17 summarizes the major findings of this analysis.

<u>Key Data Sources</u>

Preliminary Data Summary for the Transportation Equipment Cleaning Industry (PDS).[79] The PDS provided the most detailed information on individual sites. EPA's Office of Water developed the PDS to obtain a basic level of familiarity with the practices of the TEC industry and to obtain an estimate of the pollutant loadings from those operations. The PDS effort was part of the effluent limitations development process. According to the PDS, there are 89 rail car cleaning facilities, 200 tank barge cleaning facilities, and at least 400 truck tank cleaning facilities. The PDS study identified 111 organic pollutants (including pesticides and herbicides) in wastewaters at TEC facilities. Of these, 50 are on EPA's Priority Pollutant List, 52 are RCRA hazardous constituents, 72 are CERCLA hazardous substances, and five are known or suspected human carcinogens. All 13 priority pollutant metals were found. The PDS reports that wastewaters from the TEC industry are a complex mixture of many

[79] U.S EPA, 1989, *Preliminary Data Summary for the Transportation Equipment Cleaning Industry*, Office of Water Regulations and Standards, EPA-440/1-89-104.

EXHIBIT 3-17

MAJOR FINDINGS FOR THE TRANSPORTATION EQUIPMENT CLEANING INDUSTRY

Discharge Mode	Number of Facilities	Total Wastewaters Mixed with ICRT Wastes (million tons/yr)[a]	Facilities Without RCRA-equivalent Treatment[a]	Facilities with Land-based Units[a]	Affected Facilities[a]	Affected Wastewater (Million tons/yr)[a]
Direct	722	5.5	566	61 - 170	61 - 170	0.48 - 1.3
Indirect	105	0.8	85	9 - 26	9 - 26	0.07 - 0.2
Zero	74	0.6	56	6 - 17	6 - 17	0.05 - 0.1
Total	**707[b]**	**6.9**	**707**	**76 - 213**	**76 - 213**	**0.6 - 1.6**

[a] The data in this column were determined on an aggregated basis and are apportioned to each type of discharge mode according to their proportions.

[b] Some facilities have more than one type of cleaning operation and/or discharge mode and therefore this total is less than the sum of the above numbers.

pollutants due to the high variability of the heels contained in the tanks. Eight facilities with TEC operations were sampled for the PDS. Many constituents were found to be above UTS. The PDS also estimates pollutant loadings in the wastewater from facilities in the tank truck, rail tank, tank barge, and aircraft exterior subsectors of the TEC industry. In these estimates, the quantities of wastewater discharged by different types of TEC facilities were assumed to vary from 5,000 to 18,000 gallons per day. It was also assumed that TEC facilities work typically for six days a week or 312 days per year.

Permit Compliance System. The Agency investigated the frequency of transportation facilities (by SIC code) that might be using land-based units. The SIC codes used for this category were : 37, 40, 42, 44, and 45. EPA estimated the number of facilities managing wastes in land-based units by examining the treatment train field within PCS. The PCS data indicates that 11 percent of the TEC facilities use land-based units.

U.S. EPA Tank and Container Interior Cleaning Screening Survey. This survey was completed in 1994. Data from this survey was used to refine the profiles of TEC industry as identified in the PDS. Screening survey data revealed that there are 707 TEC facilities, out of which EPA assumes 507 are rail car and tank car cleaning facilities. The screening survey indicates that 76 to 213 facilities use land-based units. The survey also indicated that 707 TEC facilities could be discharging up to 10.8 billion tons of wastewater per year (about 15 million tons per facility). This estimate of wastewater quantities appears to be inconsistent with the estimates using the annual number of cleanings (1.6 million) performed on different types of units reported in the same survey and data on quantities per cleaning obtained from industrial contacts (see below). The screening survey also is inconsistent with estimates obtained from the PDS.

Industrial Subtitle D Screening Survey. The analysis of these data revealed that there were approximately 8,085 generators of which 121 (1.5%) operate surface impoundments. Less than one percent (0.1%) of the transportation equipment facilities have land application units. EPA did not use these data, however, because the definition of TEC used in this survey was much broader than the definition used in the other data sources in this capacity analysis.

Industry Contacts. EPA contacted several facilities regarding the generation of ICRT wastes and the use of land-based units. The contacts indicated that wastewaters are usually discharged to POTWs after some amount of treatment on site. Untreated wastewater or treatment residuals are often shipped off site to commercial waste management facilities. The data provided by a facility that cleans tanks that contained propane gas and food grade products showed that slightly above 600 gallons of wastewater was generated from cleaning each tank car. Even after assuming that each tank uses 1,000 gallons of water, the annual generation of wastewater for cleaning 1.6 million units every year (707 facilities) is estimated to be 6.9 million tons per year (less than 10,000 tons per facility). The average consumption of water at TEC facilities is then estimated to be approximately 7,500 gallons per day (which falls within the range of wastewater quantities considered in PDS).

Key Assumptions

There are a variety of processes and sectors within the TEC industry. The high variability in these waste generation and management practices prevents the collection of comparable data. This limits EPA's ability to accurately and thoroughly assess the impact of this rule. Therefore, EPA has made assumptions in order to more accurately assess the impact of today's rule on this industry:

- Data sources did not indicate that air transportation cleaners generate ICRT wastes. Therefore, based on discussions with industry contacts, EPA has assumed that the air transportation cleaning sector of this industry does not generate ICRT wastes.

- The barge-cleaning facilities do not use land-based units in their treatment system. EPA has based this assumption on information gathered from industry contacts.

- Based on data obtained from the PDS, all tank truck cleaners are assumed to generate ICRT wastewaters. Industry contacts confirmed this assumption.

- Based on data obtained from the TEC screening survey, EPA estimated that 76 to 213 tank and rail car cleaners use land-based units.

- The average discharge of wastewater per facility is estimated to be 7,500 gallons per day based on PDS, TEC screening survey, and industry contacts. The annual quantity of wastewater generated by each facility is assumed to be 9,750 tons based on 312 days of operations per year.

- All facilities generate wastewaters with constituents above UTS, based on the PDS data. Also, no constituents are assumed to be regulated by CWA because the effluent guidelines have not yet been completed for this industry.

3.5 NEWLY IDENTIFIED TC PESTICIDE WASTES THAT WERE NOT PREVIOUSLY HAZARDOUS BY THE OLD EXTRACTION PROCEDURE

In response to the October 24, 1991 ANPRM and the Phase III proposed rule, EPA did not receive any estimates for additional D012-D017 waste quantities or newly identified D012-D017 wastes due to the use of TCLP rather than the EP. Because of the lack of comments to this issue, EPA continues to believe that the quantities of the newly-identified D012-D017 pesticide wastes due to the use of the TCLP rather than the EP are small, if any, and expects little or no additional demand for commercial treatment capacity as a result of the LDRs.

CHAPTER 4
CAPACITY ANALYSIS FOR NEWLY LISTED WASTES

This chapter presents EPA's analysis of required alternative commercial treatment capacity for several newly listed wastes that are currently being land disposed. This chapter specifically addresses carbamate production wastes (K156-161, P127-128, P185, P188-192, P194, P196-199, P201-205, U271, U277-280, U364-367, U372-373, U375-379, U381-387, U389-396, U400-404, U407, U409-411) and spent aluminum potliners (K088). The purpose of the capacity analysis is to estimate the quantity of these wastes requiring alternative commercial treatment capacity as a result of the LDRs and to determine whether adequate capacity exists to treat these wastes.

4.1 DATA SOURCES AND METHODOLOGY

EPA used several data sources to conduct the analysis of required capacity for these newly listed wastes including RCRA § 3007 Surveys of the carbamate production industry, a 1991 EPA study on spent aluminum potliners, the 1993 Biennial Report Survey, and comments received in response to the proposed Phase III LDR rulemaking. The data sources are described in more detail in the sections below.

EPA's assessment of required alternative commercial capacity was based on an analysis of the most current generation and management data for these wastes. To determine how each waste will be affected by the final rule, EPA first considered whether the waste is currently land-disposed. If a waste is not currently land-disposed, is land-disposed in a unit that has received a no-migration petition, or is managed in a RCRA-exempt unit, it is not subject to the LDRs. For the analysis of required capacity, EPA focused on the amount of waste that is currently managed in land-based units that will require alternative treatment as a results of the LDRs.

These land-disposed waste quantities were assigned to a treatment technology based on EPA's assessment of BDAT and the final LDR treatment standards set for these wastes. EPA compared the required capacity for a particular treatment process to the available commercial capacity to determine whether a capacity variance would be warranted.

4.2 CAPACITY ANALYSIS FOR CARBAMATE PRODUCTION WASTES

On February 9, 1995 (60 *FR* 7824), EPA listed as hazardous six wastes (K156-K161) generated during the production of carbamates and added 58 U and P wastes (K156-161, P127-128, P185, P188-192, P194, P196-199, P201-205, U271, U277-280, U364-367, U372-373, U375-379, U381-387, U389-396, U400-404, U407, U409-411) to the list of commercial chemical products which are hazardous when discarded. For the listing rule, EPA conducted a RCRA §3007 survey in 1990 to collect data on waste generation and waste management practices for this group of wastes. This survey indicated that a total of 440,000 tons of K156-K161 wastes are generated each year by 24 facilities.[80] In the final listing rule, EPA provided two exemptions from the definition of hazardous waste for carbamate production wastes: (1) a concentration-based exemption for K156 and K157 wastewaters, and (2) an exemption for biological treatment sludges generated from the treatment of K156 or K157, provided that they are not characteristically hazardous. The capacity analysis assumes that no wastes are exempt from the definition of hazardous waste. Therefore, the 440,000 tons is an upper bound estimate of waste generation.

EPA used information on waste generation and estimates of the percentage of each waste code that would be exhibit a characteristic of ignitability, corrosivity, reactivity, or organic toxicity (i.e., would also carry at least one of the characteristic waste codes D001-D003 or D018-D043) to calculate that 230,000 tons of carbamate wastes generated annually are characteristically hazardous. Because the treatment standards for carbamate wastes are concentrations based on the UTS, any carbamate wastes that meet the treatment standards for these characteristic wastes (which include treatment for underlying hazardous constituents) also meet the treatment standards for carbamate wastes and do not require additional treatment. Because the LDRs for characteristic wastes that are not managed in CWA units are already in effect (59 *FR* 47892) and any carbamate wastes mixed with characteristic wastes that are managed in CWA units are included in the capacity analysis in Chapter 3, EPA has determined that these characteristically hazardous carbamate wastes will not require additional treatment.

Of the remaining 210,000 tons of carbamate wastes generated annually that are not characteristically hazardous, some are currently managed as hazardous wastes <u>and</u> will not require additional treatment because they already meet the treatment standards established in today's rule. However, some of the carbamate wastes currently managed as hazardous waste will still require alternative treatment. For example, wastes disposed in Subtitle C landfills will need to undergo treatment prior to land disposal. Of the quantity of waste that will require alternative treatment either because the wastes currently are being managed as nonhazardous, or because they are managed as hazardous wastes but do not meet the treatment standards, some can be treated in existing on-site hazardous waste treatment systems that have excess capacity. In addition, approximately 1,800 tons per year of waste are currently recycled or recovered, and therefore not subject to the LDRs. Therefore, only 4,500 tons per year of carbamate wastes will require alternative off-site treatment capacity.[81] Exhibit 4-1 presents the quantity of carbamate wastes requiring alternative treatment capacity, by waste code.

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[80] Most of the data for individual facilities are confidential business information (CBI). A summary of these data can be found in the *Engineering Analysis of the Production of Carbamates*, December 1993, prepared by SAIC in the docket for the final carbamate listing.

[81] EPA presented these estimates in the proposed Phase III rule and did not receive any comments that they were incorrect.

EXHIBIT 4-1

CARBAMATE WASTES REQUIRING ALTERNATIVE TREATMENT CAPACITY

Waste Code	Quantity Requiring Alternative Treatment Capacity (tons/year)
K156	0
K157	0
K158	10
K159	0
K160	740
K161	3,700
Total	**4,500**

The treatment standards for K156-K161 wastes are concentrations and EPA believes that incineration and thermal destruction technologies can meet these standards. Therefore, 4,500 tons per year of carbamate wastes will require incineration or thermal destruction capacity. In addition, since K161 wastes may contain metal constituents, EPA has determined that stabilization may be required for some of these wastes. Therefore, EPA estimates that as much as 3,700 tons per year of K161 may require stabilization. As discussed in Chapter 2, EPA has determined that there are over 100,000 tons per year of available commercial incineration capacity and over one million tons per year of available stabilization capacity to meet these requirements.

As discussed above, in the listing rule EPA is adding 58 U and P wastes to the list of commercial chemical products which are hazardous when discarded. In general EPA believes that, due to their economic value, these chemicals are rarely discarded unless the products are significantly off-spec or contaminated. Thus, these wastes should not be generated on a continuous basis or in significant quantities. According to the RCRA §3007 Survey, there are approximately 13 tons of carbamate P wastes and 28 tons of carbamate U wastes generated annually. Although the survey was limited to carbamate manufacturers, and many potential generators of P and U wastes such as formulators and distributors of carbamate products were not included in the estimate the affected quantity, EPA did not receive any comments in response to the proposed rule indicating that this estimate was inaccurate.

The treatment standards for the U and P wastes are concentrations based on a variety of technologies. For nonwastewaters the standards are based on incineration, stabilization, and high temperature metals recovery. For wastewaters, the standards are based on biological treatment, carbon adsorption, and chemical precipitation. EPA believes that there is sufficient commercial treatment capacity to meet the requirements for any U and P carbamate wastes that require alternative treatment.

Because EPA estimates that there is adequate commercial treatment capacity to meet the treatment requirements for carbamate wastes, EPA has decided not to grant a national capacity variance for these wastes.

4.3 CAPACITY ANALYSIS FOR SPENT ALUMINUM POTLINERS

This section describes the capacity analysis for spent potliners (K088) generated from the primary reduction of aluminum as well as other forms of K088 wastes (e.g., remediation-derived wastes). This analysis estimates the quantity of K088 requiring alternative treatment and the available capacity of the related alternative treatment technologies.

4.3.1 Background

K088 was originally listed as a hazardous waste on July 16, 1980 (45 *FR* 47832), along with seven other waste streams generated from primary metal smelters. EPA suspended this listing on January 16, 1981, because the waste appeared to be within the scope of the Bevill exclusion. During 1984, several environmental organizations challenged EPA's failure to complete the required studies under Sections 8002(f) and (p) by the statutory deadline [Concerned Citizens of Adamstown v. EPA, Civ. No. 84-3041 (D.D.C.)]. As a result, the District Court ordered EPA to complete the studies and to take action on a planned proposed rulemaking reinterpreting the scope of the mining waste exclusion. Under court order, EPA proposed to narrow the scope of the exclusion by relisting five of seven metal smelting wastes, among other things (50 *FR* 40292).

On October 9, 1986, the Agency announced that it was withdrawing its proposed reinterpretation due to definitional problems EPA faced in determining how to group and classify the wastes (51 *FR* 36233). This withdrawal of the proposed reinterpretation continued the suspension of K088. However, through a second court action, the suspension of the K088 listing was removed (Environmental Defense Fund v. EPA, No. 88-1584 (D.C. Cir., July, 1988)). The final rule reflecting this court decision re-enacted the original listing and thus required the development of treatment standards for K088 (53 *FR* 35412, September 13, 1988).

4.3.2 Data Sources

EPA used many sources of information for the capacity analysis of K088 wastes to estimate the quantity of K088 requiring treatment, applicable treatment technologies, and their available capacities. These sources include comments received in response to the October 24, 1991 Advanced Notice of Proposed Rulemaking (ANPRM) for Newly Identified and Listed Wastes (53 *FR* 55160), a 1991 SAIC study of K088 generation by three aluminum producers, the Draft 1988 Report to Congress on Solid Waste from Selected Metallic Processing Operations, the 1993 Biennial Report Survey (BRS), and comments received in response to the proposed Phase III LDR rule.

4.3.3 Required Capacity

EPA defines spent potliners as the carbon portion of the materials contained inside the electrolytic reduction cell not including other material contained in the pot such as the collector bars, steel shell, or thermal insulation composed of insulating brick or alumina. EPA listed K088 because of its high concentrations of iron cyanide complexes and free cyanides, which are extremely toxic to both humans and aquatic life.

Waste characterization and generation data were collected for the 1991 SAIC study on spent potliner. The data in this report were provided by facility operators in response to a request for data on potliner generation. Data were collected for most, but not all 23 operating facilities. For facilities not included in the study, EPA contacted the facilities to obtain the information. The estimate of annual K088 generation that was presented in the proposed Phase III rule (approximately 118,000 tons) was based on the 1991 study updated with more recent estimates for nine facilities that provided information to EPA (Alcoa, Alumax-Mt. Holly, Reynolds and Northwest facilities).

However, several commenters to the proposed rule noted that the estimate presented in the proposed rule did not include a generation estimate for one facility, Alumax-Intalco[82] and did not include the Reynolds' facility in Troutdale, Oregon. EPA has updated its estimate to include these two facilities. Exhibit 4-2 summarizes the corrected K088 generation estimates. As shown, using these data the estimated quantity of routinely-generated K088 is approximately 125,500 tons per year, compared to approximately 118,000 tons estimated in the proposed rule.

One commenter to the proposed rule, Reynolds, noted that these generation estimates are based on the assumption that the facility is operating at maximum capacity and that actual K088 generation is lower than these estimates. Therefore, EPA extracted data from the BRS to estimate the actual quantity of K088 waste generated in 1993 (the most recent year for which EPA has national data on waste generation). As shown in

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[82] The table presented in the proposed rule stated that the generation was ">0" but did not provide a specific generation estimate.

EXHIBIT 4-2

ESTIMATED ANNUAL GENERATION OF SPENT POTLINERS (K088) BASED ON DATA PROVIDED BY ALUMINUM SMELTERS

Facility Owner	Location	Generation (tons/year)
Alcoa	Alcoa, TN	33,000 (aggregate)
Alcoa	Badin, NC	
Alcoa	Massena, NY	
Alcoa	Rockdale, TX	
Alcoa	Wenatchee, WA	
Alcoa	Warrick, IN	
Alumax	Mt. Holly, SC	2,000
Alumax (Eastalco)	Frederick, MD	4,400
Alumax (Intalco)	Ferndale, WA	4,300
Alcan	Henderson, KY	4,000
Columbia Falls	Columbia Falls, MT	7,200
Columbia Aluminum	Goldendale, WA	11,000
Kaiser	Mead, WA	3,200
Kaiser	Tacoma, WA	5,000
NSA	Hawesville, KY	3,300
Noranda	New Madrid, MO	8,400
Northwest	Dalles, OR	8,000
ORMET	Hannibal, OH	8,000
Ravenswood	Ravenswood, WV	4,200
Reynolds	Longview, WA	8,200
Reynolds	Massena, NY	4,500
Reynolds	Troutdale, OR	3,500
Vanalco	Vancouver, WA	3,525
Total		**125,500**

Exhibit 4-3, 1993 generation of K088 was approximately 101,000 tons.[83] Of the waste reported in the 1993 BRS, approximately 5,200 tons are assumed to be wastewaters[84], and the remaining 95,800 tons are assumed to be nonwastewaters.

Since annual K088 generation fluctuates from year to year based on market conditions, EPA estimates that annual generation of K088 wastes could be between 100,000 and 125,000 tons.

Several commenters to the proposed rule stated that Canadian generation of K088 should be included in the capacity analysis. Because the LDRs do not apply to waste generated outside the United States, EPA has not included Canadian generation in the estimate of the quantity of waste requiring alternative treatment capacity as a result of the LDRs. However, as discussed in Section 4.3.4 below, EPA has adjusted the quantity of available treatment capacity to reflect Canadian waste that it assumes will be treated in the U.S.

Although some K088 may be stockpiled on site, EPA does not believe that it will require additional treatment capacity. The Phase I LDR rule included a provision allowing for the storage of wastes in containment buildings meeting certain criteria, which EPA anticipated would be used by some aluminum producers to temporarily store spent potliners.[85] Nonetheless, EPA believes that facilities storing K088 wastes will dispose of them prior to the effective date of the LDRs for these wastes for economic reasons. Because wastes disposed prior to the effective date of the rule are not subject to the LDRs, these stockpiles are not likely to add to the demand for future treatment capacity.

Facilities also may generate K088 wastes as the result of remedial actions. In the proposed Phase III rule, EPA stated that it did not have data indicating that K088-contaminated soil and debris were being generated in significant quantities. EPA did not receive any data contradicting these assumptions. However, one commenter to the proposed Phase III rule (Southwire) did state that it is currently implementing a groundwater remediation project at one of their facilities and is generating both K088-contaminated groundwater and sludge from the treatment of this groundwater. However, the commenter did not provide estimates of the quantities being generated or whether this action will be completed prior to the effective date of this rule.

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[83] The data presented include all primary K088 wastes, i.e., wastes that are generated from a manufacturing or clean-up process, but does not include K088 wastes derived from treatment of a hazardous waste. See Appendix D for a more detailed discussion of the data extracted from the 1993 Biennial Report Survey.

[84] The BRS does not indicate whether a waste is a wastewater or nonwastewater. Therefore, EPA is assuming that any wastes with the form "organic liquids" or "inorganic liquids" are wastewaters.

[85] As outlined in 40 CFR 264.100 and 265.100, containment buildings are not subject to the RCRA 3004(k) definition of land disposal if they meet certain requirements.

EXHIBIT 4-3

1993 GENERATION OF SPENT POTLINERS (K088) BASED ON DATA FROM THE BIENNIAL REPORT

Facility Owner	Location	Generation (tons/year)
Alcoa	Alcoa, TN	3,700
Alcoa	Badin, NC	3,200
Alcoa	Massena, NY	4,200
Alcoa	Rockdale, TX	11,300
Alcoa	Wenatchee, WA	4,400
Alcoa	Warrick, IN	5,300
Alumax	Mt. Holly, SC	1,400
Alumax (Eastalco)	Frederick, MD	3,600
Alumax (Intalco)	Ferndale, WA	800
Alcan	Henderson, KY	3,100
Columbia Falls	Columbia Falls, MT	2,800
Columbia Aluminum	Goldendale, WA	7,700
Kaiser	Mead, WA	3,400
Kaiser	Tacoma, WA	3,900
NSA	Hawesville, KY	3,200
Noranda	New Madrid, MO	6,800
Northwest	Dalles, OR	5,800
ORMET	Hannibal, OH	6,100
Ravenswood	Ravenswood, WV	4,600
Reynolds	Longview, WA	7,800
Reynolds	Massena, NY	4,600
Vanalco	Vancouver, WA	3,000
Other Facilities		500
Total*		**101,000**

* Total may not sum due to rounding.

4.3.4 Available Capacity

Nonwastewaters are assumed to require thermal treatment to meet the LDRs. Reynolds Metal Company operates a thermal treatment unit that is capable of meeting the treatment standards for K088. According to Reynolds' description of this process, K088 is blended with limestone and brown sand and then thermally treated in a rotary kiln. Cyanides are destroyed by the oxidation at the elevated temperatures and the soluble fluoride salts react with the limestone to form calcium fluoride. Since this treatment unit is permitted to receive only K088 wastes, the facility is dedicated solely to the treatment of K088. Reynolds received delisting for the residuals from treatment in this unit on December 30, 1991 (56 *FR* 67197). The delisting for treatment residues from this process effectively limits the K088 content of the treated waste. Therefore, although the total operating throughput for this facility is 300,000 tons per year, Reynolds estimates that it can accept approximately 121,500 tons of K088 per year.[86]

In a comment submitted in response to the Phase III LDR proposal, Reynolds stated that it would make decisions regarding whether to treat K088 wastes generated in Canada at its Gum Springs facility based on the prevailing business climate and available treatment capacity, and that it was committed to providing and maintaining sufficient capacity to meet the needs of its U.S. customers.[87] In light of this comment, EPA assumes that the Gum Springs facility will not treat K088 waste generated by other companies in Canada if there are U.S. companies that require treatment capacity. However, EPA believes that for economic reasons Reynolds will treat the K088 generated by its own Canadian plant at the Gum Springs facility. Therefore, EPA expects that 10,500 tons of capacity will be required for Reynolds' Canadian-generated K088 wastes, leaving 111,000 tons of available capacity for treatment of U.S.-generated K088 wastes.

EPA also believes that combustion will meet the treatment standards for K088. Data supplied to EPA by incinerators indicates that several incinerators currently will accept K088 wastes. EPA estimates that there is approximately 20,000 tons per year of excess bulk solids capacity at these incineration facilities. However, incinerators may be unable to accept large volumes of K088 at one time or accept the waste without significant pre-processing.[88]

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[86] This information was provided by Reynolds in a comment to the Phase III proposed rule. The estimate accounts for all limits imposed by Reynolds' delisting and operating permits and assumes 15% downtime.

[87] Reynolds Metals Company comment dated July 12, 1995, number PH3P-L0015, page 2.

[88] Phone logs presented in Appendix D provide information on the ability of incinerators to accept K088 wastes. All incinerators and cement kilns that indicated that they were permitted to accept K088 wastes <u>and</u> had available combustion capacity were contacted by the Agency.

4.3.5 Capacity Variance Determination

K088 wastewaters are assumed to require a combination of alkaline chlorination, chemical precipitation, and biological treatment. Using data from the 1993 BRS, EPA estimates that approximately 5,200 tons of K088 wastewaters requiring alternative treatment capacity will be generated routinely per year. EPA has determined that there is sufficient available capacity for all of these technologies to treat the quantity of routinely-generated wastewaters reported in the 1993 BRS.[89]

EPA believes that K088-contaminated media can be treated using thermal destruction and that adequate capacity exists to treat routinely-generated K088-contaminated media. However, if a significant quantity of K088-contaminated media and/or treatment residuals are generated during a RCRA or CERCLA cleanup that is subject to the LDRs[90], there may not be adequate treatment capacity for such waste and the site generating the waste may need to apply for a site-specific capacity variance.[91]

According to EPA's analysis, 95,900 to 125,500 tons per year of K088 nonwastewaters may require alternative treatment capacity under today's final rule. EPA has determined that approximately 111,000 per year tons of capacity is available at Reynolds' treatment facility. In addition, EPA estimates that there may be some available capacity at combustion facilities for these wastes.

Given the estimated range for K088 nonwastewater generation, the difference between available and required capacity for K088 nonwastewaters may be very small. Since K088 wastes are generated sporadically, if a large quantity of waste is generated over a short period of time, facilities may not be able to find sufficient available capacity. In addition, EPA believes that facilities may need time to identify and secure adequate treatment capacity for their wastes. In particular, facilities may have to undergo some preverification arrangements and a qualification procedure, prior to sending their wastes to treatment facilities, which might take several months. Other logistical delays that facilities could encounter include setting up appropriate infrastructure to store wastes

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[89] EPA did receive one comment from National Southwire Aluminum indicating that there could be a capacity shortage for wastewaters. However, the commenter was not referring to capacity for routinely generated wastewaters, but rather capacity for the large volume of contaminated groundwater (and the resulting wastewater treatment sludge) it expects to generate as a result of remediation efforts.

[90] The LDRs do not apply to remediation wastes if they are treated in situ or within a corrective action management unit (CAMU).

[91] If a waste stream cannot be treated to meet the promulgated standards, the facility may apply for a treatability variance.

prior to shipment[92], negotiating contracts for both shipment and treatment of wastes, and adjusting treatment and pre-treatment processes to new waste matrices. For these reasons, EPA has decided to grant a nine-month variance to K088 wastes.

In the proposed Phase III LDR rule, EPA proposed a three-month variance for all wastes including K088 wastes. However, given the potential logistical problems that may be encountered, EPA believes that a three-month variance will not be sufficient for these wastes. EPA believes that nine months will allow facilities adequate time to qualify for the Reynolds treatment process and resolve any logistical problems.

Another reason EPA is choosing a nine-month rather than a three-month (or even a six-month) variance is based on past experience when there appeared to be just enough treatment capacity available. In 1988, when EPA promulgated treatment standards for K061 wastes, the Agency faced a potentially similar situation where there was just enough treatment capacity (on paper) to cover the volume of waste generated. The Agency promulgated an immediately effective prohibition, based in part on assurances from the waste treatment industry that adequate capacity was immediately available. However, in practice it took nearly nine months for the situation to sort itself out completely -- for generators to be able to contact treatment facilities and have their wastes treated. It turned out that treatment processes treating unfamiliar matrices, combined with the logistics of dealing with a new set of generators for the first time, meant that seemingly available capacity was practically unavailable in the months following issuance of the rule. After this experience, the Agency is cautious in assessing the claims of immediately available treatment capacity for a large volume of wastes that do not have a long-standing history of waste treatment. In addition, given the limited number of treatment facilities for K088 wastes, any facility shut-downs or delays can significantly affect the available treatment capacity nation-wide. Therefore, EPA believes that it is prudent to allocate a few additional months to ensure that treatment capacity is in fact available.

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[92] Due to the imposition of LDRs for these wastes, facilities that currently store K088 in waste piles (which are considered land disposal units) may have to convert these piles into containment buildings (which are not considered land disposal units, if properly constructed and maintained). Such a conversion could require a Class 2 permit modification and take several months to complete.

CHAPTER 5
CAPACITY ANALYSIS FOR SURFACE DISPOSED MIXED RADIOACTIVE WASTE

This chapter presents EPA's estimates of the quantities of mixed RCRA/ radioactive wastes (mixed wastes) contaminated with newly listed and identified wastes that will require alternative commercial treatment as a result of the Phase III LDRs. The chapter also discusses the available alternative treatment capacity for mixed wastes. The chapter is organized into five sections: Section 5.1 provides background on EPA's findings for previous analyses of required capacity for mixed wastes; Section 5.2 examines the data sources used to conduct the analysis of required capacity for Phase III mixed wastes; Section 5.3 presents the results of EPA's review of the available data sources on DOE and non-DOE mixed waste generation; Section 5.4 discusses the alternative treatment capacity that will be available to treat mixed wastes; and Section 5.5 discusses the national capacity variance for mixed wastes.

5.1 BACKGROUND

EPA has defined a mixed 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 mixed wastes contain or the radiological classification of the wastes (i.e., high-level, low-level, or transuranic), these wastes are currently subject to RCRA hazardous waste regulations. In general, the treatment standards for mixed waste are the same treatment standards in effect for non-radioactive RCRA hazardous waste.

Mixed wastes that contain spent solvents, dioxins, or California list wastes, First Third, Second Third, or Third Third scheduled wastes, Phase I, or Phase II scheduled wastes, are subject to the land disposal restrictions already promulgated for those hazardous wastes. In the Third Third rulemaking, EPA granted a two-year national capacity variance for mixed waste contaminated with First Third, Second Third, and Third Third waste because of a lack of available alternative treatment capacity. This variance expired on May 8, 1992. In addition, EPA granted a generic, one-year extension of the LDR effective date applicable to all facilities managing hazardous debris (with several exceptions), including mixed waste classified as debris. This extension was renewed for one additional year and expired on May 8, 1994.

In the Phase I rulemaking (57 *FR* 37194, August 18, 1992), EPA granted a two-year national capacity variance for mixed waste contaminated with Phase I waste because of insufficient alternative treatment capacity. The wastes regulated under the Phase I LDRs include F037, F038, K107-K112, K117, K118, K123-K126, K131, K132, K136, U328, U353, and U359. This variance expired on June 30, 1994. In the Phase II rulemaking (59 *FR* 47982, September 19, 1994), EPA granted a two-year national capacity variance for mixed waste contaminated with Phase II waste because of insufficient alternative treatment capacity. The wastes regulated under the Phase II LDRs include D018-D043, D012-D017, K141-K145, and K147-K151.

The Department of Energy (DOE) submitted a case-by-case (CBC) extension application for certain Third Third mixed waste generated and stored at 31 of its sites. DOE requested a one-year extension of the Third Third capacity variance for the mixed waste addressed in the application. EPA reviewed DOE's application and issued a proposed finding that DOE had made all but one of the demonstrations required by 40 CFR 268.5 for a case-by-case extension (57 *FR* 22024, May 6, 1992). The remaining demonstration would have required DOE to enter into a binding contractual commitment to construct or otherwise provide alternative treatment, recovery, or disposal capacity for the wastes included in the application. As a result of the passage of the Federal Facilities Compliance Act and the belief expressed by Congress that DOE no longer needs a CBC extension, EPA suspended further processing of the CBC.

The Federal Facilities Compliance Act (FFCA) was enacted into law (Public Law 102-386) on October 6, 1992. FFCA amends the Solid Waste Disposal Act (1965) which was itself previously amended by the Resource Conservation and Recovery Act (RCRA, 1976) and the Hazardous and Solid Waste Amendments (HSWA, 1984). Section 102 of the FFCA waives sovereign immunity for executive branch departments and agencies, and allows states to impose fines and penalties against federal facilities for violations of RCRA. However, the FFCA delays the effective date of the waiver for mixed waste storage violations for three years to allow DOE time to prepare plans for the development of treatment capacities and technologies for facilities at which DOE generates or stores mixed waste. Consequently, the FFCA delayed the effective date of the LDRs until October, 1995 for surface disposed mixed waste.

5.2 DATA SOURCES

Section 5.2.1 discusses the non-DOE mixed waste data sources and Section 5.2.2 discusses the data sources for DOE mixed wastes.

5.2.1 Non-DOE Mixed Waste Data Sources

For previous LDR rulemakings, EPA has received comments and data concerning the generation and treatment of mixed waste. Based on these comments, EPA believes that DOE facilities generate the vast majority of mixed waste. According to the Background Document for the Third Third LDRs, non-DOE mixed waste is believed to account for less than one percent of all mixed waste generated nationwide.[93]

In the process of conducting the analysis of required capacity that appears in Section 5.3, EPA evaluated available data on the generation and treatment of non-DOE mixed waste contaminated with Phase III wastes. The amount of comprehensive

[93] EPA, *Background Document for Third Third Wastes to Support 40 CFR Part 268 Land Disposal Restrictions, Final Rule, Third Third Waste Volumes, Characteristics, and Required and Available Treatment Capacity, Volume III, Appendix B*, May 1990.

information available to EPA on these wastes is limited. EPA and the Nuclear Regulatory Commission (NRC), however, published the results of a survey designed to "collect information to develop a national profile on the volumes, characteristics, and treatability of commercially generated mixed waste." The published results of the survey are known as the "National Profile on Commercially Generated Low-Level Radioactive Mixed Waste" (National Profile). The National Profile contains information on low-level mixed waste generated by commercial (non-DOE) facilities in 1990 and in storage at these facilities at the end of 1990. Data from the National Profile are discussed further in Section 5.3.

5.2.2 DOE Mixed Waste Data Sources

In response to the ANPRM, DOE submitted comments that contained information on mixed waste streams that would be affected by the rule. In developing its comments, DOE focused largely on collecting data on the characterization, treatment, and inventories of previously or newly regulated TC organics. DOE submitted information on TC organic waste streams in a series of tables that summarized the results of a "data call" issued by DOE to its Field Organizations in September 1991. As part of the data call, all DOE Field Organizations were sent copies of their current mixed waste profile reports contained in the DOE Waste Management Information System (WMIS). DOE sites were asked to update their waste profile reports to identify those mixed wastes that were also TC organics and to prepare new waste profile reports for newly regulated TC organic waste streams.[94]

DOE indicated in its comments on the ANPRM that none of the nine high-level waste streams included in the CBC contain TC organic wastes. DOE also indicated that the low-level TC organic waste streams that were listed and identified in its ANPRM comments, but were not identified in the CBC, were omitted from the CBC because they were identified after the internal deadline for submitting data for the CBC had passed.[95]

DOE requested information from 37 of its Field Organizations as part of its data call and received responses from 20 sites by the deadline for submitting data. Therefore, the information gathered from the data call is incomplete. In addition, DOE indicated that most of the field sites that responded to the data call did not provide information on their TC organic transuranic waste streams (TRU), and that TRU TC organic waste stream data were often omitted because many field sites did not consider TRU waste streams relevant to the data call.

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[94] DOE, *Enclosure 2, Tables Describing TC Organic Waste Streams at DOE Field Sites*, December 9, 1991.

[95] *Ibid.*

Section 105 (a) of FFCA required DOE to prepare a mixed waste inventory report within 180 days of the enactment of FFCA (i.e., by April, 1993). This Interim Mixed Waste Inventory Report was prepared on time, and included a national inventory of all mixed wastes that are currently stored or will be generated over the next five years, and a national inventory of mixed waste treatment capacities and technologies. A final report has not been issued; however, the Final Mixed Waste Inventory Report (MWIR) Data Base was made public in May, 1994. This data base provides waste-stream specific information for each DOE site. Because the data in the MWIR Data Base are more recent and more comprehensive than those provided in DOE's comment to the ANPRM and the CBC, EPA has relied on these data in conducting the capacity analysis for mixed wastes, as discussed below.

5.3 RESULTS

This section presents the results of EPA's review of available data on DOE and non-DOE mixed waste streams contaminated with newly identified hazardous wastes being restricted in today's rulemaking. Section 5.3.1 discusses non-DOE generation and storage of mixed low-level waste and Section 5.3.2 addresses the quantity of DOE mixed waste generated annually and in storage.

5.3.1 Non-DOE Generation and Storage of Mixed Low-level Waste

Information collected on individual hazardous constituents present in the mixed waste streams identified in the National Profile was generally incomplete. As a result, estimating the quantities of non-DOE low-level mixed waste that contain Phase III wastes is not possible and is not specifically addressed in this subsection. However, the results from the National Profile do provide the most recent overall picture of non-DOE low-level mixed waste generation.

Results from the National Profile presented in Exhibits 5-1 and 5-2 include estimates of the types and quantities of non-DOE low-level mixed wastes that were generated in 1990, as well as the total quantities of non-DOE low-level mixed wastes in storage at the end of 1990. The National Profile identifies five non-DOE sectors that are sources of mixed waste: academic, government, industrial, medical, and nuclear power plants. The quantities of mixed waste generated by each of these sectors in 1990 and the quantities of mixed waste stored by each of these sectors at the end of 1990 are listed and identified below in Exhibit 5-1. The National Profile's estimate of annual non-DOE low-level mixed waste generation is greater than the estimate developed in the Third Third capacity analysis. EPA believes, however, that the newer data are more complete and therefore more reliable.

Based on the results from the National Profile, the types of low-level mixed wastes that are generated by non-DOE facilities are presented in Exhibit 5-2. This exhibit lists the estimated quantities of each of these waste categories that were generated by non-

EXHIBIT 5-1

SOURCES OF NON-DOE MIXED WASTE GENERATED OR IN STORAGE IN 1990

Sector	1990 Generation (m^3/yr)	Amount Stored as of 12/31/90 (m^3)
Academic	820	150
Government	750	80
Industrial	1,400	1,200
Medical	560	60
Nuclear Power Plants	390	620
Total	**3,900**	**2,100**

Source: Oak Ridge National Laboratory, *National Profile on Commercially Generated Low-Level Radioactive Mixed Waste*, NUREG/CR-5938, ORNL-6731, December 1992.

DOE facilities in 1990 and that were in storage at non-DOE facilities at the end of 1990. The totals given in Exhibit 5-2 account for all non-DOE generated low-level mixed waste, including those for which land disposal restrictions are already in place. The asterisks in Exhibit 5-2 identify non-DOE mixed waste streams that may contain Phase III wastes. EPA, however, expects that only a small fraction of non-DOE mixed waste will become subject to the LDRs being promulgated under the Phase III rule.

5.3.2 DOE-Generated Mixed Waste

This section summarizes and evaluates DOE data on the quantities of newly identified TC organic DOE mixed waste generated annually and in storage. As shown in Exhibit 5-3, EPA estimates that 820 tons of high-level waste and 360 tons of mixed low-level waste that will be generated annually by DOE may be affected by this rule. In addition, there are currently 7,000 tons of high-level waste, 10 tons of mixed transuranic waste, and 2,700 tons of mixed low-level waste in storage that may be affected by this rule.

EXHIBIT 5-2

TYPES OF NON-DOE MIXED WASTE GENERATED OR IN STORAGE IN 1990

Waste Type	1990 Generation (m^3)	Amount Stored as of 12/31/90 (m^3)
Organics		
Liquid Scintillation Fluids (LSFs)*	2,800	360
Waste Oil*	150	180
Chlorinated Organics*	70	30
Fluorinated Organics	0	4
Chlorinated Fluorocarbons (CFCs)	110	260
Other Organics	280	120
Corrosive Liquids	80	10
Lead Wastes	80	140
Mercury Wastes	10	80
Chromium Wastes	30	50
Cadmium Wastes	<1	750
Other Hazardous Materials	300	140
Total	**3,900**	**2,100**

Source: Oak Ridge National Laboratory, *National Profile on Commercially Generated Low-Level Radioactive Mixed Waste*, NUREG/CR-5938, ORNL-6731, December 1992.

* May contain newly identified TC organic waste.

5.4 AVAILABLE CAPACITY FOR MIXED WASTE

5.4.1 Existing and Planned Non-DOE Capacity

Currently, only five commercial facilities nationwide hold or are in the process of obtaining RCRA permits to treat mixed RCRA/radioactive waste, including waste scintillation fluids. Two facilities, one each in Florida and Texas, currently hold RCRA Part B Permits for the storage and processing of mixed waste. A third facility, located in Tennessee, holds a Part B Permit for the storage of mixed waste and is operating a waste fuel boiler under RCRA interim status. A fourth facility, located in Colorado, stores and

EXHIBIT 5-3

TYPES OF DOE TC ORGANIC MIXED RADIOACTIVE WASTE GENERATED OR IN STORAGE

Waste Type	Current Inventory (m^3)			Annual Generation Rate (m^3/yr)		
	HLW	MTRU	MLLW	HLW	MTRU	MLLW
Aqueous Liquids/Slurries	7,000	0	200	820	0	170
Organic Liquids	0	2	1,300	0	0	130
Solid Process Residues	3,700	4,500	1,600	470	0	80
Soils	0	0	20	0	0	10
Debris	0	18,000	14,000	0	380	650
Lab Packs	0	0	80	0	1	20
Compressed Gases	0	0	2	0	0	0
Other	0	200	240	0	0	8
Total*	**10,700**	**23,000**	**17,000**	**1,300**	**380**	**1,100**

Source: Final Mixed Waste Inventory Report Data Base, May 1994.
* Total may not sum due to rounding.

processes mixed wastes under interim status, and has submitted an application for a Part B Permit. A second facility in Tennessee currently treats low-level radioactive waste and has submitted an application for a Part B Permit in order to process mixed RCRA/radioactive waste. Only one facility, located in Utah, is permitted to land dispose mixed RCRA/radioactive wastes. The types of waste disposed at this facility are constrained by the facility's RCRA permit and NRC license. Other than these facilities, EPA is aware of no other non-DOE facilities that are permitted to treat, store, or dispose of mixed RCRA/radioactive wastes.

According to the National Profile, a total of 41,000 m^3/yr of capacity is available for treatment of commercially-generated low-level mixed wastes at the four facilities currently accepting these wastes. This treatment capacity is spread over various technologies, including bulking/vial shredding followed by storage (for liquid scintillation fluids, LSFs); incineration; stabilization; chemical oxidation and reduction; neutralization; cleaning, decontamination, and macroencapsulation (for lead materials); and solidification. Approximately 33,000 m^3/yr of this treatment capacity is available for the bulking and storage of liquid mixed wastes, mainly LSFs, for radioactive decay prior to incineration. However, EPA does not consider storage for radioactive decay in determining available treatment capacity, and therefore these facilities do not provide any treatment capacity for incinerable mixed wastes. The remaining 8,000 m^3/yr of capacity appears sufficient to manage the more than 6,000 m^3 of non-DOE mixed waste that required treatment in 1990 (the annual generation + amount in storage), but no capacity currently exists for 300 m^3 of the total amount.[96]

5.4.2 Existing and Planned DOE Capacity

As part of its CBC extension application, DOE performed a comprehensive search for commercial facilities capable of treating mixed RCRA/radioactive waste. DOE concluded that only very limited commercial treatment capacity exists nationwide to treat its mixed RCRA/radioactive waste. The existing capacity that was identified was limited to the treatment of liquid scintillation fluids.

As part of its comments on the ANPRM, DOE submitted a series of appendices from its CBC application that provide information on 45 mixed RCRA/radioactive waste treatment facilities at 13 DOE sites. Subsequently, DOE modified its CBC application by withdrawing certain treatment facilities and adding another, reducing the total number of mixed waste treatment facilities to 36 (57 *FR* 22024, May 26, 1992). EPA evaluated this information in order to determine the amount of available mixed waste treatment capacity at DOE facilities.

In addition, as part of the data call described earlier, DOE requested its field sites to indicate whether their treatment units were capable of accepting mixed RCRA/radioactive wastes contaminated with newly identified TC organic wastes. Not all of the DOE field sites responded by the internal deadline; DOE received responses concerning only 15 of the 45 existing or planned mixed RCRA/radioactive waste treatment units originally included in the CBC. All 15 of these units, however, were unable to accept mixed RCRA/radioactive wastes contaminated with newly identified TC organic wastes. The units are either not technically capable of accepting TC organics, or are not allowed to do so by their permit or permit application. Some units face both of these difficulties.

EPA's review of the IMWIR indicates that 4,000 m^3 of treatment capacity are available annually for HLW at three DOE treatment systems. The available capacity appears sufficient to treat the estimated average annual generation. However, the IMWIR indicates that the current national inventory of HLW is greater than 280,000 m^3. This quantity dwarfs DOE's annual available treatment capacity for HLW. Consequently, DOE faces a treatment capacity shortfall for high-level mixed radioactive wastes.

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[96] This 300 tons includes CFCs and lead shielding for which there is not adequate treatment capacity.

DOE is developing the Waste Isolation Pilot Project (WIPP) in New Mexico as a permanent repository for DOE TRU wastes, including MTRU wastes. However, EPA has not yet authorized DOE to begin the placement of TRU wastes in the WIPP. In addition, wastes received at the WIPP must meet DOE's WIPP Waste Acceptance Criteria (WIPP-WAC). DOE is still in the planning stages for facilities designed to prepare MTRU wastes for shipment to the WIPP. As a result, DOE faces a capacity shortfall for treatment of MTRU wastes.

EPA's review of the IMWIR indicates that 300 m^3/yr of currently available capacity exists at four DOE treatment systems for the treatment of alpha MLLW. (MLLW may be categorized as either alpha or non-alpha depending on the transuranic alpha content). However, the available capacity is greatly exceeded by the estimated quantity of alpha MLLW requiring treatment annually over the next five years, 3,700 m^3. Consequently, DOE faces a treatment capacity shortfall for non-soil, non-debris alpha MLLW.

According to IMWIR, 1,000,000 m^3/yr of treatment capacity among 26 systems are currently available to treat non-alpha (i.e., less than 10 nCi/g transuranic alpha content) MLLW. However, IMWIR states that most of DOE's currently available treatment capacity for MLLW is represented by facilities limited to the treatment of wastewaters (defined by DOE as less than 1 percent total suspended solids (TSS)). While these treatment facilities provide excess capacity for MLLW wastewaters, they cannot process wastes with high TSS and are not readily adaptable for other waste forms. Thus, although the quantity of MLLW treatment capacity is greater than the total quantity of mixed wastes, DOE faces a treatment capacity shortfall for nonwastewater MLLW, and thus non-alpha MLLW.

The IMWIR indicates that no available treatment capacity exists at DOE facilities for mixed radioactive soils. In addition, EPA's review of IMWIR data indicates that 16 m^3/yr of currently available capacity exists at one DOE facility for the treatment of high-level mixed radioactive debris, an amount that exceeds the estimated annual generation. As noted above, EPA has not authorized DOE to begin placement of MTRU wastes into the WIPP. As a result, DOE faces a treatment capacity shortfall for mixed transuranic debris. Finally, review of IMWIR reveals that less than 2 m^3/yr of treatment capacity is available that can accept mixed low-level debris. Thus, DOE faces a treatment capacity shortfall for both alpha and non-alpha mixed low-level debris.

While DOE has provided its best available data on mixed waste generation, uncertainty remains about mixed waste generation at DOE (and non-DOE) facilities. For example, as discussed above, the MWIR data generally did not include DOE environmental restoration wastes which, when generated, will increase the quantity of newly identified mixed wastes that require treatment. The IMWIR estimates that DOE will generate 600,000 m^3 of mixed environmental restoration wastes (primarily MLLW) over the period from 1993 to 1997. Although the IMWIR notes that the estimates of

DOE environmental restoration wastes are preliminary, any quantity of this magnitude will place additional strains on DOE's limited available mixed waste treatment capacity. In addition, although uncertainty exists as the total quantities of TC organic mixed wastes generated at DOE and non-DOE facilities that are affected by today's rule, EPA believes that insufficient treatment capacity exists for these wastes at both DOE and commercial sites.

5.5 NATIONAL CAPACITY VARIANCE FOR MIXED RCRA/RADIOACTIVE WASTES

Based on the analysis presented above, EPA believes that DOE generates a large majority of mixed RCRA/radioactive wastes affected by this rulemaking and previous LDR rulemakings, and that major treatment capacity shortfalls currently exist for previously regulated mixed RCRA/radioactive wastes generated at both DOE and non-DOE facilities. As a result, EPA has determined that there is currently no BDAT or equivalent available treatment capacity for any newly listed mixed RCRA/radioactive wastes at DOE or non-DOE facilities. Because a treatment capacity shortfall was identified for every mixed RCRA/radioactive waste treatability group, EPA is today granting a two-year national capacity variance for all mixed RCRA/radioactive wastes contaminated with newly listed and identified wastes for which treatment standards are included in this rulemaking, including mixed radioactive soil and debris.

CHAPTER 6
CAPACITY ANALYSIS FOR NON-SULFIDE AND NON-CYANIDE REACTIVE (D003) WASTES NOT MANAGED IN CWA OR CWA-EQUIVALENT SYSTEMS

This chapter discusses the capacity analysis conducted for non-sulfide and non-cyanide reactive (D003) wastes that are not managed in Clean Water Act (CWA) or CWA-equivalent (e.g., Safe Drinking Water Act (SDWA)) systems. (D003 wastes that are managed in CWA and equivalent systems are addressed in Chapter 3.) Section 6.1 provides background information on the regulatory history of these wastes. Section 6.2 describes both the data sources and the methodology used in the capacity analysis. Section 6.3 presents the results of the capacity analysis for D003 wastes and Section 6.4 addresses the variance determination for D003 wastes.

6.1 BACKGROUND

In the Third Third rule (55 *FR* 22520, June 1, 1990), EPA set treatment standards for wastes exhibiting the characteristic of ignitability (D001), corrosivity (D002), reactivity (D003), and metal and pesticide toxicity (D004-11 wastes exhibit the toxicity characteristic for metals and D012-17 exhibit the toxicity characteristic for pesticides). In the Interim Final Land Disposal Restrictions Rule for Ignitable and Corrosive Characteristic Wastes Whose Treatment Standards Were Vacated (58 *FR* 29860, May 24, 1993), or the "Emergency" rule, EPA set new treatment standards for those ignitable wastes in the low-TOC ignitable liquids category and those corrosive wastes that are not managed in CWA or equivalent systems.

EPA is now amending the treatment standards for reactive (D003) wastes other than reactive sulfide and cyanide wastes to address both the property of reactivity and the universal treatment standards (UTS) (and thus the threat posed by disposal of underlying hazardous constituents (UHCs) in these wastes). The Agency is taking this action even though the CWM vs. EPA court decision did not find that reactive wastes contained sufficient concentrations of hazardous constituents to require any treatment beyond that which removed the characteristic of reactivity.[97] The Agency believes that reactive wastes are as likely to contain UHCs at levels that may pose a threat as are ignitable and corrosive wastes, and consequently, is regulating these reactive wastes (i.e., non-sulfide and non-cyanide) in the final Phase III LDR rule.

6.2 DATA SOURCES AND METHODOLOGY

EPA's assessment of required alternative commercial capacity was based on an analysis of the most current generation and management of these wastes. To determine how each individual waste stream will be affected by this rule, EPA considered determining whether a waste stream is currently land-disposed. If a waste is not

[97] As discussed in more detail in Chapter 3, the standards established in the Third Third rule were vacated by the 1992 CWM vs. EPA court decision (also known as the Third Third Court Decision).

currently land-disposed or is land-disposed in a unit that has received a no-migration petition, or is managed in a RCRA-exempt unit, it would not be subject to the LDRs. For this capacity analysis, however, EPA assumed that all nonwastewaters are land disposed and that all land-disposed wastes will require commercial alternative treatment. These assumptions are expected to overestimate the required treatment capacity.

EPA relied primarily on the 1993 Biennial Reporting System (BRS) to assess the quantity of D003 wastes not managed in CWA or equivalent systems that could be affected by today's rule. The BRS contains data on hazardous waste activities at RCRA-regulated treatment, storage, and disposal facilities (TSDFs) and large quantity generators. The BRS includes information on the waste streams generated on site and received from off site, waste physical form, waste codes, waste quantity, and the treatment systems used to treat each hazardous waste stream.

EPA only extracted information from the BRS on wastes that carried the D003 code only and that are not managed in CWA or equivalent systems. D003 wastes that are mixed with other characteristic wastes (e.g., D001, D002, TC organic wastes) have already been addressed in various LDR rules including the Emergency rule and the Phase II Land Disposal Restrictions Rule (59 *FR* 47982, September 19, 1994). Furthermore, D003 waste managed in CWA or equivalent systems are addressed in Chapter 3 and will likely undergo different types of treatment to satisfy the UTS for any UHCs (e.g., via applicable CWA permits).

6.3 REQUIRED CAPACITY FOR D003 WASTES

Exhibit 6-1 presents the wastewater and nonwastewater quantities of D003 wastes reported in the 1993 BRS (see Appendix E for a more detailed breakdown of these quantities).[98] As shown, the largest quantity of D003 wastes (approximately 2.2 million tons) is wastewater that is currently deepwell injected and is not within the scope of this chapter (because deepwell injection is a SDWA-regulated activity and thus considered CWA-equivalent). The majority of the approximately 730,000 tons of D003 wastewater that is not deepwell injected or discharged to a POTW will meet the UTS as a result of CWA discharge permits. The D003 wastes that have the greatest potential to require alternative treatment to meet LDRs are the approximately 30,000 tons of D003 nonwastewaters. Thus, D003 nonwastewaters represent a small percentage of the total quantity of D003 wastes currently generated. In addition, because the BRS does not distinguish between reactive cyanides, reactive sulfides, and other reactive wastes, this quantity is likely to be an overestimate of the non-sulfide and non-cyanide D003 wastes

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[98] EPA estimated D003 waste quantities in the document entitled "Supplemental Information Concerning The Environmental Protection Agency's Potential Responses To The Court Decision On The Land Disposal Restrictions Third Third Final Rule" (58 *FR* 4972, January 19, 1993) using the 1989 BRS. The total quantity generated was estimated to be 10 million tons. The 1993 BRS shows a considerable decrease in the amount of D003 wastes generated compared to the 1989 BRS. This reduction is probably best attributed to generator's efforts to minimize waste at the source, and differences between data reduction/compilation methods in the 1989 and 1993 BRS data sets.

EXHIBIT 6-1

QUANTITY OF D003 WASTES GENERATED IN 1993

Treatment System	Wastewater Generated (Tons)	Nonwastewater Generated (Tons)	Total Waste (Tons)
Deepwell Injected or Discharge to POTW	2,220,000	-	2,220,000
Other Treatment	730,000	30,000	760,000
Total	**2,950,000**	**30,000**	**2,980,000**

requiring alternative treatment.[99] Furthermore, the BRS does not provide any information on UHCs in these wastes. Nevertheless, given the widespread presence of UHCs in characteristic wastes, EPA assumes that the entire quantity of D003 nonwastewater not mixed with other wastes would require alternative treatment.

Some D003 wastes that may be affected by the Third Third Court Decision may not be reported in the BRS because these wastes may not have been considered hazardous by the generator once they had been decharacterized. However, the Agency does not believe that the D003 wastes that are the subject of this chapter could be significantly underreported in the BRS because these wastes are not routinely decharacterized.

6.4 VARIANCE DETERMINATION

EPA's analysis indicates that the quantities of D003 wastes potentially affected by today's rule are relatively small, especially compared to the available capacity of the relevant treatment technologies (e.g., stabilization) described in Chapter 2. Less than 30,000 tons per year of the total of almost 3 million tons per year of D003 wastes are expected to require alternative treatment. The actual required capacity is expected to be much less than this for several reasons. First, reactive cyanides – which do not require alternative treatment – account for the majority of the quantity of the D003 wastes generated. Second, EPA assumed that all of the nonwastewaters estimated from the BRS are land disposed and that all land-disposed wastes will require alternative treatment capacity. Consequently, the Agency does not believe that generators who manage D003 waste in non-CWA or equivalent systems will experience significant disruptions in operations as a result of this rule.

[99] In fact, as was shown in the Third Third rule, reactive cyanides account for the majority of the quantity of D003 wastes generated.

Nevertheless, the Agency recognizes that capacity to provide alternative treatment for these wastes may not be immediately available. EPA has determined that logistical constraints may make it difficult for generators of wastes affected by this rule to comply immediately with the new treatment standards.[100] Therefore, in order to allow all generators and off-site treatment facilities the time necessary to install the additional treatment equipment that may be needed and to conduct the necessary testing to determine whether their wastes are affected by this rule, the Agency is granting a 90-day national capacity variance from the effective date of this rule to D003 (reactive) wastes, other than reactive sulfide and cyanide wastes, that are managed in non-CWA or equivalent systems.

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[100] EPA has relied on such logistical factors in prior rulemakings to determine when capacity is realistically available. For example waste streams may have to be segregated prior to treatment, involving the reconfiguration of existing treatment systems (e.g., repiping). In addition, generators may have to locate and arrange for off-site treatment of certain waste streams that are currently managed on site and develop transportation networks. Generators may also have to perform testing to identify the UHCs in their wastes.