United States Environmental Protection Agency

Solid Waste and Emergency Response (OS-305)

EPA/530-SW-91-075
October 1991

EPA

National Survey Of Hazardous Waste Generators and Treatment, Storage, Disposal, and Recycling Facilities in 1986

Hazardous Waste Generation and Management

)272-101

REPORT DOCUMENTATION PAGE	1. REPORT NO. EPA/530-SW-91-075	2.	3. PB92-123025
4. Title and Subtitle NATIONAL SURVEY OF HAZARDOUS WASTE GENERATORS AND TREATMENT, STORAGE, DISPOSAL, AND RECYCLING FACILITIES IN 1986: HAZARDOUS WASTE GENERATION AND MANAGEMENT			5. Report Date OCTOBER 1991 6.
7. Author(s) D. UPDIKE/OSW			8. Performing Organization Rept. No
9. Performing Organization Name and Address U.S. EPA Office of Solid Waste 401 M. Street SW Washington, DC 20460			10. Project/Task/Work Unit No. 11. Contract(C) or Grant(G) No. (C) (G)
12. Sponsoring Organization Name and Address			13. Type of Report & Period Covered SURVEY 14.

15. Supplementary Notes

16. Abstract (Limit: 200 words)

is report presents comprehensive information describing the entire universe of hazarous waste management activities, cluding detailed information about each major category of hazardous waste management operations. This report also presses the significant quantities of hazardous wastes that are managed in treatment and recovery units that qualify at qualify for exemptions from RCRA-permitting requirements.

17. Document Analysis a. Descriptors

b. Identifiers/Open-Ended Terms

c. COSATI Field/Group

Availability Statement	19. Security Class (This Report) UNCLASSIFIED	21. No. of Pages 0
RELEASE UNLIMITED	20. Security Class (This Page) UNCLASSIFIED	22. Price 0

ANSI-Z39.18)

OPTIONAL FORM 272 (4-77)
(Formerly NTIS-35)

National Survey Of Hazardous Waste Generators and Treatment, Storage, Disposal, and Recycling Facilities in 1986

Hazardous Waste Generation and Management

October 1991

Office of Solid Waste
U.S. Environmental Protection Agency
Washington, DC 20460

CONTENTS

CONTENTS (continued)

CONTENTS (continued)

APPENDIXES

CHARTS

CHARTS (continued)

CHARTS (continued)

CHARTS (continued)

CHARTS (continued)

CHARTS (continued)

CHARTS (continued)

CHARTS (continued)

CHARTS (continued)

CHARTS (continued)

CHARTS (continued)

CHARTS (continued)

ACRONYMS

BDAT	Best Demonstrated Available Technology
CBI	Confidential Business Information
EP	Extraction Procedure
EPA	U.S. Environmental Protection Agency
HSWA	Hazardous and Solid Waste Amendments of 1984
HWDMS	Hazardous Waste Data Management System
LDR	Land Disposal Restrictions
LQG	Large Quantity Generator
NPDES	National Pollutant Discharge Elimination System
OSW	Office of Solid Waste
PCB	Polychlorinated Biphenyl
POTW	Publicly Owned Treatment Works
RCRA	Resource Conservation and Recovery Act
RIA	Regulatory Impact Analysis
SQG	Small Quantity Generator
TCLP	Toxicity Characteristic Leaching Procedure
TSDR	Treatment, Storage, Disposal, and Recycling Facilities

1 INTRODUCTION AND EXECUTIVE SUMMARY

This report presents the findings of two extensive national surveys conducted by mail over a three-year period to obtain detailed information concerning hazardous waste generation and management practices occurring in calendar year 1986. The two surveys—the National Survey of Hazardous Waste Generators (Generator Survey) and the National Survey of Hazardous Waste Treatment, Storage, Disposal, and Recycling Facilities (TSDR Survey)—focused on hazardous waste handlers regulated under Subtitle C of the Resource Conservation and Recovery Act, as amended in 1984 by the Hazardous and Solid Waste Amendments (hereafter referred to as RCRA).

1.1 OVERVIEW

Information developed through the Generator and TSDR Surveys is being released in two phases:

- The first report presented the surveys' major findings concerning the total quantity of hazardous waste generated in 1986 and a portion of the surveys' findings concerning 1986 hazardous waste management activities: management of hazardous wastes in treatment, storage, disposal, and recycling (TSDR) units that are subject to RCRA-permitting requirements. The report was released by EPA in July, 1991.

- This second report presents comprehensive information describing the entire universe of hazardous waste management activities, including detailed information about each major category of hazardous waste management operations. This report also addresses the significant quantities of hazardous wastes that are managed in treatment and recovery units that qualify for exemptions from RCRA-permitting requirements.

Chart 1.1-1 defines selected key terms used throughout these reports. Appendix A outlines the content of the Generator and TSDR Surveys.

Chart 1.1-1 Definition of Selected Terms Used in This Report

Generator	Facilities that generate in one month or accumulate at any one time more than 1,000 kg RCRA hazardous waste or more than 1 kg RCRA acutely hazardous waste (sometimes referred to as "large" quantity generators).
Facility	Facilities treating, recycling, disposing of, or storing hazardous waste, regardless of their permit status. Does not include accumulation exempt from RCRA-permitting requirements.
Hazardous waste	Wastes considered hazardous under RCRA (regardless of how they are managed), under other federal regulations, or by the state in which it is generated or managed.
RCRA TSDR units	Hazardous waste management units subject to RCRA-permitting requirements (sometimes referred to as RCRA units).
Non-RCRA TSDR units	Hazardous waste management units exempt from RCRA-permitting requirements (sometimes referred to as non-RCRA units).
RCRA TSDR facilities	Facilities that manage hazardous waste in RCRA TSDR units.
Non-RCRA TSDR facilities	Facilities that only manage hazardous waste in non-RCRA TSDR units.

These data have been used extensively since their collection, and this report documents some of the findings. However, any data analysis must take into account the significant changes that have occurred in hazardous waste management practices since these data were collected. Among other actions, EPA has

- implemented restrictions on the land disposal of hazardous wastes,
- expanded the toxicity characteristic testing procedures and standards to capture an expanded universe of hazardous wastes under the RCRA Subtitle C regulatory umbrella, and
- implemented pollution prevention policies designed to reduce hazardous waste generation.

Chapter 12 describes these program changes in more detail.

1.2 BACKGROUND

The 1986 Generator and TSDR Surveys comprise EPA's third effort to develop reliable national information describing hazardous waste generation and management activities in the United States. EPA's April 1984 report, *National Survey of Hazardous Waste Generators and Treatment, Storage, and Disposal Facilities Regulated Under RCRA in 1981* (1981 Mail Survey), presented the first picture of the hazardous waste system that RCRA was enacted to control, based on an extensive mail survey conducted directly by EPA. EPA's March 1989 report, *1985 National Biennial Report of Hazardous Waste Generators and Treatment, Storage, and Disposal Facilities Regulated Under RCRA* (1985 National Biennial Report), updated the 1981 Mail Survey based on EPA's compilation of data reported by generators and facilities to states and EPA regional offices through the RCRA Biennial Reporting System.

The major finding of the 1981 Mail Survey was that annual hazardous waste generation was approximately six times greater than previously estimated, with slightly more than 14,000 generators producing approximately 290 million tons of hazardous waste in 1981. The 1981 Survey found for the first time that large quantities of RCRA hazardous wastes are managed outside the scope of the RCRA-permitting program in units that qualify for exemptions from RCRA-permitting requirements. Most prominent among such units are tank treatment systems used to treat hazardous wastewaters prior to discharge to surface waters under the National Pollutant Discharge Elimination System (NPDES). The 1981 Mail Survey was unable to estimate the total quantity generated of hazardous wastes that were managed outside the scope of the RCRA-permitting system.

In the 1985 National Biennial Report, EPA reported that in 1985 almost 22,000 generators generated 271 million tons of RCRA hazardous waste that were managed in RCRA-regulated TSDR units. In addition, data received by states and EPA regional offices in 1985 again indicated that additional large volumes of RCRA hazardous waste were being managed outside the scope of the RCRA-permitting system. Again, EPA was unable to develop a reliable estimate of the national quantities of these hazardous wastes.

The 1986 Generator and TSDR Surveys differ from the previous EPA hazardous waste data collections described above in that, in addition to data on wastes managed in RCRA TSDR units, they also include hazardous wastes managed in units that qualify for exemptions from RCRA-permitting requirements.

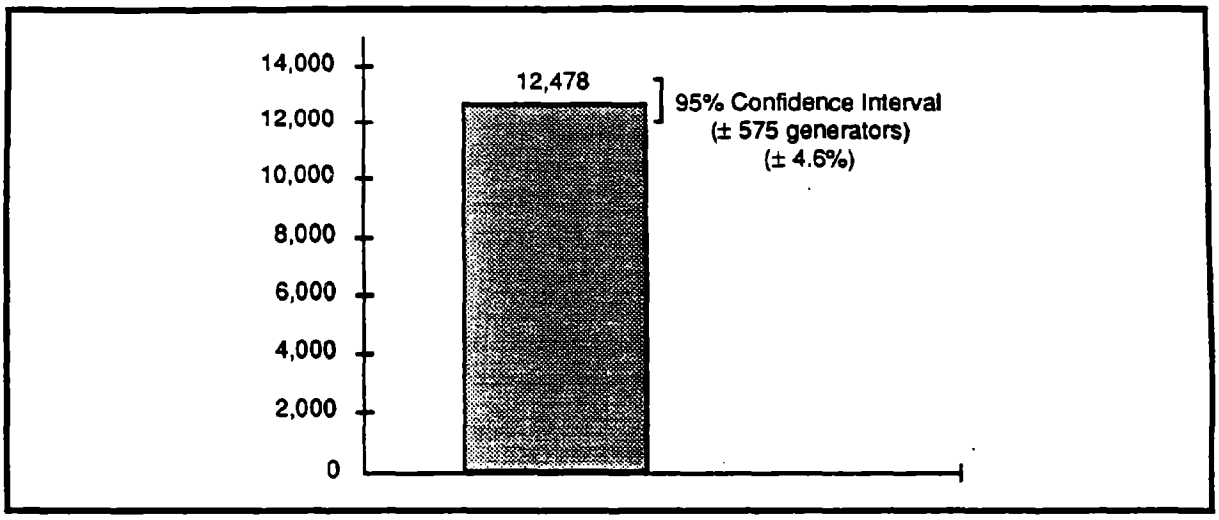
1.3 HAZARDOUS WASTE GENERATION AND MANAGEMENT IN 1986: OVERVIEW OF SURVEY FINDINGS

Based on the survey procedures and methodologies described in Chapter 2, EPA estimates that 12,478 generators generated 747.4 million tons of hazardous waste in 1986. The 747.4 million ton quantity of hazardous waste generated in 1986 is considerably greater than previous estimates for 1981 and 1985 because it includes the large volumes of hazardous waste that are managed outside the scope of the RCRA-permitting system in TSDR units that qualify for RCRA-permitting exemptions (non-RCRA TSDR units).

Charts 1.3-1 and 1.3-2 present these statistical estimates along with their confidence intervals, corresponding to the 95 percent confidence levels. The confidence interval is the range of values within which the actual number of generators and quantity of hazardous waste is likely to be, based on the statistical design of the survey and the response rates obtained. A 95 percent confidence level means that if a survey was conducted 100 times, the estimates would fall within the range 95 percent of the time. Chart 1.3-1 shows that the 95 percent confidence interval for the number of generators in 1986 is plus or minus 4.6 percent, or 575 generators. This means that there is a 95 percent certainty that the actual number of generators in 1986 was between 11,903 and 13,053. The 95 percent confidence interval for the quantity of hazardous waste generated in 1986 is plus or minus 75 million tons, or plus or minus 10 percent of the estimate.

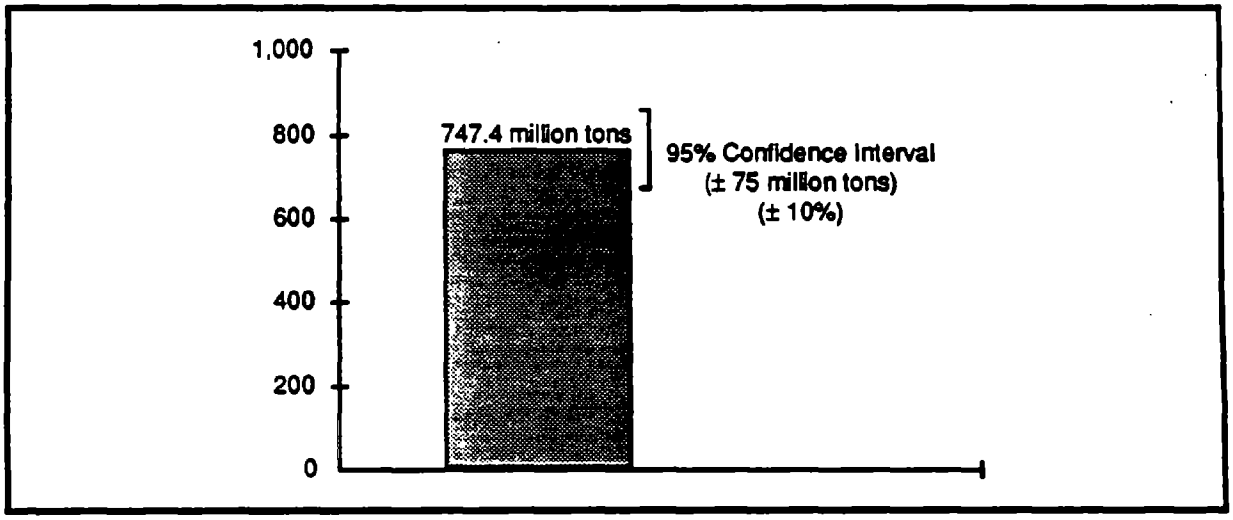
Chart 1.3-3 compares the estimates of the number of hazardous waste generators for 1981, 1985, and 1986. EPA believes that the 1985 estimate of 21,700 provided by the RCRA Biennial Reporting System overstates the actual number of generators in that year because many states include small quantity generators (SQGs) in their reporting systems and were unable to remove them when reporting to EPA on the number of generators (i.e., "large" quantity generators) within their borders. When the overcounting factor is considered, the three estimates of hazardous waste generators shown in Chart 1.3-3 are thought to be similar.

Chart 1.3-1 Estimated Number of Hazardous Waste Generators in 1986



Source: (GA1, 2, 3, 4, 5, and 27) (The letters indicate the questionnaire and the numbers indicate the question on which the data are based.)

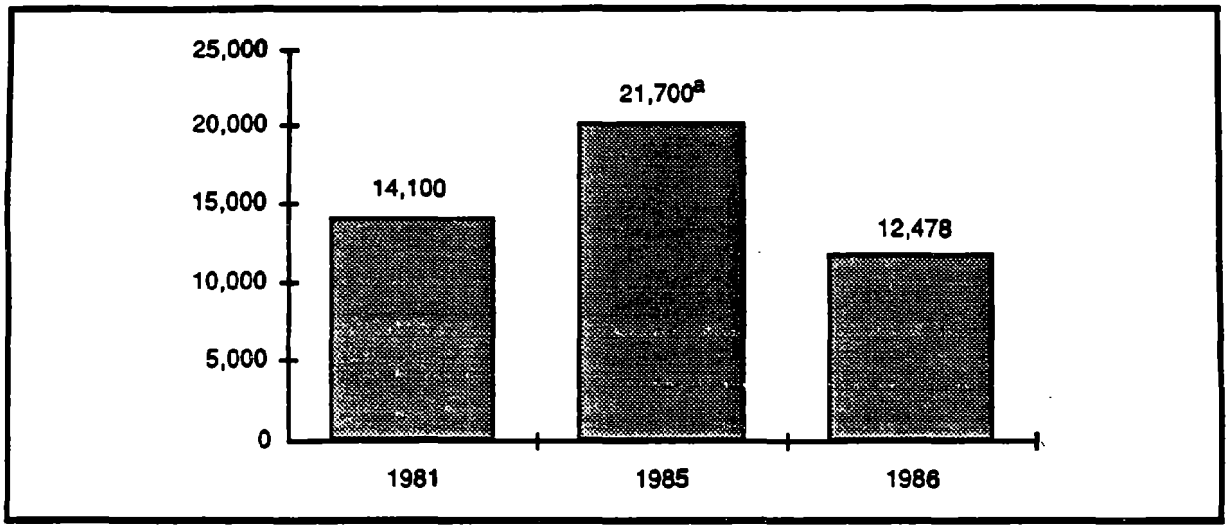
Chart 1.3-2 Quantity of Hazardous Waste Generated in 1986 (million tons)[a]



[a] For the purpose of this report, quantities reported in gallons have been converted to U.S. tons using the following standard conversion factor: 1 U.S. ton = 2,000 = 240 gallons.

Source: (GA27)

Chart 1.3-3 Number of Hazardous Waste Generators in 1981, 1985, and 1986



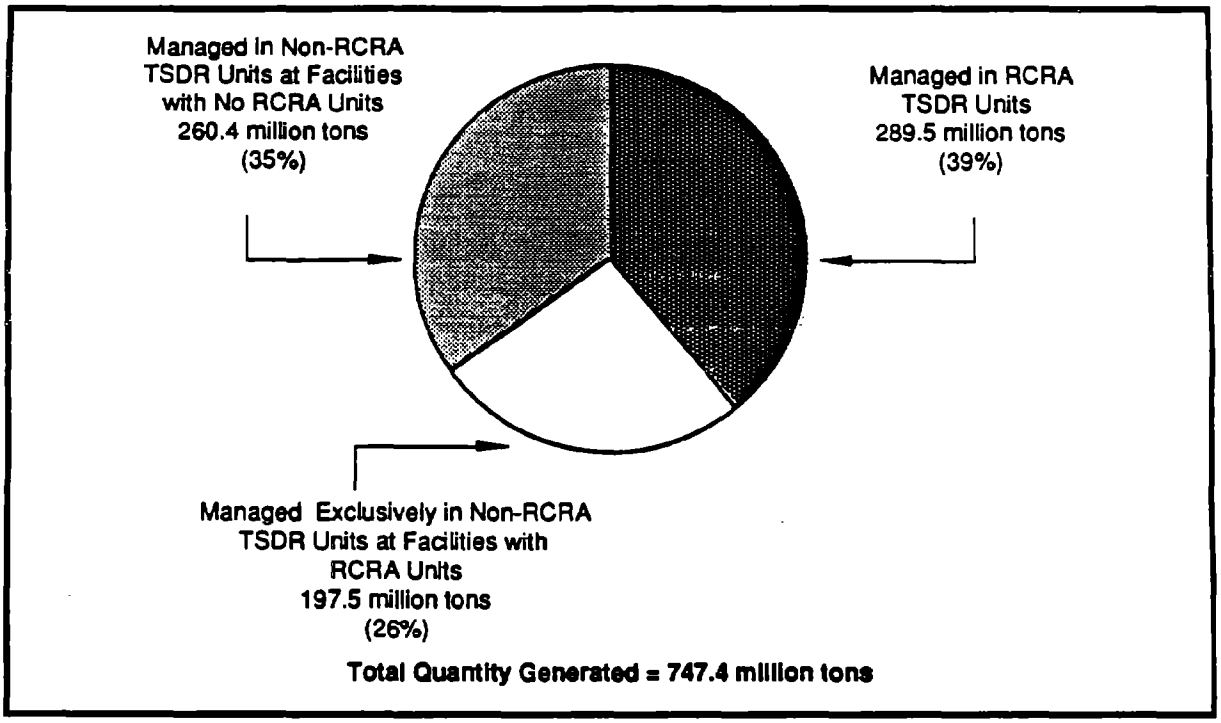
[a] The 1985 Biennial Report System estimate overstates the actual population of hazardous waste generators because some states included small quantity generators.

Source: 1981 Mail Survey, 1985 Biennial Report, (GA1, 2, 3, 4, 5, and 27)

Chart 1.3-4 disaggregates the 1986 generation estimate of 747.4 million tons according to the RCRA-permitting status of the TSDR units in which these wastes were subsequently managed and according to the type of facility that managed the hazardous waste. The chart shows three categories of hazardous waste:

- waste managed in at least one RCRA TSDR unit,
- waste managed *only* in non-RCRA TSDR units at facilities that also manage hazardous wastes in RCRA TSDR units, and
- waste managed *only* in non-RCRA TSDR units at facilities that do not have any RCRA TSDR units.

Chart 1.3-4 Quantity of Hazardous Waste Generated in 1986, by RCRA-Permitting Status of Management Units



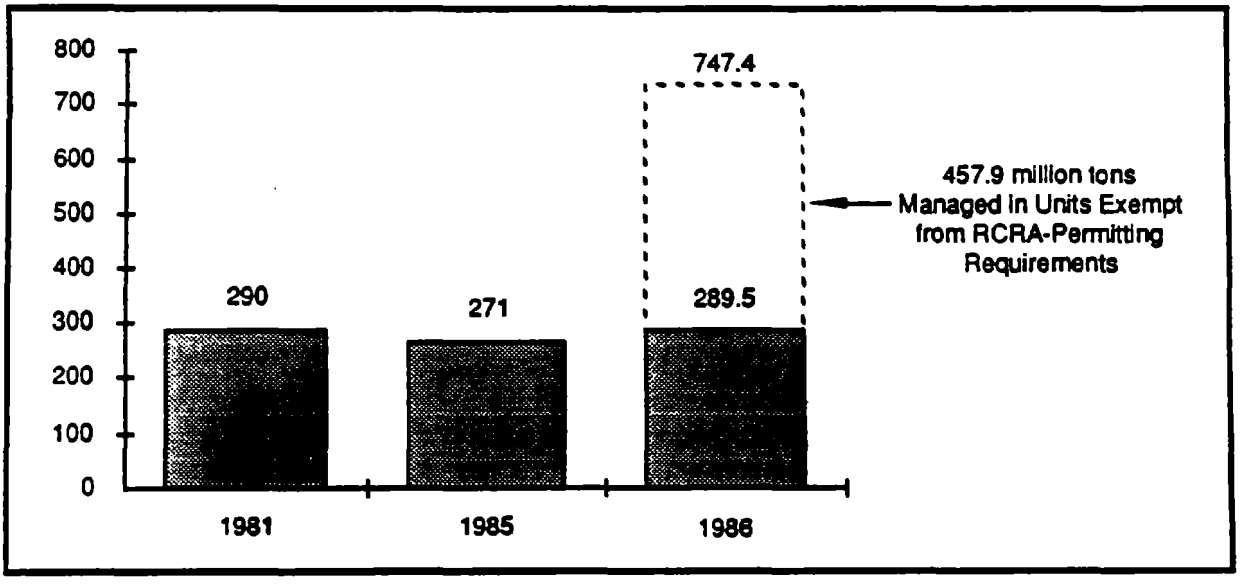
Source: (A3, A8, GA27)

An example of a RCRA TSDR facility that manages hazardous waste in RCRA and non-RCRA TSDR units is a facility that has a RCRA permit for hazardous waste storage tanks and also treats hazardous waste in a RCRA-exempt wastewater treatment system governed by a National Pollutant Discharge Elimination System (NPDES) discharge permit under the Clean Water Act. An example of a non-RCRA TSDR facility that manages hazardous waste only in non-RCRA units is a RCRA large quantity generator that treats its hazardous waste in a RCRA-exempt wastewater treatment system and ships the hazardous sludge residual from the treatment system offsite every other month. (Generators are allowed to accumulate hazardous waste onsite for up to 90 days without obtaining a RCRA storage permit.)

Only 289.5 million tons (39 percent) of the 747.4 million tons of hazardous waste generated in 1986 were managed in RCRA TSDR units. An additional 197.5 million tons (26 percent) of hazardous waste were managed in non-RCRA TSDR units at facilities with RCRA units. The remaining 260.4 million tons (35 percent) of hazardous waste generated in 1986 were managed in non-RCRA TSDR units at facilities with no RCRA units.

Disaggregating the 747.4 million tons of hazardous waste generated in 1986 according to the RCRA regulatory status of management units enables comparison of 1986 generation estimates with the previously described 1981 and 1985 estimates. Chart 1.3-5 presents hazardous waste generation estimates for all three years. The estimates for 1981 and 1985 are limited (as described in Section 1.2 above) to hazardous waste quantities that are subsequently managed in RCRA TSDR units. The estimates for 1981 and 1985 are very similar to the 1986 generation estimate of quantities subsequently managed in the RCRA-permitting system.

Chart 1.3-5 Quantity of Hazardous Waste Managed in RCRA TSDR Units in 1981, 1985, and 1986 (million tons)



Source: 1981 Mail Survey, 1985 Biennial Report, (A3, GA27)

2 SURVEY OVERVIEW

This chapter discusses the objectives of the 1986 Generator and TSDR Surveys and the approach used to develop and conduct the surveys. The information discussed in this chapter should help the reader understand the nature and application of survey data.

2.1 SURVEY OBJECTIVES

The Generator and TSDR Surveys were an effort to develop comprehensive hazardous waste information for use by the Office of Solid Waste (OSW) and other EPA offices, the regulated community, Congress, and the general public for rulemaking and related analyses. This section outlines the objectives of the Generator and TSDR Surveys.

The Generator and TSDR Surveys were conducted to support the development of a variety of regulations and analyses, including

- the land disposal restriction rules, including developing treatment standards based on Best Demonstrated Available Treatment (BDAT) technologies, and setting effective dates based on the capacity of BDAT technologies;
- regulations for corrective action for solid waste management units at facilities with RCRA permits;
- analyses of pollution prevention activities to support EPA pollution prevention outreach efforts;
- permitting standards for tanks used to treat, store, or recycle hazardous waste;
- Regulatory Impact Analyses (RIAs) for regulations associated with RCRA and HSWA;

- revisions of the organic toxicity characteristic and other additional waste characteristics used to classify wastes as "hazardous" under RCRA;
- the revised list of wastes considered hazardous under RCRA; and
- testing procedures for wastes with hazardous characteristics.

2.2 SURVEY SCOPE

This section describes the types of generators and facilities and the types of wastes included in the Generator and TSDR Surveys.

Sites Included

The facilities surveyed in the TSDR Survey include a census of facilities that treated, disposed of, or recycled hazardous waste onsite and a random sample of facilities that only stored hazardous waste and did not treat, dispose, or recycle any hazardous waste onsite. The findings presented in Chapter 3 address only those facilities with RCRA TSDR units that were operational (or temporarily idle) in 1986.

The data collected in the Generator Survey represent "large" quantity generators of hazardous wastes (referred to in this report as "generators"). A generator is a facility that generated in any one month more than 1,000 kg of hazardous waste or more than 1 kg of waste considered acutely hazardous under RCRA that was subsequently shipped offsite or managed onsite in RCRA TSDR units. Acutely hazardous wastes are wastes described by any of the following RCRA waste codes: F020, F021, F022, F023, F026, F027, and all of the codes beginning with P.

The Generator Survey employed a stratified sample. All facilities included in the TSDR Survey were also surveyed in the Generator Survey. The stratified sample design provided greater precision in the findings and produced statistically significant estimates at national, regional, and state levels.

It is important to note that both the Generator and TSDR Surveys are statistical samples. All the data presented in this report have been weighted to represent the total population of RCRA TSDR facilities and generators nationwide.

Wastes Included

RCRA defines a specific subset of solid wastes as "hazardous wastes"; these wastes are subject to RCRA regulations concerning hazardous wastes. Definitions of solid wastes and hazardous wastes are provided in the code of Federal Regulations (see 40 CFR 260-261). Many states regulate hazardous wastes in addition to those regulated under RCRA (e.g., waste oil). The Generator and TSDR Surveys include data on wastes considered hazardous under RCRA, other federal regulations, and state regulations.

The following wastes are included in the Generator and TSDR Surveys:

- Waste considered hazardous under RCRA. This includes hazardous wastewater pretreated prior to discharge under a NPDES permit or to a publicly owned treatment works (POTW); hazardous waste generated in a production process or a waste treatment process; and a hazardous waste that is a characteristic hazardous waste even though it may lose its hazardous characteristic through mixing with other waste or by treatment.
- Waste considered hazardous by the state in which it was generated or managed.
- Waste containing polychlorinated biphenyls (PCBs), asbestos, or dioxins/furans.
- Hazardous waste mixed with radioactive waste.

2.3 SURVEY METHODOLOGY

The 1986 Generator and TSDR Surveys were designed and developed over a two-year period. Because of the size and complexity of this project and of the survey instruments themselves, this section briefly explains the methodology used to develop the surveys.

Phase I: Sample Design

The initial phase of the TSDR Survey development was the National Screening Survey conducted from January through November 1986. The Screening Survey identified and collected summary information from all facilities in the United States that had filed a Part A permit under RCRA and were listed in the Hazardous Waste Data Management System (HWDMS) as of November 1985. Because a large number of the facilities that filed a Part A permit did not ultimately manage RCRA hazardous waste in units that require a permit, one objective of the Screening Survey was to determine which

facilities operated waste management units subject to RCRA-permitting requirements during 1986. Of the 5,600 facilities surveyed, approximately 3,000 were determined to be active TSDR facilities requiring or otherwise subject to permits under RCRA. A second objective of the Screening Survey was to gather information to determine the best method for surveying TSDR facilities in a more detailed follow-up survey.

In January and February of 1987, a computer-assisted telephone interview followed up the approximately 3,000 active TSDR facilities identified in the Screening Survey. These facilities were asked to verify and update the data they had provided for the Screening Survey. With this information, EPA determined the approximate number of waste management units for each waste management activity operated at each facility. This information served as the basis for distributing detailed questionnaires for the subsequent TSDR Survey.

For the Generator Survey, the population to be surveyed included all identified generators of hazardous waste. A population of 41,000 potential hazardous waste generators was identified using information from several sources:

- the 1985 Biennial Hazardous Waste Report,
- the 1986 National TSDR Screening Survey,
- the HWDMS,
- state regulatory officials, and
- EPA regional offices.

From this population, a stratified random sample of approximately 10,000 facilities was selected and surveyed. The sample was stratified by state, by whether the facility was a TSDR facility, and by the quantity of hazardous waste generated.

Phase II: Generator and TSDR Surveys

The Generator and TSDR Survey instruments were developed over a two-year period in consultation with government officials and industry trade associations. Both survey instruments were evaluated in field pretests and revised based on the results of the pretests. The TSDR Survey was mailed in August 1987, and the Generator Survey was mailed in December 1987.

Approximately 99 percent of the TSDR Survey instruments and 90 percent of the Generator Survey instruments were completed and returned. After adjusting for nonresponses, the Generator and TSDR Survey samples reflect the complete populations of Generators and RCRA TSDR facilities, respectively.

Because of the highly technical nature of the Generator and TSDR Surveys, two services were provided to respondents to improve the accuracy and completeness of responses:

- A toll-free telephone Survey Helpline was established for respondents. The helpline handled more than 15,000 calls.
- A *Survey Update* newsletter was mailed periodically to all facilities that received the questionnaires. The *Update* provided additional information for completing complex questions, suggestions for easing the burden of completing the instruments, and any corrections to the questionnaires.

Phase III: Data Management

After receiving the completed questionnaires, selected portions of each questionnaire were reviewed for technical accuracy. If necessary, telephone follow-up calls were made to the facility. After editing, the data were entered into a dedicated, secure computer. To ensure accurate keying, data were keyed twice.

Information collected in the surveys was organized into two databases. The TSDR Survey database contained 61 distinct files, and the Generator Survey database contained 41 distinct files. In addition, each database included notes files for each facility, which contained explanatory comments submitted by facilities in their survey questionnaires.

Due to the nature of some of the data collected in the Generator and TSDR Surveys, some responses were claimed as EPA Confidential Business Information (CBI) by respondents. A separate set of stringent security requirements was followed for managing CBI data. Because it was determined that the CBI data did not significantly affect any of the information presented in this report, CBI data are not included in this report.

2.4 STATISTICAL ISSUES

Adjustments to the Weights

In the TSDR and Generator Surveys, weights are used to make estimates about the entire population of generators and TSDR facilities based on responses by facilities included in the sample. A weight is a factor used to escalate from a sample measurement to an estimate for the total population. For example, if one facility was sampled from a population of ten facilities, multiplying (or weighting) the responses of the facility surveyed by ten gives an estimate of the quantity for the total population.

Initially, weights were defined based on the relative sizes of the total population and the sample of facilities that were surveyed. However, weights were statistically adjusted based on the results of the survey for two reasons: multiplicity and nonresponse.

First, weights had to be adjusted to correct for multiplicity in the sample frame (the list of facilities thought to be large quantity generators in 1986). Multiplicity occurs if a single facility is included more than once in the sample frame. In this case, a facility may have been included more than once under different EPA identification numbers if the owner or the name of the facility changed and a new number was assigned. Facilities surveyed were asked to indicate any identification numbers that had previously been assigned to that facility. This information was used to identify multiplicity in the sample frame, and weights were adjusted so that each facility is represented only once.

The second adjustment to the weights was due to nonresponse (facilities that received a survey but did not return a completed survey). Ninety percent of facilities receiving a Generator Survey questionnaire responded, and 98 percent of facilities receiving a TSDR Survey questionnaire responded. Weights for facilities that did respond to the Surveys were adjusted so that the responding facilities represent the total population of facilities.

All data presented in this report use these adjusted weights to obtain estimates for the total population of TSDR facilities and large quantity generators during 1986.

Confidence Intervals

By weighting the data from a sample survey, estimates can be made about the total population of facilities. Confidence intervals are used to measure the accuracy of these estimates. The confidence interval is the range of numbers within which the true value of an estimated number will fall with a certain known probability, based on the statistical design of the survey and the response rates obtained. A 95 percent confidence interval means that if a survey was conducted 100 times, the estimates would fall within the range 95 percent of the time.

For the Generator Survey, the 95 percent confidence interval for the total number of large quantity generators nationwide in 1986 is plus or minus 575 generators, or plus or minus 5 percent of the estimate of 12,478. This means that there is a 95 percent certainty that the actual number of generators was between 11,903 and 13,053.

Generally, regional- and state-level estimates are less certain than the national estimates (i.e., these estimates have larger confidence intervals in percentage terms). This is because, all else being equal, the confidence interval increases as the number of facilities surveyed decreases. The exception to this are estimates for North Dakota and South Dakota. These states were censused rather than sampled (i.e., every facility in these states received a survey) and a 100 percent response rate was achieved. Therefore, there is no sampling error for these states, and the totals for these states are not estimates but actual numbers reported.

(This page is intentionally blank)

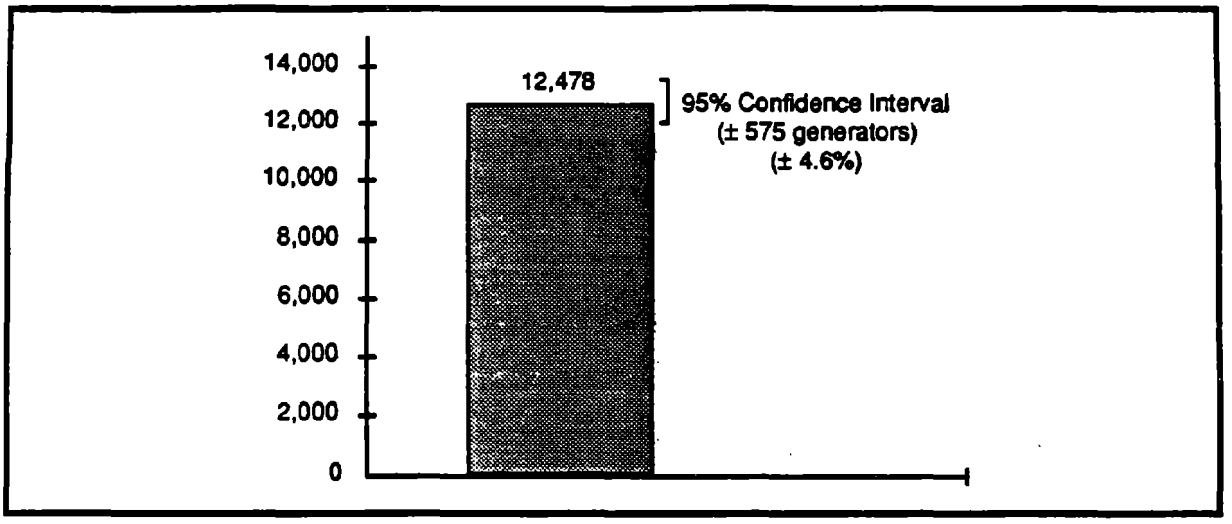
3 HAZARDOUS WASTE GENERATION IN 1986: SUMMARY

The Generator Survey contains data on "large" quantity generators (generators) of RCRA hazardous waste in 1986. As described in Chapter 2, generators are facilities that generated in any one month or accumulated at any time more than 1,000 kg of RCRA hazardous waste or 1 kg of RCRA acutely hazardous waste that was subsequently shipped offsite or managed onsite in RCRA TSDR units. Although there are also large numbers of smaller generators of hazardous waste that generated less than these threshold quantities, in aggregate these small quantity generators typically account for less than one percent of all hazardous waste generated. Throughout this report, the term "generator" is used to refer to "large" quantity generators only, and the data represent only hazardous waste generated by these "large" quantity generators.

3.1 NUMBER OF HAZARDOUS WASTE GENERATORS

In 1986, 12,478 facilities generated quantities of hazardous waste over the thresholds specified above. Chart 3.1-1 shows the estimate of 12,478 generators and its confidence interval, corresponding to the 95 percent confidence level (see Section 2.4.2 for an explanation of confidence intervals). As the chart shows, the 95 percent confidence interval for the number of generators is plus or minus 575 generators, or plus or minus 4.6 percent of the estimate of 12,478 generators. This means that there is a 95 percent certainty that the actual number of generators in 1986 is between 11,903 and 13,053.

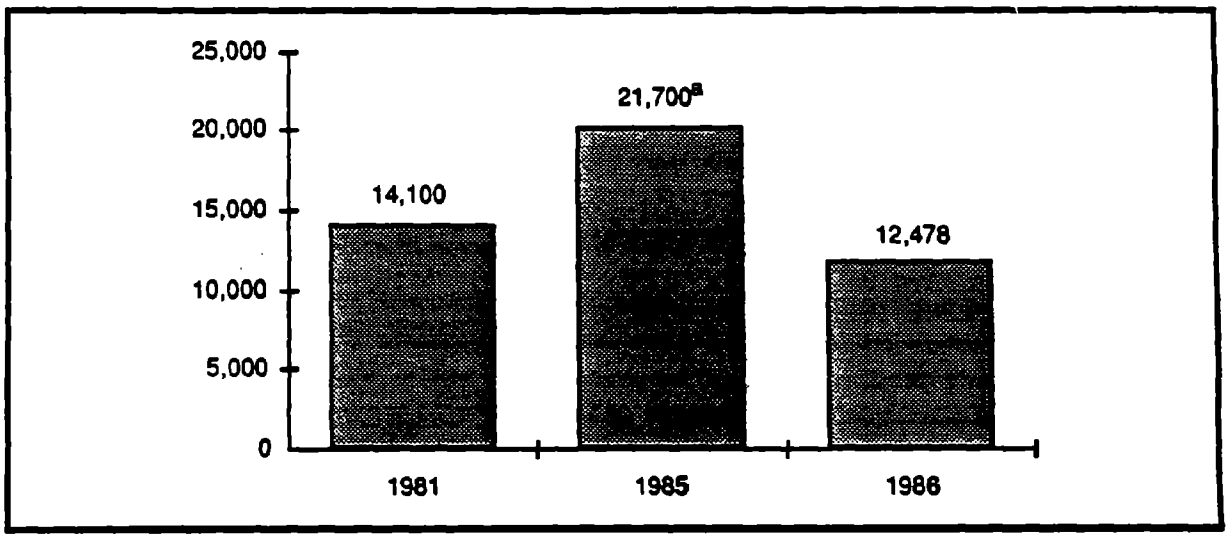
Chart 3.1-1 Estimated Number of Hazardous Waste Generators in 1986



Source: (GA1, 2, 3, 4, 5, and 27)

The 1986 Generator Survey, in combination with the TSDR Survey, comprise EPA's third effort to develop national estimates of hazardous waste generation. Chart 3.1-2 compares the 1986 estimate with the two previous estimates: the 1981 Mail Survey and the 1985 Biennial Report. In 1981, there were an estimated 14,100 generators and an estimated 21,700 generators in 1985. EPA believes that the 1985 estimate, provided by the RCRA Biennial Reporting System, overstates the actual number of generators in that year because many states include small quantity generators in their reporting systems and were unable to remove them when reporting to EPA on the number of generators (i.e., "large" quantity generators) within their borders. When the overcounting factor is considered, the three estimates of hazardous waste generators shown in Chart 3.1-2 are thought to be similar.

Chart 3.1-2 Number of Hazardous Waste Generators in 1981, 1985, and 1986



[a] The 1985 Biennial Report System estimate overstates the actual population of hazardous waste generators because some states included small quantity generators.

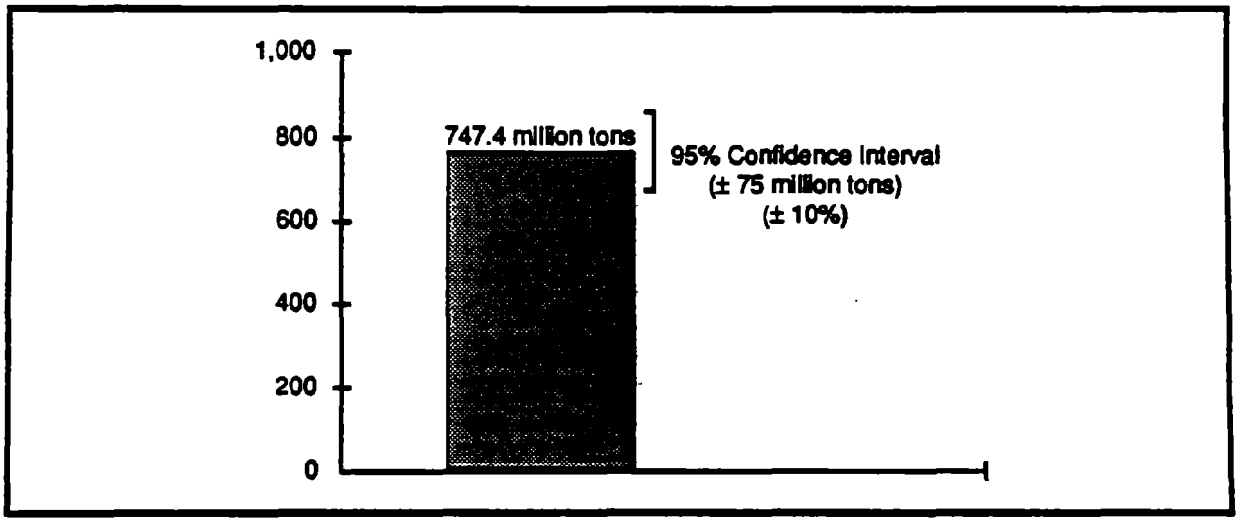
Source: 1981 Mail Survey, 1985 Biennial Report, (GA1, 2, 3, 4, 5, and 27)

3.2 QUANTITIES OF HAZARDOUS WASTE GENERATED

Large quantity generators generated an estimated 747.4 million tons of hazardous waste in 1986. This quantity includes RCRA hazardous waste, waste considered hazardous under federal regulations other than RCRA, and waste considered hazardous in the state in which it was generated. Non-RCRA hazardous waste accounted for approximately 3 percent of the total quantity of hazardous waste generated.

Chart 3.2-1 shows the estimated total quantity of hazardous waste generated in 1986 and its associated 95 percent confidence interval. The 95 percent confidence interval for the quantity of hazardous waste generated is plus or minus 75 million tons, or plus or minus 10 percent of the estimate. Thus, there is a 95 percent certainty that the actual quantity of hazardous waste generated in 1986 is between 672 million and 822 million tons.

Chart 3.2-1 Quantity of Hazardous Waste Generated in 1986 (million tons)



Source: (GA27)

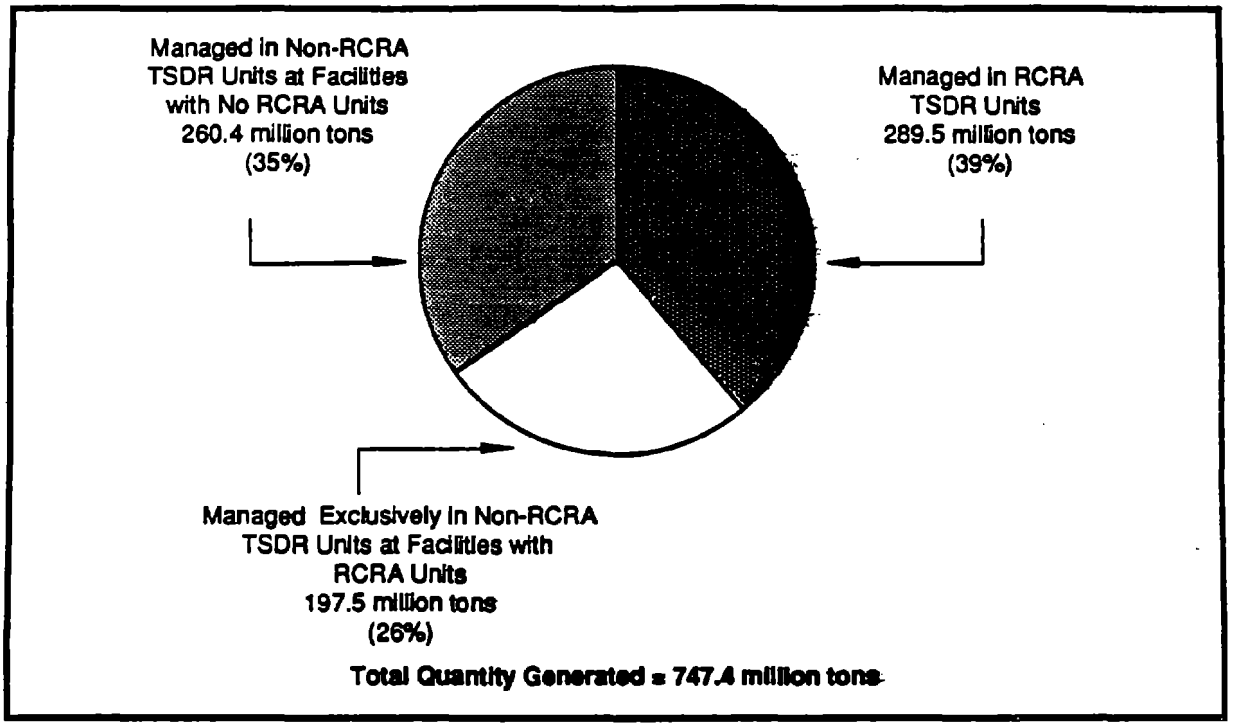
Chart 3.2-2 depicts the total quantity of hazardous waste generated in 1986 divided according to the RCRA-permitting status of the TSDR units in which these wastes were subsequently managed and according to the type of facility that managed the hazardous waste. The chart shows three categories of hazardous waste:

- waste managed in at least one RCRA TSDR unit,
- waste managed *only* in non-RCRA TSDR units at facilities that also manage hazardous waste in RCRA TSDR units, and
- waste managed *only* in non-RCRA TSDR units at facilities that do *not* have any RCRA TSDR units.

An example of a RCRA TSDR facility that manages hazardous waste in RCRA and non-RCRA TSDR units is a facility that has a RCRA permit for hazardous waste storage tanks and also treats hazardous waste in a RCRA-exempt wastewater treatment system governed by a NPDES discharge permit under the Clean Water Act. An example of a non-RCRA TSDR facility that manages hazardous waste only in non-RCRA units is a RCRA large quantity generator that treats its hazardous waste in a RCRA-exempt wastewater treatment system and ships the hazardous sludge residual from the treatment system offsite every other month. (Generators are allowed to accumulate hazardous waste onsite for up to 90 days without obtaining a RCRA storage permit.)

Only 39 percent of the 747.4 million tons of hazardous waste generated in 1986 was managed in RCRA TSDR units. An additional 26 percent of the hazardous waste was managed in non-RCRA TSDR units at facilities with RCRA units. The remaining 35 percent of hazardous waste generated in 1986 was managed in non-RCRA TSDR units at facilities with no RCRA units.

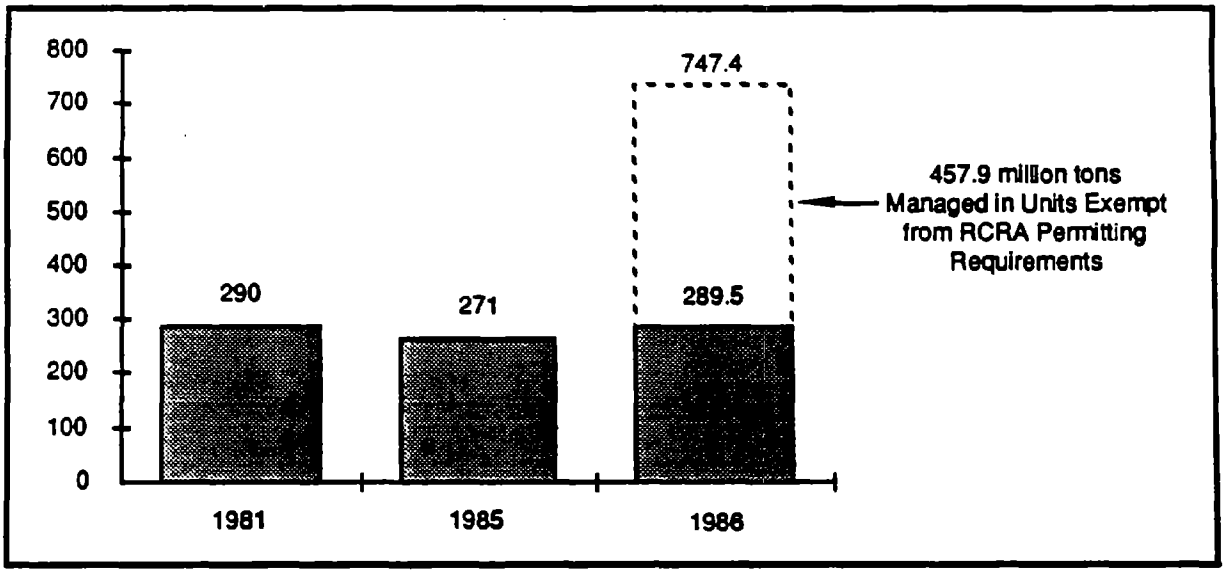
Chart 3.2-2 Quantity of Hazardous Waste Generated in 1986, by RCRA-Permitting Status of Management Units



Source: (A3, A8, GA27)

Disaggregating the 747.4 million tons of hazardous waste generated in 1986 according to the RCRA regulatory status of management units enables comparison of 1986 generation estimates with the previously described 1981 and 1985 estimates. Both the 1981 and the 1985 estimates of the quantities of hazardous waste generated include only hazardous wastes that were subsequently managed in RCRA TSDR units. Chart 3.2-3 presents hazardous waste generation estimates for 1981, 1985, and 1986. The estimates for 1981 and 1985 are very similar to the 1986 generation estimate of quantities subsequently managed in the RCRA-permitting system.

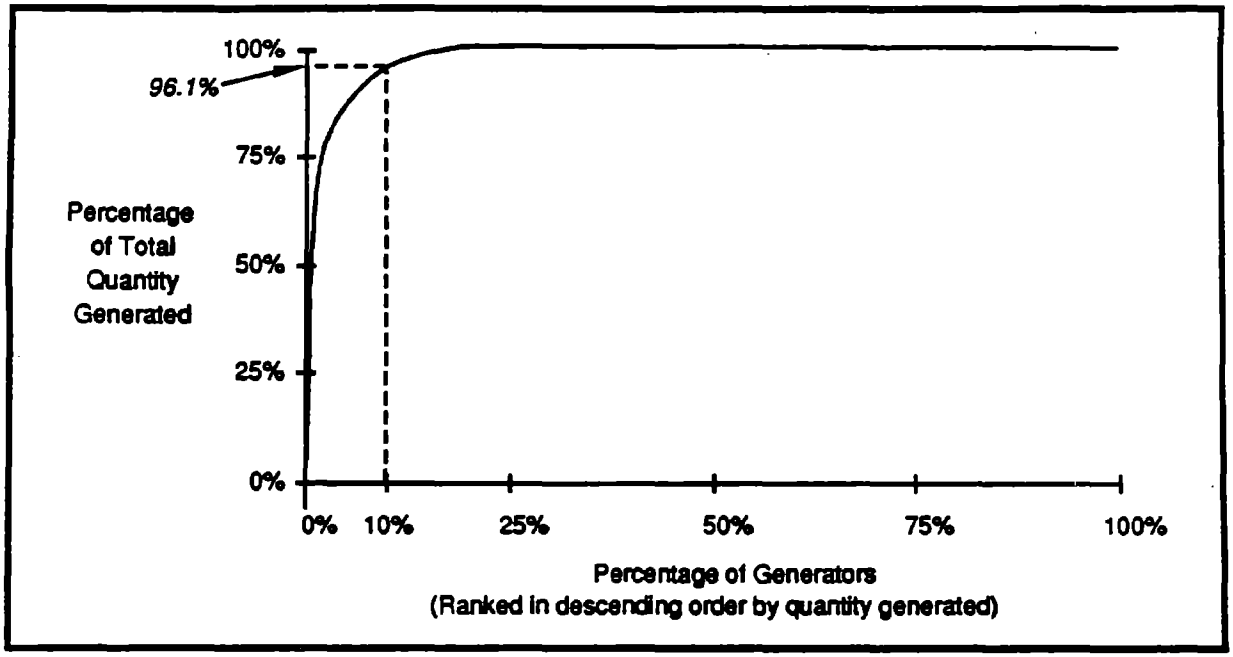
Chart 3.2-3 Quantity of Hazardous Waste Managed in RCRA TSDR Units in 1981, 1985, and 1986 (million tons)



Source: 1981 Mail Survey, 1985 Biennial Report, (A3, GA27)

A small percentage of the 12,478 generators accounted for most of the hazardous waste generation in 1986. Chart 3.2-4a illustrates the highly skewed distribution of hazardous waste generation. The chart shows the cumulative distribution of the quantity of hazardous waste generated in 1986 and is constructed by ranking generators in descending order by the quantity of hazardous waste generated. As indicated in the chart, **the top 10 percent of generators generated 96.1 percent of the total quantity of hazardous waste generated, or 718.2 million tons.**

Chart 3.2-4a Cumulative Distribution of the Quantity of Hazardous Waste Generated in 1986

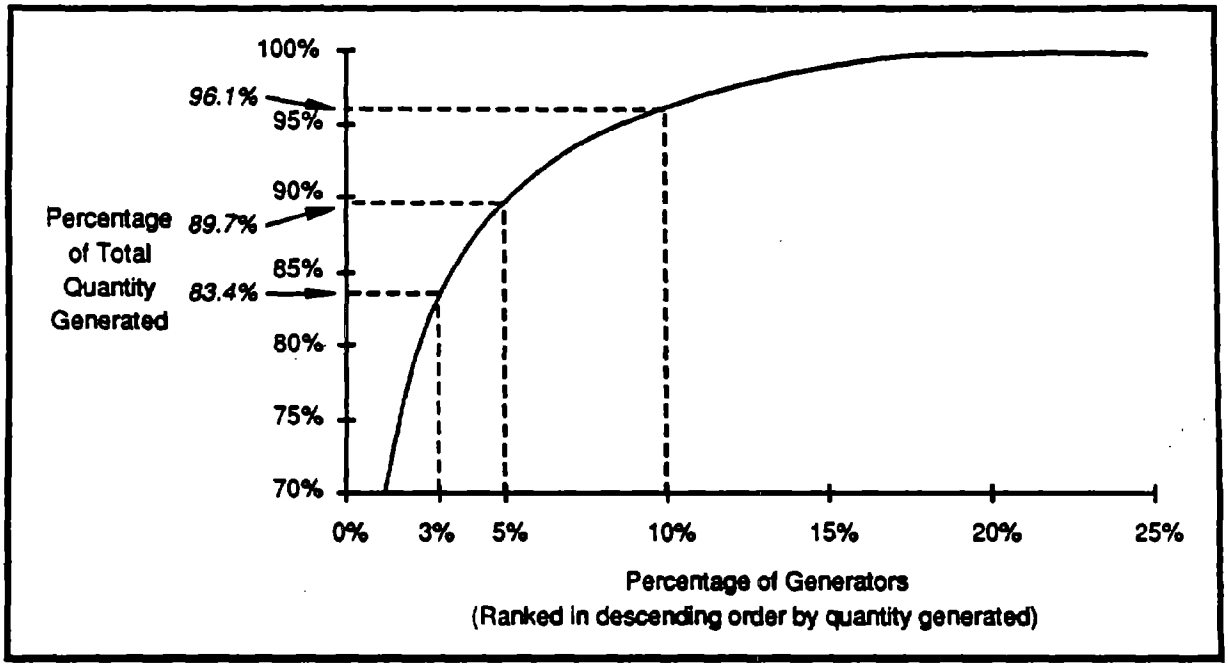


Source: (GA27)

Chart 3.2-4b shows a close-up of the top 25 percent of generators ranked in descending order by the quantity of hazardous waste generated, indicating the following:

- The top 3 percent of generators generated 83.4 percent of the hazardous waste (623.3 million tons).
- The top 5 percent of generators generated 89.7 percent of the hazardous waste (670.4 million tons).

Chart 3.2-4b Cumulative Distribution of the Quantity of Hazardous Waste Generated in 1986 for the Top 25 Percent of Generators[a]



[a] This chart is an enlargement of the top 25 percent of generators from Chart 3.2-4a to provide greater detail.
Source: (GA27)

Chart 3.2-5 provides further detail of the skewness of hazardous waste generation. The largest generator of hazardous waste generated 48.9 million tons of hazardous waste, although the smallest generator generated less than one ton. One-fourth of generators each generated 33 tons or less, half of the generators generated 147 tons or less, and three-fourths generated 2,683 tons or less.

Chart 3.2-5 Quantity of Hazardous Waste Generated by Generators: Key Statistics

	Quantity Generated per Facility (tons)
Smallest	<1
First Quartile[a]	33
Median (Second Quartile)[b]	147
Third Quartile[c]	2,683
Average	62,431
Largest	48,941,295

[a] 25 percent of generators each generated 33 tons or less.

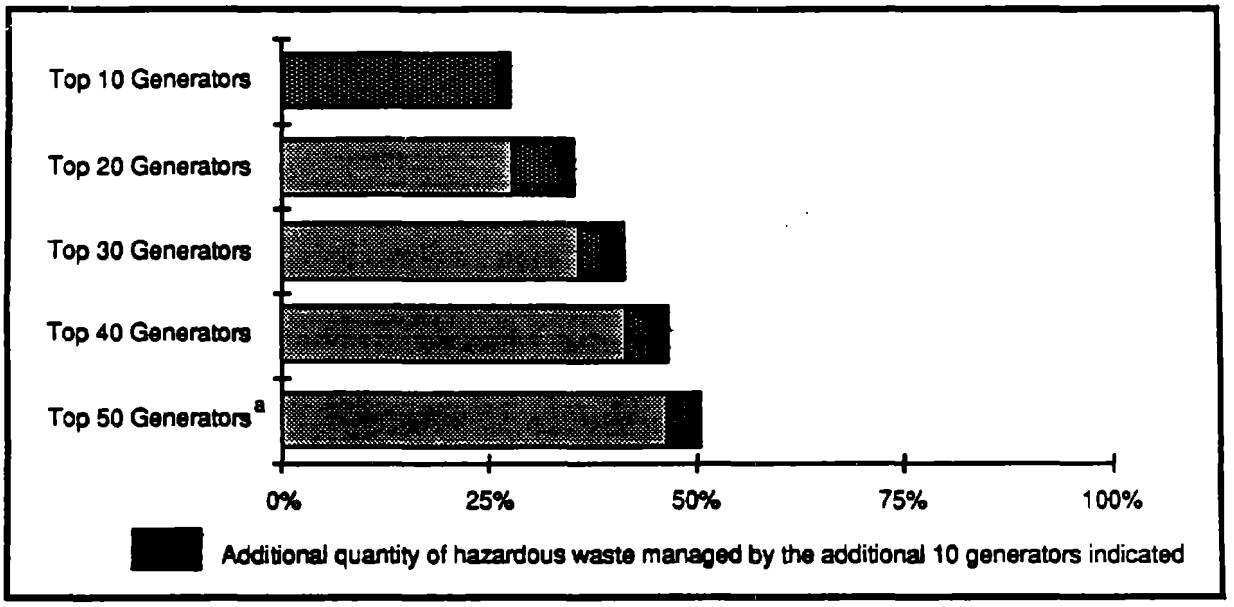
[b] 50 percent of generators each generated 147 tons or less.

[c] 75 percent of generators each generated 2,683 tons or less.

Source: GG-178 (GA27)

Chart 3.2-6 shows the quantities of hazardous waste generated by the largest generators in 1986. As the chart illustrates, the top 10 generators ranked by the quantity of hazardous waste generated (less then 0.1 percent of all generators) generated over 25 percent of all hazardous waste. The top 50 facilities, representing only 0.4 percent of all generators, generated half of all the hazardous waste generated in 1986.

Chart 3.2-6 Quantity of Hazardous Waste Generated in 1986 by the Fifty Largest Generators



[a] The top 50 generators represent the top 0.4 percent of the 12,478 generators. These 50 facilities generated 50 percent of the total quantity of hazardous waste generated in 1986.

Source: (GA27)

(This page is intentionally blank)

4 TYPES OF HAZARDOUS WASTE GENERATED

The Generator and TSDR Surveys contain data on the following types of hazardous waste:

- Waste considered hazardous under RCRA. This includes hazardous wastewater pretreated prior to discharge under a NPDES permit or to a POTW; hazardous waste generated in a production process or a waste treatment process; and a hazardous waste that is a characteristic hazardous waste even though it may lose its hazardous characteristic through mixing with other waste or by treatment.
- Waste considered hazardous by the state in which it was generated or managed.
- Waste containing PCBs, asbestos, or dioxins/furans.
- Hazardous waste mixed with radioactive waste.

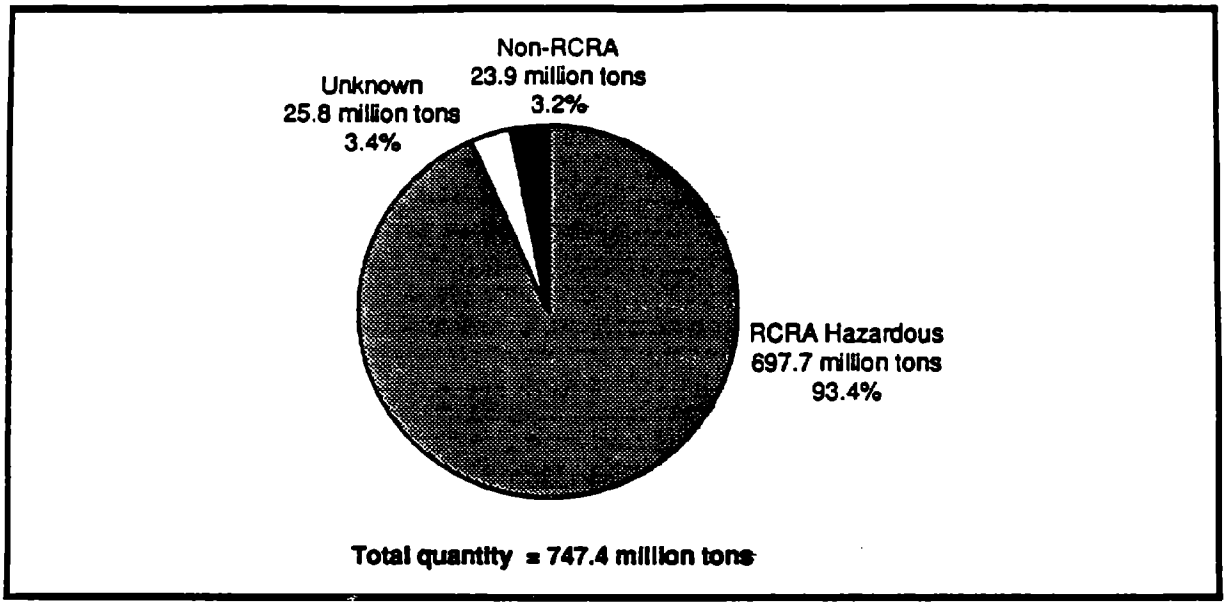
This chapter characterizes the types of hazardous waste generated in 1986.

4.1 RCRA AND NON-RCRA HAZARDOUS WASTE

Generators generated 747.4 million tons of hazardous waste in 1986. This quantity includes both RCRA and non-RCRA hazardous wastes. Non-RCRA hazardous wastes are wastes considered hazardous under state laws or under federal laws other than RCRA. If a single hazardous waste stream has both RCRA and non-RCRA hazardous constituents, the entire waste stream is considered a RCRA hazardous waste and is subject to RCRA regulations (based on the "mixture rule" in effect in 1987 when the surveys were conducted).

Chart 4.1-1 shows the quantities of RCRA and non-RCRA hazardous waste generated in 1986. Only 3.2 percent of the total quantity of hazardous waste generated, or 23.9 million tons, is non-RCRA. An additional 3.4 percent of hazardous waste generated, or 25.8 million tons, could not be classified because no hazardous waste description codes were reported in the Generator Survey.

Chart 4.1-1 Quantity of RCRA Hazardous Waste in 1986



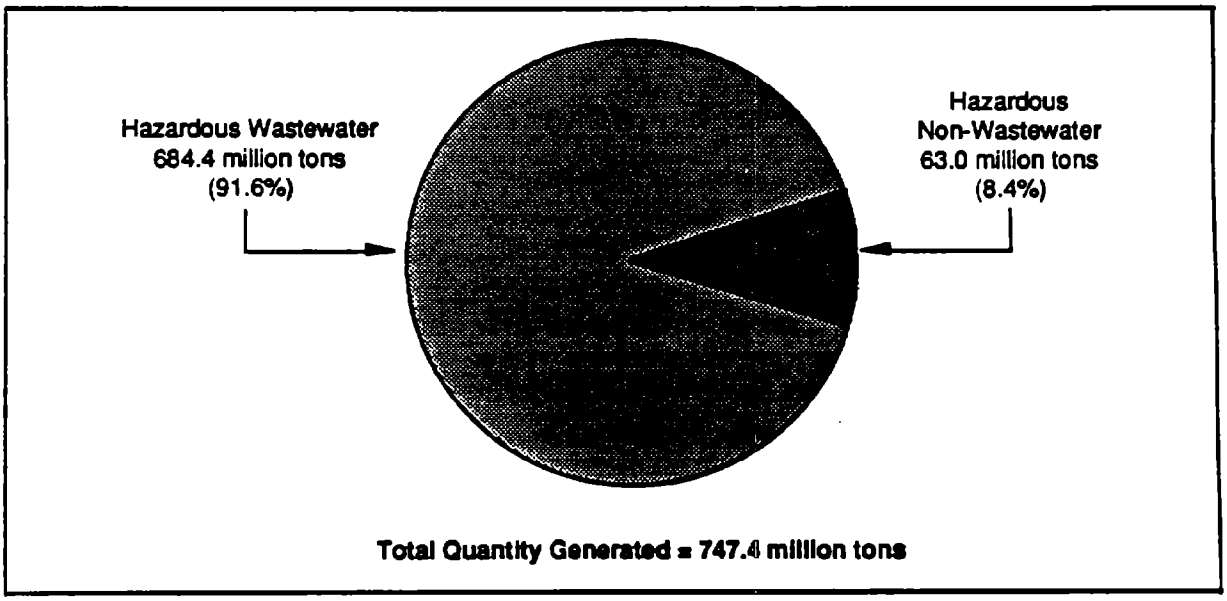
Source: GG-186 (GB10)

4.2 HAZARDOUS WASTEWATER AND NON-WASTEWATER

According to RCRA regulations, whenever hazardous wastes are introduced into nonhazardous wastes or materials, the resulting mixture is to be managed as a hazardous waste. In many instances, the hazardous materials amount to extremely small portions when mixed with nonhazardous wastewaters. Nonetheless, release of these wastes into the environment is a concern prompting their regulation under the RCRA program.

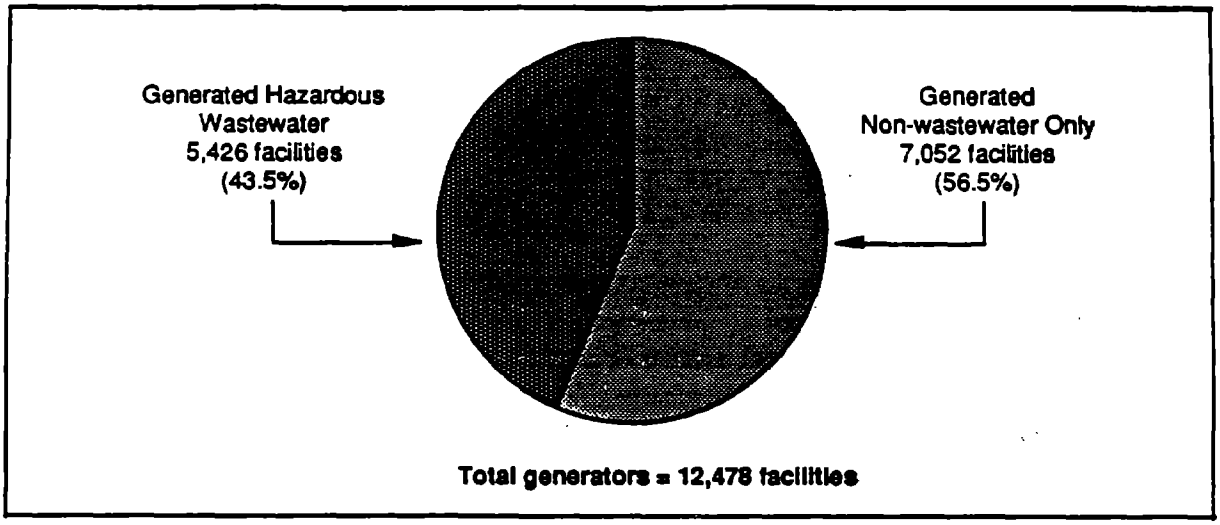
Hazardous wastewater is water mixed with hazardous waste. Chart 4.2-1 shows that 684.4 million tons of hazardous wastewater were generated in 1986. **Over 90 percent of all hazardous waste generated was wastewater. However, less than half of the generators (43.5 percent) generated hazardous wastewater in 1986 (see Chart 4.2-2).**

Chart 4.2-1 Quantity of Hazardous Wastewater Generated in 1986



Source: GG-196 (GA27, GB1, GB2)

Chart 4.2-2 Number of Facilities Generating Hazardous Wastewater in 1986

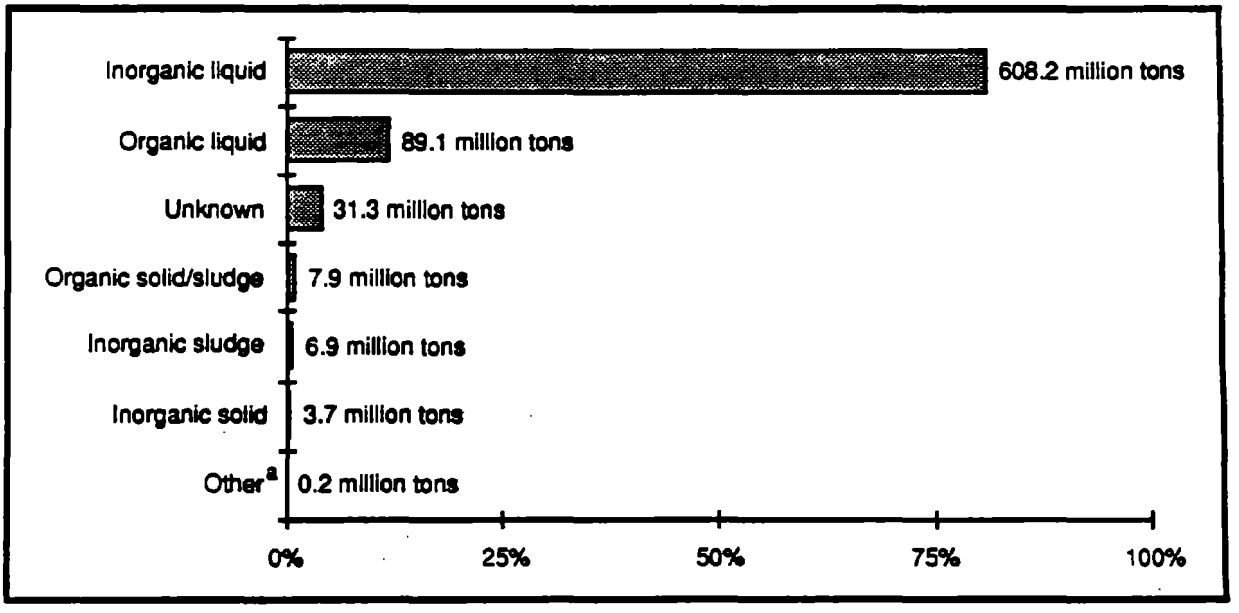


Source: GG-178 (GA20)

4.3 PHYSICAL/CHEMICAL CHARACTERISTICS

Hazardous wastes can be characterized based on their physical characteristics (e.g., solid, liquid, or sludge) and chemical characteristics (organic or inorganic). Chart 4.3-1 shows the quantities of hazardous waste generated with different combinations of physical and chemical characteristics. Over **80 percent of the hazardous waste generated (608.2 million tons) was inorganic liquid.** Inorganic liquids include caustic or acidic solutions, often containing metals. The next largest category (12 percent) of hazardous waste is organic liquids, which include organic solvents, waste oils, and petroleum products.

Chart 4.3-1 Quantity of Hazardous Waste Generated in 1986 by Physical/Chemical Characteristics



[a]Includes mixtures and gases.

Source: GG-195 (GB1, GB2, GB10)

Charts 4.3-2 to 4.3-6 show the industries generating the largest quantities of each type of hazardous waste, based on the physical/chemical characteristics of the waste. The chemical products industry (Standard Industrial Classification [SIC] 28) generated the largest quantities of inorganic liquid, organic liquid, and organic solid/sludge waste. The metal fabrications industry (SIC 34) generated the largest quantity of inorganic sludge waste, and the water transportation industry (SIC 44) was the largest generator of inorganic solid waste.

Chart 4.3-2 Industries Generating the Largest Quantities of Inorganic Liquid Hazardous Waste in 1986

SIC Code	Description	Quantity Generated (million tons)	Percentage of Total Quantity of Inorganic Liquid Hazardous Waste Generated
28	Chemical Products	294.03	48.3
36	Electronics	67.88	11.2
29	Petroleum & Coal Products	62.09	10.2
33	Primary Metals	52.67	8.7
37	Transportation Equipment	42.85	7.0
	All Other Industries	88.71	14.6
	Total Inorganic Liquid	608.24	100.0

Source: GG-195 (GB1, GB2, GB10)

Chart 4.3-3 Industries Generating the Largest Quantities of Organic Liquid Hazardous Waste in 1986

SIC Code	Description	Quantity Generated (million tons)	Percentage of Total Quantity of Organic Liquid Hazardous Waste Generated
28	Chemical Products	78.48	88.1
32	Stone, Clay, and Glass Products	3.97	4.5
34	Metal Fabrications	1.38	1.5
29	Petroleum & Coal Products	1.05	1.2
45	Air Transportation	0.89	1.0
	All Other Industries	3.36	3.8
	Total Organic Liquid	89.14	100.0

Source: GG-195 (GB1, GB2, GB10)

Chart 4.3-4 Industries Generating the Largest Quantities of Organic Solid/Sludge Hazardous Waste in 1986

SIC Code	Description	Quantity Generated (million tons)	Percentage of Total Quantity of Organic Solid/Sludge Hazardous Waste Generated
28	Chemical Products	2.44	30.8
29	Petroleum & Coal Products	2.39	30.0
25	Furniture and Fixtures	2.30	29.0
38	Instruments	0.19	2.3
	Unknown	0.14	1.8
	All Other Industries	0.48	6.1
	Total Organic Solid/Sludge	7.94	100.0

Source: GG-195 (GB1, GB2, GB10)

Chart 4.3-5 Industries Generating the Largest Quantities of Inorganic Sludge Hazardous Waste in 1986

SIC Code	Description	Quantity Generated (million tons)	Percentage of Total Quantity of Inorganic Sludge Hazardous Waste Generated
34	Metal Fabrications	2.70	39.3
36	Electronics	1.21	17.6
28	Chemical Products	1.11	16.2
33	Primary Metals	0.82	11.9
37	Transportation Equipment	0.24	3.5
	All Other Industries	0.79	11.5
	Total Inorganic Sludge	6.87	100.0

Source: GG-195 (GB1, GB2, GB10)

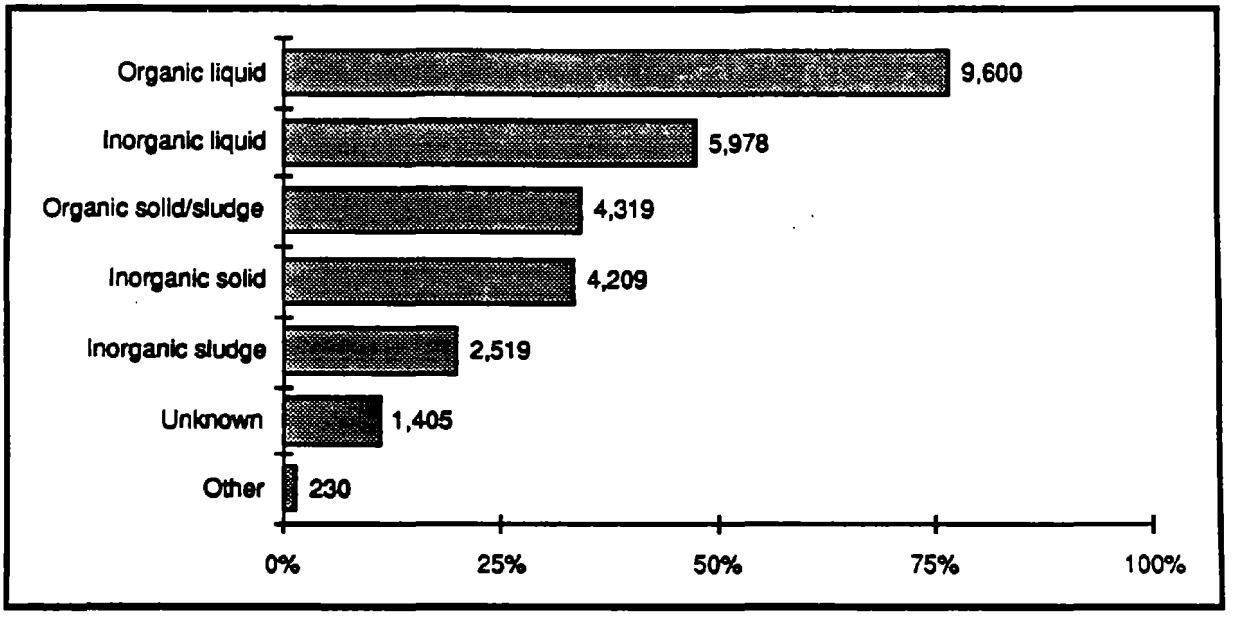
Chart 4.3-6 Industries Generating the Largest Quantities of Inorganic Solid Hazardous Waste in 1986

SIC Code	Description	Quantity Generated (million tons)	Percentage of Total Quantity of Inorganic Solid Hazardous Waste Generated
44	Water Transportation	1.55	41.3
34	Metal Fabrications	0.84	22.5
33	Primary Metals	0.35	9.4
49	Electrical, Gas, and Sanitary Services	0.30	8.0
28	Chemical Products	0.22	5.8
	All Other Industries	0.49	13.0
	Total Inorganic Solid	3.75	100.0

Source: GG-195 (GB1, GB2, GB10)

Chart 4.3-7 shows the numbers of facilities generating different types of hazardous waste based on the physical/chemical characteristics of the waste. Over 75 percent of generators, or 9,600 facilities, generated organic liquid waste. Although inorganic liquid comprised over 80 percent of the total quantity of hazardous waste generated, less than 50 percent of generators (5,978 facilities) generated inorganic liquid waste.

Chart 4.3-7 Number of Generators in 1986 by the Physical/Chemical Characteristics



Note: A single facility may generate more than one type of hazardous waste. Adding the numbers of facilities shown results in multiple counting.

Source: GG-195 (GB1, GB2)

Charts 4.3-8 to 4.3-12 show the industries with the largest numbers of facilities generating each type of hazardous waste based on the waste's physical and chemical characteristics. The chemical products industry (SIC 28) had the largest number of facilities generating organic liquid, organic solid/sludge, and inorganic solid wastes. The metal fabrications industry (SIC 34) had the largest number of facilities generating inorganic liquid and inorganic sludge wastes in 1986.

Chart 4.3-8 Industries with the Largest Numbers of Facilities Generating Organic Liquid Hazardous Waste in 1986

SIC Code	Description	Number of Generators	Percentage of Total Generators of Organic Liquid Hazardous Waste
28	Chemical Products	1,683	17.5
34	Metal Fabrications	1,122	11.7
36	Electronics	1,027	10.7
37	Transportation Equipment	735	7.7
35	Nonelectrical Machinery	602	6.3
	All Other Industries	4,431	46.2
	Total	9,600	100.0

Source: GG-195 (GB1, GB2)

Chart 4.3-9 Industries with the Largest Numbers of Facilities Generating Inorganic Liquid Hazardous Waste in 1986

SIC Code	Description	Number of Generators	Percentage of Total Generators of Inorganic Liquid Hazardous Waste
34	Metal Fabrications	1,008	16.9
28	Chemical Products	942	15.8
36	Electronics	875	14.6
37	Transportation Equipment	527	8.8
33	Primary Metals	448	7.5
	All Other Industries	4,970	83.1
	Total	5,978	100.0

Source: GG-195 (GB1, GB2)

Chart 4.3-10 Industries with the Largest Numbers of Facilities Generating Organic Solid/Sludge Hazardous Waste in 1986

SIC Code	Description	Number of Generators	Percentage of Total Generators of Organic Solid/Sludge Hazardous Waste
28	Chemical Products	939	21.7
36	Electronics	359	8.3
34	Metal Fabrications	338	7.8
37	Transportation Equipment	284	6.6
35	Nonelectrical Machinery	263	6.1
	All Other Industries	2,136	49.5
	Total	4,319	100.0

Source: GG-195 (GB1, GB2)

Chart 4.3-11 Industries with the Largest Numbers of Facilities Generating Inorganic Solid Hazardous Waste in 1986

SIC Code	Description	Number of Generators	Percentage of Total Generators of Inorganic Solid Hazardous Waste
28	Chemical Products	639	15.2
36	Electronics	508	12.1
34	Metal Fabrications	461	11.0
49	Electrical, Gas, and Sanitary Services	432	10.3
33	Primary Metals	270	6.4
	All Other Industries	1,899	45.1
	Total	4,209	100.0

Source: GG-195 (GB1, GB2)

Chart 4.3-12 Industries with the Largest Numbers of Facilities Generating Inorganic Sludge Hazardous Waste in 1986

SIC Code	Description	Number of Generators	Percentage of Total Generators of Inorganic Sludge Hazardous Waste
34	Metal Fabrications	639	25.4
36	Electronics	418	16.6
33	Primary Metals	263	10.4
37	Transportation Equipment	221	8.8
28	Chemical Products	181	7.2
	All Other Industries	797	31.6
	Total	2,519	100.0

Source: GG-195 (GB1, GB2)

4.4 HAZARDOUS CHARACTERISTICS

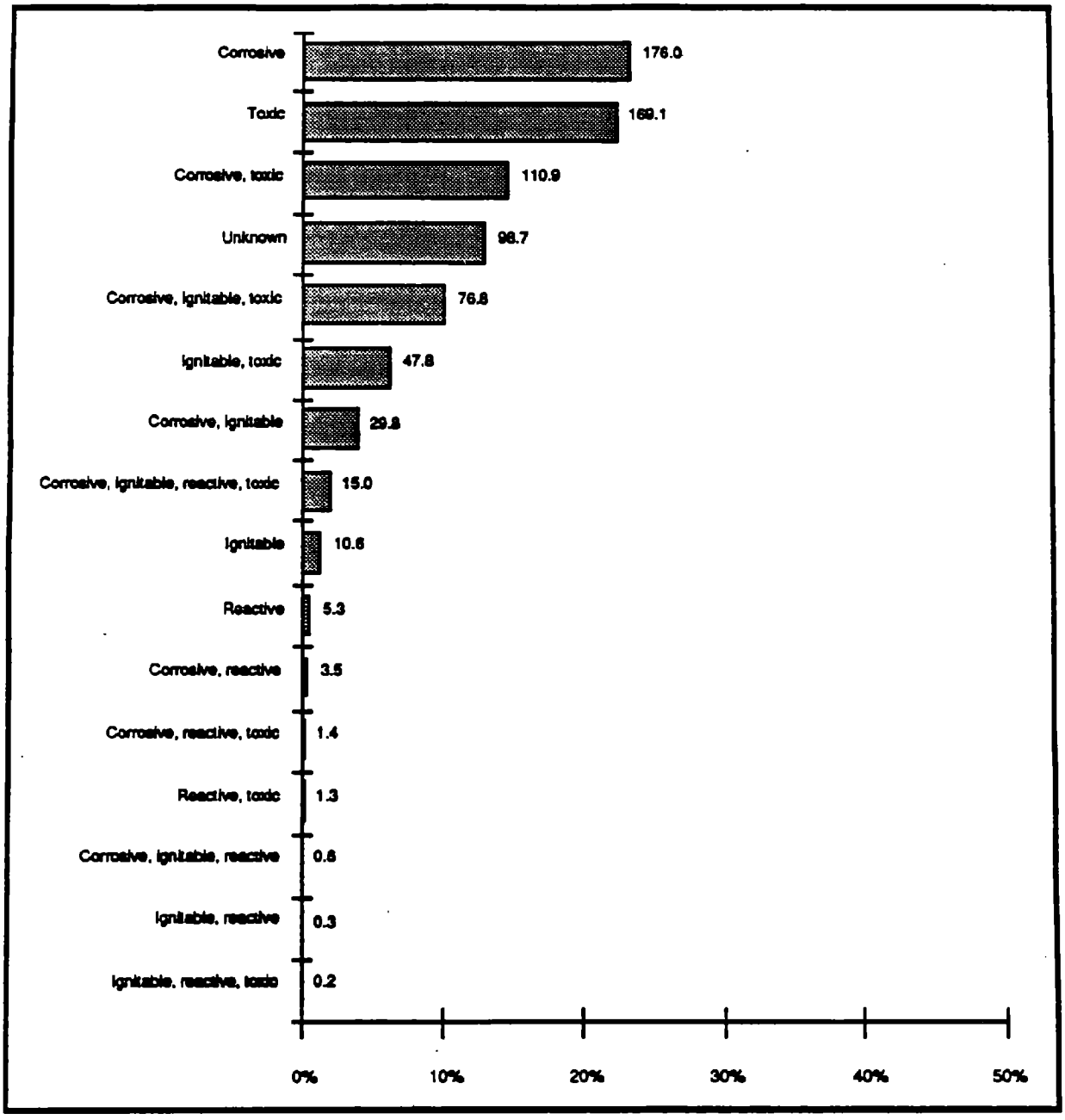
RCRA regulations classified wastes as hazardous based on four hazard characteristics:

- toxic,
- ignitable,
- reactive, and
- corrosive.

A single waste can exhibit more than one hazard characteristic. For example, certain organic solvents regulated under RCRA are both toxic and ignitable.

Chart 4.4-1 shows the quantities of hazardous wastes generated in 1986 exhibiting each RCRA hazard characteristics. As the chart indicates, the largest quantities of hazardous waste are corrosive and toxic. Over 60 percent of hazardous wastes generated were corrosive, toxic, or corrosive and toxic.

Chart 4.4-1 Quantity of Hazardous Waste Generated in 1986 by RCRA Hazard Characteristic

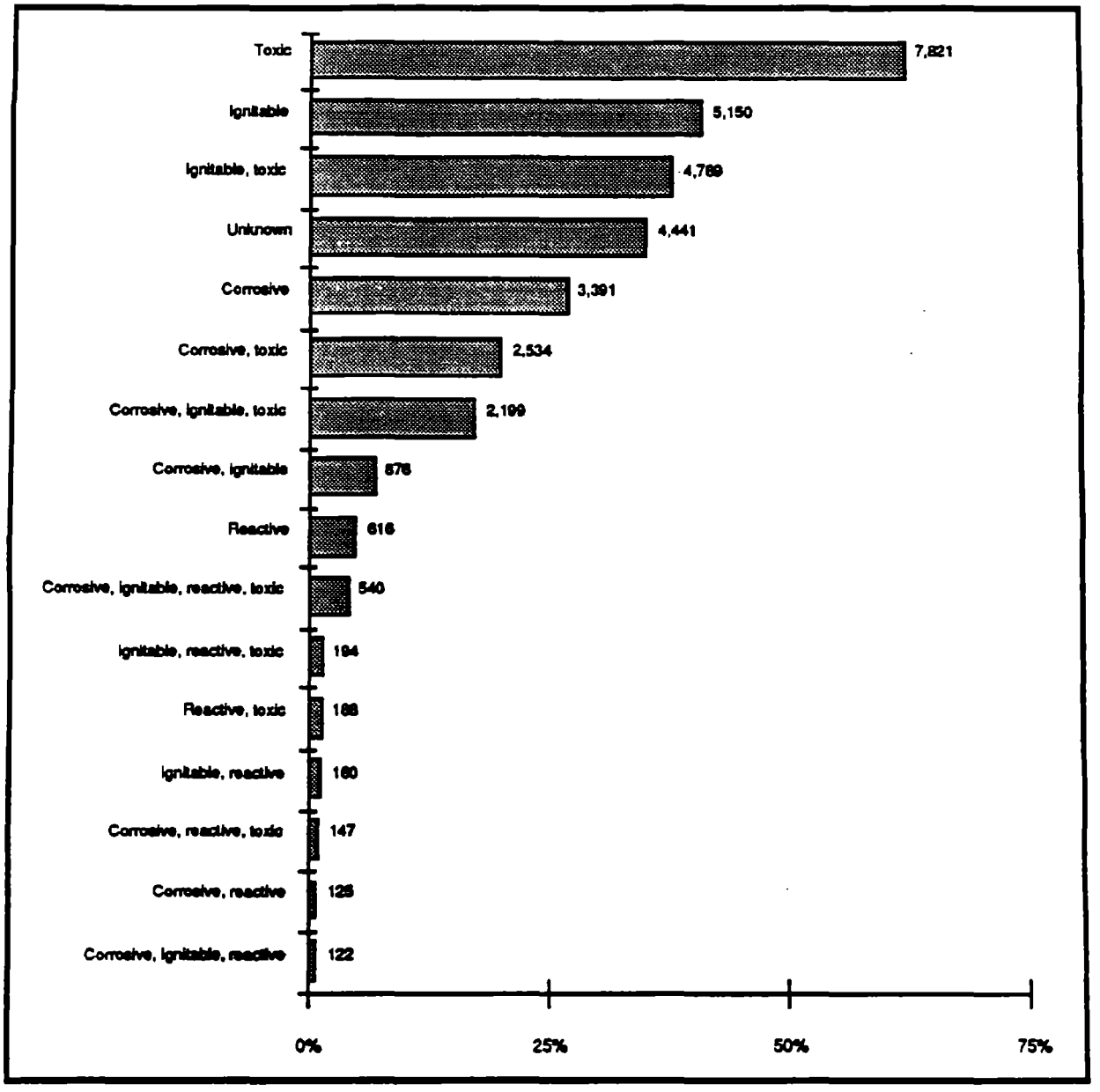


Note: Numbers next to bars indicate the quantity of hazardous waste generated in million tons.

Source: GG-186 (GB1, GB10)

Chart 4.4-2 shows the numbers of generators by the hazard characteristics of their hazardous waste. Over 62 percent of generators generated toxic hazardous wastes. Ignitable wastes and wastes that are ignitable and toxic were also common, generated by 41 percent and 38 percent of generators, respectively.

Chart 4.4-2 Number of Hazardous Waste Generators in 1986 by RCRA Hazard Characteristic of Wastes Generated



Notes: A single facility may generate more than one type of hazardous waste. Adding the numbers of facilities shown results in multiple counting.

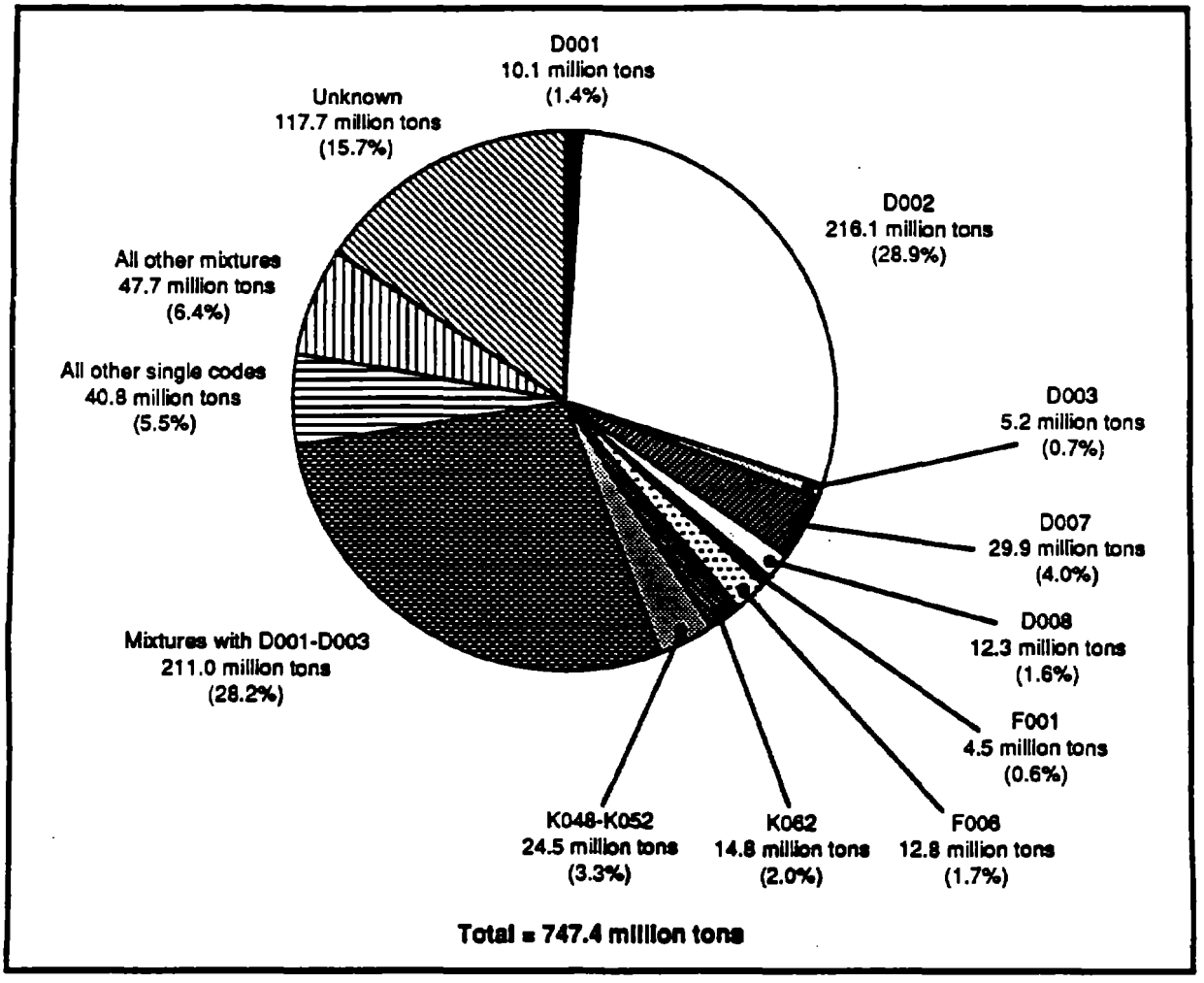
Numbers next to bars indicate the number of hazardous waste generators.

Source: GG-186 (GB1)

4.5 RCRA WASTE CODES

The RCRA regulations assign a four-digit code to each type of RCRA hazardous waste (40 CFR 261.3). A single hazardous waste can have more than one RCRA waste code if, for example, it contains more than one hazardous constituent or the waste is both specifically listed as hazardous and exhibits a hazard characteristic. Charts 4.5-1 and 4.5-2 show the quantities of hazardous waste generated in 1986 by these RCRA waste codes. Chart 4.5-1 highlights some of the largest categories of RCRA waste codes, including D002 (corrosive) and mixtures of D001, D002, and D003 (ignitable, corrosive, and reactive, respectively). Appendix B defines the RCRA waste codes used in the surveys.

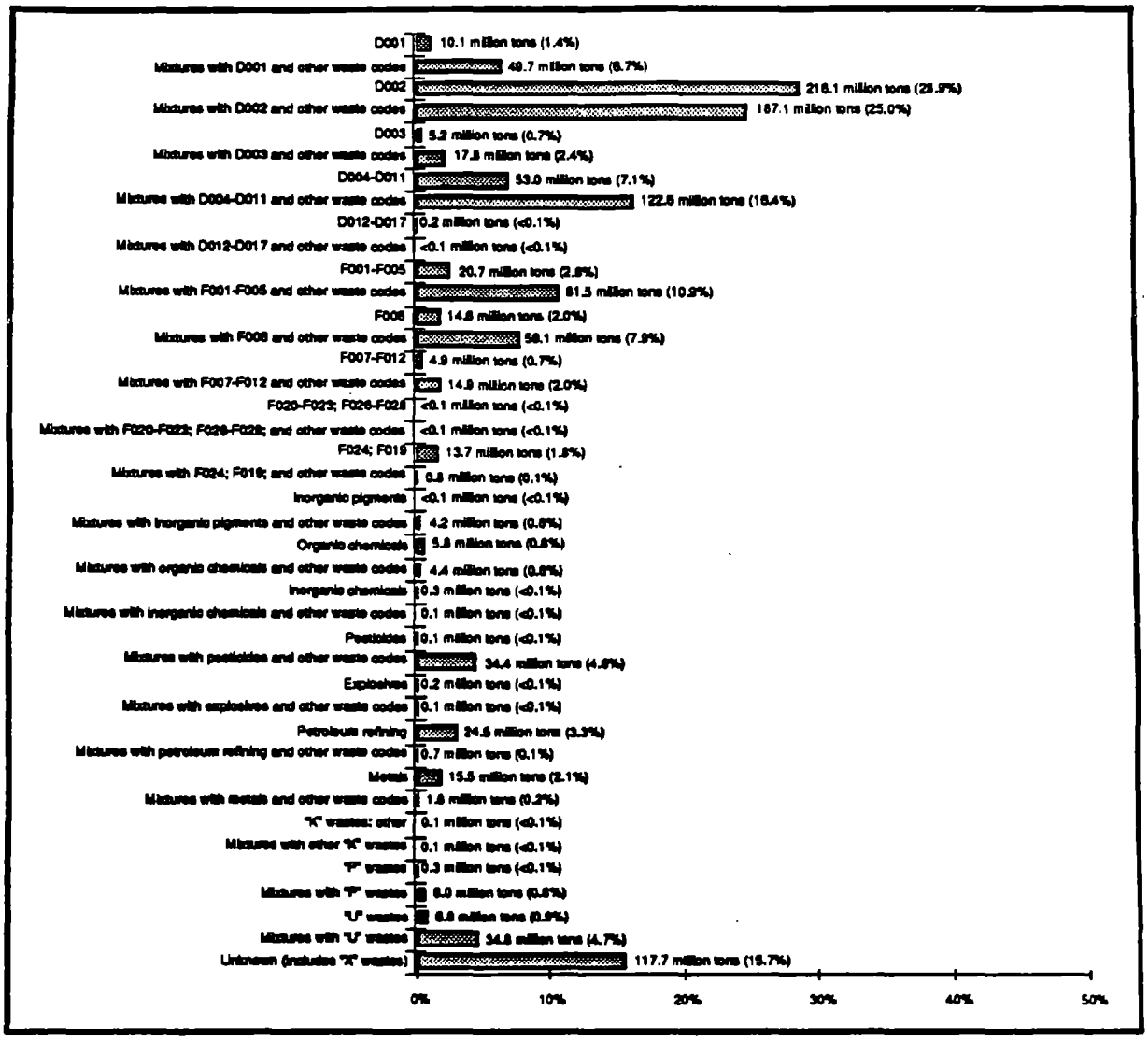
Chart 4.5-1 Quantity of Hazardous Waste Generated in 1986 by RCRA Waste Code[a]



[a] See Appendix B for a definition of RCRA waste codes.

Source: GG-193 (GB10)

Chart 4.5-2 Quantity of Hazardous Waste Generated in 1986 by RCRA Waste Code Groups



Notes: Sums of quantities and percentages exceed 747.4 million tons and 100 percent, respectively, due to multiple counting of wastes.

"K" waste code groups:

- inorganic pigments: K002-K008
- organic chemicals: K009-K011; K013-K030; K083, K085; K093-K096; K103-K105; K111-K118; K136
- inorganic chemicals: K071; K073; K106
- pesticides: K031-K043; K097-K099
- explosives: K044-K047
- petroleum refining: K048-K052
- metals: K061; K062; K069; K100
- other: all other K-only wastes

Waste codes listed above are defined in Section 261 of RCRA as hazardous wastes. Only wastes listed as of 1986 are included in this chart.

Source: GG-192 (GB1, GB10)

(This page is intentionally blank)

5 SOURCES OF HAZARDOUS WASTE GENERATED

In 1986, 12,478 generators were "large" quantity generators (generators) of hazardous waste. This chapter describes these generators, including their locations, the industries they represent, their ownership type, and their activities that generate hazardous waste.

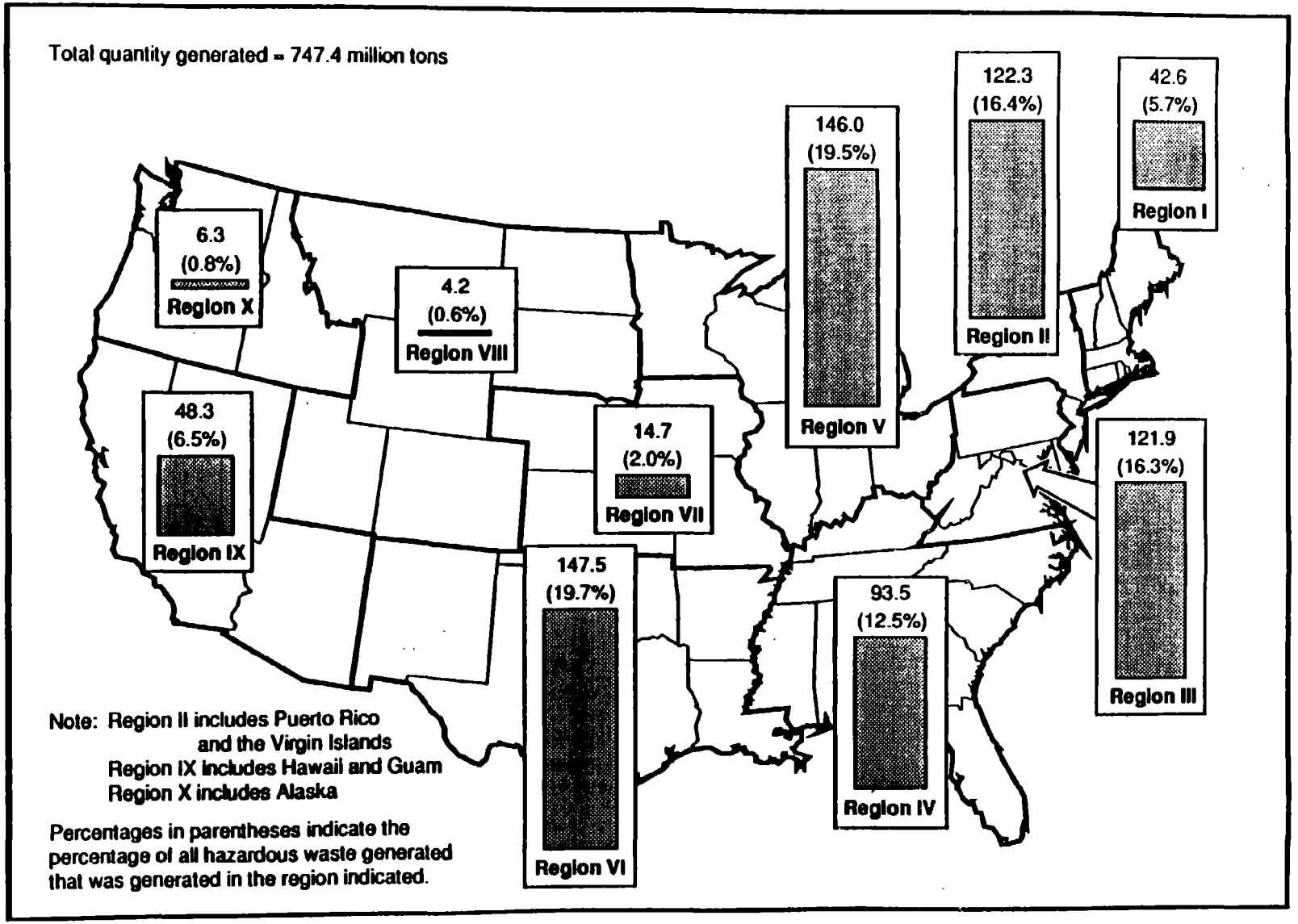
5.1 LOCATION OF HAZARDOUS WASTE GENERATORS

Hazardous waste generation is concentrated along the Gulf of Mexico, the Great Lakes, and the East Coast, although every region of the United States had at least some hazardous waste generation in 1986. Chart 5.1-1 shows the quantity of hazardous waste generated in each EPA region in 1986. Regions V and VI generated the largest quantities of hazardous waste—generating 146 million tons and 147.5 million tons, respectively. Other regions generating large quantities of hazardous waste include Region II (122.3 million tons) and Region III (121.9 million tons).

Chart 5.1-2 shows the number of hazardous waste generators in each region in 1986. Region V had the largest concentration of generators with 2,727 generators, or over 20 percent of the total number of generators. Regions IV and IX had the next largest number of generators, each having about 14 percent of the total number of generators.

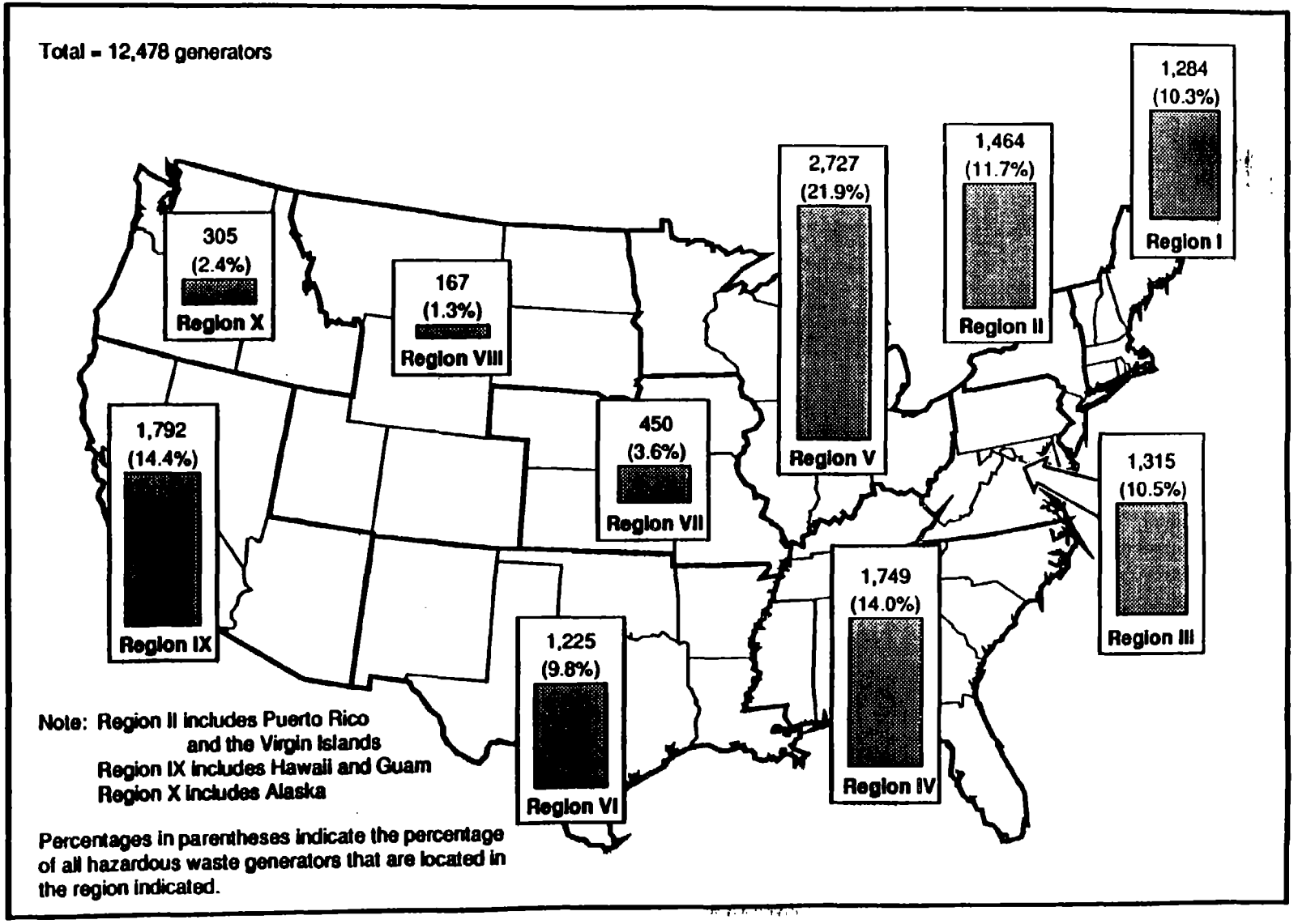
Charts 5.1-3 to 5.1-6 show the quantity of hazardous waste generated and the number of hazardous waste generators for each state in 1986. Texas generated the largest quantity of hazardous waste, generating 106.19 million tons or over 14 percent of the total quantity generated. California had the largest number of hazardous waste generators, with 1,672 generators or over 13 percent of the national total.

Chart 5.1-1 Quantity of Hazardous Waste Generated per EPA Region in 1986 (in million tons)



Source: GG-184 (GA27)

Chart 5.1-2 Number of Hazardous Waste Generators per EPA Region in 1986



Source: GG-184 (GA2, GA5, GA27, GB10)

Chart 5.1-3 Quantity of Hazardous Waste Generated by State in 1986

State	Quantity Generated (million tons)	Percentage of Total Quantity	State Rank
Alabama	9.10	1.2	18
Alaska	<0.01[a]	<0.1[b]	51
Arizona	6.69	0.9	22
Arkansas	0.96	0.1	41
California	41.56	5.6	4
Colorado	1.80	0.2	36
Connecticut	13.72	1.8	16
Delaware	0.91	0.1	42
District of Columbia	<0.01[a]	<0.1[b]	52
Florida	6.81	0.9	21
Georgia	16.62	2.2	14
Guam	0.00	0.0	53
Hawaii	0.04	<0.1[b]	46
Idaho	1.78	0.2	37
Illinois	28.34	3.8	11
Indiana	16.55	2.2	15
Iowa	2.42	0.3	33
Kansas	4.00	0.5	28
Kentucky	19.22	2.6	13
Louisiana	36.19	4.8	7
Maine	13.38	1.8	17
Maryland	5.76	0.8	23
Massachusetts	5.61	0.8	24
Michigan	62.99	8.4	3
Minnesota	2.90	0.4	32
Mississippi	4.31	0.6	27
Missouri	7.74	1.0	19
Montana	0.01	<0.1[b]	49
Nebraska	0.58	0.1	44
Nevada	0.04	<0.1[b]	47
New Hampshire	4.48	0.6	26
New Jersey	87.36	11.7	2
New Mexico	1.07	0.1	40
New York	33.60	4.5	9
North Carolina	2.13	0.3	35
North Dakota	0.18	<0.1[b]	45
Ohio	31.35	4.2	10
Oklahoma	3.11	0.4	31
Oregon	1.19	0.2	39
Pennsylvania	39.32	5.3	6
Puerto Rico	1.30	0.2	38
Rhode Island	4.72	0.6	25
South Carolina	6.98	0.9	20
South Dakota	0.03	<0.1[b]	48
Tennessee	28.33	3.8	12
Texas	106.19	14.2	1
Utah	2.24	0.3	34
Vermont	0.88	0.1	43
Virgin Island	0.00	0.0	54
Virginia	41.07	5.5	5
Washington	3.33	0.4	30
West Virginia	34.80	4.7	8
Wisconsin	3.89	0.5	29
Wyoming	0.01	<0.1[b]	50
Total	747.39	100.0	

[a]Less than 10,000 tons of hazardous waste were generated in these states in 1986.
[b]Less than 0.1 percent of the total quantity of hazardous waste generated in 1986 was generated in these states.
Source: GG-184 (GA27)

Chart 5.1-4 Quantity of Hazardous Waste Generated by State in 1986, in Descending Order

State	Quantity Generated (million tons)	Percentage of Total Quantity
Texas	106.19	14.2
New Jersey	87.36	11.7
Michigan	62.99	8.4
California	41.56	5.6
Virginia	41.07	5.5
Pennsylvania	39.32	5.3
Louisiana	36.19	4.8
West Virginia	34.80	4.7
New York	33.60	4.5
Ohio	31.35	4.2
Illinois	28.34	3.8
Tennessee	28.33	3.8
Kentucky	19.22	2.6
Georgia	16.62	2.2
Indiana	16.55	2.2
Connecticut	13.72	1.8
Maine	13.38	1.8
Alabama	9.10	1.2
Missouri	7.74	1.0
South Carolina	6.98	0.9
Florida	6.81	0.9
Arizona	6.69	0.9
Maryland	5.76	0.8
Massachusetts	5.61	0.8
Rhode Island	4.72	0.6
New Hampshire	4.48	0.6
Mississippi	4.31	0.6
Kansas	4.00	0.5
Wisconsin	3.69	0.5
Washington	3.33	0.4
Oklahoma	3.11	0.4
Minnesota	2.90	0.4
Iowa	2.42	0.3
Utah	2.24	0.3
North Carolina	2.13	0.3
Colorado	1.80	0.2
Idaho	1.78	0.2
Puerto Rico	1.30	0.2
Oregon	1.19	0.2
New Mexico	1.07	0.1
Arkansas	0.96	0.1
Delaware	0.91	0.1
Vermont	0.68	0.1
Nebraska	0.58	0.1
North Dakota	0.16	<0.1[b]
Nevada	0.04	<0.1[b]
Hawaii	0.04	<0.1[b]
South Dakota	0.03	<0.1[b]
Wyoming	0.01	<0.1[b]
Montana	0.01	<0.1[b]
Alaska	<0.01[a]	<0.1[b]
District of Columbia	<0.01[a]	<0.1[b]
Guam	0.00	0.0
Virgin Island	0.00	0.0
Total	747.39	100.0

[a]Less than 10,000 tons of hazardous waste were generated in these states in 1986.
[b]Less than 0.1 percent of the total quantity of hazardous waste generated in 1986 was generated in these states.
Source: GG-184 (GA27)

Chart 5.1-5 Number of Hazardous Waste Generators by State in 1986

State	Number of Generators	Percentage of Total Number	State Rank
Alabama	162	1.3	23
Alaska	9	0.1	48
Arizona	88	0.7	33
Arkansas	106	0.8	28
California	1,672	13.4	1
Colorado	68	0.5	35
Connecticut	315	2.5	13
Delaware	27	0.2	42
District of Columbia	6	0.0	52
Florida	244	2.0	15
Georgia	202	1.6	18
Guam	0	0.0	53
Hawaii	17	0.1	44
Idaho	13	0.1	46
Illinois	685	5.5	5
Indiana	371	3.0	11
Iowa	106	0.8	29
Kansas	95	0.8	32
Kentucky	167	1.3	22
Louisiana	149	1.2	25
Maine	58	0.5	39
Maryland	156	1.3	24
Massachusetts	678	5.4	6
Michigan	474	3.8	9
Minnesota	214	1.7	17
Mississippi	97	0.8	30
Missouri	198	1.6	19
Montana	11	0.1	47
Nebraska	50	0.4	40
Nevada	16	0.1	45
New Hampshire	88	0.7	34
New Jersey	864	6.9	2
New Mexico	24	0.2	43
New York	540	4.3	8
North Carolina	406	3.3	10
North Dakota	7	0.1	50
Ohio	654	5.2	7
Oklahoma	97	0.8	31
Oregon	112	0.9	26
Pennsylvania	838	6.7	4
Puerto Rico	61	0.5	38
Rhode Island	112	0.9	27
South Carolina	173	1.4	20
South Dakota	8	0.1	49
Tennessee	298	2.4	14
Texas	848	6.8	3
Utah	66	0.5	36
Vermont	34	0.3	41
Virgin Island	0	0.0	54
Virginia	224	1.8	16
Washington	171	1.4	21
West Virginia	65	0.5	37
Wisconsin	329	2.6	12
Wyoming	7	0.1	51
Total	12,478	100.0	

Source: GG-184 (GA2, GA5, GA27, GB10)

Chart 5.1-6 Number of Hazardous Waste Generators by State in 1986, in Descending Order

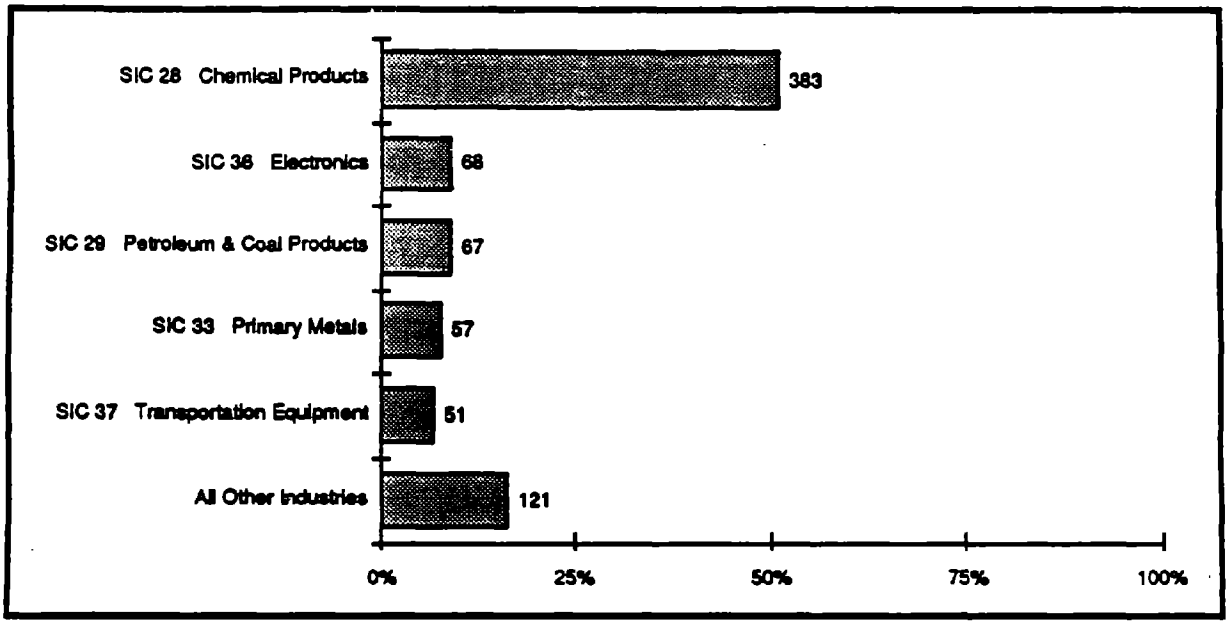
State	Number of Generators	Percentage of Total Number
California	1,672	13.4
New Jersey	864	6.9
Texas	848	6.8
Pennsylvania	838	6.7
Illinois	685	5.5
Massachusetts	678	5.4
Ohio	654	5.2
New York	540	4.3
Michigan	474	3.8
North Carolina	406	3.3
Indiana	371	3.0
Wisconsin	329	2.6
Connecticut	315	2.5
Tennessee	298	2.4
Florida	244	2.0
Virginia	224	1.8
Minnesota	214	1.7
Georgia	202	1.6
Missouri	198	1.6
South Carolina	173	1.4
Washington	171	1.4
Kentucky	167	1.3
Alabama	162	1.3
Maryland	156	1.3
Louisiana	149	1.2
Oregon	112	0.9
Rhode Island	112	0.9
Arkansas	106	0.8
Iowa	106	0.8
Mississippi	97	0.8
Oklahoma	97	0.8
Kansas	95	0.8
Arizona	88	0.7
New Hampshire	88	0.7
Colorado	68	0.5
Utah	66	0.5
West Virginia	65	0.5
Puerto Rico	61	0.5
Maine	58	0.5
Nebraska	50	0.4
Vermont	34	0.3
Delaware	27	0.2
New Mexico	24	0.2
Hawaii	17	0.1
Nevada	16	0.1
Idaho	13	0.1
Montana	11	0.1
Alaska	9	0.1
South Dakota	8	0.1
North Dakota	7	0.1
Wyoming	7	0.1
District of Columbia	6	<0.1
Guam	0	0.0
Virgin Island	0	0.0
Total	12,478	100.0

Source: GG-184 (GA2, GA5, GA27, GB10)

5.2 INDUSTRIES GENERATING HAZARDOUS WASTE

Chart 5.2-1 shows the five industries (based on two-digit SIC codes) that generated the largest quantities of hazardous waste in 1986. **The chemical products industry (SIC 28) generated 383 million tons of hazardous waste, over half of all hazardous waste generated in the U.S. in 1986.** The other industries in Chart 5.2-1 (electronics, petroleum and coal products, primary metals, and transportation equipment) each generated between 7 and 9 percent of the total quantity of hazardous waste.

Chart 5.2-1 Largest General Industries by the Quantity of Hazardous Waste Generated



Note: Numbers following bars indicate the quantity of hazardous waste generated in million tons.
Source: GG-190 (GA6, GA27)

Charts 5.2-2 to 5.2-11 provide greater detail on the quantities of hazardous waste generated by the five largest industries. Charts 5.2-2, 5.2-4, 5.2-6, 5.2-8, and 5.2-10 show the specific industries (defined by four-digit SIC code) generating the largest quantities of hazardous waste in each of the top five general industries (two-digit SIC codes) specified in Chart 5.2-1. These charts provide more specific information on the types of activities that generate hazardous waste.

Charts 5.2-3, 5.2-5, 5.2-7, 5.2-9, and 5.2-11 indicate the types of hazardous waste generated by the top five industries from Chart 5.2-1. The charts classify hazardous wastes based on their physical (i.e., liquid, solid, or sludge) and chemical (i.e., organic or inorganic) characteristics. For each of the top five industries, inorganic liquid waste was the largest quantity of hazardous waste generated.

Chart 5.2-2 Most Common Specific Industries in the Chemical Products Industry (SIC 28) by the Quantity of Hazardous Waste Generated in 1986 (by 4-Digit SIC)

SIC	Description	Quantity Generated (million tons)	Percentage of Total Quantity for Industry (SIC 28)	Number of Generators
2869	Organic Chemical	160.55	41.9	266
2821	Plastics and Resins	69.99	18.3	258
2892	Explosives	28.08	7.3	24
2865	Cyclic Crudes	27.98	7.3	63
2812	Alkalies and Chlorine Chemical Products	18.80	4.9	37
	All Other Chemical Products Industries	77.99	20.3	1,485
	Total Chemical Products Industry	383.39	100.0	2,133

Source: GG-190 (GA6, GA27)

Chart 5.2-3 Quantity of Hazardous Waste Generated by the Chemical Products Industry (SIC 28) in 1986 by Physical/Chemical Characteristics

Physical/Chemical Characteristic	Quantity Generated (million tons)	Percentage of Total Quantity for SIC 28
Inorganic Liquid	294.03	76.7
Organic Liquid	78.48	20.5
Organic Solid/Sludge	2.44	0.6
Unknown	2.31	0.6
Inorganic Sludge	1.11	0.3
Inorganic Solid	0.22	0.1
Other[a]	0.01	<0.1
Total Chemical Products Industry	383.39	100.0

[a]Includes mixtures and gases.
Source: GG-195 (GB1, GB2, GB10)

Chart 5.2-4 Most Common Specific Industries in the Electronics Industry (SIC 36) by the Quantity of Hazardous Waste Generated in 1986 (by 4-Digit SIC)

SIC	Description	Quantity Generated (million tons)	Percentage of Total Quantity for Industry (SIC 36)	Number of Generators
3674	Semiconductors	34.20	50.2	168
3679	Electronic Components	12.49	18.3	263
3639	Household Appliances	4.23	6.2	11
3672	TV Pictures Tubes	2.73	4.0	10
3661	Telephone Apparatus	2.23	3.3	34
	All Other Electronics Industries	12.25	18.0	715
	Total Electronics Industry	68.13	100.0	1,201

Source: GG-190 (GA6, GA27)

Chart 5.2-5 Quantity of Hazardous Waste Generated by the Electronics Industry (SIC 36) in 1986 by Physical/Chemical Characteristics

Physical/Chemical Characteristic	Quantity Generated (million tons)	Percentage of Total Quantity for SIC 36
Inorganic Liquid	67.88	99.6
Inorganic Sludge	1.21	1.8
Organic Liquid	0.49	0.7
Inorganic Solid	0.06	0.1
Unknown	0.03	0.1
Organic Solid/Sludge	0.01	<0.1
Other[a]	0.01	<0.1
Total Electronics Industry	68.13	100.0

[a]Includes mixtures and gases.
Source: GG-195 (GB1, GB2, GB10)

Chart 5.2-6 Most Common Specific Industries in the Petroleum and Coal Industry (SIC 29) by the Quantity of Hazardous Waste Generated in 1986 (by 4-Digit SIC)

SIC	Description	Quantity Generated (million tons)	Percentage of Total Quantity for Industry (SIC 29)	Number of Generators
2911	Petroleum Refining	65.18	98.0	203
2999	Petroleum and Coal Products	1.25	1.9	30
2992	Lubricating Oils and Greases	0.10	0.2	24
	All Other Petroleum and Coal Industries	0.01	<0.1	4
	Total Petroleum and Coal Industry	66.54	100.0	261

Source: GG-190 (GA6, GA27)

Chart 5.2-7 Quantity of Hazardous Waste Generated by the Petroleum and Coal Industry (SIC 29) in 1986 by Physical/Chemical Characteristics

Physical/Chemical Characteristic	Quantity Generated (million tons)	Percentage of Total Quantity for SIC 29
Inorganic Liquid	62.09	93.3
Organic Solid/Sludge	2.39	3.6
Organic Liquid	1.05	1.6
Other[a]	0.14	0.2
Inorganic Sludge	0.13	0.2
Inorganic Solid	0.09	0.1
Unknown	0.05	0.1
Total Petroleum and Coal Industry	66.54	100.0

[a]Includes mixtures and gases.
Source: GG-195 (GB1, GB2, GB10)

Chart 5.2-8 Most Common Specific Industries in the Primary Metals Industry (SIC 33) by the Quantity of Hazardous Waste Generated in 1986 (by 4-Digit SIC)

SIC	Description	Quantity Generated (million tons)	Percentage of Total Quantity for Industry (SIC 33)	Number of Generators
3312	Blast Furnaces and Steel Mills	30.46	53.2	107
3321	Gray Iron Foundries	5.78	10.1	66
3361	Aluminum Foundries	5.44	9.5	5
3315	Steel Wire	3.04	5.3	57
3317	Steel Pipe and Tubes	2.20	3.8	48
	All Other Primary Metal Industries	10.35	18.1	448
	Total Primary Metal Industries	57.27	100.0	731

Source: GG-190 (GA6, GA27)

Chart 5.2-9 Quantity of Hazardous Waste Generated by the Primary Metals Industry (SIC 33) in 1986 by Physical/Chemical Characteristics

Physical/Chemical Characteristic	Quantity Generated (million tons)	Percentage of Total Quantity for SIC 33
Inorganic Liquid	52.67	92.0
Unknown	0.95	1.7
Inorganic Sludge	0.82	1.4
Inorganic Solid	0.35	0.6
Organic Liquid	0.03	0.1
Organic Solid/Sludge	0.02	<0.1
Other[a]	<0.01	<0.1
Total Primary Metals Industry	57.27	100.0

[a]Includes mixtures and gases.
Source: GG-195 (GB1, GB2, GB10)

Chart 5.2-10 Most Common Specific Industries in the Transportation Equipment Industry (SIC 37) by the Quantity of Hazardous Waste Generated in 1986 (by 4-Digit SIC)

SIC	Description	Quantity Generated (million tons)	Percentage of Total Quantity for Industry (SIC 37)	Number of Generators
3721	Aircraft	15.31	30.0	62
3711	Motor Vehicle Bodies	12.79	25.0	98
3714	Motor Vehicle Parts	9.92	19.4	256
3724	Aircraft Parts	5.49	10.7	52
	All Other Transportation Equipment Industries	7.57	14.9	320
	Total Transportation Equipment Industry	51.08	100.0	788

Source: GG-190 (GA6, GA27)

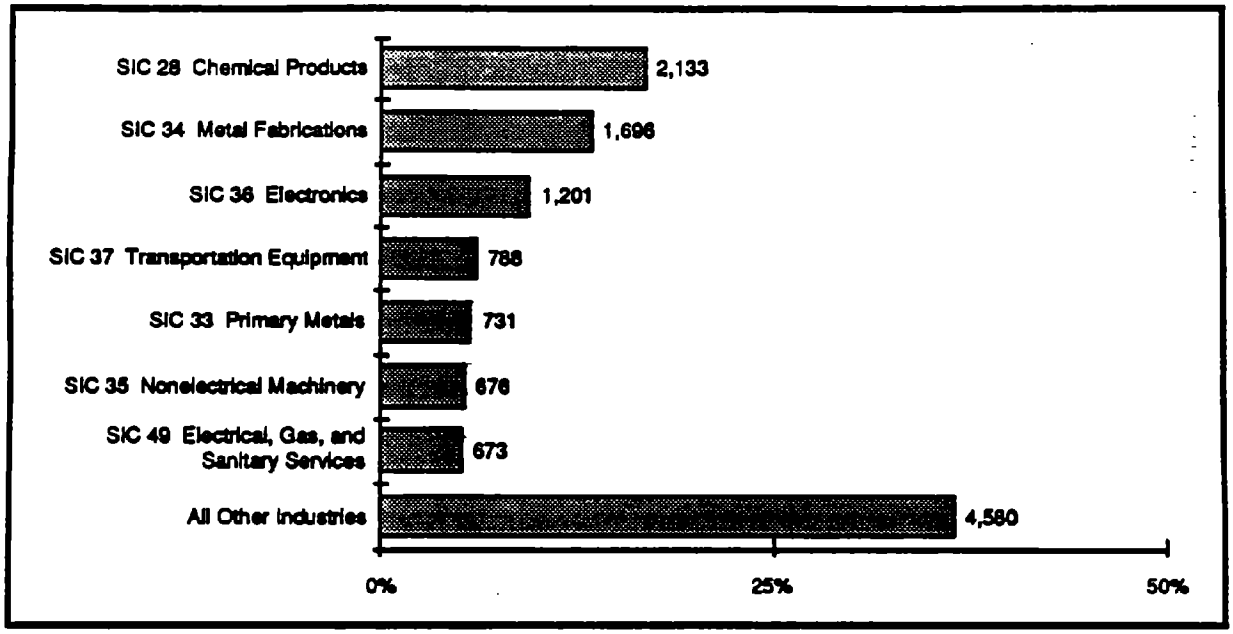
Chart 5.2-11 Quantity of Hazardous Waste Generated by the Transportation Equipment Industry (SIC 37) in 1986 by Physical/Chemical Characteristics

Physical/Chemical Characteristic	Quantity Generated (million tons)	Percentage of Total Quantity for SIC 37
Inorganic Liquid	42.85	83.9
Unknown	1.81	3.5
Organic Liquid	0.64	1.3
Inorganic Sludge	0.24	0.5
Inorganic Solid	0.07	0.1
Organic Solid/Sludge	0.03	0.1
Other[a]	0.01	<0.1
Total Transportation Equipment Industry	51.08	100.0

[a]Includes mixtures and gases.
Source: GG-195 (GB1, GB2, GB10)

Chart 5.2-12 indicates the industries with the largest numbers of hazardous waste generators in 1986. The chemical products industry (SIC 28), which generated the largest quantity of hazardous waste in 1986 (see Chart 5.2-1) also had the largest number of hazardous waste generators. Although the chemical products industry generated over half of all hazardous waste, it included only 17 percent of all generators. Other industries with large numbers of generators include the metal fabrications (SIC 34) and electronics (SIC 36) industries, with 14 percent and 10 percent of all hazardous waste generators, respectively.

Chart 5.2-12 Largest General Industries by the Number of Hazardous Waste Generators in 1986



Note: Numbers following bars indicate number of hazardous waste generators.
Source: GG-190 (GA6).

Charts 5.2-13, 5.2-15, 5.2-17, 5.2-19, and 5.2-21 provide additional information on industries with the largest numbers of hazardous waste generators. For each of the top five general industries (defined by two-digit SIC codes) from Chart 5.2-12, the specific industries (four-digit SIC codes) with the largest numbers of generators are shown.

Charts 5.2-14, 5.2-16, 5.2-18, and 5.2-20 indicate the types of hazardous waste generated by the top five industries from Chart 5.2-12. The charts classify hazardous wastes based on their physical (i.e., liquid, solid, or sludge) and chemical (i.e., organic or inorganic) characteristics. For the chemical products, metal fabrications, electronics, and transportation equipment industries, organic liquid waste was generated by the largest number of facilities. Inorganic liquid was generated by the largest number of facilities in the primary metals industry.

Chart 5.2-13 Most Common Specific Industries in the Chemical Products Industry (SIC 28) by the Number of Hazardous Waste Generators in 1986 (by 4-Digit SIC)

SIC	Description	Number of Generators	Percentage of Total Generators for Industry (SIC 28)	Quantity Managed (million tons)
2851	Paints	441	20.7	0.49
2869	Industrial Organic Chemicals	266	12.5	160.55
2821	Plastics and Resins	258	12.1	69.99
2899	Chemical Preparations	168	7.9	1.04
2893	Printing Ink	131	6.1	0.01
	All Other Chemical Products Industries	869	40.7	151.31
	Total Chemical Products Industry	2,133	100.0	383.39

Source: GG-190 (GA6, GA27)

Chart 5.2-14 Number of Facilities in the Chemical Products Industry (SIC 28) Generating Hazardous Waste in 1986 by Physical/Chemical Characteristics

Physical/Chemical Characteristic	Number of Generators	Percentage of Total Generators for SIC 28
Organic Liquid	1,683	78.9
Inorganic Liquid	942	44.2
Organic Solid/Sludge	939	44.0
Inorganic Solid	639	30.0
Unknown	235	11.0
Inorganic Sludge	181	8.5
Other[a]	62	2.9

[a]Includes mixtures and gases.

Note: A single facility can generate more than one type of hazardous wastes. Therefore, adding the numbers of generators results in multiple counting.

Source: GG-195 (GB1, GB2, GB10)

Chart 5.2-15 Most Common Specific Industries in the Metal Fabrication Industry (SIC 34) by the Number of Hazardous Waste Generators in 1986 (by 4-Digit SIC)

SIC	Description	Number of Generators	Percentage of Total Generators for Industry (SIC 34)	Quantity Managed (million tons)
3471	Plating and Polishing	427	25.2	14.72
3499	Fabricated Metal Products	139	8.2	1.67
3479	Metal Coating	138	8.1	4.83
3451	Screw Machine Products	114	6.7	0.27
	All Other Metal Fabrication Industries	878	51.8	26.48
	Total Metal Fabrication Industry	1,696	100.0	47.97

Source: GG-190 (GA6, GA27)

Chart 5.2-16 Number of Facilities in the Metal Fabrications Industry (SIC 34) Generating Hazardous Waste in 1986 by Physical/Chemical Characteristics

Physical/Chemical Characteristic	Number of Generators	Percentage of Total Generators for SIC 34
Organic Liquid	1,122	66.2
Inorganic Liquid	1,008	59.4
Inorganic Sludge	639	37.7
Inorganic Solid	461	27.2
Organic Solid/Sludge	338	19.9
Unknown	137	8.1
Other[a]	9	0.5

[a]Includes mixtures and gases.

Note: A single facility can generate more than one type of hazardous wastes. Therefore, adding the numbers of generators results in multiple counting.

Source: GG-195 (GB1, GB2, GB10)

Chart 5.2-17 Most Common Specific Industries in the Electronics Industry (SIC 36) by the Number of Hazardous Waste Generators in 1986 (by 4-Digit SIC)

SIC	Description	Number of Generators	Percentage of Total Generators for Industry (SIC 36)	Quantity Managed (million tons)
3679	Electronic Components	263	21.9	12.49
3674	Semiconductors	168	14.0	34.20
3629	Electrical Industrial Apparatus	90	7.5	0.16
3662	Radio and TV Equipment	66	5.5	1.40
3621	Motors and Generators	54	4.5	0.49
	All Other Electronics Industries	560	46.6	19.39
	Total Electronics Industry	1,201	100.0	68.13

Source: GG-190 (GA6, GA27)

Chart 5.2-18 Number of Facilities in the Electronics Industry (SIC 36) Generating Hazardous Waste in 1986 by Physical/Chemical Characteristics

Physical/Chemical Characteristic	Number of Generators	Percentage of Total Generators for SIC 36
Organic Liquid	1,027	85.5
Inorganic Liquid	875	72.9
Inorganic Solid	508	42.3
Inorganic Sludge	418	34.8
Organic Solid/Sludge	359	29.9
Unknown	122	10.2
Other[a]	34	2.8

[a]Includes mixtures and gases.

Note: A single facility can generate more than one type of hazardous wastes. Therefore, adding the numbers of generators results in multiple counting.

Source: GG-195 (GB1, GB2 GB10)

Chart 5.2-19 Most Common Specific Industries in the Transportation Equipment Industry (SIC 37) by the Number of Hazardous Waste Generators in 1986 (by 4-Digit SIC)

SIC	Description	Number of Generators	Percentage of Total Generators for Industry (SIC 37)	Quantity Managed (million tons)
3714	Motor Vehicle Parts	256	32.5	9.92
3728	Aircraft Equipment	124	15.7	1.74
3711	Motor Vehicle Bodies	98	12.4	12.79
3721	Aircraft	62	7.9	15.31
3724	Aircraft Parts	52	6.6	0.00
	All Other Transportation Equipment Industries	196	24.9	11.32
	Total Transportation Equipment Industry	788	100.0	51.08

Source: GG-190 (GA6, GA27)

Chart 5.2-20 Number of Facilities in the Transportation Equipment Industry (SIC 37) Generating Hazardous Waste in 1986 by Physical/Chemical Characteristics

Physical/Chemical Characteristic	Number of Generators	Percentage of Total Generators for SIC 37
Organic Liquid	735	93.3
Inorganic Liquid	527	66.9
Organic Solid/Sludge	284	36.0
Inorganic Solid	267	33.9
Inorganic Sludge	221	28.0
Unknown	79	10.0
Other[a]	11	1.4

[a]Includes mixtures and gases.

Note: A single facility can generate more than one type of hazardous wastes. Therefore, adding the numbers of generators results in multiple counting.

Source: GG-195 (GB1, GB2, GB10)

Chart 5.2-21 Most Common Specific Industries in the Primary Metals Industry (SIC 33) by the Number of Hazardous Waste Generators in 1986 (by 4-Digit SIC)

SIC	Description	Number of Generators	Percentage of Total Generators for Industry (SIC 33)	Quantity Managed (million tons)
3312	Blast Furnace and Steel Mills	107	14.6	30.46
3321	Gray Iron Foundries	66	9.0	5.78
3399	Primary Metal Products	62	8.5	1.62
3341	Secondary Nonferrous Metals	60	8.2	0.93
3315	Steel Wire	57	7.8	3.04
	All Other Primary Metals Industries	379	51.9	15.44
	Total Primary Metal Industry	731	100.0	57.27

Source: GG-190 (GA6, GA27)

Chart 5.2-22 Number of Facilities in the Primary Metals Industry (SIC 33) Generating Hazardous Waste in 1986 by Physical/Chemical Characteristics

Physical/Chemical Characteristic	Number of Generators	Percentage of Total Generators for SIC 33
Inorganic Liquid	448	61.3
Organic Liquid	378	51.7
Inorganic Solid	270	36.9
Inorganic Sludge	263	36.0
Organic Solid/Sludge	136	18.6
Unknown	71	9.7
Other[a]	5	0.7

[a]Includes mixtures and gases.

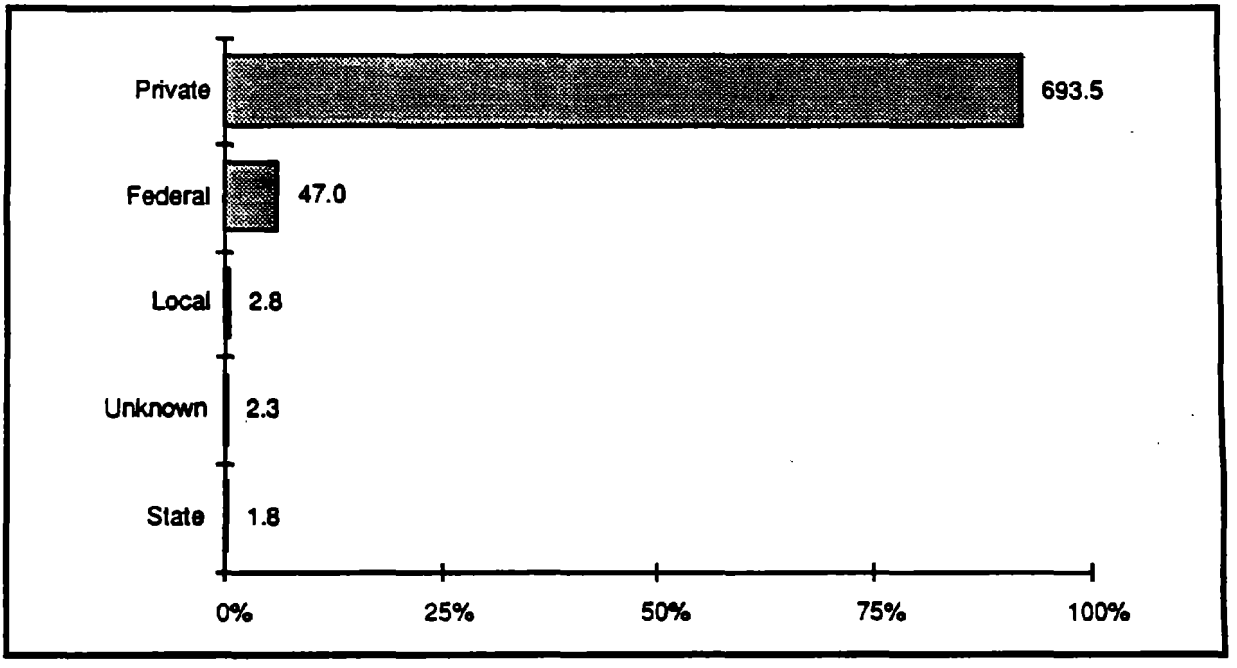
Note: A single facility can generate more than one type of hazardous wastes. Therefore, adding the numbers of generators results in multiple counting.

Source: GG-195 (GB1, GB2, GB10)

5.3 OWNERSHIP TYPE

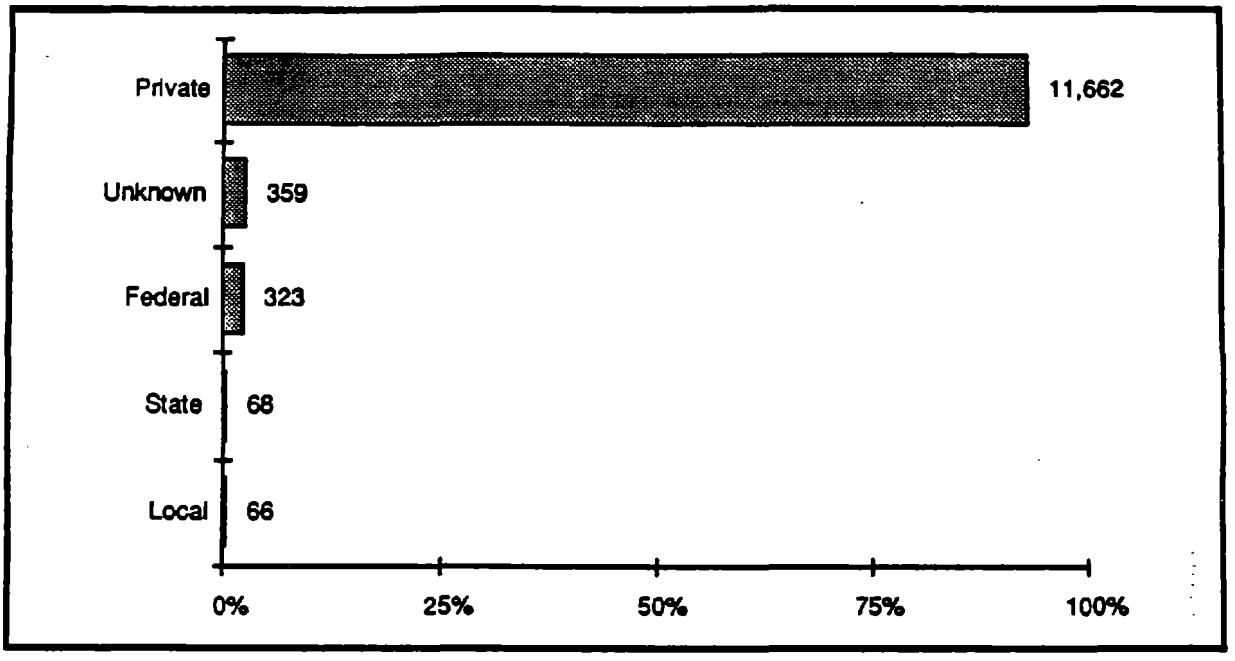
Over 93 percent (11,662) of the generators of hazardous waste in 1986 were privately owned companies. These facilities generated 693.5 million tons of hazardous waste in 1986, 93 percent of all hazardous waste generated. Federally owned facilities was the the next most common type of generator. Over 300 federally owned facilities (2.6 percent of generators) generated 47 million tons of hazardous waste in 1986, or 6.3 percent of all hazardous waste. Charts 5.3-1 and 5.3-2 present these findings.

Chart 5.3-1 Quantity of Hazardous Waste Generated in 1986 by Ownership Type



Note: Numbers following bars indicate quantity of hazardous waste generated in million tons.
Source: GG-188 (GA8, GA27)

Chart 5.3-2 Number of Hazardous Waste Generators in 1986 by Ownership Type



Note: Numbers following bars indicate number of hazardous waste generators.
Source: GG-188 (GA8)

5.4 ACTIVITIES GENERATING HAZARDOUS WASTE

Activities generating hazardous waste can be grouped as primary or secondary and as routine or nonroutine. Primary sources of hazardous waste include all production-related activities at a facility. Secondary sources are waste management activities (e.g., ash generated from incineration of hazardous waste). Routine sources are activities that occur regularly as part of business activity, including waste from process operations and routine cleaning and maintenance activities. Non-routine sources are activities that occur sporadically, such as a the closure of a tank or the discontinuation of a production line.

Chart 5.4-1 sorts the quantity of hazardous waste generated by the type of activity that generated the waste. Over 70 percent of all hazardous waste (528.8 million tons) was generated through primary/routine activities. Charts 5.4-2 to 5.4-6 show the most common waste-generating activities (by the quantity of hazardous waste generated) for each category of wastes in Chart 5.4-1.

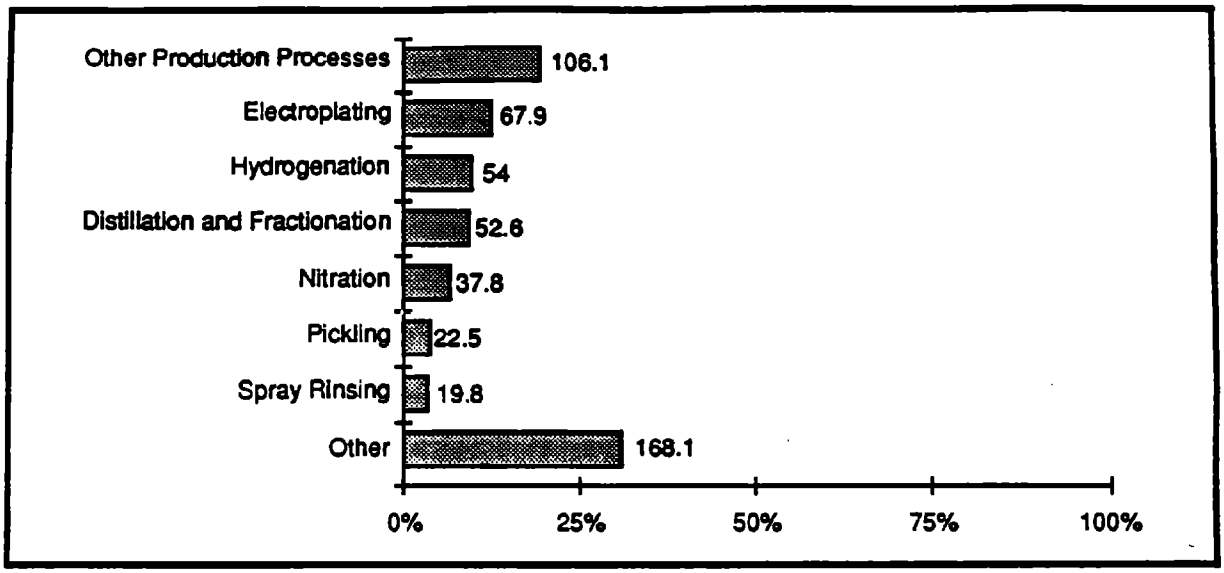
Chart 5.4-1 Quantity of Hazardous Waste Generated in 1986 by the Activity Generating the Waste (million tons)

Waste Source Category	Routine	Non-Routine	Unknown	Total
Primary	528.8	11.1	0.0	539.9
Secondary	126.7	5.2	0.0	131.9
Unknown	0.0	4.1	71.5	75.6
Total	655.5	20.4	71.5	747.4

Note: Primary sources of hazardous waste are production-related activities. Secondary sources are waste management activities. Routine sources are activities that occur regularly as part of business activity. Non-routine sources are activities that occur sporadically (e.g., spills, closure of a tank, etc.).

Source: GG-187 (GB4, GB10)

Chart 5.4-2 Most Common Sources of Primary/Routine[a] Hazardous Waste Generation by Quantity Generated in 1986

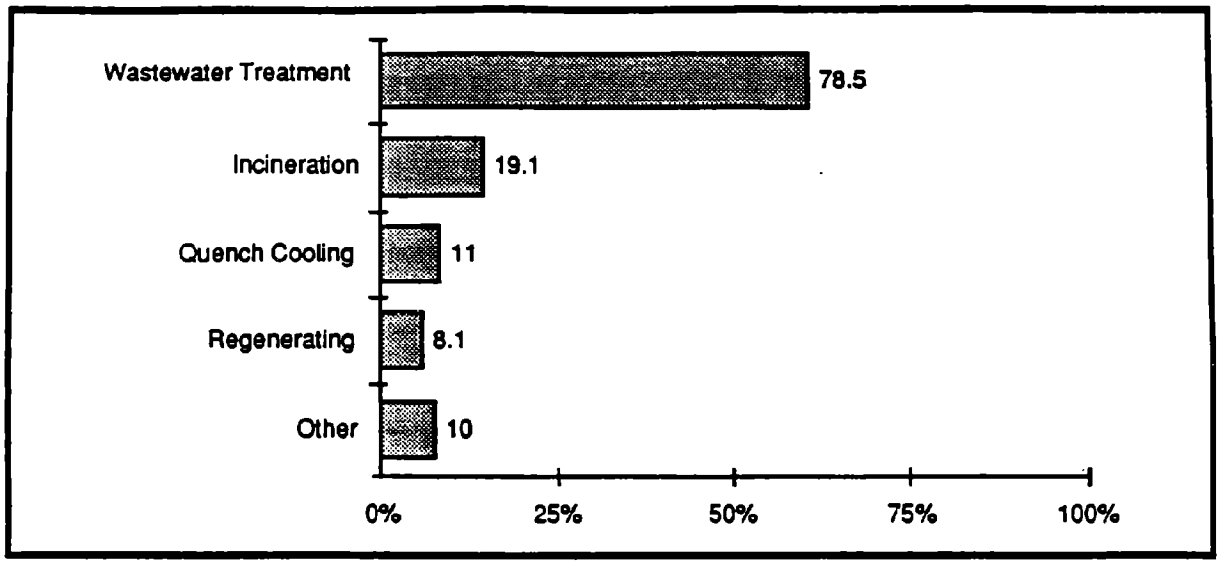


Note: Bars show the percentage of the total quantity of hazardous waste from primary/routine sources that was generated by the type of source indicated. Numbers following bars indicate quantity of hazardous waste generated in million tons.

[a]Primary/routine sources of hazardous waste are production-related activities that occur regularly as part of business activity.

Source: GG-187 (GB4, GB10)

Chart 5.4-3 Most Common Sources of Secondary/Routine[a] Hazardous Waste Generation by the Quantity Generated in 1986

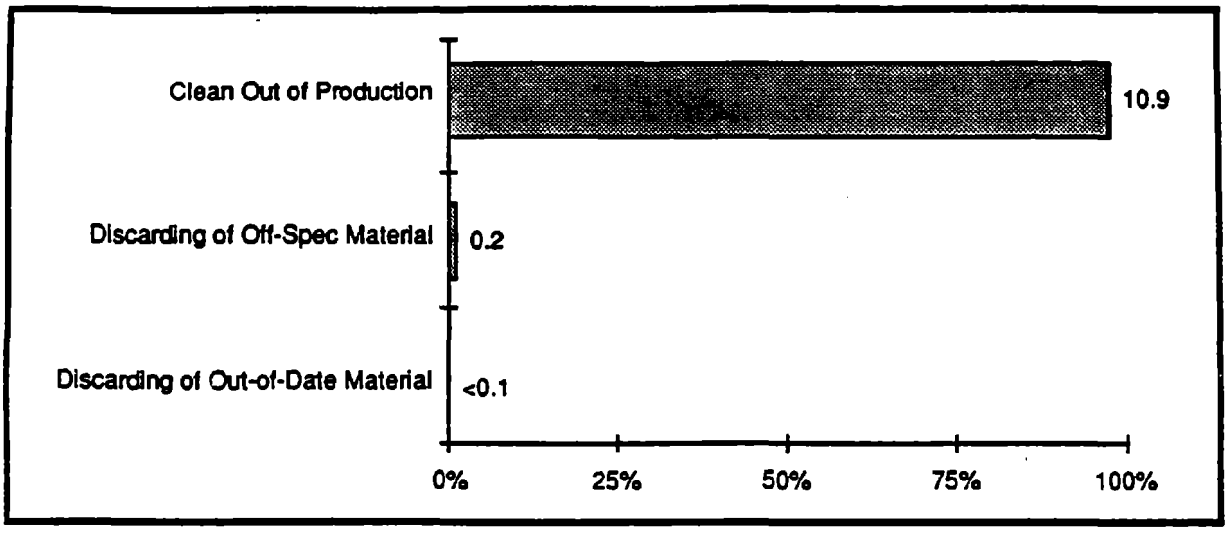


Note: Bars show the percentage of the total quantity of hazardous waste from secondary/routine sources that was generated by the type of source indicated. Numbers following bars indicate quantity of hazardous waste generated in million tons.

[a]Secondary/routine sources of hazardous waste are waste management activities that occur routinely as part of business activity.

Source: GG-187 (GB4, GB10)

Chart 5.4-4 Most Common Sources of Primary/Non-Routine[a] Hazardous Waste Generation by the Quantity Generated in 1986

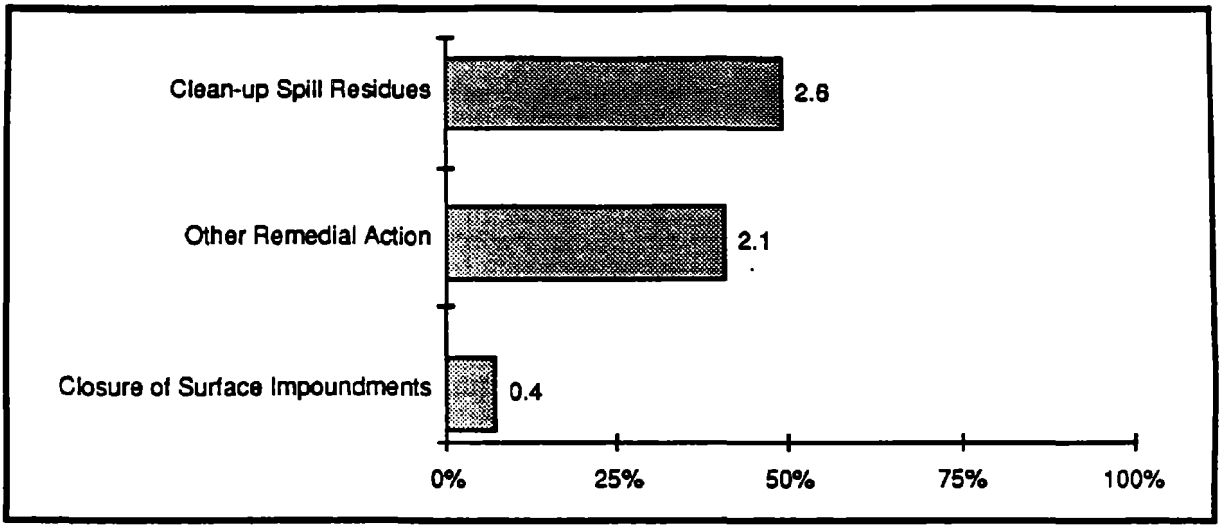


Note: Bars show the percentage of the total quantity of hazardous waste from primary/non-routine sources that was generated by the type of source indicated. Numbers following bars indicate quantity of hazardous waste generated in million tons.

[a]Primary/non-routine sources of hazardous waste are production-related activities that occur sporadically (e.g., accidental or one-time activities).

Source: GG-187 (GB4, GB10)

Chart 5.4-5 Most Common Sources of Secondary/Non-Routine[a] Hazardous Waste Generation by the Quantity Generated in 1986

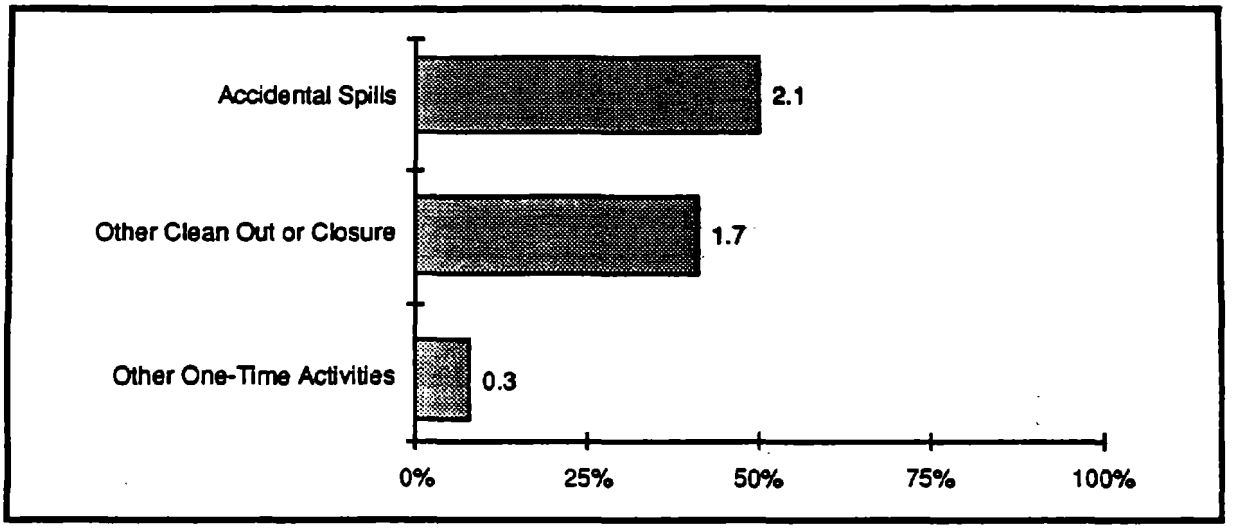


Note: Bars show the percentage of the total quantity of hazardous waste from secondary/non-routine sources that was generated by the type of source indicated. Numbers following bars indicate quantity of hazardous waste generated in million tons.

[a]Secondary/non-routine sources of hazardous waste are waste management activities for wastes that occur sporadically (e.g., from accidental or one-time activities).

Source: GG-187 (GB4, GB10)

Chart 5.4-6 Most Common Unknown Sources of Non-Routine[a] Hazardous Waste Generation by the Quantity Generated in 1986



Note: Bars show the percentage of the total quantity of hazardous waste from unknown/non-routine sources that was generated by the type of source indicated. Numbers following bars indicate quantity of hazardous waste generated in million tons.

[a]Unknown/non-routine sources of hazardous waste are activities that occur sporadically and cannot be categorized as primary (production-related) or secondary (waste management).

Source: GG-187 (GB4, GB10)

Chart 5.4-7 shows the number of generators by the source of the hazardous waste they generated: primary or secondary and routine or non-routine. **Over 80 percent of generators (10,221 facilities) generated hazardous waste from primary/routine sources.** Charts 5.4-8 to 5.4-12 show the waste generating activities conducted by the largest numbers of generators for each category of generators in Chart 5.4-7.

Chart 5.4-7 Number of Generators in 1986 by the Source of their Hazardous Waste

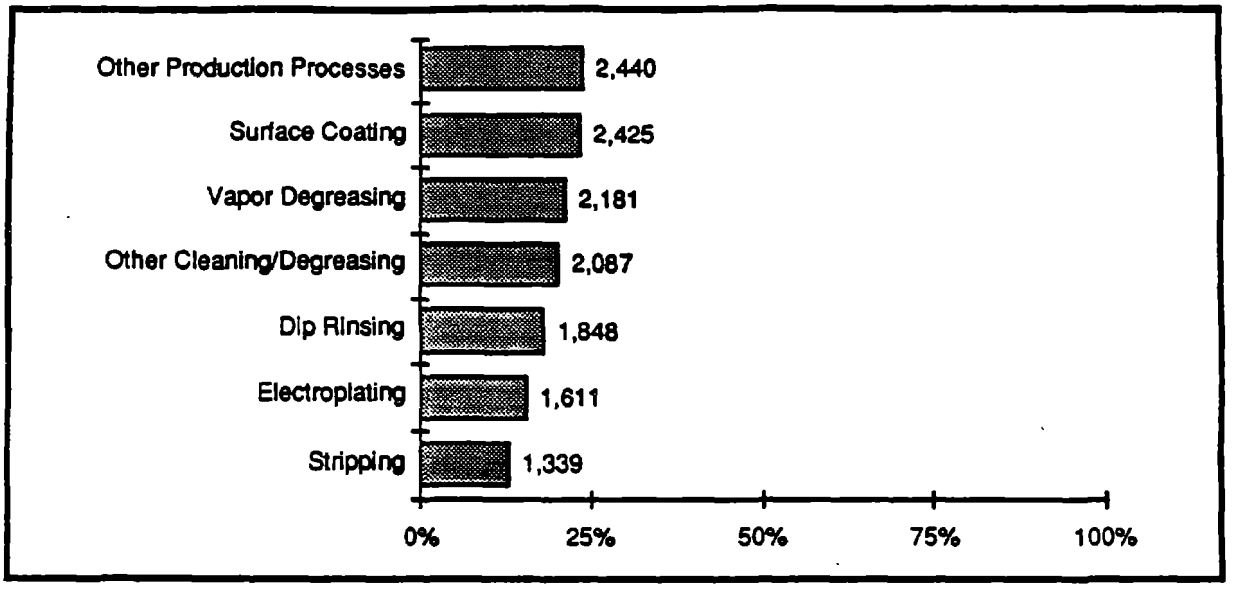
Waste Source Category	Routine	Non-Routine	Unknown
Primary	10,221	3,842	0
Secondary	2,983	1,548	0
Unknown	0	1,993	2,191

Notes: Primary sources of hazardous waste are production-related activities. Secondary sources are waste management activities. Routine sources are activities that occur regularly as part of business activity. Non-routine sources are activities that occur sporadically (e.g., spills, closure of a tank, etc.).

A single facility can generate hazardous waste from more than one source. Adding the numbers results in multiple counting.

Source: GG-187 (GB4)

Chart 5.4-8 Most Common Sources of Primary/Routine[a] Hazardous Waste Generation by the Number of Generators per Source in 1986



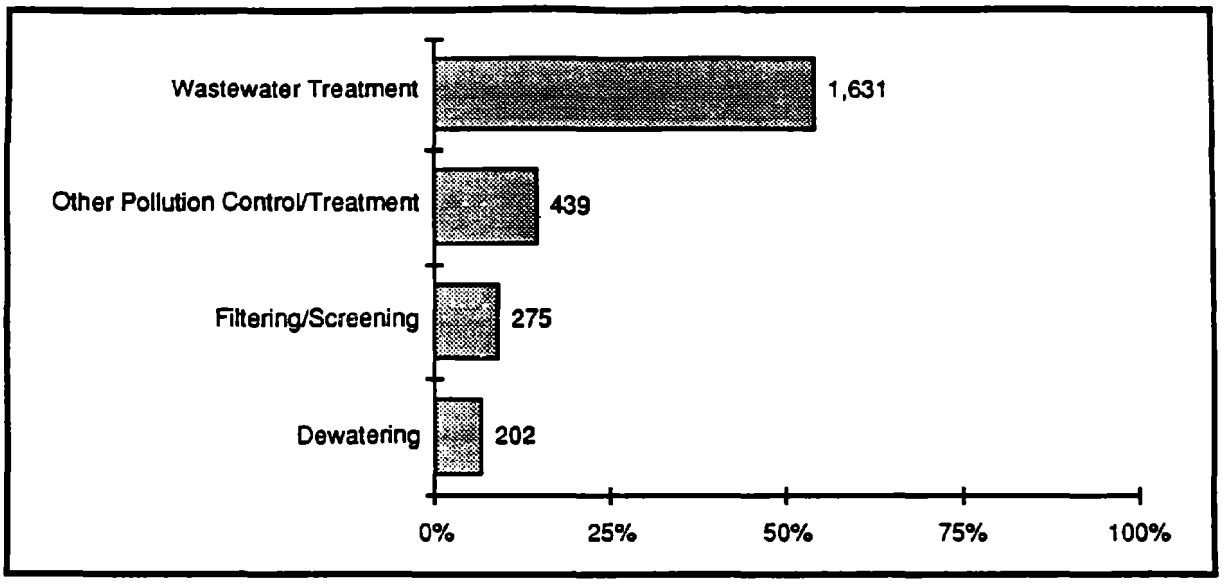
Notes: Bars show the percentage of all facilities generating hazardous waste from primary/routine sources that had the type of source indicated. Numbers following bars indicate number of generators.

A single facility can generate hazardous waste from more than one source. Adding the numbers results in multiple counting.

[a]Primary/routine sources of hazardous waste are production-related activities that occur regularly as part of business activity.

Source: GG-187 (GB4)

Chart 5.4-9 Most Common Sources of Secondary/Routine[a] Hazardous Waste Generation by the Number of Generators per Source in 1986



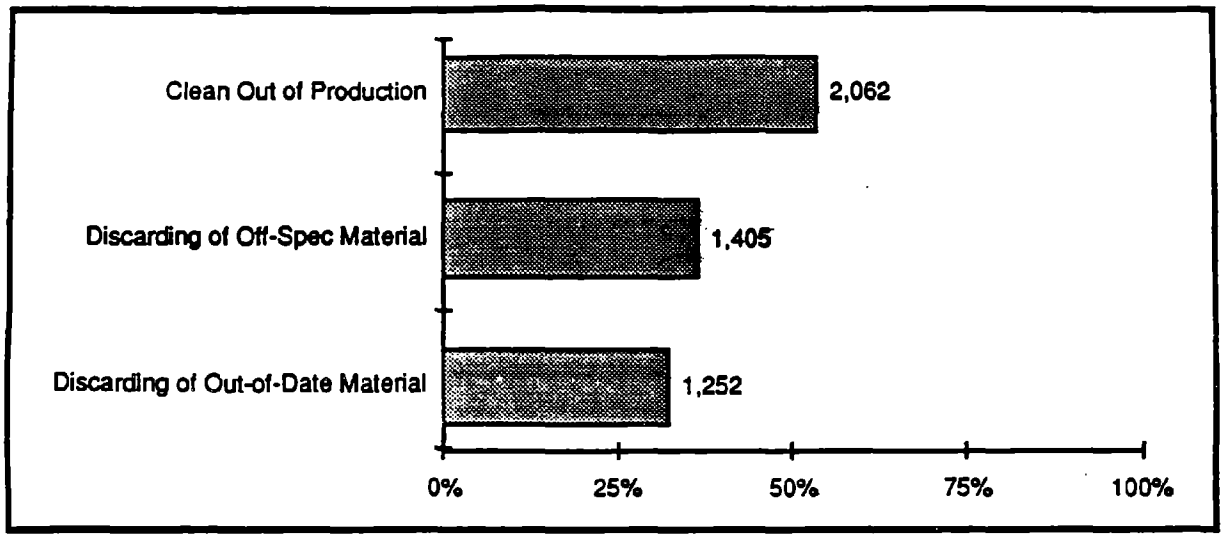
Notes: Bars show the percentage of all facilities generating hazardous waste from secondary/routine sources that had the type of source indicated. Numbers following bars indicate number of generators.

A single facility can generate hazardous waste from more than one source. Adding the numbers results in multiple counting.

[a]Secondary/routine sources of hazardous waste are waste management activities that occur routinely as part of business activity.

Source: GG-187 (GB4)

Chart 5.4-10 Most Common Sources of Primary/Non-Routine[a] Hazardous Waste Generation by the Number of Generators per Source in 1986



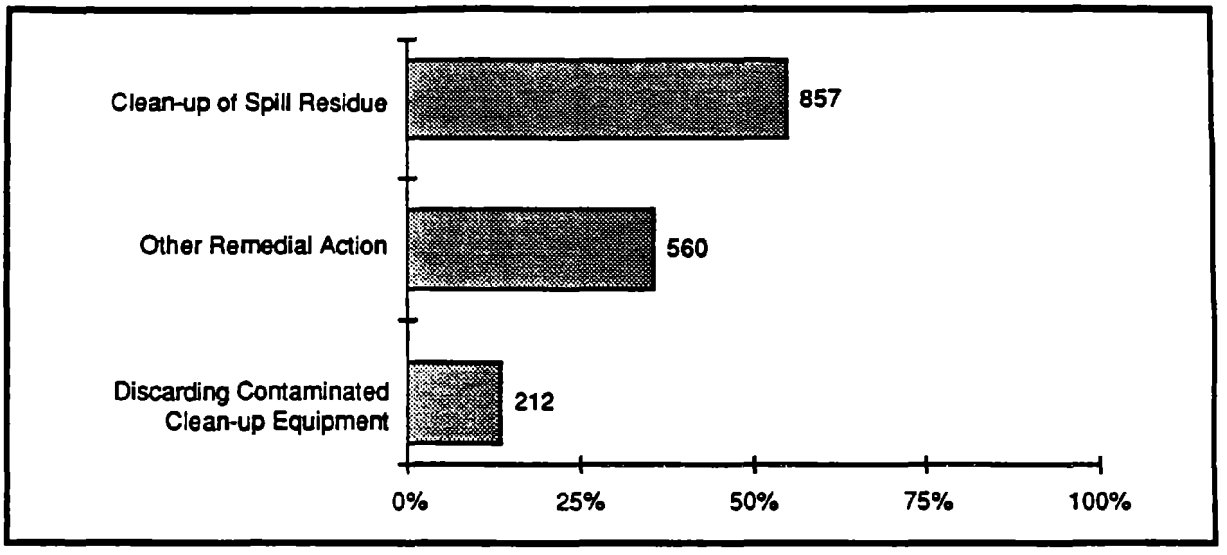
Notes: Bars show the percentage of all facilities generating hazardous waste from primary/non-routine sources that had the type of source indicated. Numbers following bars indicate number of generators.

A single facility can generate hazardous waste from more than one source. Adding the numbers results in multiple counting.

[a]Primary/non-routine sources of hazardous waste are production-related activities that occur sporadically (e.g., from accidental or one-time activities).

Source: GG-187 (GB4)

Chart 5.4-11 Most Common Sources of Secondary/Non-Routine[a] Hazardous Waste Generation by the Number of Generators per Source in 1986



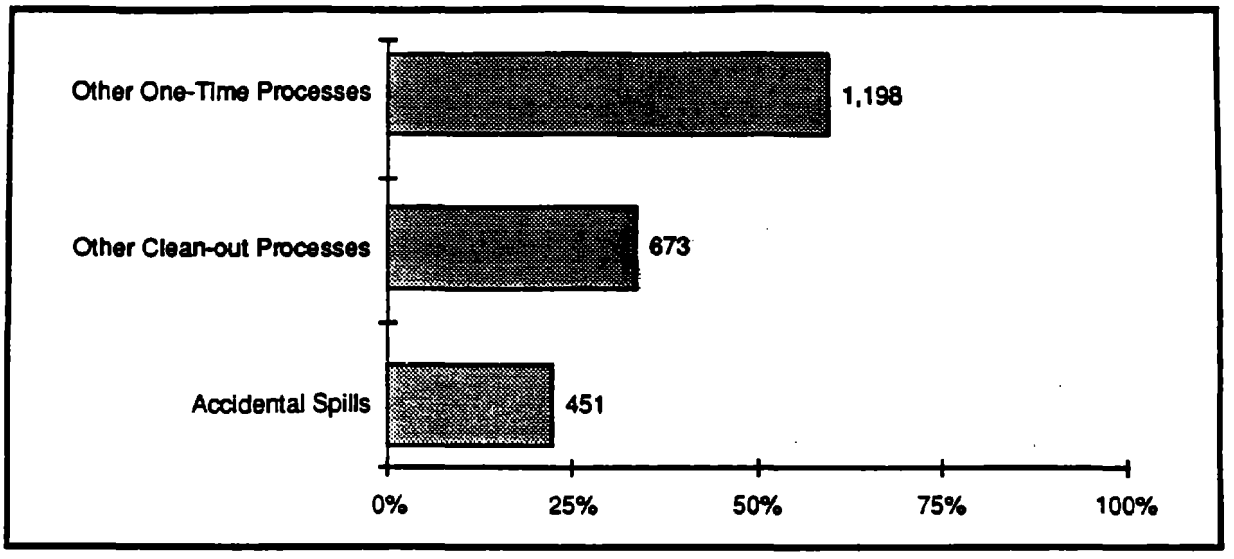
Notes: Bars show the percentage of all facilities generating hazardous waste from secondary/non-routine sources that had the type of source indicated. Numbers following bars indicate number of generators.

A single facility can generate hazardous waste from more than one source. Adding the numbers results in multiple counting.

[a]Secondary/non-routine sources of hazardous waste are waste management activities for wastes that occur sporadically (e.g., from accidental or one-time activities).

Source: GG-187 (GB4)

Chart 5.4-12 Most Common Unknown Sources of Non-Routine[a] Hazardous Waste Generation by the Number of Generators per Source in 1986



Notes: Bars show the percentage of all facilities generating hazardous waste from unknown/non-routine sources that had the type of source indicated. Numbers following bars indicate number of generators. A single facility can generate hazardous waste from more than one source. Adding the numbers results in multiple counting.

[a]Unknown/non-routine sources of hazardous waste are activities that occur sporadically and cannot be categorized as primary (production-related) or secondary (waste management).

Source: GG-187 (GB4)

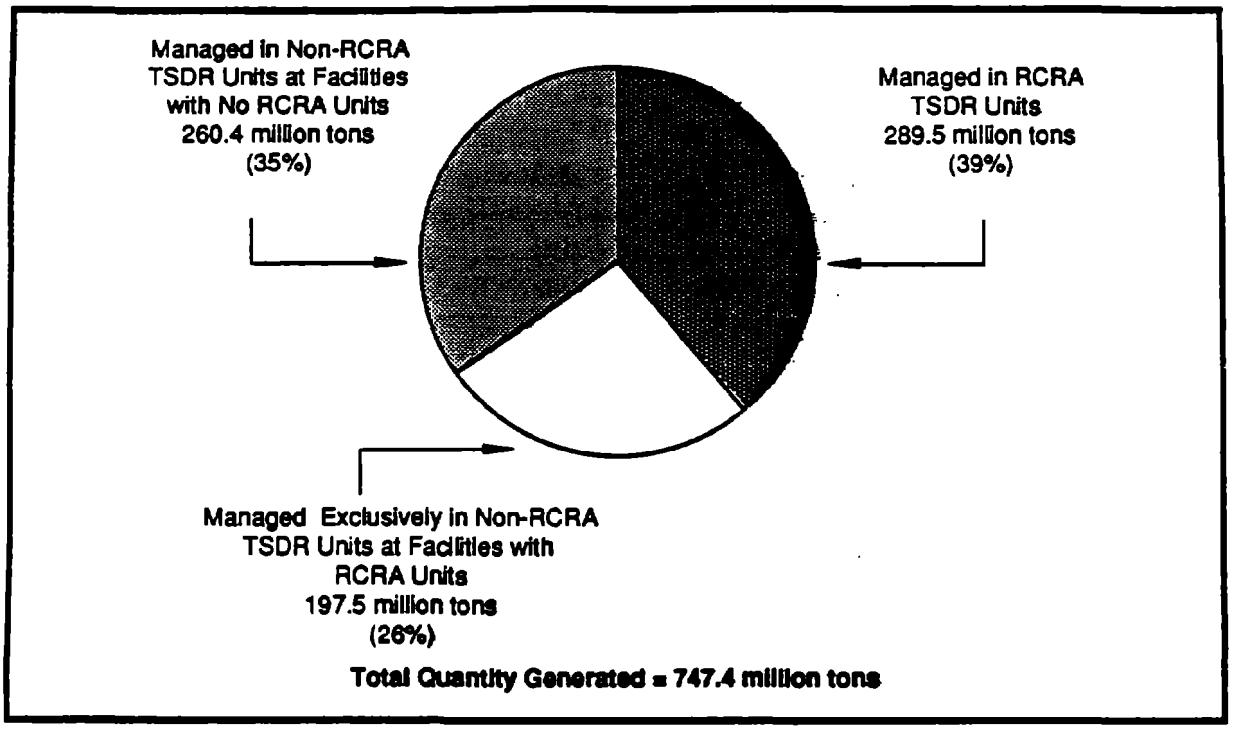
6 HAZARDOUS WASTE MANAGEMENT

In 1986, 8,866 facilities treated, stored, disposed of, or recycled hazardous waste. This number includes facilities that treated or recycled hazardous waste in units exempt from RCRA-permitting requirements but does not include facilities that only accumulated hazardous waste for less than 90 days in RCRA-exempt units. Also, the number only includes waste management facilities that are also large quantity generators (and therefore included in the Generator Survey) or have a RCRA permit (and therefore are included in the TSDR Survey). This chapter describes waste management facilities, as defined by the above criteria, and their hazardous waste management in 1986.

6.1 HAZARDOUS WASTE MANAGEMENT BY RCRA PERMITTING STATUS

RCRA regulations require permits for most units used to treat or dispose of hazardous wastes. Units used for certain recycling and recovery activities and units used to treat hazardous wastewater subject to the Clean Water Act are generally exempt from RCRA-permitting requirements. Chart 6.1-1 shows the quantities of hazardous waste by the RCRA-permitting status of the TSDR units in which the waste was subsequently managed and the type of facility that managed the hazardous waste.If a hazardous waste was managed consecutively in a RCRA and a non-RCRA TSDR unit, the waste is included in the RCRA TSDR category of Chart 6.1-1. For further explanation of the chart, see Section 3.2 of this report.

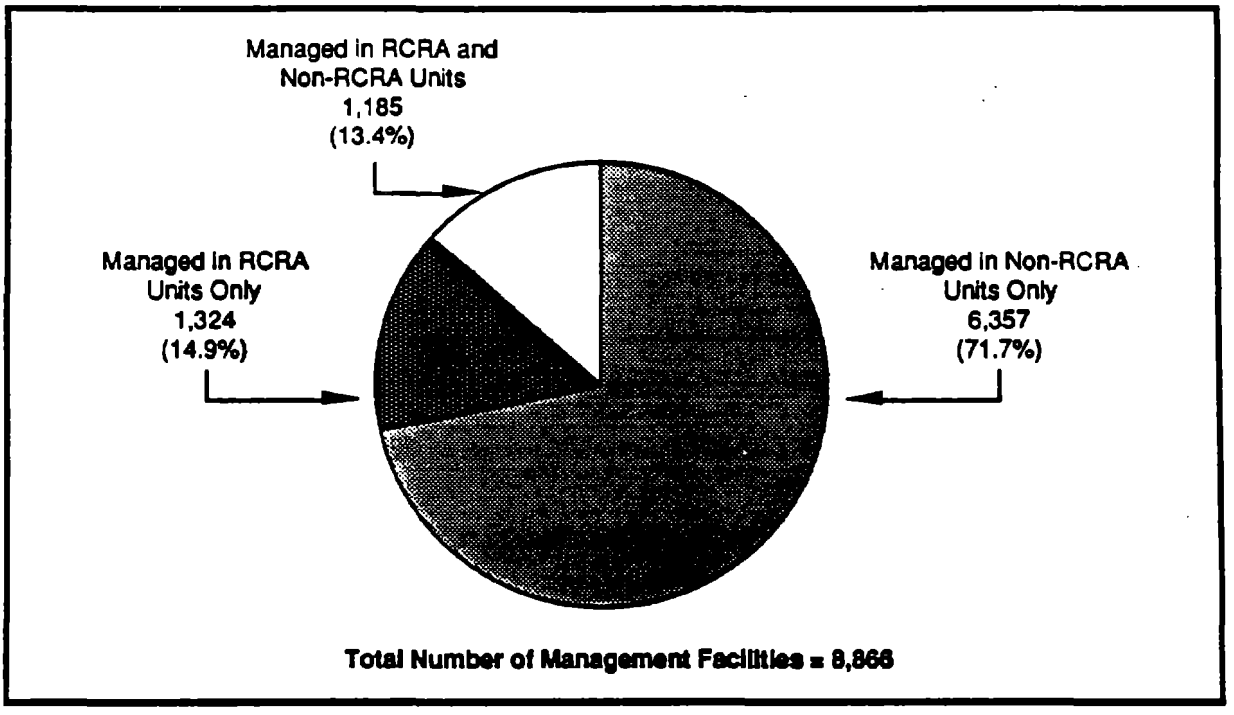
Chart 6.1-1 Quantity of Hazardous Waste Generated in 1986, by RCRA-Permitting Status of Management Units



Source: (A3, A8, GA27)

Chart 6.1-2 shows the number of hazardous waste management facilities by the regulatory status of their hazardous waste management units. Over 70 percent of the facilities (6,357 facilities) managed hazardous waste only in non-RCRA TSDR units. The remaining 28 percent of facilities had RCRA TSDR units, although about half of these facilities also managed hazardous waste in non-RCRA TSDR units.

Chart 6.1-2 Number of Hazardous Waste Management Facilities by RCRA Permit Status of Management Units in 1986



Source: TG-048, TG-043, TG-044

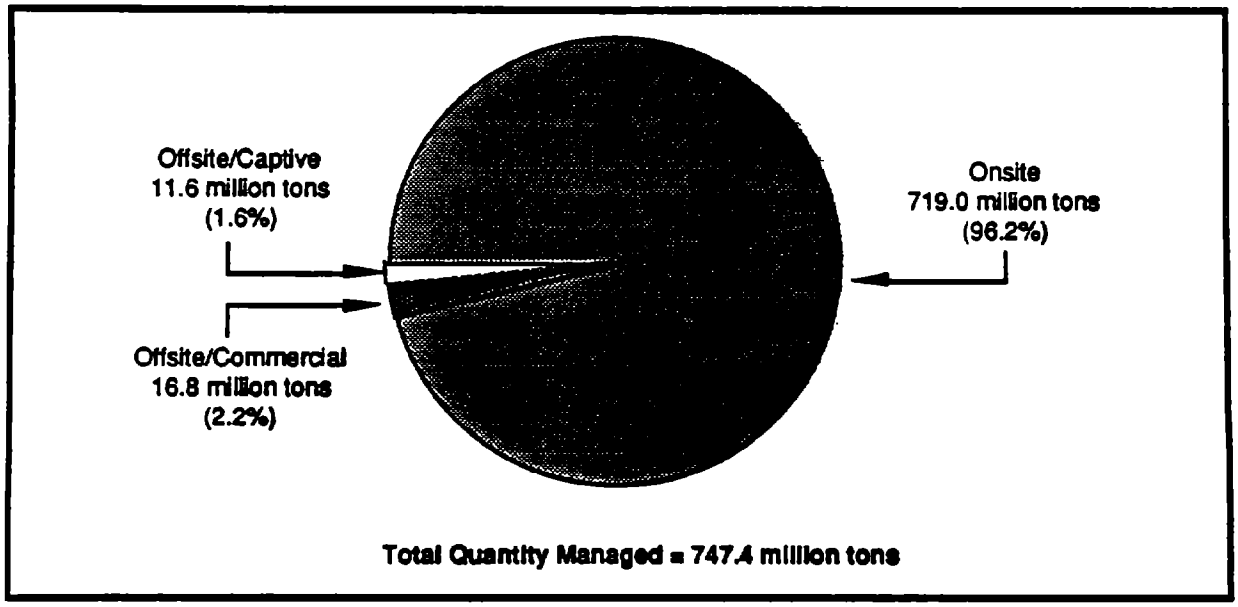
6.2 ONSITE, CAPTIVE, AND COMMERCIAL MANAGEMENT OF HAZARDOUS WASTE

Hazardous waste can be managed by three types of facilities:

- onsite: at the facility where the waste was generated,
- offsite/captive: at a facility other than where the waste was generated by a company under the same ownership as the generator, or
- offsite/commercial: at a facility other than where the waste was generated by a company under different ownership than the generator.

Chart 6.2-1 shows the quantity of hazardous waste managed onsite, offsite/captively, and offsite/commercially. **Over 96 percent of all hazardous waste generated (719 million tons) was managed onsite by the generator of the waste. Of the 28.4 million tons of hazardous waste managed offsite, roughly half was managed by commercial facilities and half by captive facilities.**

Chart 6.2-1 Quantity of Hazardous Waste that was Managed Onsite, Commercially, and Captively in 1986

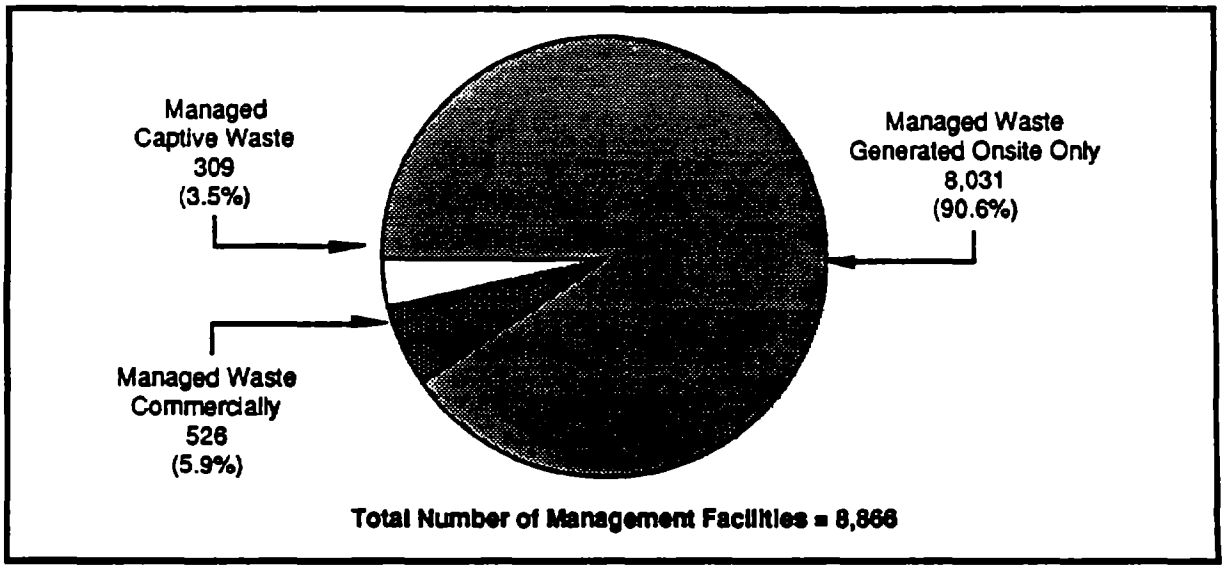


Notes: Hazardous waste managed onsite was managed by the generator of the waste.
Hazardous waste managed commercially was managed offsite by a company under different ownership than the generator of the waste.
Hazardous waste managed captively was managed offsite by a company under the same ownership as the generator of the waste.

Source: TG-048 (A8, GA27)

Chart 6.2-2 shows the numbers of hazardous waste management facilities by the origin of the hazardous waste they managed. Over 90 percent of hazardous waste management facilities managed only hazardous waste that was generated onsite. Approximately 6 percent of the facilities managed hazardous waste generated offsite by another company and 3.5 percent managed hazardous waste generated offsite but only by the same company.

Chart 6.2-2 Number of Hazardous Waste Management Facilities by the Origin of the Hazardous Waste Managed in 1986: Commercial, Captive, and Onsite-Only



Notes: Onsite-only management facilities managed only hazardous waste that was generated onsite.

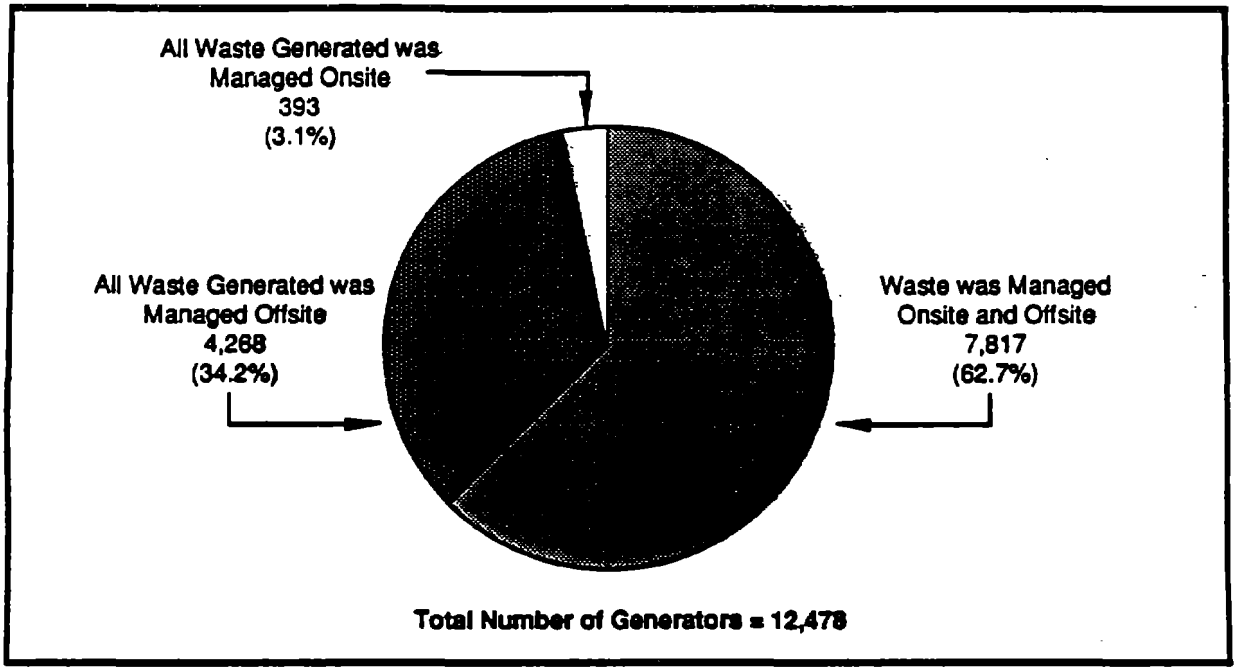
Captive management facilities managed hazardous waste generated by other facilities under the same ownership in addition to managing hazardous waste generated onsite.

Commercial management facilities managed hazardous waste generated by other facilities under different ownership in addition to waste from other sources.

Source: TG-048 (A8)

Chart 6.2-3a shows where generators managed their hazardous waste. Almost 63 percent of generators (7,817 facilities) managed their hazardous waste onsite and offsite. Thirty-four percent of generators (4,268 facilities) sent all their hazardous waste offsite for management, and only 3 percent of generators (393 facilities) managed all their hazardous waste onsite.

Chart 6.2-3a Number of Generators by Location of Their Hazardous Waste Management in 1986



Notes: Hazardous waste managed *onsite* was managed by the generator.
Hazardous waste managed *offsite* was shipped to another facility for management.

Source: TG-049 (GA23, GB18, A11)

Chart 6.2-3b provides greater detail on where generators manage their hazardous waste. For generators sending their hazardous waste offsite for management, the chart indicates whether the generator sent its waste to a facility under the same ownership (captive) or different ownership (commercial). Most generators sending their hazardous waste offsite sent their waste to a commercial facility. Over half of the generators managed part of their hazardous waste onsite and sent the rest to a commercial facility.

Chart 6.2-3b Number of Generators by Location of Their Hazardous Waste Management in 1986: Onsite, Commercial, and Captive

Type of Management	Number of Generators	Percentage of Generators
Onsite Only	393	3.1
Onsite and Offsite		
Captive Only	188	1.5
Captive and Commercial	366	2.9
Commercial Only	6,822	54.7
Unknown	440	3.5
Offsite Only		
Captive Only	128	1.0
Captive and Commercial	115	0.9
Commercial Only	3,560	28.5
Unknown	465	3.7
Total	12,478	100.0

Notes: Hazardous waste managed onsite was managed by the generator of the waste.

Hazardous waste managed captively was managed offsite by a company under the same ownership as the generator of the waste.

Hazardous waste managed commercially was managed offsite by a company under different ownership than the generator of the waste.

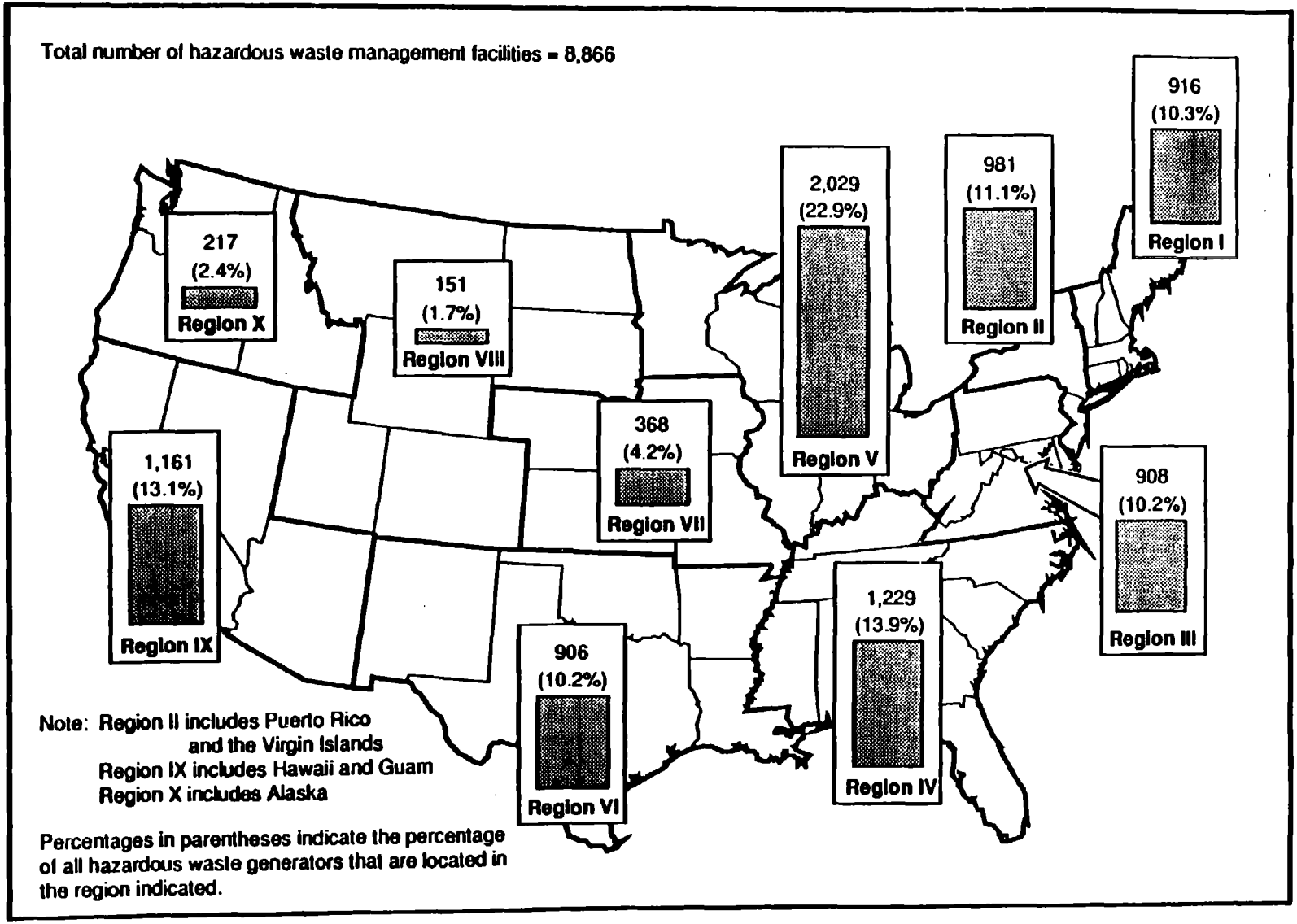
Source: TG-049 (GA23, GB18, A11)

6.3 HAZARDOUS WASTE MANAGEMENT BY LOCATION

In general, the geographic distribution of hazardous waste management facilities is similar to the distribution of hazardous waste generators (see Section 5.1). This is due in part to the high cost of transporting hazardous waste and in part to the large number of generators managing their own hazardous waste onsite (see Section 6.2).

Chart 6.3-1 shows the numbers of hazardous waste management facilities in each EPA region in 1986. Region V had the largest number of management facilities, with 2,029 facilities or 22.9 percent of all hazardous waste management facilities. Other regions with large numbers of hazardous waste management facilities include Region IV and Region IX, with 13.9 and 13.1 percent of hazardous waste management facilities, respectively.

Chart 6.3-1 Number of Hazardous Waste Management Facilities per EPA Region in 1986



Source: TG-048

Charts 6.3-2 and 6.3-3 show the number of hazardous waste management facilities in each state (in alphabetical order and descending order, respectively). California had the largest number of hazardous waste management facilities, with 1,046 facilities. Texas and Pennsylvania also had large numbers of facilities, with 622 and 547 facilities, respectively.

Chart 6.3-2 Number of Hazardous Waste Management Facilities by State in 1986

State	Number of Facilities	Percentage of Hazardous Waste Management Facilities	State Rank
Alabama	127	1.4	20
Alaska	9	0.1	47
Arizona	89	1.0	27
Arkansas	84	0.9	29
California	1,046	11.8	1
Colorado	81	0.9	31
Connecticut	266	3.0	11
Delaware	18	0.2	43
District of Columbia	1	<0.1	52
Florida	177	2.0	15
Georgia	162	1.8	19
Guam	1	<0.1	53
Hawaii	13	0.1	44
Idaho	8	0.1	48
Illinois	490	5.5	6
Indiana	287	3.2	10
Iowa	86	1.0	28
Kansas	70	0.8	35
Kentucky	123	1.4	22
Louisiana	108	1.2	25
Maine	39	0.4	40
Maryland	110	1.2	24
Massachusetts	431	4.9	7
Michigan	375	4.2	9
Minnesota	177	2.0	16
Mississippi	91	1.0	26
Missouri	172	1.9	17
Montana	10	0.1	46
Nebraska	40	0.5	39
Nevada	11	0.1	45
New Hampshire	79	0.9	32
New Jersey	500	5.6	5
New Mexico	19	0.2	42
New York	411	4.6	8
North Carolina	224	2.5	12
North Dakota	6	0.1	50
Ohio	505	5.7	4
Oklahoma	73	0.8	34
Oregon	84	0.9	30
Pennsylvania	547	6.2	3
Puerto Rico	70	0.8	36
Rhode Island	76	0.9	33
South Carolina	126	1.4	21
South Dakota	5	0.1	51
Tennessee	198	2.2	13
Texas	622	7.0	2
Utah	43	0.5	38
Vermont	26	0.3	41
Virgin Island	0	0.0	54
Virginia	167	1.9	18
Washington	116	1.3	23
West Virginia	65	0.7	37
Wisconsin	195	2.2	14
Wyoming	7	0.1	49
Total	8,866	100.0	

Source: TG-048

Chart 6.3-3 Number of Hazardous Waste Management Facilities by State in 1986, in Descending Order

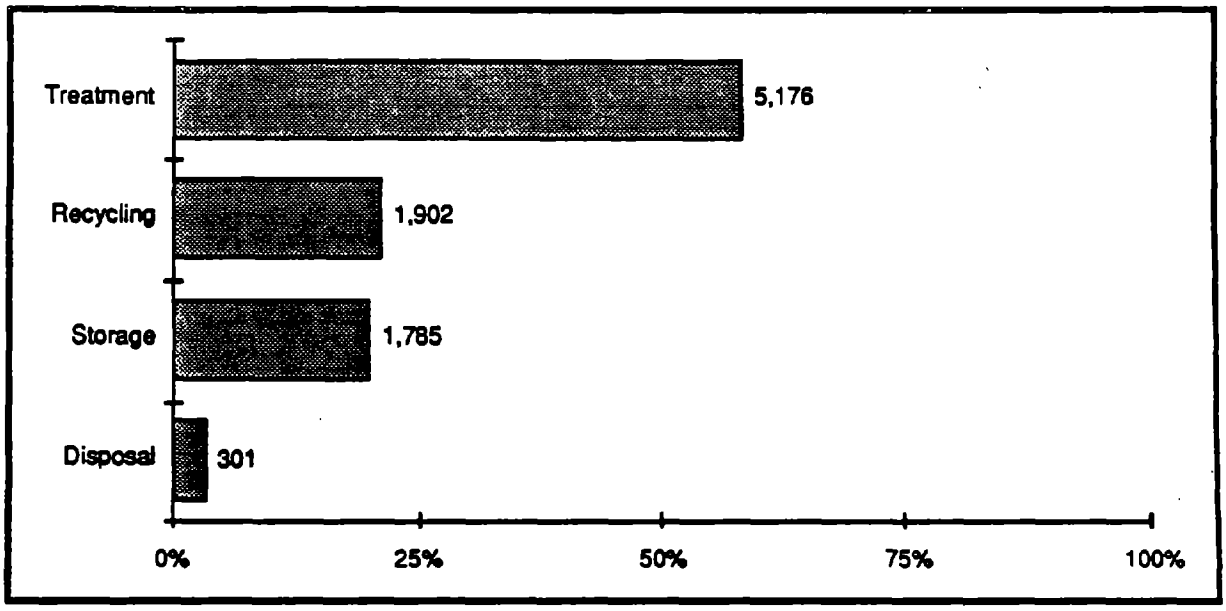
State	Number of Facilities	Percentage of Hazardous Waste Management Facilities
California	1,046	11.8
Texas	622	7.0
Pennsylvania	547	6.2
Ohio	505	5.7
New Jersey	500	5.6
Illinois	490	5.5
Massachusetts	431	4.9
New York	411	4.6
Michigan	375	4.2
Indiana	287	3.2
Connecticut	266	3.0
North Carolina	224	2.5
Tennessee	198	2.2
Wisconsin	195	2.2
Florida	177	2.0
Minnesota	177	2.0
Missouri	172	1.9
Virginia	167	1.9
Georgia	162	1.8
Alabama	127	1.4
South Carolina	126	1.4
Kentucky	123	1.4
Washington	116	1.3
Maryland	110	1.2
Louisiana	108	1.2
Mississippi	91	1.0
Arizona	89	1.0
Iowa	86	1.0
Arkansas	84	0.9
Oregon	84	0.9
Colorado	81	0.9
New Hampshire	79	0.9
Rhode Island	76	0.9
Oklahoma	73	0.8
Kansas	70	0.8
Puerto Rico	70	0.8
West Virginia	65	0.7
Utah	43	0.5
Nebraska	40	0.5
Maine	39	0.4
Vermont	26	0.3
New Mexico	19	0.2
Delaware	18	0.2
Hawaii	13	0.1
Nevada	11	0.1
Montana	10	0.1
Alaska	9	0.1
Idaho	8	0.1
Wyoming	7	0.1
North Dakota	6	0.1
South Dakota	5	0.1
District of Columbia	1	<0.1
Guam	1	<0.1
Virgin Island	0	0.0
Total	8,866	100.0

Source: TG-048

6.4 TYPES OF HAZARDOUS WASTE MANAGEMENT

Chart 6.4-1 shows the types of hazardous waste management activities conducted by waste management facilities in 1986. It is important to note that a single facility could conduct more than one type of waste management activity. **Over half of the waste management facilities (5,176 facilities) treated hazardous waste in 1986.**

Chart 6.4-1 Number of Management Facilities Treating, Storing, Disposing of, and Recycling Hazardous Waste in 1986



Note: A single management facility can have more than one waste management activity. Therefore, adding the numbers of facilities results in multiple counting.

Source: TG-050

(This page is intentionally blank)

7 HAZARDOUS WASTE MANAGEMENT METHODS: RECYCLING

EPA has established a pollution prevention hierarchy that encourages reducing or eliminating the generation of waste and recycling wastes that are generated. This chapter summarizes Generator and TSDR Survey data on hazardous waste recycling. Units used to recycle hazardous wastes are generally exempt from RCRA-permitting requirements. This chapter includes data on all hazardous waste recycling activities regardless of permitting status.

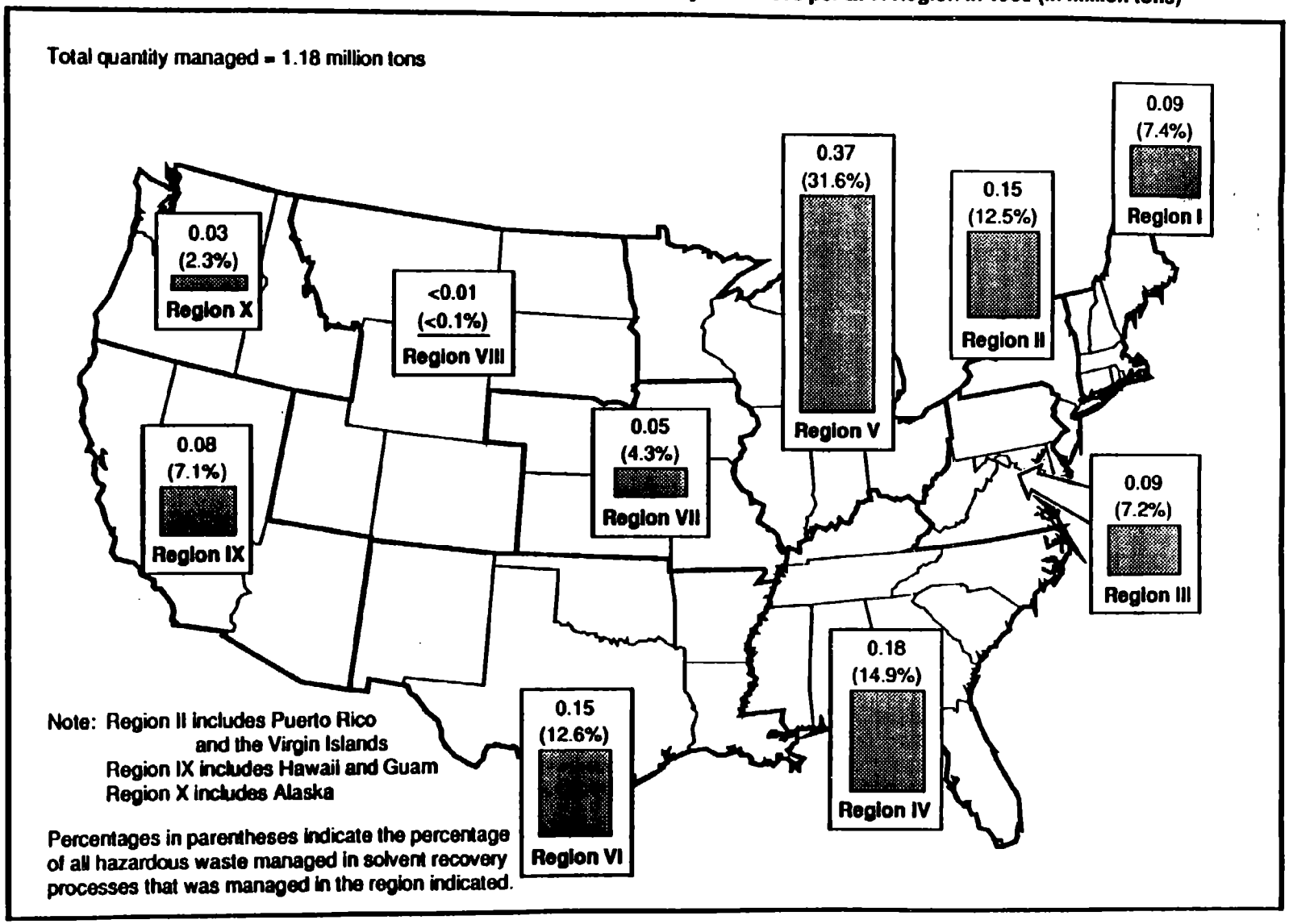
Much of the data on recycling activities are process-specific—that is, facilities reported recycling information for each recovery process they operated. Because a single hazardous waste is often managed sequentially in several recycling processes, aggregating process-specific data presented in this chapter is not appropriate.

7.1 SOLVENT AND LIQUID ORGANIC RECOVERY

Solvent and liquid organic recovery (solvent recovery) is the most common type of recycling in terms of the number of facilities engaged in recycling. Seventeen percent of all hazardous waste management facilities, or 1,470 facilities, managed 1.18 million tons of hazardous waste in solvent recovery processes in 1986.

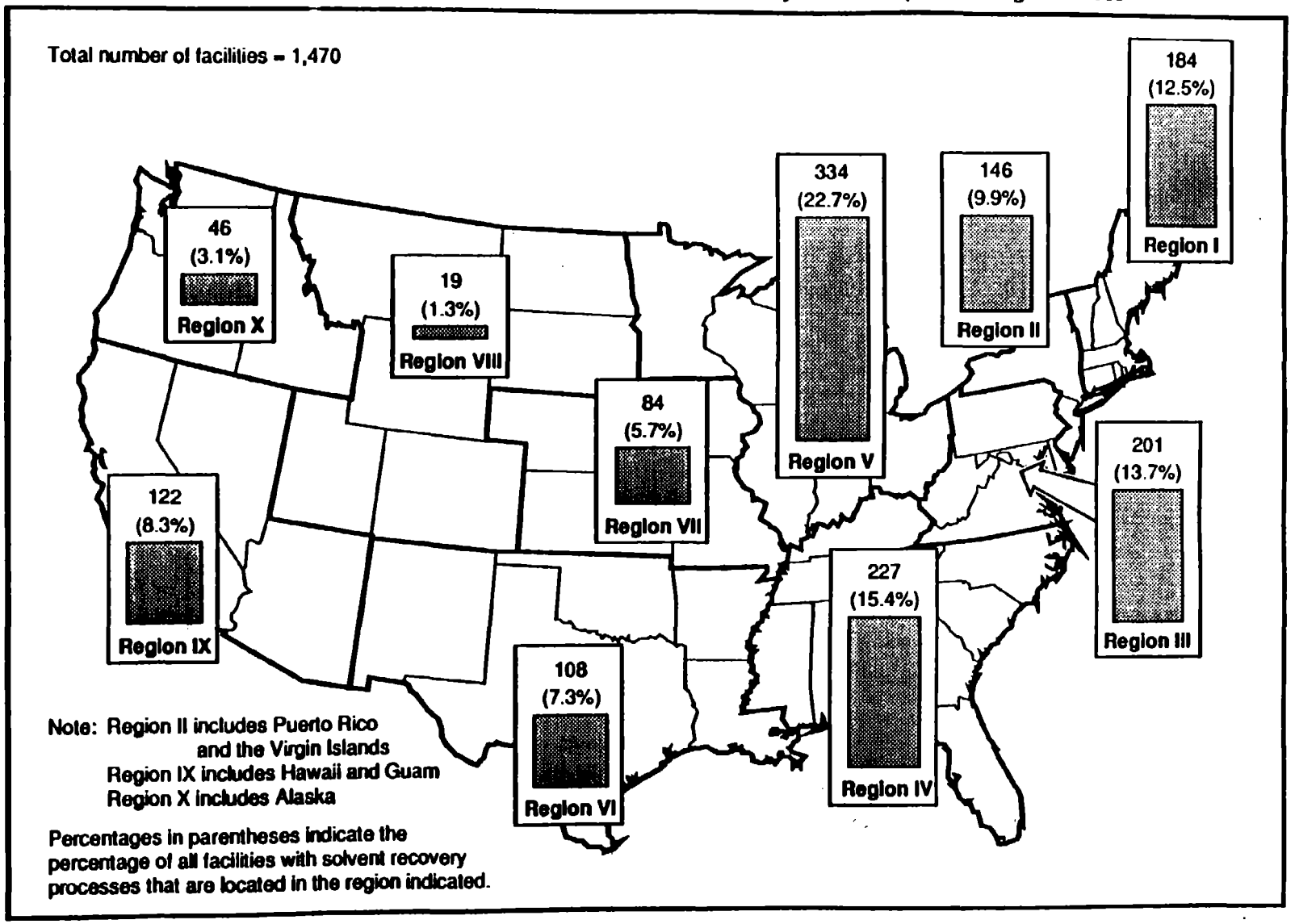
Charts 7.1-1 and 7.1-2 show the quantity of hazardous waste managed and the number of facilities managing hazardous waste in solvent recovery processes in each EPA region in 1986. Charts 7.1-3 and 7.1-4 show the same information for each state or territory.

Chart 7.1-1 Quantity of Hazardous Waste Managed in Solvent Recovery Processes per EPA Region in 1986 (in million tons)



Source: TT-140 (F3), GG-170 (GG3), TT-140II (F3)

Chart 7.1-2 Number of Facilities Managing Hazardous Waste in Solvent Recovery Processes per EPA Region in 1986



Source: TT-140 (F3), GG-170 (GG3), TT-140II (F3)

Chart 7.1-3 Quantity of Hazardous Waste Managed in Solvent Recovery Processes by State in 1986

State	Quantity Managed (million tons)	Percentage of Total Quantity Managed	State Rank
Alabama	0.08	6.4	5
Alaska	0.00	0.0	46
Arizona	<0.01[a]	0.1	37
Arkansas	0.01	0.6	25
California	0.08	7.0	4
Colorado	<0.01[a]	<0.1[b]	43
Connecticut	0.01	0.5	28
Delaware	<0.01[a]	<0.1[b]	40
District of Columbia	0.00	0.0	47
Florida	<0.01[a]	0.4	30
Georgia	0.02	1.4	18
Guam	0.00	0.0	48
Hawaii	<0.01[a]	0.1	38
Idaho	<0.01[a]	<0.1[b]	45
Illinois	0.05	4.5	9
Indiana	0.04	3.0	14
Iowa	0.01	0.8	24
Kansas	<0.01[a]	0.1	35
Kentucky	0.04	3.3	13
Louisiana	0.11	8.9	3
Maine	<0.01[a]	0.1	36
Maryland	0.01	1.2	22
Massachusetts	0.06	5.0	7
Michigan	0.11	9.2	2
Minnesota	<0.01[a]	0.2	34
Mississippi	<0.01[a]	0.2	33
Missouri	0.04	3.4	12
Montana	0.00	0.0	49
Nebraska	<0.01[a]	0.1	39
Nevada	0.00	0.0	51
New Hampshire	0.02	1.3	20
New Jersey	0.06	4.9	8
New Mexico	<0.01[a]	<0.1[b]	44
New York	0.07	6.3	6
North Carolina	<0.01[a]	0.3	32
North Dakota	0.00	0.0	50
Ohio	0.12	10.3	1
Oklahoma	<0.01[a]	0.4	31
Oregon	0.01	0.6	26
Pennsylvania	0.02	1.3	21
Puerto Rico	0.02	1.4	19
Rhode Island	0.01	0.5	29
South Carolina	0.03	2.4	16
South Dakota	0.00	0.0	52
Tennessee	0.01	0.5	27
Texas	0.03	2.7	15
Utah	<0.01[a]	<0.1[b]	42
Vermont	<0.01[a]	<0.1[b]	41
Virgin Island	0.00	0.0	53
Virginia	0.01	0.8	23
Washington	0.02	1.7	17
West Virginia	0.05	3.9	11
Wisconsin	0.05	4.4	10
Wyoming	0.00	0.0	54
Total	1.18	100.0	

[a]Less than 10,000 tons of hazardous waste were generated in these states in 1986.
[b]Less than 0.1 percent of the total quantity of hazardous waste generated in 1986 was generated in these states.
Source: TT-140 (F3), GG-170 (GG3), TT-140II (F3)

Chart 7.1-4 Number of Facilities Managing Hazardous Waste in Solvent Recovery Processes by State in 1986

State	Number of RCRA TSDR Facilities	Percentage of RCRA TSDR Facilities	State Rank
Alabama	17	1.2	27
Alaska	0	0.0	46
Arizona	9	0.6	36
Arkansas	21	1.4	24
California	111	7.6	2
Colorado	9	0.6	37
Connecticut	41	2.8	15
Delaware	3	0.2	42
District of Columbia	0	0.0	47
Florida	38	2.6	17
Georgia	24	1.6	21
Guam	0	0.0	48
Hawaii	2	0.1	44
Idaho	2	0.1	45
Illinois	45	3.1	13
Indiana	67	4.6	6
Iowa	14	1.0	28
Kansas	14	1.0	29
Kentucky	20	1.4	25
Louisiana	13	0.9	31
Maine	4	0.3	41
Maryland	40	2.7	16
Massachusetts	85	5.8	3
Michigan	30	2.0	20
Minnesota	46	3.1	12
Mississippi	6	0.4	39
Missouri	42	2.9	14
Montana	0	0.0	49
Nebraska	14	1.0	30
Nevada	0	0.0	51
New Hampshire	22	1.5	23
New Jersey	60	4.1	8
New Mexico	3	0.2	43
New York	76	5.2	5
North Carolina	55	3.7	10
North Dakota	0	0.0	50
Ohio	77	5.2	4
Oklahoma	11	0.7	32
Oregon	11	0.7	33
Pennsylvania	122	8.3	1
Puerto Rico	10	0.7	34
Rhode Island	24	1.6	22
South Carolina	19	1.3	26
South Dakota	0	0.0	52
Tennessee	48	3.3	11
Texas	60	4.1	9
Utah	10	0.7	35
Vermont	6	0.4	40
Virgin Island	0	0.0	53
Virginia	31	2.1	19
Washington	33	2.2	18
West Virginia	7	0.5	38
Wisconsin	67	4.6	7
Wyoming	0	0.0	54
Total	1,470	100.0	

Source: TT-140 (F3), GG-170 (GG3), TT-140II (F3)

Chart 7.1-5 shows the types of solvent recovery processes operated in 1986. For each type of process, the chart shows the quantity of hazardous waste managed and the number of facilities operating that type of process.

Chart 7.1-5 Types of Solvent Recovery Processes and Quantity Managed in 1986

Process Type	Quantity Managed (million tons)	Percentage of Total Quantity Managed	Number of Facilities	Percentage of Facilities
Batch Still Distillation	0.39	33.3	1,209	82.2
Phase Separation	0.35	29.7	107	7.3
Thin Film Evaporation	0.34	28.6	98	6.7
Fractionation	0.28	23.3	102	6.9
Missing	0.17	14.6	14	1.0
Other	0.17	14.5	95	6.5
Filtration	0.11	9.4	61	4.1
Desiccation	0.02	1.4	9	0.6
Solvent Extraction	0.02	1.3	39	2.7
Total	1.18[a]	100.0[a]	1,470[b]	100.0[b]

[a] A single waste may be managed in more than one solvent recovery process. Therefore, adding the quantities managed in each type of process results in double-counting. The number shown is the total quantity managed in solvent recovery processes *without* double-counting.

[b] A single facility may have more than one type of solvent recovery process. Therefore, adding the number of facilities with each type of process results in double-counting. The number shown is the total number of facilities with solvent recovery processes *without* double-counting.

Source: TT-141, GG-171, TT-141II (GG4, GG21, F4, F25a)

Chart 7.1-6 shows the regulatory status of facilities that recover solvents. The chart shows the numbers of facilities that recovered solvents and were subject to RCRA-permitting requirements or exempt from RCRA-permitting requirements. The chart does *not* refer to the permitting status of the facilities' recovery operations. Instead, the chart indicates whether *any* operation at the facility is subject to RCRA-permitting requirements.

Chart 7.1-6 RCRA-Permitting Status of Facilities Managing Hazardous Waste in Solvent Recovery Processes in 1986

RCRA-Permitting Status	Number of Facilities	Quantity Managed in Solvent Recovery (million tons)
Exempt from permitting requirements[a]	1,152	0.19
Subject to permitting requirements[b]	318	0.99
Total	1,470	1.18

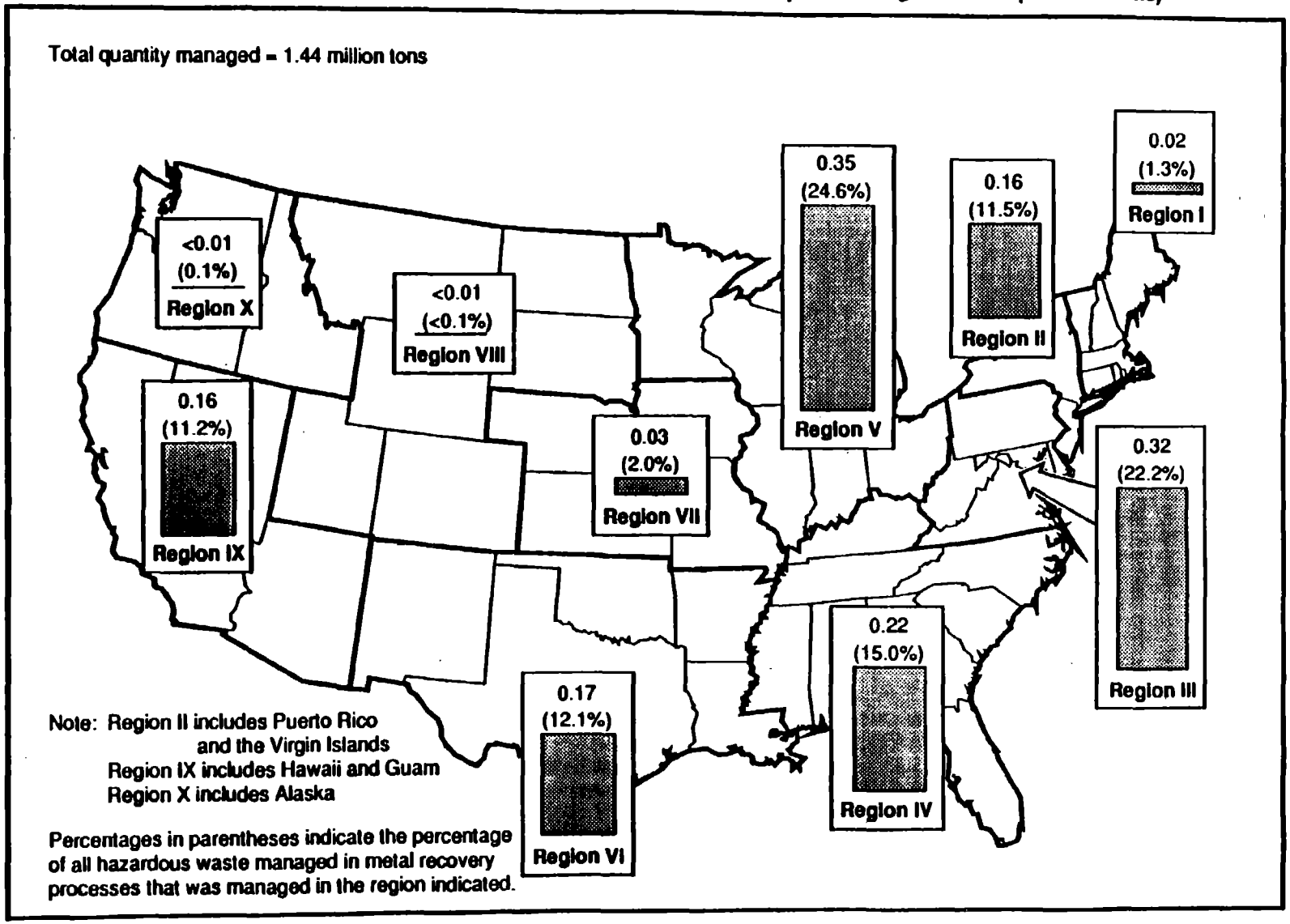
[a] Facilities managing hazardous waste only in units exempt from RCRA-permitting requirements.
[b] Facilities managing hazardous waste in at least one unit subject to RCRA-permitting requirements.
Source: TT-140 (F3), GG-170 (GG3), TT-140II (F3)

7.2 METAL RECOVERY

Metal recovery is the most common type of recycling in terms of the quantity of hazardous waste recycled. Approximately 1.44 million tons of hazardous waste was managed in metal recovery processes by 330 facilities in 1986.

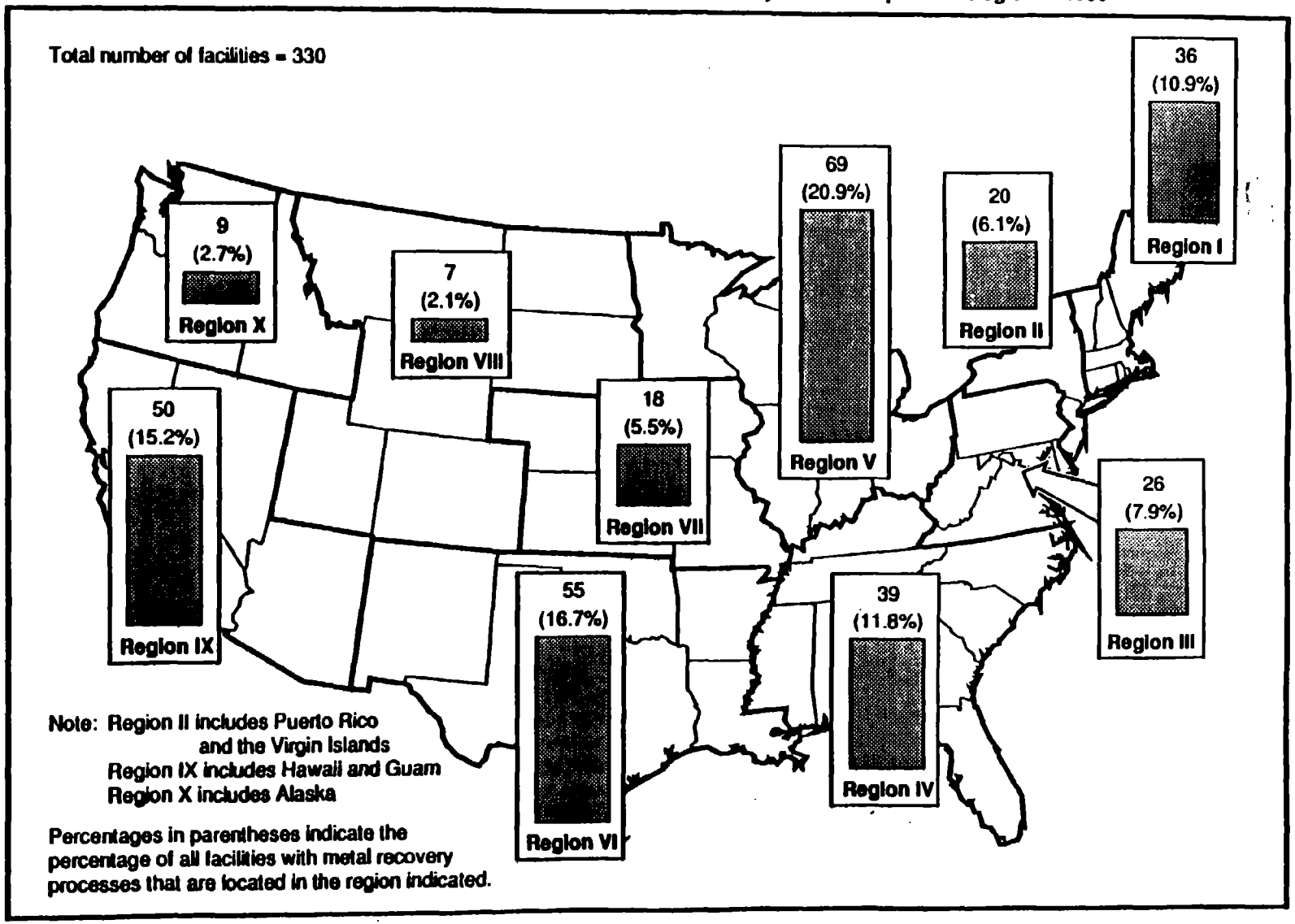
Charts 7.2-1 and 7.2-2 show the quantity of hazardous waste managed and the number of facilities managing hazardous waste in metal recovery processes in each EPA region in 1986. Charts 7.2-3 and 7.2-4 show the same information for each state or territory.

Chart 7.2-1 Quantity of Hazardous Waste Managed in Metal Recovery Processes per EPA Region in 1986 (in million tons)



Source: TT-140 (G3), GG-170 (GF3), TT-140II (G3)

Chart 7.2-2 Number of Facilities Managing Hazardous Waste in Metal Recovery Processes per EPA Region in 1986



Source: TT-140 (G3), GG-170 (GF3), TT-140II (G3)

Chart 7.2-3 Quantity of Hazardous Waste Managed in Metal Recovery Processes by State in 1986

State	Quantity Managed (million tons)	Percentage of Total Quantity Managed	State Rank
Alabama	0.14	9.9	5
Alaska	<0.01[a]	<0.1[b]	42
Arizona	0.05	3.3	8
Arkansas	0.01	0.5	21
California	0.11	8.0	7
Colorado	<0.01[a]	<0.1[b]	38
Connecticut	<0.01[a]	0.3	23
Delaware	<0.01[a]	<0.1[b]	39
District of Columbia	<0.01[a]	<0.1[b]	32
Florida	0.04	2.9	10
Georgia	0.02	1.2	15
Guam	0.00	0.0	47
Hawaii	0.00	0.0	48
Idaho	<0.01[a]	<0.1[b]	44
Illinois	0.15	10.6	3
Indiana	<0.01[a]	0.2	24
Iowa	0.02	1.1	16
Kansas	<0.01[a]	<0.1[b]	45
Kentucky	<0.01[a]	<0.1[b]	30
Louisiana	0.02	1.3	14
Maine	<0.01[a]	<0.1[b]	37
Maryland	0.03	1.9	12
Massachusetts	0.01	0.6	19
Michigan	<0.01[a]	0.1	26
Minnesota	0.03	2.2	11
Mississippi	<0.01[a]	<0.1[b]	36
Missouri	0.01	0.9	18
Montana	0.00	0.0	49
Nebraska	<0.01[a]	<0.1[b]	28
Nevada	<0.01[a]	<0.1[b]	41
New Hampshire	<0.01[a]	<0.1[b]	35
New Jersey	0.01	0.6	20
New Mexico	<0.01[a]	<0.1[b]	43
New York	0.15	10.7	2
North Carolina	<0.01[a]	<0.1[b]	46
North Dakota	0.00	0.0	50
Ohio	0.03	1.8	13
Oklahoma	<0.01[a]	<0.1[b]	33
Oregon	0.00	0.0	51
Pennsylvania	0.25	17.2	1
Puerto Rico	<0.01[a]	0.2	25
Rhode Island	0.01	0.4	22
South Carolina	0.01	1.0	17
South Dakota	0.00	0.0	52
Tennessee	<0.01[a]	<0.1[b]	34
Texas	0.15	10.3	4
Utah	<0.01[a]	<0.1[b]	40
Vermont	<0.01[a]	<0.1[b]	29
Virgin Island	0.00	0.0	53
Virginia	<0.01[a]	<0.1[b]	31
Washington	<0.01[a]	<0.1[b]	27
West Virginia	0.04	3.0	9
Wisconsin	0.14	9.7	6
Wyoming	0.00	0.0	54
Total	1.44	100.0	

[a]Less than 10,000 tons of hazardous waste were generated in these states in 1986.
[b]Less than 0.1 percent of the total quantity of hazardous waste generated in 1986 was generated in these states.
Source: TT-140 (G3), GG-170 (GF3), TT-140II (G3)

Chart 7.2-4 Number of Facilities Managing Hazardous Waste in Metal Recovery Processes by State in 1986

State	Number of RCRA TSDR Facilities	Percentage of RCRA TSDR Facilities	State Rank
Alabama	5	1.5	16
Alaska	2	0.6	35
Arizona	6	1.8	12
Arkansas	3	0.9	29
California	43	13.0	1
Colorado	2	0.6	36
Connecticut	22	6.7	3
Delaware	1	0.3	41
District of Columbia	1	0.3	40
Florida	6	1.8	13
Georgia	4	1.2	22
Guam	0	0.0	47
Hawaii	0	0.0	48
Idaho	1	0.3	42
Illinois	17	5.2	4
Indiana	3	0.9	30
Iowa	5	1.5	17
Kansas	3	0.9	31
Kentucky	5	1.5	18
Louisiana	4	1.2	23
Maine	4	1.2	25
Maryland	4	1.2	24
Massachusetts	5	1.5	19
Michigan	14	4.2	5
Minnesota	9	2.7	11
Mississippi	2	0.6	37
Missouri	5	1.5	20
Montana	0	0.0	49
Nebraska	4	1.2	26
Nevada	1	0.3	45
New Hampshire	1	0.3	44
New Jersey	6	1.8	14
New Mexico	3	0.9	32
New York	12	3.6	9
North Carolina	1	0.3	43
North Dakota	0	0.0	50
Ohio	13	3.9	7
Oklahoma	3	0.9	33
Oregon	0	0.0	51
Pennsylvania	10	3.0	10
Puerto Rico	2	0.6	38
Rhode Island	2	0.6	39
South Carolina	14	4.2	6
South Dakota	0	0.0	52
Tennessee	3	0.9	34
Texas	42	12.7	2
Utah	4	1.2	27
Vermont	1	0.3	46
Virgin Island	0	0.0	53
Virginia	4	1.2	28
Washington	6	1.8	15
West Virginia	5	1.5	21
Wisconsin	13	3.9	8
Wyoming	0	0.0	54
Total	330	100.0	

Source: TT-140 (G3), GG-170 (GF3), TT-140II (G3)

Chart 7.2-5 shows the types of metal recovery processes operated in 1986. For each type of process, the chart shows the quantity of hazardous waste managed and the number of facilities operating that type of process.

Chart 7.2-5 Types of Metals Recovery Processes and Quantity of Hazardous Waste Managed in 1986

Process Type	Quantity Managed (million tons)	Percentage of Total Quantity Managed	Number of Facilities	Percentage of Facilities
Other	0.63	43.9	102	30.9
Secondary Smelting	0.38	26.6	26	7.9
Filtration	0.22	15.0	22	6.7
Electrolytic	0.16	10.9	140	42.4
Ion Exchange	0.16	10.8	64	19.4
Evaporation	0.15	10.3	31	9.4
Reverse Osmosis	0.02	1.6	6	1.8
Solvent Extraction	<0.01	0.1	4	1.2
Sodium Borohydride	<0.01	0.1	6	1.8
Missing	<0.01	0.1	4	1.2
Liming	<0.01	<0.1	3	0.9
Total	1.44[a]	100.0[a]	330[b]	100.0[b]

[a] A single waste may be managed in more than one metals recovery process. Therefore, adding the quantities managed in each type of process results in double-counting. The number shown is the total quantity managed in metals recovery processes *without* double-counting.

[b] A single facility may have more than one type of metals recovery process. Therefore, adding the number of facilities with each type of process results in double-counting. The number shown is the total number of facilities with metals recovery processes *without* double-counting.

Source: TT-141, GG-171, TT-141II (G4, G25a, GF4, GF21)

Chart 7.2-6 shows the regulatory status of facilities that recover metals. The chart shows the numbers of facilities that recovered metals and were subject to RCRA-permitting requirements or exempt from RCRA-permitting requirements. The chart does *not* refer to the permitting status of the facilities' recovery operations. Instead, the chart indicates whether *any* operation at the facility is subject to RCRA-permitting requirements.

Chart 7.2-6 RCRA-Permitting Status of Facilities Managing Hazardous Waste in Metal Recovery Processes in 1986

RCRA-Permitting Status	Number of Facilities	Quantity Managed in Metal Recovery (million tons)
Exempt from permitting requirements[a]	207	0.78
Subject to permitting requirements[b]	123	0.65
Total	330	1.44

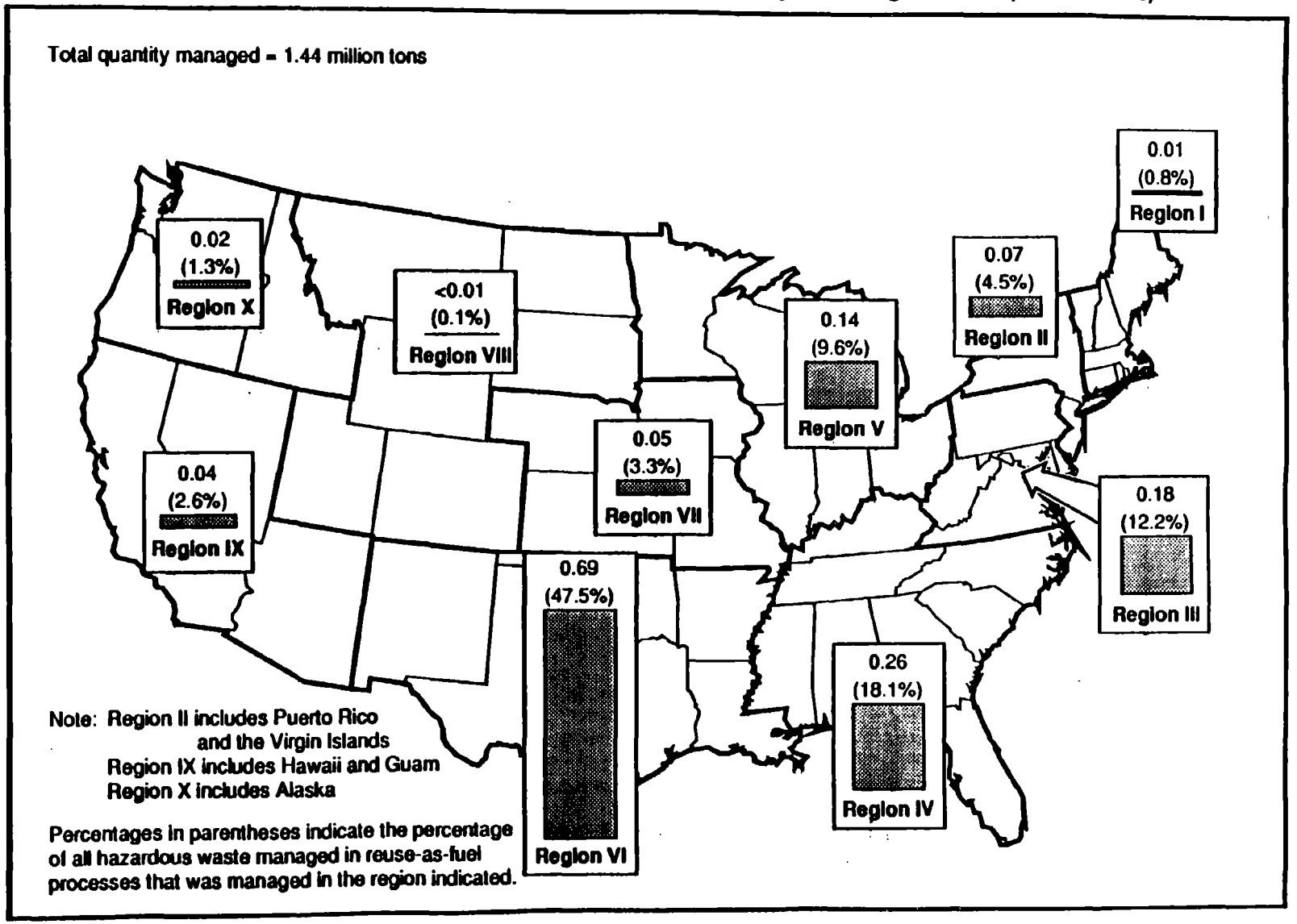
[a] Facilities managing hazardous waste only in units exempt from RCRA-permitting requirements.
[b] Facilities managing hazardous waste in at least one unit subject to RCRA-permitting requirements.
Source: TT-140 (G3), GG-170, TT-140II (G3)

7.3 REUSE AS FUEL

Reusing hazardous waste as fuel involves the burning of hazardous waste as an energy source. **In 1986, 1.44 million tons of hazardous waste were reused as fuel by 295 facilities.** The quantity of hazardous waste reused as fuel is only slightly less than the quantity managed in metals recovery processes, making reusing hazardous waste as fuel the second most common type of recycling (in terms of the quantity of hazardous waste managed).

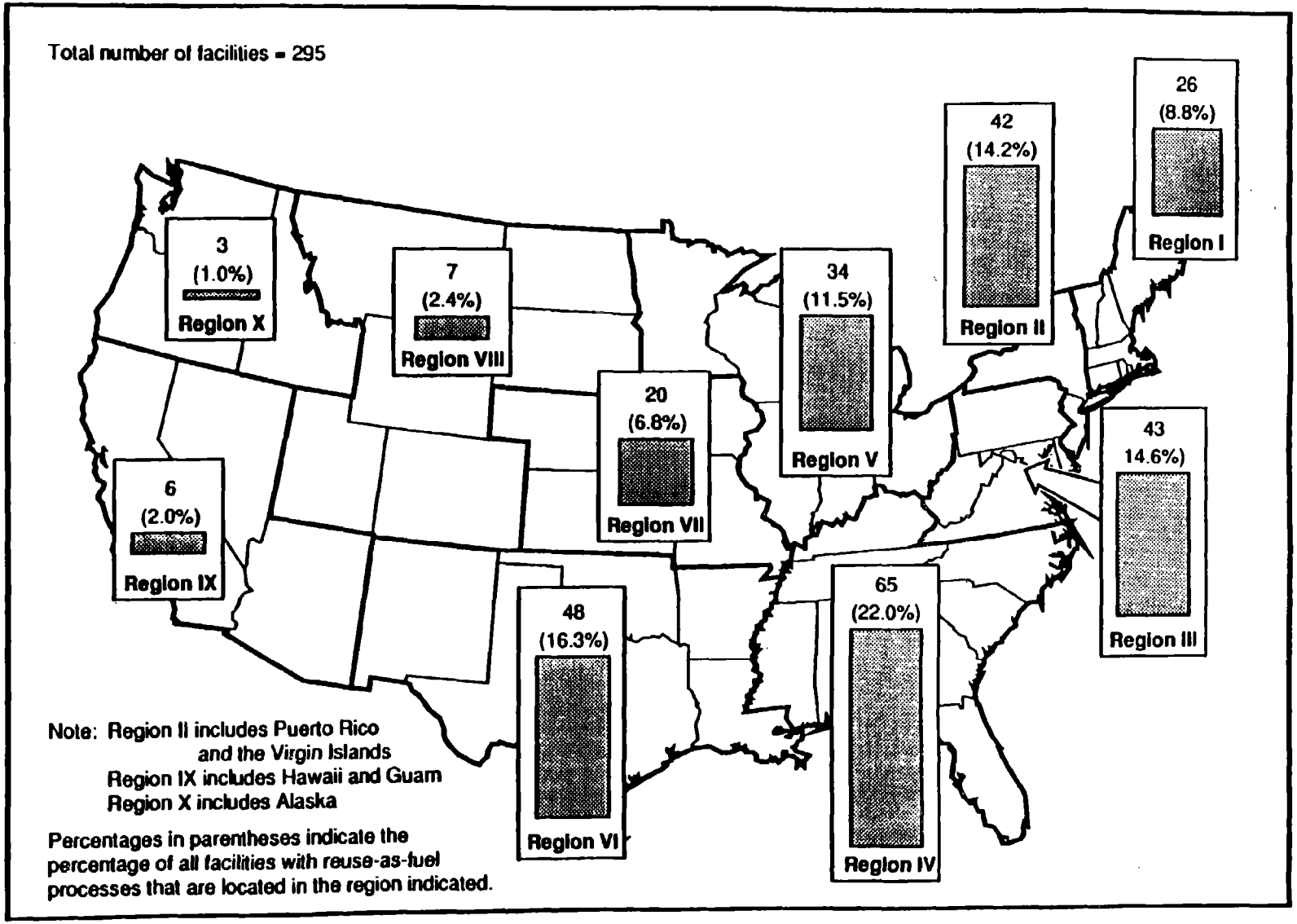
Charts 7.3-1 and 7.3-2 show the quantity of hazardous waste managed and the number of facilities managing hazardous waste in reuse as fuel processes in each EPA region in 1986. Charts 7.3-3 and 7.3-4 show the same information for each state or territory.

Chart 7.3-1 Quantity of Hazardous Waste Managed in Reuse-as-Fuel Processes per EPA Region in 1986 (in million tons)



Source: TT-140 (C3), GG-170 (GD3), TT-140II (C3)

Chart 7.3-2 Number of Facilities Managing Hazardous Waste in Reuse-as-Fuel Processes per EPA Region in 1986



Source: TT-140 (C3), GG-170 (GD3), TT-140II (C3)

Chart 7.3-3 Quantity of Hazardous Waste Managed in Reuse-as-Fuel Processes by State in 1986

State	Quantity Managed (million tons)	Percentage of Total Quantity Managed	State Rank
Alabama	0.02	1.1	18
Alaska	<0.01[a]	<0.1[b]	34
Arizona	0.00	0.0	43
Arkansas	0.03	2.2	12
California	0.04	2.6	9
Colorado	<0.01[a]	0.1	32
Connecticut	0.01	0.6	21
Delaware	<0.01[a]	<0.1[b]	37
District of Columbia	0.00	0.0	44
Florida	0.03	1.9	15
Georgia	<0.01[a]	0.1	31
Guam	0.00	0.0	45
Hawaii	0.00	0.0	46
Idaho	0.00	0.0	47
Illinois	<0.01[a]	0.2	25
Indiana	0.02	1.3	16
Iowa	<0.01[a]	<0.1[b]	35
Kansas	0.04	2.6	8
Kentucky	0.03	2.4	10
Louisiana	0.12	8.3	3
Maine	0.03	2.1	14
Maryland	<0.01[a]	0.2	24
Massachusetts	<0.01[a]	0.1	28
Michigan	<0.01[a]	<0.1[b]	38
Minnesota	0.01	0.4	22
Mississippi	<0.01[a]	<0.1[b]	33
Missouri	<0.01[a]	0.1	27
Montana	<0.01[a]	<0.1[b]	41
Nebraska	<0.01[a]	<0.1[b]	40
Nevada	0.00	0.0	50
New Hampshire	<0.01[a]	<0.1[b]	39
New Jersey	0.01	0.9	19
New Mexico	0.00	0.0	49
New York	0.05	3.3	6
North Carolina	0.03	2.4	11
North Dakota	0.00	0.0	48
Ohio	0.08	5.7	5
Oklahoma	<0.01[a]	<0.1[b]	36
Oregon	0.00	0.0	51
Pennsylvania	0.10	6.8	4
Puerto Rico	0.01	0.4	23
Rhode Island	<0.01[a]	0.1	29
South Carolina	0.01	0.7	20
South Dakota	0.00	0.0	52
Tennessee	0.14	9.4	2
Texas	0.53	36.9	1
Utah	<0.01[a]	0.1	30
Vermont	0.00	0.0	42
Virgin Island	0.00	0.0	53
Virginia	0.04	3.0	7
Washington	0.02	1.3	17
West Virginia	0.03	2.1	13
Wisconsin	<0.01[a]	0.2	26
Wyoming	0.00	0.0	54
Total	1.44	100.0	

[a]Less than 10,000 tons of hazardous waste were generated in these states in 1986.
[b]Less than 0.1 percent of the total quantity of hazardous waste generated in 1986 was generated in these states.
Source: TT-140 (C3), GG-170 (GD3), TT-140II (C3)

Chart 7.3-4 Number of Facilities Managing Hazardous Waste in Reuse-as-Fuel Processes by State in 1986

State	Number of RCRA TSDR Facilities	Percentage of RCRA TSDR Facilities	State Rank
Alabama	4	1.4	23
Alaska	1	0.3	38
Arizona	0	0.0	43
Arkansas	4	1.4	24
California	6	2.0	18
Colorado	1	0.3	39
Connecticut	11	3.7	6
Delaware	2	0.7	34
District of Columbia	0	0.0	44
Florida	4	1.4	25
Georgia	2	0.7	35
Guam	0	0.0	45
Hawaii	0	0.0	46
Idaho	0	0.0	47
Illinois	7	2.4	15
Indiana	4	1.4	26
Iowa	1	0.3	40
Kansas	7	2.4	16
Kentucky	5	1.7	19
Louisiana	11	3.7	7
Maine	8	2.7	11
Maryland	7	2.4	17
Massachusetts	5	1.7	20
Michigan	3	1.0	30
Minnesota	8	2.7	12
Mississippi	4	1.4	27
Missouri	2	0.7	36
Montana	1	0.3	41
Nebraska	3	1.0	31
Nevada	0	0.0	50
New Hampshire	3	1.0	32
New Jersey	30	10.2	1
New Mexico	0	0.0	49
New York	8	2.7	13
North Carolina	18	6.1	3
North Dakota	0	0.0	48
Ohio	10	3.4	9
Oklahoma	3	1.0	33
Oregon	0	0.0	51
Pennsylvania	10	3.4	10
Puerto Rico	4	1.4	28
Rhode Island	4	1.4	29
South Carolina	14	4.7	5
South Dakota	0	0.0	52
Tennessee	11	3.7	8
Texas	30	10.2	2
Utah	5	1.7	21
Vermont	1	0.3	42
Virgin Island	0	0.0	53
Virginia	17	5.8	4
Washington	2	0.7	37
West Virginia	8	2.7	14
Wisconsin	5	1.7	22
Wyoming	0	0.0	54
Total	295	100.0	

Source: TT-140 (C3), GG-170 (GD3), TT-140II (C3)

Chart 7.3-5 shows the types of reuse as fuel processes operated in 1986. For each type of process, the chart shows the quantity of hazardous waste managed and the number of facilities operating that type of process.

Chart 7.3-5 Types of Reuse-as-Fuel Processes and Quantity Managed in 1986

Process Type	Quantity Managed (million tons)	Percentage of Total Quantity Managed	Number of Facilities	Percentage of Facilities
Industrial Boiler	0.86	59.8	195	66.1
Cement Kiln	0.23	15.8	18	6.1
Other Industrial Furnace	0.13	9.1	5	1.7
Aggregate Kiln	0.13	9.0	9	3.1
Process Heater	0.06	3.9	18	6.1
Sulfur Recovery Furnace	0.02	1.2	3	1.0
Utility Boiler	0.01	0.3	34	11.5
Other	0.01	0.3	15	5.1
Coke Oven	<0.01	0.2	1	0.3
Smelting Furnace	<0.01	0.1	3	1.0
Blast Furnace	<0.01	0.1	1	0.3
Asphalt Kiln	<0.01	0.1	1	0.3
Other Kiln	0.00	0.0	2	0.7
Unknown	0.12	0.1		
Total	1.44	100.0	295[a]	100.0[a]

[a] A single facility may have more than one type of reuse-as-fuel process. Therefore, adding the number of facilities with each type of process results in double-counting. The number shown is the total number of facilities with reuse-as-fuel processes *without* double-counting.

Source: TT-141, GG-171, TT-141II (C4, C17a, GD4, GD17)

Chart 7.3-6 shows the regulatory status of facilities that reuse hazardous waste as fuel. The chart shows the numbers of facilities that reused hazardous waste as fuel and were subject to RCRA-permitting requirements or exempt from RCRA-permitting requirements. The chart does *not* refer to the permitting status of the facilities' recovery operations. Instead, the chart indicates whether *any* operation at the facility is subject to RCRA-permitting requirements.

Chart 7.3-6 RCRA-Permitting Status of Facilities Managing Hazardous Waste in Reusing Hazardous Waste as Fuel in 1986

RCRA-Permitting Status	Number of Facilities	Quantity Managed in Reuse as Fuel (million tons)
Exempt from permitting requirements[a]	102	0.04
Subject to permitting requirements[b]	193	1.41
Total	295	1.44

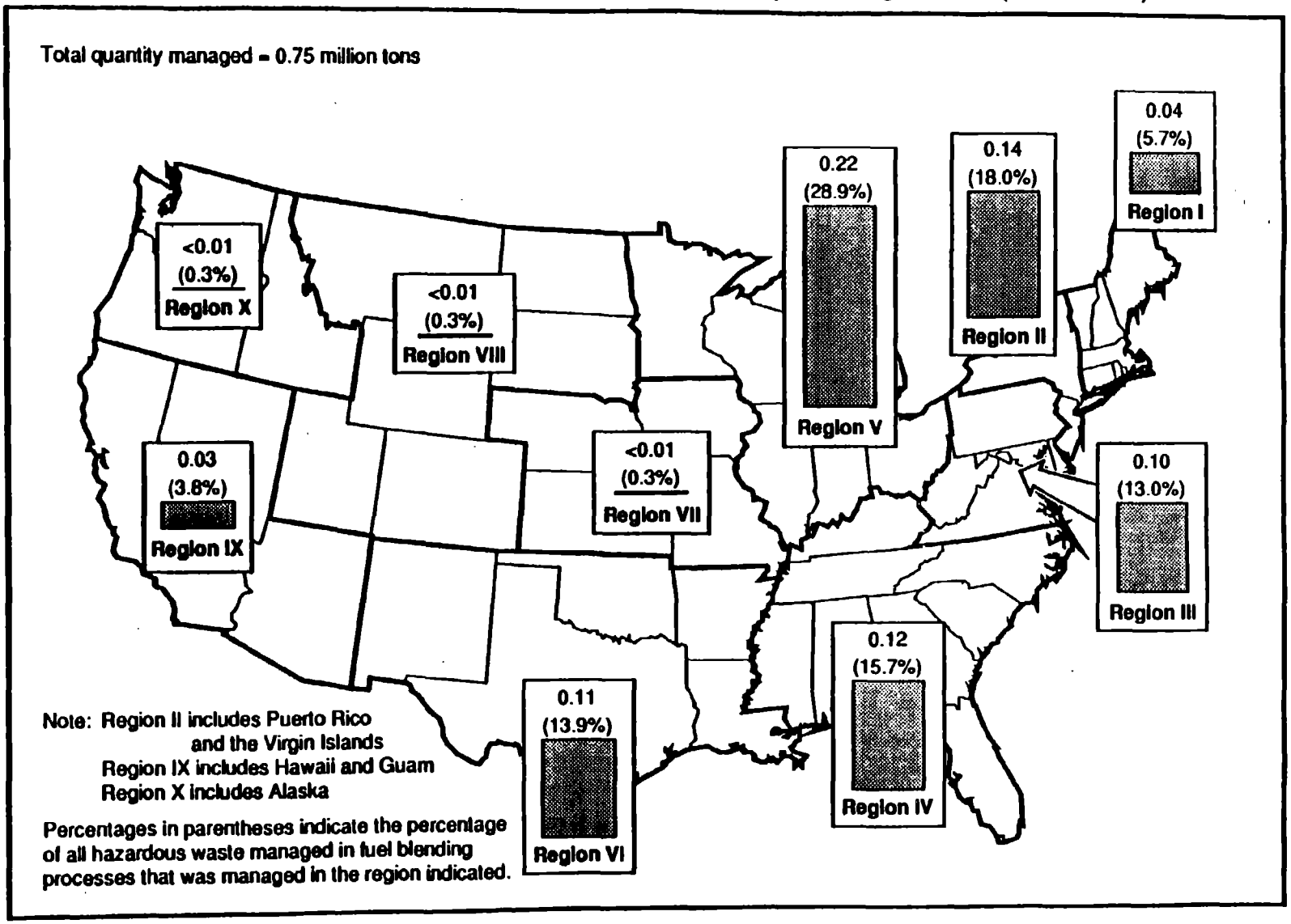
[a] Facilities managing hazardous waste only in units exempt from RCRA-permitting requirements.
[b] Facilities managing hazardous waste in at least one unit subject to RCRA-permitting requirements.
Source: TT-140 (C3), GG-170, TT-140II (C3)

7.4 FUEL BLENDING

Prior to reusing hazardous wastes as fuel, facilities can blend the hazardous waste with other types of fuel (e.g., nonhazardous waste or petroleum) to obtain the desired characteristics. **In 1986, 177 facilities managed 0.75 million tons of hazardous waste in fuel blending processes.**

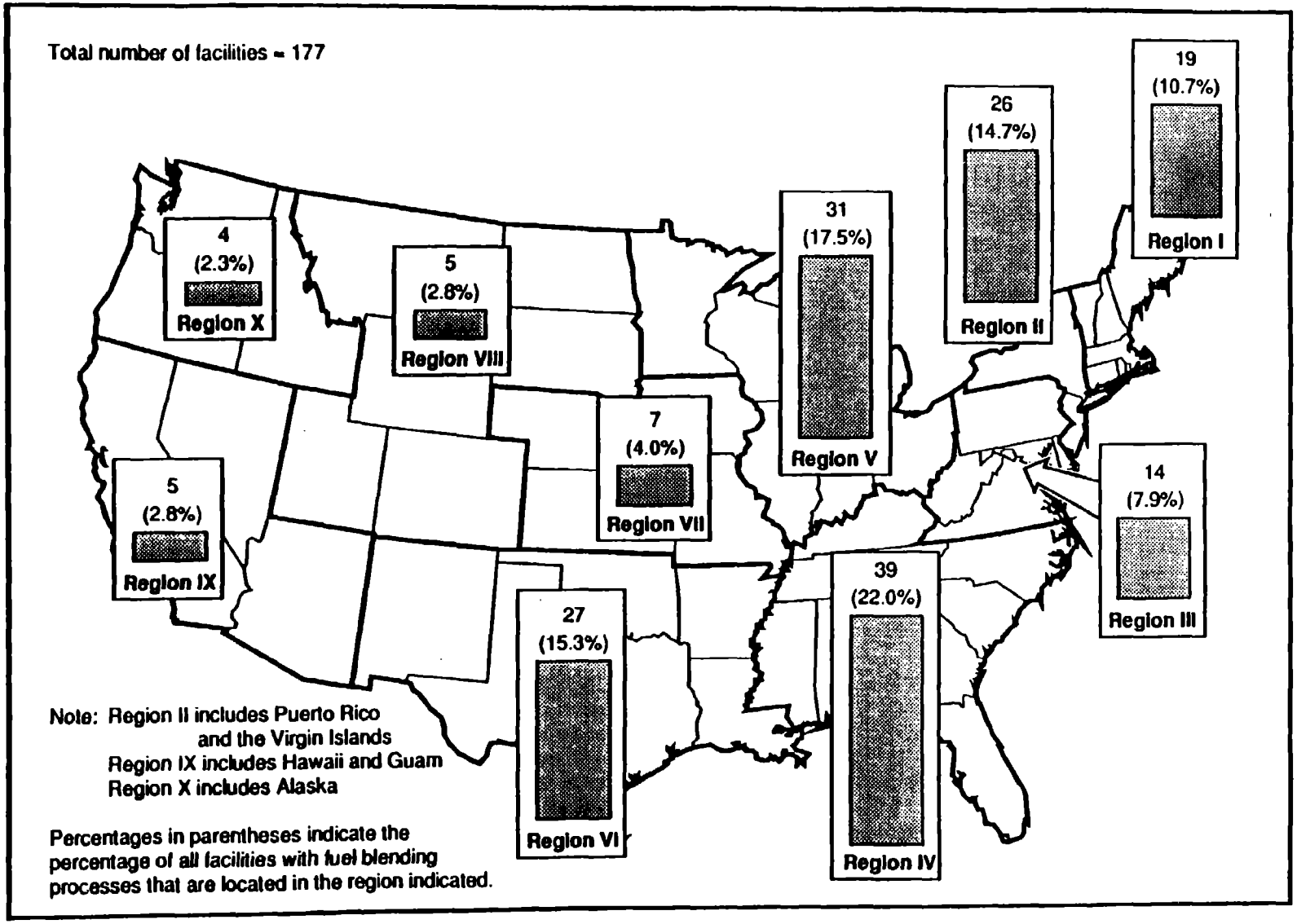
Charts 7.4-1 and 7.4-2 show the quantity of hazardous waste managed and the number of facilities managing hazardous waste in fuel blending processes in each EPA region in 1986. Charts 7.4-3 and 7.4-4 show the same information for each state or territory.

Chart 7.4-1 Quantity of Hazardous Waste Managed in Fuel Blending Processes per EPA Region in 1986 (in million tons)



Source: TT-140 (D10A), GG-170 (GC10), TT-140II (D10A)

Chart 7.4-2 Number of Facilities Managing Hazardous Waste in Fuel Blending Processes per EPA Region in 1986



Source: TT-140 (D10A), GG-170 (GC10), TT-140II (D10A)

Chart 7.4-3 Quantity of Hazardous Waste Managed in Fuel Blending Processes by State in 1986

State	Quantity Managed (million tons)	Percentage of Total Quantity Managed	State Rank
Alabama	0.02	2.2	16
Alaska	0.00	0.0	36
Arizona	0.00	0.0	37
Arkansas	<0.01[a]	0.4	26
California	0.03	3.8	11
Colorado	<0.01[a]	0.1	30
Connecticut	0.04	5.0	7
Delaware	0.00	0.0	38
District of Columbia	0.00	0.0	39
Florida	0.02	2.5	14
Georgia	0.01	0.9	21
Guam	0.00	0.0	40
Hawaii	0.00	0.0	41
Idaho	0.00	0.0	42
Illinois	0.01	1.7	18
Indiana	0.03	4.5	9
Iowa	0.00	0.0	43
Kansas	<0.01[a]	<0.1[b]	32
Kentucky	0.03	3.7	12
Louisiana	0.05	6.3	6
Maine	0.00	0.0	44
Maryland	0.03	3.6	13
Massachusetts	<0.01[a]	<0.1[b]	35
Michigan	0.06	8.2	3
Minnesota	<0.01[a]	<0.1[b]	33
Mississippi	<0.01[a]	0.1	31
Missouri	<0.01[a]	0.3	27
Montana	0.00	0.0	45
Nebraska	<0.01[a]	<0.1[b]	34
Nevada	0.00	0.0	46
New Hampshire	0.00	0.0	47
New Jersey	0.07	9.9	2
New Mexico	0.00	0.0	48
New York	0.06	7.5	4
North Carolina	0.03	4.3	10
North Dakota	0.00	0.0	49
Ohio	0.10	13.5	1
Oklahoma	<0.01[a]	0.4	25
Oregon	0.00	0.0	50
Pennsylvania	0.02	2.4	15
Puerto Rico	0.01	0.7	23
Rhode Island	0.01	0.7	22
South Carolina	0.01	1.5	19
South Dakota	0.00	0.0	51
Tennessee	<0.01[a]	0.5	24
Texas	0.05	6.8	5
Utah	<0.01[a]	0.2	29
Vermont	0.00	0.0	52
Virgin Island	0.00	0.0	53
Virginia	0.04	5.0	8
Washington	<0.01[a]	0.3	28
West Virginia	0.01	1.9	17
Wisconsin	0.01	1.0	20
Wyoming	0.00	0.0	54
Total	0.75	100.0	

[a]Less than 10,000 tons of hazardous waste were generated in these states in 1986.
[b]Less than 0.1 percent of the total quantity of hazardous waste generated in 1986 was generated in these states.
Source: TT-140 (D10A), GG-170 (GC10), TT-140II (D10A)

Chart 7.4-4 Number of Facilities Managing Hazardous Waste in Fuel Blending Processes by State in 1986

State	Number of RCRA TSDR Facilities	Percentage of RCRA TSDR Facilities	State Rank
Alabama	3	1.7	23
Alaska	0	0.0	36
Arizona	0	0.0	37
Arkansas	2	1.1	26
California	5	2.8	13
Colorado	1	0.6	31
Connecticut	10	5.6	5
Delaware	0	0.0	39
District of Columbia	0	0.0	38
Florida	8	4.5	7
Georgia	5	2.8	14
Guam	0	0.0	40
Hawaii	0	0.0	41
Idaho	0	0.0	43
Illinois	8	4.5	8
Indiana	4	2.3	16
Iowa	0	0.0	42
Kansas	2	1.1	27
Kentucky	3	1.7	22
Louisiana	11	6.2	4
Maine	0	0.0	44
Maryland	7	4.0	11
Massachusetts	1	0.6	35
Michigan	4	2.3	15
Minnesota	1	0.6	33
Mississippi	1	0.6	32
Missouri	4	2.3	19
Montana	0	0.0	45
Nebraska	1	0.6	34
Nevada	0	0.0	49
New Hampshire	0	0.0	47
New Jersey	8	4.5	6
New Mexico	0	0.0	48
New York	17	9.6	1
North Carolina	4	2.3	17
North Dakota	0	0.0	46
Ohio	12	6.8	3
Oklahoma	1	0.6	30
Oregon	0	0.0	50
Pennsylvania	4	2.3	18
Puerto Rico	1	0.6	29
Rhode Island	8	4.5	10
South Carolina	8	4.5	9
South Dakota	0	0.0	51
Tennessee	7	4.0	12
Texas	13	7.3	2
Utah	4	2.3	21
Vermont	0	0.0	53
Virgin Island	0	0.0	52
Virginia	2	1.1	24
Washington	4	2.3	20
West Virginia	1	0.6	28
Wisconsin	2	1.1	25
Wyoming	0	0.0	54
Total	177	100.0	

Source: TT-140 (D10A), GG-170 (GC10), TT-140II (D10A)

Chart 7.4-5 shows the regulatory status of facilities that blend hazardous waste for fuel. The chart shows the numbers of facilities that managed hazardous waste in fuel blending processes and were subject to RCRA-permitting requirements or exempt from RCRA-permitting requirements. The chart does *not* refer to the permitting status of the facilities' recovery operations. Instead, the chart indicates whether *any* operation at the facility is subject to RCRA-permitting requirements.

Chart 7.4-5 RCRA-Permitting Status of Facilities Managing Hazardous Waste in Fuel Blending Processes in 1986

RCRA-Permitting Status	Number of Facilities	Quantity Managed in Fuel Blending (million tons)
Exempt from permitting requirements[a]	49	0.02
Subject to permitting requirements[b]	128	0.73
Total	177	0.75

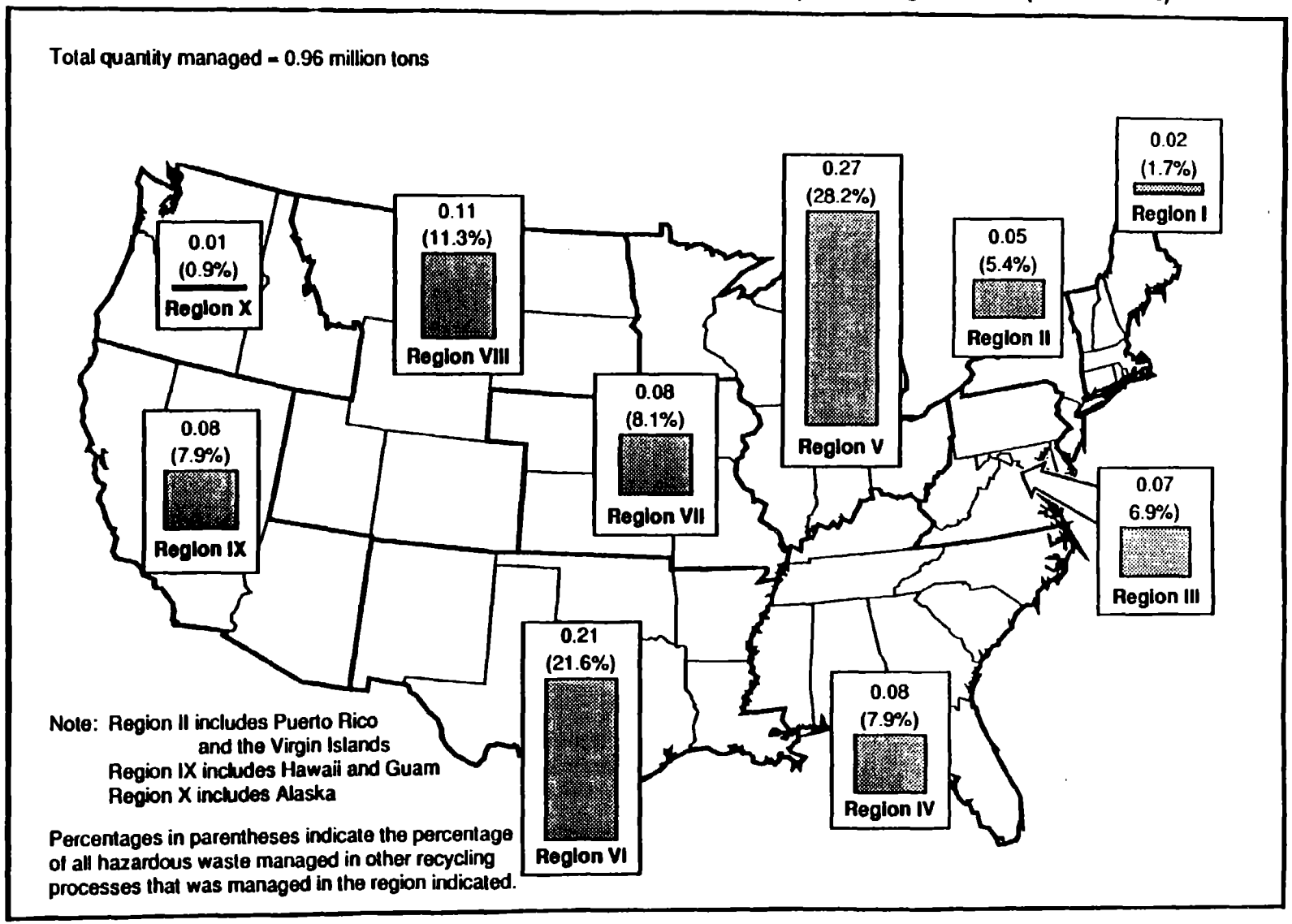
[a] Facilities managing hazardous waste only in units exempt from RCRA-permitting requirements.
[b] Facilities managing hazardous waste in at least one unit subject to RCRA-permitting requirements.
Source: TT-140 (D10A), GG-170, TT-140II (D10A)

7.5 OTHER RECYCLING

Respondents to the Generator and TSDR Surveys reported data on any recycling activities in 1986 other than those specifically mentioned in the surveys (i.e., solvent recovery, metals recovery, reusing hazardous waste as fuel, and fuel blending). **In 1986, 243 facilities managed 0.96 million tons of hazardous waste in other recycling processes.**

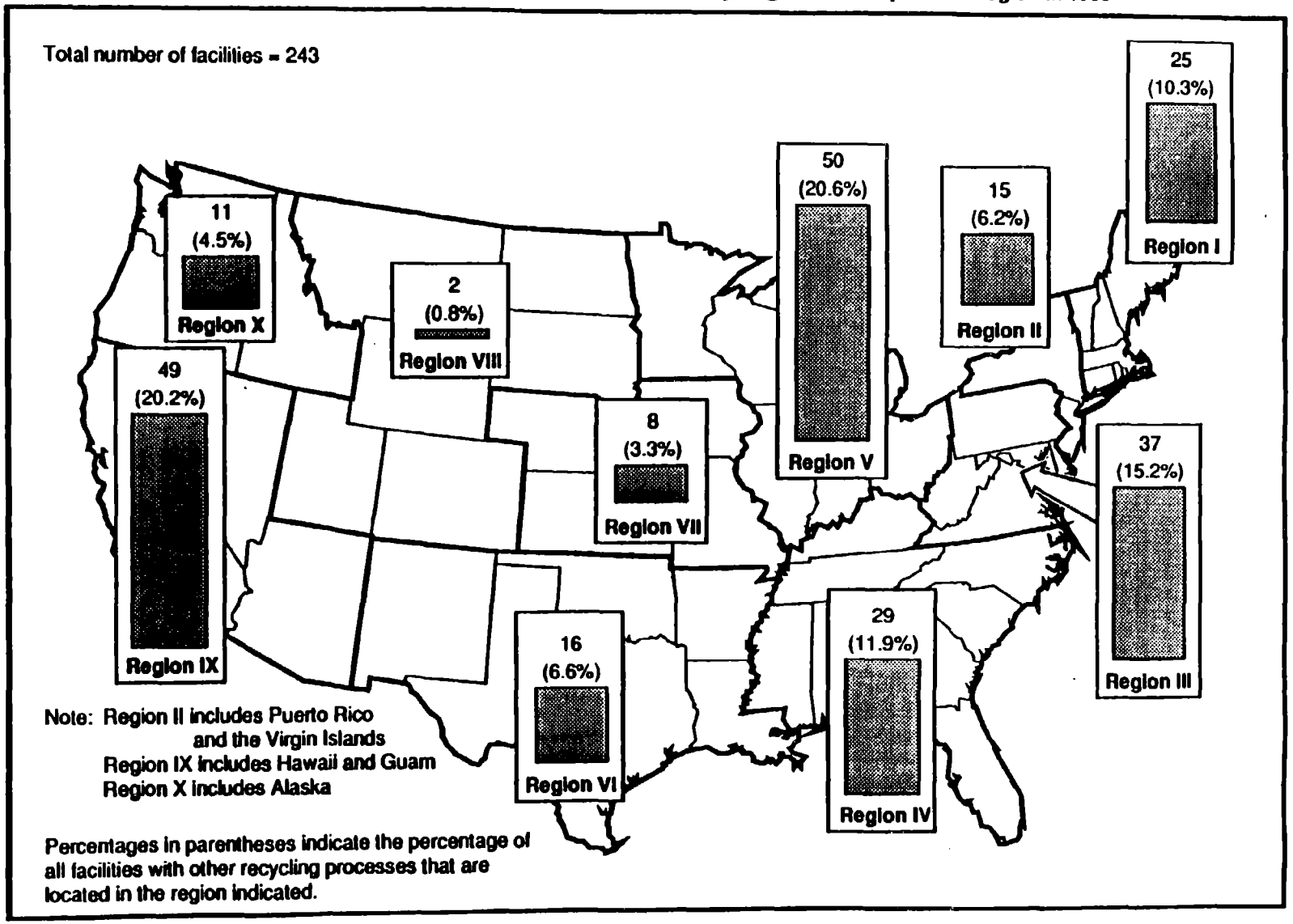
Charts 7.5-1 and 7.5-2 show the quantity of hazardous waste managed and the number of facilities managing hazardous waste in other recovery processes in each EPA region in 1986. Charts 7.5-3 and 7.5-4 show the same information for each state or territory.

Chart 7.5-1 Quantity of Hazardous Waste Managed in Other Recycling Processes per EPA Region in 1986 (in million tons)



Source: TT-140 (I26), GG-170 (GH3), TT-140II (I26)

Chart 7.5-2 Number of Facilities Managing Hazardous Waste in Other Recycling Processes per EPA Region in 1986



Source: TT-140 (I26), GG-170 (GH3), TT-140II (I26)

Chart 7.5-3 Quantity of Hazardous Waste Managed in Other Recovery Processes by State in 1986

State	Quantity Managed (million tons)	Percentage of Total Quantity Managed	State Rank
Alabama	0.00	0.0	34
Alaska	0.00	0.0	37
Arizona	<0.01[a]	0.3	23
Arkansas	<0.01[a]	<0.1[b]	29
California	0.07	7.6	4
Colorado	0.11	11.3	2
Connecticut	<0.01[a]	<0.1[b]	30
Delaware	0.00	0.0	39
District of Columbia	0.00	0.0	38
Florida	<0.01[a]	0.5	22
Georgia	0.01	1.1	19
Guam	0.00	0.0	40
Hawaii	0.00	0.0	41
Idaho	0.00	0.0	43
Illinois	0.04	4.4	9
Indiana	0.10	10.1	3
Iowa	0.00	0.0	42
Kansas	0.03	2.8	12
Kentucky	0.05	5.2	8
Louisiana	0.02	1.9	14
Maine	<0.01[a]	<0.1[b]	27
Maryland	<0.01[a]	<0.1[b]	33
Massachusetts	0.01	0.6	21
Michigan	0.03	2.8	13
Minnesota	0.03	3.3	11
Mississippi	<0.01[a]	<0.1[b]	32
Missouri	0.04	4.0	10
Montana	0.00	0.0	44
Nebraska	0.01	1.3	16
Nevada	0.00	0.0	47
New Hampshire	0.00	0.0	35
New Jersey	0.05	5.3	7
New Mexico	0.00	0.0	46
New York	<0.01[a]	0.1	25
North Carolina	<0.01[a]	<0.1[b]	28
North Dakota	0.00	0.0	45
Ohio	0.06	6.3	6
Oklahoma	<0.01[a]	0.1	26
Oregon	0.00	0.0	48
Pennsylvania	0.06	6.7	5
Puerto Rico	0.00	0.0	49
Rhode Island	0.01	1.1	17
South Carolina	0.01	1.1	18
South Dakota	0.00	0.0	50
Tennessee	<0.01[a]	<0.1[b]	31
Texas	0.19	19.6	1
Utah	0.00	0.0	36
Vermont	0.00	0.0	53
Virgin Island	0.00	0.0	52
Virginia	0.00	0.0	51
Washington	0.01	0.9	20
West Virginia	<0.01[a]	0.2	24
Wisconsin	0.01	1.3	15
Wyoming	0.00	0.0	54
Total	0.96	100.0	

[a]Less than 10,000 tons of hazardous waste were generated in these states in 1986.
[b]Less than 0.1 percent of the total quantity of hazardous waste generated in 1986 was generated in these states.
Source: TT-140 (I26), GG-170 (GH3), TT-140II (I26)

Chart 7.5-4 Number of Facilities Managing Hazardous Waste in Other Recovery Processes by State in 1986

State	Number of RCRA TSDR Facilities	Percentage of RCRA TSDR Facilities	State Rank
Alabama	2	0.8	23
Alaska	0	0.0	37
Arizona	3	1.2	20
Arkansas	1	0.4	29
California	45	18.5	1
Colorado	1	0.4	30
Connecticut	10	4.1	6
Delaware	0	0.0	39
District of Columbia	0	0.0	38
Florida	1	0.4	31
Georgia	3	1.2	21
Guam	0	0.0	40
Hawaii	0	0.0	41
Idaho	0	0.0	43
Illinois	4	1.6	16
Indiana	2	0.8	24
Iowa	0	0.0	42
Kansas	2	0.8	25
Kentucky	6	2.5	12
Louisiana	4	1.6	17
Maine	3	1.2	22
Maryland	1	0.4	32
Massachusetts	6	2.5	13
Michigan	9	3.7	7
Minnesota	2	0.8	26
Mississippi	1	0.4	33
Missouri	4	1.6	18
Montana	0	0.0	44
Nebraska	2	0.8	27
Nevada	0	0.0	47
New Hampshire	1	0.4	35
New Jersey	8	3.3	9
New Mexico	0	0.0	46
New York	7	2.9	10
North Carolina	1	0.4	34
North Dakota	0	0.0	45
Ohio	22	9.1	3
Oklahoma	4	1.6	19
Oregon	0	0.0	48
Pennsylvania	34	14.0	2
Puerto Rico	0	0.0	49
Rhode Island	5	2.1	14
South Carolina	9	3.7	8
South Dakota	0	0.0	50
Tennessee	5	2.1	15
Texas	7	2.9	11
Utah	1	0.4	36
Vermont	0	0.0	53
Virgin Island	0	0.0	52
Virginia	0	0.0	51
Washington	11	4.5	4
West Virginia	2	0.8	28
Wisconsin	11	4.5	5
Wyoming	0	0.0	54
Total	243	100.0	

Source: TT-140 (I26), GG-170 (GH3), TT-140II (I26)

Chart 7.5-5 shows the regulatory status of facilities that operated other recovery processes. The chart shows the numbers of facilities that managed hazardous waste in other recovery processes and were subject to RCRA-permitting requirements or exempt from RCRA-permitting requirements. The chart does *not* refer to the permitting status of the facilities' recovery operations. Instead, the chart indicates whether *any* operation at the facility is subject to RCRA-permitting requirements.

Chart 7.5-5 RCRA-Permitting Status of Facilities Managing Hazardous Waste in Other Recycling Processes in 1986

RCRA-Permitting Status	Number of Facilities	Quantity Managed in Other Recycling (million tons)
Exempt from permitting requirements[a]	173	0.22
Subject to permitting requirements[b]	70	0.75
Total	243	0.96

[a] Facilities managing hazardous waste only in units exempt from RCRA-permitting requirements.

[b] Facilities managing hazardous waste in at least one unit subject to RCRA-permitting requirements.

Source: TT-140 (I26), GG-170, TT-140II (I26)

(This page is intentionally blank)

8 HAZARDOUS WASTE MANAGEMENT METHODS: TREATMENT

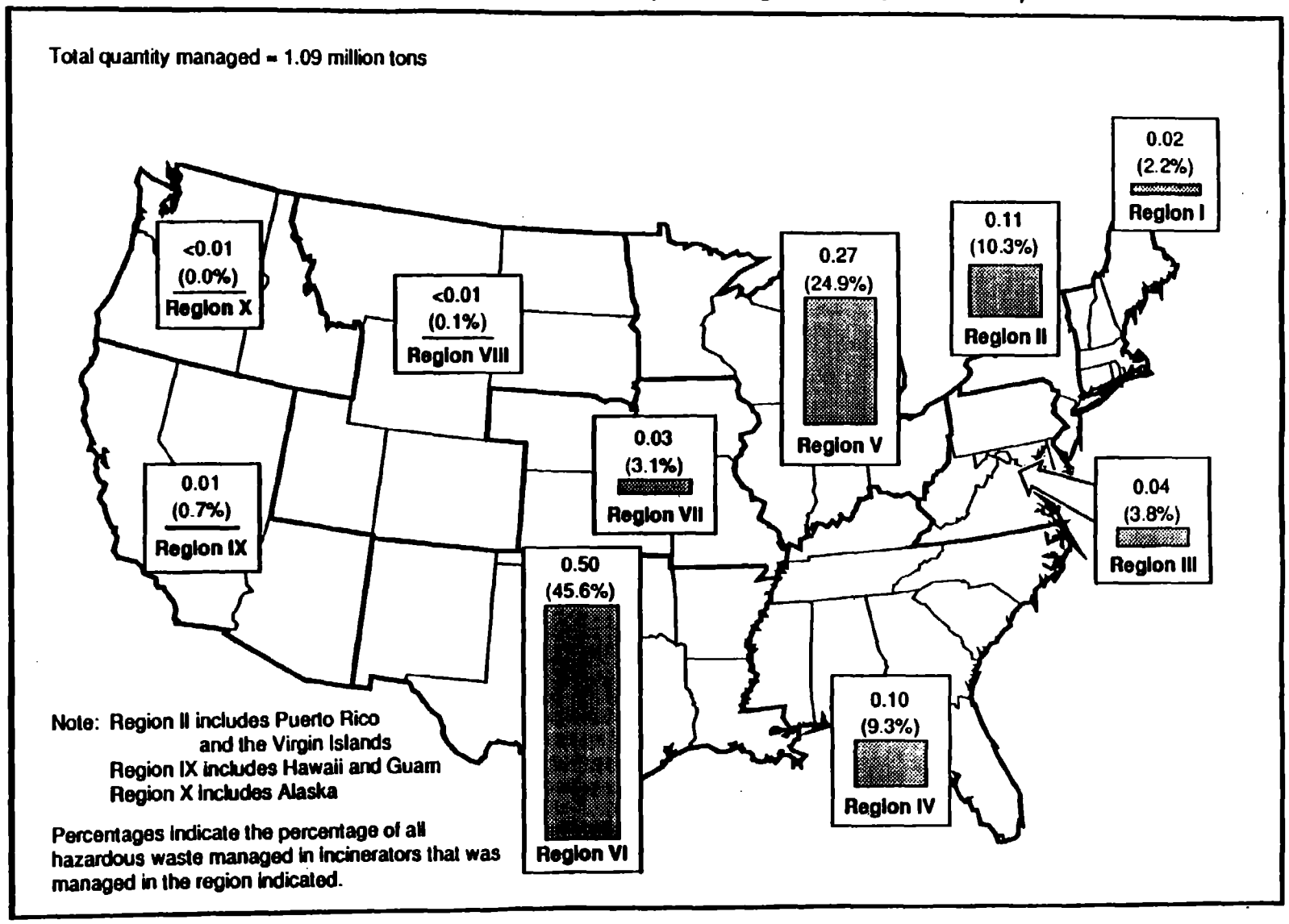
Regulations promulgated under RCRA, the Clean Water Act, and the Toxic Substances Control Act prescribe treatment standards that must be met prior to disposal or release of a hazardous waste into the environment. This chapter summarizes data on hazardous waste treatment activities. As with recycling (Chapter 7), some of the data reported in the Generator and TSDR Surveys are process-specific. For waste treatment activities that are typically sequential (i.e., a single waste is treated sequentially in several different processes), aggregating process-specific data is not appropriate.

8.1 INCINERATION

Hazardous wastes are sometimes incinerated to break down hazardous constituents into less hazardous components. **In 1986, 197 facilities incinerated 1.09 million tons of hazardous waste.**

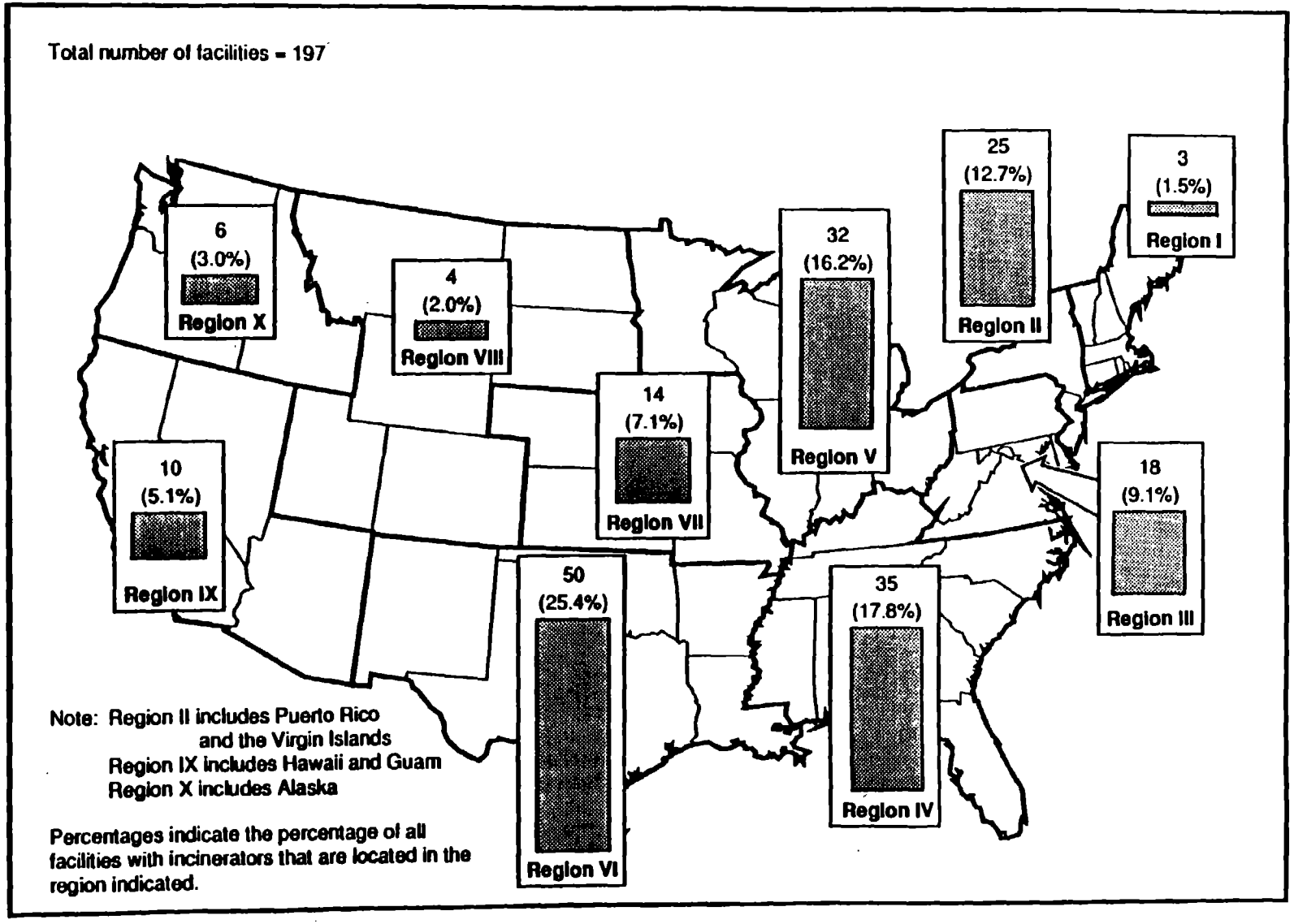
Charts 8.1-1 and 8.1-2 show the quantity of hazardous waste managed and the number of facilities managing hazardous waste in incinerators in each EPA region in 1986. Charts 8.1-3 and 8.1-4 show the same information for each state or territory.

Chart 8.1-1 Quantity of Hazardous Waste Managed in Incinerators per EPA Region in 1986 (in million tons)



Source: TT-140 (B3)

Chart 8.1-2 Number of Facilities Managing Hazardous Waste in Incinerators per EPA Region in 1986



Source: TT-140 (B3)

Chart 8.1-3 Quantity of Hazardous Waste Incinerated by State in 1986

State	Quantity Managed (million tons)	Percentage of Total Quantity Managed	State Rank
Alabama	<0.01[a]	0.5	25
Alaska	0.00	0.0	41
Arizona	<0.01[a]	<0.1[b]	37
Arkansas	0.08	7.2	4
California	0.01	0.7	21
Colorado	<0.01[a]	<0.1[b]	40
Connecticut	0.02	1.7	13
Delaware	<0.01[a]	<0.1[b]	31
District of Columbia	0.00	0.0	42
Florida	<0.01[a]	0.2	29
Georgia	0.01	1.3	17
Guam	0.00	0.0	43
Hawaii	0.00	0.0	44
Idaho	<0.01[a]	<0.1[b]	35
Illinois	0.04	3.9	6
Indiana	0.17	15.2	2
Iowa	<0.01[a]	0.2	28
Kansas	<0.01[a]	0.3	27
Kentucky	0.01	0.7	22
Louisiana	0.08	7.5	3
Maine	0.00	0.0	45
Maryland	0.01	0.6	24
Massachusetts	0.01	0.6	23
Michigan	0.01	1.3	16
Minnesota	0.03	2.4	12
Mississippi	<0.01[a]	<0.1[b]	38
Missouri	0.03	2.5	11
Montana	0.00	0.0	46
Nebraska	0.00	0.0	47
Nevada	<0.01[a]	<0.1[b]	36
New Hampshire	0.00	0.0	48
New Jersey	0.03	3.0	8
New Mexico	0.00	0.0	49
New York	0.05	4.7	5
North Carolina	0.01	0.8	19
North Dakota	<0.01[a]	0.1	30
Ohio	0.02	1.7	14
Oklahoma	<0.01[a]	<0.1[b]	32
Oregon	<0.01[a]	<0.1[b]	39
Pennsylvania	0.01	1.1	18
Puerto Rico	0.03	2.6	10
Rhode Island	0.00	0.0	50
South Carolina	0.04	3.3	7
South Dakota	0.00	0.0	51
Tennessee	0.03	2.7	9
Texas	0.34	30.9	1
Utah	<0.01[a]	<0.1[b]	34
Vermont	0.00	0.0	53
Virgin Island	0.00	0.0	52
Virginia	0.01	0.7	20
Washington	<0.01[a]	<0.1[b]	33
West Virginia	0.01	1.3	15
Wisconsin	<0.01[a]	0.4	26
Wyoming	0.00	0.0	54
Total	1.09	100.0	

[a]Less than 10,000 tons of hazardous waste were generated in these states in 1986.
[b]Less than 0.1 percent of the total quantity of hazardous waste generated in 1986 was generated in these states.
Source: TT-140 (B3)

Chart 8.1-4 Number of Facilities Incinerating Hazardous Waste by State in 1986

State	Number of RCRA TSDR Facilities	Percentage of RCRA TSDR Facilities	State Rank
Alabama	7	3.6	13
Alaska	0	0.0	42
Arizona	1	0.5	38
Arkansas	5	2.5	16
California	8	4.1	7
Colorado	1	0.5	40
Connecticut	1	0.5	35
Delaware	2	1.0	28
District of Columbia	0	0.0	43
Florida	2	1.0	27
Georgia	2	1.0	24
Guam	0	0.0	44
Hawaii	0	0.0	45
Idaho	2	1.0	32
Illinois	7	3.6	10
Indiana	7	3.6	9
Iowa	3	1.5	21
Kansas	3	1.5	20
Kentucky	8	4.1	8
Louisiana	11	5.6	2
Maine	0	0.0	46
Maryland	3	1.5	19
Massachusetts	2	1.0	26
Michigan	2	1.0	23
Minnesota	1	0.5	34
Mississippi	1	0.5	39
Missouri	8	4.1	6
Montana	0	0.0	47
Nebraska	0	0.0	48
Nevada	1	0.5	37
New Hampshire	0	0.0	49
New Jersey	8	4.1	5
New Mexico	1	0.5	41
New York	10	5.1	4
North Carolina	6	3.0	15
North Dakota	1	0.5	36
Ohio	11	5.6	3
Oklahoma	2	1.0	29
Oregon	2	1.0	33
Pennsylvania	6	3.0	14
Puerto Rico	7	3.6	12
Rhode Island	0	0.0	50
South Carolina	7	3.6	11
South Dakota	0	0.0	51
Tennessee	2	1.0	22
Texas	31	15.7	1
Utah	2	1.0	31
Vermont	0	0.0	53
Virgin Island	0	0.0	52
Virginia	2	1.0	25
Washington	2	1.0	30
West Virginia	5	2.5	17
Wisconsin	4	2.0	18
Wyoming	0	0.0	54
Total	197	100.0	

Source: TT-140 (B3)

Chart 8.1-5 shows the types of incinerators that were operated in 1986. For each type of incinerator, the chart shows the quantity of hazardous waste managed and the number of facilities operating that type of incinerator.

Chart 8.1-5 Types of Incinerators and Quantity Managed in 1986

Type of Incinerator	Quantity Managed (million tons)	Percentage of Total Quantity Managed	Number of Facilities	Percentage of Facilities
Liquid Injection	0.65	59.4	99	50.3
Rotary Kiln with Liquid Injection	0.30	28 0	21	10.7
Multiple Hearth	0.03	3.1	6	3.0
Undisclosed	0.02	2.2	11	5.6
Rotary Kiln	0.02	1.9	23	11.7
Fixed Hearth	0.02	1.7	17	8.6
Pyrolytic Destructor	0.02	1.7	7	3.6
Fluidized Bed	0.01	1.3	7	3.6
Other	0.01	1.1	15	7.6
Two Stage	<0.01	0.1	17	8.6
Fume/Vapor	<0.01	<0.1	2	1.0
Total	1.09	100.0	197	100.0

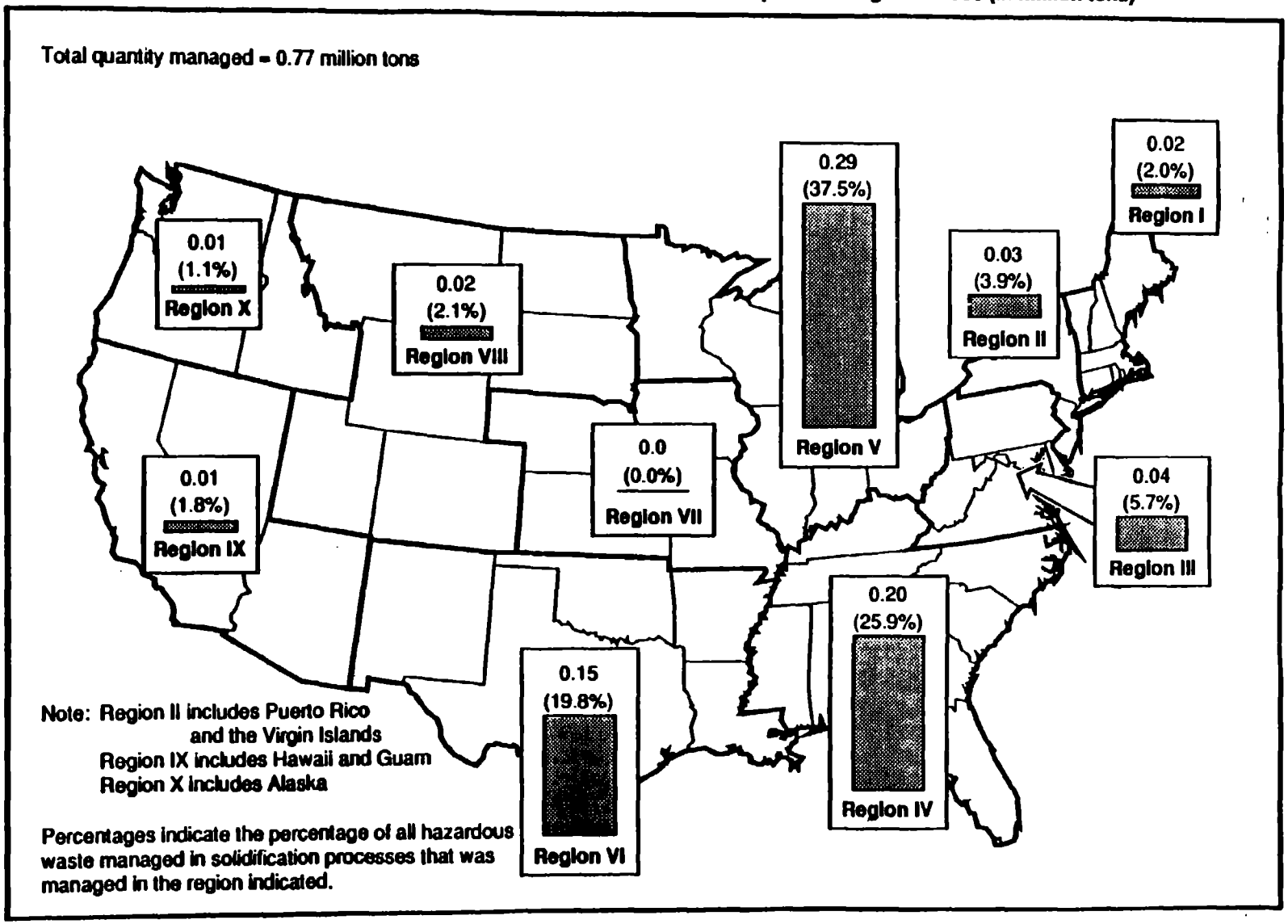
Source: TT-141 (B4, B17A)

8.2 SOLIDIFICATION

Hazardous wastes are often solidified or encapsulated to prevent hazardous constituents from entering the environment during land disposal. **In 1986, 122 facilities solidified 0.77 million tons of hazardous waste.**

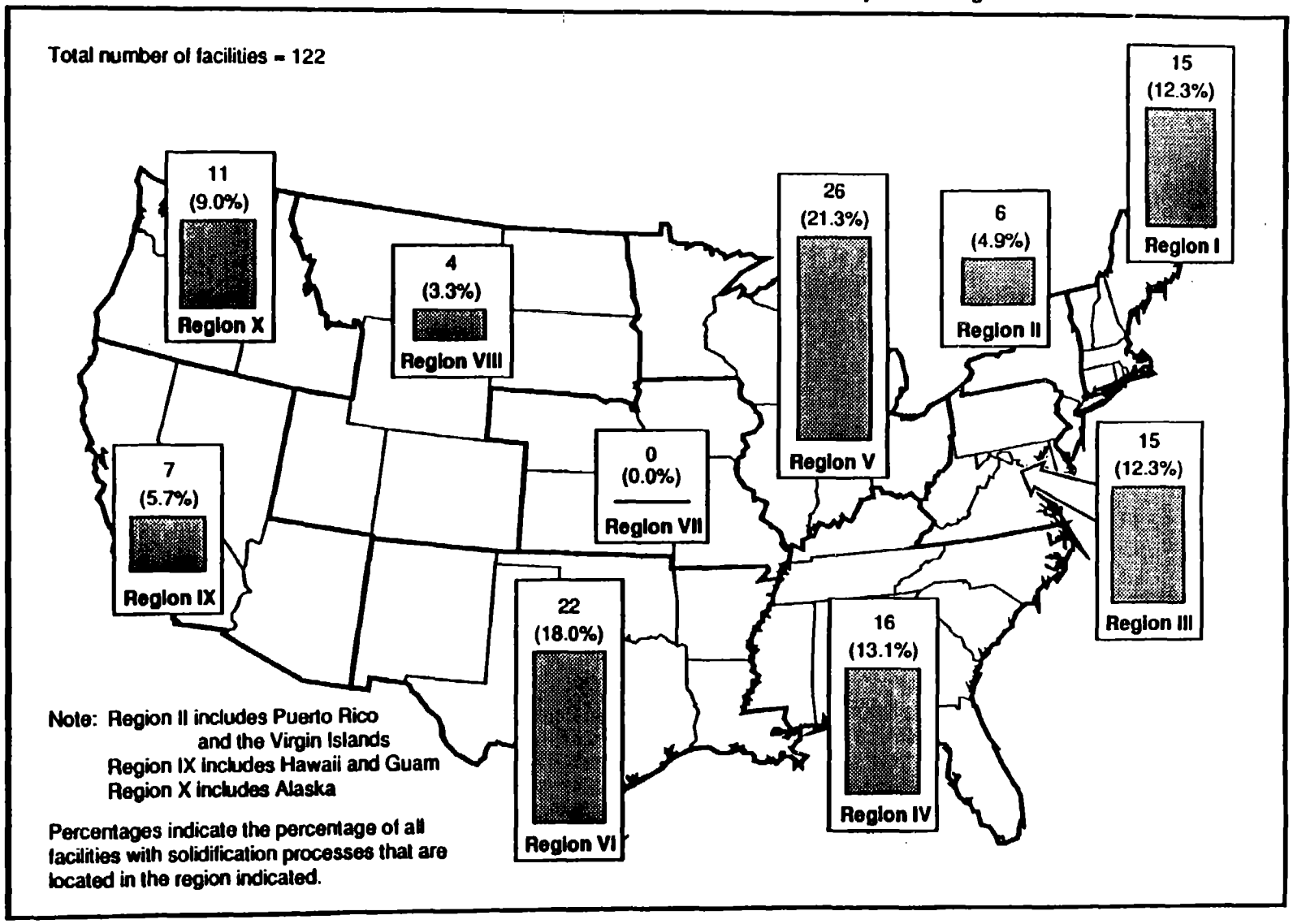
Charts 8.2-1 and 8.2-2 show the quantity of hazardous waste managed and the number of facilities managing hazardous waste in solidification processes in each EPA region in 1986. Charts 8.2-3 and 8.2-4 show the same information for each state or territory.

Chart 8.2-1 Quantity of Hazardous Waste Managed in Solidification Processes per EPA Region in 1986 (in million tons)



Source: TT-140 (E3)

Chart 8.2-2 Number of Facilities Managing Hazardous Waste in Solidification Processes per EPA Region in 1986



Source: TT-140 (E3)

Chart 8.2-3 Quantity of Hazardous Waste Managed in Solidification by State in 1986

State	Quantity Managed (million tons)	Percentage of Total Quantity Managed	State Rank
Alabama	0.05	6.2	6
Alaska	0.00	0.0	33
Arizona	0.00	0.0	34
Arkansas	0.02	2.2	11
California	0.01	1.8	12
Colorado	<0.01[a]	0.3	23
Connecticut	0.01	1.5	13
Delaware	0.00	0.0	36
District of Columbia	0.00	0.0	35
Florida	0.00	0.0	37
Georgia	0.02	2.2	10
Guam	0.00	0.0	38
Hawaii	0.00	0.0	39
Idaho	<0.01[a]	<0.1[b]	32
Illinois	0.13	16.3	2
Indiana	<0.01[a]	<0.1[b]	31
Iowa	0.00	0.0	40
Kansas	0.00	0.0	41
Kentucky	<0.01[a]	<0.1[b]	30
Louisiana	0.04	4.9	8
Maine	<0.01[a]	<0.1[b]	29
Maryland	<0.01[a]	0.5	19
Massachusetts	0.00	0.0	42
Michigan	0.10	13.2	3
Minnesota	<0.01[a]	0.1	27
Mississippi	<0.01[a]	0.2	25
Missouri	0.00	0.0	43
Montana	0.00	0.0	44
Nebraska	0.00	0.0	45
Nevada	0.00	0.0	46
New Hampshire	<0.01[a]	0.5	20
New Jersey	0.02	2.6	9
New Mexico	0.00	0.0	47
New York	0.01	1.3	14
North Carolina	<0.01[a]	0.4	21
North Dakota	0.00	0.0	45
Ohio	0.06	7.7	5
Oklahoma	0.01	1.2	15
Oregon	<0.01[a]	0.1	26
Pennsylvania	0.04	4.9	7
Puerto Rico	0.00	0.0	49
Rhode Island	0.00	0.0	50
South Carolina	0.13	16.8	1
South Dakota	0.00	0.0	51
Tennessee	<0.01[a]	<0.1[b]	28
Texas	0.09	11.5	4
Utah	0.01	1.1	18
Vermont	0.00	0.0	53
Virgin Island	0.00	0.0	52
Virginia	<0.01[a]	0.3	24
Washington	0.01	1.0	17
West Virginia	0.00	0.0	54
Wisconsin	<0.01[a]	0.3	22
Wyoming	0.01	0.7	16
Total	0.77	100.0	

[a]Less than 10,000 tons of hazardous waste were generated in these states in 1986.
[b]Less than 0.1 percent of the total quantity of hazardous waste generated in 1986 was generated in these states.
Source: TT-140 (E3)

Chart 8.2-4 Number of Facilities Managing Hazardous Waste in Solidification Processes by State in 1986

State	Number of RCRA TSDR Facilities	Percentage of RCRA TSDR Facilities	State Rank
Alabama	2	1.6	17
Alaska	0	0.0	35
Arizona	0	0.0	36
Arkansas	1	0.8	25
California	7	5.7	5
Colorado	2	1.6	19
Connecticut	4	3.3	10
Delaware	0	0.0	38
District of Columbia	0	0.0	37
Florida	0	0.0	39
Georgia	3	2.5	13
Guam	0	0.0	40
Hawaii	0	0.0	41
Idaho	2	1.6	24
Illinois	6	4.9	7
Indiana	2	1.6	23
Iowa	0	0.0	42
Kansas	0	0.0	43
Kentucky	3	2.5	16
Louisiana	5	4.1	9
Maine	1	0.8	32
Maryland	6	4.9	8
Massachusetts	0	0.0	44
Michigan	3	2.5	12
Minnesota	2	1.6	22
Mississippi	1	0.8	31
Missouri	0	0.0	45
Montana	0	0.0	46
Nebraska	0	0.0	48
Nevada	0	0.0	49
New Hampshire	10	8.2	3
New Jersey	2	1.6	18
New Mexico	1	0.8	33
New York	3	2.5	14
North Carolina	1	0.8	29
North Dakota	0	0.0	47
Ohio	12	9.8	2
Oklahoma	1	0.8	26
Oregon	2	1.6	21
Pennsylvania	7	5.7	4
Puerto Rico	1	0.8	34
Rhode Island	0	0.0	50
South Carolina	3	2.5	11
South Dakota	0	0.0	51
Tennessee	3	2.5	15
Texas	14	11.5	1
Utah	1	0.8	27
Vermont	0	0.0	53
Virgin Island	0	0.0	52
Virginia	2	1.6	20
Washington	7	5.7	6
West Virginia	0	0.0	54
Wisconsin	1	0.8	30
Wyoming	1	0.8	28
Total	122	100.0	

Source: TT-140 (E3)

Chart 8.2-5 shows the types of solidification processes operated in 1986. For each type of solidification process, the chart shows the quantity of hazardous waste managed and the number of facilities operating that type of solidification process.

Chart 8.2-5 Types of Solidification Processes and Quantity Managed in 1986

Solidification Type	Quantity Managed (million tons)	Percentage of Total Quantity Managed	Number of Facilities	Percentage of Facilities
Pozzolonic	0.45	59.0	53	43.4
Cement or Cement/Silicate	0.12	16.0	65	53.3
Other	0.03	4.0	10	8.2
Jacketing	<0.01	0.4	4	3.3
Undisclosed	<0.01	0.1	5	4.1
Organic Polymer	<0.01	<0.1	2	1.6
Asphaltic	0.00	0.0	1	0.8
Thermoplastic	0.00	0.0	1	0.8
Unknown	0.17	20.5	-	-
Total	0.77	100.0	122[a]	100.0[a]

[a] A single facility may have more than one type of solidification process. Therefore, adding the number of facilities with each type of process results in double-counting. The number shown is the total number of facilities with solidification processes *without* double-counting.

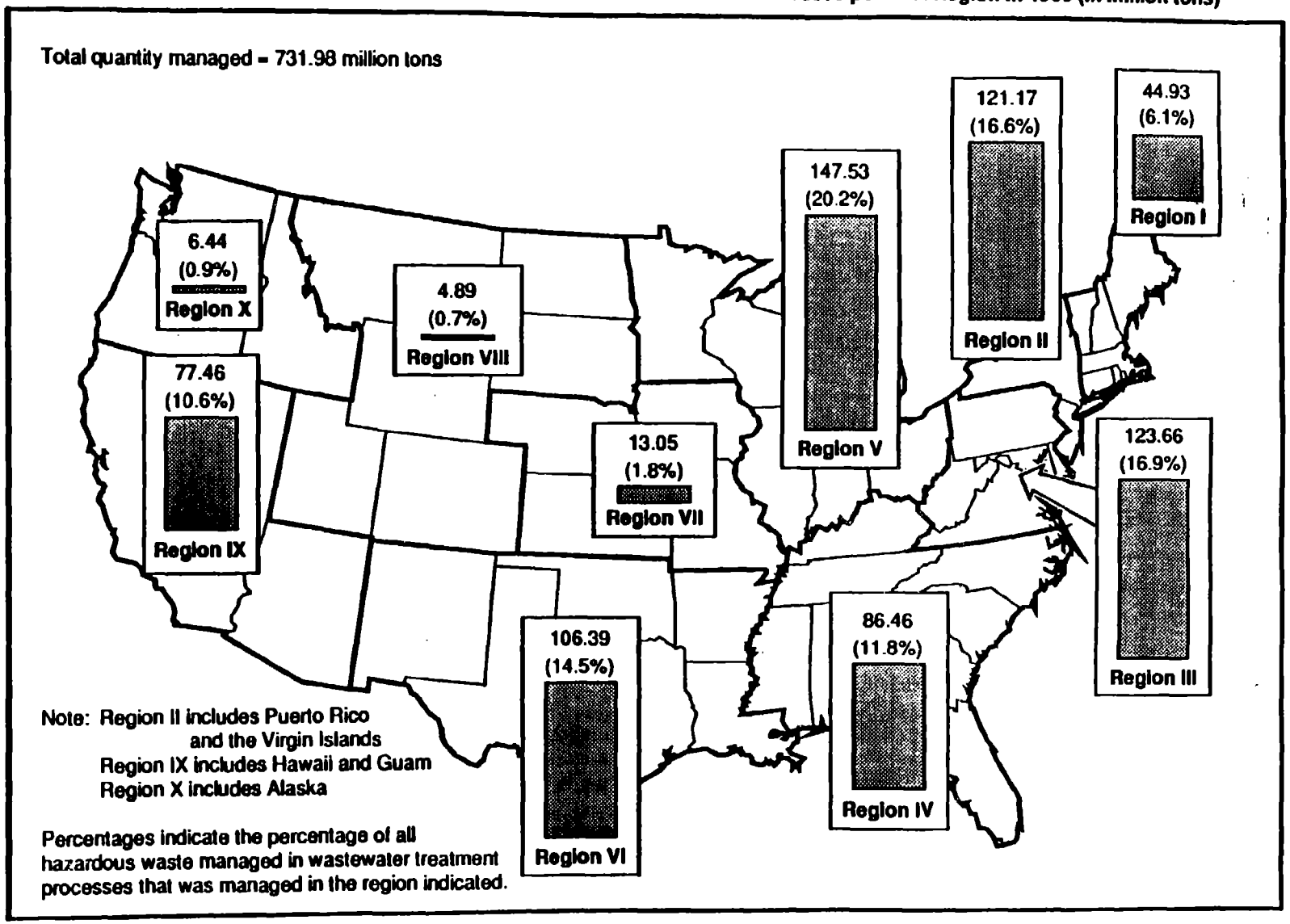
Source: TT-141 (E4, E21a)

8.3 WASTEWATER TREATMENT

Wastewater treatment is the most common hazardous waste treatment activity. Generally, wastewater treatment is regulated by the Clean Water Act and does not require a RCRA permit. In 1986, 4,399 facilities managed 731.98 million tons of hazardous waste (98 percent of all hazardous waste generated) in wastewater treatment processes.

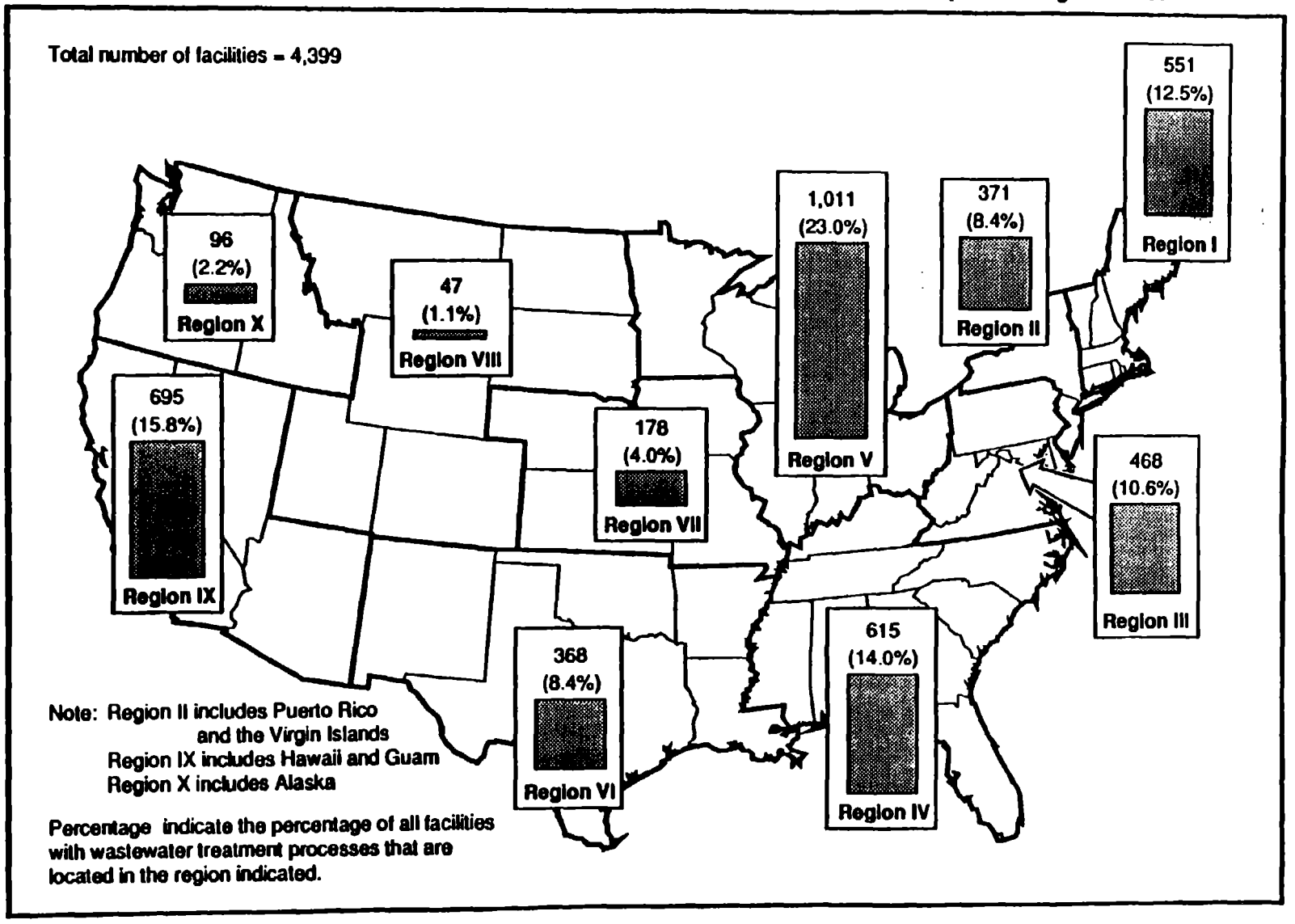
Charts 8.3-1 and 8.3-2 show the quantity of hazardous waste managed and the number of facilities managing hazardous waste in wastewater treatment processes in each EPA region in 1986. Charts 8.3-3 and 8.3-4 show the same information for each state or territory.

Chart 8.3-1 Quantity of Hazardous Waste Managed in Wastewater Treatment Processes per EPA Region in 1986 (in million tons)



Source: TT-140 (H3), GG-170 (GE3), TT-140II (H3)

Chart 8.3-2 Number of Facilities Managing Hazardous Waste in Wastewater Treatment Processes per EPA Region in 1986



Source: TT-140 (H3), GG-170 (GE3), TT-140II (H3)

Chart 8.3-3 Quantity of Hazardous Waste Managed in Wastewater Treatment Processes by State in 1986

State	Quantity Managed (million tons)	Percentage of Total Quantity Managed	State Rank
Alabama	9.18	1.3	18
Alaska	<0.01[a]	<0.1[b]	50
Arizona	7.12	1.0	20
Arkansas	1.99	0.3	35
California	70.29	9.6	3
Colorado	1.86	0.3	39
Connecticut	14.14	1.9	15
Delaware	1.43	0.2	40
District of Columbia	0.00	0.0	52
Florida	5.14	0.7	25
Georgia	16.92	2.3	13
Guam	0.00	0.0	53
Hawaii	0.04	<0.1[b]	46
Idaho	1.98	0.3	37
Illinois	35.71	4.9	8
Indiana	16.94	2.3	12
Iowa	2.11	0.3	34
Kansas	1.86	0.3	38
Kentucky	16.83	2.3	14
Louisiana	12.70	1.7	17
Maine	13.32	1.8	16
Maryland	3.95	0.5	28
Massachusetts	5.96	0.8	22
Michigan	53.90	7.4	4
Minnesota	3.36	0.5	30
Mississippi	4.59	0.6	27
Missouri	8.30	1.1	19
Montana	<0.01[a]	<0.1[b]	48
Nebraska	0.77	0.1	44
Nevada	0.01	<0.1[b]	47
New Hampshire	4.77	0.7	26
New Jersey	83.12	11.4	2
New Mexico	0.80	0.1	43
New York	36.06	4.9	7
North Carolina	3.07	0.4	31
North Dakota	0.09	<0.1[b]	45
Ohio	32.37	4.4	9
Oklahoma	2.48	0.3	33
Oregon	0.89	0.1	42
Pennsylvania	49.51	6.8	6
Puerto Rico	1.99	0.3	36
Rhode Island	5.79	0.8	23
South Carolina	6.12	0.8	21
South Dakota	<0.01[a]	<0.1[b]	49
Tennessee	24.60	3.4	11
Texas	88.44	12.1	1
Utah	2.94	0.4	32
Vermont	0.96	0.1	41
Virgin Island	0.00	0.0	54
Virginia	37.59	5.1	5
Washington	3.57	0.5	29
West Virginia	31.18	4.3	10
Wisconsin	5.25	0.7	24
Wyoming	0.00	0.0	51
Total	731.98	100.0	

[a]Less than 10,000 tons of hazardous waste were generated in these states in 1986.
[b]Less than 0.1 percent of the total quantity of hazardous waste generated in 1986 was generated in these states.
Source: TT-140 (H3), GG-170 (GE3), TT-140II (H3)

Chart 8.3-4 Number of Facilities Managing Hazardous Waste in Wastewater Treatment Processes by State in 1986

State	Number of RCRA TSDR Facilities	Percentage of RCRA TSDR Facilities	State Rank
Alabama	81	1.8	17
Alaska	1	0.0	49
Arizona	61	1.4	23
Arkansas	32	0.7	32
California	625	14.2	1
Colorado	21	0.5	39
Connecticut	187	4.3	8
Delaware	11	0.3	42
District of Columbia	0	0.0	52
Florida	108	2.5	12
Georgia	66	1.5	21
Guam	0	0.0	53
Hawaii	3	0.1	46
Idaho	6	0.1	44
Illinois	234	5.3	5
Indiana	114	2.6	11
Iowa	46	1.1	28
Kansas	27	0.6	36
Kentucky	67	1.5	19
Louisiana	49	1.1	27
Maine	22	0.5	37
Maryland	47	1.1	29
Massachusetts	215	4.9	6
Michigan	210	4.8	7
Minnesota	95	2.2	15
Mississippi	33	0.8	31
Missouri	80	1.8	18
Montana	2	0.0	47
Nebraska	22	0.5	38
Nevada	6	0.1	45
New Hampshire	53	1.2	26
New Jersey	153	3.5	10
New Mexico	7	0.2	43
New York	187	4.3	9
North Carolina	105	2.4	13
North Dakota	2	0.0	48
Ohio	253	5.8	3
Oklahoma	31	0.7	33
Oregon	31	0.7	34
Pennsylvania	302	6.9	2
Puerto Rico	31	0.7	35
Rhode Island	61	1.4	24
South Carolina	65	1.5	22
South Dakota	1	0.0	50
Tennessee	91	2.1	18
Texas	247	5.6	4
Utah	19	0.4	40
Vermont	14	0.3	41
Virgin Island	0	0.0	54
Virginia	67	1.5	20
Washington	58	1.3	25
West Virginia	40	0.9	30
Wisconsin	104	2.4	14
Wyoming	1	0.0	51
Total	4,399	100.0	

Source: TT-140 (H3), GG-170 (GE3), TT-140II (H3)

Chart 8.3-5 shows the types of wastewater treatment processes operated in 1986. For each type of process, the chart shows the quantity of hazardous waste managed and the number of facilities operating that type of process.

Chart 8.3-5 Types of Wastewater Treatment Processes and Quantity Managed in 1986

Type of Wastewater Treatment Process	Quantity Managed (million tons)	Percentage of Total Quantity Managed	Number of Facilities	Percentage of Facilities
Chemical Precipitation	329.94	45.1	2,121	48.2
Equalization	238.33	32.6	971	22.1
Biological Treatment	200.60	27.4	173	3.9
Filtration	133.97	18.3	709	16.1
Oil Skimming	119.49	16.3	585	13.3
Adsorption	77.26	10.6	292	6.6
Sludge Dewatering	73.23	10.0	1,929	43.9
Chromium Reduction	52.47	7.2	1,354	30.8
Air Flotation	30.34	4.1	111	2.5
General Oxidation	25.76	3.5	202	4.6
Unknown	20.53	2.8	197	4.5
Stripping	13.93	1.9	127	2.9
Cynide Oxidation	12.56	1.7	707	16.1
Complexed Metals Treatment	9.35	1.3	275	6.2
Other Liquid Phase Separation	8.64	1.2	309	7.0
Emulsion Breaking	8.32	1.1	188	4.3
Evaporation	7.04	1.0	195	4.4
Total	731.98[a]	100.0[a]	4,399[b]	100.0[b]

[a] A single waste may be managed in more than one wastewater treatment process. Therefore, adding the quantities managed in each type of process results in double-counting. The number shown is the total quantity managed in wastewater treatment processes *without* double-counting.

[b] A single facility may have more than one type of wastewater treatment process. Therefore, adding the number of facilities with each type of process results in double-counting. The number shown is the total number of facilities with wastewater treatment processes *without* double-counting.

Source: TG-045 (H4, H21, GE4, GE17)

Chart 8.3-6 shows the regulatory status of facilities that manage hazardous waste in wastewater treatment processes. The chart shows the numbers of facilities that operated wastewater treatment processes and were subject to RCRA-permitting requirements or exempt from RCRA-permitting requirements. The chart does *not* refer to the permitting status of the facilities' wastewater treatment operations. Instead, the chart indicates whether *any* operation at the facility is subject to RCRA-permitting requirements.

Chart 8.3-6 RCRA-Permitting Status of Facilities Managing Hazardous Waste in Wastewater Treatment Processes in 1986

RCRA-Permitting Status	Number of Facilities	Quantity Managed in Wastewater Treatment (million tons)
Exempt from permitting requirements[a]	3,323	266.21
Subject to permitting requirements[b]	1,076	465.77
Total	4,399	731.98

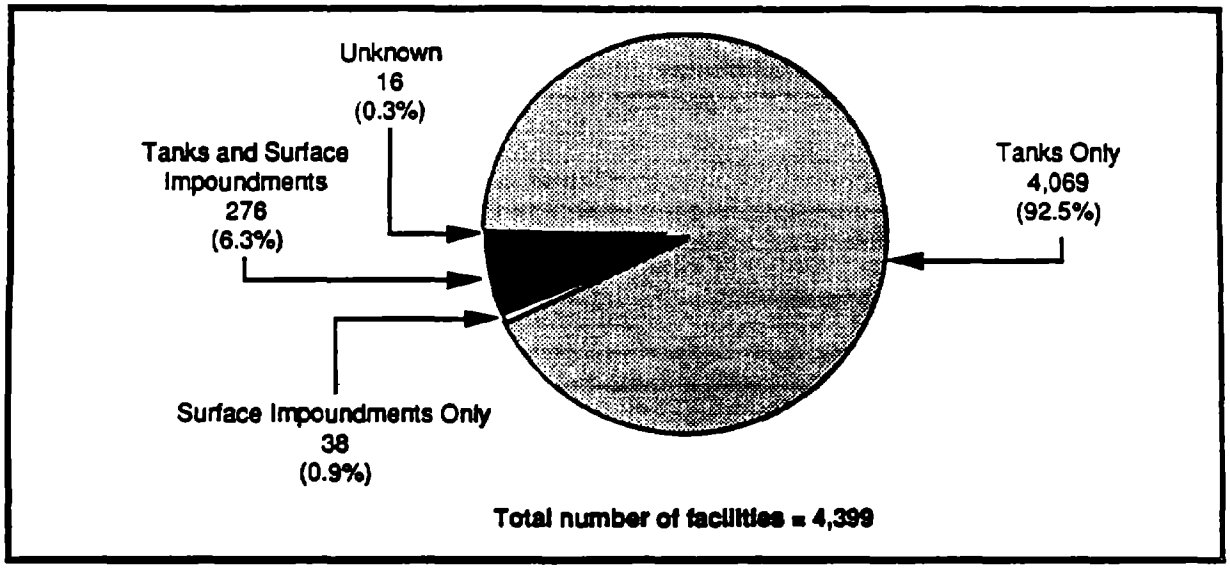
[a] Facilities managing hazardous waste only in units exempt from RCRA-permitting requirements.

[b] Facilities managing hazardous waste in at least one unit subject to RCRA-permitting requirements.

Source: TT-140 (H3), GG-170, TT-140II (H3)

Facilities can conduct wastewater treatment in tanks, surface impoundments, or both. Generally, surface impoundments are subject to RCRA-permitting requirements but tanks can be subject to or exempt from RCRA-permitting requirements. Chart 8.3-7 shows the types of units that facilities used to conduct wastewater treatment in 1986. **Over 92 percent of facilities used only tanks to conduct wastewater treatment.**

Chart 8.3-7 Number of Facilities by Type of Unit Used for Wastewater Treatment



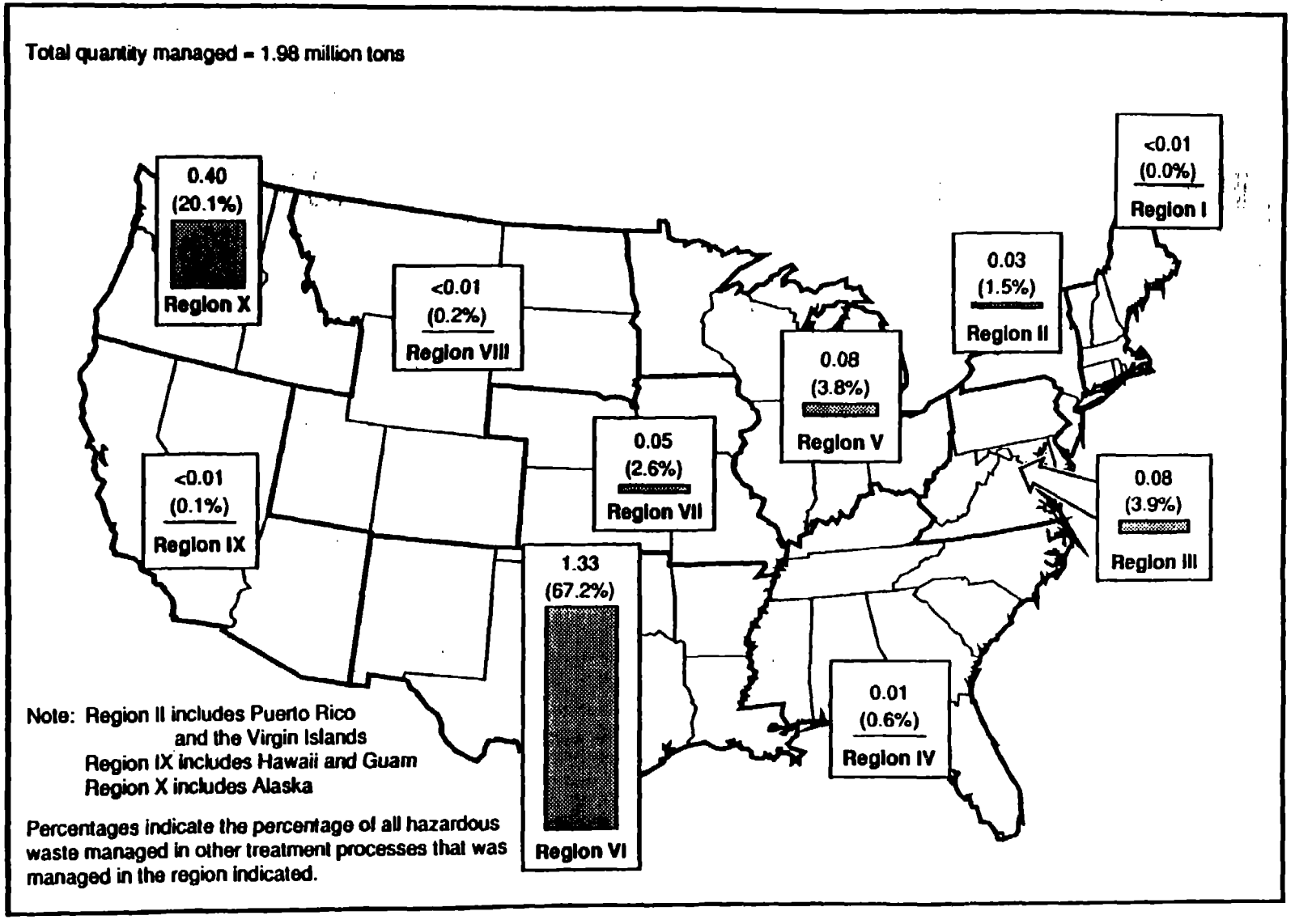
Source: (H14)

8.4 OTHER TREATMENT

Respondents to the Generator and TSDR Surveys also reported data on any treatment activities in 1986 other than those specifically mentioned in the surveys (i.e., incineration, solidification, and wastewater treatment). **In 1986, 128 facilities managed 1.98 million tons of hazardous waste in other recycling processes.**

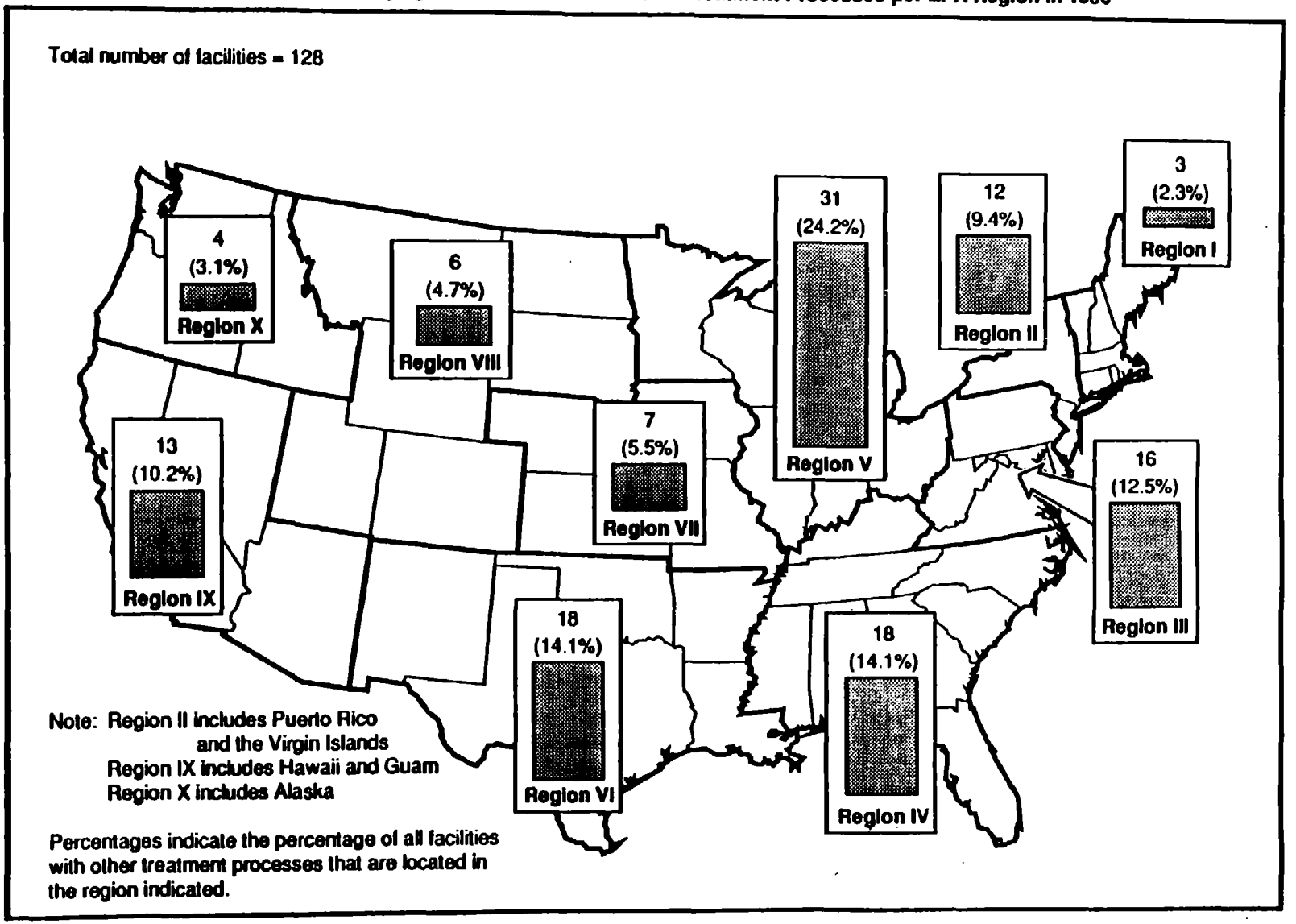
Charts 8.4-1 and 8.4-2 show the quantity of hazardous waste managed and the number of facilities managing hazardous waste in other treatment processes in each EPA region in 1986. Charts 8.4-3 and 8.4-4 show the same information for each state or territory.

Chart 8.4-1 Quantity of Hazardous Waste Managed in Other Treatment Processes per EPA Region in 1986 (in million tons)



Source: TT-140 (I26), TT-140II (I26)

Chart 8.4-2 Number of Facilities Managing Hazardous Waste in Other Treatment Processes per EPA Region in 1986



Source: TT-140 (I26), TT-140II (I26)

Chart 8.4-3 Quantity of Hazardous Waste Managed in Other Treatment Processes by State in 1986

State	Quantity Managed (million tons)	Percentage of Total Quantity Managed	State Rank
Alabama	<0.01[a]	0.2	17
Alaska	0.00	0.0	38
Arizona	<0.01[a]	<0.1[b]	34
Arkansas	0.05	2.7	5
California	<0.01[a]	0.1	21
Colorado	<0.01[a]	0.2	14
Connecticut	<0.01[a]	<0.1[b]	35
Delaware	<0.01[a]	<0.1[b]	28
District of Columbia	0.00	0.0	41
Florida	<0.01[a]	<0.1[b]	37
Georgia	<0.01[a]	<0.1[b]	36
Guam	0.00	0.0	42
Hawaii	<0.01[a]	<0.1[b]	31
Idaho	0.00	0.0	43
Illinois	0.02	0.8	10
Indiana	0.01	0.3	13
Iowa	<0.01[a]	<0.1[b]	30
Kansas	0.05	2.5	6
Kentucky	0.00	0.0	39
Louisiana	1.21	61.1	1
Maine	0.00	0.0	44
Maryland	<0.01[a]	<0.1[b]	32
Massachusetts	<0.01[a]	<0.1[b]	22
Michigan	0.02	1.1	9
Minnesota	<0.01[a]	0.2	18
Mississippi	<0.01[a]	0.2	16
Missouri	<0.01[a]	<0.1[b]	23
Montana	0.00	0.0	40
Nebraska	0.00	0.0	46
Nevada	0.00	0.0	49
New Hampshire	0.00	0.0	47
New Jersey	0.01	0.4	12
New Mexico	0.00	0.0	48
New York	0.02	1.1	8
North Carolina	<0.01[a]	0.2	15
North Dakota	0.00	0.0	45
Ohio	0.03	1.4	7
Oklahoma	<0.01[a]	<0.1[b]	26
Oregon	<0.01[a]	<0.1[b]	24
Pennsylvania	0.06	3.0	4
Puerto Rico	0.00	0.0	50
Rhode Island	0.00	0.0	51
South Carolina	<0.01[a]	<0.1[b]	29
South Dakota	0.00	0.0	52
Tennessee	<0.01[a]	<0.1[b]	25
Texas	0.07	3.3	3
Utah	<0.01[a]	<0.1[b]	27
Vermont	0.00	0.0	54
Virgin Islands	0.00	0.0	53
Virginia	0.02	0.8	11
Washington	0.40	20.0	2
West Virginia	<0.01[a]	0.1	19
Wisconsin	<0.01[a]	0.1	20
Wyoming	<0.01[a]	<0.1[b]	33
Total	1.98	100.0	

[a]Less than 10,000 tons of hazardous waste were generated in these states in 1986.
[b]Less than 0.1 percent of the total quantity of hazardous waste generated in 1986 was generated in these states.
Source: TT-140 (t26), TT-140II (t26)

Chart 8.4-4 Number of Facilities Managing Hazardous Waste in Other Treatment Processes by State in 1986

State	Number of RCRA TSDR Facilities	Percentage of RCRA TSDR Facilities	State Rank
Alabama	3	2.3	12
Alaska	1	0.8	26
Arizona	1	0.8	27
Arkansas	3	2.3	13
California	11	8.6	1
Colorado	2	1.6	19
Connecticut	2	1.6	20
Delaware	1	0.8	28
District of Columbia	0	0.0	41
Florida	1	0.8	29
Georgia	2	1.6	21
Guam	0	0.0	42
Hawaii	1	0.8	30
Idaho	0	0.0	43
Illinois	8	6.3	4
Indiana	2	1.6	22
Iowa	3	2.3	14
Kansas	1	0.8	31
Kentucky	1	0.8	32
Louisiana	1	0.8	33
Maine	0	0.0	44
Maryland	3	2.3	15
Massachusetts	1	0.8	34
Michigan	5	3.9	7
Minnesota	1	0.8	35
Mississippi	1	0.8	36
Missouri	3	2.3	16
Montana	1	0.8	37
Nebraska	0	0.0	46
Nevada	0	0.0	49
New Hampshire	0	0.0	47
New Jersey	5	3.9	9
New Mexico	0	0.0	48
New York	7	5.5	5
North Carolina	5	3.9	8
North Dakota	0	0.0	45
Ohio	11	8.6	2
Oklahoma	3	2.3	17
Oregon	1	0.8	38
Pennsylvania	6	4.7	6
Puerto Rico	0	0.0	50
Rhode Island	0	0.0	51
South Carolina	2	1.6	23
South Dakota	0	0.0	52
Tennessee	3	2.3	18
Texas	11	8.6	3
Utah	2	1.6	24
Vermont	0	0.0	54
Virgin Island	0	0.0	53
Virginia	5	3.9	10
Washington	2	1.6	25
West Virginia	1	0.8	39
Wisconsin	4	3.1	11
Wyoming	1	0.8	40
Total	128	100.0	

Source: TT-140 (I26), TT-140II (I26)

9 HAZARDOUS WASTE MANAGEMENT METHODS: STORAGE

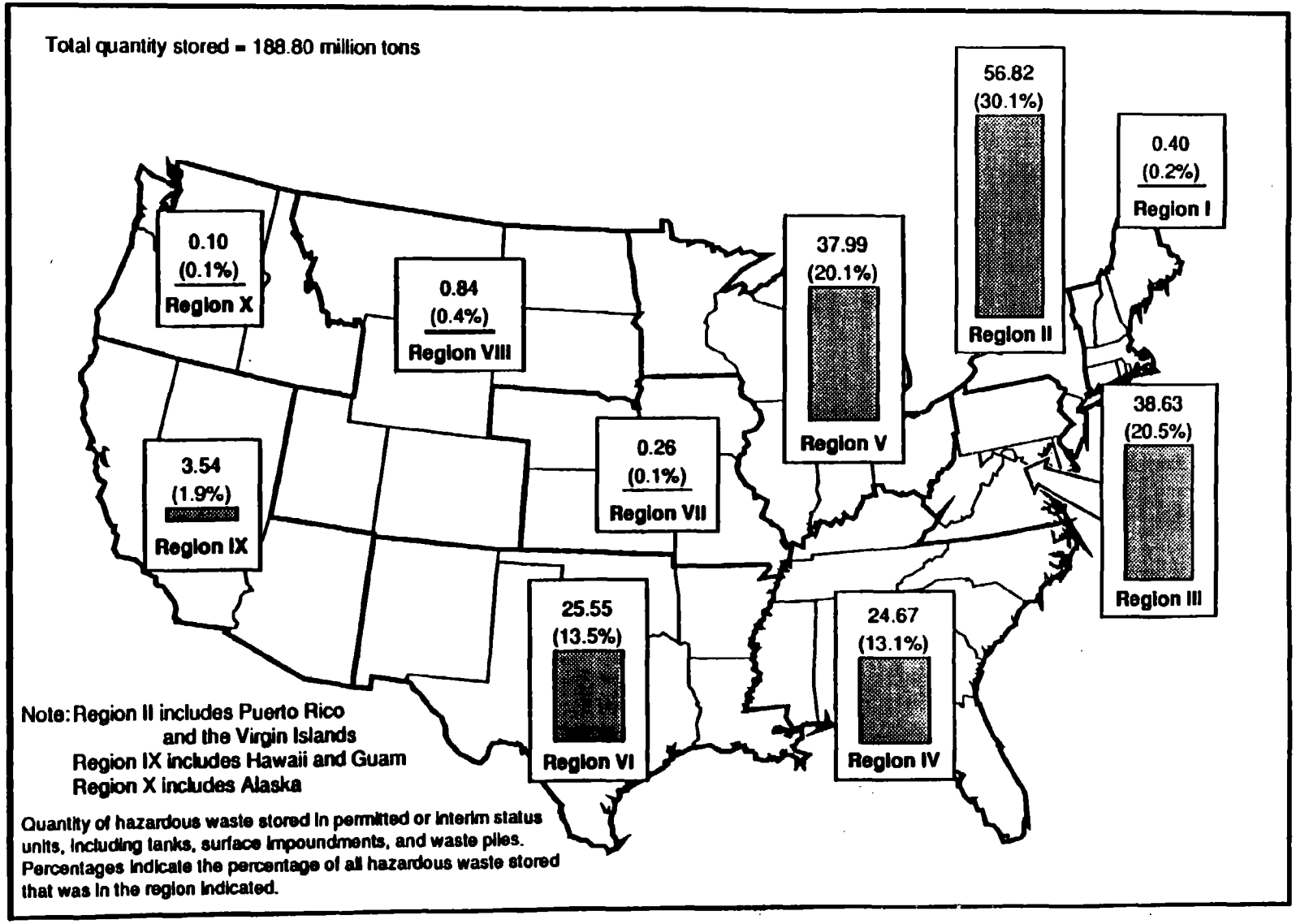
Under RCRA regulations, hazardous waste generally can be accumulated by the generator for less than 90 days without a RCRA permit. Hazardous waste stored by the generator over 90 days or by a facility other than the generator of the waste is generally subject to RCRA-permitting requirements. This chapter describes this latter type of storage—storage subject to RCRA-permitting requirements. Throughout this chapter, the term "storage" is used to refer to storage activities subject to RCRA-permitting requirements ("accumulation" refers to exempt storage). In 1986, 1,785 facilities stored 188.8 million tons of hazardous waste in units subject to RCRA-permitting requirements.

9.1 GEOGRAPHIC DISTRIBUTION

Chart 9.1-1 shows the quantity of hazardous waste stored in each EPA region in 1986. Region II stored the largest quantity of hazardous waste—56.82 million tons, or approximately 30 percent of all hazardous waste stored. Chart 9.1-2 shows the number of facilities storing hazardous waste in each EPA region in 1986. Region V had the largest number of facilities storing hazardous waste, with 474 facilities or over one-fourth of all facilities storing hazardous waste.

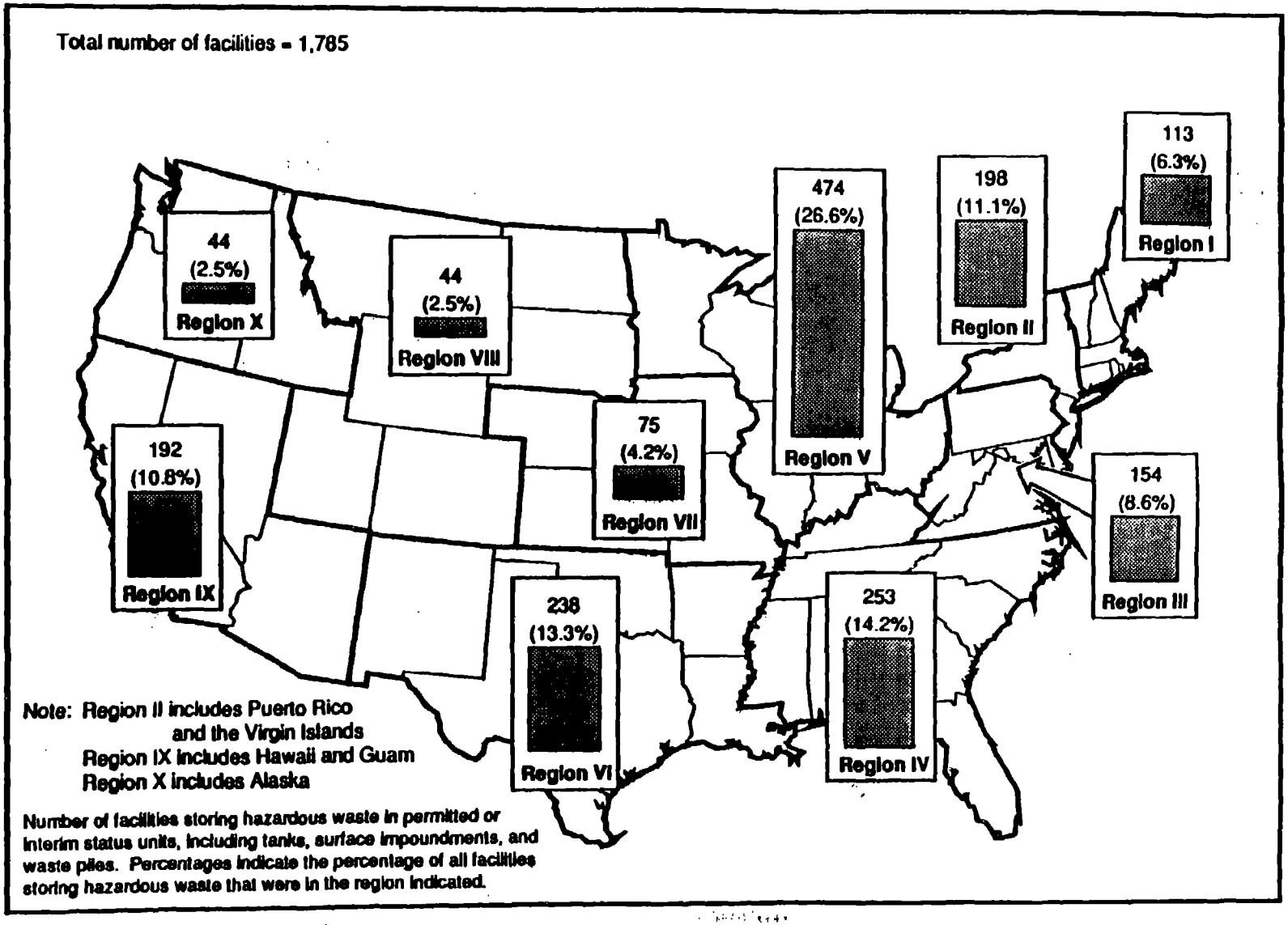
Charts 9.1-3 and 9.1-4 show, respectively, the quantity of hazardous waste stored and the number of facilities storing hazardous waste in each state in 1986. The largest quantity of hazardous waste stored was in New Jersey, with almost 55 million tons of hazardous waste stored, or 29 percent of all hazardous waste stored. California had the largest number of facilities storing hazardous waste—158 facilities or 8.9 percent of all facilities storing hazardous waste.

Chart 9.1-1 Quantity of Hazardous Waste Stored per EPA Region in 1986 (in million tons)



Source: TT-148 (J29, K49, O8)

Chart 9.1-2 Number of Facilities Storing Hazardous Waste per EPA Region in 1986



Source: TT-148 (J29, K49, O8)

Chart 9.1-3 Quantity of Hazardous Waste Stored per State in 1986

State	Quantity Stored (million tons)	Percentage of Total Quantity Stored	State Rank
Alabama	0.21	0.1	21
Alaska	<0.01[a]	<0.1[b]	45
Arizona	0.01	<0.1[b]	36
Arkansas	0.11	0.1	26
California	3.53	1.9	8
Colorado	0.83	0.4	15
Connecticut	0.32	0.2	20
Delaware	0.10	0.1	28
District of Columbia	0.000	0.0	50
Florida	0.16	0.1	22
Georgia	21.35	11.3	4
Guam	0.000	0.0	51
Hawaii	<0.01[a]	<0.1[b]	44
Idaho	<0.01[a]	<0.1[b]	38
Illinois	0.77	0.4	17
Indiana	0.46	0.2	18
Iowa	0.04	<0.1[b]	32
Kansas	0.13	0.1	24
Kentucky	0.15	0.1	23
Louisiana	8.62	4.6	6
Maine	<0.01[a]	<0.1[b]	41
Maryland	1.43	0.8	12
Massachusetts	0.07	<0.1[b]	30
Michigan	34.75	18.4	2
Minnesota	0.02	<0.1[b]	34
Mississippi	0.86	0.5	15
Missouri	0.10	0.1	27
Montana	<0.01[a]	<0.1[b]	42
Nebraska	0.000	0.0	52
Nevada	<0.01[a]	<0.1[b]	48
New Hampshire	<0.01[a]	<0.1[b]	49
New Jersey	54.79	29.0	1
New Mexico	<0.01[a]	<0.1[b]	47
New York	2.00	1.1	9
North Carolina	0.42	0.2	19
North Dakota	<0.01[a]	<0.1[b]	39
Ohio	1.95	1.0	10
Oklahoma	1.54	0.8	11
Oregon	<0.01[a]	<0.1[b]	43
Pennsylvania	0.90	0.5	14
Puerto Rico	0.03	<0.1[b]	33
Rhode Island	0.01	<0.1[b]	35
South Carolina	0.12	0.1	25
South Dakota	0.000	0.0	53
Tennessee	1.38	0.7	13
Texas	15.28	8.1	5
Utah	<0.01[a]	<0.1[b]	37
Vermont	<0.01[a]	<0.1[b]	40
Virgin Island	0.000	0.0	54
Virginia	31.73	16.8	3
Washington	0.09	<0.1[b]	29
West Virginia	4.47	2.4	7
Wisconsin	0.04	<0.1[b]	31
Wyoming	<0.01[a]	<0.1[b]	46
Total	188.80	100.0	

[a]Less than 10,000 tons of hazardous waste were generated in these states in 1986.
[b]Less than 0.1 percent of the total quantity of hazardous waste generated in 1986 was generated in these states.
Source: TT-148 (J29, K49, O8)

Chart 9.1-4 Number of Facilities Storing Hazardous Waste per State in 1986

State	Number of Facilities	Percentage of Total Number	State Rank
Alabama	42	2.4	12
Alaska	4	0.2	43
Arizona	27	1.5	22
Arkansas	19	1.1	31
California	158	8.9	1
Colorado	23	1.3	29
Connecticut	59	3.3	10
Delaware	4	0.2	40
District of Columbia	0	0.0	51
Florida	29	1.6	20
Georgia	50	2.8	11
Guam	0	0.0	52
Hawaii	4	0.2	42
Idaho	4	0.2	41
Illinois	98	5.5	5
Indiana	82	4.6	8
Iowa	22	1.2	30
Kansas	12	0.7	36
Kentucky	26	1.5	25
Louisiana	40	2.2	13
Maine	3	0.2	45
Maryland	30	1.7	19
Massachusetts	24	1.3	28
Michigan	83	4.6	7
Minnesota	38	2.1	15
Mississippi	12	0.7	35
Missouri	39	2.2	14
Montana	3	0.2	46
Nebraska	2	0.1	49
Nevada	2	0.1	48
New Hampshire	12	0.7	37
New Jersey	83	4.6	6
New Mexico	6	0.3	39
New York	99	5.5	4
North Carolina	25	1.4	26
North Dakota	1	0.1	50
Ohio	139	7.8	3
Oklahoma	24	1.3	27
Oregon	7	0.4	38
Pennsylvania	66	3.6	9
Puerto Rico	16	0.9	32
Rhode Island	13	0.7	33
South Carolina	34	1.9	17
South Dakota	0	0.0	53
Tennessee	35	2.0	16
Texas	149	8.3	2
Utah	13	0.7	34
Vermont	2	0.1	47
Virgin Island	0	0.0	54
Virginia	26	1.5	23
Washington	29	1.6	21
West Virginia	26	1.5	24
Wisconsin	34	1.9	18
Wyoming	4	0.2	44
Total	1,785	100.0	

Source: TT-148 (J29, K49, O8)

9.2 TYPE OF STORAGE UNITS

Hazardous waste can be stored in tank systems, surface impoundments, or waste piles. Chart 9.2-1 shows the quantity of hazardous waste stored and the number of facilities storing hazardous waste in each type of facility. Tank systems were used most often for storage. **Over 97 percent of all facilities storing hazardous waste did so in tank systems. These facilities stored 109.07 million tons of hazardous waste in tanks.**

Chart 9.2-1 Types of Storage Units and Quantity Stored in 1986

State	Quantity Stored (million tons)	Percentage of Total Quantity	Number of Facilities	Percentage of Facilities
Tank Systems	109.07	57.8	1,740	97.5
Surface Impoundments	79.30	42.0	141	7.9
Waste Piles	0.43	0.2	55	3.1
Total	188.80	100.0	1,785[a]	100.0[a]

[a]A single facility can have more than one type of storage. The totals shown are without double-counting.
Source: TT-148 (J29, K49, O8)

10 HAZARDOUS WASTE MANAGEMENT METHODS: DISPOSAL

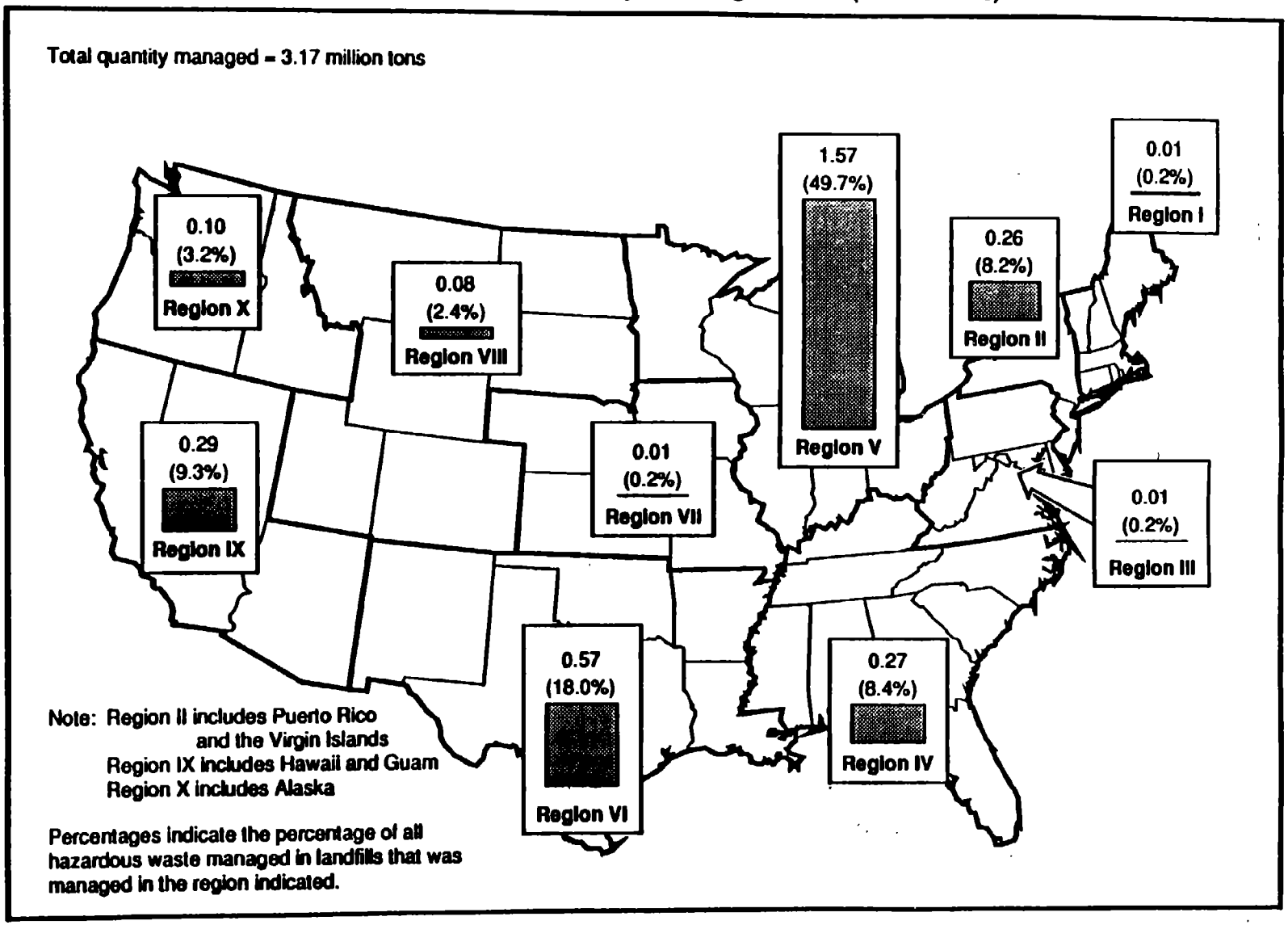
Hazardous waste can be permanently disposed of in landfills, land treatment areas, underground injection wells, or disposal impoundments. This chapter describes hazardous waste disposal operations in these units in 1986. Each of these units is subject to the land disposal restriction rules under HSWA. Chapter 12 discusses the effects these rules may have on the hazardous waste disposal activities described in this chapter.

10.1 LANDFILLS

Landfilling was the disposal method used by the largest number of facilities in 1986. During that year, 118 facilities disposed of 3.17 million tons of hazardous waste in landfills.

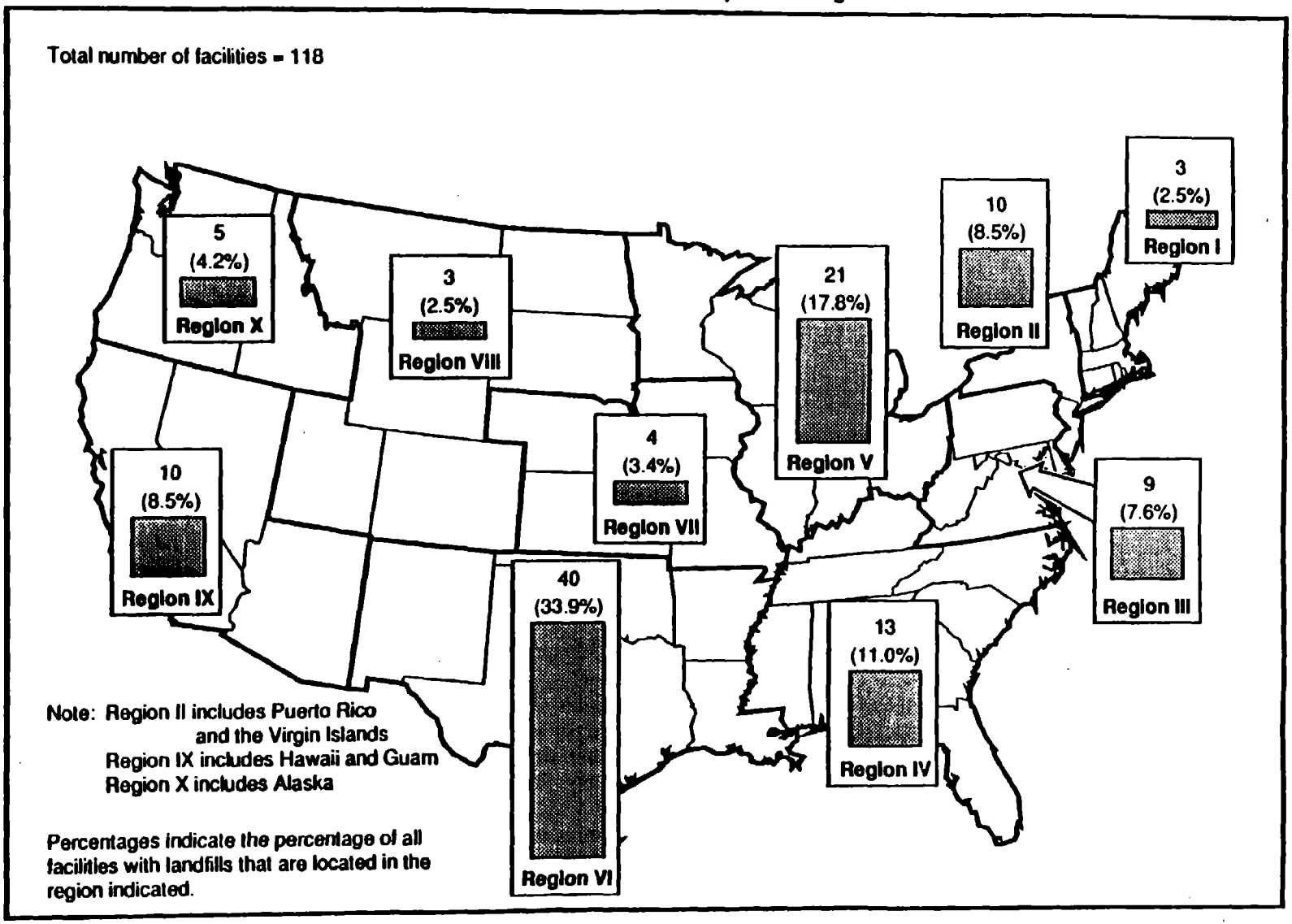
Charts 10.1-1 and 10.1-2 show the quantity of hazardous waste disposed of and the number of facilities disposing of hazardous waste in landfills in each EPA region in 1986. Charts 10.1-3 and 10.1-4 show the same information for each state or territory.

Chart 10.1-1 Quantity of Hazardous Waste Managed in Landfills per EPA Region in 1986 (in million tons)



Source: TT-140 (L3)

Chart 10.1-2 Number of Facilities Managing Hazardous Waste in Landfills per EPA Region in 1986



Source: TT-140 (L3)

Chart 10.1-3 Quantity of Hazardous Waste Managed in Landfills by State in 1986

State	Quantity Managed (million tons)	Percentage of Total Quantity Managed	State Rank
Alabama	<0.01[a]	0.1	20
Alaska	<0.01[a]	<0.1[b]	35
Arizona	<0.01[a]	<0.1[b]	31
Arkansas	0.06	2.0	14
California	0.25	7.8	6
Colorado	<0.01[a]	<0.1[b]	36
Connecticut	0.01	0.2	18
Delaware	<0.01[a]	<0.1[b]	30
District of Columbia	0.00	0.0	37
Florida	0.00	0.0	38
Georgia	0.00	0.0	39
Guam	0.00	0.0	40
Hawaii	0.00	0.0	41
Idaho	0.01	0.4	17
Illinois	0.30	9.4	3
Indiana	0.36	11.2	2
Iowa	0.00	0.0	42
Kansas	<0.01[a]	<0.1[b]	29
Kentucky	0.13	4.1	10
Louisiana	0.26	8.0	4
Maine	0.00	0.0	44
Maryland	<0.01[a]	0.1	24
Massachusetts	0.00	0.0	43
Michigan	0.64	20.3	1
Minnesota	<0.01[a]	<0.1[b]	27
Mississippi	0.00	0.0	45
Missouri	<0.01[a]	0.2	19
Montana	0.00	0.0	46
Nebraska	0.00	0.0	49
Nevada	0.05	1.5	15
New Hampshire	0.00	0.0	50
New Jersey	0.07	2.2	13
New Mexico	<0.01[a]	<0.1[b]	33
New York	0.19	6.1	7
North Carolina	0.00	0.0	47
North Dakota	0.00	0.0	48
Ohio	0.28	8.7	5
Oklahoma	0.04	1.2	16
Oregon	0.09	2.7	11
Pennsylvania	<0.01[a]	<0.1[b]	25
Puerto Rico	<0.01[a]	<0.1[b]	28
Rhode Island	0.00	0.0	51
South Carolina	0.13	4.1	9
South Dakota	0.00	0.0	52
Tennessee	<0.01[a]	0.1	23
Texas	0.19	6.1	8
Utah	0.08	2.4	12
Vermont	0.00	0.0	54
Virgin Island	0.00	0.0	53
Virginia	<0.01[a]	<0.1[b]	26
Washington	<0.01[a]	0.1	22
West Virginia	<0.01[a]	0.1	21
Wisconsin	<0.01[a]	<0.1[b]	34
Wyoming	<0.01[a]	<0.1[b]	32
Total	3.17	100.0	

[a]Less than 10,000 tons of hazardous waste were generated in these states in 1986.
[b]Less than 0.1 percent of the total quantity of hazardous waste generated in 1986 was generated in these states.
Source: TT-140 (L3)

Chart 10.1-4 Number of Facilities Managing Hazardous Waste in Landfills by State in 1986

State	Number of RCRA TSDR Facilities	Percentage of RCRA TSDR Facilities	State Rank
Alabama	4	3.4	8
Alaska	1	0.8	35
Arizona	1	0.8	32
Arkansas	2	1.7	16
California	8	6.8	3
Colorado	1	0.8	36
Connecticut	3	2.5	11
Delaware	1	0.8	31
District of Columbia	0	0.0	38
Florida	0	0.0	39
Georgia	0	0.0	40
Guam	0	0.0	41
Hawaii	0	0.0	42
Idaho	2	1.7	17
Illinois	5	4.2	5
Indiana	8	6.8	2
Iowa	0	0.0	43
Kansas	2	1.7	22
Kentucky	4	3.4	7
Louisiana	7	5.9	4
Maine	0	0.0	45
Maryland	2	1.7	20
Massachusetts	0	0.0	44
Michigan	3	2.5	9
Minnesota	1	0.8	30
Mississippi	1	0.8	37
Missouri	2	1.7	18
Montana	0	0.0	46
Nebraska	0	0.0	49
Nevada	1	0.8	26
New Hampshire	0	0.0	50
New Jersey	2	1.7	15
New Mexico	2	1.7	23
New York	5	4.2	6
North Carolina	0	0.0	47
North Dakota	0	0.0	48
Ohio	3	2.5	10
Oklahoma	1	0.8	27
Oregon	1	0.8	24
Pennsylvania	1	0.8	29
Puerto Rico	3	2.5	13
Rhode Island	0	0.0	51
South Carolina	2	1.7	14
South Dakota	0	0.0	52
Tennessee	2	1.7	19
Texas	28	23.7	1
Utah	1	0.8	25
Vermont	0	0.0	54
Virgin Island	0	0.0	53
Virginia	2	1.7	21
Washington	1	0.8	28
West Virginia	3	2.5	12
Wisconsin	1	0.8	34
Wyoming	1	0.8	33
Total	118	100.0	

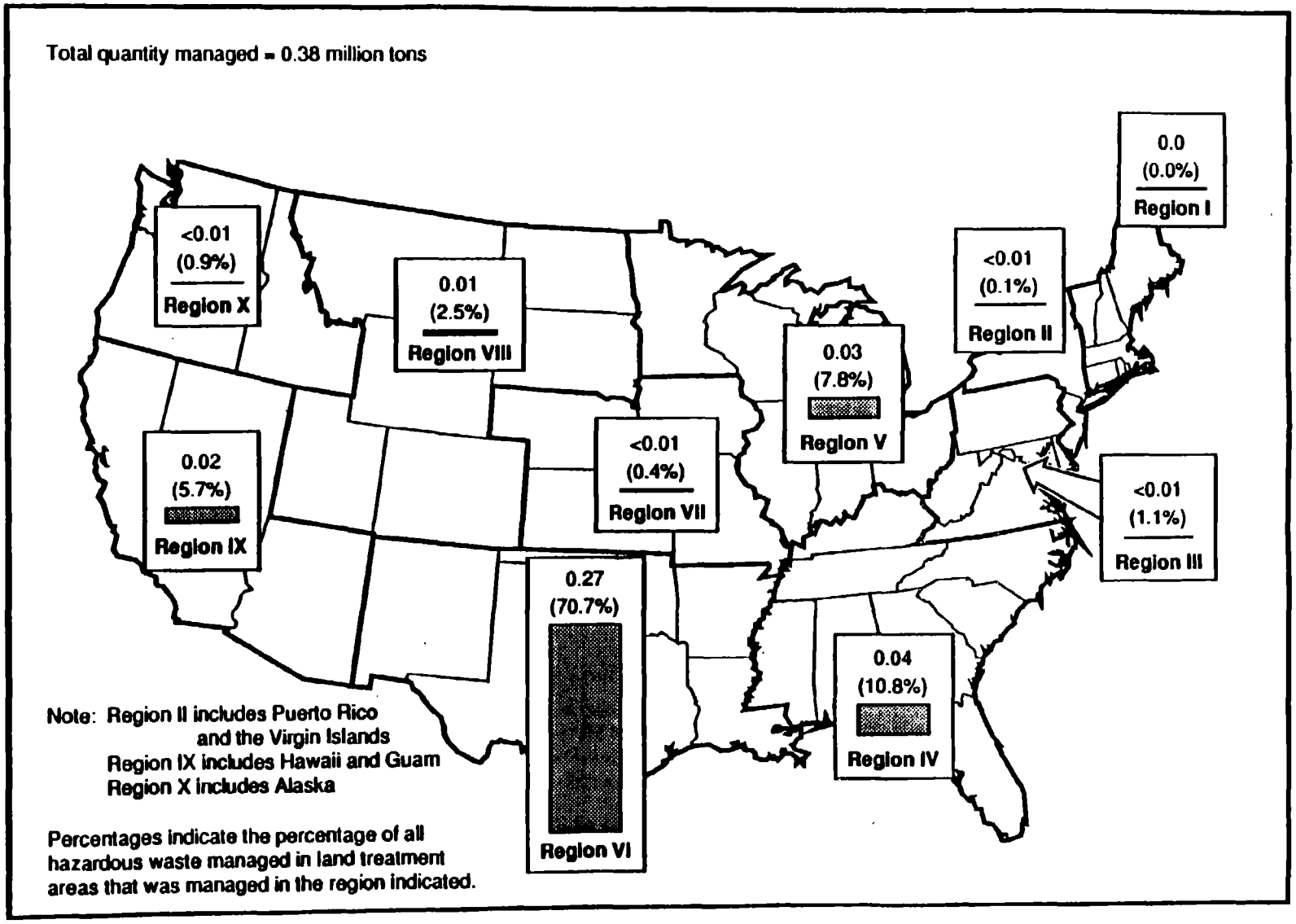
Source: TT-140 (L3)

10.2 LAND TREATMENT

A land treatment area is a section of land in which hazardous waste is applied to or incorporated into the soil surface for disposal. Facilities commonly use this method to manage petroleum wastes. The wastes are spread over the surface and then tilled under the soil, where micro-organisms help to break down the petroleum residues. During 1986, 58 facilities operated 98 land treatment areas. These land treatment areas received 0.38 million tons of hazardous waste during that year.

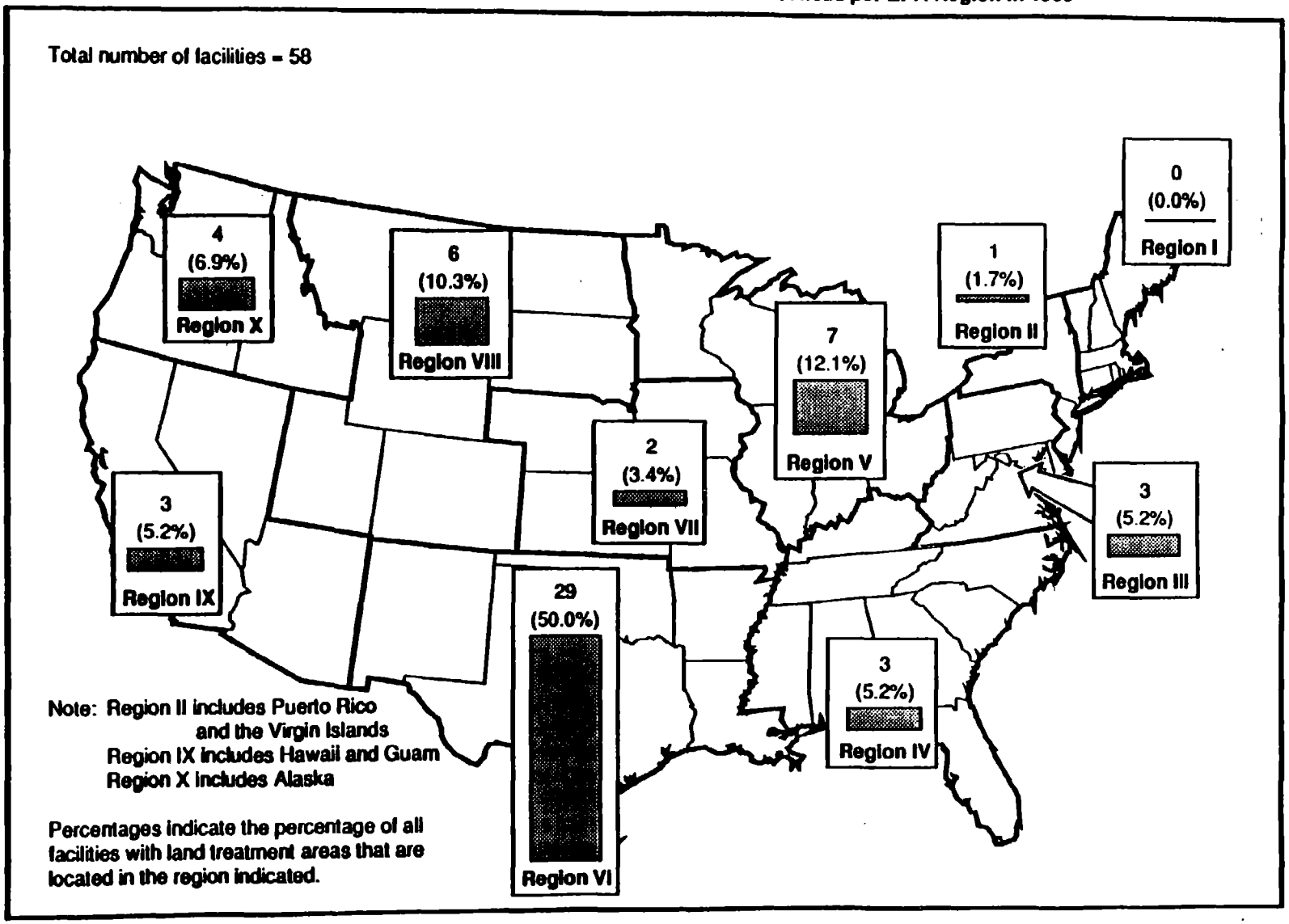
Charts 10.2-1 and 10.2-2 show the quantity of hazardous waste disposed of and the number of facilities disposing of hazardous waste in land treatment areas in each EPA region in 1986. Charts 10.2-3 and 10.2-4 show the same information for each state or territory.

Chart 10.2-1 Quantity of Hazardous Waste Managed in Land Treatment Areas per EPA Region in 1986 (in million tons)



Source: TT-140 (M3)

Chart 10.2-2 Number of Facilities Managing Hazardous Waste in Land Treatment Areas per EPA Region in 1986



Source: TT-140 (M3)

Chart 10.2-3 Quantity of Hazardous Waste Managed in Land Treatment Areas by State in 1986

State	Quantity Managed (million tons)	Percentage of Total Quantity Managed	State Rank
Alabama	<0.01[a]	0.2	19
Alaska	0.00	0.0	23
Arizona	0.00	0.0	24
Arkansas	<0.01[a]	0.6	12
California	0.02	5.7	4
Colorado	0.00	0.0	25
Connecticut	0.00	0.0	26
Delaware	<0.01[a]	0.6	13
District of Columbia	0.00	0.0	27
Florida	0.00	0.0	28
Georgia	0.00	0.0	29
Guam	0.00	0.0	30
Hawaii	<0.01[a]	<0.1[b]	22
Idaho	0.00	0.0	32
Illinois	0.01	1.9	8
Indiana	<0.01[a]	0.4	17
Iowa	0.00	0.0	31
Kansas	<0.01[a]	0.4	16
Kentucky	0.00	0.0	33
Louisiana	0.02	4.0	5
Maine	0.00	0.0	36
Maryland	0.00	0.0	35
Massachusetts	0.00	0.0	34
Michigan	0.00	0.0	37
Minnesota	0.01	2.5	7
Mississippi	0.04	10.8	3
Missouri	0.00	0.0	38
Montana	<0.01[a]	1.0	10
Nebraska	0.00	0.0	41
Nevada	0.00	0.0	43
New Hampshire	0.00	0.0	42
New Jersey	<0.01[a]	0.1	21
New Mexico	<0.01[a]	0.5	14
New York	0.00	0.0	44
North Carolina	0.00	0.0	39
North Dakota	0.00	0.0	40
Ohio	0.01	2.9	6
Oklahoma	0.06	14.9	2
Oregon	0.00	0.0	45
Pennsylvania	<0.01[a]	0.3	18
Puerto Rico	0.00	0.0	46
Rhode Island	0.00	0.0	47
South Carolina	0.00	0.0	48
South Dakota	0.00	0.0	49
Tennessee	0.00	0.0	50
Texas	0.19	50.6	1
Utah	<0.01[a]	1.0	9
Vermont	0.00	0.0	52
Virgin Island	0.00	0.0	51
Virginia	<0.01[a]	0.2	20
Washington	<0.01[a]	0.9	11
West Virginia	0.00	0.0	54
Wisconsin	0.00	0.0	53
Wyoming	<0.01[a]	0.4	15
Total	0.38	100.0	

[a]Less than 10,000 tons of hazardous waste were generated in these states in 1986.
[b]Less than 0.1 percent of the total quantity of hazardous waste generated in 1986 was generated in these states.
Source: TT-140 (M3)

Chart 10.2-4 Number of Facilities Managing Hazardous Waste in Land Treatment Areas by State in 1986

State	Number of RCRA TSDR Facilities	Percentage of RCRA TSDR Facilities	State Rank
Alabama	1	1.7	19
Alaska	0	0.0	23
Arizona	0	0.0	24
Arkansas	1	1.7	15
California	2	3.4	8
Colorado	0	0.0	25
Connecticut	0	0.0	26
Delaware	1	1.7	16
District of Columbia	0	0.0	27
Florida	0	0.0	28
Georgia	0	0.0	29
Guam	0	0.0	30
Hawaii	1	1.7	22
Idaho	0	0.0	32
Illinois	1	1.7	13
Indiana	1	1.7	17
Iowa	0	0.0	31
Kansas	2	3.4	11
Kentucky	0	0.0	33
Louisiana	7	12.1	3
Maine	0	0.0	36
Maryland	0	0.0	35
Massachusetts	0	0.0	34
Michigan	0	0.0	37
Minnesota	1	1.7	12
Mississippi	2	3.4	7
Missouri	0	0.0	38
Montana	3	5.2	6
Nebraska	0	0.0	41
Nevada	0	0.0	43
New Hampshire	0	0.0	42
New Jersey	1	1.7	21
New Mexico	2	3.4	9
New York	0	0.0	44
North Carolina	0	0.0	39
North Dakota	0	0.0	40
Ohio	4	6.9	4
Oklahoma	7	12.1	2
Oregon	0	0.0	45
Pennsylvania	1	1.7	18
Puerto Rico	0	0.0	46
Rhode Island	0	0.0	47
South Carolina	0	0.0	48
South Dakota	0	0.0	49
Tennessee	0	0.0	50
Texas	12	20.7	1
Utah	1	1.7	14
Vermont	0	0.0	52
Virgin Island	0	0.0	51
Virginia	1	1.7	20
Washington	4	6.9	5
West Virginia	0	0.0	54
Wisconsin	0	0.0	53
Wyoming	2	3.4	10
Total	58	100.0	

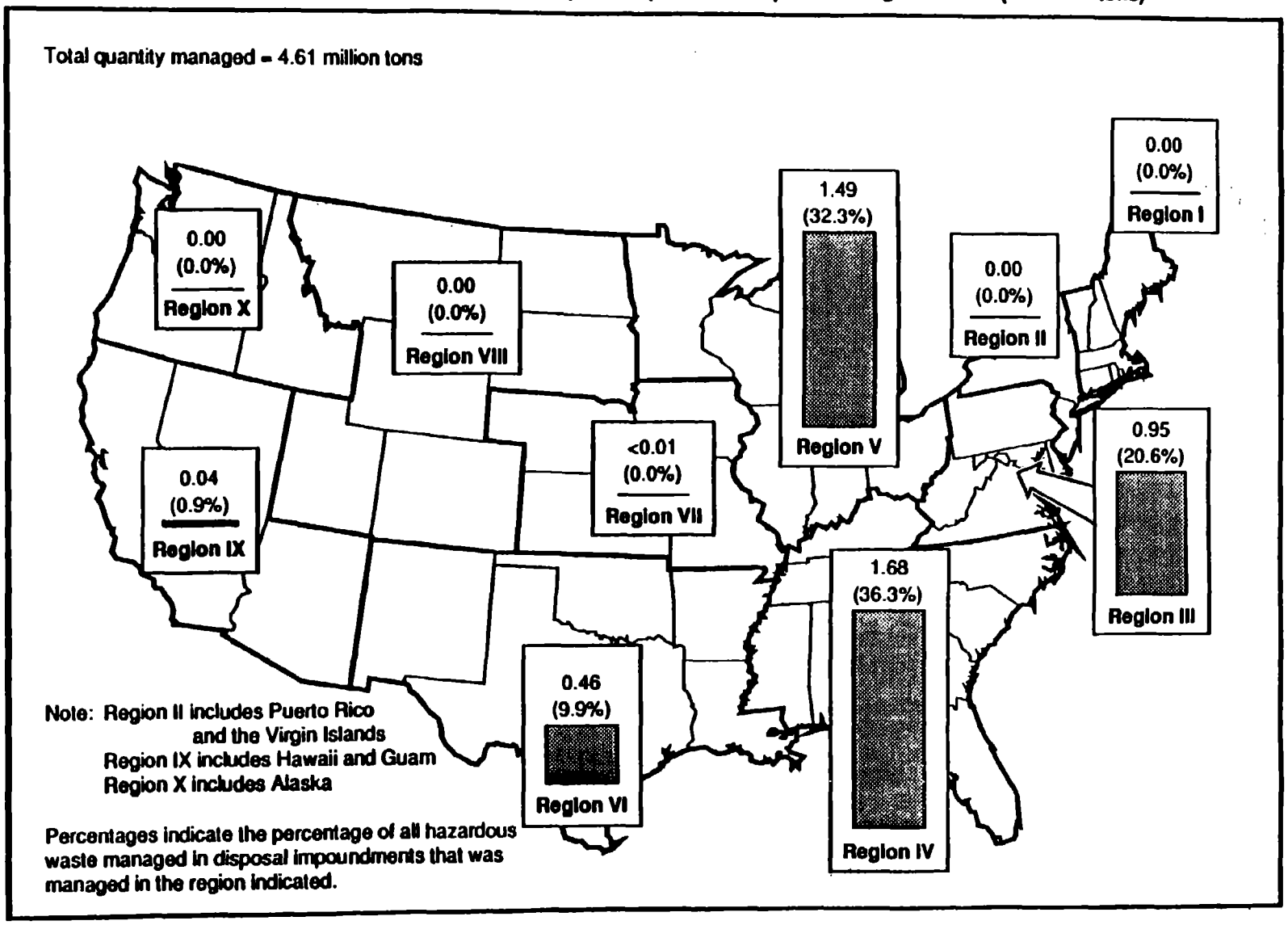
Source: TT-140 (M3)

10.3 DISPOSAL IMPOUNDMENTS

Disposal impoundments are surface impoundments used to permanently dispose of hazardous waste, generally liquid waste or waste containing free liquids. In 1986, 4.61 million tons of hazardous waste entered surface impoundments for permanent disposal. Seventy facilities operated these disposal impoundments in 1986.

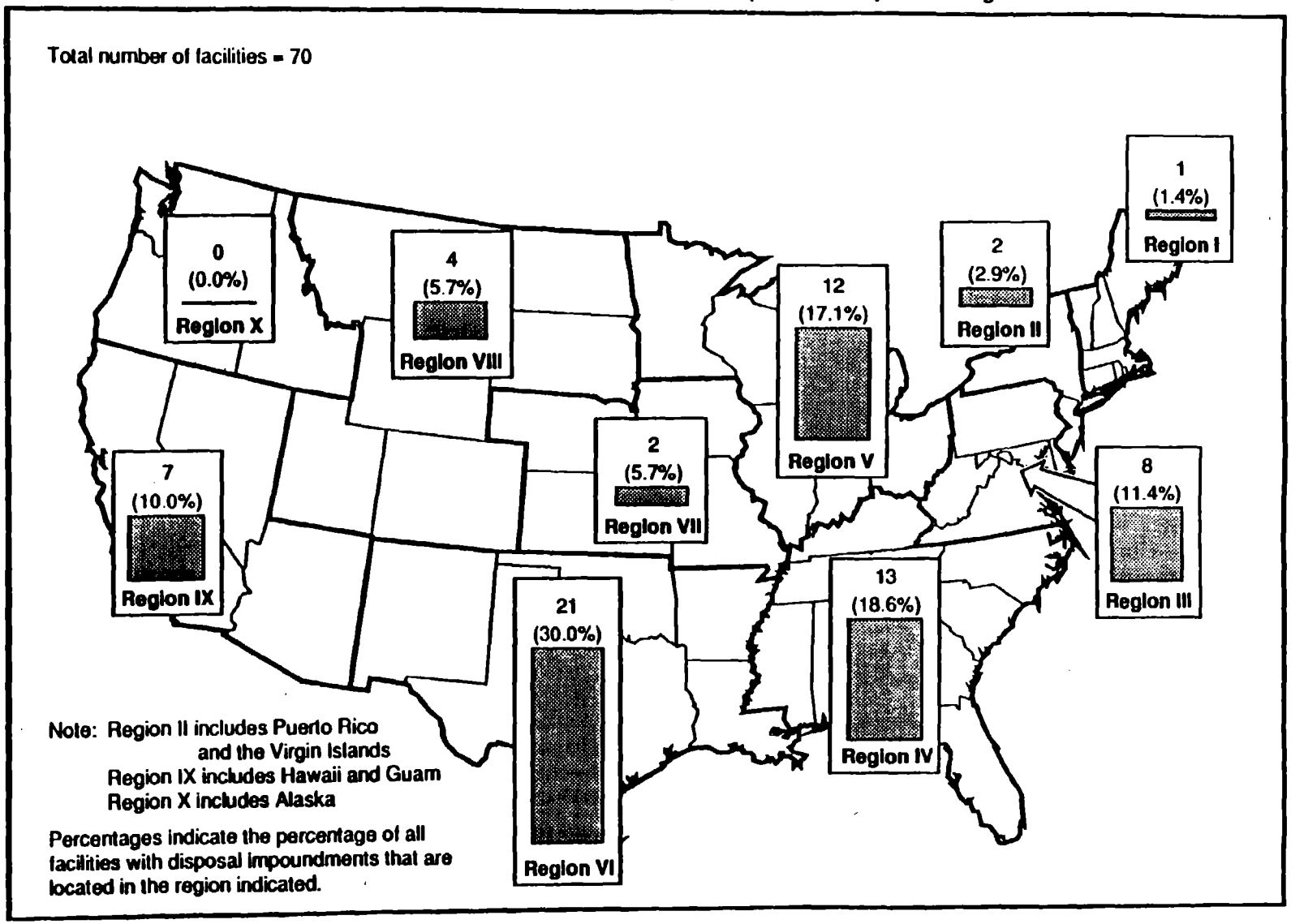
Charts 10.3-1 and 10.3-2 show the quantity of hazardous waste disposed of and the number of facilities disposing of hazardous waste in disposal impoundments in each EPA region in 1986. Charts 10.3-3 and 10.3-4 show the same information for each state or territory.

Chart 10.3-1 Quantity of Hazardous Waste Managed in Disposal Impoundments per EPA Region in 1986 (in million tons)



Source: TT-140 (K43)

Chart 10.3-2 Number of Facilities Managing Hazardous Waste in Disposal Impoundments per EPA Region in 1986



Source: TT-140 (K43)

Chart 10.3-3 Quantity of Hazardous Waste Managed in Disposal Impoundments by State in 1986

State	Quantity Managed (million tons)	Percentage of Total Quantity Managed	State Rank
Alabama	0.00	0.0	19
Alaska	0.00	0.0	18
Arizona	0.00	0.0	20
Arkansas	0.01	0.1	13
California	0.04	0.9	9
Colorado	0.00	0.0	21
Connecticut	0.00	0.0	22
Delaware	0.01	0.2	12
District of Columbia	0.00	0.0	23
Florida	0.00	0.0	24
Georgia	1.57	33.9	1
Guam	0.00	0.0	25
Hawaii	0.00	0.0	26
Idaho	0.00	0.0	27
Illinois	0.69	15.0	4
Indiana	0.00	0.0	28
Iowa	<0.01[a]	<0.1[b]	15
Kansas	0.00	0.0	29
Kentucky	0.03	0.6	10
Louisiana	<0.01[a]	0.1	14
Maine	0.00	0.0	32
Maryland	0.00	0.0	31
Massachusetts	0.00	0.0	30
Michigan	0.00	0.0	33
Minnesota	0.00	0.0	34
Mississippi	0.08	1.7	7
Missouri	<0.01[a]	<0.1[b]	17
Montana	0.00	0.0	35
Nebraska	0.00	0.0	36
Nevada	0.00	0.0	42
New Hampshire	0.00	0.0	39
New Jersey	0.00	0.0	40
New Mexico	0.00	0.0	41
New York	0.00	0.0	43
North Carolina	0.00	0.0	38
North Dakota	0.00	0.0	37
Ohio	0.80	17.3	3
Oklahoma	0.05	1.2	8
Oregon	0.00	0.0	44
Pennsylvania	0.83	18.0	2
Puerto Rico	0.00	0.0	45
Rhode Island	0.00	0.0	46
South Carolina	<0.01[a]	<0.1[b]	16
South Dakota	0.00	0.0	47
Tennessee	0.00	0.0	48
Texas	0.39	8.5	5
Utah	0.00	0.0	49
Vermont	0.00	0.0	51
Virgin Island	0.00	0.0	50
Virginia	0.03	0.8	11
Washington	0.00	0.0	52
West Virginia	0.08	1.8	6
Wisconsin	0.00	0.0	53
Wyoming	0.00	0.0	54
Total	4.61	100.0	

[a]Less than 10,000 tons of hazardous waste were generated in these states in 1986.
[b]Less than 0.1 percent of the total quantity of hazardous waste generated in 1986 was generated in these states.
Source: TT-140 (K43)

Chart 10.3-4 Number of Facilities Managing Hazardous Waste in Disposal Impoundments by State in 1986

State	Number of RCRA TSDR Facilities	Percentage of RCRA TSDR Facilities	State Rank
Alabama	3	4.3	10
Alaska	0	0.0	25
Arizona	0	0.0	26
Arkansas	1	1.4	18
California	7	10.0	3
Colorado	0	0.0	27
Connecticut	1	1.4	21
Delaware	1	1.4	17
District of Columbia	0	0.0	28
Florida	0	0.0	29
Georgia	5	7.1	4
Guam	0	0.0	30
Hawaii	0	0.0	31
Idaho	0	0.0	32
Illinois	2	2.9	11
Indiana	0	0.0	33
Iowa	1	1.4	19
Kansas	0	0.0	34
Kentucky	1	1.4	15
Louisiana	4	5.7	5
Maine	0	0.0	37
Maryland	0	0.0	36
Massachusetts	0	0.0	35
Michigan	2	2.9	13
Minnesota	0	0.0	38
Mississippi	1	1.4	14
Missouri	1	1.4	20
Montana	0	0.0	39
Nebraska	0	0.0	42
Nevada	0	0.0	45
New Hampshire	0	0.0	43
New Jersey	0	0.0	44
New Mexico	1	1.4	22
New York	1	1.4	23
North Carolina	0	0.0	40
North Dakota	0	0.0	41
Ohio	8	11.4	2
Oklahoma	2	2.9	12
Oregon	0	0.0	46
Pennsylvania	3	4.3	7
Puerto Rico	1	1.4	24
Rhode Island	0	0.0	47
South Carolina	3	4.3	9
South Dakota	0	0.0	48
Tennessee	0	0.0	49
Texas	13	18.6	1
Utah	4	5.7	6
Vermont	0	0.0	51
Virgin Island	0	0.0	50
Virginia	1	1.4	16
Washington	0	0.0	52
West Virginia	3	4.3	8
Wisconsin	0	0.0	53
Wyoming	0	0.0	54
Total	70	100.0	

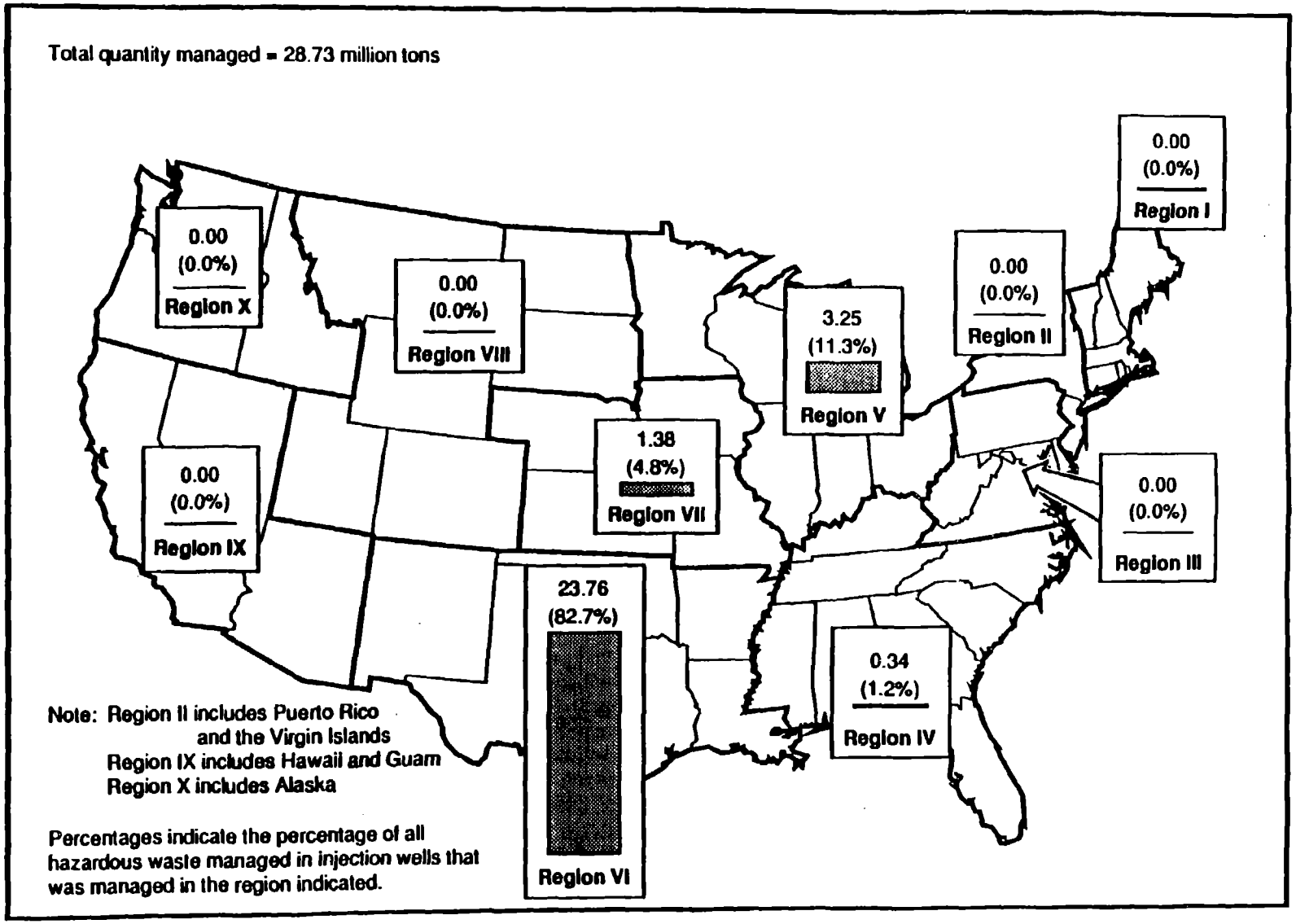
Source: TT-140 (K43)

10.4 INJECTION WELLS

Underground injection of hazardous waste is a land disposal method whereby hazardous waste is introduced into the subsurface through drilled deep wells. Underground injection wells were operated by 63 facilities in 1986 and received 28.73 million tons of hazardous waste for disposal. Underground injection was the most common method of hazardous waste disposal in 1986 based on the quantity of hazardous waste disposed of.

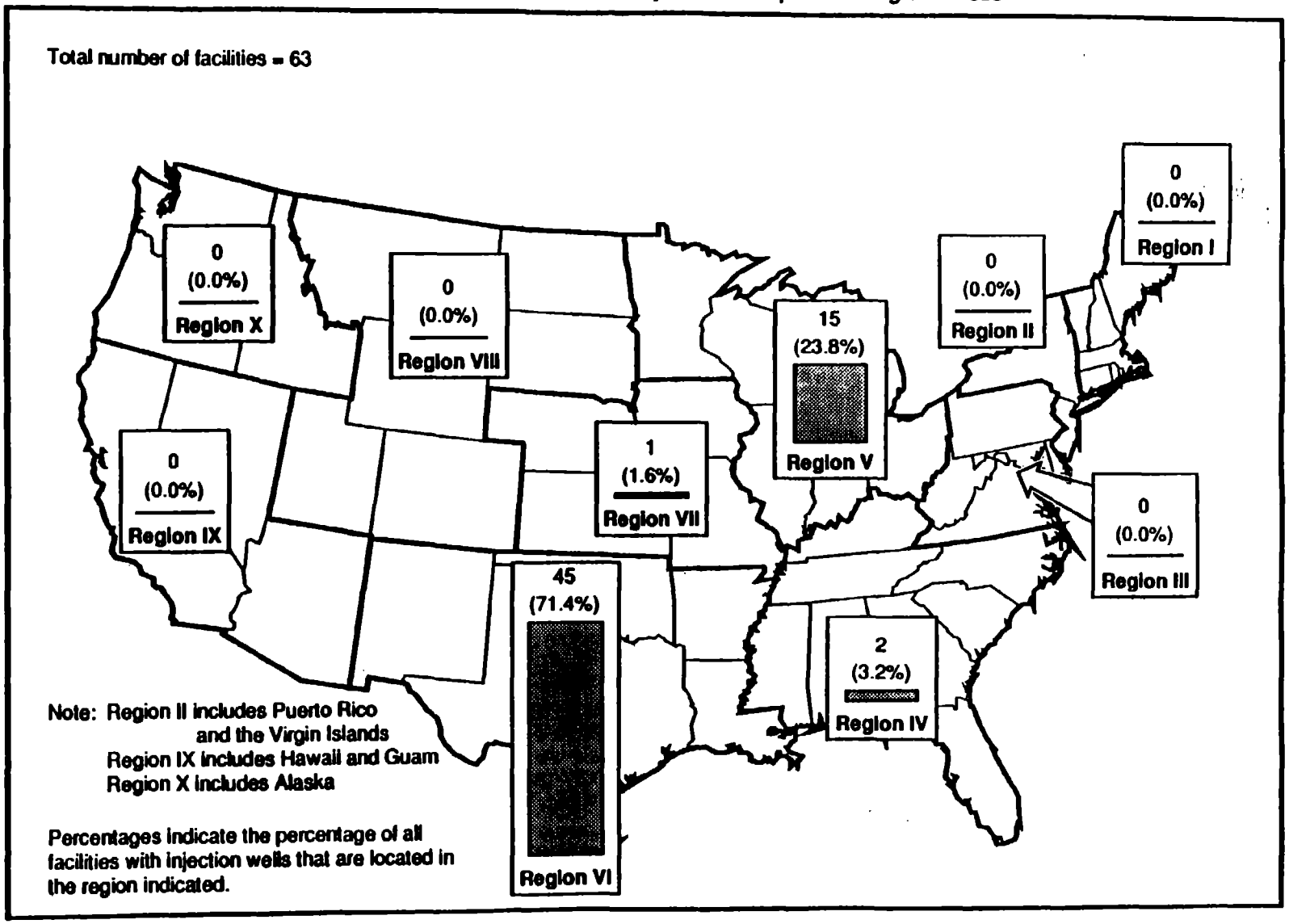
Charts 10.4-1 and 10.4-2 show the quantity of hazardous waste disposed of and the number of facilities disposing of hazardous waste in injection wells in each EPA region in 1986. Charts 10.4-3 and 10.4-4 show the same information for each state or territory.

Chart 10.4-1 Quantity of Hazardous Waste Managed in Injection Wells per EPA Region in 1986 (in million tons)



Source: TT-140 (N3)

Chart 10.4-2 Number of Facilities Managing Hazardous Waste in Injection Wells per EPA Region in 1986



Source: TT-140 (N3)

Chart 10.4-3 Quantity of Hazardous Waste Managed in Injection Wells by State in 1986

State	Quantity Managed (million tons)	Percentage of Total Quantity Managed	State Rank
Alabama	0.00	0.0	13
Alaska	0.00	0.0	12
Arizona	0.00	0.0	14
Arkansas	0.03	0.1	11
California	0.00	0.0	15
Colorado	0.00	0.0	16
Connecticut	0.00	0.0	17
Delaware	0.00	0.0	19
District of Columbia	0.00	0.0	18
Florida	0.11	0.4	9
Georgia	0.00	0.0	20
Guam	0.00	0.0	21
Hawaii	0.00	0.0	22
Idaho	0.00	0.0	24
Illinois	0.61	2.1	7
Indiana	0.89	3.1	6
Iowa	0.00	0.0	23
Kansas	1.38	4.8	5
Kentucky	0.23	0.8	8
Louisiana	10.57	36.8	2
Maine	0.00	0.0	27
Maryland	0.00	0.0	26
Massachusetts	0.00	0.0	25
Michigan	0.10	0.4	10
Minnesota	0.00	0.0	28
Mississippi	0.00	0.0	30
Missouri	0.00	0.0	29
Montana	0.00	0.0	31
Nebraska	0.00	0.0	34
Nevada	0.00	0.0	38
New Hampshire	0.00	0.0	35
New Jersey	0.00	0.0	36
New Mexico	0.00	0.0	37
New York	0.00	0.0	39
North Carolina	0.00	0.0	32
North Dakota	0.00	0.0	33
Ohio	1.64	5.7	3
Oklahoma	1.42	4.9	4
Oregon	0.00	0.0	40
Pennsylvania	0.00	0.0	41
Puerto Rico	0.00	0.0	42
Rhode Island	0.00	0.0	43
South Carolina	0.00	0.0	44
South Dakota	0.00	0.0	45
Tennessee	0.00	0.0	46
Texas	11.74	40.9	1
Utah	0.00	0.0	47
Vermont	0.00	0.0	50
Virgin Island	0.00	0.0	49
Virginia	0.00	0.0	48
Washington	0.00	0.0	51
West Virginia	0.00	0.0	53
Wisconsin	0.00	0.0	52
Wyoming	0.00	0.0	54
Total	28.73	100.0	

[a]Less than 10,000 tons of hazardous waste were generated in these states in 1986.
[b]Less than 0.1 percent of the total quantity of hazardous waste generated in 1986 was generated in these states.
Source: TT-140 (N3)

Chart 10.4-4 Number of Facilities Managing Hazardous Waste in Injection Wells by State in 1986

State	Number of RCRA TSDR Facilities	Percentage of RCRA TSDR Facilities	State Rank
Alabama	0	0.0	13
Alaska	0	0.0	12
Arizona	0	0.0	14
Arkansas	2	3.2	8
California	0	0.0	15
Colorado	0	0.0	16
Connecticut	0	0.0	17
Delaware	0	0.0	19
District of Columbia	0	0.0	18
Florida	1	1.6	9
Georgia	0	0.0	20
Guam	0	0.0	21
Hawaii	0	0.0	22
Idaho	0	0.0	24
Illinois	3	4.8	7
Indiana	4	6.3	3
Iowa	0	0.0	23
Kansas	1	1.6	10
Kentucky	1	1.6	11
Louisiana	16	25.4	2
Maine	0	0.0	27
Maryland	0	0.0	26
Massachusetts	0	0.0	25
Michigan	4	6.3	4
Minnesota	0	0.0	28
Mississippi	0	0.0	30
Missouri	0	0.0	29
Montana	0	0.0	31
Nebraska	0	0.0	34
Nevada	0	0.0	38
New Hampshire	0	0.0	35
New Jersey	0	0.0	36
New Mexico	0	0.0	37
New York	0	0.0	39
North Carolina	0	0.0	32
North Dakota	0	0.0	33
Ohio	4	6.3	5
Oklahoma	4	6.3	6
Oregon	0	0.0	40
Pennsylvania	0	0.0	41
Puerto Rico	0	0.0	42
Rhode Island	0	0.0	43
South Carolina	0	0.0	44
South Dakota	0	0.0	45
Tennessee	0	0.0	46
Texas	23	36.5	1
Utah	0	0.0	47
Vermont	0	0.0	50
Virgin Island	0	0.0	49
Virginia	0	0.0	48
Washington	0	0.0	51
West Virginia	0	0.0	53
Wisconsin	0	0.0	52
Wyoming	0	0.0	54
Total	63	100.0	

Source: TT-140 (N3)

11 UNITS SUBJECT TO THE LAND DISPOSAL RESTRICTION RULE

Regulations authorized by HSWA and promulgated by EPA since 1986 prohibit the land disposal of hazardous waste unless hazardous chemicals and characteristics have been removed, reduced, or stabilized to the greatest extent possible or unless EPA determines on a site-specific basis that there will be no migration of hazardous constituents from the land disposal unit. Land disposal units covered by these restrictions include landfills, land treatment areas, surface impoundments, waste piles, and underground injection wells. The regulations apply to all waste management activities (including storage and treatment) conducted in these units.

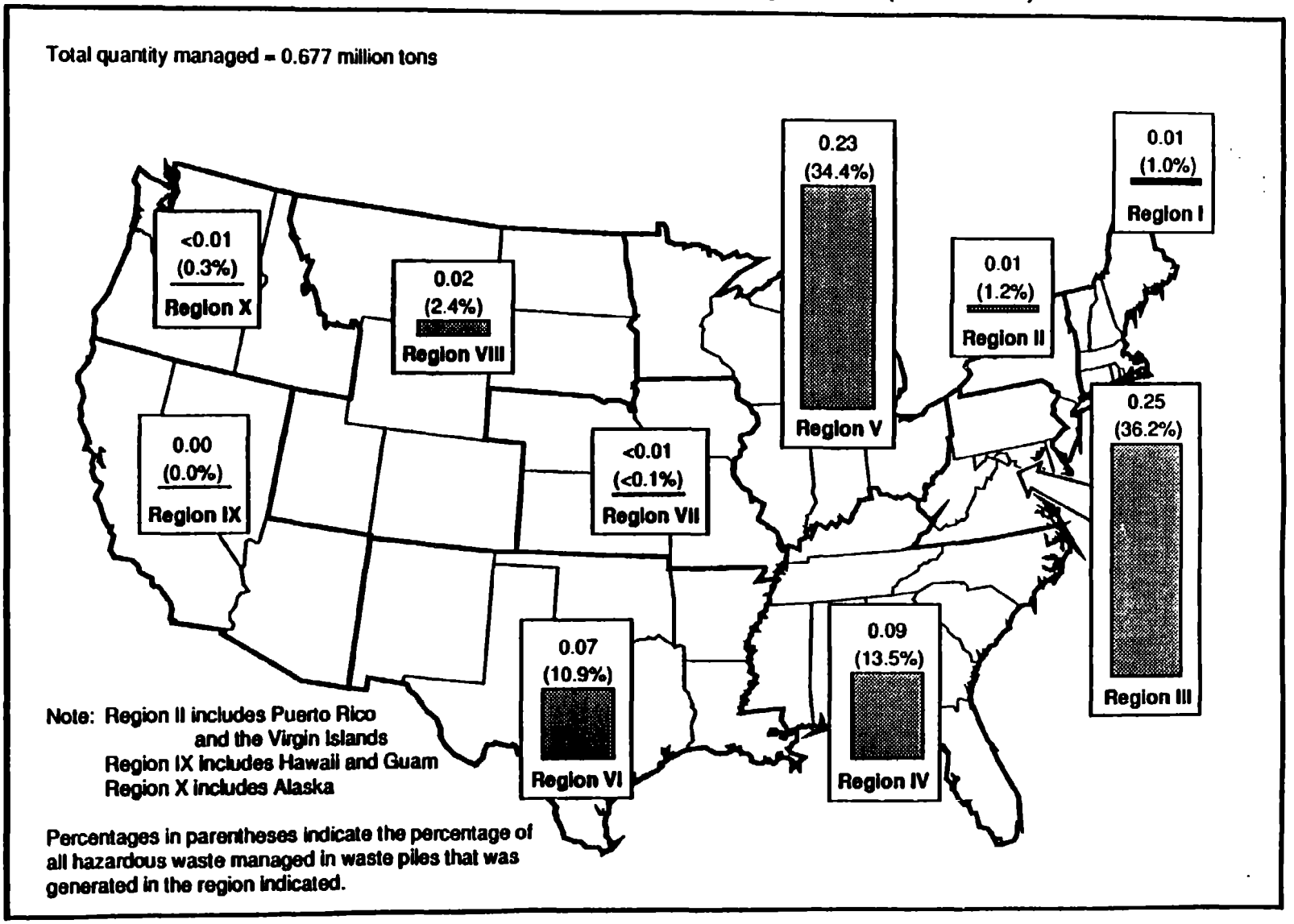
Chapter 10 included a discussion of land disposal in landfills, land treatment areas, surface impoundments used for disposal, and underground injection wells during 1986. This chapter describes the remaining units subject to the land disposal restrictions—waste piles and surface impoundments (including those used for treatment or storage). Section 12.1 describes the potential effects of the land disposal restrictions, using the 1986 data as a baseline by which to evaluate these effects.

11.1 WASTE PILES

A waste pile is an uncontained accumulation of solid or nonflowing hazardous waste. In 1986, 71 facilities managed 0.677 million tons of hazardous waste in waste piles.

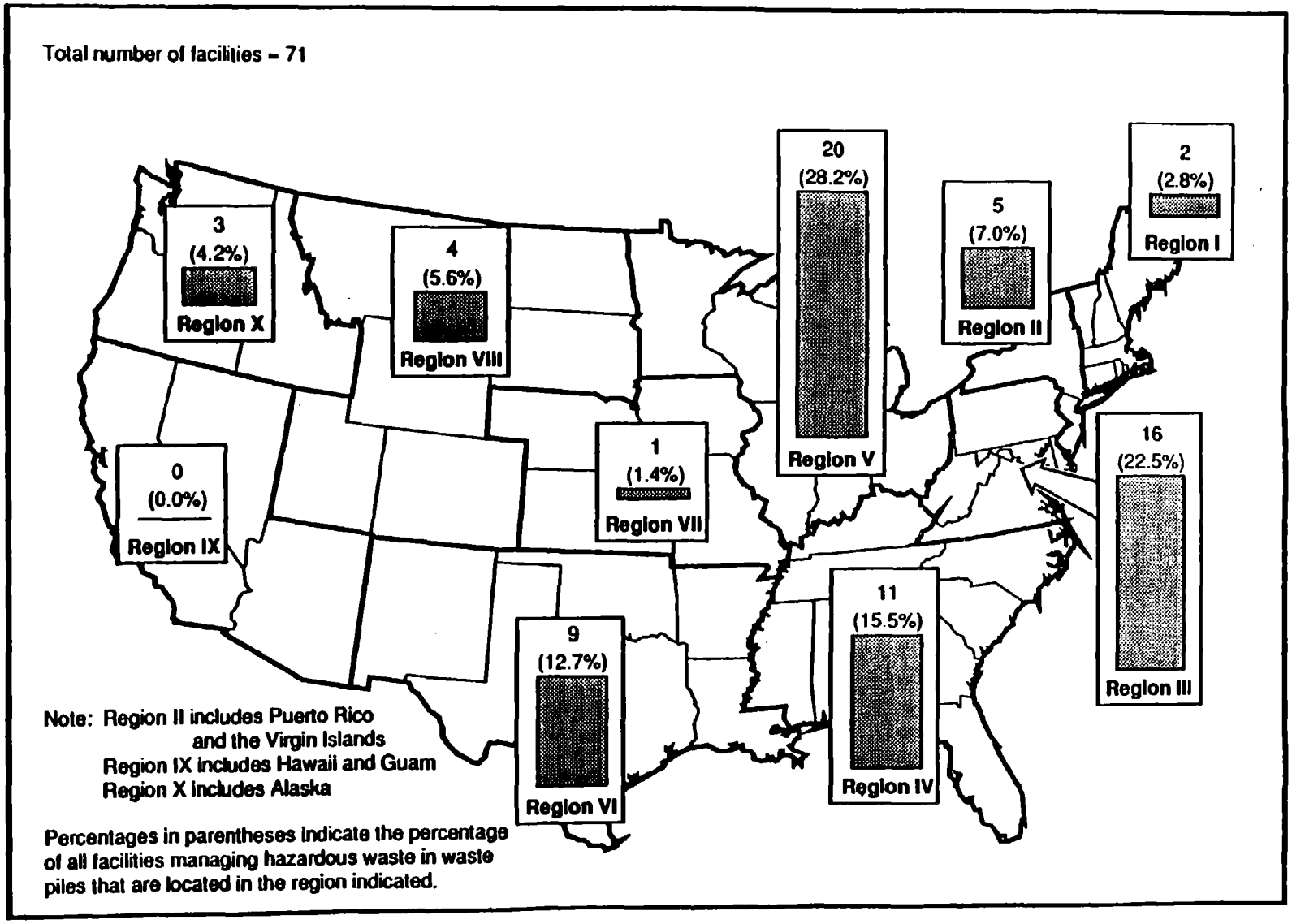
Charts 11.1-1 and 11.1-2 show the quantity of hazardous waste managed and the number of facilities managing hazardous waste in waste piles in each EPA region in 1986. Charts 11.1-3 and 11.1-4 show the same information for each state or territory.

Chart 11.1-1 Quantity of Hazardous Waste Managed in Waste Piles per EPA Region in 1986 (in million tons)



Source: TT-149 (J3)

Chart 11.1-2 Number of Facilities Managing Hazardous Waste in Waste Piles per EPA Region in 1986



Source: TT-149 (J3)

Chart 11.1-3 Quantity of Hazardous Waste Managed in Waste Piles by State in 1986

State	Quantity Managed (million tons)	Percentage of Total Quantity	State Rank
Alabama	0.046	6.8	4
Alaska	0.000	0.0	27
Arizona	0.000	0.0	28
Arkansas	0.006	0.9	16
California	0.000	0.0	29
Colorado	0.010	1.5	12
Connecticut	0.007	1.0	14
Delaware	0.000	0.0	30
District of Columbia	0.000	0.0	31
Florida	0.030	4.4	5
Georgia	0.002	0.3	20
Guam	0.000	0.0	32
Hawaii	0.000	0.0	33
Idaho	0.000	0.0	34
Illinois	0.014	2.0	9
Indiana	0.000	0.0	35
Iowa	0.000	0.0	36
Kansas	0.000	0.0	37
Kentucky	<0.001[a]	<0.1[b]	26
Louisiana	0.000	0.0	38
Maine	0.000	0.0	39
Maryland	0.001	0.2	22
Massachusetts	0.000	0.0	40
Michigan	0.181	26.8	2
Minnesota	0.010	1.5	10
Mississippi	0.004	0.5	18
Missouri	<0.001[a]	<0.1[b]	24
Montana	0.001	0.2	23
Nebraska	0.000	0.0	41
Nevada	0.000	0.0	42
New Hampshire	0.000	0.0	43
New Jersey	0.001	0.2	21
New Mexico	0.000	0.0	44
New York	0.007	1.0	15
North Carolina	0.000	0.0	45
North Dakota	0.000	0.0	46
Ohio	0.027	4.0	6
Oklahoma	0.016	2.3	7
Oregon	0.000	0.0	47
Pennsylvania	0.222	32.8	1
Puerto Rico	0.000	0.0	48
Rhode Island	0.000	0.0	49
South Carolina	0.010	1.5	11
South Dakota	0.000	0.0	50
Tennessee	0.000	0.0	51
Texas	0.052	7.7	3
Utah	0.000	0.0	52
Vermont	0.000	0.0	53
Virgin Island	0.000	0.0	54
Virginia	0.015	2.2	8
Washington	0.002	0.3	19
West Virginia	0.007	1.0	13
Wisconsin	<0.001[a]	<0.1[b]	25
Wyoming	0.005	0.8	17
Total	0.677	100.0	

[a]Less than 10,000 tons of hazardous waste were generated in these states in 1986.
[b]Less than 0.1 percent of the total quantity of hazardous waste generated in 1986 was generated in these states.
Source: TT-149 (J3)

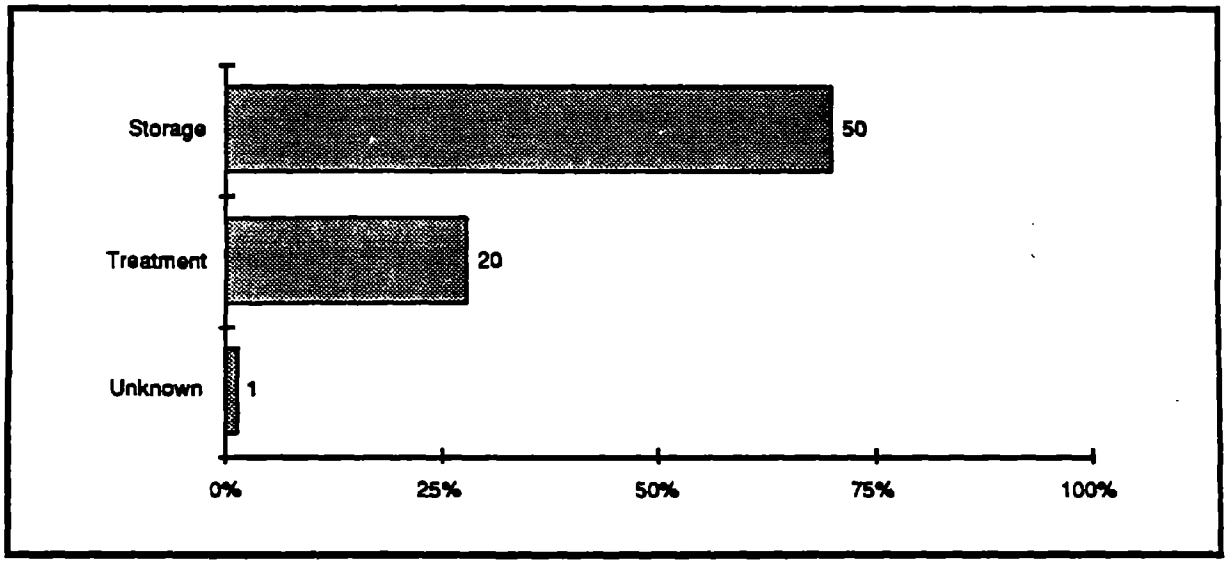
Chart 11.1-4 Number of Facilities Managing Hazardous Waste in Waste Piles by State in 1986

State	Number of Facilities	Percentage of Total Number	State Rank
Alabama	2	2.8	9
Alaska	0	0.0	29
Arizona	0	0.0	30
Arkansas	1	1.4	19
California	0	0.0	31
Colorado	2	2.8	12
Connecticut	2	2.8	13
Delaware	0	0.0	32
District of Columbia	0	0.0	33
Florida	3	4.2	6
Georgia	2	2.8	15
Guam	0	0.0	34
Hawaii	0	0.0	35
Idaho	0	0.0	36
Illinois	2	2.8	11
Indiana	0	0.0	37
Iowa	0	0.0	38
Kansas	0	0.0	39
Kentucky	1	1.4	26
Louisiana	0	0.0	40
Maine	0	0.0	41
Maryland	1	1.4	22
Massachusetts	0	0.0	42
Michigan	4	5.6	5
Minnesota	3	4.2	7
Mississippi	1	1.4	21
Missouri	1	1.4	24
Montana	1	1.4	23
Nebraska	0	0.0	43
Nevada	0	0.0	44
New Hampshire	0	0.0	45
New Jersey	2	2.8	16
New Mexico	0	0.0	46
New York	3	4.2	8
North Carolina	0	0.0	47
North Dakota	0	0.0	48
Ohio	10	14.1	1
Oklahoma	2	2.8	10
Oregon	1	1.4	27
Pennsylvania	9	12.7	2
Puerto Rico	0	0.0	49
Rhode Island	0	0.0	50
South Carolina	1	1.4	17
South Dakota	0	0.0	51
Tennessee	1	1.4	28
Texas	6	8.5	3
Utah	0	0.0	52
Vermont	0	0.0	53
Virgin Island	0	0.0	54
Virginia	5	7.0	4
Washington	2	2.8	14
West Virginia	1	1.4	18
Wisconsin	1	1.4	25
Wyoming	1	1.4	20
Total	71	100.0	

Source: TT-149 (J3)

Chart 11.1-5 shows the hazardous waste management activities conducted in waste piles in 1986. Over 70 percent of facilities with waste piles used the units to store hazardous waste in 1986.

Chart 11.1-5 Types of Waste Management Conducted in Waste Piles in 1986, by Number of Facilities



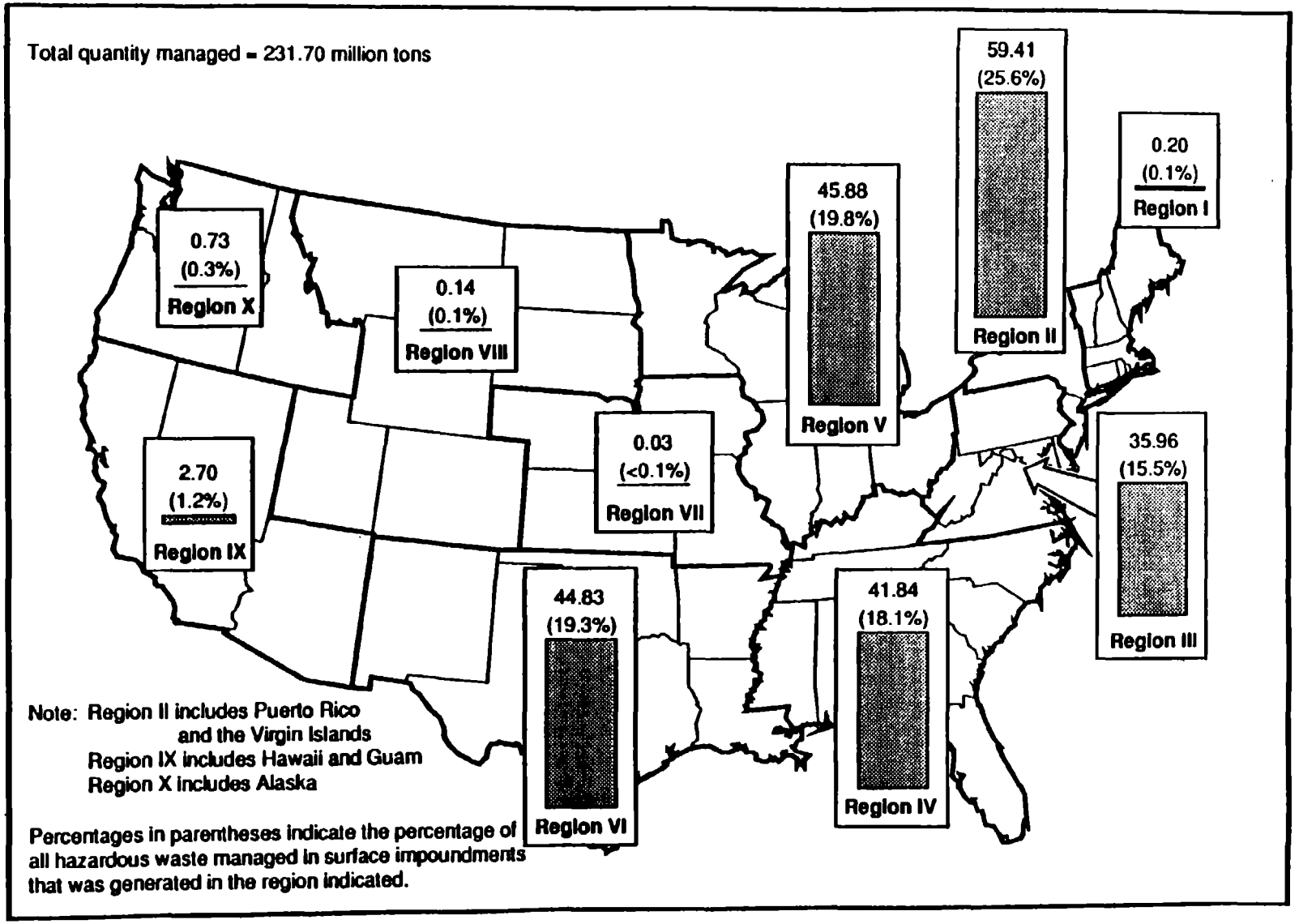
Source: TT-149 (J3, J27, J29)

11.2 SURFACE IMPOUNDMENTS

Surface impoundments are pits, ponds, or lagoons designed to hold liquid wastes or wastes containing free liquids. Surface impoundments can be used to accumulate, store, treat, recycle, or dispose of hazardous waste. In 1986, 298 facilities managed 231.7 million tons of hazardous waste in surface impoundments.

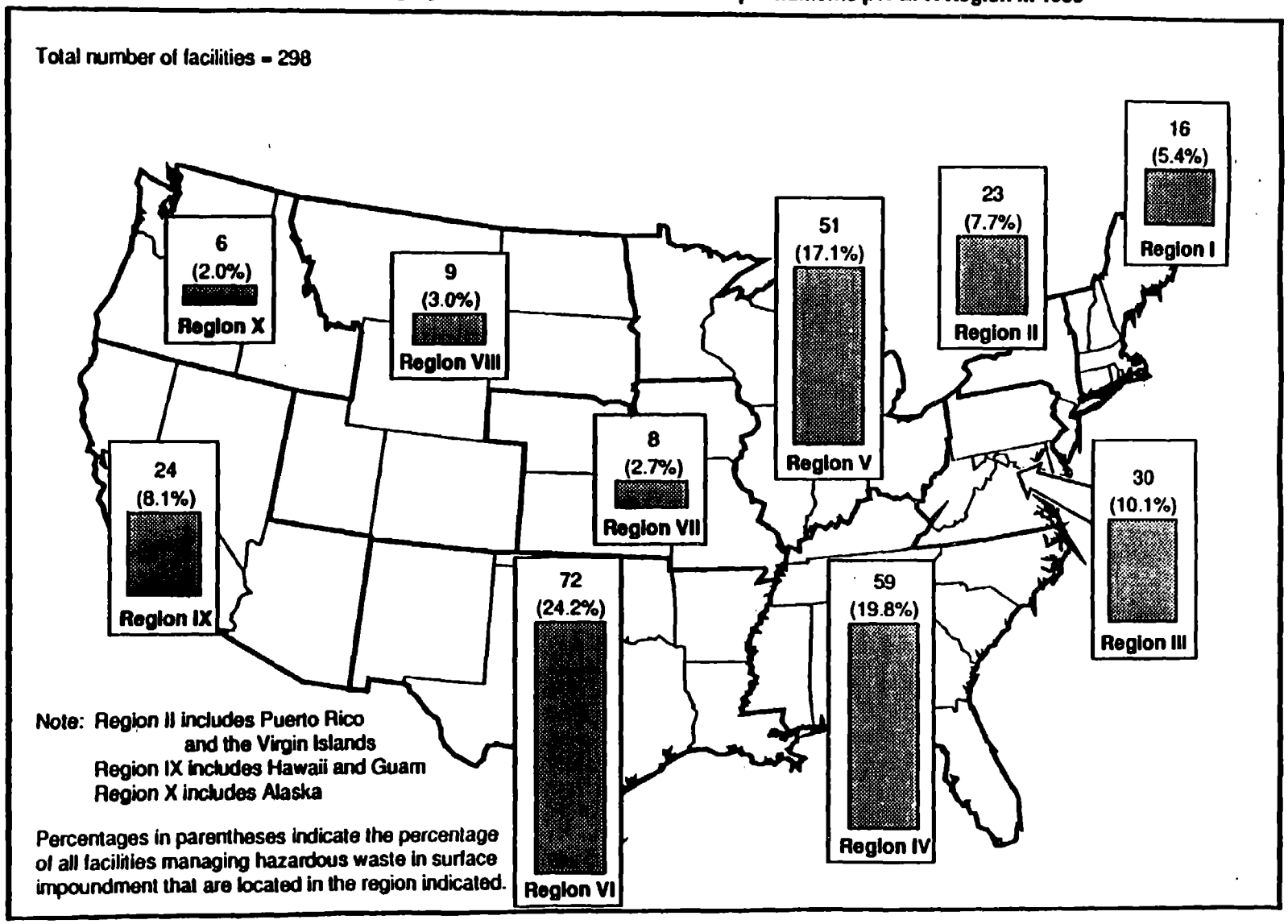
Charts 11.2-1 and 11.2-2 show the quantity of hazardous waste managed in and the number of facilities managing hazardous waste in surface impoundments in each EPA region in 1986. Charts 11.2-3 and 11.2-4 show the same information for each state or territory.

Chart 11.2-1 Quantity of Hazardous Waste Managed in Surface Impoundments per EPA Region in 1986 (in million tons)



Source: TT-150 (K3)

Chart 11.2-2 Number of Facilities Managing Hazardous Waste in Surface Impoundments per EPA Region in 1986



Source: TT-150 (K3)

Chart 11.2-3 Quantity of Hazardous Waste Managed in Surface Impoundments by State in 1986

State	Quantity Managed (million tons)	Percentage of Total Quantity	State Rank
Alabama	4.96	2.1	11
Alaska	0.00	0.0	40
Arizona	0.02	<0.1[b]	30
Arkansas	0.03	<0.1[b]	29
California	2.67	1.2	13
Colorado	0.02	<0.1[b]	31
Connecticut	0.10	<0.1[b]	27
Delaware	<0.01[a]	<0.1[b]	35
District of Columbia	0.00	0.0	41
Florida	0.31	0.1	21
Georgia	9.23	4.0	7
Guam	0.00	0.0	42
Hawaii	0.00	0.0	43
Idaho	<0.01[a]	<0.1[b]	34
Illinois	5.39	2.3	10
Indiana	0.47	0.2	19
Iowa	0.02	<0.1[b]	32
Kansas	<0.01[a]	<0.1[b]	36
Kentucky	0.78	0.3	17
Louisiana	6.00	2.6	8
Maine	0.00	0.0	44
Maryland	0.25	0.1	22
Massachusetts	0.09	<0.1[b]	28
Michigan	36.81	15.9	3
Minnesota	0.00	0.0	45
Mississippi	1.37	0.6	15
Missouri	0.01	<0.1[b]	33
Montana	0.00	0.0	46
Nebraska	0.00	0.0	47
Nevada	0.00	0.0	48
New Hampshire	0.00	0.0	49
New Jersey	53.47	23.1	1
New Mexico	<0.01[a]	<0.1[b]	38
New York	5.81	2.5	9
North Carolina	0.36	0.2	20
North Dakota	0.00	0.0	50
Ohio	3.21	1.4	12
Oklahoma	0.11	<0.1[b]	26
Oregon	0.18	0.1	23
Pennsylvania	0.82	0.4	16
Puerto Rico	0.12	0.1	24
Rhode Island	0.00	0.0	51
South Carolina	2.62	1.1	14
South Dakota	0.00	0.0	52
Tennessee	22.21	9.6	5
Texas	38.69	16.7	2
Utah	0.11	<0.1[b]	25
Vermont	0.00	0.0	53
Virgin Island	0.00	0.0	54
Virginia	12.41	5.4	6
Washington	0.54	0.2	18
West Virginia	22.48	9.7	4
Wisconsin	<0.01[a]	<0.1[b]	39
Wyoming	<0.01[a]	<0.1[b]	37
Total	231.70	100.0	

[a]Less than 10,000 tons of hazardous waste were generated in these states in 1986.
[b]Less than 0.1 percent of the total quantity of hazardous waste generated in 1986 was generated in these states.
Source: TT-150 (K3)

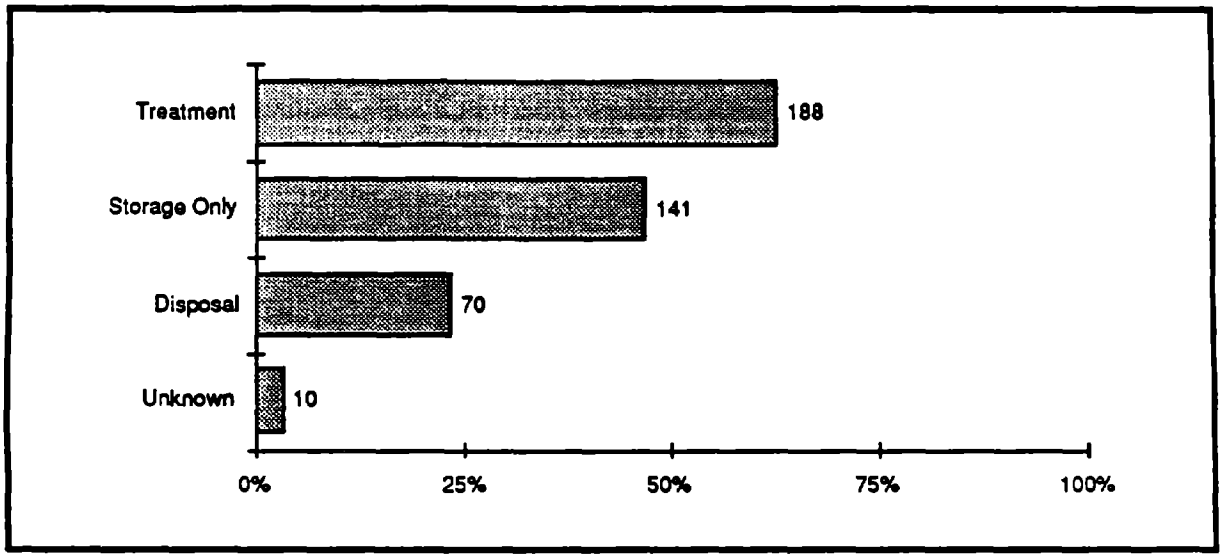
Chart 11.2-4 Number of Facilities Managing Hazardous Waste in Surface Impoundments by State in 1986

State	Number of Facilities	Percentage of Total Number	State Rank
Alabama	9	3.0	12
Alaska	0	0.0	40
Arizona	3	1.0	29
Arkansas	4	1.3	25
California	21	7.0	3
Colorado	2	0.7	32
Connecticut	12	4.0	10
Delaware	1	0.3	35
District of Columbia	0	0.0	41
Florida	14	4.7	5
Georgia	8	2.7	13
Guam	0	0.0	42
Hawaii	0	0.0	43
Idaho	1	0.3	34
Illinois	12	4.0	9
Indiana	8	2.7	15
Iowa	2	0.7	33
Kansas	1	0.3	36
Kentucky	8	2.7	14
Louisiana	21	7.0	2
Maine	0	0.0	44
Maryland	2	0.7	30
Massachusetts	4	1.3	24
Michigan	12	4.0	8
Minnesota	0	0.0	45
Mississippi	6	2.0	18
Missouri	5	1.7	22
Montana	0	0.0	46
Nebraska	0	0.0	47
Nevada	0	0.0	48
New Hampshire	0	0.0	49
New Jersey	7	2.3	16
New Mexico	1	0.3	38
New York	13	4.4	6
North Carolina	3	1.0	27
North Dakota	0	0.0	50
Ohio	18	6.0	4
Oklahoma	5	1.7	21
Oregon	2	0.7	31
Pennsylvania	13	4.4	7
Puerto Rico	3	1.0	28
Rhode Island	0	0.0	51
South Carolina	5	1.7	20
South Dakota	0	0.0	52
Tennessee	6	2.0	17
Texas	41	13.8	1
Utah	6	2.0	19
Vermont	0	0.0	53
Virgin Island	0	0.0	54
Virginia	4	1.3	23
Washington	3	1.0	26
West Virginia	10	3.4	11
Wisconsin	1	0.3	39
Wyoming	1	0.3	37
Total	298	100.0	

Source: TT-150 (K3)

Chart 11.2-5 shows the hazardous waste management activities conducted in surface impoundments in 1986. **Most facilities (63 percent) used their surface impoundments to treat hazardous waste in 1986.** Section 10.3 further describes hazardous waste disposal in surface impoundments.

Chart 11.2-5 Types of Waste Management Conducted in Surface Impoundments in 1986, by Number of Facilities



Source: TT-150 (K3, K31, K46, K49)

(This page is intentionally blank)

12 CHANGES SINCE 1986 AFFECTING HAZARDOUS WASTE MANAGEMENT

The Generator and TSDR Survey data cover the calendar year 1986 and can be used as a baseline by which to evaluate changes in hazardous waste management activities since 1986. Several factors affect hazardous waste management activities. One important factor is the level and type of production or other business activity that facilities generate. These economic factors vary from year to year and industry to industry, and their effects are difficult to assess.

A second factor that affects hazardous waste management activities is changes in the regulatory environment. Because such changes apply uniformly to particular waste management activities, the overall effect of these changes can be assessed. Among the major regulatory changes affecting hazardous waste management activities since 1986 are the implementation of the following:

- land disposal prohibitions authorized by HSWA,
- minimum technical requirements for surface impoundments authorized by HSWA,
- the toxicity characteristic leachate procedure (TCLP) test to determine if a waste is toxic and therefore hazardous under RCRA, and
- EPA and state activities to encourage industrial pollution prevention.

This chapter examines each of these changes in the regulatory environment since 1986 and suggests their probable effects on hazardous waste management activities.

12.1 LAND DISPOSAL RESTRICTION RULES

In enacting HSWA, Congress required EPA to develop regulations prohibiting the land disposal of hazardous waste unless hazardous chemicals and characteristics have been removed, reduced, or stabilized to the greatest extent

possible, or unless EPA determines on a site-specific basis that there will be no migration of hazardous constituents from the land disposal unit for as long as the wastes remain hazardous. Concern for potential groundwater and soil contamination from hazardous waste disposed of in land-based activities prompted these legislative changes. Land disposal units covered by these prohibitions include landfills, land treatment areas, surface impoundments, waste piles, and underground injection wells. These restrictions apply to all waste management activities (including storage or treatment) conducted in these land disposal units.

HSWA imposes a schedule on EPA, including provisions for two-year delays in national implementation based on capacity shortfalls in BDAT technologies, for determining conditions under which a particular hazardous waste may be disposed of in land disposal units. This schedule is outlined in Chart 12.1-1.

Chart 12.1-1. Schedule for Hazardous Waste Land Disposal Restriction Rules Under HSWA

Date Effective	RCRA Hazardous Wastes Subject to Land Disposal Restriction
November 1986	Dioxins and solvents
July 1987	Hazardous wastes banned from land disposal in California ("California list") including liquids, metals, acids, PCBs, and halogenated organic compounds
August 1988	Most hazardous third of RCRA hazardous wastes ("1st third")
June 1990	Next most hazardous third of RCRA hazardous wastes ("2nd third")
May 1991	Final third of RCRA hazardous wastes ("3rd third")

Effect of Land Disposal Restriction Rules. The land disposal restriction rules directly affect hazardous waste management activities. To meet Land Disposal Restrictions (LDR) treatment standards for land disposal, TSDR facilities are required to increase their treatment of hazardous waste prior to disposal. Land disposal restriction regulations will decrease the quantity of waste managed in land disposal units for some wastes, while increasing

disposal quantities for other wastes. For example, requirements to incinerate waste decrease disposal volume because only the residual incinerator ash will be landfilled. On the other hand, requiring wastes to be solidified to stabilize hazardous constituents will increase disposal volume due to the added quantities of stabilizing materials (e.g., cement).

Meeting BDAT standards and finding alternative methods of disposing of hazardous waste will increase the costs of hazardous waste management. To avoid these costs, facilities might attempt to reduce the quantity of hazardous waste generated and subsequently treated or disposed of. Such pollution prevention activities are described in greater detail below.

12.2 SURFACE IMPOUNDMENT REGULATIONS

Concern over groundwater contamination from hazardous waste also prompted the inclusion in HSWA of new requirements concerning surface impoundments. Under HSWA, EPA developed new minimum technical requirements for surface impoundments to prevent groundwater contamination. With limited exemptions, surface impoundments were required to be retrofitted to meet these minimum technical requirements by November 8, 1988. Minimum technical requirements include installing double liners, leachate collection systems, and groundwater monitoring.

Effect of Surface Impoundment Regulations. Because of the expense of retrofitting surface impoundments, many TSDR facilities chose instead to close surface impoundments that did not meet the minimum technical requirements. Closing surface impoundments is expected to temporarily increase the quantity of hazardous waste managed due to contaminated soils removed by the dredging of surface impoundments.

12.3 TOXICITY CHARACTERISTIC LEACHING PROCEDURE (TCLP)

Beginning September 25, 1990, facilities are required to use the TCLP test to determine if a waste is toxic and therefore subject to RCRA regulations. The test approximates the leaching of toxic constituents of waste from land disposal units. If the estimated concentration of the toxic constituent in the leachate is above regulatory thresholds established by EPA, the waste is considered hazardous under RCRA.

TCLP replaces the extraction procedure (EP) leaching test. The most notable distinction between these two is that the EP test estimates the leaching of metals only, whereas TCLP also tests the leaching of organic compounds.

Twenty-five organic chemicals will be added to the toxicity characteristic when the TCLP test becomes effective. Thirteen additional chemicals may be added to this list at a later date, and other organic chemicals are also under consideration for future inclusion under the TCLP test.

Effect of the Toxicity Characteristic Leaching Procedure. Implementing the TCLP test is expected to increase the number of wastes that fall under RCRA regulatory requirements. Facilities managing these wastes are required to obtain a permit or cease handling these hazardous wastes. Thus, implementation of the TCLP rules could increase the number of TSDR facilities with RCRA permits in addition to increasing the quantity and number of RCRA hazardous wastes managed.

12.4 BOILER AND INDUSTRIAL FURNACE REGULATIONS

Prior to 1991, burning hazardous waste as fuel was less stringently regulated than burning hazardous waste for destruction (incineration). Regulations promulgated by EPA in 1991 require boilers and industrial furnaces used to reuse hazardous waste as fuel to comply with essentially the same standards as hazardous waste incinerators. These new regulations will require operators of most boilers and industrial furnaces reusing hazardous waste as fuel to do the following:

- Meet destruction and removal efficiency standards.
- Use controls on products of incomplete combustion.
- Meet emission standards for heavy metals, hydrogen chloride, chlorine gas, and particulates.
- Obtain RCRA permits.

Effect of Boiler and Industrial Furnace Regulations. The requirement that boilers and industrial furnaces have RCRA permits will increase both the quantity of hazardous waste managed in RCRA-permitted units and the number of facilities with RCRA permits. To avoid the compliance costs of the regulations, some operators of boilers and industrial furnaces may choose to discontinue burning hazardous waste. The quantity of hazardous waste reused as fuel may therefore decline.

12.5 POLLUTION PREVENTION POLICIES

EPA has established a hierarchy of preferred waste management practices. Under this hierarchy, facilities are encouraged to use pollution prevention techniques to reduce the quantity or toxicity of the waste they generate. Pollution prevention techniques include using fewer hazardous materials in industrial processes (toxics use reduction) and reducing the quantity or toxicity of the waste those processes generate (source reduction). For those wastes that are generated, EPA encourages facilities to use environmentally sound recycling practices.

Both the federal and state governments have established programs to encourage the implementation of pollution prevention practices. HSWA includes provisions that require large quantity generators of hazardous waste to certify that the quantity and toxicity of any hazardous waste shipped offsite for waste management has been minimized to the extent economically and technically feasible. Waste minimization techniques that may be used to satisfy this requirement include pollution prevention and recycling. Other programs established to encourage pollution prevention include the following:

- EPA's Pollution Prevention Information Clearinghouse (PPIC), designed to educate facilities on pollution prevention techniques and their benefits;
- state technical assistance programs, also designed to educate facilities on pollution prevention opportunities; and
- state laws that require facilities to develop pollution prevention plans or to achieve some level of reduction in waste generation.

Effect of Pollution Prevention Policies. As facilities learn more about pollution prevention opportunities and as new pollution prevention techniques are developed, the quantity of hazardous waste generated should decline. Using pollution prevention techniques to reduce the quantity of hazardous waste generated will reduce the quantity of hazardous waste subsequently treated, stored, or disposed of. Also, increasing the recovery and reuse of hazardous waste will reduce the quantity of hazardous waste to be disposed of.

APPENDIX A

DETAILED OUTLINE OF THE GENERATOR AND TSDR SURVEYS

DETAILED OUTLINE OF THE GENERATOR SURVEY

QUESTIONNAIRE GA: GENERAL FACILITY INFORMATION

1: GENERAL FACILITY DATA
2: HAZARDOUS WASTE GENERATION
3: WASTE MINIMIZATION (Facility-wide procedures)
4: HYDROGEOLOGIC AND EXPOSURE INFORMATION
5: SOLID WASTE MANAGEMENT UNITS (SWMUS)
6: CLOSURES
7: ACCUMULATION OF HAZARDOUS WASTE IN CONTAINERS REGULATED UNDER 90-DAY RULE
8: FACILITY-WIDE SCHEMATIC (155)

QUESTIONNAIRE GB: HAZARDOUS WASTE CHARACTERIZATION

1: DESCRIPTION CODES AND GENERATION
2: MANAGEMENT
3: PHYSICAL/CHEMICAL FORM, CHEMICAL CHARACTERISTICS, AND CONSTITUENTS
4: TESTING PROCEDURES
5: HAZARDOUS WASTE MINIMIZATION

QUESTIONNAIRE GC: FUEL BLENDING

1: IN-USE FUEL BLENDING ONSITE
2: PLANNED FUEL BLENDING ONSITE

QUESTIONNAIRE GD: REUSE AS FUEL

1: GENERAL FACILITY DATA
2: SPECIFIC DATA FOR EACH IN-USE UNIT
3: TYPE AND NUMBER OF PLANNED UNITS
4: SPECIFIC DATA FOR EACH PLANNED UNIT

QUESTIONNAIRE GE: WASTEWATER TREATMENT

1: GENERAL FACILITY DATA
2: SPECIFIC DATA FOR EACH IN-USE PROCESS
3: TYPE AND NUMBER OF PLANNED PROCESSES (27)
4: SPECIFIC DATA FOR EACH PLANNED PROCESS

QUESTIONNAIRE GF: METALS RECOVERY FOR REUSE

1: GENERAL FACILITY DATA
2: SPECIFIC DATA FOR EACH IN-USE PROCESS
4: SPECIFIC DATA FOR EACH PLANNED PROCESS

QUESTIONNAIRE GG: SOLVENT AND LIQUID ORGANIC RECOVERY FOR REUSE

1: GENERAL FACILITY DATA
2: SPECIFIC DATA FOR EACH IN-USE PROCESS
3: TYPE AND NUMBER OF PLANNED PROCESSES (32)
4: SPECIFIC DATA FOR EACH PLANNED PROCESS

QUESTIONNAIRE GH: OTHER RECOVERY PROCESSES

1: GENERAL FACILITY DATA
2: SPECIFIC DATA FOR EACH IN-USE PROCESS
3: TYPE AND NUMBER OF PLANNED PROCESSES

QUESTIONNAIRE GI: TANK SYSTEMS

1: GENERAL FACILITY DATA
2: TANKS REGULATED BY THE 90-DAY RULE
3: PIPING CONNECTED TO HAZARDOUS WASTE TANKS
4: TANK DESCRIPTIONS FOR EACH IN-USE TANK
5: TANK DESCRIPTIONS FOR EACH PLANNED TANK

DETAILED OUTLINE OF THE TSDR SURVEY

QUESTIONNAIRE A: GENERAL FACILITY INFORMATION

1. GENERAL FACILITY INFORMATION
2. WASTES MANAGED BY PERMIT STATUS
3. HAZARDOUS WASTES GENERATION ONSITE
4. WASTES RECEIVED FROM OFFSITE
5. MANAGEMENT OF CERTAIN SPECIAL TYPES OF WASTES
6. CONTAINER STORAGE AND ACCUMULATION OF HAZARDOUS WASTES
7. FACILITY SCHEMATIC

QUESTIONNAIRE B: INCINERATION

1. GENERAL FACILITY DATA
2. SPECIFIC DATA FOR EACH IN-USE INCINERATOR
3. TYPE AND NUMBER OF PLANNED INCINERATORS
4. SPECIFIC DATA FOR EACH PLANNED INCINERATOR

QUESTIONNAIRE C: REUSE AS FUEL

1. GENERAL FACILITY DATA
2. SPECIFIC DATA FOR EACH IN-USE UNIT
3. TYPE AND NUMBER OF PLANNED UNITS
4. SPECIFIC DATA FOR EACH PLANNED UNIT

QUESTIONNAIRE D: FUEL BLENDING

1. IN-USE FUEL BLENDING ONSITE
2. PLANNED FUEL BLENDING ONSITE

QUESTIONNAIRE E: SOLIDIFICATION/STABILIZATION

1. GENERAL FACILITY DATA
2. SPECIFIC DATA FOR EACH IN-USE PROCESS
3. TYPE AND NUMBER OF PLANNED SOLIDIFICATION PROCESSES
4. SPECIFIC DATA FOR EACH PLANNED PROCESS

QUESTIONNAIRE F: SOLVENT AND LIQUID ORGANIC RECOVERY FOR REUSE

1. GENERAL FACILITY DATA
2. SPECIFIC DATA FOR EACH IN-USE PROCESS
3. TYPE AND NUMBER OF PLANNED PROCESSES
4. SPECIFIC DATA FOR EACH PLANNED PROCESS

QUESTIONNAIRE G: METALS RECOVERY FOR REUSE

1. GENERAL FACILITY DATA
2. SPECIFIC DATA FOR EACH IN-USE PROCESS
3. TYPE AND NUMBER OF PLANNED PROCESSES
4. SPECIFIC DATA FOR EACH PLANNED PROCESS

QUESTIONNAIRE H: WASTEWATER TREATMENT

1. GENERAL FACILITY DATA
2. SPECIFIC DATA FOR EACH IN-USE PROCESS
3. TYPE AND NUMBER OF PLANNED PROCESSES
4. SPECIFIC DATA FOR EACH PLANNED PROCESS

QUESTIONNAIRE I: OTHER PROCESSES (TREATMENT OR RECOVERY)

1. GENERAL FACILITY DATA
2. SPECIFIC DATA FOR EACH IN-USE PROCESS
3. TYPE AND NUMBER OF PLANNED PROCESSES
4. SPECIFIC DATA FOR EACH PLANNED PROCESS

QUESTIONNAIRE J: WASTE PILES

1. GENERAL FACILITY DATA
2. SPECIFIC DATA FOR EACH IN-USE WASTE PILE
3. HAZARDOUS WASTE TREATED IN WASTE PILES ONSITE
4. HAZARDOUS WASTE STORED ONLY IN WASTE PILES ONSITE
5. PLANNED WASTE PILES TO STORE OR TREAT HAZARDOUS

QUESTIONNAIRE K: SURFACE IMPOUNDMENTS

1. GENERAL FACILITY DATA
2. SPECIFIC DATA FOR EACH IN-USE IMPOUNDMENT
3. HAZARDOUS WASTE TREATED IN SURFACE IMPOUNDMENTS ONSITE
4. HAZARDOUS WASTE DISPOSED OF IN SURFACE IMPOUNDMENTS ONSITE
5. HAZARDOUS WASTE STORED ONLY IN SURFACE IMPOUNDMENTS ONSITE
6. PLANNED SURFACE IMPOUNDMENTS TO STORE, TREAT, OR DISPOSE OF HAZARDOUS WASTE ONSITE

QUESTIONNAIRE L: LANDFILLS

1. GENERAL FACILITY DATA
2. SPECIFIC DATA FOR EACH IN-USE LANDFILL
3. HAZARDOUS WASTE DISPOSED OF IN LANDFILLS ONSITE
4. PLANNED LANDFILLS TO DISPOSE OF HAZARDOUS WASTE ONSITE

QUESTIONNAIRE M: LAND TREATMENT

1. GENERAL FACILITY DATA
2. SPECIFIC DATA FOR EACH IN-USE LAND TREATMENT AREA
3. HAZARDOUS WASTE DISPOSED OF IN LAND TREATMENT AREAS ONSITE
4. PLANNED LAND TREATMENT AREAS TO DISPOSE OF HAZARDOUS WASTE ONSITE

QUESTIONNAIRE N: UNDERGROUND INJECTION WELLS

1. GENERAL FACILITY DATA
2. SPECIFIC DATA FOR EACH IN-USE UNDERGROUND INJECTION WELL
3. HAZARDOUS WASTE DISPOSED OF IN UNDERGROUND INJECTION WELLS ONSITE
4. PLANNED UNDERGROUND INJECTION WELLS TO DISPOSE OF HAZARDOUS WASTE ONSITE

QUESTIONNAIRE O: TANK SYSTEMS

1. GENERAL FACILITY DATA
2. TANKS REGULATED BY THE 90-DAY RULE
3. STORAGE OR ACCUMULATION IN RCRA PERMITTED OR INTERIM STATUS TANKS
4. PIPING CONNECTED TO HAZARDOUS WASTE TANKS
5. TANK DESCRIPTIONS FOR EACH IN-USE TANK
6. TANK DESCRIPTIONS FOR EACH PLANNED TANK

APPENDIX B

DEFINITIONS OF WASTE CODES

The following list of codes is provided to assist you in completing the questions which ask about the types of hazardous waste generated and managed onsite at your facility. This list of codes has two parts:

- A list of **X waste codes** which was developed specifically for this survey to describe (1) Waste that is considered hazardous by some state or federal regulations, but not now considered hazardous by RCRA regulations and (2) Hazardous waste residuals from onsite hazardous waste management operations.
- A list of codes for the waste considered hazardous by federal RCRA regulations—**RCRA D, F, K, P, and U waste codes.**

If you generated or managed a type of waste that is considered hazardous by regulations in your state and a waste code is not provided or if you have any questions about this list of waste codes, please call the Survey Helpline (1-800-635-8850).

X WASTE CODES

This list of X waste codes was developed specifically for this survey. **These X codes are not official RCRA waste codes and should be used ONLY for this survey.**

Code	Waste description
	Waste That Is Considered Hazardous by Some State and Federal Regulations, But Not by RCRA Regulations
XPB1	Waste which has a concentration of polychlorinated biphenyls less than 50 parts per million
XPB2	Waste which has a concentration of polychlorinated biphenyls greater than or equal to 50 parts per million but less than 500 parts per million
XPB3	Waste which has a concentration of polychlorinated biphenyls greater than or equal to 500 parts per million
XASB	Waste containing asbestos
XOIL	Waste oil
XDXN	Waste containing dioxins/furans *(See Note 1)*
	Hazardous Waste Residuals from Onsite Hazardous Waste Management Operations *(See Note 2)*
XLEA	Leachate from hazardous waste landfills
XASH	Hazardous incinerator, boiler, or furnace ash
XSCR	Hazardous incinerator, boiler, or furnace scrubber water
XWWS	Hazardous wastewater treatment sludge *(See Note 3)*
XWWL	Hazardous wastewater treatment liquid *(See Note 3)*

NOTES:

1. Do not use XDXN to denote dioxin-containing wastes described by RCRA waste codes.
2. These waste codes were developed to describe hazardous waste residuals that result from the onsite management of many individual RCRA coded wastes which are no longer individually identifiable.
3. Do not use XWWS or XWWL to denote hazardous wastewater treatment sludges or liquids that contain wastes described by RCRA waste codes beginning with the letter F or K. Instead, list F or K waste codes separately and use XWWS and/or XWWL to denote all other constituents.

RCRA WASTE CODES

Code	Waste description
Characteristic Hazardous Waste *(A description of the characteristic hazardous wastes can be found at 40 CFR 26* *261.24, July 1, 1986. Listed in the box below is the maximum concentration of contaminants for the characteristic of EP toxic*	
D001	Ignitable waste
D002	Corrosive waste
D003	Reactive waste
D004	Arsenic
D005	Barium
D006	Cadmium
D007	Chromium
D008	Lead
D009	Mercury
D010	Selenium
D011	Silver
D012	Endrin(1,2,3,4,10,10-hexachloro-1,7-epoxy-1,4,4a,5,6,7,8,8a-octahydro-1,4-endo, endo-5,8-dimethano-naphthalene)
D013	Lindane (1,2,3,4,5,6-hexa-chlorocyclohexane,γ isomer)
D014	Methoxychlor (1,1,1-trichloro-2,2-bis [p-methoxyphenyl]ethane)
D015	Toxaphene ($C_{10}H_{10}Cl_8$,technical chlorinated camphene,67-69% chlorine)
D016	2,4-D (2,4-dichlorophenoxyacetic acid)
D017	2,4,5-TP Silvex (2,4,5-trichlorophenoxypropionic acid)

MAXIMUM CONCENTRATION OF CONTAMINANTS FOR CHARACTERISTIC OF EP TOXICI

A solid waste exhibits the characteristic of EP toxicity if, using EP toxicity test methods, the extract from a representative sam the waste contains any of the contaminants listed below at a concentration equal to or greater than the value given.

RCRA Waste Code	Contaminant	Maxir concent (milligr per lit
D004	Arsenic	5.(
D005	Barium	100.(
D006	Cadmium	1.(
D007	Chromium	5.(
D008	Lead	5.(
D009	Mercury	0.2
D010	Selenium	1.(
D011	Silver	5.(
D012	Endrin(1,2,3,4,10,10-hexachloro-1,7-epoxy-1,4,4a,5,6,7,8,8a-octahydro-1,4-endo, endo-5,8-dimethano-naphthalene)	0.(
D013	Lindane (1,2,3,4,5,6-hexa-chlorocyclohexane,γ isomer)	0.4
D014	Methoxychlor (1,1,1-trichloro-2,2-bis [p-methoxyphenyl]ethane)	10.(
D015	Toxaphene ($C_{10}H_{10}Cl_8$,technical chlorinated camphene,67-69% chlorine)	0.5
D016	2,4-D (2,4-dichlorophenoxyacetic acid)	10.(
D017	2,4,5-TP Silvex (2,4,5-trichlorophenoxypropionic acid)	1.(

Code	Waste description
	Hazardous Waste from Nonspecific Sources
F001	The following spent halogenated solvents used in degreasing: tetrachloroethylene, trichlorethylene, methylene chloride, 1,1,1-trichloroethane, carbon tetrachloride and chlorinated fluorocarbons and all spent solvent mixtures/blends used in degreasing containing, before use, a total of 10 percent or more (by volume) of one or more of the above halogenated solvents or those solvents listed in F002, F004, and F005; and still bottoms from the recovery of these spent solvents and spent solvent mixtures
F002	The following spent halogenated solvents: tetrachloroethylene, methylene chloride, trichloroethylene, 1,1,1-trichloroethane, chlorobenzene, 1,1,2-trichloro-1,2,2-trifluoroethane, ortho-dichlorobenzene, trichlorofluoromethane, and 1,1,2, trichloroethane, ortho-dichlorobenzene, and trichlorofluoromethane; all spent solvent mixtures/blends containing, before use, a total of 10 percent or more (by volume) of one or more of the above halogenated solvents or those solvents listed in F001, F004, and F005; and still bottoms from the recovery of these spent solvents and spent solvent mixtures
F003	The following spent nonhalogenated solvents: xylene, acetone, ethyl acetate, ethyl benzene, ethyl ether, methyl isobutyl ketone, n-butyl alcohol, cyclohexanone, and methanol; all spent solvent mixtures/blends containing, before use, only the above spent nonhalogenated solvents; and all spent solvent mixtures/blends containing, before use, one or more of the above nonhalogenated solvents, and a total of 10 percent or more (by volume) of one or more of those solvents listed in F001, F002, F004, and F005; and still bottoms from the recovery of these spent solvents and spent solvent mixtures
F004	The following spent nonhalogenated solvents: cresols and cresylic acid, and nitrobenzene; and the still bottoms from the recovery of these solvents; all spent solvent mixtures/blends containing before use a total of 10% or more (by volume) of one or more of the above nonhalogenated solvents or those solvents listed in F001, F002, and F005; and still bottoms from the recovery of these spent solvents and spent solvent mixtures
F005	The following spent nonhalogenated solvents: toluene, methyl ethyl ketone, carbon disulfide, isobutanol, pyridine, benzene, 2-ethoxyethanol, and 2-nitropropane; all spent solvent mixtures/blends containing, before use, a total of 1(percent or more (by volume) of one or more of the above nonhalogenated solvents or those solvents listed in F001, F002, or F004; and still bottoms from the recovery of these spent solvents and spent solvent mixtures
F006	Wastewater treatment sludges from certain electroplating operations except from the following processes: (1) Sulfu acid anodizing of aluminum; (2) tin plating on carbon steel; (3) zinc plating (segregated basis) on carbon steel; (4) al minum or zinc-aluminum plating on carbon steel; (5) cleaning/stripping associated with tin, zinc, and aluminum plating on carbon steel; and (6) chemical etching and milling of aluminum
F007	Spent cyanide plating bath solutions from electroplating operations
F008	Residues from electroplating operations where cyanides are used in the process
F009	Spent stripping and cleaning bath solutions from electroplating operations where cyanides are used in the process
F010	Quenching bath residues and sludges from oil baths from metal heat treating operations where cyanides are used i the process
F011	Spent cyanide solutions from salt bath pot cleaning from metal heat treating operations (except for precious metals heat treating spent cyanide solutions from salt bath pot cleaning)
F012	Quenching wastewater treatment sludges from metal heat treating operations where cyanides are used in the process (except for precious metals heat treating quenching wastewater treatment sludges)
F019	Wastes from the chemical conversion coating of aluminum
F020	Wastes (except wastewater and spent carbon from hydrogen chloride purification) from the production or manufacti ing use (as a reactant, chemical intermediate, or component in a formulating process) of tri- or tetrachlorophenol or intermediates used to produce their pesticide derivatives. (This listing does not include wastes from the production hexachlorophene from highly purified 2,4,5-trichlorophenol.)
F021	Wastes (except wastewater and spent carbon from hydrogen chloride purification) from the production or manufacti ing use (as a reactant, chemical intermediate, or component in a formulating process) of pentachlorophenol, or of ir termediates used to produce derivatives
F022	Wastes (except wastewater and spent carbon from hydrogen chloride purification) from the manufacturing use (as reactant, chemical intermediate, or component in a formulating process) of tetra-, penta- or hexachlorobenzenes ur der alkaline conditions
F023	Wastes (except wastewater and spent carbon from hydrogen chloride purification) from the production of materials equipment previously used for the production or manufacturing use (as a reactant, chemical intermediate, or compo nent in a formulating process) of tri- and tetrachlorophenols. (This listing does not include wastes from equipment used only for the production or use of hexachlorophene from highly purified 2,4,5-trichlorophenol.)

(conti

Code	Waste description
F024	Wastes, including but not limited to, distillation residues, heavy ends, tars, and reactor clean-out wastes from the production of chlorinated aliphatic hydrocarbons, having a carbon content from one to five, utilizing free radical catalyzed processes. (This listing does not include light ends, spent filters and filter aids, spent dessicants, wastewater, wastewater treatment sludges, spent catalysts, and wastes listed in § 261.32.)
F026	Wastes (except wastewater and spent carbon from hydrogen chloride purification) from the production of materials equipment previously used for the manufacturing use (as a reactant, chemical intermediate, or component in a formulating process) of tetra-, penta-, or hexachlorobenzene under alkaline conditions.
F027	Discarded unused formulations containing tri-, tetra-, or pentachlorophenol or discarded unused formulations containing compounds derived from these chlorophenols. (This listing does not include formulations containing hexachlorophene synthesized from prepurified 2,4,5-trichlorophenol as the sole component.)
F027	2,4,6-Trichlorophenol
F027	2,3,4,6-Tetrachlorophenol
F027	Pentachlorophenol
F027	Phenol,2,4,5-trichloro
F027	2,4,5-T
F027	Phenol,pentachloro
F027	Silvex
F027	Phenol,2,3,4,5-tetrachloro
F027	Phenol,2,4,6-trichloro
F027	Propionic acid, 2-(2,4,5-trichlorophenoxy)
F027	2,4,5-Trichlorophenol
F027	2,4,5-Trichlorophenoxyacetic acid
F028	Residues resulting from the incineration or thermal treatment of soil contaminated with EPA hazardous waste nos. F020, F021, F022, F023, F026, and F027
Hazardous Waste from Specific Sources	
K001	Bottom sediment sludge from the treatment of wastewater from wood preserving processes that use creosote and/c pentachlorophenol
K002	Wastewater treatment sludge from the production of chrome yellow and orange pigments
K003	Wastewater treatment sludge from the production of molybdate orange pigments
K004	Wastewater treatment sludge from the production of zinc yellow pigments
K005	Wastewater treatment sludge from the production of chrome green pigments
K006	Wastewater treatment sludge from the production of chrome oxide green pigments (anhydrous and hydrated)
K007	Wastewater treatment sludge from the production of iron blue pigments
K008	Oven residue from the production of chrome oxide green pigments
K009	Distillation bottoms from the production of acetaldehyde from ethylene
K010	Distillation side cuts from the production of acetaldehyde from ethylene
K011	Bottom stream from the wastewater stripper in the production of acrylonitrile
K013	Bottom stream from the acetonitrile column in the production of acrylonitrile
K014	Bottoms from the acetonitrile purification column in the production of acrylonitrile
K015	Still bottoms from the distillation of benzyl chloride
K016	Heavy ends or distillation residues from the production of carbon tetrachloride
K017	Heavy ends (still bottoms) from the purification column in the production of epichlorohydrin
K018	Heavy ends from the fractionation column in ethyl chloride production

(cont.

Code	Waste description
Hazardous Waste from Specific Sources	
K019	Heavy ends from the distillation of ethylene dichloride in ethylene dichloride production
K020	Heavy ends from the distillation of vinyl chloride in vinyl chloride monomer production
K021	Aqueous spent antimony catalyst waste from fluoromethanes production
K022	Distillation bottom tars from the production of phenol/acetone from cumene
K023	Distillation light ends from the production of phthalic anhydride from naphthalene
K024	Distillation bottoms from the production of phthalic anhydride from naphthalene
K025	Distillation bottoms from the production of nitrobenzene by the nitration of benzene
K026	Stripping still tails from the production of methyl ethyl pyridines
K027	Centrifuge and distillation residues from toluene diisocyanate production
K028	Spent catalyst from the hydrochlorinator reactor in the production of 1,1,1-trichloroethane
K029	Waste from the product steam stripper in the production of 1,1,1-trichloroethane
K030	Column bottoms or heavy ends from the combined production of trichloroethylene and perchloroethylene
K031	By-product salts generated in the production of MSMA and cacodylic acid
K032	Wastewater treatment sludge from the production of chlordane
K033	Wastewater and scrub water from the chlorination of cyclopentadiene in the production of chlordane
K034	Filter solids from the filtration of hexachlorocyclopentadiene in the production of chlordane
K035	Wastewater treatment sludges generated in the production of creosote
K036	Still bottoms from toluene reclamation distillation in the production of disulfoton
K037	Wastewater treatment sludges from the production of disulfoton
K038	Wastewater from the washing and stripping of phorate production
K039	Filter cake from the filtration of diethylphosphorodithioic acid in the production of phorate.
K040	Wastewater treatment sludge from the production of phorate
K041	Wastewater treatment sludge from the production of toxaphene
K042	Heavy ends or distillation residues from the distillation of tetrachlorobenzene in the production of 2,4,5-T
K043	2,6-Dichlorophenol waste from the production of 2,4-D
K044	Wastewater treatment sludges from the manufacturing and processing of explosives
K045	Spent carbon from the treatment of wastewater containing explosives
K046	Wastewater treatment sludges from the manufacturing, formulation, and loading of lead-based initiating compounds
K047	Pink/red water from TNT operations
K048	Dissolved air flotation (DAF) float from the petroleum refining industry
K049	Slop oil emulsion solids from the petroleum refining industry
K050	Heat exchanger bundle cleaning sludge from the petroleum refining industry
K051	API separator sludge from the petroleum refining industry
K052	Tank bottoms (leaded) from the petroleum refining industry
K060	Ammonia still lime sludge from coking operations
K061	Emission control dust/sludge from the primary production of steel in electric furnaces.
K062	Spent pickle liquor from steel finishing operations of plants that produce iron or steel
K069	Emission control dust/sludge from secondary lead smelting
K071	Brine purification muds from the mercury cell process in chlorine production, where separately prepurified brine is not used
K073	Chlorinated hydrocarbon waste from the purification step of the diaphragm cell process using graphite anodes in chlorine production
K083	Distillation bottoms from aniline production
K084	Wastewater treatment sludges generated during the production of veterinary pharmaceuticals from arsenic or organo-arsenic compounds

(continued)

Code	Waste description
K085	Distillation or fractionation column bottoms from the production of chlorobenzenes
K086	Solvent washes and sludges, caustic washes and sludges, or water washes and sludges from cleaning tubs and equipment used in the formulation of ink from pigments, driers, soaps, and stabilizers containing chromium and le
K087	Decanter tank tar sludge from coking operations
K093	Distillation light ends from the production of phthalic anhydride from ortho-xylene
K094	Distillation bottoms from the production of phthalic anhydride from ortho-xylene
K095	Distillation bottoms from the production of 1,1,1-trichloroethane
K096	Heavy ends from the heavy ends column from the production of 1,1,1-trichloroethane
K097	Vacuum stripper discharge from the chlordane chlorinator in the production of chlordane
K098	Untreated process wastewater from the production of toxaphene
K099	Untreated wastewater from the production of 2,4-D
K100	Waste leaching solution from acid leaching of emission control dust/sludge from secondary lead smelting
K101	Distillation tar residues from the distillation of aniline-based compounds in the production of veterinary pharmaceuticals from arsenic or organo-arsenic compounds
K102	Residue from the use of activated carbon for decolorization in the production of veterinary pharmaceuticals from arsenic or organo-arsenic compounds
K103	Process residues from aniline extraction from the production of aniline
K104	Combined wastewater streams generated from nitrobenzene/aniline production
K105	Separated aqueous stream from the reactor product washing step in the production of chlorobenzenes
K106	Wastewater treatment sludge from the mercury cell process in chlorine production
K111	Product washwaters from the production of dinitrotoluene via nitration of toluene
K112	Reaction byproduct water from the drying column in the production of toluenediamine via hydrogenation of dinitrotoluene
K113	Condensed liquid light ends from purification of toluenediamine in production of toluenediamine via hydrogenation dinitrotoluene.
K114	Vicinals from the purification of toluenediamine in production of toluenediamine via hydrogenation of dinitrotoluene
K115	Heavy ends from purification of toluenediamine in the production of toluenediamine via hydrogenation of dinitrotoluene
K116	Organic condensate from the solvent recovery column in the production of toluene diisocyanate via phosgenation o toluenediamine
K117	Wastewater from the reactor vent gas scrubber in the production of ethylene dibromide via bromination of ethene
K118	Spent adsorbent solids from purification of ethylene dibromide in the production of ethylene dibromide via bromination of ethene.
K136	Still bottoms from the purification of ethylene dibromide in the production of ethylene dibromide via bromination of ethene1

Discarded Commercial Chemical Products, Off-Specification Species, Container Residuals, and Spill Residues Thereof—Acute Hazardous Waste *(An alphabetized listing can be found at 40 CFR 261.33, July 1, 1986.)*

P001	Warfarin, when present at concentrations greater than or equal to 0.3%
P001	3-(α-Acetonyl-benzyl)-4-hydroxycoumarin and salts, when present at concentrations greater than 0.3%
P002	Acetamide, N-(aminothioxomethyl)
P002	1-Acetyl-2-thiourea
P003	2-Propenal
P003	Acrolein
P004	1,2,3,4,10,10-Hexachloro-1,4,4a,5,8,8a-hexahydro-1,4:5,8-endo,exo-dimethanonaphthalene
P004	Aldrin

(cont

Code	Waste description
P005	2-Propen-1-ol
P005	Allyl alcohol
P006	Aluminum phosphide (r,t)
P007	3(2H)-Isoxazolone,5-(aminomethyl)-
P007	5-(Aminomethyl)-3-isoxazolol
P008	4-α-Aminopyridine
P008	4-Pyridinamine
P008	4-Aminopyridine
P009	Phenol,2,4,6-trinitro-,ammonium salt (r)
P009	Ammonium picrate (r)
P010	Arsenic acid (t)
P011	Arsenic pentoxide (t)
P011	Arsenic (V) oxide (t)
P012	Arsenic (III) oxide (t)
P012	Arsenic trioxide (t)
P013	Barium cyanide
P014	Thiophenol
P014	Benzenethiol
P015	Beryllium dust (t)
P016	Methane,oxybis(chloro-
P016	Bis(chloromethyl) ether
P017	2-Propanone,1-bromo- (t)
P017	Bromoacetone (t)
P018	Strychnidin-10-one,2,3-dimethoxy-
P018	Brucine
P020	Dinoseb
P020	Phenol,2,4-dinitro-6-(1-methylpropyl)-
P021	Calcium cyanide
P022	Carbon bisulfide (t)
P022	Carbon disulfide (t)
P023	Acetaldehyde, chloro-
P023	Chloroacetaldehyde
P024	Benzenamine, 4-chloro-
P024	p-Chloroaniline
P026	Thiourea, (2-chlorophenyl)-
P026	1-(o-Chlorophenyl)thiourea
P027	Propanenitrile,3-chloro-
P027	3-Chloropropionitrile
P028	Benzene, (chloromethyl)-
P028	Benzyl chloride
P029	Copper cyanides
P030	Cyanides (soluble cyanide salts), not elsewhere specified (t)
P031	Cyanogen
P033	Cyanogen chloride
P033	Chlorine cyanide

(continued

Code	Waste description
P034	4,6-Dinitro-o-cyclohexylphenol (t)
P034	Phenol,2-cyclohexyl-4,6-dinitro- (t)
P036	Dichlorophenylarsine
P036	Phenyl dichloroarsine
P037	Dieldrin
P037	1,2,3,4,10,10-Hexachloro-6,7-expoxy-1,4,4a,5,6,7,8,8a-octahydro-endo,exo-1,4:5,8-dimethanonaphthalene
P038	Diethylarsine (t)
P038	Arsine, diethyl- (t)
P039	0,0-Diethyl S-[2-(ethylthio)ethyl] phosphorodithioate (t)
P039	Disulfoton (t)
P040	0,0-Diethyl 0-pyrazinyl phosphorothioate
P040	Phosphorothioic acid, 0,0-diethyl 0- pyrazinyl ester
P041	Diethyl-p-nitrophenyl phosphate
P041	Phosphoric acid, diethyl p-nitrophenyl ester
P042	Epinephrine
P042	1,2-Benzenediol, 4-[1-hydroxy-2-(methylamino)ethyl]-
P043	Diisopropyl fluorophosphate
P043	Fluoridic acid, bis(1-methylethyl) ester
P043	Phosphorofluoridic acid, bis(1-methylethyl) ester
P044	Dimethoate (t)
P044	Phosphorodithioic acid, 0,0-dimethyl S-[2-(methylamino)-2-oxoethyl]ester (t)
P045	3,3-Dimethyl-1-(methylthio)-2-butanone, 0-[(methylamino)carbonyl]oxime
P045	Thiofanox
P046	α,α-Dimethylphenethylamine (t)
P046	Ethanamine,1,1-dimethyl-2-phenyl- (t)
P047	4,6-Dinitro-o-cresol and salts
P047	Phenol, 2-methyl-4,6-dinitro- and salts
P047	Phenol,2'4-dinitro-6-methyl-, and salts
P048	2,4-Dinitrophenol
P048	Phenol,2,4-dinitro-
P049	2,4-Dithiobiuret
P049	Thioimidodicarbonic diamide
P050	Endosulfan
P050	5-Norbornene-2,3-dimethanol,1,4,5,6,7,7-hexachloro,cyclic sulfite
P051	1,2,3,4,10,10-Hexachloro-6,7-expoxy-1,4,4a,5,6,7,8,8a-oxtahydro-endo,endo-1,4:5,8-dimethanonaphthalene
P051	Endrin
P054	Ethylenimine
P054	Aziridine
P056	Fluorine
P057	Fluoroacetamide
P057	Acetamide,2-fluor-
P058	Fluoroacetic acid, sodium salt
P058	Acetic acid, fluoro-, sodium salt
P059	Heptachlor
P059	4,7-Methano-1H-Indene,1,4,5,6,7,8,8-heptachloro-3a,4,7,7a-tetrahydro-

(cc

Code	Waste description
P060	Hexachlorohexahydro-endo,endo-dimethanonapthalene
P060	1,2,3,4,10,10-Hexachloro-1,4,4a,5,8,8a-hexahydro-1,4:5,8-endo, endo-dimethanonaphthalene
P062	Hexaethyl tetraphosphate
P062	Tetraphosphoric acid, hexaethyl ester
P063	Hydrocyanic acid
P063	Hydrogen cyanide
P064	Methyl isocyanate
P064	Isocyanic acid, methyl ester
P065	Fulminic acid, mercury(II) salt (r,t)
P065	Mercury fulminate (r,t)
P066	Methomyl
P066	Acetimidic acid, N-[(methylcarbamoyl)oxy]thio-, methyl ester
P067	2-Methylaziridine
P067	1,2-Propylenimine
P068	Hydrazine,methyl-
P068	Methyl hydrazine
P069	2-Methyllactonitrile
P069	Propanenitrile,2-hydroxy-2-methyl-
P070	Propanal, 2-methyl-2-(methylthio)-, O[(methylamino)carbonyl]oxime
P070	Aldicarb
P071	O,O-Dimethyl O-p-nitrophenyl phosphorothioate
P071	Methyl parathion
P072	α-Naphthylthiourea
P072	Thiourea, 1-naphthalenyl-
P073	Nickel tetracarbonyl
P073	Nickel carbonyl
P074	Nickel(II)cyanide
P074	Nickel cyanide
P075	Nicotine and salts (t)
P075	Pyridine, (S)-3-(1-methyl-2-pyrrolidinyl)-, and salts
P076	Nitrogen (II) oxide (t)
P076	Nitric oxide (t)
P077	p-Nitroaniline (t)
P077	Benzenamine, 4-nitro-
P078	Nitrogen (IV) oxide
P078	Nitrogen dioxide
P081	Nitroglycerine (r,t)
P081	1,2,3-Propanetriol,trinitrate-(r)
P082	Dimethylnitrosamine
P082	N-Nitrosodimethylamine
P084	Ethenamine,N-methyl-N-nitroso-
P084	N-Nitrosomethylvinylamine
P085	Diphosphoramide,octamethyl-
P085	Octamethylpyrophosphoramide

(continue

Code	Waste description
P087	Osmium tetroxide
P087	Osmium oxide
P088	Endothall
P088	7-Oxabicyclo[2.2.1]heptane-2,3-dicarboxylic acid
P089	Parathion (t)
P089	Phosphorothioic acid,0,0-diethyl 0-(p-nitrophenyl) ester (t)
P092	Mercury,(acetato-0)phenyl-
P092	Phenylmercuric acetate
P093	N-Phenylthiourea
P093	Thiourea, phenyl-
P094	Phosphorothioic acid, 0,0-diethyl S-(ethylthio)methyl ester (t)
P094	Phorate (t)
P095	Phosgene (t)
P095	Carbonyl chloride
P096	Hydrogen phosphide
P096	Phosphine
P097	Famphur
P097	Phosphorothioic acid, 0,0-dimethyl 0-[p-((dimethylamino)-sulfonyl)phenyl]ester
P098	Potassium cyanide
P099	Potassium silver cyanide
P101	Ethyl cyanide
P101	Propanenitrile
P102	Propargyl alcohol
P102	2-Propyn-1-ol
P103	Selenourea
P103	Carbamimidoselenoic acid
P104	Silver cyanide
P105	Sodium azide
P106	Sodium cyanide
P107	Strontium sulfide (t)
P108	Strychnidin-10-one, and salts (t)
P108	Strychnine and salts (t)
P109	Dithiopyrophosphoric acid, tetraethyl ester
P109	Tetraethyldithiopyrophosphate
P110	Plumbane,tetraethyl-
P110	Tetraethyl lead
P111	Tetraethylpyrophosphate
P111	Pyrophosphoric acid, tetraethyl ester
P112	Methane,tetranitro- (r)
P112	Tetranitromethane (r)
P113	Thallium(III) oxide
P113	Thallic oxide
P114	Thallium(I) selenide
P115	Sulfuric acid, thallium(I) salt
P115	Thallium(I)sulfate

Code	Waste description
P116	Hydrazinecarbothioamide
P116	Thiosemicarbazide
P118	Methanethiol,trichloro-
P118	Trichloromethanethiol
P119	Vanadic acid, ammonium salt
P119	Ammonium vanadate
P120	Vanadium pentoxide
P120	Vanadium(V) oxide
P121	Zinc cyanide
P122	Zinc phosphide (r,t)
P122	Zinc phosphide, when present at concentrations greater than 10%
P123	Toxaphene
P123	Camphene, octachloro-

Discarded Commercial Chemical Products, Off-Specification Species, Container Residues, and Spill Residues Thereof—Toxic Waste *(An alphabetized listing can be found at 40 CFR 261.33, July 1, 1986.)*

U001	Ethanal (i)
U001	Acetaldehyde (i)
U002	2-Propanone (i)
U002	Acetone (i)
U003	Ethanenitrile (i,t)
U003	Acetonitrile (i,t)
U004	Ethanone,1-phenyl-
U004	Acetophenone
U005	2-Acetylaminofluorene
U005	Acetamide, N-9H-fluoren-2-yl-
U006	Ethanoyl chloride (c,r,t)
U006	Acetyl chloride (c,r,t)
U007	2-Propenamide
U007	Acrylamide
U008	2-Propenoic acid (i)
U008	Acrylic acid (i)
U009	2-Propenenitrile
U009	Acrylonitrile
U010	Mitomycin C
U010	Azirino(2'3':3,4)pyrrolo(1,2-a)indole-4,7-dione, 6-amino-8-[((aminocarbonyl) oxy)methyl]-1,1a,2,8,8a,8b-hexahydro-8a-methoxy-5-methyl-,
U011	1H-1,2,4-Triazol-3-amine
U011	Amitrole
U012	Benzenamine (i,t)
U012	Aniline (i,t)
U014	Auramine
U014	Benzenamine, 4,4'-carbonimidoylbis(N,N-dimethyl-

(continue

Code	Waste description
U015	L-Serine, diazoacetate (ester)
U015	Azaserine
U016	Benz[c]acridine
U016	3,4-Benzacridine
U017	Benzal chloride
U017	Benezene, (dichloromethyl)-
U018	Benz[a]anthracene
U018	1,2-Benzanthracene
U019	Benzene (i,t)
U020	Benzenesulfonyl chloride (c,r)
U020	Benzenesulfonic acid chloride (c,r)
U021	Benzidine
U021	(1,1'-Biphenyl)-4,4'-diamine
U022	Benzo[a]pyrene
U022	3,4-Benzopyrene
U023	Benzotrichloride (c,r,t)
U023	Benzene, (trichloromethyl)-(c,r,t)
U024	Bis(2-chloroethoxy) methane
U024	Ethane,1,1'-[methylenebis(oxy)]bis[2-chloro-
U025	Dichloroethyl ether
U025	Ethane,1,1'-oxybis[2-chloro-
U026	2-Naphthylamine,N,N-bis(2-chloromethyl)-
U026	Chlornaphazine
U027	Propane,2,2'-oxybis[2-chloro-
U027	Bis(2-chloroisopropyl) ether
U028	Bis(2-ethylhexyl) phthalate
U028	1,2-Benzenedicarboxylic acid, [bis(2-ethylhexyl)]ester
U029	Methane, bromo-
U029	Methyl bromide
U030	4-Bromophenyl phenyl ether
U030	Benzene, 1-bromo-4-phenoxy-
U031	1-Butanol (i)
U031	N-Butyl alchohol (i)
U032	Calcium chromate
U032	Chromic acid, calcium salt
U033	Carbonyl fluoride (r,t)
U033	Carbon oxyfluoride (r,t)
U034	Chloral
U034	Acetaldehyde, trichloro-
U035	Butanoic acid, 4-[bis(2-chloroethyl)amino]benzene-
U035	Chlorambucil
U036	4,7-Methanoindan, 1,2,4,5,6,7,8,8-octa-chloro-3a,4,7,7a-tetrahydro-
U036	Chlordane, technical
U037	Chlorobenzene
U037	Benzene, chloro-

(cont.

Code	Waste description
U038	Ethyl 4,4'-dichlorobenzilate
U038	Benzeneacetic acid, 4-chloro-α-(4-chloro-phenyl)-α-hydroxy, ethyl ester
U039	Phenol,4-chloro-3-methyl-
U039	4-Chloro-m-cresol
U041	Oxirane,2-(chloromethyl)-
U041	1-Chloro-2,3-expoxypropane
U042	Ethene,2-chloroethoxy-
U042	2-Chloroethyl vinyl ether
U043	Ethene,chloro
U043	Vinyl chloride
U044	Methane, trichloro-
U044	Chloroform
U045	Methane, chloro-(i,t)
U045	Methyl chloride (i,t)
U046	Methane, chloromethoxy-
U046	Chloromethyl methyl ether
U047	Naphthalene, 2-chloro-
U047	β-Chloronaphthalene
U048	Phenol,2-chloro-
U048	o-Chlorophenol
U049	4-Chloro-o-toluidine,hydrochloride
U049	Benzenamine, 4-chloro-2-methyl-
U050	1,2-Benzphenanthrene
U050	Chrysene
U051	Creosote
U052	Cresylic acid
U052	Cresols
U053	2-Butenal
U053	Crotonaldehyde
U055	Cumene (i)
U055	Benzene, (1-methylethyl)-(i)
U056	Cyclohexane (i)
U056	Benzene, hexahydro- (i)
U057	Cyclohexanone (i)
U058	2H-1,3,2-Oxazaphosphorine, 2-[bis(2-chloroethyl)amino]-tetrahydro-2 oxide
U058	Cyclophosphamide
U059	5,12-Naphthacenedione, (8S-cis)-8-acetyl-10-[(3-amino-2,3,6-trideoxy-α-L-lyxohexopyranosyl)oxyl]-7,8,9,10--tetrahydro-6,8,11-trihydroxy-1-methoxy-
U059	Daunomycin
U060	Dichloro diphenyl dichloroethane.
U060	DDD
U061	DDT
U061	Dichloro diphenyl trichloroethane
U062	Diallate
U062	S-(2,3-Dichloroallyl) diisopropylthiocarbamate

(continue

Code	Waste description
U063	Dibenz[a,h]anthracene
U063	1,2:5,6-Dibenzanthracene
U064	Dibenz[a,i]pyrene
U064	1,2:7,8-Dibenzopyrene
U066	Propane,1-2-dibromo-3-chloro-
U066	1,2-Dibromo-3-chloropropane
U067	Ethylene dibromide
U067	Ethane, 1,2-dibromo-
U068	Methane, dibromo-
U068	Methylene bromide
U069	Dibutyl phthalate
U069	1,2-Benzenedicarboxylic acid, dibutyl ester
U070	o-Dichlorobenzene
U070	Benzene, 1,2-dichloro-
U071	m-Dichlorobenzene
U071	Benzene, 1,3-dichloro-
U072	p-Dichlorobenzene
U072	Benzene, 1,4-dichloro
U073	(1,1'-Biphenyl)-4,4'-diamine,3,3'-dichloro
U073	3,3'-Dichlorobenzidine
U074	2-Butene,1,4-dichloro-(i,t)
U074	1,4-Dichloro-2-butene (i,t)
U075	Methane, dichlorodifluoro-
U075	Dichlorodifluoromethane
U076	Ethylidene dichloride
U076	Ethane,1,1-dichloro-
U077	Ethylene dichloride
U077	Ethane,1,2-dichloro-
U078	Ethene,1-1-dichloro-
U078	1,1-Dichloroethylene
U079	Ethene, trans-1,2-dichloro-
U079	1,2-Dichloroethylene
U080	Methane, dichloro-
U080	Methylene chloride
U081	Phenol,2,4-dichloro-
U081	2,4-Dichlorophenol
U082	Phenol,2,6-dichloro-
U082	2,6-Dichlorophenol
U083	Propylene dichloride
U083	1,2-Dichloropropane
U084	Propene,1,3-dichloro-
U084	1,3-Dichloropropene
U085	2,2'-Bioxirane (i,t)
U085	1,2:3,4-Diepoxybutane (i,t)

(con.

Code	Waste description
U086	Hydrazine, 1,2-diethyl-
U086	N,N-Diethylhydrazine
U087	Phosphorodithioic acid,0,0-diethyl-, S-methyl-ester
U087	0,0-Diethyl-S-methyl-dithiophosphate
U088	Diethyl phthalate
U088	1,2-Benzenedicarboxylic acid, diethyl ester
U089	4,4'-Stilbenediol,α,α'-diethyl-
U089	Diethylstilbestrol
U090	Dihydrosafrole
U090	Benzene,1,2-methylenedioxy-4-propyl-
U091	(1,1'-Biphenyl)-4,4'-diamine,3,3'-dimethoxy-
U091	3,3'-Dimethoxybenzidine
U092	Methanamine, N-methyl-(i)
U092	Dimethylamine (i)
U093	Dimethylaminoazobenzene
U093	Benzenamine, N,N-dimethyl-4-phenylazo-
U094	7,12-Dimethylbenz[a]anthracene
U094	1,2-Benzanthracene,7,12-dimethyl-
U095	(1,1'-Biphenyl)-4,4'-diamine,3,3'-dimethyl-
U095	3,3'-Dimethylbenzidine
U096	Hydroperoxide, 1-methyl-phenylethyl-(r)
U096	α,α-Dimethylbenzylhydroperoxide (r)
U097	Carbamoyl chloride,dimethyl-
U097	Dimethylcarbamoyl chloride
U098	Hydrazine,1,1-dimethyl-
U098	1,1-Dimethylhydrazine
U099	Hydrazine, 1,2-dimethyl-
U099	1,2-Dimethylhydrazine
U101	Phenol,2,4-dimethyl-
U101	2,4-Dimethylphenol
U102	Dimethyl phthalate
U102	1-2-Benzenedicarboxylic acid, dimethyl ester
U103	Sulfuric acid, dimethyl ester
U103	Dimethyl sulfate
U105	2,4-Dinitrotoluene
U105	Benzene, 1-methyl-2,4-dinitro-
U106	2,6-Dinitrotoluene
U106	Benzene, 1-methyl-2,6-dinitro
U107	Di-n-octyl phthalate
U107	1-2-Benzenedicarboxylic acid, di-n-octyl ester
U108	1,4-Diethylene dioxide
U108	1,4-Dioxane
U109	Hydrazine, 1,2-diphenyl-
U109	1,2-Diphenylhydrazine

(continue

Code	Waste description
U110	1-Propanamine,N-propyl-(i)
U110	Dipropylamine (i)
U111	N-Nitroso-N-propylamine
U111	Di-N-propylnitrosamine
U112	Ethyl acetate (i)
U112	Acetic acid, ethyl ester (i)
U113	2-Propenoic acid, ethyl ester (i)
U113	Ethyl acrylate (i)
U114	Ethylenebis(dithiocarbamic acid), salts and esters
U114	1,2-Ethanediylbiscarbamodithioic acid
U115	Oxirane (i,t)
U115	Ethylene oxide (i,t)
U116	Ethylene thiourea
U116	2-Imidazolidinethione
U117	Ethyl ether (1)
U117	Ethane,1,1'-oxybis- (i)
U118	2-Propenoic acid, 2-methyl-, ethyl ester
U118	Ethyl methacrylate
U119	Ethyl methanesulfonate
U119	Methanesulfonic acid, ethyl ester
U120	Fluoranthene
U120	Benzo[j,k]fluorene
U121	Trichloromonofluoromethane
U121	Methane, trichlorofluoro-
U122	Formaldehyde
U122	Methylene oxide
U123	Formic acid (c,t)
U123	Methanoic acid (c,t)
U124	Furan (i)
U124	Furfuran (i)
U125	Furfural (i)
U125	2-Furancarboxaldehyde (i)
U126	1-Propanol,2,3-epoxy-
U126	Glycidylaldehyde
U127	Hexachlorobenzene
U127	Benzene, hexachloro-
U128	Hexachlorobutadine
U128	1,3-Butadiene,1,1,2,3,4,4-hexachloro-
U129	Hexachlorocyclohexane (γ isomer)
U129	Lindane
U130	Hexachlorocyclopentadine
U130	1,3-Cyclopentadiene,1,2,3,4,5,5-hexa- chloro-
U131	Hexachloroethane
U131	Ethane,1,1,1,2,2,2-hexachloro-

(contir

Code	Waste description
U132	Hexachlorophene
U132	2,2-Methylenebis(3,4,6-trichlorophenol)
U133	Hydrazine (r,t)
U133	Diamine (r,t)
U134	Hydrogen fluoride (c,t)
U134	Hydrofluoric acid (c,t)
U135	Sulfur hydride
U135	Hydrogen sulfide
U136	Hydroxydimethylarsine oxide
U136	Cacodylic acid
U137	1,10-(1,2-Phenylene)pyrene
U137	Ideno[1,2,3-cd]pyrene
U138	Methane, iodo-
U138	Methyl iodide
U139	Ferric dextran
U139	Iron dextran
U140	1-Propanol,2-methyl- (i,t)
U140	Isobutyl alcohol (i,t)
U141	Isosafrole
U141	Benzene, 1,2-methylenedioxy-4-propenyl-
U142	Kepone
U142	Decachlorooctahydro-1,3,4-metheno-2H-cyclobuta[c,d]-pentalen-2-one
U143	Lasiocarpine
U144	Lead acetate
U144	Acetic acid, lead salt
U145	Phosphoric acid, lead salt
U145	Lead phosphate
U146	Lead subacetate
U147	2,5-Furandione
U147	Maleic anhydride
U148	Maleic hydrazide
U148	1,2-Dihydro-3,6-pyradizinedione
U149	Propanedinitrile
U149	Malononitrile
U150	Melphalan
U150	Alanine, 3-[p-bis(2-chloroethyl)amino] phenyl-,L-
U151	Mercury
U152	Propanenitrile,2-methyl- (i,t)
U152	Methacrylonitrile (i,t)
U153	Thiomethanol (i,t)
U153	Methanethiol (i,t)
U154	Methanol (i)
U154	Methyl alcohol (i)
U155	Pyridine, 2-[(2-dimethylamino)ethyl]-2-phenylamino-
U155	Methapyrilene

(continued)

Code	Waste description
U156	Methyl chlorocarbonate (i,t)
U156	Carbonochloridic acid, methyl ester (i,t)
U157	3-Methylcholanthrene
U157	Benz[j]aceanthrylene, 1,2-dihydro-3-methyl-
U158	4,4'-Methylenebis(2-chloroaniline)
U158	Benzenamine,4,4'-methylenebis(2-chloro-
U159	Methyl ethyl ketone (i,t)
U159	2-Butanone (i,t)
U160	Methyl ethyl ketone peroxide (r,t)
U160	2-Butanone peroxide (r,t)
U161	4-Methyl-2-pentanone (i)
U161	Methyl isobutyl ketone (i)
U162	2-Propenoic acid, 2-methyl-, methyl ester (i,t)
U162	Methyl methacrylate (i,t)
U163	Guanidine, N-nitroso-N-methyl-N'-nitro-
U163	N-methyl-N'-nitro-N-nitrosoguanidine
U164	4(1H)-Pyrimidinone, 2,3-dihydro-6-methyl-2-thioxo-
U164	Methylthiouracil
U165	Naphthalene
U166	1,4,Naphthoquinone
U166	1,4-Naphthalenedione
U167	1-Naphthylamine
U167	α-Naphthylamine
U168	2-Naphthylamine
U168	β-Naphthylamine
U169	Nitrobenzene (i,t)
U169	Benzene, nitro- (i,t)
U170	Phenol,4-nitro-
U170	p-Nitrophenol
U171	Propane,2-nitro-(i,t)
U171	2-Nitropropane (i,t)
U172	N-Nitrosodi-N-butylamine
U172	1-Butanamine, N-butyl-N-nitroso-
U173	Ethanol,2,2-(nitrosoimino)bis-
U173	N-Nitrosodiethanolamine
U174	N-Nitrosodiethylamine
U174	Ethanamine, N-ethyl-N-nitroso-
U176	N-Nitroso-N-ethylurea
U176	Carbamide,N-ethyl-N-nitroso-
U177	N-Nitroso-N-methylurea
U177	Carbamide,N-methyl-N-nitroso-
U178	N-Nitroso-N-methylurethane
U178	Carbamic acid, methylnitroso-, ethyl ester
U179	N-Nitrosopiperidine
U179	Pyridine,hexahydro-N-nitroso-

(contir

Code	Waste description
U180	Nitrosopyrrolidine
U180	Pyrrole, tetrahydro-N-nitroso-
U181	5-Nitro-o-toluidine
U181	Benzenamine,2-methyl-5-nitro
U182	Paraldehyde
U182	1,3,5-Trioxane,2,4,6-trimethyl-
U183	Pentachlorobenzene
U183	Benzene, pentachloro-
U184	Pentachloroethane
U184	Ethane, pentachloro-
U185	Pentachloronitrobenzene
U185	Benzene, pentachloronitro-
U186	1,3-Pentadiene (i)
U186	1-Methylbutadiene (i)
U187	Phenacetin
U187	Acetamide, N-(4-ethoxyphenyl)-
U188	Phenol
U188	Benzene, hydroxy-
U189	Phosphorus sulfide (r)
U189	Sulfur phosphide (r)
U190	Phthalic anhydride
U190	1,2-Benzenedicarboxylic acid anhydride
U191	2-Picoline
U191	Pyridine, 2-methyl-
U192	Pronamide
U192	3,5-Dichloro-N-(1,1-dimethyl-2-propynyl) benzamide
U193	1,2-Oxathiolane, 2,2-dioxide
U193	1,3-Propane sultone
U194	1-Propanamine (i,t)
U194	N-Propylamine (i,t)
U196	Pyridine
U197	p-Benzoquinone
U197	1,4-Cyclohexadienedione
U200	Reserpine
U200	Yohimban-16-carboxylic acid, 11,17-dimethoxy-18-[(3,4,5-trimethoxy-benzoyl)oxy]-, methyl ester
U201	Resorcinol
U201	1,3-Benzenediol
U202	Saccharin and salts
U202	1,2-Benzisothiazolin-3-one,1,1-dioxide, and salts
U203	Safrole
U203	Benzene, 1,2-methylenedioxy-4-allyl-
U204	Selenious acid
U204	Selenium dioxide
U205	Selenium disulfide (r,t)
U205	Sulfur selenide (r,t)

(continued

Code	Waste description
U206	Streptozotocin
U206	D-Glucopyranose, 2-deoxy-2(3-methyl-3-nitrosoureido)-
U207	1,2,4,5-Tetrachlorobenzene
U207	Benzene, 1,2,4,5-tetrachloro-
U208	1,1,1,2-Tetrachloroethane
U208	Ethane,1,1,1,2-tetrachloro-
U209	1,1,2,2-Tetrachloroethane
U209	Ethane,1-1-2-2-tetrachloro-
U210	Tetrachloroethylene
U210	Ethene,1,1,2,2-tetrachloro
U211	Methane, tetrachloro-
U211	Carbon tetrachloride
U213	Tetrahydrofuran (i)
U213	Furan, tetrahydro- (i)
U214	Thallium(I) acetate
U214	Acetic acid, thallium(I) salt
U215	Thallium(I) carbonate
U215	Carbonic acid, dithallium(I) salt
U216	Thallium(I) chloride
U217	Thallium(I) nitrate
U218	Thioacetamide
U218	Ethanethioamide
U219	Thiourea
U219	Carbamide, thio-
U220	Toluene
U220	Benzene, methyl-
U221	Toluenediamine
U221	Diaminotoluene
U222	o-Toluidine hydrochloride
U222	Benzenamine, 2-methyl-, hydrochlonde
U223	Toluene diisocyanate (r,t)
U223	Benzene, 1,3-diisocyanatomethyl- (r,t)
U225	Methane, tribromo-
U225	Bromoform
U226	1,1,1-Trichloroethane
U226	Methylchloroform
U227	1,1,2-Trichloroethane
U227	Ethane,1,1,2-trichloro-
U228	Trichloroethylene
U228	Trichloroethene
U232	2,4,5-Trichloracetic acid, salts, and esters
U233	2,4,5-Trichlorophenoxypropionic acid, salts, and esters
U234	sym-Trinitrobenzene (r,t)
U234	Benzene,1,3,5-trinitro- (r,t)

(c.

Code	Waste description
U235	1-Propanol,2,3-dibromo-,phosphate (3:1)
U235	Tris(2,3-dibromopropyl) phosphate
U236	Trypan blue
U236	2,7-Naphthalenedisulfonic acid, 3,3'-[(3,3'-dimethyl-(1,1'-biphenyl)-4,4'-diyl)]-bis(azo)bis(5-amino-4-hydroxy), tetrasodium salt
U237	Uracil mustard
U237	Uracil, 5-[bis(2-chloroethyl)-amino]-
U238	Ethyl carbamate (urethan)
U238	Carbamic acid, ethyl ester
U239	Xylene (i)
U239	Benzene, dimethyl- (i,t)
U240	2,4-D, salts and esters
U240	2,4-Dichlorophenoxyacetic acid, salts, and esters
U243	1-Propene,1,1,2,3,3,3-hexachloro-
U243	Hexachloropropene
U244	Thiram
U244	Bis(dimethylthiocarbamoyl) disulfide
U246	Bromine cyanide
U246	Cyanogen bromide
U247	Ethane, 1,1,1,-trichloro-2-2-bis(p-methoxyphenyl)
U247	Methoxychlor
U248	Warfarin, when present at concentrations of 0.3% or less
U248	3-(α-Acetonylbenzyl)-4-hydroxycoumarin and salts, when present at concentrations of 0.3% or less
U249	Zinc phosphide, when present at concentrations of 10% or less
U328	2-Amino-L-methylbenzene
U328	o-Toluidine
U353	4-Amino-L-methylbenzene
U353	p-Toluidine
U359	2-Ethoxyethanol
U359	Ethylene glycol monoethyl ether

APPENDIX C

GENERATOR AND TSDR SURVEY QUESTIONS REFERENCED IN THIS REPORT

GENERATOR AND TSDR SURVEY QUESTIONS REFERENCED IN THIS REPORT

Interpreting data from the Generator and TSDR Surveys often requires knowledge of how the data were reported by respondents. As a reference to readers, the survey questions from which data are derived are included in parenthesis in the source information at the bottom of all applicable charts.

This appendix illustrates representative Generator and TSDR Survey questions referenced in this report. Questions are presented in numerical order by the questionnaire from which the question originates. Questions repeated in the surveys for each waste management activity are shown only once in this appendix.

QUESTIONNAIRE A: GENERAL FACILITY INFORMATION

3. **What quantity of hazardous waste was managed onsite during 1986 in UNITS REQUIRING A RCRA PERMIT? What percentage of this quantity was hazardous wastewater?**

Report here the TOTAL quantity of hazardous waste that entered one or more of this facility's treatment, storage, accumulation, disposal, or recovery units during 1986. Include only hazardous waste that was managed in units for which you have a RCRA permit or interim status. Report hazardous waste that was accumulated ONLY if it was later stored, disposed, treated, or recovered for reuse onsite. COUNT ONLY ONCE any quantity of hazardous waste that entered more than one type of operation. For example, hazardous waste that was both treated and stored should be COUNTED ONLY ONCE. Similarly, hazardous waste that was treated more than once should be COUNTED ONLY ONCE.

Quantity of Hazardous Waste Managed Onsite in UNITS REQUIRING A RCRA PERMIT	*Enter waste quantities that need to be reported in tons on row a and waste quantities that need to be reported in gallons on row b. Indicate the percentage of each quantity that was hazardous wastewater.*	
Quantity	**Unit of measure**	**Percentage of quantity that was hazardous wastewater**
a.	Tons	%
b.	Gallons	%

8. **What quantity of hazardous waste in each of the following categories was managed onsite during 1986?**

Report here the TOTAL quantity of hazardous waste that entered one or more of this facility's treatment, storage, accumulation, disposal, or recovery units during 1986—regardless of the permit status of the unit. Report hazardous waste that was accumulated ONLY if it was later stored, disposed, treated, or recovered for reuse. COUNT ONLY ONCE any quantity of hazardous waste that entered more than one type of operation. For example, hazardous waste that was both treated and stored should be COUNTED ONLY ONCE. Similarly, hazardous waste that was treated more than once should be COUNTED ONLY ONCE.

Quantities of Hazardous Waste MANAGED ONSITE	*Enter waste quantities that need to be reported in tons on row a and waste quantities that need to be reported in gallons on row b. If none, enter zero.*		
Quantity generated onsite and managed onsite	**Quantity received from another facility under the same ownership and managed onsite**	**Quantity received from another facility NOT under the same ownership and managed onsite**	**Unit of measure**
a.			Tons
b.			Gallons

NOTE: The sum of all the quantities entered in Question 8 is equal to the TOTAL quantity of hazardous waste managed onsite during 1986.

Preceding page blank

11. **Of the hazardous waste GENERATED ONSITE during 1986, what quantity was shipped offsite to be managed by another facility under the same ownership? What quantity was shipped offsite to be managed by a facility not under the same ownership?**

Quantities of Hazardous Waste GENERATED ONSITE AND THEN SHIPPED OFFSITE	*Enter waste quantities that need to be reported in tons on row a and waste quantities that need to be reported in gallons on row b. If none, enter zero.*	
	Quantity generated onsite and then shipped offsite to a facility under the same ownership	**Quantity generated onsite and then shipped offsite to a facility NOT under the same ownership**	**Unit of measure**
a.			Tons
b.			Gallons

QUESTIONNAIRE F: SOLVENT AND LIQUID ORGANIC RECOVERY FOR REUSE

3. **What quantity of hazardous waste was managed onsite in solvent recovery processes during 1986?**

Report here the TOTAL quantity of hazardous waste that entered one or more of this facility's solvent recovery processes during 1986. COUNT ONLY ONCE any quantity of hazardous waste that entered more than one type of process. For example, hazardous waste that underwent both filtration and fractionation would be COUNTED ONLY ONCE.

Quantity of Hazardous Waste Managed in Solvent Recovery Processes Onsite	*Enter the quantity and circle a unit of measure.*	
	Unit of measure *(Circle one)*	
Quantity	**Ton**	**Gallon**
	01	02

Question	Solvent Recovery Process No. 1	Solvent Recovery Process No. 2
4. **What type of solvent recovery process is this?** *(Circle one)*		
Fractionation	01	01
Batch still distillation	02	02
Solvent extraction	03	03
Thin-film evaporation	04	04
Filtration	05	05
Phase separation	06	06
Dessication	07	07
Other *(specify)*	08	08
	(specify)	*(specify)*

25. **What quantity of HAZARDOUS waste in each of the following categories entered this solvent recovery process for management during 1986?** *(Enter the quantities and circle a unit of measure; if none, enter zero. The sum of b, c, and d must equal a.)*		
a. TOTAL quantity managed onsite		
i. Quantity		
ii. Unit of measure *(Circle one)*		
Tons	01	01
Gallons	02	02

Question	Solvent Recovery Process No. 1	Solvent Recovery Process No. 2
26. **What quantity of NONHAZARDOUS waste entered this solvent recovery process for management during 1986?** *(Enter the quantity and circle a unit of measure; if none, enter zero.)*		
a. Quantity		
b. Unit of measure *(Circle one)*		
Tons	01	01
Gallons	02	02
27. **What quantity of solvents and chemicals was recovered for reuse using this process during 1986?** *(Enter the quantity and circle a unit of measure; if none, enter zero.)*		
a. Quantity		
b. Unit of measure *(Circle one)*		
Tons	01	01
Gallons	02	02
30. **What quantity of residuals—solid, liquid, and sludge—was generated by this solvent recovery process during 1986? What percentage of these residuals was hazardous?** *(Include residuals from air pollution control devices [APCDs] as well as other treatment residuals. Do not include in your answer the recovered solvent or chemicals. Enter the quantities in the unit specified and indicate the percentage. If none, enter zero.)*		
a. **Solid Residuals**		
i. Total quantity generated, pounds		
ii. Percentage of solid residuals that was hazardous	%	%
b. **Liquid Residuals (including scrubber water)**		
i. Total quantity generated, gallons		
ii. Percentage of liquid residuals that was hazardous	%	%
c. **Sludge Residuals**		
i. Total quantity generated, pounds		
ii. Percentage of sludge residuals that was hazardous	%	%

QUESTIONNAIRE GA:
GENERAL FACILITY INFORMATION

1. **Which of the following BEST DESCRIBES the status of the "hazardous waste generation activities" onsite at this facility?** *(Circle one)*

   Carefully read all options and circle only one. Do not base your answer on the quantity of hazardous waste generated onsite. Call the Survey Helpline (1-800-635-8850) if you are uncertain of the status of your facility.

   01 Hazardous waste is currently generated onsite. *(Go to next question)*

   02 Hazardous waste was generated onsite during 1986, but is no longer generated onsite. *(Go to next question)*

   03 Hazardous waste was generated onsite prior to 1986, but not during 1986, and will not be generated onsite in the future. *(Skip to Question 156 on page 79)*

   04 Hazardous waste was generated onsite in the past, but that hazardous waste has since been delisted and no other hazardous waste is generated onsite at this facility. *(Skip to Question 156 on page 79)*

   05 No hazardous waste has ever been generated onsite at this facility. Notification of hazardous waste generation activities was submitted as a protective measure. Further evaluation showed that the waste generated onsite is not hazardous. *(Skip to Question 156 on page 79)*

2. **Did this facility generate, in ANY month during 1986, more than 1,000 kilograms of hazardous waste** *(Circle one)*

   01 Yes *(Skip to Question 6)*

   02 No *(Go to next question)*

3. **Did this facility accumulate, AT ANY TIME DURING 1986, more than 1,000 kilograms of hazardous waste?** *(Circle one)*

   Do not base your answer on when the hazardous waste was generated. For example, if 600 kilograms of hazardous waste were generated in one month and 500 kilograms of hazardous waste were generated in the next month, and this total quantity was onsite at any time, you would answer "Yes."

   01 Yes *(Skip to Question 6)*

   02 No *(Go to next question)*

4. **Did this facility generate, in ANY month during 1986, more than 100 kilograms of hazardous waste?** *(Circle one)*

   01 Yes *(Skip to Question 6)*

   02 No *(Go to next question)*

5. **Did this facility generate, in ANY month during 1986, more than one kilogram of acutely hazardous waste?** *(Circle one)*

   The following are acutely hazardous wastes: F020, F021, F022, F023, F026, F027, and all of the RCRA "P" wastes. See Appendix C of the Instructions booklet for a list of RCRA "P" wastes.

   01 Yes *(Go to next question)*

   02 No *(Skip to Question 156 on page 79. DO NOT SKIP if your facility generated, in any month during 1986, more than 100 kilograms of hazardous waste.)*

6. **What is the primary four-digit SIC code for this facility?**

8. **Who owns this facility?** *(Circle one)*

01 Federal government
02 State government
03 Local government
04 Private owner—sole proprietor, partnership, or corporation
05 Other owner _____ *(describe)*

20. **Of the quantity reported in Question 19, estimate the amount that was hazardous wastewater. This amount should include hazardous wastewater pretreated prior to discharge under a NPDES permit c prior to discharge to a POTW; hazardous wastewater generated in a production process or waste treatment process; and hazardous wastewater that is a characteristic waste, even though it may lose its hazardous waste characteristic through mixing with other wastewater or by treatment.**

Include in your answer the total quantity of wastewater, not just the quantity of hazardous material in the wastewater.

Quantity of HAZARDOUS Wastewater Generated	*Enter the quantity and circle a unit of measure. If none, enter zero*	
	Unit of measure *(Circle one)*	
Quantity	**Tons**	**Gallons**
	01	02

NOTE: *Report all hazardous wastewater in Questionnaire GB, "Hazardous Waste Characterization." Report any processes used to treat hazardous wastewater, including pretreatment processes, in Questionnaire GE, "Wastewater Treatment."*

23. **What quantity of hazardous waste was shipped offsite during 1986 to be managed by another facility under the same ownership? What quantity of hazardous waste was shipped offsite during 1986 to be managed by a facility NOT under the same ownership?**

Quantity of Hazardous Waste Shipped Offsite	*Enter waste quantities that need to be reported in tons in row a and waste quantities that need to be reported in gallons in row b. If none, enter zero.*	
Quantity shipped offsite to a facility under the same ownership	**Quantity shipped offsite to a facility NOT under the same ownership**	**Unit of measure**
a.		Tons
b.		Gallons

27. What quantity of hazardous waste was generated onsite during 1986?

Report here the TOTAL quantity of hazardous waste that was generated onsite during 1986. Include in your answer hazardous waste and hazardous wastewater treated using exempt processes, for example, wastewater treatment processes that discharge under a NPDES permit or discharge to a POTW and exempt recycling processes.

Quantity of Hazardous Waste Generated Onsite	*Enter waste quantities that need to be reported in tons in row a and waste quantities that need to be reported in gallons in row b. The sum of the two quantities reported in this question equal the TOTAL quantity of hazardous waste generated onsite during 1986.*
Quantity	**Unit of measure**
a. _____	Tons
b. _____	Gallons

QUESTIONNAIRE GB: HAZARDOUS WASTE CHARACTERIZATION

Question	Hazardous Waste No. 1	Hazardous Waste No. 2
1. **What RCRA waste code or codes best describe this hazardous waste?** *See Appendix C of the Instructions booklet for a list of RCRA and other waste codes. If you generate a waste that is considered hazardous by regulations in your state and a waste code is not provided, call the Survey Helpline (1-800-635-8850).*	a. ☐☐☐☐ b. ☐☐☐☐ c. ☐☐☐☐ d. ☐☐☐☐ e. ☐☐☐☐	a. ☐☐☐☐ b. ☐☐☐☐ c. ☐☐☐☐ d. ☐☐☐☐ e. ☐☐☐☐
Use the list of Waste Description Codes on the inside front cover of this questionnaire to answer Questions 2 and 3. If a code requires you to specify, do so in the space provided. 2. **What Waste Description Code best describes this hazardous waste?**	☐☐☐ *(specify)*	☐☐☐ *(specify)*
Use the list of Waste Source Codes on the inside back cover of this questionnaire to answer Questions 4 and 5. If a code requires you to specify, do so in the space provided. 4. **What Waste Source Code best describes the process(es) at this facility that generate this hazardous waste?**	S☐☐ *(specify)*	S☐☐ *(specify)*
10. **What quantity of this hazardous waste was generated onsite DURING 1986?** *(Enter the quantity and circle a unit of measure)* a. Quantity b. Unit of measure *(Circle one)* Tons Gallons	☐☐☐☐☐☐☐ 01 02	☐☐☐☐☐☐☐ 01 02

Question	Hazardous Waste No. 1	Hazardous Waste No. 2
18. Of the quantity of this hazardous waste that was generated onsite during 1986, how much was or will be shipped offsite for management? *(Enter the quantity and circle a unit of measure; if none, enter zero and skip to the note on page 16 prior to Question 20 for this hazardous waste.)*		
a. Quantity		
b. Unit of measure *(Circle one)*		
Tons	01	01
Gallons	02	02

QUESTIONNAIRE GG: SOLVENT AND LIQUID ORGANIC RECOVERY FOR REUSE

3. What quantity of hazardous waste was managed onsite in solvent recovery processes during 1986?

Report here the TOTAL quantity of hazardous waste that entered one or more of this facility's solvent recovery processes during 1986. COUNT ONLY ONCE any quantity of hazardous waste that entered more than one type of process. For example, hazardous waste that underwent both filtration and fractionation would be COUNTED ONLY ONCE.

Quantity of Hazardous Waste Managed in Solvent Recovery Processes Onsite	*Enter the quantity and circle a unit of measure.*	
	Unit of measure *(Circle one)*	
Quantity	**Tons**	**Gallons**
	01	02

Question	Solvent Recovery Process No. 1	Solvent Recovery Process No. 2
4. What type of solvent recovery process is this? *(Circle one)*		
Fractionation	01	01
Batch still distillation	02	02
Solvent extraction	03	03
Thin-film evaporation	04	04
Filtration	05	05
Phase separation	06	06
Dessication	07	07
Other *(specify)*	08	08
	(specify)	*(specify)*

Question	Solvent Recovery Process No. 1	Solvent Recovery Process No. 2
21. What quantity of HAZARDOUS waste entered this solvent recovery process for management during 1986? *(Enter the quantity and circle a unit of measure; if none, enter zero.)*		
a. Quantity		
b. Unit of measure *(Circle one)*		
Tons	01	01
Gallons	02	02
22. What quantity of NONHAZARDOUS waste entered this solvent recovery process for management during 1986? *(Enter the quantity and circle a unit of measure; if none, enter zero.)*		
a. Quantity		
b. Unit of measure *(Circle one)*		
Tons	01	01
Gallons	02	02

23. What quantity of solvents and chemicals was recovered for reuse using this process during 1986? *(Enter the quantity and circle a unit of measure; if none, enter zero.)*		
a. Quantity		
b. Unit of measure *(Circle one)*		
Tons	01	01
Gallons	02	02

Question	Solvent Recovery Process No. 1	Solvent Recovery Process No. 2
26. What quantity of residuals—solid, liquid, and sludge—was generated by this solvent recovery process during 1986? What percentage of these residuals was hazardous? *(Include residuals from air pollution control devices [APCDs] as well as other treatment residuals. Do not include in your answer the recovered solvent or chemicals. If this process was not operational during 1986, estimate the quantity of residuals that would be generated if operated at full capacity. Enter the quantities in the unit specified and indicate the percentage. If none, enter zero.)*		
a. Solid Residuals		
i. Total quantity generated, pounds		
ii. Percentage of solid residuals that was hazardous	%	%
b. Liquid Residuals (including scrubber water)		
i. Total quantity generated, gallons		
ii. Percentage of liquid residuals that was hazardous	%	%
c. Sludge Residuals		
i. Total quantity generated, pounds		
ii. Percentage of sludge residuals that was hazardous	%	%

27. Does this facility have plans to make any changes to this solvent recovery process before January 1992 that would increase/decrease its capacity to manage hazardous waste? *(Circle one)*		
Yes *(Go to next question)*	01	01
No *(Circle 02 and skip to Question 29 for this solvent recovery process)*	02 *(Skip to Q.29)*	02 *(Skip to Q.29)*

QUESTIONNAIRE H: WASTEWATER TREATMENT

Question	Wastewater Treatment Process No. 1	Wastewater Treatment Process No. 2
14. **Which onsite tanks and/or surface impoundments are used with this wastewater treatment process?** *(Identify the tanks and surface impoundments used with this process by listing the identification numbers that you entered on the schematic of your wastewater treatment process(es) that you drew for Questionnaire A, "General Facility Information.")*		
a. Tank number	i. ☐☐☐ iv. ☐☐☐ ii. ☐☐☐ v. ☐☐☐ iii. ☐☐☐ vi. ☐☐☐	i. ☐☐☐ iv. ☐☐☐ ii. ☐☐☐ v. ☐☐☐ iii. ☐☐☐ vi. ☐☐☐
b. Surface impoundment number	i. ☐☐ ii. ☐☐	i. ☐☐ ii. ☐☐

QUESTIONNAIRE J: WASTE PILES

Question	Waste Pile No. 1	Waste Pile No. 2
27. What quantity of hazardous and nonhazardous waste entered this waste pile for TREATMENT during 1986? *(Include in your answer waste that entered this waste pile for treatment, regardless of whether it was also stored. Enter the quantities and circle a unit of measure; if none, enter zero.)*		
a. Hazardous waste		
i. Quantity		
ii. Unit of measure *(Circle one)*		
Tons	01	01
Cubic yards	02	02
b. Nonhazardous waste		
i. Quantity		
ii. Unit of measure *(Circle one)*		
Tons	01	01
Cubic yards	02	02

Question		
29. What quantity of hazardous and nonhazardous waste entered this waste pile for STORAGE ONLY during 1986? *(Do not include in your answer waste that was also treated in this waste pile. Enter the quantities and circle a unit of measure; if none, enter zero.)*		
a. Hazardous waste		
i. Quantity		
ii. Unit of measure *(Circle one)*		
Tons	01	01
Cubic yards	02	02
b. Nonhazardous waste		
i. Quantity		
ii. Unit of measure *(Circle one)*		
Tons	01	01
Cubic yards	02	02

QUESTIONNAIRE K: SURFACE IMPOUNDMENTS

Question	Surface Impoundment No. 1	Surface Impoundment No. 2
31. What quantity of hazardous and nonhazardous waste entered this surface impoundment for TREATMENT during 1986? *(Include in your answer waste that entered this surface impoundment for treatment, regardless of whether it was also stored or disposed of. Enter the quantities and circle a unit of measure; if none, enter zero.)*		
a. Hazardous waste		
i. Quantity		
ii. Unit of measure *(Circle one)*		
Tons	01	01
Gallons	02	02
b. Nonhazardous waste		
i. Quantity		
ii. Unit of measure *(Circle one)*		
Tons	01	01
Gallons	02	02

Question		
46. What quantity of hazardous and nonhazardous waste entered this surface impoundment for DISPOSAL but not for treatment during 1986? *(Include in your answer waste that entered this surface impoundment for disposal including waste that was stored prior to disposal. DO NOT INCLUDE any waste that was treated in this surface impoundment prior to disposal. Enter the quantities and circle a unit of measure; if none, enter zero.)*		
a. Hazardous waste		
i. Quantity		
ii. Unit of measure *(Circle one)*		
Tons	01	01
Gallons	02	02
b. Nonhazardous waste		
i. Quantity		
ii. Unit of measure *(Circle one)*		
Tons	01	01
Gallons	02	02

Question	Surface Impoundment No. 1	Surface Impoundmei No. 2
49. What quantity of hazardous and nonhazardous waste entered this surface impoundment for STORAGE ONLY during 1986? *(DO NOT INCLUDE in your answer waste that also entered this surface impoundment for treatment or disposal. Enter the quantities and circle a unit of measure; if none, enter zero.)*		
a. Hazardous waste		
i. Quantity		
ii. Unit of measure *(Circle one)*		
Tons	01	01
Gallons	02	02
b. Nonhazardous waste		
i. Quantity		
ii. Unit of measure *(Circle one)*		
Tons	01	01
Gallons	02	02