



CHEMICAL MANUFACTURERS ASSOCIATION

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November 19, 1990

To: RCRA Task Group
RCRA Work Groups

Enclosed for your information is a copy of the 1988 CMA Hazardous Waste Survey. No action is requested.

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CMA Hazardous Waste Survey '88

Prepared for

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Since 1981, the Chemical Manufacturers Association (CMA) has conducted an annual hazardous waste survey of its member companies to characterize the waste generation and management practices of the chemical industry. Only plants with primary Standard Industrial Classification (SIC) 2800 are asked to participate in the survey. This report is a summary of the results of the 1988 survey and includes a comparison with previous years' surveys.

Number of Participants

Five hundred and eighty-two (582) plants responded. Only 66 of these plants were first-time respondents.

Seventy-seven (77) companies responded, representing about 40 percent of CMA's member companies. This year, thirty-five (35) of these 77 companies were in the top 50 chemical companies in sales for 1988 (*Chemical and Engineering News*, June 19, 1989).

Generation and Management Overview

This survey divided hazardous waste into two categories, solid waste and wastewater. This was done because the volume of wastes that are mostly water, are much larger than the other type of wastes that are more typically thought of as *solid* and mask any trends in these latter wastes.

The survey divides wastes into two categories—solid waste and wastewater

Survey Participation

CMA Waste Survey '88

58
differe comp
of
companies in sales
for 1988*

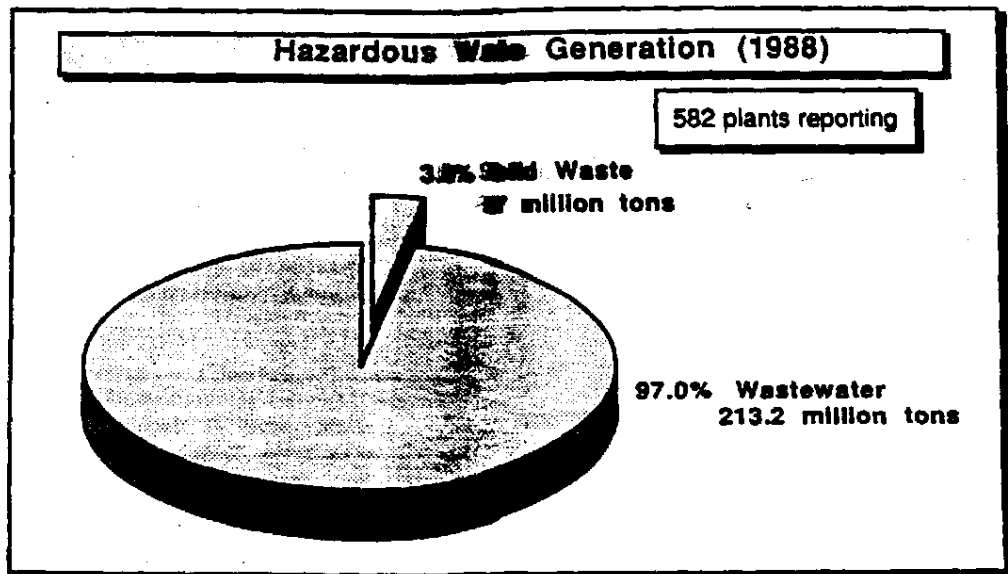
*Source: *Chemical and Engineering News*, June 19, 1989

The survey defined wastewaters as *NPDES treated wastes, those discharged to a Publicly-Owned Treatment Works (POTW), wastewaters that are disposed by underground injection, and any other aqueous waste*. This definition was solely for the purpose of categorizing responses to the survey — it does not represent a regulatory distinction.

Executive Summary

Solid waste, defined here as all other hazardous wastes not fitting the survey definition of wastewater, is not intended to be consistent with EPA's RCRA definition of solid waste. Hazardous solid waste by the survey definition is referred to in the report tables as *solid (non-wastewater) waste*. Hazardous solid waste plus hazardous wastewater (both as defined here) equals the sum total of waste defined as hazardous under RCRA and those added in state regulations (state only).

The figure below shows that generation by the survey plants was 97.0 percent hazardous wastewater (213.2 million tons) and 3.0 percent hazardous solid waste (6.7 million tons).

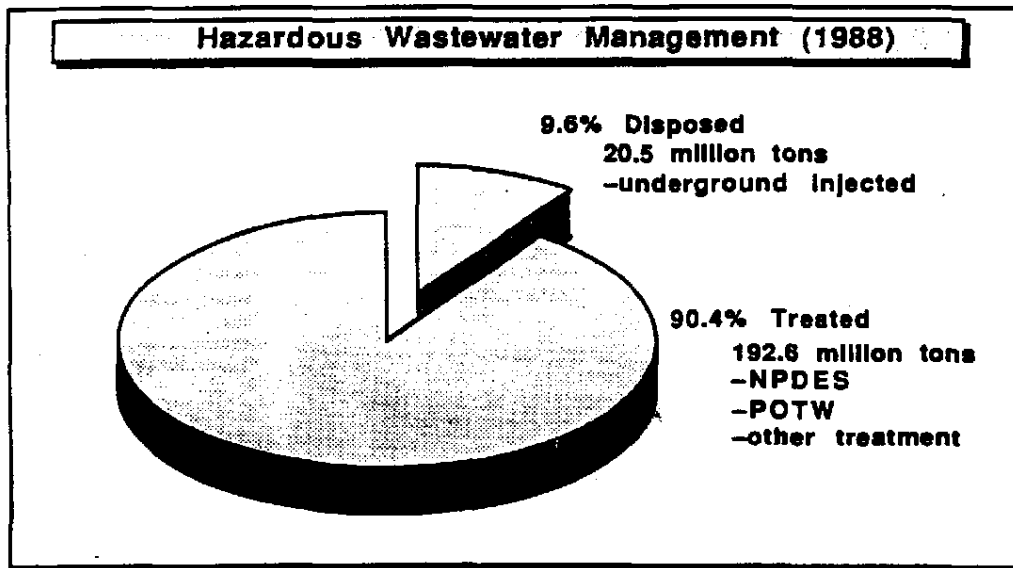


Of the 582 plants reporting, there were 86 plants (15 percent) that either did not generate any hazardous waste or generated less than 0.5 tons.

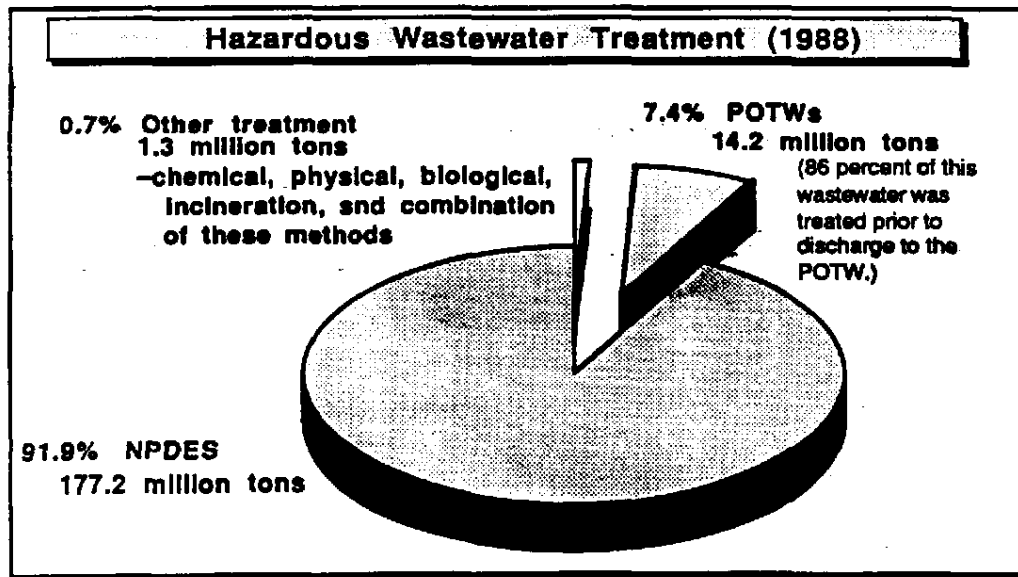
Hazardous Wastewater

213.2 million tons of hazardous wastewater were generated. 99.2 percent of the hazardous wastewater was RCRA-defined hazardous waste. The remaining 0.8 percent was state-defined hazardous waste. 30.0 percent of the hazardous wastewater was hazardous by characteristic. The remaining 70.0 percent was hazardous by listing.

The figure below shows the percentages of hazardous wastewater that were treated and disposed. 90.4 percent of the hazardous wastewater generated by the survey plants was treated (192.6 million of 213.2 million tons).



The figure below shows the percentages of the different treatment practices for hazardous wastewater from this survey.



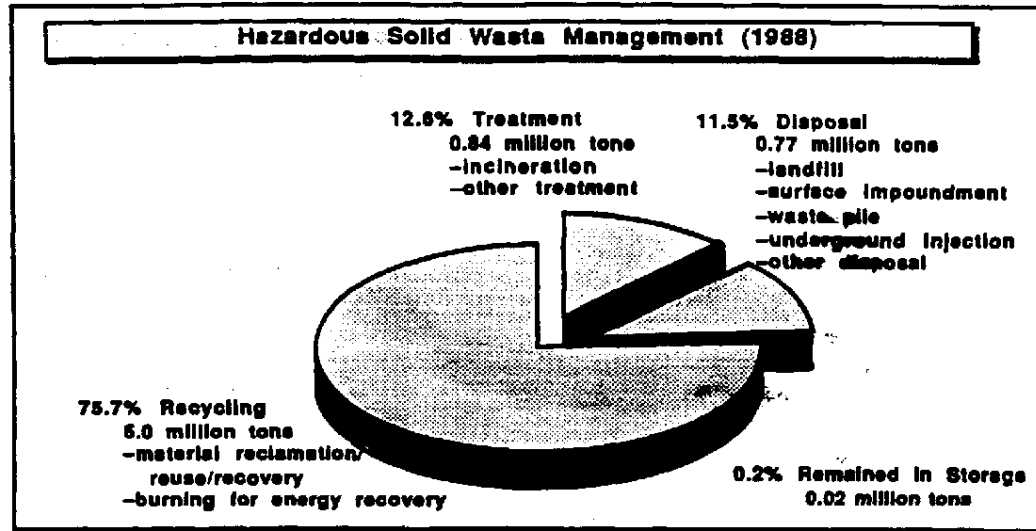
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Executive Summary

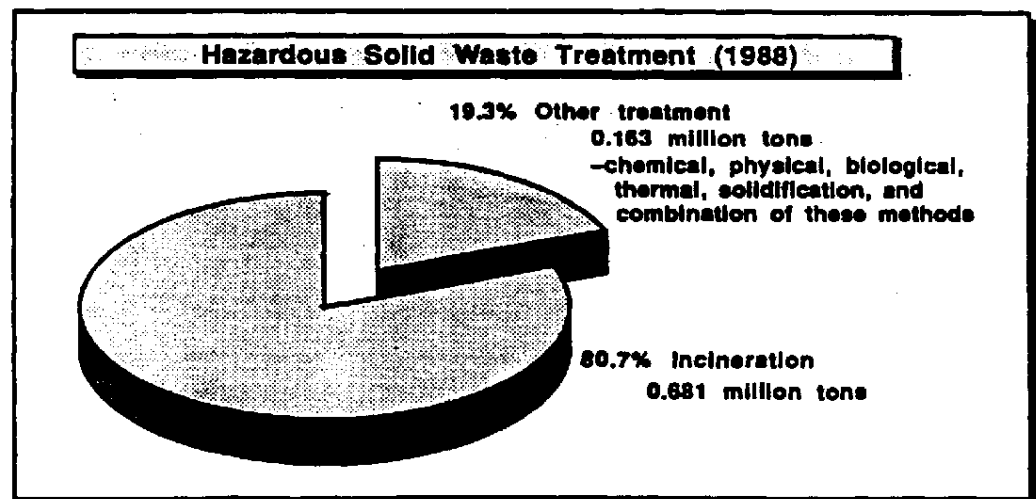
Hazardous Solid Waste (Non-Wastewater)

6.7 million tons of hazardous solid waste were generated. 98.8 percent of the hazardous solid waste was RCRA-defined hazardous waste. The remaining 1.2 percent was state-defined hazardous waste.

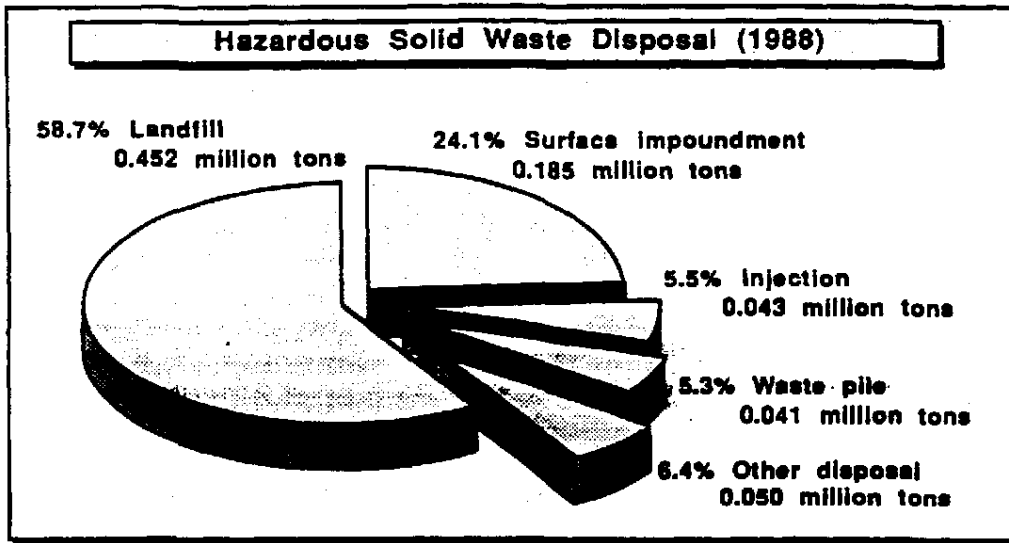
The figure below shows the percentages of hazardous solid waste that were recycled, treated, and disposed. Recycling included material reclamation/reuse/recovery and burning for energy recovery.



The figure below shows the percentages of the different treatment practices for hazardous solid waste from this survey.



The figure below shows the percentages of the different disposal practices for hazardous solid waste from this survey.



Domestic Sewage Exclusion (DSE)

Twenty (20) plants reported discharging 11.3 million tons of wastewater to a POTW under the DSE. Survey respondents were asked to report those wastes that they did not include in their hazardous waste quantities because of the DSE. These DSE wastewaters were not reported in this survey as hazardous wastes and are not included in any of the hazardous waste quantities.

Trend Analyses

Trend analyses in this report are based on two periods, 1981–1988 and 1985–1988. The latter period was chosen because 1985 marked the year many recycled wastes became part of the survey database. Plants were used in trend analyses only if they had responded every year during a trend period. There were 190 plants for the 1981–1988 trend analysis and 339 plants for the 1985 trend analysis. To emphasize the impact of recycled wastes during the 1985–1988 period, both the 1981–1988 and 1985–1988 trend groups were analyzed first with recycled wastes included and then without recycled wastes.

Executive Summary

The trend analyses often show sharp changes in hazardous waste generation and management because of the actions of a few plants with large wastes. These changes are highlighted because otherwise they tend to mask more subtle trends. To highlight the most recent changes, a comparison of the current survey year with the previous survey year (1987-1988) is included in this report. This comparison is based on 471 plants that responded to the survey in 1987 and 1988.

In the following sections, the comparison of plants that responded to both the 1987 and 1988 surveys is presented first. Next, the comparison of 1985-1988 trend plants is presented, and finally the 1981-1988 trend plants.

1987-1988 Comparison

Total hazardous waste generation increased from 1987 to 1988 by 9.7 percent (19.0 million tons). In general, changes that occurred between 1987 and 1988 in a particular category happened because of the actions of a few plants with very large wastes relative to the others in that same category. The reasons for these changes are given below.

Recycling appeared to decrease by 10.6 percent because a variance from the solid waste definition was granted for one waste. Waste quantities treated in NPDES facilities increased 12.1 percent. The largest part of this increase was from a plant that aggregated hazardous and nonhazardous wastewater for common treatment. Wastewater treatment by means other than in NPDES facilities or by discharge to a POTW decreased by 58.0 percent. Most of this decrease came from two plants. Underground injection increased 8.0 percent. Most of this increase was from reclassification of one waste. Landfill disposal increased by 50.8 percent. This increase is from cleanup wastes, primarily from impoundment closures and cleanouts.

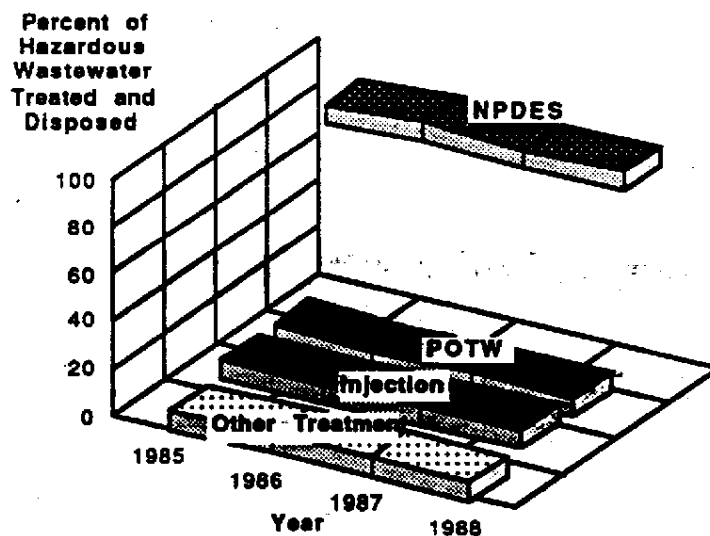
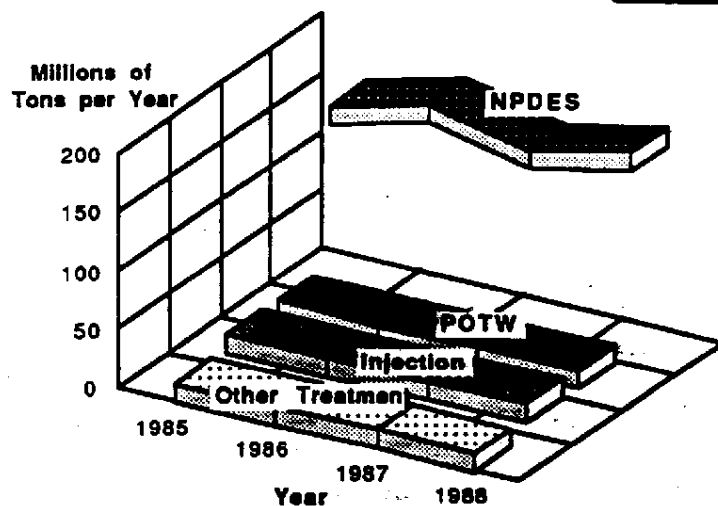
1985-1988 Wastewater Trends

The trends in wastewater quantities for the 1985-1988 trend years are shown in the figure on the facing page. The lower half of the figure, which presents wastewater quantities managed by different practices as a percentage of the total wastewater treated and disposed, is useful in showing any trends in wastewater management practices over the trend years.

Usage of NPDES facilities, POTWs, and other wastewater treatment methods has changed little from 1985 to 1988. Quantities treated in NPDES facilities were 85.4 percent in 1985 and 86.8 percent in 1988. Quantities discharged to POTWs were 6.7 percent in 1985 and 5.9 percent in 1988. Quantities treated by means other than in NPDES facilities or discharged to POTWs were 0.6 percent in 1985 and 0.2 percent in 1988. Usage of underground injection has changed little from 1985 to 1988. Quantities injected underground were 7.3 percent in 1985 and 7.0 percent in 1988.

1985-1988 Hazardous Wastewater Management Trends

Data from 339 plants reporting all 4 years

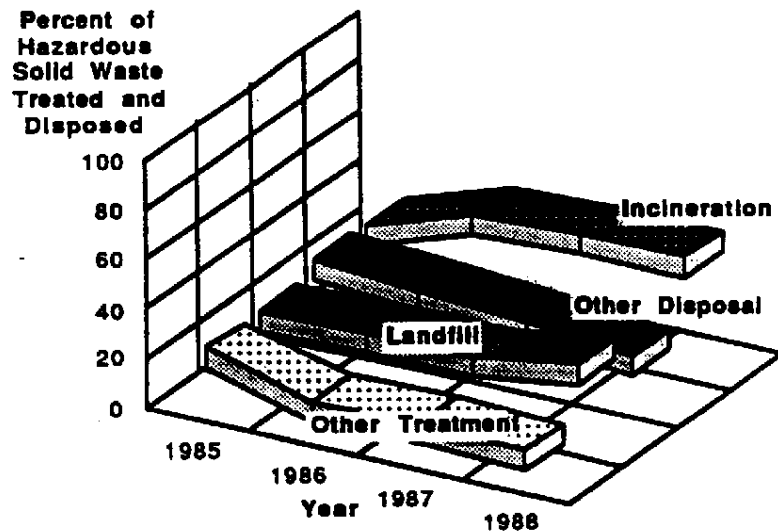
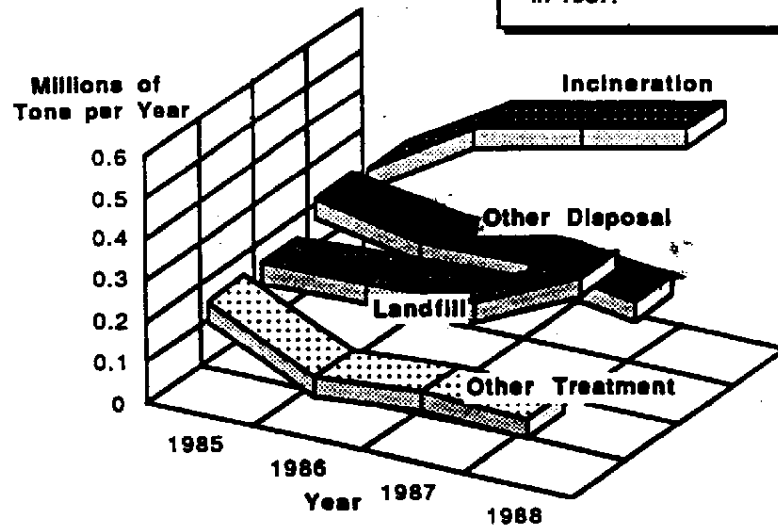


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1985-1988 Hazardous Solid Waste Management Trends

Data from 339 plants reporting all 4 years. Excludes recycled wastes in 1985-1988 and 200,000 tons cleanup wastes in 1987.

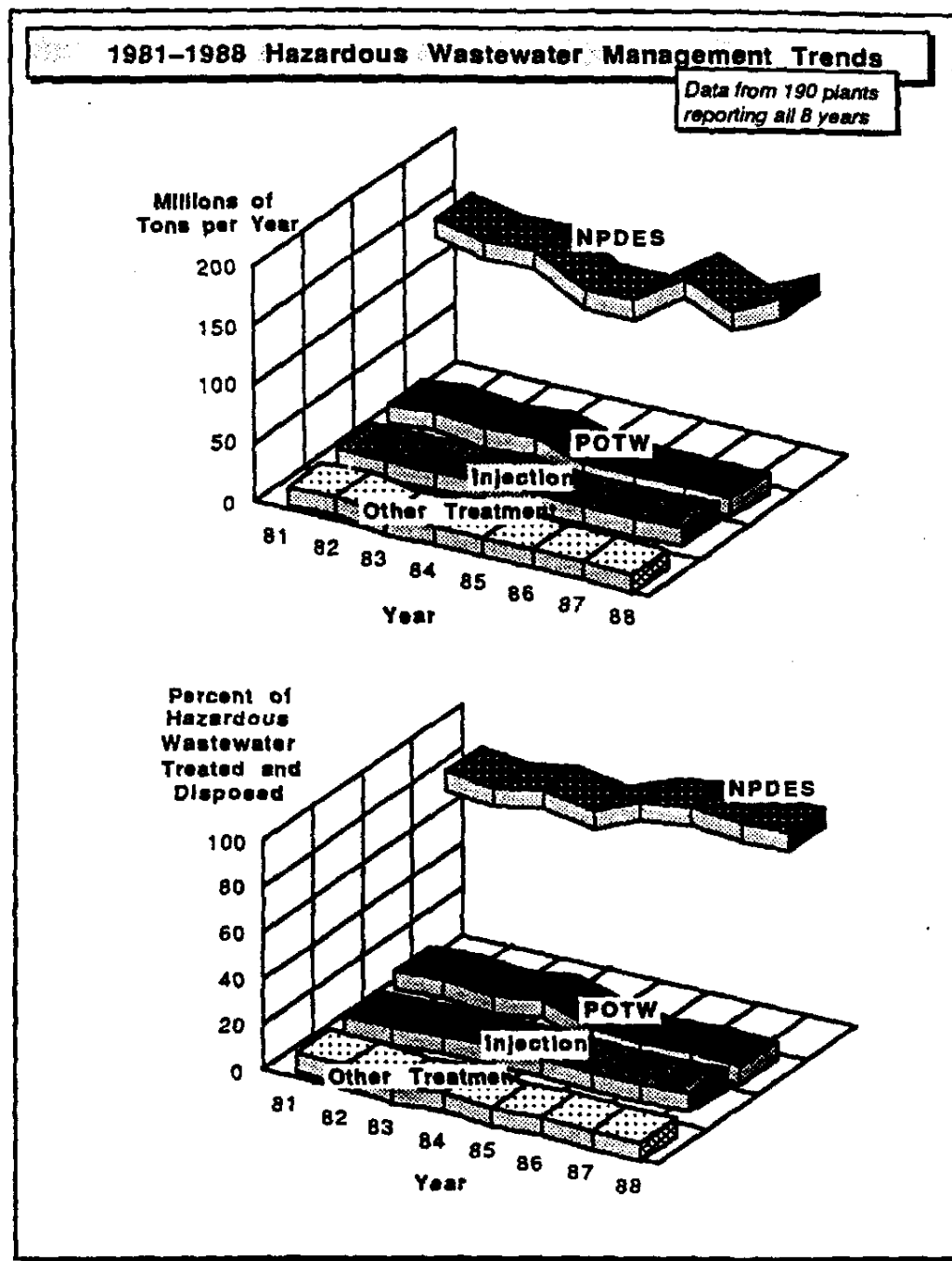


1985-1988 Solid Waste Trends

The trends in solid waste quantities for the 1985-1988 trend years are shown in the figure on the facing page. The lower half of the figure, which presents solid waste quantities managed by different practices as a percentage of the total solid waste treated and disposed, is useful in showing any trends in solid waste management practices over the trend years. The percentages exclude waste quantities that obscure trends. *The excluded quantities are the impoundment cleanup waste in 1987 and recycled wastes in 1985-1988.*

Incineration has increased from 26.6 percent in 1985 to 43.3 percent in 1988 primarily because there were increases from a few large wastes. Without these wastes, the percentage incinerated for 1985 through 1988, respectively was: 18.2, 34.1, 24.2, and 24.0 percent. Solid waste treatment decreased from 22.4 percent in 1985 to 9.4 percent in 1988. Most of the decrease that occurred in 1986 was when a plant changed treatment chemicals to render a waste nonhazardous. Landfill disposal was essentially the same from 1985 (22.2 percent) through 1987 (22.9 percent). In 1988, cleanup wastes increased landfilled wastes to 29.5 percent. Disposal by means other than underground injection and landfill decreased from 28.8 percent in 1985 to 17.8 percent in 1988.

Executive Summary



1981-1988 Wastewater Trends

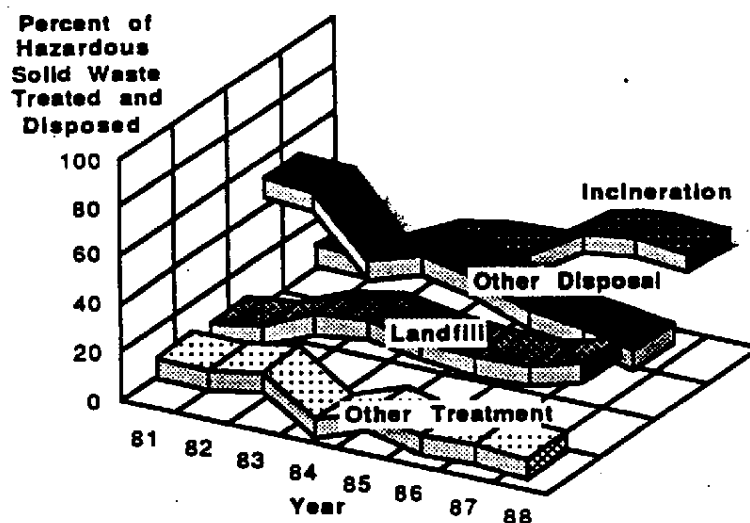
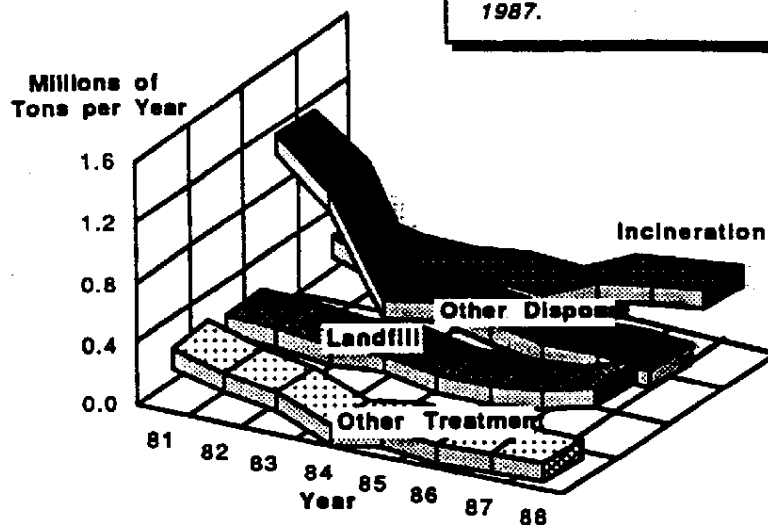
The trends in wastewater quantities for the 1981-1988 trend years are shown in the figure on the facing page. The lower half of the figure, which presents wastewater quantities managed by different practices as a percentage of the total wastewater treated and disposed, is useful in showing any trends in wastewater management practices over the trend years.

Quantities treated in NPDES facilities were 81.6 percent in 1981 and 90.1 percent in 1988. Quantities discharged to POTWs were 9.9 percent in 1981 and 3.6 percent in 1988. The quantity discharged to POTWs decreased in 1985, primarily because one plant had a wastewater reclassified as nonhazardous in that year. This decrease in discharge to POTWs caused the percentage of waste (but not the quantity) treated in NPDES facilities to increase in 1985. Since these changes in 1985, the percentage usage of NPDES facilities has increased slightly and discharge to POTWs has decreased correspondingly. Quantities treated by means other than in NPDES facilities or discharged to POTWs were 3.3 percent in 1981. Since 1983, usage of treatment methods other than NPDES and POTWs has remained relatively the same.

Executive Summary

1981-1988 Hazardous Solid Waste Management Trends

Data from 190 plants reporting all 8 years. Excludes recycled wastes in 1985-1988 and 200,000 tons cleanup wastes in 1987.



1981-1988 Solid Waste Trends

The trends in solid waste quantities for the 1981-1988 trend years are shown in the figure on the facing page. The lower half of the figure, which presents solid waste quantities managed by different practices as a percentage of the total solid waste treated and disposed, is useful in showing any trends in solid waste management practices over the trend years. The percentages exclude waste quantities that obscure trends. The *excluded quantities are the impoundment cleanup waste in 1987 and recycled wastes in 1985-1988.*

Incineration was essentially the same level for 1981 and 1982. Since 1982, there has been a steady increase in incineration. Most of the increases in 1986-1988 have been from a few plants with large wastes. Other solid waste treatment decreased from 14.0 percent in 1981 to 5.8 percent in 1988. Landfill disposal has fluctuated between 13.0-29.7 percent from 1981 to 1988. The recent increase in 1988 was the result of cleanup wastes. Disposal by means other than underground injection and landfill decreased from 58.4 percent in 1981 to 19.7 percent in 1988 with the largest decrease occurring between 1982 and 1983. Although the group of trend plants is different for the periods 1981-1988 and 1985-1988, both groups show the same trends in hazardous solid waste during 1985 through 1988.

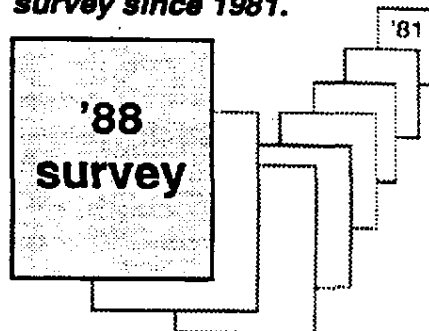
Executive Summary

Relationship of Waste Generation to Manufacturing Production

Since the 1986 survey, CMA has collected manufacturing production data from the survey respondents in an effort to normalize hazardous waste trends and to judge progress in waste minimization. As yet, the use of production data has not proved satisfactory for several reasons. The primary reasons appear to be the inherent variability between waste generation and manufacturing production and the relatively small number of plants on which to base trends. On this latter point, the number of plants is small because the evaluation must be on a common basis — on those plants that have provided data on *generation and production* for *all* years of the survey. CMA intends to continue to collect data, however, including production, to broaden the database so that it can be used to give perspective to hazardous waste generation — particularly in waste minimization and overall trends for the chemical industry.

Since 1981, the Chemical Manufacturers Association (CMA) has conducted an annual hazardous waste survey of its member companies to characterize the waste generation and management practices of the chemical industry with primary Standard Industrial Classification (SIC) 2800. Trends in waste generation and management practices are very important, as they reflect the industry's response to environment concerns related to hazardous waste management.

**CMA has
conducted this
survey since 1981.**



The CMA hazardous waste survey has always included a core set of questions in three areas: generation, treatment, and disposal. Since 1985, with the revised solid waste definition at 40 CFR (Code of Federal Regulations) 261.2, recycle has been included in the core. Besides these areas, CMA has continually used the survey as a means of collecting data for proposed or anticipated hazardous waste regulation.

The 1988 survey covered these areas: hazardous waste generation and management; the Organic Toxicity Characteristic (OTC); corrective action; and nonhazardous waste generation and management and surface impoundment inventory. A copy of the 1988 survey form is in *Appendix C*.

Much of the data presentation is in tables and figures, consistent with the earlier CMA survey reports which generally follows the format of the survey form. First, a general description of the companies and their plants that participated in the survey is given. Then follows generation and management practices and finally, trend analyses based on the CMA surveys since 1981.

Because many reported values are estimated waste quantities, the values in this report should be interpreted as having *only three significant figures*. Most of the waste quantities in this report were not rounded to three significant digits to avoid round-off errors in the sums presented in the tables.

In the trend analyses shown in this report, waste generation and waste management do not balance in the 1981-1984 period. This occurred as a result of waste in storage at the beginning or end of a survey year and math errors. Since 1984, survey responses have been checked for imbalances and followup calls are made to the survey respondents.

Survey Response

Number of Participants

Participation in the 1988 survey is summarized in Figure 1 and Table 1. Table 1 also gives a summary of survey participation since 1981.

Plants

- ◆ Five hundred and eighty-two (582) plants responded to the 1988 survey. Only 66 of these plants were first-time respondents, not having participated in the survey before.

Companies

- ◆ Seventy-seven (77) companies responded to the 1988 survey, representing about 40 percent of CMA's member companies. Participation in the survey by major chemical companies has always been high and as such, provides a realistic view of hazardous waste generation and management practices in this industry. This year, for example, thirty-five (35) of these 77 companies were in the top 50 chemical companies in sales for 1988 (*Chemical and Engineering News*, June 19, 1989).
- ◆ One hundred and fifty (150) companies have participated in CMA's survey since the survey started in 1981.

Survey Participation

CMA Waste Survey '88

- ◆ 582 plants from 77 different companies participated
- ◆ 35 of these 77 companies were in the top 50 chemical companies in sales for 1988*

*Source: *Chemical and Engineering News*, June 19, 1989

Figure 1

Trend Plants

- ◆ Trend analyses in this report are based on two periods, 1981-1988 and 1985-1988. Plants were used in a trend analysis only if they had responded every year during a trend period. There were 190 plants for the 1981-1988 trend analysis and 339 plants for the 1985-1988 trend analysis.
- ◆ As shown in Table 1 under *Plants responding every year since 1981*, the number of plants available for trend analysis has decreased with time. Each year some plants drop from the trend group because they close, stop production, are no longer a CMA member, or simply choose not to participate.

Survey Response

Number of Participants

Survey Participation*
1981-1988
(Table 1)

Year	Number of...									
	81	82	83	84	85	86	87	88		
Plants responding	535	528	721	722	684	559	555	582		
Plants responding for the first time	535	4	300	187	50	72	57	66		
Companies responding**	75	74	95	85	80	60	66	77		
Top 50 companies in sales responding†	33	33	34	37	36	33	35	35		
Plants responding every year since 1981	—	524	409	334	306	231	212	190		
Plants responding every year since 1985	—	—	—	—	—	467	387	339		

* These numbers may differ from previous survey reports because some plants have filled gaps in their survey responses or company ownership changed after a survey report was published. ** One hundred and fifty (150) companies have participated in CMA's survey since the survey started in 1981. † Source: Chemical and Engineering News

Survey Response

Primary SICs

Only plants in SIC major group 28, *Chemicals and Allied Products*, are in the 1988 survey. Each plant reported its primary SIC within this group.

Frequency of Occurrence

- ◆ The number and percentage of survey plants by primary SIC are listed in Table 2. As shown below, three SICs accounted for over 50 percent of the plants:

Most Frequently Reported Primary SICs (as Percentage of Survey Plants)		
2869	<i>Miscellaneous Industrial Organic Chemicals</i>	23%
2821	<i>Plastics Materials, Synthetic Resins</i>	18%
2819	<i>Miscellaneous Industrial Inorganic Chemicals</i>	15%

Waste Generation

- The most frequently reported SIC did not always relate to the highest sum of hazardous waste reported (see table of hazardous waste generation by SIC in *Appendix A*). The three highest quantities of solid waste and wastewater generated by primary SIC are shown below:

Highest Hazardous Solid Waste Generation by Primary SIC (as Percentage of Total Hazardous Solid Waste)		
2823	<i>Cellulosic man-made fibers</i>	62%
2869	<i>Miscellaneous industrial organic chemicals</i>	20%
2821	<i>Plastics materials and synthetic resins</i>	5%

Highest Hazardous Wastewater Generation by Primary SIC (as Percentage of Total Hazardous Wastewater)		
2869	<i>Miscellaneous Industrial Organic Chemicals</i>	63%
2800	<i>Chemicals and allied products</i>	11%
2812	<i>Alkalies and chlorine industrial gases</i>	9%

Primary 2800 SICs
of Survey Respondents in 1988
(Table 2)

Primary SIC	Product Type	Plants	
		Number	Percentage
2869	Miscellaneous Industrial Organic Chemicals	136	23.4%
2821	Plastics Materials, Synthetic Resins	108	18.6%
2819	Miscellaneous Industrial Inorganic Chemicals	89	15.3%
2812	Alkalies and Chlorine Industrial Gases	32	5.5%
2865	Cyclic Crudes and Intermediates	30	5.2%
2879	Miscellaneous Pesticides and Agricultural Chemicals	27	4.6%
2899	Miscellaneous Chemicals and Chemical Preparations	24	4.1%
2824	Synthetic Organic Fibers	21	3.6%
2891	Adhesives and Sealants	14	2.4%
2843	Surface Active and Finishing Agents	12	2.1%
2851	Paints, Varnishes, Lacquers	12	2.1%
2834	Pharmaceutical Preparations	9	1.5%
2873	Nitrogenous Fertilizers	9	1.5%
2893	Printing Ink	8	1.4%
2816	Inorganic Pigments	7	1.2%
2822	Synthetic Rubber	7	1.2%
2800*	Chemicals and Allied Products	6	1.0%
2833	Medicinal Chemicals, Botanical Products	6	1.0%
2874	Phosphatic Fertilizers	5	0.9%
2844	Perfumes, Cosmetics, Toilet Preparations	4	0.7%
2895	Carbon Black	4	0.7%
2841	Soap and Other Detergents	3	0.5%
2813	Industrial Gases	2	0.3%
2823	Cellulosic Man-made fibers	2	0.3%
2842	Specialty Cleaning, Polishing	2	0.3%
2831	Biological Products	1	0.2%
2835	In-vitro and In-vivo Diagnostic Substances	1	0.2%
2892	Explosives		

* May include research and development facilities, or plant reported general code instead of specific SIC.

Generation and Management

This section begins with an overview of generation and management from the 1988 survey. Following the overview are more detailed descriptions of the management practices for hazardous wastewater and hazardous solid waste.

The 1988 survey divided hazardous waste into two categories, solid waste and wastewater, even though every hazardous waste under RCRA (Resource Conservation and Recovery Act) hazardous waste regulations is first defined as a *solid* waste. This was done because the volume of wastes that are mostly water, are much larger the other type of wastes that are more typically thought of as *solid* (including sludges and nonaqueous liquids) and mask any trends in these latter wastes. The survey respondents were asked to put their hazardous waste into these two categories.

The survey divides wastes into two categories—solid waste and wastewater

Because many *solid wastes* contain water, there has been confusion for some respondents about the category to which a particular waste should be assigned. To avoid confusion, the 1988 questionnaire defined wastewaters as *wastes that are treated by an NPDES permitted treatment plant, discharged to a Publicly-Owned Treatment Works (POTW), wastewaters that are disposed by underground injection, and any other aqueous waste the respondent would view as a wastewater.*

Wastewater is defined here as wastes treated by an NPDES plant or sent to a POTW, underground injected wastewaters, and other aqueous wastes.

This definition was solely for the purpose of categorizing responses to the survey — it does not represent a regulatory distinction. In the case of POTWs, even though they must also have NPDES permits, they are called out separately as a management practice.

~~Solid waste~~, defined here as all other hazardous wastes not fitting the survey definition of wastewater, is not intended to be consistent with EPA's RCRA definition of solid waste. Hazardous solid waste by the survey definition, is referred to in the report tables as *solid (non-wastewater) waste*. Hazardous solid waste plus hazardous wastewater (both as defined here) equals the sum total of waste defined as hazardous under RCRA and those added in state regulations (state only).

Since the 1985 survey, respondents have been allowed to separate underground injection disposal into either solid waste or wastewater categories. Prior to 1985, both solid waste and wastewater could be reported as underground injected, but only as a lumped quantity. The quantity of solid waste reported as underground injected, however, has typically been a very small percentage of the total quantity of solid waste generated and has little impact on the comparisons between surveys.

Prior to 1985, recycled wastes were not defined as RCRA solid wastes and therefore were not in the pre-1985 surveys as hazardous wastes. These recycled wastes added significantly to the total hazardous solid waste generation during 1986-1988 where large quantities of recycled wastes were reported by only a few plants. The recycled wastes have caused large fluctuations in the trends of hazardous solid waste since 1985. In many cases, these wastes had been generated prior to 1985. Their abrupt appearance in 1985 or later, (*later — in the case of a state adopting the revised definition after 1985*), following the broadening of the solid waste definition, causes an *apparent* increase in the generation of hazardous solid waste. To add to the erratic nature of this category, plants may receive variances for these wastes under 40 CFR 260.30, and the recycled wastes drop out of the generation quantities in subsequent years when this happens. These situations are noted in this report where they affect the interpretation of the data.



Generation and Management

Overview

A general overview of the 1988 survey data is presented here in Figure 2 and Table 3. The *detail* of the data in each section of Table 3 is discussed in later tables of the report.

Total Generation

The 582 survey respondents reported generation of 219.9 million tons of hazardous waste in 1988. As shown in Figure 2, this total consists of:

- ◆ 213.2 million tons hazardous wastewater, and
- ◆ 6.7 million tons hazardous solid waste.

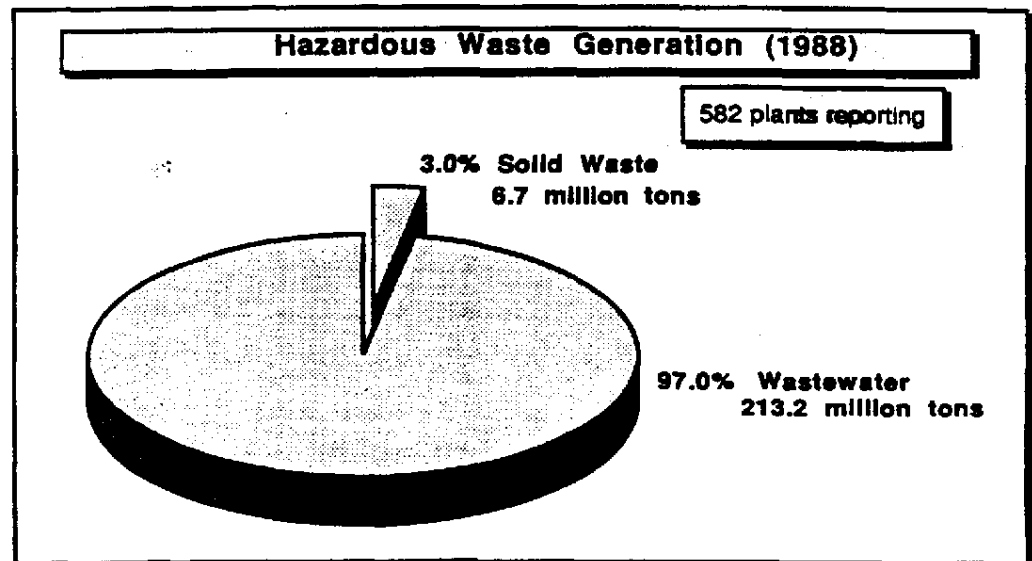


Figure 2

Zero or Less Than 0.5-Ton Generators

Of the 582 plants reporting, there were 86 plants (15 percent) that either did not generate any hazardous waste or generated less than 0.5 tons (*see Appendix B for listing by SIC*).

Generation and Management (1988)
Overview
(Table 3)

Total number of survey plants = 582			
Percent of Total	Quantity (tons)	Wastewater and Solid Waste Generated	(219,862,180 tons)
Generation			
Subdivided as wastewater and solid waste	213,190,918	97.0	
Wastewater			
Solid waste	6,671,262	3.0	
Subdivided as RCRA and state waste			
RCRA waste	218,144,582	99.2	
State waste	1,717,596	0.8	
Management			
NPDES wastewater	177,171,901	80.6	
POTW (wastewater discharged to)	14,210,165	6.5	
Underground injection	20,468,757	9.3	
Other	1,254,906	0.6	
Storage at year-end	85,189	0.039	
Solid Waste			
Recycling	4,282,536	1.95	
Material reclaimed/reused/recovered			
Burned for energy recovery	758,710	0.35	
Incinerated or treated to nonhazardous	843,474	0.38	
Disposal	728,233	0.33	
Underground injection	42,785	0.02	
Storage at year-end	15,524	0.01	

Generation and Management

Overview

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Data distributions are used here to show characteristics of waste generation in the chemical industry. From these distributions, one can see just how varied waste generation is within the chemical industry. They are also useful in showing what waste generation might be for an individual plant and what is typical for the majority of chemical plants in this survey.

The variation in generation among the survey plants is extremely high. What the distributions show is that there are many plants generating little or no hazardous waste and a few plants generating very large quantities of waste. This type of data is therefore *skewed* towards the low generation rates.

The survey data show that there are many plants generating little hazardous waste and only a few plants generating very large amounts of waste.

A population of data with these characteristics is said to be skewed from the normal distribution. Conventional statistical measures such as the mean (or average) and standard deviation cannot be used with a skewed population distribution because they are misleading measures of central tendency and variability. The more appropriate statistic is the median, the value at which half of the plants generate more waste, and the other half of the plants generate less. As such, the mean waste generation rates are given in the text for information *only*.

Figures 3 through 6 present the data distributions (as cumulative probability) of the hazardous generation of the 1988 survey plants. Figures 3 and 5 include all 582 plants reporting in 1988. Figures 4 and 6 include only those plants that generated greater than 0.5 tons of hazardous waste in 1988. The curves illustrate the *skewed* nature of the population of waste generation rates. The characteristics of the data distributions are consistent with the previous CMA hazardous waste surveys.

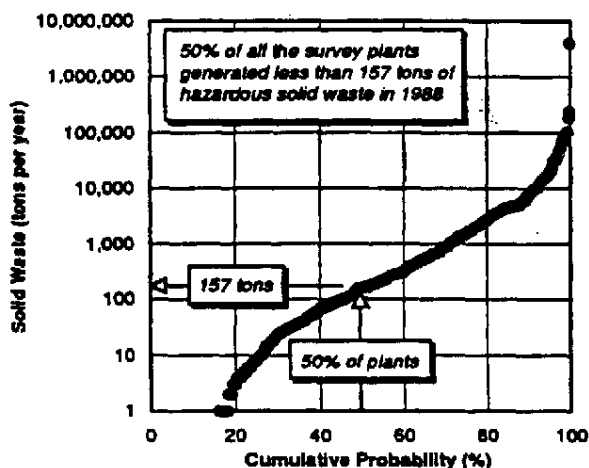
Hazardous Solid Wastes

Figure 3 shows that 50 percent of the plants generated less than 157 tons of hazardous solid waste in 1988 (median value). The mean value for hazardous solid waste generation was 11,463 tons in 1988.

Sixteen (16) percent of the survey plants (93 out of 582) reported generating no hazardous solid waste or less than 0.5 tons. When only generators of more than 0.5 tons of solid waste are grouped, Figure 4 shows that 50 percent of these plants generated less than 285 tons of hazardous solid waste in 1988 (median value). The mean value for these plants was 13,643 tons per year.

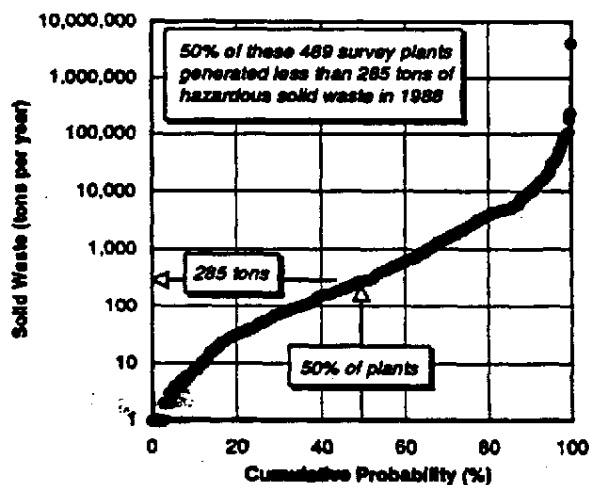
**Hazardous Solid Waste Generation (1988)
All Survey Plants**

Figure 3



**Hazardous Solid Waste Generation (1988)
Only Plants with Greater Than 0.5 Tons**

Figure 4



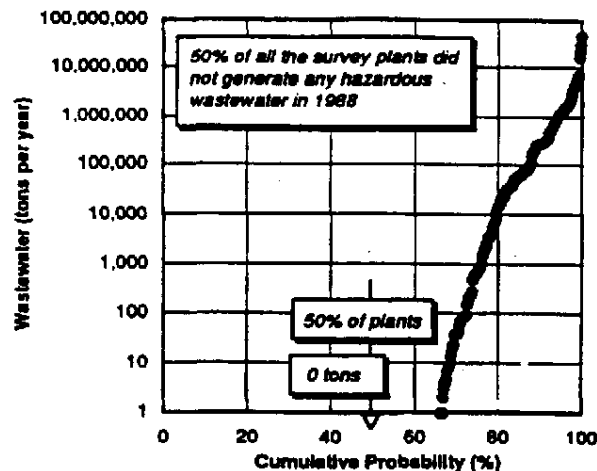
Hazardous Wastewater

Figure 5 shows that 50 percent of the plants generated less than 0.5 tons of hazardous wastewater in 1988 (median value). The mean value for hazardous wastewater generation was 366,307 tons per year. The wastewater mean is equivalent to a 0.24 million gallons per day flow.

Sixty-six (66) percent of the survey plants (385 out of 582) reported generating no hazardous wastewater or less than 0.5 tons. When only generators of more than 0.5 tons of wastewater are grouped, Figure 6 shows that 50 percent of these plants generated less than 38,050 tons of hazardous wastewater per year (median value). This wastewater quantity is equivalent to a 0.025 million gallons per day flow. The mean value for these plants was 1,082,187 tons per year. This wastewater quantity is equivalent to a 0.71 million gallons per day flow.

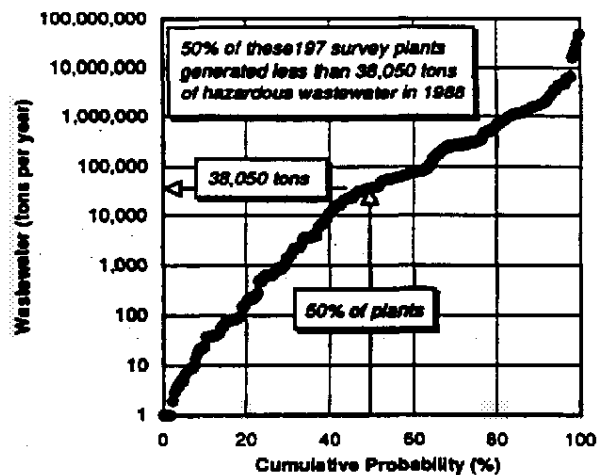
Hazardous Wastewater Generation (1988)
All Survey Plants

Figure 5



Hazardous Wastewater Generation (1988)
Only Plants with Greater Than 0.5 Tons

Figure 6



Generation and Management

Domestic Sewage Exclusion

The DSE excludes materials as *solid* wastes after they are mixed with domestic sewage (40 CFR 261.4(a)(1)(ii)) and treated at a POTW. Because a material must be defined as a solid waste before the determination is made that the material is a hazardous waste, the DSE effectively defines a material as nonhazardous at the same time that it excludes it from being defined as a solid waste. Survey respondents were asked to report those wastes that they did not include in their hazardous waste quantities because of the DSE. Such materials were not reported in this survey as hazardous wastes and are not included in any of the hazardous waste data shown in other tables of this report. The data reported by plants in the 1988 survey were gathered in an attempt to gain insight into DSE practices.

Twenty (20) plants of the 582 survey respondents reported discharging wastewaters to a POTW under the DSE. The total DSE wastewater reported by these plants was 11.3 million tons per year. As shown in Figure 7, twelve plants (12) reported discharging 1.7 million tons of wastewater that would have been hazardous by *characteristic* if not exempt under the DSE (15 percent of the total DSE wastewaters). Nine (9) plants reported discharging 9.6 million tons of wastewater that would ~~have been hazardous by listing~~ if not exempt under the DSE. This would include *listed* wastewaters, wastewaters that are a *mixture* of a listed wastewater with a nonhazardous or characteristically-hazardous wastewater, and wastewaters *derived* from a listed wastewater.

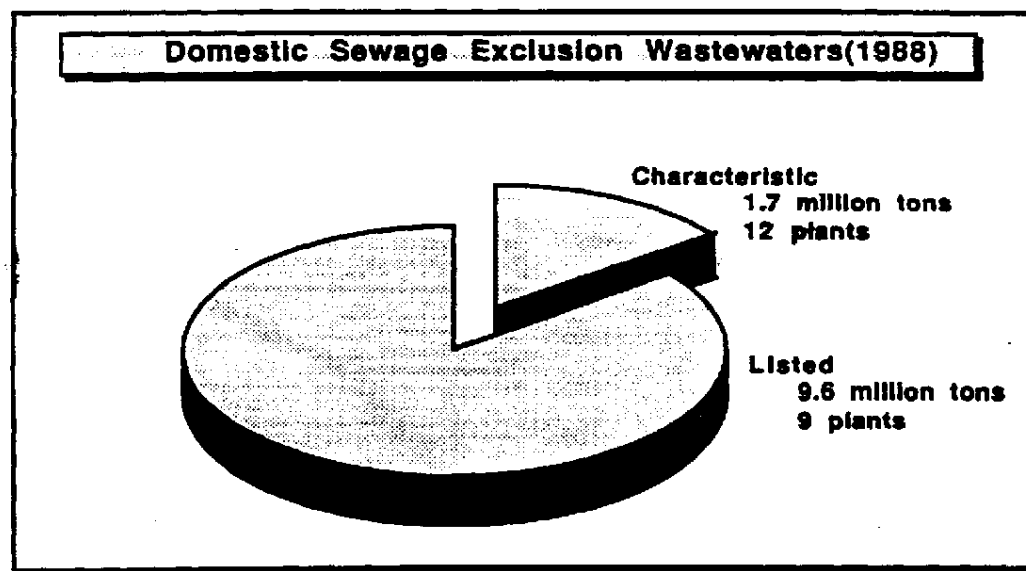


Figure 7

Because many *solid wastes* contain water, there has been confusion for some respondents about the category to which a particular waste should be assigned. To avoid confusion, the 1988 questionnaire defined wastewaters as *wastes that are treated by an NPDES permitted treatment plant, discharged to a Publicly-Owned Treatment Works (POTW), wastewaters that are disposed by underground injection, and any other aqueous waste the respondent would view as a wastewater.*

Wastewater is defined here as wastes treated by an NPDES plant or sent to a POTW, underground injected wastewaters, and other aqueous wastes.

This definition was solely for the purpose of categorizing responses to the survey — it does not represent a regulatory distinction. In the case of POTWs, even though they must also have NPDES permits, they are called out separately as a management practice. The POTW quantities do not include wastes reported by respondents under the DSE.

This wastewater section begins with an overview of hazardous wastewater generation and management practices. Separate discussions of the treatment and disposal management practices then follow.

Hazardous Wastewater

Overview

Table 4 is an overview of the hazardous wastewater generation and management practices of the 1988 survey plants, showing waste quantities and number of plants in each category. In addition, the waste quantity in each category is shown as a percentage of hazardous wastewater generated by the survey plants.

Generation

- ◆ 213.2 million tons of hazardous wastewater were generated. Of this total, only a very small percentage remained in storage (0.04 percent) awaiting treatment or disposal at the end of 1988.
- ◆ 99.2 percent of the hazardous wastewater was RCRA-defined hazardous waste. The remaining 0.8 percent was state-defined hazardous waste.
- ◆ 30.0 percent of the hazardous wastewater was hazardous by characteristic. The remaining 70.0 percent was hazardous by listing. Listed wastewaters contain nonhazardous wastes that were mixed with listed wastewaters (*mixtures*) and wastewaters *derived from* listed wastes.
- ◆ 0.3 percent was generated by site cleanup activities from RCRA, CERCLA, or other remedial actions.
- ◆ The sludge from wastewater treatment that also remained hazardous is not shown in Table 4 because it was reported as a *solid* waste in the survey.

Management

Figure 8 shows the percentages of hazardous wastewater that were treated and disposed. Wastewater treatment included NPDES and POTW facilities and other treatment practices. Disposal was by underground injection.

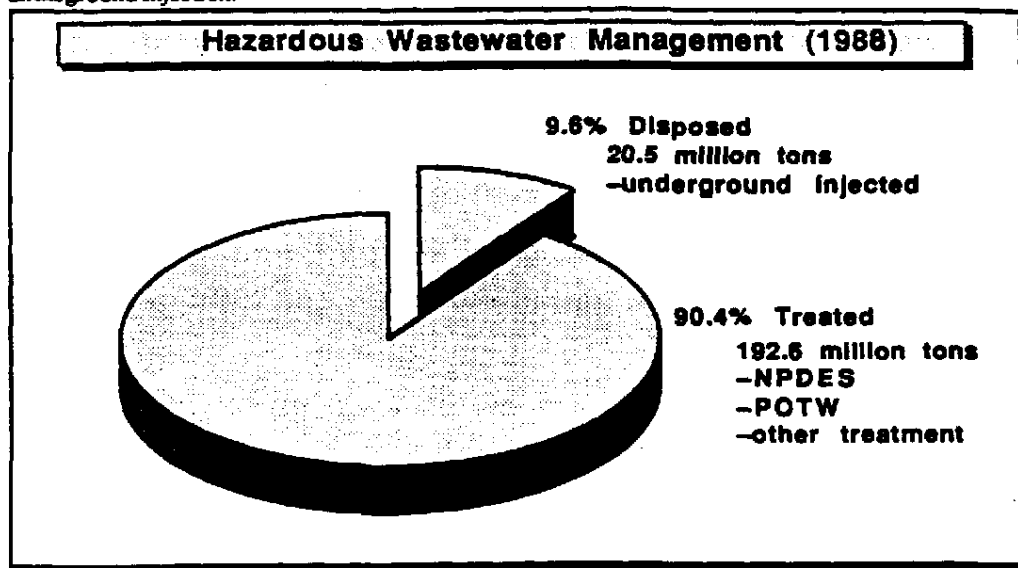


Figure 8

Hazardous Wastewater (1988)
Overview
(Table 4)

	Quantity (tons)	Number of Plants	Percent of Wastewater Generated (213,190,918 tons)
Generation			
Subdivided as RCRA and state waste			
RCRA	211,551,340	187	99.2
State	1,639,578	18	0.8
Subdivided as characteristic and listed			
Characteristic	63,941,771	158	30.0
Listed/Mixture	149,249,147	67	70.0
Management*			
NPDES wastewater	177,171,901	99	83.1
POTW wastewater	14,210,165	43	6.7
Underground injection	20,468,757	33	9.6
Other treatment	1,254,906	50	0.6
Storage at year-end	85,189	16	0.04
Site cleanup wastewater			
Site cleanup wastewater included in above quantities from RCRA, CERCLA, or other remedial action	535,502	21	0.3
* Sludge from wastewater treatment that remained hazardous was reported as a solid waste.			

Hazardous Wastewater

Treatment

Table 5 is a summary of the hazardous wastewater treatment practices of the 1988 survey plants, showing waste quantities and number of plants in each treatment category. These categories are further divided into those that are company-owned by the survey plants and commercial facilities. Waste quantities are also shown as a percentage of hazardous wastewater treated by the survey plants.

As shown in Table 5, 90.4 percent of the hazardous wastewater generated by the survey plants was treated (192.6 million of 213.2 million tons). Treatment practices included: NPDES permitted facilities; discharge to a POTW; and chemical, physical, biological, incineration, and combinations of the same. 86 percent of the wastewater discharged to POTWs was treated prior to discharge to the POTWs.

Of the total hazardous wastewater treated, 98.7 percent was treated in company-owned facilities (91.8 percent NPDES facilities, 6.2 percent POTW, and 0.7 percent other methods). Commercial facilities treated the remaining 1.3 percent (0.1 percent NPDES facilities, 1.2 percent POTW, and 0.04 percent other methods).

Figure 9 shows the percentages of the different treatment practices for hazardous wastewater from this survey.

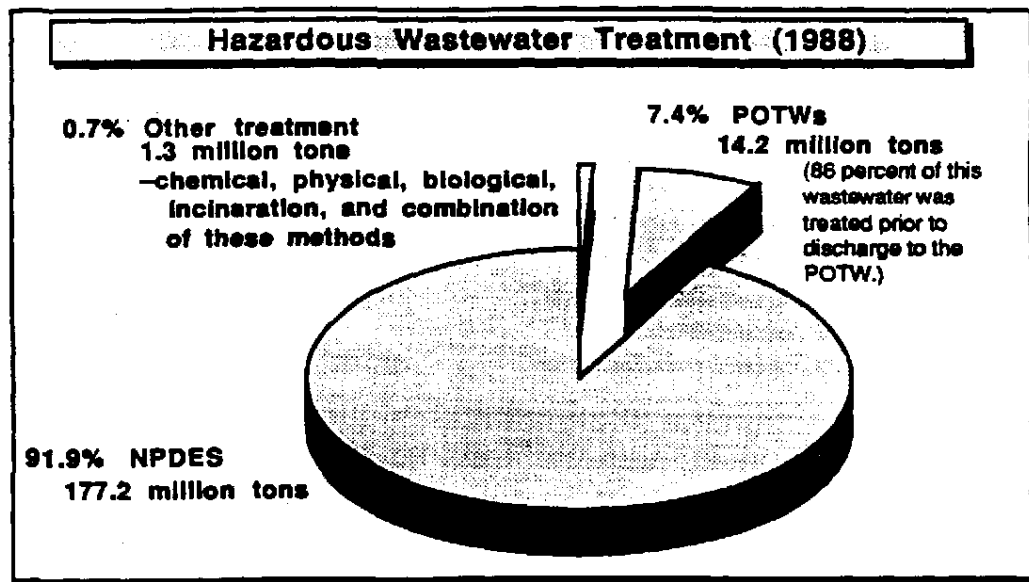


Figure 9

Hazardous Wastewater (1988)
Treatment
(Table 5)

Total Wastewater Treated (192,636,972 tons)	Company-Owned Facilities		Commercial Facilities	
	Tons	Number of Plants	Tons	Number of Plants
NPDES				
Tanks only (387 on-site tanks)	27,186,904	62	50,555	15
Wholly/partially in impoundments	149,747,753	27	186,689	3
Total NPDES				
Tons	176,934,657		237,244	
% total wastewater treated	91.6%		0.1%	
POTW				
<i>86% of the total POTW discharges was treated prior to discharge to the POTW</i>				
Tanks only (115 on-site tanks)	11,689,176	30	1,761,299	10
Wholly/partially in impoundments	301,117	2	458,573	4
Total POTW				
Tons	11,990,293		2,219,872	
% total wastewater treated	6.2%		1.2%	
Other Treatment				
Chemical	461,046	9	2,117	2
Physical	1,824	1	1,367	5
Biological	0	0	13	2
Incineration	240,921	8	1,270	7
Combination of above methods	401,089	2	14,626	5
Not specified	73,760	5	56,873	6
Total Other Treatment				
Tons	1,178,640		76,266	
% total wastewater treated	0.7%		0.04%	
Treatment Totals				
<i>Treated wastewater is 90.4% of total hazardous wastewater generated.</i>				
Tons	190,103,590		2,533,382	
% total wastewater treated	98.7%		1.3%	

Hazardous Wastewater

Disposal—Underground Injection

Table 6 is a summary of the hazardous wastewater disposal practice of underground injection of the 1988 survey plants, showing waste quantities and number of plants for facilities that are company-owned by the survey plants and commercial facilities. Waste quantities for company-owned and commercial facilities are also shown as percentages of hazardous wastewater underground injected.

As shown in Table 6, 9.6 percent of the hazardous wastewater generated by the survey plants was underground injected (20.5 million of 213.2 million tons). 93.0 percent of this wastewater was injected at company-owned facilities. The remaining 7.0 percent was injected at commercial facilities.

Hazardous Wastewater (1988)
Disposal—Underground Injection
(Table 6)

Total Wastewater Underground Injected (20,468,757 tons)	Company-Owned Facilities			Commercial Facilities		
	Tons	Number of Plants	%Total Waste Injected	Tons	Number of Plants	%Total Waste Injected
Wastewater that is underground injected is 9.6% of total hazardous wastewater generated.	19,045,794	24	93.0%	1,422,963	13	7.0%

Hazardous Solid Waste (Non-Wastewater)

The following section on hazardous solid wastes details the management practices of the 1988 survey plants. These summaries specifically exclude all hazardous wastes that are defined as wastewaters in this survey.

This solid waste section begins with an overview of generation and management practices. Separate discussions of these individual management practices then follow: recycling, treatment, and disposal.

Hazardous Solid Waste (Non-Wastewater)

Overview

Table 7 is an overview of the hazardous solid waste generation and management practices of the 1988 survey plants, showing waste quantities and number of plants in each category. In addition, the waste quantity in each category is shown as a percentage of hazardous solid waste generated by the survey plants.

Generation

- 6.7 million tons of hazardous solid waste were generated. Of this total, only a very small percentage remained in storage (0.2 percent) awaiting treatment or disposal at the end of 1988.
- ◆ 98.8 percent of the hazardous solid waste was RCRA-defined hazardous waste. The remaining 1.2 percent was state-defined hazardous waste.
- ◆ 1.6 percent of the hazardous solid waste was from site cleanup activities from RCRA, CERCLA, or other remedial actions.
- ◆ The sludge from wastewater treatment that also remained hazardous is included in the generation quantity in the table. It was 9.6 percent of the hazardous solid waste generated.

Management

Figure 10 shows the percentages of hazardous solid waste that were recycled, treated, and disposed. Recycling included material reclamation/reuse/recovery and burning for energy recovery. Treatment included incineration and other treatment methods. Disposal included landfills, surface impoundments, waste piles, underground injection (of liquids), and other disposal methods.

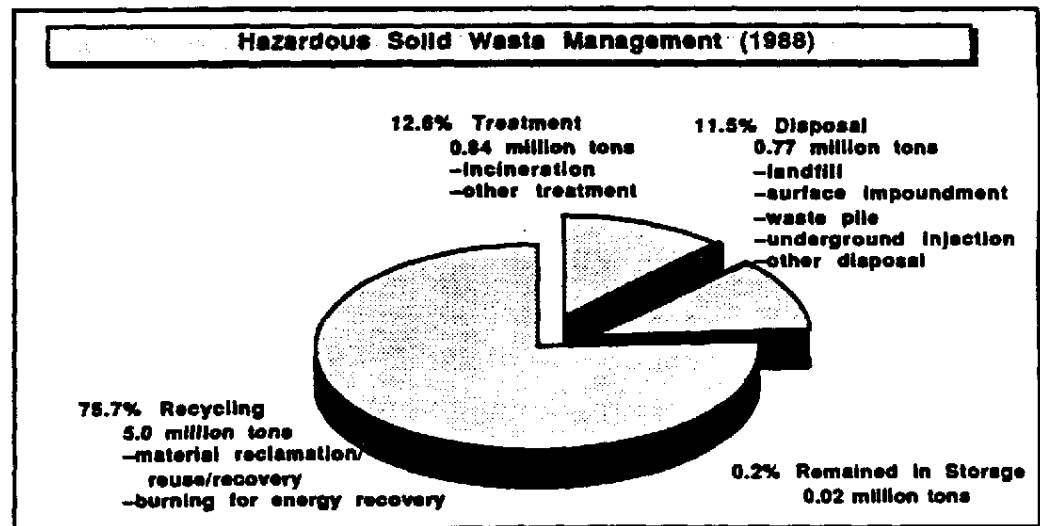


Figure 10

Hazardous Solid Waste (Non-Wastewater)

Overview

**Hazardous Solid Waste (Non-wastewater) (1988)
Overview
(Table 7)**

	Quantity (tons)	Number of Plants	Percent of Solid Waste Generated (6,671,262 tons)
Generation*			
RCRA	6,593,242	455	98.8
State	78,020	115	1.2
Management			
Material reclaimed/reused/recovered	4,282,536	201	64.3
Burned for energy recovery	758,710	178	11.4
Incineration	680,949	343	10.2
Other treatment	162,525	84	2.4
Landfill	451,810	292	6.8
Surface impoundment	185,558	6	2.8
Waste pile	40,896	1	0.6
Underground injection	42,785	20	0.6
Other disposal	49,969	10	0.7
Storage at year-end			
	15,524	10	0.2
Site cleanup solid waste			
Site cleanup solid wastes included in generation from RCRA, CERCLA, or other remedial action	104,803	99	1.6
* Sludge from wastewater treatment that remained hazardous was reported as a solid waste. This sludge (639,768 tons) represents 9.6% percent of the total hazardous solid waste generated.			

Hazardous Solid Waste (Non-Wastewater)

Material Reclaimed/Reused/Recovered

Table 8 is a summary of the hazardous solid waste material reclamation/reuse/recovery practices of the 1988 survey plants. These wastes do not include hazardous solid waste that was burned for energy recovery (see Table 9). Table 8 shows waste quantities and number of plants for facilities that are company-owned by the survey plants and commercial facilities. Waste quantities for company-owned and commercial facilities are also shown as percentages of material reclamation/reuse/recovery.

Of the material reclaimed/reused/recovered, 98.0 percent was recycled at company-owned facilities. The remaining 2.0 percent was recycled at commercial facilities. The majority of recycled waste was recycled in company-owned facilities. On average, the larger volume wastes were recycled in company-owned facilities. The frequency of plants using commercial facilities was more than 4 times that of company-owned facilities.

More than 95 percent of the material reclaimed/reused/recovered was generated by one plant. If the largest single waste is excluded from these recycled wastes, the reduced total is 0.171 million tons. On this reduced basis, 51.2 percent was recycled in company-owned facilities while 48.8 percent was recycled in commercial facilities.

Hazardous Solid Waste (Non-wastewater) (1988)
Material Reclaimed/Reused/Recovered*

(Table 8)

	Company-Owned Facilities			Commercial Facilities		
	Tons	Number of Plants	%Total Material R/R/R**	Tons	Number of Plants	%Total Material R/R/R**
All material reclaimed/reused/recovered (total 4,262,536 tons)	4,199,012	37	98.0%	83,524	175	2.0%
Same as above without largest single waste (total 171,074 tons)	87,550	36	51.2%	83,524	175	48.8%
* Material reclaimed/reused/recovered is waste recycled, minus those wastes that are burned for energy recovery. ** Percentages are based on the total for that row. The first total (4,262,536 tons) represents the quantity reported by all the survey plants. The second total (171,074 tons) is the same, but without the single largest waste.						

Hazardous Solid Waste (Non-Wastewater)**Burning for Energy Recovery**

Table 9 is a summary of the hazardous solid waste burned for energy recovery by the 1988 survey plants. This table shows waste quantities and number of plants for facilities that are company-owned by the survey plants and commercial facilities. Waste quantities for company-owned and commercial facilities are also shown as percentages of hazardous solid waste burned for energy recovery.

As shown in Table 9, 11.4 percent of the hazardous solid generated by the survey plants was burned for energy recovery (0.759 million of 6.67 million tons). Of the waste burned for energy recovery, 81.1 percent was burned in boilers, 11.7 percent in industrial furnaces, while the remaining 7.2 was burned in units not specified by the survey plants.

Of the waste burned for energy recovery, 89.8 percent was recycled at company-owned facilities. The remaining 10.2 percent was recycled at commercial facilities.

Hazardous Solid Waste (Non-wastewater) (1988)
Burned for Energy Recovery
(Table 9)

Total Waste Burned for Energy Recovery (758,710 tons)	Company-Owned Facilities			Commercial Facilities		
	Tons	Number of Plants	%Total Waste Burned	Tons	Number of Plants	%Total Waste Burned
Boilers	606,271	70	79.9%	9,140	13	1.2%
Industrial Furnaces	62,850	16	8.3%	26,036	42	3.4%
Totals Burned for energy recovery Waste burned for energy recovery is 11.4% of total hazardous solid waste generated.	669,127	86	88.2%	35,176	55	11.8%

Hazardous Solid Waste (Non-Wastewater)

Treatment

Table 10 is a summary of the hazardous solid waste treatment practices of the 1988 survey plants, showing waste quantities and number of plants in each treatment category. These categories are further divided into those that are company-owned by the survey plants and commercial facilities. Waste quantities are also shown as a percentage of hazardous solid waste treated by the survey plants.

As shown in Table 10, 12.6 percent of the hazardous solid waste generated by the survey plants was treated (0.843 million of 6.67 million tons). Treatment practices included: incineration, chemical, physical, biological, thermal other than incineration, solidification, and combinations of these methods. Of the total hazardous solid waste treated, 89.3 percent was treated in company-owned facilities (72.5 percent incineration and 16.8 percent other treatment methods). Commercial facilities treated the remaining 10.7 percent (8.2 percent incineration and 2.5 percent other treatment methods).

Figure 11 shows the percentages of the different treatment practices for hazardous solid waste from this survey.

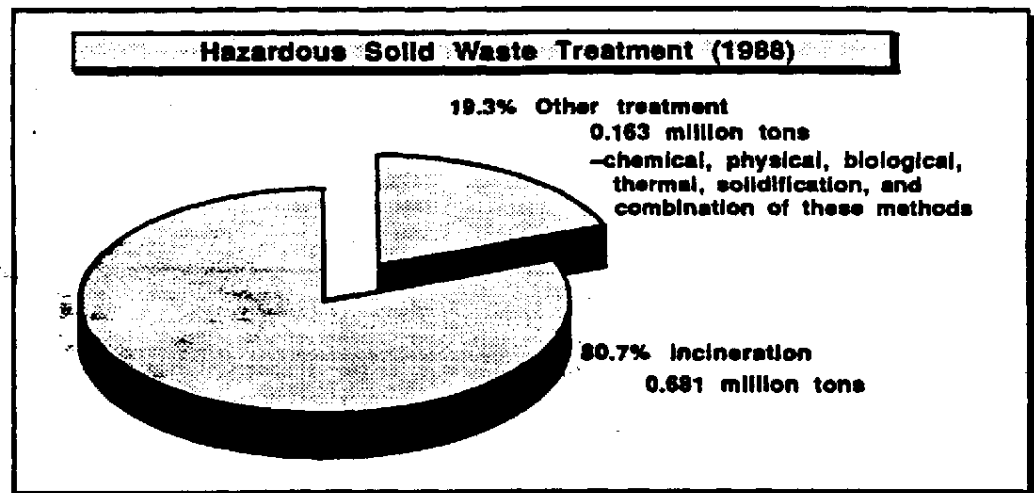


Figure 11

Hazardous Solid Waste (Non-Wastewater)

Treatment

**Hazardous Solid Waste (Non-wastewater) (1988)
Treatment
(Table 10)**

Total Solid Waste Treated (843,474 tons)	Company-Owned Facilities		Commercial Facilities	
	Tons	Number of Plants	Tons	Number of Plants
Incineration				
Tons	611,806	105	69,143	309
% total solid waste treated	72.5%		8.2%	
Other Treatment				
Chemical	40,212	8	4,528	17
Physical	83,983	4	130	2
Biological	11	3	5,187	3
Thermal	3,614	3	1,231	3
Solidification	246	2	3,804	12
Combination of above methods	12,419	7	5,230	10
Not specified	994	4	936	8
Total Other Treatment				
Tons	141,479		21,046	
% total solid waste treated	16.8%		2.5%	
Treatment Totals				
<i>Treated solid waste is 12.6% of total hazardous solid waste generated.</i>				
Tons	753,285		90,189	
% total solid waste treated	89.3%		10.7%	

Hazardous Solid Waste (Non-Wastewater)

Disposal

Table 11 is a summary of the hazardous solid waste disposal practices of the 1988 survey plants, showing waste quantities and number of plants in each treatment category. These categories are further divided into those that are company-owned by the survey plants and commercial facilities. Waste quantities are also shown as a percentage of hazardous solid waste disposed by the survey plants.

As shown in Table 11, 11.6 percent of the hazardous solid waste generated by the survey plants was disposed (0.771 million of 6.67 million tons). Disposal practices included: landfill, surface impoundment, waste pile, underground injection, and other methods (physical, biological, detonation, ocean disposal, and combinations of these methods). Of the total hazardous solid waste disposed, 64.0 percent was treated in company-owned facilities (33.4 percent landfill, 24.1 percent surface impoundment, 5.3 percent waste pile, 1.2 percent underground injection, and less than 0.1 percent other methods). Commercial facilities treated the remaining 36.0 percent (25.3 percent landfill, less than 0.1 percent surface impoundment, 4.3 percent underground injection, and 6.4 percent other methods).

Figure 12 shows the percentages of the different disposal practices for hazardous solid waste from this survey.

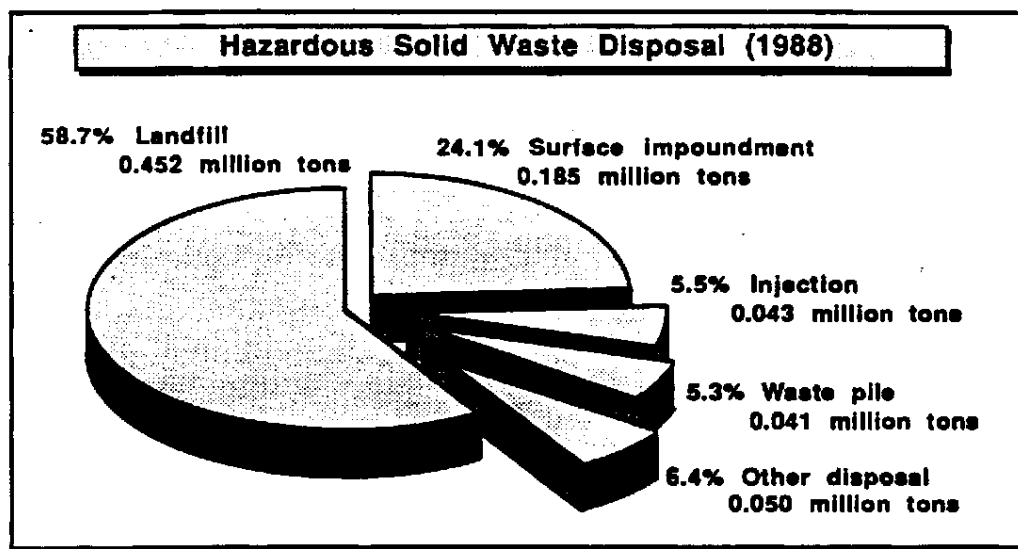


Figure 12

Hazardous Solid Waste (Non-Wastewater)

Disposal

**Hazardous Solid Waste (Non-wastewater) (1988)
Disposal
(Table 11)**

Total Solid Waste Disposed (771,018 tons)	Company-Owned Facilities		Commercial Facilities	
	Tons	Number of Plants	Tons	Number of Plants
Landfill				
Tons	257,081	30	194,729	275
% total solid waste disposed	33.4%		25.3%	
Surface impoundment				
Tons	185,512	4	46	2
% total solid waste disposed	24.1%		0.01%	
Waste pile				
Tons	40,898	1	0	0
% total solid waste disposed	5.3%		0.0%	
Underground injection (liquids)				
Tons	9,359	2	33,426	18
% total solid waste disposed	1.2%		4.3%	
Other disposal				
Physical	279	1	0	0
Biological	0	0	1,870	1
Detonation	9	1	0	0
Ocean disposal*	0	0	47,700	1
Combination of above methods	0	0	5	1
Not specified	0	0	106	5
Total Other Disposal				
Tons	288		49,681	
% total solid waste disposed	0.04%		6.4%	
Disposal totals				
Disposed solid waste is 11.6% of total hazardous solid waste generated.				
Tons	493,136		277,882	
% total solid waste disposed	64.0%		36.0%	
* Neutralization of waste hydrochloric acid				

Hazardous Solid Waste (Non-Wastewater)

Disposal

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Trend analyses in this report are based on two periods, 1981–1988 and 1985–1988. The latter period was chosen because 1985 marked the year many recycled wastes became part of the survey database. Plants were used in trend analyses only if they had responded every year during a trend period. There were 190 plants for the 1981–1988 trend analysis and 339 plants for the 1985 trend analysis. To emphasize the impact of recycled wastes during the 1985–1988 period, both the 1981–1988 and 1985–1988 trend groups were analyzed first with recycled wastes included and then without recycled wastes.

The trend analyses often show sharp changes in hazardous waste generation and management because of the actions of a few plants with large wastes. These changes are highlighted because otherwise they tend to mask more subtle trends. For example, when EPA changed the definition of a solid waste in 1985, there was a large increase in hazardous waste reported as recycled. Other reasons can be changes in plant operations or differences in regulatory interpretation. These sorts of changes for the 1981–1987 period have been noted in previous survey reports. To highlight the most recent changes, a comparison of the current survey year with the previous survey year (1987–1988) is included in this report.

Since the 1986 survey, CMA has collected manufacturing production data from the survey respondents in an effort to normalize hazardous waste trends and to judge progress in waste minimization. As yet, the use of production data has not proved satisfactory for several reasons. The primary reasons appear to be the inherent variability between waste generation and manufacturing production and the relatively small number of plants on which to base trends. On this latter point, the number of plants is small because the evaluation must be on a common basis — on those plants that have provided data on *generation and production* for *all* years of the survey. CMA intends to continue to collect data, however, including production, to broaden the database so that it can be used to give perspective to hazardous waste generation — particularly in waste minimization and overall trends for the chemical industry.

In the following sections, the comparison of plants that responded to both the 1987 and 1988 surveys is presented first. Next, the comparison of 1985–1988 trend plants is presented, and finally the 1981–1988 trend plants.

Trend Analyses

1987-1988 Comparison

Table 12 is a comparison of plants that responded to both the 1987 and 1988 surveys (471 plants). Its purpose is to highlight changes that have occurred since the 1987 survey, in particular, any unusual events that have affected waste categories. Categories for comparison are: generation, recycling, treatment, and disposal. Storage at the end of the year is presented merely to provide balance in the numbers.

Generation

- ◆ Total hazardous waste generation increased from 1987 to 1988 by 9.7 percent (19.0 million tons).
- ◆ Wastewater increased 10.3 percent (19.4 million tons).
- ◆ Solid waste decreased 5.7 percent (0.4 million tons).
- ◆ These changes occurred because of the actions of a few plants with very large wastes relative to the others in a particular category. The reasons for these changes are given in the following sections.

Recycling

- Recycling appeared to decrease by 10.6 percent because a variance from the solid waste definition was granted for one waste.

Treatment

- ◆ Waste quantities treated in NPDES facilities increased 12.1 percent. The largest part of this increase was from a plant that aggregated hazardous and nonhazardous wastewater for common treatment.
- ◆ Discharge to a POTW increased marginally by 3.3 percent.
- Wastewater treatment by means other than in NPDES facilities or by discharge to a POTW decreased by 58.0 percent. Most of this decrease came from two plants.
- Incineration increased 11.5 percent.
- Solid waste treatment by means other than incineration was essentially unchanged (1.8 percent decrease).

Disposal

- ◆ Underground injection increased 8.0 percent. Most of this increase was from reclassification of one waste.
- Landfill disposal increased by 50.8 percent. This increase is from cleanup wastes, primarily from impoundment closures and cleanouts. There were 278 plants common to 1987 and 1988 that landfilled hazardous waste. Of these 278 plants, the large cleanup wastes responsible for the landfill increase were generated by only 9 plants (3 percent of the 278 plants). For the rest of the 269 plants, landfilled wastes *decreased* by 7.2 percent from 1987 to 1988.
- ◆ Disposal by means other than underground injection and landfill decreased by 6.0 percent. This comparison excludes the 200,000 tons of cleanup waste from an impoundment in 1987.

1987-1988 Comparison

**Comparison of Hazardous Waste Generation and
Management Practices for 471 CMA Member Plants Reporting
in 1987-1988
(Table 12)**

		(million tons per year)		Percent Change from 1987
		1987	1988	
Generation				
[1]	Wastewater	188.337	207.692	10.3%
[2,3]	Solid waste	6.793	6.405	-5.7%
	Total generation	195.130	214.097	9.7%
[3] Recycling		5.477	4.898	-10.6%
Treatment				
[1]	NPDES	155.671	174.496	12.1%
	POTW discharge	12.148	12.546	3.3%
[4]	Other	2.298	0.966	-58.0%
	Total wastewater	170.117	188.008	10.5%
	Incineration	0.530	0.591	11.5%
	Other	0.163	0.160	-1.8%
	Total solid waste	0.693	0.751	8.4%
	Total treatment	170.810	188.758	10.5%
Disposal				
[5]	Underground Injection	18.235	19.700	8.0%
[6]	Landfill	0.287	0.432	50.8%
[2]	Other	0.294	0.276	-6.0%
	Total disposal	18.816	20.408	8.5%
Storage at year-end		0.027	0.032	16.7%
[1] Most of increase from one plant that aggregated hazardous and nonhazardous waste for common wastewater treatment. [2] Excludes approximately 200,000 tons from cleanout of impoundment in 1987. [3] Decrease because variance as solid waste was granted to one recycled waste. [4] Most of decrease from two plants. [5] Most of increase from reclassification of one waste. [6] Increase from cleanup waste that was landfilled in 1988 by less than 10 plants.				

Trend Analyses

1985-1988 Trends

Trends are discussed in this section mostly in the context of overall trends from 1985 to 1988 based on 339 plants responding every year during this period. Where abrupt changes occur, these are also discussed to the extent that the reason is known or there is a plausible explanation. These changes occurred because of the actions of a few plants with very large wastes relative to the others in a particular category. Table 13 shows the 1985-1988 trends *with* recycled wastes; Table 14 shows these trends *without* recycled wastes.

Generation (The solid waste generation excludes 200,000 tons of cleanup waste from an impoundment in 1987.)

- ◆ Wastewater generation increased 11.9 percent from 1985 to 1988.
- ◆ When recycled wastes are included (*see Table 13*), hazardous solid waste generation appeared to increase 230 percent from 1985 to 1988.
- ◆ When recycled wastes are NOT included in the trend analyses (*see Table 14*) hazardous solid waste generation increased 14.7 percent from 1985 to 1988.

Recycling (*see Table 13*)

- ◆ Recycled waste increased by a factor of nine from 1985 to 1986 when two plants added recycled wastes after their states adopted the 1985 EPA revised definition of solid waste in 1986. After 1986, recycled waste decreased because a variance from the solid waste definition was granted to one plant.

Treatment

- ◆ The quantity of wastes treated in NPDES facilities increased 13.7 percent from 1985 to 1988. The fluctuation in these wastes over this period was primarily the result of changes in the classification and management practices for one waste.
- ◆ Discharge to a POTW remained essentially the same from 1985 through 1988.
- ◆ Wastewater treatment by means other than in NPDES facilities or by discharge to a POTW remained essentially the same from 1985 through 1987. The decrease in 1988 was primarily from two plants.
- ◆ Incineration increased 93.1 percent from 1985 to 1988. The increases since 1985 have been primarily in wastes from a few plants.
- ◆ Solid waste treatment by means other than incineration decreased an overall 50.0 percent from 1985 to 1988. Most of the decrease that occurred in 1986 was when a plant changed treatment chemicals to render a waste nonhazardous.

Disposal

- ◆ Underground injection increased 8.1 percent from 1985 through 1988. Most of the increase from 1987 to 1988 was from the reclassification of one waste.
- ◆ Landfill disposal was essentially unchanged from 1985 to 1987. A large increase from cleanup wastes occurred in 1988.
- ◆ Disposal by means other than underground injection and landfill decreased 25.8 percent from 1985 to 1988. This comparison excludes the 200,000 tons of cleanup waste from an impoundment in 1987.

**Comparison of Hazardous Waste Generation and
Management Practices for 339 CMA Member Plants Reporting
in 1985-1988
(including recycle)
(Table 13)**

		(million tons per year)			
		1985	1986	1987	1988
Generation					
[1]	Wastewater	173.80	193.18	174.18	194.43
[2,3]	Solid waste	1.83	7.28	6.44	6.02
	Total generation	175.64	200.46	180.63	200.46
Recycling					
[3]	(see Table 14 for trends without recycled wastes)	0.67	6.20	5.25	4.69
Treatment					
[1]	NPDES	148.51	169.82	149.98	168.82
	POTW discharge	11.60	10.47	11.51	11.54
	Other	1.10	1.07	1.02	0.46
	Total wastewater	161.21	181.36	162.50	180.82
[4]	Incineration	0.29	0.44	0.50	0.56
[5]	Other	0.24	0.11	0.13	0.12
	Total solid waste	0.53	0.55	0.63	0.68
	Total treatment	161.74	181.91	163.13	181.50
Disposal					
[6]	Underground injection	12.61	11.83	11.70	13.63
[7]	Landfill	0.24	0.25	0.26	0.38
[2]	Other	0.31	0.26	0.26	0.23
	Total disposal	13.16	12.34	12.22	14.24
Storage at year-end		0.06	0.01	0.02	0.02
[1] Fluctuations during 1985-1988 period primarily from changes in management of one waste.					
[2] Excludes approximately 200,000 tons from cleanup of impoundment in 1987.					
[3] Fluctuation during 1985-1988 period from changes in classification of a few large recycled wastes.					
[4] Increase from 1985 to 1986 from one waste reclassified as hazardous. Increases in 1987 and 1988 from several plants.					
[5] Most of decrease from 1985 to 1986 from one plant that changed treatment chemicals to render waste nonhazardous.					
[6] Most of increase from 1987 to 1988 from reclassification of one waste.					
[7] Most of increase from 1987 to 1988 from cleanup waste that was landfilled by several plants.					

Trend Analyses

1985-1988 Trends

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**Comparison of Hazardous Waste Generation and
Management Practices for 339 CMA Member Plants Reporting
In 1985-1988
(excluding recycle)
(Table 14)**

		(million tons per year)			
		1985	1986	1987	1988
Generation					
[1]	Wastewater	173.80	193.18	174.18	194.43
[2]	Solid waste	1.16	1.08	1.19	1.33
	Total generation	174.97	194.26	175.37	195.76
Treatment					
[1]	NPDES	148.51	169.82	149.98	168.82
	POTW discharge	11.60	10.47	11.51	11.54
	Other	1.10	1.07	1.02	0.46
	Total wastewater	161.21	181.36	162.50	180.82
[3]	Incineration	0.29	0.44	0.50	0.56
[4]	Other	0.24	0.11	0.13	0.12
	Total solid waste	0.53	0.55	0.63	0.68
	Total treatment	161.74	181.91	163.13	181.50
Disposal					
[5]	Underground injection	12.61	11.83	11.70	13.63
[6]	Landfill	0.24	0.25	0.26	0.38
[2]	Other	0.31	0.26	0.26	0.23
	Total disposal	13.16	12.34	12.22	14.24
Storage at year-end		0.06	0.01	0.02	0.02
[1] Fluctuations during 1985-1988 period primarily from changes in management of one waste. [2] Excludes approximately 200,000 tons from cleanout of impoundment in 1987. [3] Increase from 1985 to 1986 from one waste reclassified as hazardous. Increases in 1987 and 1988 from several plants. [4] Most of decrease from 1985 to 1986 from one plant that changed treatment chemicals to render waste nonhazardous. [5] Most of increase from 1987 to 1988 from reclassification of one waste. [6] Most of increase from 1987 to 1988 from cleanup waste that was landfilled by several plants.					

Trend Analyses

Hazardous Wastewater (1985-1988)

The trends in waste quantities for the 1985-1988 trend years are shown in the top half of Figure 13 and have been discussed in the previous section on Tables 13 and 14. The lower half of the figure, which presents wastewater quantities managed by different practices as a percentage of the total wastewater treated and disposed, is useful in showing any trends in wastewater management practices over the trend years.

Treatment

As a percentage of wastewater treated and disposed for a given year:

- ◆ Usage of NPDES facilities, POTWs, and other wastewater treatment methods has changed little from 1985 to 1988.
- ◆ Quantities treated in NPDES facilities were 85.4 percent in 1985 and 86.8 percent in 1988.
- ◆ Quantities discharged to POTWs were 6.7 percent in 1985 and 5.9 percent in 1988.
- ◆ Quantities treated by means other than in NPDES facilities or discharged to POTWs were 0.6 percent in 1985 and 0.2 percent in 1988.

Disposal

As a percentage of wastewater treated and disposed for a given year:

- ◆ Usage of underground injection has changed little from 1985 to 1988.
- ◆ Quantities injected underground were 7.3 percent in 1985 and 7.0 percent in 1988.

Hazardous Wastewater (1985-1988)

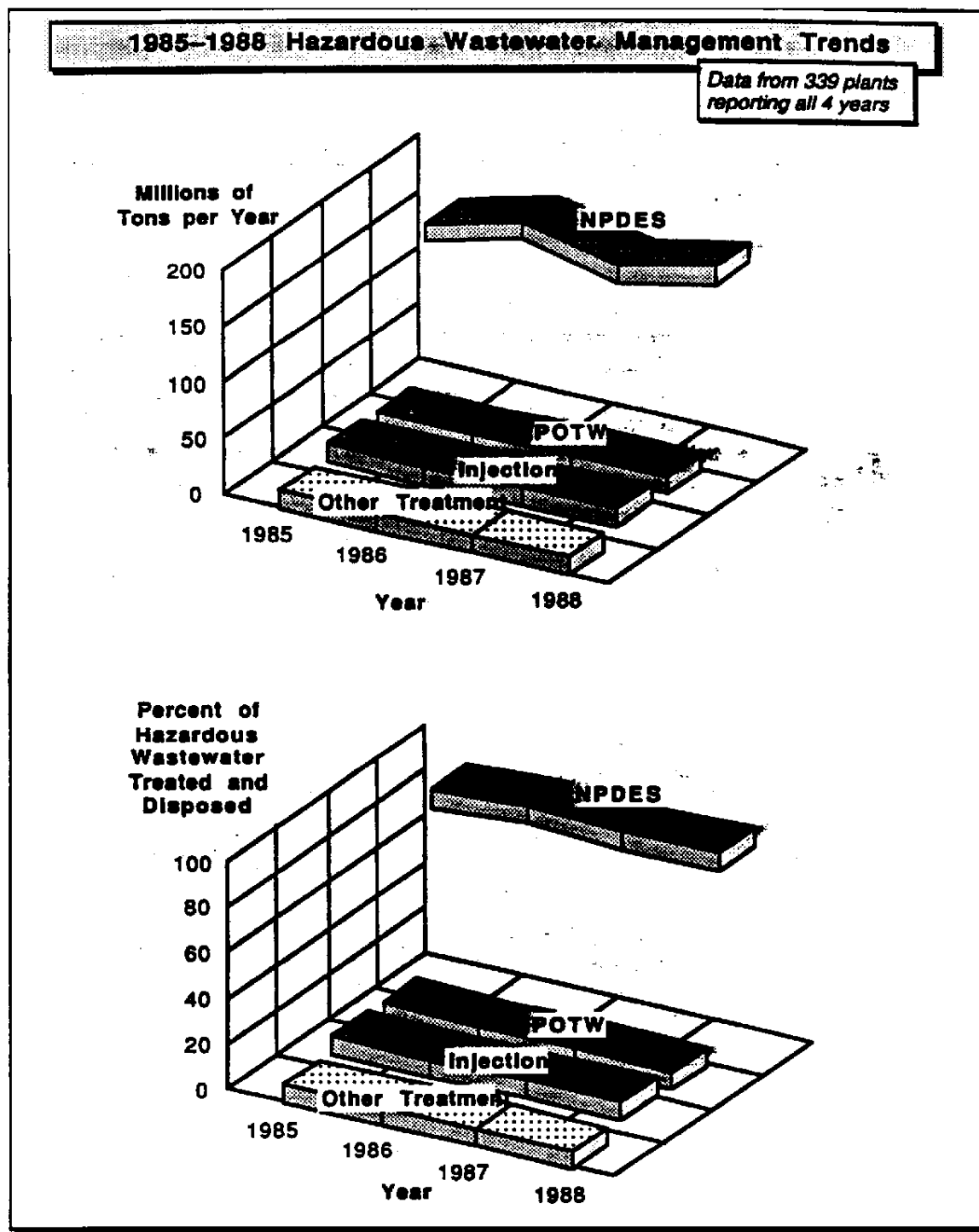


Figure 13

Trend Analyses

Hazardous Solid Waste (1985-1988)

The trends in waste quantities for the 1985-1988 trend years are shown in the top half of Figure 14 and have been discussed in the previous section on Table 14 which excluded recycled wastes. The lower half of the figure, which presents solid waste quantities managed by different practices as a percentage of the total solid waste treated and disposed, is useful in showing any trends in solid waste management practices over the trend years. The percentages exclude waste quantities that obscure trends. The *excluded quantities are the impoundment cleanup waste in 1987 and recycled wastes in 1985-1988.*

Treatment

As a percentage of total solid waste treated and disposed for a given year (*excluding an impoundment cleanup waste in 1987 and recycled wastes in 1985-1988*):

- Incineration has increased from 26.6 percent in 1985 to 43.3 percent in 1988 primarily because there were increases from a few large wastes. Without these wastes, the percentages incinerated for 1985 through 1988, respectively were: 18.2, 34.1, 24.2, and 24.0 percent.
- Solid waste treatment decreased from 22.4 percent in 1985 to 9.4 percent in 1988. Most of the decrease that occurred in 1986 was when a plant changed treatment chemicals to render a waste nonhazardous.

Disposal

As a percentage of total solid waste treated and disposed for a given year (*excluding an impoundment cleanup waste in 1987 and recycled wastes in 1985-1988*):

- Landfill disposal was essentially the same from 1985 (22.2 percent) through 1987 (22.9 percent). In 1988, cleanup wastes increased landfilled wastes to 29.5 percent.
- Disposal by means other than underground injection and landfill decreased from 28.8 percent in 1985 to 17.8 percent in 1988. This comparison excludes the 200,000 tons of cleanup waste from an impoundment in 1987.

Hazardous Solid Waste (1985-1988)

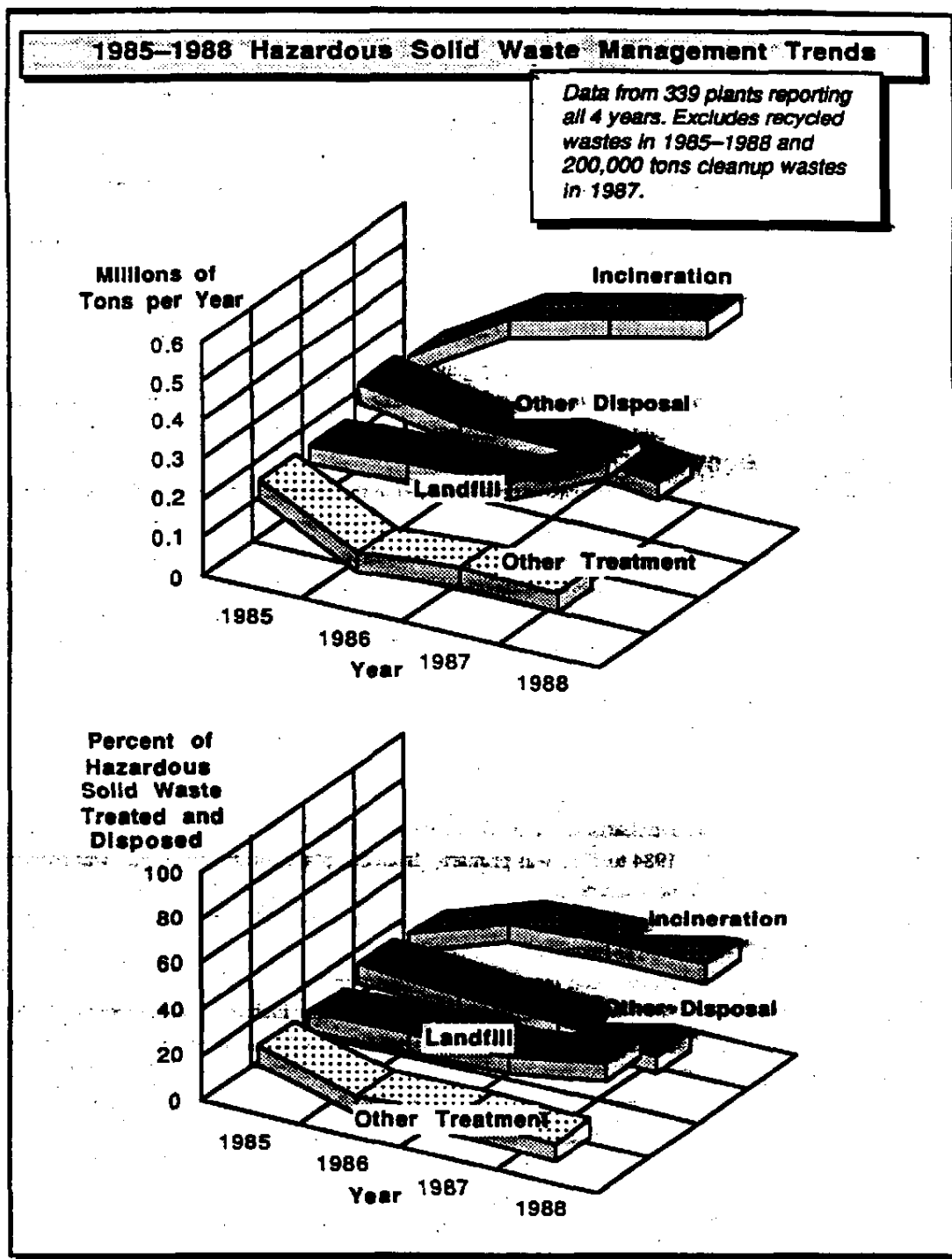


Figure 14

Trend Analyses

1981-1988 Trends

Trends are discussed in this section mostly in the context of overall trends from 1981 to 1988 based on 190 plants responding every year during this period. Where abrupt changes occur in the intervening years, these are also discussed to the extent that the reason is known or there is a plausible explanation. These changes occurred because of the actions of a few plants with very large wastes relative to the others in a particular category. Table 15 shows the 1981-1988 trends *with* recycled wastes; Table 16 shows these trends *without* recycled wastes.

Generation (The solid waste generation excludes 200,000 tons of cleanup waste from an impoundment in 1987.)

- Wastewater generation decreased 6.9 percent from 1981 to 1988.
- With the addition of recycled wastes to the hazardous waste definition (*see Table 15*), hazardous solid waste generation decreased 6.6 percent from 1981 to 1988.
- When recycled wastes are not included in the trend analyses (*see Table 16*), hazardous solid waste generation decreased 35.7 percent from 1981 to 1988.

Recycling (*see Table 15*)

- Recycled wastes first appeared in the survey in 1985 when EPA revised its definition of solid waste, making many recycled wastes subject to hazardous waste determination. In 1986, there was a large increase in the recycled quantity, primarily from one plant when its state adopted the revised solid waste definition into its hazardous waste regulations. Since then, the plant received a variance from the solid waste definition and it became nonhazardous, decreasing the quantity of hazardous recycled wastes substantially from 1986 to 1988.

Treatment

- The quantity of waste treated in NPDES facilities was essentially unchanged from 1981 to 1988. Fluctuations from 1985 to 1988 were primarily from changes in the classification and management of one waste.
- Discharge to a POTW decreased 66.5 percent from 1981 to 1988. The large decrease from 1984 to 1985 was primarily from one plant whose wastewater was reclassified as nonhazardous.
- Wastewater treatment by means other than in NPDES facilities or by discharge to a POTW decreased 94.1 percent from 1981 to 1988.
- Incineration increased 64.5 percent from 1981 to 1988.
- Solid waste treatment by means other than incineration decreased by 76.7 percent from 1981 to 1988. The increases since 1985 have been primarily in wastes from a few plants.

Disposal

- Underground injection increased by 7.0 percent from 1981 to 1988. Most of the increase from 1987 to 1988 was from the reclassification of one waste.
- Landfill disposal decreased 28.6 percent from 1981 to a low in 1985. After 1985, landfilled wastes changed little until an increase in 1988 from cleanup wastes.
- Disposal by means other than underground injection and landfill decreased by 82.1 percent from 1981 to 1988. This comparison excludes the 200,000 tons of cleanup waste from an impoundment in 1987.

1981-1988 Trends

**Comparison of Hazardous Waste Generation and
Management Practices for 190 CMA Member Plants Reporting
in 1981-1988
(including recycle)
(Table 15)**

		(million tons per year)							
		1981	1982	1983	1984	1985	1986	1987	1988
Generation									
[1]	Wastewater	172.51	168.24	172.07	143.21	130.17	156.22	139.09	160.64
[2,3]	Solid waste	1.82	1.24	0.95	0.90	1.50	3.54	2.29	1.70
	Total generation	174.33	169.48	173.02	144.11	131.67	159.77	141.38	162.34
Recycling									
[3]	(see Table 16 for trends without recycled wastes)	NA	NA	NA	NA	0.62	2.63	1.25	0.52
Treatment									
[1]	NPDES	143.36	135.26	137.64	114.04	114.90	142.25	124.27	144.72
[4]	POTW discharge	17.39	19.66	15.65	17.33	5.99	5.30	5.76	5.83
	Other	5.74	6.01	0.94	1.82	0.58	0.87	0.83	0.34
	Total wastewater	166.49	160.94	154.23	133.19	121.47	148.42	130.87	150.90
[5]	Incineration	0.31	0.22	0.23	0.26	0.24	0.40	0.46	0.51
	Other	0.30	0.22	0.16	0.02	0.08	0.05	0.07	0.07
	Total solid waste	0.60	0.44	0.39	0.28	0.32	0.45	0.53	0.58
	Total treatment	167.09	161.38	154.63	133.47	121.80	148.87	131.40	151.47
Disposal									
[6]	Underground injection	9.12	8.33	10.09	10.02	8.70	7.81	8.24	9.76
[7]	Landfill	0.28	0.27	0.24	0.26	0.20	0.21	0.24	0.34
[2]	Other	1.23	0.94	0.30	0.35	0.29	0.24	0.24	0.22
	Total disposal	10.63	9.54	10.64	10.63	9.20	8.26	8.72	10.32

[1] Fluctuations during 1985-1988 period primarily from changes in management of one waste.

[2] Excludes approximately 200,000 tons from cleanout of impoundment in 1987.

[3] Fluctuation during 1985-1988 period from changes in classification of a few large recycled wastes.

[4] Decrease from 1984 to 1985 primarily from one waste reclassified as nonhazardous.

[5] Increase from 1985 to 1986 from one waste reclassified as hazardous. Increases in 1987 and 1988 from several plants.

[6] Most of increase from 1987 to 1988 from reclassification of one waste.

[7] Most of increase from 1987 to 1988 from cleanup waste that was landfilled by several plants.

Trend Analyses

1981-1988 Trends

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**Comparison of Hazardous Waste Generation and
Management Practices for 190 CMA Member Plants Reporting
in 1981-1988
(excluding recycle)
(Table 16)**

		(million tons per year)							
		1981	1982	1983	1984	1985	1986	1987	1988
Generation									
[1]	Wastewater	172.51	168.24	172.07	143.21	130.17	156.22	139.09	160.64
[2]	Solid waste	1.82	1.24	0.95	0.90	0.88	0.92	1.04	1.17
	Total generation	174.33	169.48	173.02	144.11	131.05	157.14	140.13	161.82
Treatment									
[1]	NPDES	143.36	135.26	137.64	114.04	114.90	142.25	124.27	144.72
[3]	POTW discharge	17.39	19.66	15.65	17.33	5.99	5.30	5.76	5.83
	Other	5.74	6.01	0.94	1.82	0.58	0.87	0.83	0.34
	Total wastewater	166.49	160.94	154.23	133.19	121.47	148.42	130.87	150.90
[4]	Incineration	0.31	0.22	0.23	0.26	0.24	0.40	0.46	0.51
	Other	0.30	0.22	0.16	0.02	0.08	0.05	0.07	0.07
	Total solid waste	0.60	0.44	0.39	0.28	0.32	0.45	0.53	0.58
	Total treatment	167.09	161.38	154.63	133.47	121.80	148.87	131.40	151.47
Disposal									
[5]	Underground Injection	9.12	8.33	10.09	10.02	8.70	7.81	8.24	9.76
[6]	Landfill	0.28	0.27	0.24	0.26	0.20	0.21	0.24	0.34
[2]	Other	1.23	0.94	0.30	0.35	0.29	0.24	0.24	0.22
	Total disposal	10.63	9.54	10.64	10.63	9.20	8.26	8.72	10.32
[1] Fluctuations during 1985-1988 period primarily from changes in management of one waste.									
[2] Excludes approximately 200,000 tons from cleanout of impoundment in 1987.									
[3] Decrease from 1984 to 1985 primarily from one waste reclassified as nonhazardous.									
[4] Increase from 1985 to 1986 from one waste reclassified as hazardous. Increases in 1987 and 1988 from several plants.									
[5] Most of increase from 1987 to 1988 from reclassification of one waste.									
[6] Most of increase from 1987 to 1988 from cleanup waste that was landfilled by several plants.									

Trend Analyses

Hazardous Wastewater (1981-1988)

The trends in waste quantities for the 1981-1988 trend years are shown in the top half of Figure 15 and have been discussed in the previous section on Tables 15 and 16. The lower half of the figure, which presents wastewater quantities managed by different practices as a percentage of the total wastewater treated and disposed, is useful in showing any trends in wastewater management practices over the trend years.

Treatment

As a percentage of wastewater treated and disposed for a given year:

- ◆ Quantities treated in NPDES facilities were 81.6 percent in 1981 and 90.1 percent in 1988.
- ◆ Quantities discharged to POTWs were 9.9 percent in 1981 and 3.6 percent in 1988. The quantity discharged to POTWs decreased in 1985, primarily because one plant had a wastewater reclassified as nonhazardous in that year. This decrease in discharge to POTWs caused the percentage of waste (but not the quantity) treated in NPDES facilities to increase in 1985. Since these changes in 1985, the percentage usage of NPDES facilities has increased slightly and discharge to POTWs has decreased correspondingly.
- ◆ Quantities treated by means other than in NPDES facilities or discharged to POTWs were 3.3 percent in 1981. Since 1983, usage of treatment methods other than NPDES and POTWs has remained relatively the same.

Wastewater Disposal

As a percentage of wastewater treated and disposed for a given year:

- ◆ Usage of underground injection has fluctuated between 4.9-7.0 percent from 1981 to 1988.
- ◆ Quantities injected underground were 5.2 percent in 1981 and 6.1 percent in 1988.

Comparison to 1985-1988 Group of Trend Plants

Although the group of trend plants is different for the periods 1981-1988 and 1985-1988, both groups show the same trends in hazardous wastewater during 1985 through 1988 (see Figures 13 and 15 for comparison of 1985-1988 period).

Hazardous Wastewater (1981-1988)

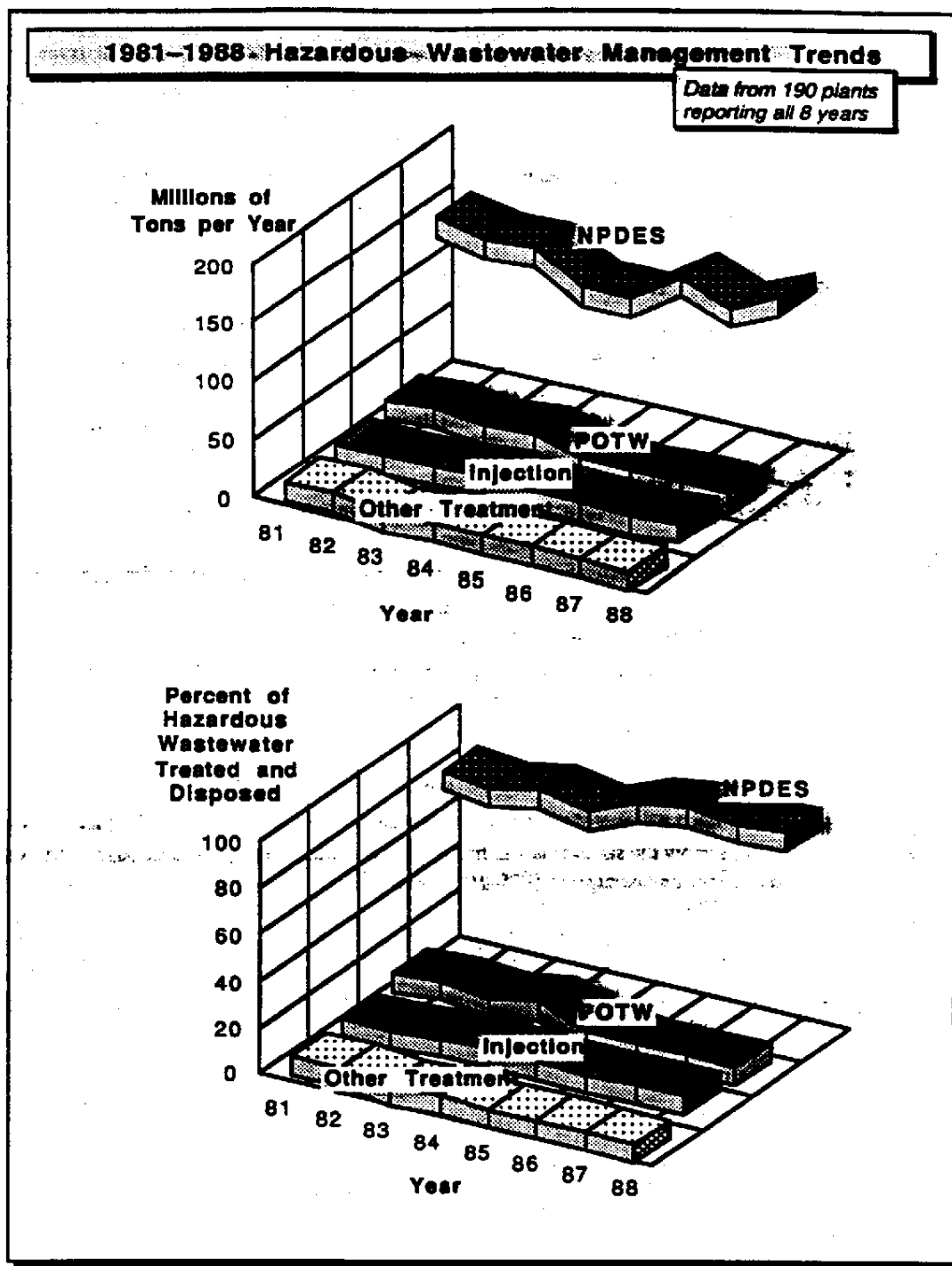


Figure 15

Trend Analyses

Hazardous Solid Waste (1981-1988)

The trends in waste quantities for the 1981-1988 trend years are shown in the top half of Figure 16 and have been discussed in the previous section on Table 16. The lower half of the figure, which presents solid waste quantities managed by different practices as a percentage of the total solid waste treated and disposed, is useful in showing any trends in solid waste management practices over the trend years. The percentages exclude waste quantities that obscure trends. The *excluded quantities are the impoundment cleanup waste in 1987 and recycled wastes in 1985-1988.*

Treatment

As a percentage of total solid waste treated and disposed for a given year (*excluding an impoundment cleanup waste in 1987 and recycled wastes in 1985-1988*):

- ◆ Incineration was essentially the same level for 1981 and 1982. Since 1982, there has been a steady increase in incineration. Most of the increases in 1986-1988 have been from a few plants with large wastes.
- ◆ Other solid waste treatment decreased from 14.0 percent in 1981 to 5.8 percent in 1988

Disposal

As a percentage of total solid waste treated and disposed for a given year (*excluding an impoundment cleanup waste in 1987 and recycled wastes in 1985-1988*):

- ◆ Landfill disposal has fluctuated between 13.0-29.7 percent from 1981 to 1988. The recent increase in 1988 was the result of cleanup wastes.
- ◆ Disposal by means other than underground injection and landfill decreased from 58.4 percent in 1981 to 19.7 percent in 1988 with the largest decrease occurring between 1982 and 1983. This comparison excludes the 200,000 tons of cleanup waste from an impoundment in 1987.

Comparison to 1985-1988 Group of Trend Plants

Although the group of trend plants is different for the periods 1981-1988 and 1985-1988, both groups show the same trends in hazardous solid waste during 1985 through 1988 (*see Figures 14 and 16 for comparison of 1985-1988 period*).

Hazardous Solid Waste (1981-1988)

1981-1988 Hazardous Solid Waste Management Trends

Data from 190 plants reporting all 8 years. Excludes recycled wastes in 1985-1988 and 200,000 tons cleanup wastes in 1987.

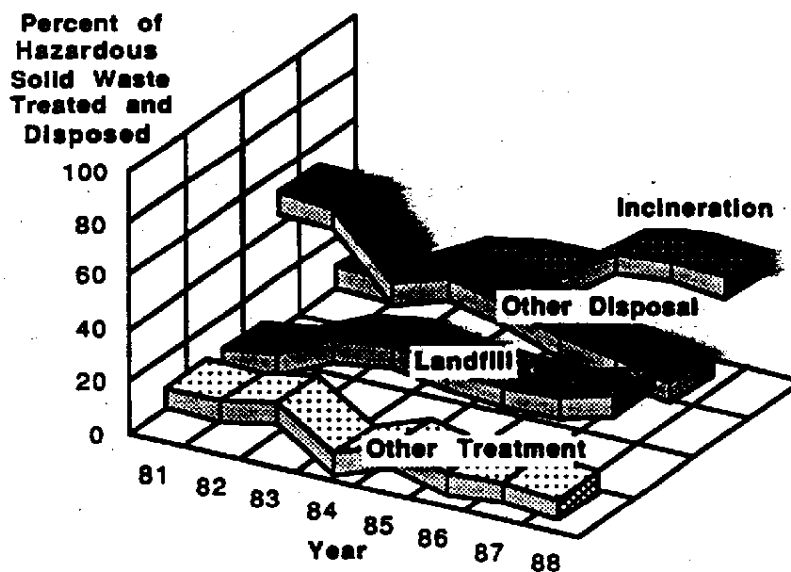
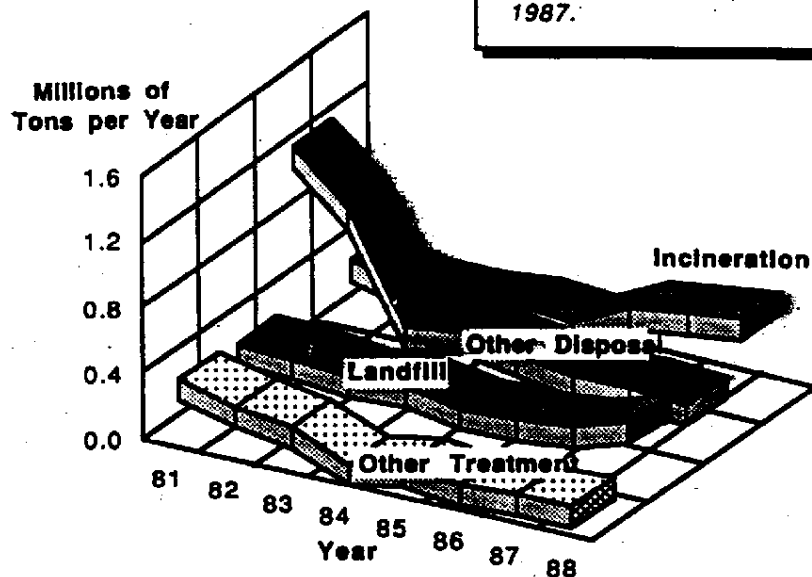


Figure 16

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Appendix A

**Hazardous Waste Generation
by SIC
(1988)**

Standard Industrial Classification			Solid Waste		Wastewater	
Group Number	Description	Industry Number	Tons	Number of Plants	Tons	Number of Plants
280	Chemical manufacturing (general)	2800	62,306		22,710,776	
		Total SIC 280	62,306	[5]	22,710,776	[2]
281	Industrial inorganic chemicals	2812	73,133		20,001,243	
		2813	86		6,678	
		2816	54,018		1,376,310	
		2819	190,614		7,414,762	
		Total SIC 281	317,851	[95]	28,798,993	[44]
282	Plastic materials and synthetic resins, synthetic rubber, synthetic and other man-made fibers, except glass	2821	314,239		6,041,102	
		2822	12,561		830,827	
		2823	4,114,883		0	
		2824	11,440		1,955,213	
		Total SIC 282	4,453,123	[122]	8,827,142	[39]
283	Drugs	2833	6,261		3,811	
		2834	56,185		2,795,911	
		2835	91		0	
		Total SIC 283	62,537	[15]	2,799,722	[4]
284	Soaps, detergents, and cleaning preparations, perfumes, cosmetics, and other toilet preparations	2841	3		0	
		2842	25		242	
		2843	2,505		18	
		2844	224		24	
		Total SIC 284	2,757	[16]	284	[3]

Appendix A

**Hazardous Waste Generation
by SIC
(1988)**

Standard Industrial Classification			Solid Waste		Wastewater	
Group Number	Description	Industry Number	Tons	Number of Plants	Tons	Number of Plants
285	Paints, varnishes, lacquers, enamels, and allied products	2851	35,930		14,325	
		Total SIC 285	35,930	[11]	14,325	[7]
286	Industrial organic chemicals	2865	68,482		8,133,672	
		2869	1,358,940		134,387,381	
		Total SIC 286	1,428,422	[155]	142,521,053	[71]
287	Agricultural chemicals	2873	5,271		0	
		2874	144		0	
		2879	292,102		7,427,491	
		Total SIC 287	297,517	[31]	7,427,491	[18]
289	Miscellaneous chemical products	2891	2,344		329	
		2892	1,165		634	
		2893	230		16	
		2895	11		0	
		2899	10,069		90,153	
		Total SIC 289	13,919	[39]	91,132	[12]
Total for all SICs			6,671,262	[489]	213,190,918	[197]

Appendix B

**Zero or Less Than 0.5-ton Generators
by SIC
(1988)**

**Zero or Less Than 0.5-ton Generators
by SIC
(1988)**

Standard Industrial Classification			Number of Plants
Group Number	Description	Industry Number	Between Zero and 0.5 Tons Generation
280	Chemical manufacturing (general)	2800	1
		Total SIC 280	1
281	Industrial inorganic chemicals	2812	5
		2819	27
		Total SIC 281	32
282	Plastic materials and synthetic resins, synthetic rubber, synthetic and other man-made fibers, except glass	2821	15
		2822	1
		Total SIC 282	16
283	Drugs	2831	1
		2834	1
		Total SIC 283	2
284	Soaps, detergents, and cleaning preparations, perfumes, cosmetics, and other toilet preparations	2841	1
		2843	3
		Total SIC 284	4

Appendix B

**Zero or Less Than 0.5-ton Generators
by SIC
(1988)**

Standard Industrial Classification			Number of Plants
Group Number	Description	Industry Number	Between Zero and 0.5 Tons Generation
286	Industrial organic chemicals	2865	1
		2869	9
		Total SIC 286	10
287	Agricultural chemicals	2873	3
		2874	1
		2879	6
		Total SIC 287	10
289	Miscellaneous chemical products	2891	3
		2893	1
		2895	3
		2899	4
		Total SIC 289	11
Total for all SICs			86

Appendix C

Blank Copy of 1988 CMA Waste Survey

VVV 000004824

1988 CMA Waste Survey Hazardous — Nonhazardous

Confidential Information

Parent Company Name

- If facility was purchased in 1988 from a different company, please give SELLER-COMPANY name BELOW. This allows us to keep track of plants and their code numbers from year to year.

Seller-Company Name

Subsidiary Name

Plant Name and Address

(zip)

EPA Identification No.

Contact Name

Title

Telephone Number

We encourage you to make a thorough and complete response to this questionnaire. CMA staff and CMA's contractor, Tischler/Kocurek (TK), will be reviewing your responses and contacting you to clarify any ambiguities. The confidential information will not be released to anyone outside CMA or TK and cannot be accessed by other CMA member companies.

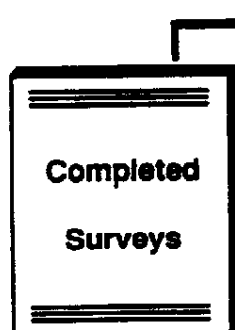
Please CALL Dianna Kocurek of TK, Round Rock, Texas, at 512.244.9058 if you have any QUESTIONS regarding this questionnaire.

Completed surveys
should be RETURNED to:

Dianna Kocurek
Tischler/Kocurek
116 East Main
Round Rock, Texas 78664

call ... ? ? ?

Questions ? ? ?



To be completed by TK:

CMA Code No: _____

Date Received: _____

1988 CMA Waste Survey Hazardous — Nonhazardous

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For TK use in telephone followup

VVV 000004826

Introduction

Assurance of Confidentiality

Each plant is given a code number on the bottom right-hand corner of the cover page and on each page of the survey. The cover sheets are removed and placed in a confidential file. Thus, the survey can be processed without identifying a plant by name. Following completion of the project, the cover sheets will be retained in a separate, confidential file.

CMA and TK have carefully established this system for your protection in the belief that the responses to this survey will be more candid and complete once the respondent has been assured of confidentiality.



Please contact JIM MULLIGAN at CMA to inquire about confidentiality or intent of this project. His telephone number is 202.887.1270.

Introductory Note

CMA needs accurate and complete information about generation and disposition of both hazardous and nonhazardous waste by the chemical industry. CMA needs this information for legislative and rulemaking advocacy, for evaluation of the Environmental Protection Agency's ongoing regulatory impact analyses, and for analyzing industry-wide trends. The goal is to establish a comprehensive in-house data base by continuing this survey on an annual basis.

General Instructions

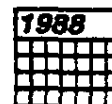
Please read the instructions on the page facing each set of questions as these instructions will explain what information is needed, as well as give definitions and notes related to the questions.

Briefly review all the questions before beginning. That way you will save time if you know in the beginning what kind of information you need to answer the questions.

Some questions provide an *other* category for unique situations. If you use this category, please identify what *other* represents.

You may PRINT rather than type your answers — in fact, we recommend it to save you time. Please print neatly, though, and in INK or BALL POINT because pencil often does not copy well.

Responses to the survey questions should correspond to 1988 calendar year records and practices. Do NOT include any INVENTORY (wastes left in storage at the end of a calendar year, awaiting treatment or disposal) from previous years in your responses.



Introduction

Definition of a Plant/Only SIC 2800 Plants



Only SIC 2800 industry plants need respond to this survey. An SIC 2800 industry is defined by the Bureau of Census as any plant whose largest source of revenue is from the manufacture of SIC 2800 products. For this survey, a PLANT includes ALL SIC 2800 FACILITIES at one site, whether operated for manufacturing, waste management, research, or combinations of these purposes.

Complete a survey for each SIC 2800 plant in the company...

Each CMA member company should complete a SEPARATE SURVEY for EACH PLANT in the company. Companies may have a single individual, such as an environmental coordinator, respond for all or several of their plants, or have each plant respond separately.

Numerical Responses

Report waste quantities in TONS. These quantities must be reported AS HANDLED or AS IS tons — sometimes also called WET tons. If you do not have actual weight measurements, give your best estimate. Give answers to the nearest ton. For your convenience, here are a few unit conversions:

- 1 ton = 2000 pounds
- = 0.907 metric tons
- = 240 gallons



If your answer is zero (0) for any question, you can either leave it blank or write down zero.

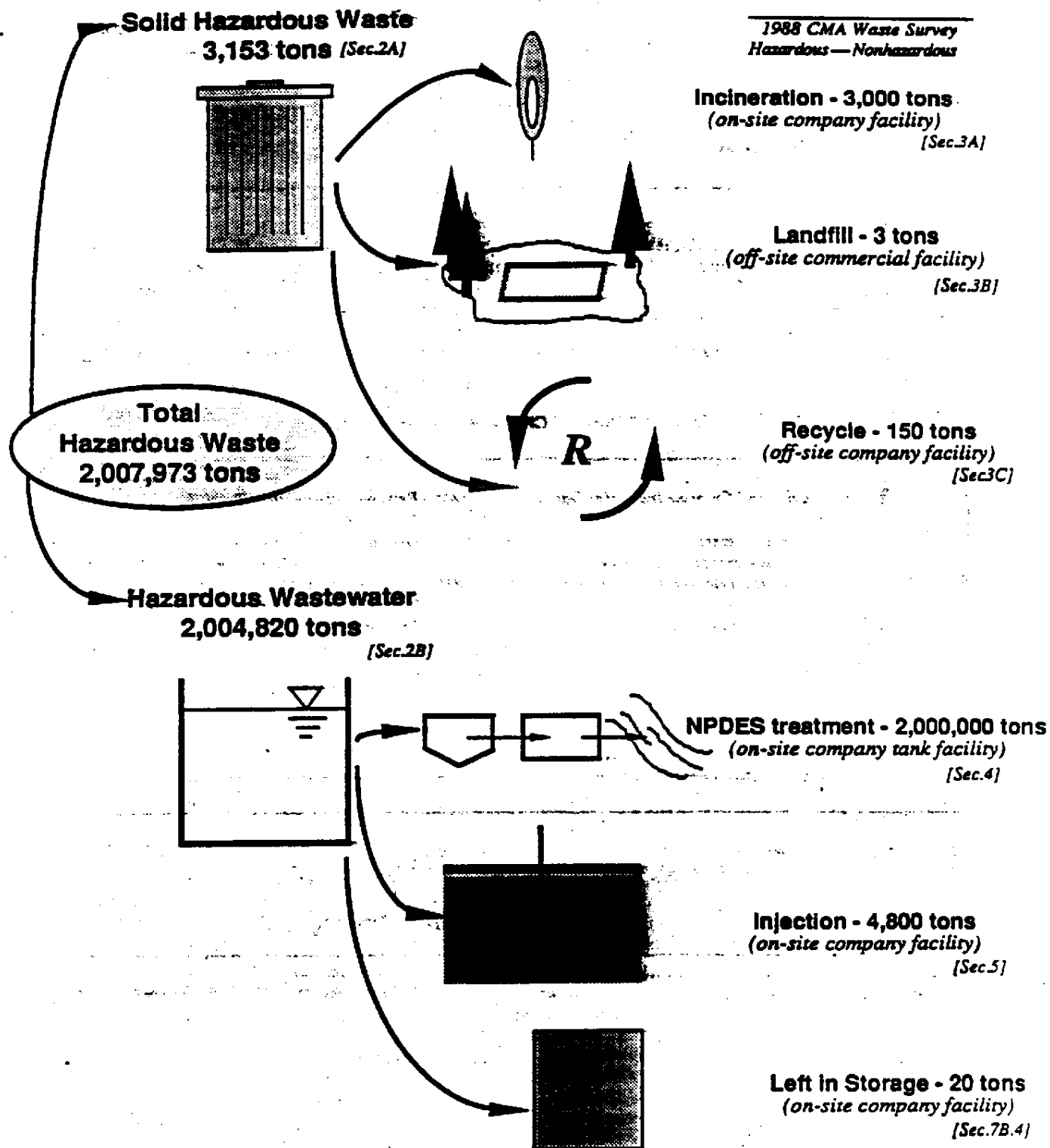
Avoid Double-Counting



Wastes are subdivided into specific categories in the survey (*wastes that are treated, wastes that are disposed, etc...*). The choice of category for a waste can be confusing, for example, if the waste is both treated and disposed — this can lead to double-counting of waste quantities if the instructions are not followed exactly.

To help you avoid double-counting (*and having to contact you for clarification*), there are CALCULATION CHECKS in Section 7 (hazardous waste) and Section 10 (nonhazardous waste). Please complete these checks to verify that your numbers balance.

On the next page is an EXAMPLE DIAGRAM of how hazardous waste quantities are categorized and how they should balance. Nonhazardous wastes are categorized and balanced in a similar fashion.



**Example Diagram of How Hazardous Wastes may be Categorized
for this Survey**

Instructions

1. Plant Description

A. Plant SIC Code

ONLY SIC 2800 INDUSTRY plants should respond to this survey. An SIC 2800 industry plant is defined by the Bureau of Census as any plant whose largest source of revenue is from the manufacture of SIC 2800 products. *If your primary SIC code is NOT 2800, do not complete the survey.* You may wish to notify your company environmental coordinator that the facility is not SIC 2800.

SIC codes starting with 28 as the first two digits represent manufacturing of "Chemicals, Allied Products."

SIC 2800 Codes - Chemicals, Allied Products



2812 Alkalies and Chlorine Industrial Gases	2844 Perfumes, Cosmetics, Toilet Preps.
2813 Industrial Gases	2851 Paints, Varnishes, Lacquers
2816 Inorganic Pigments	2861 Gum and Wood Chemicals
2819 Misc. Industrial Inorganic Chemicals	2865 Cyclic Crudes and Intermediates
2821 Plastics Materials, Synthetic Resins	2869 Misc. Industrial Organic Chemicals
2822 Synthetic Rubber	2873 Nitrogenous Fertilizers
2823 Cellulosic Man-Made Fibers	2874 Phosphatic Fertilizers
2824 Synthetic Organic Fibers	2875 Fertilizers, Mixing Only
2831 Biological Products	2879 Misc. Pesticides and Agric. Chems.
2833 Medicinal Chemicals, Botanical Products	2891 Adhesives and Sealants
2834 Pharmaceutical Preparations	2892 Explosives
2841 Soap and Other Detergents	2893 Printing Ink
2842 Specialty Cleaning, Polishing	2895 Carbon Black
2843 Surface Active and Finishing Agents	2899 Misc. Chemicals and Chemical Preps.

B. Plant Location

A list of codes for STATES is given below.

Codes for States



Alabama01	Hawaii12	Michigan23	North Carolina .34	Utah45
Alaska02	Idaho13	Minnesota24	North Dakota ...35	Vermont46
Arizona03	Illinois14	Mississippi25	Ohio36	Virginia47
Arkansas04	Indiana15	Missouri26	Oklahoma37	Washington ...48
California05	Iowa16	Montana27	Oregon38	West Virginia 49
Colorado06	Kansas17	Nebraska28	Pennsylvania ...39	Wisconsin50
Connecticut ...07	Kentucky18	Nevada29	Rhode Island ...40	Wyoming51
Delaware08	Louisiana19	New Hampshire 30	South Carolina 41	Virgin Islands 52
Wash., DC09	Maine20	New Jersey31	South Dakota .42	Puerto Rico ...53
Florida10	Maryland21	New Mexico32	Tennessee43	
Georgia11	Massachusetts .22	New York33	Texas44	

Questions

1. **Plant Description**

Enter the codes for your plant's *primary* 2800 SIC and the state in which your plant is located.

A. SIC Code — — — — — [1]

If your primary SIC code is not 2800...



...do not complete the survey.

You may wish to notify your company environmental coordinator that the facility is not SIC 2800.

B. State Code — — — — — [2]



If your facility did not generate any hazardous waste in 1988...

...your survey response is still important to CMA < it is useful to know how many SIC 2800 facilities did not generate hazardous waste. If you did not generate any hazardous waste in 1988...

...complete only the following sections in the survey:



1A, 1B

2A(I), 2B(I), 2C(I), 2C(II)



8

9

10

Instructions

2. Hazardous Waste Generation

A. Hazardous Solid Waste

Do NOT include WASTEWATER in this section (*wastewaters will be counted in Section 2B*). In this survey, wastewaters are defined to be wastes that are treated by an NPDES permitted treatment plant, discharged to a Publicly-Owned Treatment Works (POTW), WASTEWATERS that are disposed by UNDERGROUND INJECTION, or any other AQUEOUS waste which you would classify as a wastewater.

For UNDERGROUND INJECTED wastes, these wastes may be counted as WASTEWATER or SOLID wastes, whichever is the common description at your facility. If you consider an underground injected waste as a solid waste, then it should be included in this section.

Do NOT include the following wastes in this section:

- Δ Hazardous wastewaters
- Δ RCRA wastes which are not subject to full regulations under the provisions of 40 CFR 261.5 (*conditionally exempt small generator*), or 40 CFR 261.6(a)(3) (*selected recycled wastes*)
- Δ Delisted wastes

The following are descriptions of the different types of hazardous solid waste that you should count in this section.

Recyclable Solid Hazardous Wastes

Prior to 1985, RECYCLABLE wastes were exempted from full regulation at 40 CFR 261.6(a). However, due to the change in solid waste definition many of these wastes are now subject to some regulation. Review the current regulations at 40 CFR 261.6 and 40 CFR 266 (*if these regulations are in effect in your state*) to be sure that you correctly INCLUDE these recyclable wastes which were regulated in 1988.

Listed Solid RCRA Hazardous Wastes...*including mixtures of a solid waste and one or more listed wastes*

RCRA listed solid wastes are specifically identified by Subpart D of 40 CFR 261: "Each hazardous waste listed in this Subpart is assigned an EPA Hazardous Waste Number which precedes the name of the waste." Any solid hazardous waste generated by your plant which can be defined by one of these numbers should be included in responding to this question. Listed wastes mixed with other solid wastes should meet the definition of hazardous waste in 40 CFR Subpart A, 261.3(a)(iii) and (iv). Also, INCLUDE RCRA listed wastewater TREATMENT SLUDGES or sludges resulting from the treatment of RCRA listed wastes.

Characteristic Solid RCRA Hazardous Wastes

RCRA hazardous characteristic wastes exhibit one or more of the characteristics identified in Subpart C of 40 CFR 261. INCLUDE RCRA hazardous CHARACTERISTIC wastewater TREATMENT SLUDGES.

State Solid Wastes

RCRA allows states to adopt more expansive definitions or listings of hazardous wastes than those adopted by the federal government. Include ADDITIONAL wastes generated by your plant which were considered to be hazardous wastes ONLY by your STATE. Remember to INCLUDE all wastewater TREATMENT SLUDGES considered hazardous by your state.

Questions

2. Hazardous Waste Generation

A. Hazardous Solid Waste

Enter the **TOTAL** quantity of solid hazardous waste (RCRA and STATE) generated at your plant during the 1988 calendar year, **EXCLUDING** hazardous WASTEWATER and wastewaters which were underground injected.

(i) **TOTAL RCRA and state
SOLID hazardous waste** _____, _____, _____ tons
[3]

Of the total RCRA and state solid hazardous waste in 2A(i) above, enter the quantity of solid waste generated at your plant which was considered hazardous by STATE regulations **ONLY, EXCLUDING** state WASTEWATER and wastewaters which were underground injected.

(ii) **STATE only
SOLID hazardous waste** _____, _____, _____ tons
[4]

 *Stop! If your facility is
in Texas, do not include
Class I - NonHazardous
wastes in your hazardous waste quantities.
Count your Class I-NonHazardous waste
in Section 10.*



Of the total RCRA and state solid hazardous waste in 2A(i) above, enter the quantity of all solid hazardous wastewater treatment **SLUDGES** (RCRA and STATE).

(iii) **SOLID hazardous
SLUDGES from
wastewater treatment** _____, _____, _____ tons
[5]

Instructions

2. Hazardous Waste Generation

A. Hazardous Solid Waste

Site-Cleanup Wastes

Of the total solid hazardous waste counted in 2A(i), enter the quantity that was the result of RCRA, CERCLA, or other remedial action.

Major Changes in Waste Quantities

You may have had a major change in your solid hazardous waste generation from 1987 to 1988, either in waste type or quantity. If this happened at your facility, please enter the decrease (or increase) in tons and add a brief comment for explanation. CMA uses these data in its trend analyses to explain abrupt changes in waste generation and management practices.

Examples of these types of changes would be regulatory interpretation, process startup or shutdown, and delistings.

Questions

2. Hazardous Waste Generation

A. Hazardous Solid Waste

Enter the quantity of solid hazardous waste reported in Section 2A(i) that was the result of RCRA, CERCLA, or other remedial action.

(iv) SOLID hazardous
site-CLEANUP
wastes

_____, _____, _____ tons
[6]

Did your waste practices
change significantly since
1987?

Enter the quantity of solid hazardous waste that was the result of a MAJOR CHANGE in WASTE PRACTICES from 1987 to 1988 (answer this question only if you consider the change major; you be the judge of what is considered major). If the change was an INCREASE in waste quantity, enter the quantity on LINE (1) below. If the change was a DECREASE in waste quantity, enter the quantity on LINE (2) below. If there was no major change in waste quantity, but the type of waste changed significantly, briefly explain the reason for the change below.

(v) Major changes in solid hazardous waste quantities from 1987 to 1988

Line (1) INcrease
in
quantity _____ tons
[7]

Line (2) DEcrease
in
quantity _____ tons
[8]

Please give a brief explanation if there was a major change in solid hazardous waste quantity or type from 1987 to 1988.

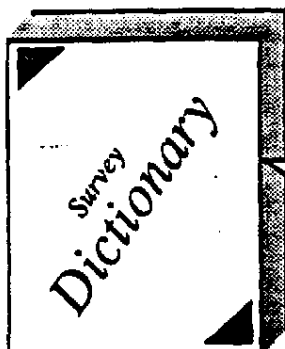
_____ [9]

Instructions

2. Hazardous Waste Generation

B. Hazardous Wastewater

Definition of Wastewater



In this survey, wastewaters are defined to be wastes that are treated by an NPDES permitted treatment plant, discharged to a Publicly-Owned Treatment Works (POTW), WASTEWATERS that are disposed by UNDERGROUND INJECTION, or any other AQUEOUS waste which you would classify as a wastewater.

In this survey, wastewaters are defined to be wastes that are treated by an NPDES permitted treatment plant, discharged to a POTW, wastewaters that are disposed by underground injection, or any other aqueous waste that your facility calls a wastewater.

The following are descriptions of the different types of hazardous wastewater that you should count in this section.

Characteristic and Listed Hazardous Wastewaters

Of the total RCRA and STATE wastewater, enter how much is LISTED wastewater (or mixtures of wastewater with listed hazardous wastewater) or CHARACTERISTIC wastewater. If a wastewater is a listed waste or a mixture of a waste with a listed waste, but also exhibits a hazardous characteristic(s), the wastewater should be counted only in the listed waste quantity; DO NOT DOUBLE-COUNT listed wastewater as characteristic wastewater. Characteristic hazardous wastes are defined in Subpart C of 40 CFR 261. Listed hazardous wastes are identified in Subpart D of 40 CFR 261.

State Hazardous Wastewaters

RCRA allows states to adopt more expansive definitions or listings of hazardous wastewaters than those adopted by the federal government. Include ADDITIONAL wastewaters generated by your plant which were considered to be hazardous wastewaters ONLY by your STATE. Be sure to include state hazardous wastewater fitting the survey definition of wastewater.

Excluded Wastes

Do NOT include the following wastes in this section:

- Δ Hazardous solid wastes
- Δ RCRA wastes which are not subject to full regulations under the provisions of 40 CFR 261.3(a)(iv) (mixture rule), 40 CFR 261.5 (conditionally exempt small generator), or 40 CFR 261.6(a)(3) (selected recycled wastes)
- Δ Delisted wastes
- Δ Wastewaters that you do not count in your hazardous waste generation quantities because you believe it is exempted from such by the Domestic Sewage Exclusion (40 CFR 261.4(a)(1)(ii)). Because there are several interpretations of the applicability of the Domestic Sewage Exclusion, please use the interpretation held at your facility.

Questions

2. Hazardous Waste Generation

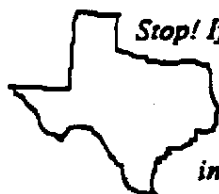
B. Hazardous Wastewater

Enter the **TOTAL** quantity of all RCRA and STATE hazardous wastewater and underground injected wastewaters generated at your plant during calendar year 1988. Of this total, enter the quantity that was **CHARACTERISTIC** hazardous wastewater and the quantity that was **LISTED** hazardous wastewater. If a wastewater was a **LISTED** waste, but also had hazardous characteristics, include it only in the **LISTED** waste category below. If a wastewater was a **MIXTURE** of a waste and a **LISTED** waste, include it in the **LISTED** waste category.

(i) **TOTAL RCRA and state hazardous WASTEWATER** _____ tons
[10]

(a) **CHARACTERISTIC RCRA and state hazardous wastewater** _____ tons
[11]

(b) **LISTED/MIXTURE RCRA and state hazardous wastewater** _____ tons
[12]



Stop! If your facility is in Texas, do not include Class I - NonHazardous wastes in your hazardous waste quantities. Count your Class I-NonHazardous waste in Section 10.



Enter the quantity of all hazardous wastewater and underground injected wastewaters generated at your plant that was considered hazardous **ONLY** by the STATE, and not under RCRA.

(ii) **STATE hazardous WASTEWATER** _____ tons
[13]

Instructions

2. Hazardous Waste Generation

B. Hazardous Wastewater

Site-Cleanup Wastes

Of the total hazardous wastewater counted in 2B(i), enter the quantity that was the result of RCRA, CERCLA, or other remedial action.

Major Changes in Waste Quantities

You may have had a major change in your hazardous wastewater generation from 1987 to 1988, either in waste type or quantity. If this happened at your facility, please enter the decrease (or increase) in ~~tons~~ and add a brief comment for explanation. CMA uses these data in its trend analyses to explain abrupt changes in waste generation and management practices.

Examples of these types of changes would be regulatory interpretation, ~~process~~ startup or shutdown, and delistings.

Questions

2. Hazardous Waste Generation

B. Hazardous Wastewater

Enter the quantity of hazardous wastewater reported in Section 2B(i) that was the result of RCRA, CERCLA, or other remedial action.

(iii) Hazardous
site-CLEANUP
WASTEWATERS _____ tons
[14]

Did your waste practices
change significantly since
1987?

Enter the quantity of hazardous wastewater that was the result of a MAJOR CHANGE in WASTE PRACTICES from 1987 to 1988 (*answer this question only if you consider the change major; you be the judge of what is considered major*). If the change was an INCREASE in waste quantity, enter the quantity on LINE (1) below. If the change was a DECREASE in waste quantity, enter the quantity on LINE (2) below. If there was no major change in waste quantity, but the type of waste changed significantly, briefly explain the reason for the change below.

(iv) Major changes in hazardous wastewater quantities from 1987 to 1988

Line (1) INcrease
in
quantity _____ tons
[15]

Line (2) DEcrease
in
quantity _____ tons
[16]

Please give a brief explanation if there was a major change in hazardous wastewater quantity or type from 1987 to 1988.

_____ [17]

Instructions

2. Hazardous Waste Generation

C. Domestic Sewage Exclusion (40 CFR 261.4(a)(1)(ii))

Note: *The waste you report in Section 2C should be waste you count as NONHAZARDOUS (and not included in the hazardous wastewater quantities in Sections 2B(i) - (iv)) under the Domestic Sewage Exclusion.*

There are several interpretations of the applicability of the Domestic Sewage Exclusion; please use the interpretation held at your facility. In this section, enter the waste quantities that you exclude from your calculation of hazardous wastewater generation by the Domestic Sewage Exclusion. Place these quantities in the *characteristic* and *listed* categories, as applicable.

Questions

2. Hazardous Waste Generation

C. Domestic Sewage Exclusion (40 CFR 261.4(a)(1)(ii))

Enter the quantity of wastewater that was generated in calendar year 1988 that would be a *listed* or *characteristic* hazardous wastewater if you did not exclude it from the hazardous waste definition by the DOMESTIC SEWAGE EXCLUSION. If a wastewater would be a *listed* waste, but also would have hazardous characteristics, include it only in the *listed* waste category below. If a wastewater would be a *mixture* of a waste and a *listed* waste, include it in the *listed* waste category. Remember, the wastewaters that you exclude by the Domestic Sewage Exclusion should not be counted in your hazardous wastewater quantities in Section 2B(i)-(iv).

(i) CHARACTERISTIC
RCRA and state
Domestic Sewage
Exclusion wastewater _____ tons
[18]

(ii) LISTED/MIXTURE
RCRA and state
Domestic Sewage
Exclusion wastewater _____ tons
[19]

Instructions

3. Hazardous Solid Waste — Management

A. Treatment — Hazardous Solid Waste

Treatment to Nonhazardous Level

In this section, treated wastes should be included **ONLY IF SUCH TREATMENT MADE THE WASTE NONHAZARDOUS**. (For the purposes of this survey, **INCINERATION** is considered a **TREATMENT** method, excluding any hazardous residues that were subsequently disposed — count these residues in Section 3B). Do **NOT** include waste which were treated and made **LESS HAZARDOUS** — such wastes should be reported in Section 3B or Section 5.

Wastewater Excluded

Do **NOT** include **WASTEWATER** in this section. Wastewaters will be counted in Sections 4 and 5.

Underground Injection Excluded

Underground injection wastes should **NOT** be **INCLUDED** in this section; these wastes will be counted in Section 5. Underground injection wastes are those injected through a bored, drilled, or driven well; or through a dug well, where the depth of the dug well is greater than the largest surface dimension.

Subsurface Injection Excluded

Subsurface injection wastes are those injected below the surface of the ground and which do not meet the definition of underground injection wastes (for example, landfarming wastes). Subsurface injection wastes should **NOT** be **INCLUDED** in this section as treated wastes; they are counted in Section 3B under waste disposal.

Hazardous Residues from Incineration and Other Treatment Excluded

Any hazardous residue from incineration or other treatment that was separately disposed of should **NOT** be **INCLUDED**. For example, if an incineration residue was still considered hazardous and was landfilled, don't count the landfilled quantity in Section 3A — count it in Section 3B.

Recyclable Wastes Burned in Boilers and Industrial Furnaces

Do **NOT** include any recyclable wastes that were legitimately **BURNED** in **BOILERS** or industrial **FURNACES** (wastes that had a heating value **GREATER THAN 5000 Btus per pound**); count these wastes in Section 3C. If the waste was burned in a boiler, but had a heating value **LESS THAN 5000 Btus per pound**, **INCLUDE** the waste **UNDER INCINERATION** in Section 3A.

Other Recyclable Wastes Excluded

Do **NOT** include any other recycled/reused/reclaimed wastes which were handled as **RECYCLABLE** materials at 40 CFR 261.6 or 40 CFR 266 — count these wastes in Section 3C.

Fuel Blending Included — Less Than 5000 Btus per Pound

If a waste with a heating value **LESS THAN 5000 Btus per pound** was blended with other materials for fuel and was burned, it should be listed under the **INCINERATION** category of this section.

Questions

3. Hazardous Solid Waste — Management

A. Treatment — Hazardous Solid Waste

Enter the quantity of RCRA and state hazardous solid waste treated under the following categories during the calendar year 1988. Do NOT include burning in BOILERS or industrial FURNACES of wastes with GREATER THAN 5000 Btus/lb, other RECYCLABLE wastes, WASTEWATER, UNDERGROUND INJECTION wastes (solid or wastewater), or HAZARDOUS RESIDUES from incineration or other treatment.

On-Site and Off-Site
COMPANY-OWNED Facilities
("as-is" tons)

COMMERCIAL Facilities
("as-is" tons)

(i) Incineration _____ [20] _____ [21]
(Incineration includes wastes with LESS THAN 5000 Btus/lb that were burned in boilers or industrial furnaces.)

(ii) Other _____ [22] _____ [23]

Please give
description of
other treatments



_____ [24] _____ [25]
(Examples: chemical, physical, biological, thermal, solidification, detonation)

(iii) Total RCRA
and state wastes
for Section 3A _____ [26] _____ [27]

Instructions

3. Hazardous Solid Waste — Management

B. Disposal — Hazardous Solid Waste

Wastewater Excluded

Do NOT include wastewater in this section. These wastes will be counted in Sections 4 and 5.

Underground Injection Excluded

Underground injection wastes should NOT be INCLUDED in this section; these wastes will be counted in Section 5. Underground injection wastes are those injected through a bored, drilled, or driven well; or through a dug well, where the depth of the dug well is greater than the largest surface dimension.

Recyclable Wastes Burned in Boilers and Industrial Furnaces Excluded

Do NOT include any recyclable wastes that were legitimately BURNED in BOILERS or industrial FURNACES (wastes that had a heating value GREATER THAN 5000 Btus per pound); count these wastes in Section 3C.

Other Recyclable Wastes Excluded

Do NOT include any other recycled/reused/reclaimed wastes which were handled as RECYCLABLE materials at 40 CFR 261.6 or 40 CFR 266 — count these wastes in Section 3C.

Subsurface Injection

INCLUDE subsurface injected wastes in this section. Subsurface injection wastes are those injected below the surface of the ground and which do not meet the definition of underground injection wastes (for example, landfarming wastes).

Surface Impoundments

Whether materials were being treated, stored, or disposed of in a surface impoundment may involve close questions of judgment. If the wastes were treated to a nonhazardous level, count the wastes in Section 3A. Wastes that were treated, but remained hazardous (or were not treated) were DISPOSED of in an impoundment if the owner or operator intended that the materials were to REMAIN there UPON CLOSURE — include these wastes in Section 3B. If the wastes remained hazardous, but were only being stored in the impoundment for disposal later, the stored wastes are not included in either Section 3A or 3B, but may show up as storage in the overall waste balance in Section 7 — if you've counted it in your generation for that year. Please put the waste in proper category — treatment, storage, or disposal and avoid double-counting the waste.

Waste Piles

As with surface impoundments that may have been used either for treatment, storage, or disposal, use your judgment regarding materials placed on waste piles. Please try to avoid double-counting.

Hazardous Incineration and Treatment Residues

Any HAZARDOUS RESIDUE from incineration or other treatment that was disposed should be INCLUDED in Section 3B (if these residues remained hazardous after treatment, they should not have been counted in Section 3A). For example, if an incineration residue was still considered hazardous and was landfilled, count the landfilled quantity in this section.

Questions

3. Hazardous Solid Waste — Management

B. Disposal — Hazardous Solid Waste

Enter the quantity of RCRA and state hazardous solid waste disposed under the following categories during the calendar year 1988. Do NOT include burning in BOILERS or industrial FURNACES of wastes with GREATER THAN 5000 Btus/lb, other RECYCLABLE wastes, WASTEWATER, or UNDERGROUND INJECTION wastes (solid or wastewater).

	On-Site and Off-Site COMPANY-OWNED Facilities ("as-is" tons)	COMMERCIAL Facilities ("as-is" tons)
(i) Landfill disposal	----- [28]	----- [29]
(ii) Surface impoundment disposal	----- [30]	----- [31]
(iii) Waste pile disposal	----- [32]	----- [33]
(iv) Other disposal	----- [34]	----- [35]
Please give description of other disposal	----- [36]	----- [37]
(v) Total RCRA and state wastes for Section 3B	----- [38]	----- [39]



(Examples: biological, landfill, chemical)

Instructions

3. Hazardous Solid Waste — Management

C. Reclaimed/Reused/Recyclable — Hazardous Solid Waste



Prior to 1985, RECYCLABLE wastes were exempted from full regulation at 40 CFR 261.6(a). However, due to the change in solid waste definition many of these wastes are now subject to some regulation. Review the current regulations at 40 CFR 261.6 and 40 CFR 266 to be sure that you correctly include these recyclable waste which were regulated in 1988.

Burned for Energy Recovery

In March 1983, EPA developed a *sham* recycling enforcement policy that considered the burning of ~~low~~ heating value hazardous waste (less than 5000—8000 Btu/lb) in a boiler or industrial furnace as incineration and subject to regulations under the incinerator standards of Subpart O of Parts 264 or 265 (see 40 CFR 260.10 for the definition of *boiler* and *industrial furnace*). On May 6, 1987, EPA proposed extensive regulations for the burning of hazardous waste in boilers and industrial furnaces (52 FR 16982).

Burning in Boilers and Industrial Furnaces

In this survey, burning of any waste with LESS THAN 5000 Btu/lb heating value is counted as INCINERATION in SECTION 3A. EPA's proposed regulations would apply to burning in boilers or industrial furnaces irrespective of the heating value. However, to be consistent with past CMA surveys and EPA policy, only INCLUDE waste quantities in Section 3C if the heating value was GREATER THAN 5000 Btu/lb.

Other Wastes Burned for Energy Recovery

If you have a waste that was burned for energy recovery, but you do not know if it was burned in a boiler or industrial furnace, count this waste as *other wastes burned for energy recovery*. If the waste went to a fuel-blender, and you do not know the type of unit the blended waste was burned in, also count it as *as other wastes burned for energy recovery*. INCLUDE only those wastes with heating value GREATER THAN 5000 Btu/lb.

Other Reclaimed/Reused/Recycled Wastes

Enter the quantity of waste reported in Section 2A(i) that was handled as a recyclable waste at 40 CFR 261.6 and 40 CFR 266, EXCLUDING any waste BURNED for energy recovery.

Questions

3. Hazardous Solid Waste — Management

C. Reclaimed/Reused/Recyclable — Hazardous Solid Waste

Enter the waste quantities counted in Section 2A(i) that had a heating value of 5000 Btu/lb or MORE and that were BURNED for ENERGY RECOVERY. Count the waste as burned in a boiler, an industrial furnace, or other type of unit. If you do not know the type of unit the waste was burned in, count the waste as *Other*, Section C(iii). If the waste went to a fuel-blender, and you do not know the type of unit the blended waste was burned in, also count it as *Other*, Section C(iii).

	On-Site and Off-Site COMPANY-OWNED Facilities ("as-is" tons)	COMMERCIAL Facilities ("as-is" tons)
(i) RCRA and state wastes BURNED in BOILERS	— — — — — [40]	— — — — — [41]
(ii) RCRA and state wastes BURNED in industrial FURNACES	— — — — — [42]	— — — — — [43]
(iii) RCRA and state wastes BURNED in OTHER units (or type of unit was not known)	— — — — — [44]	— — — — — [45]

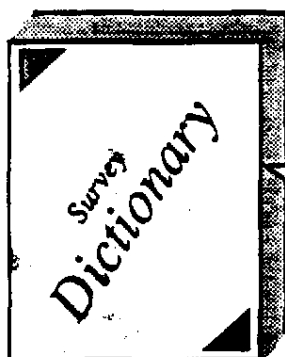
Enter the waste quantities counted in Section 2A(i) that were handled as recyclable wastes under 40 CFR 261.6 or 40 CFR 266, EXCLUDING wastes that were BURNED for ENERGY RECOVERY.

	On-Site and Off-Site COMPANY-OWNED Facilities ("as-is" tons)	COMMERCIAL Facilities ("as-is" tons)
(iv) Other RCRA and state wastes that were reclaimed/ reused/recycled (excluding wastes burned for energy recovery)	— — — — — [46]	— — — — — [47]

Instructions

4. Hazardous Wastewater — Management

Definition of Wastewater



In this survey, wastewaters are defined to be wastes that are treated by an NPDES permitted treatment plant, discharged to a Publicly-Owned Treatment Works (POTW), WASTEWATERS that are disposed by UNDERGROUND INJECTION, or any other AQUEOUS waste which you would classify as a wastewater. A POTW is any device or system used in the treatment of municipal sewage or industrial waste of a liquid nature which is owned by a State or municipality.

In this survey, wastewaters are defined to be wastes that are treated by an NPDES permitted treatment plant, discharged to a POTW, wastewaters that are disposed by underground injection, or any other aqueous waste that your facility calls a wastewater.

Wastewaters Excluded from this Section

In this section, do NOT include hazardous wastewaters which were UNDERGROUND INJECTED; these wastewaters are counted in Section 5. Do NOT include wastewaters that you exclude from your hazardous waste generation quantities by the DOMESTIC SEWAGE EXCLUSION.

Please note that any HAZARDOUS RESIDUE from treatment or pretreatment of wastewater that was separately disposed of should NOT be INCLUDED in your response to this question. These residues are counted as solid hazardous waste in Sections 2A and 3.

Number of On-Site Tanks

Only those tanks that were COMPANY-OWNED and ON-SITE at your facility should be counted. Do not count any tanks that were off-site at another company-owned facility to which you sent hazardous wastewater for treatment. In counting the number of tanks, include those that were used for the treatment or storage of hazardous wastewater.

Hazardous Wastewaters Discharged to POTWs

In addition to the total waste you count as discharged to a POTW, enter the waste quantity that was TREATED prior to discharge to the POTW.

Questions

4. Hazardous Wastewater — Management

Enter the quantity of RCRA and state hazardous wastewater (EXCLUDING UNDERGROUND INJECTION wastewaters and HAZARDOUS treatment RESIDUES disposed separately) treated under the following categories during the calendar year 1988.

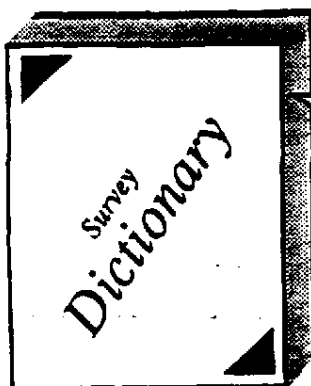
	<i>On-Site and Off-Site</i> COMPANY-OWNED Facilities <i>("as-is" tons)</i>	COMMERCIAL Facilities <i>("as-is" tons)</i>
NPDES Facility		
(i) In tanks only	_____[48]	_____[49]
(ii) Wholly or partially in impoundments	_____[50]	_____[51]
(iii) Number of on-site tanks	_____[52]	
POTW - wastewaters discharged to a POTW		
(iv) In tanks only	_____[53]	_____[54]
(v) Wholly or partially in impoundments	_____[55]	_____[56]
(vi) Number of on-site tanks	_____[57]	
(vii) Of the quantity in (iv) and (v) above, enter the quantity of wastewater that was TREATED prior to discharge to the POTW.	_____[58]	_____[59]
Other wastewater management methods		
(viii) Other methods	_____[60]	_____[61]
 Please give description of other methods	_____[62]	_____[63]
Totals		
(ix) Total RCRA and state wastewater for Section 4	_____[64]	_____[65]

Instructions

5. Hazardous Waste — Underground Injection

Definition of Underground Injection

Underground injection of hazardous wastes means the injection of wastes through a bored, drilled, or driven well; or through a dug well, where the depth of the dug well is greater than the largest surface dimension.



Underground injection of hazardous wastes is defined as the injection of wastes through a bored, drilled, or driven well; or through a dug well, where the depth of the dug well is greater than the largest surface dimension.

Both Solid Waste and Wastewater Included

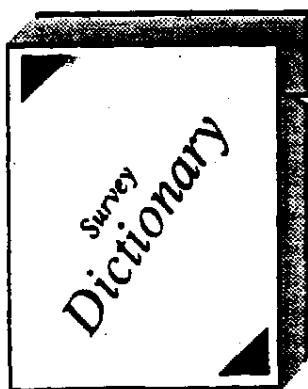
In this section, **INCLUDE** both **SOLID** waste and **WASTEWATER**. Count the underground injected wastes as solid wastes or wastewater whichever is the description common at your facility.

Questions

5. Hazardous Waste — Underground Injection

Enter the quantity of RCRA and state hazardous waste disposed of by underground injection as solid waste and wastewater during the calendar year 1988.

	<i>On-Site and Off-Site COMPANY-OWNED Facilities ("as-is" tons)</i>	<i>COMMERCIAL Facilities ("as-is" tons)</i>
(i) Solid waste	_____[66]	_____[67]
(ii) Wastewater	_____[68]	_____[69]
(iii) Total RCRA and state waste for Section 5	_____[70]	_____[71]



*Is your injected hazardous waste a solid or a wastewater?
Use the description common at your facility.*

Instructions

6. *Production Basis*

CMA believes that the hazardous waste survey database has shown decreases in waste generation by the chemical industry since 1981. Critics such as the National Resources Defense Council, the Office of Toxic Assessment, and the National Public Radio have suggested that these decreases are merely the result of decreases in manufacturing and plant closings. CMA is asking for production data here to refute these claims. CMA has tried in the past to relate waste generation trends to production trends indirectly by other means (production ratios, U.S. Federal Reserve Board production indices). These methods have not satisfied the critics who want to see a direct comparison of waste generation and production for facilities in the CMA database.

Confidentiality

The production data that you report will be kept confidential by CMA's contractor — neither CMA or other member companies will have access to the data. You are ~~not asked to list~~ names of actual products, only the total production for your facility. Any reporting of the data by CMA will only be in summary form — no single facility will be identified.

Only Processes Generating Hazardous Waste

Report your production numbers only for those processes that generated hazardous waste in 1988. You can report the production in any unit you wish (tons, pounds, millions of pounds, thousands of pounds) — but please *specify what unit you are using*.

Questions

6. Production Basis

Enter the total production of all processes that GENERATED HAZARDOUS WASTES.

Units

1988 production

[72]

[73]

Instructions

7. Calculation Check — Hazardous Waste

The purpose of this checksheet is to make sure that your numbers for hazardous waste add up correctly. In the early surveys, this check was not done and it caused quite a few headaches in working with the data.

If your numbers do not add up correctly on the checksheet, it means that you have double-counted or mis-counted wastes in some part of the survey. If this happens, please go over the numbers you've reported in the survey once again. If your numbers don't add up when CMA's contractor looks at them, you will be called. And chances are that you've put all your worksheets away and will have to drag them out again when CMA's contractor calls you. So do yourself a favor and check your numbers now.

This is how the balancing act works:

Solid Waste

Generation = Treatment + Disposal + Underground Injected +
+ Burned for Energy Recovery
+ Other Reclaimed/Reused/Recyclable
+ Storage

Wastewater

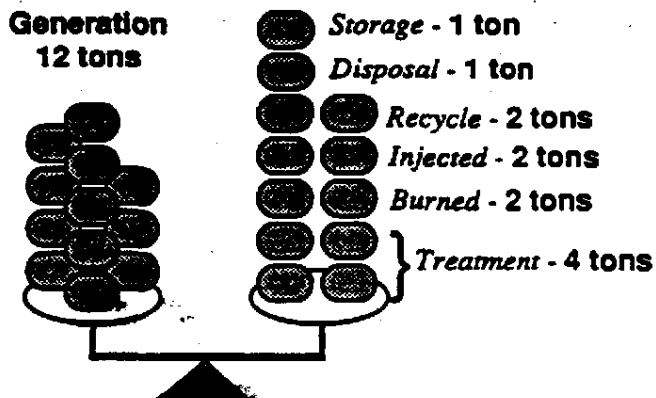
Generation = Treatment + Underground Injected + Storage

STORAGE in the above equations should be zero unless you actually had wastes left in storage as of December 31, 1988. If you had NO WASTES LEFT IN STORAGE at the end of 1988 and storage does not equal zero in the above equations, then you haven't counted your hazardous wastes correctly in each section of the survey. If you did have WASTES LEFT IN STORAGE at the end of 1988, the storage numbers above should be a reasonable estimate of this amount.

Please make sure your numbers
Balance !

This is an example for....

Hazardous Solid Waste



Questions

7. Calculation Check — Hazardous Waste

Solid Waste

- | | | | |
|-------------------------------------|-----------------------|-----------|--|
| 1. Generation | _____ , _____ , _____ | tons [74] | (see 2A(i)) |
| 2. Treatment | _____ , _____ , _____ | tons [75] | (see row total 3A(iii)) |
| 3. Disposal | _____ , _____ , _____ | tons [76] | (see row total 3B(v)) |
| 4. Injection | _____ , _____ , _____ | tons [77] | (see row total 5(i)) |
| 5. Burned for Energy Recovery | _____ , _____ , _____ | tons [78] | (see row totals 3A(iii)-(iii)) |
| 6. Other Recycled/Reused/Recyclable | _____ , _____ , _____ | tons [79] | (see row total 3C(ii)) |
| 7. Storage (as of 12/31/88) | _____ , _____ , _____ | tons [80] | (subtract lines 2, 3, 4, 5, 6 from line 1) |

If you did not have any solid wastes which were generated in 1988 and left in storage as of December 31, 1988, then line 7 should be equal to zero. If it is not, then please re-check your solid waste quantities in sections 2, 3, and 5.

If you had solid waste which was generated in 1988 and left in storage as of December 31, 1988, please check that the value on line 7 matches storage records for your facility, or is a reasonable estimate of the quantity of 1988 solid wastes left in storage.

Wastewater

- | | | | |
|-----------------------------|-----------------------|-----------|-----------------------------------|
| 1. Generation | _____ , _____ , _____ | tons [81] | (see 2B(i)) |
| 2. Treatment | _____ , _____ , _____ | tons [82] | (see row total 4(ix)) |
| 3. Injection | _____ , _____ , _____ | tons [83] | (see row total 5(ii)) |
| 4. Storage (as of 12/31/88) | _____ , _____ , _____ | tons [84] | (subtract lines 2, 3 from line 1) |

If you did not have any wastewater which was generated in 1988 and left in storage as of December 31, 1988, then line 4 should be equal to zero. If it is not, then please re-check your wastewater quantities in sections 2, 4, and 5.

If you had wastewater which was generated in 1988 and left in storage as of December 31, 1988, please check that the value on line 4 matches storage records for your facility, or is a reasonable estimate of the quantity of 1988 wastewaters left in storage.

Congratulations!



If your checksheet balances, proceed to GO and collect \$350.

If not, please re-check your quantities in Sections 2—5.

1988 CMA Waste Survey
Hazardous — Nonhazardous

Instructions

8. OTC — Organic Toxicity Characteristic

Background

Two years ago in its 1986 survey, CMA asked for information on EPA's Organic Toxicity Characteristic (OTC) that EPA proposed in June 1986. The proposed OTC set maximum levels on about 40 organic compounds; these levels were based on human health criteria and the EPA-projected contamination of drinking water supplies by these compounds. The way the OTC would work would be, if the concentration of a compound in the leachate of a solid waste was above these levels, that waste would be a RCRA hazardous waste. For wastewaters, if the concentration in the wastewater was above these levels, it would also be a RCRA hazardous waste.

Six months after the OTC levels are identified, EPA must decide whether a ban on land-based management of OTC-characteristic waste is necessary. If an OTC-characteristic waste is banned, it means that it cannot be treated, stored, or disposed in land-based facilities (such as landfills and impoundments) unless the OTC compounds the waste contains are reduced to EPA-specified levels.

Treatment of OTC-characteristic waste will be used in many cases to meet these specified levels so that the waste can then be handled in land-based units. If treatment capacity is not available for an OTC-characteristic waste at the time EPA issues its land ban decision, EPA may delay the ban for a period of up to 2 years. CMA is concerned because EPA does not have adequate data on treatment capacity for wastes that will become OTC-characteristic wastes in order to make a well-informed decision. Of particular concern to CMA is the treatment capacity for incineration of solid wastes.

Since June 1986, EPA has changed some of the human health criteria and its projections of contamination in drinking water supplies. Consequently, the OTC levels are likely to change when EPA issues its final rule on this subject, probably in the fall of 1989. Therefore, CMA is asking for data in this survey to address these changes. Specifically, CMA is asking for 2 items: (1) the quantity of your waste that will become hazardous by the OTC-characteristic; and (2) what method would you use to remove the land ban restriction from the waste.

Organic Toxicity Characteristic Levels. Use the OTC levels shown at the bottom of page 32 to judge if your waste will be hazardous by the OTC-characteristic. These levels are the ones CMA expects will be issued in EPA's final rule on the OTC.

Report Only Wastes That are Nonhazardous Now. If your waste is already a hazardous waste, do not include it in what you report here.

Point of Application of the OTC Levels. Decide if the waste would be OTC-characteristic based on the waste characteristics at the point just before it enters the treatment, storage, or disposal facility. For example with a surface impoundment, this would be at the influent point.

Base Your Answers on Current Conditions. Decide if your waste is OTC-characteristic based on your current conditions, not what happened in 1988.

Total OTC-characteristic Wastes. Report the total amount of nonhazardous waste that would be OTC-characteristic.

Instructions

8. OTC — Organic Toxicity Characteristic

OTC-characteristic Wastes Handled in Land-based Facilities... Of your total waste that would be OTC-characteristic, report the quantity that is currently handled in a land-based facility. Land-based facilities are: landfills, surface impoundments, waste piles, land application units, and injection wells. Remember though, you should count the unit if the waste is OTC-characteristic *before* it enters the land-based facility (see *Point of Application of OTC Levels*).

Alternate Handling Methods... Of your OTC-characteristic wastes handled in land-based facilities, choose alternate methods that you think you would likely use to meet OTC levels for these wastes. For each method you choose, report the tons of waste for which the method would be used. *If you would use several methods for a waste, report the tons of this waste for each method.* For example, if you would use both stripping and biological treatment for 10,000 tons of wastewater, report 10,000 tons for stripping and 10,000 tons for biological treatment.

Also report what type of facility you would likely use for each alternate method — a company-owned facility or a commercial facility. The company-owned facility can be either at your site (on-site) or elsewhere (off-site).

You will have to use your best judgment for choosing alternate methods and facilities, based on your knowledge of the waste and facilities. If you have no idea what alternate method and facility type you would use for a waste, report the tons of this waste as *Don't Know*.

Note: For this survey, assume that stabilization or fixation will not be an adequate method for organic constituents, unless you are certain it will work for your waste.

♦ ♦ ♦

January 1989 Draft Final Rule Organic Toxicity Characteristic Concentrations, mg/L

benzene.....	0.5	1,2-dichloroethane.....	0.5	pentachlorophenol.....	1.0
carbon disulfide.....	400.0	1,1-dichloroethylene.....	0.7	phenol.....	100.0
carbon tetrachloride.....	0.5	2,4-dinitrotoluene.....	0.1	pyridine.....	4.0
chlordane.....	0.03	heptachlor (and its hydroxide).....	0.008	tetrachloroethylene.....	0.7
chlorobenzene.....	100.0	hexachlorobenzene.....	0.02	2,3,4,6-tetrachlorophenol.....	100.0
chloroform.....	6.0	hexachlorobutadiene.....	0.5	toluene.....	1000.0
o-cresol*.....	200.0	hexachloroethane.....	3.0	trichloroethylene.....	0.5
m-cresol*.....	200.0	isobutanol.....	1000.0	2,4,5-trichlorophenol.....	400.0
p-cresol*.....	200.0	methyl ethyl ketone.....	200.0	2,4,6-trichlorophenol.....	2.0
1,2-dichlorobenzene.....	300.0	nitrobenzene.....	2.0	vinyl chloride.....	0.2
1,4-dichlorobenzene.....	7.5				

* o-, m-, and p-cresol concentrations are added together and compared to a threshold of 200.0 mg/L.

Questions

8. OTC — Organic Toxicity Characteristic

	On-Site and Off-Site COMPANY-OWNED Facilities ("as-is" tons)	COMMERCIAL Facilities ("as-is" tons)
(i) Total SOLID WASTE that would be OTC-characteristic	-----[85]	-----[86]
(ii) Of the total in (i) above, the amount that is handled in land-based facilities	-----[87]	-----[88]
(iii) Of the land-based total in (ii) above, the amount of SOLID WASTE that will be handled by each of the following alternate methods:		
Incineration—liquid	-----[89]	-----[90]
—pumpable sludges	-----[91]	-----[92]
—other solids	-----[93]	-----[94]
Reuse/recycle/reclamation	-----[95]	-----[96]
Solvent extraction	-----[97]	-----[98]
Source reduction	-----[99]	-----[100]
Stabilization/fixation	-----[101]	-----[102]
Wet air oxidation	-----[103]	-----[104]
Other...please give	-----[105]	-----[106]
description here>>>>>>>	-----[107]	-----[108]
Don't know	-----[109]	-----[110]
(iv) Total WASTEWATER that would be OTC-characteristic	-----[111]	-----[112]
(v) Of the total in (iv) above, the amount that is handled in land-based facilities	-----[113]	-----[114]
(vi) Of the land-based total in (v) above, the amount of WASTEWATER that will be handled by each of the following alternate methods:		
Biotreatment	-----[115]	-----[116]
Incineration—liquid-based	-----[117]	-----[118]
Reuse/recycle/reclamation	-----[119]	-----[120]
Source reduction	-----[121]	-----[122]
Stripping(gas, air, steam, etc.)	-----[123]	-----[124]
Wet air oxidation	-----[125]	-----[126]
Other...please give	-----[127]	-----[128]
description here>>>>>>>	-----[129]	-----[130]
Don't know	-----[131]	-----[132]

Instructions

9. Corrective Action

CMA is requesting INFORMATION from ALL GENERATORS, even those that are currently not subject to corrective action requirements.

If you responded to the CMA 1986 Hazardous Waste Survey, this section will look familiar. In the 1986 survey, CMA asked for information on corrective action to be able to show the economic impact of EPA's corrective action program. After reviewing the data, CMA felt that most survey respondents were underestimating the number of units that would need corrective action — possibly the idea of corrective action was still new at that time.

CMA is revisiting this issue now that corrective action is more familiar to persons today to be able to update these economic impacts.

Background

The Hazardous and Solid Waste Amendments of 1984 greatly expanded authorities under RCRA for requiring corrective action for releases of hazardous waste and constituents at facilities that manage hazardous wastes. A generator that has interim status or has been issued a permit after enactment of the 1984 amendments (November 8, 1984) is subject to corrective action requirements of RCRA section 3004(u) or 3008(h). Conversely, if a generator has a permit issued prior to November 8, 1984 (which has not been reopened after that date) or is a *generator only*, the generator is not subject to corrective action requirements.

EPA has proposed, or is considering proposing, regulations that may bring such *exempted* generators into the permitting system and therefore, subject to corrective action requirements. An example proposal is the Organic Toxicity Characteristic (OTC) (Section 8 of the survey). *For this reason, CMA is requesting INFORMATION from ALL GENERATORS, even those that are currently not subject to corrective action requirements.*

In 1987, CMA conducted a major study to demonstrate to EPA and Congress that the corrective action program, if strictly and broadly implemented, would affect many solid waste management units at terrific costs to the chemical industry. The study estimated the cost of various cleanup remedies at various types of sites and applied these estimates to the aggregate number of waste management units of CMA members that were likely to be subject to corrective action, based on the responses to the 1986 survey. Your response to this question will augment the study results. In addition, CMA will utilize your responses in its legislative efforts on the corrective action proposal which will be issued shortly.

To protect the **CONFIDENTIALITY** of your information, all data will remain coded and data for all the survey respondents will be combined so that corrective action problems at individual facilities cannot be identified. Your response will not be exchanged or reviewed by other CMA member company personnel.

Hazardous Waste Permit Status of Facility

Check all that apply to the permit status of your facility (plant) with respect to hazardous waste: generator only, have a permit or interim status, don't handle hazardous wastes now, and will not be handling hazardous waste in the foreseeable future.

Total Number of Units

Enter the total number of each type of unit at your facility. Count all active, inactive, closed units whether or not they are under corrective action now.

Number Requiring Corrective Action

Of the total number of units of each type at your facility, enter the number that are, will be, or are expected to be subject to corrective action requiring physical remediation.

Permit Status — Hazardous Waste Units

For all hazardous waste units **REQUIRING CORRECTIVE ACTION**, enter the number of units that are permitted and those that have interim status. The sum of permitted and interim status units should be the same as the number of units you counted requiring corrective action.

Surface Area/Affected Area

For all landfills, surface impoundments, land treatment units, and waste piles **REQUIRING CORRECTIVE ACTION**, enter the surface area in **ACRES**. For all other units, enter the land area in **ACRES** that would be subject to corrective action.

Questions

9. Corrective Action

Hazardous Waste Permit Status of Facility (check all that apply)

- ☐ Generator only ☐ Hazardous waste permit or interim status
☐ Do not handle hazardous waste ☐ Will not be handling hazardous waste in the foreseeable future

Enter for the types of units below, both those handling hazardous waste and those handling nonhazardous waste: the total number of units; the number and size that are, will be, or are expected to be subject to corrective action that will require physical remediation; and the permit status of the hazardous units requiring corrective action.

Units Handling Hazardous Waste	Total Number of Units*	Corrective Action Units		
		Number Requiring Corrective Action	Number of Corrective Action Units with Interim Status? Permit?	Surface Area or Affected Area** (acres)
EXAMPLE				
Landfill				
Impoundment				
Land treatment				
Waste pile				
Incinerator				
Tank (above-ground)				
Tank (underground)				
Container storage				
Injection wells				
Transfer stations				
Recycling units				
Other***				

(please give description of other _____)

Units Handling Nonhazardous Waste	Total Number of Units*	Corrective Action Units	
		Number Requiring Corrective Action	Surface Area or Affected Area** (acres)
EXAMPLE			
Landfill			
Impoundment			
Land treatment			
Waste pile			
Incinerator			
Tank (above-ground)			
Tank (underground)			
Container storage			
Injection wells			
Transfer stations			
Recycling units			
Other***			

(please give description of other _____)

- * Count all active, inactive, and closed units whether or not they are under corrective action now.
- ** For landfills, surface impoundments, land treatment units, and waste piles, report the surface area of the active/inactive units. For all others, report the land area that would be subject to corrective action.
- *** For example, sewer lines, cooling towers, and drainage ditches.

1988 CMA Waste Survey
Hazardous—Nonhazardous

Instructions

10. Subtitle D — Nonhazardous Wastes

Background

Nonhazardous wastes have recently received a great deal of attention from Congress, EPA, and the public — with many people labeling the solid waste problem a national crisis. One major 1988 Senate bill would have required double liners for all wastewater ponds, regardless of the regulatory status or quality of the wastewater. EPA is expected to develop standards for industrial nonhazardous waste disposal facilities following completion of the Municipal Solid Waste Disposal Criteria (proposed 53 FR 33314; August 30, 1988).

Nonhazardous wastes cover a wide variety of wastes not defined as hazardous wastes under Subtitle C (*Hazardous Waste Management*) of the Resource Conservation and Recovery Act (RCRA). Chemical manufacturers generate and manage a broad range of nonhazardous wastes, from wastewaters and wastewater treatment sludges to process wastes, contaminated soil, and plain trash.

Congress has already begun the RCRA reauthorization process; the emphasis in the bills introduced thus far has been on nonhazardous wastes with new, more stringent requirements for Subtitle D (*State or Regional Solid Waste Plans*) of RCRA. CMA has very little specific data on nonhazardous waste generation and management practices in the chemical industry for use in commenting on proposed legislation and EPA regulations. Hence, CMA is asking you to supply data in two key areas: 1) nonhazardous waste generation and management practices and 2) surface impoundments.

Given the expected legislative schedule for RCRA reauthorization, the data obtained from this survey may be the only data available to support development of reasonable legislation. This may be CMA's best opportunity to affect the outcome.

A. Generation and Management Practices

Wastes NOT Covered Here. In this nonhazardous waste section, do NOT include any wastes that are defined as HAZARDOUS under RCRA or by the state. Also, do not include any materials that are not considered RCRA solid wastes *when they are recycled in certain ways* (see 40 CFR 261.2(e)) or any wastewater that you do not count as hazardous because of the Domestic Sewage Exclusion (DSE) (see page 14 of this survey for explanation of DSE).

Nonhazardous Wastewater. Use the same definition of wastewater found on page 10 of this survey. Here are examples of nonhazardous wastewater that you should include: noncontact cooling water that passes through a surface impoundment after use; wastewater discharged to an NPDES treatment facility; wastewater discharged to a POTW (Publicly Owned Treatment Works); other wastewater treated or disposed on-site or off-site; wastewaters that are recycled and are not excluded as wastes by 40 CFR 261.2(e); or wastewaters that would become hazardous under the Organic Toxicity Characteristic (OTC) but were not hazardous in 1988 (see page 31 of this survey for an explanation of the OTC). *The amount you report for noncontact cooling water is what you discharge, not the volume you recycle over and over in the system.*

Nonhazardous Solid Waste. Solid wastes are any wastes that do not meet the definition of wastewater on page 10 of this survey. Here are examples of nonhazardous solid wastes that you should include: ash from coal burning (bottom ash/slag and flyash); trash and garbage; construction and demolition debris and rubble; wastewater treatment sludge; solid process wastes; contaminated soil; wastes burned for energy recovery in boilers, industrial furnaces, or other thermal units, or sent to fuel blenders; wastes that are recycled and are not excluded as wastes by 40 CFR 261.2(e); or wastes that would become hazardous under the OTC but

Instructions

10. Subtitle D — Nonhazardous Wastes

were not hazardous in 1988.

Number of On-Site Units...Count the number of on-site units used to treat, store, dispose, or recycle nonhazardous wastes *only*. Units you should count are: tanks; container storage areas; impoundments; landfills; incinerators; waste piles; boilers, industrial furnaces, or other thermal units; and land application or treatment areas. Do not count any sumps or ditches. *If a unit handles hazardous waste as well as nonhazardous waste, do not count it.*

Ash and Noncontact Cooling Water...Two types of nonhazardous waste covered in this survey are generated in very large amounts — ash from coal burning and noncontact cooling water. You are asked to report these wastes separately so that these large amounts will not overshadow the other wastes you report.

Waste Generation...At the top of each column, report the total waste you generated in 1988 for that type of waste.

Waste Quantities...The waste you report for each management practice should be only that waste generated in 1988. *Please do not count waste that was left over from years before 1988.* If you have problems in separating the 1988 waste from previous waste, make your best guess for the 1988 amount.

Management Practices...For each nonhazardous waste, choose only one management practice that best describes how the waste was handled. You may have some problem in choosing between the treatment and disposal practices when a waste has gone through both. For example, what practice do you choose for sludge from a wastewater treatment plant? Use this general rule — if a waste still must be disposed after treatment, put it in a disposal category.

Notes:

- (1) **NPDES**—National Pollutant Discharge Elimination System. It refers to your wastewater treatment system (including treatment, storage, and storm water impoundments) that has a permit to discharge its effluent under the NPDES regulatory system.
- (2) **POTW**—Publicly-Owned Treatment Works, like your city's wastewater treatment plant. It includes treatment, storage, and storm water impoundments.
- (3) **Tanks Only**—if the waste is treated in tanks **ONLY**.
- (4) **Impoundments**—if the waste is treated entirely or at least in part in a surface impoundment.

Column Totals and Numbers-Check...Total the numbers in each column. If the waste generation number at the top of each column is less than the column total, you probably counted waste that you had stored from previous years. Please review the instructions in *Waste Quantities* above and correct your numbers. If the waste generation number at the top of each column is more than the column total, ask yourself if the difference in the two numbers is the amount of waste you had left in storage at the end of 1988. If that sounds reasonable, okay. If not, please check your numbers again.

Site Cleanup Wastes...Of the waste generation amount that you report at the top of each column, report the quantity of *nonhazardous* waste that was generated through RCRA, CERCLA, or other remedial site cleanup activities.

**CMA Subtitle D (Nonhazardous Waste)
Generation and Management Practices**

Report the amount in TONS of nonhazardous waste in each category for 1988. Choose only one category for each waste. Boxes that are crossed-out are considered not applicable for that type of waste.

Management Practice	Number of on-site units	Wastewater		Solid Waste	
		Non-contact Cooling Water	Other Wastewater	Bottom Slag/Ash Fly Ash	Other Solid Waste
Waste Generation					
Recycling/Material Recovery					
Burning for Energy Recovery (the boiler/furnace is not used for power generation)					
NPDES—tanks only					
NPDES—imhoff tank					
POTW—tanks only					
POTW—imhoff tank					
Landfill					
Incineration					
Treatment by other means					
Municipal landfill					
Other landfill					
Surface impoundment					
Underground injection					
Waste Pile Disposal					
Disposal by Other Means					
Column Totals					
Site Cleanup Waste (How much of waste generation was site cleanup?)					

Please double-check your calculations The waste generation should be the same as the column total or greater than the column total above. If it is not, please re-check your numbers. See the instructions about how to account for storage.

Instructions

10. Subtitle D — Nonhazardous Wastes

B. Surface Impoundment Inventory — On-site Only

Each on-site surface impoundment that you report should be entered on a separate line of the inventory form. If your impoundments will not fit all on one page, copy the form and number your pages. If you do not have answers for every item for an impoundment, leave the unknown item BLANK.

Impoundment Identification—The identification column is for *your purposes only* so that you can keep track of which impoundments you have included in the inventory. The identification will not be entered into the database of this survey.

Usage—Choose all of the following usages that apply to describe each impoundment:

NPDES—National Pollutant Discharge Elimination System. It refers to your wastewater treatment system (including treatment, storage, and storm water impoundments) that has a permit to discharge its effluent under the NPDES regulatory system.

POTW—Publicly-Owned Treatment Works, like your city's wastewater treatment plant. It includes treatment, storage, and storm water impoundments.

Disposal—where you intend to leave the waste when you no longer use the disposal unit. For example, a fly ash pond that will be drained and capped with the ash remaining. An example that is NOT disposal is a wastewater treatment pond where sludge is removed from time to time and/or the remaining sludge will be removed when the unit is no longer in use.

Other—where none of the above descriptions fit the impoundment.

Volume—Give the capacity of the impoundment in gallons. If your records show volume in ft^3 , use the following conversion to gallons: $1.0 \text{ ft}^3 = 7.48 \text{ gallons}$

Type of Waste Handled—Four types of wastes are listed: noncontact cooling water, boiler ash/slag and flyash, other wastewater, and other solid waste. Choose all codes that apply to the impoundment.

Liner Type—Choose all of the following liner descriptions that *now* apply to the impoundment.

Concrete liner—covering all sides and the bottom of the impoundment and where the joints have been sealed to stop leaks

Synthetic liner—like one made of plastic or rubber material, one that is not concrete or clay

Engineered clay liner—where the clay has been brought in and compacted

Natural clay liner—where the impoundment has been dug out in a clay soil or located in a depression with clay soil; the clay soil that forms the bottom of the impoundment acts as a liner.

Other—a liner that does not meet any of the above descriptions

None—the impoundment has no liner

Ground Water Monitoring—Answer yes if now there are wells specifically for taking samples of the ground water and measuring the ground water level around the impoundment.

Will Handle OTC Wastes—Answer yes if the impoundment will be used for wastes that will become hazardous by the OTC. For an explanation of the OTC, see page 31.

Meets MTRs Now—Answer yes if the impoundment currently has double liners, leak detection and collection, and ground water monitoring equal to hazardous waste technology requirements.

Changes Because of OTC—choose only one of the following changes that apply because of the OTC:

Retrofitted to MTRs—impoundment will be retrofitted to meet MTRs

Receive variance—impoundment is expected to or will receive a variance from the MTR requirement under section 3004(o)(2) or 3005(j)(2), (3), (4), or (13) of RCRA.

Replaced with Tank—impoundment will be replaced with a tank

Closure—impoundment will be taken out-of-service and closed

No change—no change is planned for the impoundment

Changes before Effective Date of OTC—Answer yes if, before the effective date of the OTC, the impoundment will be closed or otherwise taken out-of-service, retrofitted to meet MTRs, receive a variance from the MTR requirement, or replaced with a tank.

Vista Chemical Company

900 Threadneedle
Houston, Texas 77079
(713) 588-3000

P.O. Box 19029
Houston, Texas 77224
Fax (713) 588-3236

TEG: JOL: EPT: ~~MMH~~: AJO: RF

XF: 32

VISTA

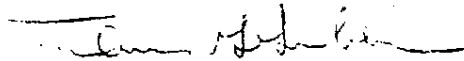
November 7, 1990

Ms. Sandra L. Tirey
Associate Director, Health Programs
CMA
2501 M Street NW
Washington, DC 20037

Dear Sandra:

Attached is our reply form for participation in Phase II of the OECD High Production Volume Existing Chemicals Testing Program. Vista supports this program but has concerns about the potential cost. We realize that it is difficult to estimate potential costs at this time. However, our commitment is contingent on our presumption that based on the known low hazard of this material, actual testing costs may be relatively low.

Sincerely,



Thomas G. Grumbles, C.I.H.
Manager Environmental Affairs

dlj

Attachment

cc: J. D. Burns, R. D. Gamblin

VVV 000004867

CHEMICAL MANUFACTURERS ASSOCIATION
REPLY FORM - PAGE 2
PARTICIPATION IN PHASE II OF THE OECD HPV CHEMICALS PROGRAM

COMMENTS:

Vista Chemical Company designates the following individual to
serve as the lead representative for our company in the OECD program:

Name: Thomas G Grooms
Title: Manager, Environmental Affairs
Address: VISTA Chemical
PO Box 19029
Houston, TX 77224

Phone: 713-588-3445
Fax: 713-588-3456

This reply form was completed by:

Name: Thomas G Grooms
Title: _____
Phone: _____

Please return completed reply form by COB Friday, October 26,
1990, to:

Sandra L. Tirey
Associate Director, Health Programs
Chemical Manufacturers Association
2501 M Street, NW
Washington, DC 20037

202/887-1274 (phone)
202/887-1237 (fax)

VVV 000004868

CHEMICAL MANUFACTURERS ASSOCIATION
REPLY FORM

PARTICIPATION IN PHASE II OF THE
OECD HIGH PRODUCTION VOLUME EXISTING CHEMICALS TESTING PROGRAM

Vista Chemical Company manufactures the following chemical and agrees to take lead responsibility for sponsoring it in the OECD HPV Existing Chemicals Testing Program:

1-Tetradecanol (112721)

Vista Chemical Company prefers to use the following ~~option~~ to manage our activities in the OECD HPV Existing Chemicals Testing Program: (please check one)

Option A:

Our company will take lead responsibility for the chemical listed above, including data collection and testing, and will interact directly with EPA, which serves as the U.S. representative to the OECD.

Option B:

Our company will take lead responsibility for the chemical listed above, including data collection and testing. We request that CMA establish a CHEMSTAR panel of individual producers of different chemicals to interact with EPA and the OECD on behalf of producers of these different chemicals.

(The approximate cost to participants will depend on the number of companies and will be discussed with interested companies.)

X Option C:

Our company is interested in forming a consortium of co-producers of the above chemical to share costs of collecting data and conducting testing. We request that CMA establish a chemical specific panel or augment an existing panel within the CHEMSTAR program.

(The approximate cost to participants will depend on the scope of the program and will be determined by CMA and interested companies.)

Surface Impoundment Inventory

* **Handwritten forms are OKAY**, it is not necessary to type your data.

If you have no information to make an estimate for an item, leave it BLANK.

**CMA Subtitle D (Nonhazardous Waste)
Surface Impoundment Inventory**

[illegible]

1988 CMA Waste Survey

Hazardous—Nonhazardous