

GROWTH POTENTIAL IN THE HAZARDOUS WASTE  
MANAGEMENT SERVICE INDUSTRY

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by John P. Lehman\*

EPA's Office of Solid Waste Management Programs is concerned with the proper management of all residuals of our society destined for land disposal. Recycling; treatment by physical, chemical, biological or thermal means; and landfill disposal are the primary waste management options being considered. In this discussion we are primarily concerned with industrial manufacturing and pollution control residues, and, in particular, the fraction of those residues which are potentially hazardous to public health and the environment.

One of the major conclusions of EPA's 1973 Report to Congress on Disposal of Hazardous Wastes was "a private hazardous waste management service industry exists and is capable of expanding under the stimulus of a regulatory program."

Almost three years have passed since that report was issued. We have much more information about hazardous wastes and their service industry than we did then.

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A Federal regulatory program for hazardous waste management has not yet been enacted, but is under consideration in the Congress now. Meanwhile, several States have enacted hazardous waste management regulatory legislation and have begun to implement regulatory programs.

It seemed to us that a fresh look at the status and growth potential of the hazardous waste management service industry under current conditions, and under a postulated Federal/State regulatory program, was in order to check our basic assumption made in 1973. Accordingly, Foster D. Snell, Inc., conducted for EPA a survey and analysis of the potential for capacity creation in the hazardous waste management service industry. Although the final report is not yet completed, I can comment on some of the findings now.

First, I will present a short review of our current data on industrial and hazardous waste generation, which is needed for service capacity projections. Next, I will discuss the service industry profile as it exists today. Lastly, I will outline the growth potential of the service industry with and without a hazardous waste regulatory climate.

Most of the data about the hazardous waste management service industry was obtained from interviews with many different companies in that industry. I want to thank

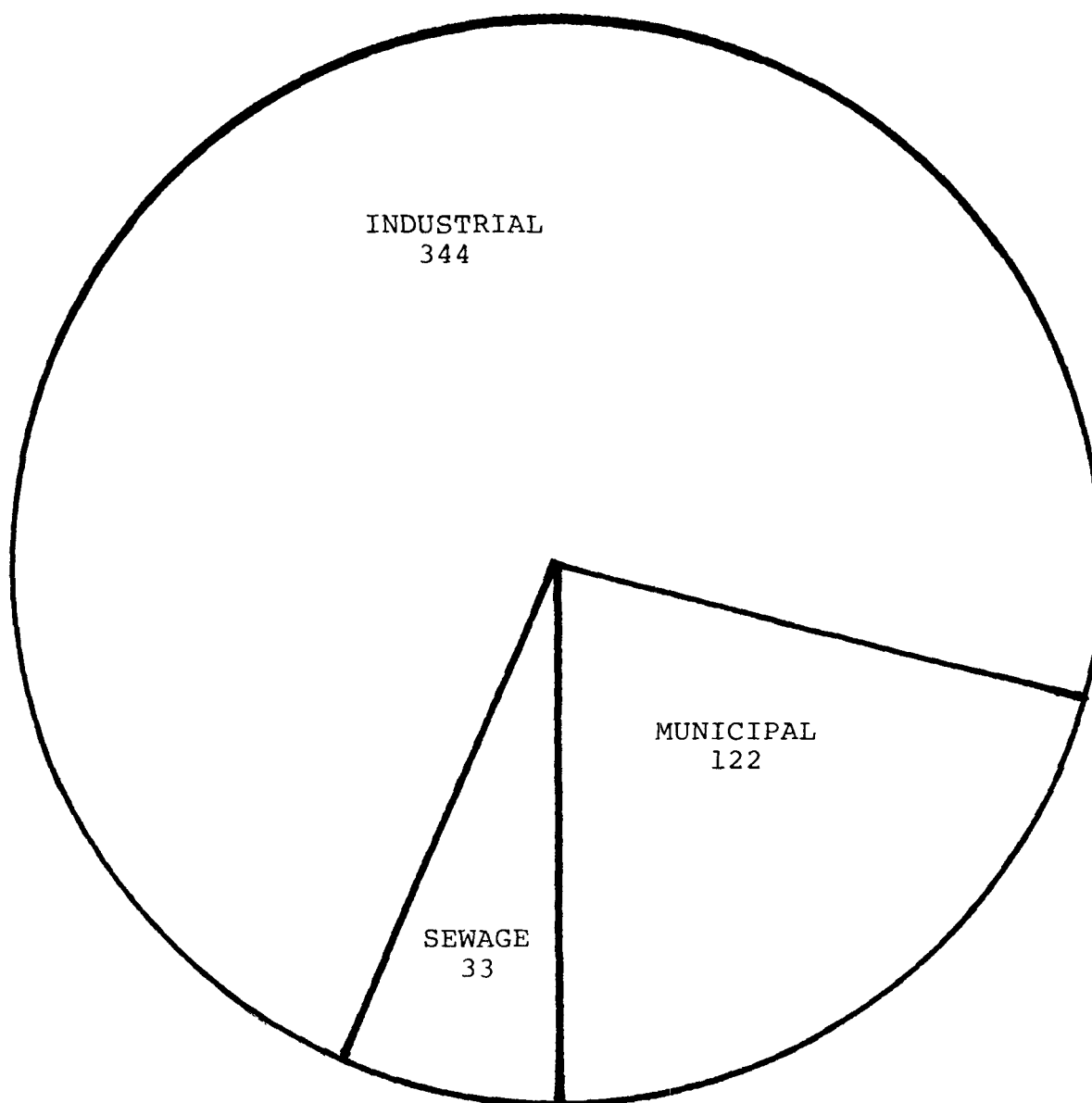
the many people who cooperated with our study. The voluntary contributions by these people, which was always informative and often frank and open, makes us believe the results are accurate and truly representative of the current situation.

#### Industrial Waste Profile

At last year's NSWMA Exposition in Los Angeles, I presented some preliminary results from 6 of a series of 13 Federal surveys of industrial waste in the United States. Data from all 13 studies are now available, plus some updated estimates for those industries not studied in detail.

Our latest estimates indicate that 344 million metric tons of industrial waste on a wet weight basis (i.e., as is, including water content) are produced each year by U.S. industry. For perspective, municipal waste amounts to 122 million metric tons per year and sewage sludge is produced at a rate of 33 million metric tons per year (Figure 1). Few people appreciate the fact that industry produces almost three times as much waste each year as is generated by residential and commercial sources. Further, industry generates about ten times more waste than do the sewage treatment plants.

FIGURE 1  
ESTIMATED INDUSTRIAL WASTE VERSUS OTHER RESIDUALS  
WET WEIGHT IN MM METRIC TONS PER YEAR



The total industrial manufacturing and pollution control waste produced by the 13 industries studied in detail amounts to 200 million metric tons per year, on a wet basis, or 58 percent of all industrial waste. Of this amount, 40 million metric tons per year, or 20 percent, is considered potentially hazardous (Figure 2). Our 1973 estimate of ten million metric tons per year of hazardous waste from all industrial sources was clearly on the low side. The hazardous waste load from these industries is projected to increase to 52 million metric tons per year in the next decade, or a rate of increase of roughly three percent per year.

Of particular interest to the hazardous waste management service industry is the new information that on a weighted average, only 18 percent of potentially hazardous waste is managed off-site, that is, by contract to outside service facilities. However, this weighted average is skewed by the primary metals industry which only manages two percent of its wastes off-site. Excluding this industry, the weighted average is 35 percent of potentially hazardous waste managed off-site. The electroplating industry sends the largest absolute amount (3.5 million metric tons per year) of potentially hazardous waste to outside service contractors. The organic chemical industry is also a major customer of the hazardous waste management service industry.

FIGURE 2  
HAZARDOUS WASTE PROFILE  
(MM METRIC TON, WET)

<u>INDUSTRY</u>	<u>1974</u>	<u>WASTELOAD</u> <u>1977</u>	<u>1983</u>	PERCENT MANAGED OFF-SITE
PRIMARY METALS	20	21	25	2
ORGANIC CHEMICALS	7	12	13	20
ELECTROPLATING	5	4	5	70
INDUSTRIAL INORGANIC				
CHEMICALS	4	4	5	15
TEXTILE MILL PRODUCTS	2	2	1	5
PETROLEUM REFINING	1	1	1	60
7 OTHERS	1	2	2	75
TOTAL	40	46	52	18

## Industry Profile

Structure. In 1975, the hazardous waste industry was comprised of 95 firms with 110 sites in the United States (Figure 3). Over 90 percent of the companies had only one site engaged in hazardous waste management. The three largest firms of the industry have three to six sites per company handling hazardous wastes.

Of the 95 companies in the industry, 57 percent are tightly held private corporations or partnerships. All of these companies have only one site and typically have sales revenues less than \$500,000 annually. Forty-three percent of the total site locations are controlled through common stock corporations or by divisions or subsidiaries of parent corporations. This segment of the industry is responsible for approximately 65 to 70 percent of the total industry revenues. The five largest firms account for 33 percent of total revenues. For the majority of these corporations, hazardous waste management is not their primary business.

Only about eight percent of the sites are municipally owned; they are concentrated in California.

Geographic Distribution. The geographic distribution of sites was concentrated in EPA Regions II, V, and IX. These regions contain approximately 60 percent of the sites.



FIGURE 3

1975

INDUSTRY STRUCTURE

°95 FIRMS; 110 FACILITIES

°57% FIRMS PRIVATE; 43% PUBLIC (STOCK)

°5 LARGEST FIRMS DO 33% OF BUSINESS

°EMPLOYMENT; 2,000

°CAPACITY 7.3 MM TONS; 5.3 MM TONS ADEQUATE

Regions I, VII and X were sparsely populated with sites comprising collectively only 11 percent of the total facilities.

Employment. In 1975, there were an estimated 2,000 employees actively engaged in the hazardous waste industry. Approximately 11 percent of the employees are classified as professionals. Of the professional employees, 75 percent are chemists or chemical engineers. Larger firms with sales over two million dollars per year have the highest percentage of professionals with a chemical background; some of the leading firms in the industry have 100 percent of professionals with chemical backgrounds (including sales personnel). Of the other 25 percent of professionals in the industry, the majority is composed of employees with business backgrounds who are engaged in sales, accounting and management.

Union involvement in the hazardous waste treatment industry is small with only one in five firms having labor organizations. The union activity is concentrated in firms with larger revenues and corporations with hazardous waste divisions. No one union dominates the activity in the industry. The Teamsters, Chemical Workers and Steelworkers unions have involvement in the industry.

Capacity. In 1974, the hazardous waste management service industry had sufficient capacity to recycle, treat, or dispose of approximately 7.3 million tons of waste per year. However, some of the capacity is keyed to disposal processes of questionable environmental adequacy. For example, some of the waste disposal capacity involves poorly designed, located, or operated landfills which are not suitable for hazardous wastes. Also, it is EPA policy to oppose emplacement of materials by deep-well injection without strict controls and a clear demonstration that such emplacement will not interfere with present or potential use of the subsurface environment, contaminate ground water resources, or otherwise damage the environment. Some deep-well injection capacity does not appear to meet these criteria. Consequently, it is estimated that there was environmentally adequate capacity for 5.3 million tons of hazardous waste in 1974.

Utilization of existing capacity ranged from 30 to 80 percent depending on the type of process and region of the country. The average utilization rate was 53 percent. The highest utilization rates were in EPA Region IX, averaging 80 percent for all processes.

Markets. EPA has identified 13 industry groupings which are major generators of hazardous wastes. The hazardous waste management industry views the 13 EPA groupings in

terms of the wastes produced and the general types of treatment required to process the wastes. The hazardous waste management industry generally uses the following five categories to describe markets:

- . Metals/Metal Finishing
- . Paints/Solvents/Coatings
- . Organics
- . Petroleum
- . Inorganics

Figure 4 presents the match between the five categories and the 13 industry groupings. The types of wastes and the general types of processes used for treatment and disposal are also included.

Financial Status. The industry's sales and profits have remained healthy over the five-year period 1971 to 1975 (Figure 5). Sales jumped from \$46 million in 1971 to \$107 million in 1975, an increase of 133 percent. However, the major growth in both number of companies and revenue occurred between 1971 and 1973. Increase in revenue since 1973 has been due primarily to price increases of services, not increases in waste volume. At present, the median sales revenue of the companies surveyed was approximately \$1 million annually.

Similarly, net income has increased 83 percent since 1971. Pre-tax income has averaged 10 percent of sales

FIGURE 4  
1975 MARKET STRUCTURE OF THE  
HAZARDOUS WASTE MANAGEMENT SERVICE INDUSTRY

<u>MARKET CATEGORY</u>	<u>EPA INDUSTRY GROUP</u>	<u>TYPES OF HAZARDOUS WASTES</u>	<u>CURRENT TREATMENT OR DISPOSAL METHODS</u>
Metals/Metal Finishing	Batteries Electroplating  Primary metals smelting and refining Special machinery	Acid solutions Metals containing sludges	Neutralization Chemical Treatment Sanitary Landfill Secure Landfill Deep Well Injection Ocean Disposal
Paints/Solvents/ Coatings	Paint and allied products	Organics Solvents	Incineration Chemical Treatment Sanitary Landfill Secure Landfill
Organics	Organic chemicals Pharmaceuticals Rubber and plastics Textiles Dyeing and finishing	Pesticides Biologicals Rubber Plastics	Incineration Biological Treatment Chemical Treatment Sanitary Landfill Secure Landfill
Petroleum	Petroleum refining	Oily wastes	Incineration Deep Well Injection
Inorganics	Inorganic chemicals Leather tanning	Aqueous solutions of salts, metals, etc.	Chemical Treatment Ocean Dumping Secure Landfill

Source: Foster D. Snell, Inc., analysis based on industry interviews.

FIGURE 5  
FIVE YEAR FINANCIAL HISTORY OF  
HAZARDOUS WASTE MANAGEMENT INDUSTRY  
(Millions of Dollars)

<u>ITEM</u>	<u>1971</u>	<u>1972</u>	<u>1973</u>	<u>1974</u>	<u>1975</u>
Active Number of Companies in Industry	76	82	87	91	95
Industry Total Revenues	\$46	\$65	\$88	\$103	\$107
Total Net Income	4.1	3.7	5.6	6.6	7.5
Total Industry Working Capital	5.2	9.0	13.0	5.0	3.8
Industry Current Ratio	1.48	1.72	1.55	1.57	1.41
Total Tangible Assets	41	69	77	91	90
Total Tangible Equity	19	30	32	34	33
Total Fixed Assets	26	43	48	50	49
Total Land	4.7	7.9	8.7	8.4	8.5
Total Debt	23	39	51	59	54
Total Long-Term Debt	14	20	25	32	26
Total Short-Term Debt	3.2	5.2	5.8	5.8	7.2

Source: Foster D. Snell, Inc., Estimates Based on Industry Interviews  
and Corporate Financial Statements

over this period. Net income as a percentage of revenues has varied between 5.5 percent and 9.0 percent. However, profits as a percent of total tangible equity (net worth) has been between 18 and 22 percent over the period. This demonstrates that the industry has been making adequate profits on its invested capital.

All is not rosy in the financial picture, however. The working capital (current assets minus current liabilities) position has declined since 1973. This is also reflected in the current ratio (current assets divided by current liabilities). The industry has kept a very low cash position while its current liabilities have been growing. This poor cash flow situation is detrimental when attempting to obtain low interest rates for long-term debt.

From 1972 to 1975 the total tangible equity remained relatively stable while the industry total tangible assets have grown by 30 percent. This shows that the owners have not been investing their capital for expansion. Industry expansion has been financed through debt.

Long-term debt was available to the industry until 1973. Since 1973, long-term debt has remained stable. Short-term debt financing has increased from \$3.2 million in 1971 to \$7.2 million in 1975. This high cost debt financing additionally points out the current problems of the industry to obtain a lower cost of capital.

Firms that are active in the hazardous waste treatment industry can be classified into two basic categories: firms whose main objective is hazardous waste treatment, and divisions or sites of larger companies that are engaged in the industry. The firms with their main objective in treatment or disposal of hazardous waste had the following characteristics over the past five years:

- . Net income has ranged between five percent and ten percent of revenues with 1971 as the most profitable year.
- . In 1975, 15 percent of the companies surveyed were unprofitable.
- . Amount of working capital available in the industry has decreased with time and the current ratio has dropped from 1.77 to 1.28.
- . In 1975, approximately 40 percent of the companies surveyed had working capital deficits.

Large corporations who have divisions or sites engaged in hazardous waste management have maintained a relatively more stable financial picture from 1971 to 1975.

Success Factors. A firm's ability to obtain capital at a reasonable cost was a large factor in the determination of the firm's success. Many of the firms were subsidiaries or divisions of larger parent organizations which had accessibility to long-term capital. The industry in general



is young, and does not have an established reputation with private sources of debt financing. Hence, a number of the smaller firms have had to utilize short-term financing, retained earnings, or maintain low cash positions in an effort to obtain necessary capital for expansion. These firms report this has seriously affected their ability to expand.

The non-uniformity of the enforcement of regulations has enabled some firms to operate at lower costs than others. Examples of differing regulations include the allowable discharge limits for an area, permits for the ultimate disposal of hazardous chemicals to landfills that are less than secure, and the amount of "pressure" asserted by local enforcement agencies.

Obtaining a site permit in localities that are accessibly close to industry sources is a current problem. In some cases, localities will not permit any further industrial expansion.

Almost all of the hazardous wastes handled are serviced on a contract basis. In general, the larger industrial firms which seek to maintain a good public image are disposing of their waste in a process approved by the local authorities. However, in most areas of the United States, the industrial firms signing contracts with the "environmentally adequate"

hazardous waste service industry does not fill capacity.

In the current mode of operations, the most successful firms have contracts for handling wastes from large reliable sources.

Firms that offered a full-service hazardous waste treatment service were more profitable than specialized operations. A facility apparently needs the capability of handling more than one industry's wastes. In addition, multiple service firms have an established reputation in most geographic areas. However, several instances were reported of firms which "over-built" and were not successful. The capital cost required of a full service facility was high; volume never approached capacity and many multi-source facilities were unsuccessful.

#### Growth Potential

The growth potential of the hazardous waste management service industry is dependent on the future demand for such services, the availability of capital to finance expansion, and the regulatory climate which may lead to closure of environmentally inadequate capacity.

In 1974, the amount of hazardous wastes available for contract exceeded the available environmentally adequate capacity by approximately 2.3 million metric tons per year (Figure 6). However, this overall figure for capacity short-fall must be viewed with caution since there are

FIGURE 6  
HAZARDOUS WASTES CAPACITY STATUS  
1974  
(MM METRIC TONS, WET)

<u>MARKET CATEGORY</u>	<u>AVAILABLE FOR CONTRACT</u>	<u>ENVIRONMENTALLY ADEQUATE CAPACITY</u>	<u>SURPLUS OR DEFICIT</u>
METALS/METAL FINISHING	4.3	1.4	(2.9)
ORGANICS	1.7	0.4	(1.3)
INORGANICS	0.7	1.1	0.4
PAINTS/SOLVENTS/COATINGS	0.1	0.7	0.6
PETROLEUM	0.8	1.7	0.9
TOTAL	<u>7.6</u>	<u>5.3</u>	<u>(2.3)</u>

substantial variations by region of the country and by markets. For example, there were short-falls in available capacity in the metals/metal finishing and organic chemicals markets, but surplus capacity in the other markets.

As of 1975, the industry's designed capacity was being under utilized. None of the companies interviewed reported facilities operating at full capacity. Nevertheless, except for the northeastern area, the industry plans to increase waste volume throughput by 1977 by:

- . adding new processes at existing sites
- . opening new sites in other States
- . adding storage and mixing facilities
- . adding sales personnel to cover new markets, and
- . adding operating personnel to further utilize existing equipment.

By 1977, we anticipate that the hazardous waste available for contract will increase slightly, but that environmentally adequate capacity will increase at a faster rate (Figure 7). Consequently, the deficit in capacity will decrease to 1.7 million metric tons per year. Again, this overall short-fall can be misleading because it is mainly due to large short-falls in the metals/metal finishing and organic chemicals markets. We predict continuing surplus capacity in the other markets.

FIGURE 7  
HAZARDOUS WASTES CAPACITY STATUS  
1977  
(MM METRIC TONS, WET)

<u>MARKET CATEGORY</u>	<u>AVAILABLE FOR CONTRACT</u>	<u>ENVIRONMENTALLY ADEQUATE CAPACITY</u>	<u>SURPLUS OR DEFICIT</u>
METALS/METAL FINISHING	3.5	1.7	(1.8)
ORGANICS	2.7	0.7	(2.0)
INORGANICS	0.8	1.1	0.3
PAINTS/SOLVENTS/COATINGS	0.1	0.8	0.7
PETROLEUM	0.8	1.9	1.1
TOTAL	<u>7.9</u>	<u>6.2</u>	<u>(1.7)</u>

The above capacity projections for 1977 were made based on fairly firm expansion plans discussed during interviews with service industry management. Beyond 1977, the crystal ball becomes much more clouded. Capacity projections in the 1980's are highly dependent on the hazardous waste management regulatory climate.

If the current State hazardous waste management regulatory status remains constant through 1983, we would expect some of the financially weak companies to drop out, leaving about 75 to 85 companies in the business. The number of facilities would increase, however, to about 130 to 140 facilities, employing about 2,100 people. The waste available for contract would be about 10 million metric tons per year. The available environmentally adequate capacity would be about 7 million tons, but only 5 million tons of this capacity would be utilized. The capital needed for the added capacity would amount to approximately \$200 million.

Thus, in this scenario, we see a modest growth rate in the industry of about five percent per year, but a continuing short-fall in environmentally adequate capacity. Of great concern is our projection that about one-half of the hazardous waste available for contract, or about 5 million metric tons per year overall would presumably be disposed of at environmentally inadequate facilities.

This overall figure could be much higher due to regional and market variations in capacity.

A considerably different projection for 1983 results if it is assumed that Federal or State legislation requiring environmentally adequate treatment and disposal of all hazardous waste is enacted by about 1977 and subsequently implemented on a phased time schedule to minimize capacity growth lead time problems and reduce costs.

Under this scenario, there would be some new entrants in the business such that by 1983 we would expect 90 to 100 companies to be operating. The number of facilities would increase substantially to about 160 to 170 facilities, employing about 4,500 people. The available environmentally adequate capacity would be about 9 million metric tons per year, but it would be utilized unevenly, due to regional and market variations, particularly in the metals and organic chemicals waste categories, such that deficits in capacity up to 6 million metric tons per year are possible.

About \$600 million in new capital would be needed to finance this expansion. Some of this would be available from capital markets, and the remainder is expected to be generated from increased profits as facility utilization is increased due to regulatory pressures.

Thus, even with a regulatory climate, a substantial short-fall of needed capacity, in the right place and for

the correct markets, is anticipated in 1983 in the hazardous waste management service industry, even though the overall capacity will closely approach the total hazardous waste load available for contract. Consequently, our original premise that the private sector will respond to provide needed capacity in a regulatory climate appears to be nearly correct on a macro-scale, but incorrect when regional and market-specific variances are taken into account.

These conclusions are, of course, based on imperfect data and projections which may or may not come to pass. For example, we have assumed the percent of industrial wastes managed off-site will remain constant through 1983. If waste generators were to build a substantial amount of waste treatment and disposal capacity on-site, the short-falls in capacity in the hazardous waste management service industry would be correspondingly reduced or even eliminated.

In short, the hazardous waste management marketplace is dynamic and requires periodic assessment, particularly if new regulation is imposed. We shall watch the capacity creation situation closely and shall adjust governmental response as appropriate.

#### Summary

To recap, in this recent work we have found that:

1. Industry produces three times more waste annually than is generated by residential and commercial



sources, and ten times more than sewage treatment sludge.

2. There is about four times as much potentially hazardous waste being generated annually than we thought in 1973 (40 vs. 10 million metric tons per year).
3. The annual growth rate of hazardous waste generation will be less than anticipated (3 vs. 5 to 10 percent per year).
4. On a weighted average, only 18 percent of all hazardous waste is treated or disposed of by off-site hazardous waste management service contractors. Excluding the primary metals industry, this factor jumps to 35 percent.
5. There are more hazardous waste management service companies with more capacity than we thought in 1973, but this capacity is being used only at a 50 percent rate and some of the disposal practices are environmentally inadequate. Even so, more wastes are being better managed than we thought.
6. Overall, the hazardous waste management service industry's sales and profits have remained healthy in the last five years, but 15 percent of the companies surveyed were unprofitable and 40 percent had working capital deficits.

7. In 1974, there was a short-fall of 2.3 million metric tons of environmentally adequate waste disposal capacity; this capacity deficit will decrease to 1.7 million metric tons in 1977 due to planned expansion in the service industry.
8. Matching of waste loads to available capacity varies substantially by region of the country and by markets.
9. There is a large capacity short-fall in the metals and organic chemicals markets, but surplus capacity in the other markets.
10. If the current State hazardous waste management regulatory status remains constant through 1983, we see a modest growth rate in the service industry, but a continuing short-fall in environmentally adequate capacity.
11. If it is assumed that Federal or State legislation requiring environmentally adequate treatment and disposal of all hazardous waste is enacted by 1977, then by 1983 we project that the overall service capacity will increase to closely approach the total waste load available for contract, but there will remain a substantial short-fall of capacity in the right place and for the correct markets.

12. These capacity deficits could be reduced or eliminated if waste generators build more on-site waste treatment and disposal facilities.

The hazardous waste management service industry plays an important role in protecting public health and the environment by properly treating and disposing of potentially hazardous waste. It is a high-risk business in a dynamic market place. EPA supports the concept of a private sector response to governmental mandates for environmentally adequate management of hazardous waste. I hope this discussion will assist the service industry by highlighting the problems and opportunities we see in the future. I refer you to the full report, which should be available within six months, for further details.

Thank you very much.

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