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HAZARDOUS WASTE

Future Availability of and Need for Treatment Capacity Are Uncertain

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The Honorable Thomas A. Luken
Chairman, Subcommittee on
Transportation, Tourism,
and Hazardous Materials
Committee on Energy and Commerce
House of Representatives

The Honorable James J. Florio
House of Representatives

In response to your request of March 21, 1986, this is our report on barriers to the development of treatment facilities as alternatives to land disposal of hazardous wastes.

As arranged with your offices, unless you publicly announce its contents earlier, we plan no further distribution of this report until 30 days from the date of this letter. At that time, we will send copies to interested parties and make copies available to others upon request.

Hugh J. Wessinger
Senior Associate Director

Executive Summary

Purpose

Each year, the United States disposes of about 275 million metric tons of hazardous wastes. About 13 million metric tons are placed in landfills, waste piles, and impoundments from which toxic constituents can drain into soil and groundwater. In 1984, the Congress directed that land disposal of hazardous wastes be phased out over a 5-year period unless risks to public health and the environment could be minimized, either by treating the wastes before disposal or by preventing their migration. Concerned that there might not be enough capacity to treat hazardous wastes, the Chairman, Subcommittee on Transportation, Tourism, and Hazardous Materials, House Committee on Energy and Commerce, asked GAO to identify any barriers impeding the development of treatment facilities and efforts to overcome them.

Background

The 1976 Resource Conservation and Recovery Act (RCRA) established a system for managing wastes considered hazardous to public health and the environment. It requires all generators of hazardous wastes to dispose of them in a treatment, storage, or disposal facility that meets Environmental Protection Agency (EPA) standards. As of November 1987, 324 land disposal facilities were operating in the United States.

In 1984 amendments to RCRA, the Congress found that certain types of these land facilities could not assure that hazardous waste would be contained over a long period of time. Thus, to avoid substantial risk to public health and the environment, the amendments required an eventual ban on land disposal unless it could be demonstrated that hazardous wastes would not migrate from the disposal site for as long as they remained hazardous. Otherwise, the wastes would have to be treated through incineration, decomposition, or some other process that reduces hazardous constituents to EPA-specified concentration levels before land disposal.

The law gave EPA a series of deadlines, beginning in 1986 and continuing annually through 1990, for setting standards of treatment for the close to 500 wastes that EPA has defined as hazardous. If EPA sets standards by the deadlines and finds that there is a shortage of capacity to treat the waste, it may defer implementation of the standards for 2 years; in specific cases, it may grant an additional 2-year extension, thus providing for up to 4 years for construction of facilities needed to meet standards. Should EPA not meet the deadlines for setting treatment standards, land disposal of the waste is automatically banned, except where wastes will not migrate from their disposal site. Thus far, EPA has met the first two deadlines that have fallen due.

Results in Brief

Relatively little treatment capacity is being added. Companies that would build the facilities claim that they first need to know the treatment standards EPA will require for the remaining wastes before they can decide how to respond: whether to build a new treatment facility, for example, or make a process change that would reduce or eliminate wastes. Companies also say that local community opposition to hazardous waste treatment facilities is a significant barrier, as is the time and cost of applying for necessary permits.

EPA recognizes that the need for additional capacity can be better determined after treatment standards are set. However, if additional facilities have to be built, it may take more than the maximum 4-year extension period the Congress has allowed, based on the experiences of new or proposed projects. EPA and the states are taking a number of steps to facilitate siting and permitting, but delays occur for a variety of reasons that cannot easily be foreseen or avoided. Despite the time involved, it would be premature to consider extending congressional deadlines before treatment standards are set and companies decide how they will comply with them.

Principal Findings

Little Additional Treatment Capacity Is Being Built

Although EPA does not keep track of all new proposals, regional office staff are aware of only 19 treatment facilities in 42 states that began operating after 1984 or are currently under consideration. Together, these new facilities represent an annual capacity increase of roughly 1.3 million metric tons, a less than 1-percent addition to current levels.

According to a number of industry and government officials, companies have been unwilling to invest in new facilities until EPA sets treatment standards, at which time companies will know how much of their wastes have to be treated and the kinds of treatment necessary. Commercial waste management companies are also wary about building treatment facilities because of uncertain demand.

Officials also said that public opposition and the length of time and cost involved in obtaining necessary permits have deterred development of hazardous waste facilities. In an attempt to make it easier for companies to obtain siting and permitting approval, both federal and state governments have taken steps to reduce some of the associated uncertainties.

A number of states, for example, have siting laws to help resolve conflicts and provide technical assistance and economic incentives to communities, while EPA has proposed various regulatory changes to facilitate the permitting process.

Adding Capacity May Take More Time Than Is Allowed

If more capacity is needed to meet EPA's treatment standards, it may be difficult in some cases to add new capacity within the maximum 4 years allowed by the Congress. Among the 19 new or proposed projects GAO looked at, 6 are expected to obtain site approval and operating permits and begin operations in 4 years or less. However, 6 other companies estimate that they will require between 4 and 5 years, and the remaining 7 companies estimate that at least 5 to 8 years will have elapsed before their facilities start operating. In each case, delays occurred for reasons particular to each project, such as legal challenges and changes in management.

In view of the potentially long lead times, many of the largest waste generators have begun to look at a variety of ways to comply with the land disposal restrictions. However, they are not willing to commit the considerable resources necessary for more detailed planning until EPA sets treatment standards. EPA also recognizes that the delays allowed by the Congress may not provide enough time to bring new facilities on line if any additional capacity is needed, but it believes that it must first set treatment standards and evaluate whether and where capacity shortages might exist, a position with which GAO concurs.

Recommendations

Because of the uncertain need for treatment facilities and EPA actions to encourage and facilitate siting and permitting, GAO makes no recommendation at this time. However, GAO recognizes that this issue may need to be revisited once standards are established and the need for additional facilities determined.

Agency Comments

GAO discussed the information presented in this report with EPA and industry officials. Their comments are included where appropriate. As requested by the Chairman's office, GAO did not obtain official agency comments.

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Abbreviations

API	American Petroleum Institute
CSSI	Chemical Securities Systems Inc.
CWM	Chemical Waste Management, Inc.
EPA	Environmental Protection Agency
GAO	General Accounting Office
HWFAB	Hazardous Waste Facility Approval Board
MRC	Metropolitan Recovery Corp.
PCBs	polychlorinated biphenyls
RCRA	Resource Conservation and Recovery Act
WTI	Waste Technologies Industries

Introduction

Under the 1984 amendments to the Resource Conservation and Recovery Act of 1976 (RCRA), the Congress required a gradual end to land disposal of untreated hazardous wastes. As required by the amendments, the Environmental Protection Agency (EPA) must develop treatment standards for the close to 500 types of wastes that have been defined as hazardous; any wastes that do not meet these standards beyond the dates set by the Congress will be banned from land disposal. In March 1986, the Chairman, Subcommittee on Transportation, Tourism, and Hazardous Materials,[1] House Committee on Energy and Commerce, asked us to determine whether any barriers impede the development of necessary treatment facilities.

Managing Hazardous Waste

Under RCRA, the Congress established a program for managing hazardous wastes so as to protect human health and the environment. Subtitle C of RCRA requires owners and operators of hazardous waste treatment, storage, or disposal facilities to have a permit that is issued either by EPA or an EPA-authorized state. To obtain a permit, hazardous waste handlers must meet certain standards for facility design and operation. Recognizing that it could take years to issue permits to all existing facilities, RCRA allowed facilities in existence in November 1980 to continue operating under an interim status, following "good housekeeping" practices until they receive final permits.

Wastes are considered hazardous under RCRA if they significantly contribute to increased illness or mortality, or if they could cause environmental or health hazards if improperly handled. EPA has further defined as hazardous any solid waste that is either ignitable, reactive, or corrosive, or contains certain toxic constituents that will leach into groundwater. A solid waste is also considered hazardous if it appears on a published list of EPA-tested wastes and chemical products. As of February 1988, the list contained about 460 substances.

According to EPA's 1986 national screening survey, the United States annually disposes of about 275 million tons[2] of these hazardous wastes.[3]

[1]Before the 100th Congress, this Subcommittee was named the Subcommittee on Commerce, Transportation, and Tourism. Although the name changed, the Subcommittee continues to have jurisdiction for environmental matters. As agreed with the new Subcommittee Chairman's office, this report is also being addressed to Congressman James J. Florio, the prior Subcommittee Chairman.

[2]All tons in this report are metric tons.

[3]This amount includes only those hazardous wastes subject to RCRA regulation and does not include hazardous substances regulated under other federal laws, such as the Clean Water Act.

Most of these wastes—about 208 million tons—are treated at some 1,600 facilities around the country, using processes that change the character of the wastes and make them less hazardous. Some of the most widely used treatment methods are incineration, biological decomposition, chemical neutralization, solidification, and steam stripping, which converts hazardous constituents in wastewater into a gas that is then captured through air pollution control equipment. Another 57 million tons undergo processing to recover usable materials.

About 13 million tons of hazardous waste, including residue from treatment, are annually disposed of in land disposal facilities. As of November 1987, 324 of these facilities were operating. Some portion of that waste, however, is not previously treated but goes directly into land facilities. Many of these facilities are surface impoundments—pools of aqueous wastes ranging in size from a few hundred square feet to hundreds of acres, located at the same sites as the plants at which the wastes are generated. Land disposal facilities also include hazardous waste landfills, which are generally below-ground pits, and land treatment facilities, at which waste is spread on the land or placed in shallow pits where it undergoes biological decomposition.

Land Disposal Bans

Under the 1984 amendments to RCRA, the Congress declared that reliance on land disposal should be minimized or eliminated in order to avoid risks to human health and the environment. Finding that certain types of land disposal facilities are not capable of assuring long-term containment of hazardous wastes, the Congress stated that land disposal should be the least favored method for managing hazardous wastes. The amendments therefore specified that land disposal would be prohibited unless: (1) the wastes are treated before disposal to substantially reduce the concentration levels of toxic constituents or (2) it can be demonstrated with some certainty that hazardous constituents will not migrate from the disposal facility for as long as the wastes remain hazardous. The bans are to take effect over a 5-year period, with a series of deadlines for five different groups of wastes.

The first deadline was for dioxin and solvent wastes. (See table 1.1.) By November 1986, EPA was to establish standards for treating these wastes in order to minimize threats to human health and the environment.

Table 1.1: Timetable for Land Disposal Bans

Waste category	Deadline
Dioxins and solvents	November 1986
California-listed wastes	July 1987
First third of EPA-listed wastes	August 1988
Second third of EPA-listed wastes	June 1989
Final third of EPA-listed wastes and characteristic wastes[a]	May 1990

[a]Although treatment standards for characteristic wastes (i.e., wastes that exhibit the characteristics of ignitability, corrosivity, etc.) are to be set by May 1990, EPA has ruled that they are not subject to land bans if EPA does not set treatment standards by that date.

The next deadline for banning wastes was for a group of wastes referred to as the California list. This group includes those wastes that had been restricted from land disposal by the state of California. The list consists of: liquid wastes containing free cyanides, certain metals, polychlorinated biphenyls (PCBs), or corrosives; and liquid and nonliquid wastes containing halogenated organic compounds. Unlike the other groups of wastes, the California-list wastes were required by law to meet specific concentration levels—those established by the state of California—if EPA had not set more stringent concentration levels by the July 1987 deadline. With the exception of most halogenated organic compounds, for which the effective date of treatment standards was deferred because of a capacity shortage, the statutory standards for all California-list wastes are now in effect. In the case of free cyanides and metals, however, EPA is considering more stringent standards in the future. In any case, because the California-list wastes are also included in EPA's list, their treatment standards will be reviewed again as EPA develops standards for listed wastes.

The last three deadlines for banning wastes pertain to EPA's approximately 460 listed wastes, which are to be ranked and divided into three groups according to the volume of wastes generated and their intrinsic hazard. Treatment standards for the first third of the listed wastes must be established and go into effect by August 1988; deadlines for the other two-thirds are June 1989 and May 1990. This last deadline also applies to wastes that exhibit hazardous characteristics.

If EPA finds, by the date that treatment standards are to become effective, that capacity is inadequate to meet these standards, EPA may delay implementation of the land disposal bans until such capacity becomes available, for up to 2 years. On a case-by-case basis, however, EPA can extend the effective date for 2 additional years if the applicant for an extension can demonstrate a good faith effort to comply with the land

disposal restrictions and a contractual commitment to construct or otherwise provide alternative capacity. Because RCRA prohibits generators from storing hazardous wastes after the land bans go into effect (unless it is to accumulate them for treatment, disposal, or recovery purposes), companies cannot continue to produce hazardous wastes if treatment capacity is still not available after the maximum 4-year delays.

Unless EPA sets treatment standards by the required deadlines or determines, on a case-specific basis, that no migration will occur, the law prohibits land disposal of hazardous wastes at any concentration. There are, however, exceptions to these automatic bans. As noted earlier, for the California-list wastes, statutory concentration levels go into effect. In the absence of treatment standards for the first and second thirds of the EPA-listed wastes, land disposal can continue if the land disposal facility is the only alternative to treatment available. In addition, landfills and surface impoundments must satisfy certain technical requirements for liners, leachate collection systems, and other protective measures. In any case, EPA has only until May 1990 to set treatment standards for the EPA-listed wastes; if it fails to do so, the outright ban would go into effect.

Status of Disposal Restrictions

As of March 1988, EPA had met the first two statutory deadlines. As shown in table 1.2, EPA established treatment standards for dioxins and solvents in November 1986. However, EPA found there was not enough capacity nationwide to treat dioxins and certain types of solvent-contaminated wastes, and it consequently extended the deadlines for these wastes to November 1988.

In July 1987, the deadline for the California-list wastes, EPA set treatment standards for PCBs and halogenated organic compounds and adopted the statutory concentration levels for these two groups of wastes and corrosives. However, it extended the deadline for most types of halogenated organic compounds to July 1989 because of a lack of adequate treatment capacity. As noted earlier, the statutory concentration levels for metals and free cyanides also went into effect, but EPA is considering promulgating more stringent levels.

Table 1.2: Current Status of Adopted Treatment Standards

Waste	Statutory deadline	Status
Dioxins	November 1986	Standard set, but deadline was extended to November 1988 because of treatment capacity shortage.
Solvents	November 1986	Standard in effect for some solvent-containing wastes, but for others, deadline was extended to November 1988 because of treatment capacity shortage.
Halogenated organic compounds	July 1987	Standard was set, but deadline was extended to July 1989 (except for dilute wastewater) because of treatment capacity shortage.
Corrosives, PCBs	July 1987	EPA-adopted statutory concentration levels in effect. Treatment standard set for PCBs but not for corrosives.
Metals, free cyanides	July 1987	Statutory concentration levels in effect; EPA may set more stringent levels.

Objectives, Scope, and Methodology

Concerned that there might not be enough capacity to treat hazardous wastes in order to meet land disposal restrictions, the Chairman, Subcommittee on Transportation, Tourism and Hazardous Materials, House Committee on Energy and Commerce, asked us in March 1986 to determine what barriers, if any, stood in the way of capacity development. In subsequent discussions with the Chairman's office, we agreed to pay particular attention to barriers presented by siting and permit review procedures. We assumed that EPA would meet the statutory deadlines for setting treatment standards, and that a maximum of 4 years would be available to develop treatment capacity before land disposal restrictions would be imposed. If EPA does not meet the deadlines, generators would have less time to find land disposal alternatives.

Our first step was to identify treatment facilities that had recently been sited, permitted, or were still under review as of October 1986, during the time of our survey. Because EPA headquarters did not have this information, we contacted all of EPA's 10 regional offices and asked them to identify known attempts to site a new hazardous waste treatment facility or expand an existing one. We received information for 42 states. For lack of time, we were not able to obtain information on projects in Delaware, Kansas, Maryland, Montana, Nebraska, North Dakota, South Dakota, and Wyoming.

Upon further checking, 35 of the 82 facilities that were ultimately identified turned out to be something other than a new hazardous waste treatment facility (e.g., nonhazardous waste facilities). Eight more of the 82 facilities identified did not meet our criteria because they had not submitted a permit or siting application by October 1986, and 20 others were no longer active projects. This left 19 active projects either in operation or still under consideration.

We selected 6 of these 19 active projects as case studies for a review of the siting and permitting processes. We chose these six to include both expansions and new facilities and different treatment facility types (incinerators and others). To obtain information about them, we visited five in person and contacted officials of the sixth by telephone. In those cases where siting had been approved, we talked with representatives from local communities to determine what their concerns had been and whether they had been addressed. For those facilities that had received permits or were well along in the permitting process, we also met with officials of the state permitting agencies and the EPA regional offices. During our visits, we reviewed pertinent state and local laws, regulations, policies, and procedures related to siting and permitting hazardous waste facilities.

We also sought the views of industry and government officials on significant barriers to development of treatment facilities and efforts to overcome them. We interviewed, by telephone and in person, representatives of (1) commercial hazardous waste management companies, including three of the largest companies in the United States; (2) industries that generate large quantities of hazardous wastes; and (3) EPA and state agencies responsible for hazardous waste facility siting and permitting. The commercial waste management companies and associations included: Chemical Waste Management Inc. (CWM), Rollins Inc., CECOS (a wholly owned subsidiary of Browning Ferris Industries), the Hazardous Waste Treatment Council, and the National Solid Waste Management Association. Large generators were represented by the Chemical Manufacturers Association, Dow Chemical U.S.A., E.I. DuPont De Nemours and Co., Monsanto Co., Union Carbide Corp., the National Association of Manufacturers, and the American Petroleum Institute. Government agencies and officials were represented by the Association of State and Territorial Solid Waste Management Officials, the National Governors Association, and the Consortium of Hazardous Waste Siting Authorities. We also talked to officials of 5 companies that operate commercial PCB incinerators and 14 companies that EPA lists as generators of dioxin

wastes. Finally, we talked to officials in nine states, including those in which we identified new or proposed treatment facilities.

Within EPA, we interviewed officials of the Office of Program Management and Support, Office of Waste Programs and Enforcement, Office of Water Enforcement and Permits, Office of the Inspector General, and the Office of General Counsel. In addition to telephoning all 10 regional offices, we also visited EPA regions IV (Atlanta) and V (Chicago) because they reported the most siting and permitting activity. From headquarters officials, we obtained information on EPA's progress in developing treatment standards and EPA's plans for the future.

We conducted our review between May 1986 and November 1987 following generally accepted government auditing standards. Following the request of the Subcommittee Chairman's office, we did not obtain official agency comments on a draft of this report. However, during our review, we discussed our findings with EPA officials, and with company officials in some cases, and incorporated their remarks where appropriate.

Little Additional Hazardous Waste Treatment Capacity Is Being Built

Few additional treatment facilities have been built or proposed in recent years. We identified three facilities that began operating after 1984 and 16 proposed facilities that are either under review or construction.

Until EPA establishes all required treatment standards, however, it will not be possible to determine whether any further increases in capacity will be needed. To a large extent, the absence of treatment standards accounts for the relatively small increase in treatment capacity. Generators of hazardous waste are waiting to see what the standards will be before deciding whether to (1) build new facilities, (2) have their wastes treated commercially, or (3) change their manufacturing processes to reduce the volume of waste produced. At the same time, companies in the waste management business are unwilling to invest in new facilities until they have a clearer indication of future demand. Besides these uncertainties, another perceived barrier to installing new capacity is the time and costs associated with siting and permitting, although EPA and the states have initiated actions to facilitate both processes.

New and Proposed Treatment Facilities

From information provided by EPA and the states, we found that as of October 1986, only 19 of the treatment facilities that had been proposed for construction in the 42 states included in our review were either operating or under review. Although 20 other proposals were also reported by this date, they were no longer under consideration, either because they had been withdrawn or disapproved after applying for a permit or siting approval. As shown in table 2.1, 3 of the 19 projects had begun operation as of October 1987. Five of the remaining 16 had been issued final permits, and 4 of these 5 were in the construction phase. Ten others were at some stage of the permit review process, and the remaining project planned to submit its application in early 1988.

Table 2.1: Treatment Facilities Under Review or in Operation

Name and location of facility	Type	Estimated annual capacity	Status (as of 10/87)
California Thermal Treatment Services, Vernon, Calif.	New-commercial incinerator	24,200-27,500 tons	Final permit under review
Chemical Securities Systems, Inc. (CSSI), Arlington, Ore.	Expansion-commercial incinerator	23.4 million gallons (87,050 tons)[a]	Final permit under review
Chemical Waste Management, Inc (CWM), Emelle, Ala.	Expansion-commercial incinerator	48,310 tons	Permit issued but under appeal
Ecoflo, Inc , Greensboro, N.C.	New-commercial treatment	7.8 million gallons (29,020 tons)[a]	Final permit approved; under construction
Ecolotec, Dayton, Ohio	Expansion-commercial treatments	41 million gallons (152,520 tons)	EPA permit issued but under appeal; state permit under review
ENSCO, Mobile, Ariz.	New-commercial incinerator and treatment	77,000-82,500 tons	Sited; permit application to be submitted in early 1988
Eticam, Inc., Fernley, Nev.	New-commercial treatment	30 million gals. (111,600 tons)[a]	Operating
Eticam, Inc., Warwick, R.I.	New-commercial treatment	6 million gals. (22,320 tons)[a]	Operating
GSX Services, Inc., Laurinburg, N.C	New-commercial treatment	26 million gals. (96,720 tons)[a]	Draft permit issued
LWD, Inc , Calvert City, Ky.	Expansion-commercial incinerator	(not available)[b]	Final permit under review; construction started under interim permit
McDonnell Douglas Corp., St. Louis, Mo.	Expansion-on-site incinerator	660 tons	Operating
Metropolitan Recovery Corp. (MRC), Roseville, Minn.	New-commercial treatment	7.8 million gallons (29,020 tons)[a]	Final permit approved; under construction
New York State Plasma Arc Unit, Niagara Falls, N.Y.	New-mobile incinerator	120,000 gallons (450 tons)[a]	Permit application under review
PPG, Inc., Circleville, Ohio	New-on-site incinerator	46,200 tons	Sited and permitted; under construction
Pyrochem, Inc., Louisa, Ky.	New-commercial incinerator	39,600 tons	Permit under review
Radium Petroleum Co., Kansas City, Mo	Expansion-commercial incinerator	10,840-18,070 tons	Permit application under review
SCA Chemical Services, Memphis, Tenn.	New-commercial incinerator	87,910 tons	Permit under review
Stauffer Chemical Co , Martinez, Calif.	New-on-site incinerator	231,000 tons	Permit application under review
Waste Technologies Industries (WTI), East Liverpool, Ohio	New-commercial incinerator and treatment	253,000 tons	Sited and permitted; under construction
Total capacity = 1,347,420 - 1,363,450 tons			

[a]One million gallons = 3,720 tons on average

[b]LWD has withheld data on capacity for proprietary reasons.

All but four of the projects are commercial facilities providing treatment services for wastes from a number of different generators. One of these four is a chemical company incinerator that will use hazardous waste as

fuel in producing sulfuric acid. Another is a state-owned mobile incinerator that will be used to destroy hazardous wastes from abandoned or inactive waste sites. The other two are on-site facilities, incinerators handling wastes produced at PPG's and McDonnell Douglas Corporation's installations. In all, 12 of the 19 facilities include incinerators.

Altogether, these 19 facilities represent an increase of approximately 1.3 million tons a year in treatment capacity, a very small addition to the 764 million tons of total capacity estimated by EPA in 1981, the most recent estimates available.[1] However, the capacity of these new facilities would significantly increase commercial capacity, adding about 18 percent to the 6 million tons of commercial capacity estimated in 1981. Although the current treatment capacity would appear to be more than adequate to handle the 275 million tons disposed of annually, there could still be shortages depending on the types of treatment methods required and the location of available facilities.

Barriers to Additional Treatment Capacity

According to industry and government officials, uncertain need as well as obstacles encountered in siting and permitting accounts for the relatively small growth in treatment capacity. In general, companies have been reluctant to propose new projects because of the many unknowns they face: the treatment standards EPA will set and the amount of wastes that will have to be treated, the most economical method of waste management available in light of the treatment standards, other yet-to-be-identified wastes that may affect the demand for treatment, and project sponsors' ability to obtain siting and permitting approval.

Unknown Treatment Standards

Officials we interviewed believe that the most fundamental barrier to adding capacity has been the absence of treatment standards. Until companies know what will be expected of them, they are delaying their decisions on how to proceed. Oil companies, for example, now rely heavily on land treatment, a method of land disposal, to manage hazardous wastes. Some companies hope to be able to continue using this method by demonstrating, in petitions to EPA, that the hazardous constituents will not migrate from the impoundments in which they are placed. If they are unsuccessful, they may have to switch to incineration or some other form of treatment, but they will not make plans until they are more certain of the requirements.

[1]National Survey of Hazardous Waste Generators and Treatment, Storage and Disposal Facilities Regulated Under RCRA in 1981, Environmental Protection Agency, April 1984.

Since EPA plans to base its treatment standards on the best demonstrated available technology, companies acknowledge that they have some general notion of what the standards might be. However, representatives of major chemical manufacturers said that their corporate management was not willing to make financial commitments for planning or design studies without precise treatment standards. For example, depending on the standards adopted, a company may decide to build a multimillion-dollar treatment facility, recycle its wastes, or change its manufacturing process to reduce or eliminate its waste production.

EPA headquarters officials agree. They recognize that in the absence of standards, commercial developers do not know the extent to which land disposal will continue to be allowed and consequently the amount of capacity needed. They also recognize that rapidly changing technology can sometimes make it difficult to predict what the standards will be. In the case of electric arc furnace dust, for example, the best available technology has changed just in the last 3 years.

Competition From Other Forms of Waste Management

Representatives of waste management companies believe that the number of other forms of waste management available as alternatives to treatment has been a deterrent to the construction of treatment facilities. Generators of hazardous wastes may respond to the land disposal restrictions in a variety of ways other than through treatment, their choices inevitably guided by what is found to be most economical within the constraints imposed by EPA's standards. Given this uncertainty, a number of commercial waste management companies are not willing to make commitments for new treatment facilities now. For example, one option that waste generators may choose is to reduce the volume of hazardous wastes generated through recycling or changes in process technology. Among 14 companies EPA lists as dioxin generators, 6 have stopped producing dioxins because they have either changed their manufacturing processes or stopped manufacturing the products that produced the dioxin waste.[2] Facing this shrinking market, one commercial PCB incineration company executive told us his company was unwilling to undertake the effort required to obtain a RCRA permit to burn dioxins.

Another alternative to treatment that some generators may turn to is discharge of liquid wastes into publicly owned sewage treatment systems. Hazardous wastes that are discharged into sewer systems must meet basic treatment standards under the Clean Water Act, but more

[2]Two of the 14 companies claimed they never produced dioxins, and 2 others declined to answer.

stringent standards have thus far been developed only for certain industries. Consequently, some generators may find that wastes subject to treatment standards under RCRA might not yet be subject to treatment standards under the Clean Water Act. Thus, depending on the amount of treatment required by the Clean Water Act, it may become more economical to use the local sewage treatment plant than to build another type of treatment facility.

Yet another alternative for companies that produce incinerable wastes may be industrial furnaces and boilers. On the basis of a survey conducted for EPA in 1984, EPA estimates that about 230 million gallons of hazardous wastes a year are currently burned as fuel in these types of facilities. EPA believes that even more may be burned as companies find it economically attractive to ship their wastes to a cement kiln or some other type of industrial furnace that can use the wastes as fuel. According to one of the largest commercial waste management companies, many such companies could not compete with these existing types of incineration facilities.

Other Wastes That May Require Treatment

In addition to the preceding uncertainties, EPA has not yet fully defined all types of hazardous wastes. Although EPA has thus far identified four characteristics of hazardous wastes, the 1984 RCRA amendments required EPA to identify additional ones, including measures or indicators of toxicity. As a first step, EPA has proposed to expand the toxicity characteristic to include an additional 38 organic chemicals. Chemical companies believe that if this proposal is adopted, potentially large volumes of industrial wastewater would have to be treated in hazardous waste treatment facilities, thereby creating the need for greater treatment capacity. On the other hand, EPA is also considering ways of refining its definitions of listed hazardous wastes, using such criteria as concentration and management practices. As a result of this ongoing review process, expected to take place over the next several years, the volume of wastes regulated under RCRA could substantially decrease.

At the same time, EPA does not know how much waste will have to be treated as part of the program to clean up hazardous waste sites. Under the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, also known as Superfund, about 800 sites have already been selected as national priorities for federal cleanup of hazardous wastes, and many more could be identified in the future. In addition, EPA estimates that as many as 2,500 RCRA facilities may require cleanup. In most of these cases, any hazardous wastes that are removed as part of

the cleanup effort must be treated in accordance with EPA standards before being disposed of at a land facility. However, until these sites are fully evaluated, which EPA believes could take many years, it is difficult to estimate the volume of wastes that may have to be treated as a result of future cleanup efforts.

Siting and Permitting

In addition to the uncertainties associated with unknown treatment standards and an unknown market, most of the people we interviewed believed that public opposition to locating facilities nearby was a major barrier to the development of new hazardous waste treatment capacity. Companies are also deterred by the time and costs associated with obtaining permits.

A hazardous waste facility must obtain numerous permits and approvals before construction and operation can begin. First, it must obtain either state or local approval (or both) to locate at its chosen site. This may be the first opportunity for a community to express its concerns about a project, and it could be at this point or at any later stage in the review process that a community's opposition could lead to the withdrawal or disapproval of an application. Concerns might include: the effects on a community's drinking water supplies, air, and water quality; effects on property values; accidents during the transport and treatment of wastes; operators' adherence to permit conditions; and the diligence of the state or EPA in enforcement.

To obtain a RCRA permit, the owner/operator has to submit an application either to the state agency if it has been authorized by EPA to issue permits under RCRA or, if not, to both EPA and the state. The application itself must contain detailed technical information on the design and operation of the facility and the composition of the waste it will handle. Once EPA or the state agency completes its review and asks for additional information if necessary, it issues a draft permit or a notice of intent to deny the permit, and invites public comments. Following a 45-day comment period, or longer if the agency feels it is necessary, the agency makes its final decision.

In addition to a RCRA permit, a facility could require permits under the Clean Air Act, the Clean Water Act, the Safe Drinking Water Act, and other applicable environmental laws. In states that do not have permitting authority under these laws, an owner/operator may have to obtain both state and federal permits. And finally, the owner may have to meet local building restrictions and any other local ordinances.

Although few attempts have been made to measure the effects of siting and permitting, there is evidence that projects are often canceled during the process. During our survey of proposed treatment facility projects, we found 10 proposed projects that had been unable to obtain permit or siting approval and another 10 that had been withdrawn from consideration. A survey conducted by a New York State legislative commission found that 20 of 50 applications for commercial treatment facilities (including incinerators) were either withdrawn or failed to win approval.[3]

More difficult to gauge, however, is the extent to which the fear of public opposition and permitting costs have deterred companies from proposing projects. For example, officials at four of the five companies that operate commercial PCB incinerators (other than mobile incinerators) told us that they would not seek to expand their facilities in order to burn dioxins because of anticipated public opposition. One company official said that when also faced with declining production of dioxins, he is not willing to fight public opposition and risk a company worth $50 million to $60 million for $1 million worth of dioxin business.

In a few states, legislatures have been limiting or prohibiting new hazardous waste facilities or major expansions. North Carolina, for example, recently enacted legislation that sets wastewater discharge limitations stringent enough to affect the viability of a proposed chemical waste treatment plant. Oregon restricted the size of hazardous waste incinerators and barred the import of hazardous wastes, and the Louisiana legislature prohibited construction of an incinerator at a particular location. According to the New York State legislative commission survey, four states have declared moratoria against siting any type of hazardous waste facility, although in some of these cases, the moratoria are temporary pending the states' assessments of their need for facilities or the completion of statewide plans.

According to an official of one of the largest commercial waste management companies in the United States, the siting and permitting processes are the major deterrents to companies entering the market. He is confident that additional capacity will be needed regardless of when and how the land bans are implemented, and his company is currently planning

[3]Hazardous Waste Facility Siting: A National Survey, New York State Legislative Commission on Toxic Substances and Hazardous Wastes, June 1987.

major expansions of its incinerator capacity; he believes other companies are doing so as well. However, widespread local opposition to hazardous waste facilities and the length, cost, and complexity of permitting are inhibiting new companies from entering the market, according to the official. A company must be prepared to spend 6 to 7 years to design, site, and construct a treatment facility, he claimed, with siting and permitting taking 4 to 5 years.

Others gave similar estimates. An official of a large chemical manufacturing company estimated that preparing a permit application for a new, large-scale incinerator would take about 2 to 3 years and cost about $2 million. Preparing a plan and conducting a trial burn then takes another 3 to 4 years and costs at least another $1 million. An official of a commercial waste management company said that $3 million is a fairly typical cost for obtaining state and federal permits. Because of the time and costs involved, this waste management company has decided not to try to site or permit any new facilities but only to expand existing facilities, either those it owns or purchases.

In the view of a state environmental official, the length of time and cost of permitting may have a positive effect by screening out those companies that do not have sufficient resources. In doing so, according to the state official, the permitting process eliminates operators whose financial ability to operate a facility is questionable.

Another issue was the time involved in modifying RCRA permits. Currently, any changes to the permit other than what EPA considers minor ones—changes in ownership or operational control, for example—are considered major modifications and require full review, including public hearings. Two different commercial treatment companies said this process takes at least 9 to 12 months. As a result of the time and cost, one official said, some companies are not making technical changes even though they might be improvements.

Efforts to Reduce Barriers

Once EPA sets its treatment standards, companies believe a major impediment to new treatment facility construction will be removed. However, because RCRA requires that the standards be issued at the same time as land disposal restrictions, companies could not gain any more time in which to respond if EPA were to accelerate its schedule and issue standards sooner.

On the other hand, both federal and state governments have undertaken a number of initiatives to encourage hazardous waste facility siting and to make the permitting process more predictable and less time-consuming. For one thing, the 1986 amendments to federal Superfund legislation tie cleanup of contaminated hazardous waste sites to the availability of adequate treatment capacity. Beginning in 1989, the law requires states to provide assurance that they have adequate capacity to treat or dispose of the hazardous waste expected to be generated within their states over the next 20 years; states will be eligible for federal cleanup funds under the law only if they can provide such assurance. In connection with this provision, EPA's Assistant Administrator for Solid Waste and Emergency Response recently warned state environmental commissioners that banning or restricting hazardous waste facility siting in their states could jeopardize the availability of federal cleanup funds as well as their authority to implement RCRA in their states.

To assist states and communities in siting new facilities, the 1984 RCRA amendments directed EPA to develop additional criteria for the acceptable location of new and existing treatment, storage, and disposal facilities. As part of this effort, EPA was to identify areas of vulnerable hydrogeology, that is to say, areas where hazardous wastes could readily contaminate groundwater. These criteria are intended to build on earlier EPA criteria that restrict construction in floodplains and areas of seismic activity. EPA published guidance on hydrogeology in July 1986, and it plans to propose additional location criteria in July 1988 and issue final regulatory standards a year later.

For their part, a number of states have been active in trying to resolve conflicts and induce the construction of hazardous waste facilities. According to the New York State legislative commission survey, 31 states have developed a siting process for hazardous waste facilities in addition to the RCRA permitting process. Eleven of these states provide technical assistance grants to communities for evaluating technical issues surrounding the siting and operation of a hazardous waste facility, and 19 states provide opportunities for negotiations or mediation in case of conflict. Fourteen states also provide some form of economic incentive to communities to site facilities.

In addition to these measures, 11 states can initiate development on their own; in fact, 6 states must site facilities if no private sponsors come forward. Moreover, 24 states can override the authority of local zoning laws for siting new hazardous waste facilities.

EPA has also proposed changes in current regulations to facilitate expansion of treatment and certain other types of hazardous waste facilities. In September 1987, EPA proposed a new system for modifying permits that distinguishes between three types of changes rather than just between major and minor modifications. By creating an intermediate category, EPA would allow permit holders to increase the capacity of their treatment facilities by up to 25 percent without undergoing the rigorous review entailed in a major modification. Also under this category, permit holders could modify their permits to treat new types of wastes previously not included in their permits but compatible with their treatment processes. EPA now anticipates issuing final rules on the proposal in June 1988. EPA has also revised its regulations to make it possible for treatment facilities operating under interim status, that is, without final permits, to expand capacity without regard to capital costs, which had previously been limited.

EPA has also proposed rules to make it easier to locate mobile incinerators and other mobile treatment units. Unlike conventional facilities, mobile units can travel to sites where wastes are generated, treat the wastes there, and then move on to another location. Currently, these treatment facilities are required to go through a full-scale permit review procedure at each site at which they operate, addressing the same design and operation issues each time. To avoid what it considers to be regulatory impediments to their use, EPA proposed in June 1987 to create special permitting procedures for mobile treatment units that would allow owners or operators to obtain a single statewide permit for a certain type of unit, which would be appended by site-specific conditions for each location at which that type of unit was operated. EPA expects to take final action on the proposal in July 1988.

Conclusions

Despite the impending restrictions on land disposal, there have been relatively few additions to treatment capacity made or proposed, apparently because companies are unwilling to invest in new facilities until EPA issues treatment standards and they can better evaluate their alternatives to land disposal. Companies have also been deterred, they say, by long and costly siting and permitting procedures. However, until treatment standards are set and companies have a chance to choose among various alternatives to land disposal, including waste reduction, it is difficult to predict how much, if any, additional treatment capacity is needed.

Some of these uncertainties will eventually be reduced as EPA develops its standards. The need for treatment facilities will also be better understood once EPA completes its efforts to expand and refine its definitions of hazardous wastes. What is less certain, however, is the extent to which siting and permitting will pose a barrier to new treatment capacity if it turns out that additional facilities are necessary. The federal government and the states are concerned with facilitating the process, and they have made some attempts to resolve siting conflicts and shorten permitting time. However, as discussed in chapter 3, many factors independent of the review process can affect the length of time necessary to develop new facilities, and changes in siting and permitting will not necessarily speed the addition of capacity if it turns out to be needed.

Adding Capacity May Take More Time Than RCRA Allows

Although EPA can delay implementation of the land bans for up to 4 years, this may not be enough time to bring new facilities on line. Among the 19 new or proposed treatment projects we identified, 13 will have taken from 4.5 to 8 years from the time the proposals were first submitted to the time the facilities begin operating, assuming there are no other delays or problems.

The length of time involved in each of these projects seems to be a function of circumstances particular to the project, rather than any common characteristic such as size or type of treatment facility. Contract difficulties, changes in corporate management, and other such factors have played roles in project development time.

In view of potentially long lead times, major oil and chemical companies, the largest of the hazardous waste generators, have begun to do some planning for new treatment facilities, although a number are hoping to continue certain land-based treatment. However, they say they cannot afford to go any further until EPA sets its treatment standards. EPA officials also recognize that there may not be enough time to add sufficient capacity if it turns out that more is needed, but their more immediate concern is determining whether and where shortages exist. For those types of wastes for which it has already identified capacity shortages, EPA has undertaken efforts to encourage or facilitate the development of treatment capacity.

Time Required to Develop New Facilities

As noted earlier, the RCRA amendments permit EPA to postpone for up to 2 years the effective date of its treatment standards if it finds insufficient capacity available to meet those standards. EPA can further extend the deadline by a maximum of 2 years on a case-by-case basis if the generator has made a good faith effort to meet the land disposal restrictions and has a contractual commitment to provide alternative capacity.

While 6 of the 19 new or proposed treatment facilities will have been developed within this 4-year time period, the rest will have taken 4.5 to 8 years from the time they first applied for their permits until they begin operating. (See table 3.1.) Overall, the average development time for the 19 projects is roughly 4.5 years.

As table 3.1 shows, the three facilities that are now operating—the McDonnell Douglas plant and the two Eticam facilities—each took no more than 2 years for permit review and construction. The experience of these three facilities is in marked contrast to the remaining projects,

however. Most of the others are still under review or in construction and will take considerably more time to complete—from 4.5 years for several facilities to 8 years for the ENSCO facility in Arizona and the WTI facility in Ohio. According to EPA or the companies, many of these estimates are highly optimistic in that they assume that no further delays or problems will be encountered.

Table 3.1: Timetable for Facility Development

Facility	Estimated annual capacity	Total project time (years)
Calif. Thermal Treatment, Vernon, Calif.	24,200-27,500 tons	4–4.5
CSSI, Arlington, Ore.	23.4 million gallons (87,050 tons)[a]	4.5
CWM, Emelle, Ala.	48,310 tons	5
Ecoflo, Greensboro, N.C.	7.8 million gallons (29,020 tons)	+4[c]
Ecolotec, Dayton, Ohio	41 million gallons (152,520 tons)[a]	4–4.5
ENSCO, Mobile, Ariz.	77,000-82,500 tons	8
Eticam, Fernley, Nev.	30 million gallons (111,600 tons)[a]	2
Eticam, Warwick, R.I.	6 million gallons (22,320 tons)[a]	2
GSX, Laurinburg, N.C.	26 million gallons (96,720 tons)[a]	5.5
LWD, Calvert City, Ky.	(not available)[b]	5.5
McDonnell Douglas, St. Louis, Mo.	660 tons	1.5
MRC, Roseville, Minn.	7.8 million gallons (29,020 tons)[a]	3
New York Plasma Arc Unit, Niagara Falls, N.Y.	120,000 gallons (446 tons)[a]	5.5
PPG, Circleville, Ohio	46,200 tons	5
Pyrochem, Louisa, Ky.	39,600 tons	3
Radium Petroleum, Kansas City, Mo.	10,840-18,070 tons	4.5
SCA, Memphis, Tenn.	87,910 tons	4.5–5
Stauffer Chemical, Martinez, Calif.	231,000 tons	4
WTI, East Liverpool, Ohio	253,000 tons	8

[a]One million gallons = 3,720 tons on average

[b]LWD is withholding the capacity estimates for proprietary reasons

[c]Company estimates

[d]Because of the uncertain future of the wastewater treatment portion of the project, officials are not estimating a completion date. However, if the project goes forward, total time [illegible] years

[e]Because SCA expects community groups to appeal its permit, construction could [illegible]

Factors Accounting for Long Lead Times: Six Case Studies

To determine what contributes to the long lead times involved in developing some treatment facilities, we looked at the histories of 6 of the 19 projects, including 4 estimated to take among the longest times and 1 that took only 2 years to become operational. From their experiences, we expected to identify those factors that seem, typically, to add to project time. We also expected to find certain common characteristics that could account for the projects' successful development.

Although a larger sample may be more revealing, in those cases we reviewed, we could not find any common features that appeared to govern success in developing a facility or the time it took. As table 3.1 shows, the size of a facility did not appear to be a factor. Both large and small facilities were able to obtain necessary approvals, and a large facility like Eticam's Nevada plant took the same amount of time to develop as its much smaller plant in Rhode Island. A number of the projects met with public opposition, but this did not always cause long delays, and conversely, long delays were encountered in projects that had little public opposition. And, as discussed below, the time spent by the permitting agency in reviewing a permit application did not appear to be excessive. Instead, each of the six cases we looked at seemed to be unique; its development time determined by the particular circumstances surrounding it. The following case studies briefly describe these particular conditions and how they affected or may affect the time required to develop each facility.

Chemical Waste Management, Inc. (CWM), Emelle, Alabama

Throughout the review of CWM's permit application, the company has had technical disagreements with EPA and Alabama. Although the project is currently estimated to take 5 years, construction of the incinerator depends on whether these differences can be resolved to the company's satisfaction.

In September 1985, CWM proposed to expand its existing treatment, storage, and disposal facility with an incinerator that would burn aqueous wastes, solids, sludges, and liquid organic wastes. With a planned capacity of 48,310 tons per year, the incinerator falls into the small- to mid-size range among the 19 projects. Because Alabama was not then authorized to issue permits under RCRA, CWM submitted applications to both EPA and the Alabama Department of Environmental Management, which administers the state's hazardous waste disposal law.

EPA and the state each spent a year reviewing the application, which included a review of additional information furnished in response to

three Notices of Deficiency, or formal notices that information is missing. The two agencies issued draft permits in September 1986, and public comments were heard during a 3-month period ending in December.

Public opposition was limited and had little effect on the issuance of CWM's permit. However, CWM had a number of objections to EPA's draft permit concerning the types of controls EPA was requiring, the specifications for the test run (called the trial burn), restrictions on the incinerator's thermal relief vent, and so on. Even though these differences were not resolved, EPA issued the final permit in May 1987. CWM subsequently appealed the terms of the permit, and EPA is currently deciding which portions of the appeal it will hear. Alabama is waiting for the outcome of this procedure before deciding whether to issue its permit. According to CWM's environmental manager, the state is also holding up issuance of CWM's permit until questions are resolved about the company's compliance with operating requirements for its storage facility.

According to CWM's attorney, if the appeal is successful, construction could begin by summer 1988, and the incinerator could begin operating 2 years later, sometime in 1990. If the appeal is not successful, however, CWM will not build the incinerator.

GSX Services, Inc., Laurinburg, North Carolina

The GSX facility proposed in Laurinburg, North Carolina, is a wastewater treatment plant with a total annual capacity of 26 million gallons. If approved, it will have the capacity to treat about 150 different types of wastes, using 15 treatment processes; treated wastewater is to be discharged into the local sewage treatment plant, with other residuals shipped off-site. If the facility is completed according to GSX's current estimates, it will have taken 6 years from application to operation, in large part because of time spent in resolving North Carolina's objections to the facility. However, if GSX does not succeed in its challenge to a state law, the facility may not be built at all.

GSX submitted its permit application to the North Carolina Department of Human Resources in June 1985. After issuing two Notices of Deficiency, the state found the application to be complete in July 1986. It then forwarded the application to EPA for review, in keeping with EPA Region IV policy to review all hazardous waste facility applications. EPA's review, which lasted until January 1987, recommended that the state not try to control the water quality of the river basin through the facility's RCRA permit, stating that it was more appropriate to do so through the sewage treatment plant's discharge permit issued under the

Clean Water Act. The state accepted this recommendation and subsequently issued GSX a draft permit in April 1987.

At about the same time, a series of bills was introduced into the North Carolina state legislature imposing restrictions on new hazardous waste facilities. EPA was asked to review the three bills, and in each case it found that the bills either limited the state's RCRA permitting authority or were inconsistent with the federal program and therefore made North Carolina's RCRA authority subject to withdrawal. Despite EPA's position, the North Carolina legislature, in June 1987, enacted a law to prohibit commercial hazardous waste treatment facilities from discharging wastewater into surface water (a river, for example) upstream from a public drinking water supply intake unless there is a dilution factor of 1,000 or greater at the point of discharge. However, the statute provides for repeal of this provision if EPA revokes the state's RCRA authority.

In September 1987, GSX, later joined by the Hazardous Waste Treatment Council, petitioned EPA to take such action against North Carolina. In November, EPA announced that it was initiating proceedings to determine whether to withdraw its approval of North Carolina's RCRA program, citing inconsistencies with the federal program. Among these are the restrictions the North Carolina law places on interstate movement of hazardous wastes and the limits on siting new commercial treatment facilities in the state. In addition, EPA believes that the dilution requirement is arbitrary and is not supported by evidence that it is necessary for health and environmental reasons. EPA originally planned to hold public hearings in February 1988 and to issue its decision on the North Carolina program by May, but it subsequently delayed its schedule by 4 months to allow time for reviewing all state programs for consistency with federal laws and regulations.

According to GSX management, if EPA revokes the state's RCRA authority and issues GSX's final permit, the permit could be appealed by those opposed to the facility. If the appeal were to be decided in 6 to 9 months, in GSX's favor, the permit would become effective in late 1988 and construction could begin in early 1989; the facility could then begin operating in early 1991. If, on the other hand, EPA decides not to revoke North Carolina's RCRA authority, GSX would not construct the Laurinburg facility.

Ecoflo, Inc., Greensboro, North Carolina

Like the GSX facility, the future of the wastewater treatment component of Ecoflo's North Carolina project is not altogether certain. Here too, the viability of this portion of the treatment project, as well as the amount of time spent in developing it, depends on whether North Carolina's wastewater discharge law is allowed to stand.

The Ecoflo facility in Greensboro, North Carolina, consists of storage units, a blending type of treatment facility with a capacity of 2 million gallons, and a wastewater treatment plant capable of handling 5.8 million gallons of organic and aqueous waste a year. The company submitted its permit application to North Carolina in July 1984. The state issued two Notices of Deficiency, which were resolved by April 1985 when the draft permit was issued. A public hearing was held during the public comment period, but there was little public opposition, and a final permit was issued in July 1985. Construction began immediately thereafter on the storage portion of the project and on the blending facility sometime later.

Although this phase of construction is expected to be completed in March 1988, there is currently no timetable for constructing the wastewater treatment unit. As originally proposed and approved, all treatment residuals were to be shipped off-site for disposal. However, after new management took charge of the company in 1986, it decided that this plan was not economically feasible and that it would be necessary to apply for a modification to the company's RCRA permit to allow discharge of residuals into the local sewage treatment system.

Before the company could apply for such a modification, however, the North Carolina state legislature enacted wastewater discharge standards which Ecoflo officials doubt their facility could meet. Although GSX's petition to EPA could result in a nullification of the law, officials did not see any near-term solution and have therefore postponed indefinitely their plans to apply for a modification to their permit.

ENSCO, Mobile, Arizona

Although built and operated by a private company, the ENSCO facility in Arizona will be a state-owned incineration, treatment, storage, and disposal facility capable of handling 77,000 to 82,500 tons of hazardous wastes a year. By the time the facility begins operating, an estimated 8 years will have elapsed, much of it taken up by problems associated with the construction of an access road.

The development of the facility began in 1980 with the passage of Arizona's hazardous waste siting law. The law provided for (1) selection and acquisition of a facility site, (2) the construction and operation of a facility by a private company selected by competitive bidding, and (3) establishment of a fee rate schedule and a trust fund for continued operation. With responsibility for implementing the law, the state Department of Health Services (now the Department of Environmental Quality) evaluated 10 potential sites. In 1981, after public hearings, the legislature chose to acquire the Mobile site, located in a sparsely populated rural area owned by the U.S. Department of the Interior's Bureau of Land Management. While some local opposition was raised against the selection, the land was transferred in 1984.

Although the Arizona Department of Health Services selected ENSCO as its contractor in 1983, problems with financing and constructing an access road held up the project for several years. As originally planned, ENSCO was to share the costs of building the 22-mile road with an oil refinery proposed for the area. When the refinery project was canceled, ENSCO and the state began negotiations on how the construction costs would be shared. Finally, in 1986, ENSCO agreed to assume one-third of the construction costs; the state would be responsible for the rest. Even so, constructing the road turned out to be more complex than the department had anticipated, and work did not begin until December 1987.

Although ENSCO had not yet submitted its RCRA permit application as of October 1987, the facility manager expected to do so in January 1988 and expected the facility to receive its permit in July 1988. He believes that Arizona's review of the application will proceed very quickly because ENSCO has been working with the state for 5 years on developing the application, and the state has already reviewed the conceptual design for the facility. ENSCO plans to begin preparing the site in early 1988 and to complete construction of the facility by December 1988.

Eticam, Inc., Warwick, Rhode Island

Among the 19 projects, the Eticam facility in Rhode Island is one of the three that took 2 years or less to develop and is currently in operation. Its relatively brief review and construction period is largely due to the nature of its operation and the ability of project sponsors to address community concerns.

Eticam's Warwick, Rhode Island, facility is a commercial metal recycling facility intended to treat 6 million gallons of electroplating wastes a

year. Although it began operating in August 1986, the facility is not expected to run at full capacity until June 1988, after a new air pollution control system is installed.

Although short, the project's lead time might have been even shorter had the project developed as originally planned. After three unsuccessful attempts to site a treatment facility in Rhode Island, Eticam finally acquired an interest in an existing incineration and treatment company operating under interim status. In June 1984, the two companies filed a joint application for a final RCRA permit, listing Eticam's treatment plant as an expansion of the existing facility. Despite public opposition to the fact that Eticam located its facility without going through the public review called for in the state's siting process, the joint permit was approved in October 1985.

Soon after, however, Eticam's partner declared bankruptcy and dissolved the joint venture. Eticam was then required to submit a new permit application as an individual owner, and in compliance with Rhode Island's siting law, to negotiate a siting agreement with the local community, the City of Warwick. Eticam submitted its application in January 1986, received its RCRA permit in July 1986, and signed the siting agreement the following month, the same time that it completed construction of its facility. Although RCRA generally requires new facilities to have their permits before they can be built, the Eticam facility was exempt from this requirement because it recycled precious metals, which are not considered hazardous wastes under RCRA. The facility was therefore ready to begin treating other types of electroplating wastes considered hazardous as soon as it received its RCRA permit.

The siting agreement between Eticam and the City of Warwick was executed under a 1982 Rhode Island siting law, which requires that the owner of a proposed hazardous waste facility negotiate an agreement with the local community. The law also provides for binding arbitration if an agreement cannot be reached within 90 days. EPA facilitated the process in this case by providing a $50,000 grant to the community to use in hiring experts to evaluate Eticam's proposal. As part of the agreement, the city was to receive fire-fighting equipment, free disposal of a certain portion of the city's waste, restricted transportation routes, and annual grants for monitoring and evaluations. The agreement was renegotiated in September 1987 and will be negotiated again every 5 years for the duration of the permit.

Waste Technologies Industries (WTI), East Liverpool, Ohio

The largest of the 19 projects, the WTI facility in East Liverpool, Ohio, is a waste-to-energy treatment and incineration facility that will be able to treat 253,000 tons of organic and inorganic wastes a year. Much of the 8 years spent to develop the project, if it begins operating when expected, will have been taken up with legal and administrative challenges brought by a neighboring state and local community groups.

Formed as a joint venture of four companies, the WTI project had to submit separate permit applications to both EPA and the state of Ohio because the state did not have RCRA authority at that time. Also, the state permit had to be approved by the Ohio Environmental Protection Agency and a state Hazardous Waste Facility Approval Board (HWFAB), an independent authority responsible for siting and permitting hazardous waste facilities. Both applications were submitted in September 1981, and the federal permit was issued in June 1983. After forwarding the application to HWFAB, the Ohio EPA approved it in February 1983; HWFAB approved it in February 1984.

The federal permit did not become effective for some time, however, because of administrative appeals. The state of West Virginia, which borders the WTI site, and a number of other groups expressed concerns about the environmental safety of the proposed facility, its location, and the adequacy of certain permit provisions. They therefore requested that the EPA Administrator review the agency's decision to issue the permit. Although the request for review was denied, the public comment period was reopened in order to hear West Virginia's comments. However, the regional administrator determined after reviewing the comments that no changes to the permit were necessary, and EPA's permit became effective in January 1985.

Ohio's permit, although not delayed, was the subject of a legal suit. In this instance, West Virginia and two community groups challenged Ohio's issuance of the permit, arguing that Ohio had not complied with certain conditions and criteria required by its laws. Ohio's action was upheld, however, by both the District Court of Appeals and the Ohio Supreme Court.

According to WTI's marketing services administrator, the company could have begun construction of the facility in January 1985, once it had obtained both state and federal permits, but it chose to await the outcome of the Ohio court cases before proceeding. By the time the courts handed down their decisions, in December 1986, WTI had begun negotiating for the sale of the company with Chemical Waste Management, Inc.

(CWM), and in January 1987, CWM signed an option to purchase WTI. However, during negotiations, the Ohio EPA told WTI that its purchase by CWM would require a major modification to the facility's permit; sale of the company has been held up as a result. WTI therefore decided to proceed with construction, to begin in November 1987, and it expects the facility to be on-line by early 1990.

Permit Processing as a Factor in Delays

As noted in chapter 2, industry and government officials regard siting and permitting as a major barrier to the development of new treatment facilities. One particular point cited was the time and costs associated with permitting. However, excluding the ENSCO facility, which has not yet submitted its permit application, most of the projects we looked at did not experience particularly lengthy permit reviews, according to EPA standards. And in most of the five cases, permit review time will amount to less than half the total project time.

The first step in the review process, once the permit application is submitted, is for EPA and/or the state permitting agency to review the application and issue any Notices of Deficiency to the company applying for a RCRA permit. During the next stage, the applicant must resolve these deficiencies to the satisfaction of the permitting agency, which will then develop and issue a draft permit. A public comment period follows, and ultimately, the agency issues a final permit.

In 1984, before RCRA was amended, EPA issued general guidelines for how long this process should take for existing treatment and incineration facilities applying for their final permits. The guidelines called for a 12-month review period for treatment facilities and an 18-month review for incinerators, beginning with the submission of the application and ending with the issuance of the final permit. According to EPA, these guidelines, the only ones EPA has developed, represent the best achievable schedule based on the regulations, policies, and technical guidance in effect in 1984. Since then, the RCRA amendments have imposed additional regulatory requirements that would increase the time needed for review. The time required could also be greater for new facilities and in states where EPA and the state issue separate permits.

Looking at the five projects that submitted permit applications, permit review times in most cases compare favorably with EPA guidelines. As shown in table 3.2, the total time spent in processing the permit applications ranged from 6 months, in the case of Eticam's second permit, to an anticipated 35 months for GSX. Almost all of the projects had public

comment periods that exceeded EPA standards, generally to deal with controversial issues. On the other hand, the estimated or actual time required to issue the final permit is less than EPA standards in a number of cases. The GSX facility, however, exceeds EPA standards for each stage of the review process, and its total estimated review time is 35 months, about 3 times the standard. To some extent, this reflects the involvement of both North Carolina and EPA in reviewing the permit application, the controversial nature of the project and the extended period of time for EPA to respond to the petition brought against the state of North Carolina. In any event, for all but the GSX and Eticam projects, permit review periods will amount to less than half of the total project development time.

Table 3.2: Time Spent in Permit Review

Facility	Initial review	Resolving deficiencies	Issuing draft permit	Public comment	Issuing final permit	Total review time	Total project time
CWM (incinerator)	4 months	6 months	2 months	3 months	5 months	20 months	5 years
Ecoflo (treatment)	1 month	5 months	3 months	3 months	immediate[b]	12 months	+4 years
Eticam[a] (treatment)	(a) 1 month (b) 2 months	(a) 2 months (b) 1 month	(a) immediate[b] (b) immediate[b]	(a) 7 months (b) 2 months	(a) 6 months (b) 1 month	(a) 16 months (b) 6 months	2 years
GSX (treatment)	3 months	10 months	9 months	4 months	9 months[c]	35 months[c]	5.5 years
WTI (incinerator and treatment)	1 month	9 months	4 months	1 month	6 months	21 months	8 years
EPA guidelines	2 months	1 month-treatment 2 months-incinerator	2 months-treatment 3 months-incinerator	2 months	5 months-treatment 9 months-incinerator	12 months-treatment 18 months-incinerator	

[a]Eticam had to apply for a second permit after its partner went bankrupt

[b]Permits were issued within a few days.

[c]Estimates given by GSX.

Contingency Plans to Deal With Shortfalls in Capacity

In view of the long lead times that may be involved, we asked officials of four major chemical companies and the oil industry—those companies that generate among the largest quantities of hazardous wastes—whether they had begun to develop alternative waste management practices. We also talked to EPA officials in charge of implementing the land bans to determine whether they were making plans for shortfalls in treatment capacity.

Industry Planning

According to a representative of the American Petroleum Institute (API), a number of oil companies are planning to build incinerators to treat

their wastes as alternatives to land disposal. These companies are not well advanced in their plans, however, having gotten only as far as engineering plans. The API spokesman believed it unlikely that these facilities would be in place in time to meet the deadlines, even with the allowable extensions. It was his view that EPA would consider additional extensions.

Other API members, on the other hand, plan to continue using land treatment systems. These companies, as noted in chapter 2, are planning to petition EPA to continue this form of disposal, arguing that there will be no migration of hazardous constituents for as long as the waste remains hazardous. In meetings that API has had with EPA and congressional staff, the spokesman said, it was recognized that this form of land treatment (known as bioremediation) is environmentally sound but subject to abuse if not regulated. The API representative believes that it will be difficult to demonstrate no migration but not impossible for well-operated land treatment facilities.

According to chemical company officials, the large chemical companies began treating their wastes some time ago as a result of Superfund legislation and the liability it imposes for cleanup of hazardous waste contamination. Even before the land disposal restrictions, for example, many companies had stopped disposing of dioxins and spent solvents in landfills.

Like the oil companies, some chemical companies also hope to continue to use land-based disposal methods, in this case, underground injection wells. One company has already submitted a petition to EPA to allow continued use of these deep wells for the California list wastes, based on a demonstration of no migration of hazardous constituents. Another company is planning to build additional incinerators and has one such project at the public hearing stage.

All of these companies are concerned, however, about those wastes for which treatment standards have not yet been set. Company officials explained that while they have some idea of what treatment standards might be, it was not enough information on which to make a decision to build a $200-million project. By their own estimates, they might need from 4 to 7 years to build a new incinerator, but they simply do not know at this point how they will respond to treatment standards—whether they might decide to build an incinerator or make some process change—and how much time they will need.

These companies are also uncertain about how they will respond if EPA expands its definition of hazardous waste to include organic toxicants. As noted in chapter 2, RCRA amendments require EPA to identify additional characteristics of hazardous waste, including measures or indicators of toxicity. EPA issued a proposed rule in June 1986 that would, according to chemical company officials, require billions of gallons of wastewater a day to be treated, although EPA is still uncertain about its effect. This would mean that the surface impoundments in which these wastes are now treated must either obtain RCRA permits and be retrofitted to meet RCRA standards, or replaced by treatment tanks regulated under the Clean Water Act. Either alternative would be difficult and expensive, according to these companies. EPA does not plan to issue a final rule until August 1988, so company officials do not yet know whether organic toxicity will become an additional characteristic and, if so, what the treatment standard will be. In some cases, one official said, the solution might be to make process changes to remove the waste from the waste stream, rather than to invest in retrofitting surface impoundments or in tank treatment. But here too, companies believe they cannot determine what to do until EPA makes its decision.

EPA Planning

From EPA's point of view, determining the need for additional capacity is of more immediate concern than whether it will be available in time. In an observation similar to one made by generators, the Director of EPA's Characterization and Assessment Division (the office in charge of developing the land ban regulations) said that hazardous waste management practices changed radically after Superfund legislation made generators liable for cleanup costs, and one effect may have been an overall reduction in the volume of hazardous wastes produced. In fact, in attempting to develop treatment standards, EPA has found that there are some types of hazardous wastes that are no longer generated at all. The director added that EPA will have a better idea of the extent of waste reduction that has already taken place when its survey of hazardous waste generation is complete, in late 1988 or early 1989, although it still will not know how much additional waste reduction will occur as a result of its treatment standards.

Although its planning has not been extensive, EPA has begun to consider various options in the event that treatment capacity is not available when needed, looking particularly at those wastes—dioxins, certain solvents, and halogenated organic compounds—for which 2-year extensions are now in effect. Its options are limited, however, since EPA cannot extend the deadlines any more than RCRA allows nor can it force

a community to accept a facility. Other than banning production of hazardous wastes, EPA can only provide public education or some form of assistance to encourage or facilitate development. As an example, the director cited the proposed changes in EPA regulations to allow RCRA permit holders to make modifications, including expansions, to their facilities more easily. EPA has also been talking to cement kiln operators to encourage them to burn hazardous waste as fuel. EPA's efforts have been so successful in creating alternative capacity for treating solvents that there is currently some excess capacity at solvent treatment facilities, according to the director.

Among those wastes for which capacity shortages have been identified, the director believes that the most pressing problem may be with dioxins that are stored and awaiting treatment and disposal. Although she is not sure what EPA will do if no additional dioxin incinerators are built, she said that EPA has considered the possibilities of seeking to amend the legislation, a change EPA does not advocate, as well as federal management of the wastes. The director added, however, that recently conducted EPA studies show that not all forms of dioxins are equally hazardous to human health. If EPA revises its list of hazardous wastes to take these differences into account, she believes the capacity problem might ease somewhat.

Conclusions

Until treatment standards are set and companies can respond, one can only speculate about whether additional treatment capacity will be needed. Considering the potentially long lead times involved in building a new treatment facility, however, it may not always be possible to add whatever new capacity may be required in the maximum 4 years allowed under RCRA. Based on those projects that we examined, shortening lead times would also be very difficult, since many different factors can account for the lengthy development periods, and some of these, such as changes in company management, cannot be foreseen or avoided. Because the siting and permitting process can take a year or more, events that are not necessarily related to the review process itself can occur during that time to delay a project.

With no easy way to decrease the time spent on developing new treatment facilities, planning would have to be underway now in order to ensure that treatment capacity is available by the time land disposal restrictions take effect. However, the major generators are reluctant to undertake more detailed planning and design work before EPA sets its final treatment standards and provides them with a better basis for

evaluating their alternatives. EPA has proposed certain regulatory changes that would make adding capacity easier and has attempted to encourage development in other ways, but we agree that it can do little more until it knows whether and where there are shortages and what industrial sectors they might affect. Because of the considerable questions surrounding the need for additional treatment capacity, we believe it would be premature to consider extending congressional deadlines for land disposal restrictions at this time, even though it could take longer to add capacity than the Congress has allowed. We recognize, however, that once standards are established and the need for additional facilities can be determined, we may need to review this issue again.

Major Contributors to This Report

Resources, Community, and Economic Development Division, Washington, D.C.

Hugh J. Wessinger, Senior Associate Director (202) 275-5489
Gregg A. Fisher, Group Director
James A. Fowler, Assignment Manager
Bernice Steinhardt, Consultant
James R. Jones, Evaluator
Cynthia Y. Robinson, Secretary

Boston Regional Office

Ellen M. Crocker, Evaluator-in-Charge
William J. Yazbek, Evaluator-in-Charge (former)
Lisa E. Krinsky, Evaluator
Melissa P. Read, Evaluator

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