

BY THE U.S. GENERAL ACCOUNTING OFFICE

**Report To The Chairman, Subcommittee  
On Commerce, Transportation And Tourism  
House Committee On Energy And Commerce**

**EPA's Efforts To Clean Up  
Three Hazardous Waste Sites**

This report focuses on the Environmental Protection Agency's (EPA's) efforts to clean up three hazardous waste sites in New Jersey, Ohio, and Rhode Island. Cleanup actions taken at the three sites GAO reviewed ranged from containing on-site waste to moving the waste to another site. However, these sites still have contamination problems, and studies are underway to determine how best to handle them.

EPA is required to select the most cost-effective method to clean up hazardous waste sites. Until EPA completes studies necessary to define long-term cleanup solutions for each of these three sites and the cost of accomplishing those solutions, the most cost-effective method for these sites cannot be determined.



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sites, and EPA is studying how to address remaining problems. EPA and the states have initiated legal action at the three sites to recover cleanup costs. (See pp. 1 and 5.)

Since December 1980, EPA has taken actions at the Laskin/Poplar site to clean up hazardous wastes. Over 300,000 gallons of contaminated oil have been transported from the site and incinerated, and over 400,000 gallons of contaminated water were treated and released into a nearby creek. These efforts have cost about \$2.2 million. According to EPA, not all Laskin/Poplar wastes were disposed of during initial cleanup actions because the initial efforts had stabilized the site, and further cleanup could await detailed study. By early 1985, EPA plans to complete a study--began in September 1983--addressing the remaining problems including over 400,000 gallons of contaminated oil, 320,000 gallons of sludge, and unknown quantities of contaminated water. (See pp. 5 to 8.)

EPA efforts at the LiPari site began in July 1983 with the construction of an underground containment wall designed to keep hazardous wastes in place, contaminated groundwater from leaving the site, and other water from entering it. Such facilities do, however, allow some leakage, and EPA is studying the feasibility of collecting and treating polluted ground water to further restrict the spread of contaminants. EPA had spent about \$4.4 million on cleanup efforts through December 1983. (See pp. 8 to 11.)

From 1980 to 1982, EPA and the state moved more than 10,000 steel drums of hazardous waste from the Picillo site. Groundwater pollution remains, and Rhode Island is currently studying the extent of pollution and available cleanup alternatives. This study is to be completed by June 1984. Efforts at this site have cost about \$5.1 million. (See pp. 11 and 12.)

COST-EFFECTIVE REMEDIAL ACTIONS MAY INVOLVE CLEANUP AND/OR CONTAINMENT

EPA has flexibility in deciding the best approach to long-term solutions (called remedial actions) at Superfund sites.

LiPari to assess the reliability of the underground containment wall. (See pp. 14 and 15.)

Neither Superfund nor its implementing regulations provide cleanup standards to be used in determining the most cost-effective approach. The absence of such standards has been a matter of concern by some EPA and state officials responsible for site cleanups. According to EPA, circumstances will frequently arise where no clearly applicable standards are available for acceptable levels of hazardous substances in soil and other media and where developing those standards would be costly and time consuming. (See pp. 15 and 16.)

An Office of Technology Assessment study to be completed in early 1985 is examining (1) the extent to which the absence of specific national standards affects the selection of cleanup technologies and (2) whether sufficient data exist to develop such standards.

#### AGENCY COMMENTS

GAO did not obtain agency comments on this report. GAO did, however, discuss the matters contained in the report with EPA headquarters and regional officials responsible for the Superfund program and incorporated their views, where appropriate.

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### ABBREVIATIONS

EPA	Environmental Protection Agency
GAO	General Accounting Office
NCP	National Contingency Plan
NPL	National Priorities List



## CHAPTER 1

### INTRODUCTION

The Comprehensive Environmental Response, Compensation, and Liability Act of 1980, commonly known as "Superfund," was enacted on December 11, 1980, to clean up problems posed by the nation's uncontrolled hazardous waste sites. The act provides for a \$1.6-billion fund to be accumulated over a 5-year period from taxes on petroleum and certain chemicals and from federal appropriations. EPA uses Superfund to clean up spilled toxic wastes and hazardous waste sites.

This report addresses EPA Superfund activities at three hazardous waste sites--Laskin/Poplar Oil Company, Jefferson, Ohio; LiPari Landfill, Pitman, New Jersey; and Picillo Farm, Coventry, Rhode Island. The three states identified the sites as having hazardous waste problems years before the Superfund legislation was enacted in 1980. The State of New Jersey closed the LiPari Landfill in 1971. Ohio received complaints of pungent odors coming from the Laskin/Poplar Oil Company site at least as early as 1976. A fire and explosion at Picillo Farm in 1977 brought that site to the attention of Rhode Island officials.

### SUPERFUND CLEANUP PROCESS

Superfund required that a plan for implementing the responsibilities and authorities of the act be incorporated into the National Contingency Plan (NCP). This plan, first published in 1968, initially outlined procedures for oil-spill cleanups. In 1982, NCP was revised to include a delineation of federal and state response authorities for abandoned or uncontrolled hazardous waste sites. NCP provides for three types of Superfund actions for incidents involving hazardous waste sites:

- Immediate removal actions by EPA are to provide prompt response (within hours or days) to prevent immediate and significant harm to human life, health, or the environment. Generally, immediate removals are limited to those cleanup efforts which can be completed in 6 months and cost no more than \$1 million.
- Planned removal actions are those that allow EPA time to plan the cleanup activities but which still require an expedited action to reduce an imminent and substantial danger. The 6-month or \$1 million limitation also applies, and states are required to contribute 10 percent of the removal costs. Both types of removal actions can be taken anywhere a hazardous waste threat exists.
- Remedial actions are intended to achieve a permanent remedy at hazardous waste sites. Superfund remedial actions can be taken by either EPA or by the states. NCP



requires that the selected remedial approach be cost-effective. Superfund remedial alternatives can range from no action, to containment of wastes on-site, to a mix of cleanup and containment, to total site cleanup. NCP also requires that the cost of the remedy be balanced against the amount of money in the fund needed to respond to other hazardous waste problems.

To be eligible for a remedial action under Superfund, a site must be included on EPA's National Priorities List (NPL). NPL designates the nation's worst known sites contaminated with hazardous wastes. NPL sites are determined by a national ranking system, and each state is allowed to designate a state priority site regardless of its national ranking.

Superfund remedial actions can be led by either a state or by EPA:

- States can take the lead role under a cooperative agreement with EPA, which transfers federal dollars to the state. A state then develops a work plan, schedule, and budget; contracts for any services it needs; and is responsible for making sure that all the conditions in the cooperative agreement are met. EPA is responsible for monitoring the state's progress throughout the project.
- EPA can take the lead, with the state having an advisory role. EPA, generally using contractor support, manages work early in the planning process. In the later design and implementation (construction) phases, contractors do the work under the supervision of the U.S. Army Corps of Engineers.

Before remedial action is undertaken, the state must assure that: (1) it will provide future maintenance of the site, (2) off-site disposal capability is available, if necessary, and (3) it will pay 10 percent of the costs of remedial action, or if the site was owned by the state or a local government at the time of disposal, that it will pay at least 50 percent of the costs.

Remedial action under Superfund generally involves the following sequence of activities:

- Preparation of an initial plan for the collection of information needed to develop a site strategy.
- Investigation to determine the type and extent of contamination at the site.
- Preparation of a feasibility study to analyze various cleanup alternatives and assess their cost-effectiveness. The feasibility study is often conducted with the investigation as one project.

--Selection of the "cost-effective" remedy--that is, the alternative that provides the most protection to human health and the environment at the least cost.

--Design of the remedy.

--Implementation of the remedy, which might involve, for example, constructing facilities to treat groundwater.

At anytime during the cleanup process, EPA can require, to the extent possible, that responsible parties<sup>1</sup> either perform the cleanup themselves or reimburse EPA and the states for the costs of the Superfund removal and/or remedial actions.

#### OBJECTIVES, SCOPE, AND METHODOLOGY

Our objective was to provide for the three sites--Laskin/Poplar Oil Company, LiPari Landfill, and Picillo Farm--information on (1) the progress being made to clean up hazardous wastes and (2) the use of cost-effectiveness evaluations in selecting remedial measures.

We performed work at EPA headquarters in Washington, D.C.; EPA Region I (Boston, Massachusetts), Region II (New York, New York), and Region V (Chicago, Illinois); the New Jersey Department of Environmental Protection; the Ohio Environmental Protection Agency; and the Rhode Island Department of Environmental Management.

To determine the progress made in addressing pollution problems at the three sites, we examined EPA and state project files--including feasibility studies, enforcement documents, health impact reports, financial records, and correspondence--and discussed with cognizant EPA and state program officials site description/history, pollution at the sites, cleanup and containment actions taken, problems remaining to be addressed, cleanup costs, and the status of enforcement efforts against responsible parties.

To determine the extent that cost-effectiveness analyses were used to select cleanup remedies, we reviewed analyses for the LiPari and Picillo sites. In reviewing these analyses, we identified the alternatives studied and the methodology followed in recommending the cost-effective alternative. We also discussed the results of these analyses with EPA regional and state officials. We did not review the cost effectiveness analysis of proposed remedial actions at the Laskin/Poplar site because it had not yet been completed. In addition, we discussed the status of the Office of Technology Assessment's study concerning the need

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<sup>1</sup>A person, corporation, or other entity that is (1) a past or present owner or operator of a site and/or (2) a generator or transporter which contributed hazardous substances to a site.

for cleanup standards for hazardous waste sites with the Office's officials.

As requested by the Chairman's office, we did not obtain agency comments on the report. We did, however, discuss the matters contained in the report with EPA headquarters and regional officials responsible for the Superfund program. Their views have been incorporated in the report, where appropriate.

Our work was conducted from September 1983 through January 1984. Except as noted above, this review was performed in accordance with generally accepted government auditing standards.

## CHAPTER 2

### CLEANUP PROGRESS AT THREE SITES

Although EPA has initiated cleanup actions at the three sites, hazardous waste problems remain, and further study is underway to determine what additional work is needed. For each of these sites, we present information on EPA and state actions, the remaining cleanup required, and EPA's enforcement efforts against responsible parties.

#### CLEANUP EFFORTS AT LASKIN/ POPLAR OIL COMPANY SITE

EPA activities under Superfund removals at the Laskin/Poplar site have been aimed at disposing of hazardous liquids, stabilizing remaining liquid, and stabilizing solid wastes to prevent additional releases of hazardous pollutants into the environment. Under the Superfund remedial action program, EPA is studying the site to determine how best to complete the job. EPA is also seeking to recover its costs from the responsible parties.

The Laskin/Poplar Oil Company site is located in Ashtabula County, Ohio. It is about 9 acres in size and is bordered by a creek, the county fairgrounds, open fields, a wooded area, and baseball fields. During the 1960's, the company's owner burned used oil to heat greenhouses on the site. As business at the greenhouses deteriorated during the mid 1970s, the owner began to purchase used oil for resale or for dust control on dirt roads in Ashtabula County and the horse racing track on the county fairgrounds.

In January 1976, the Ohio agency responsible for environmental protection received complaints from the county health department concerning pungent odors emanating from the property. Subsequent tests by EPA and the Ohio Department of Health detected hazardous wastes in used oil stored at the site. Hazardous waste pollution found at the site before cleanup efforts began included:

- contaminated oil and sludges in about 30 underground, in-ground, and aboveground storage tanks;
- contaminated water in three open ponds;
- discharges of contaminated oil and waste to Cemetery Creek, which flows into the Grand River--the main drinking water supply for nearly 25,000 people; and
- contaminated soil.

#### Cleanup actions taken

According to the EPA on-scene coordinator, several Superfund removal actions were necessary at the site because heavy rain

caused the ponds and open tanks to overflow and supporting dikes to deteriorate. In December 1980,<sup>1</sup> an EPA contractor began work to contain a continuous waste discharge from the site into Cemetery Creek. Oil was skimmed off the tops of two ponds and stored in steel drums at the site, and water levels were lowered by releasing decontaminated water into the creek. The third and most stable pond was used for spill retention.

In March 1981, the dike supporting one of the three ponds broke open and spilled about 25,000 gallons of contaminated water into Cemetery Creek. EPA cleaned up the spill and installed siphon pipes between two ponds and the creek to keep water levels down, thereby decreasing the pressure on the sides of the two ponds. Problems with the two ponds and two open tanks continued and required EPA to take several Superfund removal actions between July 1981 and November 1982. As a result:

- 309,670 gallons of contaminated oil were removed and transported to Arkansas for incineration,
- 445,000 gallons of water were treated and released into a drainage ditch on the west side of the site or into Cemetery Creek,
- 204,594 gallons of hazardous sludge were solidified and stored on-site,
- two open tanks were covered, and
- two of the three ponds were drained and filled with clay.

In the summer of 1983, a security fence was installed around the site. As of December 1983, cleanup efforts at the Laskin/Poplar site had cost about \$2.2 million.

#### Efforts to address remaining hazardous wastes

Although EPA has taken several cleanup actions--one under the Clean Water Act authority and two Superfund immediate removals--at the site, not all of the wastes have been removed, and contaminated water from the one remaining pond continues to be discharged into the creek. In addition to the wastes in the pond, remaining hazardous wastes include

- 434,650 gallons of contaminated waste oil and sludge located at the bottom of 28 storage tanks,

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<sup>1</sup>Although Superfund was enacted in December 1980, funds were not appropriated until June 1981. In the interim, EPA used funds available under the Clean Water Act to address hazardous waste problems that affected surface waters.

- one 320,000-gallon tank filled with solidified sludges,
- an unknown quantity of contaminated water and sludge in an open pond, and
- contaminated soil around one of the tanks.

According to EPA's on-scene coordinator for the Laskin/Poplar site, all of the hazardous wastes have not been removed for the following reasons:

- Because of an oversight, EPA did not provide its contractor with sample results which indicated that some of the oil had a high lead content. Because high lead content increased the cost of incinerating the oil, the contract dollar limit was reached before all the oil could be incinerated.
- During the cleanup, EPA found that soil around one of the tanks was probably contaminated and would have to be removed. Funds for this activity were not included in the scope of the contract.
- Most of the liquid in one tank was not creosote as indicated in the scope of work provided to the contractors. The contractor found that the tank's liquid contents could neither be incinerated nor treated, but will have to be solidified and disposed of at a later date.

The on-scene coordinator told us that he decided not to ask for increased funding for the Superfund removal action because those efforts had stabilized the site, and further cleanup could await detailed study.

A 1983 EPA study indicated that more needs to be known about the extent of the contamination on-site before the remaining problems can be addressed. According to the study, better data are needed on (1) wastes in the storage tanks, (2) contaminate levels of on-site soil as well as at various locations off-site, including the fairgrounds, ball fields, and neighbors' properties, and (3) organic vapors at the site. Additional testing to obtain these data is being done as part of the Superfund remedial action study scheduled to be completed for EPA in February 1985. EPA estimated that, after this study is completed, it will take about 11 months--or until early 1986--to choose and implement the best alternative for site cleanup.

Studies by the state and Federal Centers for Disease Control have indicated that no present health threat to the nearby community exists. However, a 1983 EPA study concluded that hazardous waste contamination could pose a real threat to the immediate vicinity if, for example, on-site storage tanks ruptured.

## Enforcement efforts against responsible parties

In 1979, EPA took legal action against the Laskin/Poplar Oil Company to clean up the site. The company was charged with discharging pollutants into surface waters without a permit, violating rules governing the storage and disposal of hazardous wastes, creating health and environmental hazards by burning contaminated oil in its greenhouse boilers, and storing hazardous wastes on-site. In January 1981, the company signed a consent decree which required that the site be cleaned up and the contaminated liquid wastes be properly disposed. However, the owner did not have the funds to carry out these activities.

Between June 1982 and January 1984, EPA notified 95 companies that it had identified them as generators and/or transporters of hazardous wastes found at the site and therefore were potentially responsible for cleaning up the site or reimbursing EPA for its cleanup costs. According to the EPA Region V enforcement coordinator, in April 1984, EPA referred a cost-recovery suit against responsible parties to the Department of Justice for prosecution.

## CLEANUP EFFORTS AT LIPARI LANDFILL

Hazardous waste cleanup efforts at the LiPari site have resulted in the site's being fenced and on-site hazardous wastes being contained. The manner in which remaining on-site and off-site contamination will be addressed is awaiting further study. EPA has begun legal action to recover its costs from the responsible parties.

The LiPari site is an inactive landfill occupying a former gravel pit. The 16-acre site is bordered by peach and apple orchards and by two streams, one of which flows into the Delaware River. A suburban housing development comes to within 100 yards of the site.

The site was purchased in 1958 and used in a sand and gravel business. During that same year, the owner also began accepting municipal and industrial wastes for disposal. Disposal continued at the site until 1971, when the New Jersey State Solid Waste Administration closed the site after area residents signed affidavits complaining of intolerable odors, the inability to breathe, headaches, nausea, and dying vegetation.

The exact nature and amount of the hazardous material deposited in the landfill are not known. According to a 1980 EPA consultant's report, approximately 3 million gallons of liquid wastes have been disposed of at the site. Although the disposal area was about 6 acres in size, contamination has spread to an additional 10 acres. Pollution at the site has included the seepage of substantial volumes of contaminated liquid wastes from the landfill into (1) groundwater, (2) nearby streams, and (3) a

lake that had to be closed to recreational usage and fishing. A 1981 EPA study estimated that 49 million gallons of contaminated groundwater were within the 16-acre site. A 1982 EPA study estimated that the site had 290,000 cubic yards of contaminated soil and wastes. According to the EPA Region II project manager for the LiPari site, an estimated additional 50,000 cubic yards of contaminated soil exist along streams bordering the site.

Studies culminated in  
containing wastes at site

The LiPari site has been the subject of a number of federally funded studies. In 1978,<sup>2</sup> EPA awarded a grant to the Delaware Valley Regional Planning Commission to study the impact of the landfill and to determine alternative abatement procedures. A feasibility report issued in October 1979 concluded that initial action should be directed toward containing wastes in the contaminated area and that contaminated groundwater within the landfill be collected and treated at a nearby sewage treatment plant. Another EPA-funded feasibility study issued in October 1980 and revised in December 1980 proposed that the site be contained with a clay cap and slurry wall.<sup>3</sup> Further evaluation and monitoring of the site led to a second report in September 1981 that recommended containment of wastes and further evaluation of collecting and treating wastes contained within the landfill and an adjacent marsh.

In order to comply with the requirements of Superfund and consider alternatives proposed by responsible parties, EPA contracted for a cost-effectiveness analysis of alternatives. The consultant's report was issued in July 1982. In total, 32 alternatives were evaluated. These ranged from a no-action alternative at no cost to an alternative involving removal and disposal of waste at a cost of \$32 million. The report recommended, as most cost-effective, a slurry wall completely encircling a 16-acre area and a program to collect and treat the contaminated groundwater from the site at a local sewage treatment plant.

EPA Region II recommended adoption of the consultant's proposal--(1) construct a slurry wall for waste containment and (2) groundwater collection and treatment--except that before proceeding to the second phase, a feasibility study evaluating alternatives for groundwater collection and treatment should be

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<sup>2</sup>Prior to Superfund's enactment, EPA utilized authorities and funds available under the Clean Water Act to address hazardous waste problems that affected surface waters.

<sup>3</sup>An underground wall used to keep groundwater and liquid wastes from leaving a site and additional groundwater from entering the site. It is generally constructed by excavating a trench around a site that is then filled with a relatively impermeable substance such as bentonite clay.



done. EPA and the state signed an agreement in September 1982 to contain wastes at the site.

The design of the containment facility began in November 1982 and was completed in April 1983. The Corps of Engineers awarded the construction contract for EPA in July 1983, and construction began in late August. When construction was shut down for the winter in December 1983, the containment project was near completion. It is anticipated that construction will be completed during 1984. As of December 1983, cleanup efforts at LiPari had cost about \$4.4 million.

#### Site security efforts

Site security has been a problem at LiPari. In July 1979, the local board of health posted signs prohibiting unauthorized entry to the landfill. Subsequent state investigations found, however, that children and motorcyclists had been observed on the site and were exposed to the toxic chemicals present there. As a result of a federal enforcement action, the owner was ordered in September 1980 to fence the site.

EPA officials informed us that various problems delayed completion of the fence until May 1983. These included:

- securing access easements from adjacent property owners,
- determining where to locate the fence in view of flood prevention regulations (fences crossing streams may act as dams during floods), and
- developing an alternative irrigation water source for the adjacent property owners.

#### Efforts to address remaining hazardous wastes

According to EPA, the containment project will not mitigate all pollution problems at LiPari. As mentioned previously, a second phase of the remedial action under consideration involves a proposal for treatment of the contaminated groundwater within the landfill at a local sewage treatment plant. The responsible authority--the Gloucester County Utilities Authority--has expressed concerns about the proposal. These concerns included impacts of the contaminants on the treatment plant's operations as well as on sludge disposal.

Although EPA completed and issued studies in February and September 1983 dealing with the authority's concerns, as of May 2, 1984, the Authority had still not accepted the proposal. According to a 1982 EPA consultant's study, capital and operation and maintenance costs to pump and treat the contaminated groundwater would be significantly higher if the Authority's plant was not used and an on-site treatment facility had to be built.

Three distinct locations of off-site contamination also exist: the embankment marsh area between the site and one of the two adjoining streams, and sediments in both of these streams and a downstream lake. According to a January 1984 EPA Region II document concerning unresolved problems at LiPari, the embankment area is of most concern. Contaminated groundwater has seeped off-site in this area and has affected an estimated 50,000 cubic yards of soil. EPA Region II has received \$220,000 in fiscal year 1984 for additional studies of the off-site contamination problem. Final decisions on whether to remove and treat the groundwater and whether to address the other areas of concern will have to await completion of this study.

#### Enforcement efforts against responsible parties

In the early 1970's, state enforcement efforts were unsuccessful in getting the owner to clean up the site, and no action was taken by the state against the waste generators. During early 1982, EPA Region II attempted to settle with some generators responsible for disposing waste at the site. In October 1983, however, EPA informed attorneys for the responsible parties that difficulty in estimating the actual cost of remedial work at that juncture made settlement negotiations inappropriate. As of May 1, 1984, the EPA Region II enforcement coordinator told us that EPA is preparing a cost-recovery case against responsible parties involved with the LiPari site. He also stated that the case should be referred to the Department of Justice sometime during 1984.

#### CLEANUP EFFORTS AT PICILLO FARM

Cleanup efforts have eliminated the major source of contamination at the site--some 10,000 drums of hazardous wastes. However, contaminated groundwater remains on- and off-site. In addition, quantities of contaminated soil remain on-site. The decision on how to address remaining problems at the Picillo site will not be made until an ongoing study is completed in June 1984. EPA is awaiting completion of its feasibility study before it takes legal action against responsible parties to recover federal and state funds expended at the site.

The Picillo Farm site occupies about 7.5 acres of what had been a 100-acre pig farm, and is surrounded by wooded areas. The area is rural, with 30 to 40 homes within a 1-mile radius of the site. Surface water flowing from the site enters a brook which discharges into a pond used as a source of irrigation for commercially grown cranberries.

During the 1970's, the site was used as a waste disposal area. According to the former EPA Region I Project Officer for the Picillo site, thousands of drums and an unknown quantity of liquid wastes were dumped at the site. The State of Rhode Island became aware of the illegal dumping in September 1977 when an

explosion and fire occurred at Picillo. In addition to the thousands of drums of hazardous wastes on-site, the following hazardous waste problems were found:

- on- and off-site groundwater contamination,
- concentrations of contaminants in surface water,
- pungent odors, and
- contaminated soil.

#### Cleanup efforts

The state initiated a study in late 1977 to determine the extent of contamination at the Picillo site. It installed the first group of groundwater monitoring wells in February 1978. EPA personnel first inspected the site in May 1979 and found hazardous waste contaminants flowing into the swamp northwest of the site.

From 1980 to 1982, the state and EPA removed and disposed of more than 10,000 drums of hazardous waste. The drums were removed by July 1982. Test wells were installed and wastes sampled, analytical testing was performed, site security was maintained, and air quality was monitored. In addition, contaminated soils were collected and stored on-site. Through December 1983, \$5.1 million had been spent to clean up the Picillo site.

#### Efforts to address remaining hazardous wastes

In January 1983, the state awarded a consultant contract for a study to address remaining problems at Picillo site, including contaminated groundwater and piles of contaminated soil. The contractor submitted its report to the state in August 1983. Both EPA and state project officers on the Picillo site indicated that the study required further work including: (1) meeting the requirements of NCP, (2) considering air pollution and on-site contamination of soils in excavated trenches, (3) clarifying the study's proposed recommendations, (4) quantifying the source of contamination, and (5) defining the human health impacts. The consultant is to complete this additional work by June 1984.

#### Enforcement efforts against responsible parties

State legal actions in the late 1970's against the site owner have resulted in the assessment of \$481,000 in damages and the attachment of out-of-state property. Between December 1981 and January 1983, EPA notified responsible parties that they were liable for site cleanup costs, but settlement negotiations cannot begin until the ongoing feasibility study is completed in June 1984 and decisions are made regarding remaining site cleanup.

## CHAPTER 3

### COST-EFFECTIVE REMEDIAL ACTIONS MAY INVOLVE

#### CLEANUP AND/OR CONTAINMENT OF HAZARDOUS WASTES

NCP provides for flexibility in deciding how to remedy problems at Superfund hazardous waste sites. Available remedies range from taking no action, to containment of wastes on-site, to partial cleanup and containment measures, to total cleanup of a site. NCP also requires EPA or the state to determine that remedial actions are cost-effective. Cost-effectiveness analyses of various remedial actions have been made at two of the three sites we reviewed, resulting in a mix of cleanup and containment measures being considered, but no final decisions have been made on what remains to be done and what will be done. The fund-balancing requirement of NCP may be considered at any step in the alternative evaluation process and can result in eliminating or scaling down alternatives.

EPA has not completed studies necessary to define the long-term cleanup solution goal for each site. Until this is done, we cannot determine whether the cleanup or containment approach at these sites will ultimately be the most cost-effective approach in the long run.

#### USE OF COST-EFFECTIVENESS ANALYSES AT THREE SITES

NCP requires that the Superfund remedial action selected at any hazardous waste site be cost-effective and mitigate and minimize damage to and provide adequate protection of public health, welfare, or the environment. Cost-effectiveness analyses are not required for Superfund removal actions because these actions are designed to quickly respond to immediate hazardous waste threats and not provide a long-term cleanup solution.

Cost-effectiveness analyses have been performed at two of the three sites we reviewed--the Picillo and LiPari sites. A cost-effectiveness analysis of proposed remedial actions at the Laskin/Poplar site has not yet been completed. Because prior actions taken there were done under the removal program, a cost-effectiveness study was not required. The cost-effectiveness studies done at the LiPari and Picillo sites provide examples of how EPA uses those studies in selecting remedial actions.

#### Use of cleanup at Picillo

A February 1982 state consultant's cost-effectiveness study examined five alternative remedial actions for the Picillo site, as follows:

--Site monitoring and security.

- Contaminated groundwater collection and treatment.
- Containment with contaminated groundwater collection and treatment.
- Drum excavation and removal.
- A combination of drum excavation and removal and contaminated groundwater collection and treatment.

Estimated costs of the alternatives studied ranged from \$4 million to \$12.5 million. The consultant concluded that the preferred alternative was drum excavation and removal, with contaminated groundwater collection and treatment at an estimated cost of \$4.6 million to \$6.6 million. However, additional study was recommended to determine how to optimally implement the groundwater collection and treatment portion of the alternative. That study is scheduled to be completed by June 1984.

#### Use of containment at LiPari

An EPA consultant's report of July 1983 recommended for LiPari that a slurry wall be constructed encircling a 16-acre area to contain the wastes, and a program be developed to collect and treat the contaminated groundwater within the site at a local sewage treatment plant. The consultant considered 32 remedial alternatives encompassing a wide range of problem mitigation. For example, some alternatives addressed a 6-acre contaminated area, while others addressed 16- and 22-acre areas. In addition, some alternatives envisioned removing and treating the contaminated groundwater from the site while other alternatives made no provisions for groundwater pumping and treating.

Two factors suggested that total cleanup of the LiPari site would not be practical. Cost was one factor. The cost-effectiveness study estimated that it would cost \$1.2 million to construct a slurry wall to contain the wastes and \$32 million to completely remove and dispose of wastes at the site. This cost estimate included \$13 million to transport 290,000 cubic yards of wastes and soil to the nearest suitable facility 360 miles away. The study determined that total cleanup at the LiPari site was highly effective but minimally cost effective. The other factor was technology. The Chief of EPA Region II's Hazardous Waste Site Branch told us that at some point in the future, the Superfund program could move toward emerging technologies to treat hazardous wastes at sites like LiPari through chemical or biological treatment or through incineration. Presently, however, he said the cost of these technologies is high and their success has not been sufficiently documented.

The Director of New Jersey's Division of Waste Management told us that to enhance the reliability of containments like LiPari, a program to pump and treat the contaminated groundwater

within the site is an absolute necessity. In its record of decision on a Superfund site in New Hampshire which involved a similar construction approach, EPA stated that treatment of the groundwater contained within the slurry wall is necessary because the leakage of contaminants under the slurry wall is expected to continue, and because the long-term integrity of slurry-wall installation at this hazardous waste site cannot be predicted at this time.

EPA's Office of Research and Development is undertaking a 2-year monitoring program to assess the effectiveness of the containment system at the LiPari site. The results of this program should be helpful in determining how reliable such containments are as long-term barriers to waste migration.

#### Lack of cleanup standards for cost-effectiveness decisions

During our review of the cost-effectiveness issue, one concern that surfaced involved the lack of environmental standards (such as, to what level should groundwater be cleaned) for use in making cost-effectiveness determinations. For example, New Jersey's Director of Waste Management stated that cost-effectiveness studies are helpful but that it is not very meaningful to do them in the absence of cleanup standards.

The chief of EPA Region II's Hazardous Waste Site Branch told us that if cleanup standards existed, a consultant's scope of work could direct him to identify and determine the cost effectiveness of a range of alternatives that would accomplish those levels of cleanup. In the absence of such standards, this official said that consultants identify remedial alternatives that accomplish various levels of problem mitigation and then decide on which alternative provides the most mitigation for the cost involved. He characterized this type of approach as more "cost-benefit" than "cost-effectiveness" analysis, the difference being that cost-effectiveness analysis measures different ways to meet a common goal whereas cost-benefit analysis has no common goal.

According to supplementary information contained in NCP, EPA received comments during the revision process indicating that the plan should include specific levels of cleanup that must be attained with any remedy. However, EPA responded that the methodology for determining the appropriate extent of remedy was based on the recognition that experience in developing remedies for hazardous waste sites is limited. Moreover, each site has unique characteristics which merit individual attention and often represent factors that have never been dealt with before. EPA acknowledged that circumstances will frequently arise in which clearly applicable standards do not exist for acceptable levels of hazardous substances in soil and other media. EPA further pointed out that it cannot develop new standards for the hundreds of substances it will be confronted with in response actions. EPA stated that not only is the requisite authority lacking in the

Superfund legislation, but such a task would also be enormous, costly, and time-consuming, and it would unduly hamper the cleanup of releases at hazardous waste sites.

An Office of Technology Assessment study, to be completed in early 1985, is examining the issue of cleanup standards. The objectives of the study are to (1) assess the extent to which the absence of specific national standards affect the selection of cleanup technologies and protection of health and the environment and (2) determine whether sufficient data exist to develop such standards.

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RESOURCES COMMUNITY  
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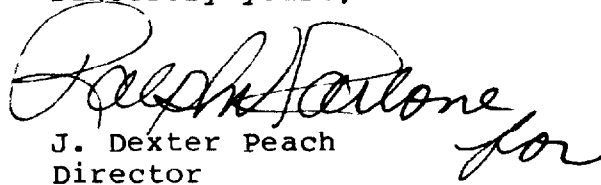
The Honorable James J. Florio  
Chairman, Subcommittee on Commerce,  
Transportation and Tourism  
Committee on Energy and Commerce  
House of Representatives

Dear Mr. Chairman:

As requested in your September 27, 1983, letter and in subsequent discussions with your office, this report discusses the status of cleanup efforts at three hazardous waste sites: Laskin/Poplar Oil Company, Ohio; LiPari Landfill, New Jersey; and Picillo Farm, Rhode Island. The report provides information on these sites' cleanup progress and the use of cost-effectiveness evaluations in selecting remedial measures.

Unless you publicly release its contents earlier, we will make this report available to other interested parties 7 days after the issue date. At that time, copies of the report will be sent to appropriate congressional committees; the Administrator, Environmental Protection Agency; and the Director, Office of Management and Budget.

Sincerely yours,

  
J. Dexter Peach  
Director

D I G E S T

The Comprehensive Environmental Response, Compensation, and Liability Act of 1980, commonly known as "Superfund," was enacted to clean up problems posed by the nation's worst uncontrolled hazardous waste sites. The act provides for a \$1.6-billion fund to be accumulated over a 5-year period from taxes on petroleum and certain chemicals and from federal appropriations. The act requires the Environmental Protection Agency (EPA), to the extent possible, to have responsible parties perform the cleanup themselves or pay for the cleanups performed by the government using Superfund resources. (See pp. 1 to 3.)

Concerned about past progress in cleaning up hazardous waste sites, the Chairman, Subcommittee on Commerce, Transportation and Tourism, House Committee on Energy and Commerce, asked GAO to review efforts at three hazardous waste sites--Laskin/Poplar Oil Company, Ohio; LiPari Landfill, New Jersey; and Picillo Farm, Rhode Island. Specifically, GAO was asked to obtain information on the progress being made to clean up the sites and EPA's use of cost-effectiveness evaluations in selecting remedial measures.

Since 1980, cleanup actions have been taken at each of the three sites, and studies are underway to determine how best to complete the job. Superfund provides that long-term remedies be cost-effective, but no standards exist that specify to what extent sites must be cleaned up to effect permanent remedy.

CLEANUP PROGRESS AT THREE SITES

In the 1970's, the states mentioned earlier identified the three sites as having hazardous waste problems. The State of New Jersey closed the LiPari site in 1971. Ohio received complaints of pungent odors coming from the Laskin/Poplar site at least as early as 1976. A fire and explosion at Picillo Farm in 1977 brought that site to the attention of Rhode Island officials. Since 1980, Superfund cleanup actions have been taken at these

Selected remedies must be cost-effective and can range from no action, to waste destruction or offsite disposal, to containment of wastes onsite, to a combination of these approaches. (See p. 13.)

The Laskin/Poplar site has not yet progressed through the cleanup process to the point where a cost-effective analysis has been performed. Although cost-effectiveness analyses of remedial actions have been made for the Lipari and Picillo sites, EPA has required additional studies to refine certain aspects of these analyses. Since EPA has not completed studies necessary to determine long-term cleanup solutions for each of the three sites or the costs of accomplishing those solutions, whether cleanup or containment will ultimately be the most cost-effective solution in the long run cannot be determined. (See p. 13.)

Cleanup alternatives for Picillo included site monitoring and security, containment of hazardous wastes on-site, off-site drum disposal, and a combination of off-site drum disposal and collection and treatment of contaminated groundwater. Estimated costs of these alternatives ranged from \$4 million to \$12.5 million. EPA and the state decided that the most cost-effective approach was to first dispose of the drums, then separately analyze the feasibility of collecting and treating the contaminated groundwater. The state plans to complete this cost-effectiveness analysis by June 1984. (See p. 13.)

EPA indicated that total cleanup of the Lipari site may not be practical. An EPA consultant estimated that \$32 million would be needed to transport the wastes to another site or about \$1.2 million to contain the wastes on-site. Furthermore, an EPA official said that emerging technologies for total cleanup through waste treatment are costly, and their success has not yet been sufficiently documented. According to a state official, additional remedial action beyond containment is needed at Lipari because contaminants continue to leak from the underground containment into area ground and surface waters. He stated that a program to pump and treat the contaminated groundwater from within the site is an absolute necessity. EPA is undertaking a 2-year groundwater-monitoring program at