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**UNITED STATES GENERAL ACCOUNTING OFFICE  
WASHINGTON, D.C. 20548**

RESOURCES, COMMUNITY,  
AND ECONOMIC DEVELOPMENT  
DIVISION

MARCH 20, 1985

B-216455

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

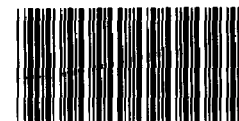
Dear Mr. Chairman:

Subject: Status of EPA's Remedial Cleanup Efforts  
(GAO/RCED-85-86)

In your May 2, 1984, letter you requested information on the Environmental Protection Agency's (EPA's) progress in cleaning up the nation's worst hazardous waste sites (referred to as priority sites) during the first 4 years of the 5-year Superfund Program. This program, established by the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (commonly referred to as Superfund), authorized EPA (by presidential delegation) to respond to hazardous substance releases and to clean up inactive hazardous waste disposal sites using removal and remedial actions. Removal actions are short-term responses to address immediate and significant dangers at any hazardous waste site but are not necessarily final solutions. Remedial actions are intended to be permanent solutions but may not be prompt because they involve extensive study of the problem, must arrive at a cost-effective solution, and often require a series of cleanup measures before a final remedy is achieved.

As agreed with your office, we focused our review on the (1) extent to which EPA believes the worst sites have been cleaned up under its remedial program and (2) status and funding of ongoing remedial actions.

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EPA has identified 538 priority sites and proposed another 248 sites for designation on the National Priorities List (NPL). This designates the nation's worst known sites contaminated with hazardous substances posing the greatest threat to humans or the environment. We found that as of December 31, 1984:

--EPA considered cleanup actions completed at 10 priority sites. These actions usually ranged from removing some or all of the wastes to containing wastes on-site. Of these 10 sites,<sup>1</sup> 2 were cleaned up under the remedial program, 5 were cleaned up by the removal program, 2 by private parties, and 1 using Clean Water Act funds prior to Superfund's passage.

--Thirty-six percent or 194 of the 538 priority sites had no cleanup action underway or planned; 44 percent or 236 sites are in the investigation and/or study phase; and 19 percent or 104 sites had Superfund-financed or responsible party cleanup action approved or underway. EPA considered cleanup action complete at the remaining four priority list sites.

We reviewed files in detail for the 58 sites approved for cleanup as of June 30, 1984. Specifically, we found that most--47 sites--involved planned actions which would only partially or temporarily resolve the sites' problems. Additional cleanup activity was anticipated at these sites primarily because of the difficulties of decontaminating groundwater.

#### OBJECTIVES, SCOPE, AND METHODOLOGY

Our objectives were to determine (1) the extent to which EPA believes cleanup has been completed at priority sites and (2) the status and funding of ongoing remedial efforts.

To obtain the status of the 538 NPL sites as of December 31, 1984, we reviewed EPA's data bases on the remedial, removal, and enforcement programs. These data bases provided information on program activity and funds obligated and expended. We did not verify the accuracy of those data bases but did review in detail the status of remedial accomplishments at the 58 NPL sites that had been approved for cleanup under the remedial program through June 30, 1984 (the cutoff date for our site identification effort). For these 58 sites we reviewed case files and interviewed officials at EPA headquarters in Washington, D.C., to obtain and verify site status information. In addition, we reviewed the

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<sup>1</sup>Of these 10 sites, 4 are on the current NPL, 1 was formally deleted from the NPL after cleanup, and the remaining 5 were cleaned up as proposed NPL sites and therefore never included on the NPL.

the six sites that EPA identified as being cleaned up as of June 30, 1984, and that are no longer considered priority sites.

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 officials responsible for the Superfund Program. Their views have been incorporated in the report where appropriate.

Our work was conducted from June 1984 through January 1985. Except for not verifying the accuracy of EPA's data bases, our review was performed in accordance with generally accepted government auditing standards.

STEPS INVOLVED IN THE  
REMEDIAL CLEANUP PROCESS

After a potential site has been identified, investigated, and assessed, EPA decides whether it should be placed on the NPL. Only sites placed on the NPL qualify for remedial cleanup action. 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 balances the need for protection of public health, welfare, and the environment against the amount of money available in the fund to respond to other sites.
- Design of the remedy.
- Implementation of the remedy. Remedial actions may involve transferring the hazardous material to secure landfills, treating the material at a hazardous waste treatment facility, treating or isolating the material on the site, or a combination of these actions.

At any point in the process a removal action may be taken if circumstances warrant.

EPA may negotiate voluntary cleanups. EPA usually negotiates with the responsible parties at two points in the remedial process: (1) before the remedial investigation/feasibility study (in an attempt to get the responsible parties to do the study as well as the selected remedy) or (2) after the study (in an attempt to get the parties to implement the selected remedy). Also, EPA can either direct or seek a court order to require responsible parties to perform the cleanup themselves or it may take action to require the responsible parties to reimburse Superfund for the cost of removal and/or remedial actions.

FEW SITES CONSIDERED  
TO BE CLEANED UP

As of December 31, 1984, EPA considered 10 sites cleaned up and planned to complete 7 additional sites during fiscal year 1985. These 17 sites are identified in the following table. A major reason for the small number of completed remedial cleanups is that the remedial cleanup process requires several time-consuming steps--taking up to 2 to 3 years before actions can begin.

NPL Sites That EPA Believes  
Are Completed or Will Be Completed  
by September 30, 1985

<u>Sites completed as of December 1984</u>	<u>Cleanup action</u>
Butler Tunnel, Pittston, Pennsylvania	Removal <sup>a</sup>
Chemical Metals Industries, Inc., Baltimore, Maryland	Removal
Luminous Process, Athens, Georgia	Remedial
PCB Roadside Spills, North Carolina	Remedial
Chemical and Minerals Reclamation, Cleveland, Ohio	Removal
Gratiot County Golf Course, St. Louis, Michigan	Responsible party
Walcotte Chemical Co. Warehouses, Greenville, Mississippi	Responsible party
PCB Wastes, Trust Territories	Removal
Tapitimu Farm, American Samoa	Removal
PCB Warehouse, Commonwealth of the Marianas	Removal
 <u>Sites in process</u>	 <u>Cleanup action</u>
Pinette's Salvage, Washburn, Maine	Removal
Friedman Property, Freehold Township, New Jersey	Remedial
Enterprise Avenue, Philadelphia, Pennsylvania	Remedial
Lehigh Electric & Engineering Co., Old Forge Borough, Pennsylvania	Remedial
Matthews Electroplating, Roanoke County, Virginia	Remedial
Morris Arsenic Dump, Morris, Minnesota	Remedial
Perham Arsenic, Perham, Minnesota	State
 <sup>a</sup> This action was completed with Clean Water Act funds prior to the passage of Superfund.	

The degree of cleanup action taken at the completed sites varied since neither the Superfund Act nor EPA's implementing regulations define cleanup. The selected remedial action at a hazardous waste site must be cost-effective and provide adequate protection of public health, welfare, and the environment. EPA has flexibility in deciding how to clean up Superfund sites. Remedies considered by EPA range from containment of wastes

on-site, to partial cleanup and containment measures, to total removal of wastes from a site.

The 10 sites EPA considered cleaned up generally involved relatively uncomplicated remedies compared to problems EPA currently faces at most NPL sites. For example, we reviewed EPA's cleanup efforts at the six sites which it considered cleaned up as of June 30, 1984. Cleanup at four sites involved removing hazardous wastes from the sites; at the remaining two sites, cleanup consisted of removing some and containing other hazardous wastes on-site. A brief summary of the cleanup action taken and contamination remaining at each of the six sites is contained in the enclosure.

MOST SITES IN REMEDIAL  
PROCESS ARE IN STUDY PHASE

The study of the extent of the problem and alternative cleanup approaches dominated the first 4 years of the remedial process. Of the 538 NPL sites, 298 sites were undergoing Superfund-financed remedial activities as of December 31, 1984. Of the 298 sites, 236 sites were undergoing or were approved for remedial investigations and feasibility studies to determine the extent of site contamination and to analyze various cleanup alternatives to address the contamination. The remaining 62 sites had been approved for cleanup action.

A total of 108 sites had cleanup action approved or underway or were considered cleaned up by EPA. This includes the 62 sites discussed above; 30 sites where cleanup activities were performed and financed exclusively by private parties; 12 NPL sites that have received only Superfund-financed removal actions; and 4 sites that have been cleaned up. The following chart summarizes the status of all NPL sites in the remedial process as of December 31, 1984.

Cleanup Activity at 538 NPL Sites  
as of December 31, 1984

<u>Category</u>	<u>Number of sites</u>
Sites considered by EPA to be cleaned-up	4 <sup>a</sup>
Superfund-financed remedial activity	298 <sup>b</sup>
Responsible party-financed remedial activity	30 <sup>b</sup>
Superfund-financed removal activity only	12
No removal or remedial fund- financed activity	<u>194<sup>c</sup></u>
Total	<u>538</u>

<sup>a</sup>As discussed in the footnote on page 2, EPA believes that an additional 6 sites have been cleaned up.

<sup>b</sup>Removal actions may have been performed at some of these sites to mitigate or prevent immediate and significant dangers. Responsible parties may also have taken action at some of these sites.

<sup>c</sup>Some NPL sites may have cleanup activities in progress that have been initiated by state funding or state enforcement action against private parties. EPA does not track these sites and could not provide us with how many sites are in these categories. Also, EPA may have prepared initial plans for collecting site information needed to develop a remedial strategy but not yet obligated funds for fund-financed remedial activity.

EPA reported that Superfund obligations totaled about \$353 million for remedial activities for the 298 NPL sites through December 31, 1984, and expenditures were about \$106 million. According to the Chief of EPA's Remedial Analysis Section, Hazardous Site Control Division, the money for remedial activity at a site is fully obligated at the beginning of each step and expended in increments as each step of the remedial process is completed.

MOST ONGOING SITE  
CLEANUPS ARE PARTIAL  
REMEDIES

As discussed earlier, 62 sites had been approved for cleanup action as of December 31, 1984. However, to provide adequate time to obtain and verify site status information, we reviewed the 58 sites that had reached the cleanup phase by June 30, 1984. Of these 58 sites, the approved actions were considered final remedies for 11 of the sites, while the actions planned at 47 sites were only partial or temporary in nature with additional cleanup activity anticipated. The following table categorizes the nature of the remedial actions taken at the 47 sites.

<u>Remedial Actions Involving</u> <u>Partial or Temporary Measures</u> <u>as of June 30, 1984</u>	
<u>Nature of action</u>	<u>Number of sites</u>
Removing or containing surface hazardous wastes found in drums, tanks, lagoons and surface soil	31
Providing alternate water supply because of contaminated drinking water	11
Removing or containing subsurface hazardous wastes found in buried drums, subsurface soil, and groundwater	4
Permanent relocation of residents from hazardous waste sites	<u>1</u>
Total	<u>47</u>

Additional study is required at these 47 sites to determine the extent of contamination remaining and to select a cleanup alternative to deal with the permanent remedy of remaining contamination. For 42 of the 47 sites this additional study involves groundwater contamination. As part of the final remedies for major groundwater contamination problems, EPA and state officials have estimated that the cost to operate and maintain groundwater treatment for some sites could continue for 20 to 30 years.

As of June 30, 1984, \$180 million from Superfund had been obligated for remedial activities at the 58 NPL sites. The



following chart shows a breakdown of obligations and expenditures by remedial activity for these sites.

<u>Remedial Obligations and Expenditures</u> <u>for 58 Sites as of June 30, 1984</u>		
	<u>Obligations</u>	<u>Expenditures</u>
Remedial investigation/ feasibility studies	\$ 31,877,422	\$11,081,904
Technical assistance	326,286	169,708
Remedial design	6,711,582	2,632,421
Initial remedial measures <sup>a</sup>	22,181,478	10,319,230
Remedial actions	77,842,613	19,139,496
Other <sup>b</sup>	<u>40,861,200</u>	<u>25,236,837</u>
<b>Total</b>	<b>\$179,800,581</b>	<b>\$68,579,596</b>

<sup>a</sup>Initial remedial measures are remedial actions that are taken before a permanent remedy has been selected so as to limit exposure or threat of exposure to a significant health or environmental hazard.

<sup>b</sup>Other includes activities such as relocation of residents who lived on or near NPL sites.

The Chief of EPA's Remedial Analysis Section, Hazardous Site Control Division, gave several reasons for the difference between dollars obligated and expended, including the following:

- A remedial investigation and feasibility study, designed to investigate the extent of contamination at a site and suggest various alternatives for a cost-effective final remedy, may take up to 2 years to complete. The money for this remedial activity is usually fully obligated at the beginning of this activity but expended in increments.
- Remedial actions may take up to several years to complete while dollars for the project are usually obligated prior to hiring the cleanup contractor.
- Delays in expenditures also occur if EPA enforcement negotiations with potential responsible parties are renewed during the remedial process and eventually are unsuccessful.

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B-216455

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

Sincerely yours,

A handwritten signature in cursive script, appearing to read "J. Dexter Peach".

J. Dexter Peach  
Director

Enclosure

SUMMARY OF CLEANUP ACTIONS AT  
SIX SITES CONSIDERED COMPLETED BY EPA

Butler Tunnel, Pennsylvania - An estimated two million gallons of oil and other hazardous chemicals, including cyanide waste, were illegally dumped into an old mine tunnel. This waste began discharging into the Susquehanna River. According to the Chief of the Removal Program's Response Operation Team, EPA corrective actions, which began prior to Superfund's passage, were accomplished under the Clean Water Act. These actions included installing filter fences to retain discharge, containing and cleaning up oily waste in the river, drilling wells to intercept waste, and installing an inland waste treatment system. The state of Pennsylvania is responsible for operating and maintaining the site, including monitoring the possible discharge of hazardous wastes that remain in the ground and mine shaft.

Chemical Metals Industry, Maryland - This site consisted of two abandoned land areas separated by 20 row houses. Several hundred drums and contaminated soil from which odors emanated were found at the site. According to the Chief of the Removal Program's Response Operation Team, EPA, under its Superfund removal program, removed all drums, debris, and some contaminated soil from the site and placed a clay covering over each area. According to EPA, groundwater contamination remains at the site; however, the groundwater is not used as a drinking source. EPA plans to perform further study of the groundwater to determine what, if any, action to take.

Chemical Minerals, Ohio - According to the Chief of the Removal Program's Response Operations Team, at this site EPA's Superfund removal program funded the disposal of 8,000 gallons of solvents and several thousand storage drums and contaminated soil, as well as the dismantling of the building located on the site. EPA considers the site clean; no contamination remains on-site because surface soils were scraped away to expose "clean dirt." No groundwater monitoring was done because of little possibility of such contamination.

Gratiot County Golf Course, Michigan - According to the Chief of the Compliance Branch, Office of Waste Programs Enforcement, cleanup of this site was performed by the responsible party. The site contained buried and surface hazardous materials. EPA also identified DDT contamination in a small leachate stream entering a tributary to the Pine River. The responsible party's actions included constructing a leachate collection system and pumping the leachate from a holding pond for off-site disposal; removing all buried and surface materials; and constructing a fence. According to EPA little contamination remains at this site; groundwater monitoring was performed for a short period of time after cleanup with only one well detecting minor groundwater contamination. Thus, no further action is planned.

Luminous Processes, Georgia - This site contained radioactive soils and a contaminated building and equipment. According to the Chief of the Remedial Analysis Section, Hazardous Site Control Division, the EPA remedial program funded the excavation and disposal of the radioactive soils and decontamination of the building and equipment. EPA performed radiological assessments within the building and determined that no hazard remains.

Walcotte Chemical, Mississippi - This site involved over 200 drums and several large tanks containing hazardous materials that were found in an abandoned warehouse on concrete floors. According to the Chief of the Compliance Branch, Office of Waste Programs Enforcement, responsible parties removed the drums and tanks. EPA considers the site clean because the drums and tanks were stored on concrete and none of the drums or tanks showed signs of leaking.