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SUPERFUND

Information on Operations and Maintenance Activities and Costs

Statement for the record by
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Mr. Chairman and Members of the Subcommittee:

Thank you for the opportunity to present the preliminary results of our ongoing work for this subcommittee on operations and maintenance activities and costs at hazardous waste sites being cleaned up under the Environmental Protection Agency's (EPA) Superfund program.[1] Even after cleanup remedies at Superfund sites are completed, additional site activities may be necessary to ensure that the remedy continues to operate effectively and the cleanup continues to protect human health and the environment. For example, if contaminated soil is contained with a waterproof cover, the cover must be maintained indefinitely to prevent erosion. Similarly, treatment systems for contaminated groundwater may have to be operated for decades before reaching and maintaining acceptable levels of water quality.

Our testimony today is based on our ongoing review of operations and maintenance activities and costs at sites on EPA's National Priorities List (NPL). At the request of the Ranking Minority Member, we will focus on three areas: (1) the extent to which such operations and maintenance (O&M) activities are necessary at NPL sites, (2) the projected costs to the federal government, states, and responsible parties to perform these activities, and (3) EPA's actions to ensure that sites requiring O&M continue to protect human health and the environment. Since our work is still ongoing, the material we present is preliminary and subject to change. In summary, we have found the following:

-- At about 62 percent or 143 of the 229 NPL sites we reviewed where the remedy has been constructed,[2] EPA, states, and responsible parties must perform some long-term actions as a result of the cleanup remedy chosen for the site. These actions--which include, among other things, controlling erosion, operating groundwater treatment systems and pumps, monitoring environmental

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[1]Under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA or Superfund), EPA assesses hazardous waste sites and places the most seriously contaminated on its National Priorities List (NPL). Since CERCLA was enacted in 1980, EPA has placed nearly 1300 sites on this list. The Act authorizes EPA to clean up contaminated sites, using funds from the Superfund trust fund, and to compel responsible parties to perform or pay for cleanups.

[2]EPA defines a site as construction-complete when the cleanup remedy selected has been built. Completing construction, however, may not mean that all hazardous chemicals have been removed or that the site is sufficiently clean to be removed from the NPL.

conditions, or placing restrictions on the use of land or water--will continue for decades, or in some cases, indefinitely.

-- Our preliminary estimates indicate that O&M costs could be about $33 billion to $41 billion[3] nationwide over the next four decades. Sites that are already on the NPL represent about $20 billion to $25 billion of this total. In order to be conservative, we used the lower end of the range to calculate our preliminary estimates on the O&M costs for the federal government, states, and responsible parties. These costs could be approximately $4 billion[4], $10 billion, and $20 billion, respectively, to operate and maintain NPL sites. In fact, based on these estimates, states and responsible parties can expect to pay, on average, $12 million for all O&M associated with each cleanup. The choice of a cleanup remedy determines the O&M activities and costs. For example, if surface waste must be contained, rather than permanently treated, the maintenance costs resulting from this choice could increase costs for the states and responsible parties because of the long-term commitment necessary.

-- The federal government monitors the O&M activities of states and responsible parties in order to ensure they are being performed and that site conditions are acceptable. However, the agency's principal focus to date has been on evaluating and cleaning up sites rather than on such monitoring. Monitoring is important because the states and responsible parties do not always follow the O&M action plans and because conditions at sites can worsen, requiring further action. EPA is required to review certain sites every 5 years. However, EPA has

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[3]We used an EPA database which includes O&M estimates through 2040 from approved and anticipated cleanup plans. However, to project costs into the future, EPA used an average cost estimate for all cleanup plans regardless of the selected cleanup technology. EPA's estimate also did not break out federal government cost responsibilities. In addition to using approved cleanup plans, we are also using our own database to better project costs associated with different types of cleanup technologies and the future costs of O&M to the federal government. We plan to issue final O&M estimates in a report to the Ranking Minority Member of this Subcommittee within the next several months. All figures in this statement are in 1994 dollars.

[4]This total includes $1.6 billion for operations and maintenance at federal facilities and costs that EPA incurs during the first 10 years of groundwater treatment at some sites.

more than 120 5-year reviews that have not been completed. As a result, the agency may not be aware of worsening conditions at other Superfund sites that have not been reviewed.

BACKGROUND

Before discussing Superfund O&M activities and costs in detail, we would like to provide some background information on what happens at Superfund sites after cleanup construction is complete. Although EPA may have taken steps to protect human health and the environment, hazardous chemicals may remain in the land or groundwater at these sites. For example, at sites with contaminated soil, EPA may decide to cover the contaminated area with a protective layer, like clay, which will require maintenance indefinitely to protect against erosion. Similarly, sites where groundwater contamination is being treated may require several decades of treatment system operation to reach acceptable levels of water quality. In these cases, continuing actions are necessary to ensure that the cleanup remains protective. This O&M phase will continue indefinitely at many cleaned sites, leaving EPA, states, and responsible parties financially responsible for repairs, inspections, and other necessary activities for decades to come. Sites where the waste or soil is treated need to be operated for a finite period of time and eventually need no maintenance.

O&M costs are borne by the states, responsible parties, and the federal government. When EPA reaches an agreement with responsible parties that they will clean up a site, it also generally requires that they pay for these ongoing O&M activities. Sites where EPA funded the cleanup are more complicated: EPA is financially responsible for activities during an "operational and functional" period. At sites where no groundwater treatment is needed, this period lasts about 1 year; where groundwater treatment is needed, EPA operates the pumps and treatment systems for 10 years. During this operational and functional period, the states must pay 10 percent of costs. At the end of this period, EPA turns the sites over to the states, which must conduct and pay for the remaining O&M.[5] (See app. I)

Extent of Operations and Maintenance Activities

[5]CERCLA and agency regulations define operations and maintenance as the activities that occur after the state becomes responsible for the site. However, throughout this report, we define O&M costs as including both EPA's operational and functional costs and the states' O&M costs in order to capture all costs resulting from O&M activities after construction of a cleanup.

Operations and maintenance at Superfund sites may continue for decades, or at those sites that rely on containment and land or water use controls, indefinitely. Operations and maintenance activities and costs are directly determined by the cleanup approach used at the sites. At about 62 percent of the 229 construction-complete sites we reviewed,[6] long-term actions are necessary as a result of the cleanup remedy. These cleanups and resulting O&M activities include:

-- Twenty-two percent (51 site cleanups) used waterproof covers to physically contain hazardous waste or contaminated soil, preventing exposure to the waste and reducing the amount of additional contaminants entering groundwater. These sites will require maintenance, such as erosion control activities, and periodic inspections, for an indefinite time period.

-- Twenty-two percent (51 site cleanups) mandate pumping and in some cases, treating groundwater. These sites will require operating pumps and treatment systems, keeping the equipment in repair, and monitoring groundwater quality.

-- Ten percent (24 site cleanups) used both waste containment and groundwater treatment technologies. These sites will require erosion control, inspections, pump and treatment system operation, and groundwater monitoring.

-- Seven percent (17 site cleanups)[7] will require local governments or landowners to restrict land or water use on or near the site to protect the cleanup remedy or to prevent public exposure to hazardous waste. Use controls may involve closing drinking water wells, prohibiting drilling new wells, and/or deed restrictions.

(See app. II for the distribution of O&M activities that will be required at construction-complete and deleted sites.)

OPERATIONS AND MAINTENANCE COSTS

Operations and maintenance costs are expected to grow over

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[6] We reviewed EPA's data as of June, 1994. Since that time, EPA has classified 63 additional sites as construction-complete for a total of 292 sites. This number includes 77 sites which have been deleted from the NPL. We will incorporate this additional data into our final analysis.

[7] An additional twelve percent of site cleanups used these restrictions in combination with other cleanup technologies.

time as more sites enter the O&M phase. We are working to develop information on yearly O&M costs through the year 2040 to demonstrate this growth. Based on our preliminary estimates, the states and responsible parties could expect to pay an average of $12 million for the O&M associated with a single cleanup.[8] These costs vary according to the type of operations and maintenance required at a site. For example, using our estimates, we found the following:

-- When a cleanup uses technologies designed to contain surface waste, the need for ongoing maintenance could entail at least $5 million, on average, after building the containment system.

-- When the cleanup is based on treating surface waste, operating a treatment system could entail an average of $8 million after building the treatment system. Treating surface waste, however, does not involve the additional time and expense associated with maintaining waste containment systems.

-- When the cleanup is based on treating groundwater, operating the system could entail $18 million after building the treatment plant.

O&M Monitoring

Even though states and responsible parties perform most O&M activities, EPA still has an ongoing monitoring role to ensure that O&M activities are implemented and that the cleanups continue to protect human health and the environment. For example, EPA requires its site project managers to review reports on site conditions or groundwater quality that the states or responsible parties submit to ensure that the required O&M activities are implemented. Until recently, the agency has focused on getting sites evaluated and cleaned up rather than on its monitoring activities. Although some sites have been in the O&M phase for several years, EPA is just now developing guidance on how site project managers should monitor O&M.

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[8]While EPA uses 30 years as a default when estimating the costs associated with O&M, the actual period may be longer or shorter. At sites where waste is contained rather than treated, maintenance activities are necessary in perpetuity, so these standard 30-year estimates understate the true cost. Similarly, the length of operations for groundwater treatment depends on how long it takes to meet the cleanup standards. In fact, EPA's recent survey of site cleanup managers indicated that they expect about 1/5 of cleanups to require more than 30 years of O&M.

Both GAO and EPA's Inspector General (IG)[9] found that close monitoring was important because EPA, states, and responsible parties were not always following their required action plans for O&M. For example, the EPA IG identified a significant monitoring problem at the Heleva Landfill site in Lehigh County, Pennsylvania, where EPA still had O&M responsibility because the site involved groundwater pumping and treatment. In 1994, a pond adjacent to the landfill overflowed onto the waterproof cover potentially damaging it. In addition, the site project manager responsible for monitoring the site was unaware of the requirement to sample surface water, such as the ponds, even though the cleanup plan required it at least once every three months. In fact, no sampling had been performed since the waterproof cover's installation in 1990. In addition, burrowing animals had dug several holes in the cover, potentially damaging the cover's lining.

GAO found that monitoring may be needed after a site has been cleaned up. At the Lehigh Electric site in Old Forge, Pennsylvania, for example, EPA had removed surface debris, equipment, and soil contaminated with PCBs.[10] Consequently, the site was deleted from the NPL in 1986. However, ongoing groundwater monitoring revealed that PCB contamination levels were increasing. Consequently, EPA has recommended a new study to determine the contamination source and possible cleanup methods. As a result of this study, EPA may incur additional cleanup costs.

Five-Year Reviews

In addition to monitoring ongoing activities, EPA must also formally review some sites in the O&M phase. EPA conducts two types of 5-year reviews. Superfund's reauthorization in 1986 called for 5-year reviews (statutory reviews) at certain sites where a cleanup remedy was selected after 1986 and where waste remains on site. EPA has also decided to conduct 5-year reviews (policy reviews) at sites where the remedies were decided on before 1986. According to EPA, the purpose of the review is two-fold: (1) to confirm that the cleanup technologies remain effective at protecting human health and the environment, and (2) to evaluate whether the original contamination cleanup goals remain protective of human health and the environment.

Although guidance on performing the day-to-day monitoring is

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[9]Backlog Warrants Higher Priority for Five-Year Reviews (United States Environmental Protection Agency, Office of Inspector General, E1SSFF4-11-0029-5100229, March 24, 1995).

[10]PCB stands for polychlorinated biphenyls, organic chemicals which are carcinogenic.

absent, EPA does have guidance for the formal reviews EPA must complete at sites every 5 years. These reviews often succeed in identifying when O&M activities are being neglected or site conditions are deteriorating. For example, our analysis of 5-year reviews showed the following:

-- At the Mowbray Engineering site in Greenville, Alabama, the review indicated that site conditions were unacceptable, with trees and excess vegetation growing on the cap and the surrounding fence. No O&M activities had been conducted between the construction of the cap and the 5-year review. EPA reiterated in the review that the site must be mowed regularly to prevent high grass growth and to prevent trees from becoming established and potentially damaging the cap.

-- At the Kellogg-Deering Wellfield in Norwalk, Connecticut, EPA's 5-year review identified problems with the groundwater sampling. The responsible party for the site was not sampling the groundwater at some monitoring wells as specified in the cleanup plan. EPA's purpose for requiring the groundwater sampling was to provide an "early warning system" to detect the migration of contaminants. As part of ongoing work at other areas of the site, EPA has now approved a sampling plan which will monitor the cleanup's effectiveness.

-- At the Middletown Road Dump in Annapolis, Maryland, the 5-year review concluded that the site continued to be used as an illegal dump site since it essentially remained open to pedestrian traffic.

Despite the benefits of the 5-year reviews, EPA's IG found that EPA has a significant backlog of such reviews--more than 120 have not been completed. As a result of the backlog, the agency may not be aware of problems occurring at other Superfund sites. EPA has tried to verify which sites need reviews, and when they are due. The agency has also attempted to reduce the size of the backlog by narrowing the scope of the review in certain instances. Nevertheless, EPA regional staff said that while EPA has set specific expectations, known as Superfund Comprehensive Accomplishment Plan (SCAP) goals,[11] for them to complete other activities, such as cleanup plans at Superfund sites, it has not set such expectations for the 5-year reviews. Thus, these reviews have a lower priority. EPA's Inspector General recently concluded that adding 5-year reviews to the list of SCAP goals would improve the agency's performance. However, EPA is moving away from using the SCAP system to set agency priorities to allow

[11]SCAP targets are a pre-determined numerical goal upon which budgets are allocated and the regions are evaluated.

for more flexible funding. Therefore, the Assistant Administrator for Solid Waste and Emergency Response is taking measures to set more specific deadlines for 5-year reviews, and establish accountability for completing them.

OBSERVATIONS

In summary, Mr.Chairman, the majority of sites currently on the NPL will require long-term operations and maintenance, especially those sites requiring waste containment or groundwater treatment. The related costs will become a substantial portion of the federal government's, states', and responsible parties' spending even after they have paid millions of dollars to construct the required cleanup remedy. How much these parties spend on O&M will be influenced by policy decisions about whether cleanup remedies will use treatment or containment and decisions on who should pay for Superfund cleanups.

Operations and maintenance oversight has taken a back seat to other Superfund activities that EPA must implement and monitor. As a result, responsible parties and states have not always performed O&M activities as required. EPA's plans to develop guidance on how to oversee O&M activities and raise the priority of 5-year reviews should help to remedy this situation.

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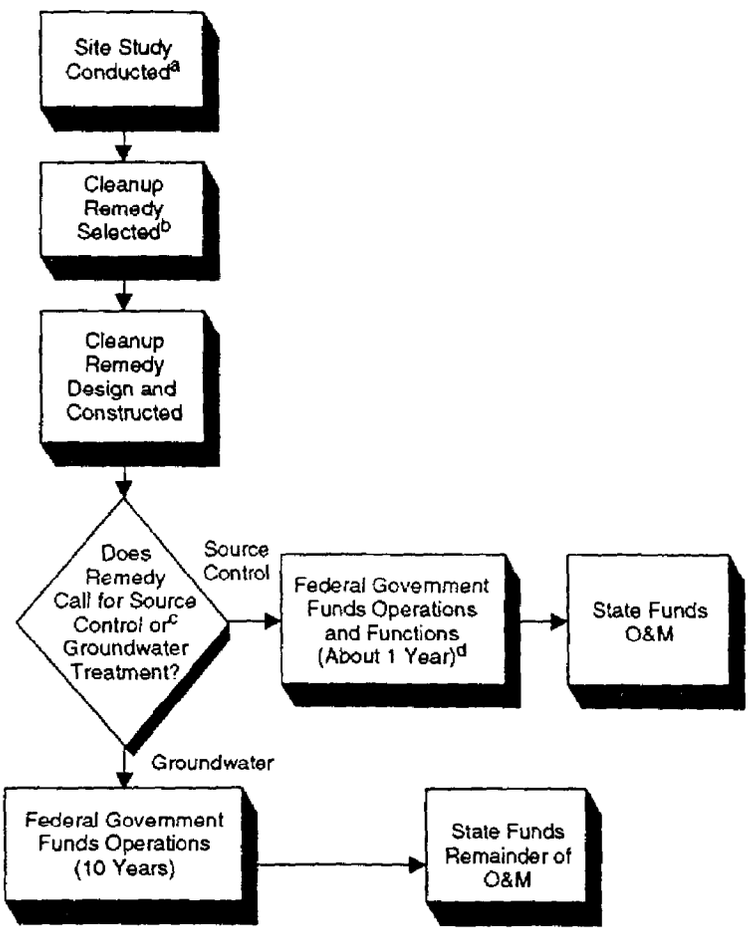
Process for Superfund Sites Requiring Operations and Maintenance

Appendix I: Process for Sites That Require Operations and Maintenance



[a]This flowchart applies to sites where the remedy is funded by the federal government. At sites where responsible parties fund the cleanup, they will also fund operations and maintenance.

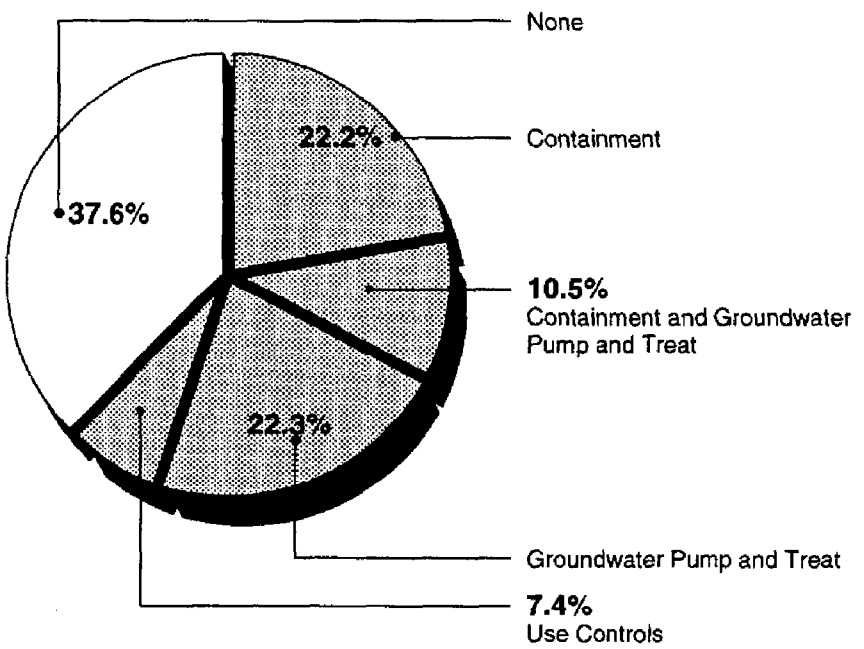
[b]For illustrative purposes, this flowchart provides an example of a site with one cleanup action. Some NPL sites require several actions. Each cleanup action would go through a process similar to the one depicted in this chart.

[c]Source control refers to cleanups that address the source of contamination, such as polluted soil or buried chemical waste. Cleanup actions might include containing waste with a waterproof landfill type cover, or treating soil to reduce the level of pollution. In groundwater treatment, groundwater is extracted from underground aquifers and treated to remove contaminants.

[d]States must pay for 10 percent of the costs incurred during cleanup action and the operational and functional period.

Percentages of Long-Term Actions Needed at Construction-Complete Sites

Appendix II: Percentages of Long-Term Actions Needed at Construction Complete Sites



Sites needing long-term actions

Containment requires protecting an area with a waterproof cover (cap). The cap must be routinely monitored.

Groundwater pump and treat requires extracting water through pumps and chemically treating the water to reduce contaminants.

Use controls require monitoring and controlling local land or water use through fencing and/or deed restrictions.

Sites using containment and/or groundwater pump and treat may also include use controls.

Percentages used in this chart reflect information on construction complete sites as of 6/30/94.

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