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ISSUE BRIEF
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Costs Under Superfund

The number of sites and costs associated with the Superfund program are overestimated, according to an environmental liabilities study by the American Academy of Actuaries. The likely number of cleanup sites will be 2,000, with an ultimate cost to the Superfund of less than $100 billion. These figures contrast sharply with other estimates of 3,000 to 4,500 eventual sites and costs of $165 billion. The Academy and other analysts agree that cleanups will proceed at a rate that will cost about $2 billion per year.

The report also summarizes the consequences of various legislative reforms. Only eliminating retroactive liability, the most radical reform proposal, would have a substantial impact on private sector costs and provide significant relief from the nearly $1 billion a year in legal costs. However, relieving third-party polluters of liability for past legal dumping will shift costs to the government's Superfund. Eliminating liability for pre-1981 sites would lower cleanup costs for potentially responsible parties by approximately $1 billion, but that cost would be shifted to the government. Unless remedy selection and administrative reforms are also enacted, the real savings would be about $450 million in reduced annual transaction/legal costs.

This brief is based on the public policy monograph "Costs Under Superfund: A Summary of Studies and Comments on Reform," which is available from the American Academy of Actuaries.

1. Costs: Current Superfund Law

By now, there is widespread dissatisfaction with the operation of the Superfund program that was born of the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) of 1980.

The American Academy of Actuaries is the public policy voice of the actuarial profession, providing the actuarial profession's expertise to policy makers. This issue brief is taken from a monograph on Superfund produced by the Academy's Environmental Liabilities Work Group:

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Back in 1980, everything about Superfund seemed orderly—at least on paper. According to the general framework of the law, the government was to levy taxes on the chemical and petroleum industries, and use these monies, as a "Superfund," to investigate and remediate hazardous waste sites.

Using data from its site inspections, the Environmental Protection Agency (EPA) would assign each site a hazard ranking. Then, sites with sufficiently high rankings were placed on the National Priorities List (NPL). Finally, plans for remediation of the site would commence.

However, CERCLA has not worked as originally intended: both its costs and timing are badly out of line. Although it was envisioned as a short-term program, with a limited number of sites and a total cost of $1 billion to $2 billion, CERCLA cleanup costs (including legal expenses), to date, have swollen to over $25 billion.

And cleanup work has proceeded agonizingly slowly. As of January 1994, fewer than 220 of the NPL 1,410 sites had seen complete remediation.

There are several reasons why Superfund has failed to meet early expectations. Lengthy legal hassles are most commonly mentioned, but in fact the Superfund cleanup process itself entails an arduous, multi-phase initiative. One phase alone (the last—"operations and maintenance" [O&M]—can last for decades.

To identify the best means of fixing what currently ails Superfund, it is crucial to know upfront what can reasonably be expected to happen with the program if nothing in it is changed, in terms of eventual numbers of sites, various kinds of costs, and total costs.

Many studies have attempted to quantify the cost of cleaning up the NPL sites under the current Superfund law. Of these, the American Academy of Actuaries Environmental Liabilities Work Group selected eleven for comparison and analytical comment. The studies chosen included those done by, for example, the University of Tennessee, the Congressional Budget Office (CBO), the General Accounting Office, and the Chemical Manufacturers Association.

The work group's review was in agreement with some of the key findings of these studies. For example, the work group concurred with the estimated midpoint for total annual cleanup costs: approximately $2 billion.

However, for two critical projections—total number of sites and total ultimate cost—the work group dissented from the published studies in important ways. The group's consensus was that the published estimates for ultimate number of NPL sites and total costs are too high, by a substantial amount. While the major studies project ultimate Superfund costs in the range of $150 billion to $165 billion, the work group estimates that total costs will be less than $100 billion.

2. Diverse Costs in Superfund

Three kinds of costs are key to understanding what's happening with Superfund: (1) the total costs over the life of the program, (2) annual costs, and (3) transaction costs (for the most part, legal fees and other costs associated with litigation). With most federal programs, "transaction costs" are immaterial. But the hefty size of Superfund litigation costs has emerged as a major factor, for the private parties involved.

Calculating the total costs for cleaning up all the NPL sites is a matter of simple multiplication: the number of sites that will ultimately be cleaned up, times the estimated average cost per site. Three studies analyzed by the work group included estimates for both these factors.

First, the ultimate number of sites was estimated at 3,000 to 4,500. (The breadth of this range derives from differences in two assumptions: the number of years for which new sites will be added to the NPL list and the number of sites added per year.)

Second, the average cost per site (undiscounted) was pegged at $35 million to $50 million.

When multiplied, these numbers yield a range of $150 billion to $165 billion for ultimate program costs.

There is no way to avoid substantial uncertainty in making the assumptions that go into these numbers. In particular, significant differences in O&M costs are inevitable, because these costs will continue to accumulate way into the future; experience to date with them is so limited; and it isn't possible to guess what new kinds of technology may come on line to make site cleanup quicker or cheaper.

Also, several kinds of assumptions have a critical influence on estimates of ultimate costs. For example, the results from the CBO study presume that the worst, in terms of site cleanup, will be behind us in the not-too-distant future. Once the major disasters—the megasites—have been remediated, we will enter a "barrel-scraping" phase, when only the less costly sites will require attention.

Among the several studies referenced by the work group, annual cleanup costs for non-federal NPL sites are consistently estimated at roughly $2 billion (not considering transaction costs).

For transaction costs, the most recent study reviewed (Superfund Reform 95) projected that all private sector costs would run around $900 million per year. Here, the private sector includes both insurers and "potentially responsible parties"—PRPs, companies cited by the EPA for contributing wastes to Superfund sites.

Conclusion. In analyzing the estimates for ultimate number of NPL sites, the Academy work group examined data on recent experience with the NPL. External pressures—for example, budget constraints

on the Environmental Protection Agency (EPA)—will likely keep the average number of new sites added each year below 50 (the annual average for 1990–93). Thus, by 2030, there would be a maximum of 900 new sites. Assuming that's true, the cumulative total would be roughly 2,000 sites. In other words, even the lower end of the range of published estimates—3,000 sites—is in all likelihood way too high.

With fewer sites, ultimate program costs cannot reach $150 billion. Assuming that the work group is correct in its assessment of current costs and trends, the ultimate program cost will be less than $100 billion.

In contrast, the work group's analysis showed that the estimates for two other factors were reasonable. The estimate for projected annual cleanup costs—around $2 billion—and the projection for transaction costs—$900 million per year—make acceptable sense. Transaction costs, in particular, might increase somewhat, over the near term. But these costs should then start to fall during the next decade, as more sites are cleaned up and, in consequence, the volume of litigation diminishes.

3. Choosing Among Reform Options

In the hope of bringing some measure of order to the Superfund cleanup procedure, and keeping costs—litigation costs, in particular—to a minimum, many alternatives for reforming the program have been suggested.

Some of the reform options studied so far include: changing the criteria for selecting remedies for polluted sites; eliminating the retroactive-liability provision for NPL sites that were contaminated by both municipal and industrial waste ("co-disposal"); and relieving private parties of liability for legal dumping that occurred at some or all sites prior to the enactment of Superfund. For example, one proposal advocates eliminating retroactive liability before 1981, at all sites.

These reform options could have very different consequences for Superfund costs.

In one reform scenario, new, more restrictive criteria for site selection would be implemented, or different kinds of analyses used in selecting the remedies chosen for site remediation. These reforms might, for example, require that the remedy be selected based on (1) a cost-benefit analysis, (2) consideration of future use of the site (industrial versus residential), and (3) less-stringent risk assessment criteria.

This sort of reform would serve to lower costs, for both the federal government and the private sector. A study done by the OMB (based, one should note, on the less-than-comprehensive reforms spelled out in the 1994 Superfund bill) found that reforming the criteria used for selecting a remedy would save a combined $300 million per year for PRPs and the EPA.

Transaction costs, though, would not be directly affected by these kinds of reforms. That would require new provisions that would eliminate some portion of the retrospective liability. Reforms targeted at co-disposal sites (release of liability for sites with both municipal and industrial waste) would also work to decrease transaction expenses, to some extent.

However, of all the reform proposals, only the most radical—eliminating retroactive liability—would have a substantial impact on transaction costs.

According to one study (The Brookings Institution/Resources for the Future), eliminating retroactive liability for multi-party sites when dumping occurred prior to 1981 would lower transaction costs, for PRPs and insurers, by about 40%. Another study found that eliminating retrospective liability prior to a more recent date, 1987, would bring costs down from $900 million to $100 million a year.

However, without additional reforms only the transaction costs would be reduced. Results from studies performed by the Chemical Manufacturers Association and the National Environmental Policy Institute suggest that significant additional cost reductions could be achieved if the remedy selection process was also reformed, and these cost reductions would benefit all parties.

Conclusion. As a general rule, we can say that reforms to the Superfund law will have quite different effects. Some will lower costs for all parties concerned. Others will lower costs, but only to the extent that transaction costs are curbed. Still others affect costs only by shifting the relative burdens of

who's going to pay what amount for cleanups—the federal government versus the private sector.

Given the wide divergence of their possible effects on costs, all reform proposals must be analyzed on an individual basis, with close scrutiny of their details—especially if they combine several kinds of program changes. Such analysis will be the future task of the work group.

Summary of Studies of Superfund Costs Under the Current Program

Studies' Conclusions	Work Group's Comments
Total Number of Sites: The estimated midpoint ultimate number of non-federal NPL sites ranges from about 3,000 to 4,500.	Recent placement rates are not consistent with the number of sites estimated by the studies. The Work Group believes that the ultimate number of non-federal sites is more on the order of 2,000.
Cost Per Site: The estimated midpoint ultimate undiscounted cleanup cost per site ranges from about $35 million to $50 million.	Based on 2,000 sites, the CBO study suggests average cleanup costs of $40 million per site. About 40% of this, or $17 million, is attributable to operations and maintenance, the most uncertain element of site cost.
Total Ultimate Cost: The estimated midpoint of total cleanup cost ranges from about $150 billion to $165 billion on an undiscounted basis.	The above two comments suggest that the cost of the non-federal sites will be less than $100 billion.
Annual Cleanup Cost: The estimated midpoint of total annual cleanup costs is approximately $2 billion.	The Work Group believes that the estimates of annual cleanup costs are reasonable.
Annual Transaction Cost: The estimates of annual transaction costs are relatively uniform and are about $900 million.	The Work Group believes that while transaction costs may increase initially, they are likely to decrease over the next ten years as more sites are cleaned up and the amount of litigation begins to decrease.