# CBO
# TESTIMONY

Statement of
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Comprehensive Environmental Response,
Compensation, and Liability Act

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Mr. Chairman, Senator Lautenberg, and Members of the Subcommittee, I am pleased to participate in your review of the Superfund program. The Congressional Budget Office (CBO) has previously explored many aspects of the Superfund program for this Committee and others. My testimony today, however, will focus on the likely effects of repealing the retroactive feature of Superfund's liability system.

Proposals to eliminate cleanup liability for legal activities that contributed to a Superfund problem before a certain cutoff date can take many specific forms. To illustrate the set of possibilities, CBO analyzed two alternative cutoff dates: January 1, 1987, as used in some recent reform proposals, and January 1, 1981, based on the December 1980 passage of the Superfund law. We also considered the implications of whether to reimburse liable parties for the costs of cleanup work they conducted under agreements with the Environmental Protection Agency (EPA). One policy would reimburse liable parties for ongoing costs incurred under existing agreements, but not for money spent before the change in the liability system. A second alternative would reimburse neither ongoing nor past costs; a third would reimburse both.

Proponents of a cutoff date for Superfund liability want to eliminate the perceived unfairness of retroactivity and to reduce or eliminate the "transaction costs" of funding cleanup through a liability-based system. The main trade-off implied in their proposals is the loss of cleanup funding from the liable parties. Making up for that loss would require some combination of cost savings, increased federal spending, and reductions in the pace of cleanup.

The desirability of such a trade-off hinges in part on the size of the various effects. CBO's analysis leads us to the following observations and estimates:

o    The liability faced by Superfund's "potentially responsible parties" (PRPs) arises mostly from actions that occurred before 1981 and almost entirely from actions before 1987. Using the best information available about today's sites, CBO estimates that 70 percent of all Superfund liability could arise from pre-1981 activities and 95 percent from pre-1987 activities.

o    Transaction costs currently represent an estimated 27 percent of all federal and private Superfund spending. The effect on those costs of a liability cutoff for legal activities at Superfund sites would depend not only on the cutoff date but also on the extent of illegal activities, which may be a factor at one-third to one-half of nonfederal sites. Under favorable conditions, with liability repealed through 1986 and little investigation or litigation about the legality of past actions, transaction costs would fall dramatically--perhaps by $1 billion per year. Alternatively, with a 1981 cutoff date and frequent questions of legality, transaction costs would fall much less or even increase.

o       Whereas any savings in transaction costs would accrue primarily to

the private sector, the government would face increased costs because

of the shift in responsibility for cleanup.  Given that the cleanup plans

EPA issues for each site tend to underestimate actual costs, that shift

could amount to $1.6 billion annually for a 1987 cutoff or $1.3 billion

for a 1981 cutoff.  By contrast, the 1995 appropriation for Superfund

was $1.4 billion.  Such sharp reductions in PRP liabilities would make

Superfund largely or almost entirely a public works program.


o       The issue of reimbursement for past or ongoing PRP costs poses

difficult policy choices.   On the one hand, not providing

reimbursement may be seen by some PRPs as inequitable and may

encourage individuals to defer complying with future laws and

regulations.  On the other hand, providing reimbursement would

require establishing criteria for acceptable documentation and

reimbursable costs, and could add as much as $13.5 billion in federal

outlays for a 1987 cutoff or $9.9 billion for a 1981 cutoff.


The rest of this statement reviews Superfund's current liability system and

discusses the basis for the estimates just mentioned.

In enacting the Superfund law, formally the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), the Congress took a two-pronged approach to the problem of who should pay for cleaning up sites contaminated with hazardous wastes or other substances. The law imposed cleanup liability on a site's present owners and operators, its previous owners and operators from periods during which it received hazardous substances, the generators of such substances, and any waste transporters responsible for choosing the site. It also established the Superfund trust fund to finance responses at sites for which the liable parties lack sufficient resources or cannot be found.

Liability under CERCLA is strict, meaning that care or negligence is not at issue. In particular, a party cannot escape Superfund liability by showing that its waste disposal practices obeyed all laws and regulations that were in force at the time. Liability is also joint and several, which means that any party can be assessed the total costs for a contaminated site (unless the party can show that its contribution produced a separate, divisible result). Finally, Superfund liability is retroactive, applying to actions that occurred before CERCLA was enacted in December 1980.

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In administering the Superfund program, EPA can enforce the liability of PRPs in either of two ways. It can have them perform the necessary cleanup directly, under government supervision, or it can conduct the cleanup through its own contractors and then negotiate or sue to recover its costs after the fact. Projects conducted by the liable parties are called "PRP-lead" or "enforcement-lead"; those initially financed by the government are called "fund-lead." In either case, parties that EPA chooses to pursue may initiate "contribution suits" for reimbursement from their fellow PRPs.

## PRP-Lead Cleanups Under EPA's "Enforcement-First" Strategy

Under EPA's "enforcement-first" strategy, adopted in 1989, liable parties have undertaken the large majority of major cleanups at Superfund sites. In each of the last three years, PRPs have conducted 72 percent to 74 percent of the detailed engineering studies ("remedial designs" or RDs) and actual cleanup projects ("remedial actions" or RAs). Over this period, PRPs have also conducted roughly one-half of the site studies called remedial investigations and feasibility studies (RI/FSs) and one-quarter to one-third of the "removal" actions (simpler, less costly cleanup efforts).

CBO calculates that PRP-lead studies and cleanups have supplied the equivalent of $2 billion per year in additional government spending over the last five years. EPA estimates that the value of PRP work commitments has been close to $1.4 billion in four of the last five years, with a dip down to $900 million in 1993. However, the agency's data on fund-lead cleanups indicate that final costs are actually 50 percent higher, using a dollar-weighted average, than its original estimates in the "records of decision" (RODs), which document its choices of cleanup remedies. Actual costs to the PRPs might be somewhat less than $2 billion. The best available evidence indicates that the private sector may be able to accomplish cleanup work at a 13 percent lower cost than the government, which implies that annual PRP costs would be $1.7 billion. In any case, the $2 billion figure represents the amount of EPA spending avoided.

CBO's calculation assumes that the tendency of RODs to understate the eventual scope of required cleanup applies to PRP-lead as well as fund-lead projects.[1] Two facts buttress this assumption. First, many PRP-lead cleanups are preceded by RI/FSs conducted by EPA, and there is no reason to believe that those RI/FSs are any more accurate than the ones that are followed by fund-lead cleanups. Second, the limited data available do not suggest that PRPs are any more successful in estimating the required scope of cleanup work when they conduct RI/FSs themselves. An

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1. The estimates in the RODs for the costs of RD/RA work represent nearly 80 percent of the dollar value of work commitments by PRPs; most of the rest goes to RI/FSs, which have exhibited similar rates of cost growth subsequent to the initial estimates.

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analysis of 83 public and private cleanups completed by 1989 found that "cleanup mis-estimation is a problem affecting both the private sector and the government equally," holding constant such other factors as the type of contamination and cleanup method.[2]

## Transaction Costs

In the context of Superfund, transaction costs refer to those costs incurred in assigning, allocating, and disputing responsibility for cleanup rather than in contributing to cleanup itself. Such costs are important because proponents of a liability cutoff date hope to eliminate or greatly reduce them.

Federal transaction costs for Superfund enforcement represent perhaps $250 million to $300 million in annual spending—or 15 percent to 18 percent of the 1994 Superfund budget. Estimates of nonfederal transaction costs are highly uncertain. The best available data, however, suggest to CBO that PRPs and insurers may now spend on the order of $900 million annually, which would represent 32 percent of their total spending. Combined, those figures yield an estimate of 27 percent for the share of total transaction costs in overall Superfund spending.

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2.   B.R. Schroeder and J.B. Hartung, *The HAZRISK Cleanup Report* (unpublished draft, Independent Project Analysis, Reston, Va., February 1991), p. 47.

<u>Federal Costs</u>. Most Superfund transaction costs incurred by the government are easy to identify. The Superfund enforcement budget, roughly $210 million in 1994, includes the costs of EPA and the Department of Justice for identifying and locating PRPs; recovering the costs of fund-lead projects; negotiating, litigating, and issuing administrative orders for PRP-lead projects; and overseeing PRP-lead RI/FSs. Spending on oversight of PRP-lead RDs and RAs is tracked separately and adds roughly $40 million in additional costs. The incremental costs that EPA incurs in the site investigations in order to collect data suitable for litigation also count as transaction costs but are harder to quantify.

<u>Private Costs</u>. Much more uncertainty surrounds the transaction costs that PRPs and insurers incur in such activities as disputing liability, negotiating settlements with EPA, litigating the applicability of insurance policies, and conducting unofficial RI/FSs as a check on EPA's own work. On the basis of the available data, CBO estimates that private transaction costs are currently on the order of $900 million per year. We derived that figure by assuming that both PRP and insurer costs are a fixed percentage markup on PRP outlays for cleanups, studies, and reimbursements to EPA and that the markup rates are 20 percent to 25 percent for PRPs (or equivalently, that PRP spend 17 percent to 20 percent of their total outlays on transaction costs) and 24 percent for insurers. Those markup rates imply that the share of transaction costs in total private-sector spending is 31 percent to 33 percent.

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That range of 31 percent to 33 percent is close to the 36 percent cited last year by Lloyd Dixon of RAND on the basis of data from two earlier studies.[3] Relative to Dixon's analysis, CBO assumes higher insurer costs, because of differences in the methods used to extrapolate 1989 data, but lower PRP costs.

Estimates of private transaction costs in the Superfund program must be interpreted with caution. Some high estimates of "average transaction-cost shares" are based on simple firm-by-firm or site-by-site averages that do not take into account the dollars spent in each case. Other estimates are median values rather than true averages. Moreover, because the data are so costly to collect, some of the available studies have used samples that probably do not represent the national whole. Another weakness of many estimates, including CBO's, is their reliance on data from sites that have not completed cleanup. Those data are likely to overstate the ultimate share of transaction costs because many categories of such costs are front-loaded--that is, occurring relatively early in the cleanup process.

An appendix to this testimony discusses the leading studies of private transaction costs in the Superfund program and illustrates the various problems encountered in interpreting the available data.

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3.    Lloyd S. Dixon, *Fixing Superfund: The Effect of the Proposed Superfund Reform Act of 1994 on Transaction Costs* (Santa Monica, Calif.: RAND, 1994), p. xvi.

## Fairness Issues

Superfund's liability system has been criticized not only on the ground that its transaction costs are unacceptably high but also on the basis that it is fundamentally unfair. Supporters of the current system argue that fairness is served by making people who contributed to the creation of a contamination problem pay for cleaning it up. Opponents respond that if the goal is to collect from those who benefited previously, then the turnover of shareholders and employees as well as the wide diffusion by market forces of the original cost savings from looser disposal practices require a broader financing scheme.

Critics also argue that the retroactive "polluter pays" approach is particularly unfair to the insurance industry, which did not foresee Superfund liabilities when it priced coverage sold in the 1960s and 1970s. They further argue that joint-and-several liability adds uncertainty that is particularly harmful to small businesses and that it encourages major PRPs to engage in unjustified contribution actions against small, innocent parties who lack the resources to defend themselves.

The effects of repealing Superfund liability for legal actions that occurred before a cutoff date would depend on the date chosen and on the incidence and significance of illegal disposal activities at sites on the National Priorities List (NPL). If illegal activity played a minor role, a 1987 cutoff would eliminate nearly all PRP liability and the vast majority of federal and private transaction costs. Indeed, it would turn Superfund almost totally into a public works program. The trade-off would be a loss in cleanup spending that exceeds the program's current EPA budget. The effects of a 1981 cutoff would be less sweeping, particularly for transaction costs, but they would still be significant. With either cutoff date, higher levels of illegal activities at NPL sites would cut into the reduction in PRP liabilities and significantly reduce--or conceivably reverse--the savings in transaction costs.

## Data on the Time Pattern and Legality of PRP Activities

Data from an August 1993 survey by EPA of all of its remedial project managers (RPMs), the regional employees who oversee site cleanup efforts, show that 72 percent of nonfederal sites listed on the NPL received no wastes since 1986. The RPMs also reported that 14 percent of the sites include post-1986 wastes and that they were uncertain about the remaining 14 percent. In addition, the survey asked

about the presence of post-1979 (rather than post-1980) wastes. The RPMs reported that 43 percent of nonfederal sites do not include post-1979 wastes, 48 percent do, and 9 percent may or may not.[4]

The survey did not explore the time distribution of wastes at the sites whose dates of operation straddle either of the cutoff dates. EPA is collecting that information from its regional offices; at present, however, the agency has only analyzed data from 15 such sites. In this limited sample of data, 59 percent of the waste volume dates from 1981 or later and just 1 percent from 1987 or later.

Even if those data are reasonably accurate for existing NPL sites, one might wonder about their applicability to future sites. CBO believes that sites added to the NPL in the rest of the decade will be similar to current sites in the time profile of their wastes and therefore would be similarly affected by the liability cutoff dates. All or nearly all of those sites will be drawn from the set of contamination problems already being investigated by EPA, most of which were created some years ago. Beyond this decade, compliance with regulations of the Resource Conservation and Recovery Act and increased vigilance prompted by CERCLA are likely to keep the number of newly created Superfund sites relatively small, although such sites may increase as a percentage of new NPL additions.

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4.     In calculating percentages from the survey data, CBO excluded not only the federally owned sites but also 84 so-called orphan sites. Those sites have no PRPs that are financially viable and therefore must rely on the trust fund to pay for cleanup.

Less information is available on the contribution of illegal activities to Superfund contamination problems. The existing data shed light on the percentage of sites where illegal activities are a factor but not on the average share of the illegal contributions at those sites. Moreover, the available site-level estimates vary widely-- from 10 percent to 35 percent or even 53 percent--perhaps in part because of differences in definitions.

The lower estimate of 10 percent comes from researchers at Resources for the Future, who reviewed the descriptions of nonfederal NPL sites in EPA's "state books" and found that illegal activity "was the cause of contamination" at 10 percent of the sites.[5] The 35 percent and 53 percent figures come from EPA's 1993 survey, which asked RPMs, "In your opinion, were site activities that caused the contamination illegal at the time?" The RPMs responded "definitely yes" for 16 percent of the nonfederal sites and "probably yes" for 19 percent, making a total of 35 percent. The RPMs were "uncertain" about another 18 percent of the sites, and further investigation might show that many of those sites also involved illegal activity.

The explanation for the wide range of the estimates may be that 10 percent is a better estimate of the fraction of sites for which illegal activity was the sole or dominant cause of contamination, whereas 35 percent to 53 percent is a better range

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5.  Katherine N. Probst and Paul R. Portney, *Assigning Liability for Superfund Cleanups: An Analysis of Policy Options* (Washington, D.C.: Resources for the Future, 1992), p. 53. The estimate of 7 percent used in a more recent study by Probst, Portney, and two coauthors differs because it excludes sites with only a single PRP (personal communication, Katherine N. Probst, April 11, 1995).

for the fraction of sites with illegal contributions to the contamination problem. That hypothesis cannot be confirmed at present.


## Implications of the Data for PRP Liabilities


Given the uncertainty surrounding how much Superfund contamination arises from illegal activity, CBO analyzed scenarios in which such activity is a factor at 10 percent and 35 percent of nonfederal NPL sites, although the actual percentage could lie above or below that range. Exempting legal activities through 1986 would reduce PRP cleanup liabilities by an estimated 95 percent if illegal contributions occurred at 10 percent of the sites. Using CBO's estimate for current PRP cleanup spending of roughly $1.7 billion per year, that 95 percent reduction translates to a dollar figure of about $1.6 billion annually (see Table 1). With the same cutoff date but illegal activity at 35 percent of sites, the estimated reduction in cleanup liability is 80 percent to 90 percent, or $1.4 billion to $1.5 billion. A 1981 liability cutoff yields estimated reductions of 70 percent ($1.2 billion) if illegal actions are a factor at 10 percent of sites, and 60 percent to 70 percent ($1.0 billion to $1.2 billion) if they occur at 35 percent of sites.

# TABLE 1. ESTIMATED ANNUAL EFFECTS OF LIABILITY CUTOFFS

| | 1987 Cutoff | | | | 1981 Cutoff | | | |
| | Illegal Activities at 10 Percent of Sites | | Illegal Activities at 35 Percent of Sites | | Illegal Activities at 10 Percent of Sites | | Illegal Activities at 35 Percent of Sites | |
| | In Percent | In Millions of Dollars | In Percent | In Millions of Dollars | In Percent | In Millions of Dollars | In Percent | In Millions of Dollars |
|---|---|---|---|---|---|---|---|---|
| Reduction in PRP Liability[a] | 95 | 1,600 | 80 to 90 | 1,400 to 1,500 | 70 | 1,200 | 60 to 70 | 1,000 to 1,200 |
| Reduction in Federal Enforcement Costs | 90 | 250 | 45 to 55 | 125 to 150 | 25 to 35 | 70 to 100 | 10 to 25 | 30 to 70 |
| Reduction in Private Transaction Costs | 90 | 800 | 60 to 70 | 550 to 625 | 45 to 55 | 400 to 500 | 20 to 40 | 200 to 350 |
| Funding Gap[b] | n.a. | 1,600 | n.a. | 1,450 to 1,600 | n.a. | 1,300 | n.a. | 1,100 to 1,300 |

SOURCE: Congressional Budget Office.

NOTES: PRP = potentially responsible party; n.a. = not applicable.

Dollar estimates for reductions in PRP liability, federal enforcement costs, and private transaction costs are rounded, based on the estimated percentage reductions.

a. Assumes that PRP cleanups cost 13 percent less than those done by the Environmental Protection Agency and that EPA's records of decision underestimate actual cleanup requirements by an average of one-third.

b. Net of savings in federal enforcement costs.

Those figures derive in part from CBO estimates that roughly 95 percent of all waste volume at nonfederal NPL sites predates 1987 and 70 percent predates 1981. The 1987 estimate is based on the 72 percent of sites that entirely stopped their waste operations before 1987 (as shown in the RPM data) and an assumed 80 percent share of pre-1987 wastes at sites that straddle the cutoff (less than the 99 percent seen in EPA's limited sample of 15 sites). The 70 percent figure for 1981 is based on linear extrapolation between the RPM survey data for 1980 and 1987, which suggests that 48 percent of sites have only pre-1981 wastes, and on a 41 percent share of such wastes at the other 52 percent of sites, as observed in the 15 straddle sites analyzed by EPA.

The percentage of waste disposal before a cutoff date is not the end of the story, however, under proposals that retain liability for actions that were illegal at the time they occurred; hence the need for assumptions about the prevalence of illegal contributions at Superfund sites. In keeping with the general thrust of the reform proposals to reduce transaction costs and private-sector burdens perceived as unfair, the analysis assumes that PRPs held responsible for illegal actions would be subject to some kind of proportional liability based on their contributions to the contamination problems at their sites rather than to joint-and-several liability.[6]

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6. A proportional liability scheme that maintains the current classes of PRPs faces the question of the relative responsibility of site owners and operators compared with off-site waste generators and transporters. Specific legislative guidance on the allocation of responsibility between on- and off-site parties would help keep transaction costs down but might lead to unfair results in particular cases.

In the case of a 1987 cutoff and relatively few sites with illegal activity, CBO assumes that EPA would choose to dismantle most of Superfund's enforcement program, leaving enough resources to identify and pursue only the most egregious illegal pre-cutoff polluters and any sufficiently major post-cutoff PRPs. Under that scenario, PRP liabilities would fall by essentially the same proportion as the percentage of wastes released before 1987--namely, 95 percent.

Because the other cases would leave many more parties subject to Superfund liability, CBO assumes that EPA would have to maintain a sizable enforcement program and would regularly attempt to enforce the liability of PRPs whose pre-cutoff activities were illegal. The impact of such enforcement efforts on PRP liabilities would depend on the average shares of the illegal waste contributions and on EPA's success rate in tracking down the illegal polluters and getting money or work commitments from them.

Lacking hard data on those factors, CBO used a range of reasonably low and high estimates. For the case with illegal activity at 10 percent of the sites, the analysis assumed a range of 60 percent to 80 percent as the illegal share on the theory that those sites represent the "hard core" in which illegal activity was the sole or dominant cause of contamination. For the cases in which illegal activity took place at 35 percent of sites, the assumed range for the average illegal share was 30 percent to 70 percent. In all cases, the success rate of EPA's enforcement efforts was assumed to

lie between 25 percent and 75 percent. Combining those assumptions, plus data indicating that sites with illegal activity cost an average of 5 percent less to clean up, yielded the estimated reductions in PRP liability (see Table 1).

## Effects on Transaction Costs

In the most favorable scenario--a 1987 cutoff and relatively little illegal activity--CBO estimates that federal enforcement costs would drop by 90 percent. Alternatively, given a 1981 cutoff and illegal activity at 35 percent of the sites, the estimated reduction in enforcement costs is only 10 percent to 25 percent. Those savings are less than proportional to the reductions in PRP liabilities in all cases and substantially less in three of the four. The range of savings in private transaction costs runs from 90 percent at the high end to 20 percent to 40 percent at the low end. Those costs also fall less sharply than cleanup liabilities, although more than federal enforcement costs. All of those estimates represent judgments by CBO based on qualitative considerations. The precise numerical figures are necessarily somewhat speculative. Higher levels of illegal activity at NPL sites than those assumed here could cause federal and private transaction costs to rise rather than fall.

The estimates of savings on enforcement assume that federal costs fall as sites are removed entirely from the liability system but that the costs do not decline with reductions in the number of PRPs at the remaining sites, where EPA continues to enforce liability for cleanup. CBO also assumes that a significant enforcement program incurs some fixed costs annually, such as the costs of ensuring that all site sampling data are of litigation quality in case they are subsequently needed for enforcement purposes. Hence, for example, with an estimated 70 percent of waste volume dating before 1981 but just 48 percent of sites having only pre-1981 wastes, CBO expects that enforcement savings from a 1981 cutoff would not exceed 40 percent, even without questions about the legality of disposal activities. Finally, the estimates assume that illegality of PRP actions would be costly for the government to identify--partly because of the variation in state and local laws--and prove to the satisfaction of PRPs or the courts.

Private transaction costs are likely to be more closely tied than federal enforcement costs to the numbers of PRPs involved in the liability system. Exempting certain parties from liability implies not only that those parties save on disputes with their insurers, EPA, and other PRPs but also that the remaining parties have fewer sparring partners in their PRP negotiations. Nevertheless, CBO expects that the savings would be less than proportional because costs that PRPs share for negotiating with EPA as a group would remain (albeit shared among fewer parties). With a 1981 cutoff, another reason for less-than-proportional savings would be that some PRP-

insurer disputes covering multiple sites would continue. By contrast, a 1987 cutoff would eliminate essentially all Superfund transaction costs related to insurance coverage, thanks to changes in policy language in the mid-1980s.

## The Gap in Cleanup Funding

The reductions in PRP liabilities discussed above represent a shift in cleanup responsibility to the federal Superfund. EPA would have to replace dollars not spent by the PRPs with some combination of cost savings and increased public spending if it was to maintain the current pace of site cleanups. Taking into account the 13 percent advantage in efficiency assumed for the PRPs and the above savings in federal enforcement costs, CBO estimates that the remaining funding gap in the four scenarios would be as low as $1.1 billion to $1.35 billion (in the case with a 1981 cutoff and illegal activity at 35 percent of sites) or as high as $1.6 billion (with the 1987 cutoff and illegal activity at 10 percent of sites).

Some analysts have noted that the unobligated balance in the Superfund trust fund has grown in recent years and suggested that spending on the program could be increased without raising the Superfund taxes. The balance has indeed grown--from $0.9 billion at the beginning of fiscal year 1993 (after subtracting $734 million from a repayable advance owed back to the general fund) to $2 billion at the start of 1995.

Under the current budget rules, however, the constraint on spending for discretionary programs such as Superfund is not the availability of tax revenues, dedicated or general, but the annual budget caps. The Congress can choose to spend more on Superfund, but it will have less to spend on other discretionary programs if it does so.

Cost-saving changes in Superfund's cleanup methods, support activities, and administration could significantly contribute to closing the funding gap, without running afoul of the budget caps. Of course, the value of particular items in the Superfund budget and the merits of changing the liability system are separate questions. Programmatic and budgetary changes that the Congress deems worthwhile could be enacted under the present liability system, with the savings used instead to speed the pace of cleanup, increase federal spending on other programs, or reduce the deficit.[7] In some ways, establishing a 1981 or 1987 liability cutoff might make cost-cutting more difficult: some categories of support activities might require increased funding to accommodate the estimated three- or four-fold increase in the number of fund-lead cleanups.

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7. In principle, such savings could also be used to buy down the Superfund taxes. Under current budgeting rules, however, the savings would be counted under the discretionary spending caps and would not directly provide the necessary offset on the pay-as-you-go scorecard for a reduction in taxes.

The federal costs of establishing a cutoff date for Superfund liability would also depend on the choice of a policy on reimbursement for past or ongoing cleanup costs spent by PRPs under EPA supervision. Full reimbursement could conceivably cost an additional $13.5 billion with a 1987 cutoff, relative to no reimbursement, or $9.9 billion with a 1981 cutoff. Actual costs, however, would depend on the level of documentation that PRPs must submit with their reimbursement claims. More restrictive reimbursement policies would lower the costs to the federal government but raise issues of fairness and future incentives.

CBO estimated the potential costs of full reimbursement as follows. The dollar value of all PRP cleanup commitments through fiscal year 1994 is an estimated $13.3 billion, which equals the official EPA figure of $10.2 billion, scaled up by 50 percent (the average error in the ROD estimates of cleanup costs) and down by 13 percent (the assumed private-sector cost advantage).[8] Another $900 million in cost-recovery payments from PRPs to EPA brings the total to $14.2 billion. Applying the above estimates of pre-1987 and pre-1981 liability shares (95 percent and 70 percent) yields $13.5 billion and $9.9 billion, respectively.

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8.    EPA's estimate of $10.2 billion is in nominal dollars, unadjusted for inflation. For simplicity, CBO assumes that the reimbursement scheme would exclude compensation for inflation or interest.

How much of those eligible costs would actually be reimbursed would depend on the ability of PRPs to document their expenditures. The documentation problem could be compounded if the burden of proof was on PRPs to show that the original actions that made them liable for cleanup costs were legal at the time. Of course, the trade-off involved in setting documentation requirements is that more stringent requirements prevent some legitimate PRPs from getting reimbursed and lead to higher administrative costs for both PRPs and the government, whereas more lenient requirements may lead to payment of fraudulent claims.

As an alternative to full reimbursement or no reimbursement, the Congress could choose to authorize payment only for new expenses incurred under existing PRP work commitments. Such a "forward-reimbursement" policy would avoid the issue of documenting past expenditures and would reduce federal costs. Estimates of the PRP spending yet to occur on existing cleanup projects can be calculated using spendout rates, which describe the pattern of expenditures over time. A recent study by Resources for the Future and the Brookings Institution used a pattern in which PRPs spend 2.5 percent of total costs in each of the first two fiscal years following a cleanup commitment and 23.75 percent in each of the next four years.[9] Applying those spendout rates, CBO estimates that potential federal costs under forward reimbursement would be $7.4 billion with a 1987 cutoff and $5.2 billion with a 1981

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9.  Katherine N. Probst and others, *Footing the Bill for Superfund Cleanups: Who Pays and How?* (Washington, D.C.: Brookings Institution and Resources for the Future, 1995), p. 137. This spendout pattern is somewhat slower than one previously used by CBO but is more in keeping with reports from industry sources.

cutoff. For either cutoff date, the costs are slightly more than half of those possible under a policy of full reimbursement.

Note that the costs of the forward-reimbursement policy represent the cumulative value of a grace period that EPA gets under the no-reimbursement policy. With no reimbursement, the annual funding gap discussed previously builds up over a transition period of several years, as PRPs continue to pay for cleanup under existing commitments. Forward reimbursement eliminates the transition period, since EPA starts assuming the costs for ongoing PRP cleanups right away.

Although full reimbursement is the most costly option for the federal government and may be difficult to administer, policies that limit reimbursement-- whether formally or through stringent documentation requirements--have potential drawbacks of their own. Without full reimbursement, some PRPs may feel that they have been unfairly treated compared with others whose sites were discovered later or who chose to "lie in the weeds" rather than cooperate with EPA. Quite apart from the views of current PRPs, the possibility also exists that individuals or firms subject to controversial future regulations will be more reluctant to comply, if only out of fears that competitors who delay compliance will gain an advantage by waiting out a change in policy.

## CONCLUSION

In summary, repealing Superfund liability for actions before a certain date involves a trade-off between the potential reductions in transaction costs and gains in fairness on the one hand and the difficulty of replacing the current PRP cleanup spending on the other hand. Two factors that would affect the size of the various effects and hence the desirability of the trade-off are the difference between EPA's estimates of cleanup costs and actual costs to the PRPs and the significance of illegal actions by Superfund PRPs. The second factor is subject to great uncertainty at present.

The size of the effects would also be sensitive to Congressional policy choices regarding the cutoff date and reimbursement. The later the cutoff date, the greater are both the savings in transaction costs and the gap in cleanup funding. The more generous the reimbursement policy, arguably the more fair the results but the higher the costs to the federal government.

# APPENDIX: ESTIMATES OF PRIVATE TRANSACTION COSTS IN THE SUPERFUND PROGRAM

Superfund's transaction costs have been controversial for years and have received increasing attention from researchers and policy analysts. Two studies from RAND and a recent study from the General Accounting Office (GAO) provide valuable information on transaction costs in the private sector. Nonetheless, the available data are far from comprehensive, and the resulting analyses must be interpreted with caution. Three particular factors that can lead to misinterpretations are confusion between simple averages or medians and true dollar-weighted averages; the limitations of existing data in terms of comprehensiveness and accuracy; and the likelihood that transaction costs are front-loaded in the cleanup process.

## Main Findings of the Leading Studies

The first RAND study (henceforth, "RAND I"), of which I was a coauthor, examined the Superfund experience through 1989 of five large industrial firms and four national insurers. The data showed transaction-cost shares of 17 percent for the industrial PRPs (excluding the costs at sites where a firm had spent less than $100,000 to date) and 88 percent for the insurers.[10]

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10. Jan Paul Acton and Lloyd S. Dixon, *Superfund and Transaction Costs* (Santa Monica, Calif.: RAND, 1992). The five PRP firms had spent $100,000 or more at 73 different sites, of which 49 were on Superfund's National Priorities List and 24 were non-NPL sites being cleaned up under Superfund's removal authorities, state cleanup programs, or voluntarily. The average

The second RAND study, or "RAND II," surveyed 108 small and medium-sized firms named as PRPs at 18 Superfund sites. It estimated that transaction costs represented 32 percent of spending by all PRPs (surveyed and non-surveyed) at those sites through 1991.[11]

The GAO study, with data on the Superfund experiences of 367 large-firm PRPs, has the broadest coverage of the three. It concluded that the median (not average) firm spent approximately one-third of total costs on legal expenses.[12]

Interpretation Problem #1: Simple Averages and Medians

A simple firm-by-firm or site-by-site average of Superfund transaction costs can be much larger than a dollar-weighted average--the correct measure for describing the distribution of total spending--because firms with minor liabilities and those involved at sites in the early stages of the cleanup process may have low total costs but proportionately high transaction costs. The RAND II data, for instance, show that looking separately at each of the 112 surveyed PRP-site pairs yields an average

transaction-cost share for the NPL sites alone was 19 percent; the share for all sites, including those at which a firm had spent less than $100,000, was 21 percent.

11.  Lloyd S. Dixon, Deborah S. Drezner, and James K. Hammitt, *Private-Sector Cleanup Expenditures and Transaction Costs at 18 Superfund Sites* (Santa Monica, Calif.: RAND, 1993).

12.  General Accounting Office, *Superfund: Legal Expenses for Cleanup-Related Activities of Major U.S. Corporations* (December 1994).

transaction-cost share of 62 percent, although the dollar-weighted average--the share of such costs in total spending--is only 21 percent.[13]

A report from the National Paint and Coatings Association (NPCA) falls prey to the confusion between simple and dollar-weighted averages. The report on the NPCA members' experiences with transaction costs says, "Overall, the respondents estimated that 71 percent *of their money spent* on Superfund so far has gone to transaction costs" (emphasis added), but the figure is in fact a simple average of the percentages reported by the responding firms. The only dollar-weighted average derivable from the data is restricted to settled claims; that figure is 35 percent.[14]

The GAO study illustrates similar problems arising from the use of medians rather than averages. The median cost for legal expenses among responding firms in the study was roughly $500,000--meaning that half of the firms spent less than $500,000 and half spent more--and the median amount that firms spent on cleanup was approximately $1.2 million. Sums or ratios of those figures are not meaningful, however, partly because they do not reflect how much more or less than the medians that firms on either side spent. For example, the median responses to the questions on legal and cleanup costs sum to $1.67 million, 12 percent less than the $1.9 million

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13.   Dixon, Drezner, and Hammitt, *Private-Sector Cleanup Expenditures*, p. 29.

14.   National Paint and Coatings Association, *NPCA Superfund Survey* (Washington, D.C.: NPCA, 1992). Because of a transcription error, the figure for settled claims is given as 38 percent in the report.

median response to the question about total spending (legal and cleanup costs together).[15]

Two results of the study led GAO to estimate that legal costs for the median responding firm were about one-third of total Superfund spending, but neither is fully adequate as a substitute for a dollar-weighted average. One result was that median legal and cleanup costs were roughly $500,000 and $1 million, respectively. More precise figures of $484,000 and $1.19 million yield a total of $1.67 million and a legal-cost share of 29 percent (alternatively, using the $1.9 million median for total costs yields a share of 25 percent). Again, however, the more important problem with this finding is that sums and ratios of medians are not themselves medians and lack any meaningful statistical properties. The other evidence came from a direct question on the share of legal expenses in total costs; the median response (estimated using linear interpolation) was 34 percent. That result does not take into account the dollar amounts spent by each respondent and is therefore more like a firm-weighted average than a dollar-weighted average.

The true dollar-weighted average share of legal costs in the GAO data can be approximated by assuming that costs are evenly distributed within each survey interval and choosing an average cost for the "over $100 million" range. If the average $100

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15.  These calculations are based on medians derived by linear interpolation within the cost intervals included in the survey; GAO uses the same method (*Superfund: Legal Expenses*, p. 23). Some of the 12 percent difference could conceivably arise from costs seen by respondents as belonging to neither the "legal" or "cleanup" categories, as defined in the survey, although the language of the report suggests that GAO viewed the two categories as encompassing all Superfund costs.

million-plus cost is assumed to be $150 million, then the approximate dollar-weighted share is 25 percent using the data on legal costs and cleanup costs or 28 percent using the data on legal costs and total costs. Alternatively, if the $100 million-plus average is $200 million, then the comparable estimates are 23 percent and 26 percent.


## Interpretation Problem #2: Limitations of the Data


The cost involved in collecting the widespread data on Superfund transaction costs has confronted researchers with a trade-off between comprehensiveness and accuracy. Whereas the GAO study has the most comprehensive data of the three leading studies, its offsetting disadvantage is that respondents reported their legal, cleanup, and total costs only in interval ranges and used "personal knowledge and experience," rather than actual figures from company accounting systems, as the primary source for 32 percent to 36 percent of the responses. Conversely, the RAND studies were conducted on a smaller scale, which allowed more detailed investigation of records but sacrificed breadth of coverage. The uncertain relevance of the RAND I study's data on large firms for smaller PRPs was a key motivation for the RAND II study. As noted above, RAND II surveyed more firms--108--but restricted its attention to just 18 sites.

CBO believes that the heavy overrepresentation of sites with more than 50 PRPs in the RAND II study (9 of the 18 sites in the sample, compared with the expected 2.6) adds a significant upward bias to its estimated shares of transaction costs. That the 108 sampled firms represent only 3 percent of the PRP-site pairs involved at the 18 sites further complicates the interpretation of the study's findings. The estimate of 32 percent as the share of transaction costs for all PRPs at the sites (compared with the observed share of 21 percent for the sampled firms) resulted from the use of statistical bootstrapping techniques. Those techniques cannot fully substitute for direct data on the nonsurveyed firms, however, and hence the 32 percent estimate is only the mean of a distribution of possible values of the true share of transaction costs. By calculating the "90 percent confidence interval," the RAND II authors concluded that the true share has a 90 percent probability of being between 20 percent and 44 percent.

Interpretation Problem #3: Front-Loading of Transaction Costs

Many transaction costs occur before the major cleanup work begins; in other words, transaction costs are more front-loaded than cleanup costs. Accordingly, estimates of the average share of transaction costs based partly or entirely on observations from sites that have not finished cleanup may overstate the ultimate share.

So far, RAND II is the only study to try to extrapolate from data on midstream costs to costs at completion of cleanup. Its analysis illustrates the front-loading problem. Three alternative sets of assumptions about costs remaining at the 18 sites yielded 27 percent, 25 percent, and 19 percent as the point estimates (with substantial confidence intervals around each) for the ultimate share of transaction costs at those sites, compared with the estimate of 32 percent for spending through 1991. CBO believes that the assumptions underlying the lower two estimates are more plausible and would therefore estimate a percentage in the low 20s for the ultimate share of transaction costs at the 18 sites in the study.