United States General Accounting Office

GAO

Testimony

Before the Subcommittee on Finance and Hazardous Materials, Committee on Commerce, House of Representatives

For Release
on Delivery
Expected at
10:30 a.m. EST
Wednesday
February 4, 1998

SUPERFUND

Times to Complete Site Listing and Cleanup

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GAO/T-RCED-98-74

Mr. Chairman and Members of the Committee:

Thank you for the opportunity to discuss two recent GAO reports on the pace of cleanup in the Superfund program. The first of these is our March 1997 report, which discusses the time taken to evaluate hazardous waste sites for possible placement on the National Priorities List (NPL)—the Superfund program's list of the nation's worst hazardous waste sites—and the time to clean them up after the listing.[1] The second report is our September 1997 report on the status of cleanup for sites listed from 1986 to 1994. The pace of Superfund cleanups has been a long-standing concern of the Congress and the Environmental Protection Agency (EPA).[2] In the 1986 Superfund Amendments and Reauthorization Act (SARA), the Congress set time goals for EPA to (1) evaluate sites for placement, when warranted, on the NPL and (2) begin various cleanup actions. EPA has also established targets for processing Superfund sites for budget and planning purposes. I would like to outline the findings of these reports and briefly respond to EPA's comments on our March report.

In summary,

- Our March 1997 report said that EPA took an average of 9.4 years—calculated from the date of each site's discovery[3]—to evaluate and process the nonfederal sites it added to the NPL in 1996.[4] This evaluation and processing time was generally longer than for prior years. For example, listing took an average of 5.8 years after discovery for the nonfederal sites added to the NPL in 1986 through 1990. SARA requires EPA to evaluate nonfederal sites for listing, when warranted, within 4 years of their discovery. Listing decisions were made within 4 years of discovery for 43 percent of the 8,931 nonfederal sites discovered in 1987 through 1991—the last year for which an analysis could be done at the time of our review. A number of factors contributed to the increased time to list a site, including a backlog of sites awaiting evaluation and a reduction in the annual number of sites being added to the NPL.

[1]Superfund: Times to Complete the Assessment and Cleanup of Hazardous Waste Sites (GAO/RCED-97-20, Mar. 31, 1997).

[2]Superfund: Duration of the Cleanup Process at Hazardous Waste Sites on the National Priorities List (GAO/RCED-97-238R, Sept. 24, 1997).

[3]In this statement, the date of "site discovery" is the date that a site is entered into EPA's Superfund database.

[4]This statement focuses on nonfederal sites, since they make up almost 90 percent of all Superfund sites. However, our March 1997 report presented cleanup times for both federal and nonfederal sites.

- Our March report also said that cleanup times have also lengthened for completed projects. Nonfederal cleanup projects completed in 1986 through 1989 were finished, on average, 3.9 years after the sites were placed on the NPL. By 1996, however, nonfederal cleanup completions averaged 10.6 years. Although SARA did not set deadlines for completing cleanups within a certain number of years, EPA set an expectation for 1993 for its regions to complete a cleanup within 5 years of a site's listing. Ten percent of the cleanup projects at nonfederal sites listed in 1986 through 1990 were finished within 5 years of the site's listing. Much of the time to complete cleanups is attributable to the early planning phases of the cleanup process when the decision is made on the selection of a cleanup remedy. Actual construction work at sites is being done quicker than the selection of cleanup remedies. EPA officials attributed the increased completion times for cleanups to the growing complexity of sites, efforts to reach settlements with parties responsible for site contamination, and resource constraints.

- Our September report said that because a large portion—87 percent—of the sites listed on the NPL in fiscal years 1986 through 1994[5] were still in the Superfund cleanup process as of July 1, 1997, the average cleanup time for this group of listed sites will exceed 8 years, possibly by a substantial margin. EPA has estimated that recently listed sites will be cleaned up within an average of 8 years.

- EPA said that the methodology used in our March 1997 report was biased in favor of showing increasing completion times and that the report is inconsistent with our earlier Superfund reports. It claimed to have recently speeded up the Superfund process. We believe that our March 1997 report fairly portrays trends in the program and is consistent with our earlier reports. In its comments to us, EPA did not adequately support its claim of faster processing times.

Background

In 1980, the Congress passed the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), commonly known as Superfund, to clean up highly contaminated hazardous waste sites. The act gave EPA the authority to clean up the sites and to compel the parties responsible for the contamination to perform or pay for the cleanups. As of September 30, 1997, there were 1,353 sites on the NPL, and another 52

[5]We chose fiscal years 1986 through 1994 for our analysis because the last major legislative changes were made to the program in fiscal year 1986 and because few cleanups would have been completed for the sites listed after 1994.

had been proposed for listing; 159 of the currently listed sites are federal sites. As of the end of fiscal year 1997, EPA had begun constructing cleanup remedies at 477 sites. It has completed constructing cleanup remedies at 504 sites. EPA's goal is to complete the construction of remedies at 650 sites by the end of the year 2000, assuming level funding.

Cleanup actions fall into two broad categories: removal actions and remedial actions. Removal actions are usually short-term actions designed to stabilize or clean up a hazardous site that poses an immediate threat to human health or the environment. Remedial actions are usually longer-term and more costly actions aimed at a permanent remedy. The sites that are referred to EPA for Superfund consideration are screened in a number of evaluations leading to a decision on whether to list the site on the NPL. Once listed, the sites are further studied for risks, and cleanup remedies are chosen, designed, and constructed. (See app. I for a more detailed description of the steps to place a site on the NPL and the time taken to accomplish those steps. See app. II for a similar discussion of the steps to clean up a site.)

The Superfund Amendments and Reauthorization Act of 1986 (SARA) provided that facilities discovered after the act was passed should be evaluated for placement on the NPL within 4 years of the site's discovery if EPA determines on the basis of a site inspection or preliminary assessment that such an evaluation is warranted. In 1992, EPA developed techniques to speed up the evaluation and cleanup of sites. These techniques included the expanded use of removal actions and the merging of certain site evaluations. EPA pilot-tested these techniques in 1992 and declared them operational in 1994. In 1995, EPA initiated its final round of administrative reforms, intended to make the program faster and achieve other improvements. In planning its Superfund activities in 1993, EPA set an expectation that sites would be cleaned up within 5 years from listing. More recently however, EPA has estimated that newly listed sites will be cleaned up within 8 years.

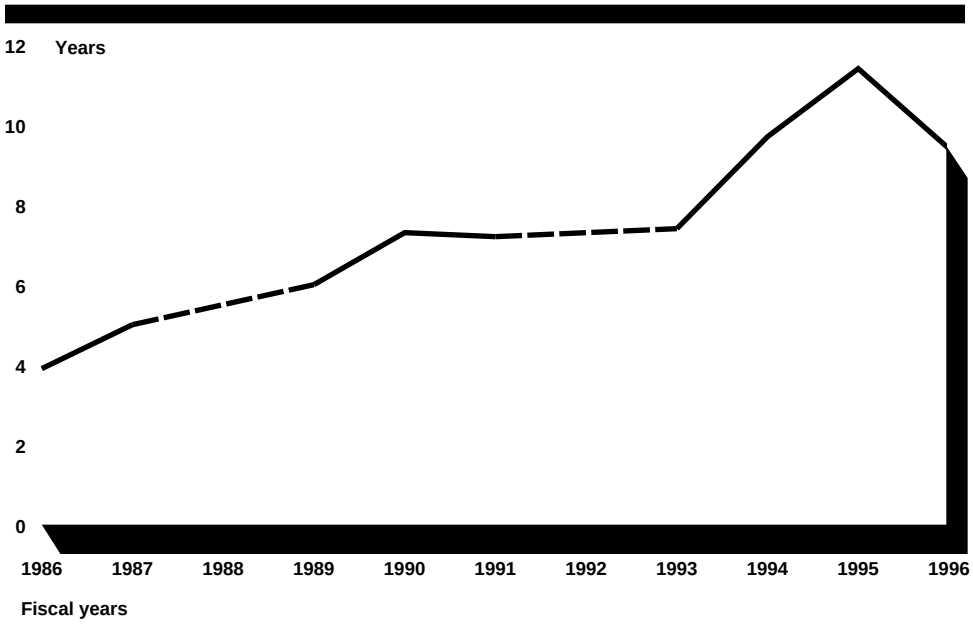
For our reviews, we asked EPA to provide us with data on the length of time taken (1) to evaluate sites for possible placement on the NPL and (2) to complete cleanups of listed sites. The source of the data was EPA's Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS), which is the official repository of Superfund data. To measure the time taken to evaluate sites for listing, we identified sites that were added to the NPL each year and calculated the time between their listing and their "discovery," i.e., their entry into CERCLIS. To measure

the time for the cleanup process following listing, we identified the "operable units"[6] at which remedial actions had been completed each year and calculated the time between the end of the remedial action and the date the site was added to the NPL. We also measured the time it had taken operable units to complete various phases of the Superfund process. For example, we calculated how long it took for cleanup remedies to be selected and designed.

Sites Have Taken Longer to Be Listed on the NPL

Generally, the average time between discovering a site and placing it on the NPL has increased over the life of the Superfund program. (See fig. 1.)

Figure 1: Average Time From Nonfederal Site Discovery to Placement on the NPL



Note: No sites were placed on the NPL in fiscal years 1988 and 1992. Data for fiscal year 1996 exclude three sites that were added to the NPL without undergoing the usual evaluation because they posed imminent public health risks.

[6]EPA may divide a site into two or more "operable units" corresponding to different physical areas at a site or different environmental media (such as soil or groundwater) to be cleaned up. Nonfederal Superfund sites have an average of 1.8 operable units.

As indicated by figure 1, sites listed in fiscal year 1996 had been discovered an average of 9.4 years earlier, down from 11.4 years in fiscal year 1995. The average site listing time has not met SARA's 4-year goal since 1986.

Although average listing times have generally lengthened, it should be understood that EPA can move quickly to list some sites if circumstances warrant. For example, in 1996, it listed three sites within 9 to 12 months after discovery when the Public Health Service's Agency for Toxic Substances and Disease Registry issued a public health advisory concerning the sites. EPA used an expedited process that bypassed its normal evaluation process to list these sites. In addition, EPA may undertake removal actions at sites to deal with imminent threats before they are listed. However, listing is necessary before the full range of problems presented by many sites can be addressed under Superfund.

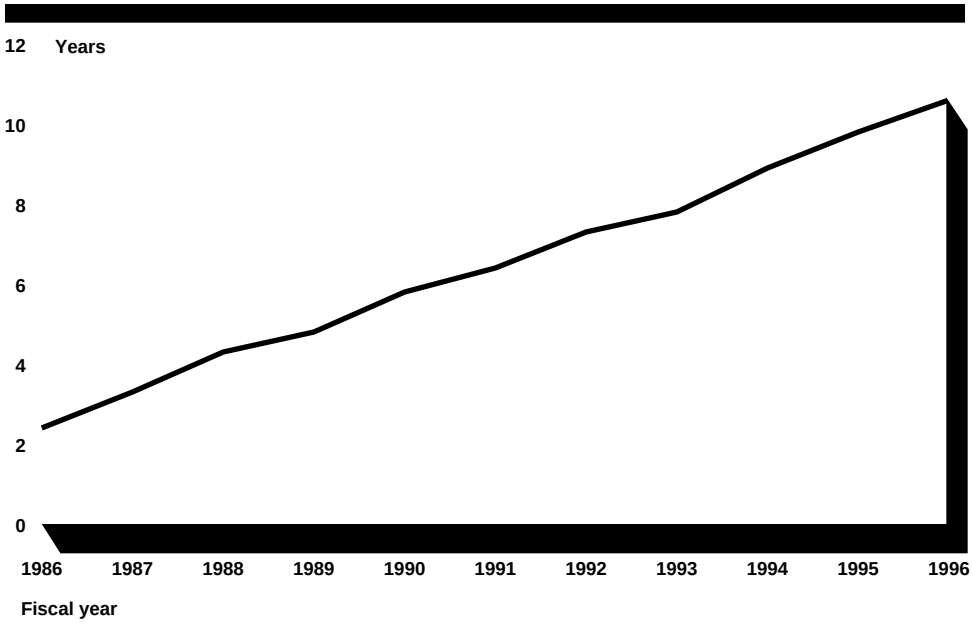
The increase in the time to complete site listing is primarily a result of delays in processing sites in the end stage of the listing process, that is, after the sites have been inspected and the final analysis needed to evaluate their eligibility is done. (See app. I for a description of the Superfund process for evaluating sites for listing.) The time to complete this end stage for sites that were listed on the NPL rose from about 2 years in fiscal year 1986 to about 6 years in fiscal year 1996. A substantial portion of this time is accounted for by periods in which sites were in backlogs awaiting processing.

Cleanup Completion Times Have Lengthened

For sites with completed cleanups, the average time between the sites' placement on the NPL and the completion of the cleanup increased in 1986 to 1996.[7] Figure 2 shows the average time between listing a site on the NPL and the completion of cleanup at the operable units at the site.

[7]Cleanup completion is defined as the end of the remedial action phase, that is, the date when, under EPA's procedures, an official document is signed indicating that the physical construction is complete for all remedial and removal work required at the site. Additional time may be required for the operation of long-term remedies. For example, the pumping and treating of groundwater to remove contaminants can take decades.

Figure 2: Average Time From Placing a Nonfederal Site on the NPL to Completion of Cleanup at Its Operable Units



As the figure shows, completion times for cleanups of operable units have become progressively longer. In 1996, cleanup completions averaged 10.6 years for nonfederal operable units. As mentioned earlier, in 1993 EPA set an expectation for its regions to complete a cleanup within 5 years of a site's listing. More recently, EPA said it expected that the sites listed in fiscal years 1993 through 1996 would be cleaned up in an average of 8 years.

The increase in overall cleanup times was accompanied by a marked increase in the time to select cleanup remedies—the study phase of the cleanup process and the time during which attempts are made to reach settlements with the parties responsible for site contamination. This study phase was completed on average in about 2-1/2 years in 1986 but took an average of about 8 years in 1996. (See app. II for data on times to complete the remedy selection and design phases of the Superfund cleanup process.)

Average Cleanup Times for Sites Listed in Fiscal Years 1986 Through 1994 Will Exceed 8 Years

Our September 1997 report compared EPA's estimate of future cleanup times with the program's historical performance. We calculated, for the sites that began the cleanup process in fiscal years 1986 through 1994, (1) how long it took to clean up completed sites and (2) how long the uncompleted sites have been in the cleanup process. We found that, as of July 1, 1997, remedial action had been completed[8] at 13 percent (95) of the 752 sites placed on the NPL in fiscal years 1986 through 1994. These remedial actions were completed in an average of 6.3 years after the sites were listed. As of the same date, remedial action had not been completed at 87 percent (657) of the sites listed in fiscal years 1986 through 1994. These uncompleted sites had been in the cleanup process an average of 8.1 years, that is, they had been listed on the NPL an average of 8.1 years earlier. Assuming that all remedial actions at these "in process" sites had been completed on July 1, 1997, the average cleanup duration for all sites listed on the NPL during the 9-year period would have been 7.9 years, almost as long as EPA's 8-year estimate of the cleanup time for recently listed sites. But because such a large proportion of the sites are still in process, the average cleanup time for these sites will exceed 8 years, possibly by a substantial margin. EPA can reach its 8-year cleanup estimate for recently listed sites only through much faster cleanup times than have been achieved in the past.

Factors Influencing the Sites' Listing and Cleanup Times

The Superfund database, which was the primary source for the data presented in this statement, does not contain all the information needed to fully explain the reasons for the changes in study and cleanup completion times over the history of the program. However, our past reviews and discussions with EPA officials have identified some of the factors that have lengthened listing and cleanup times.

The time from discovery to listing has increased over the years for a number of reasons. A major factor was that the Superfund program started with a backlog of sites awaiting evaluation.[9] In addition, program changes caused other delays. These changes included revisions to eligibility standards requiring the reevaluation of many sites, the need to seek states' concurrence for site listings, and reductions in the annual number of sites that EPA added to Superfund. Furthermore, between 1994 through 1996, EPA's budget for assessing sites was cut by some 50 percent and, according to EPA officials, EPA's current priority is to finish cleaning up sites that have

[8]At all operable units.

[9]Of the 40,665 sites referred to EPA for Superfund evaluation through 1996, 14,697 had entered the program by 1982.

already been listed. The probability of long time frames for future site listings is indicated by the large number of sites that are awaiting a listing decision (about 3,000) and the small number of sites that have been admitted to the Superfund program in recent years (an average of 16 per year in fiscal years 1992 through 1996).

EPA officials said that the upward trend in cleanup times for completed sites might be linked to the completion of more difficult cleanups. Our work supports this explanation. In September 1994, we reported that EPA's data revealed longer average cleanup times for ongoing projects than for those already completed.[10] In that report, we said that despite EPA's efforts to expedite cleanups, cleanup times might grow longer because of the greater complexity of these ongoing projects. Also, EPA officials said that the effort to find the parties responsible for contaminating sites and reach cleanup settlements with them can increase cleanup times. They also thought that funding had affected the pace of cleanup. For example, they said that because of budget constraints, EPA was not able to fund $200 million to $300 million in cleanup projects in fiscal year 1996. In addition, EPA has shifted funding away from selecting remedies and toward the design and construction phases of the cleanup process. As indicated, remedy selection times have increased greatly over the years.

EPA's Reaction to Our Findings

In responding to a draft of our March 1997 report and in a December letter to GAO, EPA objected to our portrayal of the program's completion times. EPA challenged the fairness of our methodology, said that our report was inconsistent with earlier GAO reports, and said that it had recently accelerated the cleanup process. We have responded to these objections in our final March 1997 report and in a letter to the Administrator of EPA.[11] We would like at this time to reemphasize a few of the points we made in our response to EPA's comments:

- Our methodology accurately and fairly presents information on various trends in the Superfund program. This methodology shows increasing cleanup times for sites completing the Superfund cleanup process, not because it was "programmed" to produce this result, as EPA claimed, but because these times have, in fact, increased.

[10]Superfund: Status, Cost, and Timeliness of Hazardous Waste Site Cleanups (GAO/RCED-94-256, Sept. 21, 1994).

[11]Superfund: Response to EPA's Letter Concerning Recent GAO Reports (GAO/RCED-98-55R, Jan. 28, 1998).

- Our reports and testimony over the last several years that have discussed the slow progress of site cleanups in the Superfund program are entirely consistent with our March 1997 report. For example, in 1994 we reported[12] that EPA's data indicated a trend toward longer cleanup times for projects still under way, even though the agency had initiated several major efforts to expedite the process. In fact, some of these "in process" sites are now reaching the end of cleanup and are reflected in the March 1997 report's data on recent longer cleanup completion times.

- The data we presented in our March 1997 report are most relevant for judging the program's performance for those sites that have completed the entire assessment and cleanup process or the segments of it—such as remedy selection—that we measured. Our work does not foreclose the possibility that process times have recently improved. EPA claims that such improvement has occurred, but in its comments to GAO, the agency has not provided data to adequately support its claim.

Observations

Increasing completion times for listing and cleanup are important because the Superfund program still has to deal with a large number of hazardous waste sites. While EPA has made progress at many NPL sites—completing the construction of remedies at more than 500 sites and starting construction at close to another 500 sites—construction has not yet been completed for most sites currently on the NPL, and thousands of additional sites remain in EPA's inventory of potentially hazardous waste sites. Shortening the time required for future listings and cleanups will require (1) EPA and the states to come to grips with the large number of sites awaiting an NPL decision and (2) EPA to expedite the remedy selection process.

Mr. Chairman, this concludes my prepared statement. I will be happy to respond to your questions or the questions of committee members.

[12]Superfund: Status, Costs, and Timeliness of Hazardous Waste Site Cleanups (GAO/RCED-94-256, Sept. 21, 1994).

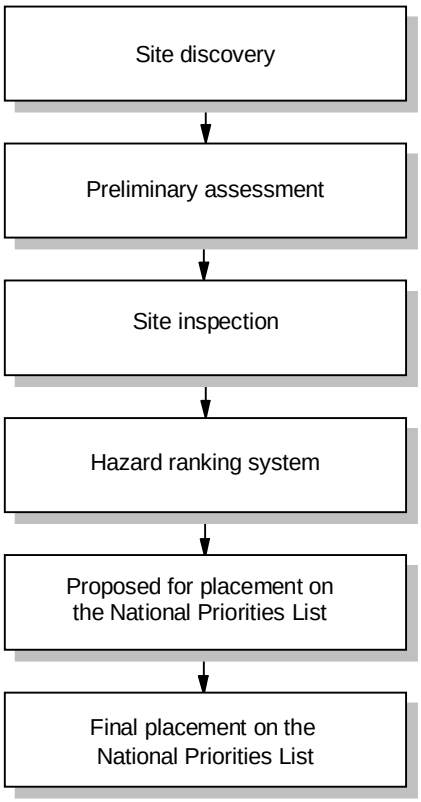
Time Taken to Accomplish the Principal Steps in the Process of Placing Sites on the NPL

We examined the time taken to accomplish the principal steps in the process of placing a site on the National Priorities List (NPL)—the preliminary assessment, the site inspection, and the proposal to list the site as a national priority.

Steps in the Process of Listing a Site

The Environmental Protection Agency's (EPA) regulation implementing the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) outlines a formal process for placing hazardous waste sites on the NPL (see fig. I.1).

Figure I.1: How a Site Gets on the NPL



Source: EPA.

The listing process starts when EPA receives a report of a potentially hazardous waste site. A state government or private citizen most often

reports a nonfederal site. EPA enters a potentially contaminated site into a database known as the Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS). EPA or the state in which the potentially contaminated nonfederal site is located then conducts a preliminary assessment to decide whether the site poses a potential threat to human health and the environment.

If the site presents a serious, imminent threat, EPA may take immediate action—called a removal action—to deal with the acute problems. If the preliminary assessment shows that the site warrants further study, EPA may proceed to the next step of the evaluation process, the site inspection, which takes a more detailed look at possible contamination. If at any point the site is found not to pose a potential threat serious enough to warrant federal attention, the site can be eliminated from further consideration under CERCLA.

If warranted by the results of the site inspection, EPA applies the hazard ranking system to evaluate the site's potential risk to public health and the environment. The hazard ranking system is a numerically based scoring system that uses information from the preliminary assessment and the site inspection to assign each site a score ranging from 0 to 100. This score is used as a screening tool to determine whether a site should be considered for further action under CERCLA. A site with a score of 28.5 or higher is considered for placement on the NPL. EPA first proposes a site for placement on the NPL and then, after receiving public comments, either places it on the NPL or removes it from further consideration. The hazardous waste sites on the NPL represent the highest priorities for cleanup nationwide.

Preliminary Assessments

Figure I.2 shows, for nonfederal sites, the average time taken to complete a preliminary assessment of conditions at a site following its discovery.

Figure I.2: Average Time From Site Discovery to Completion of the Preliminary Assessment at Nonfederal Sites

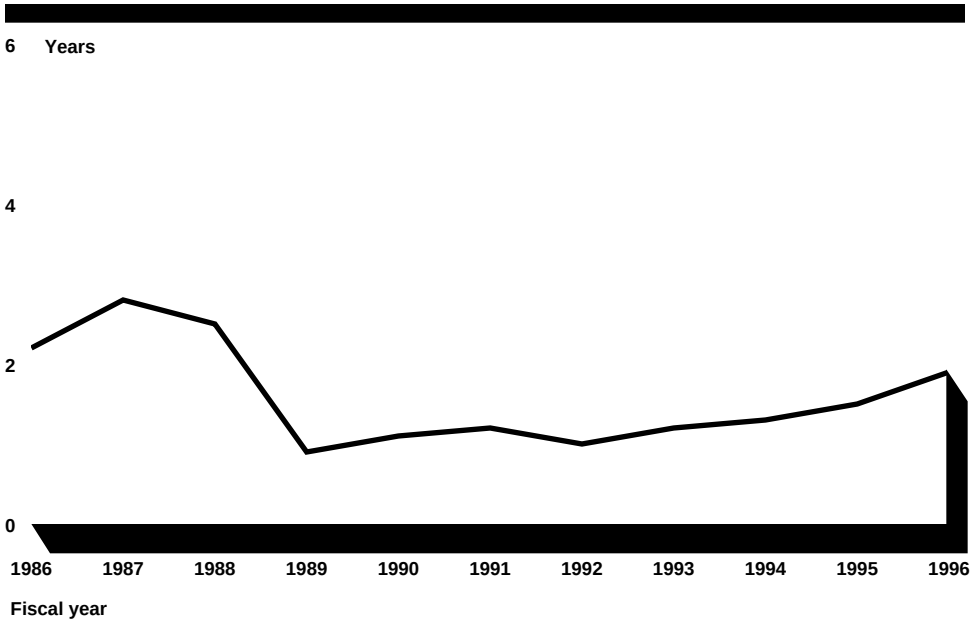


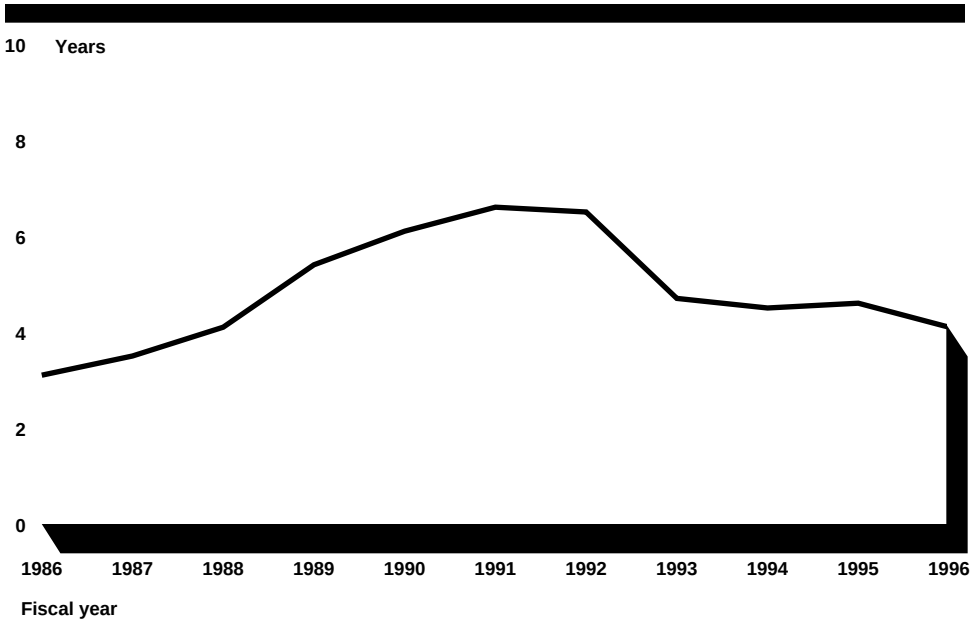
Figure I.2 shows that in 1987 through 1989, EPA sharply reduced the average time between the discovery of a site and the completion of the preliminary assessment at nonfederal sites. EPA officials attributed this decrease to EPA's effort to reduce the time for completing preliminary assessments following the passage of the Superfund Amendments and Reauthorization Act of 1986 (SARA).

After SARA's passage, EPA adopted a policy of completing a preliminary assessment within 1 year of a site's discovery. The preliminary assessment was completed within a year of discovery at about two-thirds of the sites that were discovered after fiscal year 1987 and were preliminarily assessed by the end of fiscal year 1995. The officials said that EPA's efforts to complete assessments within 1 year had reduced the backlog of sites needing assessments and shortened the time required for the assessments. However, since 1989, the time from the discovery of a site to the completion of the preliminary assessment has gradually increased.

Site Inspections

Figure I.3 shows, for nonfederal sites, the average time between discovery of the site and completion of the site inspection.

Figure I.3: Average Time From Site Discovery to Completion of the Site Inspection at Nonfederal Sites

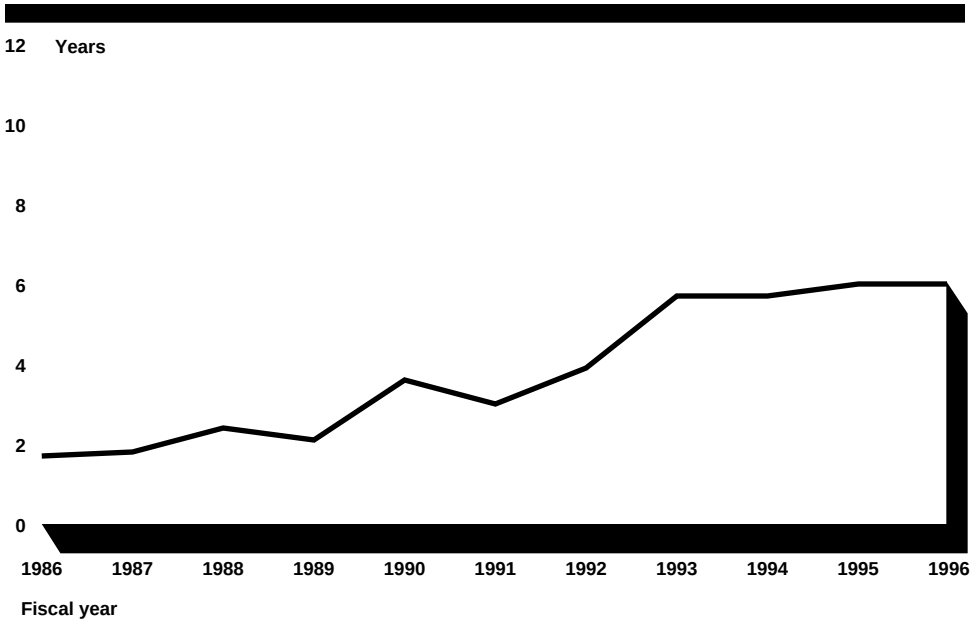


As figure I.3 shows, the average time from the discovery of the site to the completion of the site inspection has declined in recent years. EPA has made progress over the past 5 years in reducing the time from discovery to completion of the site inspection for nonfederal sites. In 1991, EPA took an average of 6.6 years to complete the site inspection, whereas in 1996, it brought this average down to 4.1 years. EPA officials told us that the time for completing site inspections increased until 1991 because EPA concentrated its resources on completing preliminary assessments within 12 months, an effort that created a backlog of site inspections. They said that after reducing the backlog of preliminary assessments, EPA focused on reducing the backlog of site inspections, bringing about the recent improvement in the time for completing site inspections.

Proposing a Site as a National Priority

Figure I.4 shows, for nonfederal sites, the average time between completing the site inspection and proposing to place the site on the NPL.

Figure I.4: Average Time From Completion of Site Inspection to Proposal for Listing at Nonfederal Sites



As figure I.4 shows, the average time required to propose a site for placement on the NPL generally increased for nonfederal sites in 1986 through 1996. For nonfederal sites proposed for listing in 1986, the proposal took 20 months from the completion of the site inspection, compared with 6 years in 1996.

According to EPA officials, the increases in the time required to propose sites for listing are partly attributable to revisions in the hazard ranking system mandated by SARA. SARA directed EPA to obtain additional data so that the system could more accurately assess the relative risk to human health and the environment posed by sites and facilities nominated to the NPL. EPA officials said that the agency decided to limit listings while it was revising the hazard ranking system. EPA announced in April 1987 that it was considering revisions to the system, and in December 1988 it requested comments on proposed revisions. In December 1990, EPA promulgated final revisions to the hazard ranking system.

EPA officials said that the revisions to the hazard ranking system led EPA to seek additional data on 5,275 nonfederal sites in 1992 through 1996. For these sites, EPA developed a temporary intermediate step—referred to as a site inspection prioritization—to gather the additional information needed

on the sites' risks to human health. EPA officials also said that the time taken to assess sites has grown because of the large backlog of sites at the start of the Superfund program, enforcement activities, and the need to seek a state's concurrence for listing a site. In addition, the number of sites placed on the NPL has declined in recent years.

Duration of Evaluation Steps

We attempted to obtain data from CERCLIS showing the duration of some of the major steps in the process of evaluating sites for placement on the NPL: the preliminary assessment, the site inspection, and the site inspection prioritization. However, the starting date for many of these steps is not recorded in the database. For example, the beginning and ending dates are available for only 27 percent (4,693 of 17,469) of the site inspections completed at nonfederal sites through fiscal year 1995.

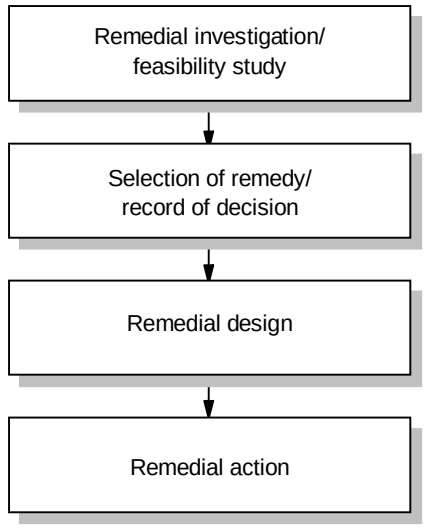
Time Taken to Accomplish the Principal Steps in the Process of Cleaning Up Sites

In addition to measuring the total time taken from the placement of a site on the National Priorities List (NPL) to the completion of its cleanup, we examined the time taken to complete two of the principal intermediate steps: (1) the preparation of the record of decision, which documents the final remedy selected after the completion of the remedial investigation and feasibility study (RI/FS), and (2) the preparation of the remedial design, which includes the technical drawings and specifications for the selected remedy. We also obtained data on the duration of the RI/FS, the remedial design, and the remedial action.

Steps in the Process of Cleaning Up a Site

The Environmental Protection Agency's (EPA) regulation implementing the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) outlines the remedial process for cleaning up sites on the NPL (see fig. II.1).

Figure II.1: How Sites Are Cleaned Up



Source: EPA.

The remedial responses to an NPL site consist of several phases. If a site is divided into discrete cleanup projects, known as operable units, each of the operable units may pass through these phases. First, through the RI/FS, the conditions at a site are studied, problems are identified, and alternative

methods to clean up the site are evaluated. Then, a final remedy is selected, and the decision is documented in a record of decision. Next, during an engineering phase called the remedial design, technical drawings and specifications are developed for the selected remedy. Finally, in the remedial action phase, a cleanup contractor begins constructing the remedy according to the remedial design. Once EPA, in consultation with the state in which the site is located, determines that the work at a site has achieved all of the desired cleanup goals, the site can be removed (deleted) from the NPL.

Selecting a Remedy

Figure II.2 shows, the average time taken from the placement of a nonfederal site on the NPL to the selection of a remedy for cleanup of its operable units.

Figure II.2: Average Time From Placing a Nonfederal Site on the NPL to Selecting a Remedy for the Site's Operable Units

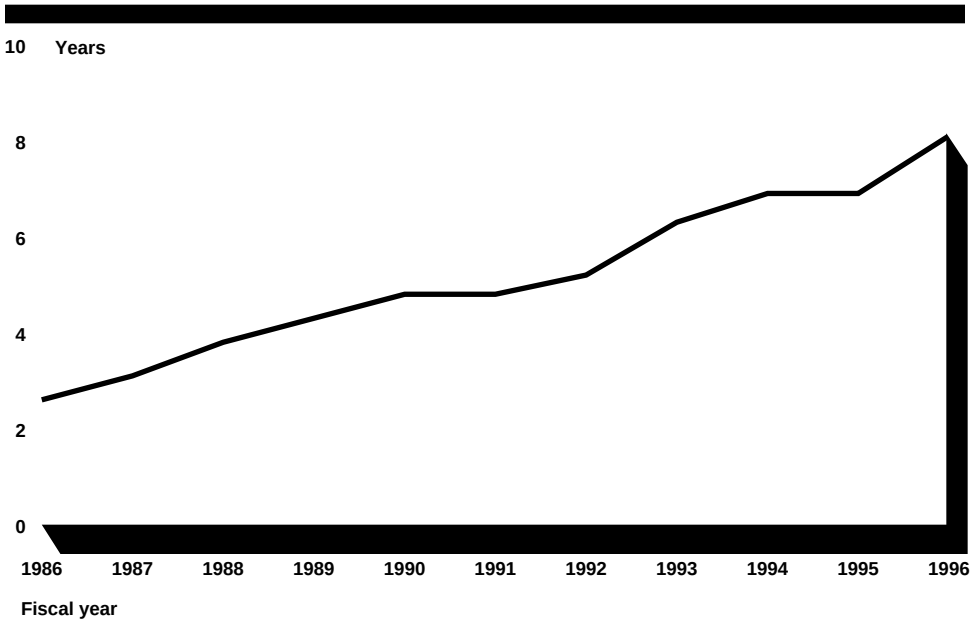


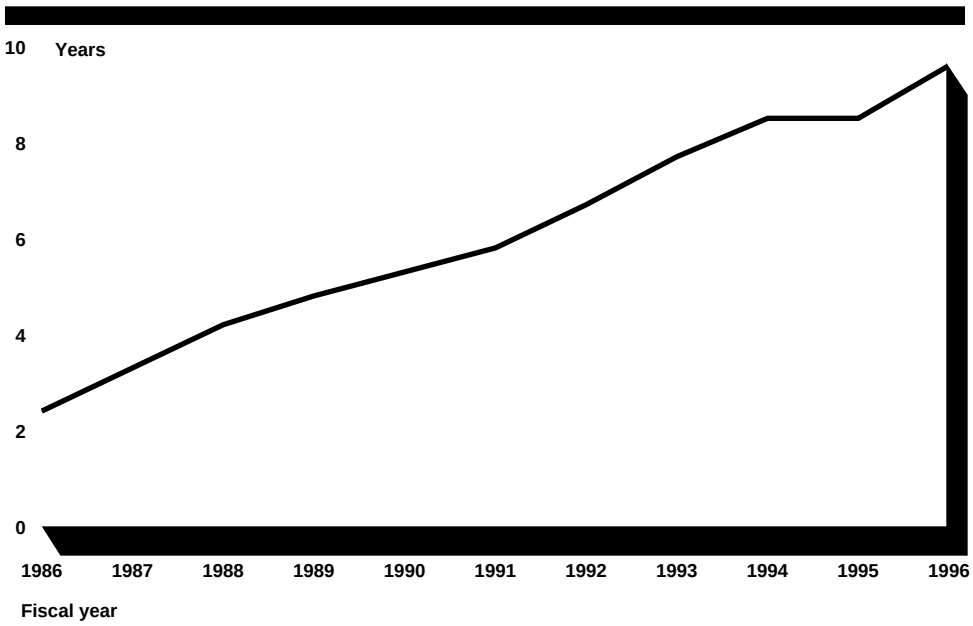
Figure II.2 shows that the average time taken to select a remedy at nonfederal sites has steadily increased over the years. In 1986, selecting a remedy after a site was listed took an average of 2.6 years, compared with an average of 8.1 years in 1996.

The cleanup phase that ends with the selection of a remedy comprises two periods: the time between listing and the start of the RI/FS and the time for the RI/FS. Both of these periods add significantly to the total time taken to complete cleanups. For nonfederal sites at which RI/FSs were begun from 1991 through 1996, an average of 4.5 years had elapsed since the sites were proposed for listing. For the nonfederal sites at which RI/FSs were completed in 1995 (the last year for which complete data were available), the RI/FS took an average of 4.4 years to complete, or about 2 years more than in 1986.

Designing a Remedy

Figure II.3 shows the average time taken to develop the remedial design—the technical drawings and specifications for the selected remedy—for nonfederal operable units. The elapsed time is measured from the date of a nonfederal site's placement on the NPL.

Figure II.3: Average Time From Placing a Nonfederal Site on the NPL to Developing a Remedial Design for the Site's Operable Units



Duration of Cleanup Steps

EPA's records indicate that the actual time taken recently to complete the latter phases of the cleanup process—the remedial design and the remedial action—is less than one-half of the total time taken, from listing, to complete recent remedial actions. Nonfederal remedial designs took 2.3

years to complete in 1996, up from 1.6 years in 1991. Nonfederal remedial actions took about 2 years in 1996, essentially as long as they took in 1991.

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