

GAO

Report to the Chairman, Committee on
Government Reform and Oversight,
House of Representatives

March 1997

SUPERFUND

Times to Complete the Assessment and Cleanup of Hazardous Waste Sites





United States
General Accounting Office
Washington, D.C. 20548

**Resources, Community, and
Economic Development Division**

B-275267

March 31, 1997

The Honorable Dan Burton
Chairman, Committee on Government
Reform and Oversight
House of Representatives

Dear Mr. Chairman:

The pace of Superfund cleanups has been a long-standing concern of the Congress and the Environmental Protection Agency (EPA). In the Superfund Amendments and Reauthorization Act of 1986 (SARA), the Congress set time goals for EPA and federal agencies to (1) evaluate individual nonfederal and federal sites for placement, when warranted, on the National Priorities List (NPL)—Superfund's list of the nation's worst hazardous waste sites—and (2) begin various cleanup actions. In 1992, EPA introduced several initiatives designed to expedite Superfund cleanups.

Given the congressional interest in the pace of Superfund cleanups, you asked us to examine trends in the time taken to (1) evaluate and process hazardous waste sites for possible placement on the NPL and (2) clean up these sites following their listing.

Results in Brief

EPA took an average of 9.4 years—calculated from the date of each site's discovery—to evaluate and process the nonfederal sites it added to the National Priorities List in 1996. While this evaluation and processing time shows some improvement over 1995, when listing took an average of 11.4 years after discovery for nonfederal sites, it is 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 National Priorities List from 1986 to 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 from 1987 through 1991. The average time between discovery and listing for federal sites has also increased over the years, rising from about 6.5 years for sites listed in 1990 to 8.3 years for sites listed in 1995.¹ Much of the increase in the time taken to list both federal and nonfederal sites has occurred in the latter stages of the evaluation process, after sites have been inspected and before final decisions about the need to list them are made. EPA officials attributed the increases to a

¹No federal sites were listed in 1996.

number of factors, including the large numbers of sites initially referred to the agency for evaluation and EPA's emphasis on completing work on already listed sites. Long waits for listing may continue because a large number of sites are potentially eligible for Superfund and a limited number of sites are being added to the program each year.

Cleanup completion times have also lengthened. Nonfederal cleanup projects completed from 1986 through 1989 were finished, on average, 3.9 years after sites were placed on the National Priorities List. By 1996, however, nonfederal cleanup completions were averaging 10.6 years. SARA did not set deadlines for completing cleanups within a certain number of years, but 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 from 1986 through 1990 were finished within 5 years of the site's listing. Federal agencies took, on average, 6.6 years from the date of listing to finish the cleanup projects they completed in fiscal year 1996. Much of the time taken to complete cleanups is spent during the early planning phases of the cleanup process, when cleanup remedies are selected. Less time has been spent on actual construction work at sites than on the selection of remedies. EPA officials attributed the increases in the time taken to complete cleanups to the growing complexity of the cleanup problems at sites, the agency's efforts to reach settlements with parties responsible for the contamination at sites, and resource constraints.

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 contaminated sites or to compel the parties responsible for the contamination to perform or pay for the cleanups. As of November 6, 1996, there were 1,205 sites on the NPL: 1,054 nonfederal and 151 federal.

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 waste site that poses an immediate threat to human health or the environment. Remedial actions are generally longer-term and usually costlier actions aimed at achieving a permanent remedy.

To promote timely cleanups, the Superfund Amendments and Reauthorization Act (SARA) of 1986 set numerical cleanup goals for all NPL sites. SARA provided that, for facilities discovered after the act was passed, a facility shall 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. For certain contaminated federal sites identified as of October 17, 1986 (the date of SARA's enactment), the act required EPA to ensure the performance of a preliminary assessment of each such facility within 18 months (1.5 years) after October 17, 1986. In addition, the act required EPA to ensure the evaluation and placement of such sites on the NPL, if appropriate, within 30 months (2.5 years) after October 17, 1986.

In 1992, EPA implemented the Superfund Accelerated Cleanup Model. This model introduced several initiatives designed to accomplish Superfund cleanups in less time and at less cost. The initiatives included (1) integrated site assessments—efforts to reduce redundancies in data collection, (2) non-time-critical removals—efforts to reduce risks sooner by accelerating some cleanup actions, and (3) presumptive remedies—efforts to reduce the costs and time to study various cleanup alternatives by identifying in advance the most effective cleanup remedy for a given situation.

We reported² last year that EPA's regions were not effectively using one of the initiatives—the authority to use non-time-critical removals to save time and money. We found that although these removals show promise for expediting Superfund cleanups, budgetary and legal issues have constrained their wider use. EPA site managers estimate that using non-time-critical removals instead of the full remedial process can, on average, cut the time for similar cleanup actions by about 2 years and reduce the costs by about half a million dollars. Compared to the full remedial process, the removal process considerably shortens the evaluation (study and design) steps but may conduct similar cleanup actions.

EPA, other federal agencies, and state governments all play roles in the Superfund process. EPA administers the program, evaluates nonfederal sites for placement on the NPL, oversees cleanups performed by the parties responsible for contaminating sites, and performs cleanups itself when these parties cannot be found. Federal agencies are responsible, under EPA's supervision, for evaluating and cleaning up their own properties.

²A Superfund Tool for More Efficient Cleanups (GAO/RCED-96-134R, Apr. 15, 1996).

States may enter into contracts or cooperative agreements with EPA to carry out certain Superfund actions, including site evaluation and cleanup oversight.

For this report, we asked EPA to provide us with data on the length of time taken by EPA, authorized states, and federal agencies to evaluate sites for possible placement on the NPL, to complete cleanups of listed sites, and to accomplish the steps leading to listing and cleanup. The source of this information was EPA's Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS), which is the official repository of Superfund data. For more detailed information on the time taken to complete steps in the evaluation and cleanup phases of the Superfund process, see appendixes I and II, respectively. Appendix III presents the numbers of observations, by year, included in the average time for each processing step (e.g., date of placement on the NPL) depicted in the report's figures.

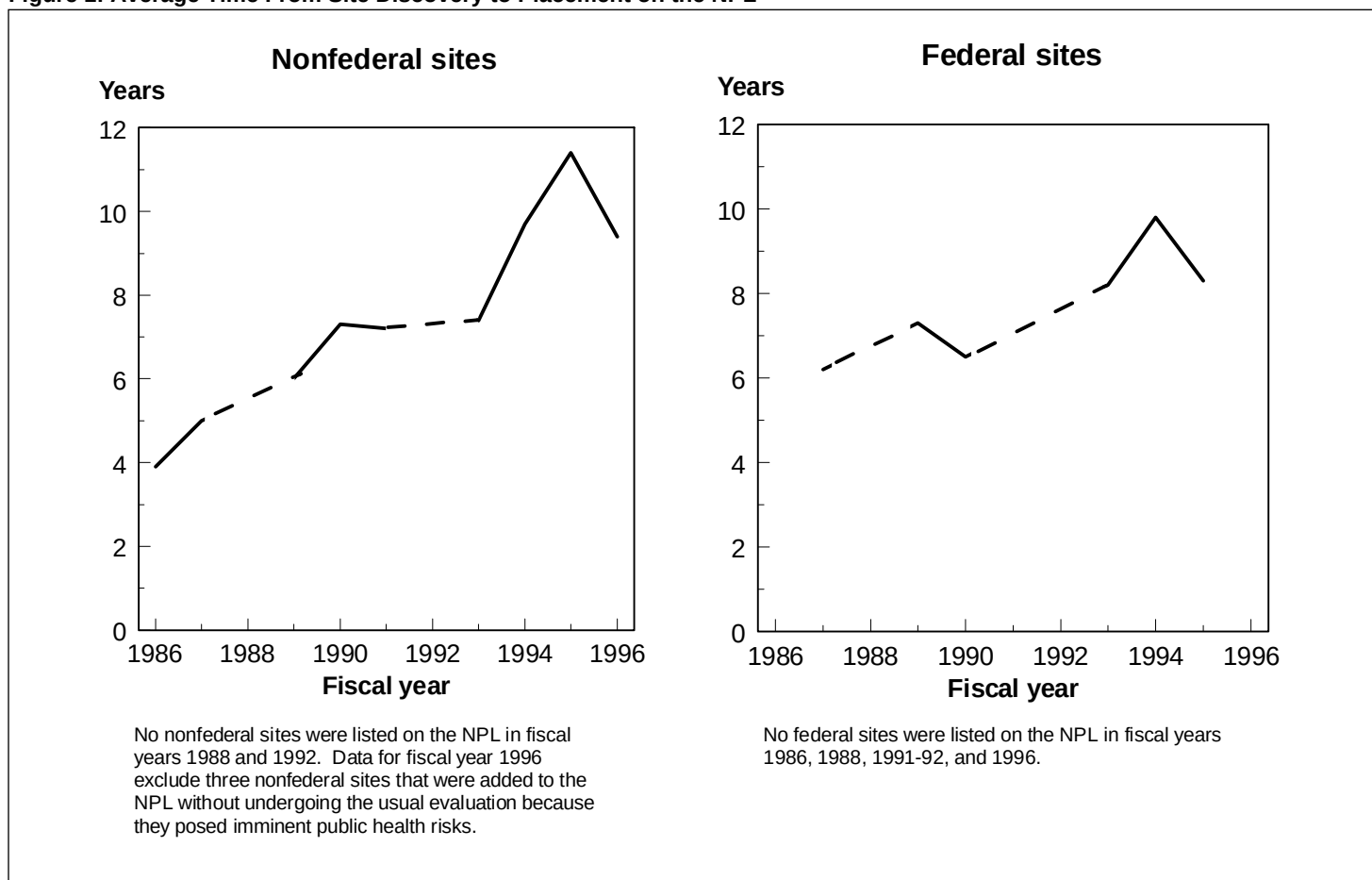
We used a "date of event" analysis (e.g., date of a site's placement on the NPL, date of completing a cleanup) in presenting data on completion times because of its usefulness in showing the productivity and management of Superfund resources over time. (See app. IV.) This analysis considers the actual number of listings, cleanups completed, or intermediate steps completed in a given year regardless of when the sites were discovered or placed on the NPL. Our approach is consistent with a method used by EPA in its management reports to measure the program's accomplishments. This "date of event" analysis contrasts with a "date of submission" analysis, which would track processing times by the year sites were discovered or listed. Both methods are accepted forms of analysis. The date of submission method can be useful for measuring the effects of policy changes. We did not use this method in our analysis because the changes EPA made to accelerate the Superfund process are too recent for their effects to be reflected in the available data.

We also attempted to measure trends in the time taken to complete listings and cleanups, using SARA's goals and EPA's own standards as benchmarks. Because these standards set 4- and 5-year completion goals, our analysis was limited to sites discovered or listed not later than 1991. Because EPA's initiatives to expedite cleanups were introduced after this time, their effect on achieving the standards cannot yet be determined using this approach. We are, however, currently reviewing the implementation and possible effects of these initiatives.

Listing Times Have Increased

The length of time between discovering a site³ and placing it on the NPL has increased significantly over the life of the Superfund program. (See fig. 1.) According to EPA, this increase is due largely to the backlog of sites referred to the agency for evaluation, additional processing requirements, and a reduction in the number of sites added annually to Superfund.

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



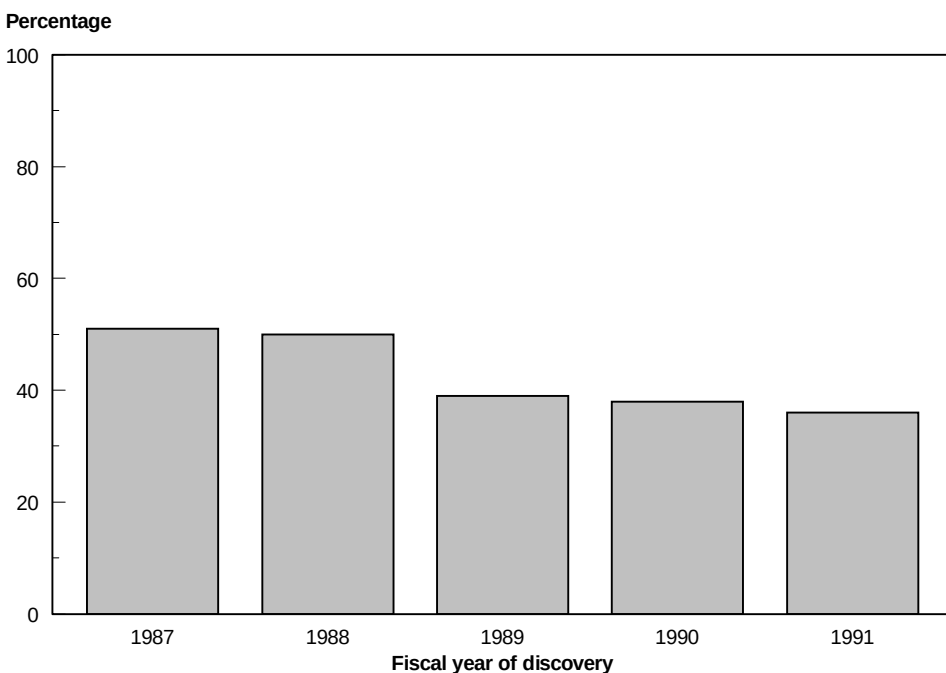
Note: The broken lines indicate the years in which no sites were placed on the NPL.

Figure 1 shows a generally increasing trend in the time taken to place sites on the NPL following their discovery. In 1996, EPA took an average of 9.4

³In this report, the date of "site discovery" is the date that a site is entered into CERCLIS.

years to list nonfederal sites and, in 1995, 8.3 years to list federal sites. SARA's goal was for EPA to evaluate nonfederal sites for listing, when warranted, within 4 years of their discovery. For federal sites, SARA's goal was for EPA to evaluate certain sites identified as of October 17, 1986, within 2.5 years of that date. EPA established a policy goal to complete preliminary assessments and site inspections of federal sites discovered after October 17, 1986, within 1.5 years of their discovery. EPA made decisions⁴ about listing nonfederal sites within 4 years of their discovery for 43 percent of the 8,931 sites discovered from fiscal year 1987 through fiscal year 1991. However, as shown in figure 2, the percentage of sites for which decisions were made within 4 years of discovery decreased in each succeeding year, from 51 percent in fiscal year 1987 to 36 percent in fiscal year 1991.

Figure 2: Percentage of Nonfederal Listing Decisions Made Within 4 Years of Discovery



⁴Listing decisions include decisions to propose sites for inclusion on the NPL and decisions that no further Superfund action is warranted at sites.

According to EPA officials, decisions not to list sites are now being made faster than during the period from 1987 through 1991, when many listing decisions were delayed pending a revision of the standards for evaluating hazardous waste sites. According to EPA, most sites are now excluded from further consideration for Superfund after an early assessment of their conditions.

EPA has made some progress in reducing the time between discovering a site and completing certain steps required to place it on the NPL. Specifically, the average time from discovery to the completion of initial studies at nonfederal sites has declined from its peak in the late 1980s. (See app. I.) In addition, in 1996, the average time taken to list nonfederal sites fell to 9.4 years from 11.4 years in 1995. However, the time between discovery and listing for the seven sites placed on the NPL in the first quarter of fiscal year 1997 moved up again to an average of 11.2 years. These sites were discovered as recently as 1993 and as long ago as 1979.

Although average processing times have lengthened, EPA can move quickly to list some sites if circumstances warrant. For example, in 1996, it listed three sites within about 9 to 12 months of their 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 regardless of whether the sites are listed. However, listing is necessary before the full range of problems presented by many sites can be addressed under Superfund.

EPA officials gave a number of reasons why assessment times have grown. They said that the Superfund program started with a backlog of sites awaiting evaluation.⁵ They also cited changes in the program, such as revised evaluation standards requiring the reevaluation of sites and the need to seek a state's concurrence for listing a site. In addition, the number of sites placed on the NPL in recent years has declined.

The officials also said that the agency's current priority is to finish cleaning up the sites that have already been listed. Accordingly, EPA reallocated its budget between 1994 and 1996, cutting the funds for assessing sites by some 50 percent. The challenge for the future is indicated by the large number of sites that could enter the Superfund

⁵Of the 40,665 sites referred to EPA for Superfund evaluation through 1996, 14,697 had been referred by 1982.

program in the future and the small number that have been placed on the NPL in the recent past. In a 1996 report,⁶ we estimated that between 1,400 and 2,300 sites could be added to the program in the future. In contrast, 16 sites per year were admitted, on average, from 1992 through 1996.

EPA officials said that the listing of new sites is likely to remain constrained and that EPA is emphasizing the use of alternative strategies to clean up sites more quickly or to transfer the responsibility for cleanups to other parties. These alternative strategies include (1) assigning more cleanups to the removal rather than the remedial program, (2) expanding state cleanup programs, and (3) encouraging voluntary cleanups by responsible parties.

Cleanup Completion Times Have Increased

For sites with completed cleanups, the average time between the site's placement on the NPL and the cleanup's completion increased significantly from 1986 to 1996. For nonfederal sites, the time required to complete cleanups increased from 2.4 years in 1986 to 10.6 years in 1996. For federal sites, the time required to complete cleanups increased from about 3.3 years in 1990 to 6.6 years in 1996.⁷ The increase in overall cleanup times was accompanied by a marked increase in the time taken to select cleanup remedies—a period that includes the waiting time between placement on the NPL and the start of remedy selection studies, the performance of the studies themselves, and in some cases, negotiations to reach settlements with the parties responsible for the contamination. For nonfederal sites, this phase was completed in about 2.5 years in 1986 but about 8 years in 1996. In contrast, the average time taken to construct the actual cleanup remedy for the nonfederal sites completing this cleanup phase in 1996 was 2.1 years.

For our analysis, we considered a cleanup to be complete as of the date of EPA's remedial action report indicating that construction has been completed. According to its procedures, EPA approves this report when a cleanup remedy has been put in place at an operable unit and, except where long-term operation is needed, has achieved the required cleanup levels. EPA would consider remedial action complete when a system for pumping and treating contaminated groundwater has been installed, even though the system may have to operate for years before the contamination is reduced to acceptable levels. Our analysis of cleanup times considers

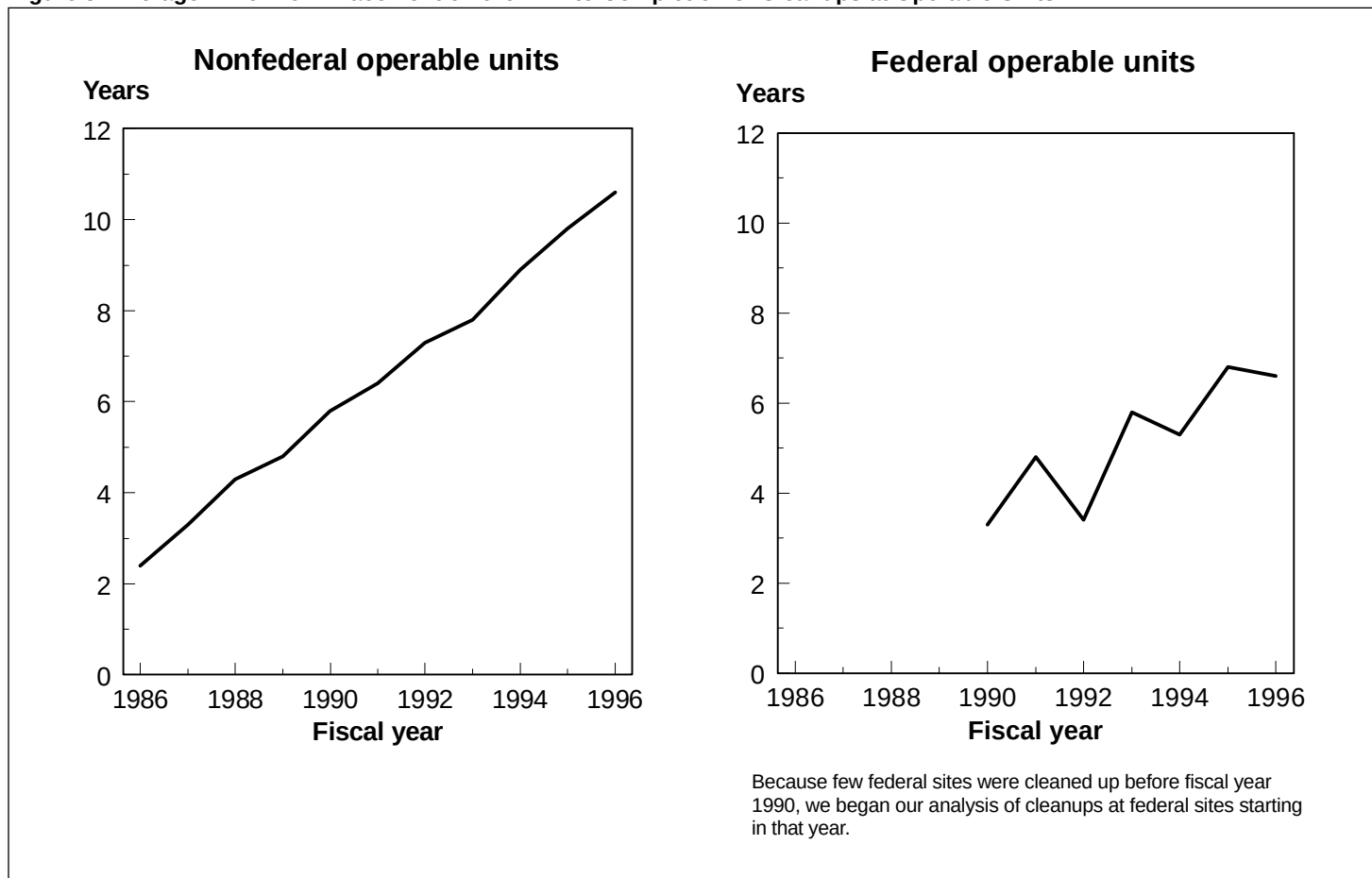
⁶Impact on States of Capping Superfund Sites (GAO/RCED-96-106R, Mar. 18, 1996).

⁷Average cleanup times for federal facilities will continue to grow, since many large federal cleanup projects remain to be completed. For example, the Department of Energy expects that cleanups will continue at its sites through the year 2070.

whole sites as well as the cleanup projects (operable units) into which sites are often divided.⁸ Since EPA and federal agencies have cleaned up more operable units than whole sites, measuring the progress in cleaning up the operable units gives a more complete picture of the program's activity.

Figure 3 shows the average time between placing nonfederal and federal sites on the NPL and completing cleanups at operable units.

Figure 3: Average Time From Placement on the NPL to Completion of Cleanups at Operable Units



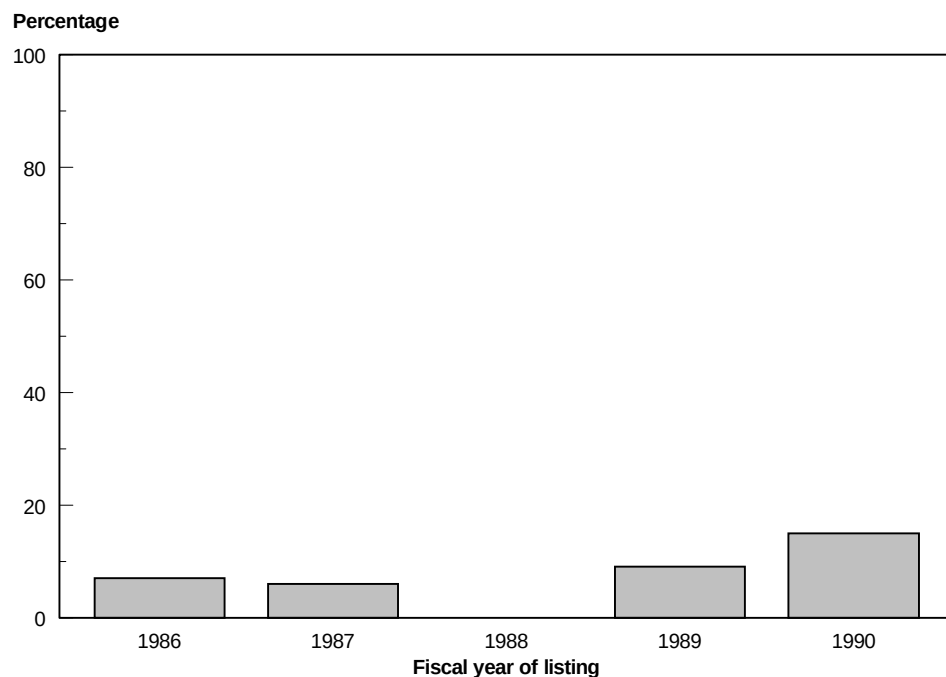
⁸EPA or another federal agency may divide a site into multiple "operable units" corresponding to different physical areas at a site or different environmental media (such as soil or groundwater) to be cleaned up. Federal sites, which include military installations and major Department of Energy facilities, are often much larger (averaging 5.9 operable units) than nonfederal sites (averaging 1.8 operable units).

As figure 3 shows, the time taken to complete cleanups of operable units has grown longer at both nonfederal and federal Superfund sites. In addition, the time taken to complete the principal steps in the process leading to the completion of cleanups has also grown longer (see app. II.) In 1996, cleanup completions averaged 10.6 years for nonfederal operable units and 6.6 years for federal operable units.

As noted, SARA set goals for starting certain cleanup actions, but not for completing the cleanups. For fiscal year 1993, however, EPA set an expectation for its regions to complete a cleanup within 5 years of a site's listing. At nonfederal sites listed from 1986 through 1990, 10 percent of the operable units were cleaned up within 5 years of their site's listing.⁹ As shown in figure 4, the percentages of operable units cleaned up within 5 years increased from 7 percent for sites listed in fiscal year 1986 to 15 percent for sites listed in fiscal year 1990. EPA officials said that they now believe that sites will be cleaned up within 8 to 10 years of their listing.

⁹At 4 percent of the nonfederal sites listed from 1986 to 1990, cleanups of all operable units were completed within 5 years of the site's listing.

Figure 4: Percentage of Nonfederal Operable Units Cleaned Up Within 5 Years of Listing



Note: No nonfederal sites were placed on the NPL in fiscal year 1988.

We also analyzed data on the time taken to clean up entire Superfund sites (as opposed to operable units). From 1986 to 1996, EPA recorded cleanups for 592 operable units at nonfederal facilities and for 118 operable units at federal facilities. During this same period, EPA recorded cleanups for 226 nonfederal sites and for only 7 federal sites. Figure 5 shows the average duration of cleanups for the 226 nonfederal sites recorded as cleaned up from 1986 to 1996.

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Figure 5: Average Time From Placement on the NPL to Completion of Cleanups at Sites

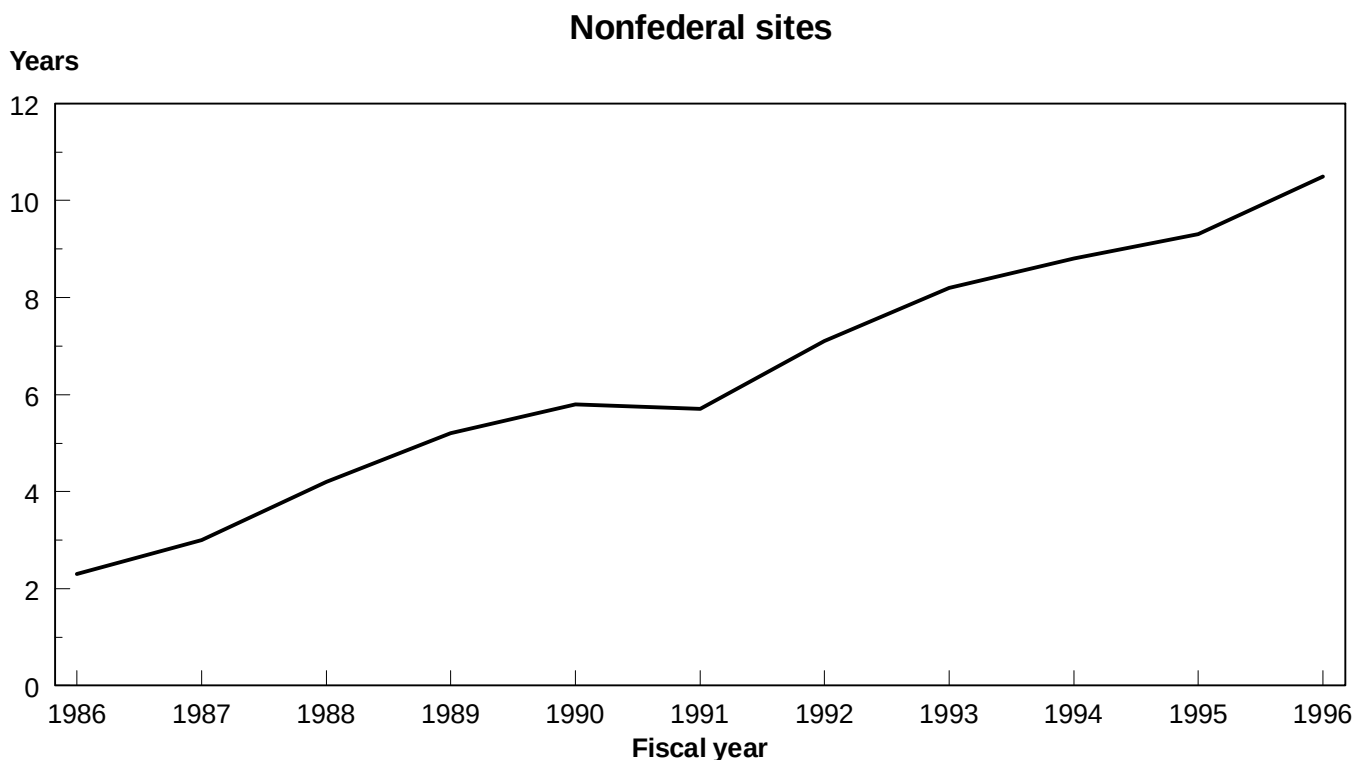


Figure 5 shows that the time taken to clean up entire sites (as opposed to operable units) has also increased. In 1996, cleanup completions averaged 10.5 years. The averages for cleaning up both operable units and entire sites from 1986 through 1996 were almost identical: 7.7 years and 7.9 years, respectively. However, the upward trend in completion times for operable units may result in longer completion times for whole sites in the future.

EPA officials said that the upward trend in cleanup times may be linked to the completion of more difficult cleanups. Our work supports this explanation. In September 1994, we reported¹⁰ that EPA's data revealed longer average cleanup times for ongoing projects than for those already completed. In that report, we said that despite EPA's efforts to expedite

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

cleanups, cleanups may take longer because of the greater complexity of these ongoing projects. In addition, we reported that EPA had shifted funding away from the remedy selection phase and toward the design and construction phases of the cleanup process. As indicated, the time taken to select remedies has increased greatly over the years. EPA officials also 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 cleanups. 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.

Conclusions

The time taken to evaluate hazardous waste sites for inclusion in the Superfund program and to complete their cleanup once they have entered the program has increased over the life of the program. Sites that have recently completed the Superfund listing process have taken over 9 years and those that have recently completed the cleanup process have taken over 10 years.

Increasing completion times are a concern because many listing and cleanup activities remain in the Superfund program. EPA has made progress at many NPL sites—completing the construction of remedies at more than 400 sites—but construction work has yet to be completed at about 800 sites. Furthermore, although only 16 sites, on average, have been added to the NPL annually in the last several years, 1,400 to 2,300 sites could be added in the future. If entry into the Superfund program remains constrained, the listing of sites that are hazardous enough to qualify for the program could be prolonged, increasing the importance of EPA's using a risk-based approach to identify the worst sites. Additionally, given the increased complexity of cleanups and the volume of activity that the program now handles, cleanups may not be completed as quickly as in the early days of the program. However, the steady increase in completion times for cleanups, especially for the earlier stages of the cleanup process ending with the selection of a remedy, raises concerns about the future pace of cleanups. Efforts to shorten the time required for future cleanups will have to deal effectively with delays in the earlier part of the cleanup process.

EPA officials believe that recent initiatives will speed the listing and cleanup of sites. They said they expect to report on the effects of some of these initiatives in the near future.

GAO is not making recommendations in this report because EPA has recently implemented administrative reforms to accelerate the Superfund process. In future reviews, we will be evaluating the implementation of these reforms.

Agency Comments and Our Evaluation

We provided a draft of this report to EPA for its review and comment. EPA provided written comments, which are reproduced in appendix V, along with our responses. Overall, EPA believed that the methodology used in the report to show time trends in the completion of Superfund processing steps is misleading and fails to acknowledge EPA's recent efforts to improve the timeliness of Superfund cleanups.

EPA questioned our method of presenting data on the history of the program. It said that, in analyzing trends in the duration of stages in the Superfund process, it prefers to compare the starting dates rather than the ending dates for completed stages. For example, in analyzing the time taken to place sites on the NPL, it prefers to compare the years in which sites were discovered rather than the years in which the sites were listed. Similarly, in presenting trends in the duration of cleanups, it prefers to compare the years in which sites were listed rather than the years in which cleanups were completed. In contrast, our report analyzes trends in duration by comparing the ending dates for completed stages, thereby presenting a historical record of the time taken to complete the various stages involved in listing and cleaning up nationally significant hazardous waste sites. As noted, our approach is consistent with a method used by EPA in its management reports to measure the Superfund program's accomplishments.

We do not believe that the method EPA's letter says we should have used to present data on the history of the program produces more equitable results than our method. In fact, the method EPA recommended to us would always show improvement in processing times because the data for later years would exclude a higher proportion of ongoing work than the data for earlier years. For example, under the method EPA recommended, the average processing time for site inspections—calculated from the date of each site's discovery—was between 1,300 and 1,400 days for sites discovered in 1985 and between 100 and 200 days for sites discovered in 1996—a clear downward trend (see app. V). However, for the sites discovered in 1985, 92.2 percent of the inspections had been completed, while for the sites discovered in 1996, only 3.3 percent of the inspections had been completed. As time passes and more of the sites discovered in

1996 are inspected, the average processing time for these inspected sites will increase, perhaps substantially. Thus, under EPA's method, we will not know if there is a true downward trend in processing times between 1985 and 1996 until sometime in the future (see app. V, comment 4).

EPA believes strongly that the trend data presented in this report do not capture the effects of the agency's recent initiatives to reform the Superfund program. EPA listed a number of the program's recent accomplishments. EPA said that its reforms have brought relevant stakeholders into the process earlier, increased the number of small parties who are protected from liability, adopted liability allocations worked out by the relevant parties, and reduced the time required for and the costs associated with Superfund cleanups. Through the full implementation of its Superfund administrative reforms, EPA expects to achieve a 25-percent reduction in the time required to clean up sites. EPA also stated that the Superfund program is faster and more efficient today than in the past, and that the agency has reduced cleanup costs, reduced the delays attributable to liability lawsuits, and freed more than 14,000 parties from cleanup liability. Furthermore, according to EPA, cleanups are complete at more than 25 percent of the NPL sites and well under way at another 35 percent. It also pointed out that 75 percent of today's cleanups are paid for by responsible parties, cutting the taxpayers' burden. Finally, EPA cited factors such as budget shortfalls, legislative and administrative weaknesses in the current program, and the continuing influx of large and complex sites as barriers undermining its efforts to increase the pace of assessments and cleanups.

We agree that the data in our report do not isolate any effects of recent policy or procedural changes on processing times. EPA did not present any specific data to substantiate its claims that its recent initiatives have accelerated Superfund cleanups, although it said that such data are currently being collected. EPA also provided other technical and clarifying comments that we incorporated as appropriate.

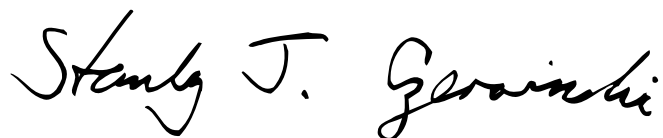
We conducted our work from November 1995 through February 1997 in accordance with generally accepted government auditing standards. A detailed discussion of our objectives, scope, and methodology appears in appendix IV.

As arranged with your office, unless you announce its contents earlier, we plan no further distribution of this report until 30 days after the date of

this letter. At that time, we will send copies to the Administrator, EPA, and the Secretaries of Agriculture, Defense, Energy, and the Interior. We will also make copies available to others on request.

We hope this information will assist you in considering the reauthorization of the Superfund legislation. If you have any further questions, please call me at (202) 512-6520. Major contributors to this report are listed in appendix VI.

Sincerely yours,

A handwritten signature in black ink that reads "Stanley J. Czerwinski". The signature is written in a cursive, flowing style.

Stanley J. Czerwinski
Associate Director, Environmental
Protection Issues

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Abbreviations

CBO	Congressional Budget Office
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act of 1980
CERCLIS	Comprehensive Environmental Response, Compensation, and Liability Information System
EPA	Environmental Protection Agency
NPL	National Priorities List
RI/FS	remedial investigation and feasibility study
SACM	Superfund Accelerated Cleanup Model
SARA	Superfund Amendments and Reauthorization Act of 1986

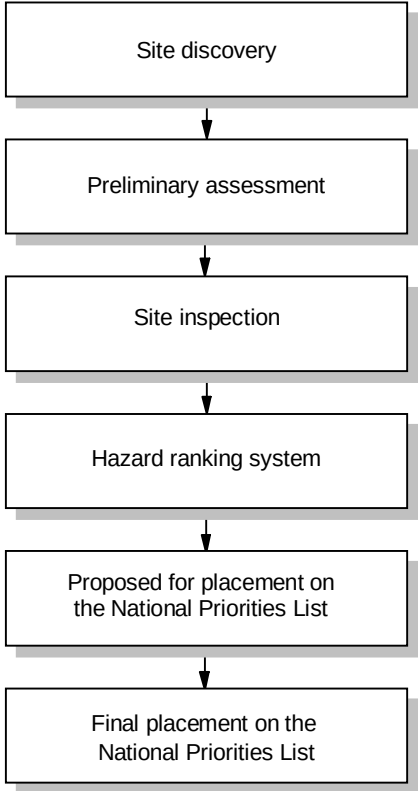
Time Taken to Accomplish the Principal Steps in the Process of Placing Sites on the NPL

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. A responsible federal agency reports a potentially contaminated federal facility to EPA for placement on a list called the federal facility docket. EPA enters a potentially contaminated private 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. A federal agency performs the preliminary assessment of its site under EPA's oversight.

If the site presents a serious, imminent threat, EPA or the responsible federal agency may take immediate action. If the preliminary assessment shows that contamination exists but does not pose an imminent threat, or if the site continues to pose a problem following an immediate action, EPA or the responsible federal agency, with EPA's supervision, 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, the site can be eliminated from further consideration under CERCLA.

Using information from the site inspection, EPA applies the hazard ranking system to evaluate the federal or nonfederal 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 and federal sites, the average time taken to complete a preliminary assessment of conditions at a site following its discovery.

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

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

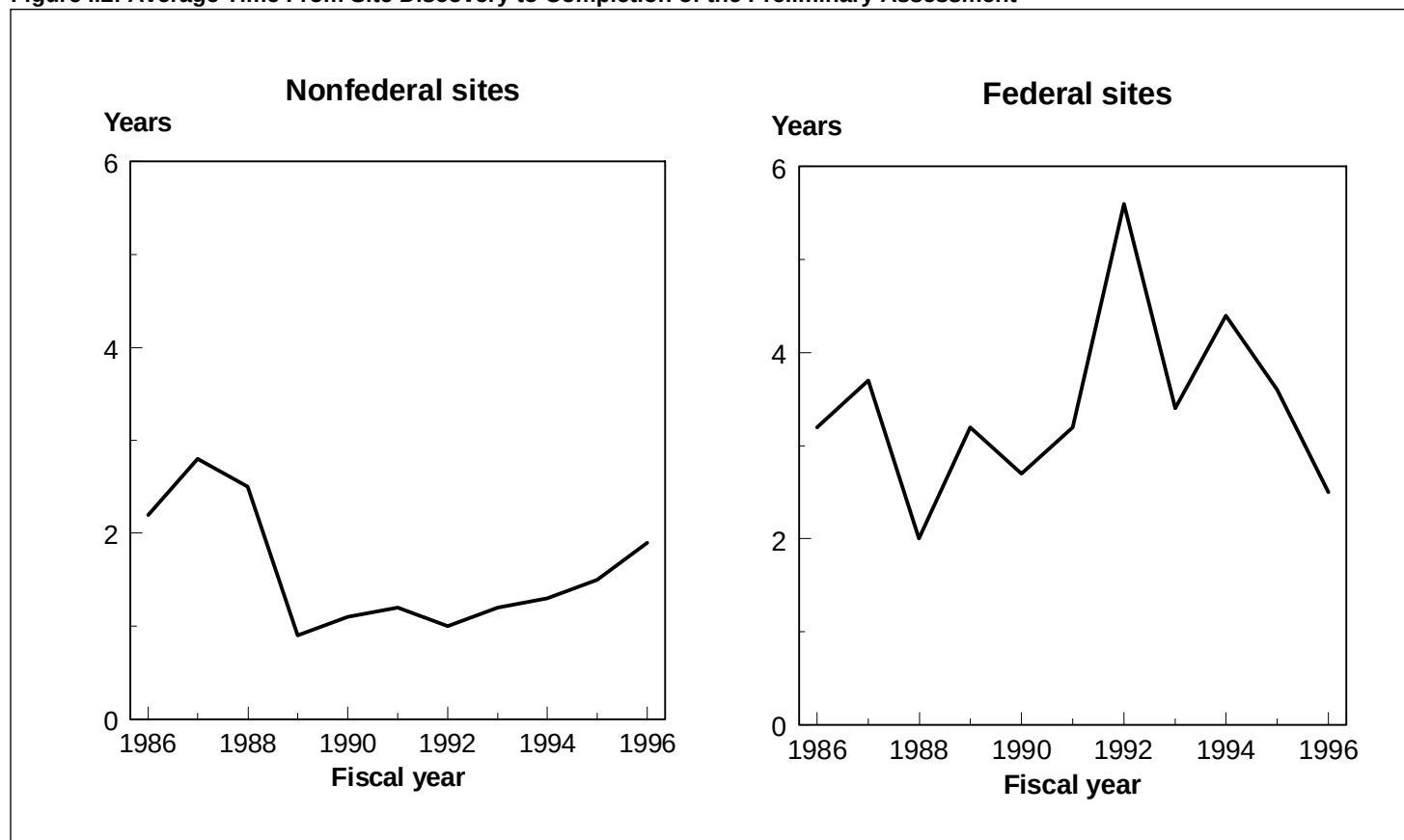


Figure I.2 shows that from 1987 to 1989, EPA sharply reduced the average time between discovery and completion of the preliminary assessment at nonfederal sites. EPA officials attributed this decrease to EPA's effort to reduce the time for completing preliminary assessments following the passage of the 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 discovery to completion of the preliminary assessment has gradually increased.

For federal sites, the average time between discovery and completion of the preliminary assessment has fluctuated over the years but has consistently exceeded SARA's goals. In fiscal year 1996, the preliminary assessment was completed for federal sites, on average, 2.5 years after discovery. SARA specified that EPA take steps to ensure that the assessment for all sites entered on EPA's first federal facility docket be completed within 1.5 years.¹¹ An EPA policy extended SARA's deadline to all subsequent dockets. EPA officials told us that federal sites are typically larger and more complex than nonfederal sites and therefore their assessment requires more work and more time to complete. The officials also said that studies prepared by federal agencies often lack needed data, requiring EPA to ask the agencies to do more work to satisfy CERCLA's requirements.¹² The officials also noted that EPA does not have much leverage over how federal agencies conduct their preliminary assessments.

Site Inspections

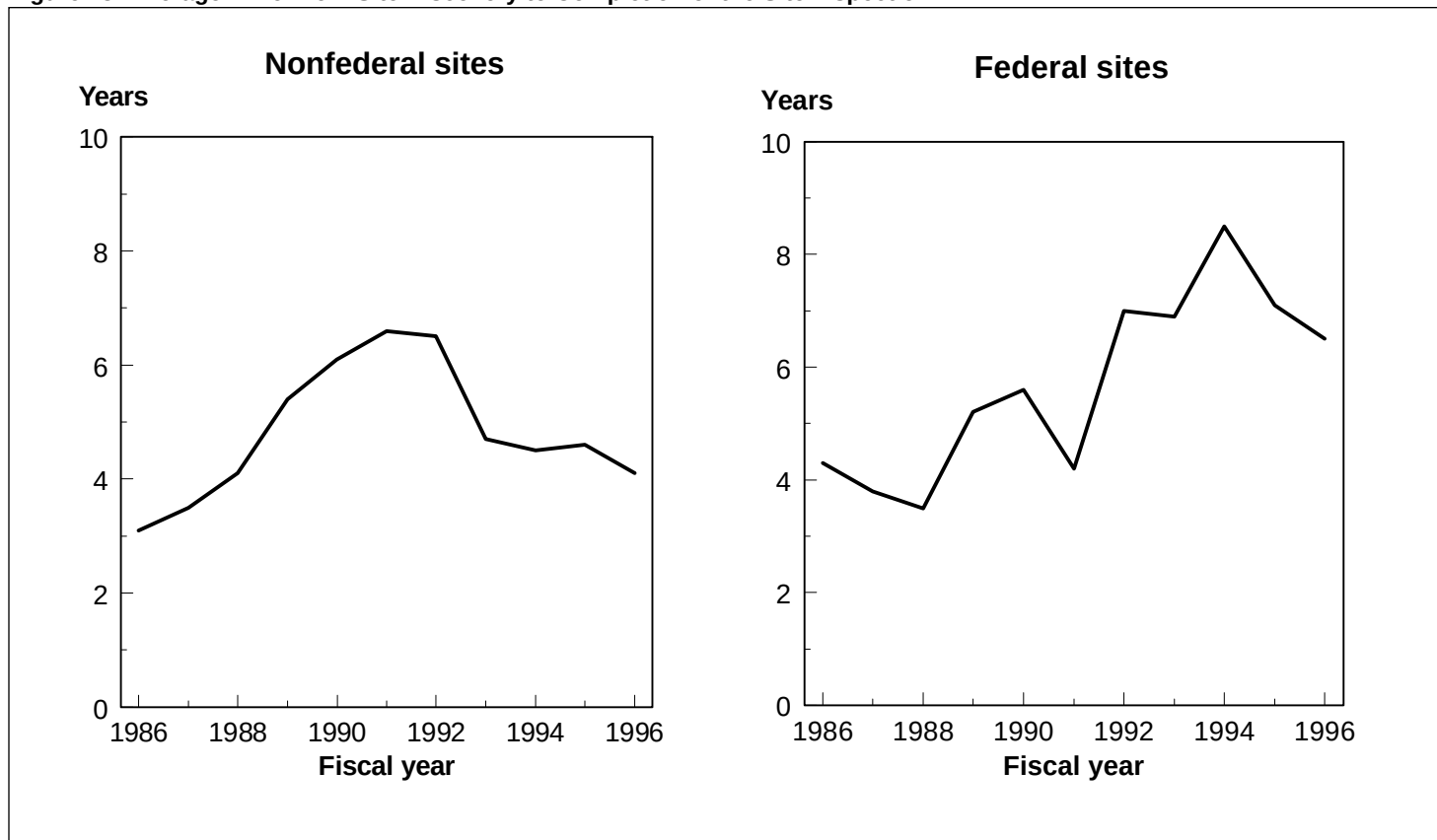
Figure I.3 shows, for nonfederal and federal sites, the average time between discovery and completion of the site inspection.

¹¹We reported in *Superfund: Backlog of Unevaluated Federal Facilities Slows Cleanup Efforts* (GAO/RCED-93-119, July 20, 1993) that EPA had not met SARA's deadlines for evaluating federal facilities for possible placement on the NPL.

¹²We reported this problem in *Federal Facilities: Consistent Relative Risk Evaluations Needed for Prioritizing Cleanups* (GAO/RCED-96-150, June 7, 1996).

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

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



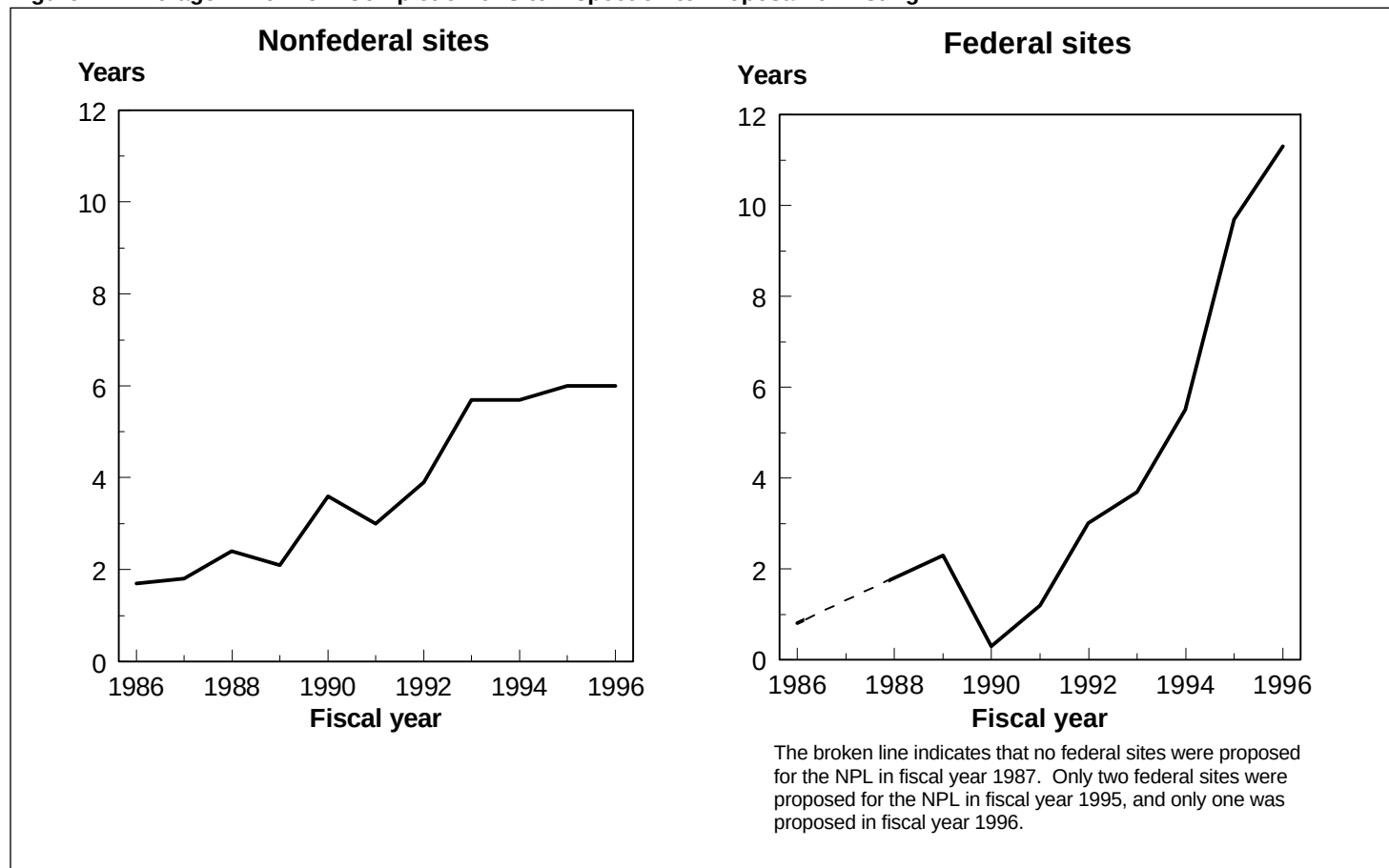
As figure I.3 shows, the average time from discovery to completion of the site inspection has declined in recent years for both nonfederal and federal sites. EPA has made progress over the past 5 years in reducing the time from discovery to completion of the site inspection for nonfederal sites. In 1991, 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 and this effort 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.

For federal sites, EPA's policy was that inspections were to be completed within 1.5 years. In 1996, inspections took 6.5 years to complete, on average, from the time of site discovery.

Proposing a Site as a National Priority

Figure I.4 shows, for nonfederal and federal 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



As figure I.4 shows, the average time required to propose a site for placement on the NPL generally increased for both nonfederal and federal

sites from 1986 to 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. For federal sites proposed for listing in 1986, the proposal took only 10 months from the completion of the site inspection, compared with 5.5 years in 1994, the last year in which a substantial number of federal sites were proposed for listing.

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 and 27 federal sites from 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 database¹³. 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. However, the data that are available indicate that these steps account for only a portion of the total time taken to evaluate a site for listing. The available data show that in fiscal year 1995, preliminary assessments at nonfederal sites were

¹³Because the starting dates for some processing phases were not indicated, we also measured durations from the date of discovery to the end of these processing phases. (See figs. I.2 and I.3)

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NPL

completed on average in 8 months; site inspections in 12 months; and sites inspection prioritizations in 12 months. These numbers suggest that a substantial portion of the time between discovery and listing elapses while a site is awaiting the next step in the process.

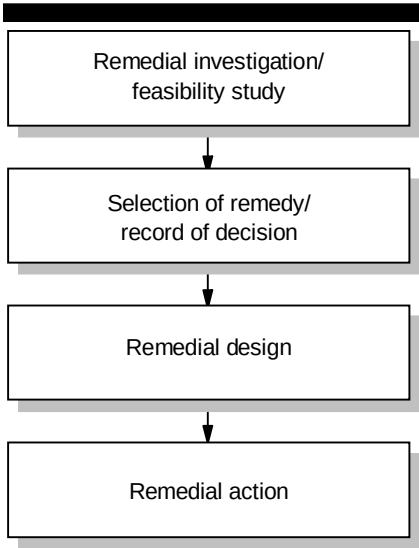
Time Taken to Accomplish the Principal Steps in the Process of Cleaning Up Sites

In addition to measuring the total time taken from the placement of a site on the NPL to the completion of its cleanup, we examined the time taken to complete two of the principal intermediate steps—the preparation of the record of decision, which documents the final remedy selected after completing the remedial investigation and feasibility study (RI/FS), and 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

EPA’s regulation implementing 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 consists 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, for nonfederal and federal operable units, the average time taken from the placement of a site on the NPL to the selection of a remedy for its cleanup.

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

Figure II.2: Average Time From Placing a Site on the NPL to Selecting a Remedy

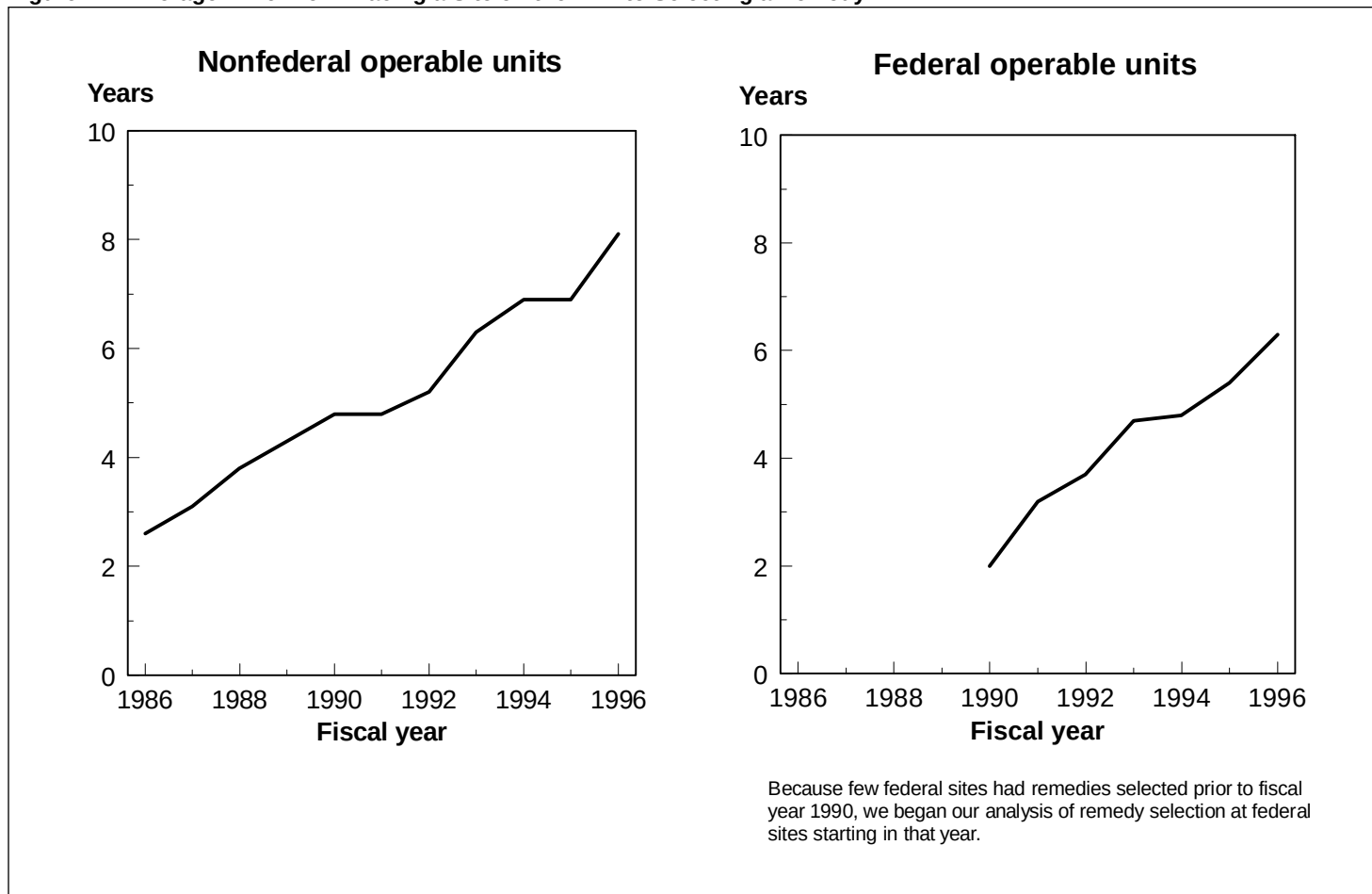


Figure II.2 shows that the average time taken to select a remedy at nonfederal sites has steadily increased over the years. In 1986, selecting a remedy after a site's listing took an average of 2.6 years, compared with an average of 8.1 years in 1996. The average time taken to select a remedy at federal sites has also increased over the years, from an average of 2 years in 1990 to an average of 6.3 years in 1996.

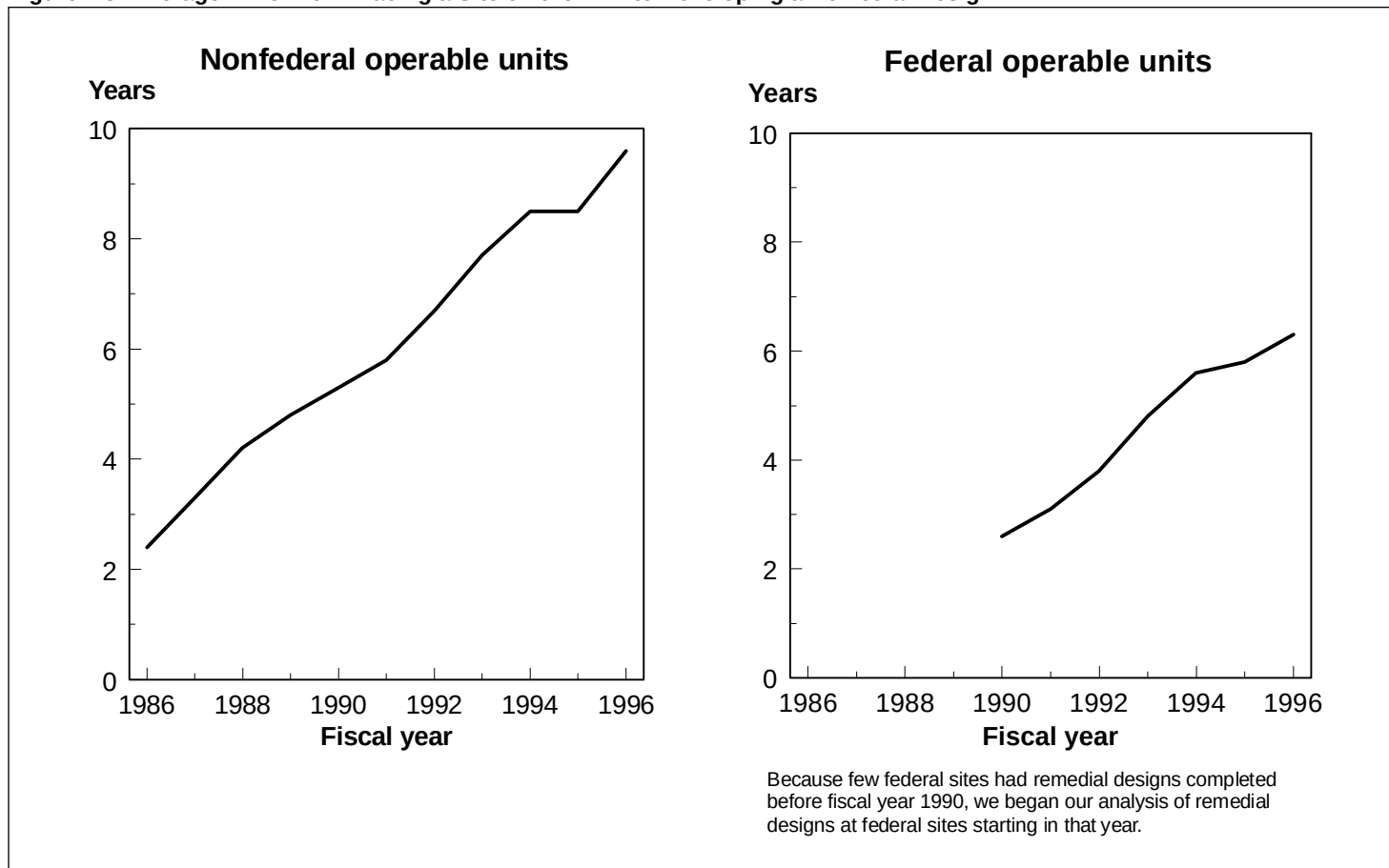
The cleanup phase that ends with the selection of a remedy comprises two periods: the time between listing and the start of the RI/FS and the time for the RI/FS. Both of these periods add significantly to the total time taken to complete cleanups. For nonfederal sites at which RI/FSs were begun from

1991 through 1996, an average of 4.5 years had elapsed since the sites were proposed for listing. For federal sites at which RI/FSS were begun during the same years, an average of 3.5 years had elapsed. 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. For federal sites, the RI/FSS took an average of 4.4 years to complete in 1996, up about 2.5 years from 1991.

Designing a Remedy

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

Figure II.3: Average Time From Placing a Site on the NPL to Developing a Remedial Design



As figure II.3 indicates, remedial designs are generally completed more quickly at federal sites than at nonfederal sites. EPA officials attributed this difference to the fact that federal cleanups do not usually involve negotiations or litigation with private responsible parties.

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.

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

Federal remedial designs were done in 1 year in 1996, up slightly from about 10 months in 1991. Federal remedial actions were completed in 1.6 years in 1996, again up slightly from 1.4 years in 1991.

Number of Observations Represented in This Report's Figures

Figure	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996
1											
Nonfederal	169	67	0	93	224	7	0	26	19	22	10
Federal	0	28	0	8	74	0	0	7	24	6	0
2											
Nonfederal	^a	2,004	2,005	1,640	1,572	1,710	^a	^a	^a	^a	^a
3											
Nonfederal	17	24	17	37	34	51	72	96	80	86	78
Federal	^a	^a	^a	^a	5	3	13	14	20	35	23
4											
Nonfederal	227	77	0	101	197	^a	^a	^a	^a	^a	^a
5											
Nonfederal	8	7	9	7	8	10	31	32	38	40	36
I.2											
Nonfederal	3,969	3,704	2,671	2,151	1,566	1,327	1,611	1,361	899	710	753
Federal	73	86	145	68	124	54	236	122	112	72	21
I.3											
Nonfederal	1,178	1,295	1,272	1,805	1,971	1,991	1,277	648	551	535	318
Federal	20	42	44	54	54	28	57	62	24	42	24
I.4											
Nonfederal	41	52	197	9	23	17	20	32	21	7	18
Federal	2	0	9	43	1	2	4	13	12	2	1
II.2											
Nonfederal	82	73	152	130	145	166	118	122	105	92	63
Federal	^a	^a	^a	^a	18	21	42	59	59	75	77
II.3											
Nonfederal	23	48	69	83	55	103	99	112	113	122	108
Federal	^a	^a	^a	^a	2	17	25	30	48	44	54

^aData are not presented for this year because the year is not included in the corresponding figure.

Objectives, Scope, and Methodology

The Chairman of the House Committee on Government Reform and Oversight asked us to provide information on the pace of Superfund cleanups. He specifically asked that we examine trends in the time taken to (1) evaluate hazardous waste sites for possible placement on the NPL and (2) clean up the sites following their listing. To accomplish these objectives, we asked EPA to provide us with data from the Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS). This information system is the official repository of Superfund data and provides integrated information on the evaluation (preremedial) and remedial programs as well as the removal program.

To determine the time taken to evaluate sites for placement on the NPL, we asked EPA to provide us with data on the sites that had moved through the various stages of the assessment process from fiscal year 1986 through fiscal year 1996. For this report, we concentrated our analysis on the following four phases of each site's evaluation: (1) from discovery to placement on the NPL, (2) from discovery to completion of the preliminary assessment, (3) from discovery to completion of the site inspection, and (4) from completion of the inspection to the proposal for listing.

To determine the time taken to clean up sites placed on the NPL, we asked EPA to provide data on sites that had progressed through the stages of the remedial cleanup process. These data also covered fiscal years 1986 through 1996. For this part of the analysis, we examined data for three principal stages of the cleanup process: (1) from the site's placement on the NPL to the selection of a remedy, (2) from the site's listing to the completion of the remedial design, and (3) from the site's listing to the completion of the cleanup. We also measured the duration of the RI/FS, the remedial design, and the remedial action and the time from the proposal for listing to the start of the RI/FS.

We used a "date of event" (such as NPL listing or completion of cleanup) analysis in our review to measure the duration of listing and cleanup phases. This method classifies sites by the year in which they completed an activity. Our approach is an accepted form of analysis useful for showing the productivity and management of resources over time. Another analytical approach would have grouped sites by their "date of submission" (discovery or listing) and compared the duration of processing steps among these groups. This method can be useful in assessing the effect of policy or operational changes. We did not use it in our report because EPA's initiatives to speed up the Superfund process are so recent. We also used goals for the completion of listing or cleanup set

out in SARA or EPA directives as benchmarks for comparison with actual listing and cleanup times.

We used EPA's definitions of site discovery and cleanup completion. Site discovery for this report is defined as the date of a site's listing in CERCLIS. Cleanup completion is defined as the end of the remedial action phase, that is, the date when, under EPA's procedures, the designated regional or state official signs a document indicating that the physical construction is complete for all remedial and removal work required at a site and, except where the long-term operation of a remedy is needed, the required cleanup levels have been attained.

EPA's management data track a site's projects, or operable units. Nonfederal sites average 1.8 operable units, while federal sites average 5.9 operable units. Each operable unit generally proceeds through the individual cleanup stages.

For example, the Department of Energy's Rocky Flats Environmental Technology Site was placed on the NPL in 1989 as one site. DOE subsequently categorized the known or suspected hazardous waste sources into 16 operable units on the basis of its cleanup priorities, the type of waste, the unit's geographic location, and public input. EPA's records show that cleanups at 3 of Rocky Flats' 16 operable units have been completed, 2 in 1992 and 1 in 1993. Tracking the time required to clean up operable units allows EPA to measure progress without waiting for entire sites to be cleaned up. At some complex sites—like Rocky Flats—work may extend well into the future. We also examined data for sites where all of the operable units had been cleaned up.

While we did not independently verify EPA's data for completeness or accuracy, EPA took a number of steps to ensure the accuracy and reliability of its data. For example, sites without valid identification numbers or with inappropriate status codes were excluded. Also, any times for individual study phases that could not possibly be valid were excluded from the analysis. For example, negative times were excluded. Also, sites with times exceeding the mean by more than three standard deviations were eliminated to prevent a few sites on the high or low end of the spectrum from skewing the overall results. These adjustments resulted in the exclusion of fewer than 1 percent of the sites.

EPA provided written comments on a draft of this report. These comments are discussed and evaluated in the pertinent sections of this report and are

reprinted in appendix V. We conducted our work from November 1995 through February 1997 in accordance with generally accepted government auditing standards.

Comments From the Environmental Protection Agency

Note: GAO comments supplementing those in the report text appear at the end of this appendix.



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

DEC 23 1996

OFFICE OF
SOLID WASTE AND EMERGENCY
RESPONSE

Stanley J. Czerwinski
Associate Director
Environmental Protection Issues
U.S. General Accounting Office
Washington, DC 20548

Dear Mr. Czerwinski:

Thank you for the opportunity to review and comment on the November 22, 1996, Draft Report entitled "It Now Takes More Time to Assess and Clean Up Hazardous Waste Sites" (GAO/RCED-97-20). This letter formally transmits our detailed comments on the draft and lays the groundwork for continuing discussions to better track, report, and analyze duration data within the Superfund program.

As demonstrated in our comments, we currently have significant concerns regarding the Report's draft conclusions that "It Now Takes More Time to Assess and Clean Up Hazardous Waste Sites" and the methodology used to support them. We feel resolution of these concerns is vital to ensure the validity and credibility of the Final Report. We, therefore, ask that ongoing discussions of issues reach resolution prior to distribution of the Report.

We recognize that Superfund has undergone a complex evolution and does not readily lend itself to simple parametric analysis. However, we believe there are some improvements to your approach that will yield a much more accurate, and statistically verifiable, reflection of Superfund operations. We at EPA are committed to continuing ongoing efforts to discuss, recommend, and improve the methodology prior to distribution of the report to better reflect the current Superfund program. We look forward to working with you on this undertaking.

Sincerely,

A handwritten signature in cursive script, reading "Stephen D. Luftig".

Stephen D. Luftig
Director
Office of Emergency and Remedial Response

Enclosures

cc: Elliott P. Laws
Steven A. Herman



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Appendix V
Comments From the Environmental
Protection Agency

Timothy Fields, Jr.
James H. Mathews
Barry Breen

U.S. ENVIRONMENTAL PROTECTION AGENCY
GAO Durations Analysis
DETAILED COMMENTS

OVERALL PURPOSE OF THE REPORT

We at EPA support efforts to provide information on program durations as part of answering public concerns about Superfund performance. However, the draft report goes one step further to imply a connection between durations of sites completed and Agency policies and management. The statistical analysis of the report does not support the implied relationship of policy and durations due to the programmatic complexities which are not discussed in depth in the report or conclusions. The report should be clearly stated that the statistical analysis was not intended to, and does not, reflect the influences of past or current policies, nor does it reflect the impact of reforms developed and implemented in the past six years or of program requirements and complexities over which there is limited Federal control.

While any argument is better supported using statistical data, the judgments evident in the report are of concern to the Agency. We would ask that more analysis be conducted on the "story" told using your data analysis to ensure that a fair and unbiased assessment of durations is portrayed. Our comments below raise more detail on the specific statistical issues, but our overarching concerns focus on whether the report in its current form provides accurate, useable information to inform the Superfund debate in a balanced manner.

The weight of the GAO header on any report offers it credibility inside and outside government. During our discussions, we were assured that GAO's analysts recognize that EPA is working to improve the pace of listings and cleanups, but data limitations cause that recognition to be relegated to the text of the document. The probability that many of those who see this report will focus solely on the title and the data charts leaves us concerned that the more positive aspects of the message are not given equal support. A more balanced, quantitative analysis of the critical and positive messages in the durations debate will better serve the Congress, the Agency, the Superfund program, and the communities and business which depend on Superfund's protections.

THE TITLE DOES NOT REFLECT THE COMPLEXITIES OF THE ANALYSIS

Based on our concerns with the methodology used for the analysis of durations which is detailed below, we strongly feel that the current title of the report should be changed. We recognize and support the need to provide accurate, timely information on the duration of site cleanups within the Superfund program. However, due to the complexity of Superfund data and activities, we feel the report title does not reflect the Report's implied purpose to attribute

See comment 1.

See comment 2.

Attachment (EPA Detailed Comments)

Page 2

changes in durations to policy changes implemented by EPA. Additionally, the title is not supported by the weight of the data.' A more appropriate and judgment-neutral title would be "Barriers Remain to EPA's Efforts to Shorten the Time to Assess and Clean Up Hazardous Waste Sites." We think the substance of our detailed comments below support this change.

More strategically, the durations debate should not be oversimplified to fit under the current title. The reality of durations analysis is that legislative limitations, funding shortfalls, fairness initiatives, and the current enforcement scheme may affect durations. We, therefore, believe that a recognition of these varied barriers should be highlighted in the title. Moreover, the best title, statistically speaking, would be to simply entitle the report "Assessment and Cleanup Durations at Hazardous Waste Sites," leaving the judgment and conclusions to the reader.

DATA ANALYSIS DOES NOT ANSWER KEY DURATIONS QUESTIONS

As stated earlier, the methodology used in the draft report does not offer the support to answer the key questions vital to the durations debate. Most notably, the analysis does not support the attribution of durations to EPA policies developed since 1992. The graphs in the document depict data which is affected by the initial backlog of unaddressed site work and is further complicated by legislative, programmatic, and policy changes which impact durations in widely varied ways. Thus, the graphic depictions of the data understandably fall short of offering any statistically significant insight into EPA's efforts to improve the program and increase the pace of cleanup. We also contend that a focus on the Superfund Accelerated Cleanup Model (SACM) ignores the equally significant impacts of other Agency improvements. We would like to substantively discuss, in the context of reporting Superfund accomplishments, the types of analyses which would best inform the debate on reform, reauthorization, and durations.

The impacts of the SACM, Administrative Improvements and Reforms, Streamlining, and the Agency's commitment to making Superfund faster, fairer, and more efficient are simply not represented in the data. Projects which achieved construction completion in 1995 were the result of those policies in place years earlier which impacted their listing, study, and remedy selection. Additionally, many efforts at improving Superfund performance have focused on early pipeline activities which are projected to realize substantial improvements later in the pipeline. Thus, the data in your report is representative of policies in place and site decisions made during the 1980s and cannot be extrapolated to show the impacts of new, innovative, and forward-looking reforms.

We feel the inability to tie durations to policies is pervasive in your draft Report due to the attribution of the duration in the year of completion. As stated in our comments below, we feel that attributing the same statistical data point to the year of listing, when policies impact decisions, is a more equitable way to array the data. While this would improve the data analysis, we feel a better methodology would look at discrete pipeline milestones and develop durations

See comment 3.

See comment 4.

Attachment (EPA Detailed Comments)

Page 3

analyses which could better reflect the complexity of decisions, technologies, and reforms in every aspect of the program. EPA is currently embarking on such an analysis in our efforts to better communicate to stakeholders and communities the *successes* of Superfund. We stand ready to work with GAO, as we currently work with CBO, to ensure that a balanced, fair assessment is accomplished.

REPORT SPECIFIC COMMENTS, CLARIFICATIONS, AND CORRECTIONS

NPL LISTING CATEGORY:

- The fundamental thesis of the Report rests on an outdated concept of the site assessment program as merely a hopper for sites bound for the National Priorities List (NPL). EPA currently views the NPL as a choice of last resort, when other cleanup options are not practicable or available. Recognizing that NPL listing is not the sole goal, per se, of site assessment, it is not meaningful to measure durations for NPL listing activities. The Report states that shortening those average durations would be desirable when that may not, in fact, be the case. A more detailed analysis of milestones within the site assessment program would quickly yield a recognition that, where appropriate, the Agency has proactively been implementing improvements across all aspects of site study and assessment. Program improvements, however, may increase study duration to achieve a larger good. Additionally, in its current form, the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) impose program activity requirements which cannot be shortened without legislative relief.
- In grappling with an analysis of durations, a subtle, but important, distinction is required to provide a fair reflection of program realities. On page 3 of the draft report, the Superfund purpose statement would better read: "The Act gave EPA the authority to compel the parties responsible for contamination to cleanup hazardous waste sites or to use federal funds to perform the cleanup to reduce risk until cleanup cost can be recovered from responsible parties based on liability orders and litigation." Our enforcement efforts are the primary component of program activities, but those efforts can, and do, increase the time it takes to list a site and the duration of the overall pipeline. The importance of these efforts must be highlighted in the durations analysis.
- On pages 1 and 3 of the report, reference is made to the 1992 announcement of the SACM approach to reducing the duration of cleanups. The Model was fully implemented in 1994 and began to show anecdotal impacts in site milestones during FY1996. The previous GAO analysis had not allowed sufficient time for the improvements to be integrated into Agency decision processes and to show tangible results. This brings into question the statement on page 4 that "EPA regions were not effectively using one of the initiatives." We do not expect

See comment 5.

See comment 6.

See comment 7.

Attachment (EPA Detailed Comments)

Page 4

to see wholesale changes in early pipeline durations until FY98-99. Since SACM was designed to better assess sites early in the process in order to achieve more efficient cleanups, we will not see real returns on our investments until those sites which entered the study phases of the program under the innovations of SACM achieve construction completion. This means duration data would not be conclusive and results not complete for another 8 to 10 years.

- The methodology used to analyze the data portrayed on page 5 (figures 1 and 2) selects sites based on year of completion of listing, rather than the year of discovery. EPA believes it is more meaningful to determine how long it takes to list a site discovered today than to ask, "when did EPA discover the sites it listed in 1995?" The analysis by GAO addresses the latter question, but should consider methodologies offered by EPA that could better answer the more fundamental former question.
- The data realities of the current methodology also are affected by the existence of a backlog of sites which have not been completed, for a myriad of reasons, across all years which statistically skew any analysis. Simply put, regardless of program performance in the later years, the outcome will almost inevitably show longer durations over time. A fact that contributes to this problem is that the program began with a backlog of 14,000 sites. Program activities have attempted to balance the requirement to address this backlog with newer, more risk-relevant site work, "worst sites first." However, until addressed, this backlog will continue to skew all analysis.
- A specific data concern germane to the site assessment analysis is caused by the historical development of site data at the inception of the program. When the initial data was collected, site discovery dates were input with dates which preceded CERCLA. Thus, some durations exceed the availability of authorities to address them. As a significant number of sites were added to our databases in 1981-83, the impacts of this data anomaly is magnified across the full life of the program. Simply put, data entered on discovery prior to 1984 is both statistically and programmatically suspect and should not be used.
- Analyses that select sites based on year of discovery (as opposed to year of listing) show equally valid statistical trends of shorter durations for more recently discovered sites. This approach, albeit with its own problems, is a more resilient indicator of program performance and reform than a listing-based illustration of the data.
- Based on our issues with the data analysis methodology, we remain concerned that the conclusion drawn does not answer the fundamental topics of the durations debate. By way of fact, over the past 5 years, where the Agency has needed to act expeditiously to list sites, we have done so. In a number of cases, EPA has taken only a few months to list sites once the need has become clear. This fact is not represented in the conclusions which result from the selected methodology.

See comment 8.

See comment 9.

See comment 10.

See comment 11.

See comment 12.

Attachment (EPA Detailed Comments)

Page 5

See comment 13.

- Another impact on the durations for listing activities, which remains outside the control of EPA managers is that the duration from proposed rulemaking to final listing is primarily driven by the nature and scope of public comments. The catalysts which effect these comments are not under EPA's purview. Therefore, a better measure of EPA performance would be the duration from discovery to proposed rulemaking.

See comment 14.

- The analysis includes assessments of Federal Facility listing durations from 1981 to 1985. As Federal Facilities were excluded from NPL listing until 1984, the conclusions drawn from this data are statistically unfounded. The only exceptions to this listing exclusion were a small universe of sites where, at time of listing, EPA did not know that site pollution sources were on Federal Facilities.

See comment 15.

- The statement on page 2 regarding discussions with EPA should read: "EPA officials attributed the increases to the large number of sites [initially] referred to the Agency for evaluation." The final sentence of the paragraph should be removed; it is inaccurate.

See comment 16.

- Similarly, the statement on page 5 would be more accurate if revised to read: "EPA officials attributed the increases to the backlog of sites [initially] referred to the Agency for evaluation [and the statistical approach used in the study]."

See comment 17.

- Data shortfalls result in an average duration from discovery to NPL listing for Nonfederal sites for 1985 of approximately 1 year (figure 1, page 5). The average durations for Federal sites for 1984 is only 1 year. This number also is part of the Federal Facilities data problem explained above. These averages are not statistically significant observations and provide a target for outside critics to further question the validity of the data and analysis.

See comment 18.

- The methodology concerns regarding attribution of duration data points to year of completion also applies to the discovery to preliminary assessment/site inspection duration. We have attached graphs showing how the preferred approach would affect the results of these analyses.

See comment 19.

- Finally, we do not agree with the statement on page 6, "EPA officials acknowledge that the upward trend in the time taken to list sites was distressing...." EPA is distressed that the methodology does not statistically analyze current program performance, though the report concludes such a result. At a minimum, we would hope that GAO would clarify that the analyses are based on completion year and articulate the "durations to policy" limitations that exist in this type of analysis. In this way, individual readers could draw their own conclusions as to the applicability of the methodology to the task at hand.

CLEANUP CATEGORY:

See comment 20.

- EPA's concerns above with completion-year durations analysis also apply to this portion of the report. Sites with a "completion of cleanups" in a given fiscal year are not affected by

Attachment (EPA Detailed Comments)

Page 6

policies, initiatives, goals, or reforms implemented in that year. On the contrary, they are the result of policies in place at the time site decisions were made, oftentimes several years prior to completion. This limitation must be clearly stated within the analysis.

- The current graphic depictions of data do not include the number of observations. As an example, the 2.6 year average for 1986 completions is based on 17 Remedial Action (RA) completions, while the 6.8 year average in 1995 was based on 86 RA completions. Under the current methodology, data on the early program years are not statistically significant. Simply stated, the key conclusion and title of the report are based on an analysis that uses as its point of departure a data point based on less than 4% of the observable data. We recognize that our preferred methodology shifts some of the data problems to the later years, and have, therefore, recommended that discrete milestone durations analysis would be most appropriate and provide more statistically significant sources of conclusion.
- The following is an example of why simple statistical parameters are inappropriate to use in broad programmatic characterization and trend extrapolation for Superfund. Consider Figure 2 on page 8 and Figure II.2 on page 28. The figures represent graphs of simple statistics, mean durations. The first graph is of the time from final listing to RA completion, and the second charts final listing to remedy selection. Presentation of these two charts of durations plotted against calendar years implies characteristic representation of the program at a point in time. Using these charts in that way would lead to the conclusion that at the same point in time, 1986, we were cleaning up projects quicker than we were selecting remedies. This demonstrates the inappropriateness of using these statistics.
- As discussions continue between EPA and GAO, we would hope to provide input from our partners in industry, State, Tribal, and local government. Testimony in recent years has shown that the results of your analysis do not comport with the daily site experiences of many of our partners in the Superfund process. While we all recognize the shortcomings of the program, most would attest to improvements in recent years. We have site-specific, anecdotal information to support this assertion, which has not been included in the draft report in favor of program-wide statistical data. Based on our analysis, durations have not quadrupled.

OTHER STUDIES SHOW A DIFFERENT PERSPECTIVE ON PERFORMANCE AND DURATIONS:

- CBO's March 1994 "Analyzing the Duration of Cleanup at Sites on Superfund's NPL" shows that the average duration of site cleanup was "9.6 years for sites 1984-1992" for non-Federal sites. The average depicted in GAO's current draft is under 7.5 years for 1986-1995 which speaks to a trend contrary to the draft conclusions. While CBO attempts to normalize total site average durations from operable unit data, the demonstrated trend brings into question the findings of the draft GAO report.

See comment 21.

See comment 22.
Now figure 3 on p. 10.
Now on p. 30.

See comment 23.

See comment 24.

Attachment (EPA Detailed Comments)

Page 7

See comment 25.

- In speaking to EPA's program performance, GAO recognized in their June 1992 Testimony "Superfund: Current Progress and Issues Needing Further Action," that "EPA is currently in the process of implementing a number of actions to expedite the Superfund cleanup process.... While it is still too early to assess the impacts of these initiatives, we view them as steps in the right direction that are in line with many of the recommendations made in our prior reports." Full, program-wide implementation of the SACM initiatives referenced did not occur until FY 1994, consistently confirming that it is too early to see substantive results from these promising reforms. In the same vein, our FY 1996 administrative reforms cannot be expected to have demonstrated pipeline-wide results.

See comment 26.

- More importantly, the same testimony of June 1992 asked the strategic question: "how can EPA accelerate the pace of site cleanups? For the foreseeable future, EPA expects that more sites will enter the cleanup process than will leave it. Consequently, the number of sites bogged down in the process can be expected to increase." Budget shortfalls, legislative and administrative weaknesses in the current program, and a continuing influx of large and complex sites should be highlighted in the report as barriers which undermine EPA's efforts at reforms to increase the pace of assessment and cleanup. This conclusion would seem to be more programmatically significant than the current title.

See comment 27.

- In their December 1996 report "EPA's Superfund Reforms: A Report on the First Year of Implementation," Superfund Settlements Project recognizes that "For all the initial antagonism and skepticism, however, relatively little attention has been paid to EPA's track record since it began implementing the October 2, 1995 administrative reforms. That track record is substantial...." While their analysis focuses primarily on costs of cleanup and does not provide conclusions, the report speaks well to the complexity of the measurements involved in assessing the implementation of policy changes within the Superfund program.

See comment 28.

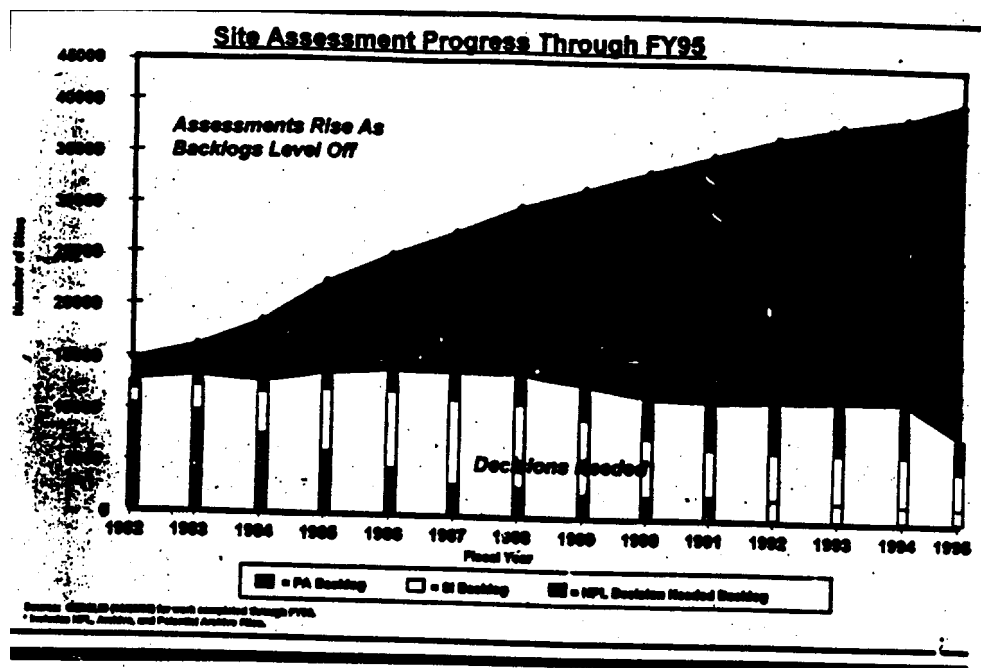
- EPA's December 1996 "Superfund Administrative Reforms Annual Report, Fiscal Year 1996," estimates the time savings to be realized from the municipal landfill presumptive remedy pilots at between 36% and 56%, in addition to significant cost savings. During the analysis of these pilots, it was learned that the biggest savings in time and cost can be realized if streamlining is incorporated at the very beginning of the scoping phase of the RI/FS. This supports our earlier contention that the results of recent, innovative policy changes still remain to be seen in future durations.

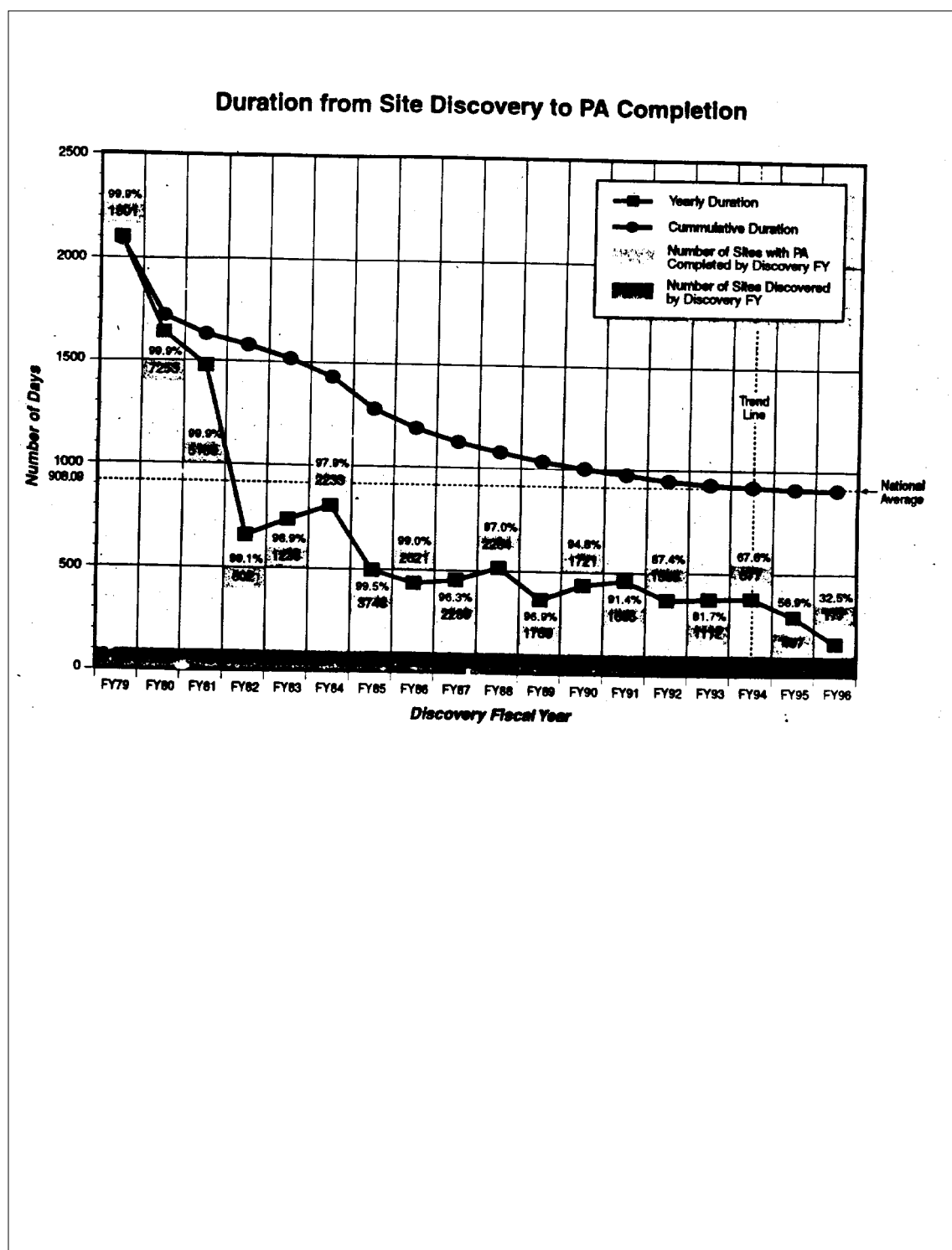
See comment 29.

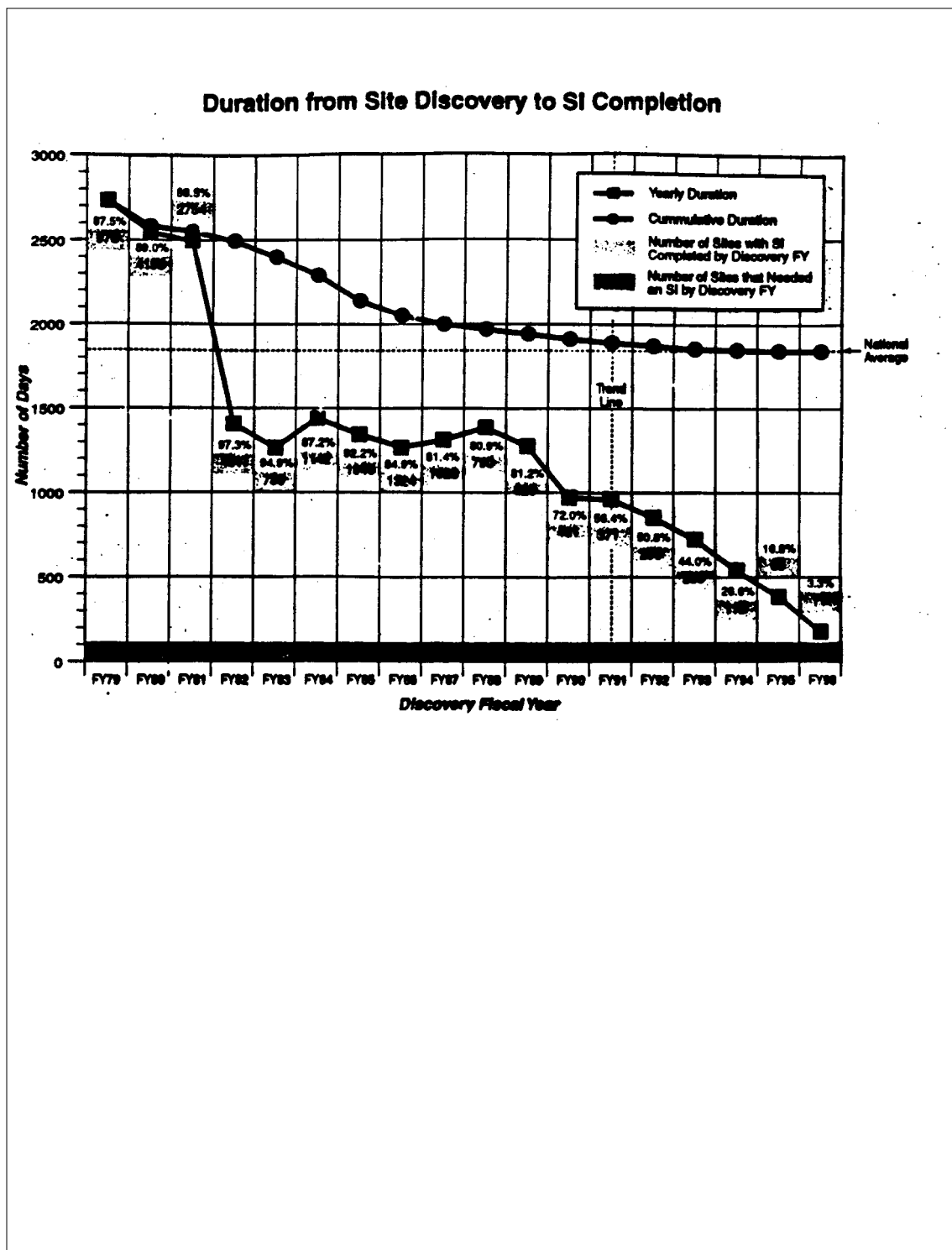
- Finally, in response to Congressman Shuster's interest in cleanup pace, EPA analysis showed:

"Preliminary data from a number of recently completed sites show that we are accomplishing time...savings in Superfund of...25%. We believe that with full implementation of Superfund administrative reforms, a 25% reduction in the time required to cleanup sites will be maintained or improved...."

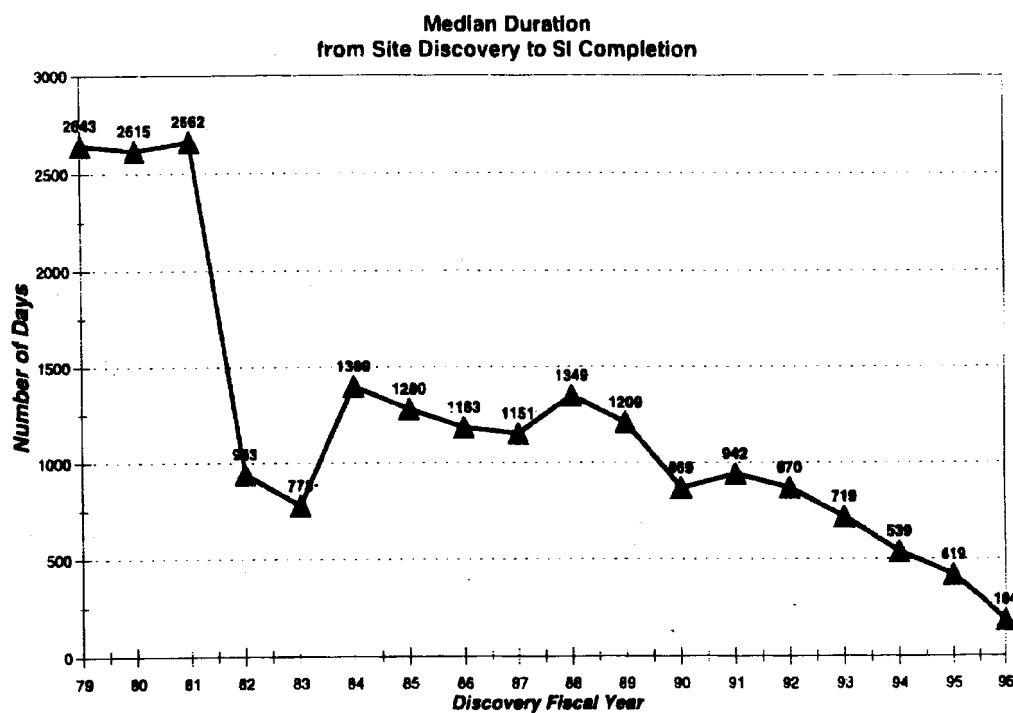
Appendix V
Comments From the Environmental
Protection Agency



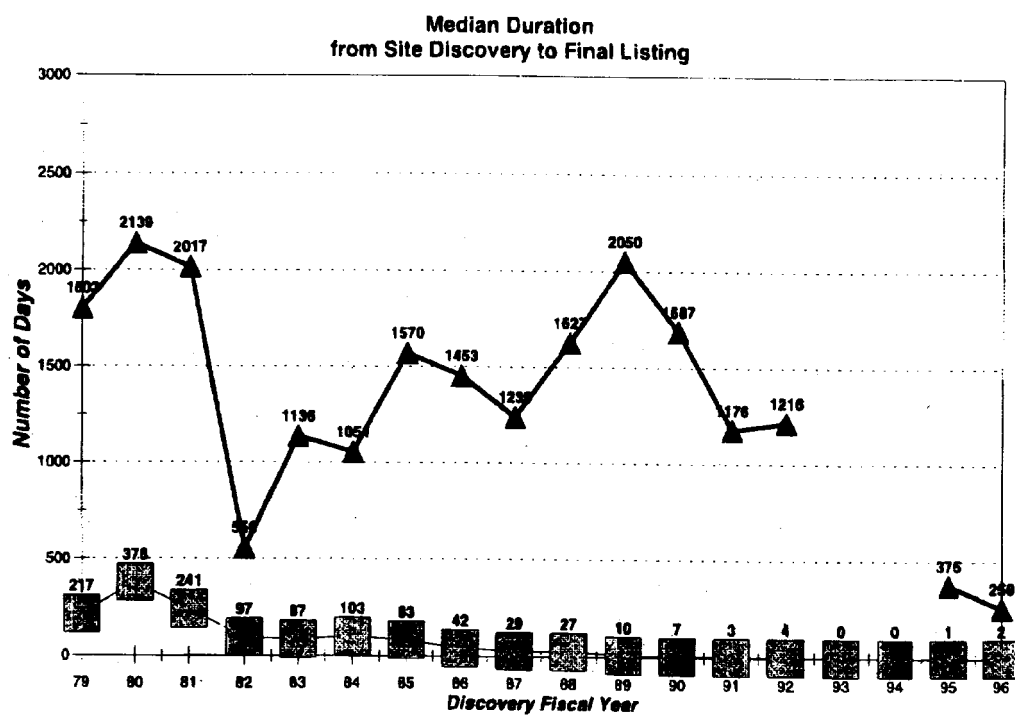




Appendix V
Comments From the Environmental
Protection Agency



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The following are GAO's comments on EPA's letter dated December 23, 1996.

GAO's Comments

1. The graphs presented in this report represent the actual recorded time frames for all Superfund sites and projects that moved through the Superfund processing pipeline from 1986 through 1996. This method of analysis is analogous to measuring a company's bottom-line financial performance over time. We did not attempt to forecast the potential effects of EPA's recent initiatives to accelerate the pace of the Superfund program.
2. We have revised the title of the report to more precisely indicate the report's contents.
3. The graphic depiction of trend data in this report is a historical presentation of the average time spent in the Superfund process by those sites that were listed and cleaned up in a given year. The information responds to the Committee's questions on (1) how long it took to evaluate and process sites for possible placement on the NPL from the time of their discovery and (2) how long it took to clean up sites after they were placed on the NPL. We agree with EPA that our presentation of historical data may not fully reflect the effects of recent policy changes. Nevertheless, in reviewing EPA's initiatives to accelerate the pace of Superfund cleanups under the Superfund Accelerated Cleanup Model (SACM) and in discussing this report with agency personnel, we found that EPA lacks data for measuring the extent to which these initiatives have been implemented or the effects of these initiatives. Our recent report on the non-time-critical removal component of SACM showed that although non-time-critical removals have an excellent potential to reduce costs and expedite the protection of human health and the environment, the program's full implementation has been constrained by budgetary and legal issues. Without adequate data, we were unable to assess the effects of the new initiatives on reducing the overall duration of stages in the Superfund process. EPA told us that it is currently embarking on an analysis of its recent initiatives to better communicate to stakeholders and communities the successes of Superfund.
4. We disagree that using the year of listing, rather than the year of completion, would array the data in a more equitable way. The method using the year of listing attributes longer processing times to sites listed in earlier years and shorter times to more recently listed sites. In other

words, this method will always show that recent processing times are an improvement over earlier processing times. As sites are completed in the future, average completion times will grow for each listing year containing these sites.

5. EPA's efforts to explore alternatives to listing sites are noteworthy. However, the Congress in the 1986 SARA legislation established a goal for completing evaluations of nonfederal sites within 4 years of their discovery and for certain federal sites within 2.5 years. The agency still maintains these time goals as its stated policy. We disagree with EPA's assertion that shortening the average time taken to evaluate sites for placement on the NPL may not be desirable. Placing a site on the NPL associates it with the nation's most hazardous waste sites. To be considered for listing, a site must demonstrate that it has potential adverse effects on human health or the environment. For communities near a toxic waste site, the time taken to investigate and decide on a site's listing may indeed be relevant and an early decision may be desirable.

6. We revised our statement of the act's purpose and included enforcement activities among the reasons EPA officials cited for long listing and cleanup time frames.

7. According to EPA, the results of its recent changes will not be complete for 8 to 10 years. We previously testified that EPA's current policy initiatives are a step in the right direction to improving the pace of Superfund cleanups. However, to effectively manage the new initiatives, EPA managers cannot wait 8 to 10 years to determine whether the recent changes work. EPA managers need data to measure the effects of the new policy initiatives.

8. See comment 4. EPA's reference to figures 1 and 2 applies to the two parts of figure 1.

9. EPA stated that backlogs of sites awaiting processing increase the time taken to list and clean up sites over time. We agree that backlogs have contributed to increased time frames. In July 1993, we reported in Superfund: Backlog of Unevaluated Federal Facilities Slows Cleanup Effort (GAO/RCED-93-119) that the existence of substantial backlogs of unevaluated federal sites was a principal reason why EPA had not met its statutory deadlines under SARA for making listing decisions. We reported that EPA had not placed a high enough priority on assessing federal facilities and that EPA and other federal agencies had never established a

plan for jointly responding to SARA's deadlines. For nonfederal sites awaiting Superfund listing decisions, SARA provided that EPA should evaluate such sites for listing, when warranted, within 4 years of SARA's enactment. For many sites, this goal was not met. We believe—and EPA agrees elsewhere in its comments—that backlogs of sites dating from the creation of the program are not the only reason for the increase in completion times.

10. The data we used in preparing our charts showing the average time between site discovery and the completion of various steps leading to listing did not include extensive periods preceding CERCLA's enactment in 1980. Specifically, 200 sites discovered before October 1, 1969, were excluded from the analysis, and all sites discovered between October 1, 1969, and September 30, 1979, were adjusted to set a discovery date of October 1, 1979. However, we have revised the charts to begin the trend lines in 1986 to exclude possibly unrepresentative sites completed early in the program.

11. See comment 4.

12. There are extremes at either end of the processing time curve. While some sites may take only a few months to list, as EPA maintains, others take significantly longer than average. We do not disagree with EPA's statement that the agency can expedite the processing of certain sites.

13. EPA argues that because it does not have full control over the time between a site's proposed and final listing, the length of this period is not a good measure of its performance. EPA's data indicate that the time required for this processing step has remained fairly constant over the life of the program and was not a factor leading to the increase in processing times. For example, from 1992 through 1995, it took 1.2 years, on average, to finalize the listing of a nonfederal site proposed for listing. This is slightly less than the 1.4 years taken, on average, from 1983 through 1995.

14. We included federal facilities listed in 1983 and 1984 because they were included in CERCLIS. However, in view of EPA's comment and the limited number of federal listings until 1990, we have deleted federal facilities listed before 1990.

15. We have revised our report as suggested and deleted the sentence in question.

16. A statement indicating EPA's disagreement with our presentation of the duration data was added to the agency comments section of the report. See comment 4.

17. We have deleted the years before 1986 from our analysis to eliminate possibly atypical sites that were completed early in the history of the Superfund program. Also, we have added the data in appendix III to the report to supplement the trend lines shown in the report's figures and indicate for the reader how many sites or operable units were tracked in these figures.

18. See comment 4.

19. Sentence deleted.

20. See comment 4.

21. See comment 17. Also, we note that our report does present data on "discrete milestones." For example, it presents information on the times taken to complete preliminary assessments, site inspections, the selection of remedies, and other steps in the Superfund process.

22. The data mentioned by EPA from figure 3 represent the average time taken to clean up 17 distinct operable units in 1986. The data in figure II.2 represent the average time taken to select a remedy for 82 other distinct operable units for that same year. These data are not inconsistent or inappropriate, as EPA implies, because they represent two distinct universes.

23. See comment 3.

24. The Congressional Budget Office's (CBO) 1994 study is based on "estimated" average durations from the proposal for listing through the completion of construction, while our data represent actual durations for operable units and sites from the final listing through the completion of the remedial action. The main finding of CBO's report was that the average time between the proposal for listing and the completion of construction will be at least 12 years for the first 1,249 sites. CBO obtained its data through interviews with remedial project managers. The managers estimated that the completion time for the nonfederal sites proposed for listing from 1981 through 1983 would average 12.9 years, while the

completion time for the nonfederal sites proposed from 1984 through 1992 would average 9.6 years.

CBO's report said that the difference between the two estimates (of 12.9 years and 9.6 years)

“may merely be evidence of the overoptimism suspected by officials at EPA headquarters. The sites listed more recently have generally not progressed as far through the Superfund pipeline; for example, only 16 percent of those with actual or estimated completion dates had been finished by 1993, compared with 31 percent of the early sites.”

25. We continue to believe that EPA's efforts to expedite cleanups are steps in the right direction. However, enough time has now elapsed for EPA to evaluate the progress and effects of the program to date. Over 4 years have elapsed since EPA formally initiated SACM, and over 2 years have elapsed since the agency proceeded to fully implement the program. As indicated in this report, our review of non-time-critical removals showed limited use of this SACM component in EPA's regions.

26. We have revised our report to indicate in the agency comments section that EPA regards factors such as budget shortfalls, legislative and administrative weaknesses in the current program, and a continuing influx of large and complex sites as barriers that undermine its efforts to increase the pace of assessments and cleanups.

27. See comment 9.

28. The presumptive remedy for municipal landfills was issued by EPA in September 1993. An EPA directive with the same date stated that presumptive remedies were expected to be used at all appropriate sites. The time savings cited by EPA were achieved at three pilot sites that used the landfill presumptive remedy in the spring of 1992. EPA's December 1996 annual report on Superfund administrative reforms stated that the agency is beginning to collect and analyze data on the use of presumptive remedies. At the time of our review, no adequate data were available to assess the effects of presumptive remedies on the time taken to complete the Superfund process.

29. We added EPA's estimate of the time savings attributable to these reforms to the report.

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