

GAO

Report to the Chairman, Subcommittee on
Oversight and Investigations, Committee
on Energy and Commerce, House of
Representatives

July 1988

SUPERFUND CONTRACTS

EPA Needs to Control Contractor Costs



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

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July 29, 1988

The Honorable John D. Dingell
Chairman, Subcommittee on Oversight
and Investigations
Committee on Energy and Commerce
House of Representatives

Dear Mr. Chairman:

You asked us to determine whether the Environmental Protection Agency (EPA) has adequate controls in place to ensure cost-effective work under its Superfund remedial contracts. This report primarily discusses the need for EPA to exercise sufficient cost control over remedial contractors. In addition, it addresses ways to improve the award fee process and strengthen prime contractor subcontracting procedures.

As arranged with your office, unless you publicly announce its contents earlier, we plan no further distribution of this report until 30 days from the date of this letter. At that time, we will send copies to the Administrator, EPA, and to other interested parties and make copies available to others upon request.

The major contributors to this report are listed in appendix II.

Sincerely yours,

A handwritten signature in cursive script that reads 'J. Dexter Peach'.

J. Dexter Peach
Assistant Comptroller General

Executive Summary

Purpose

Between 1982 and 1985, the Environmental Protection Agency (EPA) awarded five contracts, valued at about \$894 million, to engineering firms to study the extent of contamination at hazardous waste sites and devise cleanup strategies under the Superfund program. These are large, multiyear, cost-reimbursement-type contracts that offer EPA flexibility in directing work but that also carry inherent cost risks. Because of these risks, EPA must exercise increased oversight to ensure that the contractor uses efficient methods and effective cost controls.

Concerned whether EPA has exercised adequate oversight, the Chairman, Subcommittee on Oversight and Investigations, House Committee on Energy and Commerce, requested GAO to determine, among other things, whether EPA has adequate controls in place to ensure cost-effective contractor work. To evaluate the adequacy of these controls, GAO reviewed contractor performance at 43 hazardous waste sites.

Background

The Superfund program, enacted in 1980, provided EPA with \$1.6 billion to clean up inactive hazardous waste sites (remedial actions) and for other related purposes. The Superfund Amendments and Reauthorization Act, enacted in 1986, provided an additional \$8.5 billion.

Before a site can be cleaned up under the remedial portion of the Superfund program, EPA must first determine the type and extent of the contamination and identify and evaluate alternative cleanup strategies. To perform these remedial studies, EPA relies on the services of various engineering contractors. In some instances, these contractors rely on subcontractors to perform certain remedial study tasks. EPA has chosen to use cost-plus-award-fee contracts under which the contractor is entitled to reimbursement for all allowable costs, a base fee, and an award fee determined by EPA's subjective evaluation of contractor performance. In addition, the contractor earns similar base and award fees on subcontracting costs. Because the contractor has limited incentives to control costs under this contract type, EPA must monitor the contractor's performance closely.

Results in Brief

EPA has not sufficiently monitored, controlled, and challenged contractor expenditures and professional hour usage for remedial studies. Instead, EPA management focus, resulting from the urgency to expeditiously clean up abandoned waste sites, has been on the timeliness and quality of remedial studies without sufficient attention to cost control. In over

50 percent of the 43 sites GAO reviewed, inadequate contractor or sub-contractor performance, as determined by EPA, increased the cost of performing the remedial studies. EPA did not, however, challenge questionable costs for most of these increases although it has options for doing so. By not consistently and fully challenging questionable contractor costs, EPA could be conveying a message to contractors that it is willing to accept all costs regardless of the level of performance provided, thereby lessening the contractors' incentives to control costs. As a result, EPA may be paying more than needed for remedial studies.

EPA's distribution of award fees is based on a two-phased process intended to motivate successful contractor performance. Although EPA is following its process, the process itself may not be structured to maximize contractor performance. Contractors in GAO's sample that were judged to have less than satisfactory performance earned between 29 and 45 percent of the total award fee available. In addition, because EPA does not consistently include an assessment of the prime contractors' management of subcontractors in final contractor performance evaluations, it does not have sufficient information on which to assess prime contractor management of subcontractors and to make award fee decisions.

Principal Findings

Cost Control

At 41 of the 43 sites GAO reviewed, contractors experienced substantial cost increases over the course of the remedial studies. While some of these increases were due to legitimate reasons, such as unforeseen circumstances at the sites, inadequate contractor performance, according to EPA, increased the costs of performing the remedial studies at 22 of the 43 sites.

GAO found no evidence that EPA officials challenged the increased costs resulting from inadequate contractor performance at 18 of the 22 sites involved. EPA regional officials responsible for monitoring contractor work at sites often said that they did not challenge these costs because they believed that the contract type required them to pay for all costs incurred. Procurement officials told us that (1) challenging questionable costs under a cost-reimbursement contract is a difficult and time-consuming process and (2) the probability of sustaining such a challenge and achieving cost savings would have to be high in order to justify the

resources that would be required to do so. Further, EPA's management focus, resulting from the urgency to clean up waste sites, has been on the timeliness and quality of remedial studies, rather than on their cost.

Options do exist, however, for EPA to deal with questionable contractor costs. Depending on the nature, amount, and severity of the inadequate performance, EPA could (1) negotiate with the contractor to absorb part of the increase, (2) authorize the increase but not allow a corresponding increase in the base fee and award fee available, (3) refuse to authorize the increase, (4) terminate the contractor's work at the site, or (5) attempt to disallow the questionable costs. Each of these options has contractual, legal, and practical limitations, but EPA has successfully used such options in the past.

Award Fees

Contractors in GAO's sample who were judged to have less than satisfactory performance earned between 29 and 45 percent of the total award fee available. This occurred because under the current structure of the award fee process, EPA makes decisions on a substantial portion—43 percent—of the total award fee on the basis of periodic contractor performance evaluations while the remedial study is underway. As a result, contractors earned the majority of this portion of the award fee before the remedial studies were completed and before EPA could assess the overall quality of the contractors' work.

The award fee process also contributes to overall contracting difficulties because EPA performance evaluation criteria do not require an assessment of the prime contractors' management of subcontractors. Although 60 percent of the final evaluations GAO reviewed addressed subcontractor performance and/or prime contractor management of subcontractors, 40 percent did not. Such information is necessary because (1) subcontracts represent a substantial cost in performing remedial studies—about 35 percent of the total cost of the 38 sites in GAO's sample that used subcontractors, (2) EPA bases part of the award fee on subcontractor costs, and (3) inadequate subcontractor performance adversely affected the quality, timeliness, or cost of 18 of the 38 sites in the GAO sample that used subcontractors.

Recommendations

GAO recommends that the Administrator, EPA, affirm his commitment to cost control on remedial contracts by communicating the importance of balancing timeliness, quality, and costs to officials responsible for the remedial contracts. GAO also recommends that the Administrator

improve oversight of remedial contractor performance and expenditures by directing officials responsible for remedial contracts to take appropriate actions to challenge and deal with questionable costs.

Further, GAO makes a number of other contract-related recommendations, including improvements to the award fee process to make it a more meaningful incentive for cost control, timeliness, and quality work under the remedial contracts.

Agency Comments

GAO discussed the factual information presented in this report with EPA officials responsible for using and monitoring the remedial contracts. These officials agreed with the facts presented in the report and their comments have been included where appropriate. However, as requested by the Chairman's office, GAO did not obtain official agency comments on this report.

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Abbreviations

| | |
|---------|---|
| CERCLA | Comprehensive Environmental Response, Compensation, and Liability Act |
| EPA | Environmental Protection Agency |
| GAO | General Accounting Office |
| NPL | National Priorities List |
| REM/FIT | Remedial Engineering Management/Field Investigation Teams |
| SARA | Superfund Amendments and Reauthorization Act of 1986 |

The Remedial Process

EPA's remedial process for cleaning up sites is multiphased and can take years to complete. Potential hazardous waste sites come to EPA's attention as a result of reports filed by those who transported, stored, or disposed of hazardous wastes; state and local authorities; and citizens who become aware of something suspicious. Under EPA's assessment process, a site identified in this way first undergoes a preliminary assessment, which generally entails a cursory review of readily available information about wastes present at the site. If the problems are deemed serious, EPA then conducts a site investigation, which includes an on-site visit, sampling, and further analysis of waste problems. The most serious sites are placed on the National Priorities List (NPL). Superfund monies are targeted to finance cleanup costs at NPL sites. State governments or responsible parties fund cleanups at other sites.

After a site has been placed on the NPL and selected for cleanup, EPA studies the hazardous conditions existing at the site. These studies involve (1) a remedial investigation to determine the type and extent of contamination at the site and (2) a feasibility study to analyze various cleanup alternatives and assess their cost effectiveness. The feasibility study is often conducted with the investigation as one project—a remedial investigation/feasibility study, hereinafter referred to as remedial studies.

EPA then selects the most appropriate final remedy and documents it in a Record of Decision. Following the decision, the remedy—which can include monitoring site conditions, removing wastes, or building a water treatment facility—is then designed and implemented. Our primary focus was on the conduct of the remedial studies.

Use of Contractors for Conducting Remedial Studies

To conduct most of the steps in the remedial process, including the remedial studies, EPA relies on the services of various engineering firms. Between 1982 and 1985, EPA awarded five large, multiyear, cost-plus-award-fee contracts to four engineering firms to perform remedial studies at hazardous waste sites.¹ The total value of these five remedial contracts was about \$894 million.

¹Under these five contracts, contractors may also perform certain other tasks related to the remedial process. (See app. I.)

Table 1.1: EPA Remedial Contracts

| Dollars in millions | | |
|---------------------|----------------------|--------------|
| Contract | Contract term | Value |
| REM/FIT zone I | 9/30/82 to 9/30/86 | \$103 |
| REM/FIT zone II | 10/1/82 to 10/30/86 | 222 |
| REM II | 6/1/84 to 5/31/89 | 167 |
| REM III | 11/4/85 to 9/30/90 | 198 |
| REM IV | 11/19/85 to 9/30/90 | 204 |
| Total | | \$894 |

According to the acting chief of the Remedial Action Branch, Procurement and Contracts Management Division, the two REM/FIT contracts were awarded using the normal competitive procedures which included consideration of both technical ability and cost. The three other remedial contracts are classified as contracts for architectural and engineering services, according to EPA contracting officers. Federal acquisition regulations require that architectural and engineering contractors be selected on the basis of their professional credentials and abilities rather than on the basis of cost competition. EPA, in the case of these three remedial contracts, negotiated contract costs with each contractor selected.

Except for the REM II contract, the remedial contracts are zone contracts. That is, each of these contracts cover either the eastern United States (EPA regions I through IV) or the western United States (regions V through X). The REM II contract is a national contract, covering all 10 regions, which was awarded to accommodate program growth and alleviate work capacity problems experienced with the two earlier-awarded REM/FIT contracts.

Use of Cost-Plus-Award-Fee Contracts

The remedial contracts are cost-plus-award-fee contracts, whereby EPA must reimburse the contractor for all allowable costs incurred. In addition, the contractor earns a base fee of about 3 percent of allowable costs and an award fee of up to 7 percent of allowable costs that is awarded based on EPA's subjective evaluation of the contractor's performance.

EPA has also chosen to use the “term form” of the cost-plus-award-fee contract type.² Under a term-form contract, the government is purchasing a specific number and type of professional and technical hours, or level of effort, within the time period set forth in the contract. These hours are for engineers, scientists, statisticians, technicians, and other professionals who work on the individual projects. The contractor is obligated only to put forth its “best effort” in delivering these hours rather than to provide a specific product, although a product, such as a report, usually results.

The total estimated price of the contract is derived by multiplying the number of professional and technical hours by a composite wage level (a weighted average of the different professional and technical wage levels the contractor expects to use on the contract) and adding in other costs such as subcontracting, overhead, and fees. Thus, the remedial contracts contain a professional and technical hour ceiling, referred to as contract capacity, as well as a separate dollar ceiling.

According to federal acquisition regulations, cost-reimbursement-type contracts are appropriate only when the uncertainties involved in contract performance do not permit costs to be estimated with sufficient accuracy to use any type of fixed-price contract (a contract type that provides for a price that is not subject to adjustment on the basis of the contractor’s cost experience in performing the contract). According to EPA officials, the use of a cost-reimbursement contract to perform remedial studies is warranted because the many unknowns and uncertainties involved in defining contamination problems at hazardous waste sites make it difficult for either EPA or the contractor to precisely foresee the extent of work required or its associated costs.

Subcontractor Involvement

Under the remedial contracts, the prime contractors often supplement their staffs with the services of subcontractors. As such, subcontracting constitutes a substantial amount of Superfund contracting dollars. Under the five remedial contracts, approximately 35 percent, or about \$9 million, of the costs of the remedial studies we sampled were attributable to subcontracting. Prime contractors used subcontractors extensively to perform a wide variety of specialized tasks supporting

²EPA used the term form for the portions of remedial contracts dealing with the conduct of remedial studies. EPA used the “completion form,” which requires that the contractor deliver a specific end product, for other portions of the contracts.

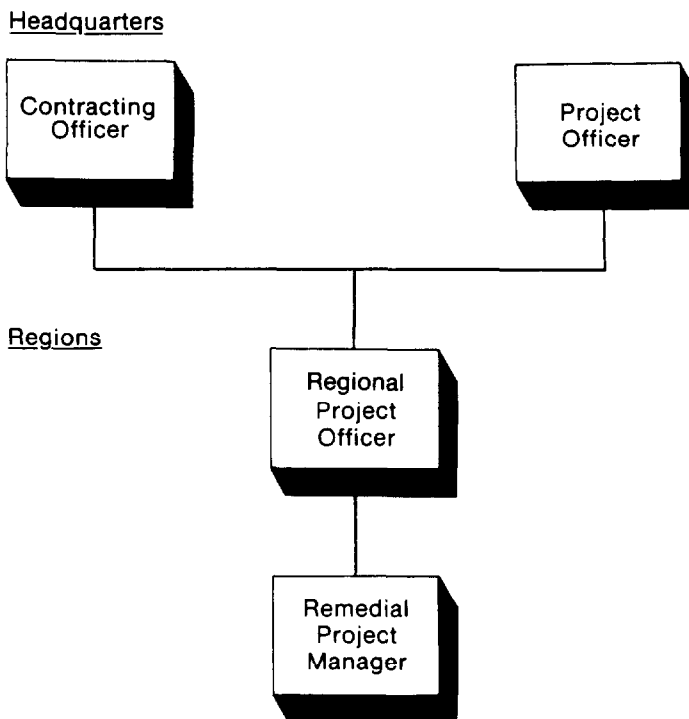
remedial studies, such as drilling, sampling, aerial photography, survey and mapping, or to complete entire remedial studies.

The government has no legal right to deal directly with subcontractors because the government does not have a direct contractual relationship with these firms. Instead, the prime contractor has the direct contractual relationship with the subcontractors and is responsible for their performance. The government is limited to managing the subcontracts through the prime contractors.

EPA's Contract Management Structure

EPA contracting officers and their technical representatives, both in headquarters and the regions, have a close partnership in managing the remedial contracts, as depicted in figure 1.1. The contracting officer is EPA's agent in charge of administering the contract, including such duties as signing the contract, obligating funds, issuing work assignments,

Figure 1.1: EPA's Contract Management Structure Headquarters



Source: Adapted from EPA guidance and directives for the Superfund remedial contracts.

modifying contract terms, and terminating the contract. Organizationally, the contracting officers are located within the Procurement and Contracts Management Division of the Office of Administration and Resources Management within EPA.

The contracting officer has a number of technical representatives. At the headquarters level, the Office of Emergency and Remedial Response within the Office of Solid Waste and Emergency Response is responsible for managing Superfund remedial activities. Designated project officers within this office are responsible, as representatives of the contracting officer, for monitoring the technical aspects of a single contract. In EPA's 10 regional offices, the regional project officers are responsible for monitoring the technical performance of the work in that region. Under the regional project officers are remedial project managers responsible for monitoring project work at individual sites. Their job involves monitoring the contractor's work, providing technical guidance to the contractor, and evaluating contractor performance. The remedial project managers are also responsible for providing feedback to the contracting officer on contractor cost, performance, and scheduling.

Work Assignments

When EPA officials want a contractor to perform a remedial study at a specific Superfund site, they must prepare a work assignment that includes an estimate of the level of effort needed and a general statement of work to be performed. After it is approved by program officials, the contracting officer issues the work assignment to the contractor and modifies the contract to obligate funds for the project. The contractor then submits a work plan to EPA outlining a proposed technical approach and a more precise estimate of the funds and hours needed. This work plan is reviewed and approved by the project and contracting officers. When it is necessary to increase funding for a work assignment or revise the work plan, the contractor must submit a request for an amendment to the remedial project manager and regional project officer for approval, and to the contracting officer for authorization of the funds.

Contracting Initiatives

EPA is in the process of implementing a new contracting initiative called the alternative remedial contract strategy. This strategy will replace the few large-zone remedial contracts of the type we reviewed with between 40 and 50 regional prime contractors who will oversee all phases of site cleanup, including the remedial study phase. Under this strategy, the remedial contracting functions, including those of the contracting

officer, will be decentralized to the regions. EPA plans to divide the country into seven regions, each of which will award 10-year, cost-plus-award-fee contracts to qualified firms. As of April 4, 1988, EPA had awarded three contracts in both regions III and V. According to the Office of Emergency and Remedial Response's contract management system plans for 1988 through 1992, EPA plans to award the remaining new contracts by 1989.

The alternative remedial contract strategy, which emphasizes the decentralization of the contracting function to the regions, has several advantages. First, EPA expects that the strategy will accelerate site cleanups because it will promote project continuity, reducing the number of projects transferred from one organization to another. Second, the strategy provides incentives for contractor performance. EPA will exercise contract options for additional work under the contract on the basis of contractor performance, and EPA may decide not to assign additional work, beyond the base number of professional hours specified in the contract, to a contractor that performs poorly. Third, the multiple contract awards will increase competition among a larger number of firms. EPA hopes that this increased competition will promote cost, schedule, and technical quality control. Fourth, EPA believes that regional delegation for assigning the work and managing the contractors will improve management because it places decisions where information is readily available, streamlines contract and project management, and enhances contractor accountability to a region as a primary client.

In addition to the move toward alternative contracting mechanisms, EPA created, in fiscal year 1988, an office of Contract Operation Review and Assessment within the Office of Emergency and Remedial Response. Though still in its formative stage, this office will, among other things, assess contract management activities and help develop long-term contracting strategy for the Superfund program. According to the director of this new office, the Director of the Office of Emergency and Remedial Response wanted to establish a proactive, rather than reactive, approach toward managing Superfund contracts.

Previous Contracting Reviews

GAO has issued three reports concerning EPA's use of contractors. In addition, the EPA Inspector General issued a report on the Emergency Response Cleanup Services contracts, a related area, on September 23, 1986. The emergency contracts are used to support emergency removals under Superfund.

Our 1982 report entitled EPA's Use of Management Support Services (GAO/CE-82-36) provided information on (1) the extent and nature of EPA's reliance on contractors to obtain management support services, (2) EPA's contracting methods followed in procuring such services, (3) contractor performance, and (4) EPA's use of individual experts and consultants.

Our second review was concerned with EPA's extensive use of cost-reimbursement-type contracts. In this 1985 report entitled The Environmental Protection Agency Should Better Manage Its Use of Contractors (GAO/RCED-85-12), we concluded that EPA was emphasizing the accomplishment of program goals and objectives at the expense of sound contract management. We recommended that EPA (1) increase the priority given to procurement operations and (2) require contracting officers to become more involved in monitoring individual work assignments as required by federal regulations. In 1987 we reported on the status of EPA improvements initiated in response to this report in a fact sheet entitled Status of EPA's Contract Management Improvement Program (GAO/RCED-87-68FS). EPA improvements included (1) increasing resources for contract management, (2) strengthening the project officer system, (3) improving and simplifying the contract management process, and (4) providing for additional technical guidance and assessments.

The EPA Inspector General's review of emergency response contracts evaluated the efficiency, effectiveness, and economy of the contracts, considering both contract award and administration. Deficiencies were identified in a number of areas, including competition, subcontractor price reasonableness, and monitoring by contracting officers. In response to this report, EPA has moved toward the use of smaller regional and site-specific contracts to increase competition. In addition, to help ensure cost reasonableness, EPA revised formerly vague contract language to be more specific and required contractors to provide additional documentation on costs incurred. EPA also plans to hire and train additional contracting officers.

Objectives, Scope, and Methodology

The Chairman, Subcommittee on Oversight and Investigations, House Committee on Energy and Commerce, asked us to determine whether EPA had established the proper controls to ensure high-quality, cost-effective, and timely work under its Superfund remedial contracts. More specifically, and as subsequently agreed with the Chairman's office, we examined

- whether EPA has placed adequate controls on the authorization of funds and hours for individual work assignments to ensure cost-effective contractor work;
- to what extent EPA monitors contractors' progress to ensure timely, high-quality, and cost-effective work, and whether EPA officials had sufficient information and incentive for monitoring purposes;
- how the award fee process used under these contracts might be improved to provide greater incentives to the contractor to control costs, timeliness, and quality; and
- whether EPA has placed adequate controls on the prime contractors' management of subcontractors to ensure high-quality, cost-effective, and timely work.

In the initial phase of our review, we found that EPA monitoring and control efforts focus on the timeliness and quality of the contractor's work rather than on cost. During this phase, we identified cost as the greatest point of risk under the remedial contracts. Our focus, therefore, was on the adequacy of EPA's cost controls for the remedial contracts.

To accomplish the above objectives, we used a multiple case study design. We reviewed all complete or substantially complete work assignments for the five remedial study contracts in EPA regions III (Philadelphia) and V (Chicago) as of December 31, 1986. These regions were selected on the basis of their contract responsibility for a large number of Superfund sites. Because this is not a probability sample, we cannot generalize from our findings to the total population of work assignments under all the contracts. (For detailed information on our universe definition and sample selection, see app. I.)

Using this approach, our sample of remedial study work assignments totaled 52, or 37 percent, of the universe of 139 similarly defined work assignments on the five contracts for all 10 EPA regions. The contract dollars expended for our sample were approximately \$26 million, or 36 percent, of the \$71 million total for the universe of 139 work assignments. EPA began 34 of these work assignments in 1983, 13 in 1984, and 5 in 1985 and 1986. We reviewed contractor performance and EPA actions on these work assignments through December 31, 1986. This cut-off date was used because it coincided closely with the timing of our sample selection.

In our sample, we usually found one work assignment for each site in our sample, although, in some cases, EPA issued more than one work assignment per site. For example, in some cases, EPA issued separate

work assignments for the remedial investigation and the feasibility study. As a result, we reviewed 52 work assignments related to 43 sites. We completed detailed case studies on each of these 43 sites.

For each case study, we completed a structured data collection instrument to collect financial and performance information. We obtained this information from (1) contract and project office files, (2) official work assignment files in the regions, and (3) contractors' subcontracting files. We also conducted structured interviews with 35 remedial project managers directly responsible for the projects. In these interviews, we obtained specific project information as well as the managers' views on the adequacy of EPA's contract controls and suggestions for improvement. Finally, we summarized the structured data collection instruments and interviews and analyzed this data base.

In addition to the case study review and analysis, we interviewed responsible project and contract officers at EPA headquarters and officials in EPA regions V (Chicago) and III (Philadelphia) and obtained EPA guidance and policy on controlling cost, timeliness, and quality under the remedial contracts. We also reviewed applicable federal and EPA acquisition regulations. Finally, we talked to three of the four remedial contractors about their subcontracting procedures.

We reviewed the EPA Administrator's fiscal years 1983 through 1987 Federal Managers' Financial Integrity Act reports for previously reported internal control weaknesses in the Superfund program and looked at those weaknesses in connection with the five remedial contracts.

As requested by the Chairman's office, we did not obtain agency comments on the report. We did, however, discuss the factual information contained in the report with EPA officials responsible for using and monitoring the remedial contracts. These officials agreed with the facts presented and their views have been incorporated into the report where appropriate.

Our work was conducted from October 1986 through February 1988. This review was performed in accordance with generally accepted government auditing standards.

Insufficient Controls Over Contractor Costs

EPA has not sufficiently monitored, controlled, and challenged contractor expenditures throughout the life of the remedial studies. Instead, EPA's management focus, resulting from the urgency to expeditiously clean up abandoned hazardous waste sites, has been on the timeliness and quality of remedial study work assignments, without sufficient attention to cost control. At over 50 percent of the sites we reviewed, inadequate contractor or subcontractor performance, as determined by EPA, increased the cost of performing remedial studies. EPA did not, however, deal with questionable costs for most of these increases although it has options for doing so. By not consistently and fully challenging questionable contractor costs, EPA may, in effect, be conveying a message to contractors that it is willing to accept all costs regardless of the level of performance provided, thereby lessening the contractors' incentives to control costs. As a result, EPA may be paying more than needed for remedial studies.

Need for Cost Control

By using cost-plus-award-fee contracts for completing remedial studies, EPA has the flexibility needed to change contractor work tasks and authorize additional funds to deal expeditiously with the uncertainties that occur in remedial work. For example, the first phase of a remedial investigation may reveal unexpected contaminants. EPA can respond by authorizing changes in the contractor's work plan as well as dollar and hour increases to deal with the situation. Some unexpected changes may be even more immediate. For example, if during well drilling, gaseous releases contain higher levels of contamination than expected, EPA can quickly authorize the contractor to use a higher level of safety equipment at a higher cost.

However, the structure of a cost-reimbursement, term-form contract provides the contractor with limited incentive to control either costs or its use of hours. In contrast to the cost incentives built into a firm fixed-price contract, where every dollar saved is an additional dollar of contractor profit, the contractor under a cost-reimbursement contract is entitled to reimbursement for all allowable costs plus fees. Similarly, because EPA pays the contractor for its best efforts in delivering the hours agreed to in the contract, rather than on results achieved or products delivered, the contractor has little incentive to limit the number of hours it uses.

Under a cost-reimbursement contract, therefore, the government must monitor the contractor's work closely. According to federal acquisition regulations, a cost-reimbursement contract may be used only when appropriate agency oversight will provide reasonable assurance that the

contractor uses efficient methods and effective cost controls. According to EPA's Project Officer's Handbook, project officers must monitor the contractor's efforts under this type of contract to avoid waste of public funds and obtain quality services within both the dollar and hour budgets. According to EPA contract administration guidance, the more a contractor realizes that EPA is closely watching the status of funds and contractor expenditures, the more incentive the contractor has to be economical.

As provided for in federal regulations, EPA guidance, and the remedial contracts, EPA has an array of management controls it can use to plan, authorize, monitor, restrict, and evaluate contractor work and expenditures. These controls are interrelated throughout the life of a work assignment. Initially, EPA can exercise control over the contractor when it prepares a work assignment to outline the scope of a remedial study of a site and the government's estimated level of effort to complete the study. EPA can exercise control over contractor performance and expenditures each time it considers authorizing the contractor to perform tasks and expend dollars and hours. EPA can review the contractor's work plan to ensure that the contractor's technical approach to the study, the budget, and the schedule are appropriate and reasonable. In addition, during the course of the work assignment, it may become necessary to modify the study scope, schedule, or budget. EPA can exercise control over contractor requests for work assignment changes, such as budget increases, by scrutinizing requests, negotiating possible reductions with the contractor, and challenging questionable increases. In addition, EPA can decide to partially approve an increase or deny fees on the increase. EPA can monitor the contractor's work and costs through several controls, including reviewing invoices and constantly communicating with the contractor. EPA can restrict contractor efforts and costs by stopping or terminating a work assignment and disallowing unallowable costs. EPA can also exert control over the contractor through its evaluation of contractor performance for award fee determinations (see ch. 3).

Inadequate Information to Evaluate Contractors' Budgets

Although remedial project managers generally reviewed and analyzed contractor work plans, they had little remedial study cost information, other than previous contractor work plans, with which to compare proposed contractor costs. As a result, EPA, in effect, has allowed the contractors to establish the parameters it uses for measuring the reasonableness of contractor cost proposals. EPA is in the process of

developing, as an aid in budget preparation, cost information on remedial study tasks. However, this project is incomplete and has experienced delays due to a lack of resources.

The contractor's remedial study work plan is the primary work assignment planning document that defines the technical approach to the study, the budget, and the schedule. When EPA issues a work assignment to a contractor to start a remedial study, the contractor must complete a work plan that describes tasks in detail and provides an initial dollar and professional hour budget estimate for each task. According to EPA contract administration guidance, work plans provide EPA with the basis for guiding the contractor's work, measuring progress and performance, and controlling costs.

EPA reviews the work plan to ensure that the contractor's understanding of and approach to accomplishing the remedial study are within the scope of the work assignment and that the proposed level of staffing and resources is appropriate, sufficient, and reasonable for performing the work. The remedial project managers are responsible for reviewing, revising, and recommending approval of work plan tasks. In addition, according to their position descriptions, remedial project managers are responsible for recommending approval/disapproval of any aspect of the proposed work assignment budget except for costs established by the contract. Remedial project managers may request backup information on the work plan from the contractor and may negotiate specific dollar and hour estimates for each task, including those that appear excessive. The EPA contracting officer then approves the work plan and authorizes dollar and hour budgets that the remedial project manager has determined are necessary to carry out the plan.

All of the remedial project managers who responded to our question said that they analyzed contractor work plans for sites in our sample. Most of these remedial project managers said that they reviewed the work plan for dollar and hour usage and to ensure that the contractor included all necessary tasks for completing the work. In addition, the remedial project managers often had other EPA officials review the work plan, and one region had a peer review group, composed of EPA specialists from other programs, review plans for technical quality. Also, about 68 percent of the remedial project managers told us that they negotiated the scope of work for the remedial study with the contractor. For example, because work plan costs appeared high, a remedial project manager reduced the initial budget by asking for four staff rather than five to

complete a task and, in another case, cut back on the number of wells to be drilled.

Although remedial project managers told us that they analyzed contractor work plans for sites in our sample, 56 percent of the remedial project managers we interviewed did not say that they used a cost comparison in work plan review. Those who reported making some comparison usually said they referred to work plans from other remedial studies or consulted with other remedial project managers to analyze whether the contractor planned to expend a reasonable amount of funds and hours for the remedial study. One remedial project manager told us that early on in the Superfund program, EPA relied on the contractors to determine remedial study budgets because remedial project managers had no idea how much the studies should cost.

Remedial project managers also told us that they would like additional guidance on work plan review. Fifty-eight percent of the remedial project managers we questioned said they did not have adequate guidance in developing work plan estimates, and when asked what type of guidance was needed, 33 percent said they needed information on acceptable cost ranges for remedial study tasks.

Federal procurement regulations and EPA's contract procurement and administration guidance are silent with respect to what information remedial project managers should use to review contractor work plans other than their best engineering judgment and experience on similar projects. However, sound management principles dictate that remedial project managers use information on acceptable cost ranges (in both dollars and hours) for each remedial study task in order to determine the reasonableness of such plans.

Recognizing this problem, EPA has undertaken a project to develop acceptable cost-range information on remedial study tasks, but the project has suffered from a lack of resources. EPA started developing information to estimate remedial study costs and schedules in 1986 using historical data on remedial study tasks and site-specific information. According to the chief of the Remedial Response Section, Office of Solid Waste and Emergency Response, EPA began the project to aid remedial project managers and regional staff in developing project remedial work assignment cost estimates for Superfund budget preparation. EPA had completed only the first 3 of approximately 15 remedial study task cost estimates when the project was put on hold in 1987 due to lack of

resources. EPA restarted the project in April 1988 and is revising the project methodology to include an independent verification of remedial study costs and schedules, as well as historical data and site-specific information. However, EPA has funded only one of four segments of the project, according to the EPA budget analyst responsible for the project.

Historical cost information would assist EPA in controlling contractor costs on remedial studies by providing the remedial project managers with a stronger basis for reviewing contractor work plans and evaluating contractor requests for budget increases. Further, it would provide a sound basis for assessing whether contractor-incurred costs are excessive or unreasonable.

Contract Cost Increases Not Always Challenged

EPA has not taken sufficient action to control cost increases on the remedial study work assignments that we examined. Although some of these increases were for legitimate reasons, inadequate contractor or subcontractor performance, as determined by EPA, increased costs on 22 (51 percent) of the sites in our sample. We found that EPA did not challenge these questionable contractor cost and hour increases on 18 of the 22 sites involved. Remedial project managers often told us they did not challenge costs because they believed that the contract type required that they pay for all costs and hours. EPA procurement officials told us that challenging contractor costs due to inadequate performance was a time-consuming and difficult process that could involve contractor appeals. These officials believed that the probability of sustaining such a challenge and achieving cost savings would have to be high in order to justify the resources required to do so. They also emphasized the need for appropriate documentation of the inadequate performance. In addition, according to these officials, the need to expeditiously complete remedial studies might hamper an effort to challenge questionable costs in some cases.

Although a number of options exist for dealing with questionable costs, EPA has not always used them for the remedial contracts. As a result, EPA may be paying more than needed for remedial studies.

Cost and Professional Hour Increases Substantial

Both dollar and professional hour increases were substantial for the sites we examined. Of the 43 sites we reviewed, all but 2 experienced increases in dollar or hour budgets. Dollars increased an average of 48

percent over the initial remedial study work plan budget, from an average work plan amount of \$452,000 to a final budget of \$669,000. Outpacing dollar increases, professional hours increased an average of 63 percent over the initial work plan budget, from an average of about 4,800 to 7,800 hours.

According to EPA officials, there are a number of legitimate reasons for the cost and hour growth experienced for the sites we reviewed. These reasons include unforeseen circumstances at the site or changes to the remedial study, major statutory and program policy changes, and underestimation of resources needed to complete the study. For example, unexpected conditions, such as extensive migration of groundwater contamination, or external factors, such as inclement weather, at the site can increase the costs or hours needed to complete the study. Also, increases may result from changes in market prices over the life of a work assignment. For example, inflation may have increased costs between the time the initial dollar and hour budgets were approved and the time costs for the project were incurred.

The evolution of the Superfund program also contributed to the cost and professional hour growth on remedial studies, according to EPA officials. Legislative changes, as well as internal EPA policy changes regarding the structure and content of remedial studies, have occurred. These changes required EPA to include additional tasks or broaden existing contractor work tasks and increase contractor budgets accordingly. For example, legislation reauthorizing Superfund required EPA to look more closely at alternative treatment technologies in addition to other possible alternatives for disposal, and this task resulted in additional costs and professional hours to some ongoing remedial studies, according to EPA officials.

Inadequate Performance Contributed to Contract Increases

In addition to the legitimate reasons for cost and hour growth, inadequate contractor or subcontractor performance resulted in increased costs and professional hours in 22 (51 percent) of the 43 sites we examined. Due to the lack of documentation in EPA files, we could quantify the cost increases resulting from inadequate performance for only 11 of the sites. These increases totaled \$326,000 and ranged from \$9,800 to \$55,000 per site. Total remedial study costs for these 11 sites was \$6.3 million. We identified inadequate performance based on EPA award fee evaluations, prime contractor evaluations of subcontractors, and judgments by remedial project managers we interviewed.

Contractor performance problems ranged from technical mistakes to inadequately written remedial study reports. For example, contractors placed groundwater monitoring wells in inappropriate locations, made errors in preparing groundwater samples, and inadequately supported remedial study reports and submitted the reports late. These inadequate performances involved the prime contractor, subcontractor, or both; inadequate subcontractor performance was involved in some way at 17 of the 22 sites. According to EPA officials, EPA experienced subcontracting problems on the remedial contracts because of (1) the large amount of subcontracting under these contracts, (2) inadequate prime contractor oversight of subcontractors, and (3) the general inexperience of engineering subcontractors in doing remedial work.

To illustrate inadequate contractor performance, at one site, the prime contractor subcontracted the entire remedial study but had to terminate the subcontract and complete the work itself because the subcontractor performed inadequately. According to EPA's and the prime contractor's evaluations, the subcontractor did not assign sufficient scientific personnel to satisfactorily complete certain tasks and never submitted a critical draft report to the prime contractor. EPA directed that the prime contractor assume full responsibility for the work, complete the outstanding work, and prepare the remedial study report. According to EPA's award fee evaluation, inadequate subcontractor performance and inadequate prime contractor oversight of the subcontractor delayed the remedial study 3 months. We were unable to determine the exact costs incurred resulting from the inadequate prime and subcontractor performance because of a lack of documentation in EPA files. EPA did penalize the prime contractor in the award fee process by awarding the contractor an award fee amount commensurate with less than satisfactory performance.

Questionable Contractor Costs Not Adequately Challenged

No evidence was available that EPA officials challenged contractor costs and hours resulting from inadequate performance in 18 of the 22 sites in our sample. The most frequent answer that remedial project managers gave us regarding the reason for no challenge was that they believed that the contract type required EPA to pay for all contractor hours worked. For example, EPA officials' answers included, "We have to pay no matter how many drafts the contractor has to write to get an acceptable product" and "I am powerless to do anything about costs associated with poor performance under a level of effort contract." As a result, EPA paid for these increases in full, including the corresponding base fee. EPA

did, however, penalize the contractors, to a limited degree, for inadequate performance by not awarding all the award fee available.

On the remaining four sites, the remedial project managers challenged the contractors' requests for budget increases resulting from inadequate performance by referring the cases to higher contracting officials. However, EPA approved the increases in full at all four sites, although at one of these sites, EPA did not authorize a corresponding increase in the base and award fees available. EPA officials responsible for two of the three other sites claimed that they had to approve the increase and could not challenge the contractor further because of the type of contract involved.

To illustrate EPA actions in relation to inadequate performance, at one hazardous waste site in our sample, the prime contractor subcontracted an entire remedial study to another engineering firm. The subcontractor performed poorly and delivered only part of the final study document before finally going out of business. The prime contractor requested about an additional \$40,000 to redo the subcontractor's poor work. The remedial project manager was dissatisfied with this situation but was informed by the regional contracting unit that EPA must pay for additional costs because of the type of contract involved. EPA therefore paid increased costs, plus a base fee.

Options Available for Dealing With Inadequate Performance

As provided for in federal acquisition regulations and the remedial contracts, options exist for dealing with cost and hour increases associated with inadequate contractor and subcontractor performance. Depending on the nature, amount, and severity of the inadequate performance, EPA could (1) negotiate with the contractor, (2) disallow unreasonable costs, (3) not authorize all or part of an increase, (4) authorize the increase but deny the corresponding base and award fees, or (5) terminate the work assignment. EPA's decision to exercise one or more of these options has to be weighed against their contractual, legal, and practical limitations.

Negotiation

When a contractor first requests a budget increase to cover costs and hours due to inadequate performance, the remedial project manager can challenge questionable contractor costs by discussing the request with the contractor, requesting additional justification, and negotiating with the contractor to absorb some or all of the proposed increase. If dissatisfied with the contractor's response, the remedial project manager can elevate the case to the remedial project officer and the contracting

officer, either of whom can attempt further negotiations with the contractor.

Contracting officials could not tell us on how many occasions they negotiated with the contractor concerning inadequate performance under the remedial contracts because, according to the chief of the Remedial Action Branch, Procurement and Contracts Management Division, contracting officers do not always document such negotiations. However, these officials told us that EPA did not have much negotiating leverage with the contractors early in the Superfund program, from September 1982 to June 1984, when it had only two remedial contracts. During this time period, the contractors had little incentive to make concessions because they knew that EPA was depending on them to complete remedial studies to meet program goals and had no other contractors to which to assign the work. Officials also said contractors have generally not been willing to absorb costs.

EPA was, however, successful in using negotiation at one site that was not in our sample. At this site, inadequate prime contractor and subcontractor performance resulted in increased costs. As a result of negotiations, the prime contractor agreed to return to EPA about \$10,000 in base fees the contractor had already received that were associated with the inadequate performance. In addition, the prime contractor disallowed certain subcontractor costs and denied subcontractor fees. EPA may have more negotiation leverage in the future under the alternative remedial contract strategy because EPA will have the option of assigning work to other contractors.

Disallowance

As a second option, EPA can attempt to disallow costs incurred due to inadequate contractor or subcontractor performance. In a cost-reimbursement contract, EPA must reimburse a contractor for all allowable costs in return for its best efforts to perform the work. One of the requirements for determining whether a cost is allowable is that the cost be reasonable. According to federal acquisition regulations, a cost is reasonable if, in its nature and amount, it does not exceed that which would be incurred by a prudent person in the course of competitive business. Although disallowing costs as unreasonable is difficult to sustain, EPA contract administration guidance states that disallowing contractor costs that are unreasonable is a powerful means of persuading a contractor to manage efficiently.

EPA contracting officers did not disallow any costs for the 43 sites we examined. According to the former chief of the Administration Section, Remedial Action Branch, Procurement and Contracts Management Division, demonstrating that costs due to inadequate contractor performance were unreasonable would be time consuming and difficult and, therefore, contracting officers would be reluctant to attempt such an action except in the most extreme cases of inadequate performance. EPA procurement attorneys told us that demonstrating that a contractor did not put forth its best effort in completing a work assignment would be very difficult. According to these officials, the concepts of reasonableness and best effort are elusive and subjective in nature. In addition, the application of these concepts is complicated by the nature of the work involved, the lack of specific performance standards in the remedial contracts, and the mitigating circumstances often surrounding each case, including EPA misdirection and poor documentation of events and decisions. Contractors are given wide discretion in exercising their judgment in performing remedial studies. According to EPA's Cost Analysis Guide, even costs that may be attributed to contractor mistakes and oversights can be considered reasonable because some mistakes are ordinary and necessary business costs that are unanticipated or unavoidable, and to disallow such costs would unjustly punish a contractor. On the other hand, we found that costs of obvious, frequent mistakes have been considered unreasonable and successfully challenged by the government.¹

Disapproval of a Cost Increase

As a third option, in cases in which the contractor requests a budget increase to pay for costs incurred due to inadequate performance,² EPA can refuse to authorize all, or part, of this increase. In response, the contractor might absorb the increase and continue work or, more likely, refuse to do the work that would have been funded by the budget increase. Therefore, disapproval may be a radical remedy if EPA needs the work completed.

¹These cases involved products rather than services. However, while these cases demonstrate the principle of cost reasonableness, we cannot predict with certainty the final outcome of an EPA disallowance under the remedial contracts.

²For 13 of the 22 sites, the contractors submitted requests for budget increases to redo or complete inadequate work. For the remaining nine sites, we were unable to determine whether the contractor requested a budget increase for the inadequate performance because (1) EPA lacked adequate documentation, (2) the contractor financed the increase with funds designated for other tasks and did not require an increase, or (3) another agency redid the work.

According to the chief of the Remedial Action Branch, Procurement and Contracts Management Division, EPA contracting officers have not refused to authorize any increases resulting from inadequate performance under the remedial contracts. Although another official claimed that some increase requests may have been adjusted, no adjustments were made on increases in our sample relating to inadequate performance. Contracting officers have not used this option because of (1) the difficulties in preparing a case EPA could clearly sustain and (2) the need to get remedial studies done, according to the chief of the Remedial Action Branch. For example, EPA would have to have detailed documentation of the problems and be able to prove the problem did not result, in part, from EPA's misdirection of the contractor. EPA's contracting officers believe that the potential for sustaining a disapproval would have to be high to justify their time spent preparing the case and defending it through contractor appeals.

Denial of Fees

As a fourth option, again in the case of a request for a budget increase, EPA can approve the increase request but deny the corresponding base and award fees on the increase. Generally, contractors are entitled to additional base fee and increased award fee available on cost increases associated with approved changes in the scope of work. However, EPA can approve increases but deny fees if a contractor is redoing work—within the same scope of work—because of inadequate performance or failure to conform to the contract requirements.

According to the former chief of the Administration Section, Procurement and Contracts Management Division, it is difficult to deny contractors fees on cost increases because (1) EPA would have to prove that the contractor did not put forth its best effort and (2) the possible recovery of a relatively small amount of base fee would not justify the large investment of contracting officer's time needed to prove a case because the contractor would most likely dispute EPA's contention. However, we found that EPA was successful in all four of its attempts to deny contractors the base and award fees associated with cost increases under the remedial contracts. One of these attempts involved a site in our sample.

Termination

As a final option, EPA can terminate the work assignment for default if the contractor has failed to perform its obligations under the contract, or for convenience if the government decides termination is in its best interest. Under the remedial contracts, meeting the burden of proving default can be difficult, again because of a lack of objective performance

specifications or deadlines. Absent these, the government would have to show that a contractor's inadequate performance and mistakes were so severe as to be tantamount to nonperformance, a material breach of contract. Also, although termination for convenience is generally used when funds are no longer available or the goods and services provided are no longer needed, the government can terminate for inadequate performance to demonstrate to the contractor that EPA is willing to "cut its losses" and that the same action might occur on other work assignments if performance does not improve. However, terminating a work assignment can result in site cleanup delays and additional costs to start over with a new contractor.

According to the chief of the Remedial Action Branch, Procurement and Contracts Management Division, contracting officers have not attempted to terminate any work assignments for default or convenience because the resulting termination costs would outweigh any benefits and site cleanup could be delayed. Also, in reference to termination for default, EPA officials again cited the difficulties involved in preparing a sustainable case. Although terminating a work assignment may have been a limited option early in the Superfund program, from September 1982 to June 1984, because EPA had only two remedial contracts, EPA could have terminated a work assignment when one contractor performed poorly and assigned the work to the other contractor. EPA did, in fact, terminate a work assignment at one of our sample sites to handle a conflict-of-interest situation that arose early in the remedial study. Further, through the threat of using or initiating this alternative, EPA may encourage the contractor to respond adequately before EPA has to proceed through the entire termination process. EPA used such a threat on at least one work assignment under the remedial contracts and, as a result, the contractor rectified the problem. The regional project officer involved with this work assignment told us that this threat was useful because it was a prospective, rather than reactive, technique for improving contractor performance. Termination of work assignments due to inadequate performance may become a more viable option under the alternative remedial contract strategy, but only if EPA is willing to interrupt activity at a site and start over with a new contractor.

Need for Consistent Challenge of Contractor Costs

Although pursuing the options presented above could be time consuming and difficult, challenging questionable contractor costs and hours is important because the challenge itself influences the contractor to be more economical. Conversely, failure to pursue action where warranted could convey a message to the contractors—and may have already done

so—that EPA is willing to accept cost increases no matter what level of performance is provided. Despite the limitations it faces in challenging contractor costs resulting from inadequate performance, EPA has demonstrated that it can limit costs incurred. However, EPA has not consistently challenged all questionable contractor costs and hours.

Work Assignment Budgets Not Used to Control Contract Resources

When contractors incur costs in excess of the authorized work assignment dollar or hour budget before EPA authorizes an increase, a work assignment overrun results. Remedial project managers are responsible for ensuring that contractors submit requests for work assignment budget increases as soon as the need is identified to prevent the occurrence of overruns. However, contractors frequently overran authorized dollar and hour budgets on individual work assignments in our sample, which EPA eventually approved. The contractors were able to overrun work assignment budgets, in part, because remedial project managers did not adequately monitor dollar and hour budgets. This lack of monitoring and control over work assignment budgets also may have contributed to EPA's remedial contract capacity problems: EPA exhausted its remedial contract capacity (contractor hours) before the contracts expired or available funding was exhausted.

Contractor Overruns Extensive

Work assignment hour and dollar budgets provide a broad baseline against which remedial project managers can monitor contractor performance and expenditures. EPA's Remedial Project Management Handbook states that remedial project managers are responsible for anticipating the need for budget increases. Consequently, remedial project managers must ensure that contractors submit timely justification for budget and schedule changes as soon as the need is identified rather than after the additional costs have been incurred and authorized budget ceilings exceeded. However, at 49 percent of the 43 sites we reviewed, the contractor exceeded the dollar budget one or more times. Further, in 72 percent of the cases in our sample, the contractor exceeded the professional hour budget one or more times.³ (EPA has a financial control system in place to preclude payment of contractor expenditures in excess of contract obligations.)

³These percentages exclude the period from October 1985 to October 1986 because, according to EPA officials, any overruns occurring then may have been due to the lack of Superfund money available while reauthorization of Superfund legislation was being debated, rather than a result of poor monitoring or control by EPA. Although contrary to EPA guidance, in some cases overruns occurred at this time because EPA could not obtain funds in a timely manner.

Many remedial project managers told us they were unaware of dollar and hour budget overruns despite the availability of information allowing them to monitor contractor expenditures and anticipate potential overruns. For the sites with dollar overruns, 42 percent of the remedial project managers we talked to said they were unaware that the contractor had exceeded the authorized budget. For sites with hour overruns, 38 percent of the remedial project managers claimed that they were unaware of the situation. This occurred in spite of the fact that the remedial contracts require the contractors to submit monthly progress reports to summarize technical and financial activities, including a cost summary of planned versus actual and authorized expenditures on a work assignment level. However, about 40 percent of the project managers we spoke to did not use monthly contractor progress reports to monitor the contractors' expenditures. The former remedial project officer in region III explained that remedial project managers may not have reviewed contractor progress reports because they knew the status of their sites before they received the reports. However, the contractors' monthly progress reports document information, such as authorized versus actual expenditures, that may not be conveyed to the remedial project managers in informal contacts with the contractors. Had more remedial project managers reviewed the progress reports, they perhaps would have better anticipated some of the overrun situations.

Several of the remedial project managers told us they did not monitor contractor professional hours because they did not think it was important. For example, on a remedial study work assignment at a former landfill, the contractor overran its hour budget three times but did not exceed its dollar budget. These overruns ranged from 26 to 623 hours. The number of approved professional hours for this site ranged from an initial budget of 2,336 to a final budget of 4,526. EPA's remedial project manager for the work assignment informed us that she did not take any action on the hour overrun because she was not concerned about hour overruns. The former regional project officer in EPA region III told us that remedial project managers typically focus on the dollar budgets and do not track professional hour usage.

For all the overruns we noted, EPA approved the increases after the fact. For example, one contractor exceeded the dollar and professional hour budget and then asked for increases because it had experienced cost growth on tasks completed several months earlier in the project. The remedial project manager approved and the contracting officer authorized these increases. Because work assignment budgets are allocation and management tools but generally not contractual cost ceilings, EPA

must fund overruns involving allowable costs. As a result, when overruns occur, EPA loses control over the resources expended in the overrun: the remedial project manager cannot evaluate the increase and determine if it is necessary because the contractor has already spent the funds. In essence, the contractor rather than EPA has decided how funds should be spent. Since EPA is not controlling these increases, the government's risk of inefficient and ineffective use of contract resources is increased.

EPA's Contract Capacity Problems

Insufficient monitoring of contractor hour usage in particular may also have contributed to a series of contract-wide capacity (contract hours) problems. Specifically, because of the substantial contractor hour increases in the work assignments we examined, and in the contracts overall, EPA exhausted its remedial contract capacity before the contracts expired or available funding was exhausted. This capacity problem caused EPA to transfer sites and work assignments (i.e., remedial studies) among contracts and procure new contracts at additional cost to the government. EPA has not conducted an analysis of the causes of this capacity problem. However, EPA contracting and project officers told us that exhausting contract hours before funding could be due to a variety of reasons, including that (1) salary escalations did not occur as planned in the contract, (2) the salary-level mix used on the contract was different than originally planned, or (3) subcontracts were used less than originally planned.

As previously mentioned, contractors generally have limited incentives to control professional hour usage under a cost-reimbursement contract. This may be, in part, because each increase in hours results in a proportional increase in the amount of award fee available to the contractor.

In August 1983, about a year and half after the start of the REM/FIT zone contracts, EPA determined that the Superfund workload had increased at a rate much faster than anticipated and would far exceed contract resources. EPA issued sole-source expansions to the two contracts, increasing hours by 50 percent for remedial planning activities. The total cost for the expansion was about \$112 million for both contracts, including additional funds for the subcontracting and base and award fees. In addition, EPA procured the REM II contract to expand its remedial contract capacity. EPA attributed the increase in hours to major changes in Superfund program policies and unforeseen workload demands. Since the program's initiation, EPA had expanded both the number of hazardous waste sites on the National Priority List and the

number requiring remedial studies. Subsequent to this expansion, EPA again began to experience capacity problems with its remedial contracts. EPA transferred about 25 work assignments from the REM/FIT zone II contract to the REM IV contract.

In April 1986, EPA discovered that the REM II contract had capacity problems. In June 1987, the contractor estimated that it would need about 2.2 million hours to fully fund all projects underway, but the contract ceiling was set at 1.6 million hours. During the summer of 1987, EPA took several actions to respond to the capacity problem. It allocated hour ceilings to the regions, stopped issuing new work assignments, and transferred 72 sites to other contracts. According to the REM II project officer, the contract capacity problems were due to the unanticipated large influx of work assignments and amendments following the reauthorization of Superfund. Transferring sites and work assignments among contractors incurs the risk of disruption of remedial progress at the site. In addition, site and work assignment transfers to other contracts reduce hour capacity on these other contracts as well. EPA has extended the REM II contract, which was due to expire on May 31, 1988, to May 31, 1989.

EPA officials responsible for the remedial contracts have not analyzed why EPA exhausted hour capacity but not funding on the contracts. Although we do not know what portion of the contract capacity problem is due to EPA not controlling contractor hours, the risk of contract capacity problems is increased in such cases.

Inadequate Compliance With Administrative Internal Controls

Although the extent of monitoring varied by remedial project manager, we found that some managers were not performing required contract administration duties such as reviewing contractor invoices and maintaining complete work assignment files. However, we did find that remedial project managers were communicating frequently with the contractors by telephone and were conducting site visits. While all the remedial project managers we spoke with monitored contractor performance, they were primarily concerned with the technical rather than financial aspects of the contractors' work.

Effective contractor monitoring is essential for remedial project managers to identify and anticipate problems, ensure that work progresses in an efficient and timely manner, ensure that the government receives quality performance, and ensure that sufficient records exist for cost recovery and contract administration purposes. According to EPA's

Remedial Project Management Handbook, the remedial project manager is the single EPA individual responsible for directing the contractor staff in a number of technical and policy areas.

Contractor Invoices Not Reviewed

Remedial project managers and project officers responsible for our 43 sites did not consistently review contractor invoices, an important internal control function designed to measure the reasonableness of contractor expenditures against technical work progress. Consequently, EPA officials had insufficient assurance that contractor costs incurred, including those due to inadequate performance, were reasonable.

Under the Superfund remedial contracts, the contractors submit monthly invoices for reimbursement of incurred costs and payment of base fee and award fee, where applicable. The project officers at EPA headquarters are responsible for verifying and certifying contractor billings to ensure that payment is made for services rendered. The project officers rely on the remedial project managers to review the invoices for all the sites they are monitoring and recommend approval or disapproval of contract payment. This requirement is included in each EPA remedial project manager position description. Remedial project manager review and project officer certification (a sign-off by project officers to show that invoices were reviewed) are not intended to signify that invoiced costs are absolutely accurate or complete; rather, review and certification are intended to verify that invoiced costs are reasonable considering the services rendered. According to EPA guidance, if EPA has a question about contractor charges, it can ask for more information, suspend payment while resolving payment disputes with the contractor, or disallow costs.

Despite EPA's requirements for the remedial project managers to review monthly invoices, we found that about 55 percent of the remedial project managers we talked to did not routinely review contractor invoices. Fewer remedial project managers in region III reviewed invoices than in region V. According to the former remedial project officer in region III, the region's remedial project managers were reluctant to review contractor invoices because they considered themselves to be environmental specialists and not accountants and did not understand the information presented in the invoices. About half of the remedial project managers we talked to did not find reviewing the contractor invoices helpful because they believe they need additional guidance in reviewing invoices and better information from the contractors in the invoices. Under the later remedial contracts, EPA negotiated with the contractors

to provide more information in the invoices, such as data on personnel levels actually used.⁴

EPA contracting officers did not suspend or disallow any contractor costs on the 43 sites that we examined. About 20 percent of the remedial project managers we spoke with said they raised questions with the contractors on certain invoiced costs, but none of the resulting discussions led to suspension or disallowance. In addition, a contracting officer responsible for one of the remedial contracts told us that the remedial project managers had rarely contacted him with questions regarding contractor invoices.

EPA project officers were unaware that the remedial project managers were not reviewing contractor invoices. As a result, these project officers were certifying contractor invoices on the mistaken assumption that the remedial project managers had reviewed the invoices and did not recommend disapproval. Because the remedial project managers were not consistently reviewing contractor invoices, EPA may not have availed itself of an important opportunity to scrutinize contractor costs, challenge questionable costs, and disallow those that were unreasonable. In addition, EPA actions were not consistent with the Comptroller General's specific internal control standard on supervision that states that qualified and continuous supervision is to be provided to ensure that internal control objectives are achieved.⁵

Poor Recordkeeping on Work Assignments

Although records are important for both project management and future cost recovery actions, remedial project managers were not keeping adequate records of contractor performance and expenditures at the sites we examined. Throughout the life of a work assignment, the remedial project managers are responsible for maintaining thorough and accurate records of contractor activities and expenditures. These records document contractor strengths and weaknesses for award fee evaluations, are considered part of the official contract administration file, and in the event of a contract dispute may be subject to examination by the Board of Contract Appeals or federal courts. Also, because cost recovery actions typically lag several years behind the remedial process, it is

⁴At the time that we verified the facts contained in this report with EPA officials, the comptroller of EPA's region III told us that the region had instituted procedures for reviewing and certifying invoices.

⁵Internal controls that federal agencies are required to follow are set forth in GAO's Standards for Internal Controls in the Federal Government, published in 1983 pursuant to the Federal Managers' Financial Integrity Act of 1982.

important for the remedial project managers to keep well-organized and comprehensive files.

We found that about 40 percent of the work assignment files we examined in the regions were not complete and organized. For example, we found that many of the files we reviewed did not contain a complete set of contractor progress reports. As noted earlier, we were unable to determine the exact cost increases incurred due to inadequate contractor performance at our sites because of a lack of documentation. In addition, about 30 percent of the remedial project managers we talked to did not document results of their monitoring actions, such as the results of site visits, meetings, and telephone conversations. Further, in at least two instances, EPA officials made special requests to contractors to supply documents because EPA files were incomplete and unorganized.

Poor recordkeeping jeopardizes sound project management and cost recovery actions. The Comptroller General's specific internal control standard on documentation requires that documentation of significant events and expenditures of resources should be accurate, complete, and facilitate the tracing of actions after the events have occurred. In its fiscal year 1985 report to the President on internal controls required by the Federal Managers' Financial Integrity Act of 1982, EPA identified poor recordkeeping as a material weakness in its Superfund program internal controls. In fiscal year 1985, EPA began to implement corrective actions, including evaluating procedures for producing cost recovery documentation, issuing a final policy on maintaining cost documentation, and assembling site-specific files for cost recovery purposes. However, these actions did not specifically address the remedial project manager's responsibilities for adequate contract administration recordkeeping. Better work assignment recordkeeping by the remedial project managers would facilitate EPA's recordkeeping initiatives. In addition, adequate recordkeeping also would allow EPA to better challenge questionable contractor costs and sustain disputes.

EPA Management Does Not Focus on Superfund Contract Cost Control

Cleaning up hazardous waste sites has become a national priority and the focus of significant public, congressional, and media attention in recent years. The urgency of addressing abandoned hazardous waste sites that may be adversely affecting human health and the environment has been translated into statutory deadlines and regulatory priorities. However, EPA management emphasis to expeditiously clean up sites may be insufficiently balancing the timeliness, quality, and costs of obtaining remedial studies.

Little Emphasis Placed on Costs

Planning for the cleanup of abandoned hazardous waste sites is a technically difficult but vital step. The need for quality information and decision-making on an expedited basis has become a national concern. The Congress has translated national concern into statutory deadlines. With the passage of SARA in 1986, the Congress set a schedule for EPA to begin remedial studies of how to clean up sites on the National Priorities List. In a major national teleconference explaining SARA, the Administrator of EPA said, "In essence, Congress told us: The goals achieved in the past were good, but speed up your progress in the future!"

In addition to accelerating remedial studies, the Superfund program is also concerned with the quality of investigations and decision-making on selecting alternatives to remedy sites. As EPA's project officers have explained, the remedial study is the planning stage for the actual site cleanup. Also, according to the deputy chief of the Hazardous Waste Management Branch in region III, while representing about 5 to 20 percent of the total cleanup costs of a site, decisions made during the remedial study stage will directly affect the other 80 to 95 percent of the costs involved. According to the senior remedial project manager in region III, the focus of the remedial contracts is on technical quality and not cost control.

EPA management's focus on timeliness and quality of remedial studies over contractor cost control is reflected in the positions taken by the remedial project managers. The remedial project managers we spoke with generally rated quality and timeliness over costs as considerations in managing their projects. Several said that costs were a minor consideration on their remedial study work assignments. This attitude may explain, to some extent, why remedial project managers do not have sufficient information to compare contractor cost estimates, challenge questionable contractor cost increases, control contractor work assignment budgets, review contractor invoices, maintain adequate records, and perform other contract administration duties.

EPA management officials told us that while time and quality pressures are significant, they do care about the cost of conducting remedial studies. They cited, as one example of their concern, an ongoing study of remedial costs that is designed to identify, among other things, the factors that affect remedial study costs and determine what can be done to control those factors. This study is scheduled for completion by the end of fiscal year 1988. In addition, according to the acting chief of the Hazardous Site Control Division, EPA efforts to reduce the time required to complete remedial studies should also decrease study costs. Finally, the

implementation of the alternative remedial contracts concept should lower study costs through increased competition and greater incentives for contractor performance.

The above efforts are a step in the right direction. However, while EPA management officials emphasized their concern about remedial study costs, it appears that this concern has not been adequately communicated to the remedial project managers who have primary responsibility for monitoring costs and hours on individual sites. As a result, this concern has not been translated into day-to-day oversight and control of costs.

Remedial Project Managers Face Competing Demands

EPA management may not be promoting effective and prudent cost control on remedial contracts because the remedial project managers, EPA's principal individuals responsible for monitoring and controlling contractor expenditures, face competing demands. In addition, their turnover and work load are significant.

As the principal contact between EPA and the remedial contractor, and as the contracting officer's technical representative, the remedial project manager is responsible for planning, monitoring, controlling, directing, and coordinating the work and for communicating with the contractor. In addition, the remedial project manager is responsible for the success of EPA's remedial planning activities, including preparing EPA's Record of Decision and coordinating its review and approval. Remedial project managers and regional managers we talked to emphasized that a remedial project manager's main responsibility is to prepare a Record of Decision that presents a technically sound and cost-effective cleanup alternative that complies with all applicable laws. Because the remedial project managers rely on the contractor's remedial study to support the Record of Decision, they are dependent on the timeliness and quality of the contractor's product. Thus, the remedial project managers have more incentive to focus on the quality and timeliness of contractor efforts during a remedial study rather than on the costs of these efforts. In addition, remedial project managers informed us that they are environmental scientists and engineers more concerned with the technical quality of the contractor's work than with its costs.

Although the majority of remedial project managers we spoke with have taken EPA's project officer and contract administration courses and have position descriptions that specify their contract administration duties, some project managers or their supervisors told us that the contracting

officers, not project managers, are responsible for cost control. In addition, about 60 percent of the remedial project managers we spoke with indicated they have little control over costs. Further, the remedial project managers may be disadvantaged in managing the remedial contractors because of their work assignment work loads, experiences, and turnover levels.

While remedial project manager work load and experience varied on the sites we examined, we found that their work load was significant. Beginning in 1985, EPA's Contracts Management Manual set forth work load limitations for all project officers and work assignment managers, such as remedial project managers, for different levels of experience. Although these work load limitations were not in effect when some of our sample work assignments were active, we compared the limitations to the remedial project managers' recollections of their work assignments to approximate the significance of their work loads at the time. We found that about 20 percent of the remedial project managers assigned to our sites had work loads that exceeded the limitations. (We were unable to assess the work loads for all the remedial project managers assigned to our sites because some managers could not recall their assignments.) On average, the remedial project managers were responsible for a little over four active hazardous waste sites. In addition, remedial project manager work assignment management experience varied by manager, ranging from no experience to over 10 years.

Roughly 25 percent of the remedial project managers we spoke with reported that their work loads and time constraints limited their ability to make site visits. In addition, several EPA Superfund program and contracting officials we spoke with told us that remedial project manager work loads and inexperience limited their ability to effectively monitor contractor performance and expenditures.

Another factor affecting EPA's management of contractors is the number of different remedial project managers assigned to manage particular work assignments due to personnel turnover and other factors. We found that, on average, 2.3 remedial project managers were assigned to each of our 43 sites; 15 sites had 3 or more remedial project managers assigned to them. This changeover of EPA personnel does not provide for continuity in contract administration. About 25 percent of the individuals that we interviewed had since left EPA as of January 1988.

Since SARA was enacted, EPA has expanded the number of personnel assigned to the Superfund program and has taken action to enhance promotion opportunities. Superfund employee staffing, work load, and turnover problems are covered more fully in a separate report.⁶

Conclusions

Cost-reimbursement contracts offer EPA the flexibility needed for its remedial studies but contain inherent cost risks because the contractor has limited incentive to control costs. Despite the need for cost control, EPA did not sufficiently monitor, control, or challenge contractor expenditures and professional hours usage throughout the life of the remedial studies we reviewed. This may be due, in part, to EPA's emphasis on the timeliness and quality of the remedial studies.

Specifically, EPA did not have sufficient information to review the reasonableness of contractor budgets and subsequent cost increases. Consequently, EPA did not know the acceptable cost ranges for remedial study tasks. EPA has a project underway to develop this information, but the project has experienced delays.

In addition, EPA did not take sufficient action to control costs on the contract work assignments we reviewed. Cost and hour increases on the remedial studies reviewed were substantial. While some of these increases were for legitimate purposes, increases at 22 of 43 sites in our sample were due to inadequate contractor and subcontractor performance, according to EPA. Although the options available to EPA for dealing with questionable contractor costs have limitations, EPA has demonstrated in the past that it can successfully use such options to control costs. By not fully challenging questionable contractor costs, EPA may be, in effect, telling the contractors that it is willing to reimburse them for all costs regardless of their level of performance.

Although work assignment budgets are intended to control contract resources, EPA did not sufficiently use the remedial study work assignment budgets for this purpose in the cases we reviewed. Contractor overruns (both dollar and hour) on the work assignments we examined were substantial. Moreover, several remedial project managers did not sufficiently monitor contractor costs and hours even though they had this information available to them. EPA approval of the overruns after the fact reduced EPA's ability to control contractor expenditures.

⁶Superfund: Improvements Needed in Work Force Management (GAO/RCED-88-1, Oct. 26, 1987).

Further, insufficiently monitoring and controlling contractor use of professional hours in particular may have also contributed to remedial contract capacity problems in which contract hours were exhausted before the contracts expired and funding was exhausted. Although EPA officials offered a variety of reasons that could explain these capacity problems, EPA has not conducted an analysis of this issue.

Contrary to EPA's own guidance and internal control standards, remedial project managers did not consistently review contractor invoices. Consequently, EPA did not determine whether contractor costs were reasonable. In addition, incomplete and unorganized work assignment files and poor recordkeeping may jeopardize EPA's management of the remedial contractors and its cost recovery actions. Further, the primary individuals that EPA relies on to monitor and control contractor performance and expenditures, the remedial project managers, may have had little incentive to control costs because they faced competing demands, substantial work loads, and frequent turnover.

We recognize that more attention to cost control and taking a tougher stand with hazardous waste contractors impose certain practical considerations and difficulties. However, we believe that sufficient attention to controlling contractor expenditures on the remedial contracts will convey a strong message to the contractors that the government is unwilling to accept unnecessary costs and inadequate performance. This message is especially important when one considers that EPA's alternative remedial contracts strategy will result in a significant increase in the number of prime contractors and subcontractors.

The Superfund remedial contracts awarded between 1982 and 1985 have a value of about \$894 million, and as we have demonstrated in this report, EPA needs to focus more attention on cost control for these contracts. Other cost-reimbursement, term-form contracts entered into by EPA have a value of about \$2.3 billion. We are concerned that these other contracts may have the same cost control problems that we identified in the Superfund remedial contracts and believe that EPA may need to review the implementation of cost controls over these other contracts.

Recommendations

We recommend that the Administrator, EPA, affirm his overall commitment to cost control in two ways. First, communicate the importance of balancing timeliness, quality, and costs on remedial studies by incorporating explicit language in EPA's contracting and project officer guidance and position descriptions. Second, require that remedial contracting and

project officers and remedial project managers diligently monitor and control contractor expenditures throughout the duration of remedial study work assignments.

Further, we recommend that the Administrator, EPA, direct that the Office of Administration and Resources Management and the Office of Solid Waste and Emergency Response take the following steps to improve EPA's specific oversight of remedial contractor performance and expenditures:

- Complete development of cost-range information for remedial study tasks and require remedial project managers to use this information to assess the reasonableness of the contractor cost proposals and subsequent cost increases.
- Re-emphasize the need for contracting and program officers to challenge questionable contractor expenditures, especially those due to inadequate contractor and subcontractor performance, and take appropriate actions to deal with them.
- Reinforce existing policy in writing to employees and remedial contractors that contractors are not to incur costs above the amounts EPA has authorized in the work assignments, and require remedial project managers to monitor contractor expenditures, both dollars and hours.
- Resolve the issue of why EPA consistently exhausts contract hours, but not dollars, on the remedial contracts.
- Require that EPA personnel comply with internal control standards, specifically that remedial project managers review contractor invoices and determine the reasonableness of contractor costs and that they establish and maintain complete and accurate work assignment records.

Since there is limited incentive to control costs under the cost-reimbursement, term-form contracts that EPA frequently uses, and serious deficiencies exist in the control of costs under the Superfund remedial contracts, EPA could also review the implementation of cost controls over other such EPA contracts, keeping in mind the deficiencies disclosed in this report.

Award Fee Process Does Not Maximize Contractor Performance

Under a cost-plus-award-fee contract, contractors recover the costs incurred for work performed and a base fee that does not vary with performance. EPA's distribution of award fees, which are in addition to costs and base fee, is based on a two-phased process used to motivate successful contractor performance. Although EPA is following its process, we found that the process itself may not be structured to maximize contractor performance.

One problem with the structure is that EPA performance evaluation criteria do not require an evaluation of the prime contractors' management of subcontractors. Although 60 percent of the final contractor performance evaluations we reviewed addressed subcontractor performance and/or prime contractor management of subcontractors, 40 percent of these evaluations did not. As a result, EPA officials did not have sufficient information on this aspect of contractor performance, which in some cases was inadequate, when making award fee decisions. Such information is necessary because (1) subcontracts represented a substantial cost in conducting remedial studies—about 35 percent of the total cost of our 38 sites, (2) EPA based part of the award fee available to the prime contractors on subcontract costs and needs some basis on which to award these fees, and (3) inadequate subcontractor performance has been a frequent problem under the remedial contracts.

Another problem is that the structure of the award fee process for remedial contracts tends to reward all degrees of performance rather than just satisfactory or better performance. During the first phase of the award fee process, EPA makes decisions on a substantial portion—43 percent—of the total award fee on the basis of periodic contractor performance evaluations while the remedial study is underway. Consistent with its process, EPA awarded most of the fee available in this phase to the contractors. However, in some cases, when the remedial study was completed, EPA judged the overall quality of the work performed to be less than satisfactory. Although EPA awarded the contractors none of the available award fee in the second phase of the process because of less than satisfactory performance, the contractors had already earned a substantial portion of the award fee in the first phase. As a result, contractors in our sample who were judged to have less than satisfactory overall performance earned between 29 and 45 percent of the available award fee.

The Award Fee Process

Each remedial contract specifies estimated prime contractor costs, subcontractor costs, and a ceiling on the number of hours the contractor will work. The contracts also specify two types of fees—a base fee and award fee. The base fee, consisting of 3 to 3-1/2 percent of contractor costs (depending on the contract terms but generally 3 percent) and 2 percent of subcontractor costs, is paid to the contractor on a monthly basis and does not vary with performance. The award fee, divided into two phases, varies depending on EPA's subjective evaluation of the contractor's performance. The total amount available for award is 7 percent of prime contractor costs plus about 2 percent of subcontractor costs.

Specifically, the phase I fee that is available consists of about 3 percent of contractor costs and 1 percent of subcontractor costs. EPA makes periodic decisions as the work is being performed on how much of the phase I fee the contractor will earn. The phase II fee available is about 4 percent of contractor costs and 1 percent of subcontractor costs. EPA determines how much of the phase II fee the contractor will earn as projects are completed. These percentages varied slightly among the five remedial contracts we reviewed.

The award fees established for the total contract are made available and awarded to the contractor for remedial work on a site-by-site basis through individual work assignments. The fees related to prime contractor costs are allocated to an individual work assignment in the same proportion that level of effort hours expended on the work assignment bear to the total hours allowed under the contract. For example, if the level of effort hours used on a work assignment represented 1/10th of 1 percent of the total hours for the contract, the fees made available for that work assignment would also be 1/10th of 1 percent of total contract fees. Fees related to subcontracting costs are allocated to an individual work assignment in the same proportion that actual subcontracting costs for that work assignment bear to total subcontracting costs allowed under the contract.

Award Fee Evaluation Process

Remedial project managers in the field are responsible for evaluating contractor performance at individual sites in six performance areas (rating dimensions): project planning, technical competence and innovation, cost and schedule control, reporting, resource utilization, and effort. After review, the evaluations are forwarded to a Performance Evaluation Board, composed of various headquarters and regional project office and contracting personnel, which conducts a detailed analysis of all evaluations. This Board forwards an award fee recommendation for

each site to the fee determination official at headquarters who is responsible for the final decision. EPA's award fee decisions are unilateral and final; the contractor may not appeal these decisions.

Under these plans, EPA evaluates contractor performance every 4 months. Different procedures are used to evaluate and award fees under phase I and under phase II. The contractor is eligible to receive part of the phase I award each evaluation period. Contractors earn 100 percent of the phase I fee available if the performance for the period is at least satisfactory. If performance is less than satisfactory, the remedial project manager must prepare a written evaluation supporting this judgment. Based on this evaluation, the Performance Evaluation Board then determines what portion of the phase I fee the contractor will earn. The remedial project manager is not required to prepare written evaluations for those projects on which performance is satisfactory or above.

To award the phase II fee at the completion of the remedial study, the remedial project manager prepares a final evaluation of the contractor's overall performance. On the basis of this final evaluation, the Performance Evaluation Board and fee determination official determine what portion of the phase II fee available the contractor will earn. Table 3.1 shows the range of phase II fees that can be paid to the contractors for various performance levels. This information is used by the Performance Evaluation Board in making award fee decisions. Contractors receive no phase II fee for less than satisfactory performance.

Table 3.1: Performance Scales for REM/FIT Contracts

| Performance level | Range of total award fee |
|--------------------------|---------------------------------|
| Less than satisfactory | 0 percent |
| Satisfactory | 0 to 30 percent |
| Exceeds expectations | 31 to 65 percent |
| Outstanding | 66 to 100 percent |

EPA chose to use a phased award fee process on the remedial contracts for several reasons. According to EPA, the primary benefit of the two-phased award fee process is that it reduces the amount of paperwork and administrative time associated with the evaluation process. In the early stages of the remedial contracts, EPA evaluated all sites every evaluation period, and thus the Performance Evaluation Board had one hundred or more evaluations to review each time it met. Under the phased process, the Board reviews evaluations for studies in progress that are

less than satisfactory and for those that have been completed. By holding back a substantial amount of the fee until study completion, the phased award fee process was intended to provide more incentive to the contractor to provide high-quality final products. In addition, it was intended to encourage the contractors to limit cost overruns, which EPA had found were often not apparent until the study neared completion.

In 1987, EPA delegated the responsibility for making remedial contract award fee decisions to the regions. This was done to prepare for the implementation of the alternative remedial contract concept. Under this concept, EPA will rely on a greater number of smaller remedial contracts, awarded and managed by individual regions, rather than on the large zone contracts used previously. EPA delegated the responsibility for making award fee decisions to the regions under the remedial contracts we reviewed. As a result, performance evaluation boards have been formed and are operating in each of the regional offices.

Remedial Contract Award Fees

We found that EPA has generally rewarded contractors for good performance by awarding a higher award fee while contractors with poor performance received lower award fee amounts. Of our 43 sample sites, we had complete award fee information (both phase I and II) on 39. (For the remaining four, we could not obtain phase II award fee information because contractor work at the sites was on-going as of December 31, 1986.) Overall, based on phase II awards, the contractor received "outstanding" evaluations in 12 cases, "exceeds expectations" evaluations in 13 cases, "satisfactory" in 8 cases, and "less than satisfactory" in 6 cases. For the 39 sites, EPA awarded the contractors an average of 69 percent of the total award fee available. This broke out to about 86 percent of the phase I fee available and 49 percent of the phase II fee available.¹ These award fees were in addition to the full base fee.

Of the 39 sites, contractors involved in 11 received at least one less than satisfactory rating in phase I. Total fees awarded for these 11 sites averaged 50 percent of that available. For 6 of these 11 work assignments, the contractors also received a less than satisfactory rating in phase II and no award fee, but overall, the six received an average of 43 percent of the total available award fees. For the 28 sites that did not receive a

¹EPA changed its award fee process to the phased approach in 1984. Prior to that, EPA calculated the available award fees on the basis of estimated work assignment costs and distributed these fees among the applicable evaluation periods. Most of the sites in our sample were evaluated under the previous system for one to four evaluation periods.

less than satisfactory rating in phase I, the contractors received an average of 77 percent of the total award fee available.

Evaluation of Prime Contractors' Management of Subcontractors Is Inconsistent

We found no evidence that EPA considered the prime contractor's management and oversight of subcontractors in the award fee process in 43 percent of our sample sites. Contractor performance evaluation criteria indicate that subcontracting issues may be addressed under the rating dimension entitled "resource utilization." This rating dimension also covers a variety of other aspects of performance, including the prime contractor's staffing, recruiting, and training of personnel for the contracts, equipment maintenance and accounting, and use of travel funds. There is no requirement, however, that each of these areas be addressed in contractor performance evaluations.

Federal acquisition regulations do not specify the evaluation criteria to be used in cost-plus-award-fee contracts but instead state that the number of evaluation criteria and requirements will differ widely among contracts. EPA's experience with remedial contracts indicates that it needs criteria to evaluate contractor management of subcontractors. For example, subcontracting represents a substantial cost in conducting remedial studies under these contracts. At our 38 sample sites that used subcontractors, subcontract costs totaled about \$9 million, or 35 percent of the total remedial study cost. In addition, inadequate subcontractor performance and/or prime management and oversight of subcontractors have often been a source of problems under these contracts. Of our 38 sites, we identified 18 at which subcontractor performance or prime contractor oversight of subcontractors had a negative effect on the cost, timeliness, and/or quality of the remedial study. Finally, as previously mentioned, portions of the phase I and II fees are based on subcontractor costs. For example, under the REM/FIT contracts, the phase I fee contains about 3 percent of prime contractor costs and 1 percent of subcontractor costs.

Final phase II award fee evaluations we reviewed did not consistently include assessments of prime contractors' oversight and management of subcontractors. Of the 38 sites in which subcontractors were used, EPA had prepared final evaluations for 37. In these 37 evaluations, subcontracting and prime oversight and management of subcontractors were addressed (either positively or negatively) in 21 (57 percent) and not addressed in 16 (43 percent). In addition, of the 18 sample sites at which we identified problems with subcontracting performance or prime contractor oversight of subcontractors, subcontracting was addressed in 12

of the final evaluations for these sites and not addressed in 6. For these six sites, the contractors received an average of 79 percent of the total award fee available.

To further illustrate the problem, we found that at one of our sites, the prime contractor used a subcontractor, at a cost of about \$481,000, to perform a remedial study. According to the prime contractor's evaluation of the subcontractor's performance, the subcontractor initially performed well but later encountered difficulty in preparing the final reports. The numerous revisions required to produce an acceptable product increased project costs by about \$37,000. In EPA's final evaluation of the prime's performance at this site, the contractor was given an outstanding rating and was awarded 93 percent of the total award fee available, and, therefore, 93 percent of the subcontracting fees available—about \$9,000. However, the final evaluation did not contain any mention of the subcontractor's performance problems or an evaluation of the prime contractor's oversight of the subcontractor. As a result, the Performance Evaluation Board and fee determination official had no information on this aspect of the contractor's performance.

To ensure that subcontractor management is addressed in all contractor performance evaluations, EPA should revise its evaluation criteria to include a rating dimension dealing exclusively with the prime contractors' management of subcontractors. In this way, remedial project managers would be required to comment either positively or negatively on this aspect of contractor performance.

Award Fee Process Has Rewarded Less Than Satisfactory Performance

EPA's award fee structure for the remedial contracts has rewarded all degrees of overall performance rather than just satisfactory or better performance. Specifically, contractors in our sample who were judged to have less than satisfactory overall performance earned an average of 39 percent of the total award fee available. As a result, EPA is using only a portion of the total award fee to reward satisfactory or better performance and, in effect, is guaranteeing the contractors at least part of the award fee for less than satisfactory overall performance.

According to federal acquisition regulations, a cost-plus-award-fee contract should be used when the likelihood of meeting acquisition objectives will be enhanced by using a contract that (1) effectively motivates the contractor toward exceptional performance and (2) provides the government the flexibility to evaluate contractor performance and the conditions under which it was achieved. In line with this, the award fee

structure and process should reward contractors for satisfactory and better performance, but not for less than satisfactory performance. Further, it seems reasonable to expect the remedial contractors to perform at least satisfactorily, especially with this contract type, which results in the contractor assuming little or no cost risk. In addition, with the early evolutionary years of the Superfund program behind them, the remedial contractors now have from 3 to 5 years experience in conducting remedial studies. These contractors, therefore, should be capable of performing these studies satisfactorily.

Although EPA has taken steps to provide additional incentives to the remedial contractors by using a phased award fee process, this approach resulted in the contractors in our sample receiving at least 29 percent of the total award fee available. At the five of our sample sites that received less than satisfactory ratings in phase II² and received no phase II award fee—some of the most severe cases of poor performance under these contracts—the contractors earned an average of 77 percent of the phase I fee and, as a result, 39 percent of the total award fee available—about \$62,000. For each of these sites, the contractors received one or two less than satisfactory evaluations during phase I and, therefore, some reduction in the phase I fee awarded in one or two evaluation periods. However, the contractors received all the phase I fee available for the remaining evaluation periods. As a result, the contractors received the majority of the phase I fee available. Because the phase I fees represented a substantial portion—43 percent—of the total fee available, the contractor was able to earn from 29 to 45 percent of the total fee available even when performance was less than satisfactory. These award fees were in addition to the base fee that all contractors received.

As an example of this situation, at one Superfund site, EPA awarded the contractor 100 percent of the phase I fee available for the first six evaluation periods. However, the contractor was awarded none of the available phase I fee for the seventh and final evaluation period because of unanticipated cost growth and a late and poorly prepared final report. The remedial project manager also considered these problems severe enough to warrant a less than satisfactory phase II evaluation for overall contractor performance at the site and, as a result, the contractor was awarded none of the available phase II fee. Overall, however, the

²The remedial contractors received a less than satisfactory rating in phase II for 6 of the 39 sites for which we had complete award fee information. We considered five of these six in the above analysis because one site was started very early under the contracts before the institution of the phased award fee process. As a result, EPA's award fee decisions on this site were not representative of its experience under this award fee process.

contractor received 29 percent of the total award fee, plus full base fee, for a project rated as the lowest among our sample of all completed remedial studies in two regions having significant Superfund activity.

Process Improvements Could Be Made

Under the regulations, EPA has a great deal of flexibility to design and administer an award fee system that will motivate the contractors toward successful performance. In addition, EPA can make unilateral changes to this system at any time. EPA could amend the award fee structure to change the split between the phase I and II fees to 1 and 6 percent, or 2 and 5 percent, respectively. In this way, EPA limits the amount of award fee given to contractors for less than satisfactory performance. For example, if the phase I fee was reduced to 1 percent of contractor costs, contractors would earn, at most, 14 percent of the total award fee for less than satisfactory performance.

Such a change would also be consistent with EPA's rationale for implementing the phased award fee process. EPA's justification for the phased process stated that the split established between phase I and II was based on 2 years of experience with the two REM/FIT contractors who had consistently received "exceeds expectations" ratings. This justification, however, cautioned that this split should not be used as a model for every new cost-plus-award-fee contract but that the split should be carefully evaluated for each new contract.

Conclusions

Under the remedial contracts, EPA has a great deal of flexibility to design and administer an award fee process to meet its needs. Further, EPA's award fee decisions are unilateral and cannot be appealed by the contractor. EPA, however, has not taken full advantage of the opportunity that the award fee process presents to encourage the contractor to succeed in such areas as cost control, timeliness, and quality.

Currently, EPA does not consistently include an assessment of prime contractor management of subcontractors in final contractor performance evaluations. In about 40 percent of the sites in our sample, the final evaluations did not include such an assessment. As a result, the Performance Evaluation Board did not have sufficient information on which to base award fee decisions in these cases. By collecting accurate and complete information on subcontractor management and considering this information in making award fee decisions, EPA may be able to motivate the remedial contractors to anticipate and correct problems in

the area of subcontractor management. Further, collecting this information will be even more important as EPA moves forward with its alternative remedial contracts. Under these contracts, EPA will have the latitude to choose among a number of contractors when assigning remedial work, and past contractor performance will be one factor used in making these assignment decisions.

In addition, EPA's award fee structure does not sufficiently provide an incentive for remedial contractors to perform at satisfactory or better levels. Contractors in our sample who were judged to have less than satisfactory performance earned between 29 and 45 percent of the total award fee available. We believe that contractors should receive little or no award fee unless they perform at least satisfactorily. Under EPA's current award fee structure, however, contractors earn the majority of the phase I fee—a substantial portion of the total award fee—before the remedial study is completed and before EPA can assess the overall quality of the contractors' work.

Recommendations

Improvements to the award fee plans for the remedial contracts, including those for the alternative remedial contracts, could provide additional incentives to the contractors to effectively manage subcontractors and to perform, overall, at satisfactory or higher levels. To accomplish this, we recommend that the Administrator, EPA,

- amend the remedial contracts award fee evaluation criteria to require a separate rating on subcontractor management;
- amend the award fee structure to shift a greater proportion of the total award fee available from the phase I fee to phase II; and
- determine, for each new alternative remedial contract awarded, the appropriate split between the phase I and II award fees on the basis of the contractor's performance record and experience.

EPA Should Expedite Subcontracting Reviews

Under federal acquisition regulations, EPA is required to review remedial contractors' systems for awarding and managing subcontracts. These reviews evaluate prime contractors' compliance with government subcontracting policies and proper internal control practices. Over the past 4 years, EPA has reviewed the subcontracting systems of the four remedial contractors associated with the five contracts we reviewed but has approved only two because of recurring deficiencies in these contractors' systems. The approval process, which includes followup reviews, has taken, on average, 22 months to complete.

The absence of an approved system does not stop the prime contractor from awarding work to subcontractors. EPA instead relies on contracting officer review and approval of each individual subcontracting action to ensure the efficient and effective use of government funds. However, review of the large number of individual subcontracts that were awarded under the remedial contracts has been a considerable administrative burden on the contracting officers. This burden has resulted in contracting officers not reviewing 118 of the 152 subcontracts in our sample that required review. These subcontracts were worth about \$5 million.

Under EPA's current practices, prime contractors have little incentive to implement acceptable subcontracting systems, and EPA has no assurance that they are complying with government subcontract policies and proper internal control practices. As a result, the risk of waste and inefficiency in the use of government funds is increased.

Requirements for EPA Approval of Subcontracts

Federal procurement regulations require prime contractors under a cost-reimbursement contract to notify the contracting officer in advance of entering into subcontracts which are (1) cost-reimbursement, time and materials, or labor-hour contracts; (2) fixed-price contracts exceeding \$25,000; (3) for the acquisition of special test equipment in excess of \$10,000; or (4) for experimental, developmental, or research work. Prior to entering into these subcontracts, the contractor must also obtain the contracting officer's written approval, or consent, for these subcontracts (consent process).

The consent process requires the contracting officer to review the request and supporting data and determine whether requirements for competition, cost/price analysis, and other items have been met. On the basis of this review, the contracting officer must notify the contractor,

in writing, that consent is either granted or withheld and include any changes or corrections required.

Federal procurement regulations further require that when a contractor's negotiated sales to the government are expected to exceed \$10 million during a 12-month period, the government must review the contractor's system for awarding and managing subcontracts (known in the regulations as contractor purchasing system reviews). The objective of these reviews, first required in 1984, is to evaluate the efficiency and effectiveness with which contractors spend government funds and comply with government subcontracting policies and proper internal control practices. These reviews, which provide the government a broader perspective of the prime contractor's systems for awarding and managing subcontracts than provided by the consent process, require a complete evaluation of the contractor's system. When a contractor's system is approved, contracting officer consent is no longer required for (1) cost-reimbursement, time and materials, or labor-hour subcontracts or (2) fixed-price subcontracts exceeding \$25,000; however, advance notification is still required. After approval, the government must maintain sufficient surveillance to ensure that the contractor is effectively managing its system and re-review these systems every 3 years. These requirements apply to the five remedial contracts we reviewed.

Subcontracting Reviews Have Not Been Completed

As of March 1988, 17 EPA contractors met the criterion requiring a subcontracting system review. EPA has approved 4 of these 17 systems. The 4 contractors involved in the five remedial contracts we reviewed are among these 17. EPA recently approved two of these remedial contractors' subcontracting systems, one in late 1987 and one in March 1988. EPA has not yet approved the remaining two contractors' systems.

EPA's subcontracting system review process for the remedial contractors has taken, on average, 22 months for the contractors to meet government requirements. The two systems that were not yet approved as of April 1988 had been under review for 12 and 22 months, respectively. The chief of the Planning and Cost Advisory Branch told us that it was not possible to predict when these two systems would be approved because approval depends largely on the contractors' ability to implement an acceptable system. The approval process has been lengthy, in part, because all four remedial contractors failed EPA's initial review due to inadequate subcontracting policies and procedures. Problems noted in these reviews included

- inadequate competition in awarding subcontracts;
- inadequate documentation for source selection, competition, and cost/price analysis; and
- inadequate closeout procedures performed for completed subcontracts.

Consequently, contractor actions to improve their systems and EPA's subsequent followup reviews have been time consuming. Three of the remedial contractors have required three rounds of review and the fourth has required two rounds of review because EPA continued to identify subcontracting system deficiencies. This cycling of EPA reviews and contractor corrective actions takes time. As of April 1988, the average time between the initial and first followup review was about 13 months and between the first and second followup review, 9 months.

The length of time that contractor purchasing system reviews are taking appears to be due to two factors. First, the prime contractors have little or no incentive to expeditiously implement acceptable systems because the only penalty they receive for a deficient system is that EPA does not grant approval. For example, EPA has neither set time tables for contractors to bring their systems into compliance nor penalized the contractors through the award fee process for failing to bring their systems into compliance, although EPA has penalized the contractors for some instances of poor subcontractor management. Second, EPA has not put high priority on completing these reviews. EPA initially set up a review schedule to review half of the contractors the first year and the other half the second year. EPA, however, did not meet this schedule due to resource constraints and a high contractor failure rate. The Planning and Cost Advisory Branch chief explained that staff are not assigned solely to review teams but are detailed temporarily. As a result, when assigned to review teams, staff are often subject to competing priorities between their responsibilities on the team and their usual assignments, thus making timely completion of the reviews difficult.

EPA Did Not Consent to All Subcontracts

Because two of the remedial contractors do not have approved systems and the remaining two were approved only recently, EPA has had to review and approve individual subcontracts on a case-by-case basis through the consent process. However, EPA did not review and consent to 118 of the 152 subcontracts requiring review that were associated with the 38 sites in our sample involving subcontractors. As a result, these subcontracts—worth about \$5 million—escaped EPA scrutiny.

All but six of the subcontracts that EPA did not review were task orders issued under basic ordering agreements. According to EPA contracting officials and procurement attorneys, these task orders are the formal contract instruments to which all subcontract requirements apply, including consent. A basic ordering agreement is a written document of understanding, not a contract, negotiated between the prime contractor and subcontractor that outlines basic terms of future contracts—the task orders. These agreements, which are provided for in federal procurement regulations, expedite the contracting process because these basic terms have been settled in advance. To assign work to a subcontractor under a basic ordering agreement, the prime contractor issues a task order stating the services needed. Contracting officers typically consented to the basic ordering agreements, although they did not review the resulting task orders. The former chief of the Administrative Section for the remedial contracts told us that he did not have sufficient staff to consent to all these separate procurement actions.

The consent process in general represents a heavy administrative burden on the contracting officer. The contracting officer is responsible for reviewing every subcontract requiring consent under the regulations. Under contracts as large as the remedial contracts, the number of subcontracts requiring consent is sizable, as evidenced by the 152 subcontracts requiring consent for our 38 sample sites involving subcontractors. One contracting officer told us that he may spend from 30 to 45 minutes reviewing a single subcontracting package. The chief of the Planning and Cost Advisory Branch said that EPA has a difficult time keeping up with the Superfund subcontract consent workload.

Future Contracting Will Increase Review Workload

Looking to the future, EPA has to complete subcontracting reviews for the two remedial contractors without approved systems. EPA will also have to maintain surveillance and conduct 3-year reviews of the approved systems. In addition, the implementation of EPA's alternative remedial contracts will affect, although it is not clear how much, EPA's subcontract approval reviews. At a minimum, EPA is expected to award 40 to 50 alternative remedial contracts by 1989. Many of these contractors will also require subcontracting reviews. Further, according to the chief of the Planning and Cost Advisory Branch, some of these new contracts may be awarded to firms with relatively little experience in dealing with federal procurement requirements. For this reason, bringing these firms into compliance with government subcontracting policies may prove to be even more challenging for EPA than its current contractor workload.

Conclusions

Under federal procurement regulations, EPA must conduct subcontracting reviews of the remedial contractors. However, because the contractors have little or no incentive to bring their systems into compliance and because EPA has not given these reviews high priority, EPA has approved only two of the four remedial contractors' systems. EPA, instead, has had to rely on the consent process to ensure proper subcontract procedures. However, EPA contracting officers have not had enough time to review the sizable number of subcontracts awarded under the remedial contracts. As a result, a significant number of subcontracts escaped EPA scrutiny, and thus the risk of waste and inefficiency has increased. Left unaddressed, this situation will only worsen. EPA must complete subcontracting reviews for the two remedial contractors without approved systems and maintain surveillance and conduct 3-year reviews of approved systems.

Although time consuming, subcontracting reviews of remedial contractors may be less resource-intensive than individual consent, particularly with the number of alternative remedial contracts expected by 1989. However, EPA has yet to come to terms with the problem. EPA has not imposed compliance deadlines on contractors or denied them award fees for noncompliance. In addition, EPA views this problem as one of limited resources and competing priorities. However, by instituting deadlines and denying award fees for noncompliance, EPA may be able to improve this situation without committing additional resources.

Recommendation

The timely approval of remedial contractors' subcontracting systems should reduce the cost risk associated with unacceptable subcontracting practices under these contracts. To expedite subcontracting reviews, we recommend that the Administrator, EPA, formally negotiate with prime contractors to establish firm time tables for implementing acceptable subcontracting systems and hold these contractors accountable for these time frames under the award fee process.

Universe and Sample Selection

Focus of Review

We focused our review on the five remedial contracts described in chapter 1. In addition to these five, EPA had issued three earlier remedial response contracts. We did not examine the three early contracts because they were closed out by the time we began planning this review. In addition, the early contracts do not represent EPA's current program but rather the agency's earliest attempts to complete remedial work.

We then limited our work to the remedial segment of the five contracts for the following reasons. First, remedial work was common to all five contracts: only two of the contracts contained field investigation projects. (EPA conducts field investigation projects, which include a preliminary assessment and site investigation, to determine whether a site should be proposed for the National Priorities List and remedial action.) Second, our survey work revealed more potential contract administration problems on the remedial projects than on the field investigation projects. Finally, we believe the remedial work represents the area of greater risk because remedial projects are generally more complex, expensive, and lengthy than field investigation projects.

To further focus the review, we chose to examine only remedial study work assignments because they represented the bulk of the large-dollar work assignments under the remedial segment of the contracts. The average dollar amount of the remedial study work assignments in our sample is \$494,000. Furthermore, the average remedial study takes about 2 years to complete and requires active EPA monitoring efforts.

In addition to remedial study work assignments, EPA has issued work assignments for the following remedial tasks under the contracts: immediate remedial measures, remedial action master plans, community relations plans and implementation, and technical oversight or enforcement support of remedial studies performed by the states. We did not review immediate remedial measures and remedial action plans because EPA no longer completes these tasks under the remedial program. In addition, EPA completed only six immediate remedial measure work assignments and the remedial action plans completed had a relatively small average dollar value of about \$25,000. Also due to their small dollar value, about \$5,000 and \$37,000 respectively, we chose not to examine either work assignments for community relation plans and implementation or technical oversight of remedial studies being completed by states. We did not review enforcement support work assignments because EPA completed only a small number of them.

Universe Definition

We defined our universe as all complete or substantially complete remedial study or focused feasibility study work assignments completed under the five remedial contracts as of December 31, 1986. A description of each element of this definition follows:

- A remedial study is the first step of the Superfund remedial cleanup process and involves determining the extent and type of contamination at each site, identifying and evaluating various cleanup methodologies, and selecting the most appropriate remedy.
- A focused feasibility study is usually part of a larger remedial study. The focused study evaluates cleanup methodologies for a specific part of the overall problem at a site, usually a problem requiring little field work and more immediate attention. For example, a Superfund site may have contaminated groundwater and drinking wells. EPA may complete a focused feasibility study and select a cleanup alternative on the drinking wells segment so that actual cleanup of the wells can commence while the “full remedy” remedial study for contamination at the site is still ongoing.
- A “complete” remedial study or focused feasibility study, as EPA defines it, occurs when the agency issues a Record of Decision based on the study. The Record of Decision states the agency’s decision on which cleanup alternative to pursue.
- A “substantially complete remedial or focused feasibility study,” as we defined it (with EPA concurrence), occurs when EPA releases a draft remedial or focused feasibility report for public comment. The chief of the Remedial Action and Contracts Section, EPA Hazardous Site Control Division, concurred with this definition because these studies are approximately 90-95 percent complete when EPA issues a draft report to the public for comment.
- The cut-off point is December 31, 1986, because we defined the universe during late January and early February 1987, and at that time EPA had complete information as of the December date.

Thus defined, our universe includes 139 work assignments for all 10 EPA regions. A total of about \$71 million was expended for these work assignments.

One limitation of this definition is that it does not include remedial study work assignments ongoing but not complete or substantially complete as of December 1986. In some cases, such work assignments have been ongoing for a long period of time and are problem projects. We did not consider these work assignments for two reasons: (1) EPA’s Office of

Inspector General is looking at one of the sites, Laskin Poplar, in a current review and (2) because our methodology excludes some of EPA's severest problem cases, our report findings will more strongly suggest the common experience and problems under these contracts.

Sample Selection

We reviewed all complete or substantially complete remedial study work assignments in EPA regions III (Philadelphia) and V (Chicago). These regions were selected based on their responsibility for a large number of Superfund sites. Accordingly, our final sample of 52 work assignments in EPA regions III and V is 37 percent of the universe of 139 similarly defined work assignments. The dollar total of our sample is approximately \$25,707,000, or 36 percent of the \$71,208,000 total for the universe of 139 work assignments. Our sample is distributed among four of the five remedial contracts. The bulk of the sample falls under the two expired contracts, REM/FIT zone I and REM/FIT zone II because EPA had not completed many work assignments under the later contracts as of the December 1986 date. We found no work assignments fitting our definition under the REM III contract.

Table I.1: Sample Work Assignments

| Contract | Number of work assignments in sample |
|---------------------------|--------------------------------------|
| REM/FIT zone I (expired) | 20 |
| REM/FIT zone II (expired) | 25 |
| REM II | 6 |
| REM IV | 1 |

We usually found a one-to-one relationship between work assignments in our sample and remedial studies. However, in some cases EPA issued more than one work assignment per remedial study (for example, EPA issued one work assignment for the remedial investigation and a separate one for a feasibility study) or a second contractor finished a project (resulting in a second work assignment). As a result, we reviewed 52 work assignments that constituted 43 complete or substantially complete remedial studies. We completed detailed case studies on each of these 43 remedial studies.

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