United States General Accounting Office

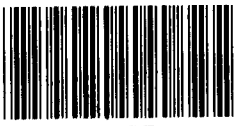
GAO

Report to the Chairman, Subcommittee on Environmental Protection, Committee on Environment and Public Works, U.S. Senate

November 1991

SUPERFUND

EPA Could Do More to Minimize Cleanup Delays at the Clark Fork Sites



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GAO/RCED-92-20

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

Resources, Community, and
Economic Development Division

B-245837

November 21, 1991

The Honorable Max Baucus
Chairman, Subcommittee on Environmental
Protection
Committee on Environment and Public Works
United States Senate

Dear Mr. Chairman:

As requested, this report assesses the progress and problems of the Environmental Protection Agency's (EPA) cleanup of the Clark Fork Superfund sites in Montana. Specifically, the report discusses the (1) extent and cost of cleanup work, (2) adequacy of cleanup plans, and (3) effectiveness of EPA's efforts to recover Superfund's cleanup costs. It also contains recommendations to the Administrator, EPA, for making improvements in each of these areas.

Unless you publicly release 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 of this report to the appropriate congressional committees; the Administrator, EPA; and the Director, Office of Management and Budget. We will also make copies available to others upon request.

This work was performed under the direction of Richard L. Hembra, Director, Environmental Protection Issues, (202) 275-6111. Major contributors are listed in appendix III.

Sincerely yours,

J. Dexter Peach
Assistant Comptroller General

Executive Summary

Purpose

Mining and smelting activities over the last century have contaminated land and water in western Montana's Clark Fork River Basin with hazardous wastes. Because these wastes include known or probable carcinogens that pose serious threats to human health, the Environmental Protection Agency (EPA) established four Superfund sites in the river basin. These four contiguous sites contain 23 operable units (contaminated areas) and encompass the largest land area of all Superfund sites. Although cleanup work has been under way at these sites since 1982, none have been completely cleaned up.

Concerned over the progress being made in cleaning up the four sites, the Chairman, Subcommittee on Environmental Protection, Senate Committee on Environment and Public Works, requested that GAO report on the (1) extent and cost of cleanup work, (2) adequacy of cleanup plans, and (3) effectiveness of EPA's efforts to recover cleanup costs.

Background

The Comprehensive Environmental Response, Compensation, and Liabilities Act of 1980, also known as "Superfund," provides EPA with broad authority to clean up hazardous sites that threaten human health and the environment. When EPA determines that such a threat exists, it places the worst contaminated sites on the National Priorities List (NPL). But before cleanup work can be initiated, EPA conducts studies to determine an appropriate cleanup remedy. EPA also searches for the parties responsible for the pollution so it can make them clean up the site or reimburse EPA for Superfund's cleanup costs. EPA has identified about 20 responsible parties at the Clark Fork sites but considers Atlantic Richfield Corporation to be the primary responsible party.

EPA began investigations in the Clark Fork Basin in 1982, and in 1983, it placed the Silver Bow Creek, the Anaconda Smelter, and the Milltown Reservoir sites on the NPL. In 1987, EPA expanded the Silver Bow Creek site and placed the Montana Pole site on the NPL. EPA's Region VIII (Denver) and its Helena, Montana, office are responsible for cleaning up the Clark Fork sites. But to help in the cleanup, EPA also delegated authority and provided funding to the Montana Department of Health and Environmental Sciences. EPA's Office of Solid Waste and Emergency Response (Solid Waste Office) provides program direction and oversight.

Results in Brief

Since 1982, limited progress has been made in cleaning up the Clark Fork sites. Only 2 of the sites' 23 operable units have been completely cleaned up. About $24 million of the $54 million spent by EPA and

Atlantic Richfield was spent on cleanup studies. Studies at three sites did not result in identifying appropriate cleanup remedies, thus delaying cleanups by years. EPA and department officials attributed study problems and associated delays to the size and complexity of the sites and their staff's inexperience in dealing with such sites.

The Clark Fork master plan, developed in 1988 by EPA and the Montana health department to coordinate cleanup work, did not provide a workable sequencing of cleanup activities or realistic milestones. The revised 1990 plan addresses limitations in the 1988 plan, but EPA's Montana Office needs to improve its strategy for monitoring the plan's implementation. EPA also has acted nationally and at the Clark Fork sites to address problems, such as lack of public participation in cleanup planning, but further cleanup delays are likely because of disagreements over soil cleanup levels, EPA's model provisions for cleanup agreements, and public concerns over cleanups for selected units. EPA's Solid Waste Office could help keep cleanup activities on track by taking a more proactive role in monitoring Clark Fork's cleanup progress.

EPA also has been slow to issue letters demanding responsible parties to reimburse EPA for Clark Fork's cleanup costs partly because of staffing shortages. As a result, GAO estimated that the government lost an opportunity to earn as much as $750,000 in interest income. In light of the interest income to be realized from issuing timely demand letters, EPA could find it cost beneficial to request additional staff resources.

Principal Findings

Cleanup Costs and Delays

Through January 1991, EPA and Atlantic Richfield had spent $33 million and $21 million, respectively, on the Clark Fork sites. Cleanups have been completed at two operable units—the Mill Creek and the Milltown Water Supply units. Four other units had some of their hazardous waste removed—the Priority Soils, Mine Flooding, Rocker, and Montana Pole.

Of the total expended, about $24 million was spent on studies and about $20 million on cleanups—EPA did not have a breakdown at the time of GAO's review for about $10 million it spent between July 1989 and January 1991. Studies at three sites—Silver Bow Creek, Anaconda Smelter, and Milltown Reservoir—did not identify appropriate cleanup remedies. For example, the Anaconda Smelter study, which was in progress for

about 1.5 years, was never completed and did not produce a cleanup remedy because EPA severely underestimated the site's contamination problems. EPA Region VIII and Montana health department officials attributed their study problems to their staffs' inexperience in dealing with large and complex sites, but inadequate public participation was also a factor. EPA has acted nationally and at the Clark Fork sites to address these and other problems and to accelerate cleanups.

Notwithstanding these actions, further delays are possible. EPA has no soil cleanup standards, although it is developing them. In the meantime, EPA officials believe that disagreements are likely to result between EPA and Atlantic Richfield over what these levels should be at Clark Fork's operable units. Also, Atlantic Richfield believes that provisions in EPA's recently issued model cleanup agreements, such as a requirement to carry liability insurance, are too restrictive. Its reluctance to accept such provisions might delay reaching cleanup agreements. Moreover, EPA might have to order the cleanup and seek court enforcement to resolve any disagreements. Despite the potential for further delay, EPA's Solid Waste Office has not been monitoring Region VIII's overall cleanup progress, and as such, it is not in a good position to help the region keep cleanup activities on track.

Master Planning

In 1988, EPA Region VIII and the Montana health department issued a master plan that identifies, prioritizes, and coordinates cleanup activities at the Clark Fork sites. This plan, however, did not provide for a logical sequencing of cleanup activities, as disclosed by public comments, or contain realistic milestones. Of the 17 milestones identified in the plan, 16 either were missed or had to be extended.

EPA Montana Office and health department officials believe the 1990 plan contains a logical sequencing of cleanup activities and realistic milestones, and reflects more extensive public involvement. Public involvement is important because local citizens are the ones most affected by the threat that the sites pose to human health. Although local citizen groups were satisfied with their involvement in developing the latest plan, citizen groups' concerns with cleanups at the Berkeley Pit, Colorado Tailings, and Warm Springs Ponds areas could cause milestones to be missed. Moreover, the EPA Montana Office's strategy for monitoring the 1990 plan does not provide for informing the public of EPA's progress in meeting the plan's milestones or for assessing alternatives that could be taken to minimize any expected delays.

Timeliness of Cost Recovery

Although EPA has not recovered any of the $33 million it spent at the Clark Fork sites, litigation to recover about $6 million is pending. However, EPA Region VIII has been slow in issuing letters demanding cost reimbursement, which has cost the government the opportunity to earn substantial amounts of interest income. For example, EPA issued a demand letter 32 months late for cleanup costs at the Milltown Reservoir site and 20 months late for removal costs at the Anaconda Smelter site. GAO estimated that the government could have earned as much as $750,000 in interest if these letters had been issued on time.

A number of problems, including poor cost documentation, lack of staff, inexperience, and an inefficient accounting system, have hampered EPA's cost identification activities and prevented the agency from taking timely cost-recovery action. EPA is correcting these problems, but EPA Region VIII officials still do not believe they have sufficient staff resources to issue timely demand letters. GAO reported in December 1989 on how three other EPA regions had problems with issuing timely demand letters because of staffing limitations, thereby denying the government the opportunity to earn millions of dollars in interest. GAO recommended that EPA provide more staff resources for cost recovery, if cost beneficial, but EPA has yet to conduct such an analysis.

Recommendations to the Administrator, EPA

GAO recommends that EPA (1) conduct periodic reviews of Region VIII's overall progress in cleaning up the Clark Fork sites, with a view toward helping them keep cleanup activities on track; (2) require Region VIII to revise its monitoring strategy to provide for notifying the public of its progress in meeting master plan milestones and for assessing alternatives that could be taken to minimize any expected delays; and (3) provide additional resources, as needed, to allow for the timely issuance of demand letters for the Clark Fork sites. GAO also believes that EPA should conduct a cost-benefit analysis to determine whether additional staff resources should be requested to facilitate timely issuance of demand letters elsewhere, as previously recommended.

Agency Comments

GAO discussed the report's contents with responsible EPA officials, who generally agreed with the facts as presented, and have included their comments where appropriate. However, as requested, GAO did not obtain official agency comments on a draft of this report.

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Abbreviations

EE/CA	engineering evaluation/cost analysis
EPA	Environmental Protection Agency
GAO	General Accounting Office
NPL	National Priorities List
OSWER	Office of Solid Waste and Emergency Response
ROD	record of decision
RI/FS	remedial investigation/feasibility study

Introduction

Thousands of waste disposal sites contaminated with hazardous substances threaten the health and safety of the public. Four of the worst sites are located in western Montana's Clark Fork River Basin, and collectively, these four contiguous sites are know as the Clark Fork sites. To address the contamination at these and other sites across the nation, the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (commonly known as Superfund) gave the Environmental Protection Agency (EPA) a broad mandate to clean up sites contaminated with hazardous substances. To pay for these cleanups, the law established a $1.6 billion, 5-year trust fund, which was supplemented by $8.5 billion and extended another 5 years by the 1986 Superfund Amendments and Reauthorization Act. In 1990, Superfund was reauthorized for an additional 3 years by the Omnibus Budget Reconciliation Act, which increased the fund another $5.1 billion, for a total of $15.2 billion.

As required by Superfund, EPA developed the National Contingency Plan, which includes methods for discovering and investigating potential hazardous waste sites, and establishes criteria for determining priorities among releases or threatened releases at those sites. As part of the plan, EPA created the National Priorities List (NPL), which lists those sites considered to present the most serious threats to public health and the environment. As of June 1991, the NPL contained about 1,200 sites or proposed sites, including the four Clark Fork sites.

The Cleanup and Enforcement Process

Under Superfund, the parties responsible for the contamination are responsible either for paying for the costs of cleanup or for cleaning it up themselves, usually through a contractor. If the responsible party is unknown, EPA contracts for the cleanup and Superfund pays for it. When responsible parties are willing to participate in the site's cleanup, EPA attempts to negotiate an agreement with them about what the cleanup will entail and how it will proceed. Throughout the cleanup process, EPA oversees the cleanup operations.

When EPA is unable to negotiate an agreement, it has two options. First, it can contract for the site's cleanup, using Superfund moneys, and then seek recovery of its cleanup costs from the responsible parties. Alternately, where there is an imminent and substantial endangerment, EPA can issue a unilateral order to the responsible parties compelling them to study or clean up the site according to a specific schedule. If the responsible parties do not comply with the order, they can be fined up to $25,000 for each day that they fail to comply. Also, if the responsible

parties refuse to perform the cleanup, they can be held liable for up to three times the total costs EPA incurs for cleaning up the site.

Two basic types of Superfund cleanup actions are available: remedial actions and removal actions. Remedial actions are designed to mitigate or permanently eliminate conditions at hazardous waste sites, while removal actions are interim responses to immediate and significant threats. Removal actions do not necessarily involve the physical removal of hazardous substances, but rather the removal of threats to human health and/or the environment. For example, EPA might choose to leave contaminated wastes in place and secure and isolate them with a clay cap instead of removing them.

A remedial cleanup action generally consists of four steps. First, with EPA oversight, the contractor conducts a remedial investigation and a feasibility study, known collectively as the "cleanup study," of a site. The purpose of the cleanup study is to collect the data necessary to adequately characterize the nature and extent of a site's contaminants, identify and evaluate remedial alternatives, and select the most effective one. Second, EPA issues a record of decision, which selects a cleanup remedy and justifies the selection. Third, the contractor develops a detailed design for accomplishing the selected remedial action. And finally, the contractor implements the remedial action. A remedial action may involve cleaning up an entire site or only a part of it. NPL sites often require multiple remedial actions because the sites contain multiple sources of contamination.

Removal actions may take different forms. A time-critical removal is completed within a short time period after discovery of the threat. An expedited response action, also referred to as a "non-time-critical removal," is generally implemented for problems that present a significant, but not immediate, threat. Expedited response actions are used when at least 6 months are available to conduct an Engineering Evaluation and Cost Analysis to guide removal efforts.

Extent of Contamination at Montana's Clark Fork Basin

Over a century of mining, milling, smelting,[1] and wood treating has left major contamination problems in western Montana's Clark Fork Basin. Such heavy concentrations of mining-waste-related contamination are found in few other Superfund sites across the nation. The major contaminants found in the basin include arsenic and heavy metals such as cadmium, lead, copper, and zinc. These contaminants are found throughout the basin in various mining-related wastes and, in some cases, in soil and water. For example, contaminants are found in mining wastes such as waste rock dumps; in mill wastes, such as tailings (raw materials separated out during the milling, or crushing, of mineral ores); and in smelting wastes, such as slag (refuse separated from metal during the refining process) and flue dust (particulate matter that settles from smoke stack emissions during smelting operations). Additionally, contaminants such as creosote, dioxin, and pentachlorophenol—organic compounds used in treating wood—are found in the soil and in the groundwater. These contaminants' effects on human health are listed in appendix I.

The Clark Fork Basin contains four distinct but contiguous Superfund sites: Silver Bow Creek/Butte Area, Montana Pole and Treating, Anaconda Company Smelter, and Milltown Reservoir. Together, these four sites comprise the largest geographic area in the nation to be cleaned up under Superfund. The four sites include 77 separate areas of existing or potential contamination covering about 50,000 acres along about 140 miles of the Clark Fork River and its tributaries. The sites are not only contiguous but interrelated; because the sites are generally connected by waterways, cleanup activities at one site can affect other sites, or even other portions of the same site.

EPA began initial investigations of the Clark Fork Basin in 1982, and in 1983 placed the Silver Bow Creek, Anaconda Smelter, and Milltown Reservoir sites on the NPL. These sites are currently ranked 20th, 48th, and 349th, respectively, out of about 1,200 on the list. In 1987, after subsequent investigations, EPA added the Butte area and the upper Clark Fork River to the Silver Bow Creek site. The fourth site, Montana Pole, was placed on the list in 1987 and is currently ranked 841st.

[1]Smelting is a heating process that extracts metal from raw ore.

EPA has divided the 4 sites into 23 geographic, or contaminant-specific portions, known as "operable units."[2] Table 1.1 lists the operable units, by site. Figure 1.1 shows the four sites and several of the key operable units.

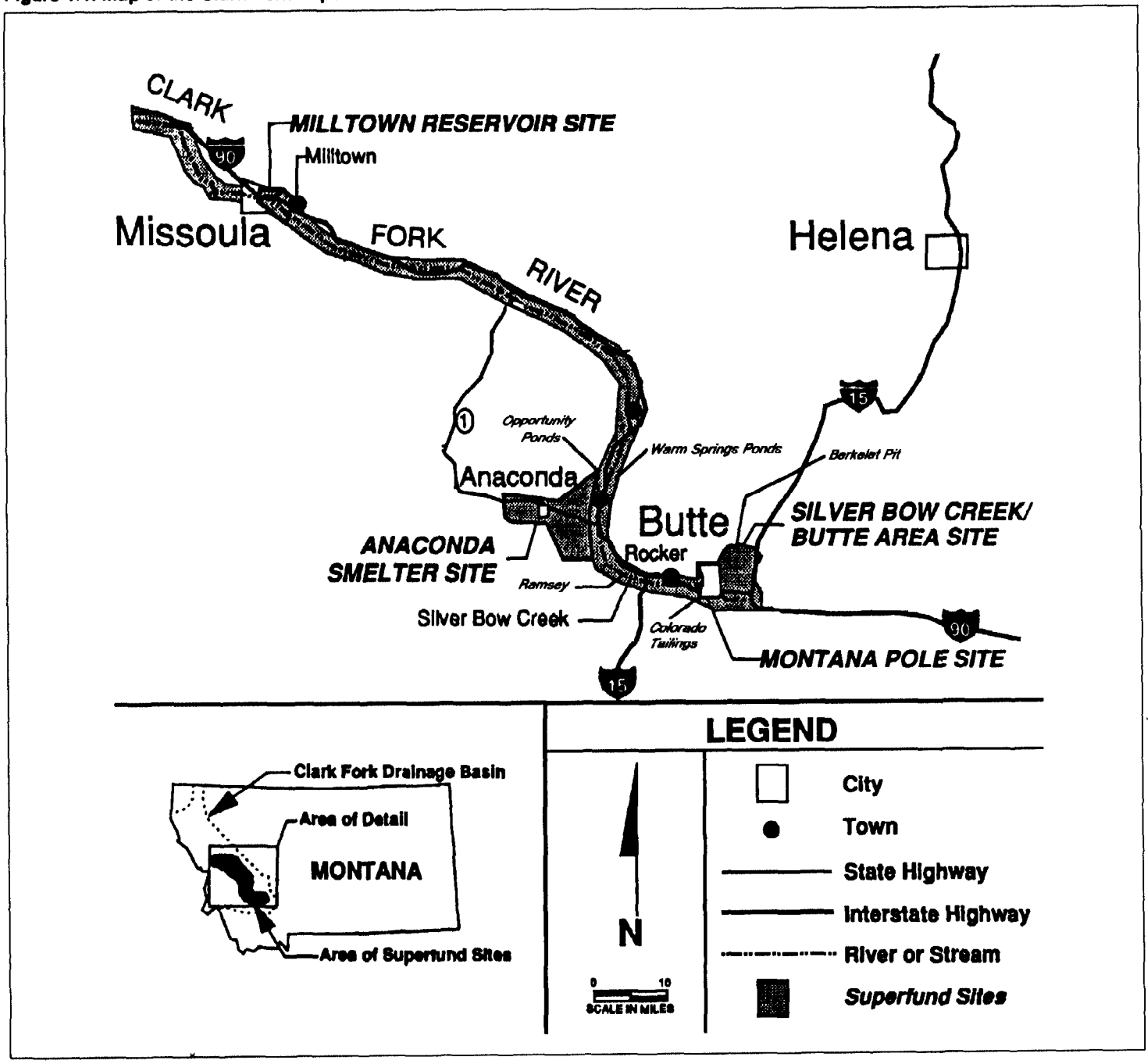
Table 1.1: Operable Units in the Clark Fork Basin

Site/operable unit			
Silver Bow Creek/ Butte Area	**Montana Pole**	**Anaconda Smelter**	**Milltown Reservoir**
Priority Soils	Montana Pole	Old Works	Clark Fork River
Lower Area 1		Arbiter/ Beryllium Wastes	Milltown Water Supply
Mine Flooding		Smelter Hill	Reservoir Sediments
Nonpriority Soils		Flue Dust	
Active Mine Area		Community Soils	
Rocker		Mill Creek	
Streamside Tailings		Agricultural Lands/ Regional Soils	
Warm Springs Ponds		Site-Wide Groundwater	
		Tailings	
		Surface Water/ Sediments	
		Slag Piles	

Source: GAO analysis of EPA data.

[2]EPA's latest cleanup plan for the Clark Fork Basin lists 28 operable units encompassing 23 separate geographic locations. In the case of Clark Fork sites, EPA counts removal and remedial actions at the same location as separate operable units; for example, at the Old Works, which we treat as one operable unit, EPA counts both the removal and the remedial actions as separate operable units.

Figure 1.1: Map of the Clark Fork Superfund Sites



Source: EPA.

Silver Bow Creek/Butte Area

The Silver Bow Creek/Butte Area site includes 450 acres of soil and water contaminated by historical and modern mining operations. The Butte Area is the location of a very large ore body that has been mined for copper, lead, zinc, molybdenum, gold, and silver. Over the course of mining activities, more than 500 mines and shafts were developed, resulting in an estimated 3,000 miles of interconnected underground workings and approximately 150 major waste rock dumps. Early mining-related wastes were dumped adjacent to and directly into Silver Bow Creek, which runs through Butte and continues about 25 miles to its end—a series of settling ponds called the Warm Springs Ponds. Immediately downstream from the last of the three settling ponds, the Clark Fork River originates, flowing northward. The site is divided into eight operable units.

Montana Pole

At the Montana Pole site, also considered 1 of the 23 operable units, 40 acres of surface and groundwater have been contaminated by the use of organic compounds during wood-treating operations. The site is located in west Butte by Silver Bow Creek. The wood-treating plant, operated from 1947 to 1984, treated a full line of wood products, including utility power and transmission poles, bridge foundation pilings, planking, railroad ties, timbers, and fence and guard rail posts.

Anaconda Smelter

The Anaconda Smelter site, approximately 25 miles northwest of Butte, is contaminated by waste materials from nearly 100 years of smelting copper ore taken from the mines in Butte. The site is a 6,000-acre area in and around the city of Anaconda, Montana. The contaminated byproducts of the smelting process are scattered around the site, and include 185 million cubic yards of tailings, 27 million cubic yards of slag, and 300,000 cubic yards of flue dust. Highly toxic beryllium waste also remains on the site, left from beryllium-processing operations conducted in the late 1960s. (Beryllium is an element used primarily as a hardening agent for metal alloys.) The Anaconda Smelter site is divided into 11 operable units.

Milltown Reservoir

The Milltown Reservoir, approximately 90 miles northwest of Anaconda, acted as a settling basin for contaminated mine waste sediments in the Clark Fork River and contains about 6 million cubic yards of these sediments. Drinking water wells in nearby Milltown were contaminated

with arsenic from these sediments. In addition to the contaminated reservoir and groundwater, the Milltown Reservoir site also contains contaminated tailings along nearly the entire stretch of the Clark Fork River from Warm Springs Ponds to the Milltown Reservoir. The site is divided into three operable units.

Parties Involved in the Clark Fork Cleanup

Three primary parties have been involved in the Clark Fork Basin cleanup: EPA, the Montana Department of Health and Environmental Sciences (the Montana health department), and Atlantic Richfield Company (considered to be the major party primarily responsible for the contamination).[3] Through cooperative agreements with the state of Montana, EPA delegated to the health department the primary authority for cleaning up selected sites and provided Superfund moneys to fund the states' cleanup activities. To set cleanup priorities and coordinate cleanup actions, EPA's Montana Operations Office, assisted by the Montana health department, Atlantic Richfield, and a number of local organizations, developed a Clark Fork Superfund Master Plan. The plan was published in October 1988 and updated in November 1990. Before 1988, Atlantic Richfield had limited involvement in the Clark Fork cleanup activities, but has since indicated to EPA its willingness to conduct most of the future cleanup studies.

Objectives, Scope, and Methodology

Concerned about the considerable costs incurred and the little cleanup progress made to date, the Chairman, Subcommittee on Environmental Protection, Senate Committee on Environment and Public Works, requested that we review EPA's Superfund activities in the Clark Fork Basin. On the basis of this request and subsequent discussions with the Chairman's office, we determined the

- extent and cost of cleanup work,
- adequacy of EPA's cleanup plans, and
- effectiveness of EPA's efforts to recover cleanup costs.

We conducted our work at EPA headquarters in Washington, D.C.; EPA's Region VIII in Denver, Colorado; EPA's Montana Operations Office in Helena, Montana; the Montana Department of Health and Environmental Sciences in Helena; and Atlantic Richfield Company's Denver and Anaconda, Montana, offices.

[3]EPA identified about 20 other parties who contributed to the contamination, but EPA considers Atlantic Richfield to be the primary responsible party.

To determine the extent and cost of cleanup work at the Clark Fork Superfund sites, we interviewed officials of EPA, the Montana health department, and Atlantic Richfield about planned and actual cleanup activities and associated costs. We used cost data from EPA's Region VIII. These costs were somewhat higher than the costs we obtained from EPA's Montana office. However, at the time of our review, these two offices were reconciling their differences. Because the EPA Montana office maintains nearly 30,000 documents pertaining to the Clark Fork sites, we obtained an index of all the documents and then identified, requested, and reviewed relevant documents using this index. We also obtained and reviewed documents from the Montana health department. Through this document review, we created a chronology of major cleanup events at each of the Clark Fork sites. When the chronologies indicated apparent irregularities (e.g., work had been begun but not completed), we followed up on those irregularities to determine their cause and impact on cleaning up the Clark Fork sites. Additionally, we visited the four sites to gain an understanding of the severity and extent of contamination.

To determine the adequacy of cleanup plans, we reviewed EPA's 1988 and 1990 master plans for the Clark Fork sites and related documents. We compared planned and actual cleanup activities and assessed the extent to which the plans incorporated strategies for cleaning up sites where mining was ongoing. We also interviewed EPA's Clark Fork Coordinator, the official primarily responsible for EPA's 1988 and 1990 master plans; representatives of citizen groups in Butte, Anaconda, and Milltown, Montana; and Atlantic Richfield officials to obtain their opinions on (1) whether the master plans contained realistic strategies for cleaning up all problems of concern, (2) whether the four sites' cleanup efforts were effectively integrated into the master plan's overall cleanup schedule, and (3) whether citizen groups in the Clark Fork Area believed they were sufficiently involved in the planning process. We also interviewed officials from EPA's Region VIII and Montana offices and the Montana health department to obtain their opinions about whether barriers remain that could further impede cleanup progress.

To determine the effectiveness of EPA's efforts to recover Superfund's costs, we interviewed officials responsible for cost recovery in EPA Region VIII and the EPA Montana office. We also reviewed EPA's cost-recovery procedures and compared them with EPA's Montana office and Region VIII practices.

We conducted our review from April 1990 through April 1991 in accordance with generally accepted government auditing standards. We discussed our findings with EPA officials and incorporated their comments where appropriate. These officials generally agreed with the report's findings. However, at the request of the Chairman, we did not ask EPA to officially review and comment on this report.

Continued Cleanup Delays at Clark Fork Are Likely

Between 1980 and January 1991, EPA and Atlantic Richfield spent over $50 million on cleanup activities in the Clark Fork Basin. Although some cleanup actions are still underway, only a few of the sites' operable units have been completely cleaned up. Almost half of the total spent in the past 10 years was spent on studies to identify needed cleanup actions. However, studies at three of the four sites—Silver Bow Creek, Anaconda Smelter, and Milltown Reservoir—did not identify a cleanup remedy that could be used, thereby delaying cleanup work at these sites by a year or more. EPA officials attributed the study's shortcomings to their staff's inexperience in cleaning up such a large and complex site.

To EPA's credit, it has taken a number of actions to correct these problems and to accelerate cleanup activities. For example, EPA has taken over the lead responsibility for the Silver Bow Creek and Milltown Reservoir sites from the Montana health department. In addition, EPA has accelerated studies for certain operable units—those with well-defined problems that present a significant threat—to provide for more timely removal of the more serious contaminants. But despite these actions, EPA has not monitored Region VIII's overall progress in cleaning up the Clark Fork sites.

Moreover, the potential exists for further delays because of two unresolved issues. First, no standards exist for safe concentrations of contaminants in the soil. Disagreements between EPA and Atlantic Richfield over these levels are certain to delay future cleanups if court action becomes necessary to resolve these disagreements. Second, Atlantic Richfield believes that EPA's efforts to bring conformity to its future cleanup agreements through the use of national models could eliminate some rights that Atlantic Richfield enjoyed under its previous agreements with EPA, like its right to pick its own cleanup contractor. To the extent that its previous rights might become diminished, Atlantic Richfield may be less willing to enter into cleanup agreements with EPA.

Status of the Clark Fork Cleanup

Although 3 of the 4 Clark Fork sites have been listed on the NPL since 1983, remedial action cleanups have been completed at only 2 of the 23 operable units: the Mill Creek operable unit in the Anaconda Smelter site and the Milltown Water Supply unit in the Milltown Reservoir site. Additionally, partial cleanup through removal actions was taken at four operable units: Priority Soils, Mine Flooding, and Rocker, in the Silver Bow Creek/Butte Area site; and Montana Pole. As of January 1991, two more removal actions were underway in the Silver Bow Creek/Butte

Area site—again at the Priority Soils unit and also at the Warm Springs Ponds unit.

Table 2.1 shows that Superfund and Atlantic Richfield have spent a total of about $54 million on investigations, studies, and cleanup in the Clark Fork Basin. The majority of this amount came from Superfund. The table also shows that a very large portion of the money spent—about $24 million—by Superfund and Atlantic Richfield was spent on studies and investigations. At the time of our review (Apr. 1990-Apr. 1991), EPA did not have a breakdown of the $9.6 million it spent between July 1989 and January 1991 to show the portion that was spent for studies and cleanups.

Table 2.1: Source and Use of Funds for Cleanup Activities in the Clark Fork Basin Between 1980 and January 1991

Dollars in millions

Source of funding	Total spent	Amount spent on Studies and investigations	Amount spent on Cleanups
EPA	$20.5		
Montana health department	12.8		
Subtotal (Superfund)	33.3	$15.7[a]	$8.0[a]
Atlantic Richfield	20.7	8.3	12.4
Total	**$54.0**	**$24.0[a]**	**$20.4[a]**

[a]Excludes $9.6 million EPA spent between July 1989 and January 1991.
Source: GAO representation of data provided by EPA and Atlantic Richfield.

According to EPA's current (Jan. 1991) plans, remedial actions at 6 of the remaining 21 operable units are scheduled to be completed by 1995 and at 10 more of the 21 units by 2001. Cleanup milestones have not yet been established for the remaining five units largely because EPA did not have sufficient information to do so. For example, EPA did not know when mining operations would end and therefore could not establish milestones for the Active Mine Area unit at the Silver Bow Creek/Butte Area site. Appendix II contains actual and projected cleanup actions for the 4 sites' 23 operable units.

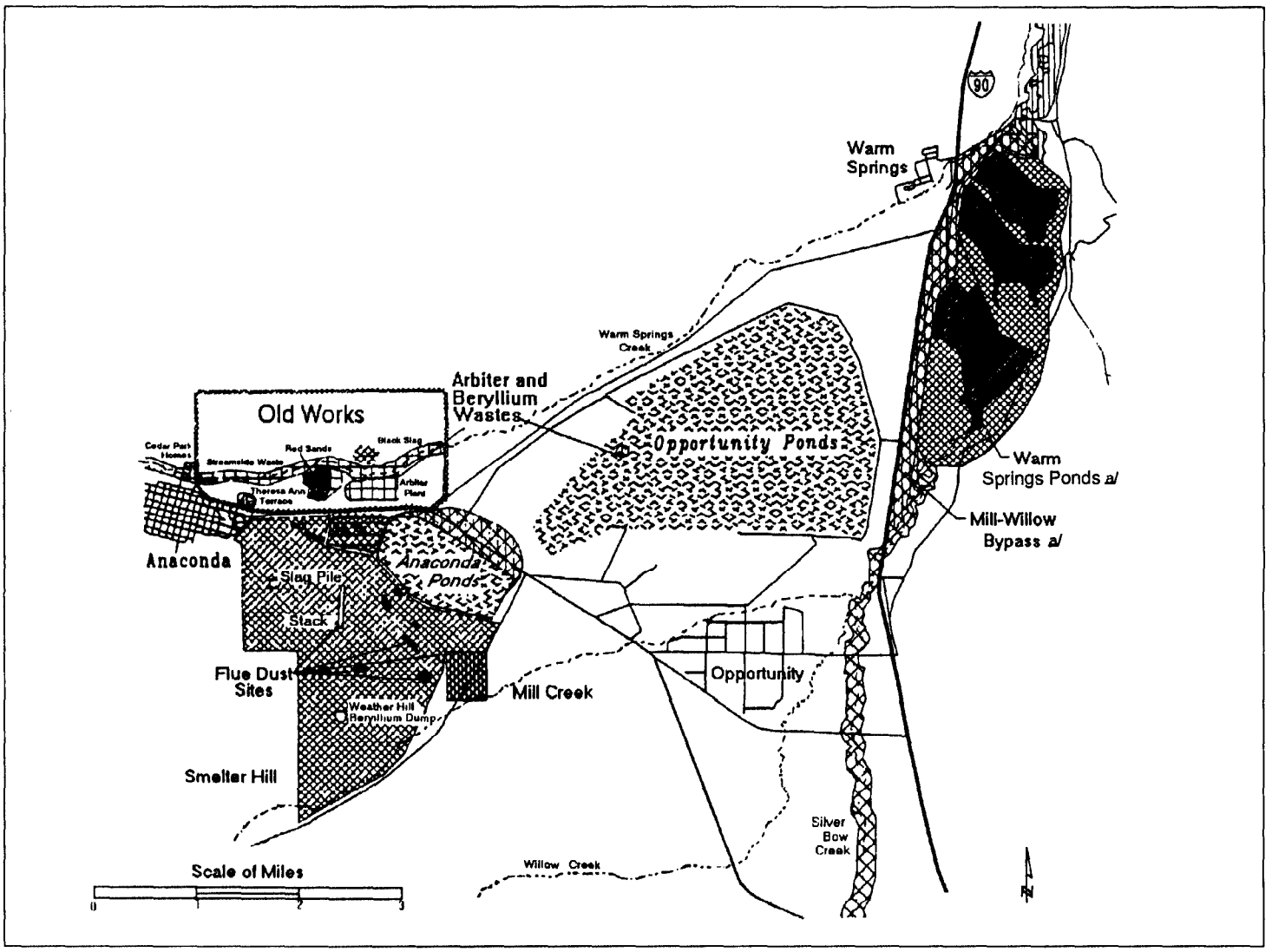
Delays at the Anaconda Smelter Site

Cleanup work at the Anaconda Smelter site (see fig. 2.1) was delayed about 1.5 years because a sitewide study to identify needed cleanup remedies was never completed. As of January 1991, EPA had spent about $6.4 million on cleanup studies and activities at this site's 11 operable units. Additionally, Atlantic Richfield had spent about $7.8 million. So far, cleanup work has been completed at only the Mill Creek unit (1988).

In addition, some contaminated waste was removed at the Smelter Hill unit. Currently, EPA is studying remedial or removal actions at five operable units. Of the 10 remaining units to be cleaned up, 8 are scheduled to be cleaned up over the next 10 years, with the last to be completed in 2001. EPA had no estimates of when work will be completed at the remaining two units.

The Anaconda Smelter site is contaminated by many waste materials (e.g., flue dust, slag, and tailings) from a century of copper-smelting operations. Additionally, the site is contaminated by highly toxic beryllium waste from beryllium-processing operations in the 1960s. One of the large operable units at this site—Smelter Hill—covers about 4 miles of heavily contaminated land. (See fig. 2.2.)

Figure 2.1: Anaconda Smelter Site



[a]These units/areas are part of the Silver Bow Creek site.

Source: GAO portrayal of an EPA map.

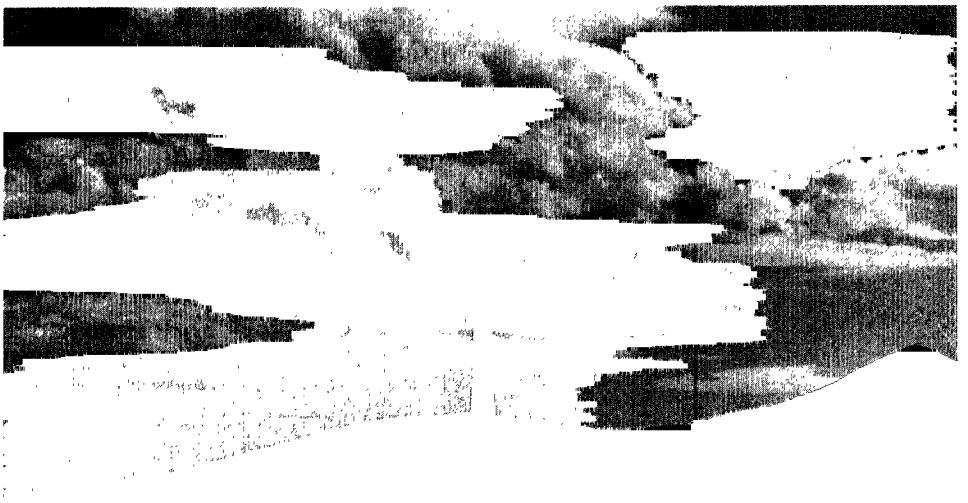


Figure 2.2: Smelter Hill, in the Anaconda Smelter Site

To address the contamination issues at this site, Atlantic Richfield, in an October 1984 agreement with EPA, agreed to do a sitewide study. However, in March 1985, shortly after the study began, the Center for Disease Control found elevated concentrations of arsenic in the urine of children living in the community of Mill Creek (see fig. 2.1), located near Smelter Hill. Consequently, EPA and Atlantic Richfield shifted their attention and resources from the sitewide study to deal with the arsenic problem at Mill Creek. Between April 1986 and August 1987, EPA had temporarily relocated 13 families with children or other sensitive individuals, and in July 1986, Atlantic Richfield began a cleanup study for Mill Creek. Following the completion of this study, the remaining 24 families were permanently relocated during 1988, and the contaminated area was fenced off.

After work on the sitewide study was stopped in 1986 to address the health problems at Mill Creek, the study was never resumed because EPA had recognized that such studies were not productive, and in 1988, EPA formally terminated its agreement with Atlantic Richfield for the sitewide study. According to the Director of the EPA Montana office, had the health problems at Mill Creek not been discovered, EPA would have terminated its agreement with Atlantic Richfield earlier—in 1986 or

1987—and started work on an operable-unit basis. Additionally, the director stated that had EPA known in 1984 what it knows now, it would have conducted a screening study (i.e., a preliminary study that provides data for prioritizing cleanup studies and removal activities) rather than a sitewide cleanup study.

Moreover, when the sitewide study for the Anaconda site was started, the Superfund program was only about 4 years old, and according to EPA officials, none of the staff who were hired to implement this new program at the Clark Fork sites had any previous Superfund experience. The staff that were initially hired to administer the program came from other EPA environmental programs, other federal agencies, and a private company. While some of these hires had worked in Superfund-related areas, such as in hazardous waste, water, or mining programs, others lacked both Superfund and related program experience. However, the staff who have worked on the sites for years now have experience with the Superfund program.

Delays at the Silver Bow Creek/Butte Area Site

As of January 1991, EPA, through the Montana health department, had spent about $8.9 million on cleanup studies and activities for the Silver Bow Creek/Butte Area site, and Atlantic Richfield had spent about $11.9 million. Although no cleanup work has been completed, some contaminated waste has been removed at three of the site's operable units—Priority Soils, Mine Flooding, and Rocker. In addition, removal work was underway at the Warm Springs Ponds, and additional removal work was also being performed at the Priority Soils unit. Of the eight operable units at the site, cleanups at five are scheduled for completion through 1997, one is scheduled for cleanup in 2001, and cleanup dates for two units have yet to be determined.

Efforts to produce a sitewide study for the Silver Bow Creek/Butte Area did not produce any remedial actions and delayed cleanup work at the site by up to 4 years. The sitewide study was undertaken in 1984 by the Montana health department with EPA funding. However, in 1986, the health department realized that the sheer size of the site, together with the diversity of problems posed by the site's contaminants, made it impossible to do a sitewide study. Consequently, the health department started to move toward unit-specific studies, and in 1988 it terminated the sitewide study after the study's members had produced a workplan for conducting further cleanup studies on an operable unit basis.

The health department's Superfund Chief attributed the department's problems with the sitewide study approach to his staff's inexperience, stating that none of his staff had any previous experience with the Superfund program or dealing with large and complex cleanups. The chief stated, however, that the sitewide study effort was not a total loss; its data were used to further divide the site into operable units (not all of the current operable units had been identified in 1986) and were used for narrower studies.

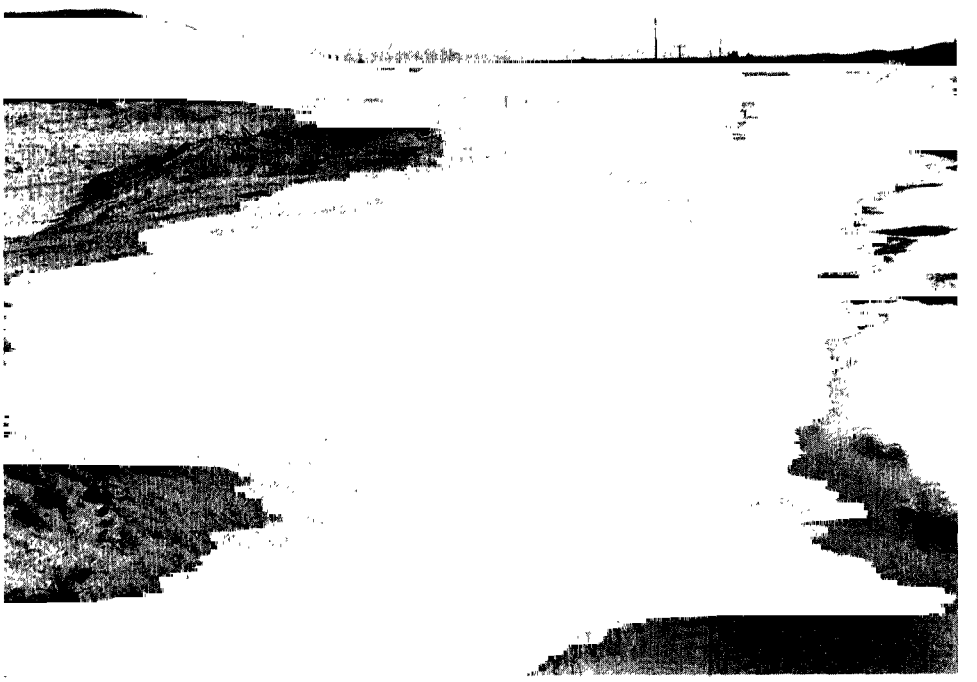
While the sitewide study was underway, two narrower cleanup studies were initiated on two areas or units within the Silver Bow Creek site—the Colorado Tailings area (within the Lower Area One operable unit) and the Warm Springs Ponds operable unit. However, the cleanup of these two areas/units was also delayed because of insufficient data on one study and public dissatisfaction with EPA's selected remedy for the other study.

Inadequate Study Delayed Cleanup of the Colorado Tailings

Cleanup was delayed by at least a year at the Colorado Tailings location because EPA and the health department, in an attempt to meet a congressionally imposed deadline, used data from the sitewide study to support the selected cleanup remedy. However, EPA later concluded that the sitewide study's data were not adequate to support the necessary legal action to compel Atlantic Richfield to perform the cleanup.

Because of its prominent location next to Interstate Highway 90 and alongside Silver Bow Creek (see fig. 1.1), the Colorado Tailings location has been the subject of much public attention. In addition to being an eyesore, the tailings are barren of vegetation (see fig. 2.3) and contaminate Silver Bow Creek with arsenic, copper, zinc, cadmium, and lead. Additionally, elevated concentrations of these heavy metals and arsenic have been detected in the tailings, soils, surface water, and groundwater of the Lower Area One operable unit.

Figure 2.3: The Colorado Tailings, Adjacent to Silver Bow Creek



In 1985, the Congress earmarked $1 million in the budget of the Office of Surface Mining, Department of the Interior, for cleaning up the Colorado Tailings but specified that the appropriation was contingent on whether a contractual commitment could be made by June 1987 to perform the cleanup. Atlantic Richfield, the major party responsible for the contaminated tailings, had indicated a willingness to clean them up. With this understanding in mind, the Montana health department produced a draft study in July 1986 identifying needed cleanup actions for the tailings.

But health department officials were worried that the study and the consequent cleanup commitment might not be completed by June 1987 to take advantage of the $1 million appropriation. Consequently, to save time during the study, the health department allowed the contractor to use sitewide data from the Silver Bow Creek study rather than gathering specific data on the extent of contamination at the Colorado Tailings area. The study was completed in 8 months at a contract cost to EPA of about $215,000.

On the basis of this study, the Montana health department proposed in July 1986 that Atlantic Richfield dig up the tailings and move them to a

location elsewhere on the Silver Bow Creek site at a cost to Atlantic Richfield of about $2 million. But Atlantic Richfield refused to implement the proposed remedy, contending that the data used in the study were not adequate to demonstrate that the tailings were the primary source of contamination of Silver Bow Creek. According to an Atlantic Richfield official, its studies showed that most of the creek's contamination came from Butte's groundwater, a problem that the health department's remedy would not have addressed. Also, Atlantic Richfield officials believed that the cost of moving the tailings would be closer to $5 million than $2 million. Moreover, it no longer supported proceeding with reclamation of the tailings out of sequence with other Superfund activities at the Silver Bow Creek site.

EPA and the health department considered obtaining Atlantic Richfield's compliance through court action, but decided against this approach because the study did, in fact, lack the specific data necessary to support the proposed remedy—removal of the tailings. Because Atlantic Richfield would not make a contractual commitment to implement the proposed remedy, EPA and the health department were not able to use the $1 million earmarked for cleanup of the Colorado Tailings.

In 1991, EPA finished its proposed plan for the Lower Area One operable unit, including the tailings. This plan shows that the tailings and another part of the unit are sources of metal contamination in Silver Bow Creek. To implement its preferred cleanup remedy, EPA now estimates it will now cost $45 million, which is substantially higher than earlier estimates. EPA's preferred alternative provides for the complete excavation of the Colorado Tailings and partial removal of tailings elsewhere on this unit.

Because of this experience, the EPA Montana Operations Office, according to its director, now requires legally defensible, quality data to be obtained for all cleanup studies.

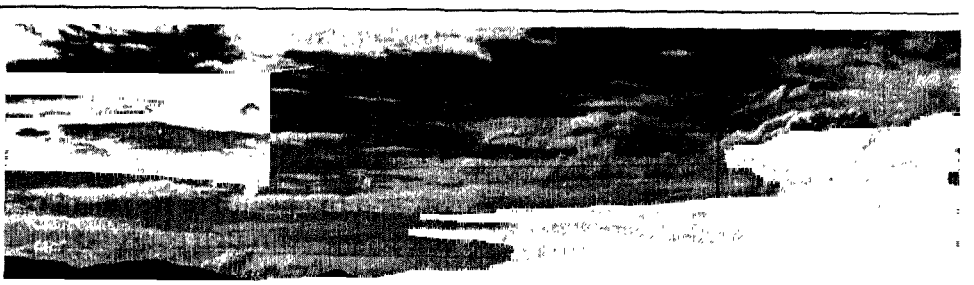
Public Dissatisfaction Delayed Cleanup at Warm Springs Ponds

At the Warm Springs Ponds operable unit (see fig. 2.1) within the Silver Bow Creek site, cleanup progress was delayed by a year because of the public's dissatisfaction with the selected remedy. Earlier participation by the public and Atlantic Richfield in the cleanup process may have avoided this delay.

The Warm Springs Ponds operable unit (see fig. 2.4) contains one of the largest and most dangerous areas of contamination within the Silver

Bow Creek site. Covering nearly 4 square miles, the ponds are contaminated with 19.5 million cubic yards of tailings containing arsenic, lead, and copper, much of which has flowed into the ponds from upstream sources, including the Lower Area One unit. The ponds are protected from flooding by a series of dikes. But in the case of a severe flood and resulting dike failure, the contamination from the ponds would enter the Clark Fork River, thereby contaminating it for many miles downstream.

Figure 2.4: The Warm Springs Ponds Cover 4 Square Miles



In 1986, to prevent a possible failure of the dike system and the consequent catastrophic release of contamination downstream, the Montana health department, under a cooperative agreement with EPA, contracted for a cleanup study, which was completed in 1989. As an interim solution, the study proposed the construction of another settling pond to collect flood water, should a flood occur.[1] At the time the study was completed, EPA estimated that it would cost about $63 million to implement this interim solution.

[1] After contaminated areas upstream from the ponds have been cleaned up, EPA plans to determine whether the interim solution is adequate to serve as a permanent solution.

In accordance with EPA policies in effect at the time, the Montana health department was not allowed to seek input from the public or Atlantic Richfield until the cleanup study was nearly completed. When the health department sought public input on the completed study, it received many negative comments. Local citizens contended that the addition of another pond would affect such things as groundwater, property values, public health, and environmental aesthetics affecting tourism. As an alternative, Atlantic Richfield proposed strengthening the existing dike system to protect the ponds from a 100-year flood—a flood of such magnitude that it could be expected to occur only once in 100 years. This proposal received support from many but not all local citizens. Accordingly, upon approval of the proposal by the health department's contractor, the EPA Montana Office modified its proposed remedy to agree with Atlantic Richfield's proposal. By this time, EPA had taken over cleanup responsibility because the Montana health department lost its project manager. According to an EPA estimate, the modified remedy will cost about $57 million to implement, or about $6 million less than the interim remedy it initially endorsed. EPA adopted the modified remedy in an interim record of decision signed in September 1990, which was about 18 months later than scheduled. Currently, Atlantic Richfield is working to implement the modified remedy, and expects to complete it in 3 years.

According to Atlantic Richfield and Montana health department officials, delays in remedy selection could have been avoided, had the company and the public been allowed to participate in developing the cleanup study. Having learned from its experience with the public's reaction to the proposed remedy, EPA has greatly expanded its involvement of the public and Atlantic Richfield in the cleanup process for the four Clark Fork sites. New local policies issued by the EPA Montana Operations Office in November 1990 encourage the public to comment on draft documents prepared as cleanup studies progress, and to attend public meetings to discuss interim cleanup study results.

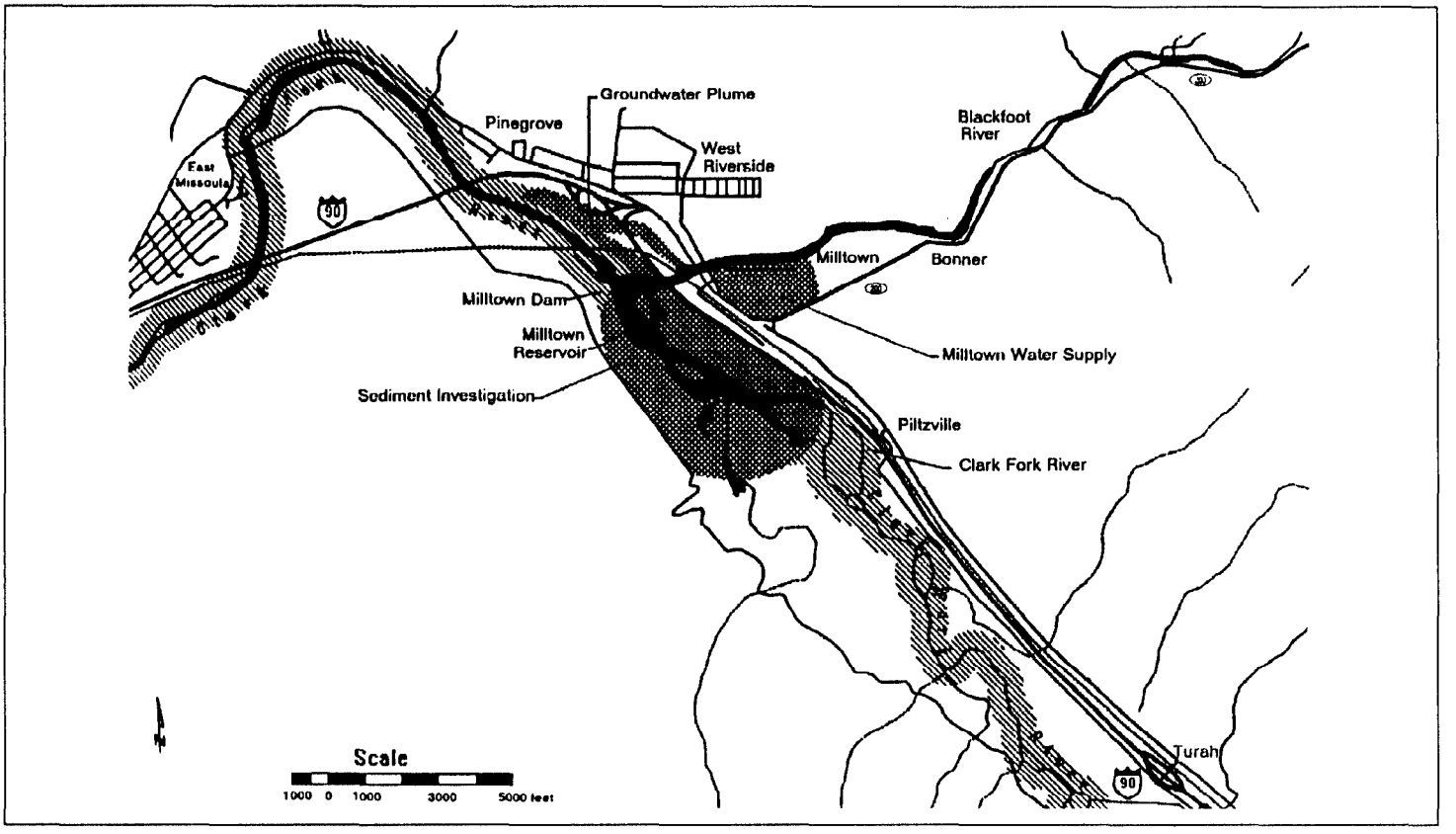
But despite EPA's efforts to address citizens' concerns and to involve them more in the cleanup process, some citizens are still concerned that EPA's interim solution (strengthening the existing dikes) will become final and that the ponds will continue to remain in the floodplain, thereby posing a continuing threat to health and the environment. These concerns are discussed in greater detail in chapter 3.

Delays at the Milltown Reservoir Site

The cleanup of the Milltown Reservoir/Sediments unit at the Milltown Reservoir was delayed by about 3 years because the Montana health department was not able to get its contractor to provide quality data. As of January 1991, EPA had spent about $4.2 million on this site. Some of the money was spent to clean up one of the site's three operable units—the Milltown Water Supply unit—which was completed in 1985. EPA was also performing another cleanup study for the Milltown Reservoir/Sediments unit after taking over this responsibility from the Montana health department. The cleanup of the third unit—Clark Fork River—is not scheduled to be completed until 1998.

The Milltown Sediments operable unit (see fig. 2.5) is contaminated by mine waste sediments that have been carried from the Clark Fork River into the Milltown Reservoir. The contaminated sediments, which have accumulated behind the reservoir's dam, include concentrated arsenic, lead, cadmium, zinc, and copper.

Figure 2.5: Milltown Reservoir Site



Source: GAO portrayal of an EPA map.

In April 1985, the Montana health department contracted for the Milltown Sediments study, and the contractor submitted a draft study in October 1985. However, EPA and the health department found that the quality of the work was poor and that additional data were needed to complete the study. The contractor promised to correct the data problems, and EPA and the health department allowed it additional time to do so. According to health department officials, about 18 months then passed, during which the health department repeatedly attempted to get the contractor to correct the data problems and complete the study. In 1987, with the data quality problems still remaining, the health department began contract termination procedures, and the contract was terminated. Although the Montana health department had paid the contractor about $91,000, a health department official told us that about $40,000 in payments was withheld from the contractor, pending resolution of the data quality problems and completion of the study.

Following the termination of this contract, the department hired a new contractor in 1988 to determine how much of the study data was usable for ongoing Superfund studies. However, after EPA took over the lead responsibility for the Milltown Reservoir site in January 1989 because of the Montana health department's loss of its project manager for this site, EPA decided to have Atlantic Richfield conduct a new study, as the company had verbally agreed to perform all future studies at the Clark Fork sites.

Cleanup Activities at the Montana Pole Site

The Montana Pole site, the newest of the four sites and also the only nonmining site, has had little cleanup work since it was added to the NPL in 1986. As of January 1991, EPA had spent about $3.8 million at this site, and Atlantic Richfield had spent about $1 million. In part, this money was used to finance a removal action that was completed at the site in 1988 to halt the seepage of pentachlorophenol and diesel oil into Silver Bow Creek. Additionally, under the oversight of the Montana health department, Atlantic Richfield started a cleanup study in June 1990. This site is scheduled to be cleaned up by 1995.

EPA Acts to Address Problems, but More Could Be Done to Monitor Cleanup Progress

EPA has taken a number of actions to address problems and to accelerate cleanup at the Clark Fork sites. However, some of the problems encountered at Clark Fork—inexperienced staff and the lack of public participation—were not unique to these sites. Similar problems have occurred at other Superfund sites throughout the nation. In response, EPA has acted nationwide and at the Clark Fork sites to address its problems. Although EPA plans to monitor its implementation of these actions, it has not been monitoring Region VIII's overall progress in cleaning up the Clark Fork sites.

Nationwide Actions

In A Management Review of the Superfund Program, issued in June 1989, the EPA Administrator reported on progress and strategies for improving Superfund performance. The report recognizes that the cleanup process is a lengthy one that involves complex problems, uncertainty in data, and different opinions on how to address the problem. It also recognizes the importance of obtaining public participation in Superfund oversight, decision-making, and implementation early in the process and discusses the escalating costs of cleanup studies and remedial action. Additionally, the report confirmed that when Superfund was enacted in December 1980, EPA had no practical experience with the difficulty and duration associated with cleaning up hazardous waste sites.

To address these problems and others affecting the timely cleanup of Superfund sites, EPA's September 1989 Implementation Plan identified some 120 tasks, including a number of policy or procedural changes that were to be implemented over the next 2 years. In April 1991, EPA reported that 102 of the 120 projects had been completed and that the remaining tasks were on track for completion by September 30, 1991. Additionally, EPA reported that its Office of Solid Waste and Emergency Response (OSWER), which has responsibility for administering Superfund, was planning to do some field studies to determine how well implementation was progressing.

Site Specific Actions

Besides taking national action, EPA also has taken local action at the Clark Fork sites to address problems and to speed up cleanups. First, on the basis of its experience at both the Anaconda Smelter and Silver Bow Creek sites, EPA is no longer conducting sitewide studies at any of the Clark Fork mining sites. Instead, EPA has begun conducting studies at operable units within the sites. Second, EPA plans to conduct a preliminary screening study at the Anaconda Smelter site. This study would be used to obtain analytical data for setting priorities for the remaining cleanup activities at the site. Third, EPA has expanded the level of public involvement in the Superfund process to help prevent any unexpected public opposition to proposed cleanup remedies, as happened at the Warm Springs Ponds unit. Fourth, the EPA Montana Office has developed a master plan for cleaning up multiple sites and for coordinating and informing the public of cleanup activities. The latter two actions are discussed in more detail in chapter 3.

In addition, to accelerate cleanups, EPA is conducting a number of expedited response actions at units (such as the Old Works) having well-defined problems that present a significant but not immediate threat, and it has plans to conduct more of these actions. In conducting an expedited response action, EPA, in contrast to its regular cleanup study, prepares a smaller scale study—an engineering evaluation and cost analysis—and uses the results to guide its removal efforts. Since these studies require less time to prepare than a regular cleanup study, they allow EPA to act sooner to address potential threats to public health or the environment. Although EPA expects these expedited response actions to be consistent with the final remedy, EPA cannot be fully assured of this consistency until a final remedy is selected on the basis of a regular cleanup study. Therefore, these actions involve some risks.

EPA also has assumed the lead responsibility for the Silver Bow Creek (excluding the Streamside Tailings operable unit) and Milltown Reservoir sites from the Montana health department because of staff turnover in that department. According to EPA officials, the Montana health department lost its project officers for these two sites. Foreseeing potential delays as a result of these losses, EPA took over the lead responsibility for Milltown in January 1989 and for Silver Bow Creek in January 1990.

EPA's Monitoring Activities

Besides OSWER's plans to use special field studies to oversee regional implementation of actions resulting from EPA's management review, EPA uses other means to oversee the activities of its regions. By far and most importantly, EPA establishes annual targets for each of its 10 regions. For example, EPA establishes annual targets for such things as the number of cleanup studies or number of cleanups started or the number of cleanup settlements reached. It then monitors the regions' progress in meeting these targets throughout the fiscal year.

The Clark Fork sites have been designated as enforcement sites in that EPA expects the potentially responsible parties for these sites to clean them up. In this respect, OSWER's Office of Waste Programs Enforcement has responsibility for overseeing regional enforcement activities. Besides using daily contacts with the regions to keep abreast of regional enforcement activities, the Office of Waste Programs Enforcement has regional coordinators to coordinate activities between headquarters and the regions and to monitor EPA regional enforcement activities.

The activities of the regional coordinator for EPA's Region VIII have generally been narrowly focused in terms of their activities in connection with the Clark Fork sites. For example, during the past year, the regional coordinator has reviewed records of decisions—the decision that documents and justifies a particular remedy—for the Warm Springs Ponds unit at the Silver Bow Creek site and for the Flue Dust unit at the Anaconda Smelter site, tackled various issues in response to congressional requests, and helped the region respond to comments from a potential supplier for a treatability process for flue dust. However, neither the present coordinator for Region VIII, who has operated in this capacity for about a year, nor the former coordinator have been involved in overseeing, or in conducting periodic reviews of, the regions's overall progress in cleaning up the Clark Fork sites. As a result, EPA has not been in as good a position as it could be in to help Region VIII keep cleanup activities on track.

Two Unresolved Issues Threaten Future Cleanup Efforts

Although EPA has taken some actions to expedite cleanup, two unresolved issues may lead to further cleanup delays. First, the lack of EPA soil contamination standards may lead to disagreements, and ultimately court action, between EPA and Atlantic Richfield over the level of soil cleanup standards that must be achieved. Second, Atlantic Richfield believes some of the provisions in EPA's recently issued model cleanup agreements, like the insurance requirements, are too stringent. Should Atlantic Richfield reject these provisions, EPA might have to order the cleanup and, if necessary, seek court enforcement of its order.

Disagreements Over Soil Cleanup Standards

EPA has standards that set quantitative concentration limits for specific contaminants. For example, the Safe Drinking Water Act sets the maximum contaminant level for lead in drinking water at 50,000 parts per billion. However, no federal standards exist for contaminant levels in soil although EPA is currently working on developing such standards. But until federal soil standards are available, EPA will have to establish safe concentration levels for some of the operable units on which work remains to be done. And if Atlantic Richfield is to clean up these units, EPA and Atlantic Richfield will have to reach agreement on these soil contaminant levels.

EPA and Atlantic Richfield, however, have not had the opportunity yet to disagree on the safe concentration levels for such soil contaminants as arsenic and lead. None of the three records of decision that EPA has already issued for the Clark Fork sites addressed the cleanup of contaminated soil. Although Atlantic Richfield has conducted removal actions at the Priority Soils and Rocker operable units, soil contamination there was so severe that EPA and Atlantic Richfield were readily able to agree on the removal action that had to be taken.

Nevertheless, both EPA and Atlantic Richfield believe that disagreements over what constitutes safe concentration levels for soil contaminants could delay cleanups for operable units on which records of decisions are still to be prepared. For example, EPA expects to select a remedy, including the safe soil contamination levels to be achieved, for the Smelter Hill unit in 1993. Because EPA expects Atlantic Richfield to clean up this unit, EPA will need Atlantic Richfield's concurrence with the chosen remedy. Disagreements over these levels could delay the selection of this remedy. Moreover, should EPA fail to obtain Atlantic Richfield's concurrence, EPA might have to resort to litigation, which could set the cleanup of this site back by years. EPA was somewhat skeptical that it will be able to easily obtain Atlantic Richfield's concurrence

because that company has already challenged EPA in court on its proposed national standard for lead contamination in soil.

Concerns Over Model Cleanup Agreement Provisions

In 1990, EPA headquarters developed, in draft, model agreements that identify the specific provisions the regions are to use to achieve nationwide consistency in their agreements with potentially responsible parties for cleanups and cleanup studies. The provisions cover such things as the work to be performed, including selecting the contractor, developing the work plan, and submitting periodic progress reports to EPA; the resolution of disputes; and the penalties to be assessed for delays in performance. Although some uncertainty exists over the extent to which EPA Region VIII and its Montana Office will pursue inclusion of these provisions in its agreements with potentially responsible parties, Atlantic Richfield has indicated that it may refuse to accept provisions it considers too stringent. Should this occur, EPA's only course of action for getting Atlantic Richfield to clean up the site would be to issue the company a unilateral order, and if needed, seek court enforcement of its order—actions that would further delay cleanup of the affected sites.[2]

According to Atlantic Richfield officials, some of the model's provisions are too stringent, and therefore, the company might refuse to accept them. In addition, it might refuse to comply with any unilateral orders EPA might issue in response to Atlantic Richfield's refusal to accept such provisions. Specifically, Atlantic Richfield officials were concerned that the model gives EPA final approval over the contractors that Atlantic Richfield hires to do the cleanup and the individuals assigned to those projects. Further, potentially responsible parties, such as Atlantic Richfield, would not only be fined for delays for which they are responsible, but they are also required to take whatever actions are necessary to compensate for delays EPA might cause. The model agreement also would require Atlantic Richfield to obtain liability insurance instead of self insuring.

According to the Director of the EPA Montana Office, EPA's future agreements with Atlantic Richfield for studies and cleanups will conform closely to the model agreements included in the January 1991 draft guidance. He favors close adherence to the model agreements because he believes that (1) EPA should have consistency nationwide and (2) EPA

[2]EPA can issue administrative orders unilaterally to potentially responsible parties. Because of the prospect of treble damages or judicial enforcement, including penalties, associated with noncompliance with these orders, EPA believes its order authority provides a powerful impetus for potentially responsible parties to reach agreement with EPA.

needs to operate from the strongest position possible to fulfill its mission. However, EPA's Region VIII Hazardous Waste Division Director said that EPA's policies pertaining to the model agreements afford the regions some latitude in implementing the model agreements, thereby suggesting that some room exists for compromise. In fact, after the draft model agreements were issued, EPA and Atlantic Richfield reached agreement on the cleanup of the Priority Soils operable unit of the Silver Bow Creek/Butte Area site. Nevertheless, Atlantic Richfield officials are cautious that future disagreements might arise over provisions in the model agreements, thereby delaying cleanups at other operable units.

Conclusions

Although EPA, the Montana health department, and Atlantic Richfield have spent tens of millions of dollars, limited progress has been made in cleaning up the Clark Fork Superfund sites. Because of their inexperience in cleaning up large and complex sites, EPA and the Montana health department initiated a number of studies that failed to achieve their intended purpose of identifying cleanup remedies or that took longer to complete. In addition, the public was not allowed to participate earlier in the study process. As a result, cleanup activities at the Clark Fork sites were delayed for years. However, both EPA's Region VIII and its Montana Office claim that they have learned much during the past decade from these experiences. As a result, EPA's Montana Office has revised its study approach and public participation policies to help minimize future delays and accelerated studies to provide for more timely removals of contaminants at selective units. EPA also has acted nationally to address problems that have delayed the cleanup of Superfund sites.

Regardless of whether these actions prove effective, it would be unrealistic to expect that all future Clark Fork cleanup activities will proceed smoothly and without delay, considering the numerous parties involved in the cleanup and the hundreds of millions of dollars that may ultimately be required to clean up these sites. In fact, the potential already exists for additional delays because of the absence of soil standards and differences over what constitutes safe concentrations of various soil contaminants. Additionally, Atlantic Richfield's concern over EPA's efforts to achieve nationwide consistency in its formal cleanup agreements also threatens to further delay cleanups at the Clark Fork sites. And even though EPA can use its various enforcement tools to obtain Atlantic Richfield's participation, these tools also require time as well as money to implement.

Nevertheless, EPA could do more to oversee Region VIII's progress in cleaning up the Clark Fork sites. Although OSWER monitors Superfund activities at EPA's 10 regions, these monitoring activities have not included periodic reviews of Region VIII's overall progress in cleaning up the Clark Fork sites. While we recognize that it might not be practical for EPA to conduct periodic reviews of cleanup progress at each of its almost 1,200 Superfund sites, such reviews would seem to be in order for the Clark Fork sites, considering the size and complexity of these sites, the past problems at these sites, and the potential that already exists for further delays.

Recommendation to the Administrator, EPA

To help minimize further delays in cleaning up the Clark Fork sites, we recommend that the Administrator, EPA, direct OSWER to conduct periodic reviews of Region VIII's overall progress in cleaning up the Clark Fork sites, with a view toward identifying potential problems that could further delay cleanups and needed solutions to avoid and minimize such delays. OSWER could accomplish this by participating in the quarterly meetings that Region VIII's Montana Office plans to have with its work group to review the implementation of the Clark Fork master plan. This plan and the work group are discussed in detail in chapter 3. Additionally, Region VIII and its Clark Fork sites could be included in the field studies that OSWER plans for reviewing the actions that EPA has taken in response to its June 1989 management review of the Superfund program.

Latest Master Plan Is More Realistic, but Improvements Are Needed in EPA's Strategy for Monitoring the Plan's Implementation

To provide a coordinated strategy for the overall cleanup of all Clark Fork sites, EPA and the Montana health department developed a master plan. The plan, which was issued in 1988, specified the timing and sequence for initiating cleanup studies and cleanup remedies for the various operable units at the four Clark Fork sites. Shortly after the plan was issued, however, EPA Region VIII realized that the plan did not adequately sequence the timing of cleanups at the various operable units because the plan did not allow first for the cleanup of all upstream units, thereby risking the recontamination of downstream units that were to be cleaned up first. Moreover, EPA was aware that its plan did not contain cleanup milestones that were realistic and achievable—16 of 17 operable unit milestones were either missed or had to be later extended.

In November 1990, EPA and the Montana health department issued a revised master plan. According to EPA and health department officials, the new plan provides a more appropriate sequencing of cleanup work and more realistic cleanup milestones. Additionally, the EPA Montana Office took a more proactive approach in involving citizens in the plan's development by including representatives from affected local communities on the master plan work group that was used to develop the plan.[1] EPA also has a strategy for monitoring its progress in implementing the plan through quarterly sessions with the master plan work group. Although this work group includes representatives from various community or citizen groups, EPA's monitoring strategy does not provide for periodically informing the public of its progress in meeting the plan's milestones. Additionally, this strategy does not provide for assessing alternatives that could be taken to minimize any expected slippages in the plan's milestones.

Although EPA increased citizen participation in developing the 1990 master plan and has developed policies for obtaining earlier public input on various cleanup activities, citizen concerns with selected or potential cleanup actions could lead to slippages in the plan's cleanup milestones. Specifically, citizens are concerned about EPA's plans to address the (1) flooding at the Berkeley Pit operable unit, (2) disposition of the Colorado Tailings at the Lower Area One unit, and (3) a final remedy for the Warm Springs Ponds unit.

[1]This group consists of representatives from EPA, the Montana health department, affected local communities, and Atlantic Richfield.

1988 Master Plan Did Not Effectively Sequence All Cleanup Activities

EPA's efforts to develop a master plan which would provide a coordinated strategy for conducting the overall cleanup of the Clark Fork Basin fell short of its intended objective. EPA intended that the plan lay out the timing and sequencing of cleanup work for all four sites along the 140 miles of the basin. But the plan was found to be inadequate when a local citizen group noted that two downstream operable units were scheduled for cleanup before some upstream units that were considered to be one source of their contamination, thereby posing a danger of recontamination.

According to the 1988 Master Plan, EPA and the Montana health department developed the plan to aid the public in understanding how requirements of the Superfund process relate to response actions being planned or implemented at the Superfund sites. The specific objectives of the plan were to

- identify, prioritize, and coordinate inter-site activities to achieve the most rapid and effective investigation and cleanup of the Clark Fork sites;
- coordinate Superfund activities with other environmental improvement programs;
- provide for consistent approaches to response actions for all sites; and
- communicate information on Superfund activities to all interested parties.

The plan consolidated 77 potential contamination problems into 25 operable units.[2] Because there were so many problems to be addressed, the plan established priorities to ensure that the most serious problems were addressed first. Using the sequencing criteria in table 3.1, EPA and the health department evaluated the 25 operable units and placed them in either a high-, medium-, or low-priority category. The lower the number within each category, the more critical the problem. The resulting ranking of units is shown in table 3.2.

[2]EPA's latest cleanup plan lists 28 operable units, encompassing 23 separate geographic locations.

Table 3.1: Criteria for Establishing Priorities for Operable Units

Priority	Sequencing criteria
High	High potential human health exposure High potential environmental exposure Provides critical-path data needed to fully address other operable units
Medium	Medium potential human health exposure Medium potential environmental exposure Potential for recontamination of other operable units located downstream, downgradient, or downwind Unusually complex problem requiring lengthy evaluation
Low	Low potential human health exposure Low potential environmental exposure Low present human health or environmental exposure but potential future exposure Low risk of off-site contamination

Source: EPA's 1988 Master Plan.

Table 3.2: 1988 Plan's Proposed List of Priorities for Clark Fork Operable Units

Priority	Sequencing of units
High	Mill Creek Walkerville (now a part of Priority Soils) Priority Soils Old Works Removal (part of Old Works operable unit) Flue Dust Warm Springs Ponds Travona Flooding (now a part of Mine Flooding) Montana Pole Mine Flooding (Berkeley Pit) Rocker
Medium	Lower Area One Streamside Tailings Smelter Hill Clark Fork River Milltown Reservoir Anaconda Community Soils Anaconda Sitewide Ground Water Old Works (general)
Low	Butte Non-Priority Soils Tailings (ground water/alluvium) Arbiter (now includes Beryllium) Smelter Wastes (now includes only slag) Anaconda Surface Water and Sediment Agricultural Lands Active Mine Area

Source: EPA's 1988 Master Plan.

Shortly after the 1988 plan was issued, the Clark Fork Coalition—a citizen group—commented that the issued plan provided for cleaning up the Warm Springs Ponds before cleaning up some upstream locations, such as Travona/Berkeley Pit, Silver Bow Creek Lower Area One, and

Streamside Tailings. These areas were considered to be sources of contamination for Warm Springs Ponds, thereby threatening to recontaminate the ponds after its cleanup.

In response to the Coalitions' comments, EPA revised the sequencing of cleanup activities to provide for cleaning up these upstream units before the Warm Springs Ponds. On the basis of this experience, EPA Montana Office officials told us that they learned the value of obtaining citizens' participation during the planning process, rather than seeking citizens' comments on the plan after its issuance.

1988 Master Plan Did Not Contain Realistic Milestones

EPA's efforts to provide realistic cleanup milestones for the master plan were inadequate. As of January 1991, milestones had either been missed or extended at 16 of the 17 operable units that had milestones.

We compared the 1988 plan's original "record of decision" dates (the point at which the remedial investigation and feasibility study have been completed and the preferred remedy has been selected) for 17 operable units with the actual decision dates, if applicable, or the revised decision dates as of January 1991.[3] None of the five record of decision milestones scheduled to be met by January 1991 had been met on schedule. In addition, of the remaining 12 milestones originally scheduled to be met after January 1991, all but 1 had been extended. Table 3.3 shows, by site and operable unit, the difference between the original record of decision milestone and the actual or revised one. For example, the original date of the record of decision for the Old Works operable unit was extended 5 months, whereas the decision was extended about 6 years and 7 months for the Non-Priority Soils unit. In contrast, the record of decision for the Arbiter/Beryllium unit was moved up about 7 months. We did not compare planned versus actual resource expenditures because the master plan contained no resource estimates.

[3]Six units were excluded—two units had been or were being cleaned up at the time of the 1988 plan, and the other four units did not have milestones established either in 1988 or as of January 1991.

Table 3.3: Comparison of Record of Decision Dates for Operable Units at the Clark Fork Sites

	Year/month																							
	1989												1990											
Site/operable unit[a]	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D
Silver Bow Creek/Butte																								
Warm Springs Ponds																								
Mine Flooding																								
Lower Area One																								
Priority Soils																								
Streamside Tailings																								
Non-Priority Soils																								
Anaconda Smelter																								
Flue Dust																								
Smelter Hill																								
Community Soils																								
Old Works																								
Arbiter/Beryllium																								
Site-Wide Groundwater																								
Tailings																								
Slag Piles																								
Milltown Reservoir																								
Milltown Sediments																								
Clark Fork River																								
Montana Pole																								
Montana Pole																								

Year/month					
1991	1992	1993	1994	1995	
JFMAMJJASOND	JFMAMJJASOND	JFMAMJJASOND	JFMAMJJASOND	JFMAMJJASOND	Other
			O		
				O	
X				O	
X		O			
	X				Feb.1999
O					
X		O			
	X			O	
	X O				
	O	X			
		X			Mar. 1996
		X			Mar. 1996
		X			Sept. 1999
			O		
X					Jan. 1996
X	O				

Legend: X - As planned in 1988 Master Plan. O - Planned as of January 1991.

[a]Six operable units are omitted from this analysis. The records of decision for the Milltown Water Supply and Mill Creek operable units were completed in 1985 and 1986, respectively. Four other operable units did not have milestones established in 1988 or do not presently have milestones established.

Source: GAO analysis of EPA data.

According to EPA and Montana health department officials, unrealistic milestones were the main reason that milestones in the 1988 plan had to be extended. They explained that the milestones were unrealistic for two reasons. First, EPA Montana Office and health department officials lacked experience in planning cleanup activities of such magnitude, and thus had difficulty in estimating the time that would be needed to complete cleanup studies. Second, EPA Montana Office officials used the guidance that headquarters provided them, which turned out to be inappropriate for operable units as large and complex as the ones at Clark Fork.

In July 1987, EPA headquarters directed the regions to reduce the duration of the cleanup study process. At that time, the process took an average of 25 months, but EPA headquarters believed it could be reduced to 18 months. According to EPA Montana Office officials, their lack of experience caused them to base their 1988 plan's milestones on this 18-month criterion, and they realized only later that this criterion was inappropriate for projects as large and complex as at the Clark Fork sites.

1990 Master Plan Addresses Limitations in the 1988 Plan

EPA's November 1990 master plan appears to overcome the limitations found in the initial plan by sequencing cleanup work more appropriately and providing milestones that are more realistic and achievable. Moreover, EPA has increased citizen participation in the plan's development as well other aspects of the cleanup process.

The 1990 plan sets forth a logical sequence of cleanup activities. EPA used basically the same criteria for establishing priorities for cleaning up operable units as it did for its 1988 master plan. But unlike the 1988 plan, actions to remediate upstream sources of contamination are scheduled to be completed before the downstream actions, except when human health concerns necessitate a different sequence. Furthermore, all of the representatives we interviewed from the various citizen groups, including the Clark Fork Coalition, agreed with the sequencing of cleanup activities contained in the 1990 master plan.

Also, the milestones contained in the 1990 plan are more realistic than those in the 1988 plan, according to EPA Montana Office and health department officials. These officials attributed this improvement to the considerable experience they have gained in estimating time frames for completing cleanup actions and the additional information they have acquired about the Clark Fork sites. For example, from preliminary remedial investigations, EPA Montana Office officials gained information on the type and extent of a site's contamination that enabled them to better estimate the time needed to complete subsequent studies. Additionally, EPA Montana officials hired a contractor to help them estimate milestones for the 1990 plan. The contractor used a computerized project planning tool that estimated the time required for all the individual projects identified in the plan.

EPA Montana and health department officials also increased public participation in developing the 1990 master plan. The master plan work group was expanded to include representatives of Senator Conrad Burns' office (Montana), the Clark Fork Coalition, the Missoula County

Health and Commissioner's Office, the Citizens' Technical Environmental Committee (Butte), and the Anaconda Deer Lodge Reclamation Advocates. The members for each of the citizen groups represented on the master plan work group that we interviewed were satisfied with their level of involvement in developing the 1990 plan. Atlantic Richfield officials were also more involved in developing the 1990 plan than they had been in developing the 1988 plan.

Additionally, EPA Montana Office and health department officials chose to increase the level of community involvement above that required by Superfund. For example, Superfund does not require public participation in reviewing drafts of cleanup studies. The 1990 master plan, however, encourages public participation in reviewing and commenting on draft cleanup studies and on draft engineering evaluations and cost analyses. By doing so, EPA Montana officials hope to identify and respond to the public's concerns earlier in the process. They believe that this will help them to meet cleanup milestones.

EPA Needs a Better Strategy for Monitoring the Implementation of Its Master Plan

Although EPA's Montana Office has a strategy to monitor the 1990 master plan's milestones during quarterly meetings with the master plan work group, this strategy has two weaknesses. EPA's strategy does not provide for informing the public of its progress in meeting plan milestones. EPA has already extended several milestones since the plan's issuance in November 1990, but the public was not informed of this through posted or published notices. In addition, the strategy does not include provisions for assessing alternatives for avoiding potential slippages or for minimizing actual ones. Since the master plan was issued to keep the public informed of EPA's plans for cleaning up the Clark Fork sites, EPA could further this goal by informing the public of its progress in implementing the plan and the actions it is taking to prevent or minimize milestone slippages. Public involvement is important because local citizens are the ones most affected by the threat the sites' pose to human health and the ones that have been the most vocal over the cleanup activities at these sites.

The EPA Montana Office's strategy for monitoring master plan milestones provides for tracking milestones, having project managers prepare a written narrative in the event of slippages, and meeting quarterly with the master plan work group to monitor plan milestones. According to EPA's Montana Office, the EPA project managers who lead the site cleanup efforts will explain any actual or anticipated slippages to the work group at these quarterly meetings. The work group held its first

meeting in December 1990 and discussed the milestone-tracking process. EPA officials reminded the group that the forum was not a decision-making body, but a discussion and advisory forum.

Although this strategy is a step in the right direction, it has two shortcomings. First, when it becomes apparent that a milestone may slip, the strategy does not provide for assessing alternatives to minimize the extent of slippage and its potential impact on other cleanup activities. For example, a potential slippage in milestones might be prevented or minimized by putting additional staff on the project, providing legal or technical advice, providing additional funds, or negotiating alternative cleanup actions with the responsible party. Second, although the work group consists of representatives of various citizen groups, there are no provisions or mechanisms to ensure that the public at large is kept informed of EPA's progress in implementing the master plan.

EPA Region VIII and Montana Office officials agreed that there was merit to having a strategy that included provisions for assessing alternatives and keeping the public informed of EPA's progress in meeting plan milestones. In fact, they said that the issue of whether master plan milestones should be followed up was raised at a recent work group meeting and by the public. Accordingly, they expected that some type of action would be forthcoming in this area and they said that they would take our proposal to include provisions in their strategy for informing the public and assessing alternatives under consideration.

Citizens' Concerns Over Selected Cleanup Remedies

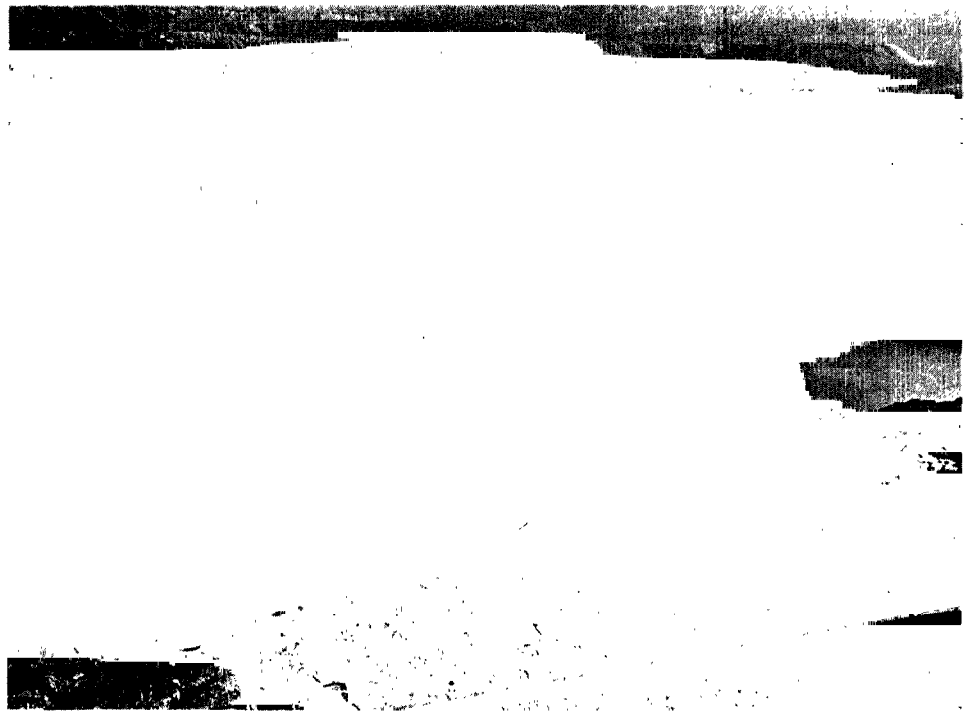
Although the EPA Montana Office has taken various actions to involve citizens in the planning and cleanup process, EPA has not been able to resolve all citizens' concerns. Citizen groups we interviewed expressed concern over how EPA will address the (1) flooding at the Berkeley Pit operable unit, (2) disposition of the Colorado Tailings at the Lower Area One unit, and (3) final remedy for the Warm Springs Ponds operable unit. Although EPA Montana Office officials plan to obtain the views of citizen groups on the selected remedies for these three units, EPA recognizes that it still might not be able to appease everyone's concerns. In contrast, EPA was able to accelerate cleanup actions to partially satisfy a citizen group's concerns with the Old Works unit in the Anaconda Smelter site.

Berkeley Pit

The Berkeley Pit is an open-pit mine that began filling up in 1982 once the mining company stopped pumping water out of it. (See fig. 3.1.)

About 7.6 million gallons of water, contaminated with a high concentration of arsenic and heavy metals, flows daily into the pit and associated mines. According to a U.S. Geological Survey official, water will continue flowing into the pit indefinitely. Although Atlantic Richfield is currently studying various remedies, the selected remedy, according to EPA and Atlantic Richfield officials, may involve building a pumping plant to maintain the pit's water level at an elevation of about 5,410 feet—the level at which EPA believes water can be kept from migrating out of the pit. According to an EPA Montana Office official, water pumped from the pit will be treated to remove the contamination and then discharged into Silver Bow Creek.

Figure 3.1: The Berkeley Pit



The Citizens' Technical Environmental Committee, however, wants EPA to begin pumping the water out of the pit immediately (about 13 billion gallons as of 1988). The Committee is concerned primarily about the pit's socio-economic effect on the community of Butte. That is, they believe that as long as the pit contains any contaminated water, property values in Butte will be negatively affected; they also fear that businesses will be reluctant to relocate to the Butte Area. Additionally, the Committee believes that the rising water in the pit and surrounding shafts makes mining the remaining ore impossible.

According to EPA officials, Superfund does not allow them to select remedial actions on the basis of socio-economic effects; instead, EPA must make its decisions solely on the basis of protecting human health and the environment. As long as the water in the Berkeley Pit is prevented from migrating out of the pit, it poses no threat to human health or the environment. Consequently, EPA officials questioned whether they could prove that the pit's water was an endangerment to the community. They also doubt that they could justify constructing a treatment plant large enough to empty all the water in the pit because of its costs. An EPA official explained that it would cost a lot more to pump and lift the water from the bottom of the pit—the distance from the rim of the pit to the bottom is 800 feet—than it would to pump the water at its surface. In addition, they said that if the pit were pumped dry, this would allow a large volume of water to flow into the pit that would also have to be pumped. EPA officials, however, did not have any estimates of the amount of additional costs that would be incurred to pump the pit dry.

Lower Area One

EPA's activities at another location in Butte, the Lower Area One operable unit, have also raised public concerns. The Clark Fork Coalition as well as local Butte citizens are concerned that EPA did not effectively evaluate viable alternative locations for disposing of this unit's tailings. The Coalition is also concerned that the cleanup action that they believe EPA is most likely to select—relocating the tailings to a site elsewhere in the Lower Area One unit—will not provide a permanent cleanup solution.

The EPA project manager for this unit told us that because of public concerns over the disposal of the tailings on-site, EPA and Atlantic Richfield agreed to a study addendum to examine other potential sites, including transportation and disposal of the tailings elsewhere in the Clark Fork Basin at Smelter Hill, Anaconda Ponds, and Opportunity Ponds. He said that Opportunity Ponds already contains 300 million cubic yards of wastes and that adding the tailings there would not be so significant. He said that eventually, these ponds will probably be graded, capped, and covered with a growth medium. Although EPA received support for this proposal from the Clark Fork Coalition and Butte citizens, the Anaconda Deer Lodge Reclamation Advocates and some Anaconda citizens are against accepting tailings from Butte.

Despite this evaluation of off-site disposal sites, the project manager said that on-site disposal of the tailings is still technically sound. He said that EPA officials believe the tailings can be isolated on-site to protect

them from a 100-year flood. A decision on the cleanup action to be taken, however, will not be made until after EPA evaluates the public comments it expects to obtain on the addendum to the Lower Area One cleanup study.

According to the EPA project manager, EPA's expedited response action for this unit is not necessarily intended to be a permanent solution, although such actions usually are. EPA will consider the need for additional cleanup actions for the Lower Area One unit later when it conducts a cleanup study for the Butte Priority Soils unit.

Although EPA and Atlantic Richfield agreed to a study addendum to examine additional disposal sites in response to public concerns, the project manager told us that this action has caused milestones to slip. He said that cleanup work was scheduled to begin in August 1991. But with the study addendum, he now expects that EPA will not be able to reach an agreement with Atlantic Richfield for the cleanup until November 1991, which is after the end of this year's construction season. Accordingly, cleanup work will not begin now until 1992.

Warm Springs Ponds

In another case, at the Warm Springs Ponds, EPA signed an interim record of decision in September 1990 that provides for disposing of some of the sites' tailings and contaminated soils and for raising, widening, and strengthening the ponds' berms to protect it from flooding. Although EPA does not plan to make a final decision on the ponds' cleanup until after upstream sources of contamination are cleaned up, the Clark Fork Coalition is concerned that the interim remedy, if it becomes final, will not provide an adequate solution. The Coalition believes the long-term solution must involve removing all of the tailings from the ponds.

According to the EPA Montana Office's Clark Fork Coordinator, EPA evaluated removing the ponds' contaminated materials by disposal at a local repository when it screened several cleanup options. This option, however, was not considered further because of its very high costs. EPA's preliminary analysis indicated that conventional excavation, transport, and disposal of the 19 million cubic yards of contaminated material in the ponds would cost approximately $400 million to $500 million. In addition, locating a permanent repository for this volume of material would be difficult. For example, if the contaminated pond material were piled 30 feet deep, about 600 acres would be needed to store it. This official also said that it would be difficult to find a suitable storage area

of this size within reasonable distance of the ponds that would be acceptable to all parties concerned.

According to an EPA headquarters' official, the EPA Montana Office issued an Explanation of Significant Difference in June 1991 to defer cleanup action under the September 1990 interim record of decision on a portion of the Warm Springs Ponds—pond number 1 and the area below it. Instead, EPA will conduct a further study to determine the method—dry versus wet closure—it should use to clean up these areas. The results of this study are to be made available to the public for comment, and EPA's record of decision thereon is scheduled to be issued during the third quarter of fiscal year 1992.

Old Works

At the Old Works operable unit, on the other hand, EPA was able to partially satisfy a citizen group's concerns by accelerating cleanup there. According to EPA officials, the short-term cleanup action planned at this unit was too comprehensive, so they narrowed its scope. Initially, EPA's expedited response action at this unit was to look at the red sands, surface water runoff, and some of the contaminated waste piles in the Old Works floodplain as well as the yards of a few houses thought to be contaminated. However, in response to concerns from the community for a quicker cleanup, EPA reduced the scope of its expedited response action to surface water runoff, a limited examination of the red sands, and the removal of only very highly contaminated waste piles, commonly referred to as "hot spots." By reducing the scope, EPA expects the expedited response action to be completed by 1994 rather than by 1996.

Conclusions

Given the enormity and complexity of the Clark Fork sites, planning is paramount to timely and cost-effective cleanup action. Accordingly, EPA Region VIII and its Montana Office should be commended for their initiative in developing a master plan for the Clark Fork sites. Although the initial master plan did not effectively sequence activities, contain realistic milestones, or adequately involve citizen groups in its preparation, the 1990 plan appears to have overcome these limitations. Nevertheless, EPA could improve its strategy for monitoring the plan's implementation. The strategy should contain provisions for periodically informing the public of EPA's progress in implementing the plan and for assessing alternatives for preventing or minimizing milestone slippages. Besides the public relations benefits to be realized, the information generated as a

result of these strategy improvements should prove useful to EPA headquarters in monitoring cleanup activities at the Clark Fork sites as recommended in chapter 2. But notwithstanding this, citizen concerns remain over some cleanup actions that could cause future milestones to slip as EPA moves to address them.

Recommendations to the Administrator, EPA

To improve its strategy for monitoring implementation of the Clark Fork Master, we recommend that the Administrator, EPA, require Region VIII and its Montana office to include provisions in its strategy for (1) assessing viable alternatives for avoiding or minimizing slippages in milestones and (2) periodically notifying the public of its progress in meeting milestones, including slippages and the steps EPA is taking to deal with them.

EPA's Untimely Cost Recovery Efforts Have Resulted in Lost Interest Income

EPA has not recovered any of the $33 million it has spent through January 1991 at the Clark Fork Basin, although an action is pending in federal district court to recover $6 million, or about 18 percent, of these costs. Moreover, because of delays in issuing demand letters to responsible parties to recover Superfund costs at the Clark Fork sites, the government has lost an opportunity to realize hundreds of thousands of dollars in interest income. The EPA Montana office was not able to follow EPA's guidance for issuing demand letters because of problems it encountered in identifying the EPA costs necessary to support these letters. These problems include poor cost documentation, lack of staff, and an inefficient cost-accounting system. But despite its efforts to address these problems, EPA officials believe that insufficient staff levels and weaknesses in its accounting system will continue to hamper efforts to meet EPA's demand letter guidelines. We previously reported on EPA's ability to take timely cost-recovery action in a December 1989 report.[1]

Interest Income Lost Through Untimely Cost-Recovery Actions

To initiate cost recovery, EPA issues letters to responsible parties demanding payment of its cleanup-related costs, including costs for overseeing responsible party cleanup actions. When reimbursement is obtained, the moneys are returned to Superfund and invested in Department of Treasury securities. However, up until the time that EPA obtains reimbursement, EPA is authorized to recover interest on the amount demanded on the basis of Superfund's interest earnings in Department of Treasury securities from the day the responsible parties received the demand letter.[2] If the demand letters do not produce a settlement, EPA can seek reimbursement for its costs, including any accrued interest, by referring the case to the Department of Justice for legal action. EPA bases its demand letters on documentation it collects and reviews to ensure that accounting and cost information are recorded and charged properly.

EPA guidance does not include a specific timetable for issuing demand letters, stating that they should be issued "as soon as practicable." However, EPA cost-recovery guidance states that cost recovery, which EPA defines as the referral of a cost-recovery case for legal action, should be initiated no later than 1 year after a removal is completed or 18 months

[1]Superfund: A More Vigorous and Better Managed Enforcement Program Is Needed (GAO/RCED-90-22, Dec. 14, 1989).

[2]The applicable interest rate for fiscal year 1991 is 7.99 percent.

after the signing of the record of decision for a remedial cleanup action.[3] Since EPA guidance states that demand letters are to be sent by the regions prior to initiating legal action for cost recovery, at the latest then, demand letters also should be issued no later than 1-year following a removal action or 18 months in the case of a remedial action.

Using these criteria for the issuance of demand letters, EPA issued a demand letter 32 months late for remedial costs associated with the Milltown Reservoir site and 20 months late for removal costs associated with the Anaconda Smelter site. Because of these delays in issuing demand letters, we estimate that the government lost an opportunity to realize as much as $750,000 in interest earnings. EPA also was late in issuing demand letters to recover costs of two other removal actions at the Clark Fork sites.

Cost Recovery for the Milltown Reservoir and Anaconda Smelter Sites

At the Milltown Reservoir site, EPA signed the initial record of decision for the cleanup of the Milltown Water Supply operable unit in April 1984. On the basis of EPA guidance at the time for the initiation of cost recovery, the EPA Montana Office should have issued a demand letter no later than October 1985, 18 months after the record of decision was signed. However, EPA did not issue a demand letter for about $1.5 million in site costs until June 1988. Because this letter was almost 3 years late, we estimated that the government may have lost an opportunity to earn about $270,000 in interest income.

The EPA Montana Office also was late in seeking cost-recovery at the Anaconda Smelter site. EPA is treating the demolition of the Anaconda Smelter complex as a removal for cost recovery purposes. Accordingly, EPA should have issued demand letters to responsible parties no later than June 1987, 1 year after the demolition was completed. However, EPA did not issue demand letters for a total of $4.9 million in costs until February 1989. Because it was about 18 months late in issuing this demand letter, we estimated that the government lost an opportunity to earn about $480,000 in interest income.

In response to EPA's June 1988 and February 1989 demand letters, neither Atlantic Richfield (a responsible party at both the Anaconda

[3]In July 1988, EPA redefined the appropriate timing for cost recovery for remedial actions as the beginning of the construction of the remedial action.

Smelter and Milltown Reservoir sites) nor the Cleveland Wrecking Company (a responsible party at the Anaconda Smelter site) have reimbursed EPA. As a result, EPA referred a cost-recovery case to the Department of Justice for Milltown Reservoir costs in September 1988 and for Anaconda Smelter costs in March 1989. Justice filed a single complaint, combining the two referrals for a total of $6.4 million, on June 23, 1989, only 4 days before the statute-of-limitations expired for recovering the removal costs for demolishing the Anaconda Smelter complex.[4]

Despite this complaint, neither Atlantic Richfield nor the Cleveland Wrecking Company have begun to reimburse EPA for any of its costs. An Atlantic Richfield official told us that Atlantic Richfield is not satisfied with EPA's cost documentation and that EPA will need to provide more detailed information before it reimburses EPA. In addition, Atlantic Richfield is challenging EPA's demand for reimbursement in federal district court, questioning Superfund's constitutionality.[5] In a separate action, however, according to an EPA official, EPA and Atlantic Richfield are attempting to negotiate the amount that Atlantic Richfield will reimburse EPA.

Cost Recovery for Other Removal Actions

Region VIII also had not met the 1-year time frame provided by EPA guidelines for recovering costs for two other removal actions, one at the Silver Bow Creek/Butte Area site and one at the Montana Pole site. Additionally, according to an EPA Montana Office official, the EPA Montana Office has not yet billed responsible parties for oversight costs for three completed removals at the Silver Bow Creek/Butte site, although the consent orders under which the responsible parties agreed to perform these removals stipulated that EPA was to bill the parties after completion of the removals. At the time of our review, EPA had not yet identified the amount it spent in performing or overseeing these removal actions, according to an EPA Region VIII official. Consequently, we could not estimate the interest lost because of these delays.

[4]As amended in 1986, Superfund generally gives EPA 3 years from the date of completing a removal and 6 years from the initiation of on-site construction of a remedial action to initiate cost recovery in a federal district court before losing its right to obtain recovery.

[5]Superfund's constitutionality has repeatedly been upheld by the federal courts. See, e.g., United States v. Monsanto Co., 858 F.2d 160, 174 (4th Cir. 1988), cert. denied, 490 U.S. 1106 (1989) and United States v. Northeastern Pharmaceutical & Chemical Co., 810 F.2d 726, 732 (8th Cir. 1986), cert. denied, 484 U.S. 848 (1987).

Under EPA guidelines, Region VIII should have initiated cost recovery for a removal at Walkerville, located in the Priority Soils unit at the Silver Bow Creek site, and for a removal action at the Montana Pole site by October 1989. At the time of our review, the Region VIII official responsible for recovering removal costs told us that she planned to refer cost-recovery cases for these removals in June or July 1991, at least 20 months late and about 4 months before the statute-of-limitations expired. This official subsequently advised us that cost-recovery action for these two removals was taken on June 30, 1991. She explained that EPA was reluctant to take cost-recovery action earlier because doing so would have revealed EPA's enforcement strategy. EPA planned to keep its legal arguments confidential until all cleanup at this location was completed.

EPA is also responsible for recovering oversight costs for removals under terms of consent orders with the responsible parties. Consent order provisions for removal actions at Walkerville (completed in 1988) and Timber Butte (1989) in the Priority Soils operable unit and at the Mine Flooding operable unit (1989) stipulate that EPA is to bill the responsible parties after the removal is completed. Although the EPA Montana Office had not billed the responsible parties at the time of our review, an EPA official told us that EPA billed Atlantic Richfield in June 1991 for a portion of costs for the Silver Bow Creek site. Timely cost-recovery actions have not been taken because of the problems EPA's Region VIII and Montana Office were having in identifying costs.

Problems in Identifying EPA Costs Have Delayed Cost Recovery

A number of problems, including poor documentation of costs, the lack of staff, staff inexperience, and an inefficient cost-accounting system, have slowed EPA's identification of its remedial and removal costs and delayed the issuance of demand letters. Although the EPA Montana Office and EPA Region VIII have taken steps to improve cost-recovery efforts, EPA regional officials involved in cost recovery believe they lack sufficient staff and an adequate accounting system capable of producing needed data to meet EPA guidelines for the timely issuance of demand letters.

The problems that EPA has had in documenting its costs include illegible documents, documents without signatures, documents with incomplete information or obvious discrepancies, and documents with unauthorized alterations. EPA's contractor identified these problems in attempting to support nearly $2 million of the approximately $6.2 million EPA is now

seeking to recover for costs it incurred at Milltown Reservoir through December 1985, and at Anaconda Smelter through September 1988.

According to an EPA Montana Office official, a lack of resources and inexperienced staff have also resulted in delays in identifying costs. Moreover, this official said that Atlantic Richfield's demand for more detailed cost documentation is putting additional strain on the EPA Montana Office's resources.

Region VIII officials told us that they have been slow to identify costs because of (1) delays in obtaining final contractor bills and final EPA cost reports, which are not required until 1 year after the completion of the removal and (2) inefficiencies in EPA's accounting system. Although EPA generally seeks to recover its costs by operable unit, its primary accounting system is unable to record costs in this manner. To identify operable unit costs, Region VIII must record these costs manually using a separate system. Problems in identifying costs have delayed EPA Region VIII's and the Montana Office's issuance of demand letters.

According to EPA officials, both the EPA Montana Office and Region VIII have taken action to improve the cost-recovery process. In 1989, the EPA Montana Office hired a specialist to coordinate the cost documentation process for all Superfund sites in Montana. Also in 1989, the EPA Region VIII Finance Section and the Superfund Enforcement Section added staff to assist in the cost-recovery process. Additionally, EPA is presently developing a new integrated financial management system that is to provide costs by operable unit. This new system is scheduled to be completed in late 1993. But despite these improvements, EPA officials do not believe that either Region VIII or the EPA Montana Office will be able to meet EPA guidelines for the timely issuance of demand letters for either the Clark Fork sites or for other sites within the region primarily because of insufficient staff resources.

Other EPA Regions Have Insufficient Staff Resources for Cost Recovery

Other EPA regional offices besides Region VIII have had problems with taking timely cost-recovery action because of insufficient staff resources.

In our December 1989 report, we reported that demand letters were not issued or were issued late in 71 percent of the 48 cases we reviewed in three EPA regions—Region II (New York City), V (Chicago), and IX (San Francisco)—that were appropriate for cost recovery. We criticized this late action to recover costs because it jeopardizes recovery, results in

lost interest income, and reduces the credibility of the Superfund enforcement program. We stated that timely action had not been taken, according to EPA officials, because EPA lacked the staff resources for this.

Additionally, we reported that as of June 1989, EPA had a backlog of 689 cases, all with costs in excess of $200,000 each, with a total of $1.9 billion in costs that were eligible for recovery. These cases fell into two priority categories; those with and those without an expiration date coming due as a result of statue-of-limitations requirements. We also reported that although EPA expected to be able to address all cost-recovery cases approaching a statute-of-limitations requirement, EPA's data at that time indicated that EPA would not be able to address about 130 cases during fiscal year 1989. We estimated that Superfund would lose almost $6.7 million in interest earnings because it lacked the resources to address this backlog. The report recommended that EPA provide sufficient staff resources, if cost-beneficial, to address its backlog of cost-recovery cases.

In recommending that EPA provide additional staffing, we envisioned that the interest earnings to be realized from more timely issuance of demand letters would more than justify an EPA budget request for additional resources. In commenting on this recommendation in July 1990, EPA stated that regional legal and technical resources devoted to cost recovery grew over 20 percent in fiscal year 1989 because of the infusion of additional staff-years and dollars. However, assuming a stable resource base, it believed that further reallocations of staff resources to address the cost-recovery backlog would not be cost-beneficial, as it would divert resources from other critical Superfund enforcement activities. It also stated that a further reallocation of staff resources to cost recovery would significantly increase the resource demands on the Department of Justice. Despite EPA's contention that it would not be cost-beneficial to provide additional staff resources, including resources for Justice, the Acting Director for Superfund enforcement told us that EPA had not done a cost-benefit analysis to support its comments.

Since the time of our December 1989 recommendation, the Congress enacted the Budget Enforcement Act of 1990 to limit discretionary spending in an effort to further reduce the deficit. The act sets fixed dollar caps through 1993 for three categories of discretionary spending: defense, international, and domestic. Superfund falls within the domestic category. In 1994 and 1995, the limits are set for a single category—total discretionary spending. Under the act, any increase in funding for a program that would cause the caps within a category to be

exceeded would require a reduction in funding for other programs in that category. Government spending is likely to be at or above the caps through fiscal year 1995. Thus, for EPA to increase the resources and staff it devotes to cost recovery, it would either have to shift resources from other Superfund activities, an action EPA finds unacceptable, or funding for some other discretionary program would have to be reduced, an action that would require governmentwide program trade-offs. Accordingly, a cost-benefit analysis could help the agency to obtain additional resources by providing the Congress with information it needs to make these program trade-offs.

Conclusions

EPA has not been timely in recovering Superfund's costs in cleaning up the Clark Fork Basin. Neither the EPA Montana Office nor Region VIII has met EPA guidelines on issuing demand letters because of problems in identifying costs, including poor cost documentation, and insufficient staff resources, thus denying EPA the opportunity to realize substantial amounts of interest income. Although EPA has some actions underway to help it to better identify costs, it has not conducted a cost-benefit analysis to determine whether additional staffing should be requested for cost recovery in light of the additional interest income to be earned from the timely issuance of demand letters.

Recommendations to the Administrator, EPA

To improve cost-recovery activities, we recommend that the Administrator, EPA, provide additional resources, as needed, to allow for the timely issuance of demand letters for the Clark Fork sites. In addition, we continue to believe that the Administrator should conduct a cost-benefit analysis, as previously recommended, to determine whether additional resources should be requested for cost recovery to allow EPA to take advantage of the interest income to be realized from the timely issuance of demand letters for other Superfund sites and in other EPA regions.

Effects of Contaminants at the Clark Fork Sites on Human Health

Table I.1 lists in alphabetical order major metal and organic contaminants found at the Clark Fork sites and their effects on human health:

Table I.1: Contaminants at the Clark Fork Sites and Their Effects on Human Health

Contaminant	Effects on human health
Heavy metals and metalloids	
Arsenic	Central nervous system effects, skin effects, cardiovascular damage; known human carcinogen
Beryllium	Weight loss, shortage of breath, progressive loss of respiratory function, death
Cadmium	Kidney effects, bone damage, hypertension, anemia, glandular alterations, suppression of the immune system
Copper	Gastrointestinal irritation, anemia, kidney and liver injury
Lead	Central nervous system effects, enzyme inhibition, reduced growth, hypertension; certain lead salts are probable human carcinogens
Mercury	Mental disturbance, neurologic defects, severe inflammation of the lungs, tremors, incoordination
Zinc	Anemia, reduced copper in the blood, reduced body weight
Organics	
Creosote	Mucous membrane burns; shock; convulsions in children; fluid in the lungs; respiratory, cardiac, and circulatory failure
Dioxin	Probable human carcinogen
Pentachlorophenol	Probable human carcinogen

Source: GAO presentation of EPA data.

Status of Cleanup at the 23 Clark Fork Operable Units

Figures II.1 through II.4 represent the status of cleanup at the 23 operable units in the Clark Fork Basin. Information to the left of the vertical dashed line shows actual cleanup from January 1988 through January 1991. Information to the right of the vertical line shows EPA's cleanup projections as of January 31, 1991. Three kinds of cleanup actions appear on the graph: (1) time-critical removals, (2) non-time-critical removals, and (3) remedial actions.

- Time-critical removals: These are represented by only one dark-grey bar, representing implementation start and end dates. Time-critical removals by their nature do not include formal studies.
- Non-time-critical removals: The light-grey bar shows engineering evaluation/cost analysis (EE/CA) start and end dates. The medium-grey bar shows not only work plans and negotiations but also the decision on how to perform the actual removal. The dark-grey bar represents the cleanup start and end dates.
- Remedial action: The light bar begins at the point where the "site characterization" portion of the remedial investigation/feasibility study (RI/FS) begins, and continues through completion of the "detailed analysis of alternatives." Several activities occur during the period represented by the medium-grey bar. These activities include public comment, selection of remedy, preparation of the record of decision, filing of the consent decree, and remedial design. Although the graph does not show it, EPA has in many cases scheduled these activities to begin before the "detailed analysis of alternatives" phase of the RI/FS is completed. The dark triangle shows the date that the record of decision is signed. The dark-grey bar shows remedial action start and end dates.

There was no EE/CA study done for the non-time-critical removal at Warm Springs Ponds. The removal was undertaken on the basis of the RI/FS done for the Warm Springs Ponds.

Figure II.1: Status of Cleanup at the Butte Portion of the Silver Bow Creek/Butte Area Site

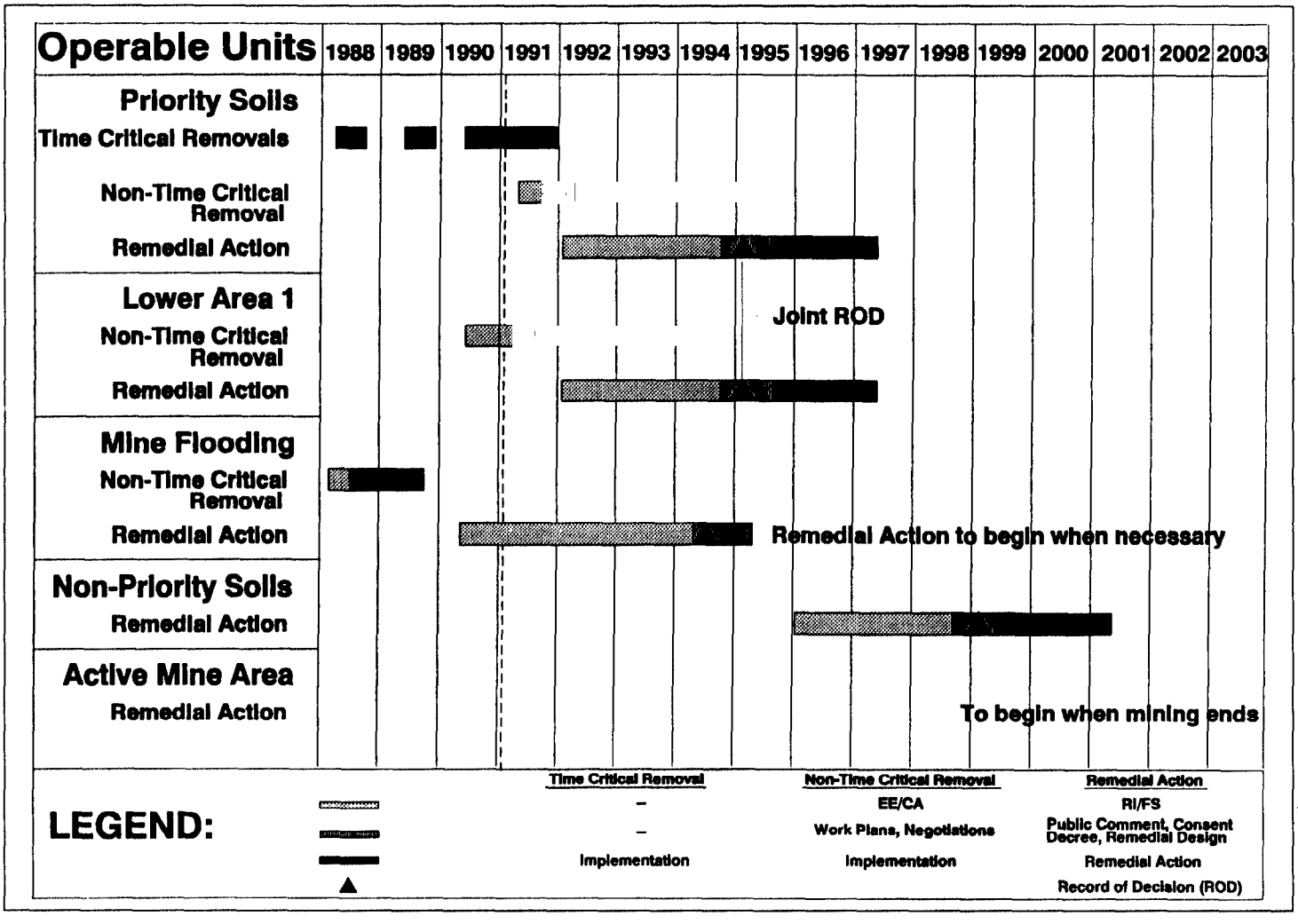


Figure II.2: Status of Cleanup at the Montana Pole Site, and the Silver Bow Creek Portion of the Silver Bow Creek/Butte Area Site

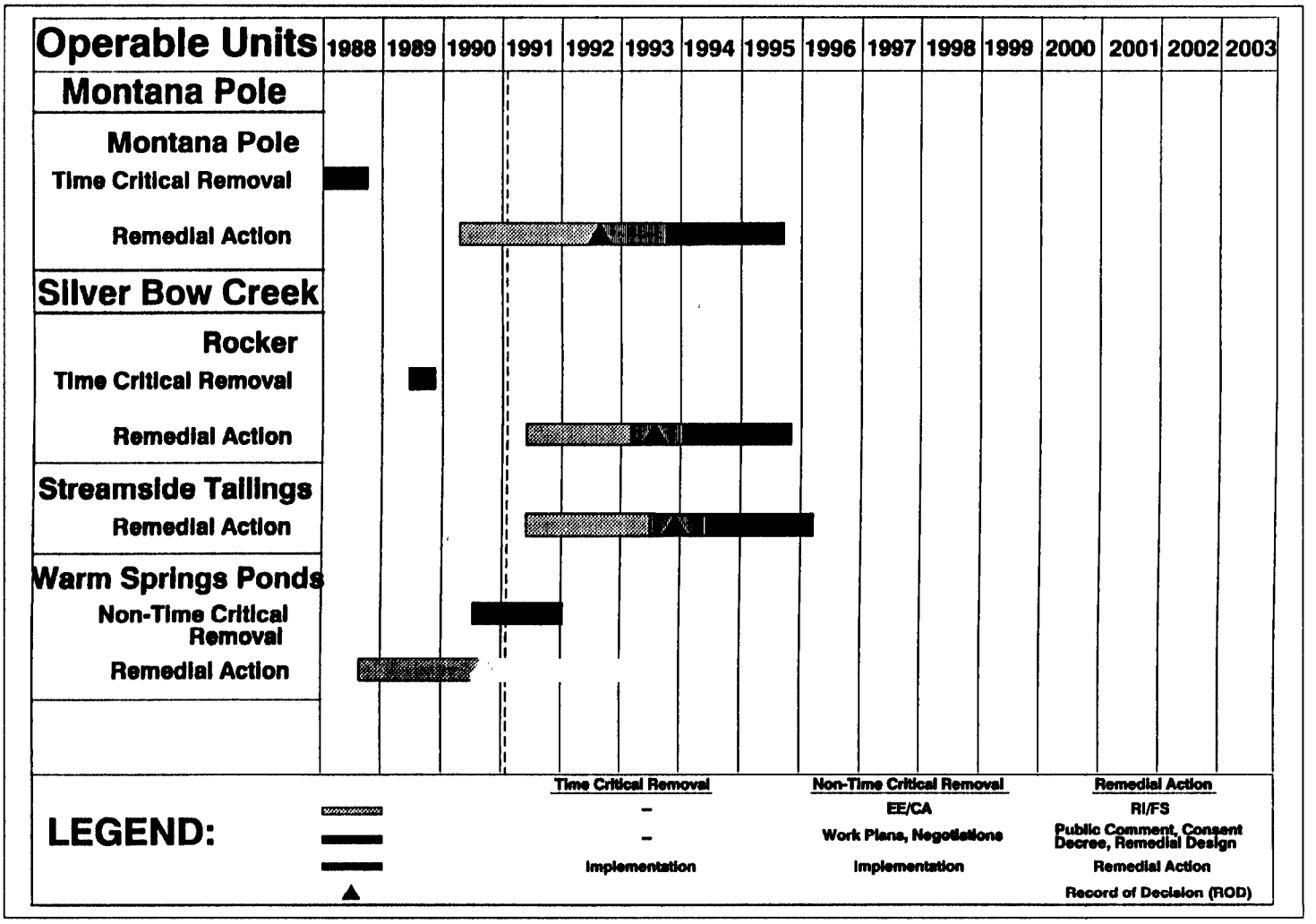
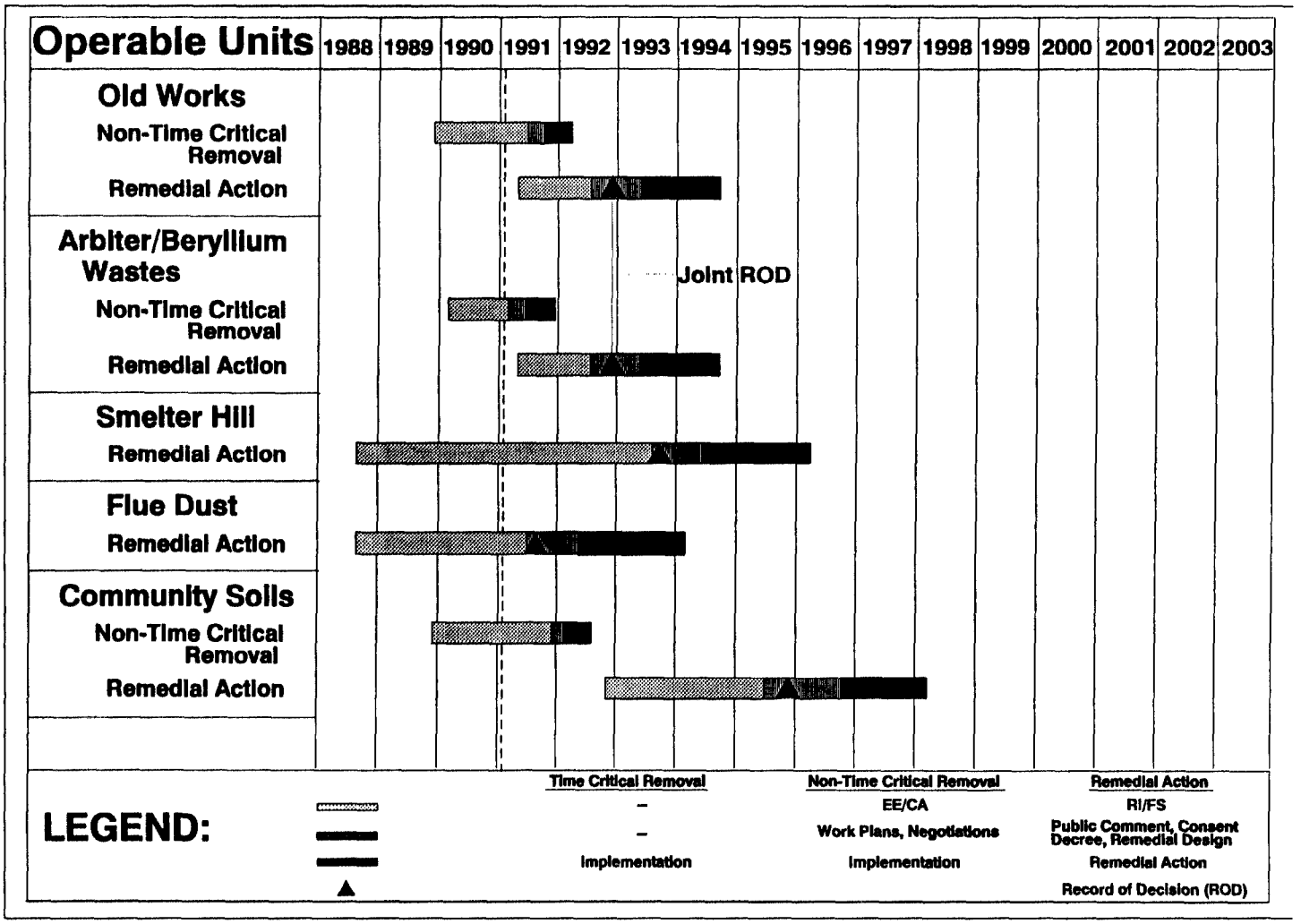


Figure II.3: Status of Cleanup at the Anaconda Smelter Site



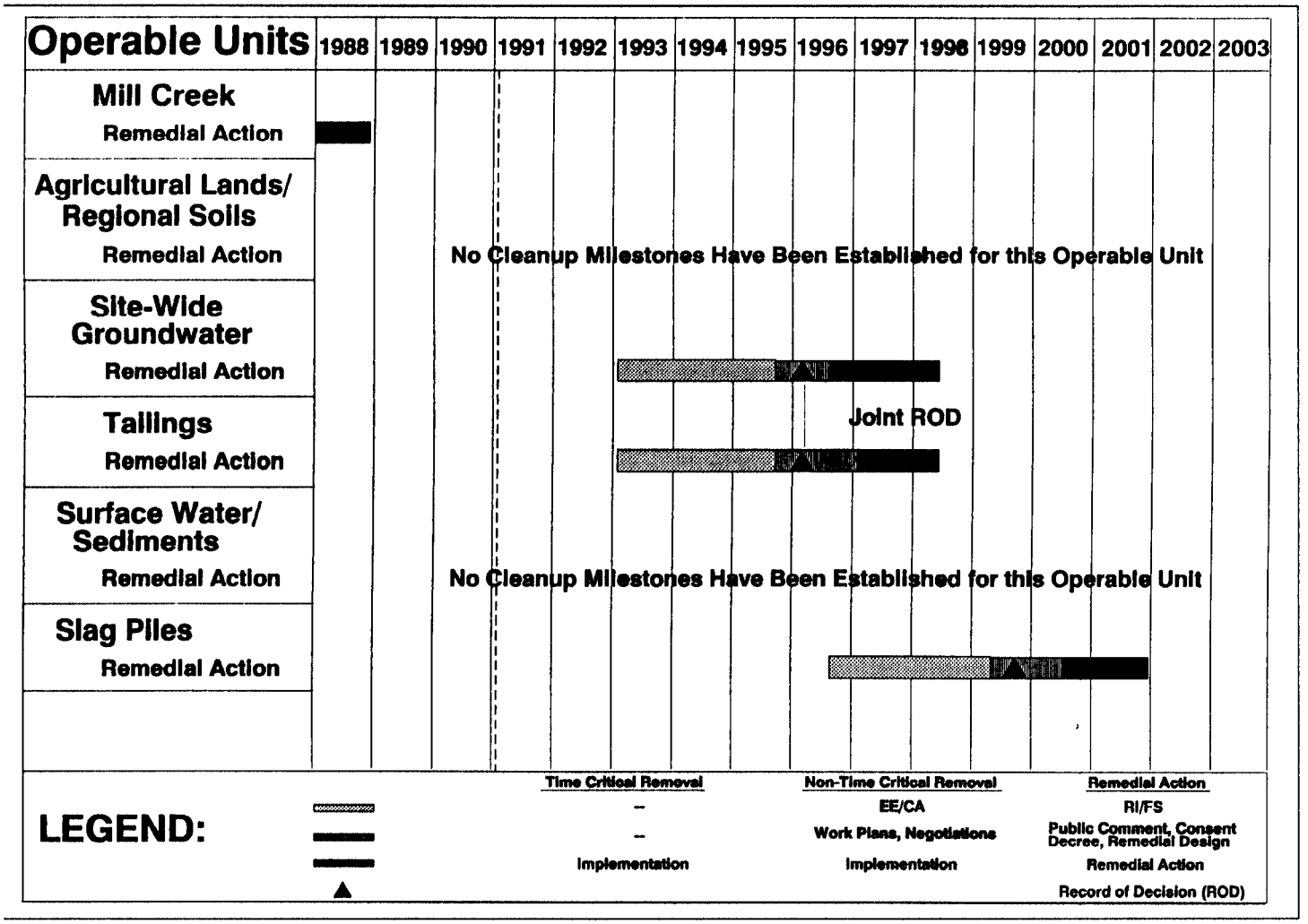
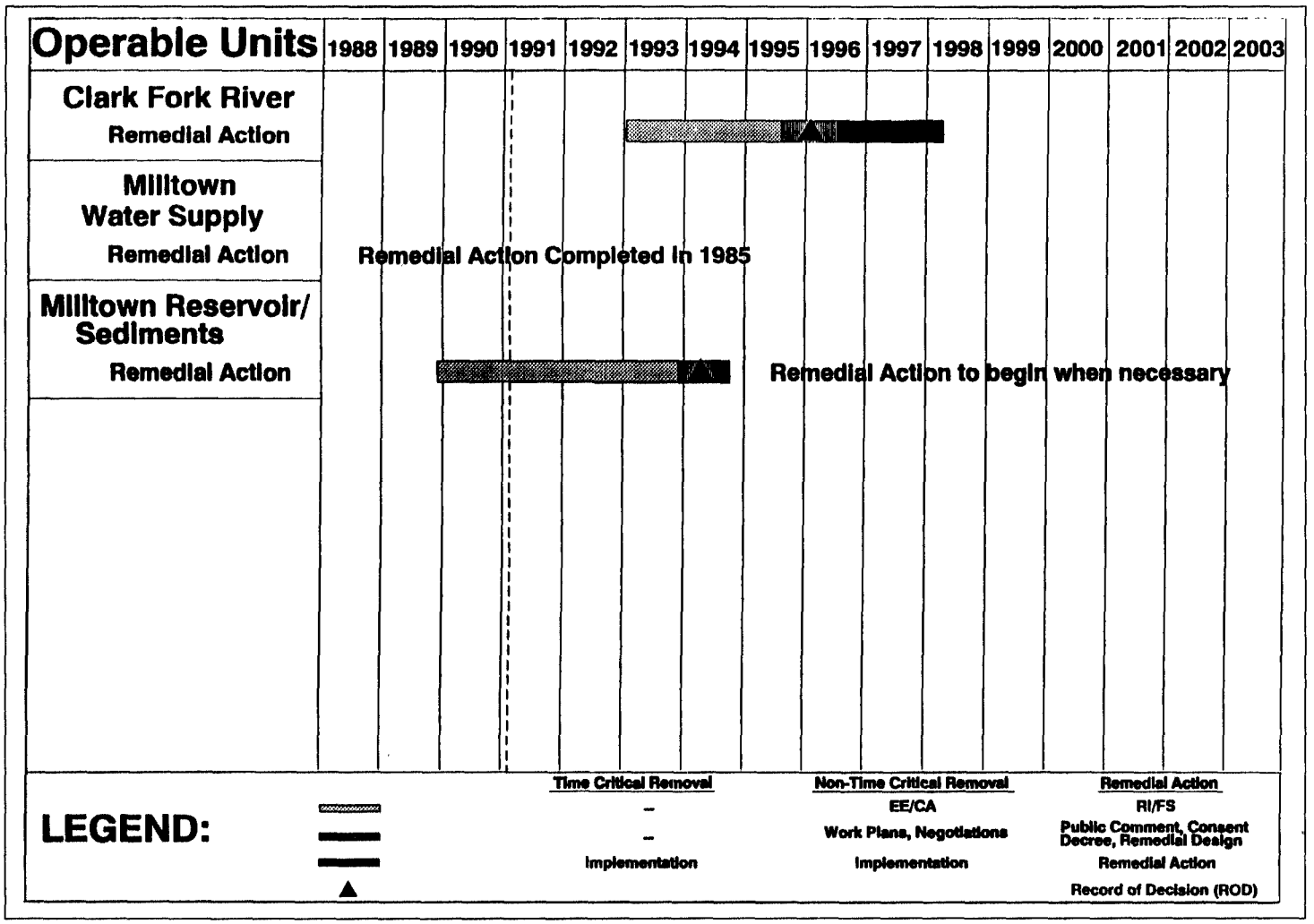

Operable Units
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
Mill Creek
Remedial Action
Agricultural Lands/ Regional Soils
Remedial Action
No Cleanup Milestones Have Been Established for this Operable Unit
Site-Wide Groundwater
Remedial Action
Tailings
Remedial Action
Joint ROD
Surface Water/ Sediments
Remedial Action
No Cleanup Milestones Have Been Established for this Operable Unit
Slag Piles
Remedial Action
LEGEND:
Time Critical Removal
Implementation
Non-Time Critical Removal
EE/CA
Work Plans, Negotiations
Implementation
Remedial Action
RI/FS
Public Comment, Consent Decree, Remedial Design
Remedial Action
Record of Decision (ROD)

Figure II.4: Status of Cleanup at the Milltown Reservoir Site



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