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United States General Accounting Office
Washington, DC 20548

March 28, 2001

Congressional Requesters

Subject: EPA's Expenditures to Clean Up the Bunker Hill Superfund Site

This letter responds to your request that we review the Environmental Protection Agency's (EPA) expenditures for the Bunker Hill Superfund site, a mining area in the Coeur d'Alene River Basin in northern Idaho. In 1980, the Comprehensive Environmental Response, Compensation, and Liability Act created the Superfund program to clean up highly contaminated hazardous waste sites. In 1983, EPA listed Bunker Hill on the National Priorities List—the agency's list of the nation's most contaminated sites—because contamination from heavy metals and other materials posed a severe risk to human health and the environment. EPA's Bunker Hill cleanup activities have focused on a 21-square-mile area (referred to as "the box") located in the center of the 1,500-square-mile river basin.

Originally, some of the mining companies responsible for the contamination agreed to conduct the cleanup work. However, EPA and the state of Idaho took over the majority of the cleanup effort following the bankruptcy of a major responsible party. In April 1995, EPA and the state of Idaho signed an agreement setting out a cleanup strategy with an estimated total cost of \$126 million; the agreement also capped the state's share of these expenses at \$12.6 million.¹ To implement this agreement, EPA segmented the cleanup work into various components—such as the demolition of industrial complex structures, removal of contaminated soil in gulches and creeks, revegetation of hillsides, and treatment of wastewater—and hired contractors to do the work. You asked us to determine (1) EPA's actual expenditures for the cleanup activities at Bunker Hill and how these expenditures differ from the estimate set forth in the agreement and (2) the reasons for any major differences (defined as \$2 million or more) between the actual and estimated Bunker Hill cleanup expenditures for each component.

¹Any change to this share would require an amendment to the agreement.

In summary, we found the following:

- As of September 30, 2000, EPA had expended about \$212 million for various cleanup and management support activities within “the box” area of the Bunker Hill Superfund site. About \$101 million of the expenditures was for cleanup-related activities not covered by the EPA/state agreement and therefore not included in the 1995 cost estimate. These activities included the study and design of cleanup activities, emergency removals of contaminated materials, enforcement of responsible party cleanup activities, and indirect management support. The remaining \$111 million was expended on cleanup work covered by the agreement. EPA and the state of Idaho expect that the cleanup work covered by the agreement will be completed by about the end of 2002 at a projected final cost of about \$140 million—or about \$14 million more than the \$126 million estimate in the agreement. EPA also expects that the agreement will be modified to cover the future costs of improving the site’s existing water treatment plant, estimated to range from \$16 million to \$33 million.
- For the components of the cleanup work where contractors were hired to conduct the work, the projected final costs range from \$4.7 million less to \$6.1 million more than the amounts originally estimated. The \$4.7 million cost savings occurred as a result of improved contractor performance in response to contractual incentives. Cost increases resulted primarily from (1) higher-than-anticipated quantities of contaminated materials requiring removal, (2) greater handling of materials to dry them before disposal (because they were excavated from below groundwater levels), and (3) floods that recontaminated areas that had already been cleaned.

Background

In 1980, the Comprehensive Environmental Response, Compensation, and Liability Act created the Superfund program to clean up highly contaminated hazardous waste sites. EPA, the federal agency responsible for implementing the act, places sites that pose a sufficiently serious threat to human health or the environment on the National Priorities List for possible remedial action under the program.

EPA employs a multistage process to clean up hazardous waste at sites on the National Priorities List. EPA first conducts a remedial investigation and feasibility study to review and consider site conditions, cleanup problems, and alternative cleanup methods. During this study phase, EPA may also initiate emergency removals of highly contaminated materials to quickly address the most severe health or environmental threats. Following the remedial investigation and feasibility study, a Record of Decision is published to document the selected cleanup remedy and estimated costs. EPA may compel the parties responsible for the contamination to clean it up or EPA itself may hire contractors to conduct the site cleanup and try to recover the cleanup costs from the responsible parties later.

When responsible parties perform the cleanup, they develop the detailed design plans and conduct the cleanup either directly or through hired contractors. In addition, the responsible parties perform and pay for any necessary long-term operations and maintenance actions. EPA oversees the entire process and ensures that the cleanup meets federal requirements.

When EPA performs the cleanup, it must first enter into an agreement with the respective state involved. Among other things, the agreement must provide that the state in which the Superfund site is located match 10 percent of the site's cleanup costs. The cleanup costs that the state must match include the cost of the remedial actions as well as any associated on-site support costs specifically to manage the agreed-upon cleanup actions. Under the EPA/state agreement, Idaho is not required to match site study, emergency removals, remedial design, enforcement, or indirect EPA costs. In addition, EPA regulations provide that the state is generally responsible for long-term operations and maintenance costs once the cleanup is complete.

After reaching an agreement with the state, EPA develops technical drawings and specifications for each component of the cleanup in a phase called "remedial design." With these specifications, EPA, or an agency designated by EPA, negotiates with and hires contractors to perform various components of the cleanup work. Once the cleanup is complete, EPA and the state evaluate the remedial actions employed to determine if they are operational and functional. Once this determination is made, EPA regulations provide that the state is generally responsible for long-term operations and maintenance costs.

EPA listed Bunker Hill on the National Priorities List in 1983. Subsequent to this listing, EPA chose a two-pronged approach to the cleanup—one for the populated areas and one for the nonpopulated areas. In an August 1991 Record of Decision, EPA published the cleanup actions for the populated areas of the site with an estimated cost of about \$41 million. In a second Record of Decision, published in September 1992, EPA laid out the cleanup actions for the nonpopulated areas of the site—as well as some portions of the populated areas not included in the August Record of Decision—and included a cleanup estimate of about \$57 million. The responsible parties initially implemented the cleanup actions for both records of decision. The responsible parties are about two-thirds finished with the cleanup of the populated areas. However, EPA and the state of Idaho took over the majority of the cleanup effort in 1994 for the nonpopulated areas following the bankruptcy of a major responsible party. In April 1995, EPA and the state of Idaho signed an agreement laying out a new strategy for cleaning up the nonpopulated areas at an estimated cost of \$126 million. The new agreement formally capped the state's share of the cost for cleaning up the nonpopulated areas at \$12.6 million (10 percent of the agreed-upon cost estimate). Under this agreement, Idaho is also responsible for long-term operations and maintenance once the cleanup is complete.

According to EPA and the state of Idaho, the increase in total estimated cost, from the \$57 million in the 1992 Record of Decision for nonpopulated areas to the \$126 million in the 1995 EPA/state agreement, resulted primarily from a change in strategy.

EPA agreed with Idaho to change the cleanup strategy to minimize the costs associated with long-term site operations and maintenance and thus reduce the costs' impact on the state. Doing this, however, required additional cleanup actions and expenditures. Instead of removing some contaminated material and maintaining many impoundment areas, as described in the 1992 Record of Decision, the new strategy would require removing significantly more contaminated material and consolidating that material into a few, large impoundment areas that are lined and covered to prevent infiltration. In addition, the agreement provided a 37-percent contingency cost factor for unknown conditions in an effort to establish the best estimate possible, given the phase in which the estimates were made—prior to remedial design—and the information available at the time.² Finally, significant cost increases were incurred because EPA and the state had to pay wage rates that were estimated to be about 40 percent more than the wage rates the responsible parties were paying. Unlike projects funded by responsible parties, federally-funded construction projects are subject to prevailing wage rates under the Davis-Bacon Act.³

EPA Expects Actual Cleanup Costs to Exceed Estimates by About \$14 Million

As of September 30, 2000, EPA had expended about \$212 million for various cleanup and management support activities within “the box” area of the Bunker Hill Superfund site.⁴ About \$101 million was for cleanup-related activities for the populated and nonpopulated areas not covered by the EPA/state agreement and therefore not included in the 1995 estimate. These activities included the study and design of cleanup activities, emergency removals of contaminated materials, enforcement of responsible party cleanup activities, and indirect management support. The remaining \$111 million was expended to accomplish cleanup work included in the 1995 agreement. EPA and the state of Idaho expect that the cleanup work covered by the agreement will be completed by about the end of 2002, at a projected final cost of about \$140 million—or about \$14 million higher than the \$126 million estimate. (See enc. I for a comparison of Bunker Hill’s cleanup costs to those of other Superfund sites.) EPA expects most of the anticipated \$14 million cost increase to be offset by about \$11 million in settlement funds received from responsible parties. In addition, Idaho has informally agreed to increase its contributions to the EPA/state agreement to cover 10 percent of the remaining \$3 million.

²According to the American Society of Civil Engineers, it is common practice to add 20 percent or more to the estimated probable total project cost at the completion of the study and report phase (prior to remedial design). In addition, larger or more complex projects sometimes require higher contingencies.

³The Davis-Bacon Act, enacted in 1931, and related legislation require employers on federally funded construction projects valued at more than \$2,000, or on federally assisted projects, to pay their workers, at a minimum, wages that the Secretary of Labor has determined to be “prevailing” for corresponding classes of workers on similar projects in the same locality.

⁴In addition to the cleanup costs incurred by EPA and the state of Idaho, responsible parties and others, including the U.S. Department of Justice, the Bureau of Mines, and the Agency for Toxic Substances and Disease Registry, have incurred costs related to the cleanup of the Bunker Hill site.

According to our analysis of the component cleanup costs incurred to date and EPA's estimates of the cleanup activities yet to be completed, the \$14 million cost increase is the result of several factors.

- First, according to EPA officials, many cleanup areas that require “capping” (covering contaminated areas with a layer of soil or other material) were thought to be within the mining companies’ area of responsibility at the time the EPA/state agreement was signed. Subsequent to signing the agreement, EPA and the state identified areas needing capping that were not within the mining companies’ area of responsibility and added them to the components in the EPA/state agreement. In addition, because of different property uses, the type of cap required for many of these added areas will be changed from a 6-inch layer of gravel to a more costly 24-inch layer of gravel, asphalt, or concrete.
- Second, EPA expects greater-than-anticipated costs for the maintenance and security of the site overall. For example, in an effort to complete the cleanup work quickly, EPA and the state directed the cleanup contractors to work during winter conditions, thus increasing road maintenance needs in the winter. Also, heightened vandalism and trespassing concerns have increased security costs.
- Finally, component cleanup work near completion is expected to cost about \$6 million more than was originally estimated primarily because more contaminated material had to be removed than anticipated. The component cleanup work is discussed in more detail under the following section heading of this letter.

In addition to the estimated \$140 million that will be expended to implement the 1995 EPA/state agreement, EPA anticipates significant expenditures to upgrade and operate the existing water treatment plant. EPA and the state of Idaho took over the site’s water treatment plant in November 1994 after the mining company that owned and operated the plant went bankrupt. The 1992 Record of Decision—which outlined the cleanup work that needed to be done and was the basis of the April 1995 agreement—did not consider owning and operating the water treatment plant. Thus, such costs were not included in the remedial investigation and feasibility study process. However, after taking over the treatment plant’s operation, EPA and the state recognized that they would incur some costs in operating the plant, so they included estimated costs in the agreement for interim treatment plant operations (until the cleanup work under the agreement was completed). In March 2001, EPA completed a 2-½-year-long remedial investigation and feasibility study for the treatment plant that estimated necessary remedial action costs of \$16 million to \$33 million and 30-year operating costs of \$26 million to \$37 million. Estimated remedial actions include (1) decreasing the amount of water needing treatment by reducing water flows through the Bunker Hill Mine, (2) replacing and upgrading plant facilities (which are at the end of their useful life), and (3) constructing new areas for sludge disposal. Under EPA regulations, EPA and the state share the cost of operating the water treatment plant. EPA is responsible for up to 10 years of water treatment before the state takes over operation and maintenance responsibilities. EPA expects to amend the 1992 Record of Decision for the water treatment plant work by about

the end of 2001 and will require an amended EPA/state agreement before implementing the work.

Finally, additional cleanup costs may be incurred if the cleanup strategies employed throughout the site under the EPA/state agreement ultimately do not improve surface and groundwater quality to the levels outlined in the 1992 Record of Decision. However, according to EPA officials, this determination cannot be made until all cleanup activities have been completed and the site's environment has been allowed to stabilize. EPA officials said that within 5 years, EPA and the state of Idaho would evaluate whether additional remedial actions are needed.

Component Cost Increases Are Primarily Due to Underestimated Contamination and Cleanup Complexity

After reaching agreement in 1995 for cleaning up the nonpopulated areas, EPA and the state of Idaho began the remedial design phase, including the development of technical drawings and specifications for the cleanup. Using these specifications, EPA negotiated with and hired contractors to conduct the cleanup work for a majority of the cleanup components.⁵ These components include the demolition of industrial complex structures, removal of contaminated soils in gulches and creeks, revegetation of hillsides, and wastewater treatment. For the implemented components, the projected final costs range from \$4.7 million less to \$6.1 million more than the original estimates, with a net increase of about \$6 million, as shown in table 1.

Table 1: Comparison Between Component Contract Estimates and Projected Completion Estimates for the Bunker Hill Site

Dollars in millions

Components^a	Component contract estimates	Projected completion estimates	Expected increase or decrease^b
<i>Overlapping work area I:</i> Industrial Complex Government Gulch Magnet Gulch Bunker Creek	\$43.6	\$38.9	(\$4.7)
<i>Overlapping work area II:</i> Central Impoundment Area Smelterville Flats	37.2	43.3	6.1
Milo Creek	3.8	6.4	2.5
Hillsides	8.9	9.2	0.3
Interim water treatment	4.4	6.3	1.8
Total	\$97.9	\$104.1	\$6.1

^aSome components are grouped because negotiated cleanup contracts often involved work in more than one component area.

^bTotals may not add because of rounding.

Source: GAO's analysis of EPA's data.

⁵Contractors have not yet been hired to implement all of the projected cleanup work in the EPA/state agreement.

Completion costs for the work area encompassing the Industrial Complex, Government Gulch, Magnet Gulch, and Bunker Creek areas are expected to be a net \$4.7 million less than the negotiated contract estimates. A cost reduction of \$11.5 million was achieved when a large contractor increased the efficiency of its industrial complex work in response to a set of financial incentives. On the other hand, a cost increase of \$6.8 million for this component resulted when higher-than-expected quantities of contaminated soils were encountered in both gulches and in Bunker Creek and when adverse weather affected the flow of work, as described below:

- The quantity of contaminated soil removed was over 30 percent more than the amount in the contract estimate.
- Because of excessive rains, the contractor conducted more erosion control measures than anticipated in the contract estimate.
- A flood caused the recontamination of some areas around Bunker Creek that had just been cleaned, thus requiring some areas to be recleaned.
- Because of increases in material handling and weather delays, crews worked overtime to complete the work on schedule.

The net effect of these events was a decrease of \$4.7 million for the projected cost of this work area (\$11.5 million, saved as a result of new contractor incentives, less the \$6.8 million in cost increases).

Completion costs for the Central Impoundment and Smeltonville Flats areas are expected to be \$6.1 million more than the negotiated contract estimates. The cost increase is due primarily to an increase in dewatering (material drying) efforts and a state-requested change in the grading design. To ensure adequate compaction, material located several feet below the groundwater level needed to be dewatered prior to disposal in the Central Impoundment Area, as described below:

- Unanticipated dewatering costs resulted when the original plan for disposing of the extracted water had to be changed. The negotiated contract estimate assumed that the extracted water was of a quality that would allow for its discharge directly into the nearby South Fork of the Coeur d'Alene River. However, the state of Idaho determined that the contaminant level of the extracted water was greater than what was allowed for direct discharge into the river. Thus, the extracted water had to be stored in specially constructed ponds that allowed the extracted water to slowly infiltrate back into the ground.
- Increased dewatering costs also resulted from the additional handling of the excavated materials in the Central Impoundment Area. To ensure adequate compaction, the material needed to be thoroughly dried by fluffing and pushing it into thin layers prior to final grading.

- Increased grading costs resulted from changes in the site grading design. After the work began, the state of Idaho requested that the grading of the Central Impoundment Area be changed so that the area could accommodate a golf course in the future. According to Idaho officials, this change would enhance the area's potential use in an economically depressed area.

The completion costs for the Milo Creek component are expected to be \$2.5 million more than the original estimate. The cost increase is due primarily to flooding (a different storm from the one that flooded the Bunker Creek area), which recontaminated areas that had already been cleaned and destroyed the existing storm water control infrastructure. An entirely new storm water control system with sufficient capacity to handle floods had to be constructed.

Finally, while the difference in dollars is less than \$2 million, the interim water treatment component is expected to cost \$1.8 million, or 41 percent, more than the contract estimate owing to the replacement of the main water line to the treatment plant. After the main water line—the line that carries water from the Bunker Hill Mine to the Central Treatment Plant—became clogged, EPA determined that replacing the line would be cheaper than repairing it because of the water line's age of almost 30 years and location.

Agency Comments

We provided EPA and the state of Idaho with a draft of this report for review and comment. Both EPA and the state of Idaho agreed with the information contained in the report and provided technical comments, which we incorporated into the report as appropriate.

Scope and Methodology

Our review focused on the 21-square-mile Bunker Hill area, known as “the box,” located in the center of the 1,500-square-mile Coeur d'Alene River Basin in northern Idaho. We performed our work at EPA's Region 10 office in Seattle, Washington, and the Corps of Engineer's project office (EPA's general contractor for the cleanup) in Kellogg, Idaho. In addition, we obtained data from Idaho's Department of Environmental Quality in Boise, Idaho.

To determine actual and estimated costs for “the box” as of September 30, 2000, we obtained and analyzed cost data from EPA's (1) Integrated Financial Management System on the type and amount of actual spending and (2) “SCORPIO” system on indirect costs. In addition, we obtained and analyzed various documents associated with the cleanup, including the two records of decision, the EPA/state agreement, negotiated contracts for cleanup work, and the Corps of Engineer's Project Control Summary Report. We also conducted site visits to familiarize ourselves with the site and the completed work.

To determine the reasons for differences between actual costs and estimates, we obtained and analyzed documents relating to the changes to the original negotiated

contract amounts for those work areas with material differences (defined as \$2 million or more). We also interviewed officials from EPA, the Corps of Engineers, and Idaho's Department of Environmental Quality to discuss changes from estimates.

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If you have any questions about this report, please contact me at (202) 512-3841. Other key contributors to this report were Keith Oleson and Ruth Anne Decker.



David G. Wood
Director, Natural Resources
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Enclosure

List of Congressional Requesters

The Honorable Larry Craig
United States Senate

The Honorable Mike Crapo
United States Senate

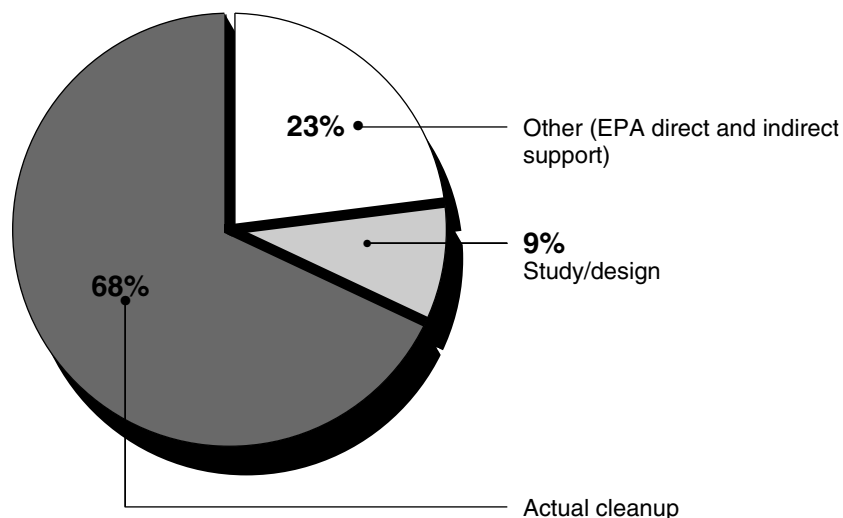
The Honorable C.L. "Butch" Otter
House of Representatives

Comparison of Bunker Hill’s Categorized Costs to Those of Other Superfund Sites

To provide some perspective on Bunker Hill’s cleanup costs, we compared the ratio of three cost categories for Bunker Hill with the ratios experienced by other Superfund sites that we previously reviewed—Raymark in Stratford, Connecticut; Sharon Steel in Midvale, Utah; United Creosoting in Conroe, Texas; and NL Industries in Granite City, Illinois.⁶ The three cost categories are “actual cleanup” (remedial and removal actions); “study and design;” and “other,” which includes both the Environmental Protection Agency’s (EPA) direct and indirect support costs. Direct support costs include enforcement, oversight, remedial support, general administrative management, and research and development costs. Indirect support costs are overhead costs that EPA headquarters allocates to all Superfund sites.⁷

As shown in figure 1, as of September 30, 2000, about 68 percent of EPA’s Bunker Hill costs were devoted to actual cleanup activities, about 9 percent went toward study and design activities, and about 23 percent went to other activities (17 percent for direct support and 6 percent for indirect support).

Figure 1: Categorized Costs for Bunker Hill as of September 30, 2000



Source: GAO’s analysis of EPA’s data.

The 68 percent for actual cleanup costs is lower than that experienced by the other Superfund sites we recently reviewed. The percentage of costs devoted to actual cleanup at the other Superfund sites ranged from 74 percent at Sharon Steel to 86

⁶See *Superfund: Analysis of Costs at Five Superfund Sites* (GAO/RCED-00-22, Jan. 28, 2000).

⁷To comply with new cost accounting standards issued by the Federal Accounting Standards Advisory Board, EPA began using a new methodology for allocating indirect support costs to Superfund sites during our review. Under this new methodology, indirect costs increased from about \$10 million to \$57 million, raising cleanup costs as of September 30, 2000, from about \$165 million to \$212 million. However, to provide a meaningful comparison, we used the old methodology to determine the amount of indirect costs and compute the cost ratios for Bunker Hill.

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percent at NL Industries, as shown in table 2.⁸ According to EPA, Bunker Hill’s actual cleanup cost ratio is lower than that of the other Superfund sites because EPA has incurred significant enforcement and oversight costs related to the work performed by the responsible parties in both the populated and nonpopulated areas of the site. Such enforcement and oversight costs are included in the other cost category. Thus, the impact is a lower ratio for actual cleanup costs and a higher ratio for Bunker Hill’s other costs when compared with those of other Superfund sites.

Table 2: Comparison Between Bunker Hill’s Categorized Costs and Those of Other Superfund Sites

Cost categories ^a	Categorized costs under old indirect cost allocation method				
	Bunker Hill (13,440 acres)	Raymark (33 acres)	Sharon Steel (570 acres)	United Creosoting (100 acres)	NL Industries (16 acres)
Actual cleanup (remedial & removal actions)	68%	75%	74%	85%	86%
Study/design	9%	11%	14%	8%	7%
Other (EPA direct and indirect support) ^b	23%	14%	13%	7%	8%

^aBunker Hill’s costs are those incurred as of September 30, 2000. Raymark’s costs are those incurred for the industrial site. (Raymark had seven other work areas surrounding the site that were not completed at the time of our previous review.)

^b“Other” includes (1) directly related EPA support and management, site assessments, enforcement, oversight of responsible parties, research and development, lab analysis, and technical assistance grants and (2) indirectly related EPA support and management costs consisting of EPA’s headquarters costs that are allocated among all Superfund sites.

Note: Percentages may not add because of rounding.

Source: GAO’s analysis of EPA’s data.

According to EPA, Bunker Hill’s large size and complexity resulted in high costs for oversight activities and negotiating settlements. Therefore, the 23 percent shown for Bunker Hill’s “other” category is larger than the percentages shown for the other sites.

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⁸Although the fifth site, Newmark, which is located in San Bernardino, California, had 53 percent of its total costs devoted to actual cleanup, the cleanup was only half-complete at the time of our previous review and, thus, was excluded from our comparison.