United States General Accounting Office

GAO

Report to the Chairman, Subcommittee on Military Procurement, Committee on National Security, House of Representatives

May 1996

NUCLEAR WASTE

Greater Use of Removal Actions Could Cut Time and Cost for Cleanups

GAO/RCED-96-124

GAO

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

Resources, Community, and
Economic Development Division

B-271641

May 23, 1996

The Honorable Duncan Hunter
Chairman, Subcommittee on
Military Procurement
Committee on National Security
House of Representatives

Dear Mr. Chairman:

Since 1989, the Department of Energy (DOE) has received about $10 billion for environmental restoration projects at its 130 facilities across the country. These projects are aimed at cleaning up more than 10,500 individual waste sites, which contain hazards ranging from highly radioactive wastes to more common industrial chemicals and solvents in soil, groundwater, and burial pits. To date, much of the $10 billion has gone to study waste sites and develop an approach to their remediation, as required by environmental laws, rather than to actually clean them up. Recently, DOE has been criticized for its lack of progress in remediation at the same time as its appropriations for environmental restoration have declined.

In some cases, DOE has successfully placed more emphasis on remediation and less on planning by using "removal actions," which shorten or eliminate some of the planning steps normally required before remediation can begin. Removal actions have been used for, among other things, treating groundwater and surface water, excavating and disposing of contaminated soil, or leaving waste in place and covering it with a protective barrier. Removal actions have been used at federal facilities to respond to emergencies or other urgent circumstances—to remove leaking barrels that threatened to contaminate the Columbia River, for example—but they can also be used in nonemergency situations. As agreed with your office, we examined DOE's use of removal actions to reduce the cost and accelerate the pace of environmental restoration. Specifically, we examined whether removal actions have been successful as an alternative to other environmental restoration processes in reducing time, reducing costs, or providing other benefits. We also examined the extent to which DOE is using removal actions at its facilities and the factors that limit the greater use of this approach.

We focused our review on five DOE facilities—Hanford in Washington State, Savannah River in South Carolina, Oak Ridge in Tennessee, Rocky

Flats in Colorado, and the Idaho National Engineering Laboratory (INEL) in Idaho. In March 1995, DOE projected[1] that environmental restoration at its facilities would cost about $65 billion—including $61 billion at the five sites we reviewed.[2]

Results in Brief

Where removal actions have been used, they have reduced the overall time and cost of planning for the remediation of DOE's waste sites. At the three DOE facilities we reviewed where comparative time and cost data were readily available, removal actions took from about 70 to 90 percent less time, on average, than other planning approaches. Because removal actions substantially reduce the requirements that must be met before remediation can begin, they are also less expensive. At the three facilities, the cost to prepare for remediation through the removal action approach was from over 80 to 90 percent less than through other approaches. Removal actions may also provide other benefits, such as reducing continued risks to the environment by moving projects more quickly to actual cleanup, thereby reducing the opportunity for hazardous materials to spread further into the environment.

DOE's use of removal actions varies by facility. Two of the five DOE facilities we examined—Rocky Flats and INEL—have vigorously pursued removal actions. Oak Ridge plans to increase its use of removal actions, but Hanford and Savannah River plan a more limited role for the process even though many of their untreated sites are similar to sites where removal actions have been used successfully. Although DOE's policy guidance encourages the greater use of removal actions, DOE officials gave several reasons for not using removal actions more often. They noted that the interagency agreements and contracts governing DOE's environmental restoration do not encourage the use of removal actions, and they expressed a preference for using removal actions only in urgent situations. While not all waste sites may best be addressed through removal actions, there are still opportunities to accelerate DOE's environmental restoration through wider use of this approach.

[1]Estimating the Cold War Mortgage: The 1995 Baseline Environmental Management Report, Office of Environmental Management (Mar. 1995).

[2]The cost of environmental restoration includes the cost of remediating waste sites and decommissioning and decontaminating DOE's facilities, but it does not include DOE's waste management, nuclear material and facility stabilization, or other related programs. When these programs are included, the total cost of the environmental management program is estimated at $230 billion.

Background

DOE is the steward of a nationwide complex of facilities created during World War II to research, produce, and test nuclear weapons. Now that the United States is reducing its nuclear arsenal, DOE has shifted its focus towards cleaning up the enormous quantities of radioactive and hazardous waste resulting from weapons production. This waste totals almost 30 million cubic meters—enough to cover a football field 4 miles deep. DOE expects that environmental restoration will continue until 2070 before all of its problems have been addressed.

Remediation activities at DOE's facilities are governed by the Comprehensive Environmental Response, Compensation, and Liabilities Act (CERCLA) of 1980, as amended, and the Resource Conservation and Recovery Act (RCRA) of 1976, as amended.[3] These laws lay out requirements for identifying waste sites, studying the extent of their contamination and identifying possible remedies, and involving the public in making decisions about the sites. At each facility we visited, DOE has signed an interagency agreement with the Environmental Protection Agency (EPA) and state regulators laying out the facility's schedule for meeting the requirements of CERCLA and other environmental laws.

CERCLA offers three methods for determining how a waste site will be remediated: the full CERCLA process, interim remedial measures, and removal actions. For each of these methods, table 1 shows the key documents and related activities required before remediation can begin. Generally, DOE's guidance recommends that EPA and state regulators be involved at each of these steps. In addition, other documents not requiring regulatory approval frequently may supplement the documents shown. For example, for the full CERCLA process, DOE often issues reports for each phase of the remedial investigation for a group of waste sites, and before embarking on a remedial design, DOE generally prepares a remedial design work plan.

[3]Some DOE installations use RCRA in addition to CERCLA to clean up waste sites. While RCRA differs from CERCLA in that it also regulates active waste facilities, the two laws generally address inactive waste sites similarly. For simplicity, we use CERCLA's terminology in this report.

Table 1: Comparison of Required Steps Leading to Cleanups Under Three CERCLA Planning Processes

Key steps	Purpose
Full CERCLA process	
Work plan	Provides background information, a sampling and analysis plan, and a road map for preparing the rest of the documents
Remedial investigation	Thoroughly characterizes the waste
Feasibility study	Examines different options for remediation
Proposed plan	Tentatively selects a remedy and puts it forward for public comment
Record of decision	Documents the selected remedy and authorizes the cleanup
Remedial design study	Engineers cleanup procedures
Interim remedial measure	
Limited field investigation	Characterizes the waste
Focused feasibility study	Examines different options for remediation
Proposed plan	Tentatively selects a remedy and puts it forward for public comment
Interim record of decision	Documents the selected remedy and authorizes the cleanup
Remedial design study	Engineers cleanup procedures
Removal action	
Engineering evaluation/cost assessment	Characterizes the waste, examines different options for remediation, tentatively selects a remedy, and obtains public comment
Action memorandum	Documents the selected remedy and authorizes the cleanup

Removal actions are the most abbreviated of the three planning processes. A removal action can be used to plan for remediating a waste site to the point that no further action is needed, or it can serve as a stopgap measure for a waste site that presents an urgent threat to the public or the environment. At some point after the remediation is concluded, a removal action, like an interim remedial measure, requires a record of decision to certify that the site is clean and no further action is required. Because removal actions generally require much less characterization and planning than other approaches except in emergency situations, they are most effective at sites where the contaminants and the probable remedy are relatively well known. Although removal actions in the private sector are limited to projects costing $2 million or less and taking 12 months or less, these limits do not apply at federal facilities.

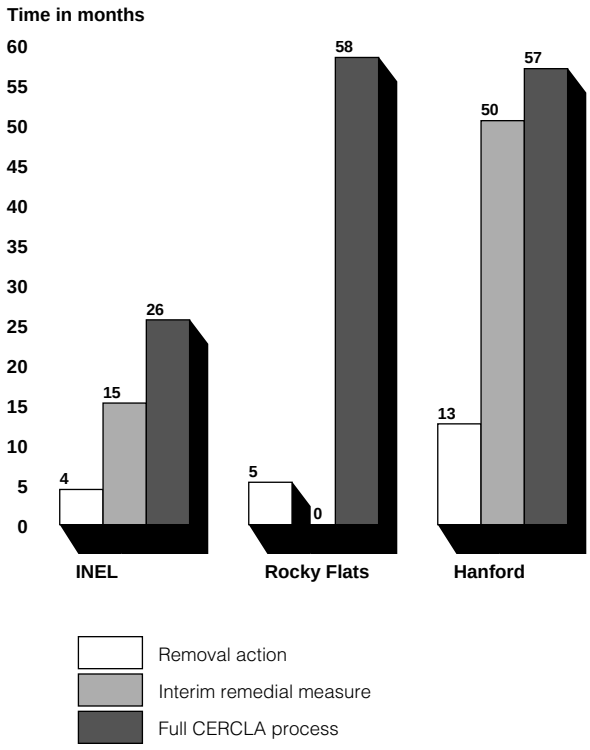
Removal Action Planning Takes Less Time, Costs Less, and Can Provide Other Benefits

Available data indicate that removal actions save time and money compared with other planning approaches. Furthermore, removal actions have been used across a wide variety of environmental restoration projects, including the same kinds of projects that have been planned using the other approaches. Removal actions may also provide other benefits, such as reducing continued risks to the environment by moving projects more quickly to actual cleanups.

Removal Action Planning Has Generally Proved to Be Faster and Less Costly

Through January 1996, the five facilities we reviewed had a total of 39 removal actions either completed or under way. Three facilities (INEL, Hanford, and Rocky Flats) provided data allowing some comparisons of the relative time and cost involved in removal actions and other types of planning efforts. As figure 1 shows, at all three facilities the average time needed for planning was considerably shorter under removal actions than under the other approaches. At INEL, for example, planning for cleanups under removal actions averaged 4.4 months, compared with 15.2 months under interim remedial measures and 25.6 months under the full CERCLA process.

Figure 1: Comparison of Time for Cleanup Planning Processes



Note: Rocky Flats' interim actions followed a different process. We did not include them in our analysis.

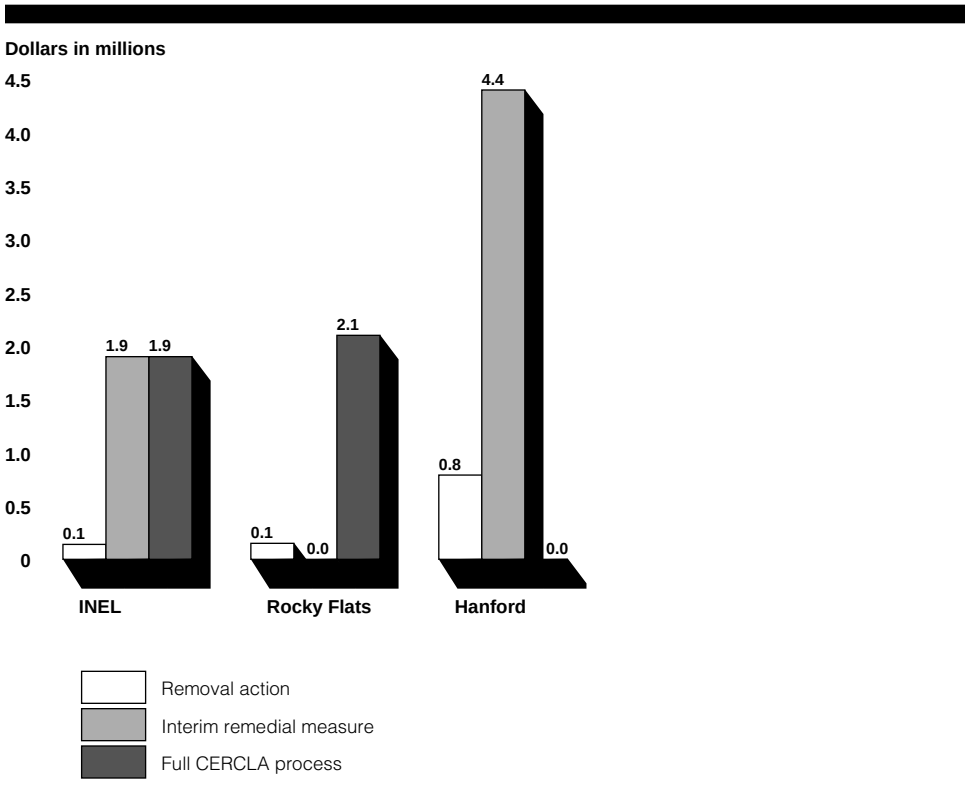
Cost comparisons show the same pattern. As figure 2 shows, at INEL and Rocky Flats, under removal actions, the cost for characterization and studies before cleanup averaged $140,000, compared with almost $2 million under either interim remedial measures or the full CERCLA process.

More limited data for Hanford support the same conclusion. The last five removal actions[4] cost an average of about $790,000 for cleanup planning. These sites are now clean, or remediation is under way. In contrast, for the 18 areas along the Columbia River where Hanford plans to use interim remedial measures to manage the cleanup, the cost of preparation

[4]Because of a change in contractors, data from earlier removal actions were too limited to separately identify project preparation costs.

averaged $4.4 million per area between October 1991 and September 1995. Remediation has not begun at any of these areas.

Figure 2: Comparison of Cost for Cleanup Planning Processes



Notes: Rocky Flats' interim actions followed a different process. We did not include them in our analysis.

Hanford's data are based on the last five removal actions initiated.

Hanford's costs for the full CERCLA process could not be determined.

When examined on a project-by-project basis, planning for removal actions also appears to be cheaper and faster than planning at comparable sites for the other environmental restoration processes. Many of DOE's waste sites fit into one of three categories: burial grounds, contaminated soil, or contaminated water.

Burial grounds may contain radioactive and/or hazardous solid and/or liquid waste. Buried in them are such things as barrels of chemicals and other material and equipment from DOE facilities. (See fig. 3.)

Figure 3: Excavation at a Hanford Burial Ground

Source: DOE.

Soil may have been contaminated by leaks or spills or by using liquid waste disposal facilities, such as trenches and waste ponds, to disperse contaminated liquids. (See fig. 4.)

Figure 4: Cleanup of a Hanford Liquid Waste Disposal Facility

Source: DOE.

Surface water or groundwater may have been contaminated by radioactive or hazardous materials leaching through the soil from spills and leaks or through normal operations. (See fig. 5.)

Figure 5: Treatment Facility for Removal of Strontium From Groundwater Near the Columbia River at Hanford

Source: DOE.

At Hanford and INEL, where more complete comparative information was available, we analyzed the removal actions that fell into these categories. We found four instances in which removal actions had been used at sites where conditions were reasonably comparable to those at sites that had been addressed under interim remedial measures (see table 2). In each case, planning for the remediation was accomplished much more quickly and at substantially less cost using a removal action. While the projects being compared are not identical, their similarities provide a reasonable basis for comparing the relative time and cost required to complete the planning that precedes remediation.

Table 2: Comparison of Removal Actions With Other Processes

Location	Common features of waste sites being compared	Outcome under removal action	Outcome under other process
Hanford	Remediation of disposal facilities contaminated by such liquid wastes as low-level radioactive wastes and hazardous chemicals. Cleanup methods selected were similar and involved excavating and removing the soil.	Planning cost an average of $146,000 per site and took 2 months. Cleanup has been completed.	Planning will cost an average of about $773,000 per site and take 5 years. Cleanup will begin in July 1996.
Hanford	Projects are removing contaminants from groundwater near the Columbia River using pump-and-treat technology. In the removal action, the contaminant is strontium-90; in the interim remedial measure, it is chromium.	Planning cost $1.6 million and took 2 years. System is currently operating.	Planning cost $6.2 million and has already taken 5 years. Only a test system is operating. The final system is not expected until April 1997.
INEL	Projects located and removed old ammunition and excavated soil contaminated with explosive chemicals. Standards developed under the interim remedial measure were used to expedite the planning of the removal action.	Planning cost $500,000 for a $2.4 million project and took 4 months.	Planning cost $1 million for a $2 million project and took 1 year.
Hanford	Projects use pump-and-treat technology to clean up carbon tetrachloride disposed of in the soil near an old processing facility.	Planning for the removal of vapor from soil cost $3.2 million and took 13 months.	As of October 1995, groundwater removal preparations have already cost $7.8 million. Full operation will not begin until June 1996, 41 months after planning began.

Removal Actions Can Provide Valuable Information, Reduce Risks, and Demonstrate Results

The relative speed of removal actions can provide other advantages to DOE. Because removal actions progress to actual cleanup more quickly than other CERCLA processes, removal actions can provide information about waste sites that is useful in focusing other types of remediation. For

example, one removal action at Hanford involved cleaning up a liquid disposal area near one of the shutdown reactors. The project manager for the removal action said important information obtained during the removal action on the extent and spread of contamination through the soil will be used to plan and conduct cleanups near other shutdown reactors, saving both time and money.

Removal actions may also reduce the cumulative risk to human health and the environment. For example, Hanford's removal action in a trench near the Columbia River reduced the concentration of uranium in the groundwater from up to 28 times the drinking water standard to below the drinking water standard. Without the removal action, uranium would have continued to leach into the groundwater for at least 3 years before a planned water treatment facility was completed. At Oak Ridge, the EPA region 4 administrator praised a recent removal action that successfully reduced radioactive strontium releases by about 40 percent. He noted that the projects were completed in less time, at less cost, and with equal or greater effectiveness than the "typical" decision-making process would have allowed. He also attributed the results to teamwork and cooperation between DOE and the regulators.

Finally, removal actions may allow DOE to "pull in its fences" by cleaning up isolated waste sites on the outskirts of a facility and thereby reduce the number of acres requiring DOE's control. For example, two removal actions addressing waste sites on remote portions of the Hanford reservation allowed DOE to complete the remediation of 27 percent, or 153 square miles, of Hanford's total land area. In February 1996, a record of decision was issued requiring no further cleanup for these areas.

Several Factors Limit DOE's Use of Removal Actions

Although DOE's guidance calls for using removal actions where appropriate, the use of these actions varies widely by facility—from greater use at two locations, to increasing use at one location, to very limited use at the remaining two locations. While many contaminated waste sites are similar in type to those already remediated through removal actions, DOE officials have given several reasons for not using removal actions more often. They have noted, for example, that the interagency agreements and contracts governing DOE's environmental restoration do not encourage the use of removal actions, and they expressed a preference for using removal actions only in urgent situations. Not all waste sites may best be addressed through removal actions;

however, there are still additional opportunities to accelerate the progress of DOE's environmental restoration through wider use of this approach.

Facilities' Efforts to Identify Potential Removal Actions Vary

In August 1994, DOE and EPA adopted a policy encouraging the use of streamlined approaches to remediate waste sites. The policy encourages DOE managers to use removal actions, among other tools, when doing so "will achieve results comparable to a remedial action, but which may be completed in less time." The policy recommends that managers give strong consideration to using removal actions in nonemergency situations. DOE issued further guidance to its facilities in November 1995, reiterating that removal actions and other accelerated approaches should be based on consensus between DOE and its regulators.[5]

At the five facilities we reviewed, the response to DOE's policy has varied. Three facilities are adjusting their environmental restoration strategies to make greater use of removal actions, while the other two continue to plan only a limited role for the approach.

Rocky Flats and INEL Have Looked for Opportunities to Use Removal Actions

Both Rocky Flats and INEL are planning to use removal actions to address significant portions of their waste sites. A Rocky Flats manager responsible for cleanup estimates that 27 waste sites will require remediation, and she plans to use removal actions for about half of them. She said using removal actions will be important to accomplishing remediation milestones because DOE officials at Rocky Flats proposed a new interagency agreement requiring several waste sites to be remediated each year. These specific remediation goals were also reflected in DOE's contract with the contractor responsible for the remediation at Rocky Flats. For example, in fiscal year 1996 the contractor is required to clean up three high-priority waste sites at the plant. The contractor's manager responsible for environmental restoration said that without using removal actions, these goals would be difficult or impossible to achieve. The state regulator for Rocky Flats added that removal actions will permit DOE to do more with fewer resources. DOE and regulatory officials said that the old interagency agreement focused almost exclusively on completing milestones required under the full CERCLA planning process. As a result, they said, the old agreement made it difficult to use removal actions.

[5]In May 1995, DOE adopted a policy that also encouraged the use of removal actions rather than other statutory approaches in decommissioning and decontaminating facilities. Because our objective was to examine the relative efficiency of CERCLA's cleanup processes, we did not address decontamination and decommissioning in this report.

At INEL, DOE officials have the flexibility under their agreement to use removal actions where appropriate. Since 1993, INEL has reallocated funds and has conducted nine removal actions, including remediating contaminated soil at several sites. INEL has three other removal actions planned, including removing almost 300,000 cubic yards of contaminated soil, recovering ammunition and other ordnance scattered over several square miles, and removing 11 underground storage tanks of up to 50,000 gallons each. DOE's Director for Environmental Restoration at INEL said the facility uses removal actions to maximize the cleanup that can be achieved with available funds. However, she noted that at some point the results of the removal action still need to be evaluated under the CERCLA process to ensure that no further action is required.

Managers from Idaho's Department of Health and Welfare who oversee environmental restoration at INEL said they consider removal actions to be effective and to save both time and money. They said that if DOE asked to use removal actions instead of other more extensive CERCLA planning processes, they would consider removal actions an acceptable alternative.

Oak Ridge Is Shifting to Greater Use of Removal Actions

While Oak Ridge has not relied extensively on removal actions in the past, officials at the facility now expect to use removal actions more frequently. Between fiscal years 1991 and 1995, Oak Ridge conducted seven removal actions. However, Oak Ridge has four removal actions planned for fiscal year 1996 and has compiled a list of 10 candidate removal actions to be carried out in the next 2 fiscal years. DOE officials believe that removal actions should be used when they can be done quickly and cost-effectively.

Hanford and Savannah River Are Making Only Limited Use of Removal Actions

Compared to the other three facilities, Hanford and Savannah River plan to rely less on the use of removal actions. At Hanford, officials previously pursued removal actions actively, but they are no longer doing so. In 1991, Hanford issued a cleanup strategy (called the Past Practice Strategy) proposing that all waste sites be considered as potential candidates for the removal action approach. Hanford had a contractor group dedicated to selecting, planning, and conducting removal actions. This group identified about 25 projects as candidates for removal actions. Seven actions were initiated before the group was dissolved in 1993 as part of a reorganization of responsibilities. Since then, although the Past Practice Strategy encouraging the use of removal actions has remained in effect, Hanford has initiated only one removal action. DOE, EPA, and state regulators have agreed to pursue interim remedial measures as the primary CERCLA planning process at the installation.

Likewise, Savannah River has made only limited use of removal actions. Since fiscal year 1991, Savannah River has performed seven removal actions. None of these actions has been intended to serve as the final remediation for the waste site. Savannah River staff plan three additional removal actions for fiscal year 1996, but these projects, much like the removal actions carried out in the past, are stopgap measures, designed to control vegetation on three waste sites, and are not intended to be final actions.

Many Untreated Sites Share Key Characteristics With Removal Action Sites

Of the more than 3,000 waste sites located at the five facilities, many are similar to those that have been addressed through removal actions. The 39 removal actions we studied addressed 4 burial grounds, 5 cases of groundwater or surface water contamination, and 21 instances of soil contamination. While many untreated sites may require no cleanup, hundreds will require further action. Many involve liquid waste disposal facilities, burial grounds, contaminated soil, and contaminated groundwater—conditions similar to those at waste sites that DOE has addressed through removal actions. For example, of the 498 identified waste sites along the Columbia River at Hanford, 54 are burial grounds and 108 are liquid waste disposal facilities.

Various Factors Are Limiting the Use of Removal Actions

Our analysis and discussions with DOE and regulatory officials at the facilities we visited suggest that six factors limit the wider use of removal actions.

Removal actions are not part of the agreements with regulators or DOE contractors. Generally, interagency agreements have not included removal actions. Instead, these agreements have often incorporated the steps included in lengthier CERCLA planning processes. The extensive planning and evaluation processes characteristic of the full CERCLA and interim remedial approaches, including the preparation of work plans and various reports, were specified in each of the agreements we reviewed. For example, at Savannah River, DOE and its regulators established milestones for fiscal year 1996 calling for the submission of almost 50 documents required under CERCLA, such as remedial investigation reports and proposed plans.

Like the interagency agreements, DOE's contracts emphasize completing steps in the process rather than performing cleanup actions, and they provide few specific incentives for remediation. For example, at Savannah

River the incentive goal is tied to meeting the interagency agreement milestones on time and doing the work at less cost. Similarly, at Hanford, over half of the incentive is tied to improving the contractor's operating processes, and less than 20 percent is tied solely to performing the actual remediation.

In contrast, in order to accomplish remediation more quickly, DOE and the regulators at Rocky Flats are revising their agreement to establish remediation-based instead of process-based milestones. In the interim, they have agreed to remediate two trenches in fiscal year 1996. DOE is already implementing this change with its Rocky Flats contractor. In fiscal year 1996, the contractor will remediate the two trenches and one other waste site as directed by DOE. The contractor said this results-oriented strategy will force the greater use of removal actions because none of the other planning approaches can be used to complete the work on schedule.

At Oak Ridge, officials attribute their more frequent use of removal actions to a change in their interagency agreement. The agreement now requires regulators to be involved in removal actions. Oak Ridge officials believe the change has increased the regulators' acceptance of removal actions.

Perceptions about when removal actions should be used are incorrect. Some DOE and regulatory officials told us that they believe removal actions are intended for emergency situations or for planning relatively small, uncomplicated remediation projects, not for "mainstream" cleanups. For example, at Hanford, DOE conducted a time-critical action to remove buried barrels containing solvents because the barrels were leaking and threatened to contaminate the Columbia River. A deputy director of environmental restoration at Hanford said that he would consider using a removal action in the future if a waste site were continuing to release contamination that posed a significant threat to human health or the environment. However, he does not view removal actions as appropriate for Hanford's normal cleanup operations at sites where no urgent threat exists.

The view that removal actions should be limited to urgent or small, uncomplicated remediation projects is not supported by DOE's and EPA's guidance or by experiences at the sites we visited. As discussed above, DOE and EPA jointly issued policy in 1994 encouraging the use of removal actions in nonemergency situations as long as CERCLA's regulations were followed. Furthermore, DOE has successfully used removal actions when

an urgent threat has not existed or when large or complex problems have required attention.

Preference is given to streamlining full CERCLA and interim remedial planning approaches. As a way to shorten the time before remediation can begin, officials at some sites are concentrating on shortening the steps of lengthier CERCLA planning processes. These officials estimate that the streamlining will reduce the time required in various planning steps. For example, DOE officials at Savannah River estimate that by streamlining the full CERCLA process they will be able to reduce the average time required to plan for a cleanup from 4 years to 3 years.

However, planning and evaluation will still take significantly longer under streamlined CERCLA processes than under removal actions. At Oak Ridge, for example, the expedited CERCLA process laid out in the site's interagency agreement is expected to take 6 years. In some cases, Oak Ridge officials expect to further shorten the full CERCLA process to about 3.5 years. However, under Oak Ridge's interagency agreement, removal actions are scheduled to take only 14 months. At Savannah River, the streamlined planning process is expected to take 3 years, whereas removal actions are estimated to require only 6 to 12 months. At Hanford, DOE and its regulators have agreed to eliminate certain documents required by the interim remedial process, but they were unable to estimate how much time and money would be saved.

Planning has progressed too far to benefit from the simpler removal action process. Several DOE officials at these facilities said that, for many waste sites, the investigative studies for the full CERCLA and interim remedial processes have progressed so far that there would be little benefit from switching to removal actions. For example, officials at Hanford pointed out that they expect most high-priority waste sites in the environmentally sensitive area next to the Columbia River to be ready for cleanup in 1 to 3 years, making removal actions unnecessary.

We found instances, however, in which the use of removal actions has been effective even after planning for remediation under lengthier processes has been partially completed. Officials at Rocky Flats and INEL used information gathered under lengthier CERCLA processes as the basis for removal actions, thereby accomplishing these actions more quickly than they would otherwise have done. For example, INEL officials used the remedial investigation report from the full CERCLA process as the engineering evaluation for a removal action to remove radioactively

contaminated soil from six waste sites. INEL officials estimate that changing to a removal action speeded the actual remediation by several years and saved $2.6 million. At Oak Ridge, the state regulator said that at some sites cleanups now under the full CERCLA process may be converted to removal actions. He said that Oak Ridge's focus is increasingly on getting into the field.

Limited planning may increase the risk that an incorrect remedy will be chosen. Frequently, contamination at DOE waste sites is not well known. Of the 39 removal actions we reviewed, 1 incurred added or unnecessary costs because the actual conditions at the site were different from the expected ones. At Hanford, DOE conducted a removal action to excavate old drums thought to contain residues of a hazardous chemical. Upon excavation, DOE found no significant contamination in the pit. Fuller characterization before excavating the site might have helped to avoid the expense of excavation. However, a state regulator at Hanford said that full characterization of the burial ground would have cost more than the excavation.

A removal action may not be the final solution. A final issue that was raised at several facilities was that, in contrast to the full CERCLA process, a removal action is an interim solution that must be documented through a record of decision after the action has been completed. EPA officials said that potential problems with final decisions could be significantly reduced by encouraging public participation and close cooperation between the regulators and DOE. DOE officials at INEL also stressed the importance of securing the regulators' agreement with the proposed removal actions, particularly at sites where little is known of the contamination and the effectiveness of the planned remedial technology is unclear. DOE officials also expressed concern that when the final decision is proposed to the public and the regulators, additional remediation could be required. Of the 39 removal actions we studied, 26 were intended to be the final solution. None of the 26 is expected to require additional remediation when the record of decision is completed, but only one record of decision covering 4 removal actions at Hanford has been completed. In addition, interim remedial measures, which are widely used by DOE, also require a record of decision after the measures have been implemented.

Conclusions

More extensive use of removal actions would provide a means for speeding the planning process and devoting more environmental restoration dollars to actual remediation at sites. We recognize that not

every waste site is appropriate for the abbreviated planning that takes place under removal actions; however, the successful use of removal actions at a variety of environmental restoration sites throughout the DOE complex indicates that additional opportunities exist to employ this cost- and time-saving approach.

Recommendations

We recommend that the Secretary of Energy direct the managers of DOE's facilities, working with their regulators, to reevaluate their environmental restoration strategies to ensure the maximum possible use of removal actions. Where appropriate, this action may include

- systematically evaluating each waste site where actual cleanup has not yet begun, including those sites where a lengthier assessment process is under way, to identify the sites where using a removal action would be feasible and cost-effective;
- seeking agreement to eliminate requirements in existing interagency agreements that favor lengthier review and assessment processes in exchange for a commitment to achieving significant cleanup progress through removal actions; and
- identifying and implementing incentives for DOE's contractors that would increase the emphasis on, and the reward for, pursuing removal actions where appropriate.

Agency Comments and Our Evaluation

We provided a draft of this report to DOE and EPA for their review and comment. We discussed the report with officials from DOE's Office of Environmental Restoration, including the Director of the Office of Program Integration, and with officials from EPA's Federal Facilities Enforcement Office, including the Senior Enforcement Counsel. Overall, the officials agreed that the report was accurate. Both agencies provided some technical comments that we have incorporated in the report. DOE agreed with our conclusion that removal actions can be completed in less time and are less costly than other approaches. However, DOE said that the report implies that DOE has more discretion to initiate removal actions than the Department believes that it has. DOE said that the report did not give enough emphasis to the barriers, such as the requirements in interagency agreements, that the Department faces in using removal actions at more waste sites. DOE also noted that it is supporting revisions to CERCLA to increase its flexibility. We have modified our report to reflect DOE's concerns; however, we continue to believe that DOE can do more to overcome these barriers.

EPA said that it generally supports the increased use of removal actions where it and/or state regulators have had the opportunity to coordinate with DOE. EPA suggested that removal actions could be enhanced by closer cooperation between regulators and DOE through the use of teams and early efforts to include the public in decisions about using removals. EPA also suggested that DOE document the savings in time and cost from using removal actions by collecting comparative data to improve the public's and regulators' acceptance of removal actions. We agree that these are steps that DOE should consider.

Scope and Methodology

We conducted our review at Hanford in Washington State, INEL in Idaho, Oak Ridge Reservation in Tennessee, Savannah River in South Carolina, and Rocky Flats in Colorado. We selected these facilities because DOE estimates that they will account for about 94 percent of the total cost of restoring the DOE complex.

To determine whether removal actions have been successful in speeding cleanups, reducing costs, and providing other benefits, we attempted at each facility to gather data on the time spent and the costs incurred to plan waste sites' remediation using both removal actions and lengthier CERCLA processes. We reviewed projects' files, toured various sites restored through the removal action process, analyzed official records, and reviewed various reports. At Oak Ridge, Savannah River, and Hanford, cost data were not available on all projects. At those facilities, we obtained the cost data that were readily available. We also discussed the advantages and disadvantages of removal actions with DOE and contractor officials.

To identify additional opportunities for DOE to use removal actions, we compared untreated waste sites to waste sites that had been successfully treated through removal actions. We also interviewed officials at each location and reviewed lists of potential removal actions that had been prepared at some sites. To identify potential barriers to the greater use of removal actions, at each location we reviewed agreements with regulators, as well as selected contracts and incentives provided to DOE contractors. We also reviewed relevant statutes and regulations, as well as EPA's and DOE's guidance, and discussed the Department's guidance with DOE's Office of Environmental Guidance. To obtain the Department's perspective on the role of removal actions, we discussed the approach with DOE's Office of Environmental Restoration. We also interviewed state and EPA regulators responsible for activities at the five facilities and EPA officials from the Federal Facilities Enforcement Office.

We conducted our work from July 1995 to April 1996 in accordance with generally accepted government auditing standards.

As agreed with your office, unless you publicly announce its contents earlier, we plan no further distribution of this report until 10 days from the date of this letter. At that time, we will send copies of this report to the appropriate congressional committees, the Secretary of Energy, and other interested parties. We will also make copies available to others on request.

Please call me at (202) 512-3841 if you or your staff have any questions. Major contributors to this report are listed in appendix I.

Sincerely yours,

Victor S. Rezendes
Director, Energy, Resources,
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