

GAO

Report to the Ranking Minority Member,
Committee on Commerce, House of
Representatives

October 1997

HAZARDOUS WASTE

Progress Under the Corrective Action Program Is Limited, but New Initiatives May Accelerate Cleanups



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

B-277878

October 21, 1997

The Honorable John D. Dingell
Ranking Minority Member
Committee on Commerce
House of Representatives

Dear Mr. Dingell:

Under the requirements of the Resource Conservation and Recovery Act's Corrective Action Program, the nearly 3,700 nonfederal facilities that treat, store, or dispose of hazardous waste in the United States could spend about \$16 billion to clean up their properties contaminated by hazardous substances.¹ The Corrective Action Program attempts to minimize the federal cleanup burden by having current operating facilities clean up their hazardous waste contamination, thereby preventing them from becoming Superfund sites.² The companies that perform cleanups under the program include, for example, chemical manufacturers and waste disposal companies. Although the Corrective Action Program has been in effect since 1984, concerns have been raised that companies are not cleaning up their facilities quickly enough and that the properties remain contaminated, posing risks to public health and the environment.

To assess the current status of the Corrective Action Program, you asked us to determine (1) the progress made in cleaning up facilities under the program, (2) factors affecting progress, and (3) any initiatives that the Environmental Protection Agency (EPA), the states, and industry have taken to accomplish cleanups. As agreed with your office, we limited our review to nonfederal facilities.

Results in Brief

As of March 31, 1997, only about 8 percent of the approximately 3,700 nonfederal facilities nationwide that treat, store, or dispose of hazardous waste—including about 5 percent of the approximately 1,300 facilities considered to pose the highest risk—have completed cleanup actions under the Corrective Action Program, according to EPA's data. Many of the

¹The number of facilities is based on our analysis of the Environmental Protection Agency's (EPA) data. In addition, we adjusted EPA's 1992 estimated cost for cleanups to 1996 dollars.

²Under the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, also known as Superfund, EPA may compel companies responsible for hazardous waste contamination to perform a cleanup. Alternatively, the agency may perform the cleanup itself and seek reimbursement from the responsible company. As we recently reported in *Superfund: Times to Complete the Assessment and Cleanup of Hazardous Waste Sites* (GAO/RCED-97-20, Mar. 31, 1997), a significant backlog of facilities are awaiting cleanup under the Superfund program.

remaining facilities are in various stages of the cleanup process: About 17 percent are implementing cleanup remedies; another 14 percent have taken actions to contain on-site contamination so that it does not pose an immediate threat to human health or the environment; and 14 percent are still investigating the extent of contamination. Finally, about 56 percent of the facilities—including about 35 percent of those posing the highest risk—have yet to begin the formal cleanup process. Some facilities have undertaken cleanup actions outside of the program; however, the extent of these efforts is unknown because they are not reflected in the agency's program data.

Four key factors are hampering progress under the Corrective Action Program, according to EPA, state, and company cleanup managers we contacted. First, cleaning up the contaminated facilities under the program is time-consuming and costly because the process EPA developed for cleanups, and which some states authorized to implement the program have adopted, has multiple reporting and review requirements. Second, the agency, the states, and companies often disagree on how cleanup should be pursued. These disagreements prolong the cleanup process because more time is needed to negotiate cleanup terms, and companies must sometimes meet the duplicate requirements of both federal and state regulators. Third, unless EPA or the states direct the companies to begin cleanup, the companies appear to perform cleanups at their facilities only when they have business incentives to do so, such as an interest in selling or redeveloping the property. Finally, cleanup has been hampered because EPA, as well as the states in the regions we reviewed, lack the resources they need to direct more companies to begin their cleanups and to provide timely oversight at the facilities already performing cleanups under the program.

Recently, EPA, some states, and industry have undertaken initiatives to, among other things, streamline the cleanup process and make cleanup decisions on the basis of the level of the risk to public health and the environment posed at the individual facility, rather than on the basis of the more generic process specified for the program. In addition, the agency and the states are looking for ways to leverage their limited resources to accomplish cleanups more quickly. These efforts include putting facilities into alternative programs that streamline cleanups—such as states' voluntary cleanup programs. While these initiatives promise to allow faster and cheaper cleanups, some of them, such as the voluntary programs, may involve tradeoffs in the stringency of the standards applied, the permanence of the remedies selected, and the level of public participation

required. These tradeoffs increase the need for long-term oversight to ensure that the remedies continue to protect human health and the environment. Furthermore, although companies' cleanup managers favor many of the initiatives, several of them—citing their experience with cleanups under the program to date—expressed reservations about the agency's and the states' willingness to use these initiatives. Therefore, the agency's current strategy of adopting new approaches to corrective action by issuing guidance or final regulations may not be sufficient to ensure that the approaches are implemented nationwide.

Background

The Resource Conservation and Recovery Act of 1976 (RCRA) requires companies that treat, store, or dispose of hazardous waste to obtain a permit specifying how their facilities will safely manage that waste. EPA may authorize states to administer their own permitting programs for hazardous waste in lieu of the federal program, as long as these programs are equivalent to and consistent with the federal program and provide for adequate enforcement. Currently, almost all states are authorized to issue operating permits. Existing facilities, under certain conditions, can operate while EPA or the state authorized to implement the program reviews their permit applications. These facilities operate in “interim status.”

The Hazardous and Solid Waste Amendments of 1984 revised RCRA to include new provisions for cleaning up the contamination at facilities seeking permits to treat, store, and dispose of hazardous waste. The corrective actions can be specified in the facility's operating permit or in a separate corrective action permit. EPA may also use its enforcement authority to require facilities to clean up hazardous waste contamination by issuing to the facility an enforcement order specifying the corrective actions it must take. The agency's offices of Solid Waste and Emergency Response, and Enforcement and Compliance Assurance implement the Corrective Action Program through EPA's 10 regional offices. In addition to giving 47 states the authority to issue operating permits to facilities, EPA has, to date, given 32 states the authority to issue permits to facilities to undertake corrective action cleanups.³ The states authorized to issue these corrective action permits must also, as part of the authorization process, demonstrate that they have adequate authority under state laws to enforce the program at all applicable facilities.

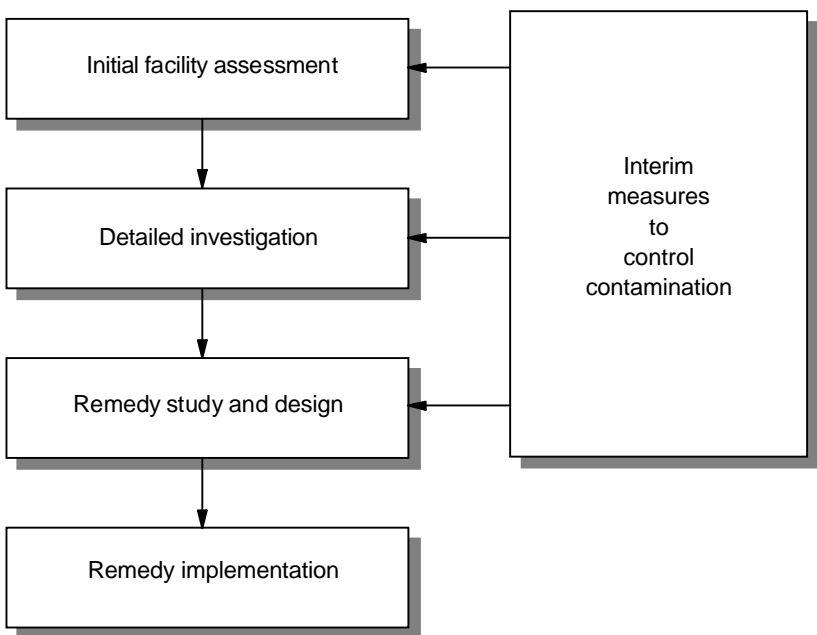
RCRA, as amended, did not set any deadlines for completing cleanups under the Corrective Action Program. In response to the planning requirements

³EPA has authorized 31 states and 1 territory—Guam—to implement the Corrective Action Program.

established for all federal agencies under the Government Performance and Results Act of 1993, EPA has set two performance targets for all high-priority RCRA facilities by 2005. These two targets are to control the (1) human exposure to hazardous contamination at 95 percent of them and (2) release of contaminated groundwater at 70 percent.

To implement the Corrective Action Program, EPA designed a cleanup process that generally includes four stages. (See fig. 1.)

Figure 1: The Four Primary Phases of the RCRA Corrective Action Process



Note: At any point in this process, the facility may be required to take interim measures to address contamination that poses an immediate threat to human health or the environment.

Source: EPA.

In the first phase—initial facility assessment—EPA or the state assesses the facility to characterize the risk posed and determine the need for immediate action. In the second phase—detailed investigation—the

company that owns the RCRA facility conducts a more detailed investigation to establish the nature and extent of contamination released to groundwater, surface water, air, and soil; this phase can be complex and take years to complete. This investigation is conducted under EPA's or the state's review and monitoring and with the agency's or state's approval. If corrective action is needed, a third phase—remedy study—is started. During this phase, the company must complete a corrective measures study that describes the advantages, disadvantages, and costs of various cleanup options; EPA solicits public comments on the selected option and approves a final method. Finally, in the fourth phase—remedy implementation—the company implements the corrective measure selected; it is required to design, construct, operate, maintain, and monitor this remedy.

To examine cleanup issues under the Corrective Action Program, we analyzed RCRA's program data and interviewed cleanup managers from 23 companies that are responsible for corrective action cleanups. For these 23 companies, we visited 20 facilities selected from the 2 largest industry groups subject to cleanup under the program—chemical and metal manufacturers—and interviewed their cleanup managers at these facilities. We also interviewed cleanup managers of five corporations that are among those with the most facilities subject to corrective action cleanup nationwide. In addition, we interviewed EPA and state program managers who directly oversee the 20 facilities. Appendix I provides additional details on our scope and methodology.

Few Facilities Have Completed Cleanups Under the Program

Since 1984, companies have completed cleanup action at about 8 percent (301) of the universe of 3,698 nonfederal facilities that treat, store, or dispose of hazardous waste, according to EPA's data. These cleanups include about 5 percent (69) of the 1,304 facilities that EPA considers to be a high priority because they pose the highest potential risk to human health or the environment.⁴ EPA or the states have certified these facilities as having completed all cleanup action and needing no further monitoring.

Of the 573 facilities that are implementing remedies, 395 of them—including 215 high-priority facilities—have put remedies in place to control human exposure to on-site contaminants. Another 34 facilities—including 18 high-priority facilities—have completed construction of at least one on-site remedy and are monitoring the

⁴We obtained EPA's database as of March 31, 1997, and, using a methodology we designed in conjunction with the EPA program managers, placed each of the facilities subject to corrective action into one of five cleanup categories, such as remedy implementation.

effectiveness of that remedy. The rest have, at a minimum, presented their suggested remedies to the public for consideration and comment and subsequently received approval from EPA or the state to implement those remedies. EPA expects that a number of facilities, such as those designed specifically as waste disposal facilities, will remain in this category because they will require monitoring far into the future.

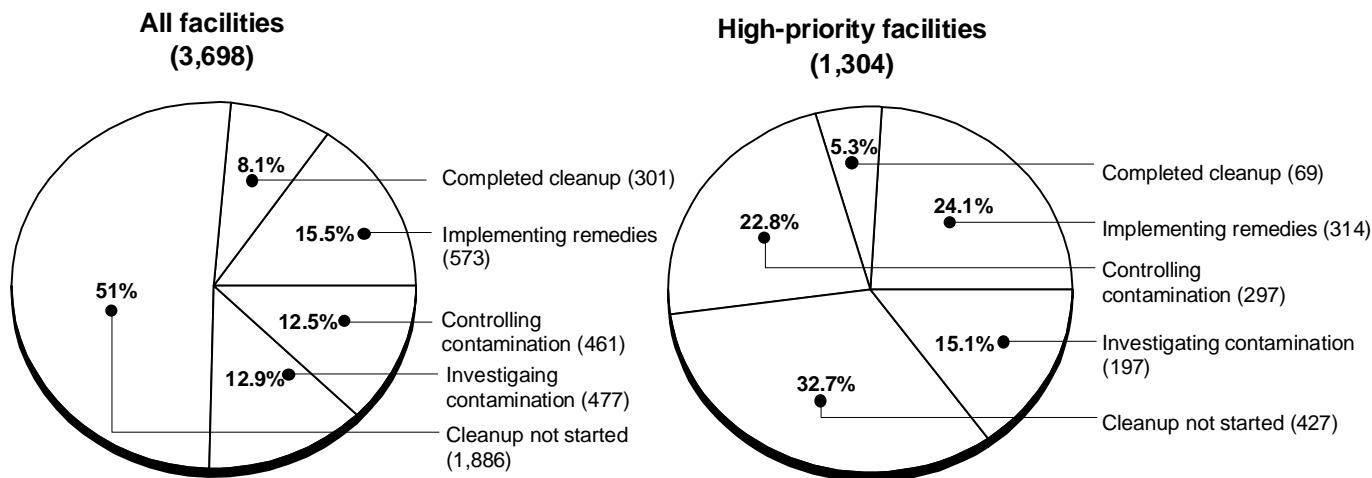
The 461 facilities that are controlling contamination—297 of them high priority—have taken interim steps at the location to abate threats to human health and the environment and to prevent or minimize the further spread of contamination by, for example, halting the migration of contaminated groundwater. The interim measures are specific to the contaminated portions of the property and may not be facilitywide. The facility may need to take additional corrective measures to complete the cleanup.

The 477 facilities—including 197 high-priority facilities—that are investigating contamination are completing, or have completed, a thorough study of the types and extent of on-site contamination. During this investigation, EPA or the state becomes actively involved with the cleanup, and the facility is considered to be participating in the Corrective Action Program.

The 1,886 facilities that have not begun their cleanups under the Corrective Action Program may have been assessed by EPA or the state and ranked as high, medium, or low priority; however, the facility, EPA, or the state has not taken any further action under the program. Of these facilities, 427 are high priority.

Figure 2 illustrates the number and percent of total and high-priority facilities that treat, store, or dispose of hazardous waste in each of the corrective action categories.

Figure 2: Status of Facilities in the Corrective Action Process by Cleanup Phase—All Facilities and High-Priority Facilities



Source: EPA data, as of March 31, 1997.

Companies have made some progress since 1993, when we last examined the Corrective Action Program. At that time, EPA data showed that only about 1 percent of the facilities that needed cleanups had undertaken cleanup actions.⁵ In addition, some companies have undertaken cleanup actions outside of the Corrective Action Program, under state environmental programs, such as state Superfund or voluntary cleanup programs, and these are not reflected in EPA's data. While some of these cleanup activities are likely to qualify as corrective action, according to EPA program managers, the extent of these types of cleanup actions is unknown.

We also examined facilities in two categories of the program—the cleanup begun and cleanup completed categories—to determine differences in progress among the states that are authorized to implement the program and those that are not, EPA's 10 regions, and the major industry groups that

⁵Hazardous Waste: Much Work Remains to Accelerate Facility Cleanups (GAO/RCED-93-15, Jan. 19, 1993). The analysis in this report was based on data in the EPA database, as of June 1992. At that time, EPA estimated that about 3,400 facilities needed cleanups. Because the data used for both reports are not fully comparable, we could not analyze progress by cleanup category.

are responsible for corrective action. (See app. II for a detailed explanation of our analysis and the results.) Some of the significant variations in progress include the following:

- States. Facilities in the states authorized to implement the Corrective Action Program have achieved more progress in both categories than facilities in the states not authorized, regardless of the industry or cleanup priority of the facility. For example, 53 percent of the facilities in the states authorized to implement the program have their cleanups under way, compared with 41 percent in the states not authorized for the program.
- EPA regions.⁶ The regions differ significantly in the percentage of cleanups they have under way or completed. For example, the Denver region has cleanups under way at about 92 percent of its facilities, while the Boston region has about 23 percent of its cleanups under way. The Denver region has completed cleanups at 12 percent of its high-priority facilities, while each of the Boston, Philadelphia, and Atlanta regions has completed less than 5 percent of its facility cleanups, regardless of priority.
- Industry. Industry's progress also varies. Petroleum and coal facilities have the largest percentage of cleanups under way at high-priority facilities—87 percent—while metals manufacturing facilities have the smallest—51 percent. Electrical, gas, and sanitary facilities have the highest percentage of completed cleanups—11 percent—regardless of priority, while metal manufacturing facilities have the lowest—5 percent.

Appendix III details cleanup progress, by category, for states, EPA regions, and industries.

Several Factors Affect Cleanup

Four key factors are hampering cleanups, according to the cleanup managers we spoke with at EPA and the companies. First, the RCRA cleanup process is time-consuming and costly. Second, EPA, the states, and companies often disagree on how to approach cleanup at a facility, including the standards and remedies that facilities should use. Third, because cleanups under the Corrective Action Program are expensive and drawn-out, unless EPA or a state directs a company to begin cleanup under the program, a company tends to initiate cleanup at its facilities only when it has economic incentives to do so. Finally, EPA and some states lack the resources needed to direct more companies to begin cleanups at the facilities not yet in the program and to provide timely oversight of cleanups already under way.

⁶See fig. III.2 in app. III for a listing of all EPA regions.

The RCRA Process Can Be Time-Consuming and Costly

According to cleanup managers from each of the 23 companies we reviewed, the RCRA cleanup process is sometimes unnecessarily time-consuming and costly. According to EPA officials, the complexity of many RCRA facilities—especially the high-priority ones—adds to the time and cost of cleanups. However, the industry representatives stated that the duplicative and restrictive nature of the cleanup process EPA and the states have implemented adds more time and cost than warranted. These representatives believe that the corrective action process forces EPA's cleanup managers to become overly prescriptive in monitoring a cleanup, concentrating on whether the facility has complied with every step in the cleanup process rather than on whether it has met the cleanup's overall goals and objectives. For example, according to the cleanup managers of one chemical company, the company has numerous, similar facilities with underground storage tanks that need to be cleaned up. The managers commented that, although EPA and the states typically require the same cleanup method at each facility, program protocol requires each facility to conduct a thorough investigation and corrective measures study, with all of the requisite data collection, reports, and plans. The managers believe that this is a heavy, costly, and unnecessary paperwork burden. Similarly, representatives of a chemical facility we visited reported that prior to EPA's involvement in the cleanup, the facility spent \$10 million to investigate the contamination and initiate its own cleanup activities, which EPA later approved as sufficient. Once EPA became involved, the facility spent an additional \$28 million, a substantial portion of which, in their view, was to comply with EPA's procedural requirements rather than to substantially increase the amount of cleanup. EPA regional officials believe that the company's estimate includes more work than EPA requires for RCRA cleanups; however, they could not determine how much the company spent for RCRA requirements because EPA does not track the cost of cleanups.

Representatives of a steel manufacturing facility told us that they cannot deviate from the schedule of consecutive steps detailed in their facility's corrective action order. As a result, the facility will not begin actual cleanup activities until about 7 years after the order was signed. Furthermore, they stated that the order specifies that the facility must submit a workplan and obtain EPA's approval for each interim measure taken at the facility. The company's representatives noted that it took about 7 months to obtain EPA's approval to place fencing and propane-powered cannons, an interim measure, around one contaminated pit to keep wildlife out. They believe that the interim measure was a simple one that could have been implemented much more quickly without

a formal workplan. These representatives' experience with cleaning up similar facilities more quickly under other programs, such as state voluntary programs, leads them to believe that RCRA's process-oriented approach is unnecessarily delaying cleanup.

Several of the EPA officials in the regions and at headquarters agreed that the corrective action process can be cumbersome and unnecessarily time-consuming. They explained that EPA somewhat modeled the RCRA cleanup process—with its extensive documentation requirements and prescribed, consecutive steps—after the Superfund process. According to these officials, Superfund cleanups follow detailed procedural steps so that the agency can document cleanup costs because, under Superfund, EPA needs the documentation to pursue reimbursement for cleanup costs from the parties that are responsible for the contamination. In addition, in the early days of both Superfund and RCRA, when the agency was relatively inexperienced with cleaning up hazardous contamination, agency decisionmakers designed the cleanup processes to be thorough to ensure that facilities choose the best cleanup solutions. Furthermore, they thought that it was important to make the requirements of the two programs consistent because Superfund and RCRA cleanups can be similar in the types and extent of contamination they must address. As a result, they noted, RCRA cleanups became very process-oriented, and the authorized states usually adopted this approach.

Some EPA officials commented that the extensive process for dealing with RCRA cleanups may not always be appropriate today. EPA and the state agencies and industry have gained experience with cleanups and tend to know more about the success of various cleanup methods, decreasing the need for extensive investigation and analysis. In addition, the managers pointed out that other approaches to cleanups have been developed, such as state voluntary programs, which they believe can achieve results comparable with RCRA's in terms of the standards and remedies applied but with less adherence to a step-by-step process.

Disagreements on Approaches, Standards, and Remedies Can Hamper Cleanups

EPA, the states, and companies frequently disagree on how to approach cleanups as well as on the standards and remedies that should be used, according to cleanup managers from each of the 23 companies in our review. This lack of agreement, some of them said, tends to hamper cleanup progress because the regulators and companies spend more time negotiating cleanup terms.

For example, according to some of the company cleanup managers, some EPA regions and states may disagree with a company and require a comprehensive, facilitywide investigation prior to beginning the corrective measures study, while others may agree to allow a company to investigate and remediate its facility in phases. Likewise, some EPA and state officials may disagree with a company's preference to clean up a facility to less stringent standards, assuming that the land will be put to industrial rather than residential uses in the future. Finally, some EPA and state officials may push the company to use permanent remedies, such as removing all sources of contamination, rather than simply containing the waste. Some of the companies that have facilities in different parts of the nation said that they experience these disagreements first-hand; another cleanup manager said that the company became aware of them through the consultants it uses who have national experience in managing the corrective action process.

According to company cleanup managers representing 8 of the 23 companies in our review, delays can occur at facilities where both EPA and the state have oversight because the regulators disagree or impose duplicate requirements. Usually, either EPA or the state monitors cleanup activity conducted under the Corrective Action Program; however, sometimes both EPA and the state are involved in portions of a facility's cleanup. For example, a company could close a landfill or surface impoundment under the state's oversight—because almost all states are authorized to oversee those types of closures outside of the Corrective Action Program—and later enter into facilitywide corrective action under EPA's oversight. This was the case at one chemical facility that we visited. The company wanted to close numerous similar surface impoundments. It closed some of them under the state's oversight prior to beginning corrective action. The state allowed the company to meet industrial land-use standards. The company closed the remaining impoundments under EPA's oversight in the Corrective Action Program, however, and EPA initially insisted upon more stringent standards that would not restrict the future use of the land. The company argued that all of the surface impoundment closures should meet the same risk-based criteria. It was 4 years before EPA and the company agreed to cleanup specifications that mirrored those of the state.

Companies Appear to Initiate Extensive Cleanups Only With Economic Incentives

According to several cleanup managers we spoke with, companies will generally ensure that the contamination at their facilities does not pose an immediate danger to public health or the environment, whether or not EPA or a state has directed the facility to enter the Corrective Action Program. For example, two of the companies we visited were addressing identified groundwater contamination before EPA or the state had approached them with a permit or order to begin corrective action. They were working with the facility's neighbors to ensure that they had safe drinking water and keeping the neighbors informed of cleanup actions. One of the facility managers explained that it was very important for the company to avoid the liability of future problems from contamination that could migrate off of the property and to maintain a good public image.

We determined, however, that the companies in our survey appear to undertake more comprehensive cleanup actions only when they have an economic incentive to do so because the corrective action process can be so costly and time-consuming. For example, two companies we visited were growing and wanted to expand their operations on the property. The company cleanup managers said that they are seeking program approval of their cleanup actions in order to avoid the risk of later having to tear down structures to address on-site contamination. Representatives of another company, a chemical manufacturer, told us that the company was motivated to clean up its facility through the program because it had an agreement with the prior owner to share in the liability costs for contamination. Because the agreement had a time limit on these provisions, the company wanted to enter the program and obtain EPA's certification that cleanup was complete before the provisions expired.

In other cases, a company subject to the Corrective Action Program may perform more extensive cleanup actions prior to any EPA or state oversight because it foresees a financial advantage in not waiting for EPA or the state to initiate the cleanup. Such a company runs the risk of having to redo its cleanup or take additional action later if the cleanup does not meet program requirements once EPA or a state directs it to enter the program. For example, one company that has closed down its steel-making operations is developing the facility into an industrial park. The company negotiates cleanup terms with the prospective tenants as part of each lease and cleans up without government oversight, retaining liability for any future cleanup that EPA or the state may require. Company representatives explained that the business community demands quicker turnaround times for real estate transactions than EPA can provide and that, therefore, the company cannot afford to wait for EPA. According to

the cleanup managers of two other companies, these companies purposely began their facility investigations prior to EPA's involvement as a way to better manage total cleanup costs. They explained that the EPA process would usually require an investigation of each area of the facility thought to be contaminated; however, if a company can show that some areas are not problematic, those areas can often be eliminated from the specifications dictated in the permit or order, making the investigation under the program cheaper. One of the managers added that, by getting started prior to EPA's involvement, the company can better control cleanup costs—more than \$14 million to date—than if EPA dictates the cleanup schedule.

In contrast, a company may clean up a facility under a state program, such as a voluntary cleanup program, to gain some assurance that the cleanup will meet the requirements of the Corrective Action Program. For example, a steel manufacturing company we visited is performing the cleanup of a large facility under a state voluntary program. According to company cleanup managers, the company plans to build extensively on the property and wants to begin as soon as possible. Even though company representatives are concerned about building before EPA certifies that no more cleanup is needed, they do not want to increase the time or money they expect would be needed to perform a facility investigation under the Corrective Action Program. The company chose the voluntary program because its process requirements are less extensive, and therefore less expensive, than those of the Corrective Action Program. In addition, the representatives expect that the cleanup under the state program will occur more quickly so that the redevelopment can begin sooner. Company representatives believe that, by meeting the state's requirements, EPA is less likely to require the company to perform additional cleanup actions later.

Furthermore, when companies have no immediate economic incentives to clean up, they wait until the state or EPA pursues corrective action with them, according to one cleanup manager at a large corporation. He explained that the company may not be anxious to pursue cleanup if the contamination is not posing an immediate threat, the facility is not losing revenue, or the company is not incurring a financial liability by delaying cleanup.

Several company cleanup managers told us that, to some extent, companies are discouraged from taking more proactive cleanup steps because the regulatory uncertainty of the program has made it difficult to

predict the cleanup actions EPA or the states might impose. For example, although the program began in 1984, EPA did not issue draft regulations governing how facilities must complete cleanups until 1990 and has not yet issued final regulations.

EPA's and Some States' Lack of Resources Hamper Their Ability to Address Cleanups

EPA cites a lack of resources as one of the main reasons it cannot direct more than a relatively small number of the facilities still not in the program to begin cleanup each year. In fiscal year 1997, the agency expected to direct cleanup at less than 2 percent (46) of the 1,886 backlogged facilities—427 of them high priority—that have not yet begun their program cleanups. Several company cleanup managers said that they had waited years for EPA to oversee their cleanups. For example, EPA did not approach one steel company to begin negotiating cleanup under an order until 8 years after EPA had initially assessed the company's facility.

The resource shortfall delays ongoing cleanups because agency staff are slow to review the documentation submitted by the companies. While EPA generally requires that companies respond to requests for reports and documents for each step of the corrective action process within 30 to 60 days of the requests, it is not uncommon for EPA to take much longer to respond to the documents that companies submit, according to company cleanup managers. For example, representatives of one steel company told us that it regularly took some EPA regional staff 9 to 12 months to respond when the company submitted drafts or workplans, and representatives of a chemical company said that they have been waiting since 1994 for EPA to respond to information that the company provided on the risks at its facility.

This gap between workload and available resources has affected the progress of the program since its inception. After the Corrective Action Program was created in 1984, the agency received a flood of applications from facilities requesting a permit to operate in compliance with the RCRA requirements. RCRA established earlier deadlines for final decisions on permit applications for certain types of facilities, such as landfills, than for other types of facilities. Because of these earlier deadlines, EPA used available resources to address the applications from those facilities first and delayed addressing other types of facilities or taking additional enforcement actions. EPA was not able to conduct facility assessments at many of these other facilities or to begin the more detailed facility investigations until the early 1990s. In an effort to enlist states' assistance with cleanups, EPA authorized states to implement the program. This

strategy appears to have helped to some extent. About 47 percent of the facilities in the 32 states authorized to implement the program are awaiting cleanup, compared with about 59 percent in the states not authorized to implement the program. In states that are not authorized to implement the program, EPA's regional staff must issue all corrective action permits and enforcement orders.

Generally, EPA relies on its regions to decide how many corrective actions to initiate each year and which facilities to pursue, given their budget and available staff. However, limited resources is still an issue in both of the regions we reviewed. In fiscal year 1997, program managers in the Philadelphia region projected that the region would have enough resources to direct companies to begin cleanups at 4 of the 69 high-priority facilities awaiting cleanup. These resources will address none of the remaining 86 lower-priority facilities. Because none of the states in the region are authorized to issue either corrective action permits or orders, the region must perform these actions.

Program managers in the Philadelphia region told us that they often rely on the states to identify those facilities (1) that they believe have contamination problems that must be addressed, especially since the region has only limited information about the facilities that was collected during the initial assessment, and (2) for which the states might issue operating permits so that EPA can add corrective action requirements to the operating permits. The regional program managers told us that their states currently supplement EPA's activities by performing limited corrective action activities that were agreed to at the beginning of the year; however, the managers said that they cannot rely on their states for additional corrective action assistance because the states do not have the resources to do more. Furthermore, these officials told us that the limited program resources contributed to the fact that few cleanups are initiated and the agency is slow to review and approve companies' submissions.

Similarly, in addition to its current enforcement workload of 50 cases, the Chicago region has 377 facilities, including 82 high-priority facilities, that are eligible for corrective action. The region relies on its states to issue most new corrective action permits and enforcement orders for those permits since all of its states are authorized to do so. Because of EPA's and the states' resource shortfalls, however, regional officials projected that the region will undertake corrective action enforcement at only three of the facilities during fiscal year 1997 and anticipated that the states will undertake only a limited number of new cleanup actions.

Furthermore, several of EPA's program managers in headquarters and the two regions noted that they may never have the resources to get to the 1,459 lower-priority sites that are in EPA's corrective action workload. They said that facilities need to address their contamination issues on their own or perhaps with the help of state regulators by working through other state cleanup programs, such as voluntary programs. The managers expect that, because most low-priority facilities will not need much cleaning up and the cleanup of medium-priority facilities will be much less extensive than at high-priority facilities, the facilities probably are not taking a significant risk in pursuing cleanups without EPA's or the states' oversight under the Corrective Action Program. We did not contact state environmental agencies nationwide to examine the extent to which they may have additional resources or capabilities to help fill the gap between EPA's workload and the resources the agency has available to manage its workload.

EPA's and States' Initiatives May Begin to Address the Cleanup Backlog

EPA, the states, and industry have recognized the need to improve the cleanup process. They have taken actions designed to, among other things, streamline the process, apply more flexible approaches, standards, and cleanup methods, and allow for better use of EPA's and the states' limited resources. By beginning to address some of the factors that hamper cleanup progress, these actions may help to reduce some of the economic disincentives that tend to keep companies from cleaning up their facilities.

EPA Headquarters' Initiatives

EPA has taken several initiatives over the years to help leverage its resources. In 1991, EPA decided to use its resources to ensure that, until it can direct more facilities to begin the formal corrective action process, it has at least controlled or abated any immediate threats to human health and the environment at all facilities. The agency also has decided to focus first on those facilities it ranked as high priority for corrective action. Furthermore, in November 1994, the agency proposed a rule that it believes should help more effectively integrate corrective action and closure activities at a facility, which should help to address some of the problems that can occur when both the state and EPA are involved in a cleanup.

In May 1996, in its advance notice of proposed rulemaking for implementing the Corrective Action Program, the agency announced plans to design new regulations for the program and introduced various revised techniques, standards, and remedies that regions and states can use to

focus cleanups more on the level of the risk posed by the facilities. In addition, the notice suggested using alternative environmental programs, such as state Superfund or voluntary cleanup programs, to accomplish corrective action cleanups, when appropriate, as a way to leverage EPA's and the states' resources for program oversight. While program managers said that the agency plans to proceed with the rulemaking, the agency's other priorities may delay the rulemaking process. Therefore, until these regulations become final, the Office of Solid Waste and Emergency Response has directed EPA regions and the states authorized to implement the Corrective Action Program to use the notice as guidance when implementing the program. In addition, headquarters managers told us that the agency plans to conduct regional training sessions on the provisions in early 1998. The regions, in turn, are to provide the training to the states.

In September 1996, the agency issued new guidance to its regions for coordinating cleanup activities among RCRA, Superfund, and state cleanup programs. The guidance describes how regions can accept cleanup decisions made by other programs, defer cleanups to other programs, coordinate when more than one program applies at a facility, and integrate the RCRA closure and post-closure activities with other cleanup activities. The guidance is intended to eliminate duplication of effort, streamline cleanup processes, and build more effective relationships between EPA and the states.

Finally, EPA's 1997 response to the planning requirements under the Government Performance and Results Act of 1993 may help the agency to better leverage its resources by focusing on performance targets. However, while EPA headquarters managers expect that these targets will help to direct the program, they commented that it is too early to determine what effect this action will have on the program. The managers explained that, by the end of 1997, the agency plans to have determined the number of facilities currently meeting these targets in order to establish a baseline for its indicators. After several years of experience with the indicators, the agency will determine what modifications are necessary.

EPA's Regional Initiatives

EPA regions are also taking steps to streamline the cleanup process. For example, project managers in the Philadelphia region explained that they sometimes help those companies that want to undertake cleanup actions before the region has sufficient resources to monitor them under the

Corrective Action Program. Regional staff help a company by answering its questions about cleanup approaches and methods, thereby serving as consultants. The region and a company engage in this informal relationship, hoping that when the company is under the program, the actions it has taken will meet the program's requirements and the region can bypass many of the process steps and more quickly certify that cleanup is complete. In addition, on a case-by-case basis, some project managers in the Philadelphia region are allowing companies to combine phases of the process and are informally reviewing companies' draft plans in an effort to shorten cleanup process times and to allow the companies to cut unnecessary costs. Similarly, program managers in the Chicago region have drafted procedures designed to expedite the cleanup process by, for example, encouraging companies to submit the investigation and cleanup design reports together.

Furthermore, EPA enforcement managers noted that some regions are beginning to use enforcement orders, instead of permits, for facilities that are high priority and are not likely to get a permit soon. They explained that enforcement orders tend to be more flexible than permits. For example, EPA can issue an order at any time, regardless of whether the company has an operating permit; in contrast, specifications for corrective action permits must be attached to an existing operating permit. Although enforcement orders may provide more administrative flexibility, EPA intends to have both orders and permits include the same substantive requirements for cleanup and public participation and achieve the same environmental results. One company cleanup manager added that companies sometimes find it easier to justify extensive cleanup costs to stockholders if these costs are part of an enforcement action because stockholders perceive that EPA is forcing the company to take the expensive actions.

States' Initiatives

States are also taking several new approaches. For example, after Illinois was authorized to implement the Corrective Action Program, it developed a tiered approach to cleanup standards. Depending upon the results of a risk assessment, a company may (1) meet the most stringent standards and not have to impose any restrictions on the future use of the land or (2) clean up to the less stringent standards allowed for industrial use of the land but restrict the land to that use, perhaps through a deed restriction. The state has also streamlined the process by which companies must ensure the quality of their cleanup work. Instead of requiring quality assurance reports at every step of the cleanup process,

the state will accept a single certification by a company that it has complied with EPA's quality assurance requirements.

Similarly, Pennsylvania, although not authorized to implement the Corrective Action Program, developed a state voluntary cleanup program that applies a risk-based approach to the cleanup of a facility as well as to the standards and remedies chosen. Under EPA's advance notice of proposed rulemaking, EPA encourages companies to clean up their facilities under programs such as Pennsylvania's, when appropriate, in lieu of the Corrective Action Program, with some modifications to meet the corrective action requirements.

Joint Initiative

The American Society for Testing and Materials, in consultation with EPA, the states, and industry, is developing a new standard way to perform risk-based corrective action for facilities with chemical contamination. This standard, called Risk Based Corrective Action (RBCA), will establish a framework, with specified cleanup levels and methods, for assessing the level of risk posed by a facility and selecting the appropriate level of cleanup on the basis of that risk and on the future expected use of the land. A subgroup in the Society is currently reviewing the standard, and the Society's endorsement of the standard is intended to, according to the subgroup's co-chair, help institutionalize the standard's use nationwide. EPA has commented on the draft standard and is working with the Society to revise the standard so that it can be applied to corrective action cleanups under RCRA. According to the subgroup's co-chair, a similar standard tested by one state has resulted in cleanups that were completed more quickly and at much less cost than would have occurred under the corrective action process. The RBCA Leadership Council, a consortium of industry representatives formed to promote use of the standard by EPA and the states has, in conjunction with EPA representatives, made presentations to the program managers in 9 of the 10 EPA regions to educate them on the standard and how it can be used to expedite the corrective action process.

Tradeoffs of Initiatives

While all of these initiatives should help to accelerate cleanups and reduce costs, some of them accomplish this goal by making tradeoffs in the controls they place on cleanups—controls designed to ensure the long-term effectiveness of remedies. For example, in April of this year, we reported that state voluntary cleanup programs more frequently employ industrial land-use standards and less-permanent remedies than federal or

state enforcement programs, thereby reducing costs.⁷ As a result, these types of cleanups more frequently require, for example, a deed restriction to ensure that the land use remains industrial, as well as long-term operations and maintenance to ensure that the remedies do not fail. In addition, some of the voluntary programs we reviewed in the April report did not provide for monitoring future land-use restrictions. We also reported that some voluntary cleanup programs reduced their requirements for meaningful public participation in cleanup decisions because these are time-consuming steps. While these tradeoffs may be appropriate for less-contaminated, lower-risk facilities, we concluded that care must be taken before voluntary programs are applied at more complex and highly contaminated facilities or at those surrounded by residential neighborhoods. In this regard, according to cleanup managers in EPA's Philadelphia region, they believe that one of the state voluntary programs in their region does not have public participation requirements that will satisfy the RCRA requirements. Therefore, when the region agreed to let a high-priority facility proceed through the program, the region stipulated that it will monitor the cleanup to ensure that the company creates more opportunities for public participation.

EPA recognized this variability among state voluntary programs when implementing its Superfund program and issued draft guidance for public comment that would outline basic criteria for the state programs. If a program met EPA's criteria, the region could enter into a memorandum of agreement with the state that would provide a company in a voluntary program with some assurance that EPA will not plan to take further action at the facility. This assurance of limited federal liability is an attractive incentive for volunteers. The draft Superfund guidance proposes to restrict facilities designated as higher-risk facilities or those already under corrective action permits or orders from being included in the scope of these agreements. All other facilities may be included on a case-by-case basis, and states authorized to implement the Corrective Action Program can allow these facilities to proceed through an approved voluntary cleanup program. The draft guidance also provides that if voluntary cleanup occurs at a facility prior to permitting, EPA or the state must determine if the cleanup satisfied all corrective action requirements.

While companies' cleanup managers favor the flexibility that many of these initiatives provide, several of them expressed reservations about EPA's and the states' willingness to adopt these new approaches

⁷Superfund: State Voluntary Programs Provide Incentives to Encourage Cleanups (GAO/RCED-97-66, Apr. 9, 1997).

nationwide. The managers commented that EPA's 1996 advance notice of proposed rulemaking incorporated many of these changes; however, they were uncertain about whether EPA will issue regulations in final form, given that the agency has issued regulations implementing only limited portions of the program to date. If the proposals do not become final and therefore remain solely as guidance, some of the companies' managers expressed concern that some EPA and state project managers would be less willing than others to adopt the more flexible approaches. Companies' cleanup managers pointed out that the program has been operating under federal guidance rather than approved regulations since it began and, as a result, that they have experienced differences among the regions and states in their cleanup approaches.

Conclusions

Thirteen years after the Congress created the Corrective Action Program to clean up contamination at operating facilities, cleanup progress is limited. Although some cleanup activity is taking place under other programs, the fact remains that less than 10 percent of the facilities have completed cleanups under the Corrective Action Program, and about half of them have not even begun their cleanups under the program. While several factors influence the time it takes to complete a cleanup, two stand out. First, the step-by-step process for cleanup is drawn out and cumbersome, and the cost of implementing it discourages companies from initiating more cleanups. Second, protracted disagreements among EPA, the states, and affected companies over the cleanup standards to be met and the methods used to meet them have also delayed cleanups. Both of these factors can contribute to the economic disincentives that companies face in performing cleanups. Furthermore, these two problems are exacerbated by the limited resources EPA and the states have for implementing the program.

EPA has the ability both to streamline the cleanup process it created and to better clarify how regions, states, and facilities can approach cleanups more consistently. EPA has begun to do this by publishing an advance notice of proposed rulemaking that incorporates some of the states', EPA regions', and industry's actions to promote more flexible cleanup approaches. While this proposed rule promises to address problems with the cleanup process, its success in that regard remains uncertain because the agency's other priorities may delay the process. In the meantime, the agency has directed the regions and states to use the advance notice of proposed rulemaking as guidance during cleanups. However, simply directing the staff in EPA's regions and the states authorized to implement

the program to follow the guidance will not ensure that they consistently use it to address the factors we identified as impeding cleanups.

Recommendations

Whether the agency decides to use program guidance or final regulations as its vehicle for reforming the program, it will have to make additional efforts to ensure that the reforms are reflected in cleanups nationwide. Therefore, we recommend that the Administrator of EPA (1) devise a strategy with milestones for ensuring that cleanup managers in EPA's regions and the states authorized to implement the program have a consistent understanding of the new approaches provided by the guidance or regulations as well as how to apply these approaches to cleanup decisions and (2) oversee program implementation to determine if cleanup managers are appropriately using the new approaches as they direct cleanups.

Agency Comments

We provided a draft of this report to EPA for its review and comment. We met with agency officials, including the Acting Deputy Director, Office of Solid Waste, the division with management responsibility for the Corrective Action Program. EPA generally agreed with the report's findings and suggested some technical revisions to the report, including some qualifications to the EPA data in our analyses, which we incorporated. The agency also identified seven issues it believed needed further clarification. First, EPA noted that, while the body of the report accurately acknowledges that facilities are taking cleanup actions outside of the Corrective Action Program that are not captured in EPA's database, the conclusions section does not. We agreed with the agency's assessment and added this point to that section. The agency also acknowledged that it needs to devise a process to capture data from the states on these other cleanup activities in order to fully assess the accomplishments of the Corrective Action Program. Second, the agency believes that one of the major factors affecting the rate of progress in the program is that the cleanups of many of the high-priority facilities are very complex and it therefore takes time to assess and clean up. We have noted this factor in the report where appropriate. Third, EPA made two points about our discussions of state voluntary cleanup programs: (1) the agency believes that a significant number of actions take place at RCRA facilities under state programs, such as state Superfund or water programs, as well as under state voluntary programs, and (2) the agency does not want to imply that it thinks high-priority sites should categorically be excluded from cleanups

conducted under state voluntary programs. We made these clarifications in the report.

Fourth, EPA noted that we should add or clarify information regarding the following three agency initiatives designed to help address some of the cleanup problems identified: (1) EPA's policy on RCRA/Superfund coordination, intended to prevent the duplication of, and promote better coordination on, cleanup efforts by the states and EPA regions; (2) EPA's post-closure rule, which the agency now plans to submit to the Office of Management and Budget for final review, intended to more effectively integrate corrective action and closure activities; and (3) EPA's new guidance on the use of certain enforcement orders as a more flexible tool for implementing cleanups. We made additions or clarifications in the report on the first two initiatives, but we did not address the third initiative because EPA has not yet issued the guidance.

Fifth, EPA disagreed with one company's claim that it spent a substantial portion of \$28 million in cleanup costs to comply with EPA's procedural requirements. EPA believes that this company's claim significantly overestimates the costs related to RCRA's procedural requirements; however, the agency does not have detailed cost data on this cleanup. Regional cleanup managers believe that the estimate includes work that the company performed at the facility that was in addition to work that EPA would require for RCRA cleanups. In response, we added EPA's view on this estimate to the report and more clearly attributed the figure to company representatives.

Sixth, EPA clarified the point that, in its view, it has conducted strategic planning efforts for the Corrective Action Program as part of the agency's RCRA Implementation Study, overall strategic plans for the Office of Solid Waste, RCRA implementation plans, and annual operating plans through the budget allocation process. We changed the report to reflect this information.

Finally, in commenting on the report's conclusions and recommendations, EPA stated that the conclusions lead a reader to expect that we would recommend that EPA issue final regulations for the program; however, we did not do so. The purpose of this report is to highlight barriers to cleanup progress, and we did not design our review to take a position on the agency's proposed regulations. We did, however, identify that one of the barriers to cleanup is regulators' inconsistent implementation of the program, in part because some regulators have used the proposed rules

more flexibly as guidance, while others have used them more stringently. We believe that EPA needs to address this issue of how consistently regulators adopt new cleanup approaches. EPA can choose to do this either by issuing guidance or by promulgating final regulations. However, we believe that EPA must also go beyond either of these actions and take the steps necessary to ensure that the guidance or regulations are being implemented properly.

We conducted our review in accordance with generally accepted government auditing standards from December 1996 through September 1997.

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

Should you or your staff need further information, please call me at (202) 512-6111. Major contributors to this report are listed in appendix V.

Sincerely yours,

A handwritten signature in black ink, appearing to read "Peter F. Guerrero". The signature is stylized with a large, looped initial "P" and a long, sweeping horizontal stroke at the end.

Peter F. Guerrero
Director, Environmental
Protection Issues

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Abbreviations

EPA	Environmental Protection Agency
RCRA	Resource Conservation and Recovery Act
RCRIS	Resource Conservation and Recovery Act Information System

Objectives, Scope, and Methodology

Because the Ranking Minority Member of the House Committee on Commerce was interested in the current status of the Corrective Action Program under the Resource Conservation and Recovery Act of 1976 (RCRA), he asked us to determine (1) the progress made in cleaning up facilities under the program, (2) factors affecting progress, and (3) any initiatives that the Environmental Protection Agency (EPA), the states, and industry have taken to accomplish cleanups. As agreed, we limited our review to nonfederal facilities.

To determine the overall progress in cleaning up facilities, we collected and analyzed information from EPA's national program management and inventory system of hazardous waste handlers, the Resource Conservation and Recovery Information System (RCRIS). RCRIS captures identification and location data on facilities that treat, store, and dispose of hazardous materials, as well as permit/closure status, compliance with federal and state regulations, and cleanup activities. EPA has determined which facilities it considers to be its universe for cleanups under the Corrective Action Program and has identified them as the Corrective Action Workload Universe within RCRIS. We focused our analysis on that universe. We categorized each facility according to its industry type using Standard Industrial Classification codes in the files. We also accounted for corrective action events occurring at each facility, grouping them into the categories suggested by EPA's program managers: cleanup not started, investigating contamination, controlling contamination, implementing remedies, and cleanup completed. We compared facilities by risk category, industry, region, and state to determine whether there are statistically significant differences. (See app. II for details on our statistical analysis and results.)

We did not independently verify the overall accuracy of the data in the RCRIS database. However, a previous GAO report criticizing the reliability of RCRIS data showed that the data elements that we used in this analysis had small error rates.⁸ Furthermore, we compared the data that the Philadelphia region maintains independently on its facilities with selected data for these facilities in RCRIS and found the RCRIS data to be generally accurate. Therefore, we concluded that the RCRIS data in the Corrective Action Workload Universe were suitable for the aggregate analyses we present in this report.

⁸Hazardous Waste: Benefits of EPA's Information System Are Limited (GAO/AIMD 95-167, Aug. 22, 1995).

To further determine cleanup progress, to identify the factors affecting corrective action, and to identify any initiatives by EPA, states, and industry to expedite cleanups, we used a combination of (1) data and documentation on cleanup progress at individual facilities; (2) information obtained through interviews with cognizant EPA regional and state officials, facility program managers, and EPA headquarters officials responsible for the RCRA Corrective Action Program; and (3) EPA and state RCRA corrective action policy and guidance. We also contacted representatives of public interest, industry, and environmental groups who have studied or have extensive experience with RCRA corrective action. We judgmentally selected two EPA regional offices that have representative corrective action workloads and activity and that oversee the states that are authorized and the states that are not authorized to implement the Corrective Action Program. Within each of the regions, we judgmentally selected two states with varying experience with corrective action cleanups. Our selections were EPA Region III, Philadelphia, Pennsylvania, and the states of Pennsylvania and West Virginia in that region, neither of which is authorized to implement the program; and EPA Region V, Chicago, Illinois, and the states of Illinois and Michigan, both of which are authorized to implement the program. Within those states, we examined 20 facilities that we judgmentally selected from the largest industry groups nationwide that are responsible for corrective action cleanups—chemical manufacturing and primary and fabricated metals manufacturing—and included facilities that were involved in all phases of the corrective action process. Finally, in addition to these 20 facilities, we interviewed and obtained documentation from representatives of 5 national companies with significant numbers of facilities nationwide that treat, store, and dispose of hazardous materials and are subject to the Corrective Action Program to determine their experience with conducting cleanups across the nation.

We conducted our work from October 1996 through September 1997 in accordance with generally accepted government auditing standards.

Technical Appendix of Statistical Results

We used analysis of variance techniques to determine which of the factors that might affect cleanups under the Corrective Action Program were statistically significant in explaining the impact on two categories of the cleanup process: cleanup begun and cleanup completed. We tested the effects of four factors: (1) region—EPA regions I through X, (2) authorization—the states authorized by EPA to implement the Corrective Action Program and the states not authorized to implement the program, (3) industry—nine major industrial groups, and (4) priority—the facility’s ranking as a high- or lower-priority. Because of the sparseness of the data, we conducted two separate analyses of variance, the first testing the relationship between region, industry, and priority; and the second testing the relationship between authorization, industry, and priority.

To determine whether the factors in our analyses could explain the differences in the two cleanup phases or whether the differences in cleanup progress observed are due strictly to chance, we used p-values from the analysis of variance. We interpreted factors to be statistically significant when the p-value was less than or equal to 0.05. When a combination of factors was significant, we chose to discuss only the combination of factors, even if the influence of the individual factor(s) may have been significant.

For the analysis using the factors of region, industry, and priority, we found statistically significant results for both categories of the process. Regarding whether cleanups have begun, the analysis showed significant results for the individual effect of industry and the combination of factors of region by priority. Regarding whether cleanups have been completed, the analysis showed significant results for the combination of region by industry and for the combination of region by priority. Table II.1 contains the results of this analysis.

Table II.1: Statistical Significance of the Factors of Region, Industry, and Priority Used to Analyze Whether Cleanups Have Begun and Whether Cleanups Have Been Completed

Factor that may influence cleanup	P-value for whether cleanups have begun	P-value for whether cleanups have been completed
Region	.0001	.0001
Industry	.0001	.0140
Priority	.0001	.0730
Region by industry	.0510	.0010
Region by priority	.0001	.0001
Industry by priority	.2530	.8520

Appendix II
Technical Appendix of Statistical Results

For the analysis using the factors of authorization, industry, and priority, we also found statistically significant results for both categories of the process. Regarding whether cleanups have begun, the analysis showed significant results for the individual effect of industry and the combination of authorization by priority. Regarding whether cleanups have been completed, the analysis showed significant results for the individual factors of industry, authorization, and priority. Table II.2 contains the results of this analysis.

Table II.2: Statistical Significance of the Factors of Authorization, Industry, and Priority Used to Analyze Whether Cleanups Have Begun and Whether Cleanups Have Been Completed

Factor that may influence cleanup	P-value for whether cleanups have begun	P-value for whether cleanups have been completed
Authorization	.0001	.0001
Industry	.0001	.0020
Priority	.0001	.0030
Authorization by industry	.0850	.8400
Authorization by priority	.0490	.2010
Industry by priority	.4100	.0950

Cleanup Progress in EPA Regions, Industries, and States

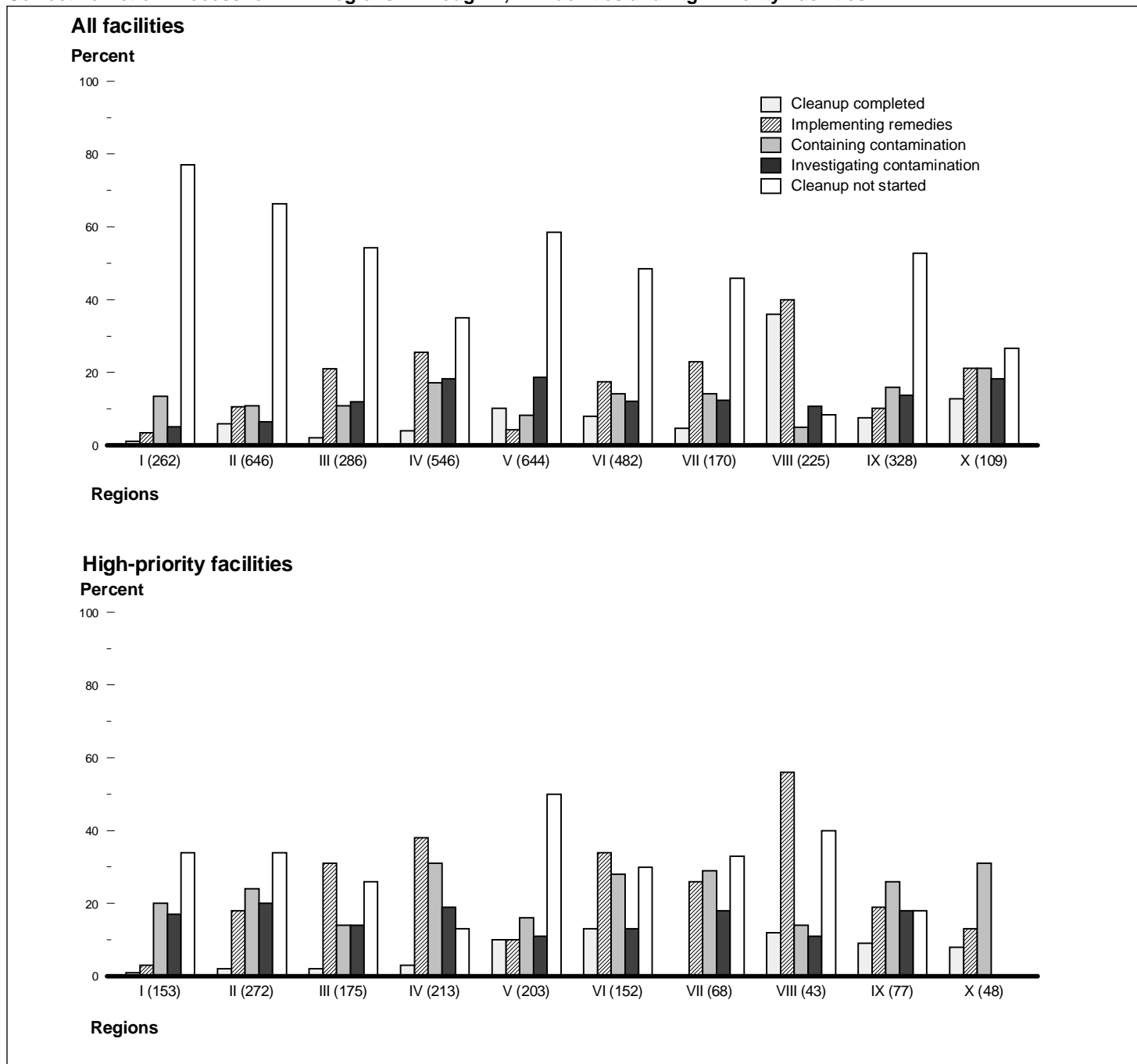
This appendix presents information on cleanup progress, by category, for nonfederal facilities that treat, store, or dispose of hazardous materials in EPA's 10 regions, 9 major industry groups, and the states. We categorized facilities using event codes in RCRIS. Table III.1 shows the cleanup categories and the event codes included in each category.

Table III.1: Cleanup Categories, by RCRIS Event Codes

Category	Event Codes
Completed cleanup	CA999
Implementing remedies	CA725, CA550, CA500, CA450, or CA400 but not CA999
Controlling contamination	CA650, CA600, or CA750 but not any of the codes above
Investigating contamination	CA200 or CA100 but not any of the codes above
Cleanup not started	Any remaining facilities without dates in any of the codes above

**Appendix III
Cleanup Progress in EPA Regions,
Industries, and States**

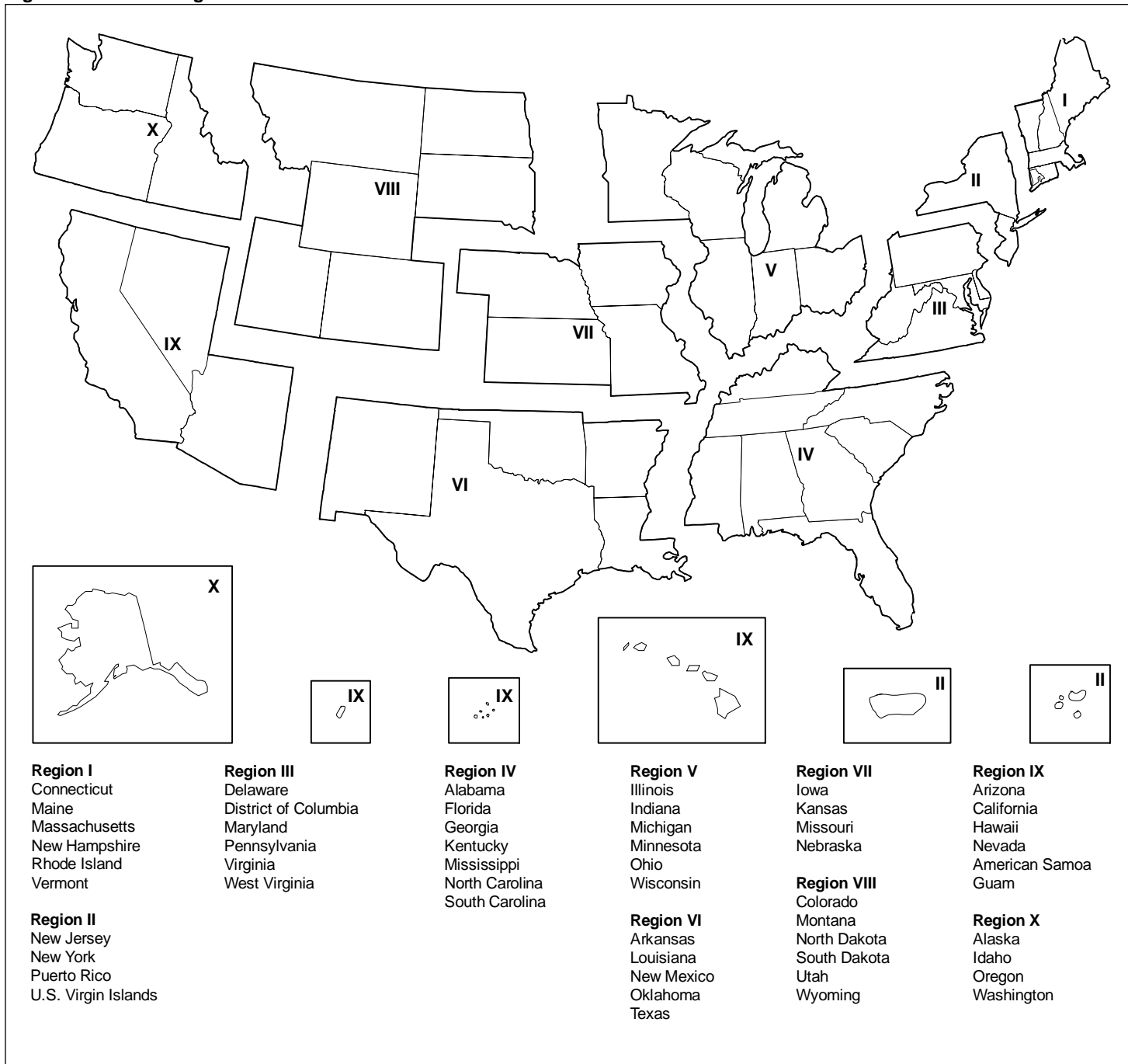
Figure III.1: Percentage of Nonfederal Facilities That Treat, Store, or Dispose of Hazardous Materials in Each Phase of the Corrective Action Process for EPA Regions I Through X, All Facilities and High-Priority Facilities



Source: EPA's Resource Conservation and Recovery Information System, as of Mar. 31, 1997.

**Appendix III
Cleanup Progress in EPA Regions,
Industries, and States**

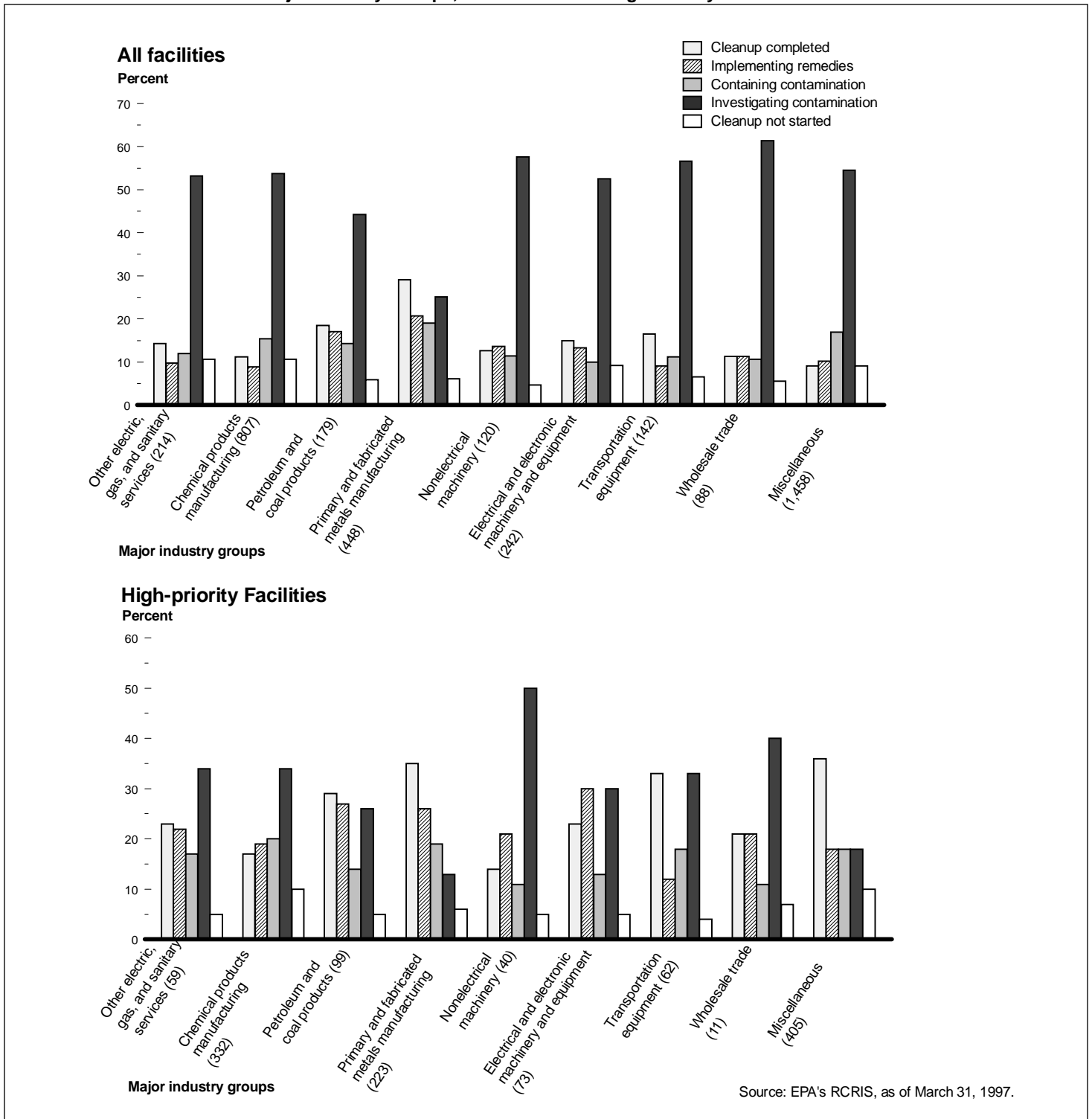
Figure III.2: EPA's Regions



Source: EPA.

**Appendix III
Cleanup Progress in EPA Regions,
Industries, and States**

Figure III.3: Percentage of Nonfederal Facilities That Treat, Store, or Dispose of Hazardous Materials in Each Phase of the Corrective Action Process for Major Industry Groups, All Facilities and High-Priority Facilities



**Appendix III
Cleanup Progress in EPA Regions,
Industries, and States**

Table III.2: All Nonfederal Facilities That Treat, Store, or Dispose of Hazardous Materials in Each Category of the Corrective Action Process in States Authorized to Implement the Corrective Action Program

State	Number of facilities	Percent with cleanup completed	Percent implementing remedies	Percent controlling contamination	Percent investigating contamination	Percent with cleanup not started
All authorized states	2,520	10	15	13	15	47
Alabama	64	0	16	9	25	50
Arkansas	41	12	12	7	42	27
Arizona	37	8	3	3	3	84
California	268	8	12	18	15	48
Colorado	166	46	37	2	10	6
Georgia	111	5	41	8	30	15
Guam	1	0	0	100	0	0
Idaho	13	23	54	8	8	8
Illinois	170	11	5	4	15	65
Indiana	96	13	1	10	26	50
Kentucky	63	0	27	21	8	44
Louisiana	74	3	31	16	16	34
Michigan	107	3	3	9	21	65
Minnesota	42	17	12	2	26	43
Missouri	72	4	8	25	18	44
North Carolina	90	4	19	20	16	41
North Dakota	6	0	67	0	0	33
New Hampshire	4	25	25	25	0	25
New Mexico	17	0	41	6	0	53
Nevada	10	0	0	10	20	70
New York	290	6	7	10	7	71
Ohio	184	10	4	13	11	63
Oklahoma	33	3	58	6	0	33
Oregon	32	13	28	19	16	25
South Carolina	57	16	21	28	12	23
South Dakota	2	0	50	0	0	50
Texas	317	10	10	16	9	56
Utah	31	13	71	0	3	13
Vermont	9	0	22	0	11	67
Washington	54	7	11	30	24	28
Wisconsin	45	16	7	4	36	38
Wyoming	14	7	14	50	21	7

Source: EPA's RCRIS, as of Mar. 31, 1997.

**Appendix III
Cleanup Progress in EPA Regions,
Industries, and States**

Table III.3: All Nonfederal Facilities That Treat, Store, or Dispose of Hazardous Materials in Each Category of the Corrective Action Process in States Not Authorized to Implement the Corrective Action Program

State	Number of facilities	Percent with cleanup completed	Percent implementing remedies	Percent controlling contamination	Percent investigating contamination	Percent with cleanup not started
All nonauthorized states	1,178	4	16	13	9	59
Alaska	10	30	10	0	10	50
Connecticut	190	1	1	12	3	84
Delaware	13	0	31	8	23	39
Florida	73	3	23	23	19	32
Hawaii	12	8	0	17	17	58
Iowa	33	12	67	0	0	21
Kansas	37	3	30	3	8	57
Massachusetts	37	3	0	22	14	62
Maryland	30	3	23	7	7	60
Maine	15	0	20	20	7	53
Mississippi	35	3	34	14	23	26
Montana	6	0	0	17	67	17
Nebraska	28	0	0	18	18	64
New Jersey	279	6	16	12	5	60
Pennsylvania	142	2	23	11	8	56
Puerto Rico	76	7	5	8	9	71
Rhode Island	7	0	14	14	0	71
Tennessee	53	0	15	19	6	60
Virginia	63	3	16	5	19	57
Virgin Islands	1	0	0	100	0	0
West Virginia	38	0	18	24	16	42

Source: EPA's RCRIS, as of Mar. 31, 1997.

**Appendix III
Cleanup Progress in EPA Regions,
Industries, and States**

Table III.4: High-Priority Nonfederal Facilities That Treat, Store, or Dispose of Hazardous Materials in Each Category of the Corrective Action Process in States Authorized to Implement the Corrective Action Program

State	Number of facilities	Percent with cleanup completed	Percent implementing remedies	Percent controlling contamination	Percent investigating contamination	Percent with cleanup not started
All authorized states	778	8	25	25	18	24
Alabama	34	0	27	18	29	27
Arkansas	18	17	22	11	44	6
Arizona	2	50	0	0	0	50
California	71	9	21	27	21	23
Colorado	21	24	57	5	10	5
Georgia	38	5	53	13	24	5
Guam	0	0	0	0	0	0
Idaho	4	14	12	9	23	42
Illinois	43	14	12	9	23	42
Indiana	32	9	3	16	28	44
Kentucky	23	0	48	35	4	13
Louisiana	36	6	47	22	11	14
Michigan	33	6	6	15	18	55
Minnesota	9	11	44	0	22	22
Missouri	31	0	10	45	26	19
North Carolina	23	0	30	44	17	9
North Dakota	2	0	100	0	0	0
New Hampshire	3	33	0	33	0	33
New Mexico	4	0	75	0	0	25
Nevada	1	0	0	0	100	0
New York	83	2	15	25	11	47
Ohio	69	10	7	25	17	41
Oklahoma	14	0	86	7	0	7
Oregon	15	20	20	33	7	20
South Carolina	25	12	28	52	8	0
South Dakota	1	0	100	0	0	0
Texas	80	18	19	39	8	18
Utah	8	0	88	0	0	13
Vermont	3	0	67	0	0	33
Washington	26	4	19	35	39	4
Wisconsin	17	12	18	6	53	12
Wyoming	9	0	22	56	22	0

Source: EPA's RCRIS, as of Mar. 31, 1997.

**Appendix III
Cleanup Progress in EPA Regions,
Industries, and States**

Table III.5: High-Priority Nonfederal Facilities That Treat, Store, or Dispose of Hazardous Materials in Each Category of the Corrective Action Process in States Not Authorized to Implement the Corrective Action Program

State	Number of facilities	Percent with cleanup completed	Percent implementing remedies	Percent controlling contamination	Percent investigating contamination	Percent with cleanup not started
All nonauthorized states	526	1	23	20	11	45
Alaska	3	0	33	0	0	67
Connecticut	116	0	1	17	4	78
Delaware	10	0	40	10	30	20
Florida	32	3	44	28	19	6
Hawaii	3	0	0	33	33	33
Iowa	8	0	100	0	0	0
Kansas	15	0	67	7	7	20
Massachusetts	20	5	0	30	10	55
Maryland	15	0	47	13	7	33
Maine	7	0	14	29	14	43
Mississippi	14	0	43	36	14	7
Montana	2	0	0	0	50	50
Nebraska	14	0	0	36	36	29
New Jersey	80	1	21	20	8	50
Pennsylvania	87	2	35	14	9	40
Puerto Rico	8	0	25	50	13	13
Rhode Island	4	0	25	25	0	50
Tennessee	24	0	29	38	4	29
Virginia	35	0	26	6	17	51
Virgin Islands	1	0	0	100	0	0
West Virginia	28	0	18	29	21	32

Source: EPA's RCRIS, as of Mar. 31, 1997.

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