

The process laid out by the Keystone group provides DOE and other federal agencies with a framework for accommodating fiscal limitations while minimizing confrontation with regulators and affected parties. But rigid adherence to a proportional sharing of budget shortfalls among all affected sites could hamper the Congress's and DOE's ability to set nationwide priorities for its cleanup program.

Under the process outlined above, a reduction in funding for the Environmental Restoration program would be shared equally by all of DOE's installations. But distributing the cuts equally could defeat the purpose of targeting reductions toward projects that are difficult to conduct with today's technologies, particularly if the more challenging tasks are concentrated at a small number of installations. Thus, if the Congress or DOE wishes to target specific projects for delay, it may have to repudiate the process that the Keystone group proposed and that DOE has subsequently endorsed.

Conclusion

Reducing funding for technically difficult projects during the next six years, thereby delaying them at least temporarily, could ultimately reduce the time and money that DOE needs to clean up its complex, particularly if the funds and time that would become available to DOE were used to develop productive new technologies. The resulting delays would require renegotiating some agreements with EPA and state regulators. But once the ultimate benefits of delay have been made clear, existing agreements may be easier to renegotiate.

Spending for Administration and Support

The Department of Energy's cleanup effort, as embodied in the EM program, is now five years old. Since its creation in 1989, the program has received a total of \$23 billion, and more than \$6 billion of that amount was appropriated for 1994 (including funding for the Uranium Enrichment Decontamina-

tion and Decommissioning program). Some critics have claimed that very little cleanup has actually resulted from this multibillion-dollar investment, however, and have questioned whether DOE is spending the taxpayer's money efficiently. In 1992, Leo Duffy, then Assistant Secretary for EM, stated publicly that waste and inefficiency chewed up 40 cents of every dollar in the cleanup program.²⁵ Several reviews of DOE's cleanup budget have highlighted concerns about the costs of administration and support.

Organization of the Nuclear Weapons Complex

Defining and estimating costs for administration and support require an understanding of how DOE operates the nuclear weapons complex. Management of and operations at DOE's 15 major installations have been the responsibility of contractors to DOE and its predecessors. At all sites still producing weapons or their components, the same contractor is responsible for both managing production and cleaning up the pollution that has resulted from past or current production.

DOE oversees the performance of its contractors from its headquarters in Washington, D.C., and 10 operations offices (Rocky Flats and nine field offices). There are many more people employed by the contractors, however, than there are DOE personnel supervising their performance. In the EM area alone, more than 49,000 contractor personnel are engaged in cleanup, overseen by fewer than 1,800 DOE employees. Because most contractor personnel are located at various DOE sites, the ratio of contractors to DOE staff is particularly high in the field. For instance, only about 400 DOE employees work at the Richland field office, which oversees operations at the Hanford installation, in contrast to the approximately 12,000 contractor personnel employed at Hanford.

Because of the way it does business, DOE incurs administrative and support--or indirect--costs at

25. Douglas Pasternak, "A \$200 Billion Scandal," *U.S. News and World Report*, December 14, 1992, p. 34.

two levels. The first occurs at the project level where the contractor charges for administrative costs. These indirect costs are generally referred to as overhead rates. The second layer occurs at the installation or program level and includes DOE's costs to direct and manage its programs as well as costs to provide services--such as security, road

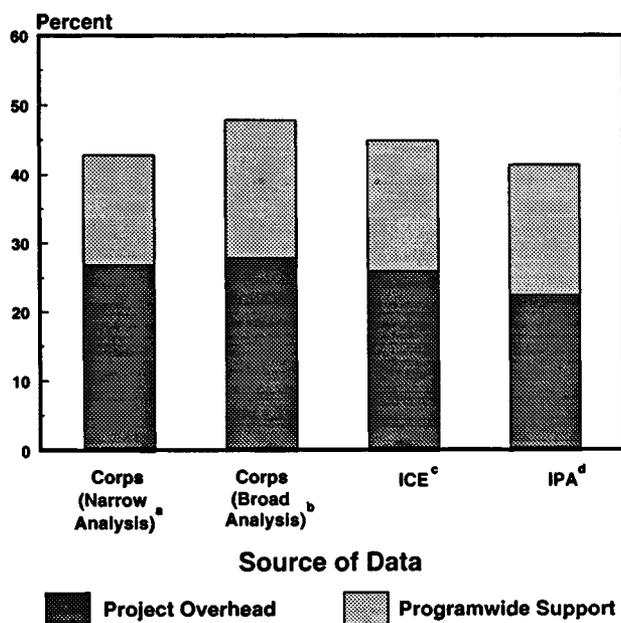
maintenance, utilities, and even laundry service--at some of its installations. These costs are referred to as programwide costs.

Estimates of EM Spending on Administration and Support

Funds devoted to administration and support activities in the EM program--a combination of spending on overhead and programwide support--account for about 40 percent of EM's total budget. Several reviews have concluded that DOE spends at least one-fifth of the funds for each project for contractor overhead.²⁶ Analyses by CBO and the Army Corps of Engineers found that DOE devoted a similar share to programwide support. The combined spending on administrative and support functions within the EM budget--at both the project and program levels--ranges from 43 percent to 48 percent based on the Corps's analyses, and from 39 percent to 45 percent based on combining the overhead rates determined by DOE's Independent Cost Estimating team and Independent Project Analysis, Inc., with CBO's estimates of programwide spending (see Figure 5). These resulting estimates of total spending of about 40 percent or more on administration and support represent a proportion that is significantly higher than the share spent by some other government agencies that may be performing comparable tasks. Reductions in this category of spending may therefore represent one means of reducing EM budgets.

Overhead Costs at the Project Level. The Department of Energy has commissioned several studies of the overhead costs of its projects.²⁷ These studies

Figure 5.
Portion of Environmental Management Funds Devoted to Administrative and Support Activities



SOURCE: Congressional Budget Office based on data from various analyses.

- Army Corps of Engineers, *Supplemental Report on Cost Estimates* (Report to the Associate Director for Natural Resources, Energy and Science, Office of Management and Budget, April 29, 1992). The narrow analysis focused on 55 projects at eight installations, representing about 20 percent of the total cleanup budget.
- Army Corps of Engineers, *Supplemental Report on Cost Estimates*. The broad analysis expanded the narrow analysis by including all the projects at two additional installations--Fernald and Hanford.
- The percentage devoted to project overhead was calculated by DOE's Independent Cost Estimating (ICE) team. See Gilbert/Commonwealth, Inc., *Independent Cost Estimate for the Environmental Restoration and Waste Management Five-Year Plan, Fiscal Years 1993-1997* (Reading, Pa.: Gilbert/Commonwealth, Inc., November 22, 1991). The percentage devoted to programwide support is a CBO estimate.
- The percentage devoted to project overhead is from Independent Project Analysis, Inc., *Project Performance Study* (Reston, Va.: IPA, Inc., November 1993). The percentage devoted to programwide support is a CBO estimate.

26. DOE's Independent Cost Estimating team estimated 26 percent, the Army Corps of Engineers estimated 27 percent to 28 percent, and Independent Project Analysis, Inc., estimated 20 percent to 23 percent.

27. Interagency Review Group, *Interagency Review of the Department of Energy Environmental Restoration and Waste Management Program* (April 29, 1992); Army Corps of Engineers, *Supplemental Report on Cost Estimates* (Report to the Associate Director for Natural Resources, Energy and Science, Office of Management and Budget, April 29, 1992); Independent Project Analysis, Inc., *Project Performance Study* (Reston, Va.: IPA, Inc., November 1993); Gilbert/Commonwealth, Inc., *Independent Cost Estimate for the Environmental Restoration and Waste Management Five-Year Plan, Fiscal Years 1993-1997* (Reading, Pa.: Gilbert/Commonwealth, Inc., November 22, 1991).

have found overhead rates charged by the contractor to be in the range of 20 percent to 28 percent.

DOE's Independent Cost Estimating team reviewed in detail the approximately 1,600 projects receiving funds in the EM program in the 1993-1997 five-year plan and evaluated actual overhead rates for subcontracts, labor, and material based on information provided by the department. Using this definition it found overhead rates of 26 percent, which it considered high.

The Army Corps of Engineers examined a more limited number of projects--55, representing slightly less than \$1 billion, or about 20 percent, of the EM budget--in detail in order to evaluate the ability of field offices to estimate costs. In its analysis, the Corps defined overhead to include project management, supervision of construction at a site, the prorated cost of administrative functions, and the contractor's profit. The Corps found that 27 percent of the funds requested were earmarked for overhead. Compared with its overhead rate of 18 percent for similar projects, the Corps felt the overhead charged by DOE's contractors was high.

In its report, the Corps acknowledged that some factors might cause DOE's overhead rates to be higher than its own. Since DOE must deal with radioactive substances, certain activities that result from regulatory requirements unique to nuclear waste might lead to higher overhead costs. The Corps noted, however, that many activities in the planning, design, and construction phases of projects are common to the cleanup of both hazardous waste and radioactive waste. Since the Corps claims that it has extensive experience in construction and hazardous waste management, it felt that costs for most of the environmental activities undertaken by DOE and the Corps should be comparable.

A more recent study of DOE's cleanup program found that the EM office spent more than either the private sector or other government agencies for equivalent work. This study, conducted by Independent Project Analysis, Inc., for the Office of Environmental Restoration and Waste Management, was intended to assess the status of EM projects and provide a baseline from which to measure improvement. The study's authors compared key param-

eters of EM projects--such as management costs, cost growth, and schedule slippage--with comparable data from environmental remediation and waste management projects completed by the private sector and other government agencies.

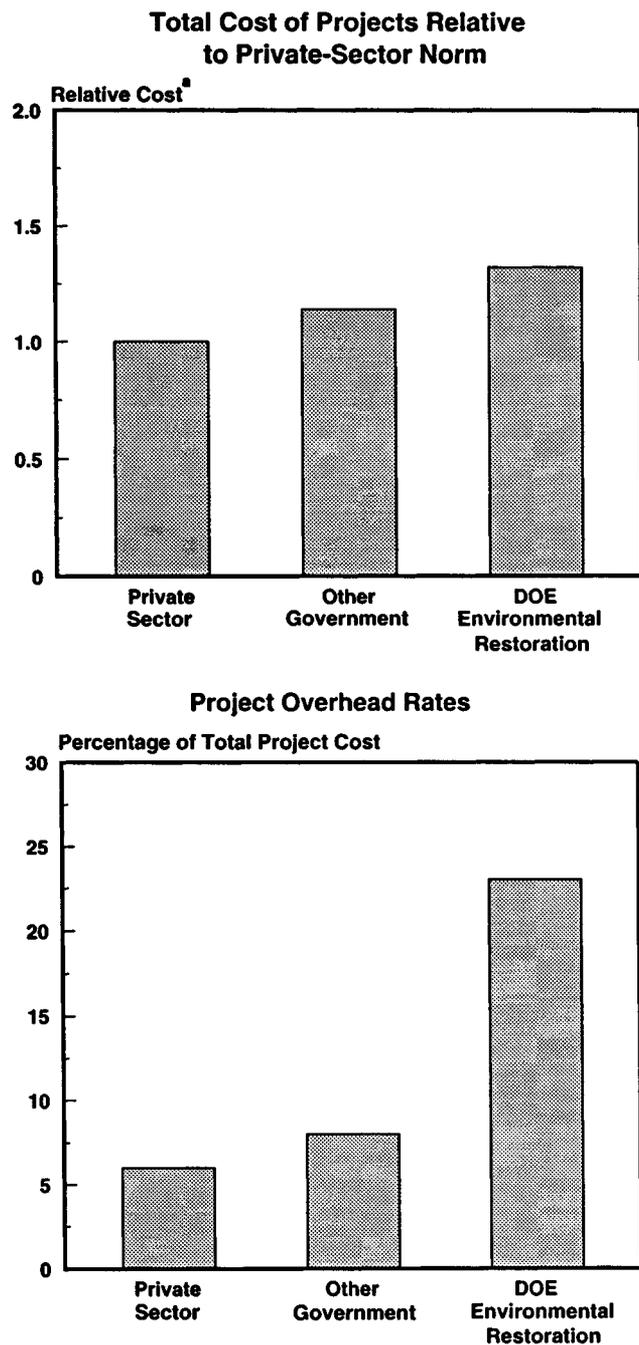
The authors of the study concluded that costs for work performed for DOE were significantly greater than the industry norm, in part because of high project management costs. The study's most striking conclusion was in the area of remediation projects; the total costs of DOE's environmental restoration projects were found to be 15 percent greater than those of other government agencies and 32 percent greater than those of the private sector (see Figure 6). The costs were higher, in part, because DOE's project management--or overhead--costs for its restoration projects, which consumed 23 percent of the costs of individual projects, were more than double those of other government agencies and nearly four times those of the private sector. These findings support those of the Corps and the ICE team and confirm that DOE is spending too much for project overhead.

Administration and Support Costs at the Program Level. In addition to the indirect costs that DOE incurs as overhead on each project, it must also pay for the cost of managing and directing its overall cleanup program and for costs at each installation to support all the cleanup projects there. Programwide support activities would include oversight of compliance, preparation and review of documents, program support or direction, technical support, litigation, quality assurance, and liaison with local groups such as Native American tribes.

To estimate the total costs of these activities within the EM budget, the Congressional Budget Office reviewed the almost 2,000 projects included in the 1993-1997 five-year plan.²⁸ Based on the title of the activity data sheet that describes each of the projects funded by the EM budget, CBO identified projects that involved programwide administra-

28. In estimating the cost of administration and support within the EM budget, CBO used the lower of the two budgets included in the five-year plan submitted in August 1991. More recent five-year plans lack the detail needed to estimate these costs. As a consequence, the August 1991 five-year plan is the most recently submitted plan that presents the necessary detailed data.

Figure 6.
Comparison of DOE's Environmental Restoration Costs with Those of Other Sectors



SOURCE: Congressional Budget Office based on data from Independent Project Analysis, Inc., *Project Performance Study* (Reston, Va.: IPA, Inc., November 1993).

a. Normalized based on average performance of private-sector companies.

tion and support activities, as defined above. CBO included as programwide support those projects within the Technology Development program that did not contribute directly to research; that is, funds not in the RDDT&E account were considered to be programwide costs.

Using this definition, CBO found that more than 360, or 18 percent, of EM's projects were devoted solely to programwide support activities. Overall, funding for these projects represented 25 percent of the total EM budget for 1993. Based on the August 1991 five-year plan, that share would remain relatively constant, averaging 24 percent during the five-year period from 1993 through 1997. As in all other projects, a portion of the funds allotted to these projects performing programwide support activities would be spent on overhead. Assuming a project overhead rate of 20 percent, total EM funding devoted solely to programwide support--and not to project overhead--would be 19 percent.

The findings of a study by the Army Corps of Engineers support CBO's findings that a significant portion of DOE's cleanup budget pays for programwide management and support functions. The Corps, in its detailed analysis of one-fifth of the EM budget, found that 16 percent of the funds were devoted to such activities. These costs, according to the Corps, fall mainly into the categories of program management and program direction. The Corps also reviewed an additional third of the EM budget in less detail and found that 22 percent of it was devoted to programwide support activities. When this additional spending is taken into account, about one-fifth of the EM budget examined by the Corps appears to be devoted to administration and support activities. This level of spending--20 percent--is more than twice the 8 percent that the Corps says it spends for programwide support.

Illustrative Savings Realized from Reducing Spending on Administration and Support

Based on the analysis by CBO and others, the roughly 40 percent of EM funds spent on administrative and support functions is high compared with spending by other agencies--both government and

private--engaged in cleanup activities and could be reduced. If DOE could reduce spending on administrative and support activities by roughly 25 percent, for example, it could save \$630 million in 1995 based on the Administration's request. Annual savings would increase to \$710 million by 2000, based on the levels outlined in the Administration's out-year targets. An illustrative 25 percent cut in overhead would result in a 10 percent overall reduction in total EM spending, which would fall within the range of cuts proposed by DOE's Independent Cost Estimating team and the Army Corps of Engineers.

Because the two reviews used different definitions of overhead, the cuts in total EM spending that would result from the reductions in overhead recommended by the ICE team and the Corps are not proportional to the reductions in overhead. The ICE team recommended a 25 percent cut in contractors' overhead only, which would result in a 7 percent reduction in total spending. The Corps suggested a decrease of roughly 60 percent in total administrative and support spending--both overhead and programwide--which would yield a 25 percent overall reduction. Compared with the reductions recommended in these two reviews, the 10 percent cut in the overall budget contemplated in this illustration is well below that recommended by the Corps and is somewhat higher than the reduction proposed by the ICE team.

How would savings in administration and support costs be realized? Although identifying management changes is not the focus of this study, other organizations have suggested ways in which DOE could better manage its EM program and thereby reduce administrative and support costs. They include increasing the program's oversight of contractors and reforming the process by which it makes contracts.

Increase Oversight of Contractors. Both internal and external reviews of DOE's operations have highlighted the lack of government oversight of contractors' performance. The interagency review of the EM budget found that the program, which is increasing rapidly in scope and funding, had insufficient staff both to budget effectively and to oversee the programs for which it was responsible.²⁹ At

many field offices, for example, it is the contractors, not government personnel, who prepare and review technical documents and cost estimates.

The Corps recommended that DOE add personnel in order to provide better oversight of contractors' performance. Assistant Secretary Grumbly, in his statement of July 15, 1993, before the Subcommittee on Energy of the House Committee on Science, Space, and Technology, outlined his intention to respond to this recommendation by shifting essential project management responsibilities at each site to DOE personnel. For example, Grumbly would like DOE personnel to prepare internal cost estimates rather than rely on contractors to prepare them.

Greater reliance on DOE personnel would require an increase in the number of DOE employees. In a period when the federal government is committed to reducing the size of its work force, such an increase could be difficult to achieve and could increase the cost of the EM program in the short run. It might be possible, however, to shift some personnel within the national defense function. That budget function includes both the Department of Defense (with about 900,000 federal civilian employees) and the weapons and associated cleanup activities of the Department of Energy (about 6,000 federal civilian employees). A shift of personnel from DoD to DOE could benefit DOE's cleanup effort by providing personnel who have extensive management experience.

Enlisting more government staff, either from DOE or DoD, to perform more of the managerial, planning, and budgeting functions that contractors now perform, though possibly costing more in the short run, could save money in the long run. For example, increased oversight might result in less duplication of effort among contractors or in lower overhead rates. Indeed, Grumbly predicted that adding 400 federal workers to do jobs now handled by contractors would save \$360 million in 1995 and more in later years. He also predicted that in-

29. Interagency Review Group, *Interagency Review of the Department of Energy Environmental Restoration and Waste Management Program*.

creased oversight, in conjunction with contract reform, could result in a 10 percent to 20 percent increase in contractors' cost efficiency over the next four years.

Reform the Contracting Process. DOE has traditionally contracted with a single entity (referred to as a management and operations, or M&O, contractor) to manage operations at an installation. The M&O contractor may then hire subcontractors to perform specific functions, such as drilling wells or providing security.

Both GAO and Assistant Secretary Grumbly have endorsed the need to reform the contracts that DOE has with its M&O contractors. The agencies that preceded DOE used special incentives in their contracts because they believed such incentives were needed to attract and retain contractors to conduct work and research on nuclear weapons. Since then, DOE's contractors have been reluctant to negotiate contracts with more stringent clauses. One example of a nonstandard contract is DOE's exclusion of the standard procurement clause from its contract with the University of California for operating the three national laboratories. As a consequence, one of the labs leased vehicles at commercial rather than government rates, costing DOE an additional \$600,000.

Another example concerns nonstandard indemnification clauses in some of DOE's contracts that have grown out of DOE's historical practice of indemnifying, or reimbursing, almost all of a contractor's costs to compensate for the unique risks inherent in producing nuclear weapons. Such clauses have had unforeseen consequences, however. In one case, DOE could not prove that a contractor's costs had been caused by bad faith or corporate mismanagement and so was forced to reimburse the contractor's loss of \$420,000 in money and materials that employees had stolen. GAO applauded DOE's attempt to avoid a recurrence of these types of expenses by moving to delete clauses from its contracts that do not reflect standard practice.

Both GAO and Grumbly have highlighted the need for DOE to establish requirements for the performance of its contractors that would specify

the product to be delivered, cost targets, and schedules. Because some of DOE's contracts have no established criteria for determining management or award fees, contractors have no idea on what basis their performance is evaluated. Some contractors have been awarded significant fees--nearly \$2 million at Rocky Flats--even though a DOE review board initially recommended no award at all; and some contractors receive substantial management fees, which increase automatically every year, to cover "indirect costs" and "complementary and beneficial activities" that were never specified.³⁰ To remedy this deficiency, both GAO and Grumbly recommended replacing the subjective or, in some cases, nonexistent award criteria with ones that can be measured.

In his testimony of July 15, 1993, Assistant Secretary Grumbly provided additional ideas on how to improve the performance of contractors. He suggested that fixed-price contracts that are solicited competitively for some tasks, such as remedial activities and landlord functions, could be appropriate at some installations. In this way, the single contract between DOE and the M&O contractor at each site and its attending subcontracts could be replaced by several smaller contracts made directly with the EM program. Such a system would engender more competition and, as a consequence, lower prices. Assuming that DOE hired more government personnel to monitor the contracts, this system would also give the EM program more control over the performance of its contractors. Grumbly also recommended that DOE make contractors more responsive to its needs by limiting the length of all contracts for services to no more than five years.

Separate contracts for weapons production and cleanup might also enhance efficiency. Even though many managers within the EM program acknowledge that the contracts they monitor carry high overhead rates, they point out that they do not always have direct control of those rates. At installations where both production and cleanup are still occurring--Savannah River and Oak Ridge, for example--the overall contract for M&O is not under

30. In a case cited by GAO, one M&O contractor's annual management fee started at \$12 million and increased automatically every year by \$250,000.

EM's control. Since the M&O contractor is responsible for both production and cleanup, as contracting practices now stand, the terms of the contract are controlled by whichever program is bigger, which is traditionally weapons production and not cleanup. To remedy this situation, Assistant Secretary Grumbly, along with other observers, has suggested that all environmental restoration work at installations with production activities be contracted separately. EM staff would then be directly responsible for overseeing the work and contracts for environmental restoration at all installations.

It is impossible to quantify with confidence the savings that could result from each of these initiatives. Assistant Secretary Grumbly, however, has predicted that the amount the EM program must pay contractors to perform tasks at DOE installations will drop 10 percent to 20 percent in four years. As a consequence, DOE is reducing its budgets in anticipation of these savings. In its authorization bill for 1994, the Senate Committee on Armed Services recommended a \$40 million reduction in EM's budget to reflect management efficiencies. In the same vein, the renegotiated agreement at Hanford specified that a savings of \$1 billion be achieved over the five years from 1994 through 1998, which would represent slightly more than a 10 percent reduction in the Administration's proposed funding of \$8.4 billion for the same period.

Of course, some risk is associated with cutting budgets in anticipation of management efficiencies. If the efficiencies are not realized, then cleanup programs will be delayed.

Nevertheless, those risks may be worth taking. Budget cuts targeted toward management costs may increase DOE's incentives to reduce those costs expeditiously. And if administration and support costs can be reduced, then DOE could devote a larger share of its funding to cleanup activities.

Maintaining DOE's Surplus Facilities

The scope of DOE's mission has decreased drastically since the end of the Cold War. The nuclear

weapons complex, designed to produce and maintain some 23,000 nuclear warheads, will shrink over the next decade along with the size of the U.S. nuclear arsenal. As a consequence, many facilities that have been producing nuclear weapons or the materials to build them, some for as long as 50 years, will no longer be needed. Accelerating the process of putting the surplus facilities in a state of low maintenance would require additional funding initially, but it could save money in the long run.

As facilities cease operations, responsibility for their security and maintenance will be transferred from the Defense Program in DOE to the Environmental Restoration and Waste Management program. In July 1992, DOE created a new office within the EM program--Facility Transition and Management (FT)--to monitor these facilities after they have been declared surplus and as they are made ready for final cleanup and disposition. The FT program eventually could be responsible for removing as many as 7,000 facilities from defense production in the next 30 years.

Some of the facilities that DOE decides it no longer needs for production may have to go through several steps to prepare for final disposition. The first step is a decision by DOE that the building is surplus. This decision results in a transfer of the facility from the control of the Defense Program to the FT program. The next step is to remove all hazards that need to be eliminated so that the facility can be maintained cheaply and safely until it can be turned over to the Environmental Restoration program for decontamination and decommissioning. After D&D, the building can be demolished or turned over to another government or private agency for other uses.

While the facilities are in transition from production to cleanup, a process that can take many years, they must be maintained and guarded so that no harm comes to either the public or the environment from the hazardous material inside. If most of the hazardous material and contaminated production equipment is removed from the building, then the requirements for inside utilities, such as ventilators and radiation detectors, and security measures can be minimized. This state--known as safe shutdown--means that the facility cannot be restarted for

production but can be left in a state of low maintenance. Achieving safe shutdown requires an investment of time and money. But if many years elapse before the facility is cleaned up or disposed of--as in the case of the surplus reactors at Hanford discussed in Chapter 3--then placing it in a state that requires low annual investments for maintenance is worth the initial effort.

In a recent report, GAO concluded that the FT program faces problems concerning maintenance, safety, and costs.³¹ In general, DOE's inactive facilities are deteriorating physically. GAO reported that the upkeep of inactive facilities is not a high priority among maintenance jobs and that such work is not generally required by environmental regulations or covered by interagency agreements. As a result, many projects for repairing surplus buildings are deferred in favor of higher-priority work elsewhere at the sites. As a consequence, conditions at those buildings are often in violation of regulations established by DOE and the Occupational Safety and Health Administration. These violations have resulted in accidents; in one such accident, a worker on the roof of a 48-year-old reactor building was killed when the roof panel collapsed.

GAO has concluded that the failure to properly maintain inactive facilities can increase the dangers and costs associated with cleaning them up. Slipshod or undocumented work performed while shutting down a facility can lead to unanticipated problems or accidents during subsequent decontamination and decommissioning. An explosion that occurred during the cleanup of a nuclear research facility at Hanford, for example, was the direct result of a contractor's decision to eliminate an interim work step earlier in the project.

Improper maintenance can also affect the cost of cleanup projects. When the plutonium fuel facility at Savannah River was put on standby in 1983, the equipment was not fully decontaminated, nor has it been cleaned up in the subsequent 11 years of inactivity. The internal equipment is now so badly de-

teriorated that it can no longer be used to remove the plutonium that remains in the facility. DOE estimated in January 1992 that an additional \$115 million will therefore be needed to decontaminate and decommission the facility. Had the facility been adequately cleaned initially, DOE could have avoided the subsequent higher cleanup costs.

In general, the cost to maintain surplus facilities awaiting cleanup is substantial and could grow because of problems of the sort just noted. Increasing near-term funding designed to attain safe shutdown status at surplus facilities could produce long-term savings in the DOE budget by reducing annual security and maintenance costs in later years.

Hanford's N-reactor as an Example

The N-reactor at the Hanford installation in western Washington provides a good example of the types of costs that can be incurred and the potential for savings that exists. The reactor, which was used to produce plutonium for nuclear weapons, has been maintained since October 1990 on a "cold standby status," which means that no production is occurring and the reactor is not operating but could be restarted if necessary. Even though DOE has decided that the reactor will never be restarted, 130 full-time employees are needed to maintain the reactor at a cost of about \$25 million annually in 1995 dollars.

Because large amounts of highly radioactive materials are still stored on the site, these personnel are needed primarily to maintain security and to meet safety standards. In particular, over 500 tons of radioactive debris such as fuel carts, fuel baskets, and process tubes are stored in a water-filled basin adjacent to the reactor building. In addition, three underground silos contain highly radioactive spacers that were placed inside the fuel rods. Before the facility can be decontaminated and decommissioned, all of these wastes must be removed and disposed of. In the meantime, DOE must guard and maintain buildings, monitor radiation levels, and complete routine upgrades to utilities on schedule. In fact, DOE contends that costs to maintain the facility will rise over time as it ages if steps are not taken to place it in safe shutdown.

31. General Accounting Office, *Cleaning Up Inactive Facilities Will Be Difficult*, GAO/RCED-93-149 (June 1993).

Placing the N-reactor in safe shutdown would involve removing superfluous materials from the site, including all the highly radioactive debris from the storage basin and the storage silos, as well as 7,000 cubic feet of documents. Because DOE has not made funds available for this purpose, however, current plans call for maintaining the N-reactor in cold standby status through 2000, at the cost of about \$25 million a year, before beginning efforts to achieve safe shutdown. Once safe shutdown is attained, however, annual maintenance costs would drop by 90 percent, to about \$2 million, based on estimates made by Westinghouse--the contractor responsible for most of the operations at Hanford (all costs are in 1995 dollars). The process of attaining safe shutdown of the N-reactor could take up to six years and require an investment of almost \$290 million. Overall, attaining safe shutdown sooner rather than later--starting in 1995 rather than 2000--would reduce total costs, adjusted for the time value of money, by about 30 percent.³²

Other Surplus Facilities

Detailed data on other DOE facilities are not available, but the situation represented by Hanford's N-reactor is probably not unique. The DOE complex contains many large facilities, some with high levels of radiation. More and more of these facilities are being idled as the need to produce nuclear weapons diminishes. Hanford alone, in addition to the N-reactor, contains several large plants that at some time in the past 50 years housed operations to separate plutonium from irradiated fuel cells. Other installations across the DOE complex contain surplus buildings with significant radioactive contamination, including plants designed to machine plutonium at Rocky Flats and the gaseous diffusion plant at Oak Ridge.

DOE will eventually have to make investments at many of these facilities to attain safe shutdown, with decommissioning to follow. Making these in-

vestments now could reduce maintenance costs, resulting in substantial annual savings. But determining how much might be saved at facilities throughout the complex is difficult for several reasons.

First, it is difficult to ascertain how much DOE is spending to maintain surplus facilities before safe shutdown. The 1995 request for surveillance and maintenance in the FT budget totals \$319 million, although that figure is unlikely to include the entire cost of maintaining the facilities. In fact, a recent press article reported that DOE was spending \$240 million annually at Hanford alone to maintain its idle facilities.³³ But if the figure of \$319 million represents a conservative estimate of the cost of surveillance and maintenance throughout the complex, and if reductions in maintenance costs similar to those associated with the N-reactor could be realized generally, then investing to achieve safe shutdown of DOE facilities could yield savings in maintenance costs of hundreds of millions of dollars a year.

Second, accurate estimates of the investment required to achieve these savings are not currently available. In one sense, the size of the investment is irrelevant, since at most sites the investment will have to be made eventually because of the presence of long-lived radioactive debris. But the magnitude of the cost would provide some indication of the feasibility of making that investment sooner--given current budgetary constraints--in order to achieve savings in maintenance costs.

In its 1995 budget, the Office of Facility Transition and Management has requested a total of \$109 million to place facilities in safe shutdown. As with surveillance and maintenance costs, however, it is impossible to know, without additional data, exactly what that request included and what activities are being funded elsewhere in the EM budget. Even if the \$109 million represented an appropriate annual total for the investment required to achieve safe shutdown, it is not clear how long DOE would have to sustain that level of investment. Given the scope and schedule of other cleanup activities, DOE might

32. The reduction of 30 percent results from differences in discounted present values, an economic calculation that takes into account the time value of money. A savings of 30 percent is based on an annual real discount rate of 2 percent. Savings fall to 24 percent at a discount rate of 4 percent and rise to 35 percent without discounting.

33. Matthew L. Wald, "At an Old Atomic-Waste Site, the Only Sure Thing Is Peril," *New York Times*, June 21, 1993, p. A1.

have to continue investing that much for a substantial period.

Even though DOE realizes that these trade-offs exist, it does not have the budgetary data needed to evaluate the benefits or drawbacks of either deferring or accelerating the deactivation of surplus buildings. Part of this deficiency may stem from the fact that DOE's shift in mission--from production to cleanup, dismantlement, and storage--has been recent and abrupt. DOE is in the preliminary stages of planning and conducting cleanup work for all of its inactive facilities. It does not know the number of facilities that are inactive but not yet transferred to the EM program, the full extent of the dangers they pose, or the cost to maintain them

safely until they can be turned over to the Environmental Restoration program for ultimate cleanup and disposal. Some facilities that were preparing for modernization or restart are now being closed permanently.

The newly created program for overseeing these transitions may facilitate the collection and standardization of budgetary data and may make the evaluation of the benefits of accelerating or deferring attainment of safe shutdown possible in the future. Once the necessary data are available, DOE should be able to determine where increases in funding to accelerate safe shutdown should be made.

Appendixes

