



Testimony

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NUCLEAR WASTE

Observations on DOE's Privatization Initiative for Complex Cleanup Projects

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G A O

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Mr. Chairman and Members of the Subcommittee:

We are here today to discuss the Department of Energy's (DOE) privatization initiative as it has been applied to DOE's nuclear waste cleanup program. DOE oversees some of the most highly radioactive and polluted sites in the United States, primarily the consequence of over 50 years of producing nuclear materials for weapons. Cleaning up radioactively contaminated buildings, soil, and groundwater within the weapons complex and safely storing wastes is a major mission for DOE. The Department estimates that for the years 2000 through 2070, it will cost between about \$150 billion and \$195 billion (1999 dollars) to complete this mission and provide long-term monitoring of the remaining sites. DOE primarily contracts with private companies to accomplish the cleanup. In the past, this effort was generally performed under cost-reimbursement contracts by contractors that managed and operated many of DOE's facilities. DOE financed the operations, owned the facilities, and paid the contractors regardless of what was accomplished.

DOE started its privatization initiative in 1995 as a way to reduce the cost and speed the cleanup of its contaminated sites and to improve contractors' performance. The initiative was primarily an alternative contracting and financing strategy to foster open competition for fixed-price contracts; require the contractors to design, finance, build, own, and operate the facilities necessary to meet treatment requirements; and pay the contractors only for products or services delivered in accordance with the contracts. Since the initiative began, DOE has managed several of its complex and expensive cleanup activities as privatization projects.

Concerns have surfaced about whether DOE's privatization initiative has yielded significant results when applied to the Department's more complex cleanup projects. Our testimony discusses (1) what DOE has accomplished by privatizing such projects and (2) our observations on the lessons that can be learned from these efforts. It is based on our past reviews of DOE's privatization initiative, including reviews of three

complex cleanup projects requested by this Committee—two at DOE’s Idaho Falls Site and one at the Hanford Site in Washington State. Collectively, the estimated contract prices for these three projects were about \$8 billion. We have included a list of products at the end of this statement that we have issued on various aspects of DOE’s privatization initiative.

In summary:

- For the complex cleanup projects we reviewed, DOE’s privatization initiative has had little success in achieving cost savings, keeping the projects moving forward on schedule, or getting improvements in contractors’ performance. For example, on the Hanford tank waste project, DOE estimated savings of from \$2.1 billion to \$3.5 billion by using the privatization approach. However, after dramatic growth in the project’s estimated cost and concerns about the contractor’s performance, DOE decided to terminate the contract. Similar problems on the Pit 9 project in Idaho led DOE to terminate that contract without achieving expected cost savings. Although DOE adopted privatization as a solution to its past contracting difficulties, recurring cost, schedule, and performance problems demonstrate that privatization has not been a successful alternative for complex cleanup projects.
- Several lessons can be learned from DOE’s privatization efforts. DOE cannot rely on privatization alone to fix its past contracting problems; instead, it must carefully evaluate privatization as just one of the many contracting and financing strategies that it can use to get the most out of federal cleanup dollars. DOE’s experience indicates that the two strategies that underpin the privatization initiative—fixed-price contracting and full private financing—will not work effectively for all cleanup projects. Rather, a complex matrix of decision factors must be analyzed before deciding how to contract for and finance a cleanup. These factors include how much is known about the characteristics of the waste, the number of contractors willing to compete, the financing options, and the risks posed by the project and the entity that is best prepared to assume them. Our review of the Hanford project indicates that

future analyses of financing options need to (1) use more realistic assumptions about cost growth for various types of contracts and (2) better reflect the actual risks assumed by the government. Because effective DOE management and oversight are critical to selecting the appropriate type of contract and financing mechanism, as well as to implementing the contract successfully, DOE needs to continue improving its technical, financial, and managerial oversight capabilities.

Background

DOE spends nearly \$6 billion each year to clean up the weapons complex and provide long-term monitoring of the remaining sites. In the past, DOE primarily approached this mission by signing cost-reimbursement contracts, telling contractors how to perform waste cleanup activities, and paying them for the amount of effort that was expended, regardless of what was accomplished. Under this arrangement, DOE financed the contractors' activities and owned the facilities. As part of a broader contract reform effort, and in an attempt to reduce costs and speed the progress of cleanup, DOE developed its privatization initiative.

DOE's privatization initiative is primarily an alternative contracting and financing strategy. For cleanup projects, privatization means using competitively awarded, fixed-price contracts to purchase cleanup services. The contractor agrees to design, finance, build, own, and operate treatment facilities. DOE specifies the required end products or services—for example, treating waste to meet disposal requirements—and generally leaves the methods and technologies used to achieve those requirements to the discretion of the contractor. The contractor is expected to finance the project with private money instead of using federal appropriations. This means that the contractor must either use its own funds (equity) or borrow money (debt) in order to proceed with design, construction, and related activities until the project is operational and the contractor begins receiving payments from DOE for successfully treating units of waste.

DOE expected that the competitive award process, the use of fixed-price contracts, and the requirement for private financing would bring contractors of a "best in class" caliber

to its projects. With the contractors' own equity and/or debt funding the projects, DOE also expected that the contractors would have significant incentives to complete the projects on schedule and within budget. Finally, DOE expected that privatization would allow cleanup to move forward while deferring the government's own budget outlays for several years until the contractors constructed facilities and prepared them for operations.

The three cleanup projects we reviewed involved constructing and operating treatment facilities.¹ (See table 1). The largest, a project at Hanford with an estimated contract price of \$6.9 billion, involves treating highly radioactive liquid wastes. The two contracts at Idaho Falls, totaling about \$1 billion, involve treating less radioactive solid wastes, some of which are mixed with sludges and other hazardous materials, that are buried in the ground or stored in drums or boxes. DOE has approved a total of eight privatization projects involving the construction and operation of facilities to treat wastes, although none have been approved since 1998. The eight projects are listed in appendix I.

¹In its January 1997 report on privatization (*Harnessing the Market: The Opportunities & Challenges of Privatization*), DOE identified three different types of privatization initiatives that the Department would implement—eliminating functions, transferring assets, and contracting out. Eliminating functions involves eliminating from the Department those activities for which a federal role is no longer required—such as the transfer of the Elk Hills Petroleum Reserve to the private sector. Transferring assets involves the sale or transfer of real property or personal property, including disposing of surplus assets such as precious metals in DOE's inventory. Contracting out involves either the Department's directly contracting for services previously provided by federal employees or site operating contractors, or site operating contractors' subcontracting specific tasks to other companies instead of performing the tasks themselves. The majority of DOE's privatization efforts have involved contracting out. These projects take three main forms—treating wastes at contractor-owned and -operated facilities, removing existing contaminated facilities and structures, and providing services using existing DOE facilities.

Table I: DOE Privatization Cleanup Projects Reviewed by GAO

	Idaho Pit 9	Idaho advanced mixed waste	Hanford tank waste
Date of contract award	Oct. 1994	Dec. 1996	Aug. 1998 ^c
Contractor	Lockheed Martin Advanced Environmental Systems	BNFL Inc.	BNFL Inc.
Wastes to be treated	250,000 cubic feet of buried transuranic ^a and hazardous wastes and contaminated soil	65,000 cubic meters of mixed waste ^b stored above ground in drums and boxes	About 5 million gallons of highly radioactive wastes stored in underground tanks
Contract price	\$200 million	\$876 million	\$6.9 billion (est.)

^aTransuranic waste contains man-made radioactive elements with atomic numbers higher than uranium, such as plutonium.

^bMixed waste is a combination of radiological contaminants, such as plutonium, and hazardous but nonradiological contaminants, such as degreasing agents or acids.

^cThe original contract was awarded in September 1996. The contract was modified in August 1998 to reflect DOE's revised approach to the project.

Source: GAO's presentation of data from DOE.

DOE's Objectives in Privatizing Complex Cleanup Projects Have Not Been Met

DOE has not achieved the cost savings or the schedule and performance improvements that it expected privatization would provide. Specifically, DOE estimated significant cost savings for each of the three projects. To date, however, none of these projects have achieved savings. (See table 2.) Instead, DOE terminated the contract on the Pit 9 project, and intends to terminate the contract on the Hanford tank waste project, after the contractors estimated significant cost increases and experienced management problems. Savings on the advanced mixed waste project are too early to determine, since construction has not yet started. However, delays in starting construction are likely to increase the estimated contract price.

Table 2: DOE's Estimated and Actual Savings to Date on Three Complex Privatization Cleanup Projects

	Idaho Pit 9	Idaho advanced mixed waste	Hanford tank waste
DOE savings estimate	\$134 million (1996 dollars)	\$670 million (1996 dollars)	\$2.1 billion - \$3.5 billion (1997 dollars)
Actual savings achieved	None—project terminated	None to date— construction has not started; construction delays will likely affect costs and potential savings	None—contract is being terminated and recompeted after significant growth in cost estimate

Source: GAO's presentation of data from DOE.

Contrary to DOE's expectations that privatization projects would stay on schedule, all three of the projects we reviewed experienced delays in meeting schedule milestones. In addition, a key feature of DOE's privatization initiative was that contractors would receive payments only for successfully treating waste. For two of the projects, DOE was dissatisfied with the contractors' performance, but it is unclear if DOE's dissatisfaction will prevent the contractors from being paid.

- The Idaho Pit 9 project was to start waste treatment operations in August 1996 and complete treating the waste by February 1999. However, the contract was terminated in June 1998 because of problems with the contractor's performance. Treatment of the waste is now being considered as part of a future project at the site. Although Lockheed Martin Advanced Environmental Systems (Lockheed Martin) provided a corporate guarantee of performance under the contract, the case is now in litigation. DOE is trying to recover the \$54 million already paid to Lockheed Martin, and Lockheed Martin is seeking additional payments of \$271 million for its work on the failed project. DOE project officials said that it is unclear how the issues will be resolved or how responsibility for the costs incurred on the project will be assigned to the parties involved.

- The Hanford tank waste project was initially to start waste treatment operations in December 2002 and complete processing about 6 percent of the waste by 2007. In 1998, DOE changed its approach to the project and revised the schedule to start waste treatment operations in February 2007 and complete processing about 10 percent of the waste by 2018. In May 2000, DOE directed BNFL² to stop work, and it is now in the process of terminating the contract because of dramatically escalating costs and concerns about BNFL's performance. DOE expects to pay BNFL for the allowable costs it incurred on the project as well as negotiated termination costs. DOE has abandoned privatization for this project and plans to recompile a contract for the design/construction phase and compete a separate contract for the operations phase. DOE hopes to keep the project moving forward in accordance with the revised schedule, but DOE officials expect some delays to occur as these changes are implemented.
- The Idaho advanced mixed waste project was to start waste treatment operations in March 2003 and complete waste treatment by December 2018. BNFL's February 2000 estimate shows that waste treatment operations will begin in November 2003 and are to be completed as scheduled in December 2018. However, several uncertainties may affect the achievement of these milestones. First, the start of construction has been delayed because BNFL has not obtained the construction permits from the state and the Environmental Protection Agency. Second, to resolve a lawsuit, DOE has agreed to pursue technical or regulatory alternatives to incineration for up to 22 percent of the waste to be treated. It is unclear how long the search for alternatives will take or whether it will be successful. Finally, it is unclear if the flexibility built into the operational phase of the project will be sufficient to absorb these potential delays and allow the project to be completed on time. However, at this early stage of the project, there are no signs that DOE is dissatisfied with BNFL's performance.

²BNFL Inc. is the U.S. subsidiary of British Nuclear Fuels plc, a public limited company in the United Kingdom. The British government is the sole stockholder of British Nuclear Fuels plc.

The cost, schedule, and performance problems we found on privatization projects are similar to problems found on other DOE cleanup projects that involved more traditional contracting and financing approaches. For example, our 1996 report on DOE's major system acquisition projects (generally projects costing \$100 million or more), none of which were privatization projects, disclosed that at least half of the ongoing projects and most of the completed ones had cost overruns and/or schedule delays.³ Reasons for these problems included inadequate project oversight and insufficient attention to technical, institutional, and management issues. Although privatization was an attempt to address these types of problems, it has not yielded the desired results.

Observations on DOE's Privatization of Complex Cleanup Projects

We have the following observations based on our past and current reviews of DOE's privatization projects:

- Fixed-price contracts may not work effectively in all situations. DOE has had a strong preference for using fixed-price contracts as a key component of its privatization program. Federal Acquisition Regulation (FAR) guidelines note that the conditions most conducive to fixed-price contracting include a clearly defined scope of work, a low probability of major changes to the work scope, the existence of proven technologies, sufficient price information to determine a fair price, and an appropriate allocation and sharing of risks. In contrast, the three projects we reviewed had changes in scope, uncertainties about waste constituents and technical approaches, unrealistic project schedules, or unresolved regulatory issues that ended up affecting schedules or costs after the contracts were awarded. For example, on the Pit 9 project, the contractor changed the design of the chemical treatment system, a major component of the project, after construction of the building had started. Eventually, the chemical treatment system was modified so much that it no longer fit in the building as constructed. These inconsistencies with the FAR guidelines make

³See *Department of Energy: Opportunity to Improve Management of Major System Acquisitions* (GAO/RCED-97-17, Nov. 26, 1996).

it more likely that significant changes will occur during the life of the contracts. Therefore, these projects may not have been good candidates for fixed-price contracts.

DOE's guidance on privatization encourages the use of fixed-price contracts for cleanup projects. In contrast, the U.S. Army Corps of Engineers has guidance that appears to be more consistent with the FAR guidelines for using fixed-price contracts. The Corps' general contracting guidance for hazardous, toxic, and radioactive cleanup projects states that fixed-price contracts are not the best contracting vehicle for complex radioactive waste cleanup projects. The guidance further states that the Corps increasingly relies on cost-reimbursement contracts for the design and operations phases of such projects. The primary reason the Corps has taken this position is that projects to clean up radioactive wastes can have significant uncertainties, including undefined amounts and concentrations of contaminants, which can affect costs and schedules. These conditions are similar to the uncertainties DOE has faced on its complex nuclear waste cleanup projects.

DOE has been more successful using fixed-price contracts for projects whose conditions have more closely matched those specified in the FAR guidelines. Generally, those projects were not complex cleanup projects that involved constructing and operating treatment facilities. For example, DOE has used fixed-price contracts at Idaho Falls and Hanford to purchase laundry services for such items as contaminated workers' uniforms. DOE's operating experience under these contracts has confirmed savings of several million dollars each year.

- Full private financing for complex cleanup projects may not be a viable approach. It is not clear whether full private financing for complex projects is achievable or whether it will provide needed assurance that contractors will perform effectively. According to DOE officials, including the Director of the Office of Contract Reform and Privatization, none of these privatized cleanup projects have secured commercial financing to date, although a few have been financed internally by the contractors.

For example, on the Pit 9 project, Lockheed Martin financed project design and construction activities from its own equity funds and government progress payments. On the Hanford project, BNFL planned to use both equity and debt financing. However, in order to make commercial financing viable, DOE agreed to pay BNFL's commercial debt in the event of contract termination. DOE decided it would terminate the contract before BNFL obtained commercial financing. On the advanced mixed waste project, BNFL is currently funding activities using its equity. However, in the unlikely event that BNFL's financing is not sufficient for the entire project, DOE may need to consider other options, such as making progress payments or changing the contract to make financing the project more attractive to lenders. These potential changes would also affect the allocation of risk between the two parties.

Full private financing also has not ensured that contractors perform satisfactorily. For example, the Pit 9 contract was terminated and the Hanford contract is being terminated because of concerns about the contractors' abilities to successfully complete the projects. On the advanced mixed waste project, it is too early to tell if BNFL can perform successfully.

Overall, full private financing of cleanup projects is only one of several ways that DOE can encourage its contractors to perform. In addition to using different mixes of public and private financing, DOE could use an incentive fee structure in its contracts to tie a contractor's performance more closely to its potential profits.

- A thorough analysis of financial alternatives and risks is an important part of structuring a successful cleanup project. When DOE initiated each of the three projects we reviewed, it limited its analysis of contracting and financing alternatives primarily to a comparison between a privatized approach and a cost-reimbursement contract without performance incentives. In our previous work on privatization, we have criticized such a narrow approach to making important contracting decisions.

On the Hanford project, after this Committee raised questions about the contract, DOE agreed to conduct a more comprehensive analysis of its financial alternatives. We are encouraged that DOE is considering a broader range of alternatives, but we have some concerns about DOE's analysis, particularly its assumptions about cost growth and its analysis of financial risks. These assumptions led DOE to conclude that privatization would be the least-cost alternative for the project.

In its March 2000 draft report, *Hanford Tank Waste Treatment Alternatives*, DOE concluded that cost growth on federally financed projects would more than offset the higher costs associated with private financing. We have several concerns about this conclusion. For example, DOE assumed that with the privatization approach, there would be no cost growth once the project started because the contractor would have incentives to control its costs. In contrast, DOE assumed that with other options, cost growth would more than offset the higher cost of private financing. However, DOE had no convincing evidence to support the assumption that the privatization approach would have no cost growth. In fact, its experiences contradict this assumption. We also are concerned about DOE's use of point estimates of cost growth rates. Since estimates of cost growth under the various options considered are not precise, using one cost growth rate can lead to a misleading conclusion about the most cost-effective approach. To clearly show the uncertainty associated with the cost growth estimated for various contracting and financing options, we believe it would be more appropriate to represent the cost growth as a range of values instead of a single point estimate.

DOE did not fully analyze or disclose the financial risks it incurred when it assumed responsibility, in the event of the Hanford contract's termination, for a large portion of BNFL's debt on the project. With this action, which DOE took so that BNFL could obtain private financing, significant performance risk shifted from BNFL to DOE. By contrast, under a more typical privatization project, the performance risk remains predominately with the contractor. Had the Hanford contract continued, it is not

clear that DOE would have reflected this shifting of the risk in its cost analysis of financial alternatives, as we suggested in our October 1998 report on this project.⁴ A more complete evaluation of the actual risks assumed by the government on this project could have shown that a significant portion of the potential cost of the project shifted to the government, since the government's liability for BNFL's debt has a cost associated with it. Such an evaluation might have found a different financing alternative more cost-effective for the government.

- Regardless of the contracting and financing mechanisms used, effective oversight is essential to a project's success. In our past work, we have raised concerns about the adequacy of DOE's technical, financial, and managerial oversight capabilities, since DOE's oversight has not been sufficient to prevent schedule slippages or cost increases. For example, on the Pit 9 project, DOE was unable to ensure that Lockheed Martin was addressing significant design, safety, and performance problems, and the contract was finally terminated. On the Hanford project, we reported in 1998 that effective oversight by DOE, especially in the areas of project administration, technical issues, and support activities, would be critical to the project's success. DOE has invested considerable effort in establishing oversight mechanisms for technical, health and safety, risk management, and business and financial aspects of the project. Even so, DOE officials said in April 2000 that they were not aware of the extent of the cost increases that BNFL was estimating for the project until shortly before BNFL submitted its proposal on April 24, 2000. This lack of awareness raises questions about the adequacy of DOE's expertise to oversee this aspect of the project. As DOE continues to explore ways to improve the performance of its cleanup program, it will be especially important to ensure the effectiveness of its technical, financial, and managerial oversight capabilities, both in structuring contracts and in overseeing them. DOE has an initiative under way to strengthen its capabilities in this area. This initiative involves improved coordination and

⁴See *Nuclear Waste: Department of Energy's Hanford Tank Waste Project—Schedule, Cost, and Management Issues* (GAO/RCED-99-13, Oct. 8, 1998).

accountability for project management teams and increased oversight of critical projects by senior DOE management.

In summary, Mr. Chairman, privatization has not been a successful approach for the complex cleanup projects we reviewed. In our view, DOE has not given sufficient attention to a number of factors when deciding how to contract for and finance such projects. These include (1) the type of waste and how well its constituents are understood, (2) the degree of competition available among private companies with the necessary cleanup expertise, (3) the financing options available, (4) the risks involved in the project and the entity that is best prepared to assume them, and (5) the capabilities of DOE's project oversight staff. In the future, DOE needs to more carefully evaluate these factors when making decisions about some of its most challenging cleanup responsibilities.

Thank you, Mr. Chairman and Members of the Subcommittee. That concludes our testimony. We would be pleased to respond to any questions that you may have.

Contact and Acknowledgments

For further information on this testimony, please contact Ms. Gary L. Jones at (202) 512-3841. Individuals making key contributions to this testimony included Carole Blackwell, Dwayne Curry, Doreen Feldman, Nancy Kintner-Meyer, Mehrzad Nadji, Tom Perry, and Bill Swick.

Appendix I

Approved DOE Privatization Cleanup Projects That Involved Constructing and Operating Facilities

Project	Location	Status as of June 2000
Tank waste remediation system	Hanford	Contract terminated during design; project to be recompleted
Pit 9	Idaho Falls	Contract terminated; parties in litigation
Advanced mixed waste treatment	Idaho Falls	Ongoing—preconstruction
Low activity waste treatment	Idaho Falls	Project cancelled
Spent nuclear fuel dry storage	Idaho Falls	Ongoing—preconstruction
Transuranic waste treatment	Oak Ridge	Ongoing—preconstruction
Environmental management waste management facility	Oak Ridge	Ongoing—preconstruction
Spent nuclear fuel transfer and storage	Savannah River	No longer a privatization project—converted from private to federal financing

Related GAO Products

Nuclear Waste: DOE's Advanced Mixed Waste Treatment Project—Uncertainties May Affect Performance, Schedule, and Price (GAO/RCED-00-106, Apr. 28, 2000).

Nuclear Waste: Department of Energy's Hanford Tank Waste Project—Schedule, Cost, and Management Issues (GAO/RCED-99-13, Oct. 8, 1998).

Department of Energy: Alternative Financing and Contracting Strategies for Cleanup Projects (GAO/RCED-98-169, May 29, 1998).

Nuclear Waste: Department of Energy's Project to Clean Up Pit 9 at Idaho Falls Is Experiencing Problems (GAO/RCED-97-180, July 28, 1997).

Nuclear Waste: DOE's Estimates of Potential Savings From Privatizing Cleanup Projects (GAO/RCED-97-49R, Jan. 31, 1997).

Hanford Waste Privatization (GAO/RCED-96-213R, Aug. 2, 1996).

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