

REVIEW OF THE DEPARTMENT OF ENERGY'S HANFORD RADIOACTIVE TANK WASTE PRIVATIZATION CONTRACT pdf

1: The Cascadia Courier: Cleaning Up the Mess at Hanford

Review of the Department of Energy's Hanford radioactive tank waste privatization contract: hearing before the Subcommittee on Oversight and Investigations of the Committee on Commerce, House of Representatives, One Hundred Fifth Congress, second session, October 8,

The Hanford Site, located in southeast Washington State, has one of the greatest concentrations of radioactive waste in the world. One of the most difficult cleanup challenges at Hanford involves the underground storage tanks holding highly radioactive liquid waste, sludge, and other materials. Cleaning up this waste is important because it poses a significant risk to the environment and to surrounding communities. Recently, DOE disclosed that waste leaking from some of the tanks has reached the groundwater and threatens the nearby Columbia River. In , DOE decided it would purchase waste treatment services through competitively awarded, fixed-price contracts to demonstrate treatment technologies and treat at least 6 percent of the waste. Under these contracts, competing contractors would finance, design, build, and operate temporary waste processing facilities and be paid on a per-unit basis if they successfully immobilized the waste for storage. DOE referred to this approach as its privatization strategy. As a starting point for our review, we used the report DOE issued to the Congress in July outlining the proposed shift in its contracting approach. We supplemented this with on-site reviews at Hanford; reviews of DOE and contractor documents and plans; and discussions with DOE, contractor, and industry officials at Hanford and in Washington, D. For simplicity, we refer to this as a contract throughout this report. Over the years, more than 1 million gallons of waste have leaked into the soil. The immobilized high-level waste will be stored on-site for eventual shipment to a national repository, while the low-activity waste will be permanently disposed of on the Hanford Site. DOE plans to use private contractors to conduct the vitrification work and over the last several years has developed a contracting approach. DOE envisioned that under this approach, two contractors would build and operate demonstration facilities that would treat at least 6 percent of the waste. DOE referred to this part of the waste treatment effort as phase I. In phase II, contractors would compete for a contract to process the remaining tank waste. This price may be adjusted in the year after technical aspects of the project become more clearly known. When separated into high-level and low-activity components, most of the waste will be low-activity radioactive waste. Low-activity waste has a wide range of characteristics, but most of it contains small amounts of radioactivity in large volumes of materials. The tanks also contain hazardous chemicals and heavy metals. Although the project award was made on the basis of a fixed-price contract, further competition between contractors and short-term demonstration facilities have been eliminated in favor of more permanent facilities that could operate for 30 years or more and, therefore, would be available to treat additional tank waste. In addition, the design phase as well as the date when DOE and BNFL are to reach agreement on final contract price have been extended by 2 years to August. If this commitment were structured as a conventional loan guarantee, DOE would have had to estimate the potential subsidy cost over the term of the loans and have the budget authority to fund them before making the guarantee. However, DOE estimated that this approach would save 26 to 36 percent over contracting approaches it had used in the past, such as reimbursing a contractor for its costs plus an agreed-upon profit amount. DOE agreed to assume this risk because it did not think BNFL would be able to obtain affordable financing unless the government provided some assurance that the loans would be repaid. In an attempt to avoid repeating past mistakes in managing large projects, DOE has identified additional expertise it needs and has developed several management tools to strengthen its oversight of the project. For example, DOE plans to have about an member team to manage this effort, and it has taken a number of steps to plan for better coordination among BNFL, the contractors providing support services at Hanford, and its own staff. The success of the project, however, will depend heavily on how well DOE implements these plans. DOE has a history of not fully implementing its management and oversight plans, and there are some early indications on this project that DOE may be having difficulty ensuring that the proper

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expertise is in place and fully funding project support activities. In this event, DOE will pay BNFL, as an allowable cost, the outstanding principal amount of the loans plus all accrued and unpaid interest, less certain other adjustments. DOE said its contracting approach evolved as it received feedback from private companies and financial advisors, as well as input from the two contractor teams that submitted proposals under the original approach. According to DOE, changes to its initial approach were made to optimize the technical approach and to make the project financially feasible or to reduce the likelihood of performance problems. These changes fall into four main areas: Table 1 summarizes these changes, and the sections that follow discuss why DOE made them. The extent to which competition will be present in phase II is unknown. DOE concluded that requiring percent private financing without government backing of the private debt could increase the financing costs so much that the project would not be affordable. DOE also concluded that an increased governmental role in backing the debt would reduce the overall cost of the project, but DOE had no specific estimate of the amount of the reduced costs. Finally, neither contractor was willing to commit to a fixed-unit price and schedule by May without adding significant contingency to the price. DOE determined that this delay would strengthen the feasibility and economics of the project, although agency officials also indicated that information gained during this delay could also lead to increased prices. These facilities were estimated to have a useful life of approximately 10 years and were considered "throw-away" buildings. According to DOE, both BNFL and Lockheed concluded that shorter-term, throw-away facilities were not feasible and that longer-life facilities were needed to provide the required levels of safety, operability, and maintainability. The contract now requires the waste treatment facilities to be designed to operate for a minimum of 30 years and have the capability to increase capacity. DOE said that although this approach means much more expensive facilities than originally anticipated and, therefore, an increase in project costs for phase I, longer-life, expandable facilities allow DOE more flexibility and options in how the waste cleanup is completed. DOE expected that construction of the facilities would begin by December. However, in their January proposals, both BNFL and Lockheed indicated that additional time was needed to further develop project design and plans for meeting regulatory and permitting requirements. The contractors believed that adhering to the original schedule would carry too many uncertainties, and that they would be unable to obtain needed project financing unless a more realistic schedule could be negotiated. DOE believes that the change will allow further design development before construction begins, thereby reducing the risks associated with design uncertainties. In , DOE estimated that in the first phase of the project, two contractors would process 6 percent of the waste by and up to 13 percent of the waste by . DOE is now estimating that phase I will last until at least , an extension of up to 10 years. Several interim steps in phase I also have revised completion dates. Additional time will be required to deactivate the facilities. One change in the project schedule was an extension allowing BNFL more time to design and construct permanent, more durable waste pretreatment and treatment plants. BNFL proposed extending the design phase by 24 months. BNFL proposed this approach, and DOE agreed to it, because 1 BNFL said that nuclear and worker safety requirements could not be efficiently incorporated into the demonstration facilities initially proposed and 2 permanent facilities provided advantages in processing the tank waste that would remain after phase I. The lengthened construction added about 4 years to the original schedule. Also, it will take BNFL about 10 years to process the waste, or about 5 years longer than if two contractors were doing so. In addition, BNFL included additional schedule contingency to deal with possible start-up and production problems. Estimated costs for the project have also increased significantly. These costs were not readily available. DOE will need to renegotiate these dates with its regulators. One of the milestones, the date to start high-level waste processing, is earlier than the date agreed to with the regulators. In July , DOE estimated the range of savings under its revised approach for phase I at 26 to 36 percent when compared with these two alternatives. However, DOE is shifting to management and integration contracts involving performance measures and incentive-based contracts. According to DOE officials, during the next 2 years they will further evaluate the trade-offs between using government and private debt to determine the best overall mix of equity, debt, and government financing for

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the project. Rough estimates are presented as precise numbers. Cost projections for two of the contract alternatives DOE considered in its analysis are based on what are called "rough order of magnitude" estimates. The margin of error for these estimates is plus or minus 40 percent, meaning that the actual cost could be up to 40 percent less than or greater than the estimate presented. Because the order of magnitude estimates are subject to so much variability, it is difficult to assign much credence to an overall savings estimate based on these numbers. Cost growth estimates are not used consistently. For the comparison between a fixed-price contract and a cost-reimbursement contract with performance incentives, DOE assumed that cost growth would be 68 percent for the cost-reimbursement contract, and the fixed-price contract would have no cost growth. However, other evidence indicates that fixed-price contracts may have greater cost growth than cost-reimbursement contracts. Although the potential cost savings DOE reported to the Congress show a range of 26 to 36 percent, DOE documents supporting the analysis show a range of 10 to 36 percent. This is not the first time DOE has based cost savings on questionable analytical practices. However, we found that DOE had understated some project costs, used incorrect cost data, and made cost comparisons using projects of different scopes. The primary cause of the cost increase was that fixed-price contracts were used on poorly defined projects, which led to changes during construction contributing to increased costs and schedule delays. In contrast, the study found that cost-reimbursement contracts exceeded the estimated costs by 35 percent. This risk comes mainly in the form of an agreement to pay BNFL for much of the debt incurred in constructing and operating the waste treatment facilities if BNFL defaults on its loan payments and DOE terminates the contract. This agreement has the same practical effect as a loan guarantee and is a dramatic departure from the original privatization strategy. Some of these risks would also exist under a more traditional contracting arrangement. We identified six main types of factors, which we believe merit continued attention as the project proceeds. A federal loan guarantee is provided directly to a lender, not to the borrower. Agencies need legislative authority to provide a loan guarantee. Thus, borrowing against assets is likely to be the main source of capital for the project. However, BNFL has developed various other approaches to deal with the need to ensure that the technology will work. These efforts are expected to continue as the vitrification facilities are being designed and built. BNFL has assured DOE that its technology will be fully tested and demonstrated before beginning operations of its full-scale, high-level waste treatment plant in February and its low-activity waste treatment plant in January. Under its revised approach, DOE retains a significant part of the risk for the success of this technology. If demonstration activities show that the technology is usable but flawed, treatment facilities may require expensive retrofitting to make them viable. However, even with this change, construction will begin well before all of the design work is completed. BNFL officials estimate that overall design work will be less than 50 percent complete at the start of construction. The officials said that the schedule is comparable to other nuclear facilities BNFL has successfully built and operated. However, BNFL officials also acknowledged that conducting simultaneous design, construction, and technology testing carries some risk. To reduce this risk, BNFL performs a periodic risk assessment to ensure that design and technology testing concerns will be addressed as quickly as possible in the next 24 months. There do not appear to be agency or industry guidelines on the extent to which facility designs for complex, one-of-a-kind nuclear processing facilities like vitrification plants should be complete before construction begins. In an analysis of an earlier DOE proposal to build a waste vitrification plant at Hanford, we raised similar concerns about concurrent design and construction and pointed out that for an advanced light water reactor, the Electric Power Research Institute recommended that construction not begin until the detailed design is 90 percent complete. These latter documents were subsequently withdrawn by BNFL. The DOE manager said that problems with safety documents could affect the project schedule and cost and that BNFL needed to make immediate improvements in its approach to safety. Several additional safety documents are required before BNFL can begin construction of the facilities in the year. Unless the required safety documentation is approved, BNFL will be unable to start construction on schedule.

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2: Major Management Challenges and Program Risks: Department of Energy

Home» Hanford Tank Waste Mission Shifts to Operations, Illustrating Completion Focus Members of the panel titled, "Progress on Hanford Tanks and Waste Treatment Mission" discuss a shift from construction to operations for portions of the Waste Treatment and Immobilization Plant.

Major Performance and Management Challenges DOE is a large agency with critical missions and serious challenges in carrying out these missions. Despite recent downsizing, DOE employs over 11, federal employees and is the largest civilian contracting agency in the federal government, retaining about , contract employees at over 50 major installations in 35 states. This report also indicates, where applicable, how DOE has responded to recommendations of the National Performance Review and addressed weaknesses through the strategic plan that it developed in response to the Results Act. DOE has had difficulty completing large projects on time and within budget. For the 34 ongoing projects, we found that 27 had cost overruns averaging over 70 percent and 16 were behind schedule. In addition, the project is at least 12 years behind schedule. Because of this delay, many nuclear power plants have had to construct their own temporary waste storage facilities. Overall, we identified four factors underlying the cost increases, delays, and terminations. Because budget authority for the total cost of a project is not provided at the time the project is approved, annual funding for the project is often less than requested. For example, the Fermilab Main Injector Project in Illinois for use in high-energy physics experiments received only 40 percent of its planned funding for the first 3 years. As a result, according to DOE officials, the project fell behind schedule and incurred additional costs. Additionally, DOE managers have often failed to penalize contractors for poor performance and have sometimes even rewarded inadequate performance. For example, during the s and early s, DOE paid millions of dollars in bonuses to the contractor at its Rocky Flats Plant in Colorado, despite well-documented safety and health deficiencies at the facility. Now that DOE has developed its first strategic and annual performance plans under the Results Act, we believe the time is right for reviewing its missions and agreeing on long-term priorities for the Department. For national security reasons, DOE relied historically on its own staff to ensure safety at these facilities. We and others have criticized DOE for weaknesses in its self-regulation. In , the Secretary of Energy announced that the Department would seek external regulation for worker safety. Two years later, DOE created advisory groups to help formulate its policies and implement plans to eliminate self-regulation for both nuclear and worker safety at its facilities. Although these advisory groups endorsed external regulation, DOE has backed off from its initial plans and is now conducting pilot programs to simulate external regulation at selected facilities and determine whether it is warranted. Although DOE maintains that its current plan reflects appropriate caution, we believe that the Department is wavering in its commitment to external regulation. We recommended in May that DOE set forth its position on the external regulation of nuclear and worker safety at its facilities and develop an implementation strategy consistent with its position. Contractors, such as those operating the large national laboratories, receive policy guidance from many different program offices but are managed and evaluated by field offices that are not accountable to the program offices. Several program and staff offices can direct a single contractor, bypassing the field office and other program offices. These leaks went undetected for many years and then remained uncorrected for several more years because the contractor assigned low priority to them, despite public concern and local environmental regulations requiring corrective action. DOE did not hold the laboratory accountable for meeting its regulatory commitments but eventually terminated the contract because the laboratory lost public trust. In , the Defense Nuclear Facilities Safety Board recommended that DOE establish clear lines of authority and responsibility to ensure the resolution of safety issues. The Board recommended that DOE undertake a major effort to rationalize and simplify its headquarters and field management structure to create a more effective line management. While DOE was reviewing its contracting practices, it was also developing its strategic plans. Together, the contract reform and strategic planning initiatives helped to shape the

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framework for contract reform that DOE has since put in place. While these reforms are generally steps in the right direction, DOE has had some problems in implementing them, and in some instances, their effectiveness will not be known for several years. Since , DOE has increased its use of competition in awarding contracts for managing and operating its facilities, but it could do more, particularly at its national laboratories. In , we reported that from July through August , DOE had awarded 8 of 24 management and operating contracts 33 percent competitively. For fiscal year through fiscal year , DOE reported that it had awarded 14 of 26 such contracts 54 percent competitively and extended the other 12 noncompetitively. According to DOE, 8 of these 12 contracts were eligible for noncompetitive renewal under the Competition in Contracting Act, which exempts contracts for federally funded research and development centers from the requirements for competition. However, as we reported in , only about half of the funds spent by management and operating contractors at the national laboratories went for research and development; the remainder went for other work, such as environmental restoration. At other facilities, DOE awards contracts for environmental restoration work competitively. In our view, DOE could improve its contracts with the national laboratories by separating and competitively awarding the portion of the work that is not related to research. Our July report indicated that DOE had taken steps to correct these problems, including issuing guidance, conducting training, and incorporating lessons learned into the fiscal year incentives. Moreover, as we reported in April , DOE incorporated performance-based incentives for fiscal year in 16 of the 20 contracts we reviewed after the contractors had started their work. To control costs and shift risks from the government to contractors, DOE has begun to use fixed-price contracts for environmental cleanups in place of the cost-reimbursement contracts that the Department routinely used in the past. The project, which we characterized as a failure, was at least 26 months behind schedule when we reported on it in July . Issues surrounding this project, such as the type and amount of waste to be cleaned up and who will pay for the increased costs, are currently in litigation. However, because lenders told DOE that the contractor would not be able to obtain affordable financing without government backing, DOE agreed to pay much of the project debt if the contractor defaulted on its loans. The extent of the liability retained by the contractor remains uncertain. While this financing approach appears reasonable for this project, DOE faces a financial risk not initially contemplated that could be in the billions of dollars. Before DOE decides whether to award fixed-price or cost-reimbursement contracts, it needs to consider several factors, including the cleanup and financial risks involved, the adequacy of the competition among qualified firms, the types of financing available, and the skills of the DOE staff responsible for designing and overseeing the contracts. DOE and its Inspector General have identified the need for stronger technical and management skills, and the National Performance Review recommended strengthening this area. DOE included performance measures in its strategic plan to address the problem. The Defense Nuclear Facilities Safety Board, in its annual reports to the Congress, has repeatedly stated that the lack of appropriate technical expertise in DOE is a significant problem. As we have reported since , managers throughout DOE have told us that the lack of skilled staff in program, project, and contracting oversight positions is one of the most fundamental challenges in the Department. In March , we reported that DOE did not assign enough staff with the proper technical capability to oversee the early stages of a project at the Fernald site in Ohio, resulting in major cleanup problems that could have been avoided. However, delays and cost overruns at both the Idaho and the Hanford facilities suggest that DOE may likewise lack expertise in administering fixed-price contracts. Both the Director of Contract Reform and Privatization and the contracting officer at Hanford acknowledged that the DOE staff at Hanford are not experts in fixed-price contracting. As DOE stated in a study, the use of fixed-price contracts for privatizing cleanups will require its employees to become more involved in the early stages of procurement development and to acquire more skills in corporate budgeting, capital market analysis, and the financing of employee benefits. Finding enough staff with the necessary skills presents a serious challenge to DOE, particularly in light of recent downsizing. At Hanford, for example, DOE plans to ensure adequate oversight of the tank waste cleanup by putting about 80 technical and managerial staff in place. However, as of August 28, , DOE had not yet filled 30 positions, including 5 of the 9 DOE staff responsible

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for contract management. DOE officials told us that they plan to hire these and other needed staff during fiscal year

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