

U.S. DEPARTMENT OF ENERGY
OFFICE OF INSPECTOR GENERAL

AUDIT OF THE
RADIOACTIVE LIQUID WASTE TREATMENT FACILITY OPERATIONS
AT THE LOS ALAMOS NATIONAL LABORATORY

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RADIOACTIVE LIQUID WASTE TREATMENT FACILITY OPERATIONS
AT THE LOS ALAMOS NATIONAL LABORATORY

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RADIOACTIVE LIQUID WASTE TREATMENT FACILITY OPERATIONS
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Audit Report Number: WR-B-98-01

SUMMARY

Los Alamos National Laboratory (Los Alamos) generates radioactive and liquid wastes that must be treated before being discharged to the environment. Presently, the liquid wastes are treated in the Radioactive Liquid Waste Treatment Facility (Treatment Facility), which is over 30 years old and in need of repair or replacement. However, there are various ways to satisfy the treatment need. The objective of the audit was to determine whether Los Alamos cost effectively managed its Treatment Facility operations.

The audit determined that Los Alamos' treatment costs were significantly higher when compared to similar costs incurred by the private sector. This situation occurred because Los Alamos did not perform a complete analysis of privatization or prepare a "make-or-buy" plan for its treatment operations, although a "make-or-buy" plan requirement was incorporated into the contract in 1996. As a result, Los Alamos may be spending \$2.15 million more than necessary each year and could needlessly spend \$10.75 million over the next five years to treat its radioactive liquid waste. In addition, Los Alamos has proposed to spend \$13 million for a new treatment facility that may not be needed if privatization proves to be a cost effective alternative.

We recommended that the Manager, Albuquerque Operations Office (Albuquerque), (1) require Los Alamos to prepare a "make-or-buy" plan for its radioactive liquid waste treatment operations, (2) review the plan for approval, and (3) direct Los Alamos to select the most cost effective method of operations while also considering other factors such as, mission support, reliability, and long-term program needs. Albuquerque concurred with the recommendations.

/s/
Office of Inspector General

PART I

APPROACH AND OVERVIEW

INTRODUCTION

As a management and operating (M&O) contractor, the University of California (University) operates Los Alamos for the Department of Energy (DOE). Los Alamos is involved in multiple areas of research and development, and as a result of these activities, generates radioactive liquid waste and some industrial waste. Los Alamos treats these wastes at its Treatment Facility. The objective of the audit was to determine whether Los Alamos cost effectively managed its Treatment Facility operations.

SCOPE AND METHODOLOGY

The audit was conducted at Los Alamos from January 13 through July 15, 1997. To accomplish the audit objective, we:

- reviewed the Fiscal Year (FY) 1997 Treatment Facility operation costs;
- reviewed the terms and conditions of the prime contract between DOE and the University;
- reviewed laws and regulations applicable to the treatment of radioactive liquid waste;
- interviewed Environmental Protection Agency and New Mexico Environmental Department officials about regulations pertaining to Los Alamos' Treatment Facility;
- reviewed Waste Management performance measures as they related to the Treatment Facility operations;
- interviewed Los Alamos and DOE personnel responsible for the operation and oversight of Los Alamos' Treatment Facility; and,
- reviewed Los Alamos documents concerning the Treatment Facility's budget, staffing, and operations.

The audit was performed in accordance with generally accepted Government Auditing Standards for performance audits and included tests of internal controls and compliance with laws and regulations to the extent necessary to satisfy the audit objective. Accordingly, we reviewed Los Alamos' controls for obtaining goods and services at the least cost to the Government. We did not rely on computer-generated data to conduct the audit. Because our

review was limited, it would not necessarily disclose all internal control deficiencies that may have existed at the time of the audit. An exit conference was held with Albuquerque officials on August 27, 1997.

BACKGROUND

Los Alamos' Treatment Facility was constructed in 1960 and began operations in February 1963. The annual amounts of treated waste have ranged from a high of approximately 16.1 million gallons in 1968 to a low of about 4.6 million gallons in 1996. Los Alamos expects to treat approximately 5 million gallons in 1997. Future volumes of waste are projected to increase to about 7 million gallons per year by the year 2004. Although the waste is treated at this central facility, it originates from various locations within Los Alamos. Currently, the waste is characterized, collected in a storage tank, and then treated using a chemical precipitation process. At the time of the audit, Los Alamos was transitioning to a new ultra filtration and reverse osmosis treatment process, similar to that used in the private sector. Since the research programs which generate the waste are expected to continue, Los Alamos will have a continuing need for waste treatment.

OBSERVATION AND CONCLUSIONS

During the audit, we noted that DOE began efforts to improve the cost effectiveness of Los Alamos' liquid waste treatment operations. Specifically, the Los Alamos Area Office (Area Office) compared Los Alamos' waste treatment costs to similar costs incurred in the private sector. In addition, the Area Office required Los Alamos to benchmark the process for treating radioactive liquid waste in order to identify ways to optimize operations and/or personnel. The importance of benchmarking to determine cost effectiveness, in fact, has been pointed out in a number of DOE Office of Inspector General (OIG) reports. An audit conducted at the Idaho National Engineering Laboratory, for example, compared the M&O's architect and engineering (A&E) costs against an industry and a state government benchmark. The comparison showed that the M&O's A&E costs for 65 conventional construction projects were significantly higher than comparable industry standards. Another OIG audit, conducted at Lawrence Livermore National Laboratory, determined that the M&O contractor was pursuing three construction projects despite not showing that the proposed projects were the best alternatives to meet mission needs and minimize costs. A lack of established benchmarks to assess the reasonableness of the total cost of designing, constructing, and managing these projects was listed as one of the causes.

While we commend DOE for initiating its benchmarking efforts, we found that Los Alamos costs to treat liquid wastes were high compared to treatment costs incurred in the private sector. Consequently, we recommended that Los Alamos prepare a "make-or-buy" plan in order to reach an informed decision about the cost effectiveness of its waste treatment operations.

PART II

FINDING AND RECOMMENDATIONS

Cost Effectiveness of the Radioactive Liquid Waste Treatment Facility Operations at the Los Alamos National Laboratory

FINDING

The DOE report, Making Contracting Work Better and Cost Less, stated that DOE must ensure that its tasks are performed economically. Furthermore, the contract between the University and DOE required Los Alamos to obtain property and services on a least-cost basis. The audit determined, however, that Los Alamos' costs to treat its radioactive liquid waste were significantly higher than those of the private sector. This occurred because Los Alamos neither completed an analysis of the privatization alternative nor prepared a formal "make-or-buy" plan as required by its contract with the DOE. As a result, Los Alamos may be spending \$2.15 million more than necessary each year and could needlessly spend \$10.75 million over the next five years to treat its radioactive liquid waste. In addition, Los Alamos has proposed to spend \$13 million for a new treatment facility that may not be needed.

RECOMMENDATIONS

We recommend that the Manager, Albuquerque Operations Office:

1. require Los Alamos to prepare a "make-or-buy" plan for its radioactive liquid waste treatment operations;
2. review the plan for approval; and,
3. direct Los Alamos to select the most cost effective method of operations while also considering other factors such as, mission support, reliability, and long-term program needs.

MANAGEMENT REACTION

Albuquerque concurred with the recommendations. Management and auditor comments are summarized in Part III.

DETAILS OF FINDING

The report, Making Contracting Work Better and Cost Less, pointed to significant and systematic weaknesses in DOE's contracting practices and stated that DOE must ensure its tasks are performed economically. The report also noted that M&O contractors are not always the best entity to do the work if specific functions can be subcontracted at a lower cost. The report indicated that numerous opportunities exist to buy direct program operations, technology

programs, infrastructure, landlord, and support activities from commercial sources in the private sector. Furthermore, DOE policy encouraged privatizing services when it was appropriate and cost effective. Finally, the contract between the University and DOE required Los Alamos to prepare a "make-or-buy"¹ plan and to acquire services on a least-cost basis.

TREATMENT COSTS

Los Alamos' treatment costs were significantly higher when compared to similar costs incurred by the private sector, specifically the nuclear power industry. The Area Office determined that nuclear power companies which had outsourced treatment operations incurred an average cost of 10 cents per gallon to treat similar waste streams while Los Alamos' cost ranged from \$1 to \$2 per gallon. Although Los Alamos claimed that its treatment costs for FY 1997 were about 53 cents per gallon, it had excluded the costs for management, facility maintenance, space and utilities, analytical services, quality control, regulatory compliance, information management, and other support type costs in its calculation. We included these costs in our calculation and estimated that Los Alamos' operational treatment costs were approximately \$1.70 per gallon in FY 1997. Although Los Alamos' claimed cost of 53 cents a gallon is less than DOE's reported cost of \$1 to \$2 per gallon and our estimated cost of \$1.70, it is still significantly higher than treatment costs in the private sector.

The high cost of treating radioactive liquid waste within the DOE complex was indicated by a study conducted by the Oak Ridge Operations Office (Oak Ridge). This study compared the cost of Oak Ridge's waste water treatment operations against those in the private sector. The results showed substantial differences not only in annual operating costs but also in the number of personnel required for operation. For example, costs at three Oak Ridge treatment facilities were approximately 3 to 15 times higher than those of the private sector while two Oak Ridge treatment operations used approximately 30 more personnel than the private sector. The study also observed that the actual difference between DOE's costs and private sector costs was even larger since the comparison did not include the costs to treat or dispose of residuals such as, sludge, spent carbon, or filter elements. As a result, this study recommended that Oak Ridge treatment operations be evaluated for privatization.²

CAPITAL IMPROVEMENT COSTS

Capital funds expended for the new treatment process and facility improvements will also impact the overall treatment cost. Our calculation of \$1.70 per gallon did not include costs for capital improvements. If these costs are included, Los Alamos' total treatment costs would become even higher. Los Alamos, for example, may spend approximately \$5 million during FY 1997 for its new treatment process and other improvements. To address concerns with the 30-plus-year-old treatment facility, Los Alamos proposed to construct a new process facility at an estimated cost of \$13 million. However, if the treatment operations are privatized, a new facility may not be needed.

¹ An analysis to determine if goods or services should be produced internally or acquired from outside sources.

² The process of procuring products or services in a more cost effective manner from commercial sources when these products or services are normally provided, or could be provided, by DOE or one of its M&O contractors.

INCOMPLETE ANALYSIS

In recent years, DOE has emphasized making cost effective "make-or-buy" decisions and privatizing work where appropriate. Twice Los Alamos evaluated the privatization of waste management activities. Although the data gathered showed that privatization could reduce costs, Los Alamos never published a Request for Proposal to definitively establish the feasibility and cost effectiveness of privatization. Los Alamos also has not prepared a "make-or-buy" plan, although such a plan has been required by its contract with DOE.

In an era of declining budgets, the importance of privatization has been emphasized by DOE in several instances. As early as 1994, for example, the Secretary authorized \$4.9 million for a conceptual design effort for the Treatment Facility and mandated that privatization be considered as an alternative. In December 1996, the Assistant Secretary for Environmental Management stressed that more focus needed to be placed on privatization. The Office of Environmental Management has also pointed to privatization as a key component for meeting DOE's cleanup activities. Most recently, the Office of Waste Management's statement of its operating principles, goals, and priorities for 1997 stated that it planned to implement privatization for selected waste management projects and improve business practices through cost analyses and benchmarking.

Although Los Alamos has twice considered privatizing some waste management activities, it did not perform a complete analysis of privatization. In March 1995, for example, Los Alamos established a Privatization Working Group to identify the possibility of privatizing activities within its Waste Management Program. This group identified radioactive liquid waste treatment as a high priority for privatization and estimated that Los Alamos could realize a cost savings of 50-60 percent. In order to obtain Expressions of Interest from the private sector, an advertisement was placed in the Commerce Business Daily. This advertisement resulted in 13 responses, thereby indicating the private sector's willingness to treat Los Alamos' liquid waste. However, the Privatization Working Group was disbanded in December 1995.

In another effort to look at privatization, Los Alamos established a multidisciplinary team in February 1996. The formation of this team was in response to a DOE request stipulating that Los Alamos privatize one or more of its waste management activities. At the end of its evaluation, the team reported that privatizing some waste management activities could reduce costs, enable Los Alamos to concentrate on mission areas, reduce liability, create jobs, and improve regulatory performance. The team concluded that publishing a Request for Proposal would help assess private sector interest and capabilities. Furthermore, the report stated that the private sector could use mobile treatment technologies and, thus, could resolve Los Alamos' present and future waste facility needs.

Despite the indicators showing that privatization could be beneficial, Los Alamos did not complete its analysis by issuing a Request for Proposal. Without the cost information generated by such a proposal, Los Alamos could not determine whether privatization was a feasible and cost effective alternative. The lack of information was pointed out in a Los Alamos document which

stated that "because we don't have a bid from a contractor for the same Statement of Work as Los Alamos is currently performing, an accurate estimate of potential savings cannot be made."

Los Alamos also could not make an informed decision about liquid waste treatment operations because it did not prepare a "make-or-buy" plan. Although the contract contained a requirement to prepare such a plan, Los Alamos did not do so because it did not consider this requirement a "hard and fast rule." An official pointed out that specifics regarding the "make-or-buy" plan requirement were being worked out in the contract extension negotiations. This official also explained that Los Alamos continued to treat waste in-house because of internal resistance to privatization. Consequently, Los Alamos never prepared a "make-or-buy" plan which would have helped determine whether privatizing its liquid waste treatment operations was an economical alternative.

POTENTIAL SAVINGS

By not ensuring that Los Alamos was using the most cost effective alternative to treat its radioactive liquid waste, DOE may be spending more than necessary. We calculated the savings on the privatization alternative. These calculations, however, generated different amounts of potential savings. Using Los Alamos' claimed cost of 53 cents per gallon and the nuclear power industry's average figure of 10 cents per gallon, we calculated that DOE could save \$2.15 million a year to treat 5 million gallons or about \$10.75 million over the next five years. However, potential savings could be significantly higher. Using our estimated cost of \$1.70 per gallon, which included support costs, we calculated that DOE could save about \$8 million a year to treat 5 million gallons or approximately \$40 million over a five-year period. Neither of these calculations included the capital cost of the proposed \$13 million new treatment facility. DOE may be able to avoid this capital cost if it selects privatization and, thus, uses the private sector's mobile treatment technology.

Before Los Alamos proceeds with the further expenditure of capital funds for the treatment facility, DOE should insist on a thorough analysis of privatizing the radioactive liquid waste treatment operations. Early indicators show that treatment costs could be reduced, new capital expenditures avoided, and the private sector could bring a mobile treatment unit on site. Funds saved by identifying a more cost effective treatment alternative could be used for other mission essential work.

PART III

MANAGEMENT AND AUDITOR COMMENTS

Albuquerque's Acting Assistant Manager for the Office of Environmental/Project Management commented on the report and concurred with the recommendations. The Acting Assistant Manager's comments are summarized below.

Recommendation 1

Recommendation. Require Los Alamos to prepare a "make-or-buy" plan for its radioactive liquid waste treatment operations.

Management Comments. Albuquerque concurred and stated that Los Alamos has committed to conduct a "make-or-buy" analysis of radioactive liquid waste collection and treatment by March 31, 1997. According to the Acting Assistant Manager, DOE and Los Alamos have discussed and agreed on the scope and schedule for completing the analysis. The "make-or-buy" analysis will include the waste collection system within its scope.

Auditor Comments. Albuquerque's comments and proposed actions are responsive to the recommendation.

Recommendation 2

Recommendation. Require Albuquerque to review the "make-or-buy" plan for approval.

Management Comments. Albuquerque concurred and stated that DOE would review the completed analysis.

Auditor Comments. Albuquerque's comment and proposed action is responsive to the recommendation.

Recommendation 3

Recommendation. Direct Los Alamos to select the most cost effective method of operations while also considering other factors such as, mission support, reliability, and long-term program needs.

Management Comments. Albuquerque agreed that after reviewing the "make-or-buy" plan, DOE would decide how to obtain radioactive liquid waste collection and treatment services in the future. The Acting Assistant Manager stated, however, that cost effectiveness should not be the sole make-or-buy criterion. Other considerations include, mission support, reliability, and consistency with long-term program plans.

Auditor Comments. We concluded that Albuquerque's comments and proposed action are responsive to the recommendation. Although cost effectiveness may not be the only criterion, the audit showed that privatization could be very beneficial to DOE from a financial point of view. Thus, we trust that DOE will consider the importance of all factors before choosing a future procurement method.

PART IVAPPENDIXRelated Office Of Inspector General Audit Reports

1. *DOE/IG-0387, Audit of Architect and Engineering Costs at the Idaho National Engineering Laboratory, March 1996*

The objective of this audit was to determine whether architect and engineering (A/E) services performed at the Idaho National Engineering Laboratory (Laboratory) were economical when compared to cost standards for A/E services in industry and the State of Idaho. The audit compared A/E costs for Laboratory projects to industry and State benchmarks. The report showed that design costs for 65 conventional construction projects were, in the aggregate, about \$5.8 million higher than comparable industry standards. In addition, the audit showed that the Laboratory spent approximately \$1.6 million more than the State benchmark for comparable projects. The situation occurred because the Laboratory did not have a way to measure the performance of its design programs and the Operations Office's policy for the selection of A/E services precluded competition.

2. *WR-B-97-06, Audit of Renovation and New Construction Projects at Lawrence Livermore National Laboratory, June 1997*

The purpose of this audit was to determine if Livermore's proposed renovation and new construction projects met mission needs at the least cost. The audit found that in pursuing three projects, estimated to cost over \$78 million, Livermore had not demonstrated that it had selected the best alternatives for meeting Department of Energy (DOE) needs while minimizing costs. Livermore was able to pursue these projects because the Oakland Operations Office (Oakland) did not ensure that Livermore had performed cost and benefit analyses of all the alternatives. Further, Oakland did not establish benchmarks to assess the reasonableness of the total costs of the projects. As a result, it was likely DOE was spending more than necessary on renovation and new construction projects at Livermore.

3. *WR-B-94-06, Subcontracting for Environmental Services at Los Alamos National Laboratory, September 1994*

The audit reviewed the implementation of DOE and Los Alamos policies and procedures for acquiring environmental services. Los Alamos did not always issue subcontracts for environmental services in the manner most advantageous to the Government. The audit identified problems with competition and reasonableness of costs and prices. These conditions existed because Los Alamos did not adequately control its procurement process and the Albuquerque Operations Office needed to improve its administration of Los Alamos' procurement system. As a result, Los Alamos may not have obtained the most economical goods and services and incurred about \$1.5 million in unsupported costs in Fiscal Year 1993.

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