



U.S. Department of Energy
Office of Inspector General
Office of Audit Services

Audit Report

Follow-up of Depleted Uranium Hexafluoride Conversion

DOE/IG-0751

December 2006



Department of Energy
Washington, DC 20585

December 26, 2006

MEMORANDUM FOR THE SECRETARY

FROM:

Gregory H. Friedman
Gregory H. Friedman
Inspector General

SUBJECT:

INFORMATION: "Follow-up Audit Report of Depleted Uranium Hexafluoride Conversion"

BACKGROUND

In 1998, legislation was enacted requiring the Department of Energy (Department) to convert the 704,000 metric tons of depleted uranium hexafluoride stored at its gaseous diffusion plants to a more stable form. In August 2002, the Department awarded a contract to Uranium Disposition Services, LLC for the design, construction, and operation of conversion facilities in Paducah, Kentucky and Portsmouth, Ohio. The Paducah facility was designed with four conversion lines to process its larger inventory of depleted uranium hexafluoride, while the Portsmouth facility was designed with three lines. The Department expected that it would take approximately 25 years to convert all of the depleted uranium hexafluoride to a more stable form.

In a report on *Depleted Uranium Hexafluoride Conversion* (DOE/IG-0642, March 2004), we noted that the Department's conversion program could have been improved by adding an additional conversion line to the Portsmouth facility. We found that with a capital investment of \$5.6 million, the Department could reduce life-cycle operating costs by about \$60.2 million and complete the project nearly five years sooner than anticipated. We recommended that the Department perform a cost-benefit analysis to determine the optimum size of the Portsmouth facility and, based on the review, implement the most cost-effective approach. While management did not initially concur with the recommendations in the report, its final response to the report stated that alternative design configurations would be evaluated.

The objective of the audit was to determine if the Department had performed a cost-benefit analysis and implemented the most cost-effective approach to converting depleted uranium hexafluoride to a more stable form.

RESULTS OF AUDIT

The Department, in fact, performed a cost-benefit analysis in May 2005 which showed that adding the fourth line to the Portsmouth facility could save about \$60 million. Yet, it had not taken the next step of moving to implement the most cost-effective approach to converting depleted uranium hexafluoride to a more stable form. As of August 2006, the Department had not added the fourth conversion line even though it had begun construction of the facility eleven months earlier. This occurred because the Department

initially believed that it could improve operational efficiencies without adding the line, and that it did not want to further delay the project which had been plagued with contractor performance problems. However, in the current audit we found that operational efficiencies and cost savings from an additional conversion line at the facility were still viable and possible. Specifically, we found that, despite the passage of time, the Department could still save \$35 million in life-cycle costs by reducing the operations schedule by nearly five years. Accordingly, we again recommended that the Assistant Secretary for Environmental Management re-evaluate the benefit of adding the fourth line against other Environmental Management priorities, and take appropriate action based on that evaluation.

MANAGEMENT REACTION

The Assistant Secretary for Environmental Management agreed in principle with our conclusion that the addition of a fourth line would likely reduce the total life-cycle cost to operate the facility. However, management determined that adding the fourth line at this time would adversely impact completion and start-up of the facility. Management agreed to evaluate adding the fourth line after commencement of plant operations, and stated that it would assess this option in time for Fiscal Year 2009 budget decisions. While we are concerned that no action had been taken in response to our earlier report to implement an effective means of reducing project costs, we found management's actions responsive to our current recommendations.

Attachment

cc: Deputy Secretary
Under Secretary of Energy
Under Secretary for Science
Chief of Staff
Assistant Secretary for Environmental Management
Manager, Portsmouth/Paducah Project Office

**REPORT ON THE FOLLOW-UP AUDIT OF DEPLETED URANIUM
HEXAFLUORIDE CONVERSION**

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PORTSMOUTH CONVERSION LINE

Cost-Benefit Analysis

The Department of Energy (Department) had not implemented the most cost-effective approach to converting depleted uranium hexafluoride to a more stable form at the Portsmouth facility. In response to our earlier report which recommended a cost-benefit analysis, the Department tasked an external team to perform the analysis for adding a fourth conversion line as part of the independent cost review required for construction projects. In May 2005, the team reported that an additional line at the Portsmouth facility could reduce project costs by about \$60 million. Soon after the analysis, the Department reported that it would prepare a baseline change proposal to add the fourth line with a target date of September 2005. Although the contractor began construction on the facility in October 2005, the Department, at the time of our review, still had not prepared a change proposal to add the line to the facility.

The Department's contractor, Uranium Disposition Services, LLC (UDS), prepared estimates on three occasions showing that the additional line would result in significant savings. In February 2004, UDS proposed that the design of the Portsmouth conversion building be expanded to allow four lines, and estimated that the additional line could result in life-cycle cost savings ranging from \$55 million to \$65 million. After it had completed the design and been approved to start construction in October 2005, UDS prepared another cost proposal, and recommended that the Department approve the addition of the line within seven days. Finally, in May 2006, at the request of the Department, UDS prepared another analysis of the cost and savings related to the fourth line, and estimated that the line could save \$35 million to \$49 million in life-cycle costs. However, as of August 2006, the Department had not given the contractor notice to proceed with the line.

Operational Efficiencies and Schedule Problems

Initially, the Department did not add the fourth line because it believed it could increase production and save costs without the additional line. Specifically, the Department stated that it had improved operational efficiency on other projects by making process changes to existing equipment. Given this experience, the Department believed that the Portsmouth conversion project could improve its operations, increase throughput, and save costs without adding the fourth line. However, the Department's plan to save costs by increasing operating efficiency is unlikely. As early as February 2004, UDS reported that its planned operating efficiency target would be "challenging" to meet, and would require the entire UDS team to perform well, particularly with respect to the maintenance of the system and the logistics necessary to efficiently

move the cylinders and conversion products. Even if operational improvements were achieved, UDS concluded that the improvements would not have the impact that an additional line would have.

Further, as the project progressed, the Department did not want to make changes to the project and risk delays by adding the fourth conversion line when it found that contractor performance was below expectations. Specifically, in May 2004, the Department admonished UDS for "significant deficiencies" in its performance which had resulted in cost growth and schedule slippage. The Department cited deficiencies in the quality of UDS' design documents, its ineffective project change control for cost and schedule, and its lack of timely responses to the Department's previous requests for corrective actions. By October 2004, the design was already one year behind schedule, and by June 2006, the project was about two years behind schedule.

While we appreciate the Department's desire to mitigate schedule delays, we believe that the long-term benefits of adding the fourth line would more than compensate for the short-term delay. The addition of the line could reduce the overall operations schedule by nearly five years, and thereby allow the Department to recoup some of the delays encountered early in the project.

Life-Cycle Cost Savings

As a result of not implementing the most cost-effective approach, the Department may miss an opportunity to reduce its life-cycle costs for converting depleted uranium hexafluoride. Although the estimated cost to add the line increased as the facility's design and construction progressed, the Department could still realize significant benefits from the line. Specifically, the estimated cost to add the fourth processing line in February 2004, early in the design phase, was approximately \$7.3 million; however, UDS' latest cost proposal, prepared eight months into construction of the building, estimated that the addition would cost \$18.8 million. Nonetheless, the Department could still save at least \$35 million in life-cycle costs by reducing the operations schedule by nearly five years if the fourth line is added to the project.

RECOMMENDATIONS

We recommend that the Assistant Secretary for Environmental Management:

1. Evaluate the priority that should be given to adding a fourth line, relative to other Environmental Management priorities, as measured by respective cost-benefits; and,

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2. Based on the results of the evaluation, take appropriate action regarding the addition of the fourth line.

**MANAGEMENT
REACTION**

The Assistant Secretary for Environmental Management agreed in principle with our conclusion that the addition of a fourth line would likely reduce the total life-cycle cost to operate the facility. Management commissioned an independent business case analysis by a subject matter expert, and, based on that analysis, determined that adding the fourth line at this time would adversely impact completion and start-up of the facility. Management agreed to consider the advisability of installing the fourth line after commencement of plant operations, and will direct a macro-assessment to further evaluate this option to be completed in time for a Fiscal Year 2009 budget decision.

**AUDITOR
COMMENTS**

Management's actions are responsive to our recommendations and are included in their entirety in Appendix 3 of this report.

Appendix 1

OBJECTIVE

The objective of this audit was to determine if the Department of Energy (Department) had performed a cost-benefit analysis and implemented the most cost-effective approach to converting depleted uranium hexafluoride to a more stable form.

SCOPE

We conducted the audit from November 2005 to December 2006 at the Portsmouth/Paducah Project Office in Lexington, Kentucky.

METHODOLOGY

To accomplish the audit objective, we:

- Reviewed the contract between the Department and Uranium Disposition Services, LLC;
- Evaluated the Department's actions taken in response to our previous report;
- Analyzed monthly project status reports;
- Estimated life-cycle cost savings related to the fourth line;
- Assessed programmatic briefings on the project; and,
- Interviewed key Departmental and contractor personnel.

The audit was conducted 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. We assessed compliance with the Government Performance and Results Act of 1993 related to the depleted uranium hexafluoride conversion facilities and found that the Department had established performance measures at various stages of the project. Because our review was limited, it would not necessarily have disclosed all internal control deficiencies that may have existed at the time of our audit. We did not conduct a reliability assessment of computer-processed data because we did not rely on computer-processed information to achieve our audit objective.

Management waived an exit conference.

PRIOR REPORTS

Depleted Uranium Hexafluoride Conversion (DOE/IG-0642, March 2004). Based on analysis of procurement and contractor cost documents, the audit concluded that the Department's plan for converting depleted uranium hexafluoride inventories could be improved by adding an additional conversion line to the Portsmouth facility. Plans called for three conversion lines. By adding another conversion line, Portsmouth could process additional material annually and complete the project nearly five years earlier than planned. The facility size was not optimized because the Department's acquisition strategy emphasized initial capital costs rather than minimizing life-cycle costs. By increasing the production capacity at Portsmouth, the Department could shorten the duration of the Portsmouth conversion project by about 5 years and save about \$55 million. We recommended that the Department conduct a cost-benefit analysis to determine the optimum size and operation of the Portsmouth facility.

Waste Incineration at the Savannah River Site (DOE/IG-0453, October 1999). We found that the Consolidated Incinerator Facility (CIF) at the Savannah River Site was not operating at its permitted capacity. The CIF was operated at about 8 percent of capacity in Fiscal Years 1997 and 1998, and was expected to operate at a maximum of only 32 percent capacity in the future. This occurred because the Department of Energy designed the CIF to incinerate more waste than the Savannah River Site had available for treatment. Based on our recommendations, management agreed to make facility modifications to increase throughput.



Department of Energy

Washington, DC 20585

December 1, 2006

MEMORANDUM FOR GEORGE W. COLLARD
ASSISTANT INSPECTOR GENERAL FOR
PERFORMANCE AUDITS
OFFICE OF INSPECTOR GENERAL

FROM: JAMES A. RISPOLI *JARispoli*
ASSISTANT SECRETARY FOR
ENVIRONMENTAL MANAGEMENT

SUBJECT: Response to Office of Inspector General concerning the
Draft Audit Report, "Follow-up Audit Report of
Depleted Uranium Hexafluoride Conversion"

Thank you for the opportunity to review and respond to your draft report on the potential cost-benefit to adding a fourth process line to the Portsmouth Depleted Uranium Hexafluoride (DUF₆) conversion facility. The Office of Environmental Management (EM) agrees in principle with the conclusion that the addition of a fourth process line in the Portsmouth DUF₆ conversion facility would likely reduce the total life-cycle cost to operate the facility.

Accordingly, I commissioned an independent business case analysis by an objective subject matter expert. Based on that analysis, EM has decided that adding the fourth Portsmouth line at this time would adversely impact completion and startup of the facility. However, EM is considering the advisability of installing the fourth processing line after the commencement of plant operations. Consequently, I will direct that a macro-assessment to further evaluate this option be completed in time for a fiscal year 2009 budget decision. I will continue to keep you apprised of our deliberations in this area.

If you have any questions, or require additional clarification, please contact me at (202) 586-7709 or Mr. Frank Marcinowski, Deputy Assistant Secretary for Regulatory Compliance, at (202) 586-0370.

cc: William E. Murphie, PPPO



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