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

Audit Report

Cold Standby Program at the Portsmouth Gaseous Diffusion Plant

DOE/IG-0634

December 2003

Department of Energy

Washington, DC 20585

December 22, 2003

MEMORANDUM FOR THE SECRETARY

FROM: Gregory H. Friedman
Inspector General

SUBJECT: INFORMATION: Audit Report on the "Cold Standby Program at the Portsmouth Gaseous Diffusion Plant"

BACKGROUND

The Portsmouth Gaseous Diffusion Plant, located in southern Ohio, was built in the 1950s in response to the increasing demand for enriched uranium for national security and energy security purposes. This facility and its companion plant in Paducah, Kentucky, provide the only enriched uranium processing capability in the United States. In 1993, the Department of Energy leased both facilities to the United States Enrichment Corporation (USEC). In May 2001, due to reductions in the commercial market for enriched uranium, USEC ceased enriching operations at the Portsmouth site. Later in the same year, concerned about the energy security implications of relying solely on the Paducah plant, the Department awarded USEC a sole source temporary contract to immediately place the plant in a "cold standby" condition, essentially a condition in which operations could be resumed within a period of 18 months to two years. The terms of the contract were to be finalized within six months.

The goal of the Cold Standby Program was to maintain the plant in a usable condition until a long-term option became available to sustain the Nation's uranium enrichment capability. Congress expected the Cold Standby Program to continue until a new gaseous centrifuge technology was successfully demonstrated. Initially, the Department anticipated that the successful demonstration of this technology would occur around March 2005; however, current plans call for maintaining the plant in cold standby until September 2006. The objective of this audit was to determine whether the Department has effectively managed the Portsmouth Cold Standby Program.

RESULTS OF AUDIT

The audit disclosed that the Department had not clearly defined the termination point of the Cold Standby Program, and the total Cold Standby Program costs had almost doubled from initial project estimates, increasing by about $189 million. Similarly, the Department had not:

- Formally updated the program mission requirements;
- Assigned responsibility of the program to a single organization;

- Executed the most cost-effective procurement strategy; nor,
- Developed a programmatic baseline.

Without a well-defined endpoint and a formalized process for assessing the continuing need of the Cold Standby Program, the Department risks possible unnecessary extensions of the program or potential disruptions in the supply of enriched uranium. In fact, if the Department decides to extend the Cold Standby Program until USEC deploys a full scale gas centrifuge, costs could increase from the initial $210 million estimate to over $600 million.

We recommended that the Department conduct a formal evaluation of Cold Standby mission requirements, consolidate program operations under a single Department entity, and increase project and contractual controls to ensure program costs are minimized. Our audit findings are consistent with the Department's February 2002 *Top-to-Bottom Review*, which discussed significant challenges facing the Environmental Management program. In particular, the review team's report noted that action must be taken up-front to improve understanding and planning of work and contract administration. The report also noted that effective contracting practices and the application of the Department's project management principles to all of its core work areas, including those at the program level, are essential to improved program performance.

MANAGEMENT REACTION

The Under Secretary for Energy, Science and the Environment concurred with our recommendations. During our audit, management initiated its own review and reached conclusions consistent with our recommendations. In responding to a draft of this report, management provided a number of technical clarifications regarding aspects of the Cold Standby Program, particularly in regard to plans for gas centrifuge deployment. That analysis, management's concerns, and our responses were incorporated into the body of the report.

Attachment

cc: Deputy Secretary
Under Secretary for Energy, Science and the Environment
Assistant Secretary for Environmental Management
Director, Office of Nuclear Energy, Science and Technology
Manager, Oak Ridge Operations Office
Manager, Portsmouth/Paducah Project Office

COLD STANDBY PROGRAM AT THE PORTSMOUTH GASEOUS DIFFUSION PLANT

TABLE OF CONTENTS

PROGRAM RESULTS AND COST

Program Plans

The Department has not clearly defined the termination point of the Cold Standby Program. Initially, the Department's Office of Nuclear Energy, Science and Technology (Nuclear Energy) coordinated the end of Cold Standby with the deployment of a government-funded gas centrifuge facility. The plans called for the Cold Standby mission to end in September 2005 with centrifuge production reaching adequate levels by September 2008. Under those assumptions, there would be a minimum one-year gap in backup domestic enrichment capability, representing the time between the latest possible resumption of gaseous diffusion operations and the planned full operation of the government-funded gas centrifuge facility. However, the government-funded centrifuge program was never implemented, and in 2002, the Department negotiated with the United States Enrichment Corporation (USEC) to deploy a commercial gas centrifuge facility. Under USEC's plan, comparable enrichment production will begin in September 2011, increasing the amount of time between the possibility of restarting the Portsmouth facility and the deployment of a new commercial centrifuge to a minimum of three years.

According to Nuclear Energy management, the current estimated three-year gap between the end of the Cold Standby mission and the gas centrifuge deployment may not adversely impact the nation's nuclear fuel supply. Management specifically noted that the decision to place the plant in cold standby was based on several dynamic, complex, and interconnected factors, and Cold Standby was only one element in an overall approach aimed at addressing nuclear fuel supply security. Based on recent reviews, management stated that the domestic supply security conditions have changed significantly, and key issues associated with the long-term viability of domestic enrichment have improved. The Office of Inspector General was informed, however, that these reviews were informal and undocumented. Thus, we could not assess their impacts on the current Cold Standby Program nor could we see where management used the reviews to justify either the cessation or continued need of Cold Standby. Given the significant changes in the nuclear fuel supply described by management and the cost of Cold Standby, it is important for the Department to formally evaluate its resources and requirements to determine whether the current gap between the end of Cold Standby and the full scale deployment of commercial gas centrifuge presents a vulnerability to the security of the domestic nuclear fuel supply.

Program Costs

In December 2000, Nuclear Energy initially estimated that Cold Standby would last four years and cost $210 million. However, the Department now projects that the program will last five years at an

estimated cost of $399 million. Increases in indirect costs and additional work scope contributed to the increase in total project cost.

USEC's indirect costs for Cold Standby have increased by an estimated $90 million through 2006. This occurred despite contract requirements for USEC to identify a continuous improvement program to effectively and efficiently reduce overhead and indirect costs to the Government. While some of the increase was attributable to a change in the cost of worker benefits, the initial rate proposed by USEC was underestimated. USEC erroneously assumed that more non-Department activities would share the indirect costs.

The cost of executing Cold Standby also grew because the Department increased the amount of work to be performed.[1] For example:

- The Department has projected that the Cold Standby mission will increase by one year, causing the total project costs to grow by about $71 million, the budgeted amount for operations and overhead for FY 2006.

- Nuclear Energy's initial estimate included deposit removal[2] only at a level necessary to enable the restart of the enrichment process. However, when the contract was issued, the Department's Office of Environmental Management (Environmental Management) provided up to $61 million for USEC to perform deposit removal activities. We were unable to compare the two deposit removal programs because the cost and technical requirements for Nuclear Energy's deposit removal activities were not defined.

- Environmental Management also provided $10 million in additional funds to another contractor for technical oversight of the program. According to the contractor's task description, technical oversight activities included monitoring and providing daily reports on USEC field activities, as well as reviewing and

[1] The costs associated with the scope growth include allocations of the $90 million indirect cost increase.

[2] Deposit removal refers to a variety of techniques designed to remove deposits of uranium from the diffusion equipment. Deposit removal is expected to improve operational performance after restart and decrease decommissioning, dismantlement, and disposal costs of the process equipment.

issuing recommendations to the Department on routine monthly deliverables under the USEC contract. This effort was not noted in the Nuclear Energy estimate as it was expected that the Department would take responsibility for these activities.

Structure, Strategy, and Management

The effectiveness of the Cold Standby Program has been limited because the Department did not formally update mission requirements; assign responsibility of the program to a single organization; execute the most cost-effective procurement strategy; or, develop a programmatic baseline.

During our review, we identified and discussed with Department officials several possible sources of enriched uranium that may also address domestic enrichment security. While these potential sources alone may not ensure against supply disruptions, we concluded that they could become part of a comprehensive strategy to ensure the availability of enriched uranium for commercial fuel. In response to our draft report, management stated that the Department had fully examined the ability to use the sources we identified as a part of its annual Cold Standby mission analysis and concluded that none were cost-effective or viable. Further, management stated that the supply of enriched uranium was more secure than when the Cold Standby Program was initiated and that delays in the deployment of gas centrifuge would not necessarily equate to a need for extension of the Cold Standby Program. However, available documentation indicates there is such a link. In fact, according to the Department's FY 2004 Congressional Budget request, Cold Standby is tied to the successful deployment of the gas centrifuge technology.

In addition, the Department did not have an organizational structure in place that was conducive to effective program execution. Since inception, policy development and operational management have been split between Nuclear Energy and Environmental Management. Nuclear Energy developed the initial Cold Standby plan and is responsible for developing Department policy for nuclear energy supplies. Environmental Management, whose primary mission is to clean up sites such as Portsmouth, was assigned the task of managing and funding the Cold Standby Program. The organizational conflict is evidenced by Nuclear Energy's lead policy role in developing the Memorandum of Agreement for the deployment of the advanced enrichment technology with USEC. Based on the agreement, the Department agreed to clean up buildings that will be occupied by USEC for the gas centrifuge project. In turn, USEC planned to take over those buildings by April 30, 2004. However, Environmental Management,

which is responsible for cleaning up the facilities, had not finalized its plans and may not finish by the expected date. Additionally, the agreement did not require an enrichment replacement capability until 2011, even though Environmental Management planned to cease Cold Standby operations in 2006.

Furthermore, the Department's lack of a cost-effective contracting strategy has contributed to the growth of the Cold Standby Program. For example, the Defense Contract Audit Agency advised the Department that cost ceilings should be negotiated to prevent unreasonable indirect cost rates during contract performance. While the Department attempted, but was unable to reach agreement with USEC on lower indirect rates, we noted that, based on current rates, the Department would pay significantly more than anticipated for indirect costs under the contract that ended September 2003. Also, the Department did not take advantage of existing agreements with USEC to minimize fee payments. For example, in 1993 the Department agreed to reimburse USEC on a cost-only basis for utilities it used in carrying out environmental cleanup work at Portsmouth. However, under the current Cold Standby contract, the Department could pay additional fees of $1.3 million for these same utilities.

Moreover, the Department has not effectively negotiated the Cold Standby contract with USEC, since the temporary contract had not been finalized two years after issuance. One of the primary reasons for the Department's inability to complete the negotiations is USEC's exclusive authority to operate the Portsmouth Gaseous Diffusion Plant. In addition, the restart process would require the safe and economic restart of thousands of specialized pieces of equipment, which would require process knowledge that is currently available only to USEC. As a result, USEC and the Department have not been able to negotiate a final agreement on contract fees and employee benefits. Since the Department did not negotiate the contract on time, the Department could pay USEC an additional $1.6 million in profits associated with increased indirect costs through FY 2003.

To its credit, in January 2002, the Oak Ridge Operations Office implemented a comprehensive review system for monitoring Cold Standby invoices. The Department also withheld 15 percent of the invoiced costs, and no fee was paid until the contract was finalized. Management stated that these measures have reduced the number of hours billed and the total costs incurred under the USEC contract.

For example, in September 2003, the contracting officer took exception to 2,518 training hours and disallowed $251,800 in related contract costs.

Finally, Environmental Management did not follow the Department's project management principles in executing the Cold Standby Program. The Department has promulgated guidance for the acquisition and remediation of capital assets, and Environmental Management has stated its intent to use those principles to manage all major projects, not just those required by the Department order. However, these principles were not followed for the Cold Standby Program. For example, a baseline representing Nuclear Energy's initial $210 million estimate was not developed, and almost three years into the program, a comprehensive programmatic baseline still does not exist. In addition, the contractor's baseline and project execution plan have yet to be approved by the Department, and the Department did not approve a restart plan until 20 months into the program. The lack of a comprehensive baseline for the program may have contributed to the program's cost growth, since a baseline is the primary instrument for controlling changes to the technical scope, cost, and schedule.

Cost and Performance Impacts

In the absence of a well-defined endpoint and a formalized process for assessing the continuing need of the Cold Standby Program, the Department risks possible unnecessary extensions of the program or potential disruptions in the supply of enriched uranium. Further, because the Department may be vulnerable to schedule increases related to USEC's deployment of gas centrifuge technology, the Department could incur additional costs related to maintaining Portsmouth in cold standby. In determining a reasonable period for Cold Standby, the Department noted that the longer the duration of the program, the more difficult and costly restart would become. If Cold Standby is extended three years to coincide with the deployment of gas centrifuge in 2011, it is projected to cost the Department $220 million over and above the current $399 million estimate, an increase of $409 million over the original estimate.

RECOMMENDATIONS

We recommend that the Under Secretary for Energy, Science and the Environment:

1. Reevaluate the Cold Standby Program mission need through a documented process, factoring in restart costs, programmatic risks, impact on site closure, and alternative supply sources;

2. Eliminate organizational conflict at Portsmouth by consolidating program activities under a single Department entity;

3. Conduct an evaluation of services already provided under existing USEC agreements, and not purchase the same items under the Cold Standby Program contract;

4. Negotiate a performance-based contract with cost ceilings; and,

5. Establish a programmatic baseline for the Cold Standby Program.

MANAGEMENT AND AUDITOR COMMENTS

Management concurred with the report's recommendations. During our audit, management initiated its own review and reached similar conclusions that are consistent with our recommendations. Corrective action plans have been identified and initiated. We have incorporated management's comments, where applicable, throughout the report and included management's verbatim response as Appendix 3.

Appendix 1

PRIOR REPORTS

- *Nuclear Nonproliferation, Implications of the U.S. Purchase of Russian Highly Enriched Uranium* (GAO-01-148, December 2000). The review found that the Highly Enriched Uranium (HEU) agreement has had a beneficial impact on the national security of the United States, but not without cost. Not only has the U.S. government spent $325 million in purchasing natural uranium from Russia, but the United States also faces a growing dependence on Russian-origin material for nuclear fuel. The Congress intended that the federal government ensure that neither the privatization of USEC nor the implementation of the HEU agreement would be harmful to the domestic uranium industry. However, developments since USEC's privatization, combined with USEC's reliance on Russian low enriched uranium for nearly half of its annual sales, have created concerns about the United State's ability to domestically produce fuel for commercial power plants. The review recommended that a study be conducted to determine the impact on the domestic nuclear fuel industry of importing newly produced low enriched uranium and to prepare a contingency plan in the event that USEC withdraws or is replaced as executive agent for the HEU agreement.

- *USEC Portsmouth Gaseous Diffusion Plant "Cold Standby" Plan* (GAO-B-286661, January 2001). The report concluded that the costs of the Department's Cold Standby plan do not constitute "expenses of privatization" within the meaning of the Privatization Act, and therefore are not payable from the USEC Fund. Unless the Department can identify further "expenses of privatization" payable from the USEC Fund consistent with the opinion in the report, Congress may wish to consider a rescission or transfer of the balance of the USEC Fund not reserved under the McConnel Act.

Appendix 2

OBJECTIVE

The objective of this audit was to determine whether the Department has effectively managed the Portsmouth Cold Standby Program.

SCOPE

The audit was performed from January 9 to August 1, 2003, at the Oak Ridge Operations Office in Oak Ridge, Tennessee; Portsmouth Gaseous Diffusion Plant near Piketon, Ohio; and Office of Nuclear Energy, Science and Technology, and Environmental Management Headquarters in Washington, D.C. The scope of the audit included the Department's actual and planned Portsmouth Cold Standby Program activities from 2000 through 2011.

METHODOLOGY

To accomplish the audit objective, we:

- Reviewed Congressional requirements and intended goals of the Cold Standby Program;
- Compared the initial and current Cold Standby plans, including the projected cost, scope, and schedule;
- Calculated program costs from June 2001 through September 2009;
- Determined and quantified the reasons for increased program costs;
- Identified possible alternative sources of enriched uranium;
- Evaluated the Department's procurement strategy for accomplishing the Cold Standby Program and reviewed alternative contracting options;
- Reviewed Departmental regulations and guidance governing project management; and,
- Discussed Cold Standby Program activities with Department 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. 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. Because only a limited amount of computer-processed data was used during the audit, we did not conduct a reliability assessment of computer-processed data.

Finally, we assessed the Department's compliance with the Government Performance and Results Act of 1993. Although the Department has set up the goal of managing the Department's vital nuclear resources and capabilities efficiently and effectively, our review of the Department's Annual Performance Plans for FYs 2001 through 2003 did not identify any performance measures directly relating to the Cold Standby Program.

We held an exit conference with Nuclear Energy's Deputy Director for Operations and Management and the Manager of the Portsmouth/ Paducah Project Office on November 25, 2003.

Appendix 3

The Under Secretary of Energy
Washington, DC 20585

November 5, 2003

MEMORANDUM FOR GREGORY H. FRIEDMAN
INSPECTOR GENERAL

FROM: ROBERT G. CARD, UNDER SECRETARY FOR ENERGY, SCIENCE AND THE ENVIRONMENT

SUBJECT: MANAGEMENT REACTION ON DRAFT REPORT, "COLD STANDBY PROGRAM AT THE PORTSMOUTH GASEOUS DIFFUSION PLANT"

This memorandum provides the comments (attached) requested in Frederick D. Doggett's memorandum of August 13, 2003.

Management concurs with all the Inspector General's recommendations contained in the draft report entitled "Cold Standby Program at the Portsmouth Gaseous Diffusion Plant." These recommendations independently support many of the conclusions reached by management during its review of the cold standby program, which review has been conducted in parallel and in part as a result of, the Inspector General's research for this report.

The Office of Nuclear Energy, Science and Technology was the primary lead program with coordination from the Office of Environmental Management in the response to this report. We would welcome the opportunity for our staffs to meet, as indicated in your memorandum of September 13, 2001, to clarify those areas where we reached similar conclusions for different reasons before the final report is issued.

I appreciate the opportunity to review the report and to provide comments. If you have any questions, please contact me or William D. Magwood, IV, Director, Office of Nuclear Energy, Science and Technology.

Attachment

cc: James Campbell, ME-1
Jessie H. Roberson, EM-1
William D. Magwood, IV, NE-1
Merley Lewis, ME-1.1
Bill Murphie, EM

IG Report No.: DOE/IG-0634

CUSTOMER RESPONSE FORM

The Office of Inspector General has a continuing interest in improving the usefulness of its products. We wish to make our reports as responsive as possible to our customers' requirements, and, therefore, ask that you consider sharing your thoughts with us. On the back of this form, you may suggest improvements to enhance the effectiveness of future reports. Please include answers to the following questions if they are applicable to you:

1. What additional background information about the selection, scheduling, scope, or procedures of the audit would have been helpful to the reader in understanding this report?

2. What additional information related to findings and recommendations could have been included in this report to assist management in implementing corrective actions?

3. What format, stylistic, or organizational changes might have made this report's overall message more clear to the reader?

4. What additional actions could the Office of Inspector General have taken on the issues discussed in this report which would have been helpful?

Please include your name and telephone number so that we may contact you should we have any questions about your comments.

Name _____ Date _____

Telephone _____ Organization _____

When you have completed this form, you may telefax it to the Office of Inspector General at (202) 586-0948, or you may mail it to:

Office of Inspector General (IG-1)
Department of Energy
Washington, DC 20585

ATTN: Customer Relations

If you wish to discuss this report or your comments with a staff member of the Office of Inspector General, please contact Wilma Slaughter at (202) 586-1924.

The Office of Inspector General wants to make the distribution of its reports as customer friendly and cost effective as possible. Therefore, this report will be available electronically through the Internet at the following address:

U.S. Department of Energy, Office of Inspector General, Home Page
http://www.ig.doe.gov

Your comments would be appreciated and can be provided on the Customer Response Form attached to the report.