U.S. Department of Energy

Office of Inspector General

Office of Audits and Inspections

AUDIT REPORT

Followup on the Office of Science's Management of the Isotope Program

OAI-L-16-12

July 2016

Department of Energy
Washington, DC 20585

July 1, 2016

MEMORANDUM FOR THE DIRECTOR, OFFICE OF SCIENCE

FROM: Sarah B. Nelson
Assistant Inspector General
for Audits and Administration
Office of Inspector General

SUBJECT: INFORMATION: Audit Report for the "Followup on the Office of Science's Management of the Isotope Program"

BACKGROUND

For over 50 years, the Department of Energy has been at the forefront of developing and producing stable and radioactive isotope products that are now used worldwide for hundreds of research, biomedical, security, and industrial applications that benefit society, including heart imaging, cancer therapy, smoke and explosive detectors, and oil exploration. The Department's Isotope Development and Production for Research and Applications Program, managed by the Office of Science's (Science) Office of Nuclear Physics, produces isotopes where there is no U.S. private sector production capability or other production capacity is insufficient to meet U.S. needs.

We last reviewed the Program in 2005, when it was managed by the Office of Nuclear Energy, and issued an audit report on *Management of the Department's Isotope Program* (DOE/IG-0709, November 2005). We reported that the Department had not always provided researchers with the isotopes needed to conduct planned research; had not adequately addressed recognized production problems during its planning process; had adopted pricing and payment policies that made it difficult for the research community to purchase the Department's isotopes; and had expended resources on maintaining unused or underutilized production facilities that could have been used to boost production. Our report made recommendations designed to help management revitalize the Program and permit it to better address the research community's needs.

Due to the importance of the development, production, and supply of isotopes to the nation, we initiated this audit to determine whether Science effectively managed the Program.

RESULTS OF AUDIT

Nothing came to our attention to indicate that Science's management of the Program was not generally effective. We found that Program officials had addressed the issues identified in our prior report. For example, Program officials revised pricing policies to make isotopes more

affordable to the research community; invested in production facility infrastructure to refurbish aging equipment; and expanded production capabilities using funds received from the *American Recovery and Reinvestment Act of 2009*. We also found that Program officials were forecasting to meet supply and demand for isotopes within the constraints of the Program's limited resources; revenues from sales and related services adequately covered production costs; and sufficient balances were being maintained in the revolving fund to pay for critical program operations and mission needs. However, we identified opportunities to improve controls in the areas of stable isotope leases and helium-3 (He-3) inventory.

Stable Isotope Leases

We found that the Program's processes for managing lease renewals, verifying material returns, and billing material losses could be improved. The Program maintains an inventory of stable isotopes available for lease to customers. Customers are responsible for paying for the time they have the isotopes plus the value of any loss of isotopic material that occurs from processing and handling of the material. We identified concerns with seven of the eight leases we reviewed. Specifically, Program officials were not periodically reviewing leases to determine whether they needed to be renewed or the materials needed to be returned. Furthermore, analyses of returned isotopes for any loss of material, dilution, or contamination were not always being performed in a timely manner to determine if customers were responsible for additional payment. We also found that customers were not consistently billed for material lost to fabricate the isotopes into usable forms. Consequently, Program officials did not recover $115,000 for lease fees due and payments for material losses. The majority of the material loss, valued at $82,099, was not billed because the customer disputed the quantity lost. In this case, the customer may not have properly packaged the isotope for return, using plastic bags instead of the original glass vials, which made recovery of the material difficult. Because the United States does not have the production capability to replenish stable isotope inventories, strong controls are important to ensure that the existing supply of stable isotopes is available to support research needs.

He-3 Inventory

We also found that controls over the inventory of He-3 could be improved. He-3 is a byproduct of tritium decay and is separated during the tritium process at the Department's Savannah River Site. We noted that Program officials did not always verify He-3 inventory sold and stored by a third-party and did not account for the He-3 held offsite. The Program had contracted Linde Electronics and Specialty Gases (Linde) to assist with sales and distribution of He-3. However, we found that Program officials were not verifying the amounts sold that were indicated in Linde's shipping documents. Furthermore, Program officials did not perform physical inventories of the He-3 stored by Linde or witness inventory audits conducted for Linde, as required by the Department's *Financial Management Handbook*. Moreover, He-3 inventory was not included in the Program's accounting records, as required. While the Savannah River Site accounted for He-3 in its Automated Reservoir Management System, quantities shipped to Linde were removed. Although notified of these shipments, Program officials did not record the He-3 inventory shipped to Linde in the Program's accounting records. Instead, officials relied on Linde for providing up-to-date inventory amounts and did not verify that information.

In addition, Program officials did not assign any tritium processing and separation costs to the He-3 inventory available for sale as required. Sales of He-3 averaged over $1.5 million annually and, as of October 2015, Linde reported having He-3 worth over $5 million. Given its value, the Program would benefit from stronger controls over He-3 sales and inventory.

SUGGESTED ACTIONS

To address the issues noted in this report, we suggest that the Director of the Isotope Development and Production for Research and Applications Program strengthen controls over stable isotope lease renewals, material returns, and billing, as well as implement He-3 inventory controls that are consistent with requirements of the Department's *Financial Management Handbook*. We discussed these suggestions with Program officials who stated they were revising their policies and procedures accordingly.

We appreciated the cooperation of your staff during the audit.

Attachments

cc: Deputy Secretary
Under Secretary for Science and Energy
Chief of Staff

OBJECTIVE, SCOPE, AND METHODOLOGY

OBJECTIVE

We performed this audit to determine whether the Office of Science (Science) effectively managed the Isotope Development and Production for Research and Applications Program.

SCOPE

We conducted the audit from July 2015 to July 2016 at Science's Headquarters Offices in Germantown, Maryland, and Science's Isotope Program operations at Oak Ridge National Laboratory (ORNL) in Oak Ridge, Tennessee. The scope of the audit covered the Program from fiscal years (FYs) 2009 through 2015. However, we limited our lease review to FYs 2012 through 2015, and our sales review to FYs 2014 and 2015. We conducted this audit under Office of Inspector General project number A15CH043.

METHODOLOGY

To accomplish the audit objective, we:

- Reviewed and evaluated relevant laws and regulations related to the Program;
- Reviewed the Program's policies, procedures, and planning documents;
- Reviewed prior Office of Inspector General, Government Accountability Office, and other independent reviews concerning the Program;
- Interviewed Science Headquarters, Office of the Chief Financial Officer, field office, and laboratory staff responsible for managing the Program;
- Conducted a site visit to ORNL to observe isotope production and processing facilities, and business operations; and
- Analyzed isotope price trends during FYs 2011 through 2015.

Additionally, we judgmentally selected isotope sales recorded by the Program to ensure the transactions were appropriate and sufficiently documented. We examined 166 of 2,515 sales transactions recorded between October 1, 2013, and July 31, 2015, based on the dollar amount, customer, and isotope sold. In total, the sample amounted to nearly $11 million of the $65 million in total sales for the period. For our review, we traced sales to supporting documents to see whether correct prices were charged and invoices were paid. Because our sample was not statistical, we could not project our results to the population of transactions.

Finally, we judgmentally selected leases to ensure the lease transactions were appropriate and sufficiently documented. We selected 8 of the 36 leases during FYs 2012 through 2015 based on the dollar amount, customer, and status of the lease. The sample of leases was valued at about

$3.7 million. We reviewed supporting documents and tested compliance with terms and conditions of the lease agreements. Because our sample was not statistical, we could not project our results to the population of leases.

During the audit, we identified issues related to the procurement of support services that may be more systemic to Science as a whole and, as such, we considered them to be out of the scope of this audit. These issues will be addressed as part of a separate audit on Science procurements.

We conducted this performance audit in accordance with generally accepted Government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objective. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objective. Accordingly, we assessed significant internal controls and compliance with laws and regulations necessary to satisfy the audit objective. In particular, we assessed the implementation of the *GPRA Modernization Act of 2010* and found that Science had not established performance measures for the Program. 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. Finally, we relied on computer processed data to achieve our audit objectives. Accordingly, we conducted an assessment of the data by comparing it to source documents and determined the data was reliable for our purposes.

Management waived an exit conference on June 23, 2016.

RELATED REPORTS

Office of Inspector General

- Audit Report on *The Global Threat Reduction Initiative's Molybdenum-99 Program* (OAS-L-12-07, July 2012). This audit found that progress had been made in developing reliable domestic production capability for molybdenum-99 (Mo-99). Mo-99 is used in the production of technetium-99m, which is the most commonly used medical isotope in the world. Because the half-life of Mo-99 is only 66 hours, it cannot be stockpiled. Furthermore, the U.S. relies on foreign countries to meet the demand because there is no domestic production.

- Special Report on *Meeting Medical and Research Needs for Isotopes Derived from Uranium-233* (DOE/IG-0795, May 2008). This report concluded that the Department of Energy's disposal plans for uranium-233 did not provide assurance that sufficient quantities of uranium-233 and its progeny isotopes would be available to support U.S. medical and scientific research needs. Uranium-233 is used to produce thorium-229, which is then used to create actinium-225 and bismuth-213, two extremely rare isotopes used in cancer research. The report noted that the Department is the only domestic producer of these isotopes and no viable alternative methods of production had been proven. The Department was disposing of uranium-233 because it no longer had authority to keep it.

- Audit Report on *Management of the Department's Isotope Program* (DOE/IG-0709, November 2005). This audit found that the Department had not always provided researchers with the isotopes needed to conduct planned research; had not adequately addressed recognized production problems during its Isotope Program planning process; had adopted pricing and payment policies that made it difficult for the research community to purchase the Department's isotopes; and had expended resources on maintaining unused or underutilized production facilities that could have been used to boost production. The recommendations were designed to help management revitalize the Isotope Program and permit it to better address the research community's needs.

Government Accountability Office (GAO)

- *Managing Critical Isotopes: Stewardship of Lithium-7 Is Needed to Ensure a Stable Supply*, (GAO-13-716, October 2013). GAO reviewed the supply and domestic demand for lithium-7 and identified options to mitigate a potential lithium-7 shortage.

- *Managing Critical Isotopes: DOE's Isotope Program Needs Better Planning for Setting Prices and Managing Production Risks* (GAO-12-591, May 2012). GAO noted that the Department's Isotope Program may be forgoing revenue that could further its mission due to the manner in which prices were established. It also reported that the Isotope Program had not established clear objectives or performed a comprehensive risk assessment.

- *Managing Critical Isotopes: Weaknesses in DOE's Management of Helium-3 Delayed the Federal Response to a Critical Supply Shortage* (GAO-11-472, May 2011). After the nation experienced a shortage of helium-3, GAO reviewed the Department's management of helium-3 and found that the Federal Government's awareness of and response to the helium-3 shortage was delayed because no Departmental entity had stewardship responsibility for the overall management of helium-3.

FEEDBACK

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