



U.S. Department of Energy
Office of Inspector General
Office of Audits and Inspections

AUDIT REPORT

Follow-Up Audit of the Los Alamos Neutron
Science Center

OAS-M-14-06

June 2014



Department of Energy
Washington, DC 20585

June 4, 2014

MEMORANDUM FOR THE MANAGER, LOS ALAMOS FIELD OFFICE

A handwritten signature in black ink, appearing to read "Rickey R. Hass".

FROM: Rickey R. Hass
Deputy Inspector General
for Audits and Inspections
Office of Inspector General

SUBJECT: INFORMATION: Audit Report "Follow-Up Audit of the Los Alamos Neutron Science Center"

BACKGROUND

The Department of Energy's (Department) Los Alamos Neutron Science Center (LANSCE), located at Los Alamos National Laboratory (LANL), was constructed in 1972. LANSCE's primary mission is to support the National Nuclear Security Administration's (NNSA) Stockpile Stewardship activities by conducting experiments that provide valuable insight on the status of the Nation's aging nuclear weapons, including information critical to decisions made in the life extension programs. According to LANL, LANSCE also currently produces Strontium, Germanium and other isotopes for medical research and commercial applications.

In 2004, the Office of Inspector General reported in *The Los Alamos Neutron Science Center* (DOE/IG-0666, November 2004), that LANSCE may not be capable of operating effectively in the future as equipment failures in major components made its accelerator's beam unreliable. The report recommended that NNSA determine whether LANSCE had a viable mission and, dependent on the determination, develop plans to refurbish the facility or shut it down. In 2010, NNSA found that fundamental science and materials research performed at LANSCE was important to its programmatic needs and should continue for at least a decade. As such, LANL developed the LANSCE Linac Risk Mitigation Strategy (LRM) to increase the reliability of the accelerator and restore its designed performance levels. The LRM has a completion date of 2019, with a total estimated project cost of \$252.9 million and will be funded with operating funds on an annual basis. The LRM is comprised of 20 subprojects involving approximately 7,500 work activities. Given the significant project cost involved, we initiated this audit to determine whether NNSA had effectively managed the refurbishment of LANSCE.

RESULTS OF AUDIT

Our review disclosed that LANL was generally meeting milestones as scheduled, executing work within budget, and had implemented some project oversight tools. While LANL met milestones for refurbishing LANSCE and executed work within budget, we observed that the LRM is facing

challenges that may hinder its ability to improve the reliability of the facility and restore performance levels of the accelerator. Further, LANL did not adhere to the Department's requirements contained in Department Order 413.3B, *Program and Project Management for the Acquisition of Capital Assets*, or employ all project management tools therein. For example, the status of the LRM's work has not been reported in the Department's Project Assessment and Reporting System (PARS II), as are other projects of similar magnitude and cost. This omission from PARS II adversely impacts the Department's ability to monitor LRM's progress to ensure that it meets its goals and objectives and stays with established cost and schedule parameters.

Schedule and Milestones

LANSCE generally completed work activities on schedule. We selected 6 LRM subprojects for detailed review and found that 21 of 24 work activities of those subprojects were completed on schedule or early. In fact, subproject personnel reported to us that they were able to reduce the schedule for refurbishment of certain components when those components required alteration by more than one vendor. For example, work activities associated with a cooling system subproject were completed 4 months ahead of schedule by sending components simultaneously to vendors for modification prior to re-assembly and installation by LRM engineers. Subproject personnel reported to us that they were able to save an estimated 4 months of schedule by implementing this revised process. We identified two work activities involving two of the same type of accelerator components that were received as much as 8 weeks after the scheduled delivery date. The third work activity not completed in a timely manner involved an amplifier system part that required vendor rework resulting in a 3-month delay in activity completion. According to the Project Manager, the delayed receipt of these three components did not adversely impact the LRM's schedule.

We also reviewed the LRM's milestones and found that LANL reported that it met 20 of 26 milestones for Fiscal Year (FY) 2013. For example, a power output coupler, a component that transmits microwaves, was received on schedule in May 2013. Four of the milestones that were not met were completed by mid-October 2013, which was 4 months later than planned. The Project Manager told us that delays in meeting two of the four milestones could impact work during FY 2014 that support restoration of the 120 Hertz operation; however, the Project Manager told us that LANL was aggressively working towards restoring the 120 Hertz operation as scheduled. The delays in meeting the remaining two completed milestones are not expected to adversely affect the LRM. Two milestones scheduled to be completed in October 2013, were delayed by 2 months as a result of the Government shutdown on October 1, 2013. Specifically, LANL had to cancel travel to test components at the vendor site. LANL reported that it completed the two milestones in December 2013. However, the Project Manager told us that any further delay in meeting the milestones would likely require the LRM to delay installation work for the accelerator's water system subproject by 1 year.

Budget and Schedule

Since the project began in October 2010, the LRM has received \$87.9 million in funding. LANL reported that it has consistently performed its scheduled work within budget each year. NNSA conducted an assessment in June 2013, to evaluate the LRM's FY 2014 schedule. According to

the review, the LRM schedule was realistic, comprehensive, complete and achievable. The review findings were based upon the assumption that funding for the LRM would be provided in the full amount and in a timely manner sufficient to support the FY 2014 schedule.

Management and Oversight

Management of the LRM was provided by a LANL Project Manager, a LANL installation team, a Federal Project Director and a Los Alamos Field Office Readiness in Technical Base and Facilities (RTBF) Portfolio Manager. While the Project Manager is responsible for the entire LRM, installation team managers are responsible for the completion of specific subprojects. LRM personnel reported to us that, dependent upon the complexity of the subproject, the Project Manager meets with the subproject installation teams biweekly or monthly to review progress and adjust the work schedule as necessary. Oversight by the Los Alamos Field Office is performed by the Federal Project Director for 2 subprojects and the RTBF Portfolio Manager for the remaining 18 subprojects. The division of subproject oversight by Los Alamos Field Office personnel was based upon the funding classification of each subproject.

The Federal Project Director and RTBF Portfolio Manager each receive monthly LRM status reports provided by different divisions at LANL. Our review of the monthly data reported since January 2013, did not reveal any significant issues in the execution of the LRM's subprojects or in the achievement of milestones established for FY 2013. LANL also included LRM in its quarterly RTBF Portfolio Status Reports issued to NNSA's Office of Infrastructure Resource Management, and the Science and Manufacturing Capabilities Office. The June 2013 report included a high-level overview on the progress of the LRM and noted that benefits to LANSCE operations had been realized as a result of risk mitigation efforts. LANL told us that these benefits included improved reliability and reduced corrective maintenance costs for the portions of the accelerator that have been updated. Both the Federal Project Director and RTBF Portfolio Manager shared the information reported to them from LANL with their respective NNSA managers. As of September 2013, the Federal Project Director and the RTBF Portfolio Manager did not report any concerns to us with the execution of the LRM.

We noted that despite the significant investment required to refurbish LANSCE, LANL had not reported the work in the Department's PARS II as other project work of similar magnitude and cost. Projects with a total project cost greater than \$10 million are required to follow Department Order 413.3B for reporting project status in PARS II. According to LANL officials, they did not adhere to the Order and employ all project management tools therein because LRM has been funded with operating funds instead of line item funding. However, because of the importance of LANSCE to the Department and NNSA, it requires greater rigor in the oversight and reporting of the LRM to ensure its success. As such, we concluded that managing LRM in accordance with the Order and reporting its status in PARS II would improve oversight and evaluation that would be of benefit to NNSA and the LRM management. Unlike the monthly status reports currently provided by LANL to NNSA, PARS II reports would provide monthly evaluations of LRM work by independent assessors.

LRM Challenges

The LRM is facing challenges as it works towards improving LANSCE's reliability and restoring its designed performance levels. Specifically, the LRM has been funded annually through LANL's operational budget, which has varied from year to year, thereby creating difficulties in the LRM management's ability to effectively plan for the long term. Specifically, LANL funded the LRM from NNSA's RTBF, a subpart of its Weapons Activities appropriation. The use of such funds means that the LRM budget was dependent, in part, upon the annual funding that LANL received from NNSA. For example, LRM management had planned to receive \$20 million in FY 2014, the same amount of funding received in FYs 2012 and 2013. However, in September 2013, LRM management was advised that LRM funding would be \$18 million in FY 2014. The unexpected \$2 million funding decrease caused LRM management to reduce the scope of FY 2014 work planned for nine subprojects. Subsequently, in December 2013, LRM management was advised that they would receive the full \$20 million in funding. The Project Manager reported to us that upon receiving the full funding the LRM would be able to execute the FY 2014 work as originally planned. Another example in which funding varied for planned LRM project work occurred in November 2012. Specifically, a funding decrease required a reduction in the LRM's scope when LANL increased the Laboratory-wide burden rate beyond what had been previously announced in August, the period in which the LRM Project Manager finalizes work scope for the coming year. According to LRM management, the unexpected increase required it to procure less control equipment than originally planned in order to decrease costs by approximately \$500,000 to remain within budget for the year.

Difficulties in planning for the LRM have been exacerbated with unexpected labor and materials cost increases. The Project Manager told us that increased costs in labor and materials may cause a delay of 1 to 2 years for the completion of three subprojects necessary to improve LANSCE's reliability. Those subprojects are still scheduled for completion in FYs 2017 and 2018. Like the varied annual funding amounts, these increased costs were indicators of circumstances beyond the LRM's control but required the LRM manager to adjust planning accordingly to remain within budget. Further, decreases in funding could potentially extend the schedule and cost of refurbishing LANSCE to full operation. According to a LANL weapon physicist, delays in the refurbishment of LANSCE could adversely impact LANL's ability to execute experiments necessary for decisions to be made in the life extension program of the B61 and other weapons programs.

RECOMMENDATION

Given the importance of LANSCE in achieving Department and NNSA mission goals, we recommend that the Manager, Los Alamos Field Office, require LANL to immediately bring the LRM — and other projects of similar magnitude — into full compliance with Department Order 413.3B. Such compliance is essential to improving the visibility and management of all NNSA projects.

MANAGEMENT RESPONSE AND AUDITOR COMMENTS

NNSA management concurred with the finding and recommendation and the need for increased visibility and management of all NNSA projects. Management further stated that it had already begun implementation of corrective actions. NNSA's formal comments are included in their entirety in Attachment 3.

Management's comments were fully responsive to the recommendation.

Attachment

cc: Deputy Secretary
Administrator, National Nuclear Security Administration
Chief of Staff

OBJECTIVE, SCOPE AND METHODOLOGY

OBJECTIVE

The objective of the audit was to determine whether the National Nuclear Security Administration (NNSA) had effectively managed the refurbishment of the Los Alamos Neutron Science Center (LANSCE).

SCOPE

The audit was performed between July 2012 and June 2014, at Los Alamos National Laboratory (LANL), LANSCE, and the Los Alamos Field Office, located in Los Alamos, New Mexico. The audit was completed under Office of Inspector General Project Number A12LA043.

METHODOLOGY

To accomplish the audit objective, we:

- Reviewed applicable laws and regulations, as well as Department of Energy (Department) policies and procedures for project management.
- Reviewed prior audit and other reports related to LANSCE.
- Interviewed key Department and LANL officials.
- Reviewed Department and LANL budget data related to LANSCE.
- Judgmentally selected 6 of the 20 refurbishment subprojects for a detailed review of the timely completion of subproject activities. Attributes considered in subproject selection included estimated cost at completion, amount of subproject completion as of our sample date and subproject importance to the restoration of the accelerator's 120 Hertz operation.
- Judgmentally selected at least four subproject work activities for each subproject selected for detailed review and from the Linac Risk Mitigation Strategy's June 27, 2013 work schedule to test for timely completion. Criteria for selection included whether the work activity was a milestone, had a recent completion date as of our sampling date, and type of documented proof of completion. Because the sample was judgmental, we could not project the results to the population.
- Determined the capabilities, usage and reliability of LANSCE.
- Reviewed LANSCE refurbishment plans and other related documentation.

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 objectives. We believe that the evidence obtained provides a reasonable basis for our conclusions based on our audit objectives. The audit included tests of controls and compliance with laws and regulations necessary to satisfy the audit objectives. In particular, we assessed the implementation of the *GPRA Modernization Act of 2010* and did not identify performance measures related to the Linac Risk Mitigation Strategy. 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 rely on computer-processed data to satisfy our audit objective.

Management waived an exit conference.

RELATED REPORTS

Office of Inspector General Reports

- Audit Report on [*NNSA's Management of the \\$245 Million Nuclear Materials Safeguards and Security Upgrades Project Phase II*](#) (DOE/IG-0901, January 2014). This special review was conducted to determine the underlying reasons that the project was not completed within cost and schedule. The review revealed that the Nuclear Materials Safeguards and Security Upgrades Project Phase II (NMSSUP) suffered from a number of project management weaknesses. Management information systems failed to provide accurate and complete information about the funds available to complete the remaining work scope. Project management issues created a series of problems that collectively resulted in significant unanticipated cost and schedule impacts. Although it failed to take effective action to address project management weaknesses in NMSSUP, the Department of Energy (Department) implemented detective controls that identified many of the issues in this report and are key tools for holding Department contractors accountable for their performance. The National Nuclear Security Administration (NNSA) had taken a number of positive actions to hold Los Alamos National Security accountable for lack of performance; however, project management concerns remain despite these actions.
- Audit Report on [*The Radioactive Liquid Waste Treatment Facility Replacement Project at Los Alamos National Laboratory*](#) (OAS-L-13-15, September 2013). This audit was initiated to determine whether NNSA and Los Alamos National Laboratory (LANL) had effectively managed the Radioactive Liquid Waste Treatment Facility replacement project. The review revealed that NNSA and LANL had not effectively managed the project over most of its lifecycle. Despite more than seven years of effort, and the expenditure of \$56 million, design work for the transuranic liquid waste facility has not been completed and the project's completion date was 11 years behind schedule. The total estimated cost for the replacement project had increased from \$86 million to as much as \$214 million. Independent peer and internal control reviews noted that NNSA and the Los Alamos National Laboratory had not developed reliable life cycle cost estimates, used a Risk Management Plan, and applied Value Engineering principles to optimize the design of the facility.
- Audit Report on [*The Los Alamos Neutron Science Center*](#) (DOE/IG-0666, November 2004). This audit was initiated to determine whether the Los Alamos Neutron Science Center (LANSCE) could satisfy future programmatic research needs. The audit revealed that the ability of LANSCE to provide needed research capabilities in the future was uncertain. Annual reliability had declined to 77 percent, 8 percent less than the standard for similar scientific facilities, and fell to a low of 44 percent in August 2003. Major components had become obsolete, were years beyond their expected service lives, and could cause a shutdown of up to one year while replacements were custom fabricated, while deferred maintenance had accumulated to over \$42 million. A \$138 million project to sustain operations had been proposed but NNSA and the Executive Council had not completed the analysis necessary to determine whether the facility had a viable future mission.

U.S. Government Accountability Office Reports

- Report on [*Recovery Act: Most DOE Cleanup Projects Are Complete, but Project Management Guidance Could Be Strengthened*](#) (GAO-13-23, October 2012). The U.S. Government Accountability Office is required to periodically report on the Department's Office of Environmental Management (Environmental Management) *American Recovery and Reinvestment of 2009 Act*-funded cleanup projects. The review found inconsistencies in how Environmental Management set and documented projects' scope, cost and schedule targets and that guidance on setting performance baselines was more comprehensive for capital asset projects than for projects known as operation activity projects. It also found that capital asset projects costing under \$10 million were classified as operation activity projects. The Environmental Management's initiative to reclassify projects as either capital asset or operation activity projects raised concerns about how projects were reclassified. Project classification is important because some requirements apply only to capital asset projects. The Department and other officials expressed concern that projects could be broken into smaller projects to avoid the requirements.



Department of Energy
National Nuclear Security Administration
Washington, DC 20585



May 15, 2014

MEMORANDUM FOR GREGORY H. FRIEDMAN
INSPECTOR GENERAL

FROM: FRANK G. KLOTZ *FK 5/15/2014*
UNDER SECRETARY FOR NUCLEAR SECURITY
ADMINISTRATOR, NNSA

SUBJECT: Comments on the Office of Inspector General Draft Report
Titled *Follow-up Audit of the Los Alamos Neutron Science
Center (A12LA043/2012-01801)*

Thank you for the opportunity to review and comment on the subject draft report. The primary objective of the Inspector General's (IG) audit was to determine whether the National Nuclear Security Administration's (NNSA) Los Alamos Field Office and Los Alamos National Security (LANS) contractor were effectively managing the refurbishment of the Los Alamos Neutron Science Center (LANSCE).

During the course of the review, the IG discovered that both LANS and NNSA's Los Alamos Field Office were inconsistent in the application of Department of Energy (DOE) Order 413.3B titled *Program and Project Management for the Acquisition of Capital Assets*, for the LANSCE refurbishment, maintenance, and upgrade program. As a result, they were not employing the appropriate project tools referenced in the order.

The IG accordingly recommended that the Manager, Los Alamos Field Office, require LANS to immediately bring LANSCE "--- and other projects of similar magnitude --- into full compliance with Department Order 413.3B." The IG's recommendation goes on to state: "such compliance is essential to improving the visibility and management of all NNSA projects."

NNSA concurs with this recommendation and the IG's accompanying statements regarding the need for increased visibility and management of all NNSA projects. Our on-going project management improvements have provided clear evidence of the benefits of both increased Federal oversight of projects and strict contractor adherence to Order 413.3B.

NNSA's planned actions and the timelines for their implementation are attached. We will place a high priority on implementing the IG's specific recommendation and its underlying foundational basis. Should you have any questions regarding this response, please contact Robert Raines, Associate Administrator for Acquisition and Project Management, on (202) 586-5627.

Attachment



Printed with soy ink on recycled paper

Attachment

NATIONAL NUCLEAR SECURITY ADMINISTRATION
Response to Inspector General (IG) Draft Report
Follow-Up Audit of the Los Alamos Neutron Science Center (LANSCE)

Recommendation 1: “Given the importance of LANSCE in achieving Department and NNSA mission goals, we recommend that the Manager, Los Alamos Field Office, require LANL to immediately bring the LRM [LANSCE Linac Risk Mitigation Strategy] --- and other projects of similar magnitude --- into full compliance with Department Order 413.3B.”

Management Response: Concur

NNSA concurs with this recommendation and has already begun its implementation. Initial priority is being placed on LANSCE and commencement of Project Assessment and Reporting (PARS II). We are concurrently assessing all other operating and Major Items of Equipment funded projects at LANL to determine their degree of compliance with Order 413.3B. The extent of the corrective actions that will be required and the timetable for completion depends upon the results of this assessment. Both should be known by December 31, 2014.

FEEDBACK

The Office of Inspector General has a continuing interest in improving the usefulness of its products. We aim to make our reports as responsive as possible and ask you to consider sharing your thoughts with us.

Please send your comments, suggestions and feedback to OIGReports@hq.doe.gov and include your name, contact information and the report number. Comments may also be mailed to:

Office of Inspector General (IG-12)
Department of Energy
Washington, DC 20585

If you want to discuss this report or your comments with a member of the Office of Inspector General staff, please contact our office at (202) 253-2162.