U.S. Department of Energy

Office of Inspector General

Office of Audits and Inspections

INSPECTION REPORT

Technetium-99 Incident at Los Alamos National Laboratory

OAI-L-16-13

August 2016

Department of Energy
Washington, DC 20585

August 2, 2016

MEMORANDUM FOR THE ASSOCIATE ADMINISTRATOR FOR EMERGENCY OPERATIONS, NATIONAL NUCLEAR SECURITY ADMINISTRATION

FROM: David Sedillo
Deputy Assistant Inspector General
for Audits and Inspections
Office of Inspector General

SUBJECT: INFORMATION: Inspection Report on the "Technetium-99 Incident at Los Alamos National Laboratory"

BACKGROUND

The National Nuclear Security Administration (NNSA) Los Alamos National Laboratory (LANL) operates the Los Alamos Neutron Science Center (LANSCE). LANSCE is a Department of Energy national user facility, hosting scientists from universities, industry, national laboratories, and other research facilities. NNSA's Los Alamos Field Office (Field Office) is responsible for administrating the LANL contract and managing Federal activities.

On August 20, 2012, a radiological incident occurred at the LANSCE Lujan Center, in which 27 workers, their offices, and/or their personal items were exposed to technetium-99, with some of the radiological material tracked off-site. After the incident, LANL worked with the Office of Emergency Response (Emergency Response) Radiological Assistance Program Teams to survey, assess, and decontaminate affected property and ensure that off-site contamination was characterized and remediated. LANL officials concluded the technetium-99 contamination level did not present a health risk. In October 2012, an NNSA Federal Accident Investigation Board (Investigation Board) reported weaknesses in the control and containment of radioactive materials and published 14 Judgments of Need (recommendations) to minimize a recurrence. In addition, Emergency Response reviewed Headquarters-level activities and operations during emergency and recovery phases of the incident and incorporated recommendations to improve the response process in an After Action Report. We initiated this inspection to determine if NNSA and LANL had taken corrective actions to address the recommendations made by the Investigation Board and Emergency Response concerning the technetium-99 incident at LANSCE.

RESULTS OF INSPECTION

We found that NNSA and LANL had developed and implemented corrective actions that addressed all except one of the Investigation Board and Emergency Response recommendations.

Specifically, we noted the following:

- LANL's Director appointed a team to develop and implement improvements not only at the LANSCE Lujan Center, but laboratory-wide. An independent management review board tracked the implementation and approved closure of those actions.

- The Field Office Manager assigned additional oversight to LANSCE and directed facility and safety officials to perform operational assessments.

- Emergency Response implemented corrective actions, such as deploying an advance team to assist the Local Incident Command.

LANL and the Field Office actions closed the 14 Investigation Board recommendations, while Emergency Response actions addressed 9 out of 10 recommendations from the After Action Report. The Office of Emergency Operations has a plan to address the remaining recommendation through an update of Department Order 151.1C, *Comprehensive Emergency Management System*, dated November 2, 2005.

LANL Investigation Board Corrective Actions

We found that LANL had developed and implemented corrective actions that addressed 13 Investigation Board recommendations. These recommendations were published in the NNSA Investigation Board's *Accident Investigation into Contamination at the Los Alamos Neutron Science Center on or about August 21, 2012*, dated September 2012. The team appointed by the LANL Director developed a corrective action plan to implement improvements and the means to verify and validate completion and effectiveness of actions. The plan's intent was to prevent or significantly reduce the probability of recurrence. An independent management review board tracked the implementation and approved closure of those actions. LANL followed up with an effectiveness review and issued its report on May 4, 2016. The Effectiveness Evaluation Report found that the changes that were made are likely to be effective for the long term and recommended that the review board close the corrective actions. As a result, all recommendations were closed.

The Investigation Board determined that during the incident there was a loss of control and containment. Therefore, LANL implemented corrective actions to reduce these risks. For example, the Investigation Board recommended managerial controls and safety measures to prevent uninformed opening of sample canisters containing radioactive materials. We verified LANL's corrective actions that implemented processes and procedure controls, which included:

- Limiting access to the storage cabinets;

- Ensuring integrated work documents include sufficient scope description to enable identification of hazards and appropriate controls;

- Updating and operating an online sample inventory system, which tracks an experimental sample from receipt to final disposition;

- Specifying roles and responsibilities of various LANSCE Lujan Center positions;

- Using a designated glove box to contain radioactive materials; and

- Emphasizing individual understanding of assumptions and preconditions.

Field Office Investigation Board Corrective Action

We determined that the Field Office implemented corrective actions for the remaining Investigation Board recommendation. The recommendation addressed the oversight requirement to periodically sample work practices at the experimental and activity level. To address the recommendation, the Field Office issued a memorandum requiring Federal facility representatives and Safety Engineering Team personnel to perform operational assessments. Each month, observed monthly activities should be rotated with consideration given to known high-risk activities or weak areas. Furthermore, we verified that an additional Field Office representative was assigned to LANSCE to assist in oversight activities.

Emergency Response After Action Report Corrective Actions

According to Emergency Response, corrective actions were developed and implemented that closed 9 out of 10 recommendations from the After Action Report. Emergency Response performed a review of Headquarters-related actions covering the incident and issued a report titled *Los Alamos Neutron Science Center (LANSCE) Contamination Response, August 25 - September 27, 2012, DOE/NNSA Internal After Action Report,* dated December 11, 2012. The report made 10 recommendations based on LANSCE incident observations and Headquarters Operations Center interactions. The After Action Report recommended that Emergency Response establish processes and protocols to form technical support teams early, prioritize data analysis, and improve communication. According to Emergency Response, it addressed the recommendations through, among others, the following corrective actions:

- Pre-deploy an advance team to assist the Local Incident Command with response planning and support; and

- Include a scientist as a member of the response team to set priorities for the collection of samples.

The remaining open recommendation proposed that the Office of Emergency Operations develop command, control, and coordination relationships between off- and on-site assets and leadership, and follow up with training and site exercises. According to Office of Plans and Policy officials, the draft Department Order 151.1D, *Comprehensive Emergency Management System*, will cancel Department Order 151.1C and will provide the basis to close the open recommendation. The draft order entered the Department's internal review and comment process in April 2016.

PATH FORWARD

Because the majority of recommendations are closed and the Office of Plans and Policy continues to progress toward addressing the final open item, we are not making any recommendations. However, we suggest that the Associate Administrator for Emergency Operations ensure that Department Order 151.1D is published. A formal response is not required.

We appreciate the cooperation of your staff that provided information and assistance during the inspection.

Attachments

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

OBJECTIVE, SCOPE, AND METHODOLOGY

OBJECTIVE

To determine if the National Nuclear Security Administration (NNSA) and Los Alamos National Laboratory (LANL) had taken corrective actions to address the recommendations made by the Federal Accident Investigation Board and Office of Emergency Response (Emergency Response) concerning the technetium-99 incident at Los Alamos Neutron Science Center (LANSCE).

SCOPE

We conducted this inspection between July 2014 and August 2016, at LANL and the Los Alamos Field Office (Field Office), located in Los Alamos, New Mexico; NNSA Albuquerque Complex, located in Albuquerque, New Mexico; and the Department of Energy and NNSA Headquarters, located in Washington, DC. The inspection was conducted under the Office of Inspector General project code S14IS011.

METHODOLOGY

To accomplish the inspection objective, we:

- Obtained briefings from LANSCE and support personnel concerning the incident, what corrective actions were taken, safety and training requirements, and training processes;
- Performed a facility walkthrough of the LANSCE Lujan Center to gain an understanding of the facility and events leading up to the incident and observed processes and procedures that were put into place after the incident;
- Obtained and reviewed the applicable Federal regulation and Department policies;
- Reviewed safety documentation developed by the Department, NNSA, Field Office, and LANL;
- Reviewed Department biannual summary report, evaluations, NNSA Federal Accident Investigation and incident reports related to LANSCE facilities, and the NNSA Emergency Response After Action Report;
- Interviewed officials representing LANL facility and training, NNSA Office of Emergency Operations, the Office of Emergency Response, the Field Office, and the Department;
- Reviewed relevant LANL internal initiatives; and
- Reviewed LANL computer training records, sample inventory system procedures, and Field Office corrective actions through judgmental samples and/or observation.

We conducted this management-based inspection in accordance with the Council of the Inspectors General on Integrity and Efficiency's *Quality Standards for Inspection and Evaluation*, dated January 2012. Those standards require that we plan and perform the inspection to obtain sufficient, appropriate evidence to provide a reasonable basis for our conclusions and observations based on our inspection objective. We believe the evidence obtained provided a reasonable basis for our conclusions and observations based on our inspection objective. Accordingly, the inspection included tests of controls and compliance with laws and regulations to the extent necessary to satisfy the inspection objective. Because our review was limited, it may not necessarily have disclosed all internal control deficiencies that may have existed at the time of our inspection. Also, we assessed the Department's compliance with the *Government Performance and Results Modernization Act of 2010* and identified performance measures for safe radiological facility operations. Finally, we did not rely on computer-processed data to satisfy the inspection objective; therefore, we did not conduct a reliability assessment.

Management waived the exit conference on June 29, 2016.

RELATED REPORTS

Department of Energy

- Office of Safety and Emergency Management Evaluations, *Independent Oversight Review of the Los Alamos National Laboratory Radiological Controls Activity-Level Implementation*, dated November 2013. The Office of Safety and Emergency Management Evaluations (Independent Oversight) conducted a review of radiological protection program (RPP) activity-level implementation performed by Los Alamos National Security LLC and its subcontractors. At the Los Alamos Neutron Science Center (LANSCE), Independent Oversight's review included the Lujan Center. The report identified two findings and three opportunities for improvement specifically dealing with LANSCE. The findings referenced instances, where radiological safety-related documents did not adequately bound hazards and work controls, or contain clear linkages as specified by LANL procedures.

- Office of Safety and Emergency Management Evaluations, *Independent Oversight Review of the Los Alamos Field Office Processes for Laboratory Oversight of Radiological Controls Activity-Level Implementation*, dated March 2014. Independent Oversight conducted a review of the NNSA Los Alamos Field Office processes for laboratory oversight of RPP activity-level implementation by Los Alamos National Security LLC and its subcontractors. Overall, the Los Alamos Field Office had established and implemented processes for oversight of LANL RPP performance. The report identified two opportunities for improvement, which dealt with the safety management program, subject matter expert conduct, and the documenting of periodic operational awareness activities.

National Nuclear Security Administration

- NNSA Federal Accident Investigation Board, *Accident Investigation into Contamination at the Los Alamos Neutron Science Center on or about August 21, 2012*, dated September 2012. The report begins when the radioactive contamination was identified on Flight Path 04 of the Lujan Center, part of the LANSCE, at LANL, and subsequent witness interviews and an evidence review. The spread of the contamination probably began during an alignment procedure when a sample canister was mistakenly opened for reuse and its radioactive contents removed. Radioactive contamination was detected on August 25 with response teams being brought in immediately. The Investigations Board findings, which became 14 Judgments of Need (recommendations), were managerial controls and safety measures designed to prevent or minimize the probability of recurrence from loss of control and containment of radiological material.

- Office of Emergency Response, *Los Alamos Neutron Science Center (LANSCE) Contamination Response, August 25 - September 27, 2012, DOE/NNSA Internal After Action Report*, dated December 11, 2012. This OFFICIAL USE ONLY report reviewed Office of Emergency Operations actions supporting the LANSCE contamination response, during the emergency phase from August 25 to September 1, 2012, and through

the recovery phase from August 29 to September 27, 2012. It addressed actions conducted by Radiological Assistance Program Region 4, Office of Emergency Response liaison personnel, the Nuclear Incident Team, and the Emergency Management Team. The report incorporates Headquarters-level activities and makes 10 recommendations, which generally establish processes and protocols to form technical support teams early, prioritize data analysis, and improve communication and Headquarters organization.

FEEDBACK

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