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

Inspection Report

Allegations Concerning the Reporting of a Radiological Incident at the Los Alamos National Laboratory

DOE/IG–0591

March 2003

Department of Energy

Washington, DC 20585

March 20, 2003

MEMORANDUM FOR THE SECRETARY

FROM: Gregory H. Friedman
Inspector General

SUBJECT: INFORMATION: Report on Inspection of "Allegations Concerning the Reporting of a Radiological Incident at the Los Alamos National Laboratory"

BACKGROUND

On February 15, 2001, an unanticipated airborne release of Plutonium-238 (Pu-238) occurred from a glovebox at the Los Alamos National Laboratory (Los Alamos) Technical Area 55 (TA-55) Site. The incident resulted in the contamination of workers. As required, Los Alamos officials prepared an Occurrence Report outlining the circumstances of the incident. The National Nuclear Security Administration (NNSA) referred to the Office of Inspector General a complaint that questioned the thoroughness and competence of the evaluation of the incident by Los Alamos and the failure to consider the procedural violations that caused the incident. Consequently, the purpose of our inspection was to evaluate the facts and circumstances surrounding the reporting of the incident.

RESULTS OF INSPECTION

We concluded that Los Alamos glovebox safety operations and procedures at the time of the release were not performed in accordance with NNSA-approved policies for the handling of Pu-238. Specifically, Los Alamos personnel did not use special tools and/or insulated gloves as required by handling procedures. Additionally, we found that the Occurrence Report for the incident was incomplete and did not accurately describe the root cause of the airborne release. For example, it mentioned that there was a tear in the protective glove, but did not discuss the cause of the glove failure; it contained the statement that no procedural violations had been found, even though handling procedures in effect at the time had not been followed; and, it did not mention the contamination of workers that occurred as a result of the release.

The information developed during our review, including the confirmation that Laboratory personnel were contaminated due to exposure to Pu-238, suggests significant safety shortcomings at the time at Los Alamos. We are concerned, as well, by the fact that the Occurrence Report did not identify the root cause of the release and the contamination of the workers. The Occurrence Report is the primary vehicle used by the Department to ensure appropriate and timely notification, investigation, and reporting of events that could adversely affect the health and safety of the public or the workers.

We recommended that responsible NNSA officials ensure that the totality of the available information surrounding the glovebox contamination incident is thoroughly reviewed by contractor and Federal officials. We also recommended that the Laboratory be directed to strengthen its internal controls to reduce and/or eliminate the possibilities of inadvertent contamination and place greater emphasis on occurrence reporting to ensure adherence to reporting requirements.

We had two observations unrelated to our specific inspection objectives, but which are highly relevant to the matter at hand. We observed that the quality of the glovebox gloves has been a continuing problem at Los Alamos. We also observed that there was disagreement and confusion among TA-55 employees on how and when to apply the requirements at the TA-55 Site for two trained and authorized persons to be in constant eyesight of each other and the nuclear material with which they are entrusted. In our view, these issues have serious implications for worker safety at Los Alamos and, specifically, safety operations at TA-55.

MANAGEMENT REACTION

Management concurred with our findings and recommendations. Management advised that Los Alamos officials had initiated a formal investigation of the incident that identified 119 corrective actions that needed to occur. Management reported that 108 of the corrective actions have been completed and the remaining actions would be completed by December 30, 2003.

Attachment

cc: Deputy Secretary
Acting Administrator, National Nuclear Security Administration
Under Secretary for Energy, Science, and Environment
Director, Policy and Internal Controls Management

INSPECTION OF ALLEGATIONS CONCERNING THE REPORTING OF A RADIOLOGICAL INCIDENT AT THE LOS ALAMOS NATIONAL LABORATORY

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Overview

INTRODUCTION AND OBJECTIVES

On May 31, 2001, the Office of Inspector General (OIG), Department of Energy (DOE), initiated an inspection to determine the facts and circumstances surrounding the reporting of a radiological incident at the Technical Area 55 (TA-55) Site of the Los Alamos National Laboratory (Los Alamos). On February 15, 2001, an unanticipated airborne release of Plutonium-238 (Pu-238) occurred from a glovebox[1] in Room 207 of Building 4 at the TA-55 Site during the handling of scrap Pu-238 fuel. The incident resulted in the contamination of workers and preparation of an Occurrence Report.[2]

On March 20, 2001, the Executive Staff Director of the National Nuclear Security Administration forwarded an anonymous complaint to the OIG. The complainant alleged that the Los Alamos Nuclear Materials Technology (NMT) Division, which was responsible for supporting weapons programmatic activities at Los Alamos, was engaged in "factual distortion, spin doctoring and deliberate concealment of RIR [Radiological Incident Report] events within the TA-55 facility." The complainant also alleged that "Unequal standards are being selectively applied to RIR investigations by NMT Division management [and] the RIR critique and reviews can be perverted for political use." The complainant discussed the specific incident in Room 207 and questioned the critique of the incident and its failure to consider the procedural violations that caused the incident.

The objectives of this inspection were to determine: (1) if the glovebox operation at the time of the unanticipated airborne release in Room 207 was performed in accordance with approved policies and procedures for the handling of Pu-238 fuel; and, (2) if the Occurrence Report accurately described the cause of the release.

CONCLUSIONS AND OBSERVATIONS

We concluded that glovebox operations at the time of the release were not performed in accordance with approved policies and procedures for the handling of Pu-238 fuel. Handling procedures require the use of special tools and/or insulated gloves so that

[1] A glovebox is a sealed system under negative pressure, which allows manipulation of objects inside the box via gloves integrated into the sides of the box.

[2] An Occurrence Report is used to report abnormal conditions and events concerning DOE operations. The final Occurrence Report is submitted when the root cause of the occurrence has been analyzed, corrective actions determined with completion dates, and lessons learned identified.

glovebox gloves do not come in contact with the Pu-238. We found that the team performing the glovebox operation at the time of the release did not use special tools and/or insulated gloves.

Additionally, we concluded that the Occurrence Report did not accurately describe the cause of the airborne release. According to the Occurrence Report, both the direct and root cause of the occurrence were described as an "Equipment/Material Problem, Defective or Failed Part." Also, the "Description of Cause" section contained the statement that ". . . No procedural violations were found." In contrast, as previously mentioned, handling procedures had not been followed.

In addition, we found that the Occurrence Report was incomplete. It mentioned that there was a tear in the glovebox glove, but did not discuss the cause of the glove failure. Occurrence Report guidelines require that the cause of the occurrence be addressed. The Occurrence Report also did not mention the contamination that occurred as a result of the release. We learned through interviews with team members that radioactivity was spread by the Lead Technician after he removed his hands from the glovebox.

We have two observations unrelated to our specific inspection objectives. We observed that the quality of the glovebox gloves has been a continuing problem at Los Alamos. We also observed that there was disagreement and confusion among TA-55 employees on how and when to apply the requirements for the two-person rule[3] at the TA-55 Facility. This requirement is an important aspect of safety operations at TA-55. These observations are briefly discussed in Appendix A.

[3] The requirement is satisfied when two trained and authorized persons are within constant eyesight of each other, and the nuclear material with which they are entrusted.

The incident involving the airborne release was initially documented in a RIR, which stated that Continuous Air Monitor Alarms had sounded in Room 207 due to a burn or tear on the right hand of a glovebox glove. The incident resulted in radioactive contamination of two Los Alamos employees.

HANDLING PROCEDURES

We determined that required handling procedures for Pu-238 were not followed. Specifically, the glovebox operation at the time of the unanticipated airborne release was not performed in accordance with approved policies and procedures for handling Pu-238 fuel. The Los Alamos Hazard Control Plan for "Pu-238 Fuel Processing," dated September 13, 2000, which governs Pu-238 fuel processing activities, states that:

> "$^{238}PuO_2$ fuel is thermally hot. Avoid bringing glovebox gloves into contact with the fuel. Handle with special tools and/or insulated gloves." [Emphasis added.]

It also states that:

> "Potential exists for thermal damage to the glovebox and glovebox gloves that could, in turn, result in loss of glovebox containment of radioactive material."

Through discussions with the team members, Inspectors learned that team members did not use any special tools or insulated gloves during the process of loading the scrap Pu-238 fuel into a container. The Group Leader said that the team handling the scrap Pu-238 should have used tools or instruments to handle the containers, since the Pu-238 is thermally hot. The Group Leader also said that the operation probably should have been performed in Room 206 instead of Room 207. She said that Room 206 contains all of the tools and instruments needed for the handling of the thermally hot Pu-238. She said that Room 207 did not contain these tools.

OCCURRENCE REPORT

The Occurrence Report did not accurately or completely describe the cause of the airborne release. It did not mention the deviations from the Pu-238 handling procedures, the cause of the glove failure, or the subsequent spread of radioactive contamination by the Lead Technician.

Consistent with the provisions of DOE Order 232.1A, "OCCURRENCE REPORTING AND PROCESSING OF OPERATIONS INFORMATION," an Occurrence Report was prepared on the February 15, 2001, release. The Final Occurrence Report, titled "Unanticipated Airborne Release of Plutonium-238 in TA-55, Building 4, Room 207," dated May 31, 2001, identified the direct and root cause of the incident as an "Equipment/ Material Problem, Defective or Failed Part." In addition, the Occurrence Report stated that:

> "The procedure was reviewed and the glove box was inspected for a source which could have caused a tear in the glove box glove. No procedural violations were found. [Emphasis added.] No source for the tear was found."

We found this statement is inconsistent with information provided by team members, namely that they did not use special tools or insulated gloves when handling the Pu-238. The failure to use special tools or insulated gloves violated established procedures for handling Pu-238 fuel.

The Occurrence Report described the glove failure as a tear, with no source of the tear found. However, information we obtained from two members of the Los Alamos Improving Glovebox Glove Project suggests that temperature and radiation caused a crack in the glove. This was not mentioned in the Occurrence Report and probably not known by the preparers of the Occurrence Report.

According to these two members, on February 27, 2001, they started an analysis associated with the glovebox glove failure. Their report identified variables that affected the service life of a glovebox glove. The two highest weighted variables were temperature and radiation. Both members agreed that the glove used during the Pu-238 operation had cracks. They both believed that the cracks were primarily caused by temperature, because Pu-238 is thermally hot. They also said that thermal gloves or special tools should have been used during the operation.

SPREAD OF CONTAMINATION

Although it is established that radioactive contamination (Pu-238) was spread by team members after the glovebox was breached, this fact was not mentioned in the Occurrence Report. We were told by team members that a monitoring device first identified the

radioactive contamination. The Lead Technician attempted to reset the monitoring device, but could not reach the reset button. The Lead Technician took a notebook with his contaminated hand, thereby spreading the contamination onto the notebook, and hit the reset switch. He handed the notebook back to another team member, whose hand then also became contaminated.

The Occurrence Report was incomplete and conveyed certain inaccuracies. For example, the section on "Lessons Learned" stressed the need for continual emphasis on the routine response to abnormal events, and stated that ". . . the operator's correct behavior to an abnormal glovebox condition . . . mitigated the potential consequences of the glove failure." However, the Occurrence Report did not mention the deviations from the Pu-238 handling procedures, the lack of a consistent and thorough understanding of the Pu-238 handling procedures by glovebox operators, and the actions that led to the spread of contamination. We believe that Los Alamos missed an opportunity to identify meaningful "Lessons Learned" because the Occurrence Report did not contain this information.

RECOMMENDATIONS

We recommend that the Manager, Los Alamos Site Office, direct the Los Alamos National Laboratory Director to:

1. Review the facts and circumstances surrounding the glovebox contamination incident and strengthen internal controls to reduce and/or eliminate the possibilities of inadvertent contamination.

2. Review occurrence reporting to ensure consistency and adherence to reporting requirements.

3. Identify and disseminate meaningful "Lessons Learned" based upon all available information.

MANAGEMENT REACTION

In correspondence dated February 6, 2003, the NNSA Associate Administrator for Management and Administration generally agreed with our findings and recommendations. He advised that LANL officials had initiated a formal investigation that generated 119 corrective actions that needed to occur. He reported that 108 of the corrective actions have been completed; five of the remaining eight actions will be completed by August 29, 2003; and the remaining three actions will be completed by December 30, 2003.

INSPECTOR COMMENTS

The Office of Inspector General believes management has taken positive steps to address the concerns raised in our report.

Appendix A – Other Matters

QUALITY OF GLOVEBOX GLOVES

The quality of glovebox gloves has been a problem at the Los Alamos National Laboratory (Los Alamos). Los Alamos officials are concerned that there is currently only one supplier for the gloves. Because Los Alamos is in the process of attempting to correct these problems, we have not made formal recommendations in this area.

The Los Alamos Improving Glovebox Glove Project identified specific problems with glovebox gloves in a July 20, 2001, document titled "Immediate Action Recommendation." According to this document, ". . . Quality of glovebox gloves continues to be a big problem. Three Non Conformance Reviews (NCRs) relating to the quality of glovebox gloves since 1998 have been issued related to North [Safety Products] glovebox gloves."

The document contained charts that presented summary quality assurance inspection information showing many rejections of gloves occurring during 2001. For one type of hypalon glove, 18 gloves were inspected in June 2001 and 14 of the 18 gloves were rejected. For a second type of hypalon glove, 136 gloves were inspected in July 2001 and all 136 gloves were rejected. For lead lined gloves, 108 gloves were inspected in May 2001 and four gloves were rejected.

Additionally, the document states that:

> "The Improving Glovebox Glove Project (IGGP) members recommend immediate action for the establishment of multiple manufacturers of glovebox gloves. Glovebox gloves are a strategic consumable. These gloves protect glovebox workers as a primary barrier from radioactive exposure and contamination. If the glovebox gloves supply is interrupted; the lack of gloves could halt glovebox operations, greatly hinder programmatic activities, and affect the safety envelope."

TWO-PERSON RULE

There was disagreement and confusion among TA-55 employees regarding how and when to apply the requirements for the two-person rule at the TA-55 Facility. For example, at the beginning of our inspection, we were told that there was no two-person rule at TA-55. However, we were later informed that there was a two-person rule, but that it only applied under certain circumstances or in certain areas. We also learned that Los Alamos had been granted a variance from performing strict visual surveillance/direct observation (two-person rule) in glovebox lines in building PF-4 at TA-55. [4]

The variance, we were told, is still in effect. Because the Department is in the process of reviewing procedures after the terrorist attacks of September 11, 2001, we have not made formal recommendations in this area. However, steps should be taken to ensure that TA-55 employees know when to apply the two-person rule to their activities, and the conditions and circumstances that existed at the time the variance was approved should be reviewed for current appropriateness.

[4] By memorandum dated October 27, 1998, subject: "Revised Request for Deviation (Variance) on Surveillance Requirements for Specific Operations at TA-55 (OSS-LANL-98-009) (OSS-AL-98-17)," the Albuquerque Operations Office Safeguards and Security Division authorized a variance from performing strict visual surveillance/direct observation (two-person rule) in glovebox lines in building PF-4 at TA-55. By memorandum dated February 8, 1999, subject: "MATERIAL SURVEILLANCE PROGRAM AT LOS ALAMOS NATIONAL LABORATORY," the Headquarters Director, Office of Safeguards and Security, concurred with the variance.

Appendix B

SCOPE AND METHODOLOGY

We reviewed the allegations concerning Radiological Incident Report policies and procedures at the TA-55 Site. In reviewing these concerns, we evaluated:

- The policies and procedures used at the TA-55 Site for processing Pu-238 fuel.
- The applicable Los Alamos National Laboratory (Los Alamos) and Department of Energy (DOE) requirements associated with reporting radiological incidents and unusual occurrences.
- The applicable Los Alamos and DOE requirements for the two-person rule.
- Radiological Incident Reports for 1999, 2000 and 2001.
- Occurrence Reports for 1999, 2000, and 2001.

As part of our review, we interviewed Los Alamos management officials at the TA-55 Site, employees involved in the processing of Pu-238 fuel, and other TA-55 Site personnel involved in operations at the facility. We also interviewed DOE officials at the TA-55 Site. In addition, we reviewed Los Alamos and DOE documentation relating to: 1) Radiological Incident Reporting; 2) Occurrence Reporting; 3) dose assessment policies and procedures; and 4) requirements for the two-person rule.

This inspection, which was conducted between May and December 2001, was conducted in accordance with the "Quality Standards for Inspections" issued by the President's Council on Integrity and Efficiency.

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