



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

# Audit Report

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## The Stabilization of Nuclear Materials at Los Alamos National Laboratory



## Department of Energy

Washington, DC 20585

August 16, 2004

### MEMORANDUM FOR THE SECRETARY

FROM: Gregory H. Friedman *Greg Friedman*  
Inspector General

SUBJECT: INFORMATION: Audit Report on "The Stabilization of Nuclear Materials at Los Alamos National Laboratory"

### BACKGROUND

In 1994, the Defense Nuclear Facilities Safety Board recommended that the Department of Energy stabilize fissionable and radioactive materials at Los Alamos National Laboratory and at numerous other Department sites. Stabilization, by definition, includes activities such as repackaging materials stored in vulnerable containers, processing non-weapons-grade plutonium, and direct discard of residues. The purpose of the Board's recommendation was to reduce safety and health risks to Department employees and the public. In 1995, in response to the Board's recommendation, the Department committed to stabilizing all of Los Alamos' fissionable materials by 2002.

Citing little progress at Los Alamos, in 2000, the Board reemphasized the importance of the stabilization program and recommended that the Department accelerate its schedule. According to the Board, additional delays could expose workers and the public to unnecessary risks. This audit was conducted to determine if the Department had accelerated the stabilization of its fissionable and other radioactive materials at Los Alamos.

### RESULTS OF AUDIT

Although the Department has made some progress in stabilizing the most hazardous fissionable materials, stabilization has not been accelerated to the level anticipated. According to Los Alamos' most recent Project Execution Plan, the materials will not be completely stabilized until 2010; a date well beyond the original projected completion date. The Department has also missed interim milestones and project tasks, which may delay the stabilization effort beyond 2010. Delays in this program occurred because:

- The stabilization effort at Los Alamos had not been fully funded;
- Los Alamos had not made full use of available tools to effectively manage the project; and,
- Performance measures and incentives were not incorporated into Los Alamos' contract.

Unless the Department and Los Alamos place a higher priority on stabilizing these materials, radioactive materials at the Laboratory may continue to deteriorate and negatively impact the



safety and health of workers. Further, by extending the schedule until 2010, the Department will incur an estimated \$78 million in additional costs to stabilize these dangerous materials. Any delay beyond 2010 would exacerbate the situation.

To its credit, the Department has recently increased the funding for the stabilization of materials at Los Alamos. Further, the Department has initiated actions to update its stabilization project planning documents. However, additional actions are necessary. We made several recommendations designed to aid in the Department's efforts to stabilize Los Alamos' material in a timely manner.

### MANAGEMENT REACTION

The Associate Administrator for Management and Administration concurred with the report's findings and recommendations. Specifically, the National Nuclear Security Administration (NNSA) agreed to incorporate additional milestones and incentives into the Los Alamos contract. In addition, NNSA will continue to emphasize the need for formal documentation for projects and sub-projects in order to consistently track scope, schedule, and budget process.

Attachment

cc: Deputy Secretary  
Administrator, National Nuclear Security Administration  
Deputy Administrator for Defense Programs

# REPORT ON THE STABILIZATION OF NUCLEAR MATERIALS AT LOS ALAMOS NATIONAL LABORATORY

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# NUCLEAR MATERIALS STABILIZATION PROGRAM

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## Background

The Defense Nuclear Facilities Safety Board (Board) is an independent agency established by Congress in 1988. The Board's mandate, under the Atomic Energy Act, is to provide safety oversight of the nuclear weapons complex by recommending to the Secretary of Energy (Secretary) specific measures to ensure the health and safety of Department of Energy (Department) workers. According to the Board, the nuclear weapons program remains a complex and hazardous operation and requires the Board's constant vigilance to ensure that the Department carries out its activities in a manner that provides adequate protection for the public, workers, and the environment.

In 1994, the Board issued, and the Department accepted, recommendations to stabilize fissionable and radioactive materials at numerous Department sites, including Los Alamos National Laboratory (Los Alamos). In 2000, citing little progress at Los Alamos, the Board reemphasized the need for stabilization and recommended that the Department accelerate its schedule to further reduce unnecessary risks to workers and the public.

The types of fissionable materials at Los Alamos that are subject to stabilization include plutonium metals, oxides, and residues. These materials are kept in containers that are not acceptable for long-term storage. As such, there is the possibility that the containers could leak and workers could be exposed to radiation, resulting in serious health consequences.

## Stabilization of Fissionable Materials

Despite the recommendations to stabilize materials, the Department has not completed or accelerated the stabilization of fissionable and other radioactive material at Los Alamos. Rather, it has extended the completion schedule until 2010. Furthermore, the Department has missed interim milestones and project tasks that are likely to further impact the schedule.

### Stabilization Schedule

According to the Department's original Project Implementation Plan (Plan), which was developed in response to the initial recommendation made by the Board, stabilization of all of Los Alamos' fissionable materials was to be completed by 2002. However, when it became clear that stabilization would not occur by 2002, the Department revised its Plan to include a completion date of 2005. By January 2001, the Plan had been revised again and the Department extended the completion date to 2010. The Board disagreed with each of the schedule revisions because

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stabilization was not accelerated as recommended. It should be noted that Los Alamos is the only Department site that has not reached agreement with the Board on an acceptable Plan.

#### Milestone Completion

In undertaking the stabilization of nuclear materials, Los Alamos has experienced delays in completing project tasks outlined in its Project Execution Plan – a contractor document that defines specific project requirements and forms the project baseline. Of 85 project tasks scheduled to be completed in FY 2003, 59 (69 percent) were rescheduled for completion in FY 2004, with anticipated delays of up to 365 days. These delays in project tasks may affect the achievement of future key stabilization milestones.

Similarly, the Department and Los Alamos committed to stabilize 271 items in Calendar Year 2003; however, only 173 were completed. Los Alamos failed to package and completely stabilize the remaining 98. Sixty-eight of these items were dioxides, which pose a particularly high risk to safety and health. The delay in stabilizing all these items may impact Los Alamos' future ability to meet a critical milestone involving a process to remove water and homogenize metals thereby allowing them to be blended with other oxides.

In addition, the 2010 completion date may have to be further extended because the inventory of fissionable materials was incomplete. According to a January 2004 Board review, approximately 155 additional containers, not previously included in stabilization plans, were generated and stored at Los Alamos and will need to be stabilized.

#### **Program Priority and Planning**

Los Alamos had not made significant progress in stabilizing its fissionable materials or in making plans to accelerate stabilization because the Department had not made the effort a priority. For example, during Fiscal Years (FY) 1997 through 2000, Los Alamos received only 58 percent of the funding it requested for the stabilization project. In 2001 and 2002, Los Alamos received 78 percent of what was requested. To its credit, the Department recently increased the funding to Los Alamos for the stabilization of materials.

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In addition, Los Alamos missed milestones towards its 2010 goal, in part, because it had not made full use of available project management tools. While Los Alamos had developed a Project Execution Plan, the detailed planning documents designed to support the Project Execution Plan were incomplete or did not reconcile with the overall plan and schedule. To facilitate project completion, work packages need to contain results-oriented statements of work, defined deliverables, target milestones, resource requirements, planning assumptions, and requisite budgets. However, we found that many of Los Alamos' work packages lacked milestones and clearly defined statements of work. Managers, therefore, lacked an objective basis to assess and report on the project's status. Los Alamos officials acknowledged the need to improve in this area and have begun to update the work packages and reconcile them to the Project Execution Plan.

Finally, the Department had not emphasized the importance of this project by including specific performance measures and incentives in its contract with Los Alamos relating to the stabilization of materials. In contrast, the Department's Savannah River Site has included such measures in its contract with the Westinghouse Savannah River Company.

## **Risk and Cost**

If the stabilization of fissionable materials is not completed, radioactive materials at Los Alamos may further deteriorate and continue to negatively impact the safety and health of workers. For example, an October 2003 Accident Investigation Report noted that two Los Alamos employees were exposed to contamination while inventorying a degraded package containing fissionable materials. In addition, continued extension of stabilization schedule can add to the cost of the program. To illustrate, by extending the schedule to 2010, the Department effectively increased its costs by \$78 million. The original cost to stabilize fissionable materials at Los Alamos by 2002 was \$105 million; the current estimate is about \$183 million. If further schedule delays are experienced, the additional cost to the taxpayer could be substantial and health and safety risks may remain unresolved.

## **RECOMMENDATIONS**

We recommend that the Deputy Administrator for Defense Programs, National Nuclear Security Administration (NNSA):

1. Direct Los Alamos to make better use of project management tools to more effectively manage the stabilization project;

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2. Reach agreement with the Board on a scheduled completion date for nuclear materials stabilization at Los Alamos and fund the program consistent with the agreement reached; and,
  3. Incorporate performance measures and incentives into the Los Alamos contract pertaining to the stabilization of fissionable materials.

## **MANAGEMENT REACTION**

The Associate Administrator for Management and Administration concurred with the report's findings and recommendations. Specifically, NNSA agreed to incorporate additional milestones and incentives into the Los Alamos contract. In addition, NNSA will continue to emphasize the need for formal documentation for projects and sub-projects in order to consistently track scope, schedule, and budget process. Management also provided comments to clarify issues raised in the report. Specifically:

- In a February 2004 letter, the Board acknowledged that Los Alamos had stabilized 1,403 items, while the Office of Inspector General (OIG) indicated that Los Alamos only completed 173 of 271 items by December 2003.
- The OIG did not take into consideration the out-year tasks that were completed ahead of schedule. "True earned value" charts provided by Los Alamos take into account the additional items that were stabilized from the out-years.

## **AUDITOR COMMENTS**

Management's comments, which are included in their entirety as Appendix 3, are responsive to our recommendations.

In response to management's additional comments, we acknowledge that Los Alamos stabilized 1,403 items in FY's 2001 - 2003. However, we audited against the Department's Implementation Plan, which committed to stabilizing 271 specific items during Calendar Year 2003, only 173 of which were completed. Secondly, we could not ascertain which items were stabilized ahead of schedule because, as indicated in the report, Los Alamos' project management documents were incomplete and could not be reconciled. Many of the work packages lacked milestones and clearly defined statements of work.



# Appendix 1

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<b>OBJECTIVE</b>	The audit was conducted to determine if Los Alamos accelerated the stabilization of its fissionable and other radioactive materials.
<b>SCOPE</b>	The audit was performed from June 2003 to February 2004 at Department Headquarters in Washington, D.C.; and Los Alamos National Laboratory in Los Alamos, New Mexico. The scope of the audit included activities in the stabilization project from FY 1994 through FY 2010.
<b>METHODOLOGY</b>	<p>To accomplish the audit objective, we:</p> <ul style="list-style-type: none"><li>• Identified the stabilization project's cost, scope, and schedule;</li><li>• Reviewed the execution of the project as detailed in its Primavera Schedule;</li><li>• Examined documentation, including the Project Execution Plan, work packages, and the Plan;</li><li>• Discussed stabilization project activities with Department, Los Alamos, and Board personnel;</li><li>• Reviewed Federal and Department regulations governing the project; and,</li><li>• Reviewed Board recommendations and correspondence to the Department.</li></ul> <p>We conducted the audit 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. We did not conduct a reliability assessment of computer-processed data because we did not consider such data to be critical to satisfying our audit objectives. As part of our review, we evaluated the Los Alamos Site Office's expectations and performance measures for the stabilization project. We determined that the Site Office had not established performance measures for the stabilization project in accordance with the Government Performance and Results Act of 1993.</p> <p>We held an exit conference with Department Headquarters on August 9, 2004. Los Alamos waived an exit conference.</p>

## Appendix 2

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### PRIOR AUDIT REPORTS

#### OFFICE OF INSECTOR GENERAL REPORTS

- *The Plutonium Stabilization and Packaging System (PuSPS) at the Rocky Flats Environmental Technology Site* (DOE/IG-0554, May 2002). The audit noted that Rocky Flats would not be able to stabilize and package all of its plutonium by the May 2002 target. It is projected that the final container will not be produced until March 2003. The Rocky Flats Field Office (RFFO) stated there were production delays due to (1) delayed start-up of the PuSPS, (2) lower than anticipated production rates, and (3) higher than expected equipment failures. In addition, Kaiser-Hill did not develop a detailed, long-term production schedule to ensure on-time completion and RFFO did not ensure that a contingency plan was developed in the event that production stopped.
- *Americium/Curium Vitrification Project at the Savannah River Site* (DOE/OIG-0489, November 2000). The audit noted that the Department would not meet its commitment to stabilize the Am/Cm by September 2002. Even though the Department submitted a revised completion date of December 2005, the audit stated the Department is not likely to meet this milestone either. According to the report, the Department committed itself to the dates before knowing they were achievable. In addition to missed commitment dates, the Department did not establish a continuous level of funding necessary to complete the project on time.

#### GENERAL ACCOUNTABILITY OFFICE REPORTS

- *Department of Energy, Problems and Progress in Managing Plutonium* (GAO/RCED-98-68, April 1998). The report noted that the Department is unlikely to meet its May 2002 target date to have its plutonium that is not in pits stabilized, packaged, and stored. One of the delays cited for this problem at Los Alamos was the competing priority for funding, staffing, and equipment. Delays result in the continued existing levels of risk to workers' health and safety and also increased costs. Los Alamos may miss its May 2002 target date by up to 3 years.




Department of Energy  
National Nuclear Security Administration  
Washington, DC 20585



JUL 23 2004

MEMORANDUM FOR Rickey R. Hass  
Assistant Inspector General  
for Audit Operations

FROM: Michael C. Kane   
Associate Administrator  
for Management and Administration

SUBJECT: Comments to Draft Report on LANL's Materials  
Stabilization Program

The National Nuclear Security Administration (NNSA) appreciated the opportunity to have reviewed the Inspector General's (IG) draft report, "The Stabilization of Nuclear Materials at Los Alamos National Laboratory." We understand that the IG conducted this audit based on a 1994 recommendation by the Defense Nuclear Facilities Safety Board. This recommendation to stabilize fissionable and radioactive materials and the 1995 Departmental commitment to stabilize all of Los Alamos National Laboratory's fissionable materials by 2002 was the basis for the IG to determine the progress of the work at the Laboratory.

NNSA generally agrees with the report and the subsequent recommendations. Additionally, we appreciate the IG acknowledging that progress that has been made in stabilizing the most hazardous materials. The following comments are offered as clarifying remarks to the report and recommendations.

There is an inconsistency that should be resolved. The Defense Nuclear Facilities Safety Board's letter of February 12, 2004, acknowledged that the Laboratory had completed 1403 stabilization items. However, the auditors indicated that, while the Laboratory agreed to complete stabilization of 271 items by December 2003, only 173 items were completed.

The auditors correctly identified the number of tasks that needed to be rescheduled from Fiscal Year 2003 to Fiscal Year 2004, there is no indication that the auditors took into consideration the out-year tasks that were completed ahead of schedule. While the auditors are correct that the Laboratory is behind schedule in some areas, they have exceeded schedule expectations in other areas. For

## Appendix 3

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example, in the “true earned value” charts that the Laboratory provided to the auditors, the Laboratory took into account the additional items that were stabilized from the out-years. We are not sure if this information should appear in the report, but it is not currently evident.

NNSA agrees with the auditors conclusion of inadequate funding in the early stage of the program. However, this Administration has increased funding each year since 2001. In fact, NNSA’s Implementation Plan—revised May, 2004—specifically incorporates those areas that will be accelerated. The revised plan also lists the requirements for project closeout. The guidance for the “Future Years Nuclear Security Program” budget document has the program fully funded for Fiscal Years 2006 through 2010.

While NNSA believes that we are utilizing good management tools effectively, we will continue to emphasize the need for formal documentation for projects and sub-projects in order to consistently track scope, schedule and budget progress. Equally, the Site Office and the Laboratory have agreed to incorporate, into Appendix F of the contract, additional milestones/incentives to obtain higher than average ratings by increasing stabilization throughput.

Should you have any questions about this response, please contact Richard Speidel, Director, Policy and Internal Controls Management. He may be contacted at 202-586-5009.

cc: Dr. Everet Beckner, Deputy Administrator for Defense Programs, NA-10  
Robert Braden, Senior Procurement Executive, NA-63  
Edwin Wilmot, Manager, Los Alamos Site Office  
Karen Boardman, Director, Service Center

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