



OFFICE OF INSPECTOR GENERAL

U.S. Department of Energy

AUDIT REPORT

DOE-OIG-19-43

August 2019

**NUCLEAR MATERIAL CONTROL
AND ACCOUNTABILITY AT THE
Y-12 NATIONAL SECURITY COMPLEX**



Department of Energy
Washington, DC 20585

August 6, 2019

MEMORANDUM FOR THE ADMINISTRATOR, NATIONAL NUCLEAR SECURITY
ADMINISTRATION

Michelle Anderson
FROM: Michelle Anderson
Deputy Inspector General
for Audits and Inspections
Office of Inspector General

SUBJECT: INFORMATION: Audit Report on “Nuclear Material Control and
Accountability at the Y-12 National Security Complex”

BACKGROUND

The Department of Energy’s capability to deter, detect, and assist in the prevention of theft or diversion of nuclear material is critical for national security. The National Nuclear Security Administration’s (NNSA) Y-12 National Security Complex (Y-12) processes and stores uranium, and other nuclear materials, in support of the Nuclear Security Enterprise mission. NNSA’s Office of Security Operations and Programmatic Planning’s Material Control and Accountability (MC&A) Program provides for the control and accountability of nuclear materials. Materials that fall under the MC&A Program include material such as plutonium, uranium, deuterium, and tritium. Department of Energy Order 474.2, *Nuclear Material Control and Accountability*, subdivides materials into two types of accountable nuclear material: Special Nuclear Materials and Other Accountable Nuclear Materials. Special Nuclear Materials include fissile isotopes – uranium-233, uranium-235, and plutonium-239 – that, in concentrated form, could be used as the primary ingredients of nuclear explosives. Other Accountable Nuclear Materials do not include fissile isotopes that can be used as the primary ingredient of nuclear explosives. Other Accountable Nuclear Materials are still required to be controlled and accounted for despite being considered less attractive for theft or diversion. Y-12’s Management and Operating contract required the site to develop and maintain an MC&A Program consistent with Department Order 474.2 requirements.

Because of the importance of the MC&A Program to national security, we initiated this audit to determine whether Y-12’s MC&A Program had adequate controls for accountability and accessibility of nuclear material. This report is one in a series of three reports¹ at select NNSA sites.

¹ The Office of Inspector General also conducted audits at the Nevada National Security Site and Sandia National Laboratories. These reviews will be issued in separate audit reports.

RESULTS OF AUDIT

We did not identify any instances of control weaknesses in Y-12's MC&A Program over accountability and accessibility of nuclear material during our review. Specifically, our review of the accounting system showed that it was capable of tracing material and included documentation supportive of transactions tested. In addition, our observation of the physical inventory process showed proper implementation of site procedures.

Accounting System

Our review of the accounting system found that the system was capable of tracing material from receipt, or creation, to disposal and included the necessary source documentation for the individual transactions. Department Order 474.2 stated that material accounting encompasses the accounting system, which must accurately reflect the nuclear material inventory and provide a complete audit trail for all accountable nuclear material from receipt through disposition. During our review, we found that the accounting system was able to track a shipped item through the accounting system back to its initial receipt at Y-12 as well as access documentation supporting the item's shipment, receipt, and internal transfer.

Physical Inventory

We observed a Material Balance Area inventory at Y-12 and determined that the MC&A Program's physical inventory procedures were implemented well and consistent with Department Order 474.2 requirements. Department Order 474.2 stated that physical inventory assures that accountable nuclear materials are not missing and that discrepancies between the physical inventory and the accounting system are detected and resolved. According to procedure requirements, movement and processing of material in the area undergoing physical inventory were stopped to reduce inventory inaccuracies. During our observation of the area undergoing physical inventory, we did not see any movement or processing of material.

A noteworthy practice at Y-12 was that barcode scanners were used as part of the inventory process, which aided in maintaining material accountability. As a way to maintain worker productivity, operations personnel had been trained on the barcode scanning process and assisted the Material Balance Area Custodian in the performance of the physical inventory. Use of the barcode scanners expedited the inventory process, leading to a faster restart of normal operations. In addition, the barcode scanner process helped to eliminate sources of human errors as personnel were no longer handwriting container identification information for verification. While errors occurred from time to time with the scanners, the Y-12 MC&A Program had a well-established method of determining the source of errors, which included matching the scanners' output to the accounting records.

Based on our audit work, we are not making any recommendations since nothing came to our attention that indicated Y-12 had not implemented an MC&A Program with adequate controls for accountability and accessibility of nuclear material.

Attachments

cc: Deputy Secretary
Chief of Staff

OBJECTIVE, SCOPE, AND METHODOLOGY

OBJECTIVE

We conducted this audit to determine whether Y-12 National Security Complex's Material Control and Accountability Program had adequate controls for accountability and accessibility of nuclear material. This report is one in a series of three reports at select National Nuclear Security Administration sites.

SCOPE

This audit was performed between April 2018 and May 2019 at the Y-12 National Security Complex and the National Nuclear Security Administration Production Office in Oak Ridge, Tennessee. The audit was conducted under Office of Inspector General project number A18LA005.

METHODOLOGY

To accomplish our objective, we:

- Reviewed applicable laws, regulations, and directives related to nuclear material control and accountability;
- Reviewed the processes and procedures for implementation of the Nuclear Material Control and Accountability Program;
- Reviewed relevant reports issued by the Government Accountability Office and the Department of Energy's Office of Inspector General and Office of Enterprise Assessments, as well as program self-assessments and field office assessments;
- Held discussions with officials from the National Nuclear Security Administration, including Federal and contractor staff associated with the Nuclear Material Control and Accountability Program; and
- Conducted a site visit, which included shadowing the performance of a physical inventory and a review of the accounting system. We judgmentally selected material transactions to trace through the accounting system to test the accuracy of information recorded. Our testing included a review of the supporting documentation in the accounting system for each transaction selected to verify adequate support for system data.

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 the evidence obtained provides a reasonable basis for

our conclusions based on our audit objective. The audit included tests of internal controls and compliance with the laws and regulations to the extent necessary to satisfy the audit objective. Because our review was limited, it would not have necessarily disclosed all internal control deficiencies that may have existed at the time of our audit. We relied on computer-processed data to achieve our audit objective and determined that the data provided was sufficiently reliable for the purposes of our audit objective.

Management waived the exit conference on May 16, 2019.

PRIOR REPORTS

- Inspection Report [*Follow-up Inspection on Material Control and Accountability at Los Alamos National Laboratory*](#) (INS-O-13-04, July 2013). The inspection revealed that while several corrective actions were completed to address the recommendations in the prior report, Los Alamos National Laboratory continued to experience problems with the accountability of certain nuclear materials in its Material Control and Accountability (MC&A) Program. Specifically, our testing revealed instances in which nuclear materials were not in the correct location, properly labeled, or accurately identified in the Los Alamos National Laboratory's MC&A database. Additionally, the Los Alamos National Laboratory Inventory Team identified several weaknesses with the accountability of certain nuclear materials in one Material Balance Area inventoried. Our recommendations included ensuring that the oversight of Material Balance Areas is sufficient to provide full implementation of the Department of Energy's MC&A policies and that the accounting database prevents multiple use of the same item identifier. A recommendation addressed to the Office of Health, Safety and Security Chief called for a determination on the allowability of sites to use felt tip pens for labeling nuclear material items and, if permissible, the circumstances under which the pens could be used. Management generally agreed with the findings and recommendations.
- Inspection Report [*Material Control and Accountability at Los Alamos National Laboratory*](#) (DOE/IG-0774, September 2007). The inspection concluded that, in general, the Los Alamos National Laboratory's MC&A Program provided timely and accurate information concerning its inventory of accountable nuclear material. However, we identified opportunities for improving controls over the nuclear material inventory. Specifically, several inventories conducted by Los Alamos National Laboratory were not completed in a timely manner. Further, a storage vault containing over 11,000 individual lots of accountable nuclear material had not undergone a 100 percent inventory in over a decade, and the formulation, assignment, and labeling of lot identification numbers could be improved to enhance controls over accuracy in accounting for nuclear material. In addition, eight custodians were both the shipping and receiving agent in the same transaction, which violated the Department of Energy's requirement for separation of duties. Finally, contrary to Los Alamos National Laboratory's MC&A Plan, there were several instances of lots containing multiple items of accountable nuclear material annotated in the Los Alamos National Laboratory's MC&A accounting system as single items.
- Inspection Report [*Material Control and Accountability at Lawrence Livermore National Laboratory*](#) (DOE/IG-0745, November 2006). The inspection found that, in general, Lawrence Livermore National Laboratory's MC&A Program provided timely and accurate information regarding the inventory, transfers, characteristics, and location of accountable nuclear material. However, the inspection identified opportunities for improvement in the MC&A Program. Specifically, designated personnel did not always follow applicable inventory procedures when conducting a required 100 percent semi-annual inventory of accountable nuclear material. Additionally, Lawrence Livermore

National Laboratory's Controlled Materials Accountability and Tracking System was not always accurate or updated to reflect the actual status or location of tamper indicating devices or items of nuclear material outside the site's Material Access Area.

FEEDBACK

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