

DOE/IG-0546

AUDIT  
REPORT

ACCOUNTING FOR SEALED  
SOURCES OF NUCLEAR MATERIAL  
PROVIDED TO FOREIGN COUNTRIES



MARCH 2002

U.S. DEPARTMENT OF ENERGY  
OFFICE OF INSPECTOR GENERAL  
OFFICE OF AUDIT SERVICES



**U. S. DEPARTMENT OF ENERGY**  
**Washington, DC 20585**

March 20, 2002

MEMORANDUM FOR THE SECRETARY

FROM: Gregory H. Friedman (Signed)  
Inspector General

SUBJECT: INFORMATION: Audit Report on "Accounting for Sealed Sources of Nuclear Material Provided to Foreign Countries"

BACKGROUND

Through the Atomic Energy Act of 1954, the Department of Energy (Department) and its predecessor agencies provided nuclear materials to foreign facilities as part of the Atoms for Peace Program. While this program was designed to aid other nations in developing their own nuclear energy capabilities, the materials provided, including fuel rods, sealed sources, and raw materials, remained U.S. Government-owned. Beginning in the 1960s, the U.S. discontinued its policy of lending the material, and began to transfer ownership through sale or donation. However, according to Departmental records, the U.S. Government still retained title to much of the nuclear material provided to foreign entities.

The Department's Nuclear Materials Management and Safeguards System (NMMSS) was designed, in part, to provide a system of accounting and control over source and special nuclear materials. The Department also maintained a separate registry to account for and track the location of "Sealed Sources." Sealed Sources, which contain nuclear or radiological material, are packaged to be environmentally safe and are generally used for calibration of radiation measuring and monitoring instruments in nuclear research and development. The Sealed Source registry was discontinued in 1984.

In October 2001, the Office of Inspector General issued a report on *Accounting for Government-owned Nuclear Materials Provided to Non-Department Domestic Facilities* (DOE/IG-0529). That report found, among other things, that the Department could not fully account for sealed sources of nuclear material loaned to domestic licensees. In view of this finding and recent world events, we initiated this audit to determine whether the Department could account for Government-owned sealed sources provided to foreign countries.

RESULTS OF AUDIT

The Department could not fully account for the sealed sources of nuclear material lent to foreign countries. The audit disclosed that the Department and its predecessor agencies did not enforce requirements for reporting sealed source information to NMMSS and

efforts to maintain a separate Sealed Source Registry were discontinued. In addition, existing international safeguard controls over nuclear material did not fully address the absence of reliable inventory information on sealed sources. Furthermore, available information was inconsistent as to whether the U.S. continued to own the sources and whether it was responsible for the final disposition of the nuclear materials.

These conditions led us to conclude that the oversight of radioactive sealed sources provided by the U.S. to foreign entities was inadequate given current realities. This raised concerns regarding the possible misuse of these radioactive sources, including the potential for the development of radiological dispersal weapons. The International Atomic Energy Agency (IAEA) has publicly acknowledged its concerns in this arena including specific references to so-called "dirty bombs." Under the circumstances, we concluded that the Department should work with the IAEA to ensure that the sealed sources are properly controlled and that existing record systems are updated and reconciled. In addition, the Department should promptly determine whether the U.S. Government continues to own the sealed sources that were loaned to foreign facilities, and determine their location and condition.

In addition, we found other discrepancies in NMMSS unrelated to sealed sources, including material balances for foreign facilities that were classified as inactive, and balances that were not logical and could not be reconciled. Responsible officials in the Department of Energy, the Department of State, and the Nuclear Regulatory Commission recognized these problems, but expressed confidence that the existing international safeguards regime provides assurance that these materials would not be diverted for unauthorized use. We did not independently confirm the sufficiency of the existing procedures.

### MANAGEMENT REACTION

The Director, Office of Security concurred with the recommendations and proposed corrective actions to improve NMMSS data on sealed sources.

The Associate Administrator for Management and Administration, NNSA disagreed with recommendations directed to the Office of Defense Nuclear Nonproliferation and some of the conclusions in the draft report. The Associate Administrator recognized that "While it is a good idea to be aware of the locations and conditions of any material, it is not the current policy of the U.S. Government to track sealed sources once they are in the control of foreign entities." Accordingly, the Associate Administrator pointed out that implementation of our recommendations would require a change in Executive Policy and international agreements.

The NNSA made valid points, but we feel that the audit report includes a sufficient acknowledgment that tracking U.S. origin material after export has not been required. However, the international community through the International Atomic Energy Agency is moving towards actions that would improve regulatory control over sealed sources.

We believe that the Department should use its information on the export of sealed sources to assist the international community, to the extent practical, in establishing appropriate regulatory controls.

Attachment

cc: Deputy Secretary  
Chief of Staff  
Under Secretary for Energy, Science and Environment  
Administrator, National Nuclear Security Administration  
Director, Office of Security  
Deputy Administrator for Defense Nuclear Nonproliferation

# ACCOUNTING FOR SEALED SOURCES OF NUCLEAR MATERIAL PROVIDED TO FOREIGN COUNTRIES

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# OVERVIEW

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## INTRODUCTION AND OBJECTIVE

In 1954, Congress established, through the Atomic Energy Act (Act), a national priority to ensure the continued conduct of research and development activities relating to nuclear theory, processes, materials, and devices. Congress envisioned the use of nuclear and radioactive material to advance the state of knowledge in medical, biological, agricultural, health, and military venues. The Department of Energy (Department), then known as the Atomic Energy Commission, was encouraged to work with colleges, universities, hospitals, and other organizations to carry out research in these areas.

Through an amendment to the Act, the Department loaned nuclear materials, including sealed sources of nuclear material, to foreign countries as part of the Atoms for Peace Program. The sealed sources contained nuclear material that had been packaged to be environmentally safe and were generally used for calibration of radiation measuring and monitoring instruments and in nuclear research and development. For example, the Department reported, in 1996, that the U.S. had provided approximately 2 to 3 kilograms of plutonium, mostly in the form of sealed sources, to foreign countries since the late 1950s. The sealed sources remained U.S. Government-owned. Although the U.S. began to permit private ownership of nuclear material in 1964, the U.S. continued to provide Government-owned sealed sources of nuclear material into the 1970s. The U.S. is still responsible for the final disposition of Government-owned sealed sources.

The U.S. is required to maintain a system of accounting and control over source and special nuclear materials and report data to the International Atomic Energy Agency (IAEA) on nuclear materials imported by and exported from the U.S. The Nuclear Materials Management and Safeguards System (NMMSS) was designed to fulfill these accounting, controlling, and reporting obligations for U.S. supplied international nuclear materials. The Department and the Nuclear Regulatory Commission (NRC) cosponsor the NMMSS, and it is managed and operated by a Department contractor.

In October 2001, the Office of Inspector General issued a report on *Accounting for Government-owned Nuclear Materials Provided to Non-Department Domestic Facilities* (DOE/IG-0529). That report found, among other things, that the Department could not fully account for sealed sources of nuclear materials loaned to domestic licensees. In view of this finding and recent world events, we initiated this audit to determine whether the Department could account for Government-owned sealed sources provided to foreign countries.

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## CONCLUSIONS AND OBSERVATIONS

We found that the Department could not fully account for the sealed sources of nuclear material loaned to foreign countries. Specifically, the Department did not maintain a database of sealed sources loaned to foreign entities, which would identify their current location and condition. Furthermore, we found that available information was inconsistent as to whether the U.S. continued to own certain sources or whether the Department was responsible for their final disposition. Tracking and accounting for sealed sources and other nuclear materials is important in order to (1) ensure that nuclear materials are used only for peaceful purposes; (2) help protect nuclear materials from loss, theft, or other diversion; (3) comply with international treaty obligations; and (4) provide data to policymakers and other government officials. While requirements set up by the Atomic Energy Commission called for NMMSS to track sealed sources, these requirements were not enforced. In addition, international agreements, negotiated with countries receiving our material, do not allow for continuing monitoring and tracking of nuclear material after export, or provide for the necessary safeguards over all sealed sources.

Without controls in place to detail the location, condition, and ownership of sealed sources located in foreign facilities, the Department cannot effectively administer its nuclear materials management program. Inaccurate inventory records limit the Department's ability to detect stolen or lost material, and to effectively carry out its responsibility to dispose of nuclear materials. Recent world events have underscored the need to strengthen the control over all nuclear materials, including sealed sources. Individually and collectively, sealed sources represent a health, safety, and material security concern. There is a need for the Department to work with the IAEA to establish adequate regulatory oversight of radioactive sealed sources in foreign countries.

This audit identified issues that management should consider when preparing its year-end assurance memorandum on internal controls. Appendix 1, the Other Matters section of this report, discusses additional inventory anomalies that we noted with NMMSS data. The Department should also consider these discrepancies when correcting inventory balances. The Office of Inspector General is separately reporting on the results of a review on the accountability and control of sealed radioactive sources at Departmental facilities.

Signed  
Office of Inspector General

# **ACCOUNTING FOR GOVERNMENT-OWNED NUCLEAR MATERIAL SEALED SOURCES PROVIDED TO FOREIGN FACILITIES**

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## **Sealed Sources Outside of the United States**

The Department does not have current information on the location and condition of the sealed sources that it and its predecessor agencies provided to foreign countries from the 1950s through the 1970s. In addition, it has inconsistent historical data regarding the ownership of the material.

Using the now defunct Sealed Source Registry, we determined that 536 Government-owned sealed sources, which contained plutonium, had been provided to 33 different countries (see Appendix 2). We selected data relating to six of the countries and compared Sealed Source Registry records with the Department's official inventory records in NMMSS. Although NMMSS data approximated information from the Sealed Source Registry on material types, quantities, and recipients for the sampled items, it did not contain information on the current location of the sources. According to Office of Security officials, the last sealed source transaction was entered into NMMSS in 1985. Accordingly, there has been no update of the information to indicate whether the sealed sources continued to be located at the initial recipient facility.

Since sealed sources contain radioactive materials that can deteriorate over time, we also requested available data on the current condition of the sources. However, neither the Sealed Source Registry nor NMMSS contained records showing the condition of the sources or a designation of who is responsible for the upkeep of the sources. Furthermore, NMMSS data showed that ownership had been transferred to the foreign entity while the Registry showed that the U.S. Government continued to own the material. Neither the Department nor the NMMSS operator could provide information to explain the discrepancy in ownership of the sources or whether the U.S. is responsible for their eventual disposition.

Subsequent to the completion of our fieldwork, an official from the Office of Security informed us that they had begun a process to reconcile ownership discrepancies. According to this official, a sample of five transactions indicated that NMMSS was accurate with regard to ownership. The reconciliation process, however, is still ongoing.

We discussed the absence of reliable data on the location and condition of sealed sources with the NRC, the Department of State, and the IAEA. None of these organizations maintained a record of loaned sealed sources, nor could they identify, with any certainty, the location and condition of the sources.



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## **Control Over Sealed Sources**

In the early 1970s, in recognition of the need to have accurate inventory data on sealed sources, the Atomic Energy Commission required that sealed sources of nuclear and special nuclear material be reported in NMMSS. Currently, Department of Energy Order 474.1A requires that nuclear material accounting systems provide accurate information relating to receipts, transfers, inventories, and shipments of nuclear materials sufficient to establish a complete audit trail from receipt through disposition. The Order also establishes NMMSS as the national nuclear materials database.

While other government agencies, such as the NRC and the Departments of Commerce and State, share in the responsibility for controlling exports and negotiating the agreements under which exports are controlled, the Department is responsible for ensuring accurate inventory data to meet the requirements of DOE Order 474.1A and planning for the disposition of the material. Additionally, the Department continues to own any loaned material and is responsible for accepting the return and final disposition of the material.

## **Tracking Loaned Sealed Sources**

Accurate and current information on sealed sources provided to foreign countries does not exist because:

- (1) The Department and its predecessor agencies did not effectively monitor information on Government-owned sealed sources of nuclear materials exported to foreign countries;
- (2) International agreements limit the type of information foreign countries report to the U.S. on nuclear materials that have been provided by the U.S.; and,
- (3) The international safeguards controls that exist over other forms of nuclear materials do not fully apply to sealed sources depending on the amount and type of material they contain.

While the requirements set by the Atomic Energy Commission called for NMMSS to be used to track sealed sources, these requirements were not enforced. Separate and apart from NMMSS, the NRC funded the creation of a registry of sealed sources based on independent contacts with facilities. Although the establishment of this registry in the early 1970s marked an effort to track sealed sources, this effort was discontinued in 1984 because of concerns over usefulness.

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In response to questions posed during the audit, the NMMSS operator stated that the system, as originally configured, could not be used to track the sources since the data was inadequate. However, in 1979, data concerning the export, import, and transfer of sealed sources involving foreign countries was entered into NMMSS. This "backfit tasking" involved the review of paper files and the creation of NMMSS transactions. A total reconciliation between the Registry and NMMSS did not occur. Since that time, there has been limited effort to track exported sealed sources owned by the U.S. Government.

In addition, international agreements, negotiated with the countries receiving U.S. material, do not allow for continued monitoring and tracking of nuclear material after export. For example, Department officials in the Office of Nonproliferation Policy told us that the U.S. agreement with the European Atomic Energy Community (EURATOM), which includes 15 countries, does not require the member countries to report retransfers of U.S. provided materials from one EURATOM country to another. Thus, NMMSS data would not necessarily reflect the current location of materials. The U.S. General Accounting Office (GAO) also identified this problem in a 1994 report<sup>1</sup>. GAO stated that NMMSS international tracking capability was limited primarily because international Agreements for Cooperation do not require foreign countries to report data on the current locations of U.S. provided materials.

Furthermore, international safeguards, that otherwise compensate for limited reporting of nuclear material transfers by foreign countries, may not fully cover sealed sources. For example, the Department has conducted periodic inventory reconciliations with each of the major U.S. trading partners including EURATOM, Canada, Japan, and Australia. NMMSS is updated to reflect the results of the reconciliations. However, a Departmental official told us that the nuclear material in sealed sources might not be included in the reconciliation depending on the amount of nuclear material in the source and the purpose for which it was transferred.

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<sup>1</sup>*Nuclear Nonproliferation: U.S. International Nuclear Materials Tracking Capabilities Are Limited*, December 1994, GAO/RCED/AIMD-95-5

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Finally, the U.S. relies on the IAEA to ensure that countries provided with U.S. materials have adequate safeguards to prevent diversion of such materials. However, the IAEA has expressed concern about the lack of adequate regulatory oversight of sealed sources of radioactive materials in many countries and is proposing a number of new initiatives to help countries search for sources of radioactive materials.

### **Safeguards Concern Over Sealed Sources**

Accurate sealed source inventory data helps to ensure that the sources are adequately protected and to plan for final disposition. While the quantities of nuclear materials in sealed sources are small, in the wrong hands, these sources could be misused. Moreover, there are risks of accidental release. For example, in September 1987, a major city in Brazil was accidentally contaminated by a medical radiation source. This resulted in several deaths, the continuing health monitoring of 110,000 people, and the eventual destruction, for safety reasons, of 85 houses.

An accurate accounting of sealed sources provided to foreign entities is also needed so the Department can plan for the final disposition of those materials it still owns. Based on the data from the Sealed Source Registry, it is entirely possible that 536 sealed sources could be returned to the United States at some future point.

### **RECOMMENDATIONS**

In our view, the resolution of this problem will require the participation of senior managers in both the Office of Security and the National Nuclear Security Administration. Therefore, we recommend that the Director, Office of Security:

1. Continue the ongoing reconciliation to determine whether the U.S. Government continues to own any of the sealed sources located in foreign countries;
2. Update NMMSS to reflect the results of the ownership determination and the other follow-up actions discussed below; and,
3. Provide information on any sealed sources identified as U.S. Government-owned to the Office of Environmental Management for use in disposition planning.

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We also recommend that the Deputy Administrator for Defense Nuclear Nonproliferation within NNSA:

4. Work with the IAEA and other agencies to ensure that all sealed sources produced by the U.S., even if they are no longer U.S. property, are properly controlled; and,
5. Identify the current location and condition of any sealed sources determined to be U.S. Government-owned.

## **MANAGEMENT REACTION**

The Director, Office of Security and the Associate Administrator for Management and Administration, NNSA commented on the draft of this report.

The Director, Office of Security concurred with recommendations regarding improvements needed to NMMSS data on sealed source inventories. The Director agreed that "...some of the data inconsistencies and insufficient reporting requirements cited in the Draft Report, may impact upon the Department's ability to effectively administer its nuclear materials management program."

The Associate Administrator for Management and Administration, NNSA disagreed with recommendations directed to the Deputy Administrator for Defense Nuclear Nonproliferation and some of the conclusions in the draft report. Specifically, the Associate Administrator noted that, under existing U.S. policy and international agreements negotiated with foreign countries, the Department is not required to monitor and track sealed sources after export. The Associate Administrator pointed out that implementation of our recommendations would require an Executive Policy change, renegotiation of international agreements, and additional resources. Finally, the Associate Administrator did not believe that implementation of our recommendation to obtain information on the current location and condition of sealed sources that remained U.S. Government-owned was the responsibility of Defense Nuclear Nonproliferation.

## **AUDITOR COMMENTS**

The actions proposed by the Director, Office of Security are responsive to our recommendations that are intended to improve NMMSS data on exported sealed sources.

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Regarding the Associate Administrator's comments, we recognized in our report that international agreements negotiated with countries receiving U.S. nuclear material do not require the Department to monitor and track sealed sources after export. However, concern over the safety and control of sealed sources has increased since most of the international agreements were negotiated. In fact, the Associate Administrator recognized in his comments that "*While it is a good idea to be aware of the locations and conditions of any material*, it is not the current policy of the U.S. Government" (emphasis supplied). Furthermore, the international community, through the International Atomic Energy Agency, is moving towards actions that would improve regulatory control over sealed sources. Accordingly, we believe that it is appropriate for the Department to work with appropriate Government agencies, including State Department and the Nuclear Regulatory Commission, and through the International Atomic Energy Administration, to identify U.S. Government-owned sealed sources that were exported to foreign countries to assist the international community in improving controls over such material.

## OTHER MATTERS

### ACCOUNTING ISSUES WITH NMMSS

In addition to sealed sources, the U.S. provided both Government and commercial nuclear materials to foreign countries in the form of raw materials and fuel rods. These materials were exported to countries that had Agreements for Cooperation with the U.S. These agreements contained obligations to prevent the theft, diversion, or loss of nuclear material. During our review, we noted inventory data inconsistencies and errors that also raised concerns about the ability of the U.S. to determine the current location and condition of materials exported to foreign countries. For example,

- (1) As of August 2001, NMMSS carried positive material balances for 33 facilities that the Department and NRC had designated as inactive. These facilities were located in 11 countries. While NMMSS had designated these facilities as inactive, we could not confirm that they were truly inactive, rather than just misclassified in NMMSS. However, the fact that NMMSS designated the facilities as inactive, while at the same time indicated that nuclear materials remained present at the facility, appeared anomalous.
- (2) A NMMSS-generated inventory report contained negative material balance records for 193 foreign facilities in 28 countries. These balances, associated with 14 different types of material, would indicate that the Department received back more material than was originally provided. However, Department officials told us that this was unlikely. They believed, instead, that the use of incorrect ownership codes during the return process, combined with the flexibility given to receiving countries to transfer materials from facility to facility or country to country (as in the case with EURATOM) without U.S. notification, led to the negative balances.

### INTERNATIONAL SAFEGUARDS

According to officials that we contacted at the Department of Energy's Office of Nonproliferation Policy, the Department of State, the NRC, and the IAEA, NMMSS data inaccuracies do not represent a concern over the risk of theft or diversion of materials. According to these officials, the international safeguards regime is structured such that materials are accounted for not by their ownership, but by the nonproliferation obligations that are attached to them at the time of transfer.

For example, as previously noted, the U.S. periodically reconciles nuclear materials inventories with its major trading partners. These reconciliations are made for nuclear material inventories that are associated with nonproliferation obligations specified in the Agreements for Cooperation. Specifically, the reconciliations account for material transferred to another country that continue to have nonproliferation requirements associated with them, but do not specifically account for material by ownership, i.e., the reconciliations do not identify the material by ownership, or as U.S. Government-owned.

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Similarly, the IAEA conducts periodic inspections observing inventories for such obligated materials and maintains an inventory database that is used to ensure that member countries have appropriate safeguards over nuclear material in their country, regardless of ownership. However, we did not independently review the controls over the IAEA inventory database. Additionally, reciprocal visits are made to foreign facilities approved for U.S. exports of nuclear material by U.S. teams composed of representatives of the Departments of Energy, Defense, and State, and the NRC.

Department officials noted that NMMSS cannot be accurate in tracking the location and condition of U.S. Government-owned materials exported to foreign countries because the international agreements for cooperation do not provide for the foreign countries to report to NMMSS about intra-country transfers, burn up of material, etc.

We are not recommending actions to correct NMMSS inventory balances for U.S. Government-owned nuclear materials.

## APPENDIX 2

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### COUNTRIES PROVIDED WITH U.S. SEALED SOURCES CONTAINING PLUTONIUM

Austria	Netherlands
Australia	Norway
Brazil	New Zealand
Canada	Pakistan
Taiwan	Philippines
Colombia	South Africa
Finland	Switzerland
France	Israel
West Germany	Sweden
Greece	Italy
Ireland	Thailand
India	Turkey
Iran	United Kingdom
Japan	Uruguay
South Korea	Venezuela
Malaysia	Vietnam
Mexico	



## APPENDIX 3

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### SCOPE

The audit was conducted from October 2001 through January 2002 at Departmental Headquarters in Germantown, MD. We also interviewed officials at the NRC, the State Department, the IAEA, and the contractor responsible for operating the NMMSS.

### METHODOLOGY

To accomplish the audit objective we:

- Reviewed Departmental requirements for the control and accountability of nuclear materials.
- Reviewed international agreements regarding conditions for the transfer and control of nuclear materials.
- Analyzed NMMSS data as of August 2001 to determine the amount and types of nuclear materials located in foreign countries. This information was also used to establish the number of negative records included in the database.
- Compared NMMSS data with information from the Sealed Source Registry to determine if NMMSS contained the inventory of U.S. Government-owned sealed sources provided to foreign countries.
- Held discussions with Department, State Department, NRC, and IAEA representatives to determine whether NMMSS information is relied upon to control and account for nuclear materials provided by the U.S. Government to foreign countries.
- Reviewed available documentation to determine if performance measures associated with the accuracy of data in NMMSS or the control and accountability of the Department's loaned or leased nuclear materials existed.

As noted in the report, we found erroneous and inconsistent data in NMMSS and the Sealed Source Registry. We did not, therefore, rely on NMMSS or the Registry to draw conclusions about nuclear materials quantities, locations, or movement. Instead, we used NMMSS and Registry data to identify issues that needed further follow-up. The audit was conducted 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 the review was limited, it would not necessarily have disclosed all internal control deficiencies that may have existed at the time of audit. Both the Office of Security and NNSA waived an exit conference.

### PRIOR REPORTS

- *Accounting for Government-Owned Nuclear Materials Provided to Non-Department Domestic Facilities*, (DOE/IG-0529). The Department could not fully account for U.S. Government-owned nuclear materials provided to domestic licensees. Specifically, according to NMMSS records (1) substantial amounts of nuclear materials were located at two licensed facilities that no longer existed, (2) several licensee facilities had balances that were not logical and could not be adequately explained or reconciled, and (3) records were incomplete in that they did not contain information on all Government-owned nuclear materials provided to licensees. These problems occurred because the Department did not provide adequate oversight of the system. Without accurate NMMSS records, the Department cannot effectively administer the nuclear materials management program.
- *Nuclear Nonproliferation: U.S. International Nuclear Materials Tracking Capabilities Are Limited*, (GAO/RCED/AIMD-95-5). The United States relies primarily on the NMMSS to track the nuclear materials exported to foreign countries. However, this system does not have all the information needed to track the specific current location (facility) and status of all nuclear materials of U.S. origin that are supplied to foreign countries. The system does not contain this information primarily because the amounts, types, and reliability of data contained in the NMMSS depend largely on the data required to be reported under international agreements for peaceful nuclear cooperation, as well as on foreign countries' and U.S. and foreign facilities willingness to report complete and accurate data.



**Department of Energy**

Washington, DC 20585

March 1, 2002

MEMORANDUM FOR WILLIAM S. MAHARAY  
ASSISTANT INSPECTOR GENERAL  
FOR AUDIT SERVICES  
OFFICE OF INSPECTOR GENERAL

FROM: JOSEPH S. MAHALEY, DIRECTOR  
*J.S. Mahaley*  
OFFICE OF SECURITY

SUBJECT: Draft Report on "Accounting for Sealed Sources of  
Nuclear Materials Provided to Foreign Countries"

As requested in your February 7, 2002, memorandum, my office has completed a review of the subject draft report. We agree with the recommendations contained in the report. The attached corrective actions are being implemented by the Office of Plutonium, Uranium, and Special Materials Inventory (SO-62), Office of Security, to verify that the sealed source information reported by the responsible Department of Energy Program Offices was accurately reported to and recorded in Nuclear Materials Management Safeguard System (NMMSS).

The action plan considers the following realities that relate to final closure of the IG audit issues:

- Sealed source issues can be attributed to inconsistencies in historical data (1950 to 1970) and limitations of existing reporting requirements for nuclear material at foreign facilities. Therefore, NMMSS may not accurately reflect the current location and condition of U.S. government-owned materials exported to foreign countries.
- Final ownership of the sealed sources in question can only be determined from examination of the contractual documents by which these sealed sources were made available to the initial recipient. This information will have to be obtained from organizations that originated the contract since the NMMSS was not a party to the contracts.

Our proposed actions focus on completing an examination and analysis of NMMSS sealed source information and other known historical documents to verify that the information originally reported to NMMSS is accurately reflected in NMMSS. Status updates of the actions will be routinely provided to you. If you have any questions, Susanne Furr of my staff may be reached at (301) 903-5750 or by email, [susanne.furr@hq.doe.gov](mailto:susanne.furr@hq.doe.gov).

Attachment

cc w/attachment:  
S. Furr, SO-62  
J. Tseng, EM-21  
R. Speidel, NN-65  
D. Wittenburg, IG



Printed with soy ink on recycled paper

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**OFFICE OF PLUTONIUM, URANIUM AND SPECIAL MATERIALS INVENTORY (SO-62)  
OFFICE OF SECURITY  
ACTIONS FOR ADDRESSING ISSUES IN THE OFFICE OF  
INSPECTOR GENERAL (IG) AUDIT DRAFT REPORT, ENTITLED  
“ACCOUNTING FOR SEALED SOURCES OF NUCLEAR MATERIALS PROVIDED  
TO FOREIGN COUNTRIES”**

**Summary**

The IG audit draft report, entitled “Accounting for Sealed Sources of Nuclear Materials Provided to Foreign Countries” is a follow on to the October 2001 IG Audit Draft Report, entitled “Accounting for Nuclear Materials Provided to Non-Departmental Domestic Facilities” (A01CG022). Both reports conclude that, for various reasons, the Department of Energy (DOE) cannot fully account for Government-owned nuclear materials, including sealed sources, at both non-Government domestic and foreign facilities. A separate action plan was provided to the IG’s office to address nuclear materials at domestic facilities. This action plan is focused on proposed procedures to resolve ownership discrepancies and other sealed source issues contained in the Report. Inconsistencies and questions surrounding the accuracy of the Department’s historical (1950-1970) sealed source data, including subsequent sealed source information that was backfit into the Nuclear Materials Management and Safeguards System (NMMSS) in the 1980’s, are detailed in the report.

The Office of Security (SO) agrees that some of the data inconsistencies and insufficient reporting requirements cited in the Draft Report, may impact upon the Department’s ability to effectively administer its nuclear materials management program. However, beyond confirming that the data reported to NMMSS on shipments of these sealed sources was accurately reflected in NMMSS, questions raised concerning current location and ownership will have to be resolved by examination of the contractual arrangement originally used to convey these sources. The Office of Security cannot speak to the recommendations made for other DOE offices with respect to this report, however, SO has agreed to work with the DOE offices concerned with these sources and to update NMMSS with accurate sealed source information as it becomes available.

**IG Conclusions and Observations**

The IG’s conclusions and observations are as follows:

- The Department cannot fully account for the sealed sources of nuclear materials loaned to foreign countries. The Department has not maintained a database of sealed sources loaned to foreign entities, which would identify their current location and condition.
- Inconsistent information exists as to whether the U.S. continued to own certain sources or whether the Department was responsible for their final disposition.
- International agreements, negotiated with countries receiving Government-owned material, do not allow for continuing monitoring and tracking of nuclear material after export or provide for the necessary safeguards over all sealed sources.

- Without controls in place to detail the location, condition, and ownership of sealed sources located in foreign facilities, the Department cannot effectively administer its nuclear materials management program. Without requirements in place to continue to track these seal sources, inaccurate inventory records will continue to limit the Department's ability to detect stolen or lost material, and to effectively carry out its responsibility to dispose of nuclear materials.
- Individually and collectively, sealed sources represent a health, safety, and material security concern, and there is a need for the Department to work with the International Atomic Energy Agency (IAEA) to establish adequate regulatory oversight of radioactive sealed sources in foreign countries.

**IG SO Recommendations - The three recommendations are:**

RECOMMENDATION 1: Continue its ongoing reconciliation to determine whether the U.S. Government continues to own any of the sealed sources located in foreign countries;

RECOMMENDATION 2: Update NMMSS to reflect the results of the ownership determination and the other follow-up actions discussed below (i.e., (1) reflect results of IAEA and other agencies efforts to ensure that all sealed sources produced by the U.S., even if they are no longer U.S. property, are properly controlled; and (2) maintain current location and condition of any sealed sources determined by SO to be U.S. Government-owned); and

RECOMMENDATION 3: Provide information on any sealed sources identified as U.S. Government-owned to the Office of Environmental Management for use in disposition planning.

**SO Proposed Actions:**

1. DOE is conducting an examination of NMMSS records to verify that the information in NMMSS is correct and accurately reflects information supplied to NMMSS concerning whether the sources are Government- or privately owned. Determination of whether the U.S. Government continues to own these sealed sources located in foreign countries will have to be made by review of the contracts by which these sources were originally loaned, leased, or sold. To date, five records have been examined to verify that the NMMSS sealed source information is correct and, therefore, will be used as the basis for further examination of records. A statistically significant sample of the original information reported to NMMSS will be conducted to verify that this information is accurately reflected in NMMSS.
2. DOE will update NMMSS with accurate sealed source information as it becomes available and implement the proper edit checks to avoid these types of inconsistencies and errors in the future. As part of the ongoing NMMSS Upgrade, the Office of Plutonium, Uranium, and Special Material Inventory (SO-62), Office of Security is examining how NMMSS functionality can be expanded to include additional sealed source information (e.g., unique identification number, location, etc.).
3. DOE will work with EM and NNSA to determine the time frame and sealed source information that is needed for routine NMMSS sealed-source reports.



**Department of Energy**  
**National Nuclear Security Administration**  
Washington, DC 20585

MAR 07 2002

MEMORANDUM FOR William S. Maharay  
Assistant Inspector General  
For Audit Services

FROM: Anthony R. Lane *Anthony R. Lane*  
Associate Administrator for  
Management and Administration

SUBJECT: Comments to Inspector General's Draft Report  
"Accounting for Sealed Sources of Nuclear  
Materials Provided to Foreign Countries"

The National Nuclear Security Administration was provided a copy of the Inspector General's draft report, "Accounting for Sealed Sources of Nuclear Materials Provided to Foreign Countries." The comments provided hereto address the facts, conclusions, and appropriateness of the recommendations reflected in the draft report. These comments were prepared after consultations with the Deputy Administrator for Defense Nuclear Nonproliferation's staff. The National Nuclear Security Administration does not agree with the recommendations directed toward it and further, disagrees with some of the conclusions arrived at in the draft report.

Attachment

cc: Deputy Administrator for Defense Nuclear Nonproliferation



Printed with soy ink on recycled paper

**Comments on  
Inspector General Draft Report  
“Accounting for Sealed Sources of Nuclear Materials  
Provided to Foreign Countries”**

**General Comments:**

While the Inspector General found that the Department could not fully account for the sealed sources of nuclear materials lent to foreign countries, they did acknowledge that international agreements negotiated with countries receiving U.S. nuclear material do not require the Department to monitor and track sealed sources after export. Furthermore, the Inspector General states that in the absence of such controls, the Department cannot effectively administer its nuclear material's management program. This conclusion appears to be based on the idea that the Department is not following an established policy. In fact, that is not the case. Had it been the Department's policy to track sources once they were in foreign facilities that requirement would have been negotiated into the various agreements with other countries. At this point, should the Administration desire to begin tracking sources, the Department's of State, Commerce, and Energy, the National Nuclear Security Administration, and the Nuclear Regulatory Commission would all need to be involved in any renegotiating of the International Agreements.

**Inspector General Recommendations:**

**“We also recommend that the Assistant Deputy Administrator for International Security and Nonproliferation, through the Principal Deputy Administrator, NNSA:**

*[NOTE: Recommendation should read: “We also recommend that the Deputy Administrator for Defense Nuclear Nonproliferation:..”]*

**Recommendation 4.**

Work with the IAEA and other agencies to ensure that all sealed sources produced by the U.S., even if they are no longer U.S. property, are properly controlled;

**Management Comment**

Non-concur

As stated in our comments, it has not been the Executive Policy of any Department to track sealed sources once they are in control of foreign entities. To do so would require a change in policy and then would require

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the Departments of State, Commerce, and Energy, the National Nuclear Security Administration, and the Nuclear Regulatory Commission to be involved in the renegotiation of any Agreements.

**Recommendation 5.**

Request information on the current location and condition of any sealed sources determined by the Office of Security to be U.S. Government-owned.

**Management Comment**

Non-concur

While it is a good idea to be aware of the locations and conditions of any material, it is not the current policy of the U.S. Government. Should the policy change, various governmental elements would require additional funding from the Congress to undertake this initiative, which could well be expensive. Furthermore, we do not believe that it should be the responsibility of the Office of the Deputy Administrator for Defense Nuclear Nonproliferation to carry out any such recommendation.



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