OFFICE OF
THE INSPECTOR GENERAL

U.S. NUCLEAR
REGULATORY COMMISSION

Audit of NRC's Regulatory Oversight of
Special Nuclear Materials

OIG-03-A-15 May 23, 2003

AUDIT REPORT

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May 23, 2003

MEMORANDUM TO: William D. Travers
Executive Director for Operations

FROM: Stephen D. Dingbaum/**RA**/
Assistant Inspector General for Audits

SUBJECT: AUDIT OF NRC'S REGULATORY OVERSIGHT OF SPECIAL NUCLEAR MATERIALS (OIG-03-A-15)

Attached is the Office of the Inspector General's audit report titled, *Audit of NRC's Regulatory Oversight of Special Nuclear Materials*.

The report reflects the results of our audit to determine whether NRC adequately ensures its licensees control and account for special nuclear material (SNM). We found that NRC's current levels of oversight of licensees' material control and accounting (MC&A) activities do not provide adequate assurance that all licensees properly control and account for SNM. Specifically, NRC performs limited inspections of licensees' MC&A activities and cannot assure the reliability of the Nuclear Materials Management and Safeguards System data. Comments your office provided at a March 5, 2003, exit meeting, during subsequent discussions, and in your May 14, 2003, written response to the draft report have been incorporated, as appropriate, in our final report. Appendix D contains the written response in its entirety. Appendix E contains our point-by-point analysis of the agency's formal comments.

It should be noted that throughout the audit, and in the formal written response to the draft report, agency managers said that NRC applies a risk-informed approach to its oversight of licensees' MC&A activities. OIG requested documentation describing the basis of, or framework for this approach. The agency was unable to provide a documented basis or framework used to risk inform its oversight of MC&A activities for all types of materials licensees. Consequently, OIG recommends that the agency document the basis for this approach (see new Recommendation #3 in the final report).

If you have any questions, please call Russ Irish at 415-5972 or me at 415-5915.

Attachment: As stated

cc: W. Dean, OEDO

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EXECUTIVE SUMMARY

BACKGROUND

The U.S. Nuclear Regulatory Commission (NRC) is authorized to grant licenses for the possession and use of special nuclear materials (SNM)[1] and establish regulations to govern the possession and use of those materials. Practical uses of SNM include (1) fuel for nuclear reactors; (2) industrial, academic, and medical research and testing; and (3) the manufacture of industrial gauging devices (sealed sources). NRC's current Commission states that proper control and accounting of SNM is an important component of the agency's safeguards and security programs.

NRC's regulations require that certain materials licensees have extensive material control and accounting (MC&A) programs as a condition of their license. However, all license applicants[2], including those requesting authorization to possess small quantities of SNM, must develop and implement plans and activities that demonstrate a commitment to accurately control and account for radioactive materials. Licensees are also required to allow NRC to inspect the materials, controls, and premises where SNM and source materials are used or stored. Therefore, references to MC&A programs and inspections in this report incorporate the activities required of **all** licensees to properly control and account for SNM in their possession.

Additionally, NRC requires that materials licensees report information to the Nuclear Materials Management and Safeguards System (NMMSS). NMMSS is a computer database managed by the U.S. Department of Energy (DOE) and jointly used with NRC as the national system for tracking certain private- and Government-owned nuclear materials.

PURPOSE

The Office of the Inspector General conducted this audit to determine whether NRC adequately ensures its licensees control and account for special nuclear material.

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[1] *Special nuclear material* – Plutonium, uranium-233, uranium enriched in the isotopes uranium-233 or uranium-235, and any other material which the Commission, pursuant to the provisions of Section 51 of the Atomic Energy Act of 1954, as amended, determines to be special nuclear material, but does not include source material; or any material artificially enriched by any of the foregoing, but does not include source material.

[2] Title 10, Code of Federal Regulations (10 CFR) Part 20, *Standards for Protection Against Radiation;* Part 40, *Domestic Licensing of Source Material*; Part 70, *Domestic Licensing of Special Nuclear Material*; Part 74, *Material Control and Accounting of Special Nuclear Material*; Part 75, *Safeguards on Nuclear Material -Implementation of US/IAEA Agreement*; Part 76, *Certification of Gaseous Diffusion Plants*; and Part 150, *Exemptions and Continued Regulatory Authority in Agreement States and in Offshore Waters Under Section 274*.

RESULTS IN BRIEF

According to NRC managers, the agency has applied a risk-informed approach to its MC&A oversight. This approach results in certain materials licensees receiving routine MC&A inspections, while others receive minimal to no inspections of their material control and accounting activities. Additionally, NRC depends on licensees following through on their commitments to comply with regulatory reporting requirements, and relies on licensees' data as the "official" record of the amounts, types, and locations of SNM without periodically validating the accuracy of the data.

Today's heightened sensitivity to the control of SNM warrants NRC's serious attention to its licensees' material control and accounting activities. However, NRC's current levels of oversight of licensees' MC&A activities do not provide adequate assurance that all licensees properly control and account for SNM. Specifically, NRC —

A. performs limited inspections of licensees' MC&A activities, and
B. cannot assure the reliability of the SNM tracking system.

Without adequate inspections to verify licensees' commitments to MC&A, or a reliable SNM tracking system, NRC has no independent means for determining if SNM was lost, stolen, or otherwise diverted while in a licensee's possession. Despite not being a regulatory requirement, having this independent ability would add value to the agency's oversight abilities.

A. NRC PERFORMS LIMITED INSPECTIONS OF LICENSEES' MC&A ACTIVITIES

Licensees' control and accounting of SNM is a fundamentally important safeguards measure. Consistent with its position to risk-inform the inspection program, NRC performs limited routine inspections of licensees' MC&A activities.
Staff consider that aspects of NRC's regulatory framework, other than inspections, make it unlikely that SNM would be lost, stolen, or diverted. However, recently reported events, such as missing fuel rods at a nuclear power plant, raise serious questions about these assumptions. Without adequate and routine inspections of licensees' MC&A activities, including periodic physical verification of licensees' inventories, NRC cannot reasonably ensure that its licensees are effectively controlling, and accurately accounting for, SNM in their possession.

B. NRC CANNOT ASSURE THE RELIABILITY OF THE SNM TRACKING SYSTEM

NRC cannot assure the reliability of the national system used for tracking the types, quantities, and locations of the SNM it regulates primarily because management has not resolved longstanding problems with NMMSS operations and data, such as:

- the reliability of NMMSS data (e.g., completeness and accuracy), and
- interactions with DOE on NMMSS-related matters.

As a result, NRC cannot ensure the accuracy and, therefore, the reliability of NMMSS data. Specifically, NRC cannot know in a timely manner, the amounts, locations, and types of SNM held by its licensees.

RECOMMENDATIONS

A Consolidated List of Recommendations made to the Executive Director for Operations (EDO) is on page 19. It should be noted that an additional recommendation has been added to the final report in response to the agency's comment on application of a risk-informed approach to oversight of licensees' MC&A activities (see Recommendation #3).

OIG ANALYSIS OF AGENCY COMMENTS

On March 5, 2003, OIG discussed its draft report with agency senior executives. Subsequent to that meeting, OIG met with members of the EDO's staff to address issues needing further clarification and/or explanation. On May 14, 2003, the Executive Director for Operations provided a formal response to this report, in which he stated general agreement with many of OIG's observations and recommendations. However, the EDO stated that NRC will defer any actions on the recommendations related to the development of an independent accounting system for SNM until a study of the issue can be conducted. The EDO's transmittal letter and specific comments on this report are included as Appendix D.

This final report incorporates revisions made, where appropriate, as a result of the subsequent meetings and the agency's formal written comments. Notwithstanding these revisions, the overall conclusions and recommendations have not changed. In effect, if the NRC was asked how much SNM a particular licensee has, the agency would have to ask the licensee and would have to accept the response as accurate because NRC performs only limited validation of the data in licensees' records and has no independent accounting system of its own. A point-by-point analysis of the agency's comments is presented in Appendix E.

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ABBREVIATIONS AND ACRONYMS

CFR	*Code of Federal Regulations*
CY	calendar year
DOE	U.S. Department of Energy
DOE/IG	U.S. Department of Energy/Office of the Inspector General
FTE	full-time equivalent
FY	fiscal year
IAEA	International Atomic Energy Agency
MC&A	material control and accounting
MD	management directive
MLSR	Monthly Letter Status Report
NMMSS	Nuclear Materials Management and Safeguards System
NRC	U.S. Nuclear Regulatory Commission
NRR	Office of Nuclear Reactor Regulation
OIG	Office of the Inspector General
SNM	special nuclear material

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GLOSSARY

Byproduct material – (1) Any radioactive material (except SNM) yielded in or made radioactive by exposure to the radiation incident to the process of producing or utilizing SNM and (2) the tailings or wastes produced by the extraction or concentration of uranium or thorium from any ore processed primarily for its source material content. [Source: Atomic Energy Act of 1954, Section 11(e)]

Critical mass – Amounts greater than, or equal to, 200 grams of plutonium; 200 grams of uranium-233; 350 grams of uranium-235, or combinations thereof. [Source: SECY-02-0093, dated May 31, 2002, for the Commissioners from W. Travers, Executive Director for Operations]

Foreign obligations – Requirements in bilateral and multilateral agreements that the U.S. Government track the amounts, locations, and uses of imported special nuclear material, and periodically reconcile records with the country of origin. [Source: absent an NRC regulatory definition, OIG relied on a DOE/State Department document for this language.]

Reporting requirements required under bilateral and multilateral agreements are referred to as "foreign obligations" in this report.

Fuel cycle facility - A facility involved in the processing and fabrication of uranium ore into reactor fuel. [Source: NUREG-1350, Volume 14, Information Digest, 2002 Edition]

Material control and accounting – Activities carried out [by licensees] to establish the quantities of nuclear material, including "special nuclear material," present within defined environments and the changes in those quantities taking place within defined periods of times. MC&A programs must ensure that all nuclear materials are accounted for and that unauthorized acts are detected. [Source: absent an NRC regulatory definition of MC&A, OIG used International Atomic Energy Agency and DOE documents for this definition].

Source material – Uranium or thorium or any combination thereof, in any physical or chemical form; or ores that contain by weight 0.05 percent or more of (1) uranium, (2) thorium, or (3) or any combination thereof. Source material includes depleted uranium and natural uranium, but not "special nuclear material." [Source: Title 10 CFR Part 40.4]

Special nuclear material – Plutonium, uranium-233, uranium enriched in the isotopes uranium-233 or uranium-235, and any other material which the Commission, pursuant to the provisions of Section 51 of the Atomic Energy Act of 1954, as amended, determines to be special nuclear material, but does not include source material; or any material artificially enriched by any of the foregoing, but does not include source material. [Source: Title 10 CFR Part 74.4]

Practical uses of SNM include (1) fuel for nuclear reactors; (2) industrial, academic, and medical research and testing; and (3) the manufacture of industrial gauging devices (sealed sources).

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I. BACKGROUND

AUTHORIZATIONS AND RESPONSIBILITIES

The U.S. Nuclear Regulatory Commission (NRC) is authorized, under the Atomic Energy Act of 1954, as amended, and the Energy Reorganization Act of 1974, to (1) grant licenses for the possession and use of special nuclear materials (SNM), source material, or byproduct material, and (2) establish regulations to govern the possession and use of those materials.

Approximately 21,000 licenses (5,000 administered by NRC and 16,000 administered by 32 Agreement States[1]) are issued for medical, academic, industrial, and general uses of nuclear materials. Additionally, more than 1,000 of the NRC and Agreement State licensees are authorized to possess SNM and are primarily responsible for ensuring the safe and secure use of nuclear materials.

NRC is responsible for developing and implementing rules and regulations that govern licensed nuclear activities and for enforcing those regulations and license conditions. Additionally, Agreement State rules pertaining to SNM require compatibility with NRC rules. NRC maintains an oversight function for determining the adequacy and compatibility of Agreement State programs.

Under the Atomic Energy Act and the Commission's regulations, NRC licensees must allow agency representatives to inspect their controls and accounting for SNM and source material, as well as the materials, premises, and facilities where the material is used or stored. Because NRC retains authority over several aspects of materials control and accounting (MC&A) in Agreement States (e.g., transfer records, reports of theft, import/export activities), certain NRC inspection authorities also apply to Agreement State licensees.

SCOPE OF MC&A PROGRAMS

NRC requires that nuclear material license holders establish and implement activities and procedures designed to control and account for the SNM in their possession. Some licensees (e.g., owners of fuel cycle facilities, power reactors, and non-power reactors) are required to have extensive material control and accounting programs as a condition of license; others are not.

[1]An Agreement State is any State that has signed as agreement with the NRC allowing the State to regulate the use of radioactive materials (except at Federal agencies, commercial nuclear power plants, and those authorized to possess a critical mass of SNM) within that State. Since NRC regulations on tritium, source and SNM transfer reporting apply directly to Agreement State licensees, references to "licensees" in this paper refer to NRC and Agreement State licensees.

However, all license applicants[2], including those requesting authorization to possess small quantities of SNM (such as that in sealed sources) must develop, document, and implement plans and activities that demonstrate a commitment to accurately account for, and control radioactive materials. Therefore, for the purposes of this report, references to MC&A (programs and inspections) are not limited to programs required under 10 CFR Part 74, but incorporate the activities required of all licensees to properly control and account for SNM in their possession.

MC&A PROGRAM ELEMENTS

NRC's requirements of licensee MC&A activities, and inspections of those activities, vary depending on the type, quantity, and use of SNM. According to NRC managers, the scope of an MC&A program and the elements applied should be commensurate with the risk and should include, as appropriate, the following elements to help ensure safe use and protection of SNM:

- systems of measurements for: determining quantities of nuclear materials received, produced, shipped, and in inventory; and, for estimating measurement uncertainties and controlling the quality (precision and accuracy) of measurements;

- written procedures for:
  - identifying and evaluating shipper-receiver differences
  - taking physical inventory
  - item and process monitoring
  - establishing material balance areas and controlling access to materials
  - resolving indicators of loss, theft, or diversion
  - calculating the Standard Error of Inventory Difference
  - assuring that personnel are trained and qualified in MC&A;

- a system of records for SNM receipts, transfers, and disposal, e.g., the Nuclear Materials Management and Safeguards System (NMMSS), and internal transfers; and

- reports of loss or theft of SNM, inventory differences exceeding specified limits, and SNM Physical Inventory Summary Reports (Form NRC-327).

[2]Title 10, Code of Federal Regulations (10 CFR) Part 20, *Standards for Protection Against Radiation*; Part 40, *Domestic Licensing of Source Material*; Part 70, *Domestic Licensing of Special Nuclear Material*; Part 74, *Material Control and Accounting of Special Nuclear Material*; Part 75, *Safeguards on Nuclear Material - Implementation of US/IAEA Agreement*; Part 76, *Certification of Gaseous Diffusion Plants*; and Part 150, *Exemptions and Continued Regulatory Authority in Agreement States and in Offshore Waters Under Section 274*.

NRC'S MC&A INSPECTION PROGRAM

As stated above, NRC requires licensees to properly control and account for the SNM in their possession. According to NRC, the agency has moved towards risk-informing its regulatory oversight of licensees in recent years. Consequently, NRC has applied a risk-informed approach to its MC&A inspection program. Inspection effort is determined by the types and quantities of SNM licensees are authorized to possess, and the risks associated with varying facility operations. For instance, activities and processes involving categories of SNM of increasing strategic significance should receive greater inspection effort.

NRC's MC&A inspection program is designed, in part, to:

- ensure that licensees implement, and continue to maintain, adequate and effective programs to sufficiently control and account for the SNM in order to prevent and detect loss, theft, or diversion;
- ensure that licensees' MC&A systems trigger timely detection, response, and recovery operations if loss, theft, or diversion occurs;
- ensure that licensees' MC&A systems, particularly their dominant safeguards risk-significant controls, perform adequately and are capable of resolving detected anomalies, whether caused by system malfunctions, human errors, or adversarial actions; and
- prevent a weakening of licensees' MC&A systems.

NMMSS REPORTING REQUIREMENTS

NMMSS is a centralized computer database managed by the U.S. Department of Energy (DOE) and jointly used with NRC for tracking certain private- and Government-owned nuclear materials. NMMSS is considered the official national accounting system for SNM inventories. NRC requires that licensees, as part of their MC&A programs, report certain types of information to NMMSS. Out of the 21,000 material licensees referenced above, about 1,000, most of which possess SNM, must report to NMMSS by means of:

- Nuclear Material Transaction Reports when transferring, receiving, or adjusting their inventories for certain amounts and types of nuclear materials;
- Material Balance Reports, when authorized to possess a critical mass of material; and/or

- Yearly inventory statements when they possess certain types and amounts of foreign origin source material.

Appendix B provides specific details regarding these reporting requirements.

NRC/DOE INTERAGENCY AGREEMENT

DOE has historically provided NRC with material control and accounting support through NMMSS. NMMSS contains active inventory records for about 1,000 licensees, both NRC and Agreement States, and 100 DOE facilities. Since 1975, NRC has reimbursed DOE for at least 30 percent of the annual cost of NMMSS, which currently costs NRC about $1.5 million per year. In addition, NRC paid DOE $700,000 during FY 2001 and FY 2002 to support a NMMSS upgrade.

NRC's use of NMMSS is governed by a 1979 programmatic agreement between NRC and DOE. This agreement established the management principles to be followed in the development and operation of NMMSS. Internal implementation of the agreement is guided by Management Directive and Handbook (MD) 11.7, *NRC Procedures for Placement and Monitoring of Work With the U.S. Department of Energy (DOE)*. This management directive specifies the policies and procedures intended to ensure that NRC effectively manages agency work placed with DOE.

US/IAEA AGREEMENT[3]

In 1980, the U.S. Government agreed to apply International Atomic Energy Agency (IAEA) safeguards standards to all SNM held by domestic installations, excluding facilities associated with direct national security significant activities. As part of the agreement, the U.S. Government committed to a national system of accounting to formally track certain nuclear materials. Although the U.S. Government had already established NMMSS prior to 1980, in promulgating 10 CFR Part 75, *Safeguards on Nuclear Material - Implementation of US/IAEA Agreement*, NRC officially recognized NMMSS as the national system of accounting to which NRC's and Agreement States' licensees must report.

NRC OFFICE RESPONSIBILITIES

In April 2002, NRC's Office of Nuclear Security and Incident Response became responsible for overseeing NRC's interests in NMMSS, as well as for regulatory review of all MC&A programs and licensees' requests for changes in those programs.

[3] *Agreement Between the United States of America and the International Atomic Energy Agency for the Application of Safeguards in the United States*, proclaimed by the U.S. President, December 31, 1980.

The Office of Nuclear Reactor Regulation (NRR) is responsible, in part, for the policy and overall program management for inspections at commercial power reactors. NRR is also responsible for policy and program management, security and MC&A regulation, and inspections at research and test (non-power) reactors.

The Office of Nuclear Material Safety and Safeguards, formerly responsible for NMMSS oversight, is responsible for conducting MC&A inspections for fuel cycle facilities and providing guidance to regional offices for materials inspection activities.

NRC's four regional offices are responsible for implementing the inspection program at commercial power reactors and some materials facilities.

CONGRESSIONAL INTEREST

Subsequent to the events of September 11, 2001, members of Congress conveyed concerns about policies and procedures used to account for, and secure, nuclear materials. In a December 2001 letter to NRC, Congressman Edward J. Markey expressed concerns associated with recent terrorist threats. In particular, the Congressman noted that nuclear materials may be used to develop devices that could be used to (1) contaminate critical infrastructure systems, (2) disrupt our Nation's financial markets, (3) impede normal economic activity, or (4) paralyze Government functions.[4] Also in December 2001, Congressmen W.J. Tauzin and John D. Dingell sent a letter to NRC's Chairman expressing concerns about potential weaknesses with respect to the security of radioactive materials. The Congressmen's letter also discussed the need for inspections of materials licensees' premises.[5]

II. PURPOSE

The Office of the Inspector General (OIG) conducted this audit to determine whether NRC adequately ensures its licensees control and account for special nuclear material.

Appendix A provides a more detailed description of the audit's scope and methodology.

[4]Letter from Congressman Edward J. Markey to Chairman Richard Meserve dated December 4, 2001.

[5]Letter from Congressmen W.J. Tauzin and John Dingell to Chairman Richard Meserve dated December 11, 2001.

III. FINDINGS

The NRC staff believes it has adequately implemented MC&A oversight programs on a risk-informed basis. This approach results in certain materials licensees (i.e., fuel cycle facilities and non-power reactors) receiving routine MC&A inspections. Yet, other licensees (e.g., commercial power reactors and small quantity holders) receive minimal to no inspections of their MC&A activities. Additionally, NRC depends on licensees following through on their commitments to comply with regulatory reporting requirements, and relies on licensees' data as the "official" record of the amounts, types, and locations of SNM without periodically validating the accuracy of the data.

Today's heightened sensitivity to the control of SNM warrants NRC's serious attention to its licensees' material control and accounting activities. However, NRC's current levels of oversight of licensees' MC&A activities do not provide adequate assurance that all licensees properly control and account for SNM. Specifically, NRC —

A. performs limited inspections of licensees' MC&A activities, and
B. cannot assure the reliability of the SNM tracking system.

Without adequate inspections to verify licensees' commitments to MC&A, or a reliable SNM tracking system, NRC has no independent means for determining if SNM was lost, stolen, or otherwise diverted while in a licensee's possession. Despite not being a regulatory requirement, having this independent ability would add value to the agency's oversight abilities.

A. NRC PERFORMS LIMITED INSPECTIONS OF LICENSEES' MC&A ACTIVITIES

Licensees' control and accounting of SNM is a fundamentally important safeguards measure. Consistent with its position to risk-inform the inspection program, NRC performs limited routine inspections of licensees' MC&A activities.
Staff consider that aspects of NRC's regulatory framework, other than inspections, make it unlikely that SNM would be lost, stolen, or diverted. However, recently reported events, such as missing fuel rods at a nuclear power plant, raise serious questions about these assumptions. Without adequate and routine inspections of licensees' MC&A activities, including periodic physical verification of licensees' inventories, NRC cannot reasonably ensure that its licensees are effectively controlling, and accurately accounting for, SNM in their possession.

Background

According to a General Accounting Office report, control and accounting of SNM is important in order to (1) ensure that nuclear materials are used only for peaceful purposes; (2) 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.[6] In addition, the US/IAEA Agreement states that "material accountancy shall be used as a safeguards measure of fundamental importance." Further, NRC's current Commission states, ". . . proper material control and accounting (MC&A) is an important component of our safety and safeguards and security programs. . . ." Applications for materials licenses must include, for NRC's approval, a licensee's multi-element plan to control and account for material in its possession.

The approximately 1,000 licensees reporting to NMMSS, most of which possess special nuclear materials, include:

- 7 major fuel cycle facilities,
- 50 research and test (non-power reactor) facilities,
- 103 operating commercial nuclear power reactors, as well as,
- 800+ other licensees authorized to possess small quantities[7] of SNM.

MC&A Inspections

Agency reorganizations since the late 1980s have resulted in a reduction of agency MC&A experts and, over the last decade, NRC's focus on regulatory oversight of licensees' MC&A programs has dramatically declined. As a result, NRC presently conducts limited routine inspections to verify that licensees carry out their MC&A obligations, including the accurate reporting of transactions to NRC and NMMSS. Specifically, in recent years, NRC only conducts routine inspections of licensees' MC&A programs at fuel cycle facilities and some non-power reactor facilities.

Currently, MC&A inspections vary by type of facility. The agency's seven licensed major fuel cycle facilities routinely receive MC&A inspections, as scheduled, and 36 of the agency's 50 licensed research and test reactors received MC&A inspections between CY 2000-2002. Yet, NRC conducts no routine MC&A inspections at 103 operating commercial nuclear power reactor sites nor at more than 800 other material licensees authorized to possess SNM.

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[6]GAO Report B-259533, titled *Nuclear Nonproliferation: U.S. International Nuclear Materials Tracking Capabilities Are Limited*, dated December 27, 1994.

[7]Small quantities of SNM means quantities of less than 1 gram of contained U-233, U-235, or plutonium, or less than 1,000 kilograms of uranium or thorium of foreign origin. (See Appendix B for details.)

Furthermore, where conducted, MC&A inspections include limited physical verification of SNM inventories and the accuracy of licensees' records, and no validation of data reported to NMMSS.

Fuel Cycle Facilities

While NRC routinely performs annual MC&A inspections at each major fuel cycle facility, NRC inspectors said that current resources are not adequate to complete all parts of the MC&A inspection program. In fact, in FY 2002, NRC allocated only 1.5 full-time equivalents (FTE) dedicated as fuel cycle MC&A inspectors. Those inspectors said they must prioritize which portions of the MC&A inspection procedure to perform. As a result, these inspections include limited physical verification of licensees' inventories, some validation of the data in licensees' records, and no validation of inventory data reported by licensees to NMMSS.

Research and Test Reactors

In contrast to the inspectors dedicated to MC&A in the fuel cycle area, research and test reactor inspectors conduct very limited reviews of licensees' MC&A programs as part of broad-based facility inspections. According to these inspectors, agency MC&A experts used to spend a couple of days conducting dedicated inspections of licensees' MC&A activities. This responsibility eventually shifted to the research and test reactor inspectors, who said that MC&A is not their specialty. These inspectors do some physical verification of fuel inventories and do ensure licensees are keeping records and reporting to NMMSS. However, they do not validate licensees' calculations, nor the data reported by the licensees to NMMSS.

Operating Nuclear Power Reactors

Historically, the agency conducted routine MC&A inspections at commercial nuclear power reactors. However, in 1988, NRC discontinued routine MC&A inspections at these facilities after an NRC task force determined that the issues covered under the MC&A program were not risk-significant. Currently, MC&A inspections occur only when authorized in response to specific plant events.

Small Quantity SNM Licensees

Based on discussions with agency staff, OIG concluded that NRC does not conduct MC&A inspections of licensees possessing small quantities of SNM. According to some NRC staff, no one in the agency is conducting these MC&A inspections. However, others believe these types of inspections are conducted but they expressed confusion over which organization(s) is actually conducting such

inspections. NRC management could not confirm whether these inspections are conducted.

Staff Assessment of Current Inspection Programs

NRC staff are confident that the agency's regulatory requirements and existing inspection programs adequately ensure that its licensees are effectively safeguarding SNM. Examples of these activities cited by NRC staff include:

- licensing review and approval of submitted Fundamental Nuclear Material Control Plans, licensee implementation of these plans, and NRC's verification of that implementation;
- requirements that licensees, as a part of their MC&A programs, submit Material Balance Reports and Nuclear Material Transaction Reports to NMMSS, where applicable;
- inspections of radiation protection programs and internal physical security areas; and
- requirements for extensive physical security barriers at power plants.

Oversight of Fuel Cycle Facilities

NRC staff are confident in the oversight activities performed at fuel cycle facilities. According to NRC staff, fuel cycle inspectors verify the accuracy of information reported to NRC on licensees' Physical Inventory Summary Reports and the facility records used to produce the reports. Staff said this type of review would effectively identify SNM inventory discrepancies.

However, after discussions with NRC inspectors, it is not clear the extent to which Physical Inventory Summary Reports are routinely validated. In addition, these reports are not submitted to, or reconciled with, NMMSS.

Self-Protecting Material at Reactors

According to NRC managers, most special nuclear material at power reactors is self-protecting from a health and safety point of view. The agency believes that this self-protecting aspect (i.e., handling highly radioactive reactor spent fuel is extremely dangerous) provides reasonable assurance that the material is controlled. Staff also believe that the risk of undetected loss, theft, or diversion of SNM at power reactor sites is low. Consequently, NRC trusts power reactor licensees to implement their MC&A obligations effectively, including the accurate reporting of SNM transaction and inventory information to NMMSS.

However, a recent OIG Event Inquiry relayed details about material unaccounted for by the Millstone Nuclear Power Station licensee.[8] In addition, although power plant licensees are required to annually reconcile their inventory data to NMMSS records, inconsistencies existed between this licensee's SNM inventory amount and that reflected in NMMSS.

Risk Significance of Possessing Small Quantities of SNM

Until recently, staff also felt confident that NRC's current level of oversight of the more than 800 licensees authorized to possess small quantities of SNM ensured adequate control and accounting for SNM. NRC staff believed that the types and quantities possessed are not risk-significant in that these materials were not likely to be used to cause mass destruction or loss of life.

Today, some NRC staff and OIG believe the threat has changed and terrorists could use small quantities of SNM in a device designed to contaminate critical infrastructure (e.g., the water supply, roads, highways, public and private buildings) and cause the general public to panic.

Planned Reevaluation of MC&A Oversight

NRC's Commission states that MC&A is an important component of agency programs designed to ensure the safe use and security of SNM. In light of heightened worldwide sensitivity to the potential threat of nuclear materials being sought for malicious intent, NRC's reliance on its licensees to comply with MC&A requirements, without physical verification, warrants reevaluation. In fact, NRC plans to reevaluate the vulnerabilities of its oversight of MC&A programs in FY 2003 and FY 2004. However, NRC's current planned reevaluation efforts do not include instituting routine MC&A inspections. According to NRC managers, a final decision on reinstating routine inspections, where not presently performed, awaits the result of the staff's programmatic review of MC&A vulnerabilities.

Summary

Staff are confident that aspects of NRC's regulatory framework, e.g., physical security requirements and approval of licensees' material control plans, make it unlikely that SNM would be lost, stolen, or diverted from licensees' facilities. Consequently, consistent with the agency's position to risk-inform its inspection program, NRC conducts limited routine MC&A inspections.

[8] *NRC's Regulatory Oversight Over The Control of Special Nuclear Material at Millstone Unit 1,* NRC OIG Event Inquiry, Case No. 01-03S, October 31, 2002.

While it is important to risk inform regulatory oversight to minimize the resource burden on licensees and the impact on agency resources, NRC must balance that goal with ensuring and maintaining the public health and safety. In light of the events of September 11, 2001, OIG believes that NRC's position to selectively verify licensees' compliance with MC&A requirements is no longer sufficient to ensure public confidence in, and respect for, the agency. Without adequate, routine inspections of licensees' MC&A activities, such as periodic physical verifications of inventories and validation of the accuracy of reports to NMMSS, NRC cannot reasonably ensure that licensees can detect loss, theft, or diversion of SNM in a timely manner.

RECOMMENDATIONS

OIG recommends that the Executive Director for Operations:

1. Conduct periodic inspections to verify that material licensees comply with MC&A requirements, including, but not limited to, visual inspections of licensees' SNM inventories and validation of report information;

2. Report to the Commission annually on the effectiveness of NRC's inspection program for ensuring that licensees satisfactorily carry out their MC&A responsibilities.

AGENCY COMMENT AND OIG RESPONSE

In its comments responding to the final draft report (see Appendix D), the agency states that ". . . it has adequately implemented an MC&A oversight program utilizing a risk-informed approach." Although OIG requested documentation for the basis of this risk-informed approach, the agency was unable to provide a documented basis or framework used to risk inform their oversight of MC&A activities for all types of materials licensees. Accordingly, OIG recommends the following:

3. Document the basis of the approach used to risk inform NRC's oversight of MC&A activities for all types of materials licensees.

B. NRC CANNOT ASSURE THE RELIABILITY OF THE SNM TRACKING SYSTEM

NRC cannot assure the reliability of the national system used for tracking the types, quantities, and locations of the SNM it regulates primarily because management has not resolved longstanding problems with NMMSS operations and data, such as:

- the reliability of NMMSS data (e.g., completeness and accuracy), and

- interactions with DOE on NMMSS-related matters.

As a result, NRC cannot ensure the accuracy and, therefore, the reliability of NMMSS data. Specifically, NRC cannot know in a timely manner, the amounts, locations, and types of SNM held by its licensees.

Background

NRC established requirements for its licensees to report information to NMMSS as part of licensees' MC&A programs. According to 10 CFR 70.9, information required of licensees by the Commission's regulations, or license conditions, ". . . shall be complete and accurate in all material respects."

Reliability of NMMSS Data

Problems with the reliability of NMMSS data have existed for decades. As early as 1979, NRC managers reported that agency efforts to rely on NMMSS, in part, for reporting inventory differences was non-productive due to apparent mistakes and errors in NMMSS data. At the time, the agency hired a contractor to " . . . identify, determine the reasons for, and provide the logic and procedures for eliminating any inconsistencies existing." The NRC contractor identified inconsistencies such as entries to NMMSS with no records to justify the entries and other data that were never entered. Based on a review of agency records, OIG could not determine if NRC took any actions to correct the deficiencies identified by the NRC contractor.

In 1997, an NRC task force identified errors in NMMSS. In its report, the task force recommended that the agency conduct an annual audit that addressed, among other things, the overall operations of NMMSS. In response, agency technical staff completed only one review and issued a report in October 1999. In that report, the NRC staff concluded that the NMMSS contractor had procedural methodologies in place that ensured effective protection and processing of licensee data submittals, but that human errors contributed to inaccurate NMMSS reports.

A DOE/IG report,[9] issued in October 2001, stated that DOE could not fully account for nuclear materials loaned or leased to NRC and Agreement State licensees because of discrepancies in NMMSS. Additionally, prior to issuance of that report, the current NMMSS contractor indicated that the historical data remained unreliable. This was due to the lack of reconciliations for licensees possessing small quantities of SNM and foreign balances, and because initial inventory balances were not validated.

[9]DOE/IG, *Accounting for Government-Owned Nuclear Materials Provided to Non-Department Domestic Facilities,* October 2001.

Completeness of NMMSS Data

According to the NMMSS contractor, NMMSS does not contain a complete history of licensees' transactions. In fact, NRC regulations require neither annual Material Balance Reports nor Nuclear Material Transaction Reports for licensees possessing small quantities of SNM, unless the transaction involves more than 1 gram of SNM. As a result, over time, the integrity of NMMSS data has deteriorated. By default, for licensees possessing small quantities of SNM, NMMSS adds up amounts on transaction reports submitted by licensees to determine inventory balances. Inventory for those facilities are calculated on transaction data alone and, because these licensees do not submit Material Balance Reports, NMMSS records cannot be reconciled to ensure accuracy. Without periodic reconciliations at these facilities, NMMSS users, such as NRC and DOE, would not know whether NMMSS data is correct.

In addition, NMMSS is not currently designed to fully capture foreign obligation[10] information from licensees. Therefore, NRC cannot be certain that NMMSS data used by DOE and the Department of State in reporting on foreign obligations fully accounts for SNM held in the U.S. According to agency-provided documents, system improvements to capture foreign obligations is progressing toward a proposed implementation date of October 1, 2003.

Verification of Licensees' Reports to NMMSS

Discrepancies in the NMMSS database over the years have been exacerbated by the lack of NRC verification of licensees' reports to NMMSS. According to NRC documents, staff suspects that the vast majority of the NMMSS discrepancies are the results of improper transaction reporting by licensees and/or data entry errors by the NMMSS contractor. Even so, NRC does not verify the accuracy of the data submitted by its licensees to NMMSS.

An NRC staff member responsible for overseeing NRC's interests in the NMMSS project, and DOE's own NMMSS contractor, have each said that one of the many reasons for NMMSS discrepancies was that NRC never validated or verified initial inventories reported to NMMSS by licensees. As a result, some material balances in NMMSS have been calculated against incorrect initial balances for decades.

[10]The U.S. Government maintains bilateral and multilateral agreements with foreign nations. Some of these agreements require the U.S. Government to track the amounts, locations, and uses of imported SNM, and to periodically reconcile records with the country of origin. Reporting requirements required under bilateral and multilateral agreements are referred to as "foreign obligations."

The agency is planning corrective actions to address errors identified in the October 2001 DOE/IG report. However, the corrective actions will not sufficiently prevent a recurrence of inventory discrepancies because the plans do not include performing routine verification of information reported by licensees to NMMSS.

Use of NMMSS to Support Agency Activities

Problems with report preparation and data accuracy have resulted in a database that is minimally used. Staff have no confidence in NMMSS data and reports are untimely and not user-friendly. Consequently, agency inspectors do not use NMMSS data to support their inspection activities. Only one MC&A inspector currently uses NMMSS data and that is for reference purposes, not inspection support.

OIG attempted to determine the amounts and types of SNM and their distribution by types of licenses through available NMMSS reports, but could not do so in a timely manner because the agency does not have this information readily available. In fact, the agency does not receive this information on any regular basis. According to NRC staff, a request for this NMMSS information would have to be submitted to DOE. As a result, it would take the agency 2 to 3 days to acquire the report from NMMSS, dependent upon DOE's assigning it high enough priority.

In summary, although licensees are required to report information to NMMSS as one element of their MC&A programs, NRC does not verify the accuracy of the information reported. Additionally, the agency does not require licensees to report transactions and transfers of less than a gram of SNM to NMMSS. As a result, NRC does not have an accurate, complete source of information readily available to identify the types and quantities of SNM that all its licensees possess.

NRC depends on licensees' data as the "official" record of the amounts, types, and locations of SNM, primarily because of the unreliability of NMMSS data. In fact, NRC staff said they would call the licensees directly if they needed to quickly know inventory balances and locations. Therefore, despite subscribing to the national database for SNM, NRC may not be able to determine if a discrepancy, such as missing or diverted SNM, exists in a timely manner.

NRC/DOE NMMSS Interaction

The 1979 NRC/DOE programmatic agreement for NMMSS established the guidelines for interaction between the agencies. However, the terms of the agreement have been generally ignored, perpetuating the problems with NMMSS. As a result, despite paying DOE about $1.5 million annually for the

maintenance and use of the database, DOE has not satisfactorily represented NRC's interests in NMMSS. For example, it took numerous unsuccessful attempts, over time, before DOE finally agreed to include improved capability for tracking required foreign obligation information in the planned NMMSS upgrade efforts. Although the time line for implementing the full computer platform upgrade has stalled, the agency projects an October 2003 implementation date for improvements in foreign obligation tracking.

Additionally, DOE initiated adjustments to NRC licensees' NMMSS accounts to resolve negative balances of SNM without prior NRC knowledge or approval. NRC knew that DOE was trying to resolve balance discrepancies of SNM, but did not intervene until after OIG brought this matter to management's attention (see Appendix C). Subsequently, NRC issued a letter to DOE noting objections to DOE's actions and directing DOE not to change licensees' data in NMMSS without NRC's prior approval.

NRC is also aware that statistics regarding the inventory balances for estimated amounts of plutonium, one type of SNM, were calculated differently by NRC and DOE. A recent State Department report to IAEA identified the total metric tons of plutonium contained in "spent civil reactor fuel" at U.S. sites. The amount reported by DOE to the State Department was calculated using NMMSS data.

Yet, an NRC manager told OIG that the total reported amount of plutonium should have been approximately 21 percent higher, based on the same NMMSS data. However, because DOE never contacted NRC to discuss any problems with the NMMSS values, NRC took no action to resolve this discrepancy regarding NRC licensees' holdings.

NRC's Management of NMMSS Activities

Insufficient resources for overseeing NMMSS resulted in ineffective monitoring of NMMSS operations and contract activities. According to NRC staff, resources dedicated to NMMSS project management was once the responsibility of a section consisting of five to six people. In FY 2002, NRC allocated only .3 FTE to monitor all of the NMMSS activities. Although actual monitoring efforts in FY 2002 exceeded 1.0 FTE, oversight of the project remained ineffective.

According to NRC, 1.0 FTE was allocated to support NMMSS activities in FY 2003. However, considering planned actions to correct NMMSS discrepancies, and ongoing upgrade activities, the increased resources will not be adequate to ensure effective oversight.

Procedures for Monitoring Work with DOE

To effectively monitor NMMSS operations and contract activities, NRC management needs to ensure that staff follow established guidance. MD 11.7 was developed to provide the guidance for oversight of NRC work placed at DOE laboratories. Specifically, the guidance was developed to ensure (1) that procedures for negotiating and managing agreements with DOE are consistent with sound business practices and contracting principles; (2) the uniform application of an agency-wide standard of contract management for projects placed with DOE; and (3) a framework exists for program management control, administration, monitoring, and closeout of projects placed with DOE. However, NRC managers and staff overseeing NMMSS operations and contract activities:

- neither updated nor strengthened the 1979 NMMSS programmatic agreement with DOE designed to establish mutually acceptable managerial principles;

- produced only unsigned, non-executable versions of major contract documents required to be maintained in files per MD 11.7 (e.g., the specific programmatic agreement between NRC and DOE for the maintenance and operation of NMMSS; Form 173, Standard Order for DOE Work);

- accepted broadly stated Project and Cost Proposals from DOE;

- historically accepted untimely Monthly Letter Status Reports (MLSR) prepared by DOE's contractor, which consistently lacked sufficient details (only in the recent months has DOE complied with NRC requests to submit timely MLSRs); and

- did not, until recently, exercise non-performance remedies available under MD 11.7, such as withholding payment or stopping work, despite repeated documentation to DOE of unsatisfactory contractor performance.

Furthermore, in FY 1999, due to NRC's inattention, DOE redirected a portion of the agency's $1.5 million NMMSS maintenance and operations allocation to initiate a major system upgrade without NRC's prior knowledge and concurrence. In OIG's opinion, this constituted an unauthorized obligation to the agency. In fact, DOE acknowledged in writing its failure to consult NRC and, as a result, discounted NRC's portion of the upgrade cost from $806,000 to $700,000. Subsequently, between FY 2001 and FY 2002, NRC paid this amount toward the NMMSS upgrade. Also, while NRC management eventually assigned an NRC technical monitor to represent NRC's interests in the upgrade, that monitor does not possess the computer background necessary for identifying and resolving emerging problems with the upgrade. To date, the contractor has not

successfully developed and completed that upgrade. In fact, NRC and DOE are reevaluating the upgrade specifications to salvage some value from their expended resources.

Agency Planned Corrective Actions

In May 2002, NRC management proposed to the Commission a plan to resolve NMMSS discrepancies identified in the referenced DOE/IG report. As of May 1, 2003, the agency had not yet implemented the corrective action plan. Although the proposed plan would involve extensive agency resources, none of the proposed actions address weaknesses in the NMMSS arrangement (i.e., the NRC/DOE agreement for the development and operation of NMMSS) or NRC management's oversight.

Summary

The NMMSS database is unreliable as a tracking system for SNM because it does not contain complete and accurate information. As a result, NRC cannot know, with reasonable certainty and in a timely manner, the amounts, types, and locations of the SNM it regulates. NRC's inattention to longstanding problems with NMMSS operations and data resulted in NRC's over reliance on DOE to represent the agency's interests in the national database. However, in a number of instances, DOE has not satisfactorily represented NRC's interests in NMMSS.

In addition, NMMSS is not designed to fully capture foreign obligation information. Since international reports are based on NMMSS data, the U.S. Government cannot be sure that those reports are complete and accurate. Consequently, the U.S. Government may not fully meet the intent of international agreements in regards to account balances.

In short, management inattention results in an annual investment of approximately $1.5 million for an unreliable system that is minimally used to support NRC's regulatory activities. OIG believes that the funds used for NRC's annual reimbursement to DOE, and the continued FTE support for the NMMSS upgrade might be more effectively used by NRC to develop and maintain its own database.

RECOMMENDATIONS

OIG recommends that the Executive Director for Operations:

4. Revise NRC regulations to require licensees authorized to possess SNM, and not currently required to do so, to conduct annual inventories and submit an annual Material Status Report or Physical Inventory Summary Report to NRC;

5. Establish an independent NRC system of accounting for SNM possessed by NRC and Agreement State licensees and ensure that beginning balances are accurate (based on NRC's physical verification of a statistical sample of the location and amounts of SNM held by the licensees or a review of a statistical sample of a licensee's records or some combination thereof);

6. Subsequent to completion of Recommendation 5, withdraw the approximate $1.5 million annual reimbursement to DOE for NMMSS and redirect those resources to support of the NRC database;

7. Subsequent to completion of Recommendation 5, dissolve the current *DOE-NRC Programmatic Agreement for Development and Operation of Nuclear Materials Management and Safeguards System (NMMSS)* and institute a new agreement regarding NRC's providing DOE with the information necessary to satisfy international reporting obligations; and

8. For any funding from NRC to DOE directed toward meeting the international reporting obligations, follow all policies and procedures for placement and monitoring of work with DOE as outlined in Management Directive and Handbook 11.7.

IV. CONSOLIDATED LIST OF RECOMMENDATIONS

OIG recommends that the Executive Director for Operations:

1. Conduct periodic inspections to verify that material licensees comply with MC&A requirements, including, but not limited to, visual inspections of licensees' SNM inventories and validation of report information;

2. Report to the Commission annually on the effectiveness of NRC's inspection program for ensuring that licensees satisfactorily carry out their MC&A responsibilities;

3. Document the basis of the approach used to risk inform NRC's oversight of MC&A activities for all types of materials licensees.

4. Revise NRC regulations to require licensees authorized to possess SNM, and not currently required to do so, to conduct annual inventories and submit an annual Material Status Report or Physical Inventory Summary Report to NRC;

5. Establish an independent NRC system of accounting for SNM possessed by NRC and Agreement State licensees and ensure that beginning balances are accurate based on NRC's physical verification of a statistical sample of the location and amounts of SNM held by the licensees or a review of a statistical sample of a licensee's records or some combination thereof;

6. Subsequent to completion of Recommendation 5, withdraw the approximate $1.5 million annual reimbursement to DOE for NMMSS and redirect those resources to support of the NRC licensee database;

7. Subsequent to completion of Recommendation 5, dissolve the current *DOE-NRC Programmatic Agreement for Development and Operation of Nuclear Materials Management and Safeguards System (NMMSS)* and institute a new agreement regarding NRC's providing DOE with the information necessary to satisfy international reporting obligations; and

8. For any funding from NRC to DOE directed toward meeting the international reporting obligations, follow all policies and procedures for placement and monitoring of work with DOE as outlined in Management Directive and Handbook 11.7.

V. AGENCY COMMENTS

On March 5, 2003, OIG discussed its draft report with agency senior executives. Subsequent to that meeting, OIG met with members of the EDO's staff to address issues needing further clarification and/or explanation. On May 14, 2003, the Executive Director for Operations provided a formal response to this report in which he stated general agreement with many of OIG's observations and recommendations. However, the EDO stated that NRC will defer any actions on the recommendations related to the development of an independent accounting system for SNM until a study of the issue can be conducted. The EDO's transmittal letter and specific comments on this report are included as Appendix D. This final report incorporates revisions made, where appropriate, as a result of the subsequent meetings and the agency's formal written comments. Nonetheless, because OIG takes exception to some of NRC comments, a point-by-point analysis is presented in Appendix E.

It should be particularly noted that the agency provided the following comments regarding Section III, Findings (see Agency Comment 3, first bullet, in Appendix E):

> "The report states that the NRC's material control and accounting (MC&A) inspection program does not adequately ensure licensees properly account for and control SNM. This statement is overly broad in that MC&A programs are necessarily different for different types of licensees because of the variation in risk. The staff believes that it has adequately implemented an MC&A oversight program utilizing a risk-informed approach. The report should address the adequacy or inadequacy of this approach and its impact on the accountability and control of SNM by different types of licensees."

In response, OIG believes that the report clearly states that MC&A programs, and inspections of those programs, differ and that the staff believes the current level of oversight is adequate from a risk-informed view. In fact, the staff consistently discussed the use of a risk-informed approach in determining who, and what, to inspect regarding MC&A. Although OIG requested documentation for the basis of this risk-informed approach, the agency was unable to provide a documented basis or framework used to risk inform their oversight of MC&A activities for all types of materials licensees.

Consequently, OIG has added an additional recommendation to this final report that the agency document the basis for this approach (see Recommendation #3 on the Consolidated List of Recommendations).

SCOPE AND METHODOLOGY

The objective of this audit was to determine whether NRC adequately ensures its licensees control and account for special nuclear materials. To accomplish this, OIG reviewed NRC regulations and relevant program documentation. Auditors also interviewed more than 40 individuals, including staff from the Commissioners' offices and Office of the Secretary of the Commission; senior executives and/or staff from the Offices of the Executive Director for Operations, Nuclear Materials Safety and Safeguards, Nuclear Reactor Regulation, International Programs, and Nuclear Security and Incident Response, and regional offices. OIG staff also met with NRC inspectors, officials from the Department of Energy, and the Project Director at DOE's NMMSS contractor. Auditors observed an agency MC&A specialist conduct an inspection at a fuel facility and interviewed the licensee.

This audit progressed in two phases. OIG's initial survey of the MC&A area, conducted from December 2001 through March 2002, identified and addressed a number of emergent issues, including significant NMMSS activities. In the second phase, from September through December 2002, OIG completed its assessment of the agency's oversight of MC&A programs and NMMSS.

On January 13, 2003, OIG issued an initial discussion draft audit report to NRC's Executive Director for Operations. OIG met with NRC staff on January 17, 2003 to discuss their comments on the draft report. The report was revised, where appropriate, and reissued on February 26, 2003. At a March 5, 2003 meeting, agency senior executives provided informal comments on the revised draft. Based on the agency's request to submit formal comments, OIG issued a final discussion draft audit report on March 25, 2003, which included revisions resulting from the above-referenced meetings. Subsequent to issuing the final discussion draft audit report, staff members from the EDO's office and OIG met to address issues needing further clarification and/or explanation. Additional revisions were made to this final audit report, where appropriate, as a result of these meetings and the agency's formal written comments.

This audit was conducted in accordance with generally accepted Government auditing standards and included a review of management controls related to the objective of this audit. The major contributors to this report were Russ Irish, Team Leader; Catherine Colleli, Senior Management Analyst, and Debra Lipkey, Senior Management Analyst.

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NRC MATERIAL INVENTORY REPORTING REQUIREMENTS TO NMMSS

Nuclear Material Transaction Reports

- Each licensee transferring, adjusting, or receiving SNM of any origin in a quantity of one gram or more of contained uranium-233, uranium-235, or plutonium must submit Nuclear Material Transaction Reports to NMMSS.

- Each licensee transferring, adjusting, or receiving 1 kilogram or more of uranium or thorium source material of foreign origin must submit Nuclear Material Transaction Reports to NMMSS.

- For the purposes of this OIG audit report, licensees' inventory transactions involving SNM of any origin in a quantity of less than 1 gram of contained uranium-235, uranium-233, or plutonium are referred to as "transactions involving small quantities." Regulations do not require that Nuclear Material Transaction Reports be prepared for these transactions.

Material Balance Reports

- Each licensee authorized to possess a critical mass of material is required to periodically complete and submit Material Balance Reports to NMMSS.

- Licensees authorized to possess at any one time and location, more than 1,000 kilograms of source material (i.e., uranium or thorium, or any combination thereof) must submit a statement of foreign origin source material inventory to NMMSS.

- Licensees authorized to possess less than a critical mass and less than 1,000 kilograms of uranium or thorium of foreign origin are referred to as "authorized to possess small quantities." Regulations do not require Material Balance Reports to be prepared by these licensees.

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w/o enclosures

ATTACHMENT C

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

OFFICE OF THE
INSPECTOR GENERAL

February 7, 2002

Mr. William Maharay
Assistant Inspector General for Audit Services
U. S. Department of Energy
Office of the Inspector General
1000 Independence Ave., S.W.
Washington, D.C. 20585

SUBJECT: REQUEST FOR AUDIT ASSISTANCE REGARDING ACTIONS TAKEN TO ADDRESS ANOMALOUS NMMSS DATA

Dear Mr. Maharay:

My office is currently conducting an audit of the Nuclear Regulatory Commission's (NRC) program to ensure licensees are able to accurately account for nuclear materials. As part of this effort, we are following up on NRC's response to DOE's request for assistance in resolving open items from the October 2001, DOE/OIG report, *Accounting for Government-Owned Nuclear Materials Provided to Non-Department Domestic Facilities*. As reflected in this report, the Nuclear Materials Management and Safeguards System (NMMSS) database contains inaccurate data and DOE's Office of Plutonium, Uranium and Special Materials Inventory started a process to correct these inaccurate records. During our audit, we identified an issue which requires your assistance in resolving.

In September 2001, DOE sent letters to 32 NRC licensees informing them of modifications made to their NMMSS plutonium account balances (Enclosures 1-3). It is our understanding that DOE directed NAC International, the NMMSS contractor, to post adjustments in the database to eliminate NRC-licensees' negative balances of government-owned and privately-owned plutonium. The following types of adjustments were made:

- changes in ownership codes from one government-owned material code to another government-owned material code
- changes in ownership code from various government-owned material codes to the privately-owned code
- zeroing out privately-owned material balances

These adjustments were made in spite of NRC's request that no action be taken to an NRC-licensee's account until NRC and the licensee resolved the matter (Enclosure 4).

The adjustments to NRC-licensees' account balances raise questions about the adequacy of the internal controls over the NMMSS database, about the accuracy of NMMSS data, and whether NRC can rely on the data. Therefore, we request your assistance in answering the following questions:

1. How did DOE obtain NRC licensee NMMSS account balances?

2. How did DOE coordinate their directive to the NMMSS contractor with NRC?

3. What mechanism did DOE use to direct the contractor to make these modifications?

4. Did DOE and NMMSS ensure that they conducted these balance adjustments according to required procedures, i.e., were Forms 741 signed and submitted?

5. What information did DOE rely on to support making the modifications to the subject accounts? Was this information verified to ensure the integrity of NMMSS data?

6. In addition, we understand some letters were returned to DOE. What action has DOE staff taken to follow up on the returned letters?

We appreciate your assistance in this matter. If you need additional information, I can be reached at (301) 415-5915.

Sincerely,

Stephen D. Dingbaum
Assistant Inspector General for Audits

Enclosures: As stated

cc: H. Bell, O IG
D. Lee, O IG
C. Paperiello, OEDO
J. Craig, OEDO
M. Virgilio, NMSS
C. Haney, NMSS

AGENCY COMMENTS

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

May 14, 2003

MEMORANDUM TO: Stephen D. Dingbaum
Assistant Inspector General for Audits

FROM: William D. Travers
Executive Director for Operations

SUBJECT: OFFICE OF THE INSPECTOR GENERAL FINAL DRAFT REPORT: AUDIT OF NRC'S REGULATORY OVERSIGHT OF SPECIAL NUCLEAR MATERIALS

In accordance with your request dated March 25, 2003, this memorandum provides the staff's written comments on the subject final draft report. The staff provided comments on an earlier version of the final draft during a meeting on March 5, 2003. Subsequently, following additional input from the staff, your audit team made a number of changes to the final draft report that resulted in the staff dismissing many of its comments. We appreciate the opportunity to review and formally comment on this report, as well as the opportunity to provide follow-on clarifying and informal comments. We believe this has resulted in the report providing a better context within which to consider the findings and recommendations.

In general, we agree with many of your observations and recommendations. However, before we take any actions related to the report's recommendation that the NRC should have its own independent accounting system for special nuclear material, we intend to study this issue further.

Please note that the staff recently completed a joint NRC-DOE program review of NMMSS. While the report is not yet final, the draft results of this review have been provided to you for your information and will be considered by staff in developing corrective actions in response to this audit.

Our comments are provided in the attachment to this memorandum.

Attachment: Staff Comments

NRC STAFF COMMENTS ON OIG'S DRAFT FINAL OIG REPORT: AUDIT OF NRC'S REGULATORY OVERSIGHT OF SPECIAL NUCLEAR MATERIALS

1. General

- Much of the report is devoted to problems with the Nuclear Materials Management and Safeguards System (NMMSS), the national system for tracking special nuclear material (SNM). While the staff recognizes that the NMMSS may not be a reliable system for licensees possessing small quantities of SNM, the emphasis on NMMSS is not commensurate with its relative importance in accounting for and controlling SNM. Those licensees who are required to report a physical inventory to NMMSS possess over 99% of the SNM. The staff has high confidence in the SNM inventories for these licensees

- Notwithstanding the recent concerns regarding radiological dispersal devices (RDDs), most SNM would not be attractive for use in an RDD because of the radiological properties of uranium isotopes. The staff intends to use the results of a recently completed report by a joint DOE-NRC working group on RDDs to inform the corrective actions it will take to address the recommendations in the OIG report.

2. Pages 5-6, under "US/IAEA Agreement"

The report states that the US/IAEA Agreement and its implementation in accordance with 10 CFR Part 75, applies to all SNM. However, Section 75.4(k) states that the requirements of 10 CFR Part 75 only apply to "installations," as defined in § 75.2(a). Most of the small quantity SNM licensees discussed in other parts of the report are not "installations" as defined in Part 75. In addition, § 75.3 provides for certain exemptions to these requirements. The 2nd line of this paragraph, if worded as "...standards to all SNM held by domestic ~~facilities~~ installations, excluding..." would accurately depict the situation.

3. Page 8, Section III, Findings

- The report states that the NRC's material control and accounting (MC&A) inspection program does not adequately ensure licensees properly account for and control SNM. This statement is overly broad in that MC&A programs are necessarily different for different types of licensees because of the variation in risk. The staff believes that it has adequately implemented an MC&A oversight program utilizing a risk-informed approach. The report should address the adequacy or inadequacy of this approach and its impact on the accountability and control of SNM by different types of licensees.

- The report states that without adequate MC&A inspections or a reliable system for tracking SNM, the NRC has no independent basis for determining if SNM was lost, stolen or otherwise diverted, relying on licensees' data as the "official" record. The specific responsibility for safeguarding nuclear material assigned to the NRC in the Energy Reorganization Act of 1974 is "monitoring, testing and recommending upgrading of internal accounting systems for special nuclear and other nuclear material licensed under the Atomic Energy Act of 1954, as amended." "Internal" in this language refers to the licensees' systems. Responsibility for accounting and control of SNM resides with the licensees. The report should address how

well the staff is verifying licensees' execution of their SNM accountability and control responsibilities.

•

4. Page 11, under "Research and Test Reactors"

- The report addresses aspects of what inspectors do at non-power reactors relative to MC&A programs. The focus should be on the adequacy or inadequacy of the inspection procedures and the basis for this conclusion since the inspectors are following approved inspection procedure guidance.

- Given that NRC's inspectors do perform some limited validation of calculations using a rule of thumb for uranium burnup with megawatt days of burnup, the last sentence should be revised to state:

  ~~However,~~ They also ~~do not validate~~ perform limited validation of licensees' calculation~~s~~, ~~nor the~~. However, the inspectors do not verify that data reported by the licensees to NMMSS is accurately kept in the database.

5. Page 19, under "Use of NMMSS to Support Agency Activities"

- The report states that the NRC relies on licensee inventory data because NMMSS data is unreliable. A more accurate rationale would be that the NRC relies on licensee records because they are more timely and detailed. For example, information on the quantities of SNM at the fuel cycle facilities changes daily. As such, by the time that licensee data gets into the NMMSS database, the data can be out of date. Also, the SNM data in NMMSS is highly summarized, while the facility has data at a detailed item level. NMMSS was never intended to report inventories on a near real-time basis or to track location of SNM within a licensee site. Clearly, NMMSS may have reliability problems relative to licensees possessing small quantities of SNM. Both the aforementioned report on RDDs and the NMMSS program review should provide the staff with information on how to address this issue. Given the staff's confidence in the NMMSS data for those licensees controlling over 99 percent of SNM, the report should clarify the basis of its reliability issue, if any exists, for this group of licensees.

6. Page 21, under "NRC/DOE NMMSS Interaction"

The paragraph at top of page states that a NMMSS report documented that the total plutonium at NRC reactor sites was approximately 21 percent more than the Department of Energy (DOE) reported (for calendar year 2001). The NRC staff contacted the DOE regarding this OIG concern. The DOE clarified that they wanted total plutonium only for spent fuel at reactor sites, and that they intentionally omitted from the NMMSS report the quantities of plutonium in reactor cores, spent fuel stored at sites other than civilian power reactor sites, and plutonium not contained in spent fuel. Based on this clarification from the DOE, the NRC staff has no issue with the totals as reported by DOE. This issue was not resolved until after the OIG's draft report was issued; therefore, it was accurate at the time the draft report was provided to the staff. The report should recognize the subsequent clarification. This does not detract from the central issue the OIG raises regarding NRC-DOE interactions relative to NMMSS.

7. Pages 22-23, under "Procedures for Monitoring Work with DOE"

- The 2nd bullet indicates that the NRC managers and staff overseeing NMMSS operations and contract activities were unable to provide major contract documents required by MD 11.7. We recognize that the documents may not have been readily available per MD 11.7. However, the staff has signed, executable versions of major contract documents and would welcome the opportunity to assist the OIG auditors in viewing them.

- The 3rd and 4th bullets indicate that the NRC managers and staff overseeing NMMSS operations and contract activities accepted broadly stated Project and Cost Proposals from DOE and accepted monthly letter status reports (MLSRs) prepared by the DOE's contractor which consistently lacked sufficient details. The staff believes it has taken repeated actions to document problems or inconsistencies noted in the MLSRs provided by DOE's contractor. In addition, there was repeated contact with the DOE Operations Office to pressure it to submit the DOE's MLSR report in a timely manner. We recognize that these activities have not had much effect until recently and that these issues could have been escalated sooner. The report should acknowledge the staff's efforts to document problems with MLSRs.

- The report indicates (page 23) that the NRC's management eventually assigned an NRC technical monitor to represent the NRC's interests in the NMMSS upgrade. It should be noted that there is only one technical monitor for this contract. An additional individual was assigned to work with the technical monitor to ensure that the NRC's reporting requirements were adequately addressed in the upgrade. We are not aware that the individual is identified as a technical monitor on any contract-related documents, though may be identified as such on some non-contract-related documents. To address these comments, the staff recommends that the statement be revised to read as follows:

  > "Also, while NRC management eventually assigned an ~~NRC technical monitor~~ individual to assist the technical monitor in representing NRC's interests in the upgrade, that ~~monitor~~ individual does not possess the computer background necessary for identifying and resolving emerging information technology problems with the upgrade.

8. Page 24, under "Recommendations"

- The 1st full paragraph on this page states the following:

  > "In addition, NMMSS is not designed to capture foreign obligation information. Since international reports are based on NMMSS data, the U.S. Government cannot be sure that those reports are complete and accurate. Consequently, the U.S. Government may not fully meet the intent of international agreements."
  >
  > [Note: Similar information is provided on pages 17-18 in the section on "Completeness of NMMSS Data"]

  The conclusion of this paragraph is incorrect. NMMSS does capture data on nuclear material imported into and/or exported from the U.S. (emphasis added) by identifying the source

(foreign supplier for imports into the U.S.) and the recipient (authorized foreign intermediate and ultimate consignees for exports). The origin of material, if it is other than the country which processes and sends it to the U.S., is also recorded. Although the NMMSS system captures relevant data, it cannot be electronically manipulated and analyzed. In other words, the problem with the current system is that relevant records must be printed and manually analyzed (e.g., deciphering codes and adding and subtracting material amounts as it proceeds through the various stages of fuel cycle operations). With the continuous advances in computer system capabilities, it is not unusual to consider upgrades and identify the various features which could be improved. The effort to improve tracking of foreign obligations in a more resource-efficient and less labor-intensive manner is only logical.

The draft report's assertion that the U.S. is not meeting the intent of its agreements because of NMMSS alone is inappropriate. It implies that the U.S. is exporting such material without the knowledge and consent of the foreign supplier. This is not the case. While the process of identifying the information is not automatic, it can be done. Again, NMMSS is only one element of a much broader U.S. system, including a variety of checks and balances incorporating advance notices of materials transactions from or specific assurances for receipt of materials provided by foreign governments, to reconcile records of materials exported from and/or imported into the U.S.

9. Pages 26-27, Section IV, Consolidated List of Recommendations
(Also applies to recommendations that appear at end of Sections III.A & III.B)

- Recommendation 1

  It is not clear whether the term "material licensees" refers to fuel cycle materials licensees, or industrial and medical materials licensees, or both. The recommendation should clarify to which class(es) of material licensees it applies.

  The report does substantiate the need for periodic inspections from risk and regulatory burden perspectives. The staff will be conducting an MC&A Program Review as part of its comprehensive review of safeguards and security programs. The need for such inspections will be considered as part of this review.

- Recommendation 3

  The staff has determined that any decision to revise the regulations should be made after the completion of the NMMSS corrective action project and the MC&A Program Review. These structured reviews will provide the needed bases for initiating rulemaking.

- Recommendations 4, 5, and 6

  The report has not provided a convincing argument for an independent NRC SNM accounting system. The costs and programmatic impacts of such a system must be thoroughly evaluated. After completing the NMMSS corrective action project, the staff will be in a better position to perform such an evaluation. A Capital Planning and Investment Control (CPIC) analysis should first be used to determine whether an independent system is more cost effective and

meets programmatic requirements. The recommendation should recognize that such an analysis should be conducted to determine if recommendations 4, 5, and 6 should be accomplished.

10. Page 30, Appendix B, NRC Material Inventory Reporting Requirements to NMMSS

The 2nd bullet under "Material Balance Reports" contains an inaccuracy. 10 CFR 40.64(b) requires a yearly statement if the licensee is authorized to possess, at any one time and location, more than 1,000 kg of uranium or thorium, not 1,000 kg or more of foreign origin material as stated. The yearly statement identifies what quantity of the 1,000 kg or more of source material possessed by the licensee is of foreign origin.

DETAILED OIG ANALYSIS OF AGENCY COMMENTS

Agency comments:

1. General

- Much of the report is devoted to problems with the Nuclear Materials Management and Safeguards System (NMMSS), the national system for tracking special nuclear material (SNM). While the staff recognizes that the NMMSS may not be a reliable system for licensees possessing small quantities of SNM, the emphasis on NMMSS is not commensurate with its relative importance in accounting for and controlling SNM. Those licensees who are required to report a physical inventory to NMMSS possess over 99% of the SNM. The staff has high confidence in the SNM inventories for these licensees.

- Notwithstanding the recent concerns regarding radiological dispersal devices (RDDs), most SNM would not be attractive for use in an RDD because of the radiological properties of uranium isotopes. The staff intends to use the results of a recently completed report by a joint DOE-NRC working group on RDDs to inform the corrective actions it will take to address the recommendations in the OIG report.

OIG Response:

1st bullet -

As stated in the report, NMMSS serves as the U.S. national accounting system for SNM satisfying the U.S. obligation under the US/IAEA Agreement. As such, and absent a vigorous inspection program to verify licensees compliance with NRC MC&A requirements, including accurate reporting of data, accounting for SNM through NMMSS becomes more important as a safeguards measure to monitor SNM use. Furthermore, the agency does not provide support for its comment that licensees required to submit physical inventory reports to NMMSS possess "over 99%" of the SNM. The agency's high confidence in the SNM inventories for these licensees may be misplaced because NRC relies on flawed reconciliation processes used by NMMSS to substantiate the inventory amounts reported by licensees to the database. For instance, NRC does not verify the accuracy of the data reported by licensees to NMMSS and the initial inventory balances reported to NMMSS were not validated.

Given that NMMSS serves as the national system costing NRC $1.5 million per year, its identification as relatively unimportant is indicative of the agency's lack of attention highlighted in this report.

2nd bullet -

OIG recognizes that NRC recently participated in an interagency working group with DOE, whose objective was to address key issues associated with RDDs, including the identification of the radioactive materials of greatest concern for use in an RDD. However, the scope of the study excluded a review of most SNM.

Agency Comment:

2. Pages 5-6, under "US/IAEA Agreement" *(now page 4 of this report)*

The report states that the US/IAEA Agreement and its implementation in accordance with 10 CFR Part 75, applies to all SNM. However, Section 75.4(k) states that the requirements of 10 CFR Part 75 only apply to "installations," as defined in § 75.2(a). Most of the small quantity SNM licensees discussed in other parts of the report are not "installations" as defined in Part 75. In addition, § 75.3 provides for certain exemptions to these requirements. The 2nd line of this paragraph, if worded as "...standards to all SNM held by domestic ~~facilities~~ installations, excluding..." would accurately depict the situation.

OIG Response:

The agency incorrectly asserts that the report states that the US/IAEA Agreement "and its implementation in accordance with 10 CFR Part 75," applies to all SNM. The report clearly states that the U.S. Government agreed to apply IAEA "safeguards standards" to all SNM held by domestic facilities. 10 CFR Part 75, as stated in the report, officially recognized NMMSS as the national system of accounting for SNM. Nonetheless, OIG changed the word "facilities" to "installations" because it does not alter the message of this paragraph.

Agency Comments:

3. Page 8, Section III, Findings *(now page 6 of this report)*

- The report states that the NRC's material control and accounting (MC&A) inspection program does not adequately ensure licensees properly account for and control SNM. This statement is overly broad in that MC&A programs are necessarily different for different types of licensees because of the variation in risk. The staff believes that it has adequately implemented an MC&A oversight program utilizing a risk-informed approach. The report should address the adequacy or inadequacy of this approach and its impact on the accountability and control of SNM by different types of licensees.

- The report states that without adequate MC&A inspections or a reliable system for tracking SNM, the NRC has no independent basis for determining if SNM was lost stolen or otherwise diverted, relying on licensees' data as the "official" record. The specific responsibility for safeguarding nuclear material assigned to the NRC in the Energy Reorganization Act of 1974 is "monitoring, testing and recommending upgrading of internal accounting systems for special nuclear and other nuclear material licensed under the Atomic Energy Act of 1954, as amended." "Internal" in this language refers to the licensees' systems. Responsibility for accounting and control of SNM resides with the licensees. The report should address how well the staff is verifying licensees' execution of their SNM accountability and control responsibilities.

OIG Response:

1st bullet -

The report states that MC&A programs, and inspections of those programs, differ and that the staff believes the current level of oversight is adequate from a risk-informed view. In fact, the staff consistently discussed the use of a risk-informed approach in determining who, and what, to inspect regarding MC&A. Although OIG requested documentation for the basis of this risk-informed approach, the agency was unable to provide a documented basis or framework used to risk inform their oversight of MC&A activities for all types of materials licensees. Consequently, OIG recommends that the agency document the basis for this approach (see Recommendation #3 on the Consolidated List of Recommendations).

2nd bullet -

OIG agrees that the primary responsibility for accounting and control of SNM resides with the licensees (see page 1 of the report). Nonetheless, as the report states, it is NRC's responsibility to implement and enforce the rules, regulations, and license conditions governing licensees use of SNM. The entirety of Finding A substantiates OIG's conclusion that NRC's current level of verification of licensees' execution of their MC&A responsibilities is inadequate. As agreed to by NRC in Comment 9, the report does substantiate the need for periodic inspections of licensees' MC&A activities.

Agency Comments:

4. Page 11, under "Research and Test Reactors" *(now page 8 of this report)*

- The report addresses aspects of what inspectors do at non-power reactors relative to MC&A programs. The focus should be on the adequacy or inadequacy of the inspection procedures and the basis for this conclusion since the inspectors are following approved inspection procedure guidance.

- Given that NRC's inspectors do perform some limited validation of calculations using a rule of thumb for uranium burnup with megawatt days of burnup, the last sentence should be revised to state:

  ~~However,~~ They also ~~do not validate~~ perform limited validation of licensees' calculation~~s~~, ~~nor the~~. However, the inspectors do not verify that data reported by the licensees to NMMSS is accurately kept in the database.

OIG Response:

The inspection procedure for MC&A at reactors provides guidance to the research and test reactor inspectors. However, as stated in the report, these inspectors said their MC&A inspections are very limited compared to the multi-day reviews conducted in the past MC&A due to resource constraints and lack of MC&A expertise. For instance, as stated by one inspector, he may run a licensee's calculation to see if he can produce the same end result, but he does not validate the calculation methodology. No change made to the report.

Agency Comment:

5. **Page 19, under "Use of NMMSS to Support Agency Activities"** *(now page 14 of this report)*

- The report states that the NRC relies on licensee inventory data because NMMSS data is unreliable. A more accurate rationale would be that the NRC relies on licensee records because they are more timely and detailed. For example, information on the quantities of SNM at the fuel cycle facilities changes daily. As such, by the time that licensee data gets into the NMMSS database, the data can be out of date. Also, the SNM data in NMMSS is highly summarized, while the facility has data at a detailed item level. NMMSS was never intended to report inventories on a near real-time basis or to track location of SNM within a licensee site. Clearly, NMMSS may have reliability problems relative to licensees possessing small quantities of SNM. Both the aforementioned report on RDDs and the NMMSS program review should provide the staff with information on how to address this issue. Given the staff's confidence in the NMMSS data for those licensees controlling over 99 percent of SNM, the report should clarify the basis of its reliability issue, if any exists, for this group of licensees.

OIG Response: (See response to comment 1.)
During this review, agency staff cited the NMMSS reconciliation process (i.e., ensure licensee reported inventory amounts match those recorded by NMMSS) as the basis for their confidence in the inventory balances for licensees possessing large quantities of SNM. This confidence is unwarranted for several reasons, including: licensees' reported data is not validated; agency and NMMSS staff identified weaknesses in the NMMSS reconciliation process, such as, changing methodologies, lag time in completing reconciliation on NRC-licensee accounts and leaving the database open during reconciliation processing; and a DOE/IG report that identified more than one licensee possessing substantial amounts of SNM as having negative NMMSS balances. Finally, although nuclear power plant licensees are required to annually reconcile their inventory data to NMMSS records, inconsistencies existed between the Millstone licensee's SNM inventory amount and that reflected in NMMSS. An effective reconciliation process would have recognized negative balances that, in this case, remained undetected for years.

Agency Comment:

6. **Page 21, under "NRC/DOE NMMSS Interaction"** *(now pages 14-15 of this report)*

The paragraph at top of page states that a NMMSS report documented that the total plutonium at NRC reactor sites was approximately 21 percent more than the Department of Energy (DOE) reported (for calendar year 2001). The NRC staff contacted the DOE regarding this OIG concern. The DOE clarified that they wanted total plutonium only for spent fuel at reactor sites, and that they intentionally omitted from the NMMSS report the quantities of plutonium in reactor cores, spent fuel stored at sites other than civilian power reactor sites, and plutonium not contained in spent fuel. Based on this clarification from the DOE, the NRC staff has no issue with the totals as reported by DOE. This issue was not resolved until after the OIG's

draft report was issued; therefore, it was accurate at the time the draft report was provided to the staff. The report should recognize the subsequent clarification. This does not detract from the central issue the OIG raises regarding NRC-DOE interactions relative to NMMSS.

OIG Response:
OIG acknowledges that, subsequent to the issuance of our draft report, NRC and DOE staff communicated on this issue. The circumstances described above in Comment #6 were used in the report to demonstrate the ineffective interaction between NRC and DOE staff relative to NMMSS activities. The fact that it took nearly a year, and an OIG report, to prompt discussion of an apparent significant discrepancy further illustrates the cited problems.

Agency Comments:

7. **Pages 22-23, under "Procedures for Monitoring Work with DOE"** *(now pages 16-17 of this report)*

- The 2nd bullet indicates that the NRC managers and staff overseeing NMMSS operations and contract activities were unable to provide major contract documents required by MD 11.7. We recognize that the documents may not have been readily available per MD 11.7. However, the staff has signed, executable versions of major contract documents and would welcome the opportunity to assist the OIG auditors in viewing them.

- The 3rd and 4th bullets indicate that the NRC managers and staff overseeing NMMSS operations and contract activities accepted broadly stated Project and Cost Proposals from DOE and accepted monthly letter status reports (MLSRs) prepared by the DOE's contractor which consistently lacked sufficient details. The staff believes it has taken repeated actions to document problems or inconsistencies noted in the MLSRs provided by DOE's contractor. In addition, there was repeated contact with the DOE Operations Office to pressure it to submit the DOE's MLSR report in a timely manner. We recognize that these activities have not had much effect until recently and that these issues could have been escalated sooner. The report should acknowledge the staff's efforts to document problems with MLSRs.

- The report indicates (page 23) that the NRC's management eventually assigned an NRC technical monitor to represent the NRC's interests in the NMMSS upgrade. It should be noted that there is only one technical monitor for this contract. An additional individual was assigned to work with the technical monitor to ensure that the NRC's reporting requirements were adequately addressed in the upgrade. We are not aware that the individual is identified as a technical monitor on any contract-related documents, though may be identified as such on some non-contract-related documents. To address these comments, the staff recommends that the statement be revised to read as follows:

  "Also, while NRC management eventually assigned an ~~NRC technical monitor~~ individual to assist the technical monitor in representing NRC's interests in the upgrade, that ~~monitor~~ individual does not possess the computer background

necessary for identifying and resolving emerging information technology problems with the upgrade.

OIG Response:
As stated in the report, insufficient allocation of resources for overseeing NMMSS has resulted in ineffective monitoring of NMMSS operations and contract activities. The items referenced above from the report are intended to provide examples of problems (i.e., challenges staff face) with contract monitoring activities. The agency's comments that signed versions of contract documents were not readily available and that efforts to improve the problems with MLSRs were not effective until recently, support the point in the report. OIG repeatedly asked NRC program staff for signed versions of contract documents. Because program staff did not provide these documents in a timely manner, OIG obtained these documents from the Office of the Chief Financial Officer and the Office of Administration.

With regard to the upgrade technical monitor - the individual assigned as the technical monitor for the NMMSS upgrade understood that role to be to monitor DOE's management of the upgrade and to keep NRC staff informed of project progress. Further, as the agency states, the individual *is* identified as a technical monitor on non-contract-related documents and represented the agency as such. Regardless of the individual's title, this situation represents another example of ineffective contract monitoring (i.e., NRC did not assign a qualified staffer with the computer background necessary to identify emerging information technology problems in the NMMSS upgrade). No change made to the report.

Agency Comments:

8. Page 24, under "Recommendations" *(under "Summary," now page 17 of this report)*

- The 1st full paragraph on this page states the following:

> "In addition, NMMSS is not designed to capture foreign obligation information. Since international reports are based on NMMSS data, the U.S. Government cannot be sure that those reports are complete and accurate. Consequently, the U.S. Government may not fully meet the intent of international agreements."
>
> [Note: Similar information is provided on pages 17-18 in the section on "Completeness of NMMSS Data"]

The conclusion of this paragraph is incorrect. NMMSS does capture data on nuclear material imported into and/or exported from the U.S. (emphasis added) by identifying the source (foreign supplier for imports into the U.S.) and the recipient (authorized foreign intermediate and ultimate consignees for exports). The origin of material, if it is other than the country which processes and sends it to the U.S., is also recorded. Although the NMMSS system captures relevant data, it cannot be electronically manipulated and analyzed. In other words, the problem with the current system is that relevant records

must be printed and manually analyzed (e.g., deciphering codes and adding and subtracting material amounts as it proceeds through the various stages of fuel cycle operations). With the continuous advances in computer system capabilities, it is not unusual to consider upgrades and identify the various features which could be improved. The effort to improve tracking of foreign obligations in a more resource-efficient and less labor-intensive manner is only logical.

The draft report's assertion that the U.S. is not meeting the intent of its agreements because of NMMSS alone is inappropriate. It implies that the U.S. is exporting such material without the knowledge and consent of the foreign supplier. This is not the case. While the process of identifying the information is not automatic, it can be done. Again, NMMSS is only one element of a much broader U.S. system, including a variety of checks and balances incorporating advance notices of materials transactions from or specific assurances for receipt of materials provided by foreign governments, to reconcile records of materials exported from and/or imported into the U.S.

OIG Response:

The report concludes that NMMSS does not capture foreign obligation information. This conclusion is correct. NMMSS captures information on country of origin, not foreign obligations. The distinction between "country of origin" and "foreign obligation" is that "country of origin" provides a record of where the material originated from while "foreign obligation" tags those materials held by the U.S. which are subject to bilateral or multi-lateral reporting requirements. Not all imported nuclear materials are subject to foreign obligations. The NMMSS upgrade is designed to provide this capability. Until that improved capability is available, DOE and NRC must use NMMSS-generated reports using country of origin information and must manually manipulate the data as described in the agency's comments above. Furthermore, over several years, NRC repeatedly requested that DOE include foreign obligation tracking capability in the NMMSS upgrade, and was only recently successful in gaining their commitment.

The report states that ". . . the U.S. Government may not fully meet the intent of international agreements in regards to account balances." OIG believes the intent of international agreement reporting requirements is to ensure the U.S. accurately and fully accounts for material imported from the foreign nation with which the U.S. maintains an agreement. OIG does not intend to imply that the U.S. is exporting such material without the knowledge and consent of the foreign supplier. Rather, the basis (NMMSS data) used to prepare material balance reports required under international agreements contains inaccuracies and is incomplete.

Agency Comments:

9. Pages 26-27, Section IV, Consolidated List of Recommendations *(now page 19 of this report)*

(Also applies to recommendations that appear at end of Sections III.A & III.B)

- Recommendation 1

  It is not clear whether the term "material licensees" refers to fuel cycle materials licensees, or industrial and medical materials licensees, or both. The recommendation should clarify to which class(es) of material licensees it applies.

  The report does substantiate the need for periodic inspections from risk and regulatory burden perspectives. The staff will be conducting an MC&A Program Review as part of its comprehensive review of safeguards and security programs. The need for such inspections will be considered as part of this review.

- Recommendation 3 *(now Recommendation 4 in this report)*

  The staff has determined that any decision to revise the regulations should be made after the completion of the NMMSS corrective action project and the MC&A Program Review. These structured reviews will provide the needed bases for initiating rulemaking.

OIG Response:

Recommendation 1

The term "material licensees" refers to both fuel cycle materials licensees and industrial and medical materials licensees.

Recommendation 3

The NMMSS Corrective Action Project is intended to address specific discrepancies identified in a DOE/IG report, which stated that DOE could not fully account for nuclear materials loaned or leased to NRC and Agreement State licensees because of discrepancies in NMMSS. Those corrective actions do not include activities to resolve the root cause(s) for the discrepancies that this recommendation is partially intended to address. Therefore, OIG, does not see the wisdom of deferring a decision to revise the regulations until the completion of that project. The OIG does, however, recognize the value of conducting the MC&A Program Review as it relates to this recommendation and will closely monitor the progress of this review.

Agency Comment:

Recommendations 4, 5, and 6 *(now Recommendations 5, 6, and 7 in this report)*

The report has not provided a convincing argument for an independent NRC SNM accounting system. The costs and programmatic impacts of such a system must be thoroughly evaluated. After completing the NMMSS corrective action project, the staff will be in a better position to perform such an evaluation. A Capital Planning and Investment Control (CPIC) analysis should first be used to determine whether an independent system

is more cost effective and meets programmatic requirements. The recommendation should recognize that such an analysis should be conducted to determine if recommendations 4, 5, and 6 should be accomplished.

OIG Response to Recommendations 4, 5, and 6:
The report concludes that NRC needs an accurate and reliable system for monitoring and tracking how effectively its licensees' report required SNM inventory information to a national system of accounting. The report clearly establishes the weaknesses in the current arrangement to co-sponsor NMMSS with DOE.

Although the agency has initiated efforts in the past to study the possibility of withdrawing as a co-sponsor of NMMSS and establishing an independent tracking system, those efforts were never completed despite the annual investment of more than $1.5 million in a system known to have deficiencies limiting its usefulness. Therefore, OIG stands by its recommendation that NRC establish an independent system of accounting for SNM possessed by NRC and Agreement State licensees.

Agency Comment:

10. Page 30, Appendix B, NRC Material Inventory Reporting Requirements to NMMSS
(now page 23 of this report)

The 2nd bullet under "Material Balance Reports" contains an inaccuracy. 10 CFR 40.64(b) requires a yearly statement if the licensee is authorized to possess, at any one time and location, more than 1,000 kg of uranium or thorium, not 1,000 kg or more of foreign origin material as stated. The yearly statement identifies what quantity of the 1,000 kg or more of source material possessed by the licensee is of foreign origin.

OIG Response:
While the report's reference to 1,000 kg is correct, the subtlety in the language is noted and the wording in the report has been revised accordingly.