

NUCLEAR MATERIALS MANAGEMENT AND SAFEGUARDS SYSTEM
(NMMSS)

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ABSTRACT

This paper describes the Nuclear Materials Management and Safeguards System (NMMSS) which is sponsored by the Department of Energy and the Nuclear Regulatory Commission. The system serves national security and program management interests, and international interests in the programs for the peaceful application of nuclear energy and non-proliferation of nuclear weapons. Within the scope of the NMMSS are found all nuclear materials applied and controlled under United States law and related international agreements, including U.S. nuclear materials production programs and U.S. private nuclear industrial activities. In addition, its national and international scope enables it to provide services to other organizations such as the Arms Control and Disarmament Agency, the Department of State, and the U.S. Congress.

INTRODUCTION

The Nuclear Materials Management and Safeguards System (NMMSS), a DOE operational support Center of Excellence, serves national security and program management interests in the utilization of nuclear resources. In addition, the system also serves international interests in the programs for the peaceful application of nuclear energy and in the non-proliferation of nuclear weapons. The purpose of the NMMSS is to provide quality nuclear data in a timely manner to support both domestic and international nuclear programs. Within the scope of the NMMSS are found all nuclear materials applied and controlled under United States law and related international agreements, including U.S. nuclear materials production programs and U.S. private nuclear industrial activities.

SPONSORS

The NMMSS is co-sponsored by two agencies of the United States federal government, the Department of Energy (DOE), which provides the major financial contribution, and the Nuclear Regulatory Commission (NRC), which contributes the remaining funding. These agencies provide the programmatic management for the NMMSS through the DOE Office of Safeguards and Security (OSS) and the NRC Office of Nuclear Material Safety and Safeguards (NMSS). Within the DOE, the responsibilities associated with contractual administration are delegated to the Oak Ridge Field Office (OR). The OR responsibilities for the NMMSS program are established by a Program Management Charter (PMC). In support of the PMC, the manager of the OR has further delegated, to the Director of the Evaluation and Control Division, the responsibilities for ensuring accomplishment of the program objectives and functional taskings.

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INFORMATION REQUIREMENTS

The NMMSS is responsible for maintaining and providing information regarding nuclear materials safeguards, production and materials management, physical accountability, financial and cost accounting, military applications and other information involving the utilization of nuclear materials for the DOE, and for providing the NRC with information concerning nuclear materials control and accountability. The NMMSS serves both agencies in support of U.S. reporting commitments under two types of international treaties and agreements: (1) the Agreement between the United States of America and the International Atomic Energy Agency (IAEA) for the Application of Safeguards in the United States of America together with the Interagency Procedures for the Implementation of the U.S.-IAEA Safeguards Agreement; and (2) the agreements for cooperation with other nations concerning the peaceful uses of nuclear energy.

OPERATING CONTRACTOR

Prior to April, 1, 1984, the NMMSS was developed, maintained, and operated by Union Carbide Corporation, Nuclear Division, for the DOE and the NRC. As of that date Martin Marietta Energy Systems, Incorporated, became the operating contractor for the DOE facilities in Oak Ridge. The NMMSS program is managed by the National Security Program Office (NSPO) with computing and technical services provided by the Management Information Systems organization of the Computing and Telecommunications Division (C&TD). The primary functions of the staff supporting the NMMSS include:

Data and File Management: serving as a liaison and providing consultation regarding data reporting requirements, managing the data processing function and managing the NMMSS database;

Domestic Information Analysis and Reporting: maintaining computer software and production processes necessary for an efficient and effective NMMSS reports system, and responding to specialized information and analysis requests;

International Information Analysis and Reporting: providing effective software, procedures and expertise in support of the international reporting functions associated with the NMMSS - including producing all U.S. nuclear material accounting reports required under the U.S.-IAEA agreements;

System Development: designing and developing new software and operational systems necessary to maintain the level of computing technology currently utilized by the NMMSS and to support projected future requirements;

Automated Nuclear Material Information Transfer (AutoMIT) System: maintaining and developing the system which provides automated transfer of nuclear material information in both a classified and unclassified environment; and

Training and Consultation: functioning as a primary skill center regarding technical details of the NMMSS and the NMMSS central database, and providing training and consultation as required for these areas.

Two program control groups support the NMMSS functions from an operational standpoint. Organizationally, these groups are members of the C&TD Systems and Operations organization but they are provided technical direction by the NMMSS programming staff. Their primary functions include:

Data Input and File Control: receiving all foreign and domestic incoming data, providing assistance in document completion, scheduling and monitoring all data processing services, and assisting in data error correction functions, maintaining all the current and historical data files;

Report Scheduling and Distribution: managing the scheduling and distribution of all the routine and special request reports produced by the system; and

Data Quality Assurance: reconciling licensee-reported inventories with the NMMSS generated inventories of special nuclear materials, assisting contractors with semiannual total reconciliation of the NMMSS generated contractors' book inventories.

DATA SOURCES

The sources of the data reported to the NMMSS are many and varied, depending on the legal requirements, restrictions for safeguards, and financial interests related to each facet of the nuclear industry. Attributes such as ownership, industrial processing and enriching services, use, nuclear material type, and material origin are the guidelines and criteria for reporting these activities to the NMMSS. Presently, data from approximately 130 contractors, 900 licensees, and 75 foreign nations or organizations are reported to the NMMSS under contractual requirements, governmental rules and regulations, and international agreements.

OPERATIONS

The NMMSS relies heavily upon the quality of the data reported by the authorized facilities involved in nuclear activity, and because of this, all of the data elements reported to the system are subject to the highest degree of editing which evaluates each unit of information according to the restrictions placed upon nuclear activity by the policies of various governing agencies of the United States. After data is verified as acceptable within the restrictions of the system it enters the database to be accessed at various times for report requirements.

The NMMSS database is designed around logical information categories which provide for the timely response capabilities necessary for servicing safeguards and related national security information requests. The primary and background subsystems compose the database. The primary subsystem consists of the actual data reported by or generated for individual facilities and is divided into three main categories: inventory, transaction, and material balance data. The primary subsystem is supported by the background subsystem which is used to provide auxiliary reference information for rapid data retrieval, interaction, and edit controls. The background subsystem includes the following information: nuclear materials, contracts, transportation, projects, organizations, import/export/retransfer, country control information, material balance categories, and financial correlations.

REPORT PRODUCTS

The NMMSS supports user information needs through report products produced in four basic categories described below:

The Safeguards information support area serves to continuously monitor licensee or contractor nuclear materials data, provides on-demand information to survey and inspection teams, analyzes shipper-receiver differences, monitors inventory differences, categorizes losses, and analyzes open transaction data or material in-transit.

The Materials Management area is divided into two subcategories: 1) program management; and 2) scrap, nuclear wastes, and excess and inactive materials. The program management area involves reports which are produced regarding nuclear materials currently used in various projects and programs. The second subcategory provides inventory information on scrap, nuclear wastes, and excess and inactive materials.

The Financial Management reports provide financial information on inventories and transactions of nuclear materials owned by the U.S. Government. Files containing unit

cost information and correlations between financial codes and NMMSS data elements are accessed to produce these reports by balance sheet account, asset type, and budget and reporting classification.

The International Activities area provides reports that support U.S. reporting requirements for international agreements. Reports are designed and maintained to satisfy the U.S. commitments based on the INFCIRC/207 agreement to provide nuclear materials import/export information to the IAEA, the INFCIRC/288 agreement to support information requirements for all IAEA selected facilities within the U.S., and the bilateral agreements for cooperation.

USERS

The largest volume of requests for services originates quite logically through the DOE and NRC. The entire organizational hierarchy, from headquarters to the operations and regional offices down to their associated facilities, use the NMMSS services. Other agencies, such as the Department of State, the General Accounting Office, foreign governments, state and municipal jurisdictions, Congress, and the public use information supplied by the NMMSS based on authorized approval by the DOE and NRC. Developed as modular units, the NMMSS software components can be characterized as having many basic retrieval, computational, and data transformation programs shared or adapted to use the database to meet all these different users' needs. The system currently consists of approximately 400 interrelated computer programs and an inventory of approximately 450 report types which account for the more than 27,000 report products which are distributed from the system each year.

CONCLUSION

The automated NMMSS, which began its evolution in 1964, was an outgrowth of a manual record keeping system designed in 1948 primarily for material accountability. The system continues to grow and expand due to its very nature. A staff of approximately 35 people is continually called upon to create additional software to manage the database and to change the configuration of the system to enhance the response capability in order to respond to the increasing volume of data being reported to the system and the increasing number of requests for information involving nuclear material activity in the U.S. and throughout the world.

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