

Minatom of Russia Situation and Crisis Center and the Automated Federal Information System for Nuclear Material Control and Accounting

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MINATOM OF RUSSIA SITUATION AND CRISIS CENTER AND THE AUTOMATED FEDERAL INFORMATION SYSTEM FOR NUCLEAR MATERIAL CONTROL AND ACCOUNTING

Automated Russian MC&A Systems: Developmental Experience and
Objectives for 2001

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ABSTRACT

Under the Situation and Crisis Center (SCC) management, the Information Analytical Center (IAC) of the Ministry of Atomic Energy (Minatom) of Russia was created to oversee the operation of the Federal Nuclear Material Control and Accounting Information System (FIS). During 2000, the FIS achieved an important milestone in its development: the basic functions of the information system were implemented. This includes placing into operation the collecting and processing of nuclear material control and accounting (MC&A) information from the enterprises reporting to the FIS. The FIS began working with 14 Russian enterprises to develop and implement full-function reporting (i.e., reporting inventory and inventory changes including closeout and reconciliation between the FIS and enterprises).

In 2001, the system will expand to include enterprise-level inventory information for all enterprises using nuclear materials in Russia. For this reason, at the end of 2000 through the beginning of 2001, five separate training sessions were held for over 100 enterprise personnel responsible for preparation and transfer of the reports to the FIS.

Through the assistance of the Nuclear Material Protection, Control and Accounting (MPC&A) program, information systems for the accounting of nuclear materials are being installed at Russia enterprises. In creating the program for modernization of the Russian Federation State System of Accounting and Control (SSAC) of nuclear material, the SCC conducted a survey of the enterprises to determine the readiness of their internal MC&A systems for reporting to the FIS. Based on the information from the survey and the results of the projects on creation of local information systems at Russian enterprises, the analysis of information and the technical aspects of MC&A systems identified deficiencies that were analyzed and recommendations for eliminating these deficiencies were proposed.

The concentration of analytical and administrative functions at the IAC allows the changing needs of the users to be met. The activities of the SCC follow the policies of the Russian Federation in the area of nonproliferation and meet the requirements of the SSAC for tracking nuclear material.

INTRODUCTION

The automated Federal Information System for Nuclear Material Control and Accounting (FIS) is designed to provide information support to management agencies responsible for state nuclear material control and accounting (MC&A) tasks within the general framework of nuclear material accounting, control, planning and management.

The FIS is a component of the State System for Nuclear Material Accounting and Control (SSAC) in the Russian Federation (RF). One of the goals of the RF SSAC is to develop and maintain an infrastructure that provides for continuous state control and accounting of nuclear material wherever it is located. It is important to remember the FIS actually includes the enterprise interface for reporting to the federal system, the FIS Information Analytical Center, the users, and information providers.

The FIS provides information support to Minatom of Russia, the agency charged with the implementation of nuclear material control and accounting at the federal and agency level. Minatom manages the FIS through its Situation and Crisis Center (SCC) serving Minatom's Department of Economics and Planning.

The FIS will also interact with the information systems of agencies overseeing subordinate organizations, which use nuclear material, thereby enabling Minatom to gather the most complete information on various aspects of nuclear activity and to share this information with other agency information systems.

Primarily, however, the FIS is a tool utilized to perform a multitude of tasks at the federal and agency levels:

- Maintaining the State Register of Nuclear Material, including correlating the data of the different agencies;
- Distributing generalized information on nuclear material to the appropriate users;

Additionally, future plans for development of the FIS include functionality for:

- Providing information support related to the export/import of nuclear material;
- Providing information support related to the movement and transportation of nuclear material, as well as accounting of in-transit material and material of foreign origin located within the Russian Federation;
- Serving as an information resource for investigation, analysis and resolution of anomalies that appear in accounting reports;
- Other tasks at the state and agency levels, as needed.

Moreover, the FIS with its auxiliary communications and storage systems is being developed to gather, store, update, and distribute to its users the reference, regulatory, and technical information that governs nuclear material control and accounting procedures.

DEVELOPMENT OF USER REQUIREMENTS

The FIS is a multi-component system with a branch structure. It is expected that users will make wide use of the system's feedback mechanism and the capability to interact

with a number of system components. The structure of the FIS, like any other information system, may be viewed as the interaction between information providers and users, as a coordinating analysis tool, or as a link for a group of systems that implement and support this interaction. Consequently, information providers to the FIS often become its users and vice versa.

Understandably, the system is being created and maintained first and foremost with the user in mind. The development of requirements may be based on the past experience of its FIS developers, but this always occurs within the context of responding to the users' requests and meeting fully the information needs of the FIS user community, both those contributing input and those using output. It is therefore critical when developing system requirements to identify the FIS information users and to understand the nature of their functions and needs.

The management and various departments of MinAtom constitute the primary information users at this stage in the development of the FIS. MinAtom departments assigned nuclear material control and accounting duties shall provide information support to MinAtom when resolving tasks at the agency and federal level.

The FIS, by collecting, correlating, and systematizing nuclear material information received from the enterprises, is able to provide the full spectrum of information required by MinAtom departments and management to perform tasks at the agency and federal levels.

The federal law "On the Use of Atomic Energy" established MinAtom of Russia as the federal executive branch agency responsible for state nuclear material control and accounting. In turn, the Minister of Atomic Energy designated a number of departments and agency organizations to implement state nuclear material control and accounting. When distributing these functions and duties, the Minister assigned the MinAtom SCC the task of managing and operating the FIS. MinAtom's Department of Economics and Planning is responsible for nuclear materials management in the Russian Federation, and as such, is the principal user of the FIS.

During the current FIS developmental phase, the group of information providers is limited to Russian enterprises with emphasis placed on facilities with weapons useable material. Each of these enterprises is creating an MC&A information system to gather all information related to the possession of nuclear material at the enterprise. These information systems account for the nuclear material located at the enterprise and generate and transmit standard reports on nuclear material inventory and inventory changes to the FIS in accordance with federal requirements.

In the future, however, FIS information providers may also include other RF State structures (other Ministries, agencies and operating organizations), international organizations, etc. Objective criteria are already established for this purpose, since a number of State MC&A tasks can be resolved only at the inter-agency level.

INTERFACE WITH THE FIS

Let us now turn our attention to the process by which information providers and users communicate with the FIS. The core of the FIS is the Information Analytical Center (IAC), which, from an operational standpoint, consists of two sectors: the Data Preprocessing Sector and the Analytical Data Processing and Management Sector.

The Data Preprocessing Sector maintains constant communication with the enterprises, i.e., the FIS information providers and chief recipients of enterprise information system reports regarding nuclear material inventories, transfers, and other inventory changes. The Sector gathers report information on nuclear material and performs certain data management functions. The Data Preprocessing Sector also checks that the data comply with the specified reporting rules and requirements, conducts a variety of tests with the information regarding format and content, and—if it conforms to the established requirements—accepts the information and enters it into the database. When errors are detected in report information, the system generates an error message and requires their correction; in this case, the staff takes a series of steps to resolve the errors with the responsible enterprise until the information complies with requirements and is accepted for input into the system.

According to the established schedule, the FIS periodically reconciles the nuclear material information it receives, thereby ensuring its accuracy and reliability. Reconciliation requires enterprises to ensure that the information they report to the FIS is consistent with the enterprise records. If it is not, the enterprise, not the IAC, is responsible for correcting the information. Reconciliation is the best method of ensuring with a high level of confidence that the data reported to the system accurately reflects the nuclear material at the enterprise, thereby promoting nuclear nonproliferation.

It is by this process that the Data Preprocessing Sector generates nuclear material report data, maintains reference information and updated versions of classifiers, and communicates actively with information providers.

All management functions and information support are the responsibility of the Analytical Data Processing and Management Sector. The chief duties of the Sector are to communicate with FIS information users and to determine the scope and characteristics of report information. The Sector generates FIS output information needed to meet the requirements of system users. When required, e.g., by a previously undefined user need, this Sector generates relevant requests for the Data Preprocessing Sector, which in turn submits these requests to the information systems of the enterprises affiliated with the FIS. Accordingly, the Data Processing and Management Sector dictates the operational development of the Data Preprocessing Sector and directs future development trends for the FIS.

The interaction between the two sectors is not, however, limited to this process. At established intervals, the nuclear material database validated by the Data Preprocessing Sector is transmitted to the Analytical Data Processing and Management Sector. The

Analytical Data Processing and Management Sector generates standard reports relevant to the interests of information users. Routine output reports are distributed according to the established schedule for generating and distributing reports to the FIS user community. Other output reports may also be prepared upon request.

The FIS uses an air gap to insure the security of the system. Therefore, FIS users do not currently have access to the FIS database; this feature is included, however, in future development plans, provided that information protection issues are resolved.

ENTERPRISE REPORTING TO THE FIS

The current strategy for transmitting nuclear material information to the FIS is based on the submission of enterprise data at the MBA level. This satisfies simultaneously MinAtom of Russia requirements for generalized data and Russia's international obligations for nuclear weapons nonproliferation.

Continued refinement of the FIS scope requires thorough and ongoing analysis. Nuclear material control and accounting specialists currently meet on a regular basis. These meetings usually take the form of workshops, three of which included presentations on the developmental status of enterprise information systems. Based on the results of each workshop, the presentations are collected and issued in the proceedings, which reflect the current status of FIS and enterprise information system development. An additional workshop is scheduled for 2001, in Protvino in the Moscow Oblast.

The FIS Planning Group decided at a joint meeting in 2000 to change the meetings for the specialists from a workshop format to the "schools" format for 2000.

The purpose of the "schools" is to train enterprise specialists to generate and transfer reports on nuclear material to the FIS. Five of these "schools" have already been conducted, with more than 100 specialists participating from all enterprises considered to potentially report to the FIS. The "school" participants received a series of lectures on nuclear material control and accounting principles and the structure of the FIS, gained practical experience in preparing reports on nuclear material for the FIS, and also received automated workstation software for preparing simplified enterprise reports within the scope and format required by the FIS (automated workstation software). This measure proved to be highly advantageous, enhancing the enterprise specialists understanding of the FIS and provided extremely valuable feedback to the FIS developers. This mutual benefit has been evident at all of the workshops.

The "schools" were deemed to be so successful and valuable that we recommend conducting these "schools" on a periodic basis in addition to holding the workshops.

At the same time, the enterprises were surveyed to further clarify the status of enterprise MC&A information systems. A questionnaire was developed that examined different aspects of enterprise activity, mainly concerning the status of information systems for

nuclear material control and accounting. The information returned from the surveys is invaluable.

The survey was sent to 45 enterprises under the jurisdiction of MinAtom and 18 enterprises under the jurisdiction of other ministries and agencies. Topics included the level of automation for MC&A information systems; attestation issues; information protection methods; the number of material balance areas and whether they are connected to the enterprise MC&A information system; methods for determining the NM inventory; level of readiness to report to the FIS; and other related questions.

According to the responses, more than a third of enterprise MC&A information systems are automated. These systems were developed at different periods of time, beginning in 1984 and without any foreknowledge of the future development of the FIS. Consequently, the systems differ significantly, using various software programs and computer hardware already available at the enterprises. These enterprises required specially developed applications to interact with the FIS.

The survey helped managers identify future development priorities for the system and gain insight into the major technical and financial obstacles facing the enterprises. Automated enterprise information systems should be capable of transmitting reports to the FIS in compliance with FIS requirements. Therefore, enterprise information systems should be attested for processing and submitting sensitive data on nuclear material to the FIS. Moreover, the enterprises should have the capability to encrypt data transferred via telecommunication channels MinAtom is developing this system without outside assistance to facilitate the management of nuclear material.

In order to enhance the connectivity of the FIS and the enterprises connected to it, measures must be adopted for the creation of enterprise information systems compatible with the FIS requirements. Given the wide variety of solutions to this problem, the most simple, accessible and least expensive option is to create standard automated workstations that function as enterprise nodes for NM accounting, which can in turn be combined into a single system network.

CONCLUSIONS

Development of the FIS began in 1996 as a research project undertaken by Atominform, one of the research institutes of MinAtom. In accordance with the orders of the Minister of Atomic Energy, the MinAtom SCC assumed the management of these activities in the beginning of 2000.

Since that time, the SCC has had great success in its new role, managing both the operation of the IAC and the reporting activities of facilities. By the middle of last year, we had a core version of the system that in reality consisted only of the Data Preprocessing Sector. Activities related to bringing this Sector into operation were funded with U.S. support. The SCC, by managing the operations of the FIS, was established as the operational focal point within the Russian Federation for the control

and accounting of nuclear material. The staff of the SCC is able to apply its prior experience to assist additional facilities as they begin interactions with the FIS.

The functions and operation of the Sector have expanded significantly. As previously mentioned, 14 enterprises are already connected to the FIS under the supervision of the SCC, enterprise specialists have received training, enterprises have been surveyed, and necessary equipment has been procured. Currently, work is actively underway with new enterprises, and plans have been developed for connecting them to the FIS in 2001. The mechanism for enterprise and FIS interaction is practically complete, and unforeseen circumstances identified during the development process have enabled us to improve the system and increase and elaborate on system reference database.

The set of measures now in place ensures that the operation of the FIS by the MinAtom SCC will be more productive in the future.

The cooperation achieved by the Russian and American members of the FIS implementation team demonstrate that positive cooperation can result in benefits to both our countries. We hope to continue achieving such positive results in the future.

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