

New safeguards measures: Initial implementation and experience

States have approved a number of measures for strengthening the IAEA's safeguards system, and now are considering others

by Dirk Schriefer

Soon after Iraq's armies invaded Kuwait in 1990, the IAEA discovered — through its inspections in the aftermath of the Gulf conflict — the size and scope of the Iraqi clandestine nuclear weapons programme. Subsequently, the international community agreed, almost unanimously, that the Agency's safeguards system needed to be strengthened in its ability to detect undeclared inventories of nuclear materials and installations.

In 1991 additional steps were proposed by IAEA Director General Hans Blix with respect to an increased assurance regarding the absence of undeclared nuclear activities in States having comprehensive safeguards agreements: access to more information and better physical access to sites. In 1992 the Agency's Board of Governors took some measures to strengthen the safeguards regime. It reconfirmed the right of the IAEA to carry out special inspections under the existing provisions of comprehensive safeguards agreements, approving the requirement for the early provision to the Agency of design information on new and modified nuclear facilities and endorsing an expanded reporting scheme. Under this scheme, States are beginning to provide the IAEA with information on exports, imports, and production of nuclear material and exports of specified equipment, beyond that required by their safeguards agreements.

In April 1993, the Director General's Standing Advisory Group on Safeguards Implementation (SAGSI) submitted recommendations for improving the effectiveness and efficiency of the safeguards system. In the summer of the same year, the Agency began a new activity with a view to developing a strengthened and more cost-effective safeguards regime.

Considering the Review and Extension Conference of the Treaty on the Non-Proliferation of Nuclear Weapons (NPT), then two years in the future, it was termed "Programme 93+2", or P93+2 for short. The activity was accompanied from the very beginning by the direct involvement of a number of Member States, who had agreed to test the measures as they were developed. Proposals under P93+2 were presented to the Board of Governors in 1994, with a special presentation of results in March and June 1995. Prior to the June Board meeting, it was decided that there were certain measures that had a legal basis in the existing comprehensive safeguards agreements (CSAs) and, thus, could be implemented immediately, and other measures that required a complementary legal basis. This approach was endorsed in June 1995 by the Board and in the following September by the General Conference. Upon the endorsement of the proposal, the Department of Safeguards established a plan with a schedule for the beginning of the implementation in January 1996.

Components of Programme 93+2

Following the extensive discussions up to the March 1995 Board of Governor's meeting, a document on P93+2 was submitted for the Board's consideration in June 1995. The measures proposed were arranged in two parts. Part 1 consisted of those which could, in the Secretariat's view, be implemented under existing legal authority and which would be practical and useful to implement at an early date. Part 2 consisted of those which the Secretariat proposed for implementation on the basis of complementary authority. While it was recommended that the Board take action on those measures falling within the Agency's existing legal

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authority (Part 1), the Director General recommended that action by the Board on the remaining measures await his next report, allowing the Secretariat the benefit of further informal consultations with Member States. Following extensive discussion of the report, the Board took note of the Director General's plan for early implementation of the measures described in Part 1. The Board urged States party to comprehensive safeguards agreements to co-operate with the Secretariat to facilitate such implementation, on the understanding that elaboration of the implementation arrangements and the clarification of States' concerns would be required. Comments and suggestions made during the discussion have been taken into account in planning the implementation of the Part 1 measures. The Agency is proceeding with the implementation of Part 1 measures as rapidly as time and resources allow.

Subsequent to the June Board meeting, a detailed implementation plan was developed, and in early November 1995 communications were sent to States party to comprehensive safeguards agreements. These letters described the actions that the Department of Safeguards had identified as necessary to proceed. The letter indicated also that implementation of Part 1 measures would be undertaken beginning in 1996, after consultations, as broadly and extensively as possible, subject to operational and budgetary constraints.

This article reports on major selected aspects of the IAEA's experience in implementing Part 1 measures. It addresses activities related to the IAEA inspectorate's broader access to information, through measures such as environmental sampling, information analysis, the provision of increased physical access to IAEA inspectors, and the use of unannounced inspections. The article further addresses the optimal use of the present safeguards system, including unattended and remote monitoring systems, greater co-operation with State Systems of Accounting and Control of Nuclear Material (SSACs), and the provision of training courses.

Broader access to information

Letters requesting additional information from States. The SSAC questionnaire was sent to 59 States with operative comprehensive safeguards agreements and two regional systems (EURATOM and the Brazilian-Argentine Agency for the Accounting and Control of

Nuclear Materials, ABACC) in December 1995. At the same time an information letter was sent to all States with a suspension protocol, to all nuclear-weapon States and to the States with INFCIRC/66-type safeguards agreements in force. It was requested that the responses be returned to the Agency by the end of February 1996. By mid-November 1996, thirty-six responses had been received, including five with incomplete or not completed questionnaires. Work is ongoing to assess the information received and to review criteria which may apply for closer co-operation with the State systems.

A letter requesting information on certain closed-down or decommissioned nuclear facilities and locations-outside-facilities (LOFs) and on nuclear facilities which were built, but where nuclear material was never introduced, was sent to all States with CSAs at the end of March 1996 with responses requested by the end of April 1996. A number of responses were received, most of which confirm the absence of such facilities; however, others acknowledge the existence of such facilities, and more information is provided. A letter requesting additional information regarding the nuclear fuel cycle that can be sought under existing legal authority is still being prepared.

Environmental sampling. Initial implementation of environmental sampling is being focused on enrichment and hot-cell facilities. This consists of taking swipe samples at locations which would be accessible to the IAEA inspectors during inspections or during design verification visits. General guidelines for these applications have been developed and approved, candidate facilities have been identified, facility-specific sampling objectives, and plans and procedures have been developed. Consultations with Member States regarding implementation were initiated throughout the year as resources were available. The consultations were held at different levels, as required by the complexity of the specific sampling or at the explicit request of the State.

Analytical equipment for the clean laboratory in Seibersdorf near the Agency's headquarters in Vienna has been installed. The laboratory has been able to receive and handle samples since mid-May, with full operation commencing in July 1996. Baseline sample collections began as early as February 1996 and have been conducted in a majority of relevant countries. Samples were taken in enrichment plants and hot cells in more than 20 countries; by mid-November 1996, more than 400 samples from different

sampling points had been taken, shipped, and received for analysis in Vienna. Analysis results are now being returned to the Department of Safeguards for assessment and evaluation. Consultations with Member States on the baseline results are beginning; as results become available, and as resources permit, these will increase in the first half of 1997.

Improved information analysis. A general framework and methodology for improved information analysis has been developed. Some computer-based tools for its implementation are in place. The work of a group of experts from several Member States on the development of the physical model of the nuclear fuel cycle is complete. In addition, the role of existing country officers is being expanded, and open source and other additional information is being added for overall assessment of non-proliferation and safeguards agreement pledges. Modifications regarding the organizational structure are in progress.

Information confidentiality. A review of procedures for protecting safeguards confidential information has taken place to ensure the adequacy of protective measures. Particular attention is being paid to the means of controlling access to safeguards confidential data in computer files. A Note by the Secretariat on the confidentiality of safeguards information was distributed to Member States in August 1996. Regarding the Agency's procedures for the distribution of environmental samples and for reporting analytical results, intended to protect the anonymity of samples and the confidentiality of results, a Consultants Group of experts from Member States reviewed the IAEA's procedures in December 1995. The Group agreed that implementation of the procedures met the objective of the Agency and of Member States.

Increased physical access

Visas. As a prerequisite for enhanced physical access to nuclear facilities or other nuclear installations, it is required that Member States provide Agency inspectors with long-term visas that include the right for multiple entry and exit to and from the country, or visa-less entry. The Agency requires and requests a one year minimum for the validity of the inspector's visa.

A large number of States has already accepted this type of visa (usually in the subsidiary arrangement to the safeguards agreement), so that in these States the possibility for immediate

implementation exists. Letters have been sent out to all Member States that grant Agency inspectors less than what is deemed to be the minimum with regard to visa requirements.

Unannounced inspections. Work is under way to identify how unannounced inspections could lead to more effective and efficient safeguards for a number of facility types. This will usually be done in conjunction with other measures. An approach is being tested in a low-enriched uranium fuel fabrication facility, and detailed consultations are under way in an attempt to define an approach for similar facilities in other countries. For research reactors, plans have been made to introduce unannounced inspections in several reactors to provide a higher degree of confidence regarding the absence of unreported production of plutonium.

Administrative procedures necessary to support unannounced inspections as part of the routine implementation of safeguards have been developed. This is particularly difficult in countries where language barriers are high, and where the use of travel and communication facilities is restricted.

Optimal use of the safeguards system

Unattended and remote monitoring. A variety of advanced technology for remote monitoring and transmission, and unattended measurements with remote transmission is being examined, tested and demonstrated. This includes digital surveillance cameras, electronic seals and motion and radiation detectors, with remote transmission by satellite and phone lines.

Two digital surveillance cameras and an electronic seal using remote data transmission through a satellite link to Vienna have been operational from a facility in Switzerland since mid-January 1996. The location under remote monitoring is a vault containing a semi-static store of direct-use material. A variety of query and transmission strategies is being evaluated. It is planned to expand this capability to a network involving five facilities in Switzerland by the end of this year.

The objective is the development of new safeguards approaches for these locations which combine the new technology with unannounced inspections thereby permitting reductions in inspection frequency and effort. Similar applications of advanced technology are scheduled to be demonstrated in the United States and in South Africa. In all cases the

installations include the authentication requirements of the Agency and the encryption requirements of the State. Other automatic systems have been providing data on facility and process status in unattended mode for some time in other countries.

Increased co-operation with SSACs. The development of, and States' responses to, the SSAC questionnaire sent out in February 1996 provide a mechanism for a systematic exploration of areas of increased co-operation which could benefit both the Agency and the SSAC. At the same time the process of increasing co-operation between the Agency and regional systems and a large, single state SSAC is continuing.

Implementation of the New Partnership Approach (NPA) continues with EURATOM; areas of increased co-operation will feature in the consultations with ABACC; and a modified NPA safeguards approach to light-water reactors will be tried in a Member State with a large number of light-water reactors.

Training courses. A number of training courses necessary for the implementation of the Part 1 measures are in various stages of development, pilot testing and implementation. Training courses on environmental sampling have taken place. By the end of September 1996, the training had been provided to approximately 100 inspectors. Training courses on the physical model and enhanced observational skills have been pilot-tested. Other courses dealing with the conduct of unannounced inspections and design information verification of closed-down and decommissioned facilities are under development.



Swipe samples being taken in field trials for laboratory analysis.

For increased co-operation with SSACs, courses for the training of SSAC personnel are under development to familiarize them with IAEA requirements. Additional training courses have been requested and are in the process of being designed. More training in support of the new measures is necessary; it is restricted by the inspectors' availability from their normal safeguards implementation duties.

Conclusions and outlook

The implementation of Part 1 measures began according to schedule, but numerous problems were encountered. Most significantly, safeguards staff had to give priority to the implementation of activities planned and scheduled under the existing safeguards regime. Implementation, as well as educating and training safeguards staff on measures and procedures relevant to Part 1, has taken more time than anticipated, due to constraints on the availability of inspectors and support staff. Consultations and discussions at various technical levels in individual States have consumed an unexpected amount of time.

The partitioning of the measures for implementation according to the legal basis as presented to the Board in June 1995, and the decision to proceed immediately with the implementation of those measures that are within existing authority, were made for pragmatic reasons only. This mode is not designed to diminish in any way the integrated nature of the entire Programme 93+2. The full benefits in strengthened effectiveness and efficiency will be derived only from a full implementation of all measures in the package.

Finalization of the measures presented in Part 2, the implementation of which requires complementary legal authority and the associated draft legal instrument, will proceed. The IAEA Board of Governors agreed in June 1996 to establish a Board Committee to continue the work on Part 2 measures and the legal instrument. The Committee has held two sessions, in July and October, and next will meet in January 1997.

The IAEA Secretariat will facilitate the work of the Committee. Progress, including the date for implementation of Part 2, will depend now on the willingness and readiness of the IAEA's Member States to talk to each other and reach agreement, and to authorize the Secretariat to continue with the implementation of the new safeguards measures. □