

# Safeguards

## Objective

*To provide credible assurance to the international community that nuclear materials and other items placed under safeguards are not diverted or misused, and, for States with comprehensive safeguards agreements in force, to provide credible assurance on the absence of undeclared nuclear material and activities for States as a whole; and to support the efforts of the international community in connection with nuclear disarmament.*

## Safeguards Conclusion for 2005

At the end of each year, the Agency draws a *safeguards conclusion* for each State, in which it applies safeguards, based upon the evaluation of all information available to it for that year. With regard to a State with a comprehensive safeguards agreement (CSA), the Agency seeks to provide credible assurance on two points: (1) that declared nuclear material remains in peaceful activities; and (2) that no undeclared nuclear material or activities exist. Only when provided with the necessary authority, access and information can the Agency draw the broader *conclusion* for such a State that *all* nuclear material in the State remains in peaceful activities.

For the Agency to draw such a broader conclusion credibly, both a CSA and additional protocol (AP) must be in force or otherwise applied for that State, and the Agency must have been able to conduct all necessary verification and evaluation activities under those agreements. For States that have CSAs in force and no APs, the Agency does not have sufficient means to draw a broader conclusion credibly, and therefore can only draw the *conclusion* that *declared* nuclear material remains in peaceful activities.

In 2005, safeguards were applied for 156 States with safeguards agreements in force with the Agency. Seventy States had both CSAs in force and APs in force or being otherwise applied. With regard to 24 of these States, the Agency concluded that for those States all nuclear material remained in peaceful activities. For 46 other such States, the Agency had not yet completed the necessary evaluations and could therefore only conclude that the declared nuclear material remained in peaceful activities. For 77 States with CSAs in force and no

APs, the Agency was, similarly, only able to draw that conclusion. Three States had in force safeguards agreements which require the application of safeguards to nuclear material, facilities and other items specified in the relevant safeguards agreement. For these States, the Agency concluded that nuclear material, facilities or other items or material to which safeguards were applied remained in peaceful activities. Five nuclear-weapon States had voluntary offer safeguards agreements in force. Safeguards were implemented with regard to declared nuclear material in selected facilities in four of the five States, and the Agency concluded that nuclear material to which safeguards were applied in selected facilities remained in peaceful activities. The Agency's *Safeguards Statement*, as well as the *Background to the Safeguards Statement and Executive Summary*, are available on the CD-ROM attached to the inside back cover of this report, and also on the Agency's public web site at <http://www.iaea.org/OurWork/SV/Safeguards/index.html>.

## Safeguards Implementation Issues

### *Democratic People's Republic of Korea (DPRK)*

Since December 2002, the Agency has remained unable to perform any verification activities in the DPRK, and could not, therefore, draw any conclusions about that State's nuclear material or activities.

### *Islamic Republic of Iran (Iran)*

During 2005, the Director General submitted six reports to the Board of Governors on the implementation of the CSA in Iran and the Board adopted two resolutions on the subject.

Iran continued to implement its CSA, and to act as if its AP were in force. Iran also provided the Secretariat with access to interview certain personnel. Corrective actions were undertaken by Iran in relation to the breaches of its obligations under its safeguards agreement.

Verification of the correctness and completeness of Iran's declarations continued in 2005. The Agency was still not in a position to conclude that there were no undeclared nuclear materials or activities in Iran after three years of intensive Agency verification. At the close of 2005, there remained two major issues of direct relevance to these efforts: the origin of low

enriched uranium (LEU) and high enriched uranium (HEU) particle contamination found at various locations in Iran; and the extent and nature of Iran's uranium enrichment programme.

In addition to its implementation of the CSA and AP with Iran, in 2005, the Agency continued to perform verification activities related to Iran's voluntary suspension of enrichment-related and reprocessing activities, which had been requested by the Board of Governors as confidence-building measures. In August 2005, Iran informed the Agency of its decision to resume the uranium conversion activities at the Uranium Conversion Facility at Esfahan.

In a resolution adopted in September 2005, the Board found that Iran's previous failures and breaches of its obligations to comply with its CSA constituted non-compliance in the context of Article XII.C of the Agency's Statute.

## Other Safeguards Issues

In June 2005, the Board of Governors decided to establish an Advisory Committee on Safeguards and Verification within the Framework of the IAEA Statute. The Advisory Committee is to consider ways and means to strengthen the safeguards system and make relevant recommendations to the Board. The first Committee meeting was held in November 2005. At the request of Member States, the Secretariat proposed a number of areas for the Committee's consideration.

During 2005, consultations were carried out by the Director General and the Secretariat with concerned States of the Middle East region on a forum on the relevance of the experience of existing nuclear-weapon-free-zones (NWFZs), including confidence building and verification measures, for establishing such a zone in the region of the Middle East. Although the concerned States did not reach a final agreement on the agenda for such a forum, the Director General remains ready to continue to consult with the concerned States in order to reach agreement in this regard. The Director General called for an expanded regional dialogue on issues of security to facilitate the establishment of an NWFZ in the region of the Middle East, at the Conference of States Parties and Signatories of Treaties That Establish Nuclear-Weapon-Free Zones held in Mexico City in April 2005. At the 2005 Review Conference of the Parties to the Treaty on the Non-Proliferation of Nuclear Weapons, held in New York

from 2 to 27 May, the Director General continued to encourage the concerned States to initiate a regional security dialogue in parallel with the resolution of long-standing conflicts that could lead to the establishment of an NWFZ in the Middle East.

## Conclusion of Safeguards Agreements and APs

The Agency continued to facilitate the conclusion of safeguards agreements and APs. As a result of these activities, the number of States party to the NPT that had yet to conclude CSAs decreased from 40 to 36; APs entered into force for 9 States during 2005. At the end of 2005, APs were in force in 71 States and were otherwise being applied in a further two States (Fig. 1). In 2005, 17 States signed APs and 8 States signed NPT safeguards agreements.

### *Small Quantities Protocols (SQPs)*

In early 2005, the Secretariat brought to the attention of Member States the limitations that the then standard 'Small Quantities Protocol' (SQP) placed on effective safeguards implementation. Introduced in 1971, SQPs were made available to States with little or no nuclear material and with no nuclear material in a facility. The original text of an SQP held in abeyance the implementation of important safeguards measures, including strengthening measures being implemented routinely in other States with CSAs in force.

The Director General submitted a report on the issue to the Board of Governors for its meeting in June 2005. The Board recognized that SQPs, as originally formulated, constituted a weakness of the safeguards system and in September 2005 it decided that, although SQPs should remain part of the Agency's safeguards system, they should be subject to modifications in the standard text and changed criteria for an SQP. The Board also decided that, henceforth, it would approve only SQP texts based on the revised standard text. The changes endorsed by the Board: (a) make an SQP unavailable to a State with an existing or planned facility; (b) require States to provide initial reports on nuclear material and notification as soon as a decision has been taken to construct or to authorize construction of a nuclear facility; and (c) allow for Agency inspections. The Board of Governors authorized the Director General to conclude exchanges of letters with all States with SQPs to give effect to these modifications.

## Implementation of Integrated Safeguards

As more States implement APs and the Agency is able to draw the broader safeguards conclusion for more of those States, ‘integrated safeguards’ are being gradually implemented in these States. The term ‘integrated safeguards’ refers to an optimum combination of measures of CSAs and APs.

Integrated safeguards were implemented throughout 2005 in Australia, Hungary, Indonesia, Japan, Norway, Peru and Uzbekistan and began during the year in Bulgaria and Slovenia. In addition, integrated safeguards approaches were approved for Canada and Poland. The introduction of integrated safeguards in States with large nuclear programmes has provided a unique opportunity to design and implement tailor-made efficient safeguards methods and approaches in many types of facilities. For instance, a new, less labour intensive safeguards approach for transfers of spent fuel to dry storage installations, field tested in Canada and the Republic of Korea, is expected to reduce substantially the number of days inspectors need to be physically present during spent fuel transfers.

The Agency organized a meeting in September 2005, in Austria, to discuss progress on integrated

safeguards. States already having substantial experience with integrated safeguards — Australia, Hungary and Japan — shared views with a larger group of States where integrated safeguards began in 2005 or are being planned for in the near term.

## Detecting Undeclared Nuclear Material and Activities: Improved Technological Capabilities and Methodologies

In the development and application of new technologies, the Agency relies heavily on 19 Member State Support Programmes. The Member States, drawing on their technical expertise, assist the Agency in meeting its needs as defined in the *Research and Development Programme for Nuclear Verification, 2006–2007*.

The Agency’s new R&D project for the identification and development of effective and appropriate advanced technologies for the detection of undeclared nuclear material and activities focused on the evaluation and prioritization of initial technology proposals from Member States. Over 60 proposals were received and, as a result of review

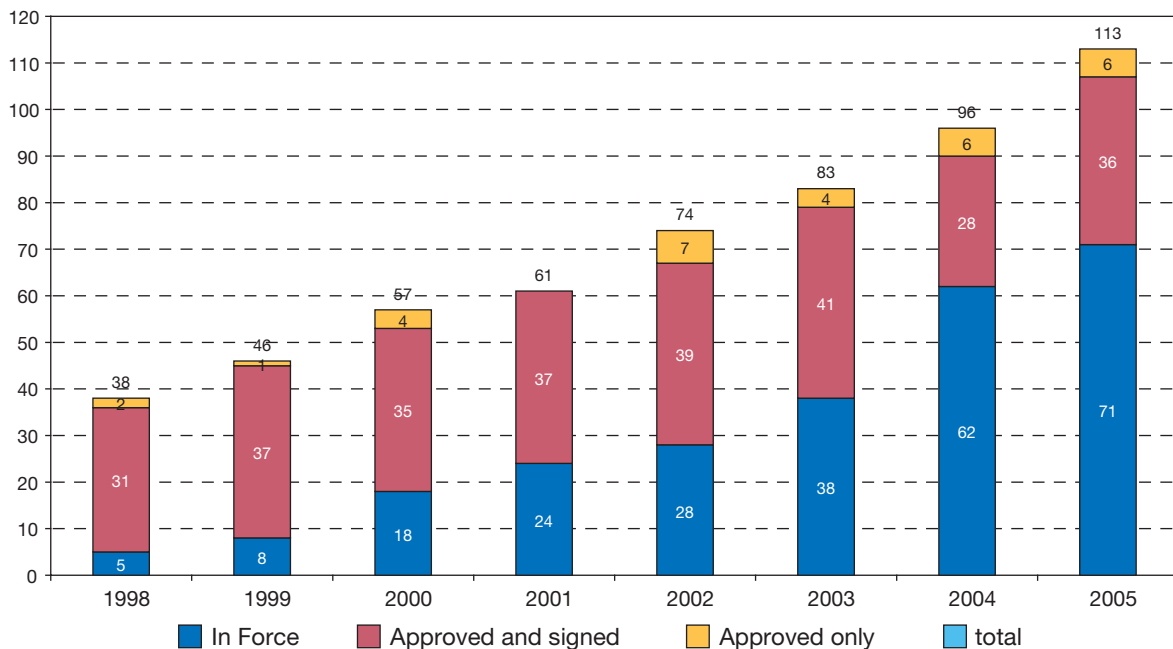


FIG. 1. Conclusion of additional protocols: 1998–2005.

and prioritization, five specific tasks from three States, covering novel techniques for the detection of undeclared activities were recommended for further development.

Environmental sampling continues to be used extensively to verify the absence of undeclared nuclear activities in facilities subject to routine inspections and complementary access. The handling and analysis of environmental samples in the Safeguards Analytical Laboratory (SAL), in Seibersdorf, was improved by modernizing the systems and methodology used for the screening of samples, sample preparation and measurement of particles by secondary ion mass spectrometry (SIMS).

A new ultra-high sensitive SIMS instrument tested by Agency specialists at laboratories in France and Sweden for application to the analysis of safeguards environmental samples has been recommended for implementation at SAL. In addition, encouraging developments in plutonium and uranium particle age dating and advances in the morphological characterization of process particles might provide promising new tools for future safeguards verification activities.

The need for enhanced Agency analytical services in terms of capacity and detection capabilities was reflected in a number of activities, including elaboration of a proposal on increasing the capacity and independence of safeguards analytical services.

## Information Analysis and Remote Monitoring

The cornerstone of the Agency's safeguards system remains the declarations submitted by States, and their subsequent verification by the Agency. However, analysis of open source information, including satellite imagery, continues to play a key role in the evaluation of States' nuclear programmes. The available information assists in the identification of activities and locations of interest, thus helping inspectors to plan field activities, clarify questions and issues of concern, and better understand nuclear programmes. The operation of covert nuclear trade activities and networks poses a new challenge to the Agency's verification work.

In July 2005, the Agency initiated the reengineering of its information systems (ISIS), which are used to collect, store, analyse and evaluate safeguards data. The ISIS Re-engineering Project

(IRP) will be carried out over a period of three and a half years. The project will comprise a large number of tasks such as establishing a new physical architecture, hardware, software and standards, defining an integrated information system with appropriate security standards and producing the information environment needed to enhance the efficiency and effectiveness of the Agency's verification activities.

A number of new or enhanced information technology (IT) tools that will support the work of inspectors or improve the efficiency of implementation were introduced during 2005. These include:

- An application that allows inspectors in the field secure access to databases located at Headquarters, and to process information related to on-going inspections;
- Software that facilitates a streamlined process of inspector designations;
- Enhancements to the software for processing AP declarations.

The IT infrastructure has been continuously upgraded, at Agency Headquarters as well as in the Agency's Regional Offices, maintaining the highest level of availability and security.

The number of Agency surveillance and radiation monitoring systems with remote transmission capabilities increased by more than 40% in 2005. Currently, 84 surveillance systems (with 302 cameras) are operating in remote monitoring mode in 15 States.<sup>1</sup> In addition, 39 unattended radiation monitoring systems are transmitting data to Agency Headquarters from facilities in seven States. The application of this technology has resulted in considerable savings of inspection efforts in 2005.

The Agency began cooperation with the European Space Agency in the area of secure satellite communications. As part of this cooperation, the Agency successfully tested secure surveillance data transmission via satellite from a nuclear power plant to Agency Headquarters. It was demonstrated that the same satellite terminal could also be used for secure voice communication, which is considered a useful tool for inspection activities in the field.

The development of the next generation surveillance system was initiated in 2005. The aim

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<sup>1</sup> As well as in Taiwan, China.

is to authorize the new system for inspection use by 2008, when the present digital surveillance system will be phased out. In November 2005, the Agency began implementing a new type of electronic optical sealing system, which represents a major technological improvement in electronic sealing applications. The new seal has remote monitoring (RM) capabilities, with strengthened authentication and state of the art encryption technology. At a plutonium storage facility in the USA, an RM system on both the radiofrequency seals and surveillance system was installed in August 2005 for a field trial. In the near future, implementation of this system will also result in considerable savings in the inspection effort at the relevant facilities. Another innovative safeguards system, which has been developed, will allow for unattended monitoring of the loading and shipment of spent fuel at WWER 1000 power reactors.

## Assistance to SSACs

State systems of accounting for and control of nuclear material (SSACs) are fundamental to effective and efficient safeguards implementation. A software application aimed at improving the quality of State reporting of nuclear material accounts has been developed and acceptance tests carried out with the cooperation of selected States. The software is available to all States with safeguards agreements on request.

Following testing during a pilot mission of the IAEA SSAC Advisory Service (ISSAS) in 2004, guidelines for the conduct of these missions were published. During 2005, emphasis was placed on the implementation of ISSAS. Upon the request of the Republic of Korea, the first ISSAS mission was conducted. Eight national, regional and international training courses were conducted for personnel in Member States to assist them in fulfilling their obligations under safeguards agreements and APs.

## Covert Nuclear Trade Networks

During 2005, proliferation risks created by covert nuclear trade networks related to the supply and procurement of sensitive nuclear technology remained a concern to the Agency. The General Conference welcomed the Secretariat's activities to strengthen safeguards by verifying and analysing information provided by Member States on nuclear supply and procurement and invited all States to cooperate with the Agency in this regard. The Agency worked with Member State Governments to facilitate the acquisition of information on the trade in sensitive technologies through a network of contacts. Analysis of such information continued and increased the Agency's understanding of the scope and operation of covert nuclear trade networks, which, in return, contributed to the implementation of safeguards. ■