

Safeguards

Objective

To draw independent, impartial and timely safeguards conclusions, in order to provide credible assurances to the international community that States are abiding by their safeguards obligations; to contribute, as appropriate, to verifying nuclear arms control and reduction agreements.

Safeguards Conclusions for 2010

At the end of each year, the Agency draws a safeguards conclusion for each State with a safeguards agreement in force. This conclusion is based on a continuous, iterative State evaluation process that integrates and assesses all of the safeguards relevant information available to the Agency. By basing the planning, conduct and evaluation of safeguards on an ongoing analysis of all available relevant information, the Agency is able to focus its verification activities in the field and at Headquarters more effectively. The safeguards system being implemented by the Agency is thus described as ‘information driven’.

With regard to States with comprehensive safeguards agreements (CSAs), the Agency seeks to conclude that all nuclear material has remained in peaceful activities. To draw such a conclusion, the Secretariat must ascertain that: (i) there are no indications of diversion of declared nuclear material from peaceful activities (including no misuse of declared facilities or other declared locations to produce undeclared nuclear material); and (ii) there are no indications of undeclared nuclear material or activities for the State as a whole.

To ascertain that there are no indications of undeclared nuclear material or activities in a State, and ultimately to be able to draw the broader conclusion that *all* nuclear material has remained in peaceful activities, the Agency assesses the results of its verification and evaluation activities under CSAs and additional protocols (APs). Thus, for the Agency to draw such a broader conclusion for a State, both a CSA and an AP must be in force for that State, and the Agency must have completed all necessary verification and evaluation activities.

For States that have a CSA but not an AP in force, the Agency draws a conclusion for a given year only with respect to whether *declared* nuclear material remained in peaceful activities; as the Agency

does not have sufficient tools to provide credible assurances regarding the absence of undeclared nuclear material and activities in a State as a whole.

For those States for which the broader conclusion has been drawn and a State level integrated safeguards approach has been approved, the Agency implements integrated safeguards: an optimized combination of measures available under CSAs and APs to maximize effectiveness and efficiency in meeting the Agency’s safeguards obligations. In accordance with the State level safeguards approach and annual implementation plan approved for each State, integrated safeguards were implemented during the entirety of 2010 in 47 States.¹

In 2010, safeguards were applied for 175² States with safeguards agreements in force with the

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Agency.³ Of the 99 States that had both a CSA and an AP in force, the Agency concluded that all nuclear material remained in peaceful activities in 57 States;⁴ for the remaining 42 States the Agency had not yet completed all the necessary evaluations and thus was unable to draw the same conclusion. For these 42 States, and for the 68 States with a CSA but not an AP in force, the Agency concluded only

¹ Armenia, Australia, Austria, Bangladesh, Belgium, Bulgaria, Burkina Faso, Canada, Chile, Croatia, Cuba, the Czech Republic, Denmark, Ecuador, Estonia, Finland, Germany, Ghana, Greece, the Holy See, Hungary, Indonesia, Ireland, Italy, Jamaica, Japan, the Republic of Korea, Latvia, Lithuania, Luxembourg, Madagascar, Mali, Malta, Monaco, the Netherlands, Norway, Palau, Peru, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Uruguay and Uzbekistan.

² The 175 States do not include the Democratic People’s Republic of Korea, where the Agency did not implement safeguards and, therefore, could not draw any conclusion.

³ The status with regard to the conclusion of safeguards agreements, APs and small quantities protocols is given in Table A6 in the annex to this report.

⁴ And Taiwan, China.

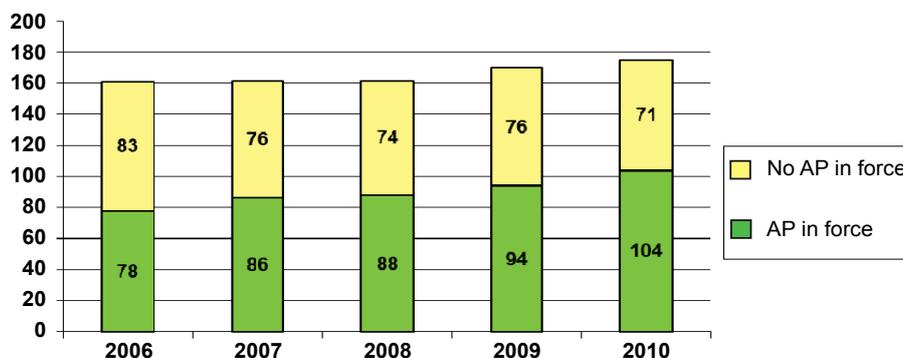


FIG. 1. Status of APs for States with safeguards agreements in force, 2006–2010 (the Democratic People's Republic of Korea is not included).

that declared nuclear material remained in peaceful activities.

Safeguards were also implemented with regard to declared nuclear material in selected facilities in the five nuclear weapon States under their

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respective voluntary offer agreements. For these five States, the Agency concluded that nuclear material to which safeguards were applied in selected facilities remained in peaceful activities or had been withdrawn as provided for in the agreements.

For the three States that had item specific safeguards agreements in force based on INFCIRC/66/Rev.2, the Agency concluded that the nuclear material, facilities or other items to which safeguards were applied remained in peaceful activities.

As of 31 December 2010, 17 non-nuclear-weapon States party to the Treaty on the Non-Proliferation of Nuclear Weapons (NPT) had yet to bring CSAs into force pursuant to Article III of the Treaty. For these States, the Secretariat could not draw any safeguards conclusions.

Conclusion of Safeguards Agreements and Additional Protocols

The Agency continued to facilitate the conclusion of safeguards agreements and APs, and the amendment or rescission of small quantities protocols

(SQPs).⁵ During 2010, CSAs entered into force for five States,⁶ and APs entered into force for ten States with CSAs.⁷ One State⁸ acceded to the safeguards agreement and AP thereto between the Agency, Euroatom and the non-nuclear-weapon States of Euratom. The status of safeguards agreements and APs as of 31 December 2010 is shown in Fig. 1. During the year, four other States⁹ signed CSAs and seven States¹⁰ signed APs. The Board of Governors approved an additional CSA for one State¹¹ and APs for two States.¹²

The Secretariat continued to implement the *Plan of Action to Promote the Conclusion of Safeguards Agreements and Additional Protocols*, which was updated in September 2010. During the year, the

⁵ Many States with minimal or no nuclear activities have concluded a small quantities protocol (SQP) to their CSA. Under an SQP based on the original standard text submitted to the Board of Governors in 1974 (GOV/INF/276/Annex B), the implementation of most of the safeguards procedures in Part II of a CSA is held in abeyance as long as certain criteria are met. In 2005, the Board of Governors took the decision to revise the standardized text of the SQP and change the eligibility criteria for an SQP, making it unavailable to a State with an existing or planned facility and reducing the number of measures held in abeyance (GOV/INF/276/Mod.1 and Corr.1). The Agency initiated exchanges of letters with all States concerned in order to give effect to the revised SQP text and the change in the criteria for an SQP.

⁶ Andorra, Angola, Chad, Gabon and Rwanda.

⁷ Albania, Angola, Chad, the Dominican Republic, Gabon, Lesotho, Philippines, Rwanda, Swaziland and the United Arab Emirates.

⁸ Romania.

⁹ Angola, the Republic of the Congo, Djibouti and Mozambique.

¹⁰ Angola, Bahrain, the Republic of the Congo, Djibouti, Lesotho, Mozambique and Swaziland.

¹¹ Angola.

¹² Angola and Gambia.

Secretariat convened two outreach events — a briefing on Agency safeguards held in New York in May in the margins of the 2010 Review Conference of the Parties to the NPT; and an interregional seminar on the Agency's safeguards system for Portuguese speaking States with limited nuclear material and activities, conducted in Lisbon, in June. In addition, consultations on the amendment of SQPs and the conclusion and entry into force of safeguards agreements and APs were held throughout the year with representatives from Member and non-Member States.

Amendment of Small Quantities Protocols

The Secretariat continued to communicate with States in order to implement the Board's 2005 decisions regarding SQPs with a view to amending or rescinding SQPs to reflect the revised standardized text and changed eligibility criteria. During the year, SQPs with three States¹³ were amended and three¹⁴ States brought into force SQPs based on the revised text.

Development of the State Evaluation Process

The drawing of soundly based safeguards conclusions is of utmost importance to the Agency. Therefore, in 2010 the Agency also continued its work on the conceptual framework for safeguards, aimed at further improving the State evaluation process.

Key to the process of drawing conclusions and determining the requisite verification activities is the State evaluation process (including the preparation and review of State evaluation reports). In 2010, as part of its ongoing efforts to strengthen this process, the Agency continued to develop and implement more effective and efficient approaches to verification, including through the development of a safeguards system that is fully driven by the use of all the safeguards relevant information available to the Agency. The Agency, therefore, is moving to a system of collaborative analysis by multidisciplinary State evaluation groups; has established a team, consisting of senior safeguards staff, to review the quality of several

recent State evaluation reports in order to identify and recommend corrections to generic weaknesses in the process; and has introduced a prioritized system for preparing such reports. During 2010, State evaluation reports covering 110 States were completed and reviewed.

Cooperation with State and Regional Safeguards Authorities

The effectiveness and efficiency of Agency safeguards depend, to a large extent, on the effectiveness of State and regional systems of accounting for and control of nuclear material (SSACs/RSACs), and on the level of cooperation of State and regional safeguards authorities with the Agency. The Agency routinely meets State and regional authorities to address safeguards implementation issues, such as the quality of operator systems for the measurement of nuclear material, the timeliness and accuracy of State reports and declarations, and support for the Agency's verification activities.

To help States build their capacity to comply fully with their safeguards obligations, the Agency conducted two IAEA SSAC Advisory Service (ISSAS) missions in 2010. It also held ten international,

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regional and national training courses for personnel responsible for the implementation of safeguards agreements and SSACs, and participated in meetings supporting the development of relevant national infrastructures. In addition to providing assistance to States in meeting their safeguards obligations, the Agency also evaluated the means by which cooperation between States and the Agency could further enhance the effectiveness and efficiency of safeguards implementation.

Implementing Safeguards in the Islamic Republic of Iran (Iran)

During 2010, the Director General submitted four reports to the Board of Governors on the

¹³ Iceland, Senegal and Swaziland.

¹⁴ Angola, Chad and Rwanda.

implementation of the NPT safeguards agreement and relevant United Nations Security Council resolutions in the Islamic Republic of Iran (Iran). In 2010, while the Agency continued to verify the non-diversion of declared nuclear material at the nuclear facilities and locations outside facilities declared by Iran, the Agency was not able to provide credible assurance about the absence of undeclared nuclear material and activities in Iran, and therefore to conclude that all nuclear material

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in Iran was in peaceful activities. Contrary to the relevant resolutions of the Board of Governors and the Security Council, Iran: did not implement the provisions of its AP; implement the modified Code 3.1 of the subsidiary arrangements general part to its CSA; suspend its enrichment related activities; suspend its heavy water related activities; and clarify the remaining outstanding issues which give rise to concerns about possible military dimensions to its nuclear programme. In 2010, Iran announced that it had selected the sites for new enrichment facilities and that construction of one of these facilities would start in 2011.

Implementing Safeguards in the Syrian Arab Republic (Syria)

In 2010, the Director General submitted four reports to the Board of Governors on the implementation of the NPT safeguards agreement in the Syrian Arab Republic (Syria). The Agency continued its verification activities in relation to the allegations that an installation destroyed by Israel at Dair Alzour in Syria in September 2007 had been a nuclear reactor under construction. Syria has yet to provide a credible explanation for the origin and presence of anthropogenic natural uranium particles found at the Dair Alzour site.¹⁵

¹⁵ ‘Anthropogenic’ refers to nuclear material that has been produced as a result of chemical processing.

Syria has not cooperated with the Agency since 2008 in connection with the unresolved issues related to the Dair Alzour site and the three other locations to which it is allegedly functionally related. In 2009, the Agency found anthropogenic natural uranium particles at the Miniature Neutron Source Reactor (MNSR) near Damascus. A plan of action was agreed between Syria and the Agency, the aim of which is to resolve the inconsistencies between Syria’s declarations and the Agency’s findings.

Implementing Safeguards in the Democratic People’s Republic of Korea (DPRK)

Since December 2002, the Agency has not implemented safeguards in the Democratic People’s Republic of Korea (DPRK) and, therefore, cannot draw any safeguards conclusion regarding the DPRK. Since 15 April 2009, the Agency has not implemented any measures under the ad hoc monitoring and verification arrangement agreed between the Agency and the DPRK and foreseen in the Initial Actions agreed at the Six-Party Talks. Although not implementing any verification in the field, the Agency continued to monitor the DPRK’s nuclear activities by using open source information, satellite imagery and trade information. In this regard, the Agency learned with great regret of the report on the uranium enrichment facility at Yongbyong. The Agency also continued to further consolidate its knowledge of the DPRK’s nuclear programme with the objective of maintaining operational readiness to resume safeguards implementation in the State, to implement ad hoc monitoring and verification arrangements and to resolve any issues that may have arisen due to the long absence of Agency safeguards. In 2010, the Agency continued to regard the DPRK nuclear issue and that country’s nuclear tests as a serious threat to the international nuclear non-proliferation regime and regional and international peace and stability.

Equipment Development and Implementation

During 2010, the Agency continued the upgrading of safeguards equipment, mainly through adding remote monitoring capabilities, updating obsolete and outdated components, and improving user documentation. The reliability of the Agency’s standard equipment systems is ensured through an ongoing programme of preventive maintenance.

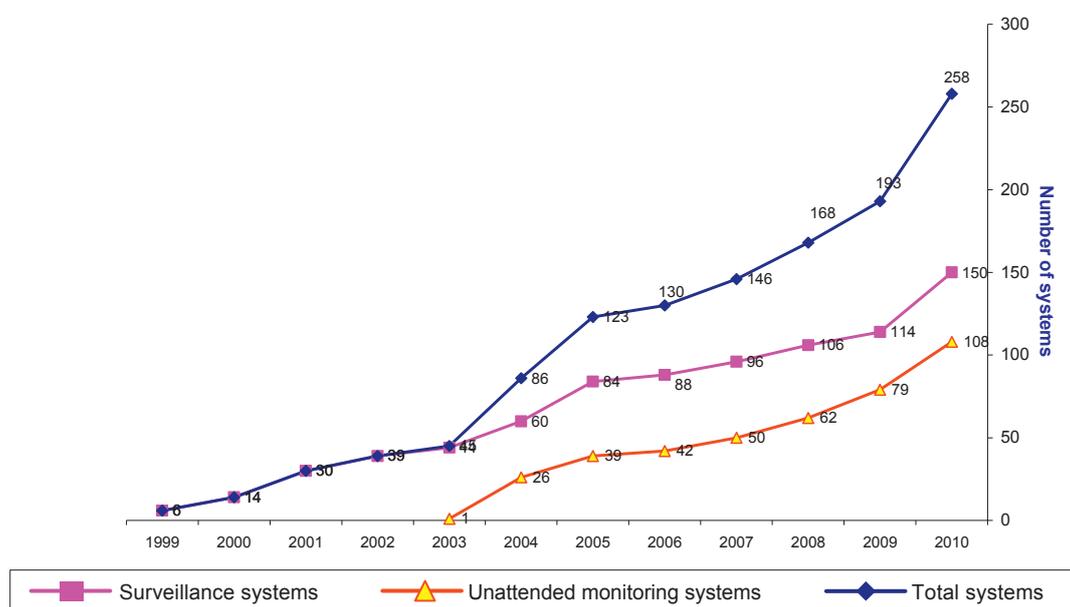


FIG. 2. Number of remote monitoring systems in use, 1999–2010.

In 2010, 1113 portable and attended non-destructive assay (NDA) systems were used in the field during inspections, and numerous related technical support activities were performed. The design of a universal NDA data acquisition platform was completed and a new device to verify spent fuel underwent field trials.

By the end of 2010, the Agency had 1173 cameras connected to 602 systems operating at 248 facilities in 33 States.¹⁶ The Agency continued to install surveillance equipment at new facilities in India and MOX facilities in Japan. During the year, the Agency also participated in technical discussions with the ABACC concerning the future application of surveillance technology in the region.

In December, the development of the next generation surveillance system (NGSS) was completed and is now undergoing equipment authorization testing with a view to its routine use by the end of 2011. During the year, pre-production prototypes of the remotely monitored sealing array, the purpose of which is to provide an effective and safe sealing method in dry storage facilities, were completed.

Remote Monitoring

The increased use of remote monitoring systems continues to enhance the effectiveness and efficiency of safeguards implementation. During 2010, 258

safeguards systems with remote monitoring were implemented at 102 facilities in 19 States.¹⁷ Figure 2 shows the increased use of remote monitoring over the past 12 years. Actual savings of inspection effort achieved through the implementation of remote monitoring are difficult to quantify accurately because it has become an integral part of many safeguards approaches and its impact on safeguards

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implementation cannot be viewed in isolation. Nevertheless, it was estimated that approximately 277 PDIs (person days of inspection) were saved due to remote monitoring in 2010.

All safeguards relevant data from the Rokkasho Reprocessing Plant in Japan is now remotely transferred to the Agency’s Headquarters on a daily basis through 26 surveillance and unattended monitoring systems. A project jointly conducted with the European Space Agency to establish the feasibility of setting up secure satellite communications for safeguards data transmission

¹⁶ And Taiwan, China.

¹⁷ And Taiwan, China.

was concluded in 2010, and the existing infrastructure was used to resume communications for selected remote sites. The handover of this system, achieved at minimal cost, means that the Secretariat now has at its disposal a fully secure, self-supported satellite network capable of global coverage. An advanced system to establish remote monitoring capabilities for monitoring of spent fuel transfers at on-load reactors was also installed at several facilities in 2010, which is expected to reduce significantly the need for on-site inspector presence when these transfers recommence in 2011. The total number of electronic seals transmitting data remotely to the Agency's Headquarters increased to 147 in 2010 (89 of which are the new electro-optical sealing system type seal).

Enhancing Sample Analysis

The safeguards analytical service provides logistical support to the safeguards programme for the sampling, transport and analysis of nuclear material and environmental samples. Sample analysis

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is performed by the Agency's Safeguards Analytical Laboratory (SAL), the Rokkasho On-Site Laboratory and the Network of Analytical Laboratories (NWAL), comprising SAL and 19 national laboratories located in Member States. In 2010, a laboratory in Brazil joined NWAL, thereby increasing the network's geographical distribution.¹⁸

In 2010, in line with its results based approach to programme management, the Agency brought responsibility for SAL (comprising the Nuclear Material Laboratory and the Environmental Sample Laboratory, both in Seibersdorf) as well as NWAL and the Rokkasho On-Site Laboratory under one administration.

¹⁸ Laboratories in Belgium, France and the USA are currently being qualified for nuclear material analysis and are expected to join NWAL.

Information Analysis

Throughout the year, the Agency continued to enhance its capabilities to acquire and process data, analyse and evaluate information, generate knowledge, and distribute information securely in ways that contribute to an effective safeguards system that is 'information driven'.

To ascertain that there are no indications of diversion of declared nuclear material, and no indications of undeclared activities, it is necessary to process, analyse and evaluate large quantities of data. For instance, more than 17 000 State reports and declarations were received and evaluated; around 440 000 nuclear material transactions were confirmed, resulting in more than 500 official statements on nuclear material inventories and transactions provided to the States. In addition, 160 material balance evaluations for 44 bulk handling facilities were conducted; 460 destructive assay samples were evaluated and more than 865 items verified by quantitative NDA; and results from laboratory analysis of 490 environmental samples collected from 45 States were evaluated. To improve the quality of State reports, specific training was provided to States on nuclear material accounting and reporting as well as on measurements and material balance concepts.

In cooperation with international experts, the Agency issued a new edition of the *International Target Values* (ITV 2010) for analysis of nuclear material. ITV 2010 is the international reference for assessing the quality of accountancy measurement systems.

In support of the State evaluation process to verify the completeness of State declarations and in-field verification activities, the Agency produced 45 trade analysis reports. In addition, Member States provided the Agency with information concerning 196 nuclear trade related procurement enquiries in 2010 for further clarification (as well as 141 enquiries relating to the previous year). In September, 12 Member States participated in a workshop, entitled 'Collecting Safeguards Relevant Trade Information', as part of the Agency's outreach programme to further enhance the provision of such information.

In 2010, 377 commercial satellite images were acquired and evaluated in support of safeguards verification activities, taking advantage of new, higher resolution commercial sensors to improve capabilities for monitoring sites and facilities worldwide. Imagery was acquired from 22 different

Earth observation satellites. New imagery providers were contracted in order to diversify sources and ensure the integrity and authenticity of satellite imagery. The use of imagery analysis continued to be a great asset, particularly where access to sites was either restricted or denied. The ongoing demand for mapping products resulted in the production of more standardized maps, three-dimensional visualization products and interactive geospatial tools to assist the Agency's verification work.

The Open Source Information System was expanded through the addition of around 8600 new items of information. Notification of significant safeguards events was provided by the internal dissemination of over 3000 articles during the course of the year through daily and weekly information bulletins. Open source research also supported the analysis of satellite imagery and clandestine procurement networks, and the evaluation of incidents of nuclear material trafficking.

Significant Safeguards Projects

IRP

The IAEA Safeguards Information System Reengineering Project (IRP) will ensure the establishment of an integrated information environment that will support an easy and cost effective evolution of departmental business processes towards a safeguards system which is fully information driven. In 2010, significant progress was made in the implementation of key IRP services, such as reference data management, State supplied data handling and integrated scheduling as well as planning and information tracking systems.

In order to ensure proper adaptation to the information requirements of the department, IRP necessitated a comprehensive evaluation of the contents of existing data systems and associated processes. In 2010, comprehensive 'role based' access control tools were introduced as part of IRP implementation to permit access to information in the Secretariat on a 'need to know' basis. Following significant 'data cleansing', a significant proportion of information stored on the mainframe has already been migrated to the new environment. Another significant project aimed at providing the Agency with a geospatial exploitation system facilitating the analysis and dissemination of information also commenced in 2010.

Japan MOX Fuel Fabrication Plant

The construction of the Japan MOX fuel fabrication plant (J-MOX) began in October 2010, with commissioning (involving uranium and MOX powder) expected to start in the middle of 2015, and commercial operation scheduled for mid-2016. In 2010, the Agency started detailed design and production of some of the equipment that will be required at the plant, the installation of which is expected in 2013–2014.

Novel Technologies Project

Within the framework of the Novel Technologies Project, concepts for advanced technologies capable of detecting undeclared activities and of providing general support to safeguards implementation were identified and developed. The project focused mainly on: novel safeguards technologies for geological repositories; on-site atmospheric gaseous compound detection (for the purpose of verifying the status of reprocessing facilities as well as the absence of unreported activities); identification of nuclear

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fuel cycle indicators and signatures that would be useful for safeguards purposes; and the application of commercial laser based sampling and analysis techniques.

Chernobyl

The objective of the Chernobyl Safeguards Project is to develop safeguards approaches and instrumentation for routine safeguards implementation at the facilities at the Chernobyl site. A new surveillance system was selected and procured in 2010, and surveillance and radiation monitoring and detection equipment already installed was upgraded.



FIG. 3. Safeguards inspectors at a nuclear facility.

ECAS

To maintain and strengthen its capabilities to provide independent and timely analysis of nuclear material and environmental samples, the Agency continued with the project entitled 'Enhancing Capabilities of the Safeguards Analytical Services (ECAS)'.

In April 2010, construction began on the extension of the Clean Laboratory to accommodate a large geometry secondary ion mass spectrometer (LG-SIMS). Partially funded by the Agency's regular budget and with generous contributions from a

Also in 2010, the conceptual design for a new Nuclear Material Laboratory (NML) to analyse nuclear material samples was completed and the detailed design was started; subject to funding, construction is scheduled to begin in 2011. The design phase of the NML has been partially funded by the Agency's regular budget, with additional contributions from Member States. Further contributions are required to achieve full funding for project completion (intended in 2014).

Support

Developing the Safeguards Workforce

To ensure the maintenance of a workforce capable of meeting future as well as current needs, the Agency must continually develop the skills of its staff (Fig. 3). As demands on the safeguards workforce evolve, so does the Agency's training curriculum. During the year, some 70 training courses were held.

To induct a new generation of 20 newly recruited inspectors, an 'Introductory Course on Agency Safeguards' (ICAS) was held, along with other basic training, including exercises at specific types of facilities, courses on safeguards techniques, and on enhanced observational and communication skills. The Agency also organized advanced training across a range of more specialized topics, including: satellite imagery; proliferation indicators of different types of nuclear fuel cycle facilities; spent fuel verification; and plutonium verification techniques. New or updated courses that were offered during the year focused mainly on providing country officers and

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number of Member States¹⁹, by the year's end structural work for the building had been completed and the mechanical and electrical outfitting had begun. It is expected that the LG-SIMS, which will enhance and ensure the sustainability of the Agency's particle analysis capabilities for environmental samples, will be installed in 2011.

¹⁹ Canada, the Czech Republic, Germany, Ireland, Japan, the Republic of Korea, Spain and the USA.

analysts with the knowledge and skills necessary for performing State evaluations.

The Agency also organized a ten month Safeguards Traineeship Programme for six young graduates and junior professionals from developing countries. The programme's objectives are to prepare trainees for employment in their home countries in the peaceful use of atomic energy, as well as to increase the number of qualified candidates from developing countries for possible hire as safeguards inspectors, either by the Agency or by their national nuclear related organizations.

Quality Management

In 2010, the Agency continued to implement its quality management system. Specific training was provided in order to raise staff awareness of the system, to increase the use of the corrective action report system, to support continual process improvement and to improve the document control system. Knowledge management efforts focused on retaining critical job related knowledge of retiring staff. The Agency conducted audits on the process for annual reporting on safeguards implementation and on the use of role based security concepts in information systems. Moreover, the Agency completed, peer reviewed and validated a cost calculation methodology which enables it to establish and monitor the cost of carrying out safeguards and to compare the costs of different safeguards implementation options.

Standing Advisory Group on Safeguards Implementation

The Standing Advisory Group on Safeguards Implementation (SAGSI) held two meetings in 2010 at which it considered: remote monitoring concepts; the verification of the front end of the nuclear fuel cycle; Agency activities on novel technologies and 'safeguards by design'; strategic planning activities; efforts to further the State level concept for all States, based on a safeguards system that is fully information driven; and safeguards training and knowledge management at the Agency.

The Future

Strategic Planning

In 2010, the Agency continued to implement the long range strategic planning methodology for

the safeguards programme. It carried out a risk assessment of issues of potential strategic importance and developed strategies to address them in the coming years. Approved within the Secretariat in August 2010, *The Long-Term Strategic Plan (2012–2023)* addresses the conceptual framework for safeguards, legal authority, technical capabilities (expertise, equipment and infrastructure), and human and financial resources for Agency verification. It also considers communication, cooperation and partnerships with the Agency's stakeholders and sets in motion various improvement initiatives. The plan was presented at the symposium on international safeguards held in November 2010 and will be subject to periodic review and updating.

Towards a Fully Information Driven Safeguards System

In order to make the safeguards system fully information driven, the Agency accelerated its work to strengthen the links between the State evaluation process and inspection related activities with a view

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eventually to merge them. The objective is to ensure that all safeguards relevant information regarding a State's nuclear programme, including feedback from in-field activities, is evaluated collaboratively by multidisciplinary teams of experts within the Agency. The aim is not only to draw safeguards conclusions, but also to determine the optimal set of State specific safeguards activities to be conducted, both in the field and at the Agency's Headquarters.

Safeguards Symposium

In November, the Agency held its 11th symposium on international safeguards in Vienna. Around 670 participants from 64 States and 17 international organizations attended the event. The objective was to foster dialogue and information exchange between the Secretariat, Member States, the nuclear industry and members of the broader safeguards and nuclear non-proliferation community on the theme of 'Preparing for Future Verification Challenges'. The

Secretariat presented its plan for the implementation of a safeguards system that is more objectives based, focused at the State level and driven by all available safeguards relevant information. Drawing from *The Long-Term Strategic Plan (2012–2023)*, participants discussed in key sessions the Agency's strategic priorities in addressing the forthcoming challenges in the areas of: advancing cooperation between the Agency and its Member States; strengthening the Agency's technical capabilities (safeguards approaches, technologies and infrastructure); bolstering its State evaluation capabilities (for example, information collection and evaluation); developing its organizational culture; and managing the safeguards workforce and knowledge.

Research and Development Programme

Research and development activities, carried out with the assistance of Member State Support Programmes (MSSPs), are essential to meet the safeguards challenges of the future. At the end of 2010, 21 States and intergovernmental organizations²⁰ had formal support programmes with the Agency

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supporting over 300 tasks, valued at over €20 million per annum.

The *Research and Development Programme for Nuclear Verification 2010–2011*, which reflects the need to achieve greater efficiency and effectiveness, consists of 24 projects in such areas as verification technology development, safeguards concepts, information processing and analysis, and training. During 2010, the Secretariat finalized the review of its R&D activities implemented in the previous two years and presented the findings in the *Biennial Report on the Research and Development Programme for*

²⁰ Argentina, Australia, Belgium, Brazil, Canada, China, the Czech Republic, the European Commission, Finland, France, Germany, Hungary, Japan, the Republic of Korea, the Netherlands, the Russian Federation, South Africa, Spain, Sweden, the United Kingdom and the USA.

Nuclear Verification 2008–2009. To enable planning, in 2010 the Agency decided to prepare a long term R&D plan.

During 2010, the Agency organized a number of meetings and workshops, notably, a biennial MSSP coordinators meeting, and interacted with other safeguards R&D organizations, such as the European Safeguards Research and Development Association (ESARDA) and the Institute of Nuclear Materials Management (INMM).

Safeguards for Future Facilities

For the effective and efficient implementation of safeguards at a new facility, safeguards concepts need to be considered in the initial design planning stages. This not only improves the facility's proliferation resistance, it also enables design changes to be effected when the costs of such changes are reasonably low.

The Agency is already preparing to safeguard new types of facilities in the future (for example, geological repositories and pyroprocessing facilities). In this regard, the Agency, inter alia, evaluated safeguards approaches for specific facility types, assessed the proliferation resistance of nuclear energy systems, and considered what safeguards measures are required early in the design stages of a facility.

In 2010, the Agency, Euratom, and the State authorities and nuclear operators of Finland and Sweden continued the development of safeguards approaches for the transfer of spent fuel from reactors to encapsulation plants and geological repositories for final disposal.

The Agency contributed to assessments of proliferation resistant nuclear energy systems through the Agency's International Project on Innovative Nuclear Reactors and Fuel Cycles (INPRO) and the Generation IV International Forum (GIF), participating in meetings and helping to finalize a report on Proliferation Resistance: Acquisition/Diversion Pathway Analysis (PRADA).

The concept of 'safeguards by design' drew growing interest in 2010, and the Agency led efforts to build consensus on stakeholders' objectives and to refine the overarching principles. For instance, the issue was discussed at numerous sessions of the safeguards symposium in November, and the Agency provided key support to those working groups dedicated to refining the concept at the 'Third International Meeting on Next Generation Safeguards' held in December 2010 in Washington, D.C.