

Nuclear Verification

Objectives

To deter the proliferation of nuclear weapons by detecting, as early as possible, the misuse of nuclear material or technology, and by providing credible assurances that States are honouring their safeguards obligations. To contribute to nuclear arms control and disarmament by responding to States' requests for verification and other technical assistance associated with related agreements and arrangements. To continually improve and optimize operations and capabilities to effectively carry out the Agency's verification mission.

Implementation of Safeguards in 2013

At the end of each year, the Agency draws a safeguards conclusion for each State for which safeguards are applied. This conclusion is based on an evaluation of all safeguards relevant information available to the Agency in exercising its rights and fulfilling its safeguards obligations for that year.

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 Agency must ascertain that: first, 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 second, there are no indications of undeclared nuclear material or activities in the State.

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, both a CSA and an AP must be in force in the State, the Agency must have completed all necessary verification and evaluation activities, and found no indication that, in its judgement, would give rise to a proliferation concern.

For States that have a CSA but not an AP in force, the Agency draws a conclusion 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.

For those States for which the broader conclusion has been drawn, the Agency implements integrated safeguards: an optimized combination of measures available under CSAs and APs to maximize effectiveness and efficiency in fulfilling the Agency's safeguards

obligations. Integrated safeguards were implemented during 2013 for 53 States^{1,2}.

In 2013, safeguards were applied for 180 States^{2,3} with safeguards agreements in force with the Agency⁴. Of the 117 States that had both a CSA and an AP in force, the Agency concluded that *all* nuclear material remained in peaceful activities in 63 States⁵; for the remaining 54 States, as all the necessary evaluations remained ongoing, the Agency was unable to draw the same conclusion. For these 54 States, and for the 55 States with a CSA but with no AP in force, the Agency concluded only that *declared* nuclear material remained in peaceful activities.

"In 2013, safeguards were applied for 180 States...with safeguards agreements in force with the Agency..."

Safeguards were also implemented with regard to declared nuclear material in selected facilities in the five nuclear-weapon States under their 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 from safeguards as provided for in the agreements.

For the three States in which the Agency implemented safeguards pursuant to safeguards agreements 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 2013, 12 non-nuclear-weapon States party to the Treaty on the Non-Proliferation of

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

² And Taiwan, China.

³ These 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.

⁴ The status of safeguards agreements is given in the Annex to this report.

⁵ And Taiwan, China.

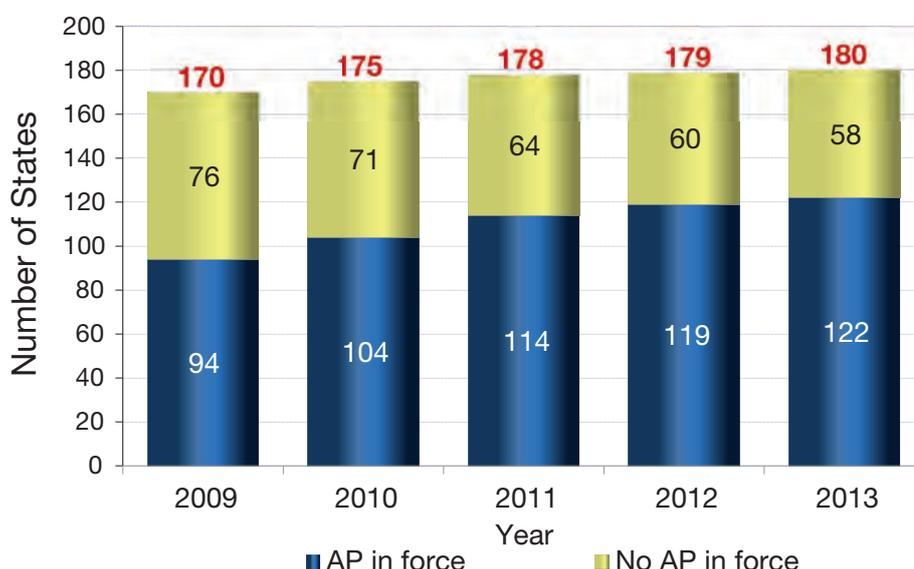


FIG.1. Number of APs for States with safeguards agreements in force, 2009–2013.

Nuclear Weapons (NPT) had yet to bring into force CSAs as required by Article III of the Treaty. For these States, the Agency could not draw any safeguards conclusions.

Conclusion of Safeguards Agreements and APs, and Amendment and Rescission of SQPs

The Agency continued to facilitate the conclusion of safeguards agreements and APs (Fig. 1), and the amendment or rescission of small quantities protocols (SQPs)⁶. During 2013, a CSA and AP entered into force for two States^{7,8}, and APs entered into force for two other States^{9,10}. The status of safeguards agreements and APs as of 31 December 2013 is shown in Table A6 in the Annex to this report. During the year, one State¹¹ signed a CSA

⁶ Many States with minimal or no nuclear activities have concluded an SQP to their CSA. Under an SQP, 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.

⁷ Bosnia and Herzegovina, and Vanuatu.

⁸ The NPT Safeguards Agreement concluded with Bosnia and Herzegovina (INFCIRC/851) superseded with respect to Bosnia and Herzegovina the NPT Safeguards Agreement concluded with Yugoslavia (INFCIRC/204).

⁹ Antigua and Barbuda, and Denmark.

¹⁰ The Additional Protocol for Denmark is applicable to that part of Denmark which is covered by INFCIRC/176, i.e. Greenland (INFCIRC/176/Add.1).

¹¹ Guinea Bissau.

and an AP, another State¹² signed an AP, and an AP was approved by the Board for another State¹³.

The Agency continued to implement the *Plan of Action to Promote the Conclusion of Safeguards Agreements and Additional Protocols*¹⁴, which was updated in September. During the year, the Agency organized an outreach event for Pacific Island States in Nadi, Fiji, held in April and May, at which the Agency encouraged the participating States to conclude CSAs and APs and to amend their SQPs. At the request of Myanmar, the Agency organized consultations and training for State officials in connection with the conclusion of an AP and amendment of its SQP. National workshops on safeguards were conducted for Myanmar and the Lao People's Democratic Republic in August. In addition, consultations on the amendment or rescission of SQPs and the conclusion of safeguards agreements and APs were held throughout the year with representatives from States in Bangkok, Geneva, Nadi, New York and Vienna, and also during training events organized in Vienna and elsewhere by the Agency.

Amendment and Rescission of SQPs

The Agency continued to communicate with States in order to implement the Board's 2005 decisions regarding small quantities protocols, with a view to amending or rescinding such protocols to reflect the revised standard text. During the year, operative SQPs were amended to reflect the revised standard text for four States.¹⁵ This means that 51 States have operative SQPs in force based on the revised standardized text and four States have rescinded their SQPs.

¹² Myanmar.

¹³ Saint Kitts and Nevis.

¹⁴ Available at: http://www.iaea.org/OurWork/SV/Safeguards/documents/sg_actionplan.pdf.

¹⁵ Andorra, Gabon, Kuwait and Mauritania.

Islamic Republic of Iran (Iran)

During 2013, the Director General submitted four reports to the Board of Governors entitled *Implementation of the NPT Safeguards Agreement and relevant provisions of Security Council resolutions in the Islamic Republic of Iran* (GOV/2013/6, GOV/2013/27, GOV/2013/40 and GOV/2013/56).

In 2013, contrary to the relevant binding resolutions of the Board of Governors and the United Nations Security Council, Iran did not: implement the provisions of its Additional Protocol; implement the modified Code 3.1 of the Subsidiary Arrangements General Part to its Safeguards Agreement; suspend all enrichment related activities; or suspend all heavy water related activities. Neither did Iran resolve the Agency's serious concerns about possible military dimensions to Iran's nuclear programme that is necessary to establish international confidence in the exclusively peaceful nature of that programme.

In October 2013, following further rounds of talks aimed at reaching agreement on a structured approach document for resolving outstanding issues related to Iran's nuclear programme, the Agency and Iran concluded that the negotiations had become deadlocked. As there was no prospect for agreement on the document, the Agency and Iran agreed that a new approach aimed at ensuring the exclusively peaceful nature of Iran's nuclear programme should be developed.

On 11 November 2013, the Director General, on behalf of the Agency, and the Vice President of Iran and President of the Atomic Energy Organization of Iran (AEOI), on behalf of Iran, signed a 'Joint Statement on a Framework for Cooperation' (the Framework for Cooperation). In the Framework for Cooperation, the Agency and Iran agreed to cooperate further with respect to verification activities to be undertaken by the Agency to resolve all present and past issues, and to proceed with such activities in a step by step manner. Iran agreed to take six initial practical measures within three months.

On 24 November 2013, a Joint Plan of Action¹⁶ was agreed between Iran and China, France, Germany, the Russian Federation, the United Kingdom and the United States of America, the aim of which is to reach a "mutually-agreed long-term comprehensive solution" that would ensure that Iran's nuclear programme "will be exclusively peaceful". Under this Joint Plan of Action, the Agency was to be "responsible for verification of nuclear-related measures" contained therein.

The Director General welcomed the Joint Plan of Action, noting that it was an important step forward but that much more needs to be done. The Director General also indicated that, with the agreement of the Agency's Board of Governors, the Agency would be ready to fulfil its role in verifying the implementation of nuclear related measures¹⁷.

¹⁶ INFCIRC/856.

¹⁷ On 24 January 2014, the Board of Governors endorsed the Agency undertaking monitoring and verification in relation to the nuclear related measures set out in the Joint Plan of Action.

While the Agency continued throughout 2013 to verify the non-diversion of declared nuclear material at the nuclear facilities and locations outside facilities declared by Iran under its Safeguards Agreement, the Agency was not in a position to provide credible assurance about the absence of undeclared nuclear material and activities in Iran, and therefore was unable to conclude that all nuclear material in Iran was in peaceful activities.¹⁸

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Syrian Arab Republic (Syria)

In August 2013, the Director General submitted a report to the Board of Governors entitled *Implementation of the NPT Safeguards Agreement in the Syrian Arab Republic*. No new information came to the knowledge of the Agency that would have an impact on the Agency's assessment that it was very likely that a building destroyed at the Dair Alzour site was a nuclear reactor which should have been declared to the Agency by Syria.¹⁹ In 2013, the Director General renewed his call on Syria to cooperate fully with the Agency in connection with unresolved issues related to the Dair Alzour site and other locations. Syria has yet to respond to these calls.

While Syria invited the Agency to conduct an inspection at the Miniature Neutron Source Reactor in Damascus in 2013, the Agency decided not to conduct any in-field verification activities in Syria. In this regard, in June 2013, the Agency informed Syria that, after considering the United Nations Department of Safety and Security's assessment of the prevailing security conditions in Syria and the small amount of nuclear material declared by Syria at the reactor, the 2013 physical inventory verification at the reactor would be postponed until the security conditions had sufficiently improved. By the end

¹⁸ As, for example, Iran did not implement its Additional Protocol, as required in the binding resolutions of the Board of Governors and the United Nations Security Council.

¹⁹ The Board of Governors, in its resolution GOV/2011/41 of June 2011 (adopted by a vote), had, inter alia, called on Syria to remedy urgently its non-compliance with its NPT Safeguards Agreement and, in particular, to provide the Agency with updated reporting under its Safeguards Agreement and access to all information, sites, material and persons necessary for the Agency to verify such reporting and resolve all outstanding questions so that the Agency could provide the necessary assurances as to the exclusively peaceful nature of Syria's nuclear programme.

of 2013 the assessment of the security situation in Syria had not changed.

Based on the evaluation of information provided by Syria and other safeguards relevant information available to it, the Agency found no indication of the diversion of declared nuclear material from peaceful activities. For 2013, the Agency concluded for Syria that declared nuclear material remained in peaceful activities.

Democratic People's Republic of Korea (DPRK)

In August 2013, the Director General submitted a report to the Board of Governors and General Conference entitled *Application of Safeguards in the Democratic People's Republic of Korea (GOV/2013/39-GC(57)/22)*, which provided an update of developments since the Director General's report of August 2012.

Since 1994, the Agency has not been able to conduct all necessary safeguards activities provided for in the DPRK's NPT Safeguards Agreement. From the end of 2002 until July 2007, the Agency was not able, and since April 2009 has not been able, to implement any verification measures in the DPRK and, therefore, could not draw any safeguards conclusion regarding the DPRK.

Since 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. Statements by the DPRK about it having conducted a third nuclear test and its intention to readjust and restart its nuclear facilities at Yongbyon, together with its previous statements about uranium enrichment activities and the construction of a light water reactor in the DPRK, are deeply regrettable.

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Although not implementing any verification activities in the field, the Agency continued in 2013 to monitor the DPRK's nuclear activities by using open source information (including satellite imagery) and trade information. The Agency has continued to observe building renovation and new construction activities at various locations within the Yongbyon site, although, without access to the site, the Agency cannot confirm the purpose of these activities. The Agency 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 DPRK.

Enhancing Safeguards

Evolving safeguards implementation

In 2013, progress continued in strengthening the effectiveness and improving the efficiency of Agency safeguards through strategic planning, evolving safeguards implementation, introducing integrated safeguards in additional States, developing safeguards approaches, strengthening the Agency's technical and analytical capabilities, and increasing cooperation with State and regional authorities responsible for safeguards implementation.

To continue ensuring consistency and non-discrimination in the implementation of safeguards, the Agency has improved internal work practices, including through: the better integration of the results of safeguards activities conducted in the field with those carried out at Headquarters, in order to determine where to focus such activities for maximum effectiveness and efficiency; advances in the handling of safeguards relevant information to facilitate evaluation, and their documentation; and adjustments to the safeguards training programme. Of particular importance is the improvement of the key processes supporting safeguards implementation and the departmental oversight mechanisms relevant to the implementation of these processes.

In August, the Director General submitted a report to the Board of Governors entitled *The Conceptualization and Development of Safeguards Implementation at the State Level*, which was, inter alia, taken note of by the Board of Governors. The Board of Governors was informed that the Secretariat would prepare a supplementary document to the report to provide the Board of Governors with more information before the 2014 General Conference, and would consult with Member States to ensure that the Secretariat had captured all of the points that Member States asked to be addressed in that document. The General Conference resolution on Strengthening the Effectiveness and Improving the Efficiency of Agency Safeguards, (GC(57)/RES/13), noted, inter alia, that the Director General will produce, after consulting with Member States, a supplementary document for consideration and action by the Board of Governors before the fifty-eighth (2014) session of the General Conference.

Information analysis

The analysis of safeguards relevant information is an essential part of evaluating a State's nuclear activities and drawing safeguards conclusions. In drawing its safeguards conclusions, the Agency processes, evaluates and conducts consistency analysis of State declarations, the results of Agency verification activities and other safeguards relevant information available to the Agency. In support of this process, the Agency draws on an increasing amount of information from verification activities performed at Headquarters and in the field, including the results of non-destructive assay (NDA), destructive assay,

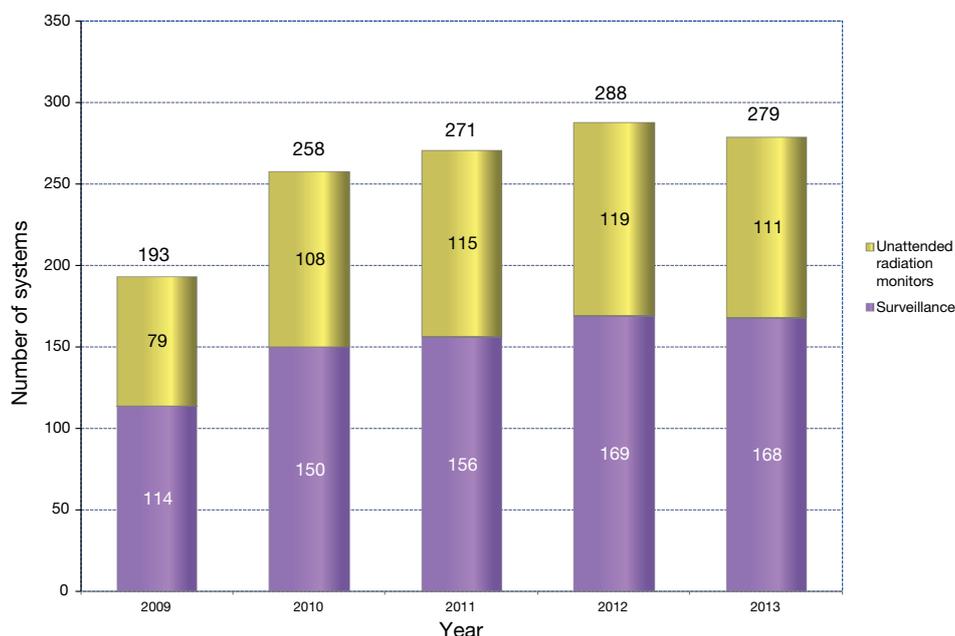


FIG. 2. Dynamics of remote monitoring deployments between 2009 and 2013.

environmental sample analyses and remotely monitored equipment, and from a diverse range of information sources, open sources (including commercial satellite imagery), trade data and other sources of safeguards relevant information. Throughout 2013, the Agency enhanced and diversified its capabilities to acquire and process data, analyse and evaluate information, and securely distribute information internally, as an essential contribution to the State evaluation process and the drawing of safeguards conclusions. It also continued to investigate new tools and methodologies to streamline and prioritize workflows and processes.

To continuously improve the quality of the information on which it must rely, the Agency monitored laboratory and measurement systems performance; organized international technical meetings; and provided to States training and workshops on nuclear material accounting, including measurement and material balance evaluation concepts.

Cooperation with State and regional 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, and on the level of cooperation between State or regional authorities and the Agency.

To assist SQP States in building capacity for complying with their safeguards obligations, in April the Agency published the *Safeguards Implementation Guide for States with Small Quantities Protocols* (IAEA Services Series No. 22).

The Agency also conducted two IAEA SSAC Advisory Service (ISSAS) missions in 2013 — to the Republic of Moldova and Tajikistan — and preparatory visits for two more missions to be conducted in 2014 — to Kyrgyzstan and the United Arab Emirates.

Safeguards equipment and tools

Throughout 2013, the Agency ensured that, across the world, its instrumentation and monitoring equipment vital to the implementation of effective safeguards continued to function as required. During the year, 1974 separate pieces of equipment were prepared and assembled into 891 portable and resident NDA systems. By the end of 2013, a total of 155 unattended monitoring systems were in operation worldwide, and the Agency had 1322 cameras connected to 612 systems operating at 251 facilities in 34 States²⁰. In addition, the Agency is responsible for maintaining approximately 200 cameras used jointly with regional and State authorities. The total number of electronic seals transmitting remote data to Headquarters was 206. By the end of 2013, there were 279 safeguards systems remotely connected to Headquarters and installed at 123 facilities in 23 States²¹ (see Fig. 2).

Member State Support Programmes (MSSPs) continued to provide significant resources in support of safeguards equipment innovations.

The Agency’s infrastructure to support its verification activities was further strengthened in 2013 by completing the refurbishment of the Unattended Monitoring Systems Laboratory and the Safeguards Equipment Receiving Area at Agency Headquarters. More than 7000 pieces of verification equipment were dispatched to support verification activities in the field.

The Agency’s Network of Analytical Laboratories (NWAL) consists of the Agency’s Safeguards Analytical Laboratory (SAL) and 20 other qualified laboratories in Australia, Brazil, France, Hungary, Japan, the Republic of Korea, the Russian Federation, the United Kingdom, the

²⁰ And Taiwan, China.

²¹ And Taiwan, China.

United States of America and the European Commission. Additional laboratories in the areas of environmental and nuclear material sample analysis are in the process of qualification in Argentina, Belgium, Canada, China, the Czech Republic, France, Germany, Hungary, the Republic of Korea, the Netherlands and the United States of America. In 2013, SAL analysed all 455 nuclear material samples collected by inspectors in the field, and 791 sub-samples from environmental swipe sampling were analysed in the NWAL (including at SAL).

“In 2013, the Agency continued to improve its safeguards information system in order to better support the implementation of safeguards.”

Support

Developing the safeguards workforce

In 2013, the Agency continued updating the ‘Introductory Course on Agency Safeguards’ to take into account the evolution of safeguards implementation. During the year, the Agency conducted 124 safeguards training courses to provide safeguards staff with the necessary competencies. Several of these courses were held at nuclear facilities.

Quality management

Quality audits were conducted on the industrial safety programme, internal safeguards training, quality control activities, and two analytical methods used at SAL. The report system in place to identify root causes of events and actions to prevent recurrence was expanded to include both radiation and industrial safety events, and quality control trends. Improvements and refinements were made to existing processes, tools and methods. In particular, these included the processes for retaining critical knowledge of staff members retiring or separating from the Agency, as well as processes for safeguards reporting and for design information verification; tools for managing and controlling internal documents and for tracking condition reports; and the method of estimating safeguards costs.

Significant Safeguards Projects

Enhancing the Capabilities of Analytical Services — ECAS

In the Environmental Sample Laboratory, the Agency’s first multi-collector inductively coupled plasma mass spectrometer, introduced in 2012, further improved the precision of analysis of uranium and plutonium in

environmental swipes. A laser ablation module was procured to complement this technology for the analysis of micrometre sized particles. In its second full year of operation, the Agency’s large geometry secondary ion mass spectrometer (LG-SIMS) provided a significant increase in the precision of measurements of environmental samples collected during safeguards inspections, design information verifications and complementary access. Techniques pioneered by the Agency were adopted by NWAL members that acquired LG-SIMS instruments for particle analysis.

Construction of the Nuclear Material Laboratory (NML) building in Seibersdorf was completed in July 2013 on schedule and within the approved budget. The building was inaugurated on 23 September 2013. The phased transition of scientific functions from the leased SAL building to the NML commenced in September 2013. The building is expected to be operational in 2014.

Overall, ECAS project activities reached 70% completion as of 31 December 2013. The remaining principal tasks in the ECAS project include the transitions of laboratory functions, facilities management and security practices to meet nuclear security recommendations on physical protection of nuclear material and nuclear facilities (INFCIRC/225/Revision 5); construction of the pedestrian arrival and goods screening buildings, traffic control lanes, internal roads and parking; construction of wastewater and electrical power supply infrastructure; design and construction of the NML building’s wing of office and training space; and procurement of certain analytical instruments and equipment for use in the NML.

Information technology

The *Medium Term Strategy 2012–2017* highlighted the safeguards information systems as a vital component of the Agency’s verification infrastructure. The information technology (IT) on which the Agency currently relies for day to day safeguards implementation is outdated and increasingly difficult to maintain. The system is also vulnerable to cyber-attacks. Therefore, the Agency needs to modernize its safeguards information technology.

In 2013, the Agency continued to improve its safeguards information system in order to better support the implementation of safeguards. By the end of the year, nearly half the re-engineering work necessary to replace outdated mainframe computer based software applications that help record and process safeguards data had been completed. In support of information analysis, further enhancements were made to the analytical tools released in 2012 to make them more effective and usable. Efforts to improve the Agency’s capability to protect sensitive information also continued. More specifically, improvements were made to security monitoring, digital forensics and the highly secure internal network, capable of hosting the next generation of safeguards applications.

To address the Agency’s continued safeguards IT modernization needs and to bring these efforts under a comprehensive management approach, the Agency

established a Modernization of Safeguards Information Technology project.

Chernobyl

The objective of the Chernobyl safeguards project is to develop safeguards approaches and instrumentation for routine safeguards implementation at the new Chernobyl facilities. The Agency is involved in the early design stages in order to integrate appropriate safeguards measures in an effective and efficient manner. During 2013, discussions took place regarding revisions to design information. Construction of the 'Interim Storage Facility for Spent Nuclear Fuel, Number 2' is now expected to be completed in 2015. The 'New Safe Confinement' over the damaged Reactor Unit 4 is expected to be completed in 2016.

Research and Development

Research and development (R&D) are essential to meet the safeguards needs of the future. In 2013, the Agency provided to MSSPs the *IAEA Department of Safeguards Long-Term R&D Plan, 2012–2023*. The document outlines the capabilities necessary to achieve the strategic objectives, for which Member State R&D support is needed. In doing so, the plan covers a number of topics, including: concepts and approaches; detection of undeclared nuclear material and activities; safeguards equipment and communication; information technology; analytical services; and training.

To address near term development objectives and to support the implementation of its verification activities, the Agency continued to rely on MSSPs in implementing its *Development and Implementation Support Programme for Nuclear Verification 2012–2013*. At the end of 2013, 20 States²² and the European Commission had formal support programmes with the Agency, with contributions both in cash and in kind. During 2013, the Agency prepared the next edition of this programme report for 2014–2015, which is linked to the long term strategy through its alignment with the *Long-Term R&D Plan, 2012–2023*. It provides MSSPs, other Member States, the R&D community and stakeholders with a framework for resource planning and for the identification of potential solutions to existing and future safeguards challenges. It also provides a basis by which the Agency can monitor progress towards reaching its strategic objectives.

²² Argentina, Australia, Belgium, Brazil, Canada, China, the Czech Republic, Finland, France, Germany, Hungary, Japan, the Republic of Korea, the Netherlands, the Russian Federation, South Africa, Spain, Sweden, the United Kingdom and the United States of America.