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Atoms for Peace

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# The Safeguards Implementation Report for 2015

*Report by the Director General*

## Main Developments in 2015

- One comprehensive safeguards agreement with a small quantities protocol based on the revised text entered into force. One operational small quantities protocol was amended, three small quantities protocols were rescinded and three additional protocols entered into force.
- For two States, the broader conclusion was drawn for the first time and implementation of integrated safeguards started in one State.
- In December 2015, the Director General reported to the Board of Governors on the final assessment of past and present outstanding issues regarding Iran's nuclear programme.
- All remaining transition activities needed to move into the new Nuclear Material Laboratory were finished and, with the completion of ECAS project in December, the Agency is able to conduct safeguards sample analysis in safe, secure and modern facilities for decades to come.
- The Agency transferred safeguards data from the mainframe computer to a new platform, re-engineered the associated software applications and decommissioned the mainframe computer, which completed the first phase of the MOSAIC project.

## Recommended Action

The Board is invited to take note of the Agency's *Safeguards Implementation Report for 2015* attached hereto.

The Board is invited to authorize the release of the *Safeguards Statement* and the Background to the *Safeguards Statement* and Summary.

# The Safeguards Implementation Report for 2015

*Report by the Director General*

# A. Safeguards Statement for 2015

**In 2015, safeguards were applied for 181 States[1, 2] with safeguards agreements in force with the Agency. The Secretariat's findings and conclusions for 2015 are reported below with regard to each type of safeguards agreement. These findings and conclusions are based upon an evaluation of all safeguards relevant information available to the Agency in exercising its rights and fulfilling its safeguards obligations for that year.**

1. **One hundred and twenty-one States had both comprehensive safeguards agreements and additional protocols in force:**

   **(a) For 67 of these States[2], the Secretariat found no indication of the diversion of declared nuclear material from peaceful nuclear activities and no indication of undeclared nuclear material or activities. On this basis, the Secretariat concluded that, for these States, all nuclear material remained in peaceful activities.**

   **(b) For 54 of these States, the Secretariat found no indication of the diversion of declared nuclear material from peaceful nuclear activities. Evaluations regarding the absence of undeclared nuclear material and activities for each of these States remained ongoing. On this basis, the Secretariat concluded that, for these States, declared nuclear material remained in peaceful activities.**

2. **Safeguards activities were implemented for 52 States with comprehensive safeguards agreements in force, but without additional protocols in force. For these States, the Secretariat found no indication of the diversion of declared nuclear material from peaceful nuclear activities. On this basis, the Secretariat concluded that, for these States, declared nuclear material remained in peaceful activities.**

**While the Secretariat concluded that, for 2015, declared nuclear material in Iran remained in peaceful activities, it was unable to conclude that all nuclear material in Iran was in peaceful activities.[3]**

3. **As of the end of 2015, 12 Parties to the Treaty on the Non-Proliferation of Nuclear Weapons (NPT) had yet to bring into force comprehensive safeguards agreements with the Agency as required by Article III of that Treaty. For these Parties, the Secretariat could not draw any safeguards conclusions.**

4. **Three States had safeguards agreements based on INFCIRC/66/Rev.2 in force, requiring the application of safeguards to nuclear material, facilities and other items specified in the relevant safeguards agreement. One of these States, India, had an additional protocol in force. For these States, the Secretariat found no indication of the diversion of nuclear material or of the misuse of the facilities or other items to which safeguards had been applied. On this basis, the Secretariat concluded that, for these States, nuclear material, facilities or other items to which safeguards had been applied remained in peaceful activities.**

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[1] These States do not include the Democratic People's Republic of Korea (DPRK), where the Agency did not implement safeguards and, therefore, could not draw any conclusion.

[2] And Taiwan, China.

[3] See paragraph 28.

5. **Five nuclear-weapon States had voluntary offer agreements and additional protocols in force. Safeguards were implemented with regard to declared nuclear material in selected facilities in all five States. For these States, the Secretariat found no indication of the diversion of nuclear material to which safeguards had been applied. On this basis, the Secretariat concluded that, for these States, nuclear material in selected facilities to which safeguards had been applied remained in peaceful activities or had been withdrawn from safeguards as provided for in the agreements.**

# B. Background to the Safeguards Statement and Summary

## B.1. Safeguards conclusions

1. The *Safeguards Statement* reflects the Secretariat's findings and conclusions resulting from the Agency's activities under the safeguards agreements in force. The Secretariat derives these conclusions on the basis of an evaluation of the results of its safeguards activities and of all other safeguards relevant information available to it. This section provides background to the *Safeguards Statement*.

| **Fact box 1. Safeguards activities overview** |
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| In 2015, there were:<br>• 200 110 (193 467)[4] significant quantities[5] of nuclear material and 431 (432) tonnes of heavy water under safeguards;<br>• 709 (704) facilities and 577 (563) material balance areas (MBAs) containing locations outside facilities where nuclear material is customarily used (LOFs) under safeguards;<br>• 2118 (2114) inspections, 623 (618) design information verifications and 64 (78) complementary accesses utilizing 13 248 (12 734) calendar-days in the field for verification[6]. |

2. A summary of the status of safeguards agreements and other information presented below is given in Tables 1 to 5 in Section B.6.

### B.1.1. States[7] with comprehensive safeguards agreements in force

3. Under a comprehensive safeguards agreement, the Agency has the "right and obligation to ensure that safeguards will be applied, in accordance with the terms of the agreement, on all source or special fissionable material in all peaceful nuclear activities within the territory of the State, under its jurisdiction or carried out under its control anywhere, for the exclusive purpose of verifying that such material is not diverted to nuclear weapons or other nuclear explosive devices."[8]

4. Comprehensive safeguards agreements consist of Part I, Part II, and Definitions. Part I consists of general provisions and Part II describes the procedures for implementing those provisions. These procedures include the record keeping and reporting obligations of the State with regard to nuclear

[4] The numbers in parentheses provide the respective data for 2014.

[5] Significant quantity — the approximate amount of nuclear material for which the possibility of manufacturing a nuclear explosive device cannot be excluded.

[6] Calendar-days in the field for verification comprise calendar-days spent on performing inspections, complementary access and design information verification and on the associated travel and rest periods.

[7] The designations employed and the presentation of material in this document do not imply the expression of any opinion whatsoever on the part of the Secretariat concerning the legal status of any country or territory or of its authorities, or concerning the delimitation of its frontiers.

[8] Paragraph 2 of INFCIRC/153 (Corrected).

material, nuclear facilities and LOFs. They also include procedures related to Agency access to nuclear material, nuclear facilities and LOFs.

5. The procedures set out in Part II of a comprehensive safeguards agreement include certain reporting requirements related to the export and import of material containing uranium or thorium which has not yet reached the stage of processing where its composition and purity make it suitable for fuel fabrication or for isotopic enrichment. Nuclear material which has reached that stage of processing, and any nuclear material produced at a later stage, is subject to all the other safeguards procedures specified in the agreement. An inventory of such nuclear material is established on the basis of an initial report by a State, which is then verified by the Agency and maintained on the basis of subsequent reports by the State and by Agency verification. The Agency performs its verification and evaluation activities in order to confirm that these declarations by the State are correct and complete — i.e. to confirm that all nuclear material in the State remains in peaceful activities.

### Small quantities protocols

6. Many States with minimal or no nuclear activities have concluded a small quantities protocol (SQP) to their comprehensive safeguards agreement. Under a SQP based on the original standard text[9] submitted to the Board of Governors in 1974, the implementation of most of the safeguards procedures in Part II of a comprehensive safeguards agreement are held in abeyance as long as certain criteria are met. In 2005, the Board of Governors approved the revision[10] of the standard text of the SQP. This revision changed the eligibility criteria for a SQP, making it unavailable to a State with an existing or planned facility, and reduced the number of measures held in abeyance. Of particular importance is the fact that, under the revised text of the SQP, the requirement that the State provide the Agency with an initial inventory report and the Agency's right to carry out ad hoc and special inspections are no longer held in abeyance.

### Additional protocols

7. Although the Agency has the authority under a comprehensive safeguards agreement to verify the peaceful use of all nuclear material in a State (i.e. the correctness and completeness of the State's declarations), the tools available to the Agency under such an agreement are limited. The *Model Additional Protocol*[11], approved by the Board of Governors in 1997, equips the Agency with important additional tools that provide broader access to information and locations. The measures provided for under an additional protocol thus significantly increase the Agency's ability to verify the peaceful use of all nuclear material in a State with a comprehensive safeguards agreement.

## B.1.1.1. States with both comprehensive safeguards agreements and additional protocols in force

### Status of implementation

8. As of 31 December 2015, 121 (118) States[2] had both comprehensive safeguards agreements and additional protocols in force.

9. Safeguards implementation involved, as appropriate, activities carried out in the field, at regional offices and at Agency Headquarters in Vienna. The activities at Headquarters included the

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[9] GOV/INF/276/Annex B.

[10] GOV/INF/276/Mod.1 and Corr.1.

[11] INFCIRC/540 (Corrected), *Model Protocol Additional to the Agreement(s) between State(s) and the International Atomic Energy Agency for the Application of Safeguards*.

evaluation of States' accounting reports and other information required under comprehensive safeguards agreements and additional protocols and the evaluation of safeguards relevant information from other sources.

## Deriving conclusions

10. A safeguards conclusion that all nuclear material has remained in peaceful activities in a State is based on the Agency's finding that there are no indications of diversion of declared nuclear material from peaceful nuclear activities and no indications of undeclared nuclear material or activities in the State as a whole. The Agency draws such a conclusion only where a State has both a comprehensive safeguards agreement and an additional protocol in force and the evaluations described below have been completed.

11. To ascertain that there are no indications of diversion of declared nuclear material from peaceful nuclear activities in a State, the Agency needs to carry out a comprehensive evaluation of all safeguards relevant information available to it, which includes information provided by the State with regard to the design and operation of nuclear facilities and LOFs, the State's nuclear material accounting reports, the State's declarations submitted under the additional protocol and the results of the Agency's in-field activities carried out to verify the State's declarations.

12. To ascertain that there are no indications of undeclared nuclear material or activities in a State, the Agency needs to carry out an evaluation of the consistency of the State's declared nuclear programme with the results of the Agency's verification activities under the relevant safeguards agreements and additional protocols and with all other safeguards relevant information available to the Agency. In particular, the Agency needs to have:

- conducted a comprehensive State evaluation based on all safeguards relevant information available to the Agency about the State's nuclear and nuclear-related activities (including design information on facilities and information on LOFs, declarations submitted under additional protocols, and information collected by the Agency through its verification activities and from other sources);
- performed complementary access, as necessary, in accordance with the State's additional protocol;
- addressed all anomalies, discrepancies and inconsistencies identified in the course of its evaluation and verification activities.

13. When the evaluations described in paragraphs 11 and 12 above have been completed and no indication has been found by the Agency that, in its judgement, would give rise to a proliferation concern, the Secretariat can draw the broader conclusion that all nuclear material in a State remained in peaceful activities. Subsequently, the Agency implements integrated safeguards — an optimized combination of safeguards measures available under comprehensive safeguards agreements and additional protocols — for that State. Due to increased assurance of the absence of undeclared nuclear material and activities for the State as a whole, the intensity of inspection activities at declared facilities and LOFs can be reduced. Integrated safeguards were implemented during 2015 in 54 (53) States[2, 12].

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[12] 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, Latvia, Libya, Lithuania, Luxembourg, Madagascar, Mali, Malta, Monaco, Netherlands, Norway, Palau, Peru, Poland, Portugal, Republic of Korea, Romania, Seychelles, Singapore, Slovakia, Slovenia, South Africa, Spain, Sweden, The former Yugoslav Republic of Macedonia, Ukraine, Uruguay and Uzbekistan.

## Overall conclusions for 2015

14. On the basis of the evaluations described in paragraphs 11 and 12, the Secretariat drew the conclusions referred to: in paragraph 1(a) of the *Safeguards Statement* for 67 (65) States[2] — Albania, Andorra, Armenia, Australia, Austria, Bangladesh, Belgium, Botswana, Bulgaria, Burkina Faso, Canada, Chile, Croatia, Cuba, Czech Republic, Denmark[13], Ecuador, Estonia, Finland, Germany, Ghana, Greece, Holy See, Hungary, Iceland, Indonesia, Ireland, Italy, Jamaica, Japan, Jordan, Kazakhstan, Kuwait, Latvia, Libya, Lithuania, Luxembourg, Madagascar, Mali, Malta, Mauritius, Monaco, Netherlands[14], New Zealand[15], Norway, Palau, Peru, Philippines, Poland, Portugal, Republic of Korea, Romania, Seychelles, Singapore, Slovakia, Slovenia, South Africa, Spain, Sweden, Switzerland, The former Yugoslav Republic of Macedonia, Turkey, Ukraine, United Republic of Tanzania, Uruguay, Uzbekistan and Viet Nam. For Switzerland and Tanzania the conclusion in paragraph 1(a) of the *Safeguards Statement* was drawn for the first time.

15. Because the evaluation process described in paragraph 12 had not yet been completed for 54 (53) States[16], the conclusion drawn for these States relates only to declared nuclear material in peaceful activities. The conclusion in paragraph 1(b) of the *Safeguards Statement* was drawn for: Afghanistan, Angola, Antigua and Barbuda, Azerbaijan, Bahrain, Bosnia and Herzegovina, Burundi, Cambodia, Central African Republic, Chad, Colombia, Comoros, Congo, Costa Rica, Cyprus, Democratic Republic of the Congo, Djibouti, Dominican Republic, El Salvador, Fiji, Gabon, Gambia, Georgia, Guatemala, Haiti, Iraq, Kenya, Kyrgyzstan, Lesotho, Liechtenstein, Malawi, Marshall Islands, Mauritania, Mexico, Mongolia, Montenegro, Morocco, Mozambique, Namibia, Nicaragua, Niger, Nigeria, Panama, Paraguay, Republic of Moldova, Rwanda, Saint Kitts and Nevis, Swaziland, Tajikistan, Togo, Turkmenistan, Uganda, United Arab Emirates and Vanuatu.

### B.1.1.2. States with comprehensive safeguards agreements in force but no additional protocols in force

## Status of implementation

16. As of 31 December 2015, safeguards were implemented for 52 (54) States in this category. Safeguards implementation involved activities in the field and at Headquarters, including the evaluation of States' accounting reports and other information required under comprehensive safeguards agreements and the evaluation of safeguards relevant information from other sources.

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[13] This conclusion is drawn with regard only to that part of Denmark which is covered by INFCIRC/193 and INFCIRC/193/Add. 8, i.e. Denmark and the Faroe Islands, which excludes Greenland. Denmark has concluded a separate comprehensive safeguards agreement and an additional protocol thereto that apply to Greenland (INFCIRC/176 and INFCIRC/176/Add.1, respectively).

[14] This conclusion is drawn with regard only to that part of the Netherlands which is covered by INFCIRC/193 and INFCIRC/193/Add.8, i.e. the Netherlands in Europe, which excludes the Caribbean part of the Netherlands (the islands of Bonaire, Sint Eustatius and Saba), Aruba, Curaçao and Sint Maarten. The Netherlands has concluded a separate comprehensive safeguards agreement that applies to its constituent parts mentioned above (INFCIRC/229), but has not yet concluded an additional protocol thereto.

[15] This conclusion is drawn with regard only to New Zealand which is covered by INFCIRC/185 and INFCIRC/185/Add.1; it is not drawn for the Cook Islands and Niue, which are also covered by INFCIRC/185, but not by INFCIRC/185/Add.1.

[16] This conclusion is also drawn with regard to that part of Denmark which is covered by INFCIRC/176 and INFCIRC/176/Add.1 (i.e. Greenland) for which the broader conclusion was not drawn.

## Deriving conclusions

17. For a State with a comprehensive safeguards agreement, the Agency's right and obligation are as described in paragraph 3 above. Although the implementation of safeguards strengthening measures[17] under such an agreement have increased the Agency's ability to detect undeclared nuclear material and activities, the activities that the Agency may conduct in this regard are limited for a State without an additional protocol. Thus, the conclusion in the *Safeguards Statement* for a State with a comprehensive safeguards agreement alone relates only to the non-diversion of declared nuclear material from peaceful activities.

18. In the course of its evaluation, the Agency also seeks to determine whether there is any indication of undeclared nuclear material or activities in the State which would need to be reflected in the *Safeguards Statement*. However, without the measures provided for in the *Model Additional Protocol* being implemented, the Agency is not able to provide credible assurance of the absence of undeclared nuclear material and activities for the State as a whole.

## Islamic Republic of Iran

19. During 2015, 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/2015/15, GOV/2015/34, GOV/2015/50 and GOV/2015/65).

20. In 2015, Iran continued to conduct enrichment related activities, although it did not produce $UF_6$ enriched above 5% U-235. Iran also continued work on heavy water related projects; however, it neither installed any major components at the IR-40 Reactor nor produced nuclear fuel assemblies for the IR-40 Reactor at the Fuel Manufacturing Plant[18].

21. On 14 July 2015, the Director General and the Vice-President of Iran and President of the Atomic Energy Organization of Iran, HE Ali Akbar Salehi, signed in Vienna a *Road-map for the clarification of past and present outstanding issues regarding Iran's nuclear programme* (GOV/INF/2015/14). The Road-map identified the necessary activities to be undertaken under the Framework for Cooperation in order to accelerate and strengthen cooperation and dialogue between the Agency and Iran aimed at the resolution, by the end of 2015, of all past and present outstanding issues — as set out in the annex to the Director General's report of November 2011 (GOV/2011/65) — that had not already been resolved by the Agency and Iran.

22. The activities set out in the Road-map, including technical-expert meetings and the conduct of safeguards activities by the Agency at particular locations in Iran, were completed on schedule. The implementation of the Road-map facilitated a more substantive engagement between the Agency and Iran.

23. On 2 December 2015, the Director General provided a report to the Board of Governors on the *Final Assessment on Past and Present Outstanding Issues regarding Iran's Nuclear Programme* (GOV/2015/68). The Agency assessed that a range of activities relevant to the development of a nuclear explosive device had been conducted in Iran prior to the end of 2003 as a coordinated effort,

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[17] Such measures include the early provision of design information, environmental sampling and the use of satellite imagery.

[18] In 2015, Iran was required by relevant binding resolutions of the Board of Governors and the United Nations Security Council, to implement the modified Code 3.1 of the Subsidiary Arrangements General Part to its Safeguards Agreement; suspend all enrichment related and reprocessing activities and suspend all heavy water related activities. Security Council resolution 2231 (2015), adopted in July 2015, included terms providing for the termination of the provisions of six Security Council resolutions adopted between 2006 and 2010.

and some activities took place after 2003. The Agency also assessed that these activities had not advanced beyond feasibility and scientific studies, and the acquisition of certain relevant technical competences and capabilities. The Agency had no credible indications of activities in Iran relevant to the development of a nuclear explosive device after 2009 and found no credible indications of the diversion of nuclear material in connection with the possible military dimensions to Iran's nuclear programme.

24. On 15 December 2015, the Board of Governors adopted resolution GOV/2015/72, in which, inter alia, it noted that all activities in the Road-map had been completed in accordance with the agreed schedule and that this closed its consideration of this item.

25. Throughout 2015, the Agency continued to undertake monitoring and verification in relation to the nuclear-related measures set out in the Joint Plan of Action (JPA) agreed between China, France, Germany, the Russian Federation, the United Kingdom, the United States of America (E3+3) and Iran, the aim of which was to reach a "mutually-agreed, long-term comprehensive solution that would ensure Iran's nuclear programme will be exclusively peaceful". The JPA was extended three times, most recently on 30 June 2015, when the E3+3 and Iran requested the Agency, on behalf of the E3/EU+3 and Iran, to continue to undertake the necessary nuclear-related monitoring and verification activities in Iran under the JPA until further notice.

26. On 14 July 2015, the E3/EU+3 and Iran agreed on a Joint Comprehensive Plan of Action (JCPOA), stating that "the full implementation of this JCPOA will ensure the exclusively peaceful nature of Iran's nuclear programme". In August 2015, the Board of Governors, inter alia, authorized the Director General to implement the necessary verification and monitoring of Iran's nuclear-related commitments as set out in the JCPOA, and report accordingly, for the full duration of those commitments in light of United Nations Security Council resolution 2231 (2015), subject to the availability of funds and consistent with the Agency's standard safeguards practices; and authorized the Agency to consult and exchange information with the Joint Commission, as set out in the Director General's report on *Verification and monitoring in the Islamic Republic of Iran in light of United Nations Security Council Resolution 2231* (2015) (GOV/2015/53 and Corr.1). After Adoption Day the Agency began conducting preparatory activities related to the verification and monitoring of Iran's nuclear-related commitments under the JCPOA.

27. In October 2015, Iran informed the Agency pursuant to paragraph 8 of Annex V of the JCPOA that, effective on JCPOA Implementation Day, Iran would provisionally apply the Additional Protocol to its Safeguards Agreement pending its entry into force, and would fully implement the modified Code 3.1 of the Subsidiary Arrangements to its Safeguards Agreement.

28. While the Agency continued throughout 2015 to verify the non-diversion of declared nuclear material at the nuclear facilities and LOFs 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.

## Syrian Arab Republic

29. In September 2015, the Director General submitted a report to the Board of Governors entitled *Implementation of the NPT Safeguards Agreement in the Syrian Arab Republic* (GOV/2015/51) covering relevant developments since the previous report in September 2014 (GOV/2014/44). The Director General informed the Board of Governors that no new information had come 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 that should have been declared to the Agency by Syria.[19] In 2015, 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.

30. In 2015, Syria indicated its readiness to receive Agency inspectors, and to provide support for the purpose of performing a physical inventory verification (PIV) at the Miniature Neutron Source Reactor in Damascus. On 29 September 2015, the Agency — after considering the United Nations Department of Safety and Security's assessment of the prevailing security level in Syria and making additional arrangements to ensure the safe transit of the inspectors — successfully carried out the PIV at the reactor.

31. On the basis of the evaluation of information provided by Syria, the results of the safeguards verification activities and all relevant information available to it, the Agency found no indication of the diversion of declared nuclear material from peaceful activities. For 2015, the Agency concluded for Syria that declared nuclear material remained in peaceful activities.

### Overall conclusions for 2015

32. On the basis of the evaluation performed and as reflected in paragraph 2 of the *Safeguards Statement*, the Secretariat concluded that for the 52 (54) States[20], declared nuclear material remained in peaceful activities. This conclusion was drawn for Algeria, Argentina, the Bahamas, Barbados, Belarus, Belize, Bhutan, Bolivia, Brazil, Brunei Darussalam, Cameroon, Côte d'Ivoire, Dominica, Egypt, Ethiopia, Grenada, Guyana, Honduras, Islamic Republic of Iran, Kiribati, Lao People's Democratic Republic, Lebanon, Malaysia, Maldives, Myanmar, Nauru, Nepal, Oman, Papua New Guinea, Qatar, Saint Lucia, Saint Vincent and the Grenadines, Samoa, San Marino, Saudi Arabia, Senegal, Serbia, Sierra Leone, Solomon Islands, Sri Lanka, Sudan, Suriname, Syrian Arab Republic, Thailand, Tonga, Trinidad and Tobago, Tunisia, Tuvalu, Bolivarian Republic of Venezuela, Yemen, Zambia and Zimbabwe.

## B.1.2. Parties to the NPT without comprehensive safeguards agreements in force

33. As of 31 December 2015, 12 (12) Parties to the NPT had yet to bring comprehensive safeguards agreements into force pursuant to Article III of the Treaty.

### Overall conclusions for 2015

34. As indicated in paragraph 3 of the *Safeguards Statement*, the Secretariat could not draw any safeguards conclusions for: Benin, Cabo Verde, Equatorial Guinea, Eritrea, Guinea, Guinea-Bissau, Liberia, Federated States of Micronesia, Palestine, São Tome and Principe, Somalia and Timor-Leste.

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[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 urgently remedy 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 assurance as to the exclusively peaceful nature of Syria's nuclear programme.

[20] In addition, this conclusion is drawn for those territories of the Netherlands referred to in footnote 13 for which the broader conclusion is not drawn – i.e. the Caribbean part of the Netherlands (the islands of Bonaire, Sint Eustatius and Saba), Aruba, Curaçao and Sint Maarten; it is also drawn for the Cook Islands and Niue, which are covered by New Zealand's comprehensive safeguards agreement but not by its additional protocol – see footnote 14.

### B.1.3. States with safeguards agreements based on INFCIRC/66/Rev.2 in force

35. Under safeguards agreements based on INFCIRC/66/Rev.2, the Agency applies safeguards in order to ensure that nuclear material, facilities and other items specified under the safeguards agreement are not used for the manufacture of any nuclear weapon or to further any military purpose, and that such items are used exclusively for peaceful purposes and are not used for the manufacture of any nuclear explosive device.

#### Status of implementation

36. As of 31 December 2015, safeguards were implemented at facilities in India, Israel and Pakistan pursuant to safeguards agreements based on INFCIRC/66/Rev.2. The implementation of safeguards under the trilateral safeguards agreement between the Agency, Canada and India was suspended as of 20 March 2015 (INFCIRC/211/Mod.1). India has an additional protocol to its INFCIRC/754 safeguards agreement in force.

#### Deriving conclusions

37. The conclusion described in paragraph 4 of the *Safeguards Statement* is reported for these three States, and relates to the nuclear material, facilities and other items to which safeguards were applied. To draw such a conclusion in respect of these States, the Agency evaluates all safeguards relevant information available to it, including verification results and information about facility design features and operations.

#### Overall conclusions for 2015

38. On the basis of the results of its verification and evaluation activities, the Secretariat concluded that the nuclear material, facilities or other items to which safeguards were applied in India, Israel and Pakistan remained in peaceful activities.

### B.1.4. States with both voluntary offer agreements and additional protocols in force

39. Under a voluntary offer agreement, the Agency applies safeguards to nuclear material in those facilities that have been selected by the Agency from the State's list of eligible facilities in order to verify that the material is not withdrawn from peaceful activities except as provided for in the agreement. In selecting facilities under voluntary offer agreements for the application of safeguards, the Agency takes such factors into consideration as: (i) whether the selection of a facility would satisfy legal obligations arising from other agreements concluded by the State; (ii) whether useful experience may be gained in implementing new safeguards approaches or in using advanced equipment and technology; and (iii) whether the cost efficiency of Agency safeguards may be enhanced by applying safeguards, in the exporting State, to nuclear material being shipped to States with comprehensive safeguards agreements in force. By implementing measures under the additional protocol in these five States with voluntary offer agreements, the Agency also seeks to obtain and verify information that could enhance the safeguards conclusions in States with comprehensive safeguards agreements in force.

#### Status of implementation

40. During 2015, safeguards were implemented at facilities selected by the Agency in the five States with voluntary offer agreements in force: China, France, the Russian Federation, the United Kingdom of Great Britain and Northern Ireland (United Kingdom) and the United States of America.

### Deriving conclusions

41. The conclusion contained in paragraph 5 of the *Safeguards Statement* is reported for the five States with voluntary offer agreements in force in which safeguards were applied to nuclear material in selected facilities. To draw the safeguards conclusion, the Agency evaluates all safeguards relevant information available to it, including verification results and information about facility design features and operations.

### Overall conclusions for 2015

42. On the basis of the results of its verification and evaluation activities, the Secretariat concluded for China, France, the Russian Federation, the United Kingdom and the United States of America that nuclear material to which safeguards had been applied in selected facilities remained in peaceful activities or had been withdrawn as provided for in the agreements. There were no such withdrawals in France, the United Kingdom and the United States of America.

## B.2. Democratic People's Republic of Korea

43. In August 2015, 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/2015/49–GC(59)/22), which provided an update of developments since the Director General's report of September 2014.

44. 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.

45. 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. No verification activities were implemented in the field in 2015, but the Agency continued to monitor the DPRK's nuclear activities by using open source information, including satellite imagery and trade information. Using satellite imagery, the Agency continued to observe signatures during 2015 which were consistent with the operation of the 5MW(e) reactor at Yongbyon. Renovation or expansion of other buildings was also seen within the Yongbyon site. However, without access to the site, the Agency cannot confirm the operational status of the reactor or the purpose of the other observed activities. 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 DPRK.

46. The nuclear programme of the DPRK remains a matter of serious concern. The DPRK's operation of the 5MW(e) reactor, the ongoing construction at the LWR site, the extension and use of the building housing the reported enrichment facility, and statements about bolstering its nuclear deterrent capability are deeply regrettable. Such actions are clear violations of relevant UN Security Council resolutions.

## B.3. Areas of difficulty in safeguards implementation

47. Although progress was made during 2015 in addressing some of the areas of difficulty in implementing safeguards, further work remains to be done.

48. The performance and effectiveness of State and regional systems of accounting for and control of nuclear material (SSACs/RSACs) have significant impacts upon the effectiveness and efficiency of Agency safeguards implementation. In 2015, some States still had not established SSACs, which are

required under comprehensive safeguards agreements. Moreover, not all State and regional authorities responsible for safeguards implementation have the necessary authority, resources, technical capabilities or independence from nuclear facility or LOF operators to implement the requirements of safeguards agreements and additional protocols. Furthermore, some State authorities do not provide sufficient oversight of nuclear material accounting and control systems at nuclear facilities and LOFs to ensure the required accuracy and precision of the data transmitted to the Agency.

49. In accordance with the decision of the Board of Governors in September 2005, States which have not amended or rescinded their SQPs should do so as soon as possible. At the end of 2015, 40 (42) States[21] had operative SQPs that had yet to be amended.

## B.4. Strengthening the effectiveness and improving the efficiency of safeguards

50. The Agency has continued to improve the efficiency of safeguards implementation while maintaining or strengthening its effectiveness. This improvement has been essential since the quantities of nuclear material and other items under safeguards and the number of facilities under safeguards have increased (see Fact box 1). In contrast, the Agency's financial resources have not risen commensurately. It should be noted that while a number of facilities are being retired from service, this will not immediately reduce verification effort as safeguards continue to be applied to those facilities until their status is confirmed by the Agency as decommissioned for safeguards purposes.

51. Some of the factors contributing to strengthening the effectiveness and improving the efficiency of safeguards are shown in Fact box 2.

**Fact box 2. Strengthening the effectiveness and improving the efficiency of safeguards**

In 2015, significant progress was made, as follows:

- At the end of the year, 127 States[2] had additional protocols in force.
- A comprehensive safeguards agreement with an SQP based on the revised text entered into force for Djibouti.
- Additional protocols entered into force for Cambodia, Djibouti and Liechtenstein.
- Togo amended its operative SQP. Azerbaijan, Jordan and Tajikistan rescinded their SQPs.
- At the end of the year, 54 (53) States[22] had SQPs in force based on the revised standard text.
- Strategic planning activities continued, with the updating of the Department of Safeguards' strategic plan and preparations for the next Agency Medium Term Strategy (MTS).
- Further development and testing of internal procedures and guidance were carried out, including guidance on conducting acquisition path analysis and developing State-level safeguards approaches for States with comprehensive safeguards agreements.

[21] The States with SQPs based on the original text are: Afghanistan, Barbados, Belize, Bhutan, Bolivia, Brunei Darussalam, Cameroon, Dominica, Ethiopia, Fiji, Grenada, Guyana, Haiti, Kiribati, Kyrgyzstan, Lao People's Democratic Republic, Maldives, Mongolia, Myanmar, Namibia, Nauru, Nepal, Oman, Papua New Guinea, Paraguay, Saint Kitts and Nevis, Saint Lucia, Saint Vincent and the Grenadines, Samoa, Saudi Arabia, Sierra Leone, Solomon Islands, Sudan, Suriname, Tonga, Trinidad and Tobago, Tuvalu, the United Arab Emirates, Yemen and Zambia.

[22] The States with SQPs in force based on the revised standard text are: Andorra, Angola, Antigua and Barbuda, Bahamas, Bahrain, Burkina Faso, Burundi, Cambodia, Central African Republic, Chad, Comoros, Congo, Costa Rica, Croatia, Djibouti, Dominican Republic, Ecuador, El Salvador, Gabon, Gambia, Guatemala, Holy See, Honduras, Iceland, Kenya, Kuwait, Lebanon, Lesotho, Madagascar, Malawi, Mali, Mauritania, Mauritius, Monaco, Montenegro, Mozambique, New Zealand, Nicaragua, Palau, Panama, Qatar, Republic of Moldova, Rwanda, San Marino, Senegal, Seychelles, Singapore, Swaziland, The former Yugoslav Republic of Macedonia, Togo, Uganda, United Republic of Tanzania, Vanuatu and Zimbabwe.

**Fact box 2. Strengthening the effectiveness and improving the efficiency of safeguards**

- Monitoring, containment and surveillance systems were further improved and deployed.
- The Agency continued modernizing technologies used for attended measurements, unattended monitoring and the remote transmission of data from such systems.
- The Agency continued to make improvements to the structural re-engineering, performance and security of the safeguards information system.
- The Agency published the *Safeguards Implementation Practices Guide on Establishing and Maintaining State Safeguards Infrastructure* and held training courses at national, regional and international levels.
- The quality management system continued to be implemented with a focus on knowledge retention, performance indicators, cost calculation methodology, and tools to help improve processes, such as internal audits and condition reports.

52. As a result of these improvements, safeguards have been implemented more effectively and it has been possible to reduce the number of calendar-days spent in the field for verification[6] in some States. The reduction of inspection effort in the field has been compensated for by an increase in evaluation activities at Headquarters. The number of regular staff in the Department of Safeguards has remained approximately constant over the past five years.

53. Member State Support Programmes (MSSPs) and the Standing Advisory Group on Safeguards Implementation (SAGSI) continued to make substantial contributions to Agency safeguards through the provision of assistance and advice, respectively.

## B.5. Safeguards expenditures and resources

54. During 2015, the activities of Major Programme 4 — Nuclear Verification — were funded from various sources — primarily through the Regular Budget and extrabudgetary contributions. The Regular Budget[23] appropriation for 2015 was adjusted to €130.7 (€126.4) million at the average United Nations exchange rate. Figure 1[24] presents indexed real growth by comparing the increase in the adjusted budget[25] to the approved budget excluding price adjustment and currency revaluation.

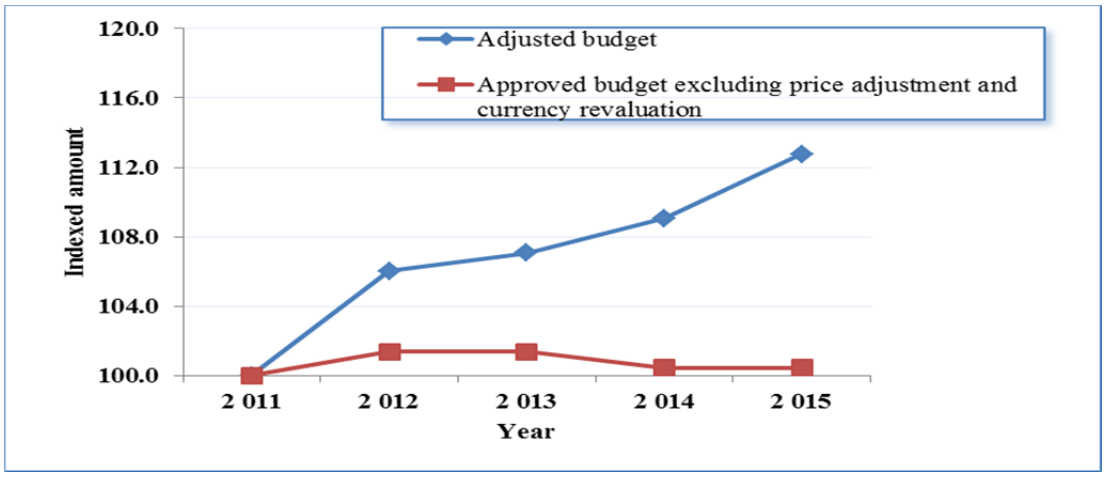


***Figure 1. Indexed real growth of Regular Budget, 2011–2015 (base 2011=100)***

[23] €132.5 million (at an exchange rate €1=$1).

[24] Represents indexed real growth. The total growth after price adjustment amounts to 7.6%.

[25] Original approved budget including price adjustment, revalued at the average United Nations operational rate of exchange for the year.

55. The expenditures for Major Programme 4 were €130.7 (€124.4) million from the Regular Budget, an increase of 5.1%, compared with 2014. The Regular Budget utilization rate for 2015 was 100% (98.4%) with no unspent balance at the end of the year. Figure 2 shows the utilization trend of Major Programme 4 for the period 2011–2015.

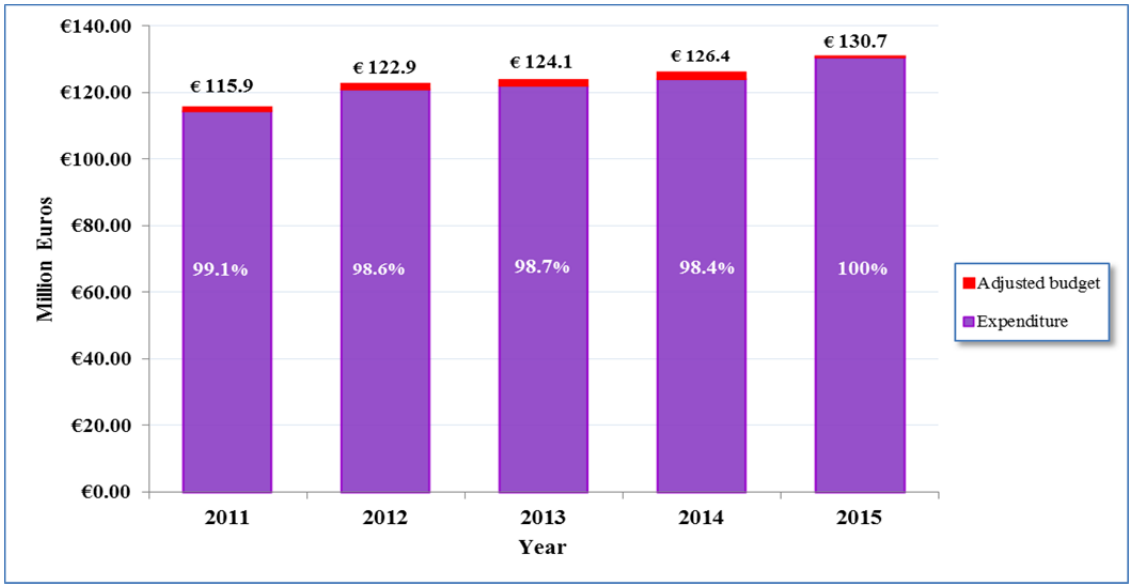


***Figure 2. Major Programme 4 — Nuclear Verification — budget and expenditures, 2011–2015***

56. The expenditures from the extrabudgetary contributions were €26.9 (€21.9) million, an increase of 23.1% compared with 2014. This increase resulted from implementation of the monitoring and verification activities in Iran in relation to the JPA and the Agency's Modernization of Safeguards Information Technology (MOSAIC) project.

## B.6. Status of safeguards agreements (as of 31 December 2015)

57. This section contains information — presented in the five tables below that conform with the structure of the Safeguards Statement — on safeguards agreements that provide the basis for the Agency's implementation of safeguards in 2015. It does not include agreements under which the application of safeguards has been suspended in the light of implementation of safeguards pursuant to another agreement. For full details see the Agency's website: http://www.iaea.org.

**Table 1 – States with comprehensive safeguards agreements and additional protocols in force**

| State | SQP | INFCIRC | Additional protocol (date of entry into force) | Broader conclusion drawn | Integrated safeguards implemented |
|---|---|---|---|---|---|
| **Afghanistan** | X | 257 | 19 July 2005 | | |
| **Albania** | | 359 | 03 November 2010 | X | |
| **Andorra** | X(A) | 808 | 19 December 2011 | X | |
| **Angola** | X(A) | 800 | 28 April 2010 | | |
| **Antigua and Barbuda** | X(A) | 528 | 15 November 2013 | | |
| **Armenia** | | 455 | 28 June 2004 | X | X |
| **Australia** | | 217 | 12 December 1997 | X | X |
| **Austria** | | 193 | 30 April 2004 | X | X |
| **Azerbaijan** | | 580 | 29 November 2000 | | |
| **Bahrain** | X(A) | 767 | 20 July 2011 | | |
| **Bangladesh** | | 301 | 30 March 2001 | X | X |
| **Belgium** | | 193 | 30 April 2004 | X | X |

| State | SQP | INFCIRC | Additional protocol (date of entry into force) | Broader conclusion drawn | Integrated safeguards implemented |
|---|---|---|---|---|---|
| **Bosnia and Herzegovina** | | 851 | 03 July 2013 | | |
| **Botswana** | | 694 | 24 August 2006 | X | |
| **Bulgaria**[(1)] | | 193 | 01 May 2009 | X | X |
| **Burkina Faso** | X(A) | 618 | 17 April 2003 | X | X |
| **Burundi** | X(A) | 719 | 27 September 2007 | | |
| **Cambodia** | X(A) | 586 | 24 April 2015 | | |
| **Canada** | | 164 | 08 September 2000 | X | X |
| **Central African Republic** | X(A) | 777 | 07 September 2009 | | |
| **Chad** | X(A) | 802 | 13 May 2010 | | |
| **Chile** | | 476 | 03 November 2003 | X | X |
| **Colombia** | | 306 | 05 March 2009 | | |
| **Comoros** | X(A) | 752 | 20 January 2009 | | |
| **Congo** | X(A) | 831 | 28 October 2011 | | |
| **Costa Rica** | X(A) | 278 | 17 June 2011 | | |
| **Croatia** | X(A) | 463 | 06 July 2000 | X | X |
| **Cuba** | | 633 | 03 June 2004 | X | X |
| **Cyprus**[(1)] | | 193 | 01 May 2008 | | |
| **Czech Republic**[(1)] | | 193 | 01 October 2009 | X | X |
| **Democratic Republic of the Congo** | | 183 | 09 April 2003 | | |
| **Denmark**[(2)] | | 193<br>176 | 30 April 2004<br>22 March 2013 | X | X |
| **Djibouti** | X(A) | 884 | 26 May 2015 | | |
| **Dominican Republic** | X(A) | 201 | 05 May 2010 | | |
| **Ecuador** | X(A) | 231 | 24 October 2001 | X | X |
| **El Salvador** | X(A) | 232 | 24 May 2004 | | |
| **Estonia**[(1)] | | 193 | 01 December 2005 | X | X |
| **Fiji** | X | 192 | 14 July 2006 | | |
| **Finland** | | 193 | 30 April 2004 | X | X |
| **Gabon** | X(A) | 792 | 25 March 2010 | | |
| **Gambia** | X(A) | 277 | 18 October 2011 | | |
| **Georgia** | | 617 | 03 June 2003 | | |
| **Germany** | | 193 | 30 April 2004 | X | X |
| **Ghana** | | 226 | 11 June 2004 | X | X |
| **Greece** | | 193 | 30 April 2004 | X | X |
| **Guatemala** | X(A) | 299 | 28 May 2008 | | |
| **Haiti** | X | 681 | 09 March 2006 | | |
| **Holy See** | X(A) | 187 | 24 September 1998 | X | X |
| **Hungary**[(1)] | | 193 | 01 July 2007 | X | X |
| **Iceland** | X(A) | 215 | 12 September 2003 | X | X |
| **Indonesia** | | 283 | 29 September 1999 | X | X |
| **Iraq** | | 172 | 10 October 2012 | | |
| **Ireland** | | 193 | 30 April 2004 | X | X |
| **Italy** | | 193 | 30 April 2004 | X | X |
| **Jamaica** | | 265 | 19 March 2003 | X | X |
| **Japan** | | 255 | 16 December 1999 | X | X |
| **Jordan** | | 258 | 28 July 1998 | X | |
| **Kazakhstan** | | 504 | 09 May 2007 | X | |
| **Kenya** | X(A) | 778 | 18 September 2009 | | |
| **Korea, Republic of** | | 236 | 19 February 2004 | X | X |
| **Kuwait** | X(A) | 607 | 02 June 2003 | X | |
| **Kyrgyzstan** | X | 629 | 10 November 2011 | | |
| **Latvia**[(1)] | | 193 | 01 October 2008 | X | X |

| State | SQP | INFCIRC | Additional protocol (date of entry into force) | Broader conclusion drawn | Integrated safeguards implemented |
|---|---|---|---|---|---|
| **Lesotho** | X(A) | 199 | 26 April 2010 | | |
| **Libya** | | 282 | 11 August 2006 | X | X |
| **Liechtenstein** | | 275 | 25 November 2015 | | |
| **Lithuania**[(1)] | | 193 | 01 January 2008 | X | X |
| **Luxembourg** | | 193 | 30 April 2004 | X | X |
| **Madagascar** | X(A) | 200 | 18 September 2003 | X | X |
| **Malawi** | X(A) | 409 | 26 July 2007 | | |
| **Mali** | X(A) | 615 | 12 September 2002 | X | X |
| **Malta**[(1)] | | 193 | 01 July 2007 | X | X |
| **Marshall Islands** | | 653 | 03 May 2005 | | |
| **Mauritania** | X(A) | 788 | 10 December 2009 | | |
| **Mauritius** | X(A) | 190 | 17 December 2007 | X | |
| **Mexico** | | 197 | 04 March 2011 | | |
| **Monaco** | X(A) | 524 | 30 September 1999 | X | X |
| **Mongolia** | X | 188 | 12 May 2003 | | |
| **Montenegro** | X(A) | 814 | 04 March 2011 | | |
| **Morocco** | | 228 | 21 April 2011 | | |
| **Mozambique** | X(A) | 813 | 01 March 2011 | | |
| **Namibia** | X | 551 | 20 February 2012 | | |
| **Netherlands**[(3)] | | 193 | 30 April 2004 | X | X |
| **New Zealand**[(4)] | X(A) | 185 | 24 September 1998 | X | |
| **Nicaragua** | X(A) | 246 | 18 February 2005 | | |
| **Niger** | | 664 | 02 May 2007 | | |
| **Nigeria** | | 358 | 04 April 2007 | | |
| **Norway** | | 177 | 16 May 2000 | X | X |
| **Palau** | X(A) | 650 | 13 May 2005 | X | X |
| **Panama** | X(A) | 316 | 11 December 2001 | | |
| **Paraguay** | X | 279 | 15 September 2004 | | |
| **Peru** | | 273 | 23 July 2001 | X | X |
| **Philippines** | | 216 | 26 February 2010 | X | |
| **Poland**[(1)] | | 193 | 01 March 2007 | X | X |
| **Portugal** | | 193 | 30 April 2004 | X | X |
| **Republic of Moldova** | X(A) | 690 | 01 June 2012 | | |
| **Romania**[(1)] | | 193 | 01 May 2010 | X | X |
| **Rwanda** | X(A) | 801 | 17 May 2010 | | |
| **Saint Kitts and Nevis** | X | 514 | 19 May 2014 | | |
| **Seychelles** | X(A) | 635 | 13 October 2004 | X | X |
| **Singapore** | X(A) | 259 | 31 March 2008 | X | X |
| **Slovakia**[(1)] | | 193 | 01 December 2005 | X | X |
| **Slovenia**[(1)] | | 193 | 01 September 2006 | X | X |
| **South Africa** | | 394 | 13 September 2002 | X | X* |
| **Spain** | | 193 | 30 April 2004 | X | X |
| **Swaziland** | X(A) | 227 | 08 September 2010 | | |
| **Sweden** | | 193 | 30 April 2004 | X | X |
| **Switzerland** | | 264 | 01 February 2005 | X | |
| **Tajikistan** | | 639 | 14 December 2004 | | |
| **The former Yugoslav Republic of Macedonia** | X(A) | 610 | 11 May 2007 | X | X |
| **Togo** | X(A) | 840 | 18 July 2012 | | |
| **Turkey** | | 295 | 17 July 2001 | X | |
| **Turkmenistan** | | 673 | 03 January 2006 | | |
| **Uganda** | X(A) | 674 | 14 February 2006 | | |

| State | SQP | INFCIRC | Additional protocol (date of entry into force) | Broader conclusion drawn | Integrated safeguards implemented |
|---|---|---|---|---|---|
| **Ukraine** | | 550 | 24 January 2006 | X | X |
| **United Arab Emirates** | X | 622 | 20 December 2010 | | |
| **United Republic of Tanzania** | X(A) | 643 | 07 February 2005 | X | |
| **Uruguay** | | 157 | 30 April 2004 | X | X |
| **Uzbekistan** | | 508 | 21 December 1998 | X | X |
| **Vanuatu** | X(A) | 852 | 21 May 2013 | | |
| **Viet Nam** | | 376 | 17 September 2012 | X | |

General Notes:

- In addition, safeguards, including the measures of the Model Additional Protocol, were applied for Taiwan, China. The broader conclusion was drawn for Taiwan, China, in 2006 and integrated safeguards were implemented from 1 January 2008.
- The safeguards agreement reproduced in INFCIRC/193 is that concluded between the non-nuclear-weapon States of the European Atomic Energy Community (EURATOM), EURATOM and the Agency.
- 'X' in the 'SQP' column indicates that the State has an operative SQP. 'X(A)' indicates that the SQP in force is based on the revised SQP standard text (see Section B, paragraph 6).
- 'X' in the 'broader conclusion drawn' column indicates that the broader conclusion has been drawn as described in Section B, paragraph 13.
- 'X" in the 'integrated safeguards implemented' column indicates that integrated safeguards were implemented for the whole of the year. X* in this column indicates that integrated safeguards were started during the course of the year.

Footnotes:

(1) The date refers to accession to INFCIRC/193 and INFCIRC/193/Add.8.

(2) The application of safeguards in Denmark under the bilateral NPT safeguards agreement (INFCIRC/176), in force since 1 March 1972, was suspended on 21 February 1977, on which date the Safeguards Agreement between the non-nuclear-weapon States of EURATOM, EURATOM and the Agency (INFCIRC/193) entered into force for Denmark. Since 21 February 1977, INFCIRC/193 also applies to the Faroe Islands. Upon Greenland's secession from EURATOM as of 31 January 1985, the Agreement between the Agency and Denmark (INFCIRC/176) re-entered into force for Greenland. The additional protocol to this agreement entered into force on 22 March 2013 (INFCIRC/176/Add.1).

(3) The safeguards agreement reproduced in INFCIRC/229 with regard to the Caribbean part of the Netherlands (the islands of Bonaire, Sint Eustatius, and Saba), Aruba, Curacao and Sint Maarten is pursuant to the NPT and Additional Protocol I to the Treaty of Tlatelolco. There is a SQP to this agreement. No additional protocol is in force for that agreement.

(4) The safeguards agreement reproduced in INFCIRC/185 is also applicable to the Cook Islands and Niue. The additional protocol reproduced in INFCIRC/185/Add. 1; however, is not applicable to the Cook Islands and Niue.

## Table 2 – States with comprehensive safeguards agreements but no additional protocols in force

| State | SQP | INFCIRC | Additional protocol |
|---|---|---|---|
| **Algeria** | | 531 | Approved: 14 September 2004 |
| **Argentina** | | 435 | |
| **Bahamas** | X(A) | 544 | |
| **Barbados** | X | 527 | |
| **Belarus** | | 495 | Signed: 15 November 2005 |
| **Belize** | X | 532 | |
| **Bhutan** | X | 371 | |
| **Bolivia, Plurinational State of** | X | 465 | |
| **Brazil** | | 435 | |
| **Brunei Darussalam** | X | 365 | |
| **Cameroon** | X | 641 | Signed: 16 December 2004 |
| **Côte d'Ivoire** | | 309 | Signed: 22 October 2008 |
| **Democratic People's Republic of Korea**(1) | | 403 | |
| **Dominica** | X | 513 | |

| State | SQP | INFCIRC | Additional protocol |
|---|---|---|---|
| **Egypt** | | 302 | |
| **Ethiopia** | X | 261 | |
| **Grenada** | X | 525 | |
| **Guyana** | X | 543 | |
| **Honduras** | X(A) | 235 | Signed: 07 July 2005 |
| **Iran, Islamic Republic of**(2) | | 214 | Signed: 18 December 2003 |
| **Kiribati** | X | 390 | Signed: 09 November 2004 |
| **Lao People's Democratic Republic** | X | 599 | Signed: 05 November 2014 |
| **Lebanon** | X(A) | 191 | |
| **Malaysia** | | 182 | Signed: 22 November 2005 |
| **Maldives** | X | 253 | |
| **Myanmar** | X | 477 | Signed: 17 September 2013 |
| **Nauru** | X | 317 | |
| **Nepal** | X | 186 | |
| **Oman** | X | 691 | |
| **Papua New Guinea** | X | 312 | |
| **Qatar** | X(A) | 747 | |
| **Saint Lucia** | X | 379 | |
| **Saint Vincent and the Grenadines** | X | 400 | |
| **Samoa** | X | 268 | |
| **San Marino** | X(A) | 575 | |
| **Saudi Arabia** | X | 746 | |
| **Senegal** | X(A) | 276 | Signed: 15 December 2006 |
| **Serbia** | | 204 | Signed: 03 July 2009 |
| **Sierra Leone** | X | 787 | |
| **Solomon Islands** | X | 420 | |
| **Sri Lanka** | | 320 | |
| **Sudan** | X | 245 | |
| **Suriname** | X | 269 | |
| **Syrian Arab Republic** | | 407 | |
| **Thailand** | | 241 | Signed: 22 September 2005 |
| **Tonga** | X | 426 | |
| **Trinidad and Tobago** | X | 414 | |
| **Tunisia** | | 381 | Signed: 24 May 2005 |
| **Tuvalu** | X | 391 | |
| **Venezuela, Bolivarian Republic of** | | 300 | |
| **Yemen** | X | 614 | |
| **Zambia** | X | 456 | Signed: 13 May 2009 |
| **Zimbabwe** | X(A) | 483 | |

General Notes:

- The safeguards agreement reproduced in INFCIRC/435 is that concluded between Argentina, Brazil, the Brazilian-Argentine Agency for Accounting and Control of Nuclear Material (ABACC) and the Agency.
- 'X' in the 'SQP' column indicates that the State has an operative SQP. 'X(A)' indicates that the SQP in force is based on the revised SQP standard text (see Section B, paragraph 6).

Footnotes:

(1) In a letter to the Director General dated 10 January 2003, the DPRK stated that the Government had "decided to lift the moratorium on the effectiveness of its withdrawal from the Treaty on the Non-Proliferation of Nuclear Weapons" and that "its decision to withdraw from the Treaty will come into effect from 11 January 2003 onwards."

(2) Iran provisionally implemented its additional protocol between December 2003 and February 2006.

**Table 3 – Parties to the NPT without comprehensive safeguards agreements in force**

| NPT Party | SQP | Safeguards agreement | Additional protocol |
|---|---|---|---|
| **Benin** | X(A) | Signed: 07 June 2005 | Signed: 07 June 2005 |
| **Cabo Verde** | X(A) | Signed: 28 June 2005 | Signed: 28 June 2005 |
| **Equatorial Guinea** | X | Approved: 13 June 1986 | |
| **Eritrea** | | | |
| **Guinea** | X(A) | Signed: 13 December 2011 | Signed: 13 December 2011 |
| **Guinea-Bissau** | X(A) | Signed: 21 June 2013 | Signed: 21 June 2013 |
| **Liberia** | | | |
| **Micronesia, Federated States of** | X(A) | Signed: 01 June 2015 | |
| **Palestine** | | | |
| **São Tome and Principe** | | | |
| **Somalia** | | | |
| **Timor-Leste** | X(A) | Signed: 06 October 2009 | Signed: 06 October 2009 |

General Note:
- 'X' in the 'SQP' column indicates that the State has an SQP. 'X(A)' indicates that the SQP is based on the revised SQP standard text (see Section B, paragraph 6). In both cases the SQP will come into force at the same time as the safeguards agreement.

**Table 4 – States with safeguards agreements based on INFCIRC/66/Rev.2 in force**

| State | INFCIRC | Additional protocol |
|---|---|---|
| **India** | 211[(1)]<br>260<br>360<br>374<br>433<br>754 | In force: 25 July 2014 |
| **Israel** | 249/Add.1 | |
| **Pakistan** | 34<br>116<br>135<br>239<br>248<br>393<br>418<br>705<br>816 | |

Footnote:
(1) Application of safeguards under this agreement was suspended on 20 March 2015.

**Table 5 – States with voluntary offer agreements and additional protocols in force**

| State | INFCIRC | Additional protocol |
|---|---|---|
| **China** | 369 | In force: 28 March 2002 |
| **France**[(1)] | 290 | In force: 30 April 2004 |
| **Russian Federation** | 327 | In force: 16 October 2007 |
| **United Kingdom of Great Britain and Northern Ireland**[(2), (3)] | 263 | In force: 30 April 2004 |
| **United States of America**[(4)] | 288 | In force: 06 January 2009 |

Footnotes:

(1) The safeguards agreement reproduced in INFCIRC/718 between France, EURATOM and the Agency is pursuant to Additional Protocol I to the Treaty of Tlatelolco. There is an SQP to this agreement. No additional protocol to that agreement has been concluded.

(2) The safeguards agreement reproduced in INFCIRC/175, which remains in force, is an INFCIRC/66/Rev.2-type safeguards agreement, concluded between the United Kingdom and the Agency.

(3) The safeguards agreement between the United Kingdom, EURATOM and the Agency pursuant to Additional Protocol I to the Treaty of Tlatelolco was signed but has not entered into force. There is an SQP to this agreement. No additional protocol to that agreement has been concluded.

(4) The safeguards agreement reproduced in INFCIRC/366 between the United States of America and the Agency is pursuant to Additional Protocol I to the Treaty of Tlatelolco. There is an SQP to this agreement. No additional protocol to that agreement has been concluded.

# C. Safeguards Implementation

58. This section presents the results[26] of safeguards implementation for 2015 for States[2] with safeguards agreements in force. The results are summarized for each group of States described in the *Safeguards Statement*. Further data regarding verification activities and results are presented in Appendices I and II.

59. An evaluation of the implementation of safeguards was performed for each State with a safeguards agreement in force, namely:

- States with both comprehensive safeguards agreements and additional protocols in force:
  - States with the broader conclusion in which integrated safeguards were implemented for the whole year or part thereof;
  - States with the broader conclusion in which integrated safeguards were not implemented during the year;
  - States with both comprehensive safeguards agreements and additional protocols in force, with the broader conclusion not yet drawn;
- States with comprehensive safeguards agreements in force but without additional protocols in force;
- States with safeguards agreements based on INFCIRC/66/Rev.2 in force, including one State with an additional protocol in force;
- States with both voluntary offer agreements and additional protocols in force.

60. Analysis of these results leads to the identification of any implementation problems for individual States and the formulation of action plans to resolve them. Generic problems are addressed in Section D.

61. Key to the process by which safeguards conclusions are drawn is the State evaluation process. During the year, State evaluations for 181 (180) States[2] were completed and reviewed.[27]

## C.1. States with both comprehensive safeguards agreements and additional protocols in force

62. Only for a State with both a comprehensive safeguards agreement and an additional protocol in force, when all the necessary evaluations have been completed, does the Agency draw the broader conclusion that all nuclear material in the State has remained in peaceful activities. After drawing the broader conclusion for a State, and when the necessary arrangements have been completed, the Agency implements integrated safeguards under which — due to increased assurance of the absence of undeclared nuclear material and activities for the State as a whole — the intensity of inspection activities at declared facilities and LOFs can be reduced.

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[26] Results for the DPRK are not included as the Agency did not implement safeguards in the DPRK.

[27] Completion of the process of reviewing the State evaluation reports extends into the first three months of the following year. The number of States shows, therefore, the total for the twelve-month period running from April 2015 to March 2016.

63. Where integrated safeguards are implemented, the Agency establishes technical objectives for specific locations, or groups of locations, according to the nuclear material or activity involved. The technical objectives form the basis of the State-level safeguards approach. The verification measures and activities necessary to meet these objectives are also defined in the State-level safeguards approach and annual implementation plans. Where integrated safeguards are not implemented, the safeguards activities to be performed in the field are based on the Agency's Safeguards Criteria.

64. As reported in paragraph 1 of the *Safeguards Statement*, 121 States had both comprehensive safeguards agreements and additional protocols in force. As reported in paragraph 1(a) of the *Safeguards Statement*, the Secretariat was able to draw the broader conclusion for 67[28] of the 121 States[2] that all nuclear material remained in peaceful activities. The results of safeguards implementation for these 67 States[2] are subdivided below into two categories: 54 States[2, 29], where integrated safeguards were implemented for the whole year or part thereof; and 13 States[30] where integrated safeguards were not implemented in 2015.

### C.1.1. States with the broader conclusion in which integrated safeguards were implemented during 2015

65. Integrated safeguards were implemented during the whole of 2015 for 53 States[2] with the broader conclusion (see Appendix II, Group 1). Integrated safeguards commenced in South Africa on 1 July 2015 bringing the total number of States with integrated safeguards implemented at the end of the year to 54. Safeguards implementation activities were carried out for these States in accordance with the State-level safeguards approach and annual implementation plan for each individual State.

66. The amounts of nuclear material under safeguards, the number of facilities and MBAs containing LOFs under safeguards, the safeguards activities undertaken during the year, the verification effort and data on the submission of accounting reports and additional protocol declarations are presented for each State in Appendix II, Tables II.1–3.

67. Having evaluated the results of safeguards activities and all other available safeguards relevant information for each of these States, the Secretariat found that there was no indication of diversion of declared nuclear material from peaceful nuclear activities and no indication of undeclared nuclear material and activities in these States[2]. On this basis, the Secretariat concluded that, for these States, all nuclear material remained in peaceful activities.

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[28] In 2015, one planned in-field verification activity was not conducted at the IR-100 research reactor and subcritical uranium-water assembly located at the Sevastopol National University of Nuclear Energy and Industry of Ukraine, where declared nuclear material was located. Nevertheless, based on the evaluation of all safeguards relevant information for Ukraine in 2015, including safeguards relevant communications from Ukraine, the Agency did not find any indication that, in its judgment, gave rise to a proliferation concern. Consequently, the Secretariat was able to draw the broader conclusion for Ukraine that all nuclear material remained in peaceful activities.

[29] Integrated safeguards were implemented only in that part of Denmark which is covered by INFCIRC/193 and INFCIRC/193/Add. 8, i.e. Denmark and the Faroe Islands, which excludes Greenland.

[30] Albania, Andorra, Botswana, Jordan, Kazakhstan, Kuwait, Mauritius, New Zealand, Philippines, Switzerland, Tanzania, Turkey and Viet Nam.

**Fact box 3. States in which integrated safeguards were implemented during 2015**

In this group of 54 States[2]:

- there were 535 (514) facilities and 479 (469) MBAs containing LOFs, which represent 75% (73%) of the facilities and 83% (83%) of the MBAs containing LOFs under Agency safeguards.
- the total amount of nuclear material under Agency safeguards was 154 568 (148 122) significant quantities, which represents 77% (77%) of nuclear material (by significant quantity) under Agency safeguards.
- a total of approximately 1 tonne of heavy water was under Agency safeguards.
- the Agency carried out 1369 (1305) inspections, 342 (322) design information verifications and 54 (59) complementary accesses utilizing 7587 (6963.5) calendar-days in the field for verification, which represents 57% (56%) of the Agency's verification effort in the field.
- the estimated cost[31] of safeguards for the group was €65 (€62) million, which represents 61% (56%) of the total cost of Agency safeguards allocated by State.

### Japan

68. To date, the Agency has successfully re-verified approximately 80% of the nuclear material present on the Fukushima Daiichi site at the time of the accident. Nuclear material inaccessible for verification remains only at three damaged reactors (Units 1–3). Spent fuel assemblies are currently scheduled to be moved from these damaged reactors during 2017–2020 with removal of core debris not expected to start before 2021. As cleanup and decommissioning activities on the site progress, safeguards measures continue to be applied to ensure that nuclear material cannot be removed from the reactors without the Agency's knowledge. These measures were enhanced in 2015 with the installation of additional radiation monitoring equipment.

## C.1.2. States with the broader conclusion in which integrated safeguards were not implemented during 2015

69. There are 13 (12) States in this group. The amounts of nuclear material under safeguards, the number of facilities and MBAs containing LOFs under safeguards, the safeguards activities undertaken during the year, the verification effort and data on the submission of accounting reports and additional protocol declarations are presented for each State in Appendix II, Tables II.4–6.

**Fact box 4. States in which integrated safeguards were not implemented during 2015**

In this group of 13 States:

- there were 35 (38) facilities and 15 (13) MBAs containing LOFs, which represent 5% of the facilities and 3% of the MBAs containing LOFs under Agency safeguards.
- the total amount of nuclear material under Agency safeguards was 3562 (2290) significant quantities, which represents 2% of nuclear material (by significant quantity) under Agency safeguards.
- the Agency carried out 91 (107) inspections, 30 (32) design information verifications and seven (11) complementary accesses utilizing 713 (784.5) calendar-days in the field for verification, which represents 5% of the Agency's verification effort in the field.
- the estimated cost of safeguards for the group was €5.6 (€7.1) million, which represents 5% (6%) of the total cost of Agency safeguards allocated by State.

[31] See Section F.1.3.

70. Having evaluated the results of safeguards activities and all other available safeguards relevant information for each of these States, the Secretariat found that there was no indication of diversion of declared nuclear material from peaceful nuclear activities and no indication of undeclared nuclear material and activities in these States. On this basis, the Secretariat concluded that, for these States, all nuclear material remained in peaceful activities. For Switzerland and Tanzania, this conclusion was drawn for the first time.

### C.1.3. States without the broader conclusion

71. There were 54 (53) States with both comprehensive safeguards agreements and additional protocols in force for which the Secretariat had not yet drawn a broader conclusion. The amounts of nuclear material under safeguards, the number of facilities and MBAs containing LOFs under safeguards, the safeguards activities undertaken during the year, the verification effort and data on the submission of accounting reports and additional protocol declarations are presented for each State in Appendix II, Tables II.7–9.

**Fact box 5. States with both comprehensive safeguards agreements and additional protocols in force, without the broader conclusion**

In this group of 54 States:

- there were 13 (26) facilities and 43 (42) MBAs containing LOFs, which represent 2% of the facilities and 7% of the MBAs containing LOFs under Agency safeguards.
- the total amount of nuclear material under Agency safeguards was 932 (3748) significant quantities which represents 0.4% of nuclear material (by significant quantity) under Agency safeguards.
- the Agency carried out 25 (69) inspections, 12 (25) design information verifications and three (eight) complementary accesses utilizing 154 (287.5) calendar-days in the field for verification, which represents 1% of the Agency's verification effort in the field.
- the estimated cost of safeguards for the group was €3.6 (€6.1) million, which represents 3% (5%) of the total cost of Agency safeguards allocated by State.

72. Attaining a broader conclusion involves activities by both the State and the Agency that may include legal and administrative aspects. The States should provide all the required nuclear material accounting and additional protocol information and respond to Agency requests seeking to resolve questions or inconsistencies. The Agency continues to work with these States to obtain the necessary information, to resolve inconsistencies in the information, to resolve safeguards relevant questions regarding their nuclear activities and to complete the evaluations for each of the States.

73. Having evaluated the results of safeguards activities and all other available safeguards relevant information for each of these States, the Secretariat found that there was no indication of diversion of declared nuclear material from peaceful nuclear activities in these States. Evaluations regarding the absence of undeclared nuclear material and activities for each of these States remained ongoing. On this basis, the Secretariat concluded that, for these States, declared nuclear material remained in peaceful activities.

## C.2. States with comprehensive safeguards agreements in force but without additional protocols in force

74. As reported in paragraph 2 of the *Safeguards Statement*, safeguards were applied[1] for 52 (54) States with comprehensive safeguards agreements but without additional protocols in force. The amounts of nuclear material under safeguards, the number of facilities and MBAs containing LOFs under safeguards, the safeguards activities undertaken during the year and the verification effort

and data on the submission of accounting reports are presented for each State in Appendix II, Tables II.10–12.

75. Having evaluated the results of safeguards activities and all other available safeguards relevant information for each of these States, the Secretariat found that there was no indication of the diversion of declared nuclear material from peaceful nuclear activities in these States. On this basis, the Secretariat concluded that, for these States, declared nuclear material remained in peaceful activities.

**Fact box 6. States with comprehensive safeguards agreements in force but without additional protocols in force**

In this group of 52 States:

- there were 96 (96) facilities and 35 (34) MBAs containing LOFs, which represent 14% of the facilities and 6% of the MBAs containing LOFs under Agency safeguards.
- the total amount of nuclear material under Agency safeguards was 3758 (3594) significant quantities, which represents 2% of nuclear material (by significant quantity) under Agency safeguards.
- the Agency carried out 479 (489) inspections and 206 (210) design information verifications utilizing 3388 (3257.5) calendar-days in the field for verification, which represents 26% (26%) of the Agency's verification effort in the field.
- the estimated cost of safeguards for the group was €23 (€22.5) million, which represents 21% of the total cost of Agency safeguards allocated by State.
- the estimated cost of safeguards for Iran was €13.1 million, which represents 12% (11%) of the total cost of Agency safeguards allocated by State.

## C.3. States with safeguards agreements based on INFCIRC/66/Rev.2 in force

76. As reported in paragraph 4 of the *Safeguards Statement*, India, Israel and Pakistan have safeguards agreements based on INFCIRC/66/Rev.2. India has an additional protocol to its safeguards agreement (INFCIRC/754).

77. The amounts of nuclear material and heavy water under safeguards, the number of facilities and MBAs containing LOFs under safeguards, the safeguards activities undertaken during the year, the verification effort and data on the submission of accounting reports are presented for each State in Appendix II, Tables II.13–15.

**Fact box 7. States with safeguards agreements based on INFCIRC/66/Rev.2 in force**

In this group of three States:

- there were 19 (19) facilities and one (one) MBA containing LOFs under Agency safeguards.
- the total amount of nuclear material under Agency safeguards was 3007 (3037) significant quantities, which represents < 2% of nuclear material (by significant quantity) under Agency safeguards.
- a total of 430 (431) tonnes of heavy water was under Agency safeguards.
- the Agency carried out 73 (64) inspections and 22 (19) design information verifications utilizing 689.5 (663.5) calendar-days in the field for verification, which represents 5% of the Agency's verification effort in the field.
- the estimated cost of safeguards for the group was €4.6 (€4.1) million, which represents 6% (4%) of the total cost of Agency safeguards allocated by State.

78. Having evaluated the results of safeguards activities and all other safeguards relevant information available to it for each of these States, the Secretariat found that there was no indication of diversion of nuclear material or of the misuse of the facilities or other items to which safeguards had been applied in these States. On this basis, the Secretariat concluded that, for these States, nuclear material, nuclear facilities or other items to which safeguards had been applied remained in peaceful activities.

## C.4. States with both voluntary offer agreements and additional protocols in force

79. As reported in paragraph 5 of the *Safeguards Statement*, there were five nuclear-weapon States with voluntary offer agreements and additional protocols in force.

80. The amounts of nuclear material under safeguards, the number of facilities under safeguards, the safeguards activities undertaken during the year, the verification effort and data on the submission of accounting reports and additional protocol declarations are presented for each State in Appendix II, Tables II.16–18.

81. Having evaluated the results of safeguards activities and all other safeguards relevant information available to it for each of these States, the Secretariat found that there was no indication of the diversion of nuclear material to which safeguards had been applied. On this basis, the Secretariat concluded that, for the five States, nuclear material to which safeguards had been applied in selected facilities, or parts thereof, remained in peaceful activities or was withdrawn from safeguards as provided for in the agreements. There were no such withdrawals from the selected facilities in France, the United Kingdom and the United States of America.

**Fact box 8. States with both voluntary offer agreements and additional protocols in force**

In this group of five States:

- the total number of facilities on the States' lists of eligible facilities was 416 (424); from these, 11 (11) facilities, or parts thereof, were selected for the application of Agency safeguards.
- the total amount of nuclear material under Agency safeguards was 34 283 (32 676) significant quantities, which represents 17% of nuclear material (by significant quantity) under Agency safeguards, including 10 479 (10 343) significant quantities of unirradiated plutonium.
- the Agency carried out 80 (78) inspections and 11 (10) design information verifications utilizing 715.5 (775.5) calendar-days in the field for verification, which represents 5% of the Agency's verification effort in the field.
- the estimated cost of safeguards for the group was €4.0 million[32], which represents 4% of the total cost of Agency safeguards allocated by State.

## C.5. Parties to the NPT without comprehensive safeguards agreements in force

82. As reported in paragraph 3 of the *Safeguards Statement*, the Secretariat could not draw any safeguards conclusions for the 12 Parties to the NPT which, at the end of 2015, had yet to bring comprehensive safeguards agreements into force pursuant to Article III of the Treaty. Six (six) of them have signed comprehensive safeguards agreements and five have signed additional protocols.

[32] This figure does not include safeguards implementation costs covered by extrabudgetary contributions.

# D. Areas of Difficulty in Safeguards Implementation

83. This section describes progress in addressing the problems in the implementation of safeguards during 2015.

## D.1. Safeguards implementation in States with small quantities protocols

84. As called on by the Board of Governors in September 2005, States which have not amended or rescinded their SQPs should respond to the Agency's proposal and either amend or rescind, as appropriate, their SQPs as soon as possible. At the end of 2015, 40 (42) States had operative SQPs that had yet to be amended.

85. The actions undertaken by the Agency under the *Plan of Action to Promote the Conclusion of Safeguards Agreements and Additional Protocols*, are provided in Section E.1.

## D.2. Effectiveness of systems of accounting for and control of nuclear material

86. The performance of State and regional authorities and the effectiveness of the respective systems of accounting for and control of nuclear material have a significant impact upon the effectiveness and efficiency of safeguards implementation. In 2015, in one-tenth of States, and a third of SQP States, SSACs or State authorities responsible for safeguards had yet to be established. Moreover, not all State and regional authorities responsible for safeguards implementation have the necessary authority, independence from operators, resources or technical capabilities to implement the requirements of safeguards agreements and additional protocols. In particular, some State authorities do not provide sufficient oversight of nuclear material accounting and control systems at nuclear facilities and LOFs to ensure the required accuracy and precision of the data transmitted to the Agency.

87. Problems continued during 2015 with regard to designation of inspectors in approximately one-quarter of States, and provision of visas in one-tenth of States. Additionally, for a small number of States, problems were encountered relating to timeliness and accuracy of reporting, inclusion of certain nuclear material in inventory reports, provision of access, and agreement to apply required safeguards measures.

88. Complete, accurate and timely provision of safeguards relevant reports and other relevant information by States is also critical for effective and efficient safeguards implementation. Safeguards effectiveness was affected in several States that did not provide design information in accordance with modified Code 3.1 of their Subsidiary Arrangements General Part, or advance notification of nuclear material receipts and transfers.

89. For Agency inspectors to conduct their verification activities effectively, they must be able to access installations and perform the verification activities within agreed timeframes. Several States delayed access of Agency inspectors to a facility or a LOF for inspection activities; limited inspector activities; limited or did not permit environmental sampling; or did not provide the necessary access as requested by the Agency. This included access to areas of facilities not containing nuclear material and access to locations where the Agency considered that required to ensure the absence of undeclared nuclear material or activities. In addition, a few States did not allow the transmission of data outside the country or delayed shipment of destructive analysis samples, thus reducing safeguards efficiency and preventing their timely analysis for drawing safeguards conclusions.

**Fact box 9. Timeliness of reports and declarations**

For 2015, for States with safeguards agreements in force:

- as of 1 March 2016, the following reports which were due with regard to 2015 had yet to be provided to the Agency:[33]
  - 13 (13) initial inventory reports from States with SQPs based on the revised standard text;
  - 64 (38) physical inventory listings (PILs) and material balance reports (MBRs) from 18 (11) States.
- for eight (10) States, more than 20% of PILs, MBRs or inventory change reports (ICRs) were dispatched with a delay greater than 40 days.
- 22 (20) States with additional protocols in force did not submit any additional protocol declarations. 18 (17) of them have still not submitted their initial declarations.
- for 22 (22) States, more than 20% of their additional protocol declarations were dispatched with a delay greater than 40 days.

90. Bulk material measurements by the nuclear facility operators generally met the international target values. However, the measurements of nuclear material in some facilities showed evidence of bias or poor measurement quality. As a consequence, the material balance evaluations at these facilities showed statistically significant values for material unaccounted for, difference statistic and shipper-receiver differences or bias in the trends for these material balance statistics.

91. The Agency's ability to resolve questions, inconsistencies, discrepancies and anomalies depends on States' cooperation in responding to Agency requests for additional information or for access to resolve such issues. Delays in resolving issues can result in the Agency being unable to attain the safeguards technical objectives. The effort to resolve questions, inconsistencies, discrepancies, and anomalies results in greater use of Agency and State resources. Several States did not sufficiently facilitate the clarification or resolution of Agency questions, including questions concerning the correctness/completeness of their declarations.

92. The Agency is addressing the above issues with State or regional authorities, as appropriate. Also, the Agency is providing assistance to State and regional authorities as discussed in Section E.5.

## D.3. Security concerns

93. The security level in various States was a growing concern to the Agency in view of the impact on the Agency's ability to perform planned in-field verification activities in those States. As before, assessment by the United Nations Department of Safety and Security of the prevailing security level in such States — considering the security of its staff — served as a guide for all official travel, including travel in connection with Agency in-field verification activities.

[33] The outstanding PILs and MBRs were typically for MBAs containing LOFs.

# E. Strengthening the Effectiveness and Improving the Efficiency of Safeguards

## E.1. Conclusion of safeguards agreements and additional protocols

94. The Agency continued to implement the *Plan of Action to Promote the Conclusion of Safeguards Agreements and Additional Protocols*, which was last updated in September 2015, and encouraged States to conclude additional protocols and to amend their SQPs. The Agency organized regional and sub-regional events for States in Africa (held in Vienna), in Southeast Asia (in Singapore) and in the Caribbean (in Panama City), and a briefing for a number of Permanent Missions, at which the Agency encouraged the participating States to conclude comprehensive safeguards agreements and additional protocols, and to amend their SQPs. Also, a national workshop on safeguards was organized for Mongolia. In addition, the Agency held consultations with representatives from a number of Member and non-Member States in Geneva, New York and Vienna at various times throughout the year. During the year, Djibouti signed a comprehensive safeguards agreement with an SQP and an additional protocol and brought them into force, and Micronesia signed a comprehensive safeguards agreement with an SQP. In addition, Cambodia and Liechtenstein brought an additional protocol into force.

95. The Agency also continued to communicate with States in order to implement the Board's 2005 decisions regarding SQPs, with a view to amending or rescinding such protocols. In 2015, Togo amended its operative SQP to reflect the revised standard text and Azerbaijan, Jordan and Tajikistan rescinded their SQPs. At the end of 2015, 54 (53) States had operative SQPs in force based on the revised standard text.

96. The status of safeguards agreements, SQPs, and additional protocols as of 31 December 2015 is shown in the tables in Section B.6.

97. Figure 3 shows the status of additional protocols from 2011 to 2015 for States with safeguards agreements in force.

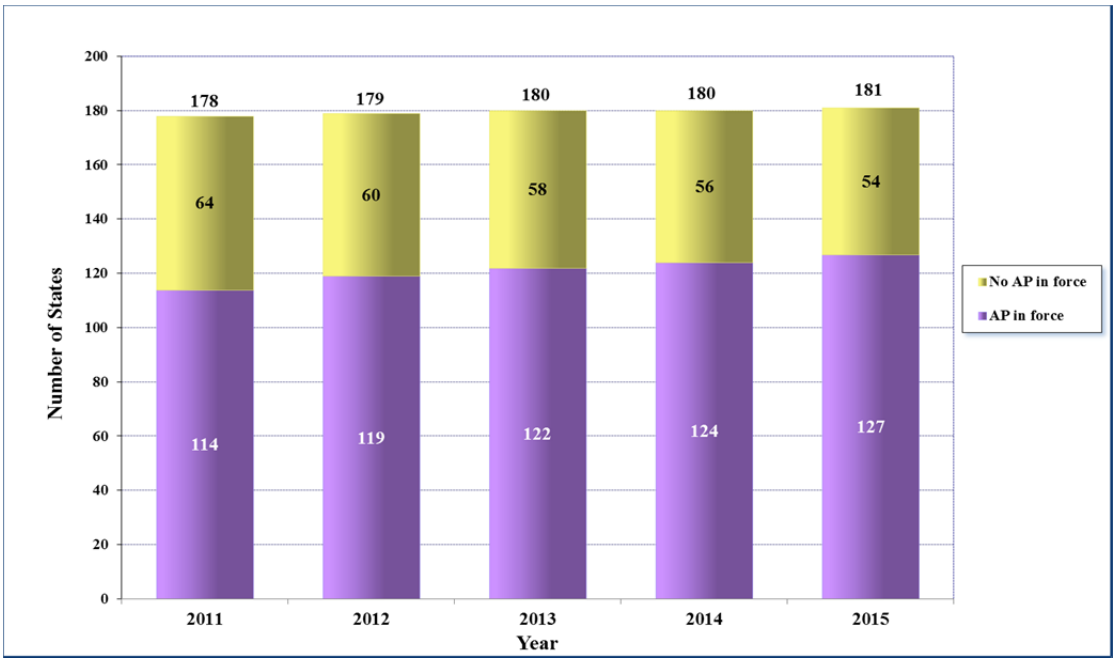


***Figure 3. Status of additional protocols for States[1, 2] with safeguards agreements in force, 2011–2015***

## E.2. Strategic planning

98. The Secretariat undertakes strategic planning to ensure that safeguards will continue to be both effective and efficient. The planning activities address the framework for safeguards implementation, legal authority, technical capabilities (expertise, equipment and infrastructure) and the human and financial resources necessary for Agency verification activities. It also considers communication, cooperation and partnerships with the Agency's stakeholders. In 2015, the Secretariat began to update its strategic plan for the Department of Safeguards, continued to implement its *Medium Term Strategy 2012–2017* and began preparations for the development of the next Medium Term Strategy for 2018–2023.

99. Research and development are essential to meet the safeguards needs of the future. In 2015, the *IAEA Department of Safeguards Long-Term Research and Development Plan, 2012–2023* continued to be implemented with the assistance of MSSPs. This document outlines the capabilities that the Department needs to achieve its strategic objectives, for which Member State research and development support is needed. The plan includes safeguards concepts and approaches, detection of undeclared nuclear material and activities, safeguards equipment and communication, information technology, analytical services and training.

100. 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 2014–2015*. During 2015, the Secretariat completed the project plans that make up the *Development and Implementation Support Programme for Nuclear Verification 2016–2017*, due to be published early in 2016. These plans provide a detailed picture of all development work that is expected to take place within the Department of Safeguards over the next two years.

## E.3. Evolving safeguards implementation

101. In August 2014, the Director General submitted a report to the Board of Governors entitled *Supplementary Document to the Report on The Conceptualization and Development of Safeguards Implementation at the State Level (GOV/2013/38)*. The supplementary document (GOV/2014/41 and Corr.1) was prepared in response to Member States' requests at the September 2013 meetings of the Board of Governors. It provides clarification and additional information to the 2013 report GOV/2013/38 and also describes how the State-level concept is applicable to States with item-specific safeguards agreements and to States with voluntary offer agreements.

102. Three technical meetings on safeguards implementation with Member States were held in 2015, during which the following topics were discussed:

- Implementation of safeguards in States with SQPs;
- Progress made in the development and implementation of safeguards in the context of the State-level concept;
- Updating and developing State-level safeguards approaches;
- Collection, processing and analysis of nuclear material and environmental samples, and use of the results;
- The progress made by the Department of Safeguards in transferring safeguards data from the mainframe computer to a new platform;
- The Performance Indicators Initiative in the Department of Safeguards.

103. During 2015, the Agency implemented State-level safeguards approaches for 54[34] States[2] under integrated safeguards. Six[35] of these approaches were updated during the year and the Secretariat is currently in the process of updating the remainder. The Secretariat is planning to develop such approaches for other States in the future. As described in documents GOV/2013/38 and GOV/2014/41 in developing and implementing a State-level safeguards approach, consultations are held with the relevant State/regional authority, particularly on the implementation of in-field safeguards measures.

104. To further ensure consistency and non-discrimination in the implementation of safeguards, the Agency has continued to improve internal work practices. These include the better integration of the results of safeguards activities conducted in the field with those carried out at Headquarters; advances in the handling of safeguards relevant information to facilitate evaluation; further development and testing of internal procedures and guidelines, including conducting acquisition path analysis and developing State-level safeguards approaches for States with comprehensive safeguards agreements; 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.

## E.4. Development of verification measures and technologies

### E.4.1. Safeguards approaches

105. Site or facility specific safeguards approaches were developed or improved in 2015 for:

- verification of spent fuel transfers between two nuclear power plants in Argentina;
- conduct of managed access in a gas centrifuge enrichment plant in Brazil;
- Agency/EURATOM partnership approach under integrated safeguards for a fuel fabrication plant in Sweden;
- use of remote data transmission at a fresh fuel HEU store in Germany;
- the verification, sealing and monitoring of spent fuel transfers from CANDU reactors to dry storage facilities where the nuclear material is difficult to access for verification.

106. The Agency continued to prepare for the future application of safeguards to new types of facility (e.g. geological repositories, spent fuel encapsulation plants, pyroprocessing facilities and laser enrichment facilities). These preparations included assessing the proliferation resistance of nuclear facilities, evaluating safeguards concepts for specific facility types and identifying safeguards measures early in the design stages of a facility.

107. In 2015, an expert group continued to address issues related to the development of safeguards measures and technologies for encapsulation plants and geological repositories, in particular with regard to prospective safeguards technologies and equipment. Also in 2015, a working group continued determining the technical measures required to safeguard a pyroprocessing facility.

108. During 2015, the Agency contributed to assessments of the proliferation resistance of nuclear facilities through participating in the Agency's International Project on Innovative Reactors and Fuel Cycle and the Generation IV International Forum. In addition, the Agency participated in the

[34] Implementation of integrated safeguards started in South Africa during the year.

[35] Cuba, Czech Republic, Ireland, Jamaica, Republic of Korea and Uruguay.

Safeguards and Security Working Group under the Republic of Korea and the United States Joint Fuel Cycle Study.

### E.4.2. Major safeguards projects

#### E.4.2.1. Chernobyl

109. The objective of the Chernobyl Safeguards Project is to develop safeguards approaches and instrumentation for routine safeguards implementation at the Chernobyl facilities. The Agency is developing an effective and efficient approach to safeguard the nuclear material to be contained in the new safe confinement of the Chernobyl nuclear power plant, which is scheduled to be installed over the damaged Reactor Unit 4 in 2017. The Agency is also developing an effective and efficient approach to safeguard the irradiated fuel when transferred from wet storage to interim dry storage. The conditioning and transfer of the fuel is expected to commence in 2017 and will take at least ten years.

#### E.4.2.2 Encapsulation Plant and Geological Repository

110. Finland and Sweden are each planning to construct an encapsulation plant and a geological repository (EPGR) in which to dispose of spent fuel. The operation of these storage facilities in Finland and Sweden is scheduled to commence in 2023 and 2027, respectively. The EPGR project coordinates the development of specific safeguards approaches for the encapsulation plants and geological repositories, assesses verification methods, and identifies the needs for new equipment and techniques necessary for safeguarding these facilities to optimize safeguards measures at the time these facilities become operational. An EPGR Liaison Group, which was formed with representatives from the Agency, the European Commission, Finland and Sweden in 2014, provides a forum for the exchange of technical information during the design and implementation of the EPGR projects in Finland and Sweden. In November 2015, the Finnish Government granted a license to construct the encapsulation plant and geological repository in Finland. The Agency, in cooperation with the European Commission, is working on identifying technical requirements for installation of safeguards equipment at the geological repository in Finland.

#### E.4.2.3. Japan Mixed-Oxide Fuel Fabrication Plant

111. Due to construction delays at the Japan Mixed-Oxide Fuel Fabrication Plant, development and implementation activities under this project were limited in 2015.

### E.4.3. Information management and analysis

#### E.4.3.1. Safeguards information system

112. The implementation of Agency safeguards relies heavily on information technology (IT). To provide better IT support for all safeguards activities, the Agency continued to make improvements to the overall performance and security of its information system, including the work in the scope of the MOSAIC project (see document GOV/INF/2014/24).

113. In 2015, the Agency transferred data from the mainframe computer to a new platform, re-engineered the associated software applications and decommissioned the mainframe computer, which completed the first phase of the MOSAIC project. The new safeguards IT working environment provides improved information security, enhanced applications and quicker access to data.

114. Work to align IT tools with safeguards implementation processes, enhance existing tools and applications, and strengthen information security started. By the end of 2015, approximately two-thirds of the currently planned projects had been initiated.

### E.4.3.2. Information analysis

115. 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 it. 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 from non-destructive assay (NDA), destructive assay, environmental sample analyses and remotely monitored equipment. The Agency also draws on a diverse range of other safeguards relevant information sources, including commercial satellite imagery, open sources and trade information. Throughout 2015, the Agency continued to investigate new tools and methodologies to streamline and prioritize workflows and processes.

116. To continuously improve the quality of the information on which it must rely, the Agency monitored the performance of laboratories and measurement systems and organized international technical meetings, training and workshops for various States on nuclear material accounting, including measurement data analysis, statistical methodologies and material balance evaluation concepts. The results of this monitoring were included in 89 performance evaluation reports issued in 2015.

117. Material balance evaluation reports are prepared routinely by the Agency for all nuclear material bulk handling facilities with an inventory or throughput of more than one significant quantity of nuclear material and, upon request, for other cases. The evaluations include the processing, reconciliation and statistical analysis of NDA and destructive analysis measurements and their comparison with State declarations. A total of 139 destructive analysis reports were produced, covering 583 uranium samples, 61 plutonium samples, five heavy water samples and three input solution samples. Two hundred and six (205) reports evaluating the balances of all nuclear material types were prepared for 83 (83) MBAs in 55 (55) facilities in 2015.

118. In 2015, the Agency prepared 217 (314) environmental sampling reports and 35 (38) summaries covering 323 (416) samples that it collected from 25 (34) States. These reports integrate and interpret the measurement results from the analytical methods that were used by the Network of Analytical Laboratories (NWAL). The measurement results are evaluated against States' declarations to identify the potential presence of undeclared nuclear material or activities. Included in the above number of reports are reports on analysis measurements of uranium impurities, particularly impurities in uranium ore concentrates.

119. In 2015, the Agency acquired 407 (407) commercial satellite images in support of safeguards verification activities. The imagery was acquired with regard to 26 (43) States [36] from 15 (16) different Earth observation satellites. Of these images, 209 (189) were new acquisitions, and the remaining 198 (218) were purchased or received from the public archives of the Agency's commercial satellite imagery providers. In 2015, the Agency produced 135 (127) imagery analysis reports, including several imagery-derived and geographical information system products, to support verification activities in the field and at Headquarters.

120. During 2015, the Agency collected 40 408 (40 000) safeguards relevant open source information items, of which over 20 000 (23 150) were provided for State evaluations, and prepared over 950 summaries of safeguards relevant information for the evaluation of 181 States[2].

[36] Including the DPRK.

121. In 2015, Member States provided the Agency with information concerning 80 (115) unfulfilled procurement enquiries for nuclear-related products. This information was used to assess the consistency of nuclear activities declared by States to the Agency. From this and other data, 60 trade analysis reports were produced for State evaluation purposes.

### E.4.4. Sample processing and analysis

122. In 2015, the Agency continued its efforts to reduce delays in the receipt, distribution, analysis and evaluation of environmental sampling results. The overall time from collection to evaluation report improved from a median of 65 days in 2014 to 62 days in 2015. Key performance indicators have been introduced to allow for careful monitoring of all stages of the environmental sampling process in order to identify potential problems and make further improvements in timeliness.

123. The NWAL consists of the Agency's Safeguards Analytical Laboratories (SAL), at Seibersdorf, Austria, and 20 other qualified laboratories of the Member States and the European Commission. The SAL comprises the Environmental Sample Laboratory and the Nuclear Material Laboratory (NML), which includes the On-Site Laboratory in Rokkasho, Japan. The Agency provides logistical support for the sampling, transport and analysis of nuclear material and environmental samples, and coordination of all reference material samples used by the quality control process to monitor the measurement system.

124. Significant contributions were received from Member States, not only through analyses carried out by the NWAL but also through the contributions of MSSPs to the development and implementation support projects on destructive analysis of nuclear material, environmental sample analysis, and other analysis.

#### E.4.4.1. Nuclear material and heavy water sample analysis

125. In 2015, the Agency collected 644 (488) nuclear material samples and five (nine) heavy water samples. All accountancy samples except the heavy water samples were analysed by the Agency's NML. The heavy water analysis was performed by the Hungarian Academy of Sciences, Centre for Energy Research. In addition, 79 (77) samples were analysed by the Agency at the Rokkasho On-Site Laboratory.

#### E.4.4.2. Environmental and other sample analysis

126. In 2015, the Agency collected 323 (416) environmental samples, including 274 (308) swipe samples and 49 (108) samples for other sample analysis. This resulted in the analysis of 787 (910) subsamples by network laboratories for bulk and particle analysis of uranium and plutonium, concentration and/or isotopic composition, and other analyses. Of these subsamples, 171 (187) were analysed at the SAL — 80 (100) at the Environmental Sample Laboratory and 91 (87) at the NML.

#### E.4.4.3. Enhancing the capability of the Safeguards Analytical Services

127. All remaining transition activities needed to move into the new NML were finished during 2015. Additional training and administrative space in the NML office was constructed and the planned security upgrades to the main gate facility, the access road and the site perimeter were completed. Procurement, receipt and installation of remaining equipment for the chemical and instrumentation laboratories was completed during the first two quarters. Active testing in the new facility was completed during the period from May to November, and provisional operation commenced in December, following approval by the Agency's Radiation Safety and Nuclear Security Regulator, and acknowledgment by the Austrian Government.

128. With the completion of the ECAS project in December, the Agency is able to conduct safeguards sample analysis in safe, secure and modern facilities for decades to come.

### E.4.4.4. Expansion of the Network of Analytical Laboratories

129. Efforts to expand the use of the NWAL for both nuclear material analysis and environmental sample analysis continued. In order to provide additional particle analysis capability for environmental samples, the Agency qualified the Korea Atomic Energy Research Institute in April 2015.

130. Laboratories for environmental or nuclear material sample analysis are in the process of qualification in nine Member States. Laboratories in China, the Czech Republic and Hungary were undergoing qualification for environmental sample analysis in 2015. In addition, laboratories in Belgium, Canada, the Netherlands and the United States of America were undergoing qualification for nuclear material analysis. A laboratory in Argentina was undergoing qualification for heavy water analysis and a laboratory in Germany is considering undergoing qualification for the provision of reference material.

## E.4.5. Safeguards equipment development and implementation

131. Throughout 2015, the Agency provided equipment and technical support for verification activities in the field, ensuring that instrumentation necessary for the implementation of effective safeguards worldwide continued to function as required. More than 6500 (8000)[37] pieces of verification equipment were dispatched to support verification activities in the field.

132. Significant financial and human resources were dedicated to performance monitoring to ensure the reliability of the Agency's equipment. At present, the reliability of digital surveillance systems, NDA systems, unattended monitoring systems and electronic seals have exceeded the target goal of 99% availability[38]. This near total availability could be achieved through preventive maintenance policies and system architecture implementing redundancy at system/component level.

133. In 2015, cooperative efforts continued with the regional or State authorities (RSAs) for the procurement, acceptance testing, training, installation and maintenance of safeguards equipment designated for joint use.

### E.4.5.1. Non-destructive assay systems

134. In 2015, the Agency safeguards activities required 2237 (2082) separate pieces of equipment, which were prepared and assembled into 1106 (969) portable or resident NDA systems, which can be grouped into 140 (140) different types. Four hundred and forty-eight (436) calendar-days of in-field technical support were spent to directly support verification activities. Thirty-nine safeguards implementation support tasks were completed to meet technical and scientific challenges associated with non-routine verification activities.

135. NDA system capabilities were expanded by the following:

- A portable radionuclide identification scanner was authorized for safeguards use.
- In cooperation with one MSSP, the functionality of the pooled multichannel analyser for gamma spectrometry was extended towards neutron coincidence counting, improving

[37] A notable reduction due to the phased implementation campaign of NGSS and its associated parts.

[38] Defined as (1 - system failures / total number of system uses).

interchangeability and maintainability of the core NDA components for both neutron and gamma NDA applications.

- The prototype passive gamma emission tomography system to measure irradiated LWR fuel assemblies was demonstrated to be capable of detecting the removal of single pins in WWER-440-type fuel. The system is now undergoing redesign to improve its reliability and performance and to shorten measurement time.
- The CANDU bundle verifier for baskets was successfully redesigned. Ten new systems were procured, supplied and tested at Headquarters and are being deployed.
- A compact gamma tomographic scanner was procured. This can measure small samples of uranium or plutonium, in impure or inhomogeneous form. Performance assessment is in progress.
- After obtaining experimental proof of concept, the prototype fast neutron collar system, developed to be insensitive to the concentration of burnable poison in modern fuel, was redesigned using commercially available components. Its performance will be evaluated in 2016 at the Institute for Transuranium Elements in Karlsruhe, Germany, with a mock-up of pressurized water reactor fuel in different configurations in a wide range of $^{235}U$ linear mass densities and Gd-burnable poison concentrations.

### E.4.5.2. Surveillance systems

136. By the end of 2015, the Agency had 1416 (1354) cameras connected to 863 (785) systems operating at 266 (263) facilities in 35 (35) States[2].

137. The Agency continued with the next generation surveillance system (NGSS) replacement campaign, replacing old camera systems that are reaching their end of life cycle (Figure 4). By the end of 2015, 532 NGSS cameras had been installed in 22 Member States. This replacement campaign is currently partially funded through a dedicated item in the Agency's Major Capital Investment Fund.

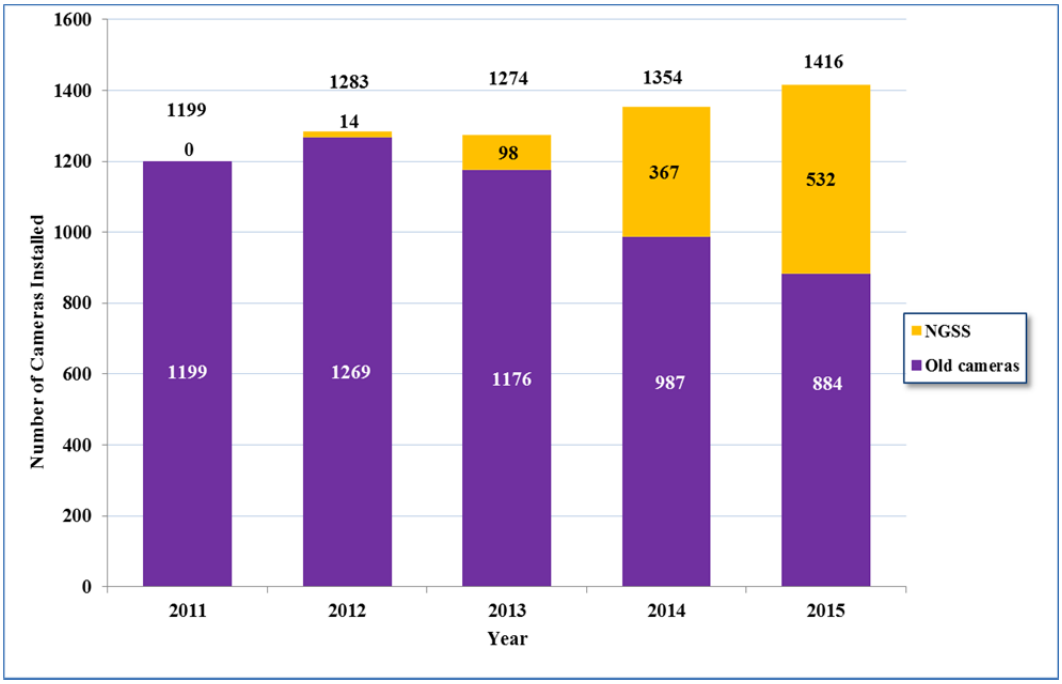


*Figure 4. Replacement campaign of old cameras with NGSS technology*

138. During 2015, the efforts for installing, replacing or maintaining surveillance cameras required 38 (35) missions comprising 407 (361) calendar-days of in-field technical support activity. The Agency also maintains approximately 210 cameras jointly used but owned by State or regional authorities. The following enhancements to surveillance systems were made:

- A prototype NGSS module providing support for analogue video cameras was delivered and is currently being evaluated, with field testing and subsequent authorization anticipated in 2016. The unit incorporates innovative tamper protection of the video signal cable based on electronic techniques.
- The NGSS underwater camera development was finalized and several units were procured for installation at facilities.

### E.4.5.3. Containment systems and instrumentation security

139. Maintaining continuity of knowledge through containment and sealing of nuclear material and critical equipment components remains one of the most important elements of the Agency's verification activities. In 2015, the Agency verified approximately 23 300 (23 200) seals that had been installed on nuclear material, facility critical equipment or Agency safeguards equipment at nuclear facilities.

140. Within the framework of the sealing and containment modernization programme, the Agency is continuously working on the implementation of new and alternative sealing technologies and also focusing on the improvement of the overall security of these instruments. In 2015, the following enhancements of sealing systems were made:

- A pre-production batch of a new passive seal (Figure 5) has been procured. Glass seal prototypes were assessed in 2014 for potential vulnerability; an extensive field test is planned in 2016 using the pre-production batch.
- The ultrasonic optical sealing bolt has been integrated with a loop seal effectively creating two seals in one.
- Procurement of 300 units of the remote monitoring sealing array has been completed, thus enabling field implementation to start in 2016.
- The development of a new electronic seal (active optical loop seal) has progressed. Prototypes are expected to be available in the first quarter of 2016.
- The laser mapping for containment verification system was deployed in Canada to streamline spent fuel cask verification activities. The system allows unique identification and tamper detection of storage containers, and is designed to be used jointly with facility operators, which saves inspection effort.

***Figure 5. Glass seal and ultrasonic optical sealing bolt***

### E.4.5.4. Unattended monitoring systems

141. At the end of 2015, the Agency used 162 (153) unattended monitoring systems installed in 23 (22) States. Of these, 136 (128) measure radiation, ten (ten) are thermohydraulic monitors and 16 (15) are solution volume measurement systems. In 2015, eight (12) major system upgrades were completed, and 38 (22) maintenance visits were conducted, requiring 510 (473) calendar-days of technical support in the field.

142. In 2015, in addition to the ongoing maintenance of installed unattended monitoring systems, enhanced systems were developed and implemented, namely:

- an open-air spent fuel monitor installed at Fukushima Daiichi (Figure 6);
- compact data acquisition units for the unattended fork detector monitor;
- fibre-optic based gamma detectors for spent fuel monitoring;
- vitrified waste coincidence counter upgrade.

***Figure 6. Open air spent fuel monitor installed at Fukushima Daiichi***

### E.4.5.5. Remote transmission and processing of data from unattended systems

143. Remote data transmission (RDT), formerly referred to as remote monitoring, is the Agency capability to receive data from unattended safeguards systems at Agency Headquarters in Vienna. The use of RDT enables greater verification efficiency by relieving inspectors from data collection and facilitates early detection of potential performance reduction of the safeguards systems. Implementation of RDT systems at facilities increased in 2015 and further increases are expected in the coming years.

144. At the end of 2015, 820 (737) unattended safeguards data streams[39] were collected remotely from 136 (127) facilities in 24 (23) States[2]. Of these, 255 data streams were produced by surveillance systems, 109 by unattended monitoring systems, and 456 by electronic seals.

145. In addition, the Agency is developing data automation and inspector review tools to help streamline the equipment data collection and review process. A real-time and integrated stream-oriented remote monitoring standard interface (RAINSTORM) was implemented in several safeguards equipment systems. An integrated review and analysis package (iRAP) is being developed as a joint effort with the European Commission, with an anticipated release in 2016.

[39] A data stream is a flow of information coming from an instrument.

### E.4.5.6. Instrumentation technology foresight

146. In 2015, the instrumentation technology foresight activities to identify and evaluate emerging instrumentation technologies that could support Agency safeguards implementation continued. These activities were performed in close cooperation with MSSPs. The main highlights for 2015 were:

- customization of an indoor positioning system;
- development of software tools for integrating radiation, position, visual and other data collected during complementary access;
- performance evaluation of the instruments for chemical and elemental analysis of non-radioactive material and compounds associated with the nuclear fuel cycle;
- demonstration of a hand-held 3D laser system for volume measurement of nuclear material;
- performance evaluation of a commercial gamma imaging system based on medium and high resolution gamma spectrometry.

## E.5. Cooperation with State and regional authorities

147. The effectiveness and efficiency of Agency safeguards depend, to a large extent, on the effectiveness of SSACs and RSACs and on the level of cooperation between State/regional authorities and the Agency.

### E.5.1. Assistance by State and regional authorities

148. Actions that enhanced the effectiveness and efficiency of Agency safeguards implementation were undertaken by a number of States.

149. In 2015, the Agency continued discussions with ABACC, the European Commission and the Republic of Korea aimed at increasing cooperation and enhancing the effectiveness and efficiency of safeguards implementation in the relevant States. A task force with Japan continued to address the long-term verification challenges at the Fukushima Daiichi site. Other actions are shown in Fact box 10.

**Fact box 10. State or regional authority actions enhancing effectiveness and efficiency of safeguards implementation**

Representative examples during 2015 include:

- hosting regional workshops to raise the awareness of Agency safeguards;
- leading efforts to strengthen safeguards implementation in a region;
- providing use of facilities in the State to train Agency safeguards inspectors, thus supporting their development and qualification;
- performing national inspections at facilities and LOFs; validating operator data; ensuring the quality of records, reports and declarations prior to submitting information to the Agency; and voluntarily sharing the results of national inspections with the Agency;
- providing the Agency with early design concepts to assist in developing safeguards measures for emerging new nuclear fuel cycle technologies;
- consulting the Agency and providing early information to allow for the integration of safeguards features into the design of new facilities, thus allowing the Agency adequate time to plan safeguards activities, test new instruments and safeguards approaches and verify the design of such facilities as they are built.

## E.5.2. Assistance to State and regional authorities

150. To assist States in building capacity for implementing their safeguards obligations, the Agency published the second of four planned safeguards implementation practice guides in February 2015, entitled *Safeguards Implementation Practices Guide on Establishing and Maintaining State Safeguards Infrastructure* (IAEA Services Series 31). The guides and other safeguards guidance are available for States at the Agency's Assistance for States webpage.

151. The Agency continues to provide the International SSAC Advisory Service (ISSAS) to States, at their request, with advice and recommendations on the establishment and strengthening of such State systems. The Agency did not receive any official requests for ISSAS missions in 2015. However, the Department of Safeguards participated in three Integrated Nuclear Infrastructure Review (INIR) missions — in Kenya, Morocco and Nigeria. INIR missions are provided upon a States' request by the Agency's Department of Nuclear Energy to States embarking on a nuclear power programme or expanding an existing one and cover 19 infrastructure issues, of which one is *safeguards,* to be considered during the different stages of developing a nuclear power programme. For more information see the Agency publication *Milestones in the Development of a National Infrastructure for Nuclear Power*.

152. The Agency also conducted seven international, regional and national training courses for personnel responsible for overseeing and implementing SSACs and RSACs, and participated in several other training activities organized by Member States on a bilateral basis. In total, more than 170 experts were trained on safeguards related topics.

153. Also, in 2015, the Agency offered its Learning Management System (CLP4NET) for the first time to participants attending SSAC training courses. The CLP4NET provides participants with access to a password protected virtual classroom through which the electronic version of instructional material, including Agency safeguards related guidance documents, can easily be downloaded.

**Fact box 11. Agency training activities**

In 2015, the Agency provided training to personnel of State and regional authorities and facility operators in the form of:

- an international SSAC training course held in the United States;
- a regional training course on safeguards and security aspects of nuclear material accounting and control at facilities held in Turkey (in cooperation with the Agency's Division of Nuclear Security);
- a regional SSAC training course for newcomer States held in the Republic of Korea;
- a national SSAC training course held in Belarus;
- refresher training on aspects of safeguards implementation held in Canada;
- a national training workshop on radiation detection equipment for inspectors, held in the Republic of Moldova;
- a national workshop on SQP amendment held in Mongolia;
- a national workshop on the implementation of the comprehensive safeguards agreement and additional protocol, including safeguards implementation at Barakah Nuclear Power Plant, held in the United Arab Emirates;
- participation in training courses organized by:
  - the United States of America (INSEP) held in Cambodia, Laos, Malaysia and Myanmar;
  - the Republic of Korea (INSA) — an international course on nuclear safeguards — held in the Republic of Korea;
  - Japan (JAEA/ISCN) — a regional SSAC course — held in Japan.

## E.6. Quality management

154. The quality management system within the Department of Safeguards provides regular oversight of the key safeguards processes and their results to ensure impartiality, effectiveness and efficiency of safeguards implementation. In order to strengthen the system, overall responsibility for it was moved to the Office of the DDG-SG. The former Section for Effectiveness Evaluation (SEE) has been given an expanded mandate to oversee Departmental performance and quality and has been renamed Section for Safeguards Performance and Quality (SPQ). The new mandate encompasses all the former responsibilities of SEE together with responsibility for performance monitoring and management of the internal quality audit programme.

155. The following quality management activities for the Department of Safeguards were completed:

- The Department developed an approach to use performance indicators more effectively to assess departmental activities and results.
- In 2015, the Department of Safeguards conducted an internal quality audit at the SAL in preparation for the ISO 9001 re-certification audit.
- One hundred and twenty condition reports identifying non-conforming/potentially non-conforming conditions and radiological and industrial safety events were initiated. Root cause analyses were performed and actions to prevent recurrence were initiated. Forty of these reports were closed in 2015. The software used to manage the condition report system was improved.
- In 2015, staff training was conducted to raise awareness of the Departmental quality management system, including managing and controlling safeguards documents, the use of the condition report system, and the principles of continual process improvement.

- The Department's cost calculation methodology, which is used to estimate the cost of safeguards implementation by State and to compare costs and effort of options in safeguards approaches, was extensively reviewed during the year. The resulting revision of the model ensures that it remains applicable to the activities performed by the Department.

- Knowledge management efforts were enhanced to support supervisors in identifying the critical job-related knowledge to be retained from 35 staff members retiring or separating from the Department of Safeguards.

- Safeguards documentation necessary to perform in-field verification activities and the drawing of safeguards conclusions was reviewed and updated to ensure that activities were consistent with internal safeguards policies and procedures. Greater attention was paid to forms and working papers to ensure their completeness and correctness. Compatibility of the data collected through this documentation with other safeguards databases was ensured.

- Improvements to the safeguards core document management system and its user interface were made to ensure its availability in a secure environment and to be in line with the changes resulting from the MOSAIC project.

## E.7. Information Protection

156. Safeguards information security continues to be a priority. In 2015, the Agency reviewed its related policies, procedures and practices, and completed improvements to procedures for proper classification and handling of all safeguards information. Additionally, extra measures are being implemented and procedures introduced to protect all Agency safeguards information in the field.

157. The Secretariat has introduced staff training on all aspects of information security. A training course on the classification of safeguards information and its handling and protection has been developed for all staff in the Department of Safeguards. In 2015, 16 such training sessions were held and, by the end of the year, 700 staff members had completed the training. The same training is now included as a module in the Introductory Course on Agency Safeguards (ICAS). Awareness campaigns and enhancements to the information security e-learning programme continue to be implemented.

158. All Agency servers, disk storage and network equipment are stored in a highly secure data centre. There is a second 'fail over' data centre available to ensure continuity. Information security continues to be addressed and improved through, for example, the systematic application of security patches and upgrades to servers, switches, and laptop and desktop computers; better encryption; internal and external vulnerability reviews; the development of in-house capabilities to combat information technology threats; and the enhancement of the disaster recovery and business continuity capability.

# F. Safeguards Expenditures and Resources

159. This section provides information on the level and use of financial and human resources for safeguards implementation during 2015. The activities of Major Programme 4 — Nuclear Verification — were funded from various sources, primarily through the Regular Budget and extrabudgetary contributions. The Regular Budget appropriation for 2015 was adjusted to €130.7 (€126.4) million at the average United Nations exchange rate. In 2015, the extrabudgetary allotments were €43.3 million.

160. Total expenditure for Major Programme 4 from the 2015 Regular Budget was €130.7 million. In addition, €26.9 million was spent from extrabudgetary contribution allotments.

161. The total combined safeguards expenditures from the Regular Budget and extrabudgetary contributions were distributed among expenditure categories as follows: staff costs — 67%; equipment — 11%; non-staff costs — 10%; contracts — 7%; travel — 6% and reimbursement of work for others — (1%).

162. During 2015, major investments were made for purchasing new or replacement equipment for the NGSS, the infrastructure and security necessary for sustainable laboratory operations, and modernizing safeguards information technology.

## F.1. Financial resources

### F.1.1. Regular Budget expenditures

163. The Regular Budget utilization rate for Major Programme 4 was 100%, i.e. there was no unspent balance from the 2015 Regular Budget at the end of the year.

164. Major Programme 4 encompasses four main programmes: Overall Management, Coordination and Common Activities; Safeguards Implementation; Other Verification Activities; and Development. Major Programme 4 also includes a dedicated programmatic element on Corporate Shared Services.

- The Overall Management, Coordination and Common Activities programme includes the resources necessary to provide a central management and coordination function, programme and resource management, security, and quality management.
- The Safeguards Implementation programme includes projects such as verification activities, information analysis, effectiveness evaluation, concepts and planning, provision of safeguards instrumentation and safeguards analytical services.
- The Other Verification Activities programme includes the activities needed to maintain operational readiness to resume safeguards implementation for the DPRK.
- The Development programme includes developing safeguards concepts, approaches, instrumentation and technologies. This programme also includes increased costs related to the transfer of mainframe applications and data to a new information technology environment.
- All corporate services supporting safeguards implementation that were formerly distributed under different programmes were consolidated under one umbrella programme, Corporate Shared Services.

165. The breakdown of the Regular Budget expenditures by programme is shown in Figure 7.

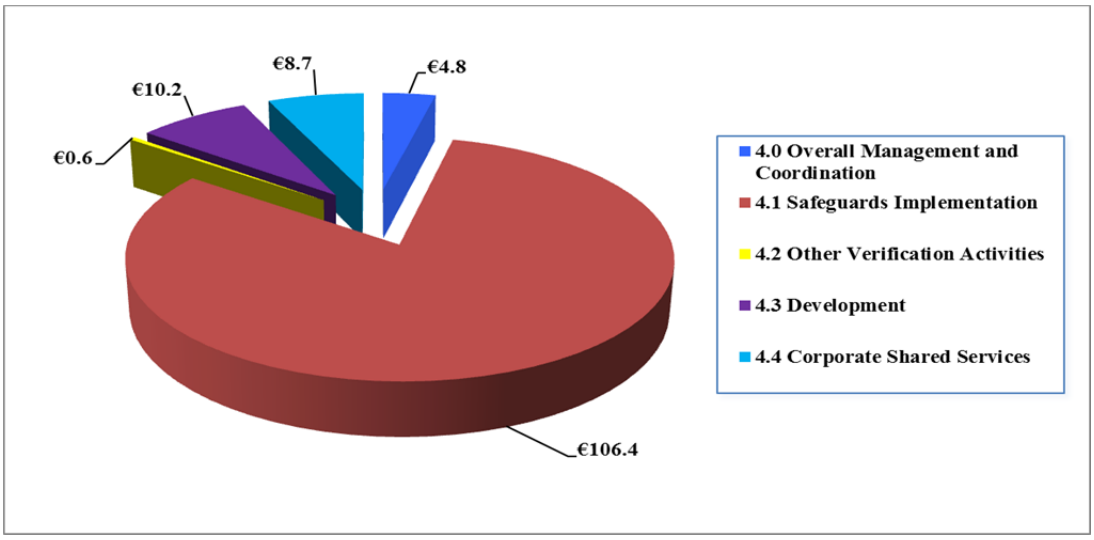


***Figure 7. Major Programme 4 structure in 2015 (in € millions)***

166. The breakdown of the Regular Budget expenditure by item of expenditure is shown in Figure 8.

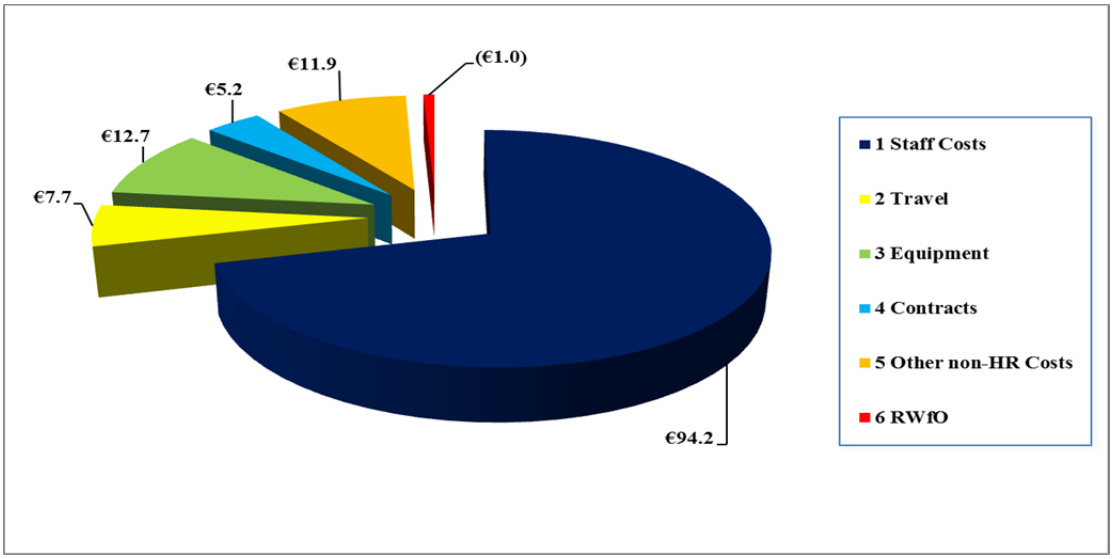


***Figure 8. 2015 Regular Budget expenditure by item of expenditure (in € millions)***

## F.1.2. Extrabudgetary contributions and expenditures

167. During 2015, €43.3 million was allotted from Member States' contributions and from the interest earned from the contributions. The allotments were designated to specific safeguards activities to be implemented over each project's life span. The related extrabudgetary allotments by donor are shown in Table 6. During the year, a total of €26.9 million from the extrabudgetary contributions was spent as follows: €5.7 million was used to finalize construction and installation contracts within the ECAS project, €7.6 million was spent on implementation of monitoring and verification activities in Iran in relation to the JPA, €4.1 million was spent on MOSAIC and €9.5 million was spent on various other operational activities of the Department of Safeguards.

**Table 6 – Extrabudgetary allotments by donor during 2015 (in € millions)**

| Donor | Allotment (in € millions) | % |
|---|---|---|
| **Austria** | 0.05 | 0.1 |
| **Canada** | 8.34 | 19.3 |
| **China** | 0.11 | 0.3 |
| **Denmark** | 0.64 | 1.5 |
| **Finland** | 0.31 | 0.7 |
| **France** | 0.54 | 1.3 |
| **Germany** | 1.66 | 3.8 |
| **Greece** | 0.01 | 0.0 |
| **Ireland** | 0.07 | 0.2 |
| **Japan** | 1.56 | 3.6 |
| **Kazakhstan** | 0.02 | 0.1 |
| **Korea, Republic of** | 0.81 | 1.9 |
| **Latvia** | 0.01 | 0.0 |
| **Luxembourg** | 0.02 | 0.0 |
| **Netherlands** | 0.40 | 0.9 |
| **New Zealand** | 0.10 | 0.2 |
| **Norway** | 1.19 | 2.8 |
| **Russian Federation** | 0.56 | 1.3 |
| **Slovakia** | 0.05 | 0.1 |
| **Spain** | 0.02 | 0.0 |
| **Sweden** | 0.11 | 0.2 |
| **Switzerland** | 0.10 | 0.2 |
| **Turkey** | 0.10 | 0.2 |
| **United Kingdom of Great Britain and Northern Ireland** | 1.50 | 3.5 |
| **United States of America** | 25.00 | 57.8 |
| **Other Sources** | **0.01** | **0.0** |
| **Grand Total** | **43.29** | **100.0** |

168. The breakdown of the expenditures from extrabudgetary contributions of €26.9 million by expenditure category is shown in Figure 9. In 2015, the largest share was related to staff costs. Other significant expenditures were related to equipment, contracts and numerous training events and workshops organized to enhance competencies in safeguards implementation.

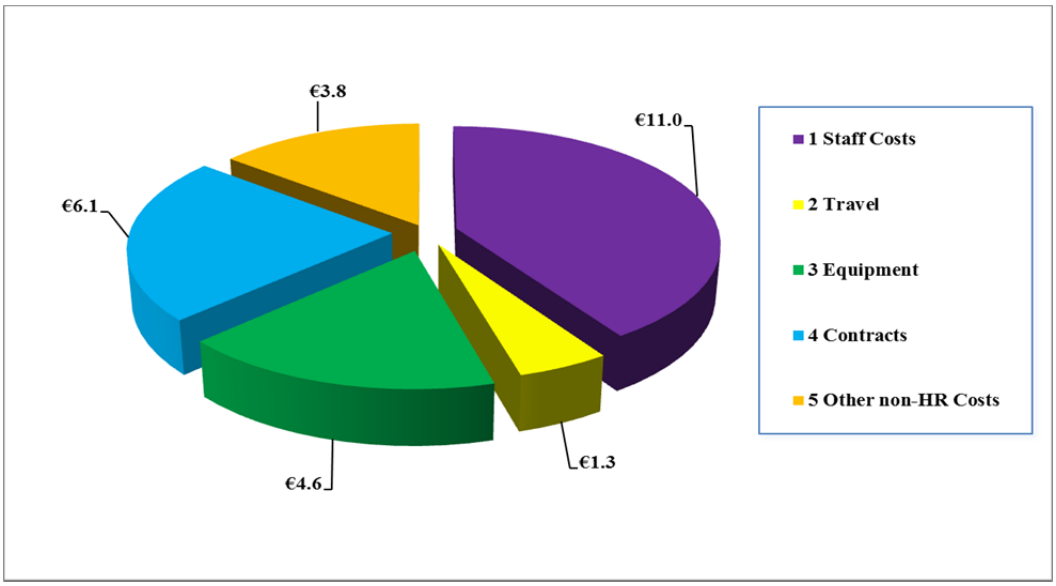


***Figure 9. 2015 Extrabudgetary contribution expenditures per category (in € millions)***

## F.1.3. Estimation of safeguards costs by State

169. The Agency has implemented a methodology that allows safeguards implementation costs to be calculated on a State-by-State basis in a consistent manner. The basis for this cost calculation methodology is a product cost model that estimates the resources required to implement the core processes of Major Programme 4. By accumulating and allocating appropriate shared costs for each product or category of product, the model calculates the full cost of a product or product category of these core processes.

170. Although the model is based on average costs, State-specific adjustments were applied to determine the estimated cost of safeguards implementation by State. These adjustments were made with regard to calendar-days in the field for verification, sampling, material balance evaluation, equipment and satellite imagery. Adjustments were also made for certain States to reflect the extra effort spent at Headquarters which falls outside the products currently identified for the core processes.

171. Table 7 shows the estimated safeguards expenditures in 2015 that can be attributed to specific States. The estimated efforts for in-field verification and for information analysis and evaluation are components of these estimated costs. Special (in-kind) contributions received from Member States on the basis of a 'cost sharing principle' associated with, for example, training and the joint use of equipment are excluded from these figures. In this assessment, 82% (87%) of the money spent from the Regular Budget can be attributed to specific States. The remainder includes costs for certain other specific products and activities, and Agency expenditures that are not accounted for by the cost calculation model at this time.

172. For 2015, the cost calculation model has continued to evolve and be revised in order to more fully capture the costs of the Agency and more appropriately assign those costs to specific products and States. Enhancements in 2015 included improved distribution of costs of information technology, information management, equipment and technical support as well as sample analysis. Therefore, changes in estimated costs from prior years may be the result of refinements in the calculation methodology and not necessarily changes in the activities performed for the State. These changes are reflected in the costs by State shown in Table 7.

**Table 7 – Estimated cost of safeguards by State in 2015**

| State | Estimated regular budget cost (€) |
|---|---|
| **Afghanistan** | 29 000 |
| **Albania** | 52 000 |
| **Algeria** | 313 000 |
| **Andorra** | 29 000 |
| **Angola** | 29 000 |
| **Antigua and Barbuda** | 21 000 |
| **Argentina** | 3 029 000 |
| **Armenia** | 367 000 |
| **Australia** | 701 000 |
| **Austria** | 113 000 |
| **Azerbaijan** | 48 000 |
| **Bahamas** | 21 000 |
| **Bahrain** | 21 000 |
| **Bangladesh** | 157 000 |
| **Barbados** | 21 000 |
| **Belarus, Republic of** | 681 000 |
| **Belgium** | 3 681 000 |
| **Belize** | 21 000 |
| **Bhutan** | 21 000 |
| **Bolivia, Plurinational State of** | 21 000 |
| **Bosnia and Herzegovina** | 107 000 |
| **Botswana** | 110 000 |
| **Brazil** | 3 498 000 |
| **Brunei Darussalam** | 21 000 |
| **Bulgaria** | 403 000 |
| **Burkina Faso** | 29 000 |
| **Burundi** | 21 000 |
| **Cambodia** | 29 000 |
| **Cameroon** | 21 000 |
| **Canada** | 6 971 000 |
| **Central African Republic** | 29 000 |
| **Chad** | 29 000 |
| **Chile** | 172 000 |
| **China, People's Republic of** | 883 000 |
| **Colombia** | 153 000 |
| **Comoros** | 21 000 |
| **Congo** | 21 000 |
| **Costa Rica** | 21 000 |
| **Côte d'Ivoire** | 21 000 |
| **Croatia** | 99 000 |
| **Cuba** | 43 000 |
| **Cyprus** | 44 000 |
| **Czech Republic** | 1 411 000 |

| State | Estimated regular budget cost (€) |
|---|---|
| **Democratic People's Republic of Korea** | 1 368 000 |
| **Democratic Republic of the Congo** | 112 000 |
| **Denmark** | 117 000 |
| **Djibouti** | 21 000 |
| **Dominica** | 21 000 |
| **Dominican Republic** | 21 000 |
| **Ecuador** | 29 000 |
| **Egypt** | 535 000 |
| **El Salvador** | 34 000 |
| **Estonia** | 137 000 |
| **Ethiopia** | 21 000 |
| **Fiji** | 21 000 |
| **Finland** | 850 000 |
| **France** | 1 155 000 |
| **Gabon** | 29 000 |
| **Gambia** | 21 000 |
| **Georgia** | 272 000 |
| **Germany** | 6 845 000 |
| **Ghana** | 113 000 |
| **Greece** | 115 000 |
| **Grenada** | 21 000 |
| **Guatemala** | 21 000 |
| **Guyana** | 21 000 |
| **Haiti** | 21 000 |
| **Holy See** | 29 000 |
| **Honduras** | 21 000 |
| **Hungary** | 847 000 |
| **Iceland** | 29 000 |
| **India** | 3 036 000 |
| **Indonesia** | 279 000 |
| **Iran, Islamic Republic of** | 13 110 000 |
| **Iraq** | 202 000 |
| **Ireland** | 50 000 |
| **Israel** | 128 000 |
| **Italy** | 902 000 |
| **Jamaica** | 133 000 |
| **Japan** | 18 993 000 |
| **Jordan** | 130 000 |
| **Kazakhstan** | 2 205 000 |
| **Kenya** | 29 000 |
| **Kiribati** | 21 000 |
| **Korea, Republic of** | 4 415 000 |
| **Kuwait** | 29 000 |
| **Kyrgyzstan** | 127 000 |

| State | Estimated regular budget cost (€) |
|---|---|
| **Lao People's Democratic Republic** | 21 000 |
| **Latvia** | 100 000 |
| **Lebanon** | 21 000 |
| **Lesotho** | 57 000 |
| **Libya** | 200 000 |
| **Liechtenstein** | 21 000 |
| **Lithuania** | 809 000 |
| **Luxembourg** | 34 000 |
| **Madagascar** | 29 000 |
| **Malawi** | 21 000 |
| **Malaysia** | 119 000 |
| **Maldives** | 21 000 |
| **Mali** | 29 000 |
| **Malta** | 29 000 |
| **Marshall Islands** | 21 000 |
| **Mauritania** | 21 000 |
| **Mauritius** | 29 000 |
| **Mexico** | 680 000 |
| **Monaco** | 29 000 |
| **Mongolia** | 29 000 |
| **Montenegro** | 29 000 |
| **Morocco** | 133 000 |
| **Mozambique** | 21 000 |
| **Myanmar** | 174 000 |
| **Namibia** | 46 000 |
| **Nauru** | 21 000 |
| **Nepal** | 21 000 |
| **Netherlands** | 2 639 000 |
| **New Zealand** | 127 000 |
| **Nicaragua** | 29 000 |
| **Niger** | 105 000 |
| **Nigeria** | 126 000 |
| **Norway** | 392 000 |
| **Oman** | 21 000 |
| **Pakistan** | 1 395 000 |
| **Palau** | 21 000 |
| **Panama** | 21 000 |
| **Papua New Guinea** | 21 000 |
| **Paraguay** | 29 000 |
| **Peru** | 121 000 |
| **Philippines** | 167 000 |
| **Poland** | 259 000 |
| **Portugal** | 117 000 |
| **Qatar** | 21 000 |

| State | Estimated regular budget cost (€) |
|---|---|
| **Republic of Moldova** | 34 000 |
| **Romania** | 1 528 000 |
| **Russian Federation** | 0 |
| **Rwanda** | 21 000 |
| **Saint Kitts and Nevis** | 21 000 |
| **Saint Lucia** | 21 000 |
| **Saint Vincent and the Grenadines** | 21 000 |
| **Samoa** | 21 000 |
| **San Marino** | 21 000 |
| **Saudi Arabia** | 35 000 |
| **Senegal** | 21 000 |
| **Serbia** | 136 000 |
| **Seychelles** | 29 000 |
| **Sierra Leone** | 21 000 |
| **Singapore** | 29 000 |
| **Slovakia** | 474 000 |
| **Slovenia** | 248 000 |
| **Solomon Islands** | 21 000 |
| **South Africa** | 2 546 000 |
| **Spain** | 1 822 000 |
| **Sri Lanka** | 21 000 |
| **Sudan** | 21 000 |
| **Suriname** | 21 000 |
| **Swaziland** | 21 000 |
| **Sweden** | 1 601 000 |
| **Switzerland** | 2 222 000 |
| **Syrian Arab Republic** | 298 000 |
| **Taiwan, China** | 0 |
| **Tajikistan** | 195 000 |
| **Thailand** | 101 000 |
| **The former Yugoslav Republic of Macedonia** | 34 000 |
| **Togo** | 21 000 |
| **Tonga** | 21 000 |
| **Trinidad and Tobago** | 21 000 |
| **Tunisia** | 21 000 |
| **Turkey** | 231 000 |
| **Turkmenistan** | 113 000 |
| **Tuvalu** | 21 000 |
| **Uganda** | 29 000 |
| **Ukraine** | 3 475 000 |
| **United Arab Emirates** | 156 000 |
| **United Kingdom of Great Britain and Northern Ireland** | 1 937 000 |
| **United Republic of Tanzania** | 34 000 |

| State | Estimated regular budget cost (€) |
|---|---|
| **United States of America** | 0 |
| **Uruguay** | 43 000 |
| **Uzbekistan** | 321 000 |
| **Vanuatu** | 29 000 |
| **Venezuela, Bolivarian Republic of** | 115 000 |
| **Viet Nam** | 251 000 |
| **Yemen** | 21 000 |
| **Zambia** | 21 000 |
| **Zimbabwe** | 21 000 |
| **Total estimation of safeguards cost by State[2]** | **107 052 000** |
| **Cost not allocated to individual States** | **23 609 248** |
| **Total costs** | **130 661 248** |

(1) Safeguards implementation costs for the Russian Federation and the United States of America were covered by extrabudgetary contribution.
(2) For Taiwan, China costs for safeguards measures applied were reimbursed by contribution to the regular budget.

## F.2. Human resources

### F.2.1. Staff resources

173. As of 31 December 2015, the total number of regular staff members in the Department of Safeguards was 687 (685): 451 (445) in the Professional category and 236 (240) in the General Service category. In addition, as of 31 December 2015, eight (four) consultants, 61 (58) staff members with temporary assistance contracts — 37 (32) Professional and 24 (26) General Service — 18 (14) cost-free experts and 19 (25) junior professional officers and other extrabudgetary staff were working in the Department.

174. As of 31 December 2015, the total number of inspectors in the Divisions of Operations was 239 (227). A further 146 (145) Professional staff members in other Divisions were available for inspection purposes.

175. There were 206 inspector-years available in 2015. These data have been calculated using a new methodology to more accurately represent the time that inspectors were expected to be available for in-field work, i.e. inspection, complementary access and design information verification. As of 2015, the methodology excludes Section Heads and Directors from the calculation as they do not directly participate in inspection work, reduces the time available for inspection work of Senior Inspectors to 50% and excludes the time necessary to train the newly recruited inspectors.

### F.2.2. Staff training

176. As the knowledge and skills required of its workforce evolve, so does the Agency's training curriculum. In 2015, a total of 6859 (6028) person-days of training were provided to Agency staff and personnel from State and regional authorities, of which 5399 (4727) person-days or 79% (78%) were for Agency staff (see Table 8). One hundred and twenty-five (88) different courses were held, some offered several times during the year, which amounted to a total of 187 (153) training courses, of which 34 (31) were held outside Agency Headquarters.

**Table 8 – Training, 2015**

| Course Categories | Number | Total Trainees (person-days) | Total Agency Instructors (person-days) |
|---|---|---|---|
| **Safeguards training** | 36 (36) | 3187 (3158) | 472 (380) |
| **Specialized safeguards training** | 28 (31) | 1490 (1375) | 317 (232) |
| **Refresher** | 2 (3) | 62 (99) | 15 (16) |
| **Others** | 7 (11) | 215 (145) | 67 (9) |
| **MOSAIC** | 45 | 690 | 80 |
| **Individual containment and surveillance training** | n/a | 70 (70) | 50 (50) |
| **Individual NDA training** | n/a | 70 (60) | 60 (45) |
| **Member States** | 7 (7) | 1075(1121) | 128 (152) |
| **Total** | **125 (88)** | **6859 (6028)** | **1189 (884)** |

177. In addition to the training received, in 2015, experienced Agency staff expended 1189 (884) person-days delivering training as instructors. Member States (the majority under MSSPs) also provided instructors and access to different types of nuclear facility, as required for various courses. The ICAS, including two comprehensive inspection exercises at a LWR to evaluate the trainees, was held for 23 (18) inspectors. In 2015, the Agency continued updating the ICAS to take the evolution of safeguards implementation in the Department into account. New training material was developed and emphasis was put on enhancing teaching methods by delivering training in a more interactive manner. During the year, the Agency conducted over 180 (146) safeguards training courses to provide safeguards staff with the necessary technical and behavioural skills, including specialized training as needed. Some of these training courses were held at nuclear facilities to enhance safeguards inspectors' and analysts' practical knowledge on collecting and verifying the safeguards relevant information, at the field and in Headquarters, in a consistent and integrated manner. In addition, the Agency developed several new training courses in line with needs of the Safeguards staff. For example, with the help of MSSPs, the Agency developed a new refresher comprehensive training course on NDA techniques.

## F.3. Support by Member States and outside expert groups

178. MSSPs continued to make substantial contributions (in cash and in kind) to Agency safeguards in 2015. As of 31 December 2015, 20 States[40] and the European Commission had formal support programmes.

179. SAGSI held two series of meetings in 2015. Topics discussed included State-level concept and State-level safeguards approach related issues; development of a model State-level safeguards approach for States with modified SQPs and the broader conclusion; dialogue with States on safeguards matters; the communication strategy of the Department of Safeguards; an update on the performance indicators initiative in the Department; the MOSAIC project; collecting, processing and analysing safeguards relevant information; the Department's competency framework; and the Safeguards Implementation Report.

[40] MSSPs are provided by Argentina, Australia, Belgium, Brazil, Canada, China, Czech Republic, Finland, France, Germany, Hungary, Japan, Netherlands, Republic of Korea, Russian Federation, South Africa, Spain, Sweden, United Kingdom and United States of America.

# G. Further Activities Supporting the Nuclear Non-Proliferation Regime

180. Two additional important areas of Agency work, which are not covered by the implementation of safeguards agreements and additional protocols, are relevant to its verification tasks: the voluntary reporting scheme and monitoring of separated neptunium and americium.

## G.1. Voluntary reporting scheme

181. As of the end of 2015, 37 States[41] and the European Commission had committed to participating in the voluntary reporting scheme on nuclear material, specified equipment and non-nuclear material. The list of the specified equipment and non-nuclear material to be used for the voluntary reporting scheme is incorporated in the *Model Additional Protocol* (INFCIRC/540 (Corrected), Annex II). China and the European Commission reported under the voluntary reporting scheme on the export, import and production of nuclear material and six States[42] reported on the export and import of non-nuclear material and equipment.

## G.2. Monitoring neptunium and americium

182. In 1999, the Board of Governors endorsed the implementation of a scheme to monitor separated neptunium and decided that the Director General should report to the Board, when appropriate, on information from States regarding separated americium.[43] Following the Board's decisions, letters were sent to 39 States[44] seeking relevant information about inventories, exports and separation of neptunium and americium, and a commitment to provide annual updates. In the intervening years, the Agency's State evaluation process has evolved to consider all safeguards relevant information available about States, including information on separated neptunium and americium. This information complements the initial reports and the annual reports received from States under the neptunium and americium monitoring scheme.

183. During 2015, the Agency received the requested information from six States[2, 45] and the European Commission. Evaluation of the information provided by States under the monitoring scheme, in conjunction with information obtained from open and other sources in the course of the State evaluation process, indicates that the quantities of separated neptunium and americium in the non-nuclear-weapon States that are party to the NPT remain small, the elements are being separated in only very small quantities, and only small quantities of the elements are being exported to these States. This evaluation, therefore, does not indicate that a specific proliferation risk currently exists.

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[41] Argentina, Australia, Austria, Belgium, Brazil, Bulgaria, China, Croatia, Democratic Republic of the Congo, Denmark, Finland, France, Germany, Greece, Hungary, Indonesia, Ireland, Italy, Liechtenstein, Luxembourg, Mexico, the Netherlands, New Zealand, Norway, Peru, Poland, Portugal, Republic of Korea, Romania, Slovenia, South Africa, Spain, Sweden, Switzerland, Turkey, United Kingdom and the United States of America.

[42] Reports were received from Denmark, Germany, Liechtenstein, Sweden, United Kingdom and United States of America.

[43] GOV/1999/19/Rev.2.

[44] Letters were sent to Argentina, Armenia, Australia, Azerbaijan, Belarus, Belgium, Brazil, Canada, China, Czech Republic, Estonia, France, Georgia, Germany, India, Indonesia, Israel, Italy, Japan, Kazakhstan, Kyrgyzstan, Latvia, Lithuania, Norway, Pakistan, Poland, Russian Federation, Republic of Korea, Republic of Moldova, Spain, Sweden, Switzerland, Tajikistan, Turkmenistan, United Kingdom, United States of America, Ukraine, Uzbekistan and Venezuela. Letters were also sent to the European Commission and Taiwan, China. All States responded except Armenia, Georgia, Kyrgyzstan, Republic of Moldova, Turkmenistan and Venezuela.

[45] Canada, Czech Republic, France, Japan, United Kingdom and Uzbekistan.

184. In 2015, no flow sheet verification was carried out at the European Commission's Institute for Transuranium Elements in Karlsruhe, Germany. The next flow sheet verification is scheduled to be performed in 2016. The flow sheet verification activities at the Rokkasho and Tokai reprocessing plants in Japan were put on hold due to the shutdown status of these facilities during 2015.

# Abbreviations

| | |
|---|---|
| ABACC | Brazilian-Argentine Agency for the Accounting and Control of Nuclear Material |
| CANDU | Canadian deuterium uranium reactor |
| DPRK | Democratic People's Republic of Korea |
| ECAS | Enhancing the capability of the Safeguards Analytical Services |
| EPGR | Encapsulation Plant and Geological Repository |
| EURATOM | European Atomic Energy Community |
| ICAS | Introductory Course on Agency Safeguards |
| ICR | inventory change report |
| INFCIRC | Information Circular |
| JCPOA | Joint Comprehensive Plan of Action |
| JPA | Joint Plan of Action |
| LOF | location outside facilities where nuclear material is customarily used |
| LWR | light water reactor |
| MBA | material balance area |
| MBR | material balance report |
| MOSAIC | Modernization of Safeguards Information Technology |
| MSSP | Member State Support Programme |
| NDA | non-destructive assay |
| NGSS | next generation surveillance system |
| NML | Nuclear Material Laboratory (Seibersdorf) |
| NPT | Treaty on the Non-Proliferation of Nuclear Weapons |
| NWAL | Network of Analytical Laboratories |
| PIL | physical inventory listing |
| RSAC | regional system of accounting for and control of nuclear material |
| SAGSI | Standing Advisory Group on Safeguards Implementation |
| SAL | Safeguards Analytical Laboratories (Seibersdorf) |
| SQP | small quantities protocol |
| SSAC | State system of accounting for and control of nuclear material |

# Appendix I. Data on Safeguards Activities — Aggregated for All States

1. Data regarding safeguards activities in 2015 set out below are aggregated for all States.[1, 2]

## I.1. Facilities, LOFs and material under Agency safeguards

2. During 2015, 709 (704) facilities and 577 (563) material balance areas (MBAs) containing locations outside facilities where nuclear material is customarily used (LOFs) were under safeguards. The 1286 (1267) facilities and MBAs containing LOFs under Agency safeguards were:

- 254 (250) power reactors — 214 (214) light water reactors, 33 (31) on-load refuelled reactors and seven (five) other type reactors;
- 154 (154) facilities with research reactors and critical assemblies;
- 91 (93) bulk handling facilities: 18 (18) conversion plants, 19 (20) enrichment plants, 44 (45) fuel fabrication plants, ten (ten) reprocessing plants;
- 131 (131) separate storage facilities;
- 79 (76) other-type facilities (including 14 associated with enrichment and reprocessing technology); and
- 577 (563) MBAs containing LOFs with small amounts of nuclear material (including 12 associated with enrichment or reprocessing technology).

3. The change in the number of facilities and MBAs containing LOFs under Agency safeguards over the last five years is shown in Figure I.1. Compared with 2011, the number of facilities and MBAs shows an increase of 6%.

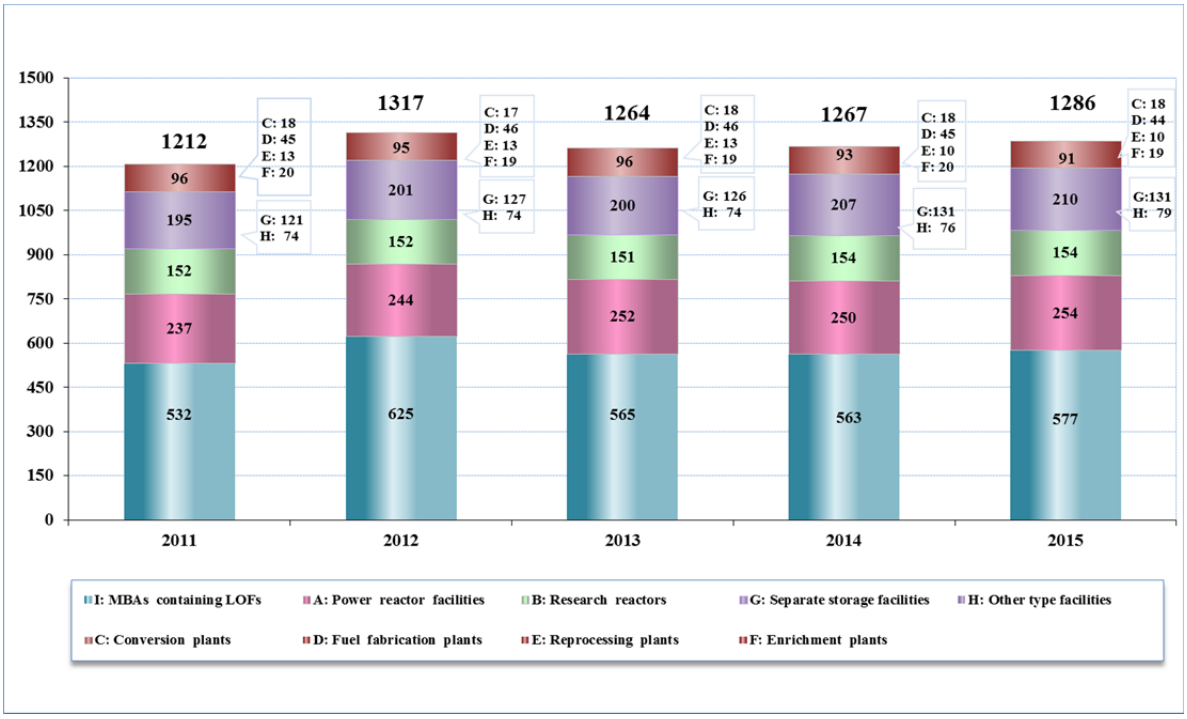


***Figure I.1. Facilities[46] and MBAs containing LOFs under Agency safeguards, 2011–2015***

[46] The facilities in Figure I.1. are categorized as per GOV/INF/361.

4. At the end of 2015, 200 110[47] (193 467) significant quantities[48] of nuclear material were under safeguards, an increase of 13% compared with 2011, as shown in Figure I.2. Of this total, 162 820 (157 754) significant quantities were in States[2] with comprehensive safeguards agreements, 3007 (3037) significant quantities in States with INFCIRC/66/Rev.2-type agreements and 34 283 (32 676) significant quantities in facilities selected in States with voluntary offer agreements.

5. Data are presented below according to material type under safeguards:

- 12 162 (12 329) significant quantities of unirradiated plutonium, including fresh mixed oxide fuel, outside reactor cores;
- 153 092 (149 284) significant quantities of plutonium contained in irradiated fuel and in fuel elements in reactor cores;
- 189 (193) significant quantities of high enriched uranium and 18 (18) significant quantities of uranium-233;
- 20 426 (18 605) significant quantities of low enriched uranium; and
- 14 224 (13 038) significant quantities of thorium and depleted and natural uranium.

Safeguards were also applied to 431 (432) tonnes of heavy water.

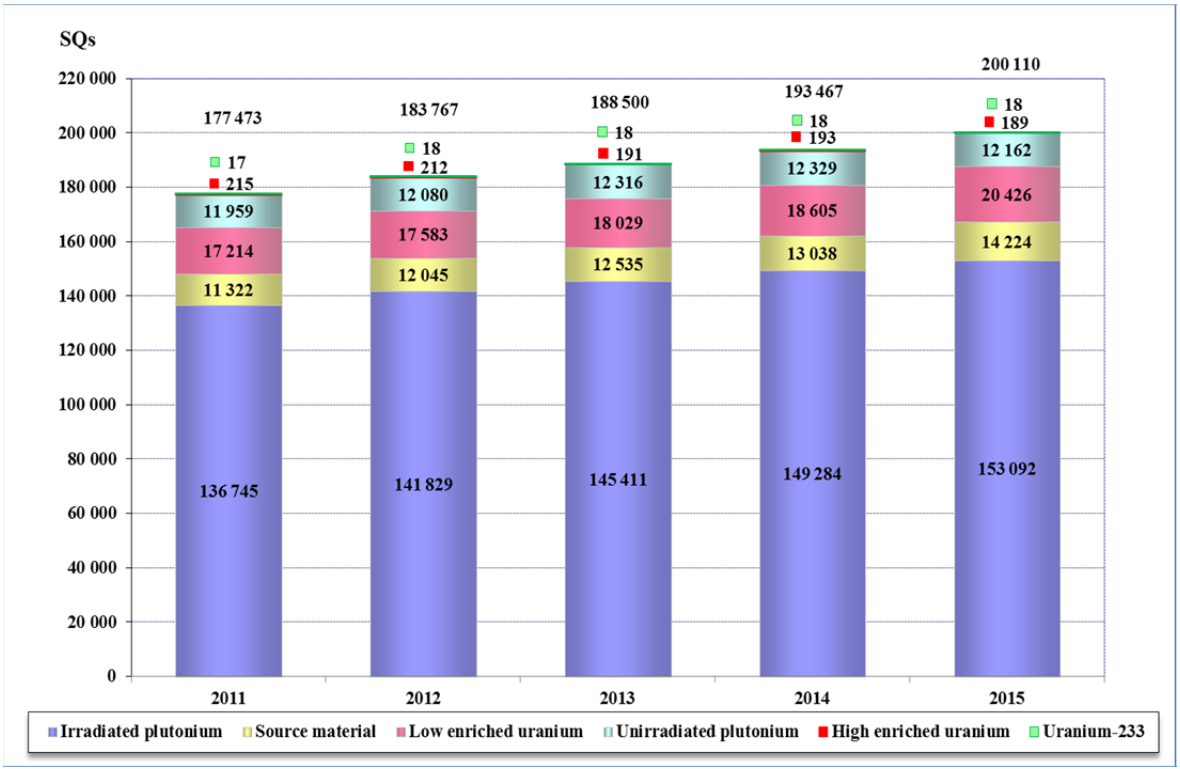


***Figure I.2. Significant quantities of nuclear material under Agency safeguards, 2011–2015***

[47] This amount includes an estimated 10 800 (11 110) significant quantities of plutonium contained in irradiated fuel assemblies in reactor which, under the agreed reporting procedures, had not yet been separately reported to the Agency.

[48] Significant quantity figures rounded to the nearest integer.

## I.2. Safeguards agreement reporting and verification activities

6. The following accounting reports were received by the Agency in 2015:

- 782 511 (961 496) inventory change reports (ICRs).
- 1280 (1254) physical inventory listings (PILs).
- 1287 (1230) material balance reports (MBRs).

7. The following verification activities were carried out in 2015:

- Inspections and design information verifications were performed at facilities and LOFs representing 13 248 (12 590.5) calendar-days in the field for verification.
- 2346 (2683)[49] surveillance and monitoring systems were reviewed.
- Agency seals:
  - 12 663 (13 081) metal seals applied to nuclear material or Agency safeguards equipment were detached and subsequently verified at Headquarters; and
  - 6399 (5207) electronic and other types of seals.
- Agency/EURATOM common seals:
  - 2564 (3028) metal seals applied to nuclear material or Agency safeguards equipment were detached and subsequently verified at Luxembourg; and
  - 1713 (1851) electronic seals.
- 231 (254) environmental swipe samples and 41 (85) samples for other analysis were collected in 2015.

The Agency dispatched 3004 (2898) statements on the results of inspections, conclusions, safeguards transfer agreement letters (to States with INFCIRC/66/Rev.2-type agreements), design information verification acknowledgement letters and inventories of nuclear material reports.

## I.3. Additional protocol reporting and verification activities

8. Since 2011, the number of States with additional protocols in force has increased by 36% and the number of additional protocol declarations evaluated by the Agency has increased by 8%. During 2015, 2171 (2141) declarations were received from 127 (104) States[2] and the European Commission.

9. Since 2011, the number of complementary accesses has fluctuated according to the Agency's need to clarify its knowledge on States. Data regarding the implementation of additional protocol activities in 2015 are as follows:

- 64 (78) complementary accesses were conducted in 20 (23) States[2] representing 135 (143.5) calendar-days in the field for verification.
- 43 (54) environmental swipe samples and eight (23) samples for other analysis were taken during complementary access in 11 (13) States and two (four) States, respectively.

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[49] This figure includes media items and data streams produced by surveillance and monitoring systems and reviewed during 2015.

- The Agency dispatched:
  - 66 (68) statements on the activities carried out under the additional protocol (10.a. statements);
  - 23 (four) statements on the results of activities in respect of questions or inconsistencies that the Agency brought to the attention of a State (10.b. statements); and
  - 22 (17) statements on conclusions drawn from additional protocol activities (10.c. statements).

# Appendix II. Data on Safeguards Activities — by Group and by State

## Group 1: States[2] with both comprehensive safeguards agreements and additional protocols in force, with the broader conclusion and integrated safeguards implemented during 2015

**Table II.1 – Amount of nuclear material, in significant quantities, under Agency safeguards at the end of 2015**

| Unirradiated plutonium | Unirradiated high enriched uranium | Unirradiated uranium-233 | Irradiated plutonium | Irradiated high enriched uranium | Irradiated uranium-233 | Low enriched uranium | Natural uranium | Depleted uranium | Thorium | Total significant quantities |
|---|---|---|---|---|---|---|---|---|---|---|
| **1674** | **43** | **1** | **125 074** | **104** | **17** | **17 881** | **3317** | **6456** | **2** | **154 568** |

Note: Heavy water under safeguards: <1 tonne. Significant quantity figures rounded to the nearest integer.

**Table II.2 – Summary of facility based verification activities by installation category in 2015**

| | Power reactors | Research reactors | Conversion plants | Fuel fabrication plants | Reprocessing plants | Enrichment plants | Separate storage facilities | Other facilities | Material balance areas containing LOFs | Total |
|---|---|---|---|---|---|---|---|---|---|---|
| **Number of facilities and MBAs containing LOFs under safeguards** | 217 | 102 | 9 | 30 | 9 | 5 | 107 | 56 | 479 | **1014** |
| **Number of facilities and LOFs inspected** | 169 | 49 | 7 | 22 | 8 | 5 | 74 | 36 | 38 | **408** |
| **Number of inspections** | 580 | 165 | 36 | 103 | 41 | 81 | 240 | 82 | 41 | **1369** |
| **Number of design information verification visits** | 130 | 53 | 6 | 22 | 8 | 5 | 75 | 36 | 7 | **342** |
| **Number of person-days of inspection** | 1136 | 445 | 225 | 699 | 458 | 326 | 567 | 163 | 70 | **4089** |

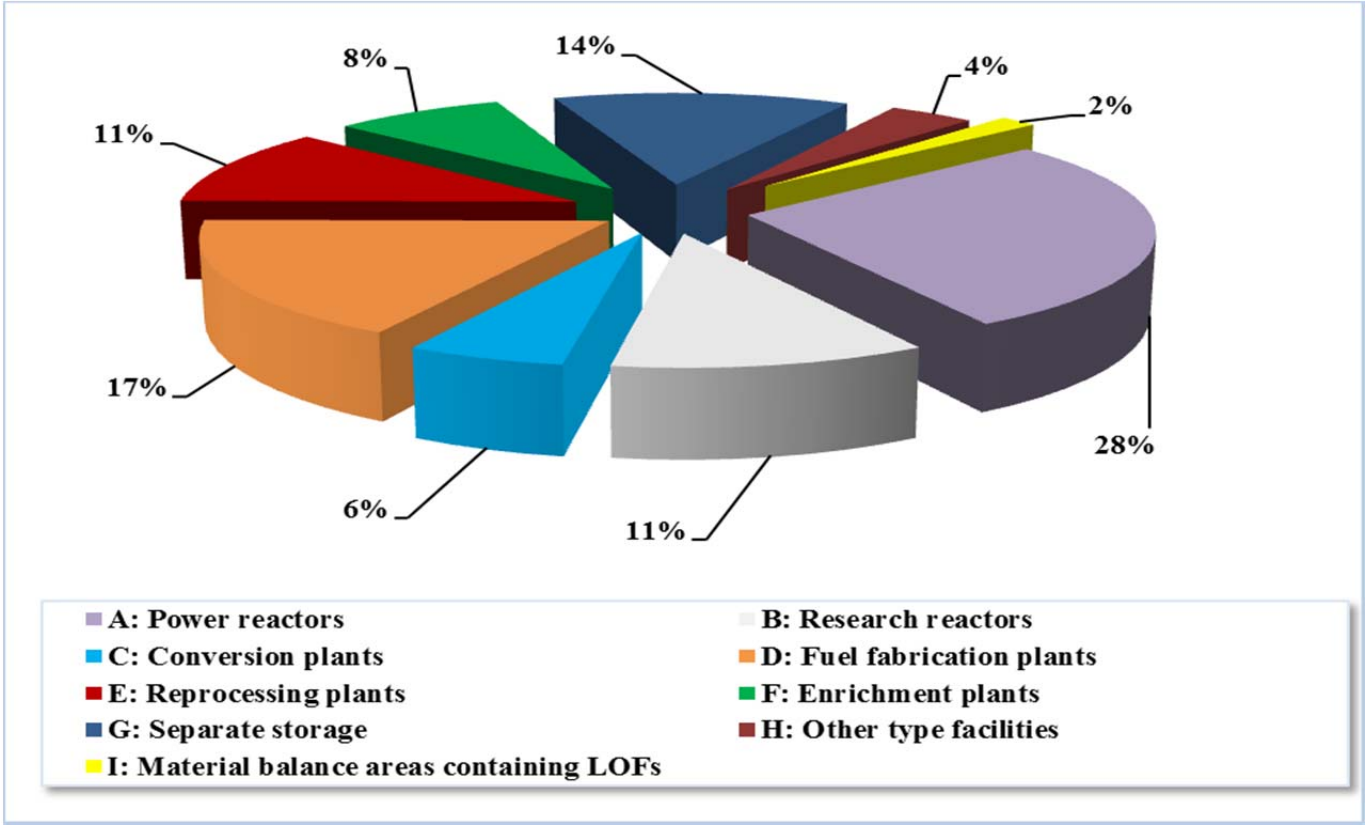


***Figure II.1. Distribution of inspection effort (person-days of inspection) by facility category for States with comprehensive safeguards agreement, broader conclusion, additional protocol and integrated safeguards the whole year***

**Table II.3 – Verification activities in 2015**

| States | Facilities under safeguards | Material balance areas containing LOFs under safeguards | Number of facilities and LOFs inspected | Total number of inspections | Number of design information verifications | Number of complementary accesses | Person-days of inspection | Calendar-days in the field for verification | Numbers of ICR reporting units received | Numbers of PIL reporting units received | Numbers of MBR reporting units received | Number of additional protocol declarations received |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Armenia** | 3 | 1 | 3 | 10 | 2 | 0 | 24 | 42 | 481 | 3 | 3 | 15 |
| **Australia** | 5 | 1 | 3 | 4 | 5 | 3 | 10 | 33 | 1166 | 5 | 5 | 56 |
| **Austria** | 1 | 6 | 0 | 0 | 2 | 0 | 0 | 3 | 151 | 7 | 7 | 18 |
| **Bangladesh** | 1 | 1 | 2 | 2 | 1 | 1 | 4 | 12 | 0 | 4 | 4 | 14 |
| **Belgium** | 23 | 9 | 22 | 136 | 31 | 1 | 183 | 281 | 21 345 | 28 | 28 | 22 |
| **Bulgaria** | 6 | 3 | 3 | 10 | 5 | 0 | 14 | 32 | 1347 | 11 | 11 | 16 |
| **Burkina Faso** | 0 | 1(1) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 13 |
| **Canada** | 34 | 8 | 30 | 153 | 19 | 6 | 564 | 1011.5 | 7664 | 49 | 49 | 40 |
| **Chile** | 4 | 1 | 0 | 0 | 0 | 1 | 0 | 9 | 17 | 5 | 5 | 12 |
| **Croatia** | 0 | 1(1) | 1 | 1 | 0 | 0 | 6 | 10 | 0 | 0 | 0 | 13 |
| **Cuba** | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 6 | 2 | 2 | 16 |
| **Czech Republic** | 12 | 2 | 11 | 41 | 11 | 0 | 51 | 77 | 4414 | 14 | 14 | 22 |
| **Denmark(2)** | 4 | 5 | 2 | 2 | 4 | 0 | 2 | 4.5 | 24 | 7 | 7 | 27 |
| **Ecuador** | 0 | 1(1) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 14 |
| **Estonia** | 1 | 2 | 2 | 2 | 1 | 0 | 2 | 4 | 17 | 6 | 6 | 9 |
| **Finland** | 10 | 4 | 4 | 11 | 6 | 0 | 14 | 38 | 1722 | 8 | 8 | 19 |

| States | Facilities under safeguards | Material balance areas containing LOFs under safeguards | Number of facilities and LOFs inspected | Total number of inspections | Number of design information verifications | Number of complementary accesses | Person-days of inspection | Calendar-days in the field for verification | Numbers of ICR reporting units received | Numbers of PIL reporting units received | Numbers of MBR reporting units received | Number of additional protocol declarations received |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Germany** | 70 | 82 | 50 | 222 | 47 | 7 | 363 | 704 | 39 026 | 136 | 135 | 80 |
| **Ghana** | 1 | 0 | 1 | 1 | 1 | 0 | 2 | 7 | 0 | 1 | 1 | 13 |
| **Greece** | 1 | 5 | 0 | 0 | 0 | 1 | 0 | 6 | 0 | 3 | 3 | 16 |
| **Holy See** | 0 | 1(b) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 13 |
| **Hungary** | 6 | 2 | 4 | 15 | 4 | 0 | 19 | 43 | 2523 | 8 | 8 | 21 |
| **Iceland** | 0 | 1(b) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 13 |
| **Indonesia** | 7 | 1 | 3 | 4 | 2 | 2 | 12 | 28 | 101 | 8 | 8 | 17 |
| **Ireland** | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 14 |
| **Italy** | 24 | 28 | 16 | 23 | 12 | 0 | 30 | 55 | 525 | 56 | 55 | 29 |
| **Jamaica** | 1 | 1 | 1 | 1 | 1 | 0 | 5 | 9 | 3 | 2 | 2 | 13 |
| **Japan** | 125 | 200 | 103 | 299 | 55 | 16 | 1537 | 2836 | 21 969 | 321 | 321 | 220 |
| **Korea, Republic of** | 45 | 2 | 29 | 63 | 14 | 5 | 325 | 635 | 8198 | 46 | 46 | 22 |
| **Latvia** | 1 | 2 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 4 | 4 | 14 |
| **Libya** | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 22 |
| **Lithuania** | 4 | 19 | 2 | 8 | 4 | 1 | 31 | 51 | 106 | 15 | 15 | 17 |
| **Luxembourg** | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 26 | 0 | 0 | 13 |
| **Madagascar** | 0 | 1(b) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 16 |
| **Mali** | 0 | 1(b) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 14 |

| States | Facilities under safeguards | Material balance areas containing LOFs under safeguards | Number of facilities and LOFs inspected | Total number of inspections | Number of design information verifications | Number of complementary accesses | Person-days of inspection | Calendar-days in the field for verification | Numbers of ICR reporting units received | Numbers of PIL reporting units received | Numbers of MBR reporting units received | Number of additional protocol declarations received |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Malta** | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 13 |
| **Monaco** | 0 | 1(c) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 13 |
| **Netherlands** | 9 | 8 | 7 | 55 | 7 | 2 | 153 | 255.5 | 26 987 | 16 | 16 | 22 |
| **Norway** | 3 | 1 | 3 | 5 | 3 | 0 | 15 | 29 | 119 | 5 | 5 | 13 |
| **Palau** | 0 | 1(c) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Peru** | 2 | 0 | 0 | 0 | 0 | 1 | 0 | 5.5 | 0 | 0 | 0 | 12 |
| **Poland** | 3 | 4 | 2 | 4 | 1 | 0 | 8 | 20 | 1408 | 7 | 7 | 15 |
| **Portugal** | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 8 | 2 | 2 | 14 |
| **Romania** | 9 | 1 | 7 | 29 | 7 | 0 | 82 | 119 | 88 429 | 8 | 8 | 17 |
| **Seychelles** | 0 | 1(c) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 14 |
| **Singapore** | 0 | 1(c) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 14 |
| **Slovakia** | 7 | 1 | 5 | 13 | 7 | 0 | 15 | 27 | 1954 | 7 | 7 | 15 |
| **Slovenia** | 2 | 14 | 1 | 4 | 1 | 0 | 5 | 11 | 455 | 7 | 7 | 15 |
| **South Africa** | 18 | 3 | 15 | 59 | 16 | 3 | 180 | 380.5 | 2685 | 19 | 19 | 16 |
| **Spain** | 16 | 16 | 15 | 53 | 17 | 0 | 97 | 178 | 7144 | 30 | 30 | 26 |
| **Sweden** | 17 | 10 | 17 | 40 | 17 | 0 | 82 | 148.5 | 23 411 | 24 | 25 | 26 |
| **The former Yugoslav Republic of Macedonia** | 0 | 1(c) | 0 | 0 | 0 | 0 | 0 | 0 | 6 | 1 | 0 | 26 |

| States | Facilities under safeguards | Material balance areas containing LOFs under safeguards | Number of facilities and LOFs inspected | Total number of inspections | Number of design information verifications | Number of complementary accesses | Person-days of inspection | Calendar-days in the field for verification | Numbers of ICR reporting units received | Numbers of PIL reporting units received | Numbers of MBR reporting units received | Number of additional protocol declarations received |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Ukraine** | 37 | 8 | 28 | 74 | 27 | 3 | 203 | 348.5 | 5114 | 38 | 38 | 19 |
| **Uruguay** | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 14 |
| **Uzbekistan** | 2 | 7 | 4 | 5 | 2 | 0 | 18 | 44 | 87 | 13 | 13 | 13 |
| **Total for 54 States** | 518 | 478 | 397 | 1350 | 333 | 53 | 4057 | 7498.5 | 268 639 | 928 | 926 | 1210 |
| **Taiwan, China** | 17 | 1 | 11 | 19 | 9 | 1 | 32 | 88.5 | 2706 | 15 | 15 | 27 |
| **Total for States and Taiwan, China** | 535 | 479 | 408 | 1369 | 342 | 54 | 4089 | 7587 | 271 345 | 943 | 941 | 1237 |
| **Total for EURATOM States[3]** | **228** | **227** | **171** | **669** | **185** | **12** | **1152** | **2058.5** | **221 023** | **405** | **404** | **500** |

[1] MBAs in States with SQPs based on the revised standard text.
[2] Includes additional protocol declarations submitted by Denmark with regard to Greenland.
[3] In addition to 500 additional protocol declarations for EURATOM States, there are 17 additional protocol declarations for locations of the European Commission.

# Group 2: States with both comprehensive safeguards agreements and additional protocols in force, with the broader conclusion and integrated safeguards not implemented, during 2015

**Table II.4 – Amount of nuclear material, in significant quantities, under Agency safeguards at the end of 2015**

| Unirradiated plutonium | Unirradiated high enriched uranium | Unirradiated uranium-233 | Irradiated plutonium | Irradiated high enriched uranium | Irradiated uranium-233 | Low enriched uranium | Natural uranium | Depleted uranium | Thorium | Total significant quantities |
|---|---|---|---|---|---|---|---|---|---|---|
| **3** | **1** | **0** | **2931** | **34** | **0** | **491** | **33** | **59** | **10** | **3562** |

Note: Significant quantity figures rounded to the nearest integer.

**Table II.5 – Summary of facility based verification activities by installation category in 2015**

| | Power reactors | Research reactors | Conversion plants | Fuel fabrication plants | Reprocessing plants | Enrichment plants | Separate storage facilities | Other facilities | Material balance areas containing LOFs | Total |
|---|---|---|---|---|---|---|---|---|---|---|
| **Number of facilities and MBAs containing LOFs under safeguards** | 11 | 12 | 0 | 2 | 0 | 0 | 8 | 2 | 15 | **50** |
| **Number of facilities and LOFs inspected** | 6 | 11 | 0 | 2 | 0 | 0 | 6 | 2 | 8 | **35** |
| **Number of inspections** | 22 | 31 | 0 | 6 | 0 | 0 | 20 | 4 | 8 | **91** |
| **Number of design information verifications** | 6 | 12 | 0 | 3 | 0 | 0 | 6 | 2 | 1 | **30** |
| **Number of person-days of inspection** | 74 | 72 | 0 | 100 | 0 | 0 | 54 | 58 | 26 | **384** |

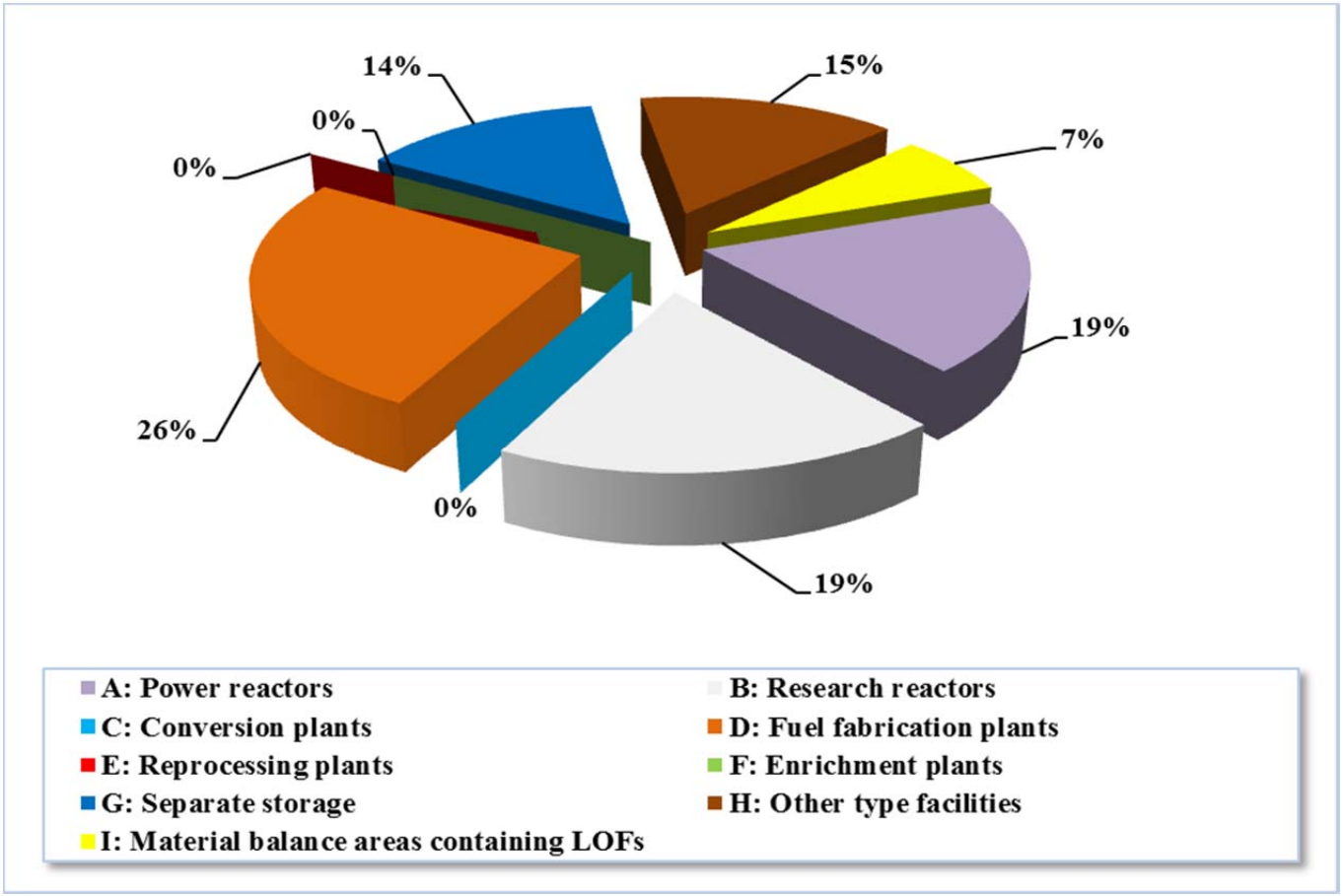


***Figure II.2. Distribution of inspection effort (person-days of inspection) by facility category for States with comprehensive safeguards agreement, additional protocol with broader conclusion, and no integrated safeguards***

**Table II.6 – Verification activities in 2015**

| States | Facilities under safeguards | Material balance areas containing LOFs under safeguards | Number of facilities and LOFs inspected | Total number of inspections | Number of design information verifications | Number of complementary accesses | Person-days of inspection | Calendar-days in the field for verification | Numbers of ICR reporting units received | Numbers of PIL reporting units received | Numbers of MBR reporting units received | Number of additional protocol declarations received |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Albania** | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 14 |
| **Andorra** | 0 | 1(1) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 14 |
| **Botswana** | 0 | 1 | 1 | 1 | 0 | 0 | 2 | 8 | 6 | 1 | 1 | 12 |
| **Jordan** | 1 | 2 | 2 | 2 | 2 | 0 | 4 | 7 | 0 | 2 | 0 | 12 |
| **Kazakhstan** | 11 | 2 | 10 | 29 | 10 | 3 | 177 | 376 | 1723 | 12 | 12 | 34 |
| **Kuwait** | 0 | 1(1) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 14 |
| **Mauritius** | 0 | 1(1) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 14 |
| **New Zealand** | 0 | 1(1) | 1 | 1 | 0 | 0 | 6 | 15 | 0 | 0 | 0 | 38 |
| **Philippines** | 2 | 1 | 2 | 2 | 1 | 0 | 8 | 15 | 16 | 3 | 3 | 14 |
| **Switzerland** | 13 | 1 | 14 | 51 | 13 | 2 | 177 | 256 | 4569 | 14 | 14 | 24 |
| **Turkey** | 3 | 1 | 4 | 4 | 3 | 0 | 8 | 12 | 32 | 4 | 4 | 24 |
| **United Republic of Tanzania** | 0 | 1(1) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 13 |
| **Viet Nam** | 5 | 1 | 1 | 1 | 1 | 2 | 2 | 24 | 23 | 2 | 2 | 18 |
| **Total for 13 States** | **35** | **15** | **35** | **91** | **30** | **7** | **384** | **713** | **6369** | **40** | **37** | **245** |

(1) MBAs in States with SQPs based on the revised standard text.

# Group 3: States with both comprehensive safeguards agreements and additional protocols in force, without the broader conclusion

**Table II.7 – Amount of nuclear material, in significant quantities, under Agency safeguards at the end of 2015**

| Unirradiated plutonium | Unirradiated high enriched uranium | Unirradiated uranium-233 | Irradiated plutonium | Irradiated high enriched uranium | Irradiated uranium-233 | Low enriched uranium | Natural uranium | Depleted uranium | Thorium | Total significant quantities |
|---|---|---|---|---|---|---|---|---|---|---|
| **0** | **0** | **0** | **782** | **0** | **0** | **121** | **8** | **21** | **0** | **932** |

Note: Significant quantity figures rounded to the nearest integer.

**Table II.8 – Summary of facility based verification activities by installation category in 2015**

| | Power reactors | Research reactors | Conversion plants | Fuel fabrication plants | Reprocessing plants | Enrichment plants | Separate storage facilities | Other facilities | Material balance areas containing LOFs | Total |
|---|---|---|---|---|---|---|---|---|---|---|
| **Number of facilities and MBAs containing LOFs under safeguards** | 2 | 7 | 1 | 0 | 0 | 0 | 1 | 2 | 43 | **56** |
| **Number of facilities and LOFs inspected** | 2 | 6 | 1 | 0 | 0 | 0 | 0 | 1 | 10 | **20** |
| **Number of inspections** | 5 | 6 | 1 | 0 | 0 | 0 | 0 | 3 | 10 | **25** |
| **Number of design information verifications** | 2 | 6 | 1 | 0 | 0 | 0 | 0 | 1 | 2 | **12** |
| **Number of person-days of inspection** | 18 | 14 | 2 | 0 | 0 | 0 | 0 | 9 | 28 | **71** |

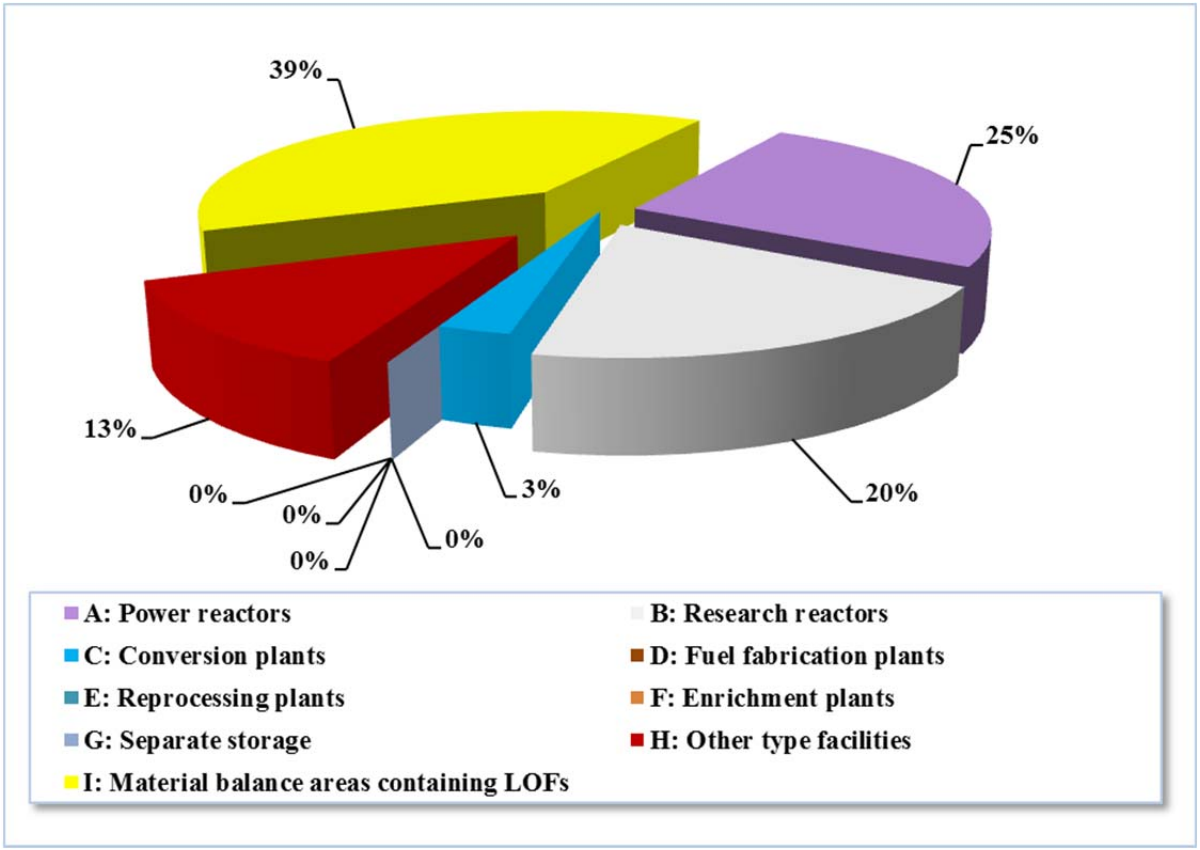


*Figure II.3. Distribution of inspection effort (person-days of inspection) by facility category for States with comprehensive safeguards agreement and additional protocol, without broader conclusion*

## Table II.9 – Verification activities in 2015

| States | Facilities under safeguards | Material balance areas containing LOFs under safeguards | Number of facilities and LOFs inspected | Total number of inspections | Number of design information verifications | Number of complementary accesses | Person-days of inspection | Calendar-days in the field for verification | Numbers of ICR reporting units received | Numbers of PIL reporting units received | Numbers of MBR reporting units received | Number of additional protocol declarations received |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Afghanistan** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| **Angola** | 0 | 1(b) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 28 |
| **Antigua and Barbuda** | 0 | 1(b) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Azerbaijan** | 0 | 1(b) | 0 | 0 | 0 | 0 | 0 | 0 | 20 | 1 | 0 | 31 |
| **Bahrain** | 0 | 1(b) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Bosnia and Herzegovina** | 0 | 1 | 1 | 1 | 0 | 0 | 4 | 8 | 0 | 1 | 1 | 108 |
| **Burundi** | 0 | 1(b) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Cambodia** | 0 | 1(b) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| **Central African Republic** | 0 | 1(b) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 14 |
| **Chad** | 0 | 1(b) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 13 |
| **Colombia** | 1 | 1 | 2 | 2 | 2 | 0 | 4 | 16 | 2 | 3 | 3 | 14 |
| **Comoros** | 0 | 1(b) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Congo** | 0 | 1(b) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Costa Rica** | 0 | 1(b) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Cyprus** | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 17 |
| **Democratic Republic of the Congo** | 1 | 0 | 1 | 1 | 1 | 0 | 2 | 6 | 0 | 1 | 1 | 4 |
| **Djibouti** | 0 | 1(b) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Dominican Republic** | 0 | 1(b) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

| States | Facilities under safeguards | Material balance areas containing LOFs under safeguards | Number of facilities and LOFs inspected | Total number of inspections | Number of design information verifications | Number of complementary accesses | Person-days of inspection | Calendar-days in the field for verification | Numbers of ICR reporting units received | Numbers of PIL reporting units received | Numbers of MBR reporting units received | Number of additional protocol declarations received |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **El Salvador** | 0 | 1(b) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 14 |
| **Fiji** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Gabon** | 0 | 1(b) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 26 |
| **Gambia** | 0 | 1(b) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Georgia** | 3 | 1 | 3 | 5 | 2 | 0 | 13 | 22 | 16 | 3 | 3 | 17 |
| **Guatemala** | 0 | 1(b) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Haiti** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Iraq** | 1 | 1 | 1 | 1 | 0 | 0 | 2 | 7 | 18 | 3 | 3 | 16 |
| **Kenya** | 0 | 1(b) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 13 |
| **Kyrgyzstan** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 33 |
| **Lesotho** | 0 | 1(b) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 16 |
| **Liechtenstein** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Malawi** | 0 | 1(b) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Marshall Islands** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Mauritania** | 0 | 1(b) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Mexico** | 4 | 2 | 6 | 9 | 5 | 1 | 28 | 47 | 277 | 6 | 6 | 20 |
| **Mongolia** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 14 |
| **Montenegro** | 0 | 1(b) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 15 |
| **Morocco** | 1 | 1 | 2 | 2 | 1 | 0 | 4 | 8 | 5 | 2 | 2 | 18 |
| **Mozambique** | 0 | 1(b) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Namibia** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 26 |
| **Nicaragua** | 0 | 1(b) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 13 |

| States | Facilities under safeguards | Material balance areas containing LOFs under safeguards | Number of facilities and LOFs inspected | Total number of inspections | Number of design information verifications | Number of complementary accesses | Person-days of inspection | Calendar-days in the field for verification | Numbers of ICR reporting units received | Numbers of PIL reporting units received | Numbers of MBR reporting units received | Number of additional protocol declarations received |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Niger** | 0 | 1 | 1 | 1 | 0 | 0 | 2 | 4 | 1 | 1 | 1 | 15 |
| **Nigeria** | 1 | 1 | 1 | 1 | 1 | 0 | 2 | 6 | 0 | 1 | 1 | 13 |
| **Panama** | 0 | 1[1] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Paraguay** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 10 |
| **Republic of Moldova** | 0 | 1[1] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 14 |
| **Rwanda** | 0 | 1[1] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Saint Kitts and Nevis** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Swaziland** | 0 | 1[1] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Tajikistan** | 1 | 1 | 1 | 1 | 0 | 0 | 6 | 12 | 0 | 0 | 0 | 12 |
| **Togo** | 0 | 1[1] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Turkmenistan** | 0 | 1 | 1 | 1 | 0 | 0 | 4 | 10 | 3 | 1 | 2 | 13 |
| **Uganda** | 0 | 1[1] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 14 |
| **United Arab Emirates** | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 8 | 0 | 0 | 0 | 19 |
| **Vanuatu** | 0 | 1[1] | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| **Total for 54 States** | **13** | **43** | **20** | **25** | **12** | **3** | **71** | **154** | **342** | **26** | **24** | **585** |

[1] MBAs in States with SQPs based on the revised standard text.

# Group 4: States with comprehensive safeguards agreements in force but without additional protocols in force

### Table II.10 – Amount of nuclear material, in significant quantities, under Agency safeguards at the end of 2015

| Unirradiated plutonium | Unirradiated high enriched uranium | Unirradiated uranium-233 | Irradiated plutonium | Irradiated high enriched uranium | Irradiated uranium-233 | Low enriched uranium | Natural uranium | Depleted uranium | Thorium | Total significant quantities |
|---|---|---|---|---|---|---|---|---|---|---|
| **0** | **5** | **0** | **3149** | **2** | **0** | **258** | **107** | **236** | **0** | **3758** |

Note: Significant quantity figures rounded to the nearest integer.

### Table II.11 – Summary of facility based verification activities by installation category in 2015

| | Power reactors | Research reactors | Conversion plants | Fuel fabrication plants | Reprocessing plants | Enrichment plants | Separate storage facilities | Other facilities | Material balance areas containing LOFs | Total |
|---|---|---|---|---|---|---|---|---|---|---|
| **Number of facilities and MBAs containing LOFs under safeguards** | 11 | 29 | 8 | 9 | 0 | 11 | 9 | 19 | 35 | **131** |
| **Number of facilities and LOFs inspected** | 6 | 18 | 7 | 9 | 0 | 11 | 4 | 18 | 9 | **82** |
| **Number of inspections** | 28 | 46 | 59 | 59 | 0 | 249 | 5 | 24 | 9 | **479** |
| **Number of design information verifications** | 9 | 44 | 24 | 31 | 0 | 47 | 4 | 41 | 6 | **206** |
| **Number of person-days of inspection** | 168 | 88 | 270 | 256 | 0 | 1707 | 10 | 51 | 17 | **2567** |

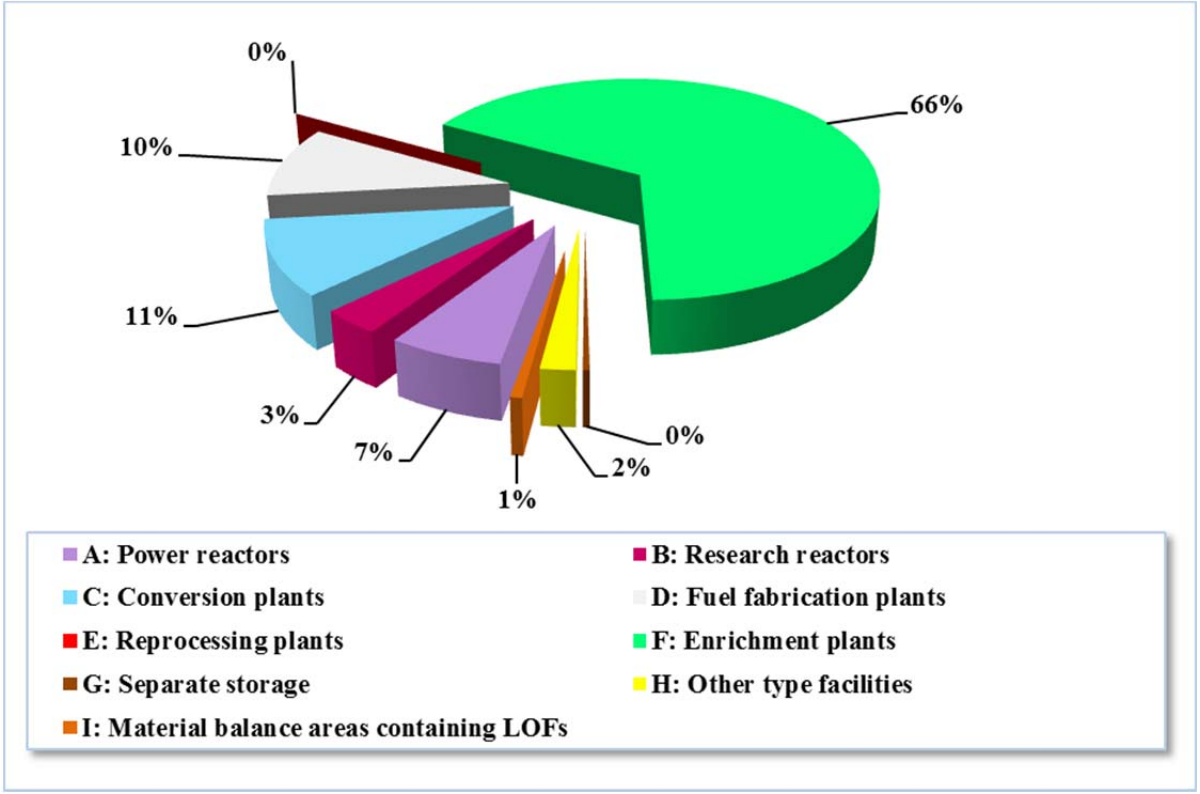


***Figure II.4. Distribution of inspection effort (person-days of inspection) by facility category for States with comprehensive safeguards agreement without additional protocol***

**Table II.12 – Verification activities in 2015**

| States | Facilities under safeguards | MBAs containing LOFs under safeguards | Number of facilities and LOFs inspected | Total number of inspections | Number of design information verifications | Person-days of inspection | Calendar-days in the field for verification | Numbers of ICR reporting units received | Numbers of PIL reporting units received | Numbers of MBR reporting units received |
|---|---|---|---|---|---|---|---|---|---|---|
| **Algeria** | 5 | 1 | 6 | 8 | 5 | 20 | 24 | 298 | 8 | 8 |
| **Argentina** | 34 | 14 | 27 | 42 | 31 | 159 | 281 | 1586 | 44 | 44 |
| **Bahamas** | 0 | 1(c) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Barbados** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Belarus, Republic of** | 4 | 2 | 1 | 12 | 1 | 20 | 48 | 504 | 3 | 4 |
| **Belize** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Bhutan** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Bolivia, Plurinational State of** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Brazil** | 22 | 4 | 18 | 46 | 20 | 167 | 362.5 | 1936 | 32 | 32 |
| **Brunei Darussalam** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Cameroon** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Côte d'Ivoire** | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Dominica** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Egypt** | 7 | 1 | 7 | 10 | 8 | 18 | 31 | 145 | 7 | 7 |
| **Ethiopia** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Grenada** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Guyana** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Honduras** | 0 | 1(c) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Iran, Islamic Republic of** | 18 | 1 | 16 | 354 | 136 | 2170 | 2600 | 10 645 | 29 | 29 |
| **Kiribati** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

| States | Facilities under safeguards | MBAs containing LOFs under safeguards | Number of facilities and LOFs inspected | Total number of inspections | Number of design information verifications | Person-days of inspection | Calendar-days in the field for verification | Numbers of ICR reporting units received | Numbers of PIL reporting units received | Numbers of MBR reporting units received |
|---|---|---|---|---|---|---|---|---|---|---|
| **Lao People's Democratic Republic** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Lebanon** | 0 | 1 (c) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Malaysia** | 1 | 0 | 1 | 1 | 1 | 2 | 8.5 | 0 | 1 | 1 |
| **Maldives** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Myanmar** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Nauru** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Nepal** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Oman** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Papua New Guinea** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Qatar** | 0 | 1 (c) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Saint Lucia** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Saint Vincent and the Grenadines** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Samoa** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **San Marino** | 0 | 1 (c) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Saudi Arabia** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Senegal** | 0 | 1 (c) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Serbia** | 1 | 2 | 3 | 3 | 1 | 6 | 8 | 20 | 4 | 4 |
| **Sierra Leone** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Solomon Islands** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Sri Lanka** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Sudan** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Suriname** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Syrian Arab Republic** | 1 | 1 | 1 | 1 | 1 | 2 | 5 | 0 | 2 | 2 |

| States | Facilities under safeguards | MBAs containing LOFs under safeguards | Number of facilities and LOFs inspected | Total number of inspections | Number of design information verifications | Person-days of inspection | Calendar-days in the field for verification | Numbers of ICR reporting units received | Numbers of PIL reporting units received | Numbers of MBR reporting units received |
|---|---|---|---|---|---|---|---|---|---|---|
| **Thailand** | 2 | 1 | 1 | 1 | 1 | 1 | 6 | 1 | 2 | 2 |
| **Tonga** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Trinidad and Tobago** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Tunisia** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Tuvalu** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Venezuela, Bolivarian Republic of** | 1 | 0 | 1 | 1 | 1 | 2 | 6 | 0 | 1 | 1 |
| **Yemen** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Zambia** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Zimbabwe** | 0 | 1 (1) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Total for 52 States** | **96** | **35** | **82** | **479** | **206** | **2567** | **3387** | **15 135** | **133** | **134** |
| **Total for ABACC States** | **56** | **18** | **45** | **88** | **51** | **326** | **643.5** | **3522** | **76** | **76** |

(1) MBAs in States with SQPs based on the revised standard text.

# Group 5: States with safeguards agreements based on INFCIRC/66/Rev.2 in force

### Table II.13 – Amount of nuclear material, in significant quantities, under Agency safeguards at the end of 2015

| Unirradiated plutonium | Unirradiated high enriched uranium | Unirradiated uranium-233 | Irradiated plutonium | Irradiated high enriched uranium | Irradiated uranium-233 | Low enriched uranium | Natural uranium | Depleted uranium | Thorium | Total significant quantities |
|---|---|---|---|---|---|---|---|---|---|---|
| **5** | **0** | **0** | **2231** | **1** | **0** | **213** | **536** | **21** | **0** | **3007** |

Note: Heavy water under safeguards: 430 tonnes. Significant quantity figures rounded to the nearest integer.

### Table II.14 – Summary of facility based verification activities by installation category in 2015

| | Power reactors | Research reactors | Conversion plants | Fuel fabrication plants | Reprocessing plants | Enrichment plants | Separate storage facilities | Other facilities | MBAs containing LOFs | Total |
|---|---|---|---|---|---|---|---|---|---|---|
| **Number of facilities and MBAs containing LOFs under safeguards** | 12 | 3 | 0 | 2 | 0 | 0 | 2 | 0 | 1 | **20** |
| **Number of facilities and LOFs inspected** | 12 | 3 | 0 | 2 | 0 | 0 | 2 | 0 | 1 | **20** |
| **Number of inspections** | 49 | 3 | 0 | 4 | 0 | 0 | 16 | 0 | 1 | **73** |
| **Number of design information verifications** | 15 | 3 | 0 | 2 | 0 | 0 | 2 | 0 | 0 | **22** |
| **Number of person-days of inspection** | 320 | 6 | 0 | 23 | 0 | 0 | 44 | 0 | 2 | **395** |

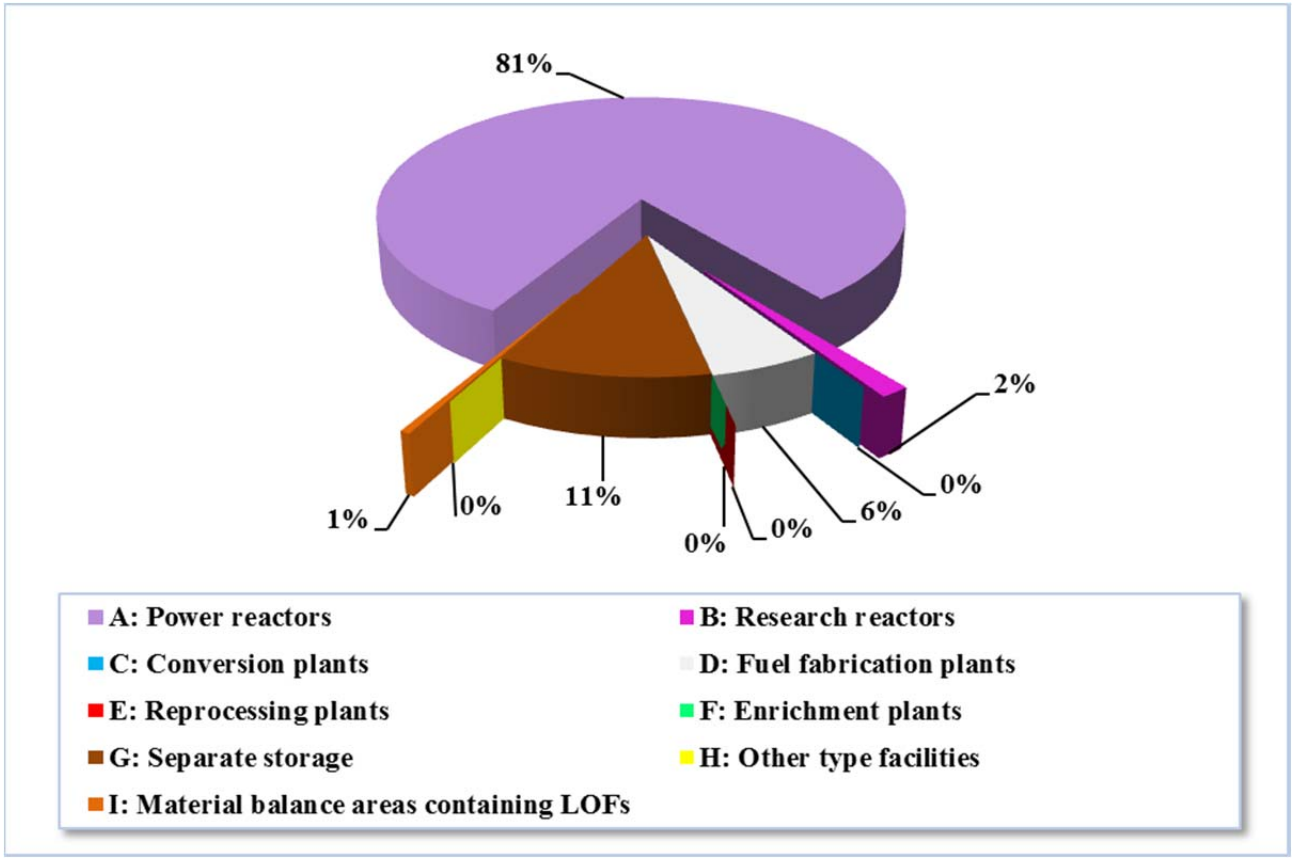


***Figure II.5. Distribution of inspection effort (person-days of inspection) by facility category for States with safeguards agreements based on INFCIRC/66/Rev.2.***

**Table II.15 – Verification activities in 2015**

| States | Facilities under safeguards | MBAs containing LOFs under safeguards | Number of facilities and LOFs inspected | Total number of inspections | Number of design information verifications | Person-days of inspection | Calendar-days in the field for verification | Number of accounting reports received | Number of additional protocol declarations received |
|---|---|---|---|---|---|---|---|---|---|
| **India** | 11 | 0 | 11 | 50 | 11 | 261 | 460 | 163 | 5 |
| **Israel** | 1 | 1 | 2 | 2 | 1 | 4 | 8 | 4 | 0 |
| **Pakistan** | 7 | 0 | 7 | 21 | 10 | 130 | 221.5 | 44 | 0 |
| **Total for 3 States** | **19** | **1** | **20** | **73** | **22** | **395** | **689.5** | **211** | **5** |

# Group 6: States with both voluntary offer agreements and additional protocols in force

### Table II.16 – Amount of nuclear material, in significant quantities, under Agency safeguards at the end of 2015

| Unirradiated plutonium | Unirradiated high enriched uranium | Unirradiated uranium-233 | Irradiated plutonium | Irradiated high enriched uranium | Irradiated uranium-233 | Low enriched uranium | Natural uranium | Depleted uranium | Thorium | Total significant quantities |
|---|---|---|---|---|---|---|---|---|---|---|
| **10 479** | **0** | **0** | **18 924** | **0** | **0** | **1463** | **845** | **2572** | **0** | **34 283** |

Note: Significant quantity figures rounded to the nearest integer.

### Table II.17 – Summary of facility based verification activities by installation category in 2015

| | Power reactors | Research reactors | Conversion plants | Fuel fabrication plants | Reprocessing plants | Enrichment plants | Separate storage facilities | Other facilities | MBAs containing LOFs | Total |
|---|---|---|---|---|---|---|---|---|---|---|
| **Number of facilities and MBAs containing LOFs under safeguards** | 1 | 1 | 0 | 1 | 1 | 3 | 4 | 0 | 0 | **11** |
| **Number of facilities and LOFs inspected** | 1 | 1 | 0 | 0 | 1 | 3 | 4 | 0 | 0 | **10** |
| **Number of inspections** | 5 | 1 | 0 | 0 | 1 | 52 | 21 | 0 | 0 | **80** |
| **Number of design information verifications** | 1 | 1 | 0 | 0 | 1 | 3 | 5 | 0 | 0 | **11** |
| **Number of person-days of inspection** | 8 | 1 | 0 | 0 | 14 | 266 | 88 | 0 | 0 | **377** |

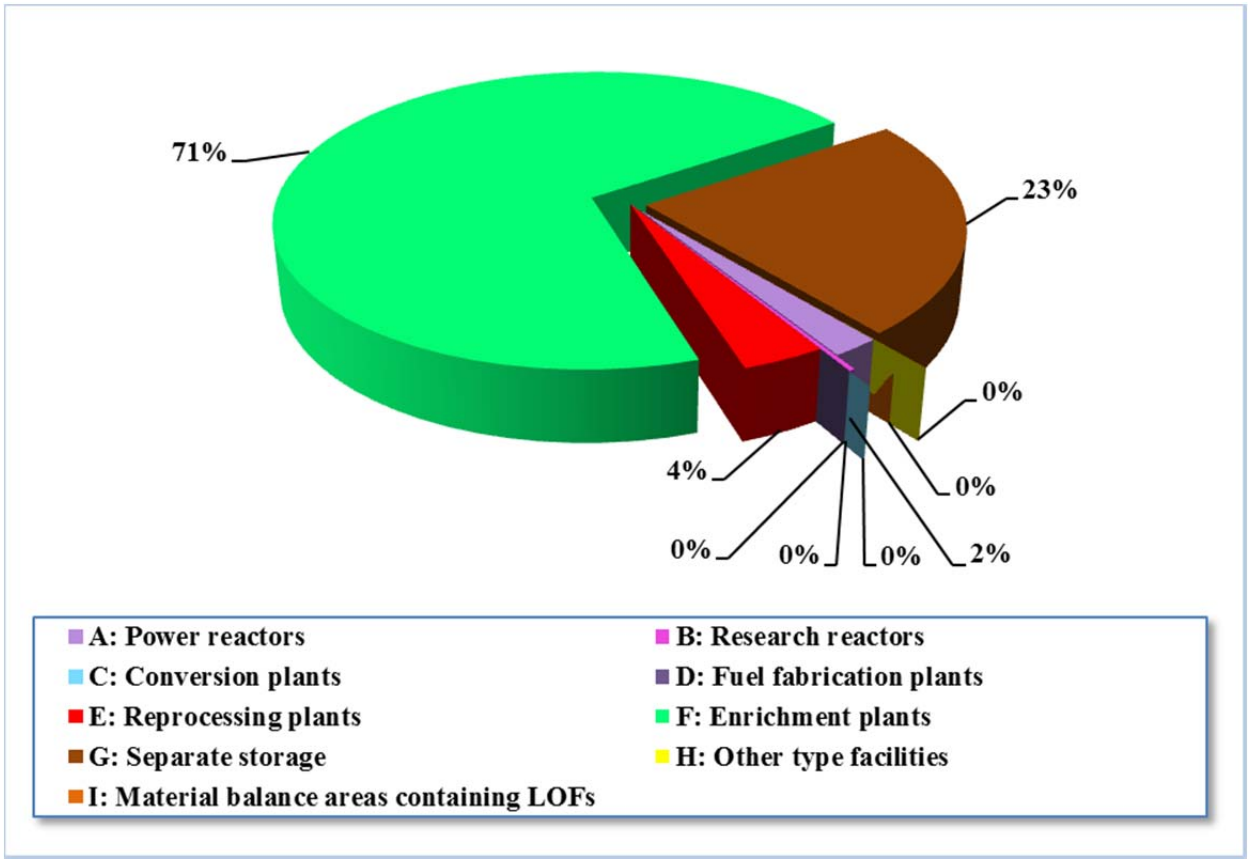


***Figure II.6. Distribution of inspection effort (person-days of inspection) by facility category for States with voluntary offer agreements and additional protocols in force***

**Table II.18 – Verification activities in 2015**

| States | Number of eligible facilities | Number of facilities or parts thereof selected for inspection | Number of facilities inspected | Total number of inspections | Number of design information verifications | Number of complementary accesses | Person-days of inspection | Calendar-days in the field for verification | Numbers of ICR reporting units received | Numbers of PIL reporting units received | Numbers of MBR reporting units received | Number of additional protocol declarations received |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **China** | 17 | 3 | 3 | 12 | 3 | 0 | 61 | 157.5 | 1279 | 4 | 4 | 15 |
| **France** | 17 | 3 | 2 | 23 | 2 | 0 | 117 | 203 | 86 697 | 38 | 38 | 19 |
| **Russian Federation** | 27 | 1 | 1 | 1 | 1 | 0 | 4 | 12 | 12 | 2 | 2 | 11 |
| **United Kingdom of Great Britain and Northern Ireland** | 66 | 3 | 3 | 40 | 4 | 0 | 172 | 286 | 348 108 | 93 | 92 | 13 |
| **United States of America** | 289 | 1 | 1 | 4 | 1 | 0 | 23 | 57 | 53 001 | 8 | 8 | 24 |
| **Total for 5 States** | **416** | **11** | **10** | **80** | **11** | **0** | **377** | **715.5** | **489 097** | **145** | **144** | **82** |