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The Safeguards Implementation Report for 2018

Report by the Director General

Main Developments in 2018

- The effort required by the Agency to fulfil its legal obligations continues to increase.
- One comprehensive safeguards agreement and two additional protocols entered into force. Three operational small quantities protocols were amended and one non-operational small quantities protocol was rescinded.
- Implementation of integrated safeguards started in two States.
- The Agency developed State-level safeguards approaches for five States. This brings the total number of States with a comprehensive safeguards agreement for which State-level safeguards approaches have been developed to 130. These 130 States hold 97% of all nuclear material (by significant quantity) under Agency safeguards in States with a comprehensive safeguards agreement.
- The Director General submitted a report to the Board of Governors on the experience gained and lessons learned during the implementation of State-level safeguards approaches for States under integrated safeguards.
- The Agency held its thirteenth Symposium on International Safeguards in Vienna.
- The Agency completed the planned modernization of safeguards information technology on schedule on 15 May 2018, within scope and budget.

Recommended Action

The Board is invited to take note of the Agency's *Safeguards Implementation Report for 2018* 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 2018

Report by the Director General

A. Safeguards Statement for 2018[1, 2]

In 2018, safeguards were applied for 182 States[3, 4] with safeguards agreements in force with the Agency. The Secretariat's findings and conclusions for 2018 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-nine States had both comprehensive safeguards agreements and additional protocols in force[5]:

(a) For 70 of these States[4], 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 59 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 45 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.

3. As of the end of 2018, 11 States 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 States 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] The designations employed and the presentation of material in this report, including the numbers cited, do not imply the expression of any opinion whatsoever on the part of the Agency or its Member States concerning the legal status of any country or territory or of its authorities, or concerning the delimitation of its frontiers.

[2] The referenced number of States Parties to the NPT is based on the number of instruments of ratification, accession or succession that have been deposited.

[3] 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.

[4] And Taiwan, China.

[5] Or an additional protocol being provisionally applied, pending its entry into force.

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
In 2018, there were: • 721 (715)[6] facilities and 593 (583) material balance areas (MBAs) containing locations outside facilities where nuclear material is customarily used (LOFs) under safeguards; • 212 814 (208 889) significant quantities[7] of nuclear material and 423.6 (432.3) tonnes of heavy water under safeguards; • 2195 (2102) inspections, 633 (601) design information verifications and 183 (140) complementary accesses utilizing 13 611.5 (13 744) calendar-days in the field for verification[8].

2. A summary of the status of safeguards agreements and other information presented below is given in Tables 1 to 5 in Section B.7.

B.1.1. States 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."[9]

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 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

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[6] The numbers in parentheses provide the respective data for 2017.

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

[8] 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.

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

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 an SQP based on the original standard text[10] 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[11] of the standard text of the SQP. This revision changed the eligibility criteria for an 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 standard 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*[12], 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[5]

Status of implementation

8. As of 31 December 2018, 129 (127) States had both comprehensive safeguards agreements and additional protocols in force[5].

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 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

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

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

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

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 2018 for 67 (65) States.[4, 13]

Overall conclusions for 2018

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 70 (70) States[4] — Albania, Andorra, Armenia, Australia, Austria, Bangladesh, Belgium, Botswana, Bulgaria, Burkina Faso, Canada, Chile, Croatia, Cuba, Czech Republic, Denmark[14], Ecuador, Estonia, Finland, Germany,

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[13] Albania, Andorra, Armenia, Australia, Austria, Bangladesh, Belgium, Botswana, 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, Kazakhstan, the Republic of Korea, Kuwait, Latvia, Libya, Lithuania, Luxembourg, Madagascar, Mali, Malta, Mauritius, Monaco, Montenegro, Netherlands, New Zealand, North Macedonia, Norway, Palau, Peru, Philippines, Poland, Portugal, Romania, Seychelles, Singapore, Slovakia, Slovenia, South Africa, Spain, Sweden, Switzerland, Tajikistan, Ukraine, United Republic of Tanzania, Uruguay, Uzbekistan and Viet Nam.

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

Ghana, Greece, Holy See, Hungary, Iceland, Indonesia, Ireland, Italy, Jamaica, Japan, Jordan, Kazakhstan, the Republic of Korea, Kuwait, Latvia, Libya, Liechtenstein, Lithuania, Luxembourg, Madagascar, Mali, Malta, Mauritius, Monaco, Montenegro, Netherlands[15], New Zealand[16], North Macedonia[17], Norway, Palau, Peru, Philippines, Poland, Portugal, Romania, Seychelles, Singapore, Slovakia, Slovenia, South Africa, Spain, Sweden, Switzerland, Tajikistan, Turkey, Ukraine, United Republic of Tanzania, Uruguay, Uzbekistan and Viet Nam.

15. Because the evaluation process described in paragraph 12 had not yet been completed for 59 (57) States, 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, Cameroon, Central African Republic, Chad, Colombia, Comoros, Congo, Costa Rica, Côte d'Ivoire, Cyprus, Democratic Republic of the Congo, Djibouti, Dominican Republic, El Salvador, Eswatini[18], Fiji, Gabon, Gambia, Georgia, Guatemala, Haiti, Honduras, the Islamic Republic of Iran, Iraq, Kenya, Kyrgyzstan, Lesotho, Liberia, Malawi, Marshall Islands, Mauritania, Mexico, Mongolia, Morocco, Mozambique, Namibia, Nicaragua, Niger, Nigeria, Panama, Paraguay, Republic of Moldova, Rwanda, Saint Kitts and Nevis, Senegal, Serbia, Thailand, 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 2018, safeguards were implemented for 45 (46) 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.

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[19] 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

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[15] 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.

[16] 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.

[17] The name "North Macedonia" has replaced the former name "The former Yugoslav Republic of Macedonia" as of 15 February 2019.

[18] The name "Eswatini" has replaced the former name "Swaziland" as of 29 June 2018.

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

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.

Syrian Arab Republic

19. In August 2018, the Director General submitted a report to the Board of Governors entitled *Implementation of the NPT Safeguards Agreement in the Syrian Arab Republic* (GOV/2018/35) covering relevant developments since the previous report in August 2017 (GOV/2017/37). 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.[20] In 2018, 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.

20. On the basis of the evaluation of information provided by Syria, and all other safeguards relevant information available to it, the Agency found no indication of diversion of declared nuclear material from peaceful activities. For 2018, the Agency concluded for Syria that declared nuclear material remained in peaceful activities.

Overall conclusions for 2018

21. On the basis of the evaluation performed and as reflected in paragraph 2 of the *Safeguards Statement*, the Secretariat concluded that for the 45 (46) States[21], declared nuclear material remained in peaceful activities. This conclusion was drawn for Algeria, Argentina, Bahamas, Barbados, Belarus, Belize, Bhutan, the Plurinational State of Bolivia, Brazil, Brunei Darussalam, Dominica, Egypt, Ethiopia, Grenada, Guyana, 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, Sierra Leone, Solomon Islands, Sri Lanka, Sudan, Suriname, Syrian Arab Republic, Tonga, Trinidad and Tobago, Tunisia, Tuvalu, the Bolivarian Republic of Venezuela, Yemen, Zambia and Zimbabwe.

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

22. As of 31 December 2018, 11 (12) States Parties to the NPT had yet to bring comprehensive safeguards agreements into force pursuant to Article III of the Treaty.

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[20] 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.

[21] In addition, this conclusion is drawn for those territories of the Netherlands referred to in footnote 15 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; and the Cook Islands and Niue, which are covered by New Zealand's comprehensive safeguards agreement but not by its additional protocol – see footnote 16. It is also drawn for France's territories covered by the safeguards agreement reproduced in INFCIRC/718 between France, EURATOM and the Agency pursuant to Additional Protocol I to the Treaty of Tlatelolco; and for the United States of America's territories covered by the safeguards agreement reproduced in INFCIRC/366 between the United States of America and the Agency pursuant to Additional Protocol I to the Treaty of Tlatelolco.

Overall conclusions for 2018

23. 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, Federated States of Micronesia, São Tome and Principe, Somalia, State of Palestine[22] and Timor-Leste.

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

24. 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

25. As of 31 December 2018, safeguards were implemented at facilities in India, Israel and Pakistan pursuant to safeguards agreements based on INFCIRC/66/Rev.2. India has an additional protocol to its INFCIRC/754 safeguards agreement in force.

Deriving conclusions

26. 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 2018

27. 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

28. 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.

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[22] The designation employed does not imply the expression of any opinion whatsoever concerning the legal status of any country or territory or of its authorities, or concerning the delimitation of its frontiers.

Status of implementation

29. During 2018, 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

30. 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 2018

31. 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 from the selected facilities in France, the Russian Federation, the United Kingdom and the United States of America.

B.2. Verification and Monitoring in the Islamic Republic of Iran in light of United Nations Security Council Resolution 2231 (2015)

32. Throughout 2018, the Agency continued to verify and monitor the nuclear-related commitments of the Islamic Republic of Iran (Iran) under the Joint Comprehensive Plan of Action (JCPOA). Iran continued to provisionally apply the additional protocol to its safeguards agreement in accordance with Article 17(b) of the Additional Protocol, pending its entry into force. During the year, the Director General submitted four reports to the Board of Governors and in parallel to the United Nations Security Council entitled *Verification and monitoring in the Islamic Republic of Iran in light of United Nations Security Council resolution 2231 (2015)* (GOV/2018/7, GOV/2018/24, GOV/2018/33 and GOV/2018/47).

B.3. Democratic People's Republic of Korea

33. In August 2018, 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/2018/34–GC(62)/12), which provided an update of developments since the Director General's report of August 2017 (GOV/2017/36-GC(61)/21). The Director General provided a further update in his introductory statement to the Board of Governors on 22 November 2018.

34. 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, the Agency could not draw any safeguards conclusion regarding the DPRK.

35. In 2018, no verification activities were implemented in the field but the Agency continued to monitor developments in the DPRK's nuclear programme and to evaluate all safeguards relevant information available to it, including open source information and satellite imagery.

36. The Executive Group and the DPRK Team, created in August 2017[23], have intensified their efforts. The DPRK Team has increased monitoring of the DPRK's nuclear programme through more frequent collection of satellite imagery and has enhanced its readiness to promptly undertake any activities it may be requested to conduct in the DPRK. Actions to enhance readiness have included: formulation and updating of verification approaches and procedures; identification of potential inspectors for initial activities in the DPRK and provision of specialized training for them; and ensuring the availability of appropriate verification technologies and equipment to support the initial activities. All of these efforts related to the Agency's enhanced readiness have been conducted within available resources, including extrabudgetary contributions from a number of Member States. Once a political agreement has been reached among the countries concerned, the Agency is ready to return to the DPRK in a timely manner, if requested to do so by the DPRK and subject to approval by the Board of Governors.

37. In 2018, the Agency continued to monitor the Yongbyon site. The Agency observed indications that were consistent with the operation of the Yongbyon Experimental Nuclear Power Plant (5MW(e)) reactor until mid-August 2018. From mid-August through November 2018 there were indications of intermittent reactor operation, and in December 2018 there were no indications of reactor operation. Starting in the first quarter of 2018, activities were observed near the Kuryong River, which may have been related to changes to the cooling system for the light water reactor (LWR) under construction and/or the 5MW(e) reactor. Between late-April and early-May 2018, there were indications of the operation of the steam plant that serves the Radiochemical Laboratory. The duration of the steam plant's operation was not sufficient to have supported the reprocessing of a complete core from the 5MW(e) reactor. At the Yongbyon Nuclear Fuel Rod Fabrication Plant there were indications consistent with the use of the reported centrifuge enrichment facility located within the plant. At the LWR, the Agency observed activities consistent with the fabrication of reactor components and the possible transfer of these components into the reactor building.

38. The Agency has evaluated all safeguards relevant information, including satellite imagery and open source information, about a group of buildings within a security perimeter in the vicinity of Pyongyang. The size of the main building and the characteristics of the associated infrastructure are not inconsistent with a centrifuge enrichment facility. The timeline of construction is not inconsistent with the reported uranium enrichment programme of the DPRK[24].

39. The Agency has not had access to the Yongbyon site or to other locations in the DPRK. Without such access, the Agency cannot confirm either the operational status or configuration/design features of the facilities or locations, or the nature and purpose of the activities conducted therein.

40. The continuation and further development of the DPRK's nuclear programme during 2018, including activities in relation to the Yongbyon Experimental Nuclear Power Plant (5 MW(e)) reactor, the use of the building which houses the reported centrifuge enrichment facility and the construction at the LWR, are clear violations of relevant UN Security Council resolutions, including resolution 2375 (2017), and are deeply regrettable.

B.4. Areas of difficulty in safeguards implementation

41. Progress was made in 2018 to address areas of difficulty in implementing safeguards. Improvements have been observed in the provision of nuclear material accountancy reports.

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[23] GOV/2017/36-GC(61)/21, para.12.

[24] GOV/2011/53-GC(55)24, para. 30. In addition, GOV/2011/53-GC(55)/24, para. 50, noted reports on the provision of centrifuge enrichment technology to the DPRK and indications that the DPRK could produce UF_6 prior to 2001.

42. 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 2018, some States had still not established SSACs, which are required under comprehensive safeguards agreements. Moreover, not all State authorities responsible for safeguards implementation have the necessary legal 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.

43. For Agency inspectors to conduct their verification activities effectively, they must be able to access installations and perform the verification activities within agreed timeframes. In 2018, access restrictions to locations, material, facility records and other relevant documentation were experienced in a number of States. In addition, difficulties have been encountered in some States in relation to customs clearance of Agency safeguards equipment.

44. 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 2018, 35 (37) States[25] had operative SQPs that had yet to be amended.

45. The Agency is addressing these issues with and providing assistance to State and regional authorities, as appropriate.

B.5. Strengthening the effectiveness and improving the efficiency of safeguards

46. 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 has increased in recent years. 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.

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

48. As a result of these improvements, safeguards have been implemented more effectively in the field and have been complemented by enhanced and improved activities at Headquarters.

49. In July 2018, the Director General submitted a report to the Board of Governors entitled *Implementation of State-level Safeguards Approaches for States under Integrated Safeguards – Experience Gained and Lessons Learned* (GOV/2018/20).

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[25] The States with SQPs based on the original standard text are: Barbados, Belize, Bhutan, the Plurinational State of 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, Saint Lucia, Saint Vincent and the Grenadines, Samoa, Saudi Arabia, Sierra Leone, Solomon Islands, Sudan, Suriname, Trinidad and Tobago, Tuvalu, Yemen and Zambia. In addition, there is an SQP based on the original standard text to the safeguards agreement reproduced in INFCIRC/718 between France, EURATOM and the Agency pursuant to Additional Protocol I to the Treaty of Tlatelolco and to the safeguards agreement reproduced in INFCIRC/229 between the Netherlands and the Agency pursuant to the NPT and Additional Protocol I to the Treaty of Tlatelolco.

50. During 2018, the Agency developed State-level safeguards approaches (SLAs) for five States with a comprehensive safeguards agreement. This brings the total number of States with a comprehensive safeguards agreement for which an SLA has been developed to 130. These 130 States hold 97% of all nuclear material (by significant quantity) under Agency safeguards in States with a comprehensive safeguards agreement and include 67 States[13] with a comprehensive safeguards agreement and an additional protocol in force for which the broader conclusion has been drawn (of which 17 are States with an SQP); 35 States[26] with a comprehensive safeguards agreement and an additional protocol in force for which the broader conclusion has yet to be drawn (of which 24 are States with an SQP); and 28 States[27] with a comprehensive safeguards agreement with an SQP in force but no additional protocol in force. Previously, an SLA was developed for one State[28] with a voluntary offer agreement and an additional protocol in force.

51. 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.

52. The Agency completed the planned modernization of safeguards information technology (IT) on schedule on 15 May 2018, within scope and budget. The modernization, completed under the MOSAIC project, has delivered more than 20 tailored tools and applications to users in the Department of Safeguards.

53. Decommissioning of the former Safeguards Analytical Laboratory (SAL) was completed in 2018. Following formal exchange of letters between the IAEA and the Austrian Federal Ministry of Sustainability and Tourism, the building in which the SAL was located was returned to the Austrian Institute of Technology on 6 December 2018.

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[26] Afghanistan, Antigua and Barbuda, Azerbaijan, Bosnia and Herzegovina, Burundi, Cambodia, Central African Republic, Chad, Congo, Côte d'Ivoire, Cyprus, Democratic Republic of the Congo, Eswatini, Fiji, Gabon, Gambia, Georgia, Guatemala, Kyrgyzstan, Malawi, Marshall Islands, Mongolia, Mozambique, Namibia, Niger, Nigeria, Republic of Moldova, Rwanda, Saint Kitts and Nevis, Senegal, Thailand, Togo, Turkmenistan, Uganda and Vanuatu.

[27] Barbados, Belize, Bhutan, the Plurinational State of Bolivia, Brunei Darussalam, Dominica, Ethiopia, Grenada, Guyana, Kiribati, Lao People's Democratic Republic, Maldives, Myanmar, Nauru, Nepal, Papua New Guinea, Saint Lucia, Saint Vincent and the Grenadines, Samoa, San Marino, Sierra Leone, Solomon Islands, Suriname, Tonga, Trinidad and Tobago, Tuvalu, Zambia and Zimbabwe.

[28] United Kingdom.

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

In 2018, significant progress was made, as follows:

- A comprehensive safeguards agreement with an SQP based on the revised standard text and an additional protocol entered into force for Liberia.
- An additional protocol also entered into force for Serbia, bringing the total number of States with additional protocols in force to 134[4], and one State had its additional protocol provisionally applied, pending its entry into force.
- Paraguay, Tonga and the United States of America amended their operative SQPs and Malaysia rescinded its SQP.
- At the end of the year, 58 (55) States[29] had SQPs in force based on the revised standard text.
- The Agency developed State-level safeguards approaches for five States.
- In July 2018, the Director General submitted a report to the Board of Governors entitled *Implementation of State-level Safeguards Approaches for States under Integrated Safeguards – Experience Gained and Lessons Learned* (GOV/2018/20).
- The Agency continued to develop its strategic planning processes with an emphasis on effective implementation.
- The Agency held its 13th Symposium on International Safeguards, 'Building Future Safeguards Capabilities' in November. The event was mostly funded through extrabudgetary contributions; it attracted more than 800 participants.
- With the completion of the MOSAIC project, the Agency enhanced the performance and security of the safeguards information system. In the course of the project, over 20 tailored tools and applications were completed and delivered to users within the Department.
- In 2018, the Agency published an updated version of the *Safeguards Implementation Practices Guide on Establishing and Maintaining State Safeguards Infrastructure (SVS 31).*
- Peer reviews of annual implementation plans and State evaluation reports were performed within the Department.
- Actions were identified and implemented to address risks and opportunities for improvement in the quality management system (QMS).
- The coordination of the Health and Safety activities in the Department of Safeguards was strengthened to increase efficiency in ensuring that adequate safety is applied to all Agency inspectors and other officials performing activities under the safeguards agreements.
- By the end of the year, the Agency had provided an upgraded version of the protocol reporter software supporting the preparation and submission of additional protocol declarations to more than 95 States. In 2018, 46 of these States submitted declarations using this software.

[29] The States with SQPs in force based on the revised standard text are: Afghanistan, Andorra, Angola, Antigua and Barbuda, Bahamas, Bahrain, Burkina Faso, Burundi, Cambodia, Central African Republic, Chad, Comoros, Congo, Costa Rica, Djibouti, Dominican Republic, Ecuador, El Salvador, Eswatini, Gabon, Gambia, Guatemala, Holy See, Honduras, Iceland, Kenya, Kuwait, Lebanon, Lesotho, Liberia, Madagascar, Malawi, Mali, Mauritania, Mauritius, Monaco, Montenegro, Mozambique, New Zealand, Nicaragua, North Macedonia, Palau, Panama, Paraguay, Qatar, Republic of Moldova, Rwanda, Saint Kitts and Nevis, San Marino, Senegal, Seychelles, Singapore, Togo, Tonga, Uganda, United Republic of Tanzania, Vanuatu and Zimbabwe. In addition, the United States of America has amended its SQP to the safeguards agreement reproduced in INFCIRC/366 between the United States of America and the Agency pursuant to Additional Protocol I to the Treaty of Tlatelolco.

B.6. Safeguards expenditures and resources

54. During 2018, the activities of Major Programme 4 — Nuclear Verification — were funded from various sources — primarily through the Regular Budget and extrabudgetary contributions. The Regular Budget[30] appropriation for 2018 was adjusted to €138.7 (€137.0) million at the United Nations operational average rate of exchange for the year. Figure 1[31] presents indexed real growth by comparing the increase in the final budget[32] to the approved budget excluding price adjustment and currency revaluation[33].

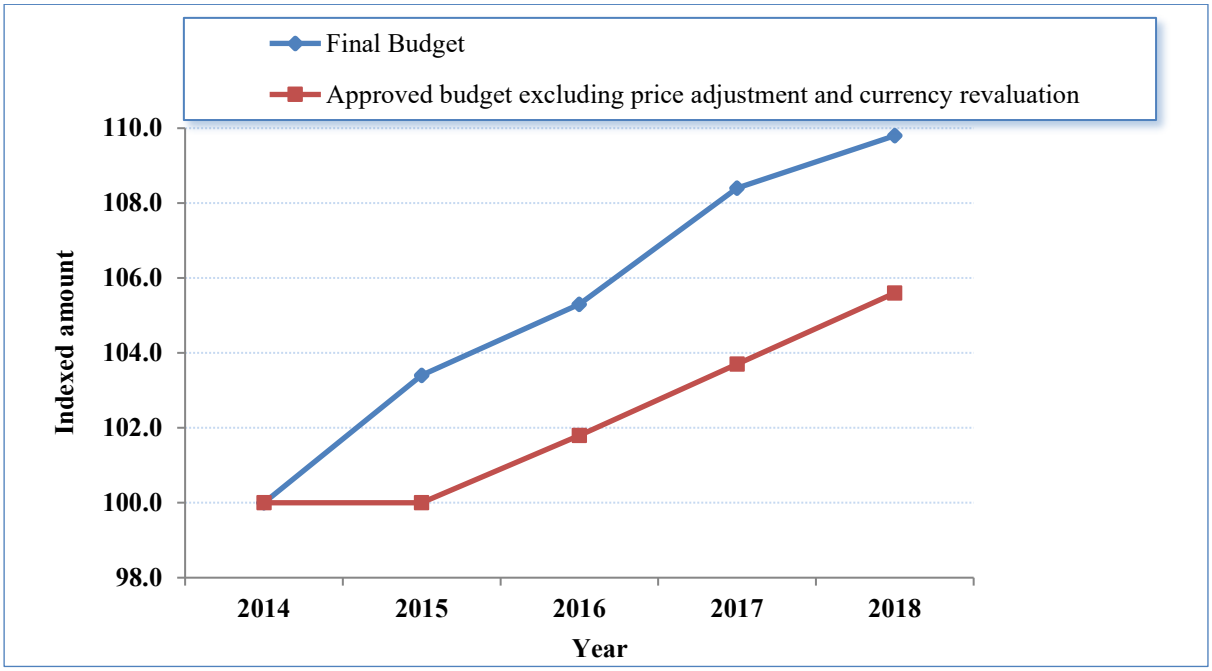

Figure 1. Indexed real growth of the Regular Budget, 2014–2018 (base 2014=100)

55. The expenditures for Major Programme 4 were €138.6 (€137.0) million from the Regular Budget, an increase of 1.2%, compared with 2017. The Regular Budget utilization rate for 2018 was 100% (100%) with an unspent balance of less than €0.1 million at the end of the year. Figure 2 shows the utilization trend of Major Programme 4 for the period 2014–2018.

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[30] €142.0 million (at an exchange rate €1=$1).

[31] Represents indexed real growth of 5.6%. The total growth after price adjustment amounts to 9.8%.

[32] Represents the final budget for the operational portion of the Regular Budget appropriation as represented in the annual Agency's Financial Statements, including the effects of the price adjustment and the recalculation of the Regular Budget portion of US dollars at the United Nations operational average rate of exchange for the year.

[33] Represents the indexed original operational portion of the Regular Budget appropriation as approved in the budget documents at an exchange rate of €1=$1 and prior to any price adjustment.

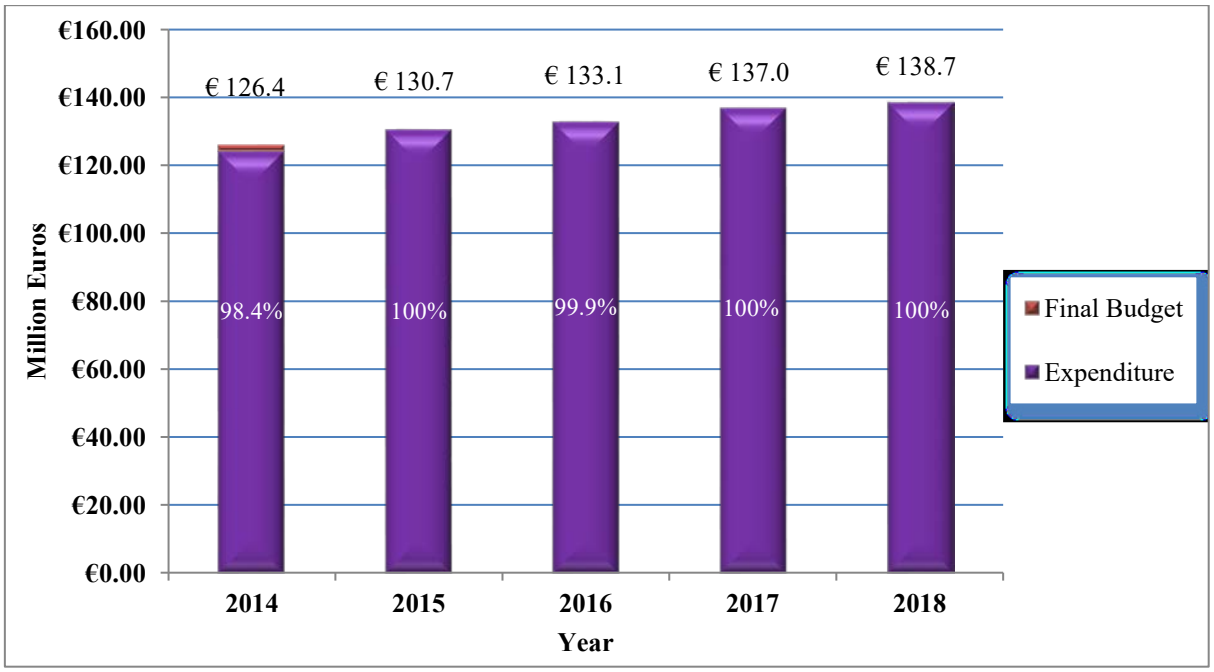

Figure 2. Major Programme 4 — Nuclear Verification — budget and expenditures, 2014–2018

56. The expenditures[34] from the extrabudgetary contributions were €18.9 (€26.8) million, a decrease of 29.6% compared with 2017. This decrease resulted mainly from completion of the MOSAIC project in May 2018.

B.7. Status of safeguards agreements (as of 31 December 2018)

57. This section contains information — presented in the five tables below — on safeguards agreements that provide the basis for the Agency's implementation of safeguards in 2018. 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)	SLA developed	Broader conclusion drawn	Integrated safeguards implemented
Afghanistan	X(A)	257	19 July 2005	X		
Albania		359	03 November 2010	X	X	X
Andorra	X(A)	808	19 December 2011	X	X	X
Angola	X(A)	800	28 April 2010			
Antigua and Barbuda	X(A)	528	15 November 2013	X		
Armenia		455	28 June 2004	X	X	X
Australia		217	12 December 1997	X	X	X
Austria		193	30 April 2004	X	X	X
Azerbaijan		580	29 November 2000	X		
Bahrain	X(A)	767	20 July 2011			
Bangladesh		301	30 March 2001	X	X	X
Belgium		193	30 April 2004	X	X	X

[34] Including Programme Support Costs.

State	SQP	INFCIRC	Additional protocol (date of entry into force)	SLA developed	Broader conclusion drawn	Integrated safeguards implemented
Bosnia and Herzegovina		851	03 July 2013	X		
Botswana		694	24 August 2006	X	X	X
Bulgaria[1]		193	01 May 2009	X	X	X
Burkina Faso	X(A)	618	17 April 2003	X	X	X
Burundi	X(A)	719	27 September 2007	X		
Cambodia	X(A)	586	24 April 2015	X		
Cameroon	X	641	29 September 2016			
Canada		164	08 September 2000	X	X	X
Central African Republic	X(A)	777	07 September 2009	X		
Chad	X(A)	802	13 May 2010	X		
Chile		476	03 November 2003	X	X	X
Colombia		306	05 March 2009			
Comoros	X(A)	752	20 January 2009			
Congo	X(A)	831	28 October 2011	X		
Costa Rica	X(A)	278	17 June 2011			
Côte d'Ivoire		309	05 May 2016	X		
Croatia[1]		193	01 April 2017	X	X	X
Cuba		633	03 June 2004	X	X	X
Cyprus[1]		193	01 May 2008	X		
Czech Republic[1]		193	01 October 2009	X	X	X
Democratic Republic of the Congo		183	09 April 2003	X		
Denmark[2]		193 176	30 April 2004 22 March 2013	X	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	X
El Salvador	X(A)	232	24 May 2004			
Estonia[1]		193	01 December 2005	X	X	X
Eswatini[5]	X(A)	227	08 September 2010	X		
Fiji	X	192	14 July 2006	X		
Finland		193	30 April 2004	X	X	X
Gabon	X(A)	792	25 March 2010	X		
Gambia	X(A)	277	18 October 2011	X		
Georgia		617	03 June 2003	X		
Germany		193	30 April 2004	X	X	X
Ghana		226	11 June 2004	X	X	X
Greece		193	30 April 2004	X	X	X
Guatemala	X(A)	299	28 May 2008	X		
Haiti	X	681	09 March 2006			
Holy See	X(A)	187	24 September 1998	X	X	X
Honduras	X(A)	235	17 November 2017			
Hungary[1]		193	01 July 2007	X	X	X
Iceland	X(A)	215	12 September 2003	X	X	X
Indonesia		283	29 September 1999	X	X	X
Iraq		172	10 October 2012			
Ireland		193	30 April 2004	X	X	X
Italy		193	30 April 2004	X	X	X
Jamaica		265	19 March 2003	X	X	X
Japan		255	16 December 1999	X	X	X
Jordan		258	28 July 1998		X	
Kazakhstan		504	09 May 2007	X	X	X
Kenya	X(A)	778	18 September 2009			

State	SQP	INFCIRC	Additional protocol (date of entry into force)	SLA developed	Broader conclusion drawn	Integrated safeguards implemented
Korea, Republic of		236	19 February 2004	X	X	X
Kuwait	X(A)	607	02 June 2003	X	X	X
Kyrgyzstan	X	629	10 November 2011	X		
Latvia[1]		193	01 October 2008	X	X	X
Lesotho	X(A)	199	26 April 2010			
Liberia	X(A)	927	10 December 2018			
Libya		282	11 August 2006	X	X	X
Liechtenstein		275	25 November 2015		X	
Lithuania[1]		193	01 January 2008	X	X	X
Luxembourg		193	30 April 2004	X	X	X
Madagascar	X(A)	200	18 September 2003	X	X	X
Malawi	X(A)	409	26 July 2007	X		
Mali	X(A)	615	12 September 2002	X	X	X
Malta[1]		193	01 July 2007	X	X	X
Marshall Islands		653	03 May 2005	X		
Mauritania	X(A)	788	10 December 2009			
Mauritius	X(A)	190	17 December 2007	X	X	X
Mexico		197	04 March 2011			
Monaco	X(A)	524	30 September 1999	X	X	X
Mongolia	X	188	12 May 2003	X		
Montenegro	X(A)	814	04 March 2011	X	X	X
Morocco		228	21 April 2011			
Mozambique	X(A)	813	01 March 2011	X		
Namibia	X	551	20 February 2012	X		
Netherlands[3]		193	30 April 2004	X	X	X
New Zealand[4]	X(A)	185	24 September 1998	X	X	X
Nicaragua	X(A)	246	18 February 2005			
Niger		664	02 May 2007	X		
Nigeria		358	04 April 2007	X		
North Macedonia[6]	X(A)	610	11 May 2007	X	X	X
Norway		177	16 May 2000	X	X	X
Palau	X(A)	650	13 May 2005	X	X	X
Panama	X(A)	316	11 December 2001			
Paraguay	X(A)	279	15 September 2004			
Peru		273	23 July 2001	X	X	X
Philippines		216	26 February 2010	X	X	X
Poland[1]		193	01 March 2007	X	X	X
Portugal		193	30 April 2004	X	X	X
Republic of Moldova	X(A)	690	01 June 2012	X		
Romania[1]		193	01 May 2010	X	X	X
Rwanda	X(A)	801	17 May 2010	X		
Saint Kitts and Nevis	X(A)	514	19 May 2014	X		
Senegal	X(A)	276	24 July 2017	X		
Serbia		204	17 September 2018			
Seychelles	X(A)	635	13 October 2004	X	X	X
Singapore	X(A)	259	31 March 2008	X	X	X
Slovakia[1]		193	01 December 2005	X	X	X
Slovenia[1]		193	01 September 2006	X	X	X
South Africa		394	13 September 2002	X	X	X
Spain		193	30 April 2004	X	X	X
Sweden		193	30 April 2004	X	X	X
Switzerland		264	01 February 2005	X	X	X
Tajikistan		639	14 December 2004	X	X	X
Thailand		241	17 November 2017	X		
Togo	X(A)	840	18 July 2012	X		

State	SQP	INFCIRC	Additional protocol (date of entry into force)	SLA developed	Broader conclusion drawn	Integrated safeguards implemented
Turkey		295	17 July 2001		X	
Turkmenistan		673	03 January 2006	X		
Uganda	X(A)	674	14 February 2006	X		
Ukraine		550	24 January 2006	X	X	X
United Arab Emirates		622	20 December 2010			
United Republic of Tanzania	X(A)	643	07 February 2005	X	X	X
Uruguay		157	30 April 2004	X	X	X
Uzbekistan		508	21 December 1998	X	X	X
Vanuatu	X(A)	852	21 May 2013	X		
Viet Nam		376	17 September 2012	X	X	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. There is an SLA developed for Taiwan, China.
- 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 'SLA developed' column indicates that a State-level safeguards approach has been developed.
- '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.

Table Notes:

(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, Curaçao and Sint Maarten is pursuant to the NPT and Additional Protocol I to the Treaty of Tlatelolco. There is an 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 amended SQP reproduced in INFCIRC/185/Mod.1 and the additional protocol reproduced in INFCIRC/185/Add.1, however, are not applicable to the Cook Islands and Niue.
(5) The name "Eswatini" has replaced the former name "Swaziland" as of 29 June 2018.
(6) The name "North Macedonia" has replaced the former name "The former Yugoslav Republic of Macedonia" as of 15 February 2019.

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

State	SQP	INFCIRC	Additional protocol	SLA developed
Algeria		531	Signed: 16 February 2018	
Argentina		435		
Bahamas	X(A)	544		
Barbados	X	527		X
Belarus		495	Signed: 15 November 2005	
Belize	X	532		X
Bhutan	X	371		X

State	SQP	INFCIRC	Additional protocol	SLA developed
Bolivia, Plurinational State of	X	465		X
Brazil		435		
Brunei Darussalam	X	365		X
Democratic People's Republic of Korea(1)		403		
Dominica	X	513		X
Egypt		302		
Ethiopia	X	261		X
Grenada	X	525		X
Guyana	X	543		X
Iran, Islamic Republic of(2)		214	Signed: 18 December 2003	
Kiribati	X	390	Signed: 09 November 2004	X
Lao People's Democratic Republic	X	599	Signed: 05 November 2014	X
Lebanon	X(A)	191		
Malaysia		182	Signed: 22 November 2005	
Maldives	X	253		X
Myanmar	X	477	Signed: 17 September 2013	X
Nauru	X	317		X
Nepal	X	186		X
Oman	X	691		
Papua New Guinea	X	312		X
Qatar	X(A)	747		
Saint Lucia	X	379		X
Saint Vincent and the Grenadines	X	400		X
Samoa	X	268		X
San Marino	X(A)	575		X
Saudi Arabia	X	746		
Sierra Leone	X	787		X
Solomon Islands	X	420		X
Sri Lanka		320	Approved: 12 September 2018	
Sudan	X	245		
Suriname	X	269		X
Syrian Arab Republic		407		
Tonga	X(A)	426		X
Trinidad and Tobago	X	414		X
Tunisia		381	Signed: 24 May 2005	
Tuvalu	X	391		X
Venezuela, Bolivarian Republic of		300		
Yemen	X	614		
Zambia	X	456	Signed: 13 May 2009	X
Zimbabwe	X(A)	483		X

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).
- 'X' in the 'SLA developed' column indicates that a State-level safeguards approach has been developed.

Table Notes:

(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) On 16 January 2016, as notified in its letter to the Director General of 7 January 2016, Iran began to provisionally apply its additional protocol in accordance with Article 17(b) of the Additional Protocol, pending its entry into force.

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

States Parties to the NPT	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
Micronesia, Federated States of	X(A)	Signed: 01 June 2015	
São Tome and Principe			
Somalia			
State of Palestine(1)	X(A)	Approved 07 March 2018	
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 Note:

(1) The designation employed does not imply the expression of any opinion whatsoever concerning the legal status of any country or territory or of its authorities, or concerning the delimitation of its frontiers.

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

State	INFCIRC	Additional protocol
India	754	In force: 25 July 2014
Israel	249/Add.1	
Pakistan	34 116 135 239 248 393 418 705 816 920	

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

State	INFCIRC	Additional protocol	SLA developed
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), (4)	263	In force: 30 April 2004	X
United States of America(5)	288	In force: 06 January 2009	

General Note:
- 'X' in the 'SLA developed' column indicates that a State-level safeguards approach has been developed.

Table Notes:
(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 between the United Kingdom and the Agency for the applications of safeguards in the United Kingdom in connection with the NPT and the additional protocol thereto were signed but have not entered into force.
(5) 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. The SQP was amended. No additional protocol to that agreement has been concluded.

C. Safeguards Implementation

58. This section presents the results[35] of safeguards implementation for 2018 for States[4] 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[5]:
  - 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 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 182 (181) States[4] were completed and reviewed.[36]

C.1. States with both comprehensive safeguards agreements and additional protocols in force[5]

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.

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

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

[36] 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 2018 to March 2019.

approach and annual implementation plans. Where integrated safeguards are not implemented, the safeguards activities to be performed in the field are based either on an SLA developed for the State or on the Agency's Safeguards Criteria, and new techniques and technologies are implemented, as applicable, to strengthen effectiveness and improve efficiency.

64. As reported in paragraph 1 of the *Safeguards Statement*, 129 States had both comprehensive safeguards agreements and additional protocols in force[5]. As reported in paragraph 1(a) of the *Safeguards Statement*, the Secretariat was able to draw the broader conclusion for 70[37] of the 129 States[4] that all nuclear material remained in peaceful activities. The results of safeguards implementation for these 70 States[4] are subdivided below into two categories: 67 States[4, 38], where integrated safeguards were implemented for the whole year or part thereof; and 3 States[39] where integrated safeguards were not implemented in 2018.

C.1.1. States with the broader conclusion in which integrated safeguards were implemented during 2018

65. Integrated safeguards were implemented for the whole of 2018 in 67 (65) States[4] with the broader conclusion (see Appendix II, Group 1), including in Kuwait and Switzerland for the first time. Safeguards implementation activities were carried out for those 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[4]. On this basis, the Secretariat concluded that, for these States, all nuclear material remained in peaceful activities.

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[37] In 2018, 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, on the basis of the evaluation of all safeguards relevant information for Ukraine in 2018, 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.

[38] 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. Integrated safeguards were implemented only in that part of the Netherlands 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. Integrated safeguards were implemented only in that part of New Zealand which is covered by INFCIRC/185 and INFCIRC/185/Add.1, which excludes the Cook Islands and Niue.

[39] Jordan, Liechtenstein and Turkey.

Fact box 3. States in which integrated safeguards were implemented during 2018

In this group of 67 States[4]:

- There were 559 (547) facilities and 496 (489) MBAs containing LOFs, which represents 78% (77%) of the facilities and 84% (84%) of the MBAs containing LOFs under Agency safeguards.
- The total amount of nuclear material[40] under Agency safeguards was 159 794 (152 715) significant quantities, which represents 78% (77%) of nuclear material (by significant quantity) under Agency safeguards.
- A total of approximately 0.7 tonne of heavy water was under Agency safeguards.
- The Agency carried out 1482 (1341) inspections, 377 (340) design information verifications and 119 (95) complementary accesses utilizing 8875 (8458) calendar-days in the field for verification, which represents 65% (62%) of the Agency's verification effort in the field.
- The estimated cost[41] of safeguards for the group was €78.1 (€74.8) million, which represents 63% (63%) of the total cost of Agency safeguards allocated by State.

Japan

68. The proportion of nuclear material on the Fukushima Daiichi site at the time of the accident which has been successfully re-verified remained at approximately 80% through 2018. Nuclear material inaccessible for verification continues to remain at only the three damaged reactors (Units 1-3). Transfers of fuel assemblies from the spent fuel ponds of these reactors are now scheduled to begin with Unit 3 in the first half of 2019 at which time the material will be re-verified. As clean-up 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. Safeguards measures remained in place throughout 2018 for the reactor Units 5 and 6, and the Common Spent Fuel Storage Facility (CSFS). Fuel transfers from the CSFS to dry cask storage were verified, thereby providing empty storage space for future receipt of fuel from the damaged units. The damaged units have been monitored using remote surveillance and unattended radiation detection systems along with frequent short-notice inspections. Further improvements of safeguards measures for the damaged reactors are being considered, in light of the development of access technologies and enhancement of the site infrastructure.

C.1.2. States with the broader conclusion in which integrated safeguards were not implemented during 2018

69. There are three (five) 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.

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[40] This figure excludes the Agency's estimate of the plutonium in reactor cores which, under agreed reporting procedures, has not yet been reported to the Agency.

[41] See Section F.1.3.

Fact box 4. States in which integrated safeguards were not implemented during 2018

In this group of three States:

- There were eight (18) facilities and three (5) MBAs containing LOFs, which represent 1% (3%) of the facilities and 1% (1%) of the MBAs containing LOFs under Agency safeguards.
- The total amount of nuclear material[40] under Agency safeguards was one (2861) significant quantity, which represents less than 0.1% (1%) of nuclear material (by significant quantity) under Agency safeguards.
- The Agency carried out six (37) inspections, five (18) design information verifications and two (four) complementary accesses utilizing 27 (193.5) calendar-days in the field for verification, which represents less than 1% of the Agency's verification effort in the field.
- The estimated cost of safeguards for the group was €0.8 (€2.5) million, which represents 1% (2%) of the total cost of Agency safeguards allocated by State.

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.

C.1.3. States without the broader conclusion

71. There were 59 (57) States with both comprehensive safeguards agreements and additional protocols in force[5] 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[5], without the broader conclusion

In this group of 59 States:

- There were 41 (40) facilities and 53 (49) MBAs containing LOFs, which represent 6% (6%) of the facilities and 9% (8%) of the MBAs containing LOFs under Agency safeguards.
- The total amount of nuclear material[40] under Agency safeguards was 1174 (1127) significant quantities which represents 0.6% (0.6%) of nuclear material (by significant quantity) under Agency safeguards.
- The Agency carried out 421 (451) inspections, 137 (140) design information verifications and 60 (41) complementary accesses utilizing 2215 (2293) calendar-days in the field for verification, which represents 16% (17%) of the Agency's verification effort in the field.
- The estimated cost of safeguards for the group was €23.3 (€20.3) million, which represents 19% (17%) of the total cost of Agency safeguards allocated by State.
- The estimated cost of safeguards for Iran was €17.0 (€15.8) million, which represents 14% (13%) 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[3] for 45 (46) 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 45 States:

- There were 79 (77) facilities and 35 (35) MBAs containing LOFs, which represent 11% (11%) of the facilities and 6% (6%) of the MBAs containing LOFs under Agency safeguards.
- The total amount of nuclear material[40] under Agency safeguards was 3768 (3632) significant quantities, which represents 2% (2%) of nuclear material (by significant quantity) under Agency safeguards.
- The Agency carried out 135 (127) inspections and 78 (71) design information verifications utilizing 952 (1232.5) calendar-days in the field for verification, which represents 7% (9%) of the Agency's verification effort in the field.
- The estimated cost of safeguards for the group was €10.7 (€11.0) million, which represents 9% (9%) 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 23 (21) facilities and one (one) MBA containing LOFs, which represents 3% (3%) of the facilities and less than 1% (1%) of the MBAs containing LOFs under Agency safeguards.
- The total amount of nuclear material[40] under Agency safeguards was 3938 (3441) significant quantities, which represents 2% (2%) of nuclear material (by significant quantity) under Agency safeguards.
- A total of 422.9 (431.6) tonnes of heavy water was under Agency safeguards.
- The Agency carried out 78 (74) inspections and 24 (20) design information verifications utilizing 787.5 (784.5) calendar-days in the field for verification, which represents 6% (6%) of the Agency's verification effort in the field.
- The estimated cost of safeguards for the group was €4.6 (€4.4) million, which represents 4% (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 Russian Federation, 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 417 (418); from these, 11 (12) facilities, or parts thereof, were selected for the application of Agency safeguards. In addition, there was one MBA containing LOFs in the United States of America's territories covered by the safeguards agreement pursuant to Additional Protocol I to the Treaty of Tlatelolco reproduced in INFCIRC/366.
- The total amount of nuclear material[40] under Agency safeguards was 35 139 (35 113) significant quantities, which represents 17% (18%) of nuclear material (by significant quantity) under Agency safeguards, including 10 917 (10 735) significant quantities of unirradiated plutonium.
- The Agency carried out 70 (71) inspections, 12 (12) design information verifications and two (0) complementary accesses utilizing 747.5 (779.5) calendar-days in the field for verification, which represents 6% (6%) of the Agency's verification effort in the field.
- The estimated cost of safeguards for the group was €4.6 (€4.6) million[42], which represents 4% (4%) of the total cost of Agency safeguards allocated by State.

C.5. States 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 11 States Parties to the NPT which, at the end of 2018, had yet to bring comprehensive safeguards agreements into force pursuant to Article III of the Treaty. Six (seven) of these States Parties have signed comprehensive safeguards agreements and five of the six have also signed additional protocols.

D. Areas of Difficulty in Safeguards Implementation

83. This section describes progress in addressing the problems in the implementation of safeguards during 2018.

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 2018, 35 (37) 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.

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

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

86. The performance of State and regional authorities responsible for safeguards implementation (SRA) 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. There have been only modest improvements in resolving SRA effectiveness issues over the last few years. In 2018, one quarter of States still did not have an established SRA or a responsive point of contact and in another quarter of States the SRA did not satisfactorily respond to the Agency's requests. Some SRAs lack the necessary authority, independence from operators, resources or technical capabilities to implement the requirements of safeguards agreements and additional protocols. In particular, some SRAs 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. The above-mentioned issues lead to additional costs and use of resources for the Agency and, in many cases, also for the State authority and nuclear facility operators.

87. Problems with regard to provision of visas for designated inspectors continued during 2018 in around one tenth of States. Restrictions on designation of inspectors, including instances where there was a limited number of designated inspectors, were experienced in approximately one fifth of States; a small improvement compared to previous years. The restrictions on designation of inspectors and problems with regards to provision of visas complicated travel and inspection planning and in some cases limited the Agency's ability to respond to changing inspection needs. Significant delays in the designation of inspectors are still encountered in a small number of States.

88. Complete, accurate and timely provision of safeguards relevant reports and other relevant information by States is important for effective and efficient safeguards implementation. Issues related to reporting of nuclear material continued for several States. Figure 3A shows the number of States for which the provision of nuclear material accountancy reports to the Agency for the period 2014–2018 were either delayed or remained outstanding. Over the last five years, modest progress has been observed on the provision of initial inventory reports by States with an SQP based on the revised standard text. In 2018, one of these States provided the initial inventory report on nuclear material. Furthermore, a reduction in the number of States that have not provided all required nuclear material accountancy reports has now been observed for two consecutive years. However, the number of States which have not provided timely nuclear material accountancy reports increased in 2018. Figure 3B shows the number of States for which the provision of additional protocol declarations to the Agency for the period 2014–2018 were either delayed or remained outstanding. In 2018, four States provided their initial additional protocol declarations. In each of the last five years, issues related to the submission of information pursuant to additional protocols have been found in over 30% of States with additional protocols in force, with the problem persisting for nearly half of them. Finally, safeguards effectiveness was adversely affected in several States that have not provided the required design information, including with respect to new facilities, in accordance with their Subsidiary Arrangements General Part, or have not given advance notification of nuclear material receipts and transfers.

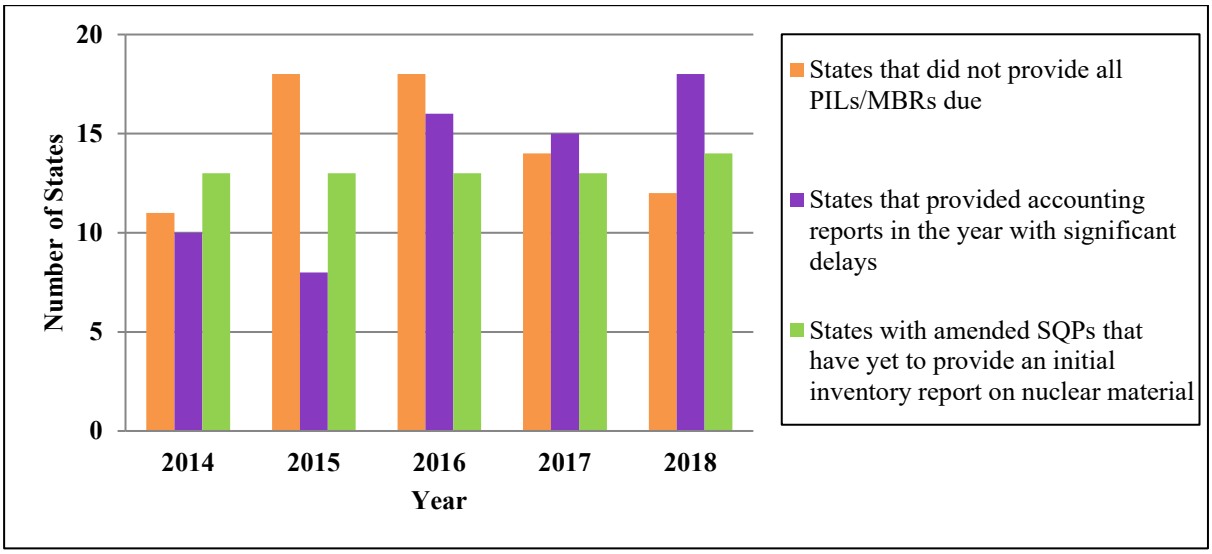

Figure 3A. States for which the provision of nuclear material accountancy reports to the Agency were delayed or remained outstanding

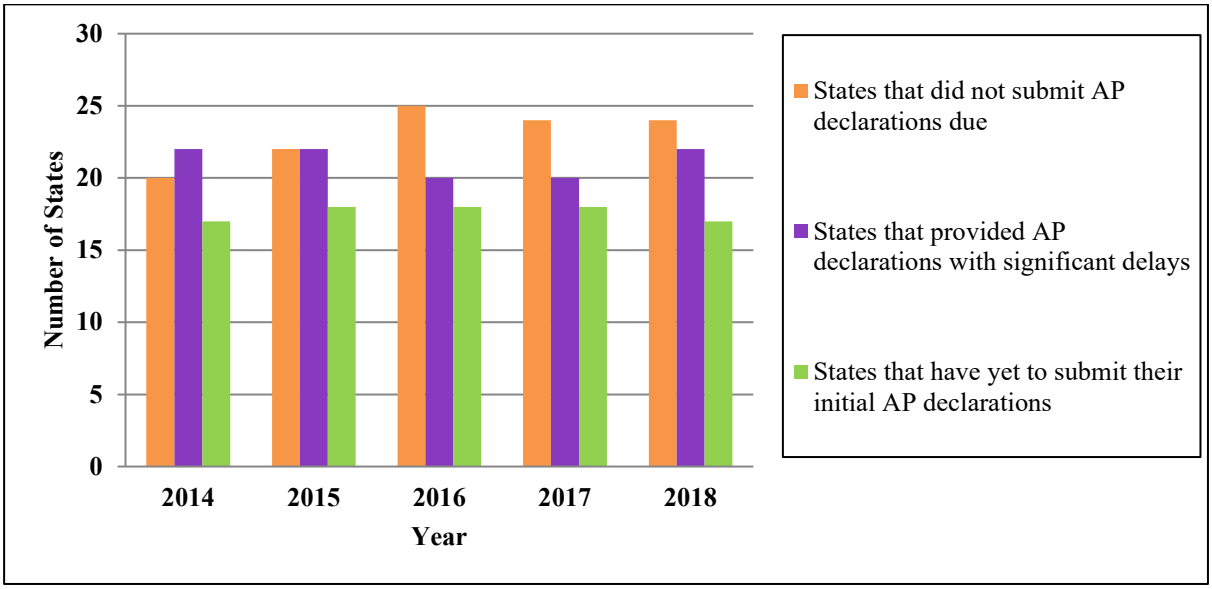

Figure 3B. States for which the provision of additional protocol declarations to the Agency were delayed or remained outstanding

89. Provision of adequate access to facilities, or other locations, and to safeguards information is an important component of the effectiveness of the Agency's verification activities in the field. Several States did not provide timely access for Agency inspectors or the equipment or services necessary to facilitate the conduct of verification activities; limited the scope of activities during inspections, including by not permitting environmental sampling; or did not provide access for inspectors to conduct the necessary verification activities, as provided for in relevant safeguards agreements and as requested by the Agency. This included limitation of access to areas of facilities where nuclear material was not present and access to locations where the purpose of Agency activities was to assure the absence of undeclared nuclear material or activities. Late submission to the Agency of changes to facility operational programmes often lead to unsuccessful or more effort in carrying out verification activities. Some States did not allow the transmission of safeguards data to Agency Headquarters, thus reducing safeguards efficiency and contributing to increased verification costs. During 2018, difficulties in customs clearance of Agency safeguards equipment were experienced in

more than 10% of the shipments. In addition, despite general improvements in the shipment times for destructive analysis samples, delays persisted in a handful of States, which prevented the timely analysis of relevant samples.

Fact box 9. Timeliness of reports and declarations

For 2018, for States with safeguards agreements in force:

- As of 1 March 2019, the following reports[43] which were due with regard to 2018 had yet to be provided to the Agency:
  - 14 (13) initial inventory reports from States with SQPs based on the revised standard text;
  - 36 (46) physical inventory listings (PILs) and material balance reports (MBRs) from 12 (14) States.
- For 18 (15) States, more than 20% of PILs, MBRs or inventory change reports (ICRs) were dispatched with a delay greater than 40 days.
- Twenty-four (24) States with additional protocols in force did not submit any additional protocol declarations. Seventeen (18) of them have still not submitted their initial declarations.
- For 22 (20) States, more than 20% of their additional protocol declarations were received by the Agency with a delay greater than 40 days.

90. Bulk nuclear material measurements by the 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, the 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 and completeness of their declarations.

92. During the year, the Agency needed to spend additional effort and resources for the States where the above-mentioned issues have been encountered. The Agency is addressing these issues with the respective State authorities as appropriate. The Agency is also providing assistance to the SRAs as discussed in Section E.5.

D.3. Security concerns

93. In certain States, the overall security situation continues to be a concern to the Agency because of the potential impact on the Agency's ability to perform planned in-field verification activities. The United Nations Department of Safety and Security (UNDSS) provide continuous assessment of the prevailing security conditions in all States and assign the appropriate security levels for staff travelling to those areas. This serves as a guideline for all official travel, including travel in connection with Agency in-field verification activities. Security clearance by UNDSS is required for all staff on official travel. In addition, training is provided to assist staff with issues related to security in the field.

[43] Approximately 40% of the outstanding PILs and MBRs were 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 2018. The Agency organized an outreach workshop for diplomats from Permanent Missions and Embassies located in Berlin, Brussels, Geneva and London (Vienna, Austria, 11–12 June 2018), a national workshop for Nepal (Kathmandu, Nepal, 10–12 December 2018) and country visits to São Tomé and Príncipe (18-19 June 2018) and Cabo Verde (21–22 June 2018). During these outreach activities, the Agency encouraged States to conclude comprehensive safeguards agreements and additional protocols, and to amend their SQPs. In addition, the Agency held consultations with representatives from a number of Member and non-Member States in Geneva, Jakarta, Lisbon, New York and Vienna at various times throughout the year. During the year, a comprehensive safeguards agreement with an SQP based on the revised standard text and an additional protocol entered into force for Liberia. In addition, the Board of Governors approved a comprehensive safeguards agreement with an SQP for the State of Palestine.[22] An additional protocol entered into force for Serbia. An additional protocol was signed for Algeria and the Board of Governors approved an additional protocol for Sri Lanka. A voluntary offer agreement and an additional protocol thereto was signed for the United Kingdom.

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 2018, the SQP was rescinded for Malaysia and the SQPs were amended for Paraguay, Tonga and the United States of America[44]. At the end of 2018, 58 (55) States[29] had operative SQPs in force based on the revised standard text. Figure 4A shows the number of States with operative SQPs from 2008 to 2018. The number of States that have an operative SQP based on the original standard text has decreased by approximately 40% in the last decade. Since 2013, the average rate at which operative SQPs based on the original standard text have been amended, rescinded or have become non-operational is approximately two per year.

96. Figure 4B shows the status of additional protocols from 2008 to 2018 for States with safeguards agreements in force. The number of States that have brought an additional protocol into force has increased by approximately 50% in the last decade. Since 2013, the average rate at which new additional protocols were brought into force is approximately two per year. At the end of 2018, there were 48 States with safeguards agreements in force but without an additional protocol in force. Of these, 35 have a comprehensive safeguards agreement with an operative SQP. Figure 4B also shows the number of States Parties to the NPT that had yet to bring comprehensive safeguards agreements into force pursuant to Article III of the Treaty. This number has decreased by approximately 60% from 2008 to 2013; since then, only two States Parties to the NPT, Djibouti and Liberia, have brought a comprehensive safeguards agreement into force.

97. The status of safeguards agreements, SQPs, and additional protocols as of 31 December 2018 is shown in the tables in Section B.7.

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[44] The United States of America has amended its small quantities protocol to the safeguards agreement reproduced in INFCIRC/366 between the United States of America and the Agency pursuant to Additional Protocol I of the Treaty of Tlatelolco, covering the United States of America's Protocol I territories.

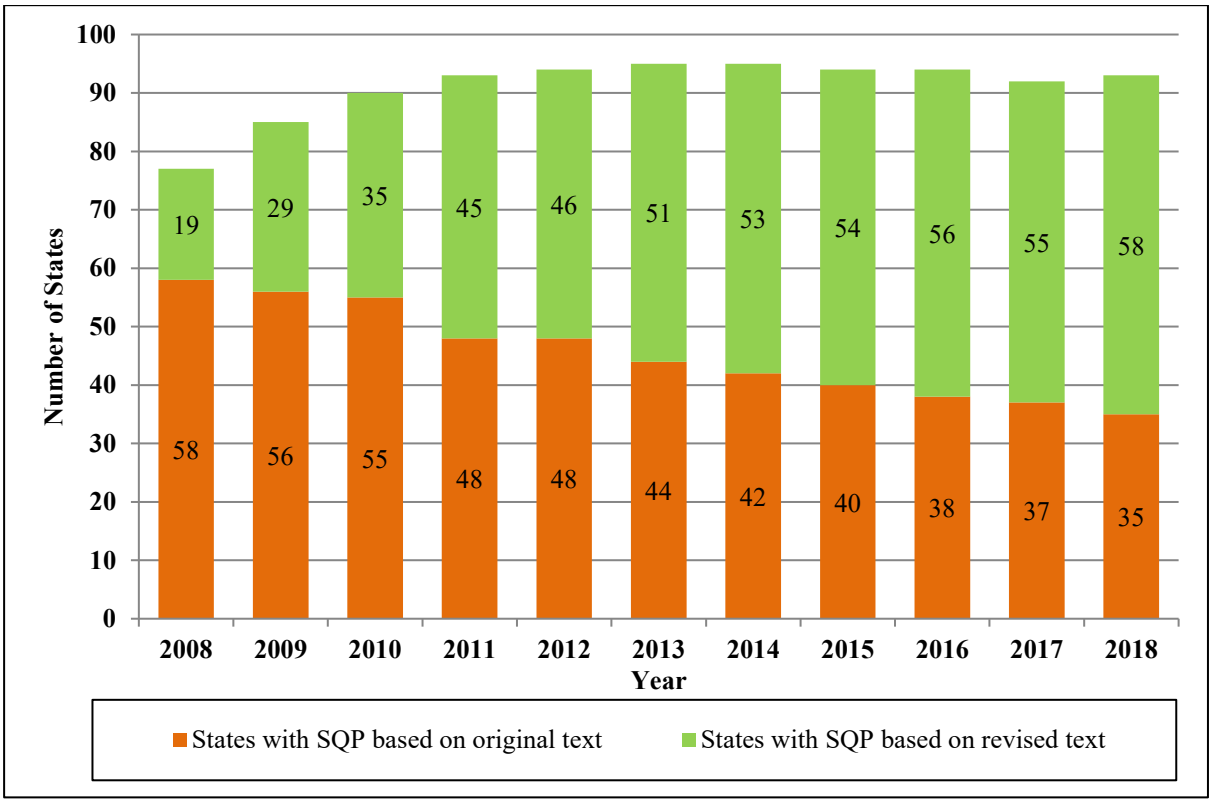

Figure 4A. Status of operative small quantities protocols for States with comprehensive safeguards agreement in force, 2008–2018

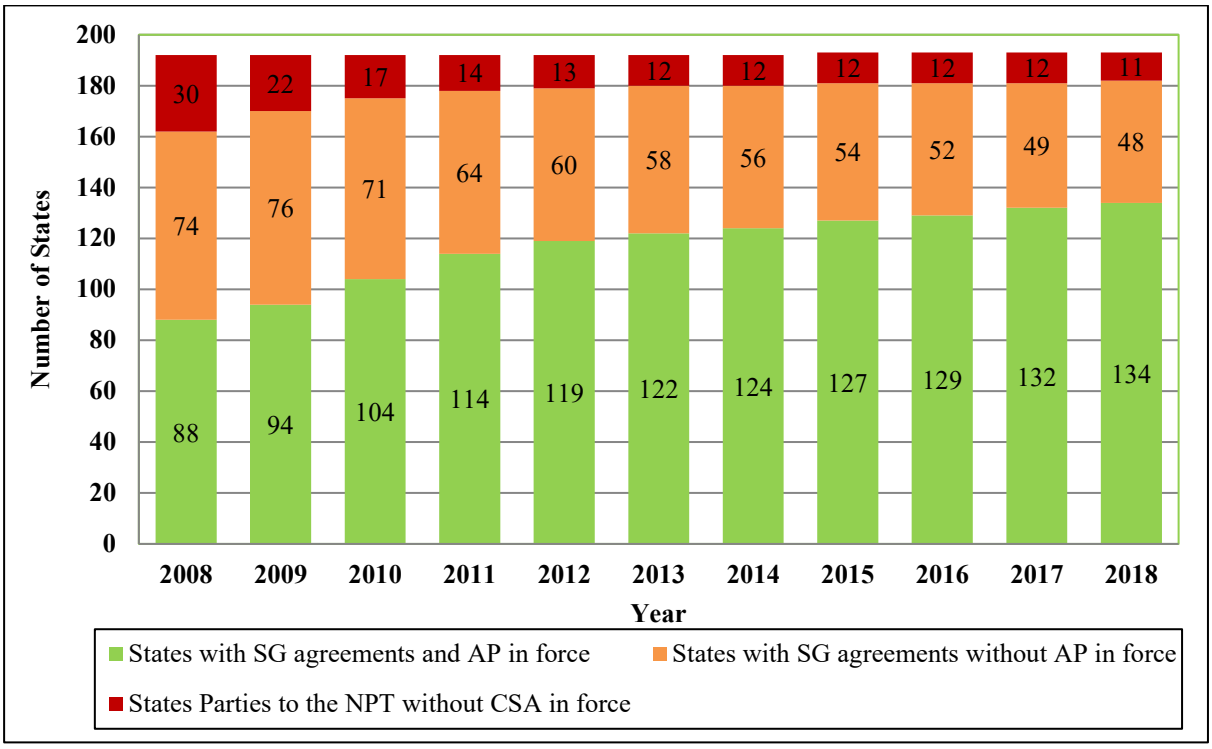

Figure 4B. Status of additional protocols for States[3, 4] with safeguards agreements in force, 2008–2018

E.2. Strategic planning

98. The Department of Safeguards conducts internal strategic planning to help ensure that safeguards continue to be implemented both effectively and efficiently into the future. In 2018, the Department continued to develop its strategic planning processes, with an emphasis on effective implementation.

99. Strategic planning contributes towards: addressing the increasing workload and static resources; anticipating and responding to new demands; keeping up with technology and innovation; and sustaining the safeguards workforce and institutional knowledge.

100. During 2018, the Agency continued to rely on MSSPs to address research and development (R&D) needs related to the implementation of verification activities. In the first quarter of 2018, the Agency published the *Development and Implementation Support Programme for Nuclear Verification, 2018–2019* and an updated Research and Development Plan (STR-385). These documents support strategic planning by identifying R&D areas relevant to safeguards, and by communicating priority R&D needs and the types of external support necessary to meet these needs.

101. The 13th Symposium on International Safeguards, 'Building Future Safeguards Capabilities' was held at the Agency Headquarters on 5-8 November 2018. The Symposium focused on identifying innovative technologies that might be exploited for safeguards; strengthening existing partnerships and creating new ones; and improving the day to day work of safeguards implementation. More than 90 individuals from developing countries received travel support to attend the event. This resulted in an improved geographic diversity in the more than 800 participants from 90 States, in comparison to 54 States in 2014. More than 42% of the participants came from regions outside of North America and Europe (20 % in 2014) and 29% were women (20% in 2014). During the Symposium, the Secretariat and other participants presented nearly 400 papers and posters in a range of interactive sessions designed to foster information exchange, experience sharing and networking. The new ideas and practical proposals generated during the Symposium will be summarized in a report to be issued in 2019 and will guide future actions around innovation, partnering and improving communication and collaboration among States, industry, academia, non-governmental organizations and the Agency. The event was mostly funded through extrabudgetary contributions.

E.3. The development and implementation of State-level safeguards approaches

102. In July 2018, the Director General submitted a report to the Board of Governors entitled *Implementation of State-level Safeguards Approaches for States under Integrated Safeguards – Experience Gained and Lessons Learned* (GOV/2018/20). This report contains the Secretariat's analysis of experience gained and lessons learned in the updating and implementation of State-level safeguards approaches for States under integrated safeguards, as described in GOV/2013/38 and GOV/2014/41 and Corr.1.

103. The Agency has progressively developed and implemented SLAs as set out in the Supplementary Document (GOV/2014/41 and Corr.1). During 2018, the Agency developed SLAs for five States with a comprehensive safeguards agreement. This brings the total number of States with a comprehensive safeguards agreement for which an SLA has been developed to 130. These 130 States hold 97% of all nuclear material (by significant quantity) under Agency safeguards in States with a comprehensive safeguards agreement and include 67 States[13] with a comprehensive safeguards agreement and an additional protocol in force for which the broader conclusion has been drawn (of which 17 are States with an SQP); 35 States[26] with a comprehensive safeguards agreement and an additional protocol in force for which the broader conclusion has yet to be drawn (of which 24 are States with an SQP); and 28 States[27] with a comprehensive safeguards agreement with an SQP in force but no additional protocol

in force. Previously, an SLA was developed for one State[28] with a voluntary offer agreement and an additional protocol in force. As described in the Supplementary Document, in developing and implementing an SLA, consultations were held with the relevant State and/or 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 better integration of safeguards activities conducted in the field with those carried out at Headquarters; further development of internal procedures and guidelines for the implementation of safeguards at the State-level; adjustments to the safeguards training programme, and strengthening the Departmental oversight mechanisms relevant to the implementation of safeguards at the State-level.

E.4. Development of verification measures and technologies

E.4.1. Safeguards approaches

105. Site or facility specific safeguards approaches/procedures[45] were developed or improved in 2018 for:

- The application of dual containment and surveillance systems at two interim spent fuel dry storages, one in Romania and one in Spain;
- The application of seals on spent fuel casks by operators under Agency surveillance using a secured iCobra reader at a dry storage in Lithuania;
- The implementation of unannounced inspections at a hot cell laboratory in Switzerland;
- The verification of nuclear material at a long-term waste management facility in Canada;
- The verification of the core fuel of a fast breeder reactor during maintenance works in Japan;
- The verification of the core fuel at a CANDU reactor in Argentina;
- The use of remote data transmission at a closed-down reprocessing plant in Italy;
- The verification of nuclear material at a site in Japan, reverting to a facility-based approach from a sector-based one following the end of major transfers between facilities on that site.

106. In 2018, the Agency updated internal guidance on termination of safeguards on nuclear material as measured discards and safeguards on nuclear material in retained waste. This was the result of work carried out by a group of consultants, advice from SAGSI and in-house experts.

107. In 2018, the Agency continued to prepare for the future application of safeguards to new types of facilities (e.g. geological repositories, spent fuel encapsulation plants, pyroprocessing facilities, small modular reactors and pebble bed modular reactors). These preparations included assessing the proliferation resistance of nuclear facilities, evaluating safeguards concepts for specific facility types, investigating prospective safeguards technologies and equipment, and identifying safeguards measures early in the design stages of a facility.

108. In 2018, the Agency published one further volume in its series of Member State guidance documents entitled: *International Safeguards in the Design of Facilities for Long Term Spent Fuel*

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[45] Including a safeguards approach for the monitoring of fresh fuel transfer at a nuclear power plant in Taiwan, China.

Management (NF-T-3.1). In addition, an interdepartmental working group on Safeguards by Design was created to foster sharing of knowledge and building of cooperation within the Agency on this subject. In 2018, the Agency held two more expert meetings on the updating of the Physical Model (characterizing all elements of the nuclear fuel cycle), covering two separate elements of the nuclear fuel cycle (reactors and fuel fabrication).

109. During 2018, 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 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 Chornobyl

110. In 2018, the Agency updated the safeguards approach for the transfer of spent fuel from wet storage to interim dry storage after conditioning. Installation and testing of safeguards equipment at the conditioning facility and interim dry storage facility were completed in 2018. The testing of the conditioning facility with spent fuel is expected to commence in 2019. Furthermore, the Agency continues to develop an effective and efficient approach to safeguard the nuclear material contained in the new safe confinement of the Chornobyl nuclear power plant, installed over the damaged reactor Unit 4.

E.4.2.2 Encapsulation Plant and Geological Repository

111. Finland and Sweden each have plans to construct an encapsulation plant and a geological repository (EPGR) in which to dispose of spent fuel. The Agency's EPGR project coordinates the development of specific safeguards approaches for EPGRs, assesses verification methods, and identifies the needs for new safeguards equipment and techniques necessary for safeguarding these facilities to optimize safeguards measures at the time these facilities become operational. Ground breaking for the encapsulation plant in Finland commenced in spring 2016, and construction works for the facility started in 2017. The Agency, in cooperation with the European Commission, has finalized a plan regarding equipment infrastructure requirements and specifications for the installation of safeguards equipment at the encapsulation plant in Finland and continues working on the equipment infrastructure requirement for the associated geological repository.

E.4.2.3. Japan Mixed-Oxide Fuel Fabrication Plant

112. Due to continuing construction delays at the Japan Mixed-Oxide Fuel Fabrication Plant, development and implementation activities under this project continued to be limited in 2018. Plant construction and commissioning are not expected to be complete before 2022.

E.4.3. Information management and analysis

E.4.3.1. Safeguards information system

113. The Agency completed the planned modernization of safeguards information technology on schedule on 15 May 2018, within scope and budget. The modernization, completed under the MOSAIC project, has enhanced existing tools and software applications in the safeguards IT system, introduced new IT tools and software applications relevant to safeguards implementation, and strengthened information security. Through the completion of the modernization activities, the Department of Safeguards has established an IT system that, inter alia, provides for effective and efficient collection,

processing and evaluation of safeguards-relevant information; increased facilitation of the analysis of diversion and acquisition path analysis; greater assistance to inspectors in conducting safeguards activities in the field and at Agency Headquarters; better underpinning of the Agency's safeguards techniques and technologies; and the continued drawing of soundly-based safeguards conclusions.

E.4.3.2. Information analysis

114. 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 analyses the consistency of State declarations, and compares them with 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 2018, the Agency continued to identify new safeguards relevant open sources of information, improve processes and enhance methodologies and tools.

115. To continuously improve the quality of the information on which it relies, 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 yearly Departmental assessments of measurement quality.

116. 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 non-destructive assay and destructive assay measurements and their comparison with State declarations. A total of 81 verification measurement performance evaluations assessing operator and Agency measurement uncertainties were performed. In addition, 149 destructive analysis reports were produced, covering 637 uranium samples, 30 plutonium samples, three input solution samples and 12 heavy water samples. Two hundred and two (215) reports evaluating the balances of all nuclear material types were prepared for 83 (84) MBAs in 52 (55) facilities in 2018. During the year, legacy software and databases related to measurement verification data evaluation have continued to be re-engineered and prepared for consolidation and integration into the secure IT environment.

117. The effectiveness and efficiency of the environmental sampling evaluation process continued to increase during the year due to the implementation of new modelling tools and by the automation of reporting features including graphics. In 2018, the Agency prepared 37 (44) environmental sampling summaries for the evaluation of States and 282 (311) environmental sampling reports covering 489 (501) samples collected from 51 (49) States[4]. 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 those on analysis measurements of uranium impurities, particularly impurities in uranium ore concentrates.

118. In 2018, the Agency acquired 936 (556) commercial satellite images in support of safeguards verification activities. The imagery was acquired with regard to 48 (32) States[46] from 22 (16) different Earth observation satellites. Of these images, 367 (253) were new acquisitions, and the remaining

[46] Including the DPRK.

569 (303) were purchased or received from the public archives of the Agency's commercial satellite imagery providers. In 2018, the Agency produced 146 (125) imagery-derived products, including analysis reports and geographical information system products, to support verification activities in the field and at Headquarters.

119. In 2018, the Agency continued to develop tools, including the Collaborative Analysis Platform (CAP), to help increase the number of open source information items collected automatically. In 2018, 673 (850) analytical products were prepared to support the State evaluation process.

120. In 2018, Member States provided the Agency with information concerning 130 (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, 114 (79) trade analysis reports were produced for State evaluation purposes.

E.4.4. Sample processing and analysis

121. Environmental and nuclear material samples collected by safeguards inspectors are analysed by the Agency's Safeguards Analytical Laboratories (SAL) in Seibersdorf, Austria – consisting of the Nuclear Material Laboratory (NML) and the Environmental Sample Laboratory (ESL) – and other members of the Network of Analytical Laboratories (NWAL). The NWAL includes 22 qualified laboratories located in Australia, Brazil, China, the European Commission, France, Hungary, Japan, the Republic of Korea, the Russian Federation, the United Kingdom, and the United States of America. In addition, the IAEA operates the On-Site Laboratory (OSL) in Rokkasho, Japan, for analysis of nuclear material samples collected at this site.

122. The Agency also provides logistical support for the sampling, transport and analysis of nuclear material and environmental samples. Key performance indicators are used to monitor all stages of the sample collection, transport and analysis process in order to identify potential problems and make improvements in timeliness. Moreover, the Agency administers a rigorous quality control programme, which includes regular inter-laboratory comparison exercises covering the major safeguards analytical techniques, to confirm the quality of analytical results across the NWAL.

123. In 2018, MSSPs provided reference materials and support to the advancement of analytical techniques. They also contributed to cooperation projects in support of the Agency's quality control effort.

E.4.4.1. Nuclear material and heavy water sample analysis

124. In 2018, the Agency collected 453 (548) uranium samples, 34 (51) plutonium-bearing samples, and two (five) heavy water samples. All accountancy samples were analysed by the Agency's NML, while the heavy water analysis was performed by the Hungarian Academy of Sciences. In addition, 87 (79) samples were analysed by the Agency at the OSL.

125. The Agency produced 512 uranium sample analysis reports in 2018 (down from a peak of 729 in 2016). The median time from the collection of a uranium sample to the final evaluation report to the Division of Operations was 118 days in 2018, consistent with historical levels. Figure 5 displays the number of uranium sample analysis reports completed during the last seven years.

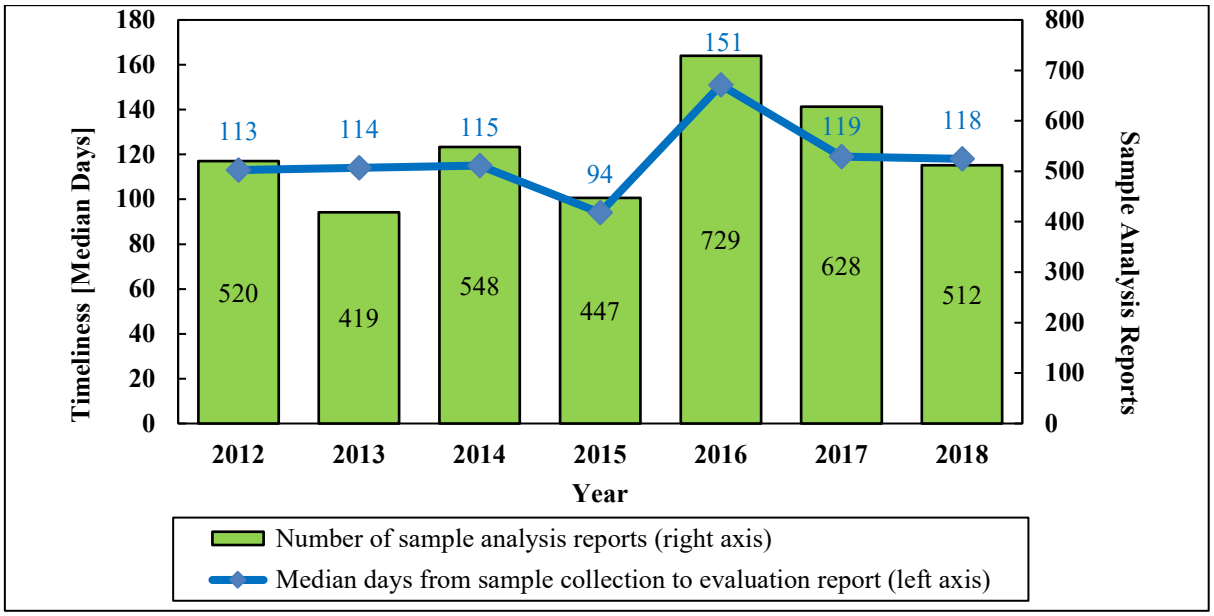

Figure 5. Number of sample analysis reports and median overall timeliness for uranium samples collected for material balance evaluation (excluding samples analysed by OSL)

E.4.4.2. Environmental and other sample analysis

126. In 2018, the Agency collected 420 (399) environmental samples, while 928 (940) subsamples underwent bulk and particle analysis of uranium and plutonium (concentration and/or isotopic composition). Of these subsamples, 123 (99) were analysed by the Agency's ESL and the rest by partner laboratories of the NWAL. The median overall time from sample collection to the evaluation report continued to improve in 2018 and amounted to 143 (157) days. Figure 6 illustrates the improvements in the efficiency of the environmental sample process over the last seven years, during which period the overall processing time was reduced by 38% despite an increase of 21% in the number of analysis reports completed. The main contributors to this improved efficiency were more timely screening and distribution of samples to the NWAL and improved analysis times by the laboratories.

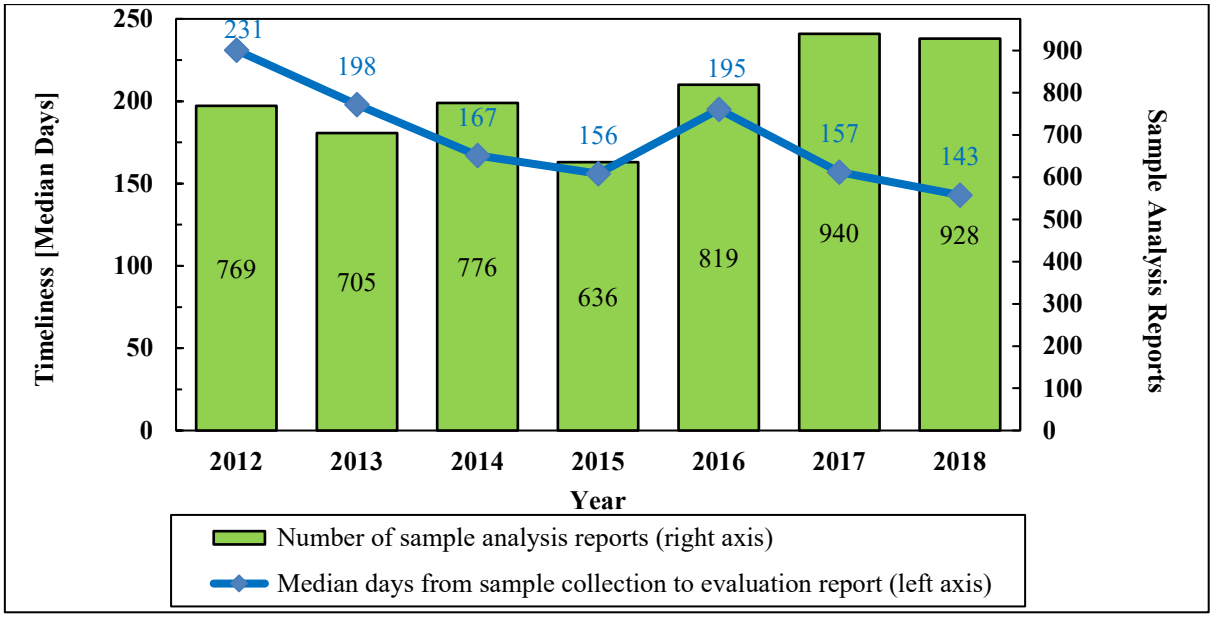

Figure 6. Number of sample analysis reports and median overall timeliness for environmental samples

127. The Agency collected 61 (84) other samples of material in 2018 to determine whether such material produced at the front-end of the nuclear fuel cycle was of a composition and purity suitable for fuel fabrication or for being isotopically enriched and should become subject to nuclear material accountancy and other safeguards procedures specified in the relevant safeguards agreements. In 2018, a total of 92 (110) such samples were analysed, including 69 (104) by the Agency's NML.

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

128. Efforts to expand the use of the NWAL continued. In 2018, no additional laboratories officially qualified for sample analysis. Laboratories in six Member States are in the process of qualification.

129. In 2018, laboratories in Belgium, Canada and the Netherlands were undergoing qualification for nuclear material analysis. In addition, a laboratory in Argentina was undergoing qualification for heavy water analysis and a laboratory in Germany was undergoing qualification for the provision of reference material. Finally, a laboratory in the United Kingdom began the qualification process for nuclear material characterization.

E.4.5. Safeguards equipment development and implementation

130. Throughout 2018, 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. One-hundred and twenty-one (68) coordination tasks supporting safeguards equipment were completed in 2018. In addition, approximately 6500 (5900) pieces of equipment were dispatched to support verification activities in the field. Of those, about 2000 (1750) items were shipped by cargo and 4500 (4150) were hand-carried by Agency inspectors and technicians. During 2018, the effort spent to install, maintain and support the use of equipment in the field required 1003.5 (1001) days of in-field work, plus the associated travel and rest days.

131. 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 has exceeded the target goal of 99% availability[47]. This near total availability could be achieved through preventive maintenance policies and system architecture implementing redundancy at system/component level.

132. In 2018, cooperative efforts continued with the regional or State authorities for the procurement, acceptance testing, training, installation and maintenance of safeguards equipment designated for joint use.

133. During 2018, the Equipment Radiation Monitoring Laboratory (ERML) monitored for radioactive contamination over 22 000 (27 000) items, including metal seals and environmental samples, and distributed over 14 000 (18 700) personal protective equipment for activities in the field.

E.4.5.1. Non-destructive assay systems

134. In 2018, the Agency prepared, tested and calibrated 2112 (2453) separate pieces of NDA equipment which were assembled into 1097 (991) NDA systems to be used during verification activities in the field.

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

135. NDA system capabilities were expanded by the following:

- A Passive Gamma Emission Tomography (PGET) unit deployed at a nuclear power plant was successfully operated from Agency Headquarters, demonstrating the feasibility of remote operation of the PGET.
- Following the completion of field testing, the performance of the Fast Neutron Coincidence Collar (FNCL) for the verification of fresh fuel assemblies containing burnable poison rods was evaluated; results showed the FNCL to be more accurate and four times faster than systems based on thermal neutron detection.
- A multipurpose gamma-spectrometric software was developed and is now available for inspection use in support of advanced analysis of high-, medium- and low- resolution gamma spectra, including enrichment and isotopic data.
- The software application for the Digital Cherenkov Viewing Device (DCVD) was re-engineered to provide a more accurate prediction of the Cherenkov light intensity from spent fuel assemblies with an improved graphical user interface and architecture (Figure 7).

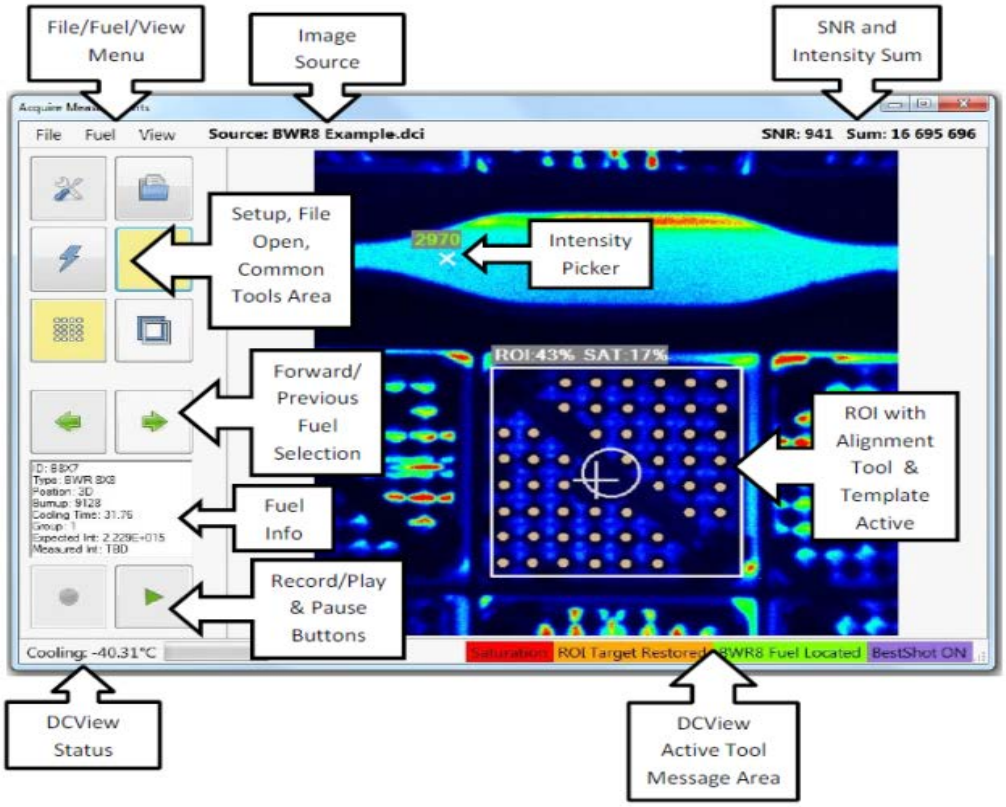

Figure 7. DCView4 software for DCVD

E.4.5.2. Surveillance systems

136. By the end of 2018, the Agency had 1563 (1541) cameras connected to 908 (940) systems operating or ready to use at 277 (277) facilities in 37 (37) States[4].

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 8). By the end of 2018, 881 (750) NGSS cameras had been installed in 29 States[4].

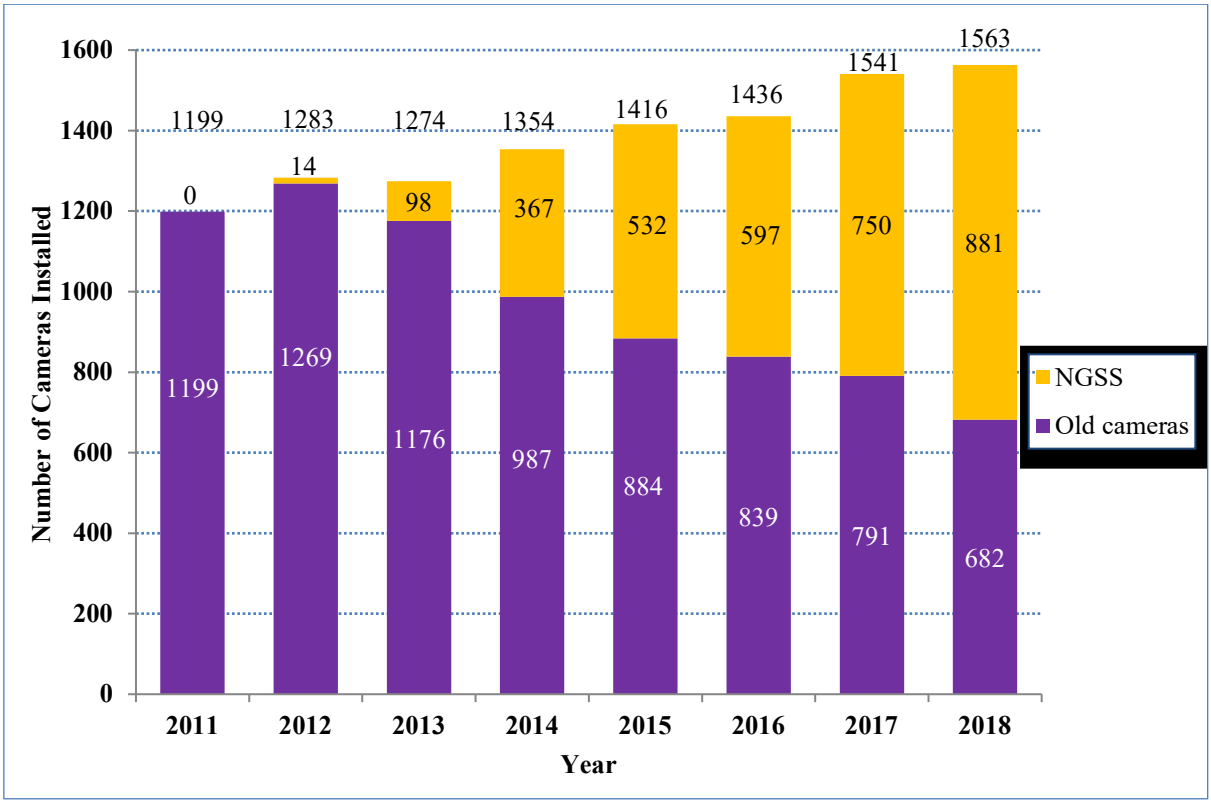

Figure 8. Replacement campaign of old cameras with NGSS technology

138. The following enhancements to surveillance systems were made:

- The new software for the review of data collected by surveillance systems continued to be developed. In 2018, this tool was integrated into the Integrated Review and Analysis Package (IRAP), and final user testing started.
- Radiation hardened cameras, NGSS cameras and underwater cameras were either installed or upgraded at multiple facilities in 2018.

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 2018, the Agency verified approximately 24 800 (24 300) 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 continues to work on the implementation of new sealing technologies and on the improvement of the overall security of these instruments. In 2018, the following enhancements to sealing systems were made:

- New prototypes of the active optical loop seal were received, and are undergoing qualification testing as part of the authorization process.
- The laser mapping for cask verification was successfully demonstrated at dry storage facilities, and its use is expected to reduce the verification effort.
- New solutions for a potential replacement of the E-CAP metal seal continue to be explored.

E.4.5.4. Unattended monitoring systems

141. At the end of 2018, the Agency used 171 (167) unattended monitoring systems (UMS) installed in 24 (24) States. Of these, 147 (143) measure radiation, eight (eight) are thermohydraulic monitors and 16 (16) are solution volume measurement systems.

142. In 2018, the installed unattended monitoring capability was maintained and the following enhancements were made:

- Unattended monitoring systems were upgraded at several CANDU reactors.
- New systems for neutron detection and quantifying measurements were installed for monitoring transfer of nuclear material at a long term waste disposal site (Figure 9).
- A new UMS cabinet power distribution system was developed. This in-house solution is fully direct current based and is expected to significantly extend the preventive maintenance cycle of UMS systems.

Figure 9. Nuclear Material Transfer Monitor equipped with neutron slab detector

E.4.5.5. Remote data 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 at Agency Headquarters in Vienna from unattended safeguards systems installed in facilities. The use of RDT enables greater verification efficiency by relieving inspectors from the task of data collection at facilities, and allows early detection of any deterioration in system performance.

144. At the end of 2018, 1102 (932) unattended safeguards data streams[48] were collected remotely from 137 (130) facilities in 29 (29) States[4]. Of these, 414 (311) data streams were produced by surveillance systems, 128 (111) by unattended monitoring systems, and 560 (510) by electronic seals.

145. The Agency continued to develop the following data automation and inspector review tools to help streamline the equipment data collection and review process:

- The Integrated Review and Analysis Package (IRAP), jointly developed with the European Commission, continued to be extended in 2018 to integrate a greater diversity of data streams. In 2018, IRAP was authorized for use for two specific facilities.
- The Near Real Time (NRT) system, which is an automated extension of IRAP, continued to be developed and prepared for its deployment. This system is expected to increase efficiency in the data analysis process.

E.4.5.6. Instrumentation technology foresight

146. In 2018, activities to identify and evaluate emerging technologies that could support Agency safeguards instrumentation continued. Those activities were performed in close cooperation with MSSPs, under the umbrella of instrumentation technology foresight activities. The main highlights for 2018 were:

- New software which integrates and geo-references different types of data has been made available to Agency inspectors for verification activities in the field.
- An improved version of the autonomous navigation and positioning system based on inertial positioning sensors was authorized for use in support of complementary access activities.
- A prototype of the next-generation Cherenkov Viewing Device (XCVD), capable of recording stabilized images in real time, was successfully tested at a nuclear facility.
- Three robotized Unmanned Surface Vehicles (USV) platforms selected from a technology crowdsourcing open challenge organized in 2017 have been tested at a nuclear power plant for supporting spent fuel verification. One of these three USV platforms was selected for further development with the objective of integrating the XCVD as a payload and introducing additional automations (Figure 10).

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

Figure 10. Field test of the USV platform, supporting the verification of spent fuel

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.

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

149. In 2018, the Agency continued discussions with ABACC and the European Commission aimed at strengthening 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 2018 include:

- Hosting international, regional and national training courses for personnel responsible for overseeing and implementing SSACs and RSACs;
- Providing use of facilities in the State to train Agency safeguards inspectors, thus supporting their development and qualification;
- Providing use of laboratories and facilities to train State participants at SSAC training courses on accounting and control of nuclear material and design information;
- 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.

150. In 2018, the Agency published an updated version of the *Safeguards Implementation Practices Guide on Establishing and Maintaining State Safeguards Infrastructure (SVS 31),* which includes in Annex I a revised model regulation for implementing comprehensive safeguards agreements and additional protocols.

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. In 2018, one ISSAS mission was conducted in Mexico and a preparatory visit for an ISSAS mission was conducted in Malaysia. The Department of Safeguards also participated in two Integrated Nuclear Infrastructure Review (INIR) missions to Saudi Arabia and Niger. Upon request, INIR missions are provided by the Department of Nuclear Energy to States embarking on a nuclear power programme or expanding an existing one. These missions 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 13 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 States on a bilateral basis. In total, more than 250 experts from some 50 States were trained on safeguards related topics.

153. In 2018, the Agency also continued to offer a Learning Management System, CLP4NET, 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 2018, the Agency provided training to personnel of State and regional authorities, facility and LOFs operators, as well as to representatives of relevant States' ministries in the form of:

- An international SSAC training course for newcomer States held in the Republic of Korea;
- An international training course on safeguards for States with SQPs held in Japan;
- An international training course on SSAC held in Japan;
- A regional training course on safeguards for SQP countries held in Jamaica;
- A regional training course on SSAC held in Brazil;
- A regional training course on SSAC held in India;
- A regional training course on the additional protocol held in South Africa;
- A national training course on SSAC for participants from Iraq held at the Agency Headquarters;
- A national training course on safeguards implementation for participants from Iran held in Japan;
- A national training course on safeguards implementation held in Tajikistan;
- A national training course on safeguards implementation held in Turkmenistan;
- A national training course on safeguards implementation held in Bahrain;
- A national training course on safeguards implementation held in the United Kingdom.

In addition, the Agency participated in training courses organized by:

- The Republic of Korea (KINAC/INSA) — an international course on fundamentals of nuclear safeguards — held in the Republic of Korea;
- The United States of America (International Nuclear Safeguards Engagement Program — INSEP): a regional workshop on nuclear material in non-fuel cycle applications held in Tunisia and a national training course on complementary access at uranium mines held in Kazakhstan; a national training course on safeguards obligations for LOFs operators, held in Ukraine; and a national training course on nuclear material accounting held in Belarus;
- The IAEA Department of Nuclear Energy and STUK — Interregional training course on implementation of national requirements for nuclear power programmes held in Finland.

E.6. Quality management

154. The quality management system (QMS) 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.

155. The following quality management activities for the Department of Safeguards took place in 2018:

- A short-term improvement plan for the QMS, which was an output of the self-assessment of the QMS conducted in 2017, was implemented. The plan addressed the integration of risks and opportunities into QMS processes, for example, in the management review, internal quality audit programme, condition reporting and process improvement.

- In 2018, the ERML obtained an ISO 17025:2017 accreditation. This accreditation further enhances the reliability of the radioactive contamination monitoring performed in the ERML.

- Three internal quality audits were completed during the year. Two of the audits were performed in support of the certification for the safeguards analytical laboratories at Seibersdorf vis-à-vis conformity with the requirements of ISO 9001:2015 standard.

A further audit was completed relating to the recent accreditation of the ERML against ISO 17025:2017.

- Seventy-four condition reports identifying quality, radiological and industrial safety, and security events were opened in 2018 – forty one of these were raised as a result of internal quality audits. Root cause analyses were performed and actions to prevent recurrence were initiated. Eleven of these reports were closed during 2018.
- Process analysis and improvement activities continued to be performed to standardize process implementation.
- Staff in the Department of Safeguards were trained to further raise awareness of the QMS, 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 model, which is used to estimate the cost of safeguards implementation by State and to compare costs and effort of options in safeguards approaches, was further refined and improved during the year. This revision ensures that the model 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 24 staff members retiring or separating from the Department of Safeguards.

E.7. Information Protection

156. Safeguards information security continued to be a priority throughout 2018. Additional functionality and enhancements were made to the Authorization Management (AM) tool, further strengthening and streamlining access and authorization management for the secure IT environment (ISE), according to the principles for authorizing access to safeguards information laid out in the Departmental Policy on Authorization and Access Management.

157. A working group was formed by the DDG to address all issues relating to security of information in the field. Measures to protect all Agency safeguards information in the field to a high standard continue to be developed and implemented. In addition, a new training module on security in the field has been added to the Introductory Course on Agency Safeguards (ICAS) in 2018.

158. The Physical Security Management System (PSMS) of the Department continued to be improved in 2018, and the IT security of the system as a whole has been enhanced. Physical security incident management and response has also been strengthened with the introduction of new procedures and capabilities, together with greater cooperation and integration with the United Nations Office at Vienna (UNOV) safety and security services.

159. The Department continues to offer classroom training on information security, including the classification and handling of information, for staff working with safeguards information, including those in other Departments. A refresher course is also offered as an e-learning module. Security awareness continues to be addressed through targeted campaigns including phishing tests and easier means for staff to report suspected phishing attempts.

F. Safeguards Expenditures and Resources

160. This section provides information on the level and use of financial and human resources for safeguards implementation during 2018. The activities of Major Programme 4 — Nuclear Verification — were funded primarily through the Regular Budget and extrabudgetary contributions. The Regular Budget appropriation for 2018 was adjusted to €138.7 (€137.0) million at the United Nations operational average rate of exchange for the year. In 2018, extrabudgetary allotments totalled €29.9 million.

161. Total expenditure for Major Programme 4 from the 2018 Regular Budget was €138.6 million. In addition, €18.9 million was spent from extrabudgetary contributions.

162. The total combined safeguards expenditures from the Regular Budget and extrabudgetary contributions were distributed among expenditure categories as follows: staff costs — 70%; equipment and intangibles — 7%; contracts — 7%; travel — 6% and other non-staff costs — 10%.

F.1. Financial resources

F.1.1. Regular Budget expenditures

163. The Regular Budget utilization rate for Major Programme 4 was 100% with an unspent balance of less than €0.1 million from the 2018 Regular Budget at the end of the year.

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

- Overall Management, Coordination and Common Activities 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 and the verification and monitoring of Iran's nuclear related commitments in light of the United Nations Security Council resolution 2231 (2015).
- The Development programme includes developing safeguards approaches for special projects in Member States, instrumentation and technologies. This programme also includes activities related to MOSAIC.
- All corporate services supporting safeguards implementation that were formerly distributed under different programmes were consolidated under Corporate Shared Services.

165. The breakdown of the Regular Budget expenditures by programme is shown in Figure 11.

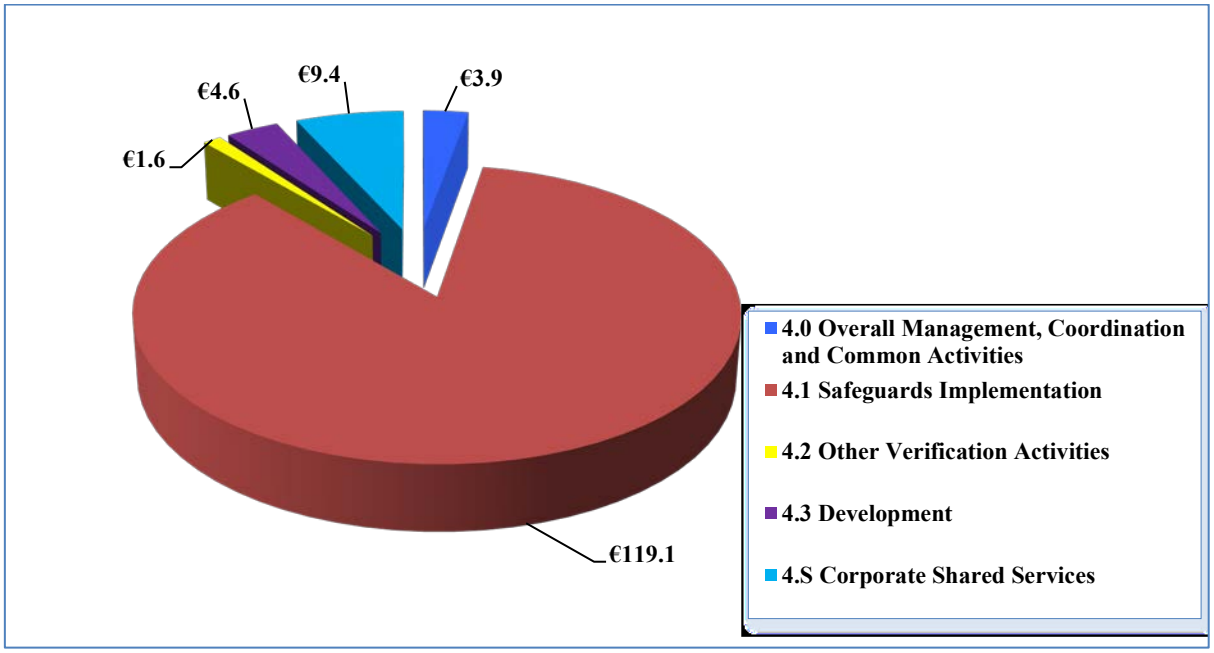

Figure 11. Major Programme 4 structure in 2018 (in € millions)

166. The breakdown of the Regular Budget expenditures by expenditure category is shown in Figure 12.

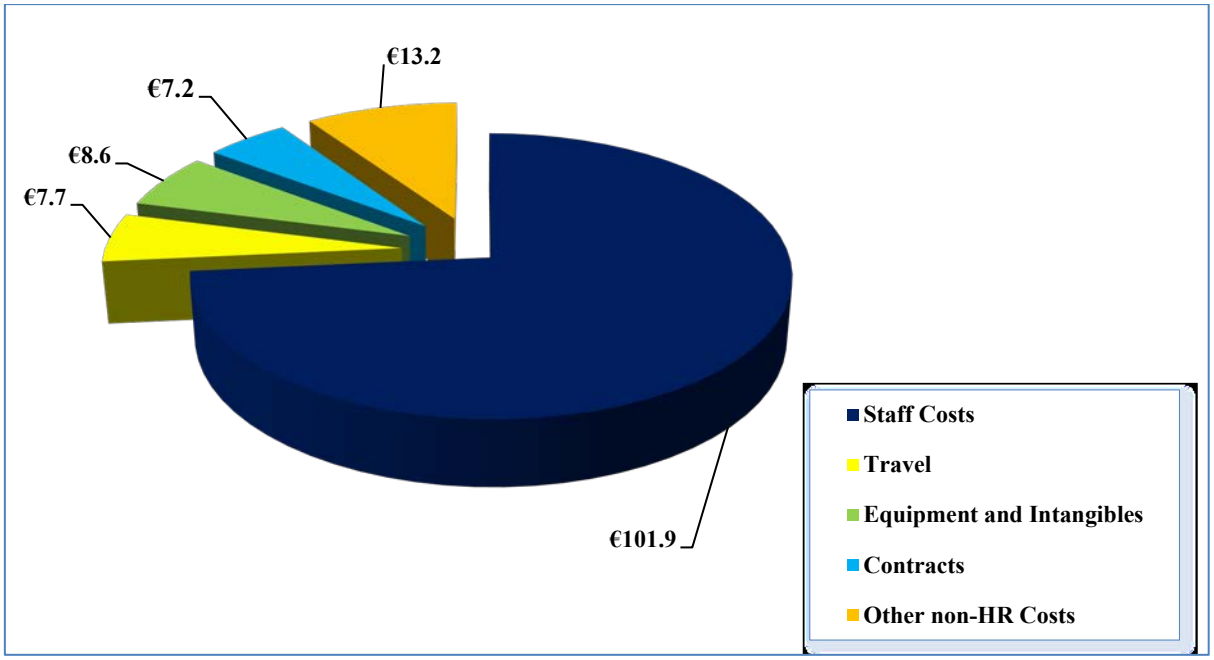

Figure 12. 2018 Regular Budget expenditures by expenditure category (in € millions)

F.1.2. Extrabudgetary contributions and expenditures

167. During 2018, €29.9 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 €18.9 million from the extrabudgetary contributions was spent as follows: €5.1 million was spent for verifying and monitoring Iran's nuclear related commitments in light of the United Nations Security Council resolution 2231 (2015); €0.7 million was spent on MOSAIC; €3.9 million was spent on Information and Communication Technology; €2.0 million was spent on provision of safeguards instrumentation and €7.2 million was spent on various other operational activities of the Department of Safeguards.

Table 6 – Extrabudgetary allotments by donor during 2018 (in € millions)

Donor	Allotment (in € millions)	%
Belgium	0.01	0.0
Canada	2.38	8.0
Denmark	0.13	0.4
European Commission	1.25	4.2
Finland	0.42	1.4
France	0.51	1.7
Germany	0.10	0.3
Hungary	0.01	0.0
Ireland	0.02	0.1
Japan	0.85	2.8
Korea, Republic of	0.81	2.7
Netherlands	0.20	0.7
New Zealand	0.12	0.4
Russian Federation	0.29	1.0
Sweden	0.58	1.9
United Kingdom of Great Britain and Northern Ireland	0.74	2.5
United States of America	20.39	68.1
Other(1)	1.14	3.8
Grand Total	**29.95**	**100.0**

Table Note:
(1) €1.10 million of this allotment represents contributions from various donors to the "single award mechanism" contributing towards verification and monitoring in the Islamic Republic of Iran in light of the United Nations Security Council resolution 2231 (2015) and the remaining €0.04 million represents contributions from other sources towards the 2018 Safeguards Symposium.

168. The breakdown of the expenditures from extrabudgetary contributions of €18.9 million by expenditure category is shown in Figure 13. In 2018, the largest share was related to staff costs. Other significant expenditures were related to contracts and equipment and intangibles.

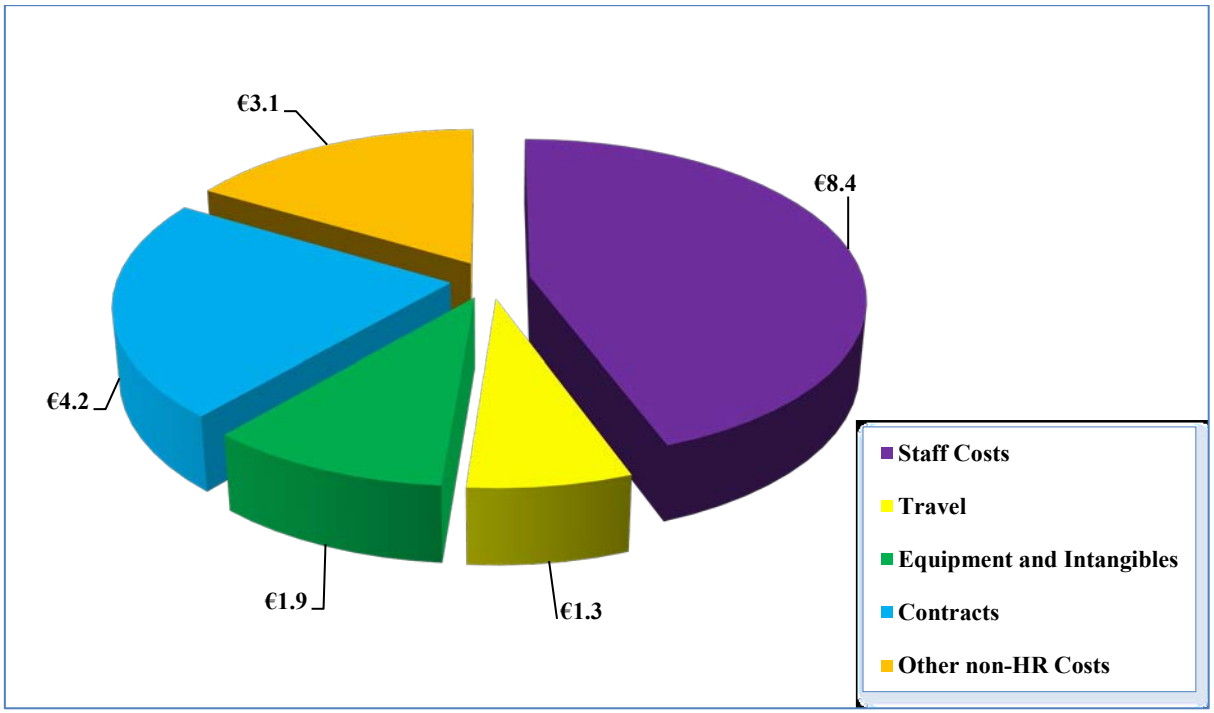

Figure 13. 2018 Extrabudgetary contribution expenditures by expenditure category (in € millions)

F.1.3. Estimation of safeguards costs by State

169. The Agency uses a methodology that allows safeguards implementation costs to be calculated on a State-by-State basis in a consistent manner. This cost calculation methodology was used to produce a product cost model that estimates the resources required to implement the core processes of Major Programme 4.

170. Although the model is based on average costs for products, State-specific adjustments were applied to determine the estimated cost of safeguards implementation by State. These adjustments were made to reflect differences between actual quantities by State and the averages used for the calculation of product costs. Specific 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 those States where extra effort was spent at Headquarters which falls outside the products currently identified for the core processes.

171. Table 7 shows the estimated safeguards expenditures in 2018 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, as are all other expenditures incurred by the Agency under Major Programme 4 during the calendar year. 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, 89% (87%) of the money spent from the Regular Budget can be attributed to specific States. The remainder includes costs for other specific products and activities that are not assigned to specific States, and Agency expenditures that are not accounted for by the cost calculation model at this time.

172. The cost calculation model has now reached a level of maturity and stability such that it captures the Regular Budget costs of the Agency under Major Programme 4 and appropriately assigns those costs to specific products and activities to States. During 2018, the model was further reviewed and refined. Effort estimates in relation to some activities at Agency Headquarters in Vienna were revised and updated in the model. For the most part, changes in estimated costs from prior years are due to

differences in the quantity of specific products, activities or relative effort occurring for a State during the year. These changes are reflected in the costs by State shown in Table 7.

Table 7 – Estimated cost of safeguards by State in 2018

State	Estimated regular budget cost (€)
Afghanistan	33 000
Albania	98 000
Algeria	536 000
Andorra	33 000
Angola	117 000
Antigua and Barbuda	44 000
Argentina	3 189 000
Armenia	276 000
Australia	951 000
Austria	156 000
Azerbaijan	210 000
Bahamas	24 000
Bahrain	33 000
Bangladesh	90 000
Barbados	24 000
Belarus	682 000
Belgium	2 270 000
Belize	39 000
Bhutan	24 000
Bolivia, Plurinational State of	24 000
Bosnia and Herzegovina	113 000
Botswana	45 000
Brazil	3 716 000
Brunei Darussalam	24 000
Bulgaria	499 000
Burkina Faso	33 000
Burundi	39 000
Cambodia	119 000
Cameroon	48 000
Canada	12 382 000
Central African Republic	24 000
Chad	33 000
Chile	366 000
China	944 000
Colombia	193 000
Comoros	24 000
Congo	24 000
Costa Rica	89 000
Côte d'Ivoire	137 000
Croatia	113 000

State	Estimated regular budget cost (€)
Cuba	190 000
Cyprus	113 000
Czech Republic	1 096 000
Democratic People's Republic of Korea	1 454 000
Democratic Republic of the Congo	139 000
Denmark	143 000
Djibouti	24 000
Dominica	24 000
Dominican Republic	39 000
Ecuador	33 000
Egypt	635 000
El Salvador	108 000
Estonia	151 000
Ethiopia	39 000
Eswatini[4]	45 000
Fiji	39 000
Finland	738 000
France	1 511 000
Gabon	116 000
Gambia	24 000
Georgia	494 000
Germany	6 803 000
Ghana	111 000
Greece	149 000
Grenada	24 000
Guatemala	44 000
Guyana	24 000
Haiti	24 000
Holy See	33 000
Honduras	24 000
Hungary	806 000
Iceland	33 000
India	2 967 000
Indonesia	552 000
Iran, Islamic Republic of[3]	17 048 000
Iraq	150 000
Ireland	111 000
Israel	158 000
Italy	984 000
Jamaica	168 000
Japan	18 597 000
Jordan	352 000
Kazakhstan	2 606 000
Kenya	145 000

State	Estimated regular budget cost (€)
Kiribati	24 000
Korea, Republic of	4 880 000
Kuwait	73 000
Kyrgyzstan	170 000
Lao People's Democratic Republic	24 000
Latvia	118 000
Lebanon	51 000
Lesotho	48 000
Libya	362 000
Liechtenstein	59 000
Lithuania	1 951 000
Luxembourg	33 000
Madagascar	33 000
Malawi	94 000
Malaysia	121 000
Maldives	24 000
Mali	33 000
Malta	48 000
Marshall Islands	24 000
Mauritania	24 000
Mauritius	33 000
Mexico	807 000
Monaco	33 000
Mongolia	128 000
Montenegro	98 000
Morocco	178 000
Mozambique	24 000
Myanmar	205 000
Namibia	33 000
Nauru	24 000
Nepal	39 000
Netherlands	3 079 000
New Zealand	34 000
Nicaragua	99 000
Niger	121 000
Nigeria	200 000
North Macedonia[5]	113 000
Norway	361 000
Oman	39 000
Pakistan	1 474 000
Palau	24 000
Panama	24 000
Papua New Guinea	24 000
Paraguay	33 000

State	Estimated regular budget cost (€)
Peru	153 000
Philippines	186 000
Poland	269 000
Portugal	183 000
Qatar	36 000
Republic of Moldova	45 000
Romania	1 293 000
Russian Federation[(1)]	0
Rwanda	24 000
Saint Kitts and Nevis	44 000
Saint Lucia	24 000
Saint Vincent and the Grenadines	39 000
Samoa	39 000
San Marino	39 000
Saudi Arabia	47 000
Senegal	125 000
Serbia	147 000
Seychelles	33 000
Sierra Leone	24 000
Singapore	46 000
Slovakia	465 000
Slovenia	217 000
Solomon Islands	39 000
South Africa	2 878 000
Spain	2 126 000
Sri Lanka	39 000
Sudan	24 000
Suriname	24 000
Sweden	1 479 000
Switzerland	1 968 000
Syrian Arab Republic	385 000
Tajikistan	147 000
Thailand	184 000
Togo	24 000
Tonga	39 000
Trinidad and Tobago	24 000
Tunisia	24 000
Turkey	385 000
Turkmenistan	137 000
Tuvalu	24 000
Uganda	68 000
Ukraine	4 144 000
United Arab Emirates	603 000
United Kingdom of Great Britain and Northern Ireland	2 116 000

State	Estimated regular budget cost (€)
United Republic of Tanzania	45 000
United States of America(1)	0
Uruguay	126 000
Uzbekistan	259 000
Vanuatu	24 000
Venezuela, Bolivarian Republic of	134 000
Viet Nam	177 000
Yemen	24 000
Zambia	39 000
Zimbabwe	39 000
Total estimation of safeguards cost by State(2)	**123 533 000**
Cost not allocated to individual States	**15 108 315**
Total costs	**138 641 315**

Table Notes:
(1) Safeguards implementation costs for the Russian Federation and the United States of America were covered by extrabudgetary contributions.
(2) For Taiwan, China, costs for safeguards measures applied were reimbursed by contributions to the Regular Budget.
(3) The Agency utilized 1187 calendar-days in the field to carry out verification and monitoring activities in relation to the JCPOA and spent €5.1 million of extrabudgetary resources for this in-field work and the associated Headquarters work.
(4) The name "Eswatini" has replaced the former name "Swaziland" as of 29 June 2018.
(5) The name "North Macedonia" has replaced the former name "The former Yugoslav Republic of Macedonia" as of 15 February 2019.

F.2. Human resources

F.2.1. Staff resources

173. As of 31 December 2018, the total number of regular staff members in the Department of Safeguards was 757 (729): 506 (475) in the Professional and higher categories and 251 (254) in the General Service category. In addition, as of 31 December 2018, nine (ten) consultants, 39 (47) staff members with temporary assistance contracts — 28 (39) in the Professional and higher categories and 11 (eight) in the General Service category — 13 (16) cost-free experts and 38 (43) junior professional officers and other extrabudgetary staff were working in the Department.

174. As of 31 December 2018, the total number of inspectors in the Divisions of Operations and the Office for Verification in Iran was 276 (260). A further 34 staff members in the Professional and higher categories from other Divisions participated in verification activities in 2018 utilizing 719 calendar-days in the field for verification.

175. There were 223 (224) inspector-years available in 2018. These data represent the time that inspectors were expected to be available for in-field work, i.e. inspection, complementary access and design information verification. The calculation methodology excludes Section Heads and Directors in Operations Divisions from the statistics 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. Table 8 provides a breakdown of the number of courses offered, the training received by staff and the input of instructor time. Seventy-seven distinct courses were held, some offered

several times during the year, which amounted to a total of 165 staff training courses, of which 26 were held outside Agency Headquarters. Fifteen new inspectors completed ICAS training in February 2018 and a further 30 inspectors commenced ICAS in the summer of 2018 and completed it by December. A total of five Comprehensive Inspection Exercises were held in 2018.

Table 8 – Training 2018

Course Categories	Number of Training courses offered	Total Training time (person-days)	Total Agency Instructors (person-days)
Safeguards training (Departmental Basics, Basic Training on SG Verification Activities, including ICAS)	99	3980	729
Specialized or advanced safeguards training	25	736	137
Refresher	9	159	38
MOSAIC	32	107	13
Total	**165**	**4982**	**917**

177. Courses held at nuclear facilities are designed to enhance practical competencies for safeguards implementation in the field. They allow safeguards staff to be trained in a realistic environment thus improving their effectiveness. In particular they improve inspectors' ability to prepare for, conduct and report on inspection, design information verification and complementary access. Courses held at Headquarters aim to develop skills for processing safeguards relevant data, e.g. by developing the analytical skills necessary to take full advantage of collaborative analysis tools. Courses are continuously updated to ensure that they address the training needs throughout the Department.

178. Due to the increased need for spent fuel verification training, two spent fuel verification courses were held in 2018. Additional training was held on utilizing software applications available as a result of the completion of the MOSAIC project which aims to enhance the overall efficiency of both implementation and evaluation.

179. New training courses were developed in 2018, including refresher training on the legal basis for safeguards and training on accelerators and associated safeguards risks. Additionally, the radiation protection training, mandatory for all occupationally exposed workers, was re-designed to include an on-line component, thereby significantly increasing access and availability of the training. The Agency continued to engage with MSSPs in the development of tools for training and in the conduct of courses at nuclear facilities.

180. In addition to Agency staff training, the biannual Safeguards Traineeship Programme also took place in 2018. Six participants from Cameroon, Jordan, Kenya, Thailand, Turkey and Viet Nam, took part in this programme, which includes modules at Headquarters and at the Atominstitut in Vienna; a ten-week training course in Karlsruhe, Germany and a one-week training course in Paks, Hungary.

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

181. In 2018, the Secretariat benefitted from the work and contributions (in cash and in kind) of MSSPs. These partnerships with 20 States[49] and the European Commission focus on enhancing the IAEA's verification capabilities and addressing specific development and implementation support needs for safeguards. The 2018 Safeguards Symposium was almost entirely funded using extrabudgetary contributions of MSSPs, cooperating organizations and exhibitors. MSSPs also provided significant in-kind support to the planning and conduct of the event. MSSP activities resulted in 73 completed tasks during 2018. As of 31 December 2018, a total of 288 tasks remained on going, of which 47 had been initiated during the year. In addition, the Secretariat held in February 2018 the biennial Member State Support Programme Coordinators' Meeting where MSSP representatives were provided with detailed information and opportunities to discuss forthcoming needs and activities in support of the IAEA's nuclear verification mission, as described in two updated strategic documents, i.e. the R&D plan and the *Development & Implementation Support Programme for Nuclear Verification 2018-2019*.

182. In 2018, two series of SAGSI meetings addressing technical matters related to safeguards implementation took place and two reports to the Director General were produced. Topics on SAGSI's agenda during the year included: planning for the 2018 Safeguards Symposium; updating internal guidance, statistical methodologies and tools to support safeguards implementation at the State level; the use of key performance indicators in the Department; engagement with stakeholders to make better use of safeguards by design dialogue; and enhancing the format and structure of the Safeguards Implementation Report.

G. Further Activities Supporting the Nuclear Non-Proliferation Regime

183. 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

184. As of the end of 2018, 36 States[50] and the European Commission had committed to participating in the voluntary reporting scheme (VRS) 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). Argentina, China and the European Commission reported under

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

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

the VRS on the export, import, production and inventory of nuclear material and six States[51] reported on the export and import of non-nuclear material and equipment.

G.2. Monitoring neptunium and americium

185. 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.[52] Following the Board's decisions, letters were sent to 39 States[53] 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.

186. During 2018, the Agency received the requested information from five States[4, 54] 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.

187. In 2018, separation of neptunium and americium did not take place at the European Commission's Joint Research Centre in Karlsruhe, Germany. Consequently, flow sheet verification of neptunium and americium was not carried out at this Centre in 2018. The neptunium flow sheet verification activities at the Rokkasho reprocessing plant in Japan remained on hold due to the shutdown status of this facility during 2018.

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[51] Reports were received from Argentina, Denmark, Germany, Mexico, Sweden and the United States of America.

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

[53] 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, the Republic of Korea, Kyrgyzstan, Latvia, Lithuania, Norway, Pakistan, Poland, Republic of Moldova, Russian Federation, Spain, Sweden, Switzerland, Tajikistan, Turkmenistan, Ukraine, United Kingdom, United States of America, Uzbekistan and the Bolivarian Republic of Venezuela. Letters were also sent to the European Commission and Taiwan, China. All States responded except Armenia, Georgia, Kyrgyzstan, Republic of Moldova, Turkmenistan and the Bolivarian Republic of Venezuela.

[54] Canada, Czech Republic, Japan, the Republic of Korea, and Pakistan.

Abbreviations

ABACC	Brazilian-Argentine Agency for the Accounting and Control of Nuclear Materials
AP	additional protocol
CANDU	Canadian deuterium-uranium reactor
CSA	comprehensive safeguards agreement
DPRK	Democratic People's Republic of Korea
EPGR	encapsulation plant and geological repository
ESL	Environmental Sample Laboratory
EURATOM	European Atomic Energy Community
ICAS	Introductory Course on Agency Safeguards
ICR	inventory change report
INFCIRC	Information Circular
JCPOA	Joint Comprehensive Plan of Action
LOF	location outside facilities
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)
SLA	State-level safeguards approach
SQP	small quantities protocol
SRA	State or regional authority responsible for safeguards implementation
SSAC	State system of accounting for and control of nuclear material
VRS	voluntary reporting scheme on nuclear material and specified equipment and non-nuclear material

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

1. Data regarding safeguards activities in 2018 set out below are aggregated for all States.[3, 4]

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

2. During 2018, 721 (715) facilities[55] and 593 (583) material balance areas (MBAs) containing locations outside facilities where nuclear material is customarily used (LOFs) were under safeguards. The 1314 (1298) facilities and MBAs containing LOFs under Agency safeguards were:

- 257 (257) power reactors — 218 (217) light water reactors, 34 (34) on-load refuelled reactors and five (six) other type reactors;
- 151 (153) facilities with research reactors and critical assemblies;
- 91 (89) bulk handling facilities: 18 (18) conversion plants, 19 (19) enrichment plants, 43 (42) fuel fabrication plants, 11 (ten) reprocessing plants;
- 142 (136) separate storage facilities;
- 80 (80) other-type facilities (including 16 associated with enrichment and reprocessing technology);
- 593 (583) MBAs containing LOFs with small amounts of nuclear material (including ten 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. Since 2014, the largest increase is observed in the number of separate storage facilities (8%), followed by the number of other-type facilities (5%) and MBAs containing LOFs (5%). Over the last five years a small increase (3%) is also observed in the number of power reactors under Agency safeguards, while the number of research reactors and critical assemblies and the total number of bulk handling facilities have both decreased by about 2%. Since 2014, the number of facilities and MBAs containing LOFs shows a slow but steady increase year on year, resulting in an overall increase of about 4% over the last five years.

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

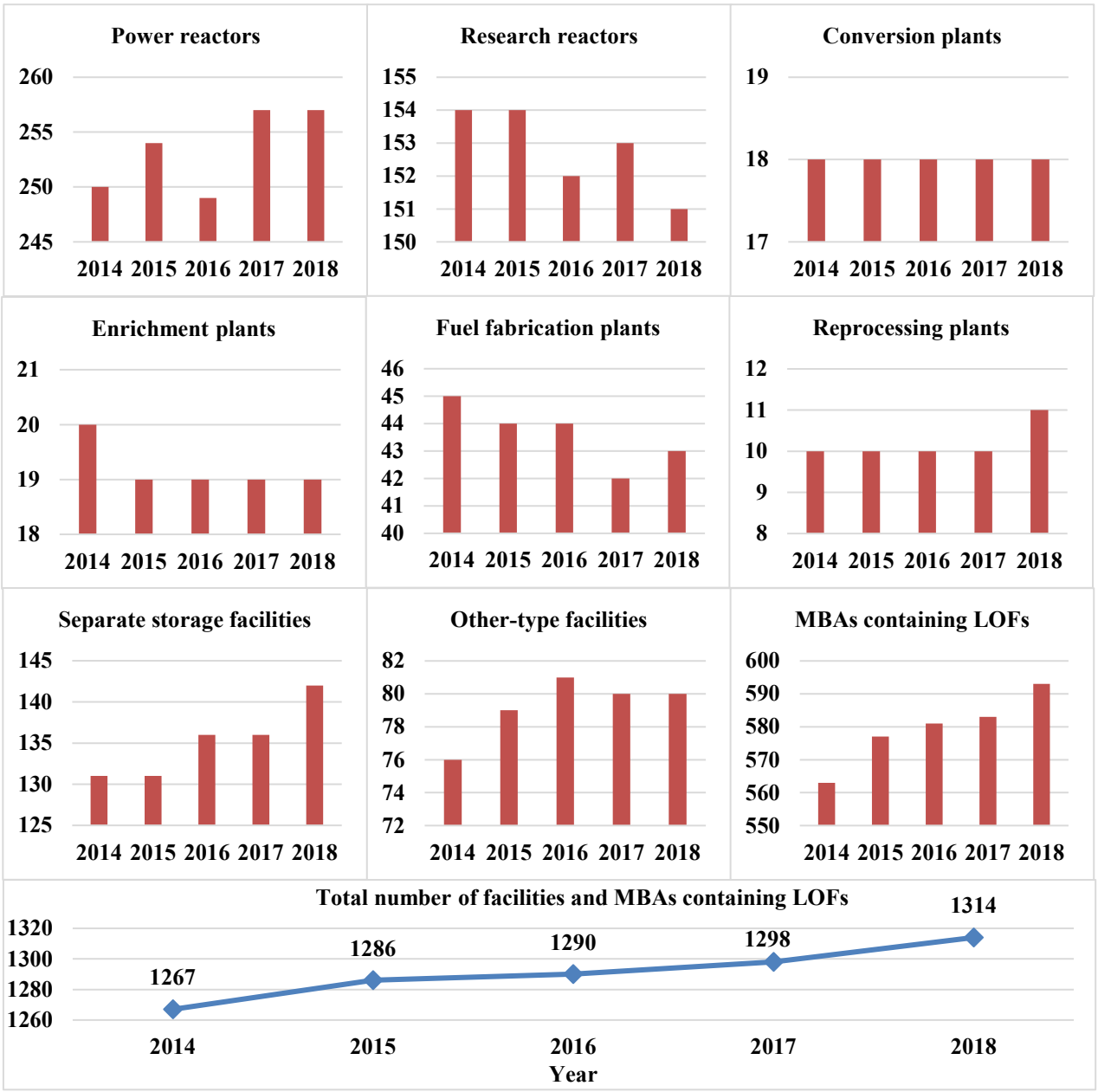

Figure I.1. Facilities and MBAs containing LOFs under Agency safeguards, 2014–2018

4. At the end of 2018, 212 814 (208 889)[56] significant quantities[57] of nuclear material were under Agency safeguards, an increase of 10% compared with 2014, as shown in Figure I.2. Of this total, 173 438 (170 023) significant quantities were in States[4] with comprehensive safeguards agreements, 4237 (3753) significant quantities in States with INFCIRC/66/Rev.2-type agreements and 35 139 (35 113) significant quantities in facilities or parts thereof selected in States with voluntary offer agreements. Over the last five years, irradiated plutonium has been the main contributor to the steady growth of significant quantities of nuclear material under Agency safeguards, followed by source material and low enriched uranium. In 2018, the total amount of low enriched uranium under Agency

[56] This amount includes an estimated 9000 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.

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

safeguards decreased slightly, reversing a trend of growth that had been observed for more than fifteen years previously.

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

- 12 079 (12 181) significant quantities of unirradiated plutonium, including fresh mixed oxide fuel, outside reactor cores;
- 163 753 (160 197) significant quantities of plutonium contained in irradiated fuel and in fuel elements in reactor cores;
- 160 (169) significant quantities of high enriched uranium and 18 (18) significant quantities of uranium-233;
- 21 136 (21 215) significant quantities of low enriched uranium;
- 15 668 (15 109) significant quantities of thorium and depleted and natural uranium.

Safeguards were also applied to 423.6 (432.3) tonnes of heavy water.

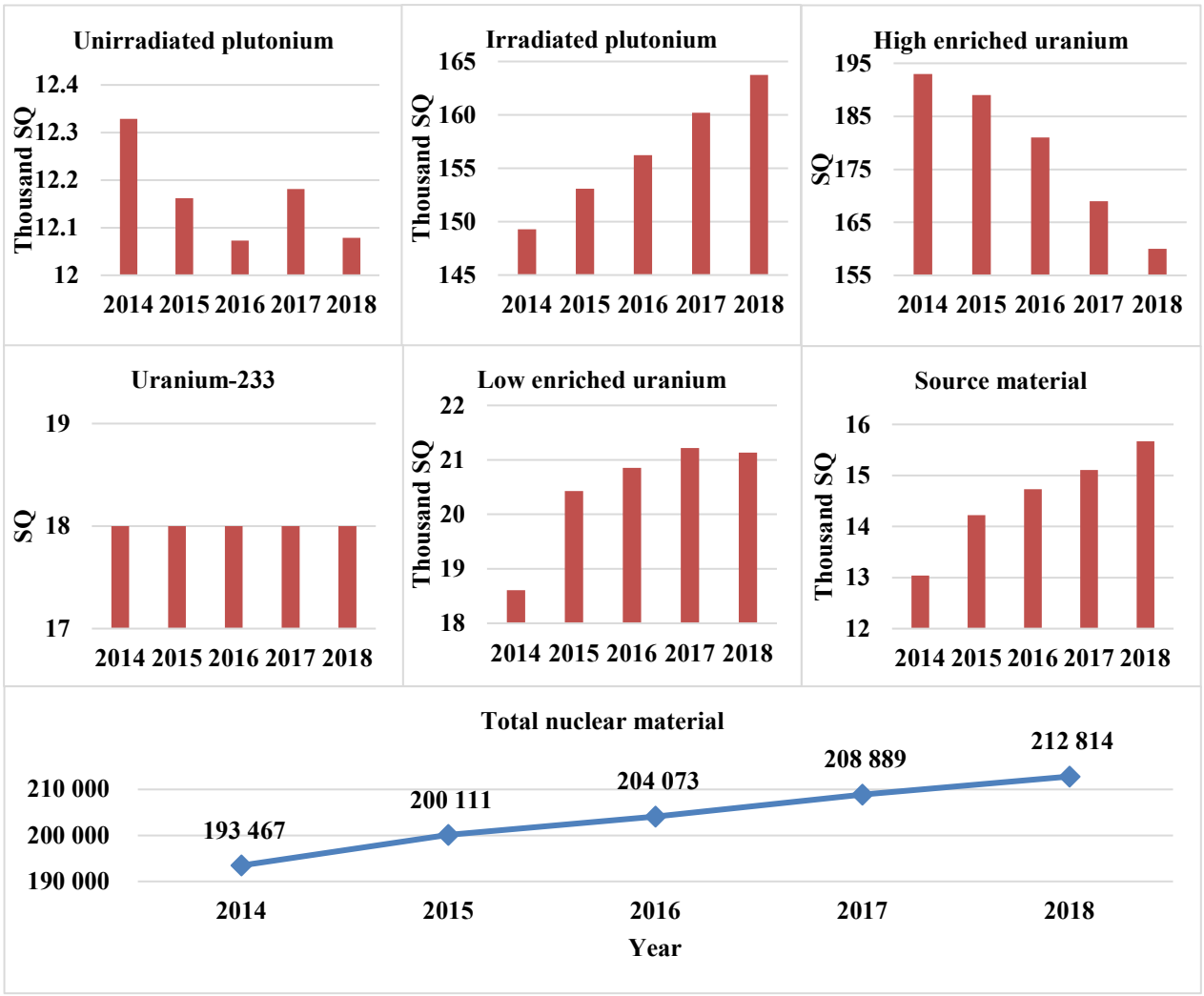

Figure I.2. Significant quantities (SQ) of nuclear material under Agency safeguards, 2014–2018

I.2. Safeguards agreement reporting and verification activities

6. The following accounting reports were received by the Agency in 2018:

- 877 373 (823 628) inventory change reports (ICRs);
- 1293 (1242) physical inventory listings (PILs);
- 1270 (1229) material balance reports (MBRs).

7. The following verification activities were carried out in 2018:

- 2195 (2102) inspections and 633 (601) design information verifications were performed at facilities and LOFs representing 13 282 (13 480) calendar-days in the field for verification.
- 2061 (2121)[58] surveillance and monitoring systems were reviewed.
- Agency seals:
  - 13 383 (13 289) metal seals applied to nuclear material or Agency safeguards equipment were detached and subsequently verified at Headquarters;
  - 6895 (6554) electronic and other types of seals.
- Agency/EURATOM common seals:
  - 2241 (2464) metal seals applied to nuclear material or Agency safeguards equipment were detached and subsequently verified at Luxembourg;
  - 2279 (1959) electronic and other types of seals.
- 270 (241) environmental swipe samples and 48 (61) samples for other analysis were collected in 2018.

The Agency dispatched 3125 (2814) 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 2014, the number of States with additional protocols in force[5] has increased by 9% and the number of additional protocol declarations evaluated by the Agency has increased by 22%. During 2018, 2613 (2513) declarations were received from 109 (107) States[4] and the European Commission.

9. Over the years, the number of complementary accesses has fluctuated according to the Agency's verification needs in States with additional protocols in force[5]. Data regarding the implementation of additional protocol activities in 2018 are as follows:

- 183 (140) complementary accesses were conducted in 51 (42) States[4] representing 329.5 (264) calendar-days in the field for verification.
- 150 (158) environmental swipe samples and 13 (23) samples for other analysis were taken during complementary access in 31 (33) States[4] and four (five) States, respectively.

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[58] This figure includes media items and data streams produced by surveillance and monitoring systems and reviewed during 2018.

- The Agency dispatched:
  - 181 (125) statements on the activities carried out under the additional protocol (10.a. statements);
  - 24 (17) 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);
  - 49 (41) 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 with both comprehensive safeguards agreements and additional protocols in force,[4] with the broader conclusion and integrated safeguards implemented during 2018

Table II.1 – Amount of nuclear material[40], in significant quantities, under Agency safeguards at the end of 2018

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
1157	**31**	**1**	**128 111**	**121**	**17**	**18 940**	**3590**	**7814**	**12**	**159 794**

Note: Heavy water under safeguards: 0.7 tonne. Significant quantity figures rounded to the nearest integer.

Table II.2 – Summary of facility based verification activities by installation category in 2018

	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	219	107	9	29	10	5	121	59	496	**1055**
Number of facilities and LOFs inspected	174	49	7	22	8	5	78	38	46	**427**
Number of inspections	591	149	42	123	42	64	338	85	48	**1482**
Number of design information verification visits	144	55	7	28	8	5	86	41	3	**377**
Number of person-days of inspection	1179	305	217	836	447	337	748	170	91	**4330**

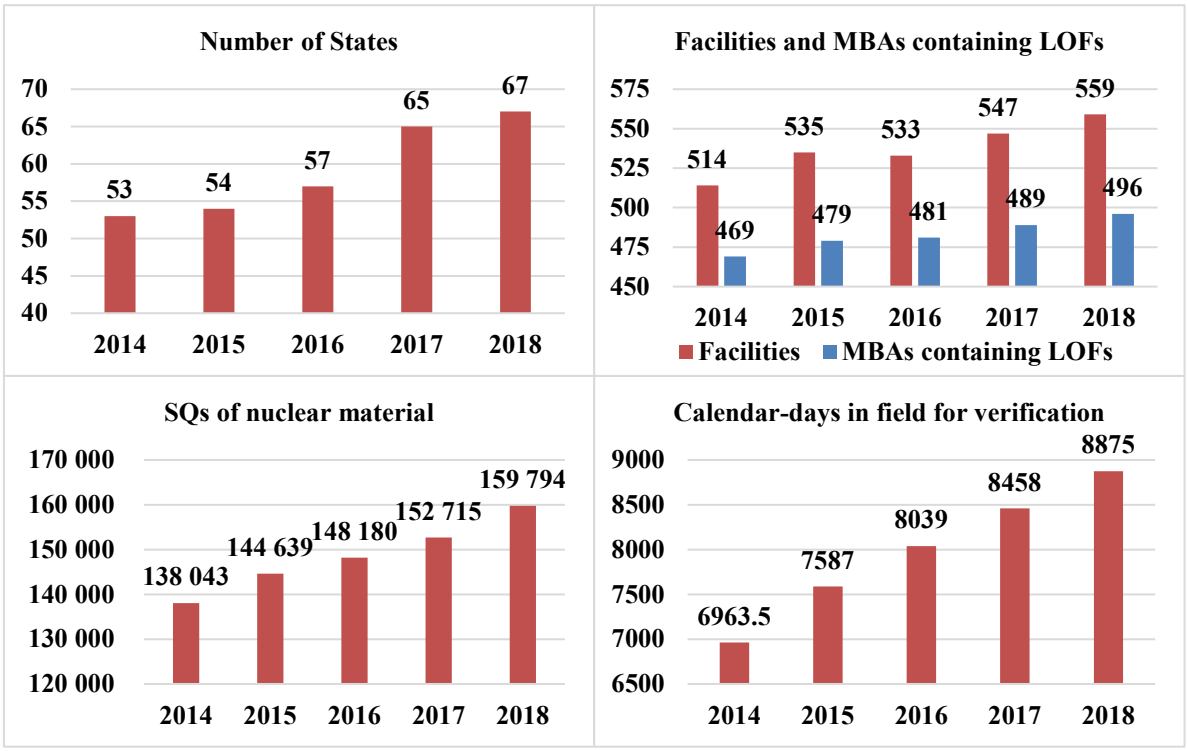

Figure II.1. Group 1: Number of States; number of facilities and MBAs containing LOFs under Agency safeguards; amount of nuclear material[40] in significant quantities under Agency safeguards; number of calendar-days in the field for verification utilized by the Agency, 2014-2018

Figure II.1 shows the number of States[4] in Group 1, together with the number of facilities and MBAs containing LOFs, the amount of nuclear material[40] in significant quantities and the number of calendar-days in the field for verification utilized by the Agency in States in Group 1 from 2014 to 2018. In 2018, the Agency has implemented integrated safeguards in approximately 81% of the facilities and 84% of the MBAs containing LOFs located in States with a CSA, which hold approximately 97% of the nuclear material under Agency safeguards in States with a CSA. Since 2014, the number of States with CSAs and APs in force, with broader conclusion and integrated safeguards implemented during the year has increased by approximately 26%. During the same period, the number of facilities in the States belonging to Group 1 increased by 9%, the amount of nuclear material in significant quantities increased by 16%, and the number of calendar-days in the field increased by 27%.

Table II.3 – Verification activities in 2018

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	1	1	0	0	2	6	0	0	0	17
Andorra	0	1(1)	0	0	0	0	0	0	0	0	0	2
Armenia	3	1	2	6	2	0	18	28	474	2	2	15
Australia	5	2	4	5	4	3	19	62	1622	7	6	65
Austria	1	5	1	1	0	1	1	3	755	6	6	18
Bangladesh	1	1	0	0	0	0	0	0	0	2	2	14
Belgium	24	9	21	69	22	3	97	195.5	21 478	29	29	22
Botswana	0	1	0	0	0	0	0	0	0	1	1	14
Bulgaria	6	3	3	8	5	1	9	31	1049	9	9	16
Burkina Faso	0	1(1)	0	0	0	0	0	0	0	0	0	14
Canada	34	8	27	240	32	10	837	1514.5	7340	50	50	58
Chile	4	1	5	5	4	1	10	18	14	5	5	14
Croatia	0	1	0	0	0	1	0	5	40	1	1	13
Cuba	0	2	0	0	0	1	0	10	3	2	2	17
Czech Republic	12	2	12	41	12	2	72	117	6231	14	14	22
Denmark(2)	4	5	0	0	0	1	0	6	32	5	5	28
Ecuador	0	1(1)	0	0	0	0	0	0	0	0	0	12
Estonia	1	2	0	0	1	0	0	3	5	2	2	13
Finland	9	4	5	14	5	1	16	36.5	1645	9	9	19
Germany	67	81	47	182	47	7	346	683	53 916	120	121	73
Ghana	1	1	0	0	0	0	0	0	0	2	2	12
Greece	1	6	1	1	0	0	1	3	2	3	3	16
Holy See	0	1(1)	0	0	0	0	0	0	0	0	0	14
Hungary	6	2	4	13	5	2	20	49.5	2731	9	9	23

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
Iceland	0	1[(1)]	0	0	0	0	0	0	0	0	0	13
Indonesia	7	1	4	5	4	2	19	37	339	8	8	18
Ireland	0	2	1	1	0	0	1	3	22	3	2	15
Italy	21	33	15	19	9	2	28	58	783	52	47	37
Jamaica	1	1	2	2	1	0	4	8	0	2	2	17
Japan	125	199	99	311	72	24	1375	2850.5	16 083	333	333	216
Kazakhstan	13	2	6	10	7	7	98	283.5	6302	11	11	17
Korea, Republic of	46	2	37	69	21	9	230	561.5	38 905	42	43	20
Kuwait	0	1[(1)]	0	0	0	0	0	0	108	1	0	36
Latvia	1	2	1	1	1	0	1	3	1	2	2	15
Libya	2	1	0	0	0	0	0	0	0	3	3	24
Lithuania	4	17	4	78	3	1	130	180	51 199	16	16	16
Luxembourg	0	2	0	0	0	0	0	0	0	0	0	13
Madagascar	0	1[(1)]	0	0	0	0	0	0	0	0	0	16
Mali	0	1[(1)]	0	0	0	0	0	0	0	0	0	13
Malta	0	1	0	0	0	0	0	0	0	0	0	13
Mauritius	0	1[(1)]	0	0	0	0	0	0	0	0	0	13
Monaco	0	1[(1)]	0	0	0	0	0	0	0	0	0	13
Montenegro	0	1[(1)]	1	1	0	0	2	6	0	0	0	15
Netherlands	8	8	7	48	6	2	157	281	28 244	19	19	23
New Zealand	0	1[(1)]	0	0	0	0	0	0	0	0	0	44
North Macedonia[(3)]	0	1[(1)]	0	0	0	1	0	6	6	1	0	26
Norway	3	1	2	6	2	1	14	36	60	5	5	14
Palau	0	1[(1)]	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
Peru	2	1	0	0	0	0	0	0	22	6	6	14
Philippines	2	1	2	2	2	0	6	11.5	0	4	4	49
Poland	3	3	2	4	1	2	6	26	1590	6	6	15
Portugal	2	0	1	1	1	1	1	3	0	2	2	14
Romania	9	1	7	25	7	3	65	117	85 550	8	8	18
Seychelles	0	1(1)	0	0	0	0	0	0	0	0	0	14
Singapore	0	1(1)	0	0	0	0	0	0	33	1	0	14
Slovakia	7	1	6	13	7	0	18	29	2239	6	6	15
Slovenia	3	14	1	4	1	1	4	18	501	9	9	14
South Africa	18	2	15	51	14	6	156	347	2347	18	18	17
Spain	17	17	18	63	17	2	110	220	6429	27	25	26
Sweden	17	9	13	30	15	1	79	159	29 914	27	27	25
Switzerland	13	2	13	79	12	1	107	240	2263	13	13	22
Tajikistan	1	1	1	1	1	0	4	10	5	2	2	17
Ukraine	38	7	24	57	28	10	202	398	5374	35	35	30
United Republic of Tanzania	0	1(1)	0	0	0	0	0	0	0	1	0	14
Uruguay	0	1	0	0	0	1	0	5	9	1	1	14
Uzbekistan	1	7	3	3	0	3	5	30	72	10	10	14
Viet Nam	1	1	0	0	0	1	0	14	55	2	2	15
Total for 67 States	**544**	**495**	**418**	**1470**	**371**	**115**	**4270**	**8712**	**375 792**	**954**	**943**	**1539**

(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) The name “North Macedonia” has replaced the former name “The former Yugoslav Republic of Macedonia” as of 15 February 2019.

	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
Taiwan, China	15	1	9	12	6	4	60	163	2324	13	13	20
Total of States and Taiwan, China	559	496	427	1482	377	119	4330	8875	378 116	967	956	1559
Total of EURATOM States(1)	**223**	**230**	**170**	**616**	**165**	**34**	**1162**	**2229.5**	**294 356**	**384**	**377**	**522**

(1) In addition to 522 additional protocol declarations for EURATOM States, there are 16 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 2018

Table II.4 – Amount of nuclear material[40], in significant quantities, under Agency safeguards at the end of 2018

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	0	0	0	1			0	1

Note: Significant quantity figures rounded to the nearest integer.

Table II.5 – Summary of facility based verification activities by installation category in 2018

	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	1	3	0	1	0	0	2	1	3	**11**
Number of facilities and LOFs inspected	0	3	0	1	0	0	0	1	1	**6**
Number of inspections	0	3	0	1	0	0	0	1	1	**6**
Number of design information verifications	0	3	0	1	0	0	0	1	0	**5**
Number of person-days of inspection	0	6	0	2	0	0	0	1	4	**13**

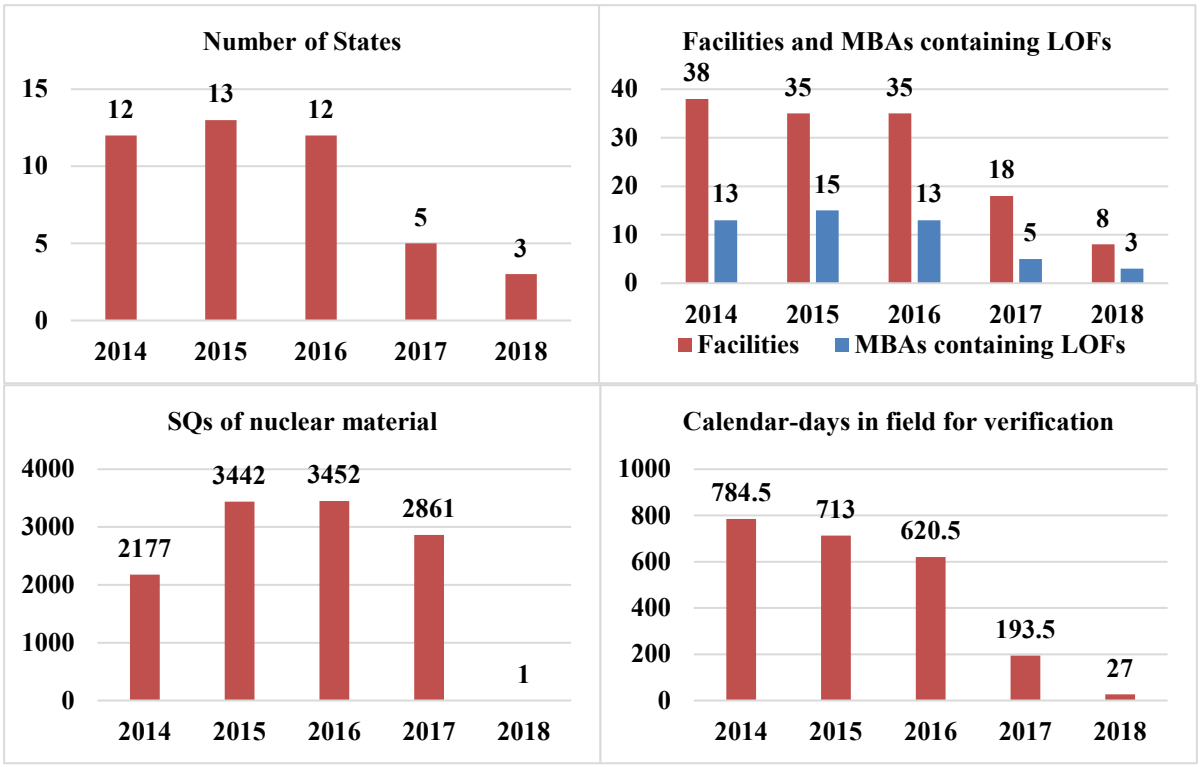

Figure II.2. Group 2: Number of States; number of facilities and MBAs containing LOFs under Agency safeguards; amount of nuclear material[40] in significant quantities under Agency safeguards; number of calendar-days in the field for verification utilized by the Agency, 2014-2018

Figure II.2 shows the number of States in Group 2, together with the number of facilities and MBAs containing LOFs, the amount of nuclear material[40] in significant quantities and the number of calendar-days in the field for verification utilized by the Agency in States in Group 2 from 2014 to 2018. With the implementation of integrated safeguards, the number of States in Group 2 has decreased significantly in the last two years. Since 2014, five States entered Group 2 in the year when the broader conclusion was drawn for them for the first time, and 14 States moved to Group 1 in the year when implementation of integrated safeguards commenced.

Table II.6 – Verification activities in 2018

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
Jordan	2	1	2	2	2	1	3	13	9	3	3	15
Liechtenstein	0	1	0	0	0	0	0	0	4	1	1	13
Turkey	6	1	4	4	3	1	10	14	17	0	0	25
Total for 3 States	**8**	**3**	**6**	**6**	**5**	**2**	**13**	**27**	**30**	**4**	**4**	**53**

Group 3: States with both comprehensive safeguards agreements and additional protocols in force[5], without the broader conclusion

Table II.7 – Amount of nuclear material[40], in significant quantities, under Agency safeguards at the end of 2018

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**	**876**	**1**	**0**	**219**	**49**	**29**	**0**	**1174**

Note: Significant quantity figures rounded to the nearest integer.

Table II.8 – Summary of facility based verification activities by installation category in 2018

	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	10	16	2	3	0	3	3	4	53	**94**
Number of facilities and LOFs inspected	5	10	2	2	0	3	2	3	21	**48**
Number of inspections	15	22	77	40	0	238	2	6	21	**421**
Number of design information verifications	7	25	25	24	0	38	1	17	0	**137**
Number of person-days of inspection	84	51	171	119	0	603	16	13	67	**1124**

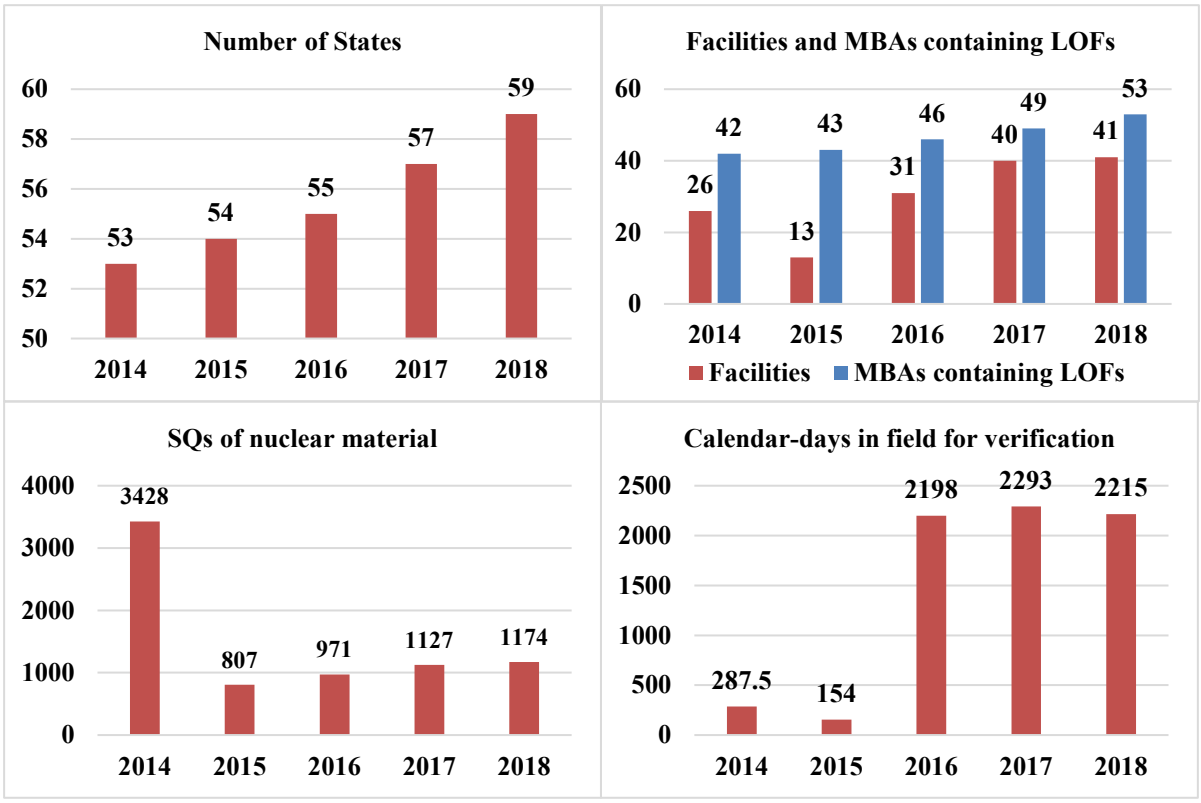

Figure II.3. Group 3: Number of States; number of facilities and MBAs containing LOFs under Agency safeguards; amount of nuclear material[40] in significant quantities under Agency safeguards; number of calendar-days in the field for verification utilized by the Agency, 2014-2018

Figure II.3 shows the number of States in Group 3, together with the number of facilities and MBAs containing LOFs, the amount of nuclear material[40] in significant quantities and the number of calendar-days in the field for verification utilized by the Agency in States in Group 3 from 2014 to 2018. As reported in Section E.1, the number of States in Group 3 has progressively increased over the years. Since 2014, 11 States entered Group 3 by bringing an AP into force[5], two of them together with their CSA, while five States moved to Group 2 in the year when the broader conclusion was drawn for those States for the first time. The most significant changes for Group 3 have occurred in 2015, when the broader conclusion was first drawn for a State with several facilities and a large amount of nuclear material, and in 2016, due to the implementation of the AP in one State with several facilities where a large number of calendar-days in the field for verification were utilized.

Table II.9 – Verification activities in 2018

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	1(1)	0	0	0	0	0	0	0	0	0	16
Angola	0	1(1)	1	1	0	1	1	9	0	0	0	14
Antigua and Barbuda	0	1(1)	0	0	0	0	0	0	0	0	0	0
Azerbaijan	0	1	1	1	0	2	4	12	10	1	1	39
Bahrain	0	1(1)	0	0	0	0	0	0	0	0	0	128
Bosnia and Herzegovina	0	1	0	0	0	1	0	6	1	1	1	38
Burundi	0	1(1)	0	0	0	0	0	0	0	0	0	0
Cambodia	0	1(1)	1	1	0	0	1	6	0	0	0	14
Cameroon	0	0	0	0	0	0	0	0	0	0	0	15
Central African Republic	0	1(1)	0	0	0	0	0	0	0	0	0	0
Chad	0	1(1)	0	0	0	0	0	0	0	0	0	13
Colombia	1	1	2	2	1	1	4	10	6	0	0	14
Comoros	0	1(1)	0	0	0	0	0	0	0	0	0	0
Congo	0	1(1)	0	0	0	0	0	0	0	0	0	0
Costa Rica	0	1(1)	1	1	0	0	4	8	0	0	0	0
Côte d'Ivoire	0	1	1	1	0	0	4	6	8	1	1	17
Cyprus	0	1	1	1	0	0	4	8	3	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
Democratic Republic of the Congo	1	0	1	1	1	0	2	8	0	1	1	0
Djibouti	0	1(1)	0	0	0	0	0	0	0	0	0	0
Dominican Republic	0	1(1)	0	0	0	0	0	0	0	0	0	0
El Salvador	0	1(1)	1	1	0	0	2	5	0	1	0	17
Eswatini(2)	0	1(1)	0	0	0	0	0	0	0	1	0	114
Fiji	0	0	0	0	0	0	0	0	0	0	0	0
Gabon	0	1(1)	1	1	0	0	4	6	22	1	0	25
Gambia	0	1(1)	0	0	0	0	0	0	0	0	0	0
Georgia	2	1	1	1	0	2	1	11	20	2	2	15
Guatemala	0	1(1)	0	0	0	0	0	0	0	0	0	0
Haiti	0	0	0	0	0	0	0	0	0	0	0	0
Honduras	0	1(1)	0	0	0	0	0	0	0	0	0	0
Iran, Islamic Republic of	21	1	16	385	123	41	989	1867	4312	32	32	21
Iraq	1	1	0	0	0	0	0	0	17	3	3	16
Kenya	0	1(1)	1	1	0	1	4	11	38	1	0	15
Kyrgyzstan	0	0	0	0	0	2	0	10	0	0	0	47
Lesotho	0	1(1)	0	0	0	0	0	0	0	0	0	13
Liberia	0	1(1)	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
Malawi	0	1[(1)]	0	0	0	1	0	8	0	0	0	0
Marshall Islands	0	0	0	0	0	0	0	0	0	0	0	0
Mauritania	0	1[(1)]	0	0	0	0	0	0	0	0	0	0
Mexico	5	2	5	8	4	2	54	93.5	154	7	7	18
Mongolia	0	0	0	0	0	1	0	8	0	0	0	13
Morocco	1	1	2	2	1	1	4	9	25	2	2	12
Mozambique	0	1[(1)]	0	0	0	0	0	0	0	0	0	0
Namibia	0	0	0	0	0	0	0	0	0	0	0	14
Nicaragua	0	1[(1)]	1	1	0	0	2	7	0	0	0	17
Niger	0	1	1	1	0	0	4	6	0	1	1	15
Nigeria	1	1	2	3	1	0	7	12	460	2	2	14
Panama	0	1[(1)]	0	0	0	0	0	0	0	0	0	0
Paraguay	0	1[(1)]	0	0	0	0	0	0	0	0	0	14
Republic of Moldova	0	1[(1)]	0	0	0	0	0	0	0	2	0	18
Rwanda	0	1[(1)]	0	0	0	0	0	0	0	0	0	0
Saint Kitts and Nevis	0	1[(1)]	0	0	0	0	0	0	0	0	0	0
Senegal	0	1[(1)]	1	1	0	0	4	12	0	2	0	20
Serbia	1	2	2	2	1	0	6	10	11	3	3	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
Thailand	3	1	1	1	1	2	1	21.5	552	2	3	17
Togo	0	1(1)	0	0	0	0	0	0	0	0	0	0
Turkmenistan	0	1	1	1	0	0	6	14	79	2	2	24
Uganda	0	1(1)	0	0	0	0	0	0	2	1	0	14
United Arab Emirates	4	1	3	3	4	2	12	31	413	3	3	91
Vanuatu	0	1(1)	0	0	0	0	0	0	0	0	0	0
Total for 59 States	**41**	**53**	**48**	**421**	**137**	**60**	**1124**	**2215**	**6133**	**72**	**64**	**905**

(1) MBAs in States with SQPs based on the revised standard text.
(2) The name “Eswatini” has replaced the former name “Swaziland” as of 29 June 2018.

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

Table II.10 – Amount of nuclear material[40], in significant quantities, under Agency safeguards at the end of 2018

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	**6**	**0**	**3200**	**0**	**0**	**242**	**65**	**255**	**0**	**3768**

Note: Significant quantity figures rounded to the nearest integer.

Table II.11 – Summary of facility based verification activities by installation category in 2018

	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	10	21	7	7	0	8	10	16	35	**114**
Number of facilities and LOFs inspected	5	13	5	7	0	7	5	14	8	**64**
Number of inspections	25	35	7	15	0	24	6	15	8	**135**
Number of design information verifications	10	18	6	8	0	10	6	16	4	**78**
Number of person-days of inspection	133	52	16	54	0	136	9	30	14	**444**

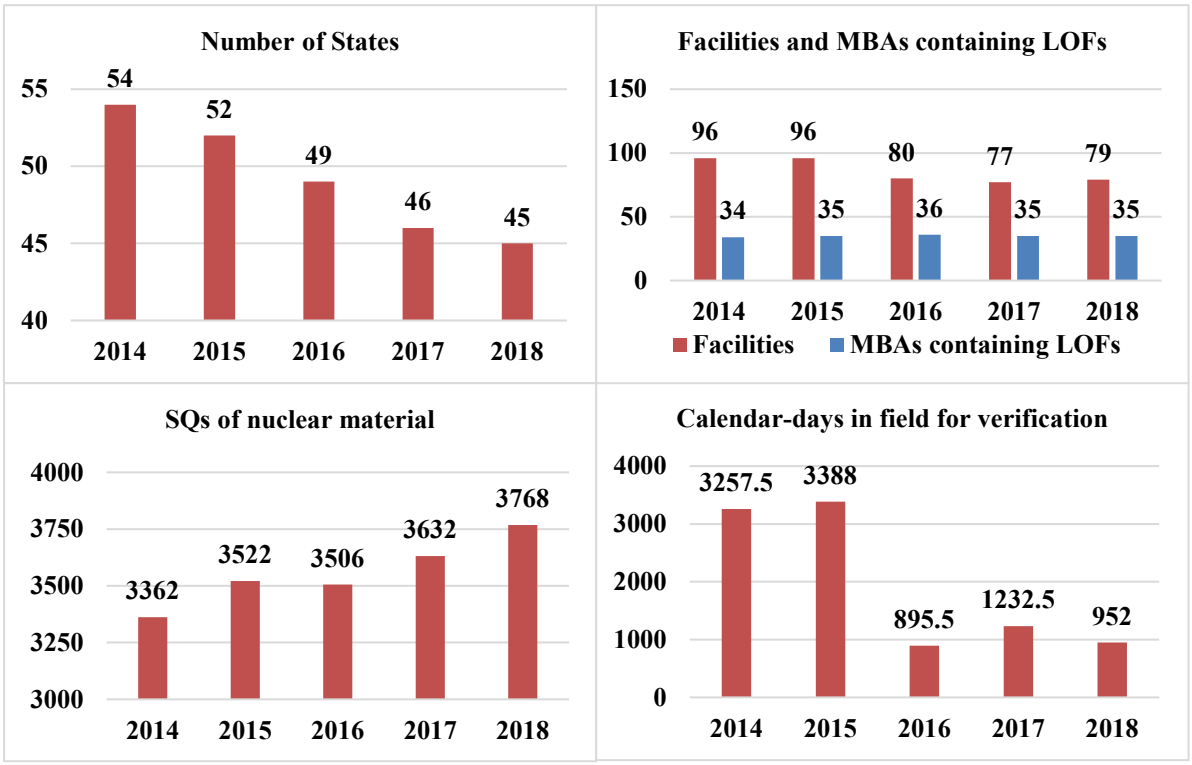

Figure II.4. Group 4: Number of States; number of facilities and MBAs containing LOFs under Agency safeguards; amount of nuclear material[40] in significant quantities under Agency safeguards; number of calendar-days in the field for verification utilized by the Agency, 2014-2018

Figure II.4 shows the number of States in Group 4, together with the number of facilities and MBAs containing LOFs, the amount of nuclear material[40] in significant quantities and the number of calendar-days in the field for verification utilized by the Agency in States in Group 4 from 2014 to 2018. As reported in Section E.1, the number of States in Group 4 has progressively decreased over the years. Since 2014, nine States that had a CSA in force without an AP have brought an AP into force[5], thus moving from Group 4 to Group 3. The most significant change for Group 4 has occurred in 2016 due to the implementation of the AP in one State with several facilities where a large number of calendar-days in the field for verification were utilized.

Table II.12 – Verification activities in 2018

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	5	7	7	16	26	28	16	16
Argentina	34	16	31	51	37	178	318.5	1766	46	46
Bahamas	0	1(1)	0	0	0	0	0	0	0	0
Barbados	0	0	0	0	0	0	0	0	0	0
Belarus	5	3	2	13	5	29	73	621	3	3
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	23	4	16	52	19	199	478.5	1289	26	25
Brunei Darussalam	0	0	0	0	0	0	0	0	0	0
Democratic People's Republic of Korea	0	0	0	0	0	0	0	0	0	0
Dominica	0	0	0	0	0	0	0	0	0	0
Egypt	9	1	7	9	8	18	42	813	10	10
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
Kiribati	0	0	0	0	0	0	0	0	0	0
Lao People's Democratic Republic	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
Lebanon	0	1[(1)]	0	0	0	0	0	6	0	0
Malaysia	1	1	2	2	1	2	5	38	2	2
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[(1)]	0	0	0	0	0	58	1	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[(1)]	0	0	0	0	0	0	0	0
Saudi Arabia	0	0	0	0	0	0	0	0	0	0
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	1	0	0	0	0	0	0	1	1
Sudan	0	0	0	0	0	0	0	0	0	0
Suriname	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
Syrian Arab Republic	1	1	0	0	0	0	0	0	1	1
Tonga	0	1(1)	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	1	1	1	1	2	9	0	0	0
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 46 States	**79**	**35**	**64**	**135**	**78**	**444**	**952**	**4619**	**106**	**104**
Total for ABACC States	**57**	**20**	**47**	**103**	**56**	**377**	**797**	**3055**	**72**	**71**

(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[40], in significant quantities, under Agency safeguards at the end of 2018

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	**1**	**0**	**2427**	**0**	**0**	**333**	**993**	**179**	**0**	**3938**

Note: Heavy water under safeguards: 422.9 tonnes. Significant quantity figures rounded to the nearest integer.

Table II.14 – Summary of facility based verification activities by installation category in 2018

	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	16	3	0	2	0	0	2	0	1	**24**
Number of facilities and LOFs inspected	13	3	0	2	0	0	2	0	1	**21**
Number of inspections	58	3	0	7	0	0	9	0	1	**78**
Number of design information verifications	17	3	0	2	0	0	2	0	0	**24**
Number of person-days of inspection	341	9	0	31	0	0	34	0	2	**417**

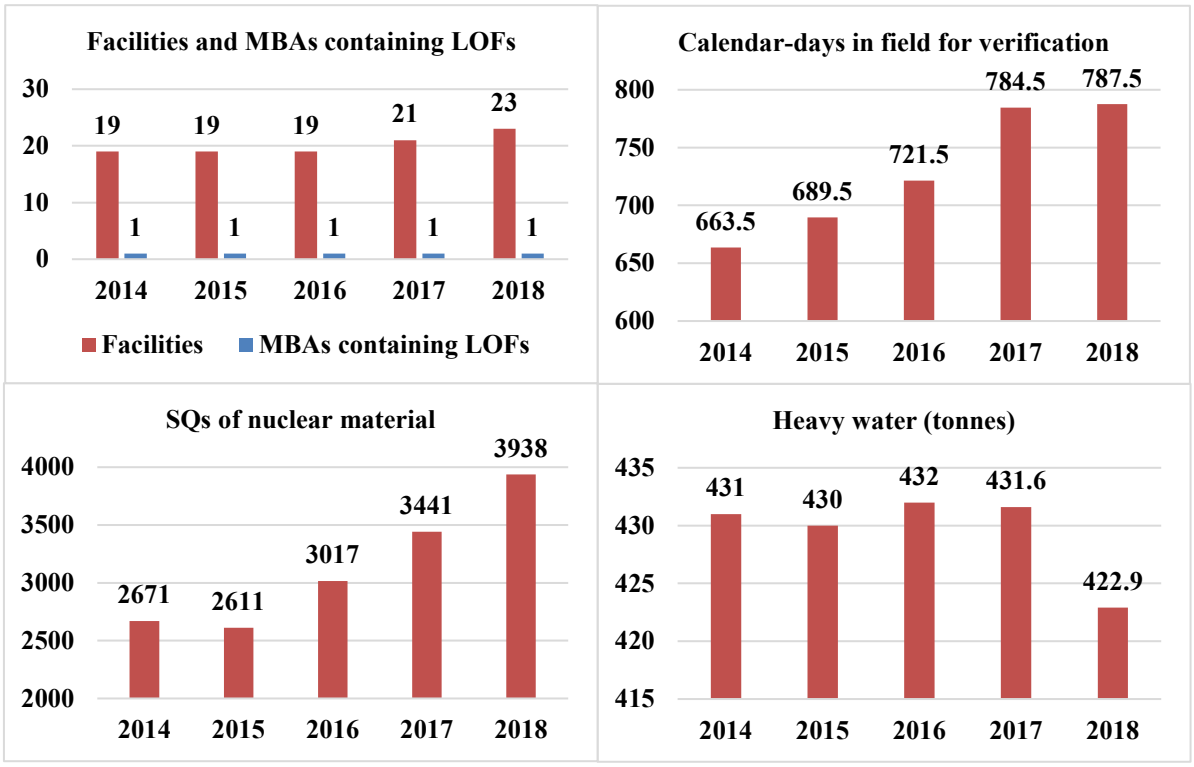

Figure II.5. Group 5: Number of facilities and MBAs containing LOFs under Agency safeguards; number of calendar-days in the field for verification utilized by the Agency; amount of nuclear material[40], in significant quantities, under Agency safeguards; amount of heavy water, in tonnes, under Agency safeguards, 2014-2018

For the three States in Group 5, figure II.5 shows the number of facilities and MBAs containing LOFs; the number of calendar-days in the field for verification utilized by the Agency; the amount of nuclear material[40], in significant quantities, under Agency safeguards; and the amount of heavy water, in tonnes, under Agency safeguards, from 2014 to 2018. The increase in the verification effort in these States is mainly due to the increase in both the amount of nuclear material and the number of facilities under Agency safeguards.

Table II.15 – Verification activities in 2018

States	Facilities under safeguards	MBAs containing LOFs under safeguards	Number of facilities and LOFs inspected	Total number of inspections	Number of DIVs	PDIs	CDFVs	Number of accounting reports received	Number of ICR reporting units received	Number of PIL reporting units received	Number of MBR reporting units received	Number of additional protocol declarations received
India	13	0	12	47	15	268	511.5	0	2744	17	15	3
Israel	1	1	2	2	1	4	8	0	6	2	2	0
Pakistan	9	0	7	29	8	145	268	64	0	0	0	0
Total for 3 States	**23**	**1**	**21**	**78**	**24**	**417**	**787.5**	**64**	**2750**	**19**	**17**	**3**

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

Table II.16 – Amount of nuclear material[40], in significant quantities, under Agency safeguards at the end of 2018

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
10 917	**0**	**0**	**20 139**	**0**	**0**	**1402**	**832**	**1849**	**0**	**35 139**

Note: Significant quantity figures rounded to the nearest integer.

Table II.17 – Summary of facility based verification activities by installation category in 2018

	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	1(1)	**12**
Number of facilities and LOFs inspected	0	1	0	0	1	3	4	0	0	**9**
Number of inspections	0	1	0	0	1	42	26	0	0	**70**
Number of design information verifications	2	1	0	0	1	3	5	0	0	**12**
Number of person-days of inspection	0	2	0	0	12	290	93	0	0	**397**

(1) MBA containing LOFs in the United States of America's Protocol I territories under the amended SQP to INFCIRC/366.

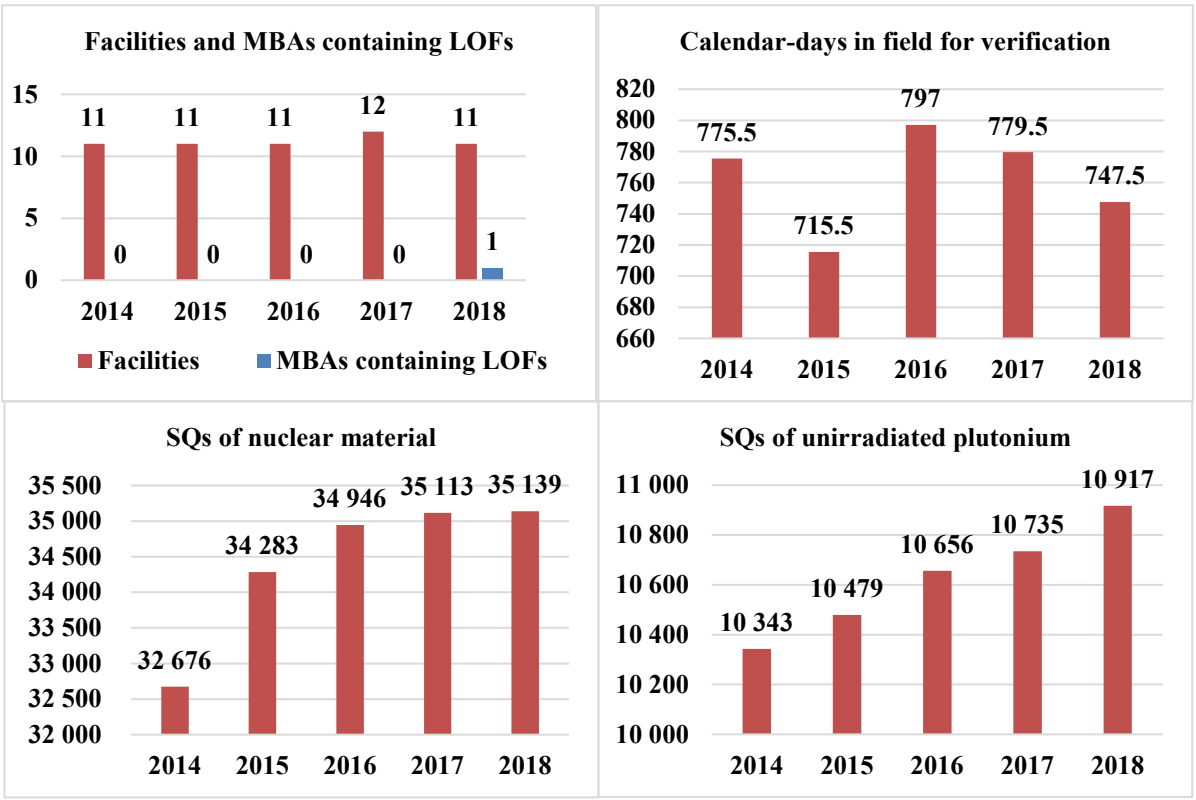

Figure II.6. Group 6: Number of facilities and MBAs containing LOFs under Agency safeguards; number of calendar-days in the field for verification utilized by the Agency; amount of nuclear material[40], in significant quantities, under Agency safeguards; amount of unirradiated plutonium, in significant quantities, under Agency safeguards, 2014-2018

For the five States in Group 6, figure II.6 shows the number of selected facilities and an MBA containing LOFs; the number of calendar-days in the field for verification utilized by the Agency; the amount of nuclear material[40], in significant quantities, under Agency safeguards; and the amount of unirradiated plutonium, in significant quantities, under Agency safeguards, from 2014 to 2018. Since 2014, the number of facilities or parts thereof selected for the application of safeguards in these States has remained relatively constant, and the effort in the field has fluctuated around an average of 763 CDFVs with a small variance. During this period, the amount of nuclear material under Agency safeguards in these States has shown an increase of approximately 8%.

Table II.18 – Verification activities in 2018

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	25	3	2	7	4	0	61	170.5	1011	4	4	11
France	17	3	2	19	2	2	123	223	65 274	39	39	17
Russian Federation	22	1	1	1	1	0	6	14	0	2	2	10
United Kingdom of Great Britain and Northern Ireland	61	3	3	39	4	0	188	307	380 230	70	70	12
United States of America	292	1	1	4	1	0	19	33	38 636	8(1)	8	27
Total for 5 States	**417**	**11**	**9**	**70**	**12**	**2**	**397**	**747.5**	**485 151**	**123**	**123**	**77**

(1) Includes the initial inventory report for the United States of America's Protocol I territories received under the safeguards agreement reproduced in INFCIRC/366 which has an amended SQP.