

# IAEA Safeguards: Reaching Safeguards Conclusions

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A PRODUCT OF

The Future of IAEA Safeguards: Rebuilding the Vienna Spirit through Russian-U.S. Expert Dialogue



**T**he ongoing evolution of the safeguards system of the International Atomic Energy Agency (IAEA or Agency) and the introduction of the state-level concept (SLC) have posed challenges for the IAEA Secretariat in reaching safeguards conclusions, including challenges in the processes for decision-making, information management, and the evaluation of effectiveness, which are critical for drawing conclusions. Mastering these processes and communicating them in the 2020s to states, particularly to those that have comprehensive safeguards agreements (CSAs) with the IAEA, will be of paramount importance, because the credibility of IAEA safeguards depends on a clear procedural basis that permits the IAEA Secretariat to draw conclusions that are impartial and technically sound. This article addresses these issues.

## IAEA Safeguards Conclusions

Of the 184 states that have concluded safeguards agreements with the IAEA, 176 are non-nuclear-weapon states that have concluded CSAs in connection with the Treaty on the Non-Proliferation of Nuclear Weapons (NPT), based on the IAEA's INFCIRC/153 (Corr.)<sup>1</sup>; five of them are nuclear-weapon states party to the NPT, all of which have what are commonly referred to as voluntary offer agreements (VOAs); and three of them are states that are not party to the NPT, each of which has concluded one or more agreements that apply to facilities, material, or equipment specified in the relevant agreement (item-specific safeguards agreements).<sup>2</sup>

At the close of each calendar year, the IAEA Secretariat draws a safeguards conclusion with respect to the implementation of safeguards

in each state that has concluded a safeguards agreement with the IAEA. The IAEA has regularly published an annual Safeguards Statement reflecting the safeguards conclusions in the Safeguards Implementation Report (SIR) since 1979.

This Safeguards Statement includes technical information and secretariat findings, as well as the overall safeguards conclusions based on this information and the findings. The formulation of the Safeguards Statement, and of the underlying safeguards conclusions, has evolved over four decades, particularly regarding conclusions drawn in connection with CSAs, in light of the discovery of undeclared nuclear activities in Iraq and the Democratic People's Republic of Korea (DPRK) in the 1990s, the approval of the Model Additional Protocol in

<sup>1</sup> IAEA, *The Structure and Content of Agreements between the Agency and States Required in Connection with the Treaty on the Non-Proliferation of Nuclear Weapons*, (INFCIRC/153 (Corrected)), June 1972, [www.iaea.org/sites/default/files/publications/documents/infcircs/1972/infcirc153.pdf](http://www.iaea.org/sites/default/files/publications/documents/infcircs/1972/infcirc153.pdf).

<sup>2</sup> IAEA, "Status List: Conclusion of Safeguards Agreements, Additional Protocols and Small Quantities Protocols," August 13, 2020, [www.iaea.org/sites/default/files/20/01/sg-agreements-comprehensive-status.pdf](http://www.iaea.org/sites/default/files/20/01/sg-agreements-comprehensive-status.pdf).

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1997 and the introduction of the SLC for safeguards, as described below.<sup>3</sup>

Whereas the pre-2003 Safeguards Statement referred to safeguarded nuclear material in all countries with a safeguards agreement generally without specifying the type of agreement, since the SIR for 2003 (which was issued in 2004), it has contained the findings and overall conclusions grouped according to the type of safeguards agreements in force and whether the state is implementing an additional protocol (AP). Given the evolution of the IAEA safeguards concept as well, it is especially important to be sure that the process of preparation of these overall conclusions is impartial and technically sound to maintain confidence in the IAEA and its safeguards.

The focus of this paper is on aspects of decision-making that lead to the IAEA Secretariat's drawing of safeguards conclusions for states with CSAs that are published in the annual Safeguards Statement in the SIR.

### Safeguards Conclusions in Connection with CSAs

As stated in paragraph 2 of INFCIRC/153, the IAEA has the “right and obligation” to ensure that safeguards be applied “on all source or special fissionable material in all peaceful nuclear activities within [the] territory [of a 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.”<sup>4</sup> This means that, pursuant to its right and obligation to implement safeguards, the IAEA must draw conclusions with respect to the compliance by states with their respective safeguards agreements. These conclusions are presented by the IAEA Director General to the IAEA Board of Governors in the Safeguards Statement in the annual SIR.<sup>5</sup>

This expression of purpose is translated into technical language in paragraph 28 of the INFCIRC/153, which describes the “objective of safeguards”<sup>6</sup> as “the timely detection of the

<sup>3</sup> IAEA, *Model Protocol Additional to the Agreement(s) between State(s) and the IAEA for the Application of Safeguards* (INFCIRC/540 (Corrected)), December 1998, [www.iaea.org/sites/default/files/infirc540c.pdf](http://www.iaea.org/sites/default/files/infirc540c.pdf).

<sup>4</sup> IAEA, *The Structure and Content of Agreements between the Agency and States Required in Connection with the Treaty on the Non-Proliferation of Nuclear Weapons*, (INFCIRC/153 (Corrected)), June 1972, [www.iaea.org/sites/default/files/publications/documents/infircs/1972/infirc153.pdf](http://www.iaea.org/sites/default/files/publications/documents/infircs/1972/infirc153.pdf).

<sup>5</sup> The safeguards conclusions contained in the SIR Safeguards Statements are not the technical conclusions specified by paragraph 30 of INFCIRC/153 and reported to the states in accordance with paragraph 90(b) of INFCIRC/153.

<sup>6</sup> Whereas INFCIRC/153 refers to the “objective of safeguards,” the model text for CSAs (IAEA, *The Standard Text of Safeguards Agreements in Connection with the Treaty on the Non-Proliferation of Nuclear Weapons* (GOV/INF/276/Annex A), August 22, 1977) and the CSAs themselves refer in Article 28 to the “objective of the safeguards procedures set forth in this part of the Agreement.”

diversion of significant quantities of *nuclear material* from peaceful nuclear activities to the manufacture of nuclear weapons or of other nuclear explosive devices or for purposes unknown, and deterrence of such diversion by the risk of early detection.”

Although the IAEA’s right and obligation extend to ensuring that all nuclear material required to be safeguarded is in fact placed under safeguards, prior to 1991, the implementation of safeguards under CSAs was primarily focused on verifying the nuclear material and facilities declared by a state. This was a matter of practice and not a matter of law, as was later confirmed by the IAEA Board of Governors and the General Conference. Consequently, the process of drawing safeguards conclusions prior to 1991 was predominantly centered on the timely detection of the diversion of significant quantities of *declared* nuclear material from peaceful nuclear activities.

That objective was linked to four numerical parameters: significant quantities, detection time, detection probability, and false alarm probability.<sup>7</sup> A general description of the approaches to safeguards and to specific activities based on these technical parameters for each type of facility used in peaceful nuclear programs was provided in the *IAEA Bulletin* in 1980.<sup>8</sup> In 1990, the IAEA Secretariat developed the safeguards criteria for 1991–1995, which went into effect in January 1991. These criteria reflected the effort and experience of the secretariat as well as the state of art of safeguards development, including issues concerning the evaluation method used for the preparation of the annual Safeguards Statement

in the SIR. These criteria were used for the planning of safeguards implementation activities in the field and at the agency’s headquarters for all facilities and locations outside facilities (LOFs) covered by safeguards, as well as for the evaluation of safeguards implementation at facilities and at the state level.<sup>9</sup>

The criteria were provided to the member states in 1991 to assist in their assessments of the credibility of the IAEA’s inspection procedures and to facilitate cooperation between member states and the IAEA in the implementation of safeguards.<sup>10</sup>

The early SIRs included information about the inspection activities conducted each year and were relatively straightforward; they focused on achieving timeliness and quantity goals for the detection of diversion. The safeguards conclusion in the Safeguards Statements in those SIRs generally provided that none of the nuclear material placed under IAEA safeguards had been diverted from peaceful activities, or that all such material had been accounted for. Some also contained a reservation that the Safeguards Statement was not absolute, without diminishing the significance of that statement. Such a reservation was justified because, as stated in the SIRs, the IAEA conclusion should be seen in the light of certain observations. These included, for example, that the level of assurance associated with the IAEA Secretariat’s findings for a particular installation or state depended on the type of safeguards agreement concluded with that state, on the cooperation of the state and of the facility operators in it, and on the manpower and equipment available to the agency.

<sup>7</sup> See V. Fortakov, “Nuclear Verification: What It Is, How It Works, the Assurances It Can Provide.” Paper presented at the IAEA Technical Workshop on Safeguards, Verification Technologies, and Other Related Experience, Vienna, Austria, May 11–13, 1998, [www.inis.iaea.org/search/search.aspx?orig\\_q=RN:30050964](http://www.inis.iaea.org/search/search.aspx?orig_q=RN:30050964). The paper describes these four technical parameters and their relationship to IAEA safeguards inspection goals. Detection probability is to be maintained “as high as possible” and false alarm probability “as low as possible”; See also IAEA, *IAEA Safeguards Glossary, 2001 edition* (International Nuclear Verification Series No. 3), 2002, [www.iaea.org/sites/default/files/iaea\\_safeguards\\_glossary.pdf](http://www.iaea.org/sites/default/files/iaea_safeguards_glossary.pdf).

<sup>8</sup> “The Present Status of IAEA Safeguards on Nuclear Fuel Cycle Facilities,” *IAEA Bulletin* 22, no. 3–4 (August 1980), ([www.iaea.org/publications/magazines/bulletin/22-3/present-status-iaea-safeguards-nuclear-fuel-cycle-facilities](http://www.iaea.org/publications/magazines/bulletin/22-3/present-status-iaea-safeguards-nuclear-fuel-cycle-facilities)), 5: “The Agency establishes in each particular situation the frequency and timing with which it must draw a conclusion as to whether there has been no diversion, as well as the quantity of material to which the conclusion refers, the probability of detection and the probability of a false alarm.

<sup>9</sup> James A. Larrimore, “IAEA Safeguards Criteria,” *Journal of Nuclear Materials Management*, 21, no. 3 (May 1993), 19–23, [www.resources.inmm.org/system/files/jnmm/vol\\_21/V-21\\_3.pdf](http://www.resources.inmm.org/system/files/jnmm/vol_21/V-21_3.pdf).

<sup>10</sup> IAEA, *Safeguards Implementation Report for 1990, Note by the Director General*, (GOV/2503), April 30, 1991.

The discovery of undeclared nuclear material and facilities in Iraq, as well as problems with the IAEA's efforts to ascertain the completeness of the DPRK's initial nuclear material declaration in 1992, raised a number of questions about the...practice of safeguards implementation and the drawing of safeguards conclusions.

### Toward the State-Level Concept

The discovery of undeclared nuclear material and facilities in Iraq, as well as problems with the IAEA's efforts to ascertain the completeness of the DPRK's initial nuclear material declaration in 1992, raised a number of questions about the aforementioned practice of safeguards implementation and the drawing of safeguards conclusions. Importantly, those questions were not related to the application of IAEA safeguards to the declared nuclear material or facilities. Concerns were voiced only about the agency's efforts to confirm the completeness of the national declarations on nuclear material subject to IAEA safeguards in light of paragraph 2 of INFCIRC/153 (and, consequently, in accordance with all CSAs), which provides that the agency has "the right and obligation to ensure that safeguards will be applied ... 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."<sup>11</sup>

In response to these concerns, the IAEA Board of Governors confirmed in February

1992 its understanding that the agency must provide assurances regarding the correctness and completeness of the nuclear material declarations by states that have concluded CSAs with the IAEA.

The Safeguards Statement for 1991, which was published in June 1992, used slightly modified language to the effect that the IAEA had not detected any event that would indicate the diversion of a significant quantity of nuclear material "placed under Agency safeguards."<sup>12</sup> The Safeguards Statement for 1991 included a further passage prompted by the discovery of Iraq's undeclared nuclear material and activities recognizing that, "owing to limitations in the information available to the Agency and in the existing safeguards practices, non-compliance with agreements could occur without detection by the Agency, particularly at *non-declared facilities*. The Agency has, as a matter of urgency, examined these limitations and measures to strengthen the safeguards system have been proposed."<sup>13</sup>

Putting the IAEA Board of Governors' understanding into practice, in December 1993 the IAEA initiated Programme 93+2, which resulted in a set of measures designed to improve the IAEA's ability under CSAs to verify

<sup>11</sup> IAEA, *The Structure and Content of Agreements between the Agency and States Required in Connection with the Treaty on the Non-Proliferation of Nuclear Weapons*, (INFCIRC/153 (Corrected)), June 1972, Part I, para. 2, [www.iaea.org/sites/default/files/publications/documents/infcircs/1972/infcirc153.pdf](http://www.iaea.org/sites/default/files/publications/documents/infcircs/1972/infcirc153.pdf).

<sup>12</sup> IAEA, "The Future of Nuclear Verification," Remarks of the Director General, October 17, 1997, [www.iaea.org/newscenter/statements/future-nuclear-verification](http://www.iaea.org/newscenter/statements/future-nuclear-verification).

<sup>13</sup> Ibid.

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the non-diversion of declared nuclear material and to provide assurances of the absence of undeclared nuclear material and activities.

This culminated in the approval by the Board of Governors in May 1997 of the Model Additional Protocol, which contained provisions for broader access by the IAEA to locations within a state, more information to be provided by the state, and a number of administrative items designed to facilitate the implementation of safeguards.<sup>14</sup> As requested by the board, the Model Additional Protocol is used as the standard for APs that are concluded by states and other parties to CSAs. At the time of this writing, almost 80 percent of the NPT non-nuclear-weapon states, or 145 states, have either signed or brought into force an AP to their respective CSAs—that is, almost 80 percent of the NPT non-nuclear-weapon states.<sup>15</sup>

In the intervening years, the Safeguards Statements in the SIRs for 1992 through 1998 distinguished between conclusions regarding the non-diversion of material that had actually been declared/placed under safeguards and issues associated with verifying the absence of undeclared nuclear material and activities (completeness), particularly in the cases of Iraq and the DPRK.

In the SIR for 1999, published in 2000, the IAEA Secretariat, for the first time, included text reflecting in its safeguards conclusions the results of its implementation of APs in two states: “Having completed the evaluation of all the information available to the Agency in respect of two States, including information obtained through activities pursuant to their comprehensive safeguards agreements and additional protocols, the Agency found no indication either of diversion of declared nuclear material or of the presence of undeclared nuclear material or activities in those States.”<sup>16</sup> The SIR for 1999 was also the first time a reference was made in the SIR to a “broader conclusion.”<sup>17</sup>

Naturally, the clarification that the IAEA must provide assurances regarding the correctness and completeness of the states’ declarations under CSAs led to changes in the approaches to the application of safeguards. These changes were discussed in detail in the course of Programme 93+2. Among the principal points made was the need to change from a facility-based approach to implementing safeguards to one in which the IAEA would look at the state as a whole, integrating the measures provided under the new authority granted to the IAEA with the measures under the IAEA’s

<sup>14</sup> IAEA, *Model Protocol Additional to the Agreement(s) between State(s) and the International Atomic Energy Agency for the Application of Safeguards* (INFCIRC/540 (Corrected)), December 1998, [www.iaea.org/sites/default/files/infcirc540c.pdf](http://www.iaea.org/sites/default/files/infcirc540c.pdf).

<sup>15</sup> IAEA, “Status of the Additional Protocol,” August 13, 2020, [www.iaea.org/topics/additional-protocol](http://www.iaea.org/topics/additional-protocol).

<sup>16</sup> IAEA, *Safeguards Implementation Report for 1999, Note by the Director General*, (GOV/2000/23), May 12, 2000.

<sup>17</sup> GOV/2000/23, Section 1, “Background to the Safeguards Statement,” para. 7, reads as follows: “To be able to draw a conclusion about non-diversion of declared nuclear material and the broader conclusion about the absence of undeclared nuclear material and activities *for a State as a whole*, the Secretariat must first have drawn the conclusion about the non-diversion of declared nuclear material ...” (italics in original).

then-existing legal authority under CSAs. The fundamental premise of integrated safeguards was that, as confidence increased regarding the absence of undeclared activities required to convert declared nuclear materials into weapons materials, the intensity of safeguards on these declared materials might be lessened.

The IAEA Secretariat provided the Board of Governors with two reports on the development of integrated safeguards in 2000.<sup>18</sup> In 2001, the IAEA began implementing state-level approaches (SLAs) for states for which the broader conclusion had been drawn. Although some considerations relating to the state as a whole were reflected in these approaches, the primary basis for determining safeguards activities at declared facilities in these states remained the safeguards criteria (adjusted to take into account the broader conclusion for those states).<sup>19</sup> In February 2002, the secretariat presented a report, *The Conceptual Framework for Integrated Safeguards*, to the board, outlining the overall objective and basic principles of integrated safeguards.<sup>20</sup> The report also described the safeguards concepts, approaches, guidelines, and criteria that govern the design, implementation, and evaluation of integrated safeguards.

These changes also brought about the evolution of the process used in the drawing of safeguards conclusions. Safeguards activities were no longer based solely on the application of safeguards to each facility; their new basis was an analysis at the level of the state of all

potential technically feasible acquisition paths that could be used to obtain nuclear material for a nuclear explosive device by means of both declared and undeclared nuclear activities, with subsequent verification.

The expression “state-level concept” was used for the first time in the SIR for 2004 to describe safeguards implementation that is based on SLAs developed using safeguards objectives common to all states with CSAs and taking into account state-specific factors. It was simply another term for the implementation of safeguards looking at the state as a whole rather than at the level of facilities, and tailoring those safeguards for individual states, which the IAEA had been doing since the mid-1990s. The IAEA Secretariat noted that the SLC was being implemented for states with integrated safeguards (i.e., for states with both a CSA and an AP and for which the broader conclusion had been drawn), and that it would be extended to all other states with CSAs.<sup>21</sup> In each of the Director General’s reports to the General Conference on safeguards from 2005 forward, a description of the SLC was included.<sup>22</sup>

## SLC Evolution and States’ Concerns

During this process of evolution, concerns were expressed by some member states about the implementation of the SLC, particularly with respect to the state-specific factors and information obtained from external sources (e.g., open-source data, information provided

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<sup>18</sup> IAEA, *The Development of Integrated Safeguards*, (GOV/INF/2000/4), March 9, 2000; IAEA, *The Development of Integrated Safeguards* (GOV/INF/2000/26), November 17, 2000.

<sup>19</sup> IAEA, *The Conceptual Framework for Integrated Safeguards* (GOV/2002/8), February 8, 2002.

<sup>20</sup> Ibid.

<sup>21</sup> IAEA, *Safeguards Implementation Report for 2004, Report by the Director General*, (GOV/2005/32), May 13, 2005, para. 68.

<sup>22</sup> IAEA, *Strengthening the Effectiveness and Improving the Efficiency of the Safeguards System and Application of the Model Additional Protocol* (GC(56)/14), July 25, 2012, Section C.2; IAEA, *Strengthening the Effectiveness and Improving the Efficiency of the Safeguards System and Application of the Model Additional Protocol* (GC(55)/16), July 26, 2011, Section C.2; IAEA, *Strengthening the Effectiveness and Improving the Efficiency of the Safeguards System and Application of the Model Additional Protocol* (GC(54)/11), July 27, 2010, para. 12; IAEA, *Strengthening the Effectiveness and Improving the Efficiency of the Safeguards System Including Implementation of Additional Protocols* (GC(53)/9), August 7, 2009, para. 12; IAEA, *Strengthening the Effectiveness and Improving the Efficiency of the Safeguards System Including Implementation of Additional Protocols* (GC(52)/13), July 31, 2008, para. 4; IAEA, *Strengthening the Effectiveness and Improving the Efficiency of the Safeguards System Including Implementation of Additional Protocols* (GC(51)/8), July 23, 2007, para. 7; IAEA, *Strengthening the Effectiveness and Improving the Efficiency of the Safeguards System Including Implementation of Additional Protocols* (GC(50)/2), August 7, 2006, para. 7; IAEA, *Strengthening the Effectiveness and Improving the Efficiency of the Safeguards System Including Implementation of Additional Protocols* (GC(49)/9), July 22, 2005, para. 7.



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by other states). In 2012, several states objected that states lacked a clear description of the concept and that discussion was needed in the IAEA Board of Governors. Some states voiced the concern that practical implementation of the SLC could potentially lead the IAEA Secretariat in the direction of biased and politically motivated conclusions.

These concerns were discussed by the IAEA's Board of Governors and General Conference over a two-year period, which ended with the adoption in 2015 of a General Conference resolution calling for the implementation of state-level safeguards to be carried out in strict accordance with the existing safeguards agreements, and for the development and implementation of SLAs to be carried out in consultation with the respective states.<sup>23</sup>

In the meantime, the IAEA Director General, acting in accordance with the 2012 General Conference's safeguards resolution,<sup>24</sup> submitted a report, GOV/2013/38,<sup>25</sup> to the Board of Governors that contained the first detailed description of the SLC. The report states that in order to exercise its right and discharge its obligation to ascertain the correctness and completeness of state declarations, the IAEA defines and carries out safeguards activities to achieve the following generic objectives at the state level. For states with CSAs, these generic objectives are (a) to detect any undeclared nuclear material or activity in the state as a whole; (b) to detect any undeclared production or processing of nuclear material at declared facilities or LOFs where nuclear material is customarily used; and (c) to detect any diversion of declared nuclear material at declared facilities or at LOFs where nuclear material is customarily used.<sup>26</sup>

In response to requests made by several member states at the Board of Governors meetings in September 2013 and during consultations held in 2013–2014, the Director General circulated a supplemental document, GOV/2014/41,<sup>27</sup> which clarified the information about the SLC provided in GOV/2013/38. As described in GOV/2014/41, the IAEA Secretariat, working in pursuit of generic objectives, develops for each state a set of technical safeguards objectives for use in the planning, implementation, and assessment of safeguards activities with regard to the state concerned. The technical safeguards objectives may differ from state to state depending on such factors as the state's nuclear fuel cycle and related technical capabilities.<sup>28</sup> The technical

<sup>23</sup> IAEA, *Strengthening the Effectiveness and Improving the Efficiency of Agency Safeguards* (GC(59)/RES/13), September 2015, para. 23–25, [www.iaea.org/sites/default/files/gc/gc59res-13\\_en.pdf](http://www.iaea.org/sites/default/files/gc/gc59res-13_en.pdf).

<sup>24</sup> IAEA, *Strengthening the Effectiveness and Improving the Efficiency of the Safeguards System and Application of the Model Additional Protocol* (GC(56)/RES/13), September 2012, [www.iaea.org/sites/default/files/gc/gc56res-13\\_en.pdf](http://www.iaea.org/sites/default/files/gc/gc56res-13_en.pdf).

<sup>25</sup> IAEA, *The Conceptualization and Development of Safeguards Implementation at the State Level* (GOV/2013/38), August 12, 2013, [armscontrollaw.files.wordpress.com/2012/06/state-level-safeguards-concept-report-august-2013.pdf](http://armscontrollaw.files.wordpress.com/2012/06/state-level-safeguards-concept-report-august-2013.pdf).

<sup>26</sup> *Ibid.*, para. 15.

<sup>27</sup> IAEA, *Supplementary Document to the Report on the Conceptualization and Development of Safeguards Implementation at the State Level* (GOV/2013/38) (GOV/2014/41), August 13, 2014, [armscontrollaw.files.wordpress.com/2014/09/iaea-state-level-safeguards-document-august-2014.pdf](http://armscontrollaw.files.wordpress.com/2014/09/iaea-state-level-safeguards-document-august-2014.pdf).

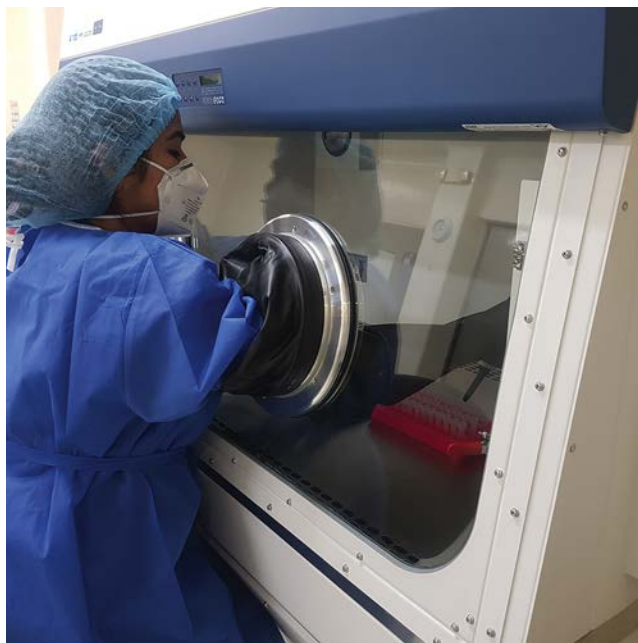
<sup>28</sup> *Ibid.*, para. 14.



objectives remain within the scope of the state's safeguards agreement and constitute a framework for defining the safeguards measures and carrying out safeguards activities with regard to the state as a whole.

These objectives are defined on the basis of the IAEA Secretariat's analysis of the pathways to the acquisition of nuclear material suitable for use in a nuclear weapon or a nuclear explosive device. As part of that analysis, the agency conducts a technical assessment for each state of the specific steps that the state could potentially take for each possible acquisition path (e.g., combining declared and undeclared nuclear activities), taking into account the state's nuclear fuel cycle and its existing capacity. The technical objectives are designed to detect such steps; achieving all these objectives should enable the secretariat to achieve all generic objectives with respect to that state. The document also emphasized that the focus of these measures is on nuclear material and does not involve judgments about a state's intention to pursue any such path.<sup>29</sup>

To illustrate: If a state has a declared uranium conversion facility and a declared research reactor, then one of the possible acquisition pathways would consist of diverting some of the declared uranium from the conversion facility; undeclared production of uranium targets from the diverted uranium at an undeclared facility; undeclared irradiation of targets using the declared research reactor in order to produce plutonium; and undeclared reprocessing of the targets to extract plutonium from them. In such a case, the technical objectives may be set with the specific goal of detecting each step on that acquisition pathway: detecting the diversion of declared uranium from the conversion facility; detecting the undeclared production of uranium targets; detecting the misuse of the research reactor to irradiate the undeclared targets; and, finally, detecting the undeclared reprocessing of the irradiated targets.<sup>30</sup> Consequently, in order to detect the diversion of declared



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uranium from the conversion facility and the misuse of the research reactor to irradiate the undeclared targets, the IAEA could use the already tried-and-tested approaches to facility-level safeguards. The new element in this concept is the setting of technical objectives for the detection of undeclared production of uranium targets and the detection of undeclared reprocessing of the irradiated targets. The approaches to achieving the technical objectives related to such actions by the state could include collecting environmental samples at the state's research facilities and assessing available open-source information about the state's research activities, as well as additional access in accordance with an AP (where applicable).

Whereas the generic objectives of state-level safeguards are the same for each state that has concluded a CSA, as noted above, the technical objectives, as described in paragraph 62 of GOV/2014/41, may differ from one state to another depending on various state-specific factors. The term "State-specific factors"<sup>31</sup> consist of six safeguards-relevant factors that are particular to a state, which are used by

<sup>29</sup> Ibid., para. 63.

<sup>30</sup> Ibid., para. 64.

<sup>31</sup> Ibid., para. 219.

the secretariat in the development of a state-level safeguards approach and in the planning, conduct, and evaluation of safeguards activities for that state. These factors are (1) the type of safeguards agreement in force for the state and the nature of the safeguards conclusion drawn by the agency; (2) the state's nuclear fuel cycle and related technical capacity; (3) the technical capacity of the state or regional nuclear material accounting and control system; (4) the implementation of specific safeguards measures; (5) the nature and scope of cooperation; and (6) the IAEA's experience.<sup>32</sup>

### Safeguards Decision-Making Process

The transition from traditional safeguards to safeguards according to the SLC has had a considerable impact on how the IAEA Secretariat implements safeguards. Some aspects of critical components of the concept, such as the above-mentioned state-specific factors and acquisition path analysis, would benefit from further elaboration and refinement. For this paper, of specific interest is the process used in evaluating the IAEA's verification activities for purposes of drawing the annual safeguards conclusions. Clearly, because of the increased work required for the provision of IAEA assurances regarding the correctness and completeness of states' declarations, the secretariat must perform many verification activities, including assessment of all safeguards-relevant information available to it. The secretariat must also analyze any apparent anomalies, discrepancies, questions, or inconsistencies detected as a result of its verification activities, and assess whether they point to matters of safeguards-related concerns.

Independent of the information provided in documents GOV/2013/38 and GOV/2014/4, it may be difficult for member states to understand the interactions between structural divisions of the IAEA Secretariat and their respective responsibilities for evaluating the agency's verification activities and making

judgments that lead to drawing safeguards conclusions. These documents suggest that much of that work is done by the state evaluation groups (SEGs) set up within the safeguards department for each state for which safeguards are implemented. While the documents note that the department has mechanisms for interaction and supervision to ensure that state assessments are conducted meticulously and consistently, and that it has a system of performance indicators related to the IAEA's safeguards objectives, they do not explain in detail how the SEGs conduct their assessments using the department's structured processes and methodologies in order to minimize any errors and avoid bias.

As noted in GOV/2014/14, performance measurement can generally be defined as a process of collecting, analyzing, and reporting information regarding the performance of an organization in achieving its objectives.<sup>33</sup> This process is important for the IAEA's ability to measure and report to member states information about its performance in achieving its objectives, which is done in the SIRs. As further noted in GOV/2014/41, "[t]he Agency's performance in regard to the objectives of safeguards implementation is the extent to which the Agency implements effective safeguards for each State in order to draw soundly based safeguards conclusions and provide credible assurances that the States are honoring their safeguards obligations."<sup>34</sup> As indicated in paragraph 165 of that document, the performance measures for safeguards activities conducted for declared facilities and LOFs are expressed in the safeguards criteria in terms of the probability of detecting the diversion of nuclear material within a specified period of time. It would be useful to learn more about the performance measures used in the evaluation of safeguards with respect to the verification of the absence of undeclared nuclear material and activities.

<sup>32</sup> Ibid., para. 108.

<sup>33</sup> Ibid., para. 163.

<sup>34</sup> Ibid., para. 164.



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Returning to the subject of the safeguards conclusions and the process of formulating them: The main actors in that process are the SEGs, which assess all the available safeguards-relevant information for each state. The SEG is the first level in evaluating safeguards results and drawing safeguards conclusions for a given country, and it documents its assessment, including conclusions on the implementation of safeguards for the relevant state in a State Evaluation Report (SER). The conclusions and recommendations of the SEGs in the SERs are systematically reviewed internally. Their findings

are subject to approval by the director of the relevant operations division and discussed at an internal departmental committee, which then produces recommendations for the Director General on safeguards conclusions. After considering these recommendations, the Director General reports to the Board of Governors in the annual SIR on the evaluations and conclusions with respect to each state in which safeguards are implemented.

According to the 2018 SIR, IAEA safeguards were applied for 182 states in 2018. Safeguards under CSAs were applied for 174 states; of those CSA States, 129 had an AP in force. For 70 of the states with both a CSA and an AP in force, the IAEA Secretariat did not detect any indications of the diversion of declared nuclear material or any indications of undeclared nuclear material or activities. On the basis of those findings, the secretariat arrived at the conclusion that, for those 70 states, all nuclear material remained in peaceful activities.<sup>35</sup> The 2002 document on the conceptual framework for integrated safeguards (GOV/2002/8) states that all safeguards conclusions are subject to uncertainty; it might be useful for that point to be reiterated in the SIRs.<sup>36</sup>

<sup>35</sup> IAEA, *The Safeguards Implementation Report for 2018* (GOV/2019/22), para. 1.a.

<sup>36</sup> IAEA, Board of Governors, *The Conceptual Framework for Integrated Safeguards, Report by the Director General* GOV/2002/8, 2002.

## CONCLUSIONS AND RECOMMENDATIONS

The IAEA Secretariat is continuously engaged in the process of adjusting the implementation of safeguards to effectively meet the challenges of detecting and deterring non-compliance by states with their respective CSAs. This has meant that IAEA safeguards are evolving in a more complex and ambitious direction than had been deemed necessary before the revelations in the 1990s of systematic efforts by states to defeat detection.

Over the course of this nearly three decades of evolution, the challenges in incorporating the detection of undeclared nuclear material and activities, and perceived deficiencies in transparency about the internal processes of verification and drawing safeguards conclusions, have rendered it more difficult than in the past for member states to be assured that the conclusions drawn by the IAEA Secretariat are based on an adequate level of safeguards activities and careful assessment.

The IAEA has internal guidance documents that address virtually every step in safeguards implementation, as well as processes designed to ensure quality and consistency in the application of that guidance. As the evolution of the SLC proceeds, greater transparency concerning these processes, including sharing additional information by the IAEA Secretariat in that regard, could contribute to a better understanding of the processes and increased trust on the part of member states, in particular in situations where the secretariat detects incidents of safeguards concern or is not in a position to draw a positive conclusion about the non-diversion of declared nuclear material or the absence of undeclared nuclear material or activities. Because these internal processes are not considered particularly safeguards-sensitive, the secretariat should be able to comfortably share descriptive information about them.

Provision of additional descriptive information by the IAEA Secretariat to member states would be of benefit to both the secretariat and the member states. Member states' confidence in the effectiveness of the secretariat should thereby be enhanced, reducing member states interventions into the secretariat's ongoing safeguards implementation activities and decisions.




In consideration of the above, the following recommendations can be offered to the IAEA Secretariat:

1. Work in accordance with the key paragraph of GC(58)/RES/14 which “welcome[d] the intention of the Secretariat to continue to engage in open and active dialogue with States on safeguards matters, and to issue periodic update reports as the Agency and States gain further implementation experience.”<sup>37</sup>
2. Publish an article in the *IAEA Bulletin* that describes the process of drawing safeguards conclusions, including a description of the relationship between the IAEA structural units and their responsibilities in drawing those conclusions.
3. Prepare informative material for member states about how the secretariat works, with information from open sources and third parties, including a description of the process for corroborating such information for IAEA safeguards purposes.
4. Prepare informative material for member states about the performance indicators used to assess the efficiency and effectiveness of safeguards implementation and about quality control procedures used in the drawing of safeguards conclusions.

<sup>37</sup> IAEA, *Strengthening the Effectiveness and Improving the Efficiency of Agency Safeguards* (CG(58)/RES/14), September 2014, [www.iaea.org/sites/default/files/gc/gc58res-14\\_en.pdf](http://www.iaea.org/sites/default/files/gc/gc58res-14_en.pdf).



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