Chapter 9

Sixty Years of Nuclear Verification

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The IAEA's primary purpose is to seek to accelerate and enlarge the contribution of nuclear energy to peace, health and prosperity, while ensuring that nuclear energy is not used in a way that furthers any military purpose. The Agency pursues the non-proliferation element of its work through the implementation of a set of technical measures, or "safeguards." These serve as important confidence building measures and help to ensure that nuclear material and technology are used only for peaceful purposes. Without safeguards, there would be far less nuclear cooperation and transfer of technology. This paper outlines the history of the Department of Safeguards, the importance of the Department's activities today, and the challenging future ahead.

Widely known as the world's "Atoms for Peace" organization within the United Nations family, the International Atomic Energy Agency (henceforth IAEA or "the Agency") is the international centre for cooperation in the nuclear field. The Agency works with its Member States and multiple partners worldwide to promote the safe, secure and peaceful use of nuclear technologies.¹

The Agency's Department of Safeguards carries out the IAEA's responsibilities as the world's nuclear inspectorate, supporting global efforts to stop the spread of nuclear weapons. It does so through the implementation of safeguards. In essence, safeguards are aimed at being able to detect and, therefore, deter:

- The diversion of nuclear material,
- The misuse of nuclear material and facilities, and
- Any undeclared nuclear material and activities.

¹<https://www.iaea.org/about>.

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Such safeguards are based on legally-binding international agreements: in particular, all non-nuclear weapon States that are party to the Treaty on the Non-Proliferation of Nuclear Weapons (NPT) are required to conclude safeguards agreements with the IAEA.

Before describing the Department of Safeguards more specifically and outlining the work carried out by the Department today, I will sketch a brief history.

In the year following the end of World War Two, a proposal was made—under the so-called ‘Baruch Plan’—to bring atomic energy under United Nations (UN) control. This idea did not get very far until, in 1953, US President Eisenhower delivered his famous “Atoms for Peace” speech at the UN. This speech, in turn, led to proposals which formed the basis of the Statute of the IAEA, which was then established in 1957.

From there, the first Safeguards agreement was concluded in 1959, the first inspection conducted in 1962, and the first comprehensive set of safeguards applied from 1965–1967.

In 1968, negotiations for the Non-Proliferation Treaty (NPT) The negotiation were completed, and the agreement entered into force in 1970. Non-nuclear weapon States who agreed to the NPT agreed that in return for nuclear weapon abstinence, they would have full access to peaceful uses of nuclear energy. Under the NPT, all such State parties agreed to accept safeguards by the IAEA with the objective of preventing the diversion of nuclear material from agreed peaceful uses. It also states that safeguards shall be applied on all source and fissionable material within States’ territories.

The NPT established a safeguards system under the responsibility of the IAEA, which began to implement safeguards in line with Article III of the treaty.

As Professor Lawrence Scheinman put it, “the entry into force of the NPT gave the IAEA a tremendous boost, making it the keystone of the non-proliferation regime.” This non-proliferation regime Scheinman mentions is a loose collection of predispositions, understandings, agreements and treaties that have been evolving for the last half century—all intended to avoid the further spread of nuclear weapons. The Safeguards system is a core component of that regime. The Agency does have enforcing powers—but instead relies on the UN Security Council for enforcement or action.

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In order to implement safeguards within a Member State, the IAEA needs to conclude a safeguards agreement with that state. There are three primary types of Safeguards agreements, each serving a specific purpose in the implementation of safeguards for Member States.

1. Comprehensive Safeguards Agreements (CSAs)
2. Item-specific Safeguards Agreements (INFCIRC 66)
3. Voluntary Offer Agreements (VOAs)

Each of the agreements is subject to a legal framework. Most of the States with safeguards agreements in force have a CSA, under which the State accepts safeguards on all nuclear material in all peaceful activities within its territory, jurisdiction or control. The State and the IAEA work together, where the IAEA is required to maintain confidentiality and the State, in return, provides information concerning nuclear material and facilities and access to the IAEA for inspections and design information verification.

Before 1991, Safeguards was traditionally focused on **declared** facilities and verifying the correctness of State declarations. This meant there were only limited detection possibilities regarding **undeclared** activities elsewhere in the State. *In other words, the IAEA was unable to verify the completeness of State declarations.*

Between 1991 and 1995, Nuclear-weapon-related activities in Iraq, Libya and the DPRK demonstrated the inadequacies of safeguards implementation and the need for strengthening measures, including complementary legal authority, to address possible **undeclared** nuclear material and activities.

As a consequence, efforts to strengthen IAEA Safeguards got underway. The Department began to consider the State as a whole. This required increased access to information and locations (including beyond nuclear facilities). Further, the Department would use advanced technology (for example, environmental sampling, remote monitoring, and satellite imagery) and expect enhanced transparency from, and cooperation with, States.

As a way to achieve the strengthened Safeguards, the Additional Protocol (AP) was introduced. This new legal instrument was approved by Board of Governors in May 1997 and provides the Agency with more rights of access to information and locations. Unlike the CSA, an AP is voluntary. Overall, the AP supplements a State's Safeguards agreement by providing:

1. Broader information: A State's nuclear fuel cycle research and development activities, all parts of a State's nuclear fuel cycle, from uranium mines to nuclear waste, and the manufacturing and export of sensitive nuclear-related equipment and material.
2. Broader access: Any building on a declared site at short-notice (access within as little as two hours), a State's declared locations or other locations where nuclear material is present, and other locations for the collection of environmental samples.

The combination of the CSA and AP enables the Agency to draw a ‘Broader Conclusion’ that all nuclear material remains in peaceful activities.

The Department of Safeguards has a distinct and well established implementation process: from the collection and processing of information to the point when the Department establishes findings and draws a Safeguards conclusion (see Figure below).

Safeguards are implemented in 182 States, of which 129 have Additional Protocols (AP) in force. The Department of Safeguards employs over 900 staff and contractors from more than 90 countries at our HQ in Vienna, at our laboratories in Seibersdorf and at our two regional offices—in Canada and Japan. In 2016 there were:

The Safeguards environment is changing fast. Over the last decade, we have had an ever-growing increase in demand, including more nuclear material as well as facilities and outside locations under safeguards. States with safeguards agreements and Additional Protocols in force are also increasing year-over-year. We add to that—accelerating changes in technology, global connectivity (globalization) and an ever increasing volume and complexity of safeguards-relevant information. However, there is still a growing gap between the demand for Safeguards and our available resources. And, of course, it is our legal obligation to implement safeguards—it is not a matter of choice. Our legal obligations determine our workload, and our workload continues to increase. Unfortunately, the budget Member States provide each year for safeguards does not rise at the same rate as the demands.

The challenges to the safeguards system are more profound and varied today than they have ever been. To succeed, the IAEA will need to be agile in response to the unexpected, without diluting the credibility of the safeguards conclusions it draws. I am confident that working together with Member States, we can meet those challenges, preserve our credibility and continue to make the world a safer place for future generations.

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