EFFECTIVE SAFEGUARDS FOR THE PREVENTION OF NUCLEAR PROLIFERATION: THE TRADITIONAL INTERNATIONAL SAFEGUARDS SYSTEM AND A PROPOSAL TO COMPLEMENT THE SYSTEM

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ABSTRACT

Since the early 1990s, when clandestine nuclear activities in Iraq and in North Korea came to light, the international community has been trying to overcome nuclear proliferation challenges by building measures based on the existing IAEA safeguards system. The Model Additional Protocol to the IAEA Comprehensive Safeguards Agreement, which expands the IAEA's authority to access relevant locations and to obtain relevant information in a country under the safeguards agreement, was introduced in 1995 to this end.

Prominent scholars and experts continue to discuss and propose measures to strengthen the current IAEA safeguards system. The IAEA General Conference started adopting resolutions towards this end in 1991, and it has also become as an essential subject at the NPT Review Process since 1995. Strengthening of the IAEA safeguards system has been regarded as one of the main tasks of the international community to overcome nuclear proliferation challenges and prevent cases such as Iraq and North Korea.

The question remains, however, whether an approach based on strengthening the current regime will be an effective way to meet those challenges. Even with the considerable efforts by the international community to improve international safeguards after the cases of Iraq and North Korea, the IAEA found further non-compliance cases, Iran and Syria.

Most recently, the IAEA tried to strengthen its traditional safeguards based on the new "State-level concept (SLC)", which can be regarded as a transformation from the traditional quantitative safeguards approach to a qualitative approach in designing safeguards procedures. However, the SLC has been criticized by a number of IAEA Member States.

The author identifies and examines aspects that have been disregarded in the existing research on the international safeguards, and argues that strengthening the current international safeguards system is not the sole path forward. Rather, it is submitted that the international community should find another approach, starting with identifying the problems of the current system and their causes.

In this paper, following the introduction in Chapter I, Chapter II, "International Control of Nuclear Energy and Safeguards As its Means", reviews existing research and identifies the key elements that contributed to the establishment of the current international nuclear safeguards system. It further examines the nature of the traditional international safeguards system, the IAEA NPT safeguards system, as a universal international safeguards system (1970-present), by reviewing the origins and the development of the international control of nuclear energy and of nuclear safeguards after World War II.

Chapter III, "International Safeguards As a Means to Assure Nuclear Non-proliferation", presents new research. The Chapter discusses the shortcomings of the current IAEA safeguards system in three aspects: institutional, political, and technical, and identifies the reasons why strengthening the current IAEA NPT safeguards system is not an effective way to address the current and future challenges in ensuring nuclear non-proliferation. The IAEA NPT safeguards, being a universal system, need to be as non-discriminatory, as objective (i.e. based on quantitative indicators), and as cost effective as possible. The author argues that effective safeguards need not necessarily be non-discriminatory, need not necessarily be objective, and should not be affected too much by cost-effectiveness.

In Chapter IV, "Mutual Safeguards System As a Means to Complement Current International Safeguards System", existing regional safeguards systems will be examined, in particular whether those systems, which are reciprocal in nature and do not require universality, could complement the current international safeguards system and contribute to nuclear non-proliferation. Taking the Brazilian-Argentine Agency for Accounting and Control of Nuclear Material (ABACC) and the European Atomic Energy Community (EURATOM) as examples, this Chapter examines whether non-universal but mutual safeguards systems could overcome the shortcomings of the IAEA NPT safeguards system.

In conclusion, it is stressed in Chapter V that a mutual safeguards system that does not have a universal nature could overcome the problems of the current IAEA NPT safeguards, and complement the traditional universal international safeguards system. Because of its universality,

the traditional international safeguards system, namely the IAEA NPT safeguards system, alone cannot be effective in preventing nuclear proliferation.

This research indicates that a greater acknowledgement of the role that mutual systems, such as the regional ones in force under the ABACC and the EURATOM, may play in the international nuclear non-proliferation regime, and a greater understanding of the differing objectives of those regimes that allow them to be more effective than the current approach, which is based on strengthening the IAEA NPT safeguards system, can play an important role in strengthening international nuclear non-proliferation.

Chapter I

INTRODUCTION

Background

On April 2009, President of the United States Barak Obama appealed for renewed support for the Nuclear Non-Proliferation Treaty (NPT): "together we will strengthen the NPT as a basis for cooperation. The basic bargain is sound: countries with nuclear weapons will move towards disarmament, countries without nuclear weapons will not acquire them, and all countries can access peaceful nuclear energy. To strengthen the treaty, we should embrace several principles. We need more resources and authority to strengthen international inspections." [1]

Already before 2009, there were ongoing discussions both inside and outside the International Atomic Energy Agency (IAEA) regarding the need to increase the resources and the authority of the IAEA to strengthen its inspections.

Since the early 1990s, when clandestine nuclear activities in Iraq and in North Korea came to light, the international community has been trying to overcome nuclear proliferation challenges by building additional measures founded on the existing IAEA safeguards system. The Model Additional Protocol to the IAEA Comprehensive Safeguards Agreement, which expands the IAEA's authority to access relevant locations and to obtain relevant information in a country under the safeguards agreement, was introduced in 1995 to this end. Prominent scholars and experts continue to discuss and propose measures to strengthen the current IAEA safeguards system[2].

Since 1991, the IAEA General Conference, the IAEA's supreme policy-making body, has

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[1] Remarks by President Barack Obama in Prague, April 5, 2009, accessed on December 9, 2016, https://www.whitehouse.gov/the-press-office/remarks-president-barack-obama-prague-delivered.

[2] Such as David Sloss, "It's Not Broken, So Don't Fix it: The International Atomic Energy Agency Safeguards System and the Nuclear Nonproliferation Treaty," *Virginia Journal of International Law*, Vol. 35, No.4, Summer 1995, pp.841-893; Richard Hooper, "Strengthening IAEA Safeguard in an Era of Nuclear Cooperation," *Arms Control Today*, November 1995, pp.14-18; David Fischer, "New Directions and Tools for Strengthening IAEA Safeguards," *The Nonproliferation Review,* Winter, 1996, pp.69-76.

adopted resolutions on strengthening the IAEA safeguards system every year[3]. It has also been an essential subject at the NPT Review Process since 1995. In particular, the 2000 NPT Review Conference has addressed the importance of the IAEA as the competent authority for the international safeguards system, and the strengthening of the IAEA safeguards has been mentioned in its Final Document, adopted by consensus of the Parties to the Treaty[4].

As such, strengthening of the IAEA safeguards system has been regarded as one of the main tasks of the international community to overcome nuclear proliferation challenges and prevent cases such as Iraq and North Korea.

The question is, however, whether an approach based on the current regime will be an effective way to meet those challenges. Even with all the efforts by the international community to improve the international safeguards after the cases of Iraq and North Korea, the IAEA reported further non-compliance cases, Iran and Syria, to the UN Security Council[5]. There have been no significant institutional achievements with regard to the strengthening of the international safeguards since the Model Additional Protocol was adopted in 1995.

Most recently, the IAEA tried to strengthen its traditional safeguards based on the new "State-level concept (SLC)"[6], which could be regarded as a transformation from the traditional

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[3] Except in 2011. The IAEA General Conference failed to adopt the traditional safeguards resolution in this year by vote. It only adopted two specific safeguards resolutions which covers only certain countries or region; "Application of IAEA safeguards in the Middle East", IAEA Document, GC (55)/23, and "Implementation of the NPT safeguards agreement between the Agency and the Democratic People's Republic of Korea", IAEA Document, GC (55)/24. The first resolution entitled Strengthening of the Safeguards System, GC (35)/RES/559, was adopted at the 35 IAEA General Conference on 22 September 1991.

[4] Final Document of the 2000 Review Conference of the Parties to the Treaty on the Non-proliferation of Nuclear Weapons, NPT/CONF.2000/28 (Part I and II), Article III and fourth and fifth preambular paragraphs, especially in their relationship to article IV and the sixth and seventh preambular paragraphs.

[5] The IAEA Board of Governors adopted a resolution entitled Implementation of the NPT Safeguards Agreement in the Islamic Republic of Iran (GOV/2006/14) on February 4, 2006, and for Syria it adopted a resolution entitled Implementation of the NPT Safeguards Agreement in the Syrian Arab Republic (GOV/2011/41) on June 9, 2011, to report the cases to the UN Security Council.

[6] IAEA Document, the Conceptualization and Development of Safeguards Implementation at the State Level, (GOV/2013/38 (restricted distribution)); IAEA Document, Supplementary Document to the Report on The Conceptualization and Development of Safeguards Implementation at the State Level (GOV/2013/38) (GOV/2014/41 and its Corrigenda), https://armscontrollaw.files.wordpress.com/2014/09/iaea-state-level-safeguards-document-august-

quantitative safeguards approach to a qualitative approach to design safeguards procedures. Although the Secretariat already started consideration of this concept in 2002, the issue had not been received much attention from Member States until the Secretariat highlighted it in the Safeguards Implementation Report for 2011[7] presented to the Member States in June 2012. The SLC has been criticized by a number of IAEA Member States, especially by Russia and some developing countries[8]. Heated discussions were conducted on this concept among the Member States and between some Member States and the IAEA Secretariat, the details of which will be reviewed in this paper.

Purpose of the Research

The purpose of this research is to examine what would be an effective international safeguards system for the prevention of nuclear proliferation.

The aim of this research is not to criticize the role of the IAEA as an international organization to implement safeguards, or the role that the IAEA NPT safeguards have played in the past decades in the international nuclear non-proliferation regime. As a universal institution, the IAEA NPT safeguards system has contributed greatly to international nuclear non-proliferation since the establishment of the NPT regime, and has implemented safeguards in all regions of the world. IAEA safeguards agreements have been implemented in 181 states, and 2114 safeguards inspections were performed in 2015[9]. The utility of this broad range of coverage in ensuring nuclear non-proliferation should not be underestimated. However, being a universal institution, the IAEA has been facing a number of serious challenges, in particular since the early 1990s.

2014.pdf.

7 IAEA Document, *Safeguards Statement for 2011*, https://www.iaea.org/sites/default/files/es2011.pdf.

8 Among others: IAEA Document, GC (58)/COM.5/OR.4, https://www.iaea.org/About/Policy/GC/GC58/GC58Com5Records/English/gc58com5or-4_en.pdf; IAEA Document, GC (58)/COM.5/OR.4, https://www.iaea.org/About/Policy/GC/GC58/GC58Com5Records/English/gc58com5or-4_en.pdf.

9 IAEA Annual Report 2015, p.v., https://www.iaea.org/sites/default/files/gc60-9.pdf.

Furthermore, this research is not aimed at discussing the total elimination of nuclear weapons, nor the abandonment of the uses of nuclear energy. There has been always the view that total elimination would be the best way, if not the only way, to achieve nuclear non-proliferation: this can be witnessed, for example, in the Joint Declaration by the United States, the United Kingdom and Canada on November 15, 1945. While recognizing the importance of total elimination of nuclear weapons for the peace and security of the world, the reality is that nuclear weapons do exist, and countries with such weapons do not appear inclined towards total elimination at any point in the foreseeable future. This research will not enter into this debate: rather, it will focus on how to prevent the further proliferation of nuclear weapons in the current international situation.

Central Thesis of the Research

The central thesis of this research is that the traditional universal international safeguards system on its own is not effective in preventing nuclear proliferation. The introduction of mutual safeguards systems, such as regional safeguards arrangements, could be a good complement to the traditional universal international safeguards system.

Methodology of the Research

This research uses a deductive approach. The author identifies and examines aspects that have been disregarded in the existing research on the international safeguards, and argues that strengthening the current international safeguards system is not the sole path forward. Rather, the international community should find another system, by identifying the problems of the current system and their causes.

Following this methodology:

Chapter II, International Control of Nuclear Energy and Safeguards As its Means, reviews existing research and identifies the key crucial elements that contributed to the establishment of the current international nuclear safeguards system. It further examines the nature of the

traditional international safeguards system, the IAEA NPT safeguards system, as a universal international safeguards system (1970-present), by reviewing the origins and the development of the international control of nuclear energy and of nuclear safeguards after World War II.

Chapter III, International Safeguards As a Means to Assure Nuclear Non-proliferation, presents new aspects of research. It discusses the shortcomings of the current IAEA safeguards system in three aspects: institutional, political and technical, and identifies the reasons why strengthening the IAEA NPT safeguards system is not an effective way to meet the current and future challenges in ensuring nuclear non-proliferation. The IAEA NPT safeguards, being a universal system, needs to be as non-discriminatory, as objective, and as cost effective as possible. This author argues that effective safeguards do not need to be non-discriminatory, do not necessarily need to be objective in terms of being quantitative, and should not be affected too much by cost-effectiveness.

In Chapter IV, Mutual Safeguards System As a Means to Complement Traditional International Safeguards System, existing regional safeguards systems will be examined, in particular whether those systems, which are reciprocal in nature and do not require universality, could complement the traditional universal international safeguards system and contribute to nuclear non-proliferation. This Chapter presents and substantiates the central thesis of the research.

Taking the Brazilian-Argentine Agency for Accounting and Control of Nuclear Material (ABACC)[10] and the European Atomic Energy Community (EURATOM) as examples, this Chapter will examine whether non-universal but mutual safeguards systems could overcome the shortcomings of the IAEA NPT safeguards system. It will also examine whether mutual safeguard systems can overcome obstacles in securing: (1) reciprocity, (2) political support, and (3) enforceability, all of which are identified as the key elements for an international safeguards system.

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10 In Portuguese "Agência Brasileiro-Argentina de Contabilidade e Controle de Materiais Nucleares (ABACC)" and in Spanish "La Agencia Brasileño-Argentina de Contabilidad y Control de Materiales Nucleares (ABACC)".

Chapter V, Conclusion, summarizes the discussion in the previous Chapters and explains possible contributions to other international verification systems.

Definitions of Terms

Some important terms need to be clarified.

In this research, the term "international safeguards system" is defined as any type of safeguards system, including multinational or bilateral systems, in general, which is designed beyond national safeguards.

"IAEA NPT safeguards" refers to the IAEA full-scope safeguards (INFCIRC/153(Corrected.)), that are created based on the NPT in 1972, to be applied to non-nuclear weapon states parties to the NPT.

"Mutual safeguards" refers to safeguards that are applied not unilaterally, but mutually on a base of reciprocity.

Chapter II

INTERNATIONAL CONTROL OF NUCLEAR ENERGY AND SAFEGUARDS AS ITS MEANS

2017 marks the 60th anniversary of the creation of the International Atomic Energy Agency (IAEA). To date, the IAEA is recognized as the most established international safeguards institution. When we refer to international safeguards, they are usually understood as the IAEA safeguards, which are implemented in a broad range of countries to assure their nuclear activities remain peaceful. The IAEA has been and is the leading organization with regard to safeguards non-compliance issues, such as North Korea or Iran.

At the same time, the IAEA is also responsible for the promotion of peaceful uses of nuclear activities worldwide.

The antecedent of this IAEA safeguards system, however, was the idea that nuclear energy should be controlled more stringently. The promotion of uses of nuclear energy was not an important element of this idea.

This Chapter reviews existing research on international control of nuclear energy and identifies the key crucial elements that contributed to the establishment of the current international nuclear safeguards system. It further examines the nature of the traditional international safeguards system, the IAEA NPT safeguards system, as a universal international safeguards system (1970-present), by reviewing the origins and the development of the international control of nuclear energy and of nuclear safeguards after World War II.

Section 1

INTERNATIONAL CONTROL OF NUCLEAR ENERGY: BEFORE THE ESTABLISHMENT OF THE INTERNATIONAL ATOMIC ENERGY AGENCY

1.1 Introduction

The idea of nuclear safeguards was first introduced after the end of the Second World War. It stems from the desire to control the uses and developments of nuclear energy to prevent the spread of nuclear technologies and material usable to produce nuclear weapons.

In this Section, the origin of the international safeguards will be examined by reviewing historical events leading to the establishment of the international safeguards system, building on that review to discuss the current and future safeguards system in the following Chapters.

1.2 Origin of the International Nuclear Safeguards

1.2.1 Joint Declaration by the United States, the United Kingdom and Canada, November 15, 1945.

In 1945, after the first atomic bombs were used by the United States on August 6 and 9, the Heads of Government of three nations, the United States, the United Kingdom and Canada[11], gathered in Washington on November 15, and issued a Joint Declaration[12]. In this declaration, the three nations stressed the need for international control of the future use of nuclear energy, and proposed the establishment of a Commission under the United Nations to prepare recommendations to this end.

The United Nations had been founded on October 24, just three weeks before this declaration was released. Its first General Assembly was to be held in January next year. After the experience of devastation caused by two World Wars, the international community was moving towards creating a world system under the governance of the United Nations, an

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[11] These three nations were engaged in the program to manufacture the first atomic bombs.
[12] "Joint Declaration by the Heads of Government of the United States, United Kingdom, and Canada, November 15, 1945," *Documents on Disarmament 1945-1959 Vol.1*, Department of State Publication 7008, August 1960, pp.1-3.

international organization, to be responsible for international peace and security. It is not my intention to go into details on the founding history of the United Nations in this chapter. It is, however, worth stressing that there was a strong aspiration in the international community in 1945 for a world governed by an international organization, and that the Joint Declaration by the United States, the United Kingdom and Canada was released under these circumstances.

The Joint Declaration is well known for proposing, for the first time in history, a commission under the United Nations to discuss possible international control of nuclear energy to prevent its use of nuclear energy for destructive purposes, and to promote the use of advances in scientific knowledge for peaceful and humanitarian ends. As McKnight described, "it was to have profound influence on subsequent discussions of controls over atomic energy"[13]. However, some points are often overlooked, in particular in the current discussions on this matter, that in my view should be examined with the utmost caution in order to understand and consider what an appropriate and effective safeguards system for international peace and security should be:

The third paragraph of the Declaration reads as follows:

"We are aware that the only complete protection for the civilized world from the destructive use of scientific knowledge lies in the prevention of war. No system that can be devised will of itself provide an effective guarantee against production of atomic weapons by a nation bent on aggression. Nor can we ignore the possibility of the development of other weapons, or of new methods of warfare, which may constitute as great a threat to civilization as the military use of atomic energy." [emphasis added]

The sixth paragraph reads further:

"We are not convinced that the spreading of the specialized information regarding the practical application of atomic energy, before it is possible to devise effective, reciprocal, and enforceable safeguards acceptable to all nations, would contribute to a constructive solution of the problem of the atomic bomb. On the contrary, we think it might have the opposite effect. We are, however,

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[13] Allan McKnight, *Atomic Safeguards- A Study in International Verification* (New York: United Nations Institute for Training and Research, 1971), p.3.

prepared to share, on a reciprocal basis with others of the United Nations, detailed information concerning the practical industrial application of atomic energy just as soon as effective enforceable safeguards against its use for destructive purposes can be devised." [emphasis added]

In the seventh paragraph, it continues:

"In order to attain the most effective means of entirely eliminating the use of atomic energy for destructive purposes and promoting its widest use for industrial and humanitarian purposes, we are of the opinion that at the earliest practicable date a Commission should be set up under the United Nations Organization to prepare recommendations for submission to the Organization."[emphasis added]

And finally, the Declaration identifies the specific issues the Commission should consider for recommendation.[14]

What is apparent from these paragraphs is, firstly, the three nations engaged in the developing of the first atomic bombs believed that no control system could alone prevent a nation that is determined on aggression from developing nuclear weapons. Secondly, they were prepared to share detailed information on nuclear energy, which they monopolized at that time in 1945, on a reciprocal basis, only in return for other nations accepting effective and enforceable safeguards to assure the information will not be used for destructive purposes. Thirdly, they set forth the objectives of their initiative as the entire elimination of the use of nuclear energy for destructive purposes on the one hand, and promotion of peaceful uses of nuclear energy on the other[15].

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[14] The specific proposals identified the Commission should make are: (a) For extending between all nations the exchange of basic scientific information for peaceful ends, (b) For control of atomic energy to the extent necessary to ensure its use only for peaceful purposes, (c) For the elimination from national armaments of atomic weapons and of all other major weapons adaptable to mass destruction, (d) For effective safeguards by way of inspection and other means to protect complying states against the hazard of violations and evasions.

[15] The objectives of the IAEA safeguards system and the IAEA NPT safeguards are defined as below:

IAEA: "The Agency shall seek to accelerate and enlarge the contribution of atomic energy to peace, health and prosperity throughout the world. It shall ensure, so far as it is able, that assistance provided by it or at its request or under its supervision or control is not used in such a way as to further any military purpose." (Article II of the IAEA Statute) [emphasis added];

IAEA NPT safeguards: "The Agreement should contain, in accordance with Article III.1 of the Treaty on the Non-Proliferation of Nuclear Weapons, an undertaking by the State to accept safeguards, in accordance with the terms of the Agreement, on all source or special fissionable

1.2.2. Moscow Communiqué by the Foreign Ministers of the United States, the United Kingdom and the Soviet Union, December 27, 1945[16] and Adoption of a UN resolution on January 24, 1946

After the release of the Joint Declaration, the Foreign Minsters of the United States, the United Kingdom, and the Soviet Union met in Moscow from December 16 to 26, 1945. They agreed in this meeting on the establishment by the United Nations of a Commission for the Control of Atomic Energy and recommended in their communiqué issued on December 27, 1945, that the General Assembly of the United Nations consider the establishment of such a Commission. In January 1946, this recommendation was submitted in the form of a resolution to the first UN General Assembly[17], which was subsequently adopted by consensus on January 24.[18]

The Terms of Reference of the Commission included in this resolution as well as in the Moscow Communiqué were exactly those raised as specific proposals in the Joint Declaration by the United States, the United Kingdom and Canada[19], and underpin the aforementioned three fundamental factors for a non-proliferation regime; specific proposal (a) to (c) concerning reciprocity, and specific proposal (d) concerning the objective of safeguards[20].

In accordance with the provisions of this resolution, the United Nations Atomic Energy Commission was established to "deal with the problems raised by the discovery of atomic energy

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material in all peaceful nuclear activities within its territory, 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." (Article I of "the Structure and the Content of Agreements between the Agency and States required in connection with the Treaty on the Non-proliferation of Nuclear Weapons," IAEA documents, INFCIRC153 (Corrected)) [emphasis added].

16 The full text of this communiqué is printed in "A Decade of American Foreign Policy: Basic Documents, 1941-1949, pp.34-36.

17 51 nations were the member of UN in 1945. Countries such as Japan, Germany, Italy and Spain were not member of UN at that time.

18 UN Document, A/RES/1(I).

19 "Joint Declaration by the Heads of Government of the United States, United Kingdom, and Canada, November 15, 1945," *Documents on Disarmament 1945-1959 Vol.1*, Department of State Publication 7008, August 1960, pp.1-3.

20 The specific proposals identified the Commission should make are: (a) For extending between all nations the exchange of basic scientific information for peaceful ends, (b) For control of atomic energy to the extent necessary to ensure its use only for peaceful purposes, (c) For the elimination from national armaments of atomic weapons and of all other major weapons adaptable to mass destruction, (d) For effective safeguards by way of inspection and other means to protect complying states against the hazard of violations and evasions.

and other related matters" and convened its first meeting on June 12 1946. The composition of the Commission was, as set out in the resolution, the members of the UN Security Council[21] and Canada, when it is not represented on the Council.

1.2. 3. The United Nations Atomic Energy Commission

The United Nations Atomic Energy Commission (UNAEC) conducted its work from June 1946 until July 1949, and was officially dissolved on January 11 in 1952 by the resolution of UN General Assembly to decide to establish a Disarmament Commission[22]. The UNAEC existed nearly five and half years. However, it was able to undertake substantive work for only less than two years, until it faced stalemate in early 1948.

The Commission submitted three reports to the Security Council outlining the outcomes of their deliberations, but failed to produce any substantive agreement at the end. As previous studies made clear[23], the reason why the Commission failed to reach an agreement on the international control of nuclear energy was the contradictory positions between the Western bloc and the Eastern bloc, with the United States and the Soviet Union as the respective key players. The United States' position was very clear from the beginning. The core of its idea was, as stressed in the three memorandums submitted by the United States to the Commission and its oral statements, that the control and development of atomic energy must be "international" and should be entrusted to an agency[24]. In order to achieve international control, the United States proposed that all other countries except the United States should entrust the agency with the

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[21] The Security Council consists of 11 members of the United Nations. China, France, the Soviet Union, the United States, and the United Kingdom are permanent members of the Council (Chapter V of the Charter of the United Nations).

[22] UN Document, A/RES/503/VI.

[23] United Nations, *The United Nations and Disarmament 1945-1970* (New York: United Nations Publications, 1970), pp.11-24; George Fischer, *The Non-Proliferation of Nuclear Weapons* (London: Europa Publications, 1971), pp.20-37; Allan McKnight, *Atomic Safeguards- A Study in International Verification* (New York: United Nations Institute for Training and Research, 1971), pp.3-65; Ryukichi Imai, *Kokusai Sasatsu (International Inspection)* (Tokyo: Asahi Shinbunsha, 1971), pp.126-129.

[24] United States Memoranda on the Proposed Atomic Development Authority, Submitted to Subcommittee I of the United Nations Atomic Energy Commission, Memorandum No. 1, July 2, 1946, Memorandum No. 2, July 5, 1946, and Memorandum No. 3, July 12, 1946.

complete and exclusive control or ownership of nuclear material[25], and the United States on its part will surrender to its knowledge on nuclear energy and its nuclear weapons only once such an international control was sufficiently established[26].

This idea encountered strong opposition by the Soviet Union. The Soviet Union, which did not possess a nuclear weapon at that time, proposed an immediate international convention for the prohibition of the production and use of nuclear weapons and for the destruction of existing stocks[27]. This opposition by the Soviet Union was maintained throughout the deliberations of the Commission. As described in its third and final report to the Security Council, because of this opposition and the general absence of cooperation by the Soviet Union, the Commission failed to achieve an agreement on the control of nuclear energy, and concluded that no useful purpose could be served by carrying on negotiations at the Commission level[28]. The Commission ceased its work on July 29, 1949, when it reported to the Security Council that "the impasse as analyzed in the third report of the Atomic Energy Commission still exists; … these differences are irreconcilable at the Commission level, and … further discussion in the Atomic Energy Commission would tend to harden these differences and would serve no practicable or useful purpose until such time as the sponsoring Powers have reported that there exists a basis for agreement [29] ". As aforementioned, the Commission was subsequently dissolved in January 1952. In the meantime, the Soviet Union conducted a nuclear explosion test in September 1949, and became the second nation possessing a nuclear weapon.

1.2.4. The International Control of Uses of Nuclear Energy

All these developments and the outcomes of the UNAEC have been well studied. However,

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[25] Ibid., Memorandum No.1.
[26] Ibid., Memorandum No. 3.
[27] Oral statement by the Soviet Union Representative (Gromyko) to the United Nations Atomic Energy Commission, June 19, 1946.
[28] Third Report of the United Nations Atomic Energy Commission to the Security Council, May 17, 1948.
[29] AEC/42 and AEC/43, Supplement No. 2 (A/1361), "Report of the Security Council to the General Assembly Covering the period from 16 July 1949 to 15 July 1950," pp. 32-33.

in terms of the failure to reach an agreement, there is one element that deserves more attention in order to understand and further examine the obstacles the international community encountered, and continues to struggle with, in establishing effective international control of nuclear energy. That element is the function of the United Nations, and especially that of the Security Council.

The UNAEC was established under the United Nations and mandated to report to the Security Council, and it submitted three reports with specific proposals to that body. When the first report, which was adopted by a vote with the abstention of Soviet Union at the UNAEC, was considered at the Security Council in early 1947, the Soviet Union tabled a number of amendments and additions. To respond to the Soviet's proposals, the Security Council adopted a resolution by consensus, recognizing that any agreement expressed by the members of the Council is preliminary since final acceptance of any part by any nation is conditioned upon its acceptance of all parts of the controls plan in its final form. The Security Council then requested the UNAEC to continue its work[30]. The Commission submitted its second report to the Security Council on September 11, 1947. The report was approved at the UNAEC by vote, with the Soviet Union voting against[31]. In other words, the Security Council considered this report, but again was not able to accept the recommendations contained in the report, due to the opposition of the Soviet Union.

The developments regarding the third report are even more indicative. When the report was discussed at the Security Council in June 1948, the countries of the Security Council, including the Soviet Union, repeated their basic positions, and the resolution proposed by the United States to adopt the recommendations contained in the report and those of previous two reports was rejected by a vote. There were only two nations opposing the resolution, but it was decisive because one of these two opposing nations was the Soviet Union, which, as a Permanent Member, has a veto of decisions by the Security Council[32]. If the Soviet Union did not have a veto, the

[30] UN Document, S/RES/20(1947).
[31] The result of the vote was 10-1-1, the Soviet Union opposing and Poland abstaining.
[32] The other nation that voted against was Ukraine.

resolution would have been adopted by a majority of the Council.

The three reports were then transmitted to the General Assembly by the subsequently adopted resolution at the Security Council[33], and deliberations on the matter were continued at the General Assembly until November 1948. The majority of the General Assembly supported the proposal by Canada, which was almost identical with the content of the 1948 resolution submitted by the United States that had been rejected at the Security Council. After extensive discussions on the proposals, the General Assembly adopted a resolution to request UNAEC to continue its work on November 4, 1948[34]. The Soviet Union voted against, but it could not prevent the adoption of the resolution since it did not have the right to veto a decision of the General Assembly.

The efforts to establish international control of nuclear energy faced a stalemate until the United States made a new proposal, "Atoms For Peace", at the General Assembly in December 1953. This will be examined in the next Section.

1.3. Conclusion

Efforts to establish international control of nuclear energy began with the Joint Statement by the United States, the United Kingdom and Canada in 1946. They proposed that this control should be discussed under the rubric of the United Nations. As examined above, however, the subsequent discussions and developments on those efforts within the framework of the United Nations resulted in a lack of political agreement on the idea of such control, mainly due to the political antagonism between the Western bloc with the United States on the one side, and the Eastern bloc with the Soviet Union on the other.

The lack of agreement, however, was not because of the lack of political support for the idea of international control itself, but because the international control proposed by the United States was designed to be conducive only to the United States' policy to monopolize nuclear weapons.

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[33] UN Document, S/RES/52(1948). This resolution to transmit the reports to the General Assembly was adopted by a vote with two abstentions, the Soviet Union and Ukraine.
[34] UN Document, A/RES/191(III).

The Soviet Union, which did not possess nuclear weapons at that time, could obviously not accept this proposal within the circumstances of ongoing rivalry with the United States. It is therefore important to note that the reciprocity the United States proposed at that time, namely to share detailed information on the application of nuclear energy in return for the imposition of effective enforceable safeguards, was not accepted by the Soviet Union.

The point we also should not overlook is that despite the political disagreement between the United States and the Soviet Union, taking a decision or reaching an agreement on an international control system of nuclear energy was not impossible at the UNAEC. The reason for this was that decisions at the UNAEC were taken by a majority of votes, as opposed to the UN Security Council, which could be hindered by the veto of one Permanent Member. Agreement on the international control of nuclear energy was only hindered when it was discussed at the UN Security Council, where the Soviet Union had the right to veto to any decisions – a right it indeed exercised.

The course of the discussions on the international control of nuclear energy and its outcome in 1946-1948 revealed that the Security Council was unable to take any actions when it came to decisions on matters contradictory to the interests of its Permanent Member States, because of the right of veto of those Permanent Member States. It implicates that because a lack of consensus of the five Permanent Member States of the UN Security Council, in other words a lack of their unanimous political support, the international community could not achieve any agreement on such important matters as control of nuclear energy.

This inability of the United Nations and the question of necessary political support for the control of nuclear energy will be further analyzed and discussed later in Chapter III of this study.

Section 2

THE INTERNATIONAL ATOMIC ENERGY AGENCY: ITS ORIGIN AND DEVELOPMENTS OF THE SAFEGUARDS

2.1 Introduction

As articulated in Section 1, the first attempts to establish an international control regime over the possession and use of nuclear energy failed due to the lack of necessary political support. The international community moved then to a new direction largely due to the leadership United States. It was a transformation from the idea of total control towards promotion of uses of nuclear energy with certain restrictions.

The International Atomic Energy Agency (IAEA) was established for this purpose and it paved the way for development of the international nuclear safeguards system. The IAEA is often called the competent authority for the international safeguards[35].

In this section, I would like to identify some key elements that have been regarded as necessary for the current international safeguards system through examining the background and history of creating this agency and its safeguards system.

2.2 Establishment of the International Atomic Energy Agency (IAEA)

2.2.1. Transformation from control to promotion of uses of nuclear energy

After the UNAEC ceased its substantive work in June 1949, discussions and negotiations on international control of nuclear energy faced a stalemate. The Soviet Union conducted a nuclear test in September 1949 and the United Kingdom followed in October 1952. While deliberations on disarmament issues were continued at the UN, the three countries possessing nuclear weapons, the United States, the Soviet Union and the United Kingdom, were losing interest in working on nuclear non-proliferation. Reflecting this fact, there were no decisions or resolutions on disarmament issues adopted by consensus at the UN around the time period of 1949-1953. These

[35] UN document, Paragraph 9 of the Final Document of the 2010 Review Conference of the Parties to the Treaty on the Non-Proliferation of Nuclear Weapons, NPT/CONF.2010/50(Vol. I).

three nuclear weapons possessing countries were building up their nuclear arsenals during that time, and there were also emerging countries considering or starting to embark on nuclear energy program in the absence of any international restrictions or controls. During 1949-1953, the spread of nuclear technology and its uses around the world, as a promising source of energy, seemed to be inevitable in the countries that were rebuilding after the devastation of the Second World War.

It was in these circumstances that Eisenhower, President of the United States, delivered a speech titled "Atoms for Peace" at the UN General Assembly in December 1953, which lead to the establishment of the International Atomic Energy Agency (IAEA). Though the IAEA is often referred to today as "the nuclear watchdog", it should be stressed that this was not the primary goal of the organization at its inception. In his speech, Eisenhower stressed the need to ease the tensions of the world: " I feel impelled to speak today in a language that in a sense is new, one which I, who have spent so much of my life in the military profession, would have preferred never to use. That new language is the language of atomic welfare."[36]. He further stated: "the United States would seek more than the mere reduction or elimination of atomic materials for military purposes. It is not enough to take this weapon out of the hands of the soldiers. It must be put into the hands of those who will know how to strip its military casing and adapt it to the arts of peace." and continued "the United States knows that if the fearful trend of atomic military build-up can be reversed, this greatest of destructive forces can be developed into a great boon, for the benefit of all mankind. … The governments principally involved, to the extent permitted by elementary prudence, should begin now and continue to make joint contributions from their stockpiles of normal uranium and fissionable materials to an international atomic energy agency." Finally, he proposed the establishment of an international atomic energy agency under the aegis of the United Nations, which would be responsible for the impounding, storage and protection of the contributed fissionable and other materials. He did not mention or propose in his speech explicitly a function of the agency to act as an inspector of countries' nuclear activities. Though there is an

[36] Address by Mr. Dwight D. Eisenhower to the 470th Plenary Meeting of the United Nations General Assembly, December 8, 1953, https://www.iaea.org/about/history/atoms-for-peace-speech.

element of rhetoric in the speech to justify the nuclear program of the United States, it is clear from the speech that Eisenhower's focus was to provide assistance to promote peaceful nuclear activities, and to convince the people of the benefit of nuclear energy[37].

According to McKnight, there were two possible approaches that had been proposed for consideration by Eisenhower's advisers[38]. The first was to stress the "increased destructive potential", the second was to propose an international effort to use nuclear energy for the welfare of man The President chose the second approach. McKnight states "the theme of his speech developed from the fact that in 1953, world supplies of special fissionable materials (plutonium and enriched uranium) were almost wholly devoted to weapons programmes, and likewise almost the entire world production of natural uranium fed reactors and isotope separation plants in the weapons States. The question that the President posed was whether the time had not come for a concerted world effort to devote some part of the atomic energy effort to the peaceful applications of atomic energy. He suggested that this could be done if the Governments principally involved would make contributions from their stockpiles of natural uranium and of special fissionable materials to a new international agency for atomic energy."[39]

This seemed to be a drastic change of the United States' approach towards control of nuclear energy, and was welcomed by many developing countries at that time. As examined in Section 1 of this Chapter, the United States had been insisting a system of international control of nuclear energy under which all other countries except the United States should entrust an international agency with the complete and exclusive control or ownership of nuclear material under an effective international safeguards system. Eisenhower's proposals, however, did not directly suggest creating an international control or safeguards system to ensure peaceful uses of nuclear energy; rather, he stressed the need to promote the uses of nuclear energy[40]. The only element

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[37] Shawn J. Parry-Giles, "Eisenhower, "Atoms For Peace (8 December 1953)"," *Voices of Democracy* 1, 2006, University of Maryland, pp.118-129, http://archive.vod.umd.edu/internat/deafpcon.htm.

[38] Allan McKnight, *Atomic Safeguards- A Study in International Verification* (New York: United Nations Institute for Training and Research, 1971), p.19.

[39] Ibid., p. 20.

[40] It only mentions; "Undoubtedly, initial and early contributions to this plan would be small in

that is common to the United States' position up till then was the establishment of an "international agency" for uses of nuclear energy – even then, Eisenhower's proposal was to establish an agency to promote uses of nuclear energy, while the past United States' Baruch Plan was to control such uses.

However, this did not necessarily mean that the United States had renounced its policy to internationally control nuclear energy. It is submitted that, reflecting the fact that the Soviet Union and the United Kingdom had successfully acquired nuclear weapons by then and an increasing number of countries were starting embarking on nuclear programmes in 1949-1953, the United States only changed its approach on how to control nuclear energy; the country never renounced its intent to place the uses of nuclear energy under international control. If we examine how the IAEA Statute and its safeguards provisions were negotiated and established, this point will appear more obvious and it gives us more insights to understand the current IAEA safeguards system.

2.2.2. Negotiations on the IAEA Statute

After the "Atoms For Peace" address, the United States approached the Soviet Union in March 1954 with an outline of the statute for an international agency based on Eisenhower's proposals[41]. The Soviet Union's initial reaction was negative; the idea of "Atoms for Peace" was not yet acceptable for the country. The United States continued private conversations with the Soviet Union and seemed to have reached a mutual understanding by September 1954[42]. Then in March 1955, the United States, the United Kingdom, France, Canada, Australia, South Africa, Belgium and later Portugal[43] started negotiation on the statute on the basis of the United States

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quantity. However, the proposal has the great virtue that it can be undertaken without the irritations and mutual suspicions incident to any attempt to set up a completely acceptable system of world-wide inspection and control".

[41] D. Fischer, *History of the International Atomic Energy Agency: The First Forty Years* (Vienna: IAEA, 1997), pp.29-30.

[42] Ibid., pp.30-31.

[43] Known as "the eight-nation group". Membership was based on being advanced in the technology of atomic energy or being producer, actual or potential, of uranium for the American and United Kingdom military programs. In 1955, the group became the twelve-nations group,

and United Kingdom draft, which had been prepared by the both countries in December 1954.

The negotiations on the draft statute were mostly conducted informally and privately during 1954 - 1956. It was made public and discussed openly only after the Statute Conference, held from September 20 to October 26 1956. The Conference was attended by eighty-one States representatives, and interestingly enough one of the main issues in the negotiations was the safeguards provisions[44].

McKnight's study[45] gave us valuable insights on the negotiations on the safeguards related issues during the Conference.

2.2.3. Key aspects of safeguards related provision in the Statute

In his study[46], McKnight summarized the main points of argument from the Conference proceedings, and one of them was regarding safeguards. Although Eisenhower's proposal did not explicitly mention the safeguards, the draft IAEA statute had safeguards provisions and it provoked discussions of a political nature, as well as discussions that focused on technical aspects. According to McKnight, safeguards provisions were discussed mainly in the context of three or four aspects.

The first aspect was in relation to disarmament. As examined in Section 1 of this Chapter, a system of international control including safeguards was first proposed and discussed in the context of nuclear disarmament. It is thus natural that a large part of the discussions at the Statute Conference was devoted to the subject of nuclear disarmament. Western European countries continued the same argument they had advanced in 1946, namely that control of nuclear energy should be accompanied or preceded by a prohibition on the production and use of nuclear weapons. However, their focus at the Statute Conference was not on insisting on a

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with the addition of Brazil, Czechoslovakia, India and the Soviet Union. Supra pp21-22.

44 D. Fischer, *History of the International Atomic Energy Agency: The First Forty Years* (Vienna: IAEA, 1997).

45 McKnight, *Atomic Safeguards- A Study in International Verification* (New York: United Nations Institute for Training and Research, 1971).

46 Ibid.

prohibition of the production or use of nuclear weapons: on the contrary, they chose to focus on the lack of safeguards provisions for nuclear disarmament. "They held that the control proposed (i.e., the IAEA power to establish a safeguards system) did neither affect nor even touch (1) the continuing military programmes of the nuclear-weapon States, (2) the programmes of States with a near potential to manufacture nuclear weapons, and (3) the ability of this last class of States to seek external assistance for their peaceful development programmes while devoting all their indigenous capacity to a military program."[47]

McKnight points out that this discussion contributed in the 1960s to the concept of a "balance of mutual obligation". The adopted IAEA Statute indeed does not include any safeguards provisions for an incident of nuclear disarmament. It was conceded by the Conference that the aim of IAEA safeguards was limited, but that nevertheless they could increase mutual confidence and provide both technical and political experience in the application of disarmament controls.

Since the IAEA was not to be created as a disarmament agency, it seems clear that the objective set forth by Eisenhower's proposals, namely the promotion of nuclear energy, played a distinctive role in determining countries' positions with regard to acceptance of safeguards provisions. The Conference decided to amend the draft statute so as to confer on the Agency power to apply its safeguards system at the request of a State to all or any of that State's activities in the field of nuclear energy[48]. There is only one paragraph in the Agency's statute that mentions explicitly disarmament and it appears not in the Agency's authority stipulated in Article III. A, but in Article III. B. as follows;

"B. In carrying out its functions, the Agency shall:

1. Conduct its activities in accordance with the purposes and principles of the United Nations

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[47] Ibid., p. 23.

[48] Article III A. 5. of the Statute of IAEA stipulates as one of its functions that the Agency is authorized "(T)to establish and administer safeguards designed to ensure that special fissionable and other materials, services, equipment, facilities, and information made available by the Agency or at its request or under its supervision or control are not used in such a way as to further any military purpose; and to apply safeguards, at the request of the parties, to any bilateral or multilateral arrangement, or at the request of a State, to any of that State's activities in the field of atomic energy;".

to promote peace and international co-operation, and in conformity with policies of the United Nations furthering the establishment of safeguarded worldwide disarmament and in conformity with any international agreements entered into pursuant to such policies;"

The word disarmament appears nowhere else in the IAEA statues.

The second aspect McKnight refers to in the context of safeguards provisions is sovereignty. McKnight wrote, "Many States advanced the Soviet argument of 1947 that the safeguards function of IAEA would "lead to interference…. in the most varied fields of the life of a State." One representative declared that safeguards "should not place a State in a position of political, economic or military dependence on other States.".[49] There was an argument that accepting an international obligation always associates with the surrender of sovereignty to some extend, but the problem was to what extent the countries should surrender their sovereignty.

In this sense, the sensitivity of countries' nuclear activities in both commercial and political aspects would have played a key role for them to consider the acceptability of such obligations in the statute. It is also important to note that some countries considered it less of an infringement of sovereignty to be inspected by an international organization than through a bilateral arrangement[50].

In the end, the countries negotiating the IAEA statute came to the conclusion that, notwithstanding adherence to the IAEA statute, countries retain the freedom to choose whether they would request assistance from the IAEA for their nuclear activities, thereby leading to acceptance of the IAEA safeguards. According to Article III A. 5, the agency's safeguards will be applied only "at the request of the parties, to any bilateral or multilateral arrangement, or at the request of a State, to any of that State's activities in the field of atomic energy". [51]

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[49] Allan McKnight, *Atomic Safeguards- A Study in International Verification* (New York: United Nations Institute for Training and Research, 1971), p.24.
[50] Ibid., p.24.
[51] Article III. A 5 of the IAEA Statute.

The third aspect is discrimination. In the negotiations on the Statute, this was not understood as discrimination between nuclear weapon States and non-nuclear weapon States, but as discrimination towards developing countries, as they are to be encouraged to apply for nuclear activities under assistance by the Agency. The argument of developing countries was that safeguards would be applied only to recipient countries, with the developed countries that provide assistance free from any safeguards obligations. In fact, in 1956 most of developed countries received some external assistance in their nuclear activities under bilateral arrangements with developed countries in nuclear applications. The Statue Conference was not able to solve this problem, and it remains a cause of confrontation between developing and developed countries until to date. If we look at this issue with the perspective of reciprocity, the provision of assistance in exchange for the acceptance of safeguards could seem to be a reciprocal arrangement. However, there is a fundamental limitation in the entire design, as the exchange would clearly not function if a country developed a nuclear program without external assistance. This point will be discussed further in this paper.

The fourth aspect McKnight raised is relations with other organs of the United Nations, and especially the relation with the UN Security Council[52].

The role of the UN Security Council was one of the main issues in the UNAEC. There were

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[52] Fisher also points out the importance of involvement of the UN Security Council: David Fischer, *History of the International Atomic Energy Agency: The First Forty Years* (Vienna: IAEA, 1997), pp.36-37;

Article XVI of the IAEA Statue reads as follows:

"ARTICLE XVI: Relationship with other organizations

A. The Board of Governors, with the approval of the General Conference, is authorized to enter into an agreement or agreements establishing an appropriate relationship between the Agency and the United Nations and any other organizations the work of which is related to that of the Agency.

B. The agreement or agreements establishing the relationship of the Agency and the United Nations shall provide for:

1. Submission by the Agency of reports as provided for in sub-paragraphs B- 4 and B- 5 of article III;
2. Consideration by the Agency of resolutions relating to it adopted by the General Assembly or any of the Councils of the United Nations and the submission of reports, when requested, to the appropriate organ of the United Nations on the action taken by the Agency or by its members in accordance with this Statute as a result of such consideration.".

high hopes for the newly established United Nations, and the Security Council was regarded to have the primary responsibility under the United Nations Charter for the maintenance of international peace and security, and for the formulation of plans for a system of regulation of armaments. There was a strong view that this responsibility had not to be undermined by creating any special agency with any independent responsibility for peace and security.

On the other hand, there was also a view that the Agency itself must possess the constitutional power to take immediate action in case of a breach by a State of a safeguards obligation.

The compromise between these two views is embodied in Article III entitled "Functions", Article XVI entitled "Relationship with other organization"[53] as well as Article XII. C entitled "Agency safeguards" [54] of the IAEA Statute. The IAEA is not created as an independent authority from the United Nations as it should act in conformity with the United Nations' policies

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[53] Article III B. 1 and4 of the IAEA Statue reads as follows:

B. In carrying out its functions, the Agency shall:

1. Conduct its activities in accordance with the purposes and principles of the United Nations to promote peace and international co-operation, and in conformity with policies of the United Nations furthering the establishment of safeguarded worldwide disarmament and in conformity with any international agreements entered into pursuant to such policies;

…..

4. Submit reports on its activities annually to the General Assembly of the United Nations and, when appropriate, to the Security Council: if in connection with the activities of the Agency there should arise questions that are within the competence of the Security Council, the Agency shall notify the Security Council, as the organ bearing the main responsibility for the maintenance of international peace and security, and may also take the measures open to it under this Statute, including those provided in paragraph C of Article XII;

[54] Article XII C. of the IAEA Statute reads as follows [emphasis added]:.

C. The staff of inspectors shall also have the responsibility of obtaining and verifying the accounting referred to in sub paragraph A-6 of this article and of determining whether there is compliance with the undertaking referred to in sub paragraph F-4 of article XI, with the measures referred to in sub- paragraph A-2 of this article, and with all other conditions of the project prescribed in the agreement between the Agency and the State or States concerned. The inspectors shall report any non-compliance to the Director General who shall thereupon transmit the report to the Board of Governors. The Board shall call upon the recipient State or States to remedy forthwith any non-compliance which it finds to have occurred. <u>The Board shall report the non-compliance to all members and to the Security Council and General Assembly of the United Nations</u>. In the event of failure of the recipient State or States to take fully corrective action within a reasonable time, the Board may take one or both of the following measures: direct curtailment or suspension of assistance being provided by the Agency or by a member, and call for the return of materials and equipment made available to the recipient member or group of members. The Agency may also, in accordance with article XIX, suspend any non- complying member from the exercise of the privileges and rights of membership.".

and must report to the United Nations. However, it retains the authority to act first in case of non-compliance by a State. As stipulated in Article XII C., the IAEA must report to the UN Security Council in case of non-compliance by a State with its safeguards obligations. How the UN Security Council should react to the report and what kind of actions are expected are not stipulated in the Statute, and the IAEA depends on a UN Security Council decision if it fails to solve a non-compliance case within its mandate stipulated in Article XII C. of the statute. The IAEA has very limited authority to remedy a case of non-compliance, meaning there is a lack of political enforceability. The role and function of UN Security Council with regard to the effectiveness of an international safeguards system will be examined later in Chapter III of this study.

2.2.4. Safeguards provisions in the Statute

The text of the draft Statute prepared by the eight-nation group stipulated in Article II that the IAEA should ensure that the materials it supplied should be used only for peaceful purposes[55]. However, when the twelve-nation group met, the United States put forward much more detailed proposals on safeguards provisions. The safeguards procedures it proposed were modeled on the safeguards prescribed in the numerous nuclear co-operation agreements that the United States was concluding at the time[56]. These safeguards were to become the substance of Article XII of the Statute as it was finally approved. With the United States' encouragement, similar inspection provisions were later included in the Treaty of Rome, which established EURATOM, and in the 1957 Convention of the OECD, under which the OECD's European Nuclear Energy Agency applied safeguards to its own joint enterprises. As a result, the IAEA Statute, the Rome Treaty and the OECD systems use identical or very similar language to describe their safeguards,

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[55] "Article II: Objectives" of the IAEA Statute reads as follows:

> "The Agency shall seek to accelerate and enlarge the contribution of atomic energy to peace, health and prosperity throughout the world. It shall ensure, so far as it is able, that assistance provided by it or at its request or under its supervision or control is not used in such a way as to further any military purpose.

[56] D. Fischer, *History of the International Atomic Energy Agency: The First Forty Years* (Vienna: IAEA, 1997), pp.42-44.

inspection rights and regimes.

For instance, IAEA, EURATOM and OECD inspectors "...shall at all times have access to all places and data and to any person[s] who by reason of his [their] occupation deal[s] with materials, equipment, or facilities" subject to safeguards. On the basis of the United States' proposals, the twelve-nation group decided the detailed procedures of the IAEA safeguards[57].

The IAEA shall also have the authority to require the observance of nuclear safety measures (Article XII.A.2), and the inspectors shall have the authority to determine that the IAEA complied with it own safeguards and safety measures (Article XII.B).

The IAEA Statue stipulates further the procedures of non-compliance cases; the inspectors shall report to the Director General any non-compliance to the Director General who shall thereupon transmit the report to the Board of Governors. If the Board finds that non-compliance has occurred, it shall call upon the State in non-compliance to remedy forthwith. The Board shall also report the non-compliance to all Member States of the IAEA, as well as the Security Council and General Assembly of the United Nations (Article XII.C of the IAEA Statute).

Fischer writes: the Indian delegation soon made clear that it was firmly opposed to extensive safeguards. It sought to defer discussion of safeguards until the IAEA was in operation and was about to conclude agreements with individual governments, at which stage the matter should, in this regard, be treated on a case-by-case basis. India also opposed the application of safeguards to

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[57] These are for example:

-Examine and approve the design of nuclear plants (but solely in order to verify that they would not further any military purpose, would comply with safety standards and would permit the application of safeguards) (Article XII.A.1).

-Require the keeping of operating records (Article XII.A.3).

-Call for and receive reports (Article XII.A.4)

-Approve the means used for reprocessing spent fuel — but solely to ensure that reprocessing did not lend itself to diversion and complied with applicable safety standards — and require the deposit with the IAEA of "special fissionable material" (i.e. plutonium) surplus to that which the State concerned needed for reactors it was operating or constructing (Article XII.A.5).

-Send inspectors to the "recipient" State or States, designated by the IAEA in consultation with the State(s). As noted, the inspectors "shall have access at all times to all places and data and to any person" dealing with nuclear items required to be safeguarded. The inspectors' tasks would be to account for all nuclear material covered by the IAEA's agreement with the State, and verify compliance with the State's undertaking against "furtherance of any military purpose" and with any other conditions prescribed in the agreement with the State (Article XII.A 6). (D. Fischer, *History of the International Atomic Energy Agency: The First Forty Years* (Vienna: IAEA, 1997), pp.42-44.).

source material, in particular to natural uranium. India had some support from France, which likewise opposed safeguards on source materials. French lack of enthusiasm for safeguards reflected their resentment of US efforts during the late 1940s and 1950s to prevent France from developing atomic weapons. The USSR also generally sought to limit the IAEA's responsibilities and the size of the IAEA's budget and to assert the rights of States over those of the IAEA. The United States, supported by the majority of members of the group and, in particular, by the United Kingdom and Canada, successfully resisted most of the attempts to weaken IAEA safeguards, but India was able to introduce a phrase limiting the IAEA's safeguards rights and responsibilities solely to those "relevant to the project or arrangement"[58].

2.3. Development of the IAEA Safeguards After the Establishment of the IAEA

2.3.1. Situation in 1957-1959

After the inauguration of the IAEA in October 1957, however, the agency did not start its work on safeguards immediately. As mentioned above, there were strong concerns among developing countries, especially those countries that had plans to embark on nuclear programmes, regarding safeguards that would impose discrimination between developing and developed countries. Reflecting these concerns, the discussions conducted at the IAEA Board of Governors in the first six months in 1957 were focused only on the agency's budget and staff, and there were even strong reservations about taking up safeguards issues, under the reasoning that these are not core issues for the agency.

In these circumstances, Japan, as one of the countries that had industrial capabilities and aspirations to utilize nuclear energy, decided to request the application of the IAEA safeguards for natural uranium to be imported from Canada. The Japanese decision was based on the conviction that an acceptance of international safeguards would provide assurance for the peaceful nature of its nuclear activities.

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[58] D. Fischer, *History of the International Atomic Energy Agency: The First Forty Years* (Vienna: IAEA, 1997), pp.42-44.

During the period between the "Atoms for Peace" speech and the creation of the IAEA safeguards, the nuclear supplier countries such as the United States, United Kingdom and Canada concluded bilateral arrangements with recipient countries to apply their own safeguards. Japan, however, was the first country to choose international safeguards to be applied to its nuclear activities. It asked the IAEA for three tons of natural uranium in October 1959, subject to the IAEA safeguards. Japan and the IAEA concluded a five page document entitled "Agreement between the International Atomic Energy Agency and the Government of Japan for Assistance by the International Atomic Energy Agency to the Government of Japan in Supplying Uranium for the Research Rector Project JRR-3"[59] on 24th of March 1959, although this agreement includes only one paragraph on the IAEA's safeguards[60].

As it was the first application of the IAEA safeguards, the IAEA reserved its rights and obligations by stipulating in this paragraph that "the details of the application of Agency safeguards shall be determined from time to time by the Board of Governors of the Agency, after consultation by the Director General of the Agency with the Government"[61]. The IAEA stated, in its letter to the Government of Japan on the same date of this agreement, that the safeguards provisions approved by the IAEA Board would be applied to the IAEA's project for Japan.

At the same time, the IAEA also stated that it was still preparing IAEA's general safeguards procedures that would encompass operations of the type safeguarded by the agreement and "pending the adoption of these general procedures the provisions listed below will be applicable in the period prior to the time that the reactor first reaches criticality. If it is found necessary to amend or extend these initial procedures before the general procedures are adopted, the Agency will consult with [the Japanese] Government prior to making such changes."[62]

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[59] IAEA document, INFCIRC/3.
[60] Ibid. Article III.
[61] Ibid. Article III.2
[62] The part of the letter from the Agency to the Government of Japan dated on March 24 1959 contained in INFCIRC/3 reads as follows, "the Agency is now preparing general safeguards procedures which will encompass operations of the type safeguarded by the agreement approving the above-mentioned project. However, pending the adoption of these general procedures the provisions listed below will be applicable in the period prior to the time that the reactor first reaches criticality. If it is found necessary to amend or extend these initial procedures before the

There were concerns among member states on introducing safeguards as ad hoc arrangements without established general procedures. Questions were also raised whether these arrangements were consistent with the IAEA Statute because the measures and procedures set forth in the Japan-IAEA agreement were not specific enough, and there were no limitations agreed to with regard to the rights and responsibility of the IAEA.

The majority of the Board was prepared to approve the agreement with the understanding that it would not be regarded as a precedent. The agreement between Japan and the IAEA and the letter was approved not by consensus, but by sixteen affirmative votes to two negative with four abstentions.

As Fischer and Szasz point out, the safeguards agreement between Japan and the IAEA in March 1959 triggered the first application of IAEA safeguards after the establishment of the IAEA in 1957,[63] and it initiated further discussions among the IAEA Member States to develop a set of rules for future safeguards agreements.

2.3.2. Safeguards documents in 1959-1968

As the discussion on the agreement between Japan and the IAEA shows, the IAEA had not formulated a clear position as to whether it should have general regulations or procedures for safeguards to be applicable to all relevant countries. This changed in June 1959, when the Director General proposed such arrangements to the Board.

The proposals of the Director General were discussed at the Board meetings in 1959 and 1960 and then referred to a working group of seven experts. The working group formulated a draft document based on the Director General proposals, which was discussed at the Board and transmitted to the General Conference in September 1960. After lengthy discussions in the General Conference, the Board again took up this issue in January 1961, and discussed this

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general procedures are adopted, the Agency will consult with your Government prior to making such changes.".

[63] David Fischer and Paul Szasz, *Safeguarding The Atom: A Critical Appraisal* (Stockholm: SIPRI, 1985), p.23.

safeguards document further in eight full meetings before finally adopting it as the first safeguards document, INFCIRC/26, in January 1961.

Based on INFCIRC/26, the IAEA developed its safeguards system through expanding the system's scope to cover nuclear facilities to be placed under the safeguards. The safeguards procedures contained in INFCIRC/26 covers only reactors of less than 100 MWT, whereas the safeguards document INFCIRC/66 adopted in 1965 was designed to cover all types of nuclear reactors. INFCIRC/66 was then developed further including other nuclear facilities than reactors[64].

The work on establishing the IAEA safeguards system reached a certain level of achievement with the adoption of INFCIRC/66/Rev.2 in 1968.

2.3.3. General rules against a case-by-case method

It is worthy to note that in the course of establishing the IAEA safeguards system, there was considerable discussion on whether it should be based on general rules or operate on a case-by-case method. One argument to support a case-by-case approach was Article XII of the IAEA statute, which required safeguards only "to the extent possible" in each case. This involved a consideration of all pertinent circumstances including the level of industrial development in the country concerned, i.e. a case by case approach. On the other hand, others argued that it was impossible for the IAEA to know the all state of economic development in each member state, and that the adoption of general rules was a pre-requisite to the IAEA's function.

The IAEA safeguards system established in 1961-1968 is the result of a compromise of these contradictory positions among the IAEA Member States. There are a number of ambiguities and flexibilities s in INFCIRC/26, INFCIRC66 and its Rev1. and 2. to meet countries' concerns and to increase the political acceptability of the documents.

With the formulation of the safeguards system under the NPT, which started after the entry

64 INFCIRC/66/Rev.1 included reprocessing facilities as subject to the safeguards and INFCIRC/66/Rev2. conversion and fabrication facilities.

into force of the NPT, this general rules against case-by-case methods discussion became more relevant to consider the nature and possible limitations of the current IAEA safeguards system.

2.4. Conclusion

With the establishment of the IAEA in 1957, the international community moved from a focus on controlling nuclear energy to its promotion, with certain restrictions. The successful possession of nuclear weapons by the Soviet Union in 1949, and the joining of that country with the United States in the nuclear "haves" club, removed the main stumbling block to the establishment of a reciprocity-based system of control. This was one of the key elements that led to this transformation in the idea of international control, enabling the establishment of the IAEA.

Also, the negotiations of the IAEA Statute, especially those on the safeguards related articles, raised the question, among others, of the sovereignty of countries that will be placed under the safeguards; in other words the political acceptability of the countries that have to accept safeguards as a means of control of uses of nuclear energy. As examined in this Section, this political acceptability issue was solved to some extent in the course of negotiations of the IAEA Statute by stipulating the right of countries to choose whether they would accept safeguards by requesting assistance from the IAEA for its nuclear activities. It created a framework in which only those countries that wish to request assistance from the IAEA for their nuclear activities are obligated to accept IAEA safeguards. It is worth noting that this created also a certain measure of reciprocity between the countries that accept safeguards on the one hand, and those actors (including countries and the IAEA) that provide assistance on the other.

Based on this framework, countries started to embark on their nuclear energy programs, and the IAEA developed its safeguards system through its relevant safeguard documents in 1959-1968.

Despite these new developments, only a limited number of countries had nuclear energy programs at that time. In addition, the IAEA was a newly established agency with no technical

experience in nuclear safeguards, meaning it required time to try to find the best way to go forward by seeking compromises to meet countries' concerns and to increase the political acceptability of the IAEA safeguards, as the discussions on and developments of its safeguards documents indicate.

The political acceptability of the safeguards by recipient countries, and certain flexibility on the part of the IAEA to obtain such acceptability, as well as the reciprocity noted above, should be regarded as the key elements required to develop the IAEA safeguards system.

Section 3

ESTABLISHMENT OF THE NPT REGIME AND THE IAEA NPT SAFEGARDS

3.1. Introduction

As the discussion regarding the necessity of general rules as opposed to a case-by-case approach within the IAEA safeguards system reveals, the IAEA safeguards system established in 1961-1968 was the result of a compromise among the IAEA Member States. There are a number of ambiguities and flexibilities to implement IAEA safeguards to meet countries' concerns, and to increase political acceptability of the documents.

In this context, this Section will review the history and the background of the establishment of the NPT, which is regarded as the cornerstone of the current international nuclear non-proliferation regime, and the IAEA NPT safeguards, which was established based on the NPT. It will examine the nature of the IAEA NPT safeguards as well as the problems of the current discussion on their strengthening.

3.2. Establishment of the NPT Regime

Based on Eisenhower's speech, the IAEA was established in1957, after extensive preparations and negotiations on its Statute over a three years period. The IAEA Statute stipulates the objectives of the organization as to "seek to accelerate and enlarge the contribution of atomic energy to peace, health and prosperity throughout the world. [The agency] shall ensure, so far as it is able, that assistance provided by it or at its request or under its supervision or control is not used in such a way to further any military purpose."[65]. Nevertheless, as Fisher notes[66], it was politically impracticable for the IAEA to begin its work on some of the main tasks foreseen in the Statute until the United States and the Soviet Union started to engage in nuclear arms control subsequent to the 1962 Cuban Missile Crisis.

Meanwhile, France succeeded in acquiring nuclear weapons in 1960, as did China in 1964.

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[65] Article II: Objectives of the IAEA Statute.
[66] David Fischer, *History of the International Atomic Energy Agency: The First Forty Years* (Vienna: IAEA, 1997), p.1.

Other countries were also embarking on nuclear programs. Japan started a nuclear research program in 1954. Using US technology, Japan started operating its first commercial nuclear power plant in 1966. In total, Canada, West Germany, Sweden, Italy, Switzerland, Belgium, the Netherlands, India, Israel and Japan started developing nuclear programs in the 1960s.

The NPT was drafted during a time when policy makers, in particular in the Western bloc, were concerned about the potential spread of countries acquiring nuclear weapons. US President John F. Kennedy predicted that there would be 15-25 nuclear weapon states – a scenario which was clearly fraught with pitfalls for international security[67]. The primary objective of the NPT was to consolidate the nuclear club at that time, and to limit the number of nuclear weapon states; in other words to prevent states had not yet developed nuclear weapons from doing so[68]. It is obvious that there was a strong element of self-interest at this time; the fewer countries that acquire the ultimate weapon, the easier the current countries could monopolize this power. At the same time, it is difficult to argue that the drafters were not correct that more countries with nuclear weapons would lead to global instability and, possibly, nuclear destruction. The sheer power of nuclear weapons, utterly unprecedented in the history of mankind, demanded that an international system be put in place to control, even restrict them.

In 1961, an Irish resolution was adopted at the UN General Assembly stating that countries already having nuclear weapons should undertake to refrain from relinquishing control of those weapons to others, and should refrain from transmitting information for the manufacture of such weapons to States not possessing them. Based on this resolution, the United States submitted a draft treaty at the18-nation Disarmament Commission in Geneva in 1962. Negotiations to finalize the text of the treaty were conducted mainly between the United States and the Soviet

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[67] President Kennedy stated at the President news conference on March 21, 1963, that "with all of the history of war, and the human race's history unfortunately has been a good deal more war than peace, with nuclear weapons distributed all through the world, and available, and the strong reluctance of any people to accept defeat, I see the possibility in the 1970s of the President of the United States having to face a world in which 15 or 20 or 25 nations may have these weapons."[emphasis added], http://www.presidency.ucsb.edu/ws/?pid=9124.

[68] Mitsuru Kurosawa, *Gunshukukokusaiho no Atarashii Shiza (International Disarmament Law: A New Framework)* (Tokyo: Yushindo, 1986), pp.35-39.

Union, to meet their concerns and their interests – and as noted above, it was clear from the outset that the main objective of the treaty would be to prevent new countries from acquiring nuclear weapons.

The NPT was adopted at the United Nations in 1968, and entered into force in 1970. In the meantime, Israel is believed to have conducted a nuclear test in1969, though the country has to this day not confirmed that it has conducted any such tests, or that it possesses nuclear weapons. In Japan, extensive domestic discussions were undertaken whether it should ratify the Treaty. The first commercial light water reactor in Japan started its operation in 1970. Japan signed the Treaty in the same year, but took six years to ratify it. In 1974, India, which remains non-party to the Treaty to date, conducted its first nuclear test.

With this aim of preventing what are often called "horizontal spreads" in mind, the NPT created the classification of "nuclear weapon states" and "non-nuclear weapon states" in the Treaty, stipulating different obligations between these "haves" and "have-nots". Under the NPT, nuclear weapon states are defined as those who had manufactured and exploded a nuclear weapon or other nuclear explosive device prior to January 1, 1967. There were only five countries that met those criteria: the United States, the Soviet Union, the United Kingdom, France, and China - although, as noted above, France and China did not join the NPT until the early 1990s.

The NPT obligates these "nuclear weapon States" not "to transfer to any recipient whatsoever nuclear weapons or other nuclear explosive devices or control over such weapons or explosive devices directly, or indirectly; and not in any way to assist, encourage, or induce any non-nuclear-weapon State to manufacture or otherwise acquire nuclear weapons or other nuclear explosive devices, or control over such weapons or explosive devices" (Article I). On the other hand from non-nuclear weapon states, the Treaty requires "not to receive [any] transfer ... of nuclear weapons or other nuclear explosive devices or of control over such weapons or explosive devices directly, or indirectly; not to manufacture or otherwise acquire nuclear weapons or other nuclear explosive devices; and not to seek or receive any assistance in the manufacture of nuclear weapons or other nuclear explosive devices." (Article II) and to accept safeguards, "as set forth in

an agreement to be negotiated and concluded with the International Atomic Energy Agency in accordance with the Statute of the International Atomic Energy Agency and the Agency's safeguards system, …" (Article III. 1.)[69].

The Treaty does not require any safeguards from nuclear weapon States.

3.3. Development of the IAEA NPT Safeguards in1970-1995

Until the NPT was formulated, the IAEA had been applying its safeguards only based on respective safeguards agreements with the limited number of countries that had peaceful nuclear programs. After the entry into force of the NPT in 1970, however, a large number of countries were expected to accede the Treaty, and thereby the IAEA was required to formulate a different type of safeguards than the individual respective safeguards arrangements.

As all non-nuclear weapon states Parties to the Treaty are obliged to accept safeguards stipulated in the Treaty, such safeguards needed to be an agreement that was unified and non-discriminatory. Otherwise it would not have been acceptable for the non-nuclear weapon states Parties to the Treaty[70]. In addition, as the NPT was designed as a universal treaty, more than 100 countries were expected to accede to the Treaty, including not only industrialized countries but also developing ones with no nuclear activities.

Furthermore, Article III of the NPT stipulates that the safeguards required by this Article shall be applied on all source or special fissionable material in all peaceful nuclear activities

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[69] The full text of Article III 1 of the NPT reads as follows:

"Article III 1. Each Non-nuclear-weapon State Party to the Treaty undertakes to accept safeguards, as set forth in an agreement to be negotiated and concluded with the International Atomic Energy Agency in accordance with the Statute of the International Atomic Energy Agency and the Agency's safeguards system, for the exclusive purpose of verification of the fulfillment of its obligations assumed under this Treaty with a view to preventing diversion of nuclear energy from peaceful uses to nuclear weapons or other nuclear explosive devices. Procedures for the safeguards required by this Article shall be followed with respect to source or special fissionable material whether it is being produced, processed or used in any principal nuclear facility or is outside any such facility. The safeguards required by this Article shall be applied on all source or special fissionable material in all peaceful nuclear activities within the territory of such State, under its jurisdiction, or carried out under its control anywhere. ".

[70] Mohamed I. Shaker, *The Nuclear Non-Proliferation Treaty – Origin and Implementation* (London, Rome, New York: OCEANA Publications, 1980), Volume II, Part 5, Principle (d), Chapter 10: "International Safeguards: Article III"), p.746.

within the territory of non-nuclear weapon states Parties to the Treaty. This indicates that the area covered by, and hence the demand for, IAEA safeguards was to be dramatically expanded. For that, the IAEA NPT safeguards needed to be not only non-discriminatory and unified, but also as cost-effective as possible.

Based on these understandings, the document "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))[71], the so called IAEA Comprehensive Safeguards Agreement (CSA), was formulated by the IAEA in June 1972. The CSA provides a template for safeguards agreements for non-nuclear weapon states Parties to the Treaty, to conclude with the IAEA.

In order to meet the requirement to be as cost-effective as possible, the CSA was designed to verify the correctness and completeness of declarations of countries using material accountancy and containment as its main tools. These have been accepted by the international community as the main methods for verification since the 1970s.

This safeguards system, however, faced a major obstacle in the 1990s when it was revealed that Iraq, a State Party to the NPT with the IAEA NPT safeguards in place, had conducted undeclared nuclear activities. In other words, the IAEA had failed to detect undeclared nuclear activities even with the IAEA NPT safeguards system.

In light of these circumstances, the international community attempted to overcome these challenges by building additional measures founded on the existing IAEA safeguards system. The Model Additional Protocol to the CSA (INFCIRC/540) [72], which expands the IAEA's authority to access relevant locations and to obtain relevant information in a country under the safeguards agreement, was introduced to this end in 1995. Prominent scholars and experts continue to discuss and propose measures to strengthen the current IAEA safeguards system based on the

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[71] IAEA Document, "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).

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

CSA[73].

Since 1991, the IAEA General Conference, the IAEA's supreme policy-making body, has adopted resolutions on strengthening the IAEA safeguards system every year[74]. It has also been an essential subject at the NPT Review Process since 1995. In particular, the 2000 NPT Review Conference has addressed the importance of the IAEA as the competent authority for the international safeguards system, and the strengthening of the IAEA safeguards has been mentioned in its Final Document, adopted by consensus of the Parties to the Treaty[75].

As such, strengthening of the IAEA safeguards system has been regarded as one of the main tasks of the international community to overcome nuclear proliferation challenges and prevent cases such as Iraq and North Korea.

3.4. CONCLUSION

It is clear that the Treaty is discriminatory, in the sense that some states are given privileges over others. The position of the "haves" is solidified, with all "have-nots" barred from approaching the "haves" status. It is thus remarkable that a considerable number of countries, including those who already had nuclear technology with potential nuclear weapons capability, such as Japan, West Germany and Italy, accepted these obligations, and renounced the possibility to acquire nuclear weapons by acceding to the Treaty. The reality of global politics is that states do

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[73] Such as David Sloss, "It's Not Broken, So Don't Fix it: The International Atomic Energy Agency Safeguards System and the Nuclear Nonproliferation Treaty," *Virginia Journal of International Law*, Vol. 35, No.4, Summer 1995, pp.841-893; Richard Hooper, "Strengthening IAEA Safeguard in an Era of Nuclear Cooperation," *Arms Control Today*, November 1995, pp.14-18; David Fischer, "New Directions and Tools for Strengthening IAEA Safeguards," *The Nonproliferation Review,* Winter, 1996, pp.69-76.

[74] Except in 2011. The IAEA General Conference failed to adopt the traditional safeguards resolution in this year by vote. It only adopted two specific safeguards resolutions which covers only certain countries or region; "Application of IAEA safeguards in the Middle East", IAEA Document, GC (55)/23, and "Implementation of the NPT safeguards agreement between the Agency and the Democratic People's Republic of Korea", IAEA Document, GC (55)/24. The first resolution entitled Strengthening of the Safeguards System, GC (35)/RES/559, was adopted at the 35 IAEA General Conference on 22 September 1991.

[75] Final Document of the 2000 Review Conference of the Parties to the Treaty on the Non-proliferation of Nuclear Weapons, NPT/CONF.2000/28 (Part I and II), Article III and fourth and fifth preambular paragraphs, especially in their relationship to article IV and the sixth and seventh preambular paragraphs.

not readily take actions if they are not convinced that action is not in their best interests. National security, and the ability to obtain what would seem to be the ultimate tool to ensure that security, is decidedly the supreme interest of any state.

Based on the NPT, non-nuclear weapon states parties to the Treaty are legally obligated to accept the IAEA NPT safeguards. In order to make this legal obligation as widely acceptable as possible, the CSA was designed to be non-discriminatory, objective, and as cost-effective as possible, and these elements characterize the current IAEA safeguards system.

Section 4

STRENGTHNING THE IAEA NPT SAFEGUARDS SYSTEM

4.1 Introduction

If we closely look at the discussions on the State-level Concept undertaken within the IAEA from June 2012 to September 2014, we can see that the fundamental question raised by the IAEA Member States is not whether the IAEA has the legal authority to verify the absence of undeclared nuclear material and activities, but what the IAEA can do as the safeguards measures and how it should draw the safeguards conclusion.

The lack of trust in the IAEA Secretariat on the part of some IAEA Member States stems not from any misunderstanding, nor any lack of efforts by the secretariat to explain its new approach on safeguards implementation. Rather, there is a fundamental difference between what these Member States expect from the IAEA as an international organization, and what the secretariat and some other Member States believe its competence extends to.

Efforts to strengthen the IAEA safeguards from the 1990s to date have always resulted in the same confrontation: while most Member States wish to contain the power of the IAEA and maintain their own sovereignty as far as possible, some member states, together with the IAEA Secretariat, wish to expand the competence of the IAEA in the area of safeguards.

In this Section, this confrontation since the early 1990s will be discussed and the current situation will be examined by taking the most recent and confrontational discussions on the State-level Concept as an example.

4.2. Strengthening the Effectiveness and Efficiency of the IAEA Safeguards

"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(Corr.) formulated in 1972 by the Safeguards Committee established under the IAEA Board of Governors, has served as the basis for comprehensive safeguards agreements in the international

community.[76]

As examined in the Section 1 of this Chapter, the NPT comprehensive safeguards system is developed to be as objective and as non-discriminatory as possible. It is based on material accountancy of declared nuclear material at declared facilities, thus its features are regarded as quantitative. Its primary objective is to give assurance that there is no diversion of declared nuclear material from peaceful nuclear activities.

This internationally established safeguards system faced an unexpected challenge in the early 1990s, when the international community discovered undeclared nuclear activities in Iraq. The IAEA had failed to detect undeclared nuclear activities in that country, despite operating the comprehensive safeguards system.

The case of Iraq revealed that there are flaws in the existing IAEA safeguards system. Most notably, the failure of the IAEA to detect undeclared nuclear material and nuclear activities, and its failure to impose a Special Inspection in case of non-compliance initiated the debate how to modify the system to meet these inabilities[77].

The Director General of the IAEA proposed the so called 93+2 Plan to strengthen the IAEA safeguards system in 1993 and the IAEA Board approved the text of a "Model Protocol Additional to the Agreement(s) between State(s) and the International Atomic Energy Agency for the Application of Safeguards" (INFCIRC/540 (Corr.))[78], referred to as the Model Additional Protocol. This additional instrument was intended to increase the IAEA's capability, especially with regard to providing credible assurance that there is no undeclared nuclear material or activities, by introducing new measures to obtain more information and access under safeguards agreements

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[76] It serves not only as the basis for the comprehensive safeguards agreements under the NPT but also those under the Nuclear Weapons Free Zone such as the Tlatelolco Treaty.

[77] Richard Hooper, "Strengthening IAEA Safeguard in an Era of Nuclear Cooperation," *Arms Control Today*, November 1995, pp.14-18; David Fischer, "New Directions and Tools for Strengthening IAEA Safeguards," *The Nonproliferation Review,* Winter 1996, pp.69-76; John Carlson, Victor Bragin, John Bardsley, and John Hill, "Nuclear Safeguards As an Evolutionary System," *The Nonproliferation Review*, Winter 1999, pp.109-117; Victor Bragin, John Carlson, and Russel Leslie, "Integrated Safeguards: Status and Trends," *The Nonproliferation Review*, Summer 2001, pp.102-110; Theodor Hirsch, "The IAEA Additional Protocol: What It Is and Why It Matters," *The Nonproliferation Review*, Fall-Winter 2004, pp.140-163.

[78] IAEA Document, INFCIRC/540 (Corr.), https://www.iaea.org/sites/default/files/infcirc540c.pdf.

with States.

After introducing the Model Additional Protocol, the IAEA has examined how to improve the efficiency of the safeguards system, as the new instrument has created the need for more resources, as well as some redundancies between the past practices and new measures.

For this purpose the "Integrated Safeguards" were developed by the Secretariat and introduced to those States that have both a comprehensive safeguards agreement and an additional protocol in force. The main objective of the Integrated Safeguards is to reduce the unnecessary costs of the safeguards implementation, and increasing the efficiency of the safeguards without reducing its effectiveness[79].

However, the Integrated Safeguards first introduced differentiation among the NPT non-nuclear weapons State Parties with regard to implementation of safeguards, making it the crucial turning point where the IAEA started to move from its traditional safeguards system to a new and controversial safeguards system. Under the Integrated Safeguards, the Secretariat decides and implements safeguards measures under the assumption that there is no undeclared nuclear material and activities in a State. Safeguard measures of a State without Integrated Safeguards are decided and implemented under the assumption that there *might* be undeclared nuclear material or activities. This naturally created discrepancies between the Member States with regard to the safeguard implementation. However, it did not cause any confrontation among the Member States until very recently, when the State-level approach developed by the Secretariat drew criticism from some Member States in 2012.

4.3. State-level Concept (SLC)

The State-level Concept is a concept the IAEA Secretariat has been trying to develop under

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[79] The secretariat explains it as a safeguards approach and implementation plan tailor made for a State. See: IAEA document, "Background on IAEA Board of Governors' Approval of Framework for Integrated Safeguards," https://www.iaea.org/newscenter/news/background-iaea-board-governors-approval-framework-integrated-safeguards.

the Integrated Safeguards since 2002[80], in order to further strengthen the implementation of the IAEA safeguards. The term "State-level" stems from the idea that the nuclear activities in a country should be examined not at each facility level, but at the level of the state as a whole. The traditional concept of the IAEA safeguards was to focus on each facility and decide what kinds of safeguards measures should be applied to each facility in accordance mainly with its type and specification. For example, if it is a nuclear power plant, there are specific measures prescribed to apply, and there was no difference which state owns that facility. The safeguards measures are already pre-determined according to the types of facilities, with clear objective criteria. The Secretariat evaluates the results of the safeguards applied to each facility and draws a conclusion as to whether there is any diversion of nuclear material in a state.

With the State-level Concept, there are no pre-determined safeguards measures by types of facilities. The Secretariat evaluates first the status of a State by examining the State's nuclear activities and their status as a whole, and then determines what kinds of concrete safeguards measures should be applied to each facility. There would therefore be different safeguards measures applied, depending on what kinds of nuclear activities the State is engaged in. State specific factors are regarded as essential to design such safeguards measures.

Although the Secretariat already started the consideration of this concept in 2002, this issue had not received much attention by the Member States until the Secretariat highlighted it in the Safeguards Implementation Report for 2011[81], presented to the Member States in June 2012. The description of "Safeguards Implementation Report for 2011" triggered discussions on the SLC among and between the Member States and the Secretariat. It has become one of the main issues within the IAEA throughout the years since then.

As the deliberations at the IAEA Board of Governors meetings in 2012-2014 are not made

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[80] IAEA Document, *IAEA Annual Report for 2002*, p.67, https://www.iaea.org/sites/default/files/anrep2002_full.pdf; IAEA Document, *IAEA Safeguards Serving Nuclear Non-Proliferation*, p.11, https://www.iaea.org/sites/default/files/safeguards_web_june_2015.pdf.

[81] IAEA Document, *Safeguards Statement for 2011*, https://www.iaea.org/sites/default/files/es2011.pdf.

public, we can only examine those of the General Conference to understand what kind of discussions have been undertaken between the Member States and the Secretariat.

The IAEA General Conference, which is held on an annual basis, adopts a number of resolutions every year. One of the traditional resolutions the General Conference has been adopting is the so-called Safeguards resolution.

At the 56th General Conference held in September 2012, when the State-level concept first became a topic o debate among the Member States, the representative of the Russian Federation stated that "his country was of the view that the safeguards evaluation of States should take into account the technical parameters of their nuclear programmes. Unfortunately, however, the notion of a State-level approach to safeguards appeared to be increasingly infused with political considerations. In-depth discussions were needed in order to clarify the State- level safeguards concept."[82]

The Representative of Brazil stated also that "…like the representative of the Russian Federation, his delegation would be interested to learn the meaning of 'the State-level concept' in paragraph (l). Perhaps the Secretariat could prepare an information document on the evolution over time of 'the State-level concept' for consideration by the Board of Governors."[83]

After lengthy discussion, the 56th General Conference adopted a resolution GC (56)/RES/13 entitled "Strengthening the effectiveness and improving the efficiency of the safeguards system and application of the Model Additional Protocol"[84]. In this resolution there are two paragraphs devoted to the SLC[85]. One of these, paragraph 20, supports the Secretariat in continuing to use the State-level approach, whereas the other, paragraph 21, requests the Secretariat to report to the Board of Governors on the conceptualization and development of the State-level concept for safeguards[86]. This indicates that the Member States could not reach agreement to take other

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82 IAEA Document, GC (56)/COM.5/OR.2 , 18 September 2012, https://www.iaea.org/About/Policy/GC/GC56/GC56Com5Records/English/gc56com5or-2_en.pdf.
83 Ibid.
84 IAEA Document, GC (56)/RES/13, 21 September 2012, https://www.iaea.org/About/Policy/GC/GC56/GC56Resolutions/English/gc56res-13_en.pdf.
85 Ibid.
86 Ibid., Paragraphs 20 and 21 of the resolution read as follows:

actions other than to defer the issue to the next General Conference.

Based on this resolution, the Director General of the IAEA presented a report on the "Conceptualization and Development of Safeguards Implementation at the State level"(GOV/2013/38) to the Member States for their consideration at the 57th General Conference in 2013.

The deliberations at the 57th General Conference in September 2013 again revealed what the main concerns of Member States were.

The representative of the Russian Federation for instance stated that "the problem with the so-called State-level concept stemmed from the fact that the Secretariat, without any consultations with Member States, kept construing texts in a manner favorable to itself, drafting new plans and introducing new mechanisms. The Secretariat should be controlled more strictly by the Agency's policy-making organs, and primarily by the Board"[87].

The Russian Federation, supported by some other Member States, especially from some NAM countries, has insisted that the IAEA Policy Making Organs, namely the General Conference and the Board of Governors, must be involved in any decisions for formalization of the SLC.

Nevertheless, the 57th General Conference also succeeded to adopt a safeguards resolution entitled "Strengthening the Effectiveness and Improving the Efficiency of Agency Safeguards (GC (57)/RES/13)"[88]. In paragraph 21 of the resolution, the conference "notes the Director General's report to the Board of Governors in September 2013 on the Conceptualization and Development of Safeguards Implementation at the State level, and also notes that the Director General will

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"20. Urges the Secretariat to continue to improve the effectiveness and efficiency of safeguards through the use of a State-level approach in the planning, implementation and evaluation of safeguards activities, in conformity with the relevant safeguards agreement(s) in force for a State, and in this context welcomes that, as of 20 September 2012, the Agency is implementing State-level integrated safeguards approaches for 53 States;

21. Requests the Secretariat to report to the Board of Governors on the conceptualization and development of the State-level concept for safeguards;".

[87] IAEA Document, GC (57)/COM.5/OR.7, https://www.iaea.org/About/Policy/GC/GC57/GC57Com5Records/English/gc57com5or-7_en.pdf.

[88] IAEA Document, GC (57)/RES/13, https://www.iaea.org/About/Policy/GC/GC57/GC57Resolutions/English/gc57res-13_en.pdf.

produce, after consulting with Member States, a supplementary document for consideration and action by the Board of Governors before the fifty-eighth (2014) session of the General Conference, providing further clarification and information to address questions and issues raised;". This was again a deference of a decision on the SLC to the next year.

Claiming that the concerns and questions raised by IAEA Member States with regards to the State-level Concept (SLC) presented by the IAEA Director General are mainly related to the legal competence of the IAEA, Rockwood, the former section head for nonproliferation and policy making in the Office of Legal Affairs of the IAEA, warns in her analysis that questioning the existing legal competence of the IAEA would mean to challenge the authority of the IAEA and that it would undermine the implementation of the IAEA safeguards significantly.[89]

The discussions on the SLC have been undertaken between the IAEA Secretariat and the Member States in a formal and an informal manner since June 2012. The issue on the legal authority of the IAEA to verify "the correctness and completeness", which Rockwood believes is a core issue of the SLC, has been also discussed. However, this issue, the IAEA's legal authority to verify "the correctness and completeness", represents only one of the problems that Member States have regarding the SLC. Treating it as if it were a fundamental issue could lead to a distortion of the real problems with the SLC.

Rockwood also emphasizes that learning the history of safeguards is essential for effective safeguards and their further evolution[90]. Yet, once again the main point Rockwood makes is regarding the legal authority of the IAEA to verify the correctness and completeness; other fundamental questions are almost ignored. It is indeed essential to learn the history of the IAEA safeguards, however, this should not be limited only to the IAEA's legal authority to verify the correctness and completeness. Rather, as Shaker has rightly done, there should be a

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89 Laura Rockwood, "The IAEA's State-level Concept and the Law of Unintended Consequence," *Arms Control Today*, September 2014, pp.25-30.

90 "The biggest challenge to effective safeguards and their future evaluation are not technical. They are a lack of knowledge about the history of safeguards and a misrepresentation of the history that capitalizes on that lack of knowledge. It is possible to correct the former and to limit the impact of the latter through education and communication raising the level of history of their evolution." Ibid., pp.29-30.

comprehensive understanding on the purpose of the IAEA and the history of the negotiations on the establishment of the agency as well as its development to date. Only through this can the real problems of the SLC, the concerns of the Member States, and eventually whether such concerns are legitimate be understood and evaluated. This point will become clear if we look at the content of the resolution adopted at the IAEA General Conference after lengthy discussions and negotiations in September 2014.

Titled "Strengthening the Effectiveness and Improving the Efficiency of Agency's Safeguards" at the GC's 58th session on 26 of September 2014[91], this resolution covers almost all aspects of strengthening the effectiveness and efficiency of the IAEA safeguards and devotes seven out of 37 operative paragraphs to the SLC. If we look at these seven paragraphs, we can better understand what the Member States' main concerns are. In particular, paragraph 24 of the resolution reflects the Member States' concerns, and is formulated in a way so as to state what the SLC should *not* be, by reiterating the statements made by the Director General and the Secretariat[92].

Furthermore, in the paragraph 25 of the resolution, the Member States note that "the development and implementation of State-level approaches requires close consultation and coordination with the State and/or regional authorities, and agreement by the State concerned on practical arrangements for effective implementation of all safeguards measures identified for use

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91 IAEA Document, GC (58)/RES/14.

92 Ibid., paragraph 24 of the resolution GC(58)/RES/24 reads as follows [emphasis added]:

- The State-level concept (SLC) does not, and will not, entail the introduction of any additional rights or obligations on the part of either States or the Agency, nor does it involve any modification in the interpretation of existing rights and obligations;
- The SLC is applicable to all States, but strictly within the scope of each individual State's safeguards agreement(s);
- The SLC is not a substitute for the Additional Protocol and is not designed as a means for the Agency to obtain from a State without an Additional Protocol the information and access provided for in the Additional Protocol;
- The development and implementation of State-level approaches requires close consultation with the State and/or regional authority, particularly in the implementation of in-field safeguards measures;
- Safeguards-relevant information is only used for the purpose of safeguards implementation pursuant to the safeguards agreement in force with a particular State – and not beyond it;.

in the field if not already in place"[93].

Prior to the 58th General Conference in 2014, the Secretariat of the IAEA prepared and presented a second report, as well as a complementary document on the concept of the SLC, to the IAEA Member States. The total volume of this report with the complementary document exceeds 40 pages. The Secretariat also arranged a number of informal and formal meetings with the Member States to explain and obtain understandings of the Member States on the SLC. However, as we can see in the above-mentioned paragraphs of the resolution, the concerns of majority of the Member States have still remained, and they are not limited only to the IAEA's competence to verify the correctness and completeness. Their concerns are more about general and broader rights and obligations of the IAEA.

In this sense, it is a tremendous victory for the Member States who were especially concerned about the SLC to have paragraph 25 included in the resolution, which requires an agreement by the State concerned for the Secretariat to impose new arrangements in the implementation of all safeguards measures. This paragraph made it very clear that whatever the Secretariat intends to do in the name of the SLC, it cannot do it without the agreement of that Member State.

The discussions between the Secretariat and the Member States on the SLC in the period of June 2012 to September 2014 and the outcome thereof reveal the general mistrust of Member States in the Secretariat's attempt to reform implementation of the safeguards – even though the Secretariat is authorized to do that, and in particular to draw safeguards conclusions.

For example, in the deliberations on this issue at the 58th General Conference, the representative of the Russian Federation stated that "nuclear material accountancy and its verification in the field should remain at the core of safeguards implementation and should continue to be the primary basis for drawing conclusions; … The paragraph highlighted a key principle that had come up in multilateral discussions concerning safeguards earlier in the year and in the Director General's report on reforming safeguards. Therefore, it made sense to reflect

[93] Ibid., paragraph 25.

that principle in a resolution of the General Conference"[94]. The representative of Brazil also stated that his delegation "wished to propose a new paragraph 4 bis, based on the discussions of the Supplementary Document to the Report on The Conceptualization and Development of Safeguards Implementation at the State Level (GOV/2013/38) set out in document GOV/2014/41.

The new paragraph would read: "Stresses further the importance of the Secretariat implementing safeguards in strict accordance with the scope and the respective rights and obligations under the relevant safeguards agreements concluded by the Agency with individual States". Argentina expressed support for the proposal made by Brazil for a new paragraph as it emphasized the need for the Agency to respect safeguards agreements signed by Member States.

There were, however, opposing views expressed by other Member States. In response to these interventions, Australia stated that the proposal made by the representative of the Russian Federation for a new paragraph 2 bis was not acceptable to his delegation as it was wrong to suggest that nuclear material accountancy was the primary basis for drawing conclusions on safeguards. With regard to the proposal made by the representative of Brazil for a new paragraph 4 bis, he said that the proposed wording appeared to be critical of the Agency and suggest that it would not otherwise be working within its rights and obligations[95]. Canada agreed with the concerns expressed by the representative of Australia with regard to the wording of the proposed paragraph 2 bis."[96]. It is especially worthy to note these references as they clearly show there are fundamental differences in understanding among some Member States with regard to the SLC.

In the course of the discussions, the Russian Federation further proposed a new paragraph 21 bis, reading: "[the GC] stresses that the implementation of safeguards in the context of the SLC should not entail the introduction of any additional rights or obligations on the part of either States or the Agency, nor any modification in the interpretation of existing rights and obligations

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94 IAEA Document, GC (58)/COM.5/OR.4, https://www.iaea.org/About/Policy/GC/GC58/GC58Com5Records/English/gc58com5or-4_en.pdf.
95 IAEA Document, GC (58)/COM.5/OR.4, https://www.iaea.org/About/Policy/GC/GC58/GC58Com5Records/English/gc58com5or-4_en.pdf.
96 Ibid.

under safeguards agreements and, where applicable, additional protocols"[97]. South Africa also stated that "the concept would not entail the introduction of any additional rights and obligations in the implementation of safeguards and the Agency would continue to take a technical and objective approach. Moreover, it would be applicable to all States strictly within the scope of their safeguards agreements. When developing and implementing the State-level concept for a given State, the Agency would consult with the State or regional authorities on the implementation of measures in the field. While it was important to proceed on the basis of those assurances, his delegation was ready to work with others on refining the language"[98].

In the end, these Member States prevailed by inserting the paragraph 25 into the resolution, which requires an agreement with the State concerned to impose new arrangements in the implementation of all safeguards measures.

4.4. Conclusion

What can be understood from these statements is that the lack of consistent and convincing explanations from the Secretariat was not the main reason of the concerns of some Member States on the SLC. It was rather the lack of trust in the attempts of the Secretariat on the part of Member States.

They are concerned because they noticed the attempt of the Secretariat to transform the traditional quantitative safeguards based on material accountancy to qualitative safeguards through introducing new criteria and methods, which are likely neither objective nor non-discriminatory. They seem to be aware of the implication of the consequence of such attempt, which might change the nature of the IAEA NPT safeguards from those have been acceptable for the Member States.

The lack of objectivity and the discriminatory nature of the SLC, regarding which many Member States expressed their concern, represent the fundamental questions about the nature of

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[97] Ibid.
[98] Ibid.

the IAEA NPT safeguards and the IAEA safeguards system.

As Shaker points out, because the international safeguards under the NPT are expected to be applied to an unprecedented number of States or groups of States with different political and economic systems, it must be universal and comprehensive, and therefore formalized, objective and rational[99].

He further writes that "The system must be formalized in order to help eliminate the inherent open-endedness of an inspection process: … The system must be objective in order to leave as little room as possible for subjective feelings on the part of the State or the authority. Predetermined terms of communication between the two are therefore also necessary. Finally the system must be rational because of the overwhelmingly large size of the safeguards task."[100]

In this sense, the words "strengthen safeguards" which Rockwood repeatedly uses in her paper, are not accurate to express the objective of many Member States and may be even misleading. As it can be seen in the titles of the safeguards resolutions that have been adopted at the past IAEA General Conferences, what needs to be strengthened for the majority of the Member States is not the safeguards per se, but rather "the effectiveness and efficiency" of the safeguards system.

Shaker's comments are worthwhile to note in this regard: "There is almost unanimity among scientists that no system of safeguards is fool-proof in detecting diversion of nuclear material from peaceful to military activities. Moreover, the cost of raising the probability of detections is very high in proportion to the extra level of confidence gained from it."[101]

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[99] Mohamed I. Shaker, *The Nuclear Non-Proliferation Treaty – Origin and Implementation* (London, Rome, New York: OCEANA Publications, 1980), Volume II, Part 5, Principle (d), Chapter 10: "International Safeguards: Article III"), p.746.
[100] Ibid. p.746.
[101] Ibid., pp.765-766.

Section 5

CONCLUSION

Through reviewing the origin of the idea of international control of nuclear energy after the World War II and the developments of the international nuclear safeguards system from the 1950s to date, the following elements can be identified as key elements which constitute the current international nuclear safeguards system: (1) reciprocity, (2) political support, (3) enforceability, (4) non-discrimination, (5) objectivity and (6) cost effectiveness.

As examined in Section 1 and 2 of this Chapter, the elements 1) reciprocity, 2) political support and 3) enforceability were already required to establish an international system to control uses of nuclear energy after 1945; while the first attempts to formulate an international control of nuclear energy has failed because of lack of reciprocity and necessary political support, the IAEA was established precisely because it was able to obtain certain levels of reciprocity, political support and enforceability in that framework.

With regard to "reciprocity", we can already see a precursor of the so-called grand bargain of the later NPT in the IAEA Statute, which is also known as the principle of a "balance of mutual responsibilities and obligations of the nuclear and non-nuclear powers"[102]. This principle constitutes a fundamental basis of the NPT, which is enshrined in the UN resolution adopted at the UN General Assembly in 1965[103]. At the very beginning of the concept of controlling the use of nuclear energy and establishing an international nuclear non-proliferation regime, there was already recognition of the importance of reciprocity, in a sense of mutual responsibilities and obligations of haves and have-nots. It is worth to re-examine why the three nations proposed both of promotion of peaceful uses of nuclear energy and non-proliferation of nuclear energy while they duly recognize that spreading information regarding practical application of nuclear energy would

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[102] Mitsuru Kurosawa, *Gunshukukokusaiho no Atarashii Shiza (International Disarmament Law: A New Framework: A Study of The Regime For Non-Proliferation of Nuclear Weapons)* (Tokyo: Yushindo, 1986), pp.172-173.

[103] UN Document, A/RES/2028(XX). This resolution was adopted soon after the submission of the first unified draft on the NPT by the United States and the Soviet Union to the UN General Assembly.

not contribute to a constructive solution of the problem of nuclear weapons. A question can be raised and should be answered to analyze appropriate safeguards system why the three nations did not simply propose to abandon the use of nuclear energy. The answer to this question was the reciprocity.

Political support was required from the beginning of the history of the international control of nuclear energy. As the case of the first attempt to control uses of nuclear energy after 1945 shows, the lack of political support for the idea of international control proposed by the United States to be conducive only to its policy to monopolize nuclear weapons hindered the establishment of an international control system. The IAEA, on the other hand, was created because the idea could enjoy the support of the international community and there was no major country opposed to it. It is clear that no international safeguards system could be created without the necessary political support, nor could any safeguards be implemented without necessary political support.

Enforceability has been also sought also from the beginning in the idea to create an international control system and the UN Security Council was thought to be entrusted to that role. However, the course of the discussions on the international control of nuclear energy and its outcome in 1946-1948 revealed that the Security Council was unable to take any action when it came to decisions on matters against the interests of its Permanent Member States, each of which owns the right of veto. Due to a lack of consensus of the five Permanent Member States of the UN Security Council, in other words a lack of their unanimous political support, the international community could not achieve any agreement on such important matters as control of nuclear energy. The same problem can be observed in the IAEA system. Enforceability is therefore understood as one of the requirements for the international safeguards system by design, but it is not functioning as designed.

These three elements, “political support”, “reciprocity”, and “enforceability” are the fundamental factors to examine whether a nuclear safeguards system can be effective as a means to ensure nuclear non-proliferation.

After the creation of the NPT and especially after its universalization in the 1990s, the international safeguards system established in the framework of the IAEA has developed as a universal international safeguards system.

Being a universal system, the IAEA safeguards had new requirements to be an effective safeguards system, which is mentioned above as (4) non-discrimination, (5) objectivity (emphasis on quantitative indicators) and (6) cost effectiveness. In other words, all these three elements are required, as the system needs to cover as many as countries possible so that it works effectively to contribute nuclear non-proliferation in the world. If it is discriminatory, i.e. not objective with clear quantitative indicators, a large number of countries cannot be expected to accept the IAEA safeguards which leads to creating loopholes in the international non-proliferation regime. Furthermore, as it is sought to be a worldwide safeguards system, it needs to be as cost-effective as possible.

Chapter III

INTERNATIONAL SAFEGUARDS SYSTEM AS A MEANS TO ASSURE NUCLEAR NON-PROLIFERATION

The NPT entered into force in 1970, entrusting the IAEA to formulate and implement the international safeguards for nuclear non-proliferation. Especially since an increasing number of countries have acceded to the NPT as non-nuclear-weapon States, the IAEA has been regarded as "the competent authority" for the international safeguards system[104]. It has obtained such an exalted status that "nothing should be done to undermine [its] authority" in relation to the obligations under the NPT[105].

After the establishment of the IAEA NPT full scope safeguards in 1974, this system seemed to function effectively. In particular with regard to limiting possibilities of industrialized countries

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104 The paragraph 9 of the Decision 2 "Principles and Objectives for Nuclear Non-Proliferation and Disarmament, adopted by the 1995 NPT Review and Extension Conference, reads as follows: "9. The International Atomic Energy Agency is the competent authority responsible to verify and assure, in accordance with the statute of the Agency and the Agency's safeguards system, compliance with its safeguards agreements with States parties undertaken in fulfilment of their obligations under article III, paragraph 1, of the Treaty, with a view to preventing diversion of nuclear energy from peaceful uses to nuclear weapons or other nuclear explosive devices. Nothing should be done to undermine the authority of the International Atomic Energy Agency in this regard." (Emphasis added by the author),
http://www.un.org/disarmament/WMD/Nuclear/1995-NPT/pdf/1995-NY-NPTReviewConference-FinalDocumentDecision_2.pdf;

The Part I of the Final Documents of the 2000 NPT Review Conferences reaffirmed this statement in the paragraph 7,
https://unoda-web.s3.amazonaws.com/wp-content/uploads/assets/WMD/Nuclear/pdf/finaldocs/2000%20-%20NY%20-%20NPT%20Review%20Conference%20-%20Final%20Document%20Parts%20I%20and%20II.pdf;

Also, the Part I of the Final Document of the 2010 NPT Review Conference has the almost identical statement in the paragraph 9;

"9. The Conference reaffirms that the International Atomic Energy Agency (IAEA) is the competent authority responsible for verifying and assuring, in accordance with the statute of IAEA and the IAEA safeguards system, compliance by States parties with their safeguards agreements undertaken in fulfillment of their obligations under article III, paragraph 1, of the Treaty with a view to preventing diversion of nuclear energy from peaceful uses to nuclear weapons or other nuclear explosive devices. It is the conviction of the Conference that nothing should be done to undermine the authority of IAEA in this regard." (Emphasis added by the author),
http://www.un.org/ga/search/view_doc.asp?symbol=NPT/CONF.2010/50%20(VOL.I)&referer=http://www.un.org/en/conf/npt/2010/&Lang=E.

105 Ibid., paragraph 9.

such as West Germany, Italy and Japan to develop nuclear weapon programs, the system seemed to be effective through placing all nuclear material those countries posses and which might be used to develop nuclear weapons under the supervision of the IAEA safeguards[106].

Clandestine nuclear activities in Iraq and in North Korea in the early 1990s, however, shoed loopholes in this safeguards system, and posed serious challenges to the system's overall credibility. The Iranian case, which was referred as one of non-compliance to the UN Security Council in 2006, also opened a new dimension for the future of the IAEA safeguards. The Syrian nuclear issue, which in 2011 was also referred as non-compliance to the UN Security Council , posed yet another challenge to the IAEA. As will be articulated in the section 2 of this Chapter, these cases show that the IAEA safeguards system is effective enough to address non-compliance.

The international community has been trying to overcome these challenges by building up additional measures on the existing IAEA safeguards system, or, in other words, by strengthening the current IAEA safeguards system[107]. The question, however, is whether this building up approach will be an effective way to meet the challenges.

This Chapter will examine the shortcomings of the current IAEA safeguards system in three aspects, namely, institutional, political and technical, and try to identify the reasons why strengthening the current IAEA safeguards system is not an effective way to meet the challenge that the international community is facing.

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[106] West Germany acceded to the Treaty in 1970, Italy in 1975, and Japan in 1976, and they placed all nuclear material they posses under the IAEA safeguards in accordance with respective comprehensive safeguards agreement with the IAEA complying with the NPT obligations.

[107] See David Sloss, "It's Not Broken, So Don't Fix it: The International Atomic Energy Agency Safeguards System and the Nuclear Nonproliferation Treaty," *Virginia Journal of International Law*, Vol. 35, No.4, Summer 1995, pp.841-893; Richard Hooper, "Strengthening IAEA Safeguard in an Era of Nuclear Cooperation," *Arms Control Today*, November 1995, pp.14-18; David Fischer, "New Directions and Tools for Strengthening IAEA Safeguards," *The Nonproliferation Review,* Winter, 1996, pp.69-76.

Section 1

INSTITUTIONAL SHORTCOMINGS

1.1. Introduction

In Chapter II, this paper highlighted four points to consider for an international safeguards system to effectively function. These are (1) reciprocity, (2) political support, (3) institutional flexibility to transform traditional safeguards to meet its challenges, and (4) enforceability (in case of non-compliance).

If we look at the institutions established under the current IAEA system, it will be clear that these institutions fail to meet all these requirements. The IAEA was established based on the Statute and has been conducting its work in accordance with legal instruments such as safeguards agreements concluded with countries or other parties. Taking these documents as the main basis, this Section will examine the institutional problems of the IAEA safeguards system. Institutional problems are often caused by political disputes, and it is usually difficult to examine them without considering political elements. However, in this section, I will try to focus as much as possible on institutional aspects, and avoid going into political details. Political aspect, which might be the very cause of institutional deficits, will be discussed in Section II of this Chapter.

In this Section, the above mentioned four main institutional shortcomings will be discussed by examining the organizational nature of the IAEA, and also the legal framework of the IAEA in accordance which the IAEA conducts its safeguards activities, namely, the nature of the IAEA NPT safeguards[108] and their limitations.

1.2. The IAEA as the international organization to implement safeguards

1.2.1. Organizational limitations of the IAEA: lack of sufficient political support

The IAEA has two main objectives as stipulated in its Statute. The first one is to promote

[108] "IAEA NPT safeguards" in this paper refers to the IAEA safeguards established in accordance with the Article III of the Nuclear Non-Proliferation Treaty (NPT).

peaceful uses of nuclear energy and the second is to prevent military uses of nuclear energy[109]. That means that this organization has two contradictory functions, namely, as a promotional and as a regulatory body with regard to uses of nuclear energy.

This contradiction was already made clear at the very beginning of the IAEA's history. The IAEA Board of Governors held its first meeting in October 1957. It took, however, almost six months for them to start to discuss a possible safeguards system, because there were a number of countries that argued that safeguards should not be the main task for the Agency[110]. Those countries believed that the IAEA was created based on Eisenhower's Atoms For Peace address, and thus its main focus should be the promotion of peaceful uses of nuclear energy[111].

If we look at the discussions among the IAEA Member States on the IAEA budget and the actual status of the budget as well as the IAEA institution, which allows such status, we can see that the positions that many countries held at the early stage of the IAEA history, remain basically still the same. Let us examine this using the status of and discussion on the IAEA programme and budget.

The IAEA set forth four areas of priorities in its Programme and Budget for 2016-2017. These are: 1) Technical Cooperation; 2) Nuclear Safety and Security; 3) Nuclear Applications; and 4) Nuclear Energy[112]. Although the IAEA identifies six major programmes, including the

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[109] IAEA Statute Article II: Objectives
"The Agency shall seek to accelerate and enlarge the contribution of atomic energy to peace, health and prosperity throughout the world. It shall ensure, so far as it is able, that assistance provided by it or at its request or under its supervision or control is not used in such a way as to further any military purpose."

[110] Allan McKnight, *Atomic Safeguards- A Study in International Verification* (New York: UNITAR, 1971), pp.44-45.

[111] Ibid. p.45; David Fischer, *History of the International Atomic Energy Agency: The First Forty Years* (Vienna: IAEA, 1997), pp.35-36.

[112] The IAEA set forth following priorities in its 2016-2017 Programme and Budget;
"The 2016–2017 Programme and Budget supports the continuing priorities identified by the Director General for the 2014-2015 biennium:

- Technical cooperation including the Programme of Action for Cancer Therapy (PACT) - €24.5 million in the 2016 Regular Budget.
- Nuclear Safety and Security - €34.7 million in the 2016 Regular Budget and the budget neutral establishment of a new Office of Safety and Security Coordination as well as continued regularization of positions in Nuclear Security.

safeguards, for its entire activities as below, the safeguards are not included as a priority in its Programme and Budget for 2016-2017.

The six Major Programmes in its annual Programme and Budget plan of the IAEA are:

Major Programme (MP) 1: Nuclear Power, Fuel Cycle and Nuclear Science

Major Programme (MP) 2: Nuclear Techniques for Development and Environmental Protection

Major Programme (MP) 3: Nuclear Safety and Security

Major Programme (MP) 4: Nuclear Verification[113]

Major Programme (MP) 5: Policy, Management and Administration Services

Major Programme (MP) 6: Management of Technical Cooperation for Development

In the IAEA Secretariat, there are six Departments responsible for these six Major Programmes. Each Department is headed by a Deputy Director General, which means that the Director General of the IAEA, the head of the IAEA Secretariat, has six deputies under him and each of these Deputies covers one of the six major programmes of the Agency. The Deputy Director General for Safeguards is one of these six Deputies, and there is no special additional authority for him.

From this organizational framework we can clearly see that the safeguards work in the IAEA institutionally does not enjoy any higher weight compared to other work of the Agency, which is a logical consequence as an institution that has two different objectives and safeguards

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- The Renovation of the Nuclear Applications Laboratories in Seibersdorf (ReNuAL) - €2.5million in the 2016 capital Regular Budget.
- Nuclear Energy - €38.9 million in the 2016 Regular Budget and the establishment of a new Division of Planning, Information and Knowledge Management (NE–PIK).".

[113] Major Programme 4 is called "Nuclear verification", but it is meant "Nuclear Safeguards"; "Major Programme 4 supports the Agency's statutory mandate to establish and administer safeguards designed to ensure that special fissionable and other materials, services, equipment, facilities and information made available by the Agency or at its request or under its supervision or control are not used in such a way as to further any military purpose; and to apply safeguards, at the request of the parties, to any bilateral or multilateral arrangement, or at the request of a State, to any of that State's activities in the field of atomic energy" (The Agency's Programme and Budget 2016-2017, p.16, paragraph 59.).

constitute only one of these two.

Let us look at this issue from the budgetary point of view.

As it is shown in the graph 1 on the next page, only 38% of the IAEA regular budget is allocated for MP4, Nuclear Verification/Safeguards. Although this is the highest level of allocations among the six Major Programmes, it is still worthwhile to point out that the safeguards work of the IAEA, which is believed as the Agency's main task in the international community, accounts for less than 50% of its entire budget.

There of course always has been pressure, especially from Western developed countries, to increase the safeguards budget in the IAEA. However, the majority of the IAEA Member States, which consists of mainly developing countries and non-nuclear-weapon States, has not agreed to this.

The IAEA regular budget is one of the few business items that the IAEA General Conference has the authority to approve[114]. The IAEA General Conference consists of all Member States and if there is no consensus among the Member States on the budget proposal submitted by the IAEA Board of Governors, the IAEA General Conference can adopt it with a two-third majority[115].

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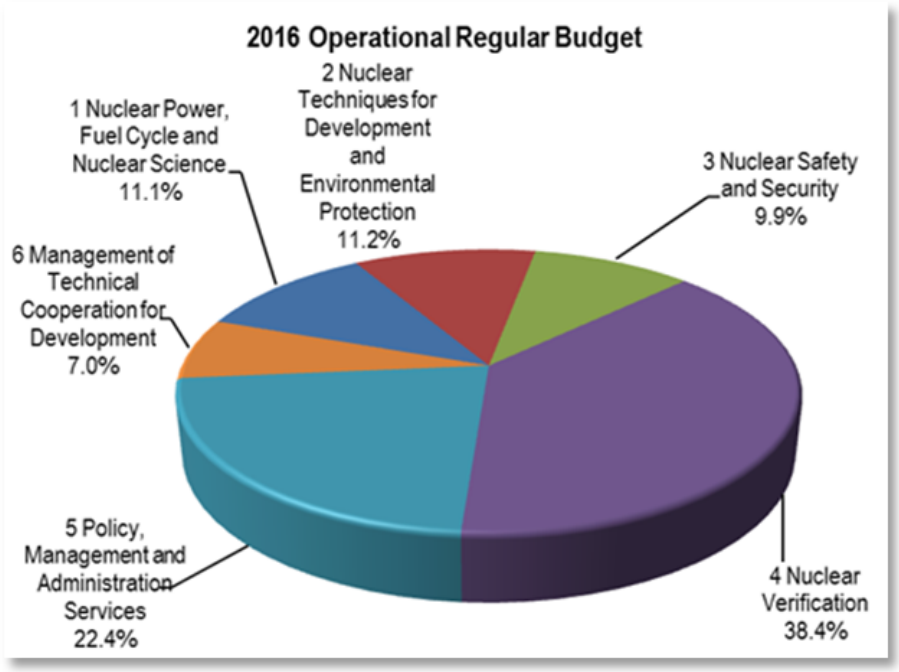
114 The IAEA Statute Article V General Conference E. 5. Reads as follows:
In accordance with article XIV, approve the budget of the Agency recommended by the Board or return it with recommendations as to its entirety or parts to the Board for resubmission to the General Conference.

115 The rules of procedure of the General Conference stipulates under its Rule 69;
The following decisions of the General Conference shall require a two-thirds majority of the Members present and voting:
(a) A decision on any financial question;
(b) A decision on a proposal for amendment to the Statute;
I A decision, upon recommendation of the Board of Governors, to suspend any Member from the exercise of the privileges and rights of membership;
(d) A decision on amendments to proposals relating to matters referred to in this Rule and on parts of such proposals put to the vote separately; and
(e) A decision which, pursuant to Rules 15, 19, 66 and 102 of these Rules, requires a two-thirds majority of the Members present and voting.



Graph1: "The Agency's Programme and Budget 2016-2017" from the IAEA website, https://www.iaea.org/About/Policy/GC/GC59/GC59Documents/English/gc59-2_en.pdf

This explains why it is so difficult for those countries that believe that safeguards should be strengthened to increase the IAEA safeguards budget. For the majority of the IAEA Member States, the developing countries and non-nuclear-weapon States, safeguards are regarded as a burden. Rather, the promotion of the peaceful uses of nuclear energy is their greatest interest[116] although, as we already saw above, both are equally enshrined in the IAEA Statute as the objectives of this Agency.

Not only trying to strike a balance among the six Major Programmes with regard to a budget proposal, developing countries have also been linking the growth rate of the IAEA regular budget with the growth rate of the Technical Cooperation Fund, which is an extra budgetary fund of the IAEA[117]. This is an additional factor making it extremely difficult to increase the regular

[116] Statement of the Group of 77 and China at the Meeting of the Programme and Budget Committee of the IAEA BOG, 5-6 May 2014, delivered by H.E. Ambassador Ala Azeez, Permanent Representative of Sri Lanka under agenda Item 4: The Agency's Draft Budget Update for 2015, http://www.g77.org/vienna/IAEAPBCMAY14.html.

[117] Ibid., Paragraph 7.3: reads: The Agency needs to implement without delay the agreement

budget significantly.

As we can see above, the two objectives of the IAEA are duly reflected institutionally in its activities both from an organizational and a budgetary point of view. As an institution that has two contradictory objectives, the IAEA is not able to obtain sufficient political support to strengthen safeguards by mobilizing its resources as a matter of the highest priority.

1.2.2.The nature of the IAEA NPT safeguards and their limitation

As Shaker emphasizes[118], the IAEA NPT safeguards, which were required and established by the NPT, and which have been universalized as the international safeguards system, was designed as non-discriminatory and as rational as possible. The main objectives in designing the NPT safeguards in the early 1970s were: 1) to be accepted by as many countries as possible so that the treaty would be universalized in order to function effectively as an international nuclear non-proliferation instrument, which, in turn, means that it needed to be 2) as non-discriminatory and 3) as objective as possible. Otherwise, namely if the safeguards system is to be discriminatory and not objective, it does not attract many countries to accede to the NPT and if not many countries accede to the Treaty, it will not be effective as an international nuclear non-proliferation treaty and can not assure nuclear non-proliferation. Also, because of the large number expected to accede to the Treaty, it needed to be 4) as cost effective, namely as rational as possible[119].

I regard these four requirements for the NPT safeguards, namely 1) universal adherence, 2) non-discrimination, 3) objectivity (emphasis on quantitative indicators), and 4) cost effectiveness

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reached by the Board of Governors on the Budget Proposal for 2009 as contained in document GOV/2009/52/Rev.1, which states that, with respect to future targets for voluntary contributions to the Technical Cooperation Fund, the 2005 decision to synchronise the TC programme cycle with the regular programme and budget cycle provides a framework to consider appropriate increases to the resources of the TC programme, including the TCF target. This decision identified 2012 as the starting date for these increases, and established that they should take into account the changes in the level of the regular operational budget from 2009 onwards and the price adjustment factor in the corresponding years, among other relevant factors.

[118] Mohamed I. Shaker, *The Nuclear Non-Proliferation Treaty – Origin and Implementation 1959-1979* (London, Rome, New York: OCEANA Publications, 1980), Volume II, Part 5, Chapter 10: "International Safeguards: Article III", pp.745-746.

[119] Ibid., p.746.

as the nature of the IAEA NPT safeguards system. And it is exactly in this nature that I believe the limitations of the current international safeguards system reside.

The NPT was opened for signature with 62 original Signatory States in July 1968. It entered into force in March 1970. On 11 May 1995, the Treaty was extended indefinitely. The number of States acceding this treaty has increased steadily since then. As of December 2015, 191 countries are registered as the States Parties to this treaty, including the five nuclear weapon States[120]. It is one of the most universally ratified treaties in the world.

A universalized treaty means that it covers almost all kinds of States, from developing countries to developed countries, countries with various political systems and with different political circumstances, countries with or without natural resources or with and without industrial capabilities.

These features of the Treaty, namely, the universality and its diversity of the States Parties have characterized the nature of the IAEA NPT safeguards system - and also its limitation.

The NPT safeguards INFCIRC/153: the full scope safeguards

As already examined in Chapter II, the main targeted countries that the United States and other Nuclear Weapon States initially wanted to place under the international safeguards to prevent from acquiring nuclear weapons were the industrially developed countries such as Japan, West Germany and Italy – countries that had the capability to develop nuclear weapons if they had enough nuclear material in their possession.

As a result, the IAEA NPT safeguards - also known as INFCIRC/153 from its document number, or otherwise referred to as the full scope safeguards - are designed to focus on the timely detection of diversion of nuclear material, using material accountancy based on a State's declaration. It should cover all nuclear material in a country, and be able to verify non-diversion of such material to nuclear weapons or other nuclear explosive devises in accordance with NPT

[120] "Status of the Treaty on Non-Proliferation of Nuclear Weapons", accessed May 30, 2016, http://disarmament.un.org/treaties/t/npt.

obligations.

This tool, nuclear material accountancy based on a State's declaration, is the most notable feature of the IAEA NPT safeguards. It was designed to meet the requirements of universal international safeguards at that time, namely objectivity, non-discrimination, as well as rationality/cost effectiveness, and in this sense was a very well designed safeguards system[121]. This system is based on two assumptions; that a State will declare faithfully all nuclear material it possesses; and that preventing the acquisition of material is the most essential factor in preventing a States from nuclear weapons production.

However, as the non-compliance cases of Iraq and North Korean have revealed, it became apparent that such safeguards are not to be effective when these assumptions failed. If a State is determined not to declare all of its nuclear activities and is still capable of producing or acquiring nuclear material, INFCIRC/153 is almost useless. Although some experts insist that detection of undeclared nuclear activities is enshrined in the purposes of the NPT safeguards[122], the IAEA NPT safeguards system was not primarily designed to detect undeclared nuclear material or nuclear activities[123]. This is an institutional deficit of this system.

Weakness of the Model Additional Protocol

To compensate this deficit, the IAEA and the international community have been trying to strengthen the IAEA safeguards system through building up new tools on the existing system[124].

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121 Mohamed I. Shaker, *The Nuclear Non-Proliferation Treaty – Origin and Implementation 1959-1979* (London, Rome, New York: OCEANA Publications, 1980), Volume II, Part 5, Chapter 10: "International Safeguards: Article III", pp.691-692; John Carlson, Victor Bragin, John Bardsley and John Hill, " Nuclear Safeguards As an Evolutionary System," *The Nonproliferation Review,* Winter 1999, pp.110-111.

122 David Sloss, "It's Not Broken, So Don't Fix it: The International Atomic Energy Agency Safeguards System and the Nuclear Nonproliferation Treaty," *Virginia Journal of International Law*, Vol. 35, No.4, Summer 1995, p.854; Laura Rockwood, "The IAEA's State-Level Concept and the Law of Unintended Consequences," *Arms Control Today*, September 2014, p.26.

123 IAEA booklet, *IAEA Safeguards Serving Nuclear Non-Proliferation,* p.9, https://www.iaea.org/sites/default/files/safeguards_web_june_2015.pdf.

124 David Sloss, "It's Not Broken, So Don't Fix it: The International Atomic Energy Agency Safeguards System and the Nuclear Nonproliferation Treaty," *Virginia Journal of International Law*, Vol. 35, No.4, Summer 1995, pp.857-858; Richard Hooper, "Strengthening IAEA Safeguard in an Era of Nuclear Cooperation," *Arms Control Today*, November 1995, pp.14-18; David Fischer,

One of such new tools is the introduction of the additional protocol to the NPT IAEA safeguards agreement.

The main purpose of the additional protocol is to strengthen the IAEA's capability to detect undeclared nuclear activities through increased access, including access to information, for the IAEA. However, because of the fundamental requirements of objectivities, non-discrimination and cost effectiveness, the additional protocol was neither as effective nor as acceptable to many countries as had been hoped. Even with an additional protocol in force, the IAEA's capability to detect undeclared nuclear activities is still very limited. This leads then the efforts by the IAEA Secretariat and some IAEA Member States for strengthening the IAEA safeguards beyond the IAEA NPT safeguards.

Efforts to transform the traditional IAEA safeguards

As examined in Chapter II of this paper, the IAEA Secretariat's efforts to transform the traditional quantitative safeguards to qualitative safeguards are facing challenges from some Member States.

First, the idea of State-level Concept is totally opposite of non-discrimination. Trimble and others describe this concept as "an approach in which IAEA considers a broad range of information about a state's nuclear capabilities and tailors its safeguards activities in each state accordingly"[125]. They also explain that under the State-level Concept the IAEA is able to tailor safeguards implementation on a State-by-State basis and avoid a "one-size- fits-all" system[126].

"New Directions and Tools for Strengthening IAEA Safeguards," *The Nonproliferation Review,* Winter1996, pp.69-76; John Carlson, Victor Bragin, John Bardsley, and John Hill, " Nuclear Safeguards As an Evolutionary System," *The Nonproliferation Review,* Winter 1999, pp.109-117; Victor Bragin, John Carlson, and Russel Leslie, " Integrated Safeguards: Status and Trends," *The Nonproliferation Review*, Summer 2001, pp.102-110; Theodor Hirsch, "The IAEA Additional Protocol: What It Is and Why It Matters," *The Nonproliferation Review*, Fall-Winter 2004, pp.140-163.

[125] David Trimble, Josey Ballenger, and Glen Levis, "IAEA's Implementation of the State-Level Concept," (paper presented at the IAEA Safeguards Symposium, Vienna, October 20–24, 2014) https://www.iaea.org/safeguards/symposium/2014/home/eproceedings/sg2014-papers/000235.pdf.

[126] Kory W. Budlong Sylvester, Joseph F. Pilat, and Chantell L. Murphy, "Developing State-Level Approaches under the State-Level Concept," Los Alamos National Laboratory, Los Alamos, NM 87545(paper presented at the IAEA Safeguards Symposium, Vienna, October 20–24, 2014)

Although Sylvester, Pilat, and Murphy note that this flexibility will necessarily be exercised while maintaining assurances of effectiveness and nondiscrimination[127], it seems difficult to argue that it is not contradictory to the original requirement of non-discrimination, insofar as it is not the same system for all countries.

Some experts such as Rockwood stress that the key element that the State-level Concept is not to discriminate some Member States, but to distinguish between them[128]. The question then arises as to whether this distinction can be made objectively. The Russian Federation made this point in its statement at the IAEA Safeguards Symposium held on 20-24 October in 2014.[129] Under the State-level approach, the IAEA is supposed to use information such from open sources and data provided by third parties, including not only third States but also organizations and private individuals. Such information may arguably not always be objective, and questions also arise as to the capacity of the Secretariat to discern what information is reliable and what is not. In a traditional safeguards system that relies on material accountancy, objectivity was assured, since the Secretariat only needs to verify that the declared quantities matches the quantities

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https://www.iaea.org/safeguards/symposium/2014/home/eproceedings/sg2014-papers/000292.pdf.

In this paper, they explained:" Under the SLC, safeguards will be focused on understanding the entirety of the nuclear program in the State—moving beyond the limitations of a traditional verification system focused on declared facilities and nuclear material—and developing SLAs for all States including those that are not under Integrated Safeguards. With the SLC, the IAEA is pursuing a more flexible safeguards system that takes full account of the knowledge gained as part of the State Evaluation process. Under the SLC, the Agency is able to tailor safeguards implementation on a State-by-State basis and avoid a "one-size- fits-all" system. This flexibility will necessarily be exercised while maintaining assurances of effectiveness and nondiscrimination but it holds the potential for more optimal safeguards implementation. While the nuclear materials and facilities present in a country will remain central to the Agency effort, issues such as the technical capabilities of the State as well as the broader conclusion are seen as relevant factors for safeguards implementation."

127 Ibid., p.1.

128 Intervention by Laura Rockwood, Carnegie International Nuclear Policy Conference 2015, 24 March, 2015,
http://carnegieendowment.org/files/15-politicssafeguard240315wintro-formatted1.pdf.
In her intervention, she claims: "on the idea of all countries being equal, you start out with an equal legal footing, but not everybody's country's nuclear fuel cycles, just to start with are the same. So it makes sense to make distinctions in how one implement safeguards. Not discrimination, but distinction.".

129 Statement by the head of the delegation of the Russian Federation, Ambassador-at large Grigory Berdennikov at the Symposium on International Safeguards: Linking Strategy, Implementation and People, on October 20-24, 2014, Vienna,
https://www.iaea.org/safeguards/symposium/2014/images/pdfs/Russian_Statement.pdf.

measured by the Secretariat.

The State-level Concept therefore raised concern by Member States regarding the transformation from the traditional non-discriminatory and objective safeguards system to a discriminatory and subjective one.

1.3. Reciprocity

The principle of reciprocity is considered essential one in nearly all areas of international relations. Though not a fundamental principle of international law as such, the importance of reciprocity is recognized in both bilateral and multilateral relations, and in international conventions of all sorts. It is manifest that independent states enter into a particular international agreement because they believe it in their best interests to do so. As a matter of logic, this suggests that there is an element of reciprocity in any international agreement: states agree to a particular obligation, in exchange for a stated, or at least expected, benefit.

Reciprocity is also an essential element for the States that renounced the possibility to develop nuclear weapons and chose to be bound by the international obligation to accept the application of safeguards.

As of 2014, 180 countries have safeguards agreements in force with the IAEA[130]. Out of those 180, 172 countries are non-nuclear weapons States Parties to the NPT and thus the IAEA NPT safeguards are applied. Five nuclear weapon States Parties to the NPT have voluntary offer agreements with the IAEA, and three other countries (India, Pakistan, and Israel) have safeguards agreements in force based on INFCIRC/66/Rev.2[131].

The IAEA NPT safeguards, based on Article III of the NPT, are applied only to non-nuclear weapon states. Nuclear weapon states, on the other hand, are not obliged to accept any IAEA safeguards - it is simply not foreseen that the countries that already possess nuclear weapons

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[130] IAEA Document, Safeguards Statement for 2014, GOV/2015/30, p.1. https://www.iaea.org/sites/default/files/sir_2014_statement.pdf.

[131] INFCIRC/66 type safeguards agreements are the agreements between countries and the IAEA established before the NPT was formulated. Safeguards under these agreements do not cover all nuclear material in a country.

would be placed under nuclear safeguards. The nuclear weapon states have voluntary offer safeguards agreements in force; however, as the name implies, these are only voluntary actions from nuclear weapon states and the obligations created by those voluntary agreements are fundamentally different from those non-nuclear weapon states have accepted under the IAEA NPT safeguards[132].

As a result, the IAEA has been implementing different types of safeguards depending on whether a country is a non-nuclear weapon state, nuclear weapon state, or non NPT State Parties. The IAEA was established based on the initiative of the United States to prevent further proliferation of nuclear weapons, therefore there was already a difference in status between those countries that already possessed nuclear weapons when the IAEA was established, and those that did not posses such weapons. The IAEA is expected to implement safeguards only in those countries that did not possess nuclear weapons. In this sense there is no reciprocity between nuclear weapon states and non-nuclear weapon states with regards to applying safeguards.

The promotion of peaceful uses of nuclear energy, one of the two objectives of the IAEA, is essentially an effort to provide non-nuclear weapon states with reciprocity; non-nuclear weapon states accept safeguards and, in return, they can receive assistance from nuclear weapon states to promote their nuclear activities. However, as examined in section 1.1. of this Chapter, strengthening safeguards and promotion of uses of nuclear energy are contradictory to each other, and therefore this does not create a true reciprocal relationship. In particular, if a country does not need any outside assistance to promote its nuclear activities., the so-called "bargain" of safeguards and assistance will fail.

The NPT consolidated this relationship between nuclear weapon states and non-nuclear weapon states. It also consolidated the legal framework of the safeguards to be applied to those two categories of countries. The IAEA NPT safeguards, created in accordance with the NPT, are to be applied unilaterally to the non-nuclear weapon States Parties to the NPT. It has been said

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[132] The details of the differences of these safeguards agreements are articulated in Chapter II of this paper.

that there is a grand bargain in the NPT; the non-proliferation obligations of non- nuclear weapon states and the inalienable right of the peaceful uses of nuclear energy of all States Parties. As Kurosawa explains, the NPT assured the non-nuclear weapon states this right as compensation for them accepting the non-proliferation obligation, but it cannot be considered as a reciprocal arrangement vis-a-vis the nuclear weapon states[133].

1.4. Enforceability in case of non-compliance

There are different views with regard to the purpose of the safeguards. Some believe that safeguards exist to prevent the diversion of nuclear material and activities from peaceful to military purposes, whereas others the prevention of countries from acquiring nuclear weapons is the purpose of the IAEA safeguards. However, it is necessary to be more precise as to which safeguards we are discussing.

The purpose of the IAEA safeguards enshrined in the IAEA Statue is to ensure that special fissionable and other materials, services, equipment, facilities, and information made available by the Agency or at its request or under its supervision or control "are not used in such a way as to further any military purpose"[134]. The IAEA NPT safeguards agreement (INFCIRC/153), on the other hand, stipulates its objective as to "verify nuclear material is not diverted to nuclear weapons or other nuclear explosive devices"[135]. Therefore, the original purpose of the safeguards of the IAEA is broader than that of the IAEA NPT safeguards.

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133 Mitsuru Kurosawa, *Gunshukukokusaiho no Atarashii Shiza (International Disarmament Law: A New Framework)* (Tokyo: Yushindo, 1986), pp.123-158.

134 The paragraph 5 of Article III of the IAEA Statute reads as follows:

"5. To establish and administer safeguards designed to ensure that special fissionable and other materials, services, equipment, facilities, and information made available by the Agency or at its request or under its supervision or control are not used in such a way as to further any military purpose; and to apply safeguards, at the request of the parties, to any bilateral or multilateral arrangement, or at the request of a State, to any of that State's activities in the field of atomic energy." (Emphasis added by the author).

135 The first paragraph of the IAEA NPT safeguard (INFCIRC/153) reads as follows:

"1. The Agreement should contain, in accordance with Article III.1 of the Treaty on the Non-Proliferation of Nuclear Weapons, an undertaking by the State to accept safeguards, in accordance with the terms of the Agreement, on all source or special fissionable material in all peaceful nuclear activities within its territory, 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." (Emphasis added by the author).

In the framework of the IAEA NPT safeguards, paragraph C of Article XII of the IAEA statute will be invoked if the IAEA cannot verify that there has not been any diversion[136].

According to the paragraph 5 of Article III of the IAEA Statute, the UN Security Council is the organ of enforcement in case of non-compliance, as the competent authority bearing the responsibility for the maintenance of international peace and security.[137] Paragraph C of Article XII of the Statute stipulates that the IAEA Board shall report to the UN Security Council in case of non-compliance of a country. However, as with a number of other international issues, the UN Security Council has showed an inability to force compliance with international obligations. In the area of nuclear non-proliferation, the UN Security Council has resolved none of the non-compliance cases such as North Korea, Iran, and Syria, although they were referred to it by the IAEA Board of Governors. The Iranian case even proved that UN Security Council resolutions could be revised by the outcome of negotiations undertaken outside the Council, as Iran did not comply with those resolutions. Rather, the issue was resolved by an agreement resulting from negotiations between the five nuclear weapon states, Germany and Iran, 9 years after the first UN Security Council resolution on this issue was adopted in 2006. Subsequent to this agreement, the Joint Comprehensive Plan of Action (JCPOA) of 14 July 2015[138], the UN

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136 The paragraph 19 of the IAEA NPT safeguards (INFCIRC/153) reads as follows:

"19. The Agreement should provide that if the Board upon examination of relevant information reported to it by the Director General finds that the Agency is not able to verify that there has been no diversion of *nuclear material* required to be safeguarded under the Agreement to nuclear weapons or other nuclear explosive devices, it may make the reports provided for in paragraph C of Article XII of the Statute and may also take, where applicable, the other measures provided for in that paragraph. In taking such action the Board shall take account of the degree of assurance provided by the safeguards measures that have been applied and shall afford the State every reasonable opportunity to furnish the Board with any necessary reassurance."

137 IAEA Statute Article III B. 4. stipulates in carrying out its functions the IAEA shall: submit reports on its activities annually to the General Assembly of the United Nations and, when appropriate, to the Security Council: if in connection with the activities of the Agency there should arise questions that are within the competence of the Security Council, the Agency shall notify the Security Council, as the organ bearing the main responsibility for the maintenance of international peace and security, and may also take the measures open to it under this Statute, including those provided in paragraph C of Article XII; Paragraph C of Article XII stipulates procedures in case of non-compliance.

138 IAEA Document, "Communication dated 24 July 2015 received from China, France, Germany, the Russian Federation, the United Kingdom, the United States of America (the E3/EU+3) and the Islamic Republic of Iran concerning the text of the Joint Comprehensive Plan of Action (JCPOA)", INFCIRC/887, https://www.iaea.org/sites/default/files/infcirc887.pdf.

Security Council terminated all its relevant previous resolutions on the Iranian nuclear issue[139].

1.5. Conclusion

The two contradictory objectives of the IAEA make it institutionally difficult to promote the safeguards in the framework of the IAEA. It also causes a lack of sufficient political support for the IAEA to strengthen its safeguards, as the Member States are divided into two groups. One group of the Member States, mainly constituting of developed countries, wish to strengthen nuclear safeguards. On the other hand, mainly developing countries attach more importance to the promotion of peaceful uses of nuclear energy. The argument of the latter that safeguards is only half of the Agency's objectives and therefore should not be given more priority than the other half (namely the promotion of peaceful uses of nuclear energy), is reflected in the organizational structure of the IAEA and its budget. The result is that the allocation of more resources, both budgetary and human, to enhance safeguards related work is hindered.

The IAEA also faces constraints in its efforts to strengthen the safeguards due to the requirements as an effective international safeguards system to be non-discriminatory and to be objective – constraints placed on it to make it universally acceptable. The environment surrounding international safeguards have changed considerably since the NPT IEA safeguards first introduced in the 1970s. The countries that are regarded as potential threats to nuclear proliferation are no longer industrialized countries more. They have enough indigenous nuclear

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139 UN Document, "Resolution 2231 (2015) Adopted by the Security Council at its 7488th meeting, on 20 July 2015," S/RES/2231 (2015),
https://www.iaea.org/sites/default/files/unsc_resolution2231-2015.pdf;
The paragraph 7 of this resolution reads as below:
"7. *Decides*, acting under Article 41 of the Charter of the United Nations, that, upon receipt by the Security Council of the report from the IAEA described in paragraph 5:
(a) The provisions of resolutions 1696 (2006), 1737 (2006), 1747 (2007), 1803 (2008), 1835 (2008), 1929 (2010) and 2224 (2015) shall be terminated,";
The paragraph 5 of this resolution reads as below:
"5. *Requests* that, as soon as the IAEA has verified that Iran has taken the actions specified in paragraphs 15.1-15.11 of Annex V of the JCPOA, the Director General of the IAEA submit a report confirming this fact to the IAEA Board of Governors and in parallel to the Security Council;".

material which they could utilize undeclared to the IAEA. The number of countries embarking on nuclear programs is growing. To respond to these changes, the IAEA has been trying to develop its safeguards system by building up new measures on the existing system, through, for example, the introduction of the Additional Protocol or the State-level approach. In those endeavors, however, the important requirements for the IAEA NPT safeguards system have been overlooked. These requirements are the core elements of non-discrimination and objectivity. Pursuing new tools that fall short of the fundamental requirements for the IAE NPT safeguards, as a universal system would not meet the expectation to strengthen the safeguards. In fact, it could potentially raise more concerns among Member States, causing just more unnecessary confrontation.

Reciprocity is the most important element to make a safeguards system to be effective. However, the IAEA cannot institutionally provide such reciprocity, due to the different status of member states, as well as the different application of safeguards between nuclear weapon states and non-nuclear weapon states under the IAEA NPT safeguards.

Enforceability in case of non-compliance is the other essential element to deter a country from violating its safeguards obligations. The IAEA NPT safeguards agreement expects the UN Security Council to play a role as the ultimate enforcement organ in case of non-compliance. However, past precedent shows that the UN Security Council is not an effective enforcement body.

Lack of sufficient institutional political supports, lack of effectiveness of safeguards due to the nature as a universal safeguards system, lack of reciprocity and lack of effective enforceability: the IAEA institutionally inherits these shortcomings.

Section 2

POLITICAL SHORTCOMINGS

2.1. Introduction

This Section, will examine how the IAEA has been suffering from the lack of necessary political support from the Member States. As examined in Section 1 of this Chapter, and as will be further discussed below, the organization has been facing political constrains mainly related to the two different and contradictory objectives set forth in the IAEA's Statute.

IAEA Member States often argue that the IAEA is a technical organization and should not be involved in political interference using the clause of Article III C of the IAEA Statute[140]. When the former Director General Muhammed ElBaradei issued his report on the Iranian Nuclear issue in November 2003, he did not use the word "non-compliance"; he "deliberately left to the board the sole responsibility for making a formal finding of noncompliance. This ambiguous language may have played a role in politicizing what should have remained the purely technical and factual work of the secretariat"[141].

In a key note speech at the Carnegie International Nuclear Conference in 2015, the current Director General of the IAEA, Yukiya Amano, stated that: "the IAEA is a technical organization and our job is to establish the facts to the best of our ability. It is up to our member states to determine the appropriate response."[142].

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[140] Statement of the G-77 and China during the IAEA Board of Governors Meeting, March 5-8, 2007,
http://www.g77.org/vienna/IAEAMARCHBOARD07.htm;
Final Document of the 14th Summit Conference of Heads of State or Government of the Non-Aligned Movement, Havana, Cuba, September 11-16, 2006, paragraph 94,
http://cns.miis.edu/nam/documents/Official_Document/14NAMSummit-Havana-Compiled.pdf;
Article III "Functions" C of the AEA Statute stipulate "C. In carrying out its functions, the Agency shall not make assistance to members subject to any political, economic, military, or other conditions incompatible with the provisions of this Statute." (Emphasis added by the author).

[141] IAEA, "Implementation of the NPT Safeguards Agreement in the Islamic Republic of Iran: Report by the Director General," GOV/2005/75, November 10, 2003. The non-compliance by Iran was determined by the Board of Governors in August 2005 and referred to the UN Security Council by the Board in February 2006; Pierre Goldschmidt, "Safeguards Noncompliance: A Challenge for the IAEA and the UN Security Council," *Arms Control Today*, February 2010, p.1.

[142] Transcript of the key note by the Director General of the IAEA, Yukiya Amano, at the Carnegie International Nuclear Conference 2015, March 23, 2015, Washington DC,
http://carnegieendowment.org/files/05-230315CarnegieAMANO-formatted.pdf.

The Group of Qualified Governmental Experts, which undertook a study on the role of the United Nations in the field of verification based on the mandates given by the UN General Assembly resolution 43/81 B of 7 December 1988, stressed in its report that "the importance of the political elements of the verification process is also underscored by the co-operative arrangements that accompany the implementation of agreed obligations, including highly intrusive verification arrangements such as on-site inspections."[143] The former Director General of the IAEA, Hans Blicks, also stresses the importance of political support for the IAEA to conduct its work.[144] Ferguson stresses also the importance of "political acceptance" in the context of imposing stringent safeguards measures. He takes the Iranian case as an example, and points to the political constraints the IAEA and the Member States face.[145]

This Section will first examine the political constrains, inherent in the IAEA as an international organization, and then consider the shortcomings of the IAEA safeguards system with regard to these political aspects.

2.2. Is the IAEA a political organization or a technical organization?

The first question is whether the IAEA is a political organization or a technical organization. If it is a purely technical organization, the question of political shortcomings is not relevant.

Goldschmidt argues that in examining IAEA responsibilities, it is necessary to distinguish

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143 Document, A/45/372, "Study on the Role of the United Nations in the Field of Verification, "United Nations Publication (1991), p.5.

144 Hans Blicks, "Verification of Nuclear Non-proliferation: Securing the Future," *IAEA Bulletin*, 1/1992, pp.2-5.

145 Ferguson argues Iranian leaders have been acutely sensitive about fairness. They have resisted adopting safeguards measures beyond what other states have applied. The United States faces political constraints as well. The Obama administration would not want to appear weak, especially in the lead-up to the 2012 presidential election.
Moreover, the International Atomic Energy Agency (IAEA) faces political constraints in that its leadership has to remain politically neutral while balancing the demands from developing and more technologically advanced states. The developing states usually want more technical assistance from the IAEA for their peaceful nuclear programs, and they want less-intrusive monitoring of these programs. In comparison, states with greater political power and monetary resources typically do not need much if any technical assistance from the IAEA. Several of these states, such as the United States, however, favor greater efforts to ensure that peaceful nuclear programs remain such (Charles D. Ferguson, "Steps towards a Deal On Enhanced Safeguards For Iran's Nuclear Program," *Arms Control Today*, March 2011, pp.9-10.).

between the respective roles of the secretariat and the board.[146] He suggests that the secretariat is expected to perform its task in the most objective and nondiscriminatory way possible, without the influence of any political considerations.[147] From Member States' point of view, it has been stressed on various occasions that the IAEA should be a technical organization and should be refrained from any political interference.

Fischer explains, however, that there has been political influence on the IAEA's decision-making process. He points to the different political stances of the IAEA Member States and argues that they had a large influence on the formulation of Programme 93+2.[148] He points out, for example, that a number of the Secretariat's proposals, especially those involving more extensive access by IAEA inspectors, run into resistance in the IAEA Board, and that this resistance stems from two sources: one from states that are traditionally very sensitive to what they perceive as encroachments on their national sovereignty, and one from states within the E.U., particularly Germany and Belgium, that generally support more intrusive safeguards and inspections.[149]

Other experts such as David Sloss, Richard Hooper, David Fischer and John Carlson also points out the political influences to the function of the IAEA.[150]

This question shall be examined using concrete examples.

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146 Pierre Goldschmidt, "Safeguards Noncompliance: A Challenge for the IAEA and the UN Security Council," *Arms Control Today*, February 2010, pp.22-27.
147 Ibid., p.23.
148 David Fischer, "New Directions and Tools for Strengthening IAEA Safeguards," *The Nonproliferation Review,* Winter1996, pp.69-76.
149 Ibid., pp.74-75.
150 David Sloss, "It's Not Broken, So Don't Fix it: The International Atomic Energy Agency Safeguards System and the Nuclear Nonproliferation Treaty," *Virginia Journal of International Law*, Vol. 35, No.4, Summer 1995, pp.857-858; Richard Hooper, "Strengthening IAEA Safeguard in an Era of Nuclear Cooperation," *Arms Control Today*, November 1995, pp.14-18; David Fischer, "New Directions and Tools for Strengthening IAEA Safeguards," *The Nonproliferation Review,* Winter1996, pp.69-76; John Carlson, Victor Bragin, John Bardsley, and John Hill, " Nuclear Safeguards As an Evolutionary System," *The Nonproliferation Review,* Winter 1999, pp.109-117; Victor Bragin, John Carlson, and Russel Leslie, " Integrated Safeguards: Status and Trends," *The Nonproliferation Review*, Summer 2001, pp.102-110; Theodor Hirsch, "The IAEA Additional Protocol: What It Is and Why It Matters," *The Nonproliferation Review*, Fall-Winter 2004, pp.140-163.

2.2.1. Case of non-compliance

The IAEA safeguards system functioned relatively well until the 1990s, when the non-compliance cases of North Korean and Iraq were revealed. I will focus on the political failures of the IAEA to function as a nuclear safeguards organization by examining other cases, especially those of Iran and Syria.

Since the 1990s, there have been several cases in which the IAEA Secretariat revealed inconsistencies with initial declarations, or undeclared nuclear activities in States with a comprehensive safeguards agreement with the IAEA, namely Romania, South Korea, Egypt, Libya, Iran and Syria. However, not all of these cases were identified as non-compliance by the IAEA Board of Governors and reported to the UN Security Council. Furthermore, the IAEA Secretariat has never reported these cases as non-compliance. In this context Goldschmidt argues that the IAEA Director General should have reported the cases of South Korea, Egypt, Libya and Iran as non-compliance to the IAEA Board of Governors in accordance with the IAEA Statutes.[151] An official of the UK Foreign Ministry who is a nuclear safeguards expert and who was involved in discussions on the South Korean case in the IAEA stated that the politicization of the IAEA findings with regard to non-compliance started when the IAEA Director General did not report the South Korean case as non-compliance in 2004[152].

As Goldschmidt and Carlson argue, the problem of this politicization stems from the fact that there is no clear definition of what consists non-compliance in the IAEA[153]. In 2003, the then IAEA Director General ElBaradei referred the Iranian case to the IAEA Board, requesting a decision as to whether that country's undeclared nuclear activities constitutes non-compliance.[154] The IAEA Board adopted by vote (not by consensus) a resolution[155] determining there was

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151 Pierre Goldschmidt, "Safeguards Noncompliance: A Challenge for the IAEA and the UN Security Council," *Arms Control Today*, February 2010, p.23.
152 Interview in Vienna in 2009.
153 Ibid.
154 ElBaradei's statement, IAEA document GOV/2003/75.
155 IAEA document, "Implementation of the NPT Safeguards Agreement in the Islamic Republic of Iran", GOV/2005/77, September 24, 2005, paragraph 1.

Iranian non-compliance in September 2005[156]. This case made it clear that a non-compliance finding by the IAEA is not a purely technical judgment. According to Goldschmidt and Ferguson, the IAEA is required to be technical and politically neutral, but IAEA decisions such as non-compliance are based on political judgments by the Member States, which constitute the IAEA Board. The IAEA Board resolution adopted on 4 February 2005 to refer the Iranian non-compliance case to the UN Security Council did not enjoyed unanimous support: it was adopted by vote with three against and five abstentions[157].

In the Iranian case, there were a number of technical reports by the Director General with regard to Iran's breaches of its safeguards agreement with the IAEA[158]. However, political pressure not to determine non-compliance came from some developing countries that had a close relationship with Iran. It was believed among the vast majority of the Member States that the Iranian case, like the cases of South Korea and Egypt, should be found as non-compliance and reported to the UN Security Council. The Syrian case, on the other hand, was very controversial and provides us with a very good example to articulate how the IAEA faces political constrains, in other words has institutional political shortcomings.

Syria's nuclear program first drew the attention of the international community when Israel bombed and destroyed a facility located in Dair Alzour in September 2007. Some countries believed that the facility destroyed by the airstrike has been a nuclear reactor under construction, to produce plutonium usable for nuclear weapons[159]. However, as the relevant IAEA Director General's reports describe, the IAEA could never come to a definitive conclusion whether the

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156 Transcript of the Director General´s Press Statement on Iran, 24 September 2005, paragraph 5, https://www.iaea.org/newscenter/mediaadvisories/transcript-director-general´s-press-statement-iran-24-september-2005.

157 Cuba, Syria, and Venezuela voted against and Algeria, Belarus, Libya, Indonesia and South Africa abstained.

158 There were already nine reports issued by the IAEA Director General on the Implementation of the NPT Safeguards Agreement in the Islamic Republic of Iran since June 2003, which stipulates Iran's failures and breaches to the safeguards agreements, namely, IAEA document, GOV/2003/40, GOV/2003/63, GOV/2003/75, GOV/2004/11, GOV/2004/34, GOV/2004/60, GOV/2004/83, GOV/2005/61, and GOV/2005/67.

159 U.S. Statement as delivered by IAEA Counselor Ike Reed at the IAEA Board of Governors Meeting, November 17-18, 2016, Agenda Item 5(b), Implementation of the NPT safeguards agreement in the Syrian Arab Republic, https://vienna.usmission.gov/us-iaea-syria-statement/.

facility was indeed a nuclear reactor. The IAEA Board discussed this issue at every Board Meeting since September 2007 until finally adopting a resolution in June 2011 to find the case as non-compliance and refer it to the UN Security Council. The resolution was adopted by a vote of 17 in favor, 6 against, and 11 abstentions. One Member State did not take part in the vote[160]. The IAEA Board consists of 35 Member States, meaning half of the Board Members were not in favor of the resolution. Procedurally speaking, this is consistent with the rules of the IAEA since the resolution was adopted by two third majority of members present and voting; abstentions are not counted[161]. However, given the gravity of the issue, the fact that half of the Board did not support the resolution is striking.

The resolution stipulates in its operative paragraph 1:

"1. Finds, based on the report of the Director General, that Syria's undeclared construction of a nuclear reactor at Dair Alzour and failure to provide design information for the facility in accordance with Code 3.1 of Syria's Subsidiary Arrangements are a breach of Articles 41 and 42 of Syria's NPT Safeguards Agreement, and constitute non-compliance with its obligations under its Safeguards Agreement with the Agency in the context of Article XII.C of the Agency's Statute; "[162]

As we can see above, the first line of this operative paragraph 1 mentions "Syria's undeclared construction of a nuclear reactor". The report of the Director General, which was used as the basis of this resolution to find Syria's non-compliance, however, does not definitively stipulate that it was a nuclear reactor. It says only that "the Agency concludes that the destroyed building was very likely a nuclear reactor"[163]. There is a footnote on this line of the DG report,

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160 "NTI-Countries-Syria-Nuclear," Last Updated: August, 2014, http://www.nti.org/country-profiles/syria/nuclear/.

161 IAEA Document, "Rules and Procedures of the Board of Governors", Rule 38, https://www.iaea.org/about/policy/board/rules-and-procedures-of-the-board-of-governors#item7.

162 IAEA Document, "Implementation of the NPT safeguards agreement in the Syrian Arab Republic", GOV/2011/41, adopted by the Board of Governors on 9 June 2011, https://www.iaea.org/sites/default/files/gov2011-41.pdf.

163 IAEA Document, "Implementation of the NPT Safeguards Agreement in the Syrian Arab Republic", Report by the Director General, GOV/2011/30, B.5. paragraph 24. https://www.iaea.org/sites/default/files/gov2011-30.pdf.

which says "since the early years of implementation of comprehensive safeguards by the Agency, it has been recognized that securing absolute proof of compliance (or otherwise) of a State with the terms of its Safeguards Agreement is not possible, and that "reasonable" inferences must be drawn in making conclusions, taking into account all the available information (GOV/2107, paragraph. 3(2); GOV/2863, paragraphs 31 and 32)."[164] The Director General provided the Board only with his inference. As Hibbs argues[165], it seems to be reasonable to believe that the Board's view was divided because of the indecisive technical assessment provided by the Director General. It also seems reasonable to believe that the Board's resolution for Syria's non-compliance was adopted not on technical grounds, but on the political assessment of the Members of the Board.

Syria's non-compliance was reported to the UN Security Council in accordance with the paragraph 3 of the IAEA Board resolution GOV/2011/41. However, the Council was not able to take any action as at least the two Permanent Members namely China and Russia, did not support the IAEA resolution[166]. The UN Security Council once again could not function as the enforcement body for the IAEA.

The Syrian nuclear issue revealed political shortcomings of the IAEA in that even if the Board of Governors adopts a resolution by majority vote, the UN Security Council is not able to act in then absence of support from all of its Permanent Members, and thus there is no enforcement.

2.2.2. Case of implementation of the IAEA safeguards

There is also other political influence on the IAEA with respect to the implementation of the

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164 Ibid.

165 Hibbs argues that "in the IAEA boardroom last week, the absence of a common understanding about what constitutes noncompliance with a state's safeguards obligations, encouraged many delegations to allow extraneous political considerations to take precedence over what should have been a safeguards judgment. Instead of contributing to a common resolve to put Syria on notice, many of these states abstained or voted no.". He further notes "the IAEA's technical safeguards judgment was not accepted by many NAM states.", Mark Hibbs, "The IAEA and Syria: A New Paradigm for Noncompliance, Article June 17, 2011, http://carnegieendowment.org/2011/06/17/iaea-and-syria-new-paradigm-for-noncompliance.

166 Ibid.

IAEA safeguards.

Ferguson argues that the IAEA should remain politically neutral while he admits it faces political constrains. He writes that "the IAEA leadership has to remain politically neutral while balancing the demands from developing and more technologically advanced states". In explaining this constraint, he continues that the developing states usually want more technical assistance from the IAEA for their peaceful nuclear programs, and they want less intrusive monitoring of those programs. In comparison, states with greater political power and monetary resources, such as the United States, typically do not need much technical assistance from the IAEA, but rather favor greater efforts to ensure that peaceful nuclear programs remain such[167].

This explains very well the problem the IAEA is facing due to the mandates entrusted to this organization. As we examined in the previous Chapter, the IAEA was created for two different purposes; one is to promote peaceful uses of nuclear energy and the other is to prevent nuclear proliferation. As a result, because of these two contradictory objectives, the IAEA often faces a lack of necessary political support.

Ferguson further points out that there are decision factors as to whether the IAEA can implement its safeguards measures, namely, "political acceptability, technical feasibility and effectiveness, and resource constraints"[168].

What Ferguson means by "political acceptability" is whether certain safeguards measures are politically acceptable for a country when those measures do not constitute legal obligations of that country, or might go beyond obligations under its safeguards agreement. For example, Ferguson points out that Iranian leaders have been acutely sensitive about fairness. They have resisted adopting safeguards measures beyond what other states have applied. The United States faces political constraints as well. The Obama administration would not want to appear weak, especially in the lead-up to the 2012 presidential election[169]. The issue of political acceptability

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[167] Charles D. Ferguson, "Steps towards a Deal On Enhanced Safeguards For Iran's Nuclear Program," *Arms Control Today*, March 2011, pp.8-16.
[168] Ibid.
[169] Ibid.

was also observed in the cases of Iraq and North Korea, when the IAEA tried to impose special inspections to verify the countries' compliance with their safeguards agreements. As Asada, Carlson and other experts suggest[170], if there is no political acceptance on the side of countries to receive special inspections, the IAEA is not able to impose necessary safeguards measures to verify a country's compliance.

2.3. Political support for the IAEA safeguards

As examined above, if we consider that there is substantive political influence on the IAEA's decision-making process to determine non-compliance and also with regard to the implementation of its safeguards measures, it is clear that the IAEA should not be regarded as a solely technical organization. If the IAEA cannot work without political influences, it needs to obtain adequate political support in order to fulfill its safeguards mandate. So the second question is whether the IAEA has adequate political support for its safeguards work.

In connection with discussions to strengthen the IAEA safeguards in 1991, Hans Blicks, the then Director General of the IAEA, stressed the importance of full support by the UN Security Council for the IAEA to apply its safeguards[171].

As Asada, Fischer, Hibbs and other experts argue, the past experience of the IAEA safeguards, however, shows that the IAEA does not enjoy this political support. For example, as Hibbs articulates, the IAEA Board resolution to determine Syria's non-compliance showed the divided political considerations of the Member States[172]. The crucial point in that case is that two

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[170] Masahiko Asada, "NPT・IAEA Taisei no Shintenkai– Hoshousochikyoukasaku wo chushin ni- (NPT/IAEA New developments of the regime -Focusing on measures to strengthening Safeguards)," *Sekaihonenho*, No. 18 (March 1998), pp.1-36; John Carlson, Victor Bragin, John Bardsley, and John Hill, " Nuclear Safeguards As an Evolutionary System," *The Nonproliferation Review*, Winter 1999, pp.109-117; Hans Blicks, "Verification of Nuclear Non-proliferation: Securing the Future," IAEA Bulletin, 1/1992, pp.2-5.

[171] Hans Blicks, "Verification of Nuclear Non-proliferation: Securing the Future," IAEA Bulletin, 1/1992, pp.2-5; David Fischer, "New Directions and Tools for Strengthening IAEA Safeguards," *The Nonproliferation Review,* Winter1996, p.70.

[172] Mark Hibbs, "The IAEA and Syria: A New Paradigm for Noncompliance," Article June 17, 2011,
http://carnegieendowment.org/2011/06/17/iaea-and-syria-new-paradigm-for-noncompliance.

Permanent Members of the UN Security Council, namely Russia and China, were against the resolution. Consequently, the UN Security Council could not take any action to address this non-compliance case and could not provide the necessary political support to the IAEA's decision.

Ferguson's political acceptability argument[173] can be also regarded as an issue of political support. As he points out, if developing countries that attach more importance on the promotion of peaceful nuclear energy do not support necessary safeguards measures, the IAEA does not have adequate political support to conduct its work.

2.4. Reasons for the lack of political support

This leads us to the next question: why the IAEA does not have adequate political support to impose necessary safeguards measures. This is again because due to the elements of non-discrimination, objectivity, and rationality, embedded in the current IAEA safeguards system based on the NPT safeguards so that it could be acceptable as many countries as possible. In my view, all these elements have left countries room to decide whether certain safeguards measures are politically acceptable or not.

Moreover, the lack of reciprocity of the IAEA safeguards is politically unacceptable for countries on which stringent safeguards measures are imposed.

As examined in Chapter II of this paper, reciprocity was regarded one of the key elements for an effective verification/safeguards system. In case of the IAEA, however, from the outset of the system reciprocity is not provided for. If safeguards or verifications are imposed under a bilateral agreement, reciprocity is not difficult. In the case of the IAEA safeguards, reciprocity is almost out of the question, mainly because the organization consists of two different categories of countries - nuclear weapon States and non-nuclear weapon States. For non-nuclear weapon States, the safeguards obligations are not reciprocal but unilateral in two aspects; firstly, the IAEA, the other party of a safeguards agreement, as an international organization, does not have

[173] Charles D. Ferguson, "Steps towards a Deal On Enhanced Safeguards For Iran's Nuclear Program," *Arms Control Today*, March 2011, pp.8-16.

any obligation to accept any safeguards measures; and secondly, at least three of the 35 IAEA Board members are nuclear weapon States and thus do not have equal obligations to those of non-nuclear weapon States. These factors seem to make it difficult for non-nuclear weapons States, which have unilateral safeguards obligations, to accept certain safeguards measures politically.

Political acceptability and reciprocity are also related to the question of incentive and disincentive. As mentioned above, the IAEA has two objectives, promotion of peaceful uses of nuclear energy and prevention of nuclear proliferation. For many developing countries, safeguards to ensure nuclear non-proliferation are usually regarded as disincentives: these countries attach more importance on promotion of uses of nuclear energy for their development.

As examined above, the IAEA is not a purely technical organization: rather, it is an organization with considerable political influences. This may appear to be simply in the nature of international organizations, as such organizations constitute of sovereign States. However, it is crucial to have a clear understanding that the IAEA is not free of political interference, as it will be a decisive factor if we think of what kinds of safeguards system could be most effective.

2.5. Conclusion

If the IAEA is not a solely technical organization, but rather an organization with political influence, the level of political support it is able to garner will be a decisive factor in order for it to function effectively as a safeguards organization.

To ensure nuclear non-proliferation, deterrence is crucial, since the gravity of the consequences if non-proliferation fails can be grave. It is therefore essential to deal with non-compliance cases in a manner so that the deterrence element functions.

As examined in this section, however, past experience of the IAEA shows that handling of the non-compliance cases has been very much influenced by different political stances of Member States, resulting in an inability of the organization to ensure effective deterrence. The non-compliance cases of North Korea or Iraq clearly did not deter Iran from violating its

safeguards obligations.

This lack of consistent political support in case of non-compliance can be also understood as the nature of a universal international safeguards system, as it mainly comes from diversity of the countries that join the system. As more countries join the system, it becomes more difficult to find common ground.

The other cause of the lack of sufficient political support for the IAEA safeguards is the lack of reciprocity. As examined also in Section 1 of this Chapter, the IAEA falls short of necessary reciprocity as an international organization, as it covers two groups of countries that have different status and different obligations.

Whether we can overcome the lack of political support for the IAEA safeguards is a difficult question. As examined in this Section and Section 1 of this Chapter, this question stems mainly from the nature of the IAEA safeguards. As long as we can not change the nature of the IAEA safeguards system in particular the elements of universality, the two different objectives, and the lack of reciprocity, it seems to be extremely difficult to change the current situation.

Section3

TECHNICAL SHORTCOMINGS

3.1. Introduction

Heinonen, who served as an IAEA safeguard inspector for more than 20 years, later as a director of the safeguards department covering Far Eastern Asia, and then as the Deputy Director General for Safeguards in the IAEA, stressed the technical difficulties in verifying undeclared activities, using the examples of South Korean case[174]. From his experience, it is regarded as extremely difficult to draw the definitive conclusion that alleged undeclared nuclear activities were conducted as a State project when the activities were conducted by a private entity, such as in the South Korean case, when the activity was conducted by a private institute.

Ferguson provided his views on the technical shortcomings of the IAEA safeguards in the context of Iranian nuclear issue[175]. He referred to his study conducted over the past two years to address how the international community could safeguard Iranian nuclear activities and prevent the country from developing nuclear weapons[176]. His study focuses on how to overcome the technical obstacles hampering achievement of that goal. In the context of preferable future safeguards systems, he pointed to the importance of addressing proliferation by non-state actors, nuclear security, and social verification. He particularly stressed the need for social verification, given that the current international safeguards system is not a prefect system.

Sokolski's view was more conclusive[177]. He emphasized that, when it comes to reprocessing activities, the IAEA safeguards system is incapable not only of detecting undeclared activities, but also of verifying the non-diversion of nuclear material, which is the core of the IAEA safeguards. Referring to his publications[178], he stressed that reprocessing activities could technically not be

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174 Interview with Olli Heinonen, October 12, 2015, Washington DC.
175 Interview with Charles Ferguson, October 15, 2015, Washington DC.
176 *Verification Requirements For Nuclear Agreement With Iran*, Nuclear Verification Capabilities Independent Task Force of the Federation of American Scientist, September 2014, *Six Achievable Steps For Implementing an Effective Verification Regime For A Nuclear Agreement With Iran"*, Nuclear Verification Capabilities Independent Task Force of the Federation of American Scientist, Second Report, August 6, 2015.
177 Interview with Henry Sokolski, October 16, 2015.
178 Henry Sokolski, Editor: *Falling Behind: International Scrutiny of the Peaceful Atom* (Strategic

safeguarded, given the complexity of the process. The IAEA would therefore fail in its tasks in terms of both timely detection and timely warning. He suggested that the international community should renounce the promotion of civil nuclear energy rather than try to strengthen the safeguards system.

The IAEA is often referred as a technical organization that is capable of verifying the correctness and completeness of a country's declaration on its nuclear activities. However, as the above-mentioned experts note, if we carefully examine past experiences and consider current as well as future possibilities on the basis of concrete cases, it is debatable whether the organization has adequate technical capability to be a safeguards implementing agency.

In this section, the shortcomings of the IAEA safeguards system from technical point of view will be discussed.

3.2. Declared activities: verification of correctness of a country's declaration

Under a NPT comprehensive safeguards agreement, the IAEA is mandated with verifying the correctness of a country's declaration on its nuclear activities[179]. However, there are cases where the IAEA was not able to provide a decisive finding. For example, as Goldschmidt notes[180], the origin of highly enriched uranium detected in a research reactor in Egypt was never identified by the IAEA, and thus the agency could not draw any conclusion on the purpose of that activity[181]. In addition, when the IAEA detected nuclear particles through environmental samplings from an area in Syria where a nuclear reactor was alleged to be under construction, the IAEA was not able to give a definitive answer as to whether those particles had originated from a reactor or from

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Studies Institute, 2008).

Henry Sokolski: Underestimated: Our Not So Peaceful Nuclear Future (Nonproliferation Education Center, 2015).

179 Laura Rockwood and Larry Johnson, "Verification of Correctness and Completeness in the Implementation of IAEA Safeguards: The Law and Practice," Jonathan L. Black-Branch, Dieter Fleck editors, *Nuclear Non-Proliferation in International Law*, *Volume II, Verification and Compliance* (Berlin, Heidelberg: Springer, 2016), p.62.

180 Pierre Goldschimidt, "Safeguards Noncompliance: A Challenge for the IAEA and the UN Security Council," *Arms Control Today*, February 2010, pp.22-27.

181 As Goldschmidt articulates the IAEA did not find this as non-compliance because of that indecisive finding.

other sources[182].

The most notable case in this regard is the Iranian non-compliance case, as explained below.

3.2.1. Iranian case

After the IAEA started its investigation on undeclared Iranian nuclear activities in 2003, the agency identified discrepancies between that country's declaration and the agency's own findings, such as the origins of highly enriched uranium and particles of plutonium which the IAEA had detected through environmental sampling at relevant sites.[183] In 2007, the then IAEA Director General ElBaradei agreed with the Iranian Government on a work plan to solve all these outstanding issues[184]. The IAEA Secretariat, in particular the Safeguards Department of the Secretariat, worked with the Iranian Government over the following six months in accordance with this work plan, and on 22 February 2008 the IAEA Director General presented a report to the Board[185]. The findings and conclusions of the Director General on the outstanding issues presented in the report, however, contained certain ambiguities[186]. The report was very carefully drafted, seemingly so as to avoid definitive conclusions. Its conclusion was that the IAEA regarded two of the main outstanding issues as "consistent with" the Secretariat's findings, and

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[182] IAEA Document, "Implementation of the NPT Safeguards Agreement in the Syrian Arab Republic", Report by the Director General, GOV/2011/30.

[183] IAEA Document, GOV/2003/63, "Implementation of the NPT Safeguards Agreement in the Islamic Republic of Iran, Report by the Director General".

[184] IAEA Document, GOV/2007/48, "Implementation of the NPT Safeguards Agreement in the Islamic Republic of Iran, Report by the Director General", a copy of that work plan (issued also as INFCIRC/711, 27 August 2007) is attached to this report,
https://www.iaea.org/sites/default/files/gov2007-48.pdf.

[185] IAEA Document, GOV/2008/4, "Implementation of the NPT Safeguards Agreement and relevant provisions of Security Council resolutions 1737 (2006) and 1747 (2007) in the Islamic Republic of Iran, Report by the Director General",
https://www.iaea.org/sites/default/files/gov2008-4.pdf.

[186] For example, concerning the origin of uranium particles detected by environmental sampling, the report say, "The Agency concluded that the explanation and supporting documentation provided by Iran regarding the possible source of contamination by uranium particles at the university were not inconsistent with the data currently available to the Agency. The Agency considers this question no longer outstanding at this stage. However, the Agency continues, in accordance with its procedures and practices, to seek corroboration of its findings and to verify this issue as part of its verification of the completeness of Iran's declarations." (emphasis added by the author), Ibid., paragraph 11.

the other two were "not inconsistent"[187]. This very ambiguous working suggests that the IAEA could not pronounce that the declaration of Iran is consistent with its findings. After more than 5 years of investigation, the IAEA was still not in a position to give a definitive answer regarding the correctness of the Iranian declaration. With this Director General's report, the IAEA essentially ceased any further investigations, including regarding the origin of the highly enriched uranium, crucial to understand the nature of Iranian nuclear activities.

The Iranian case showed that the IAEA is not able to technically verify the correctness of a country's declaration even after sustained investigation.

3.2.2. Timely detection of diversion of plutonium

Lyman and Cochran warn that the IAEA does not have the technical capability to detect diversion of plutonium in a timely manner.[188] They argue that material accountancy, which is the key tool for the IAEA to verify the correctness of a country's declaration with regard to nuclear material, cannot provide accurate information on plutonium usages: the large amounts produced at large scale nuclear facilities make it impossible for the IAEA to detect diversion of plutonium before it is used to produce nuclear weapons.

In fact, the problem of material unaccounted for (MUF) has been discussed in the IAEA especially after 1990, when Miller first raised this question[189]. As Shaker illustrates in his study

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[187] The report says to conclude, "The Agency has been able to conclude that answers provided by Iran, in accordance with the work plan, are consistent with its findings — in the case of the polonium-210 experiments and the Gchine mine — or are not inconsistent with its findings — in the case of the contamination at the technical university and the procurement activities of the former Head of PHRC. Therefore, the Agency considers those questions no longer outstanding at this stage. However, the Agency continues, in accordance with its procedures and practices, to seek corroboration of its findings and to verify these issues as part of its verification of the completeness of Iran's declarations", Ibid., paragraph 53.

[188] Edwin S. Lyman, "Can Nuclear Fuel Production in Iran and Elsewhere Be Safeguarded against Diversion?", *Falling Behind: International Scrutiny of the Peaceful Atom,* Strategic Studies Institute, 2008, pp.101-120; Thomas B. Cochran, "Adequacy of IAEA's Safeguards for Achieving Timely Detection," *Falling Behind: International Scrutiny of the Peaceful Atom,* Strategic Studies Institute, 2008:pp.121-157.

[189] Marvin Miller, "Are the IAEA Safeguards on Bulk-Handling Facilities Effective?," Nuclear Control Institute, Washington.

and as it is widely accepted in the safeguards community[190] the timely detection of the diversion of nuclear material is the core of the IAEA safeguards system. Lyman and Cochran suggest prohibiting nuclear activities for which material accountancy does not function properly, such as large scale reprocessing or enrichment. Sokolski is also of the same view. [191]. However, as discussed in this paper, this MUF issue is not the only technical problem for the IAEA safeguards system. Prohibiting certain peaceful nuclear activities because of the MUF issue could cause another problem related to the promotion of the peaceful uses of nuclear energy, which, as noted above, is one of the objectives of the IAEA. As discussed in Chapter III of this paper, prohibiting nuclear activities is not a technical issue, but a political one.

3.3 Detection of undeclared activities: verification of completeness of a country's declaration

In an interview, James Acton said that the biggest technical challenge for the IAEA safeguards is to detect undeclared activities[192]. Detection of undeclared activities has been discussed and remains one of the main issues regarding the effectiveness of the IAEA safeguards since North Korean and Iraqi undeclared nuclear activities came to light in the early 1990s.

As discussed in Chapter II of this paper, in order to strengthen the IAEA capability to detect undeclared nuclear activities, the IAEA has introduced several new tools. The Additional Protocol is the main tool, and it is widely recognized to have strengthened significantly the Agency's capability to detect undeclared nuclear activities, as Carlson, Hooper, Sloss and other experts note[193]. The IAEA Secretariat as well as the IAEA Member States are also of that view.

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[190] Mohamed I. Shaker, *The Nuclear Non-Proliferation Treaty – Origin and Implementation 1959-1979* (London, Rome, New York: OCEANA Publications, 1980), Volume II, Part 5, Chapter 10: "International Safeguards: Article III", pp.691-692.

[191] Henry Sokolski, "Assessing the IAEA's Ability to Verify the NPT," *Falling Behind: International Scrutiny of the Peaceful Atom,* Strategic Studies Institute, 2008, pp.3-61.

[192] Interview with James Acton, October 14, 2015, Washington DC.

[193] Masahiko Asada, "NPT・IAEA Taisei no Shintenkai– Hoshousochikyoukasaku wo chushin ni- (NPT/IAEA New developments of the regime -Focusing on measures to strengthening Safeguards)," *Sekaihonenho*, No. 18 (March 1998), pp.1-36; Richard Hooper, "Strengthening IAEA Safeguard in an Era of Nuclear Cooperation", *Arms Control Today*, November 1995, pp.14-18; David Fischer, "New Directions and Tools for Strengthening IAEA Safeguards," *The*

Supporters of the Additional Protocol, such as Hooper, seem to believe that it is technically possible for the IAEA to give sufficient assurance that there are no undeclared nuclear activities in a country if it has an Additional Protocol in force. However, as Rockwood, Carlson and other prominent experts point out[194] and Ferguson explains, it is not a certainty that the IAEA has such technical capabilities.

Rockwood writes, "For the first year of the implementation of comprehensive safeguards agreements, IAEA safeguards activities were, as a practical rather than legal matter, focused primarily on verifying declared nuclear material at declared facilities. Safeguards were implemented and evaluated on a facility-by-facility basis, rather than by examination of the state as a whole." and further "The flaw in that facility-level approach became evident with the discovery of Iraq's undeclared nuclear activities in 1991."[195] At the same time, quoting the judgment of the former IAEA Director General Hans Blicks, Rockwood also argues that even with an additional protocol in force, it is not possible to provide absolute assurance to prove the absence of undeclared nuclear material or activities, as proving a negative is impossible[196].

The IAEA safeguards system has evolved from the traditional quantitative approach towards a qualitative approach since the early 1990s. Under the traditional quantitative approach, the IAEA's responsibility was to verify the correctness of a country's declaration on its nuclear activities using mainly material accountancy. This is why the IAEA was often referred to

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Nonproliferation Review, Winter 1996, pp.69-76; John Carlson, Victor Bragin, John Bardsley, and John Hill, " Nuclear Safeguards As an Evolutionary System," *The Nonproliferation Review*, Winter 1999, pp.109-117; Victor Bragin, John Carlson, and Russel Leslie, "Integrated Safeguards: Status and Trends," The *Nonproliferation Review*, Summer 2001, pp.102-110; Theodor Hirsch, "The IAEA Additional Protocol: What It Is and Why It Matters," *The Nonproliferation Review*, Fall-Winter 2004, pp.140-163.

194 Carlson, Leslie and Bragin writes in their corroborative paper "Recognizing that it will be never possible to definitively prove a negative (i.E., the absence of undeclared activities), strengthened safeguards measures seek instead to provide the IAEA with a credible level of assurance that there are no undeclared activities.", Victor Bragin, John Carlson, and Russel Leslie, " Integrated Safeguards: Status and Trends," *The Nonproliferation Review*, Summer 2001, p.106.

195 Laura Rockwood, "The IAEA's State-level Concept and the Law of Unintended Consequence," *Arms Control Today*, September 2014, pp.25-26.

196 Ibid., p.29.

as a bookkeeper[197]. Under the qualitative approach, however, the IAEA is expected to act more like a detective in order to verify the completeness of a country's declaration. The question is whether the IAEA has the technical capability to give a credible assurance that there is no undeclared activity. As below, Ferguson provides a useful analysis in this regard, taking Iranian case as an example.

The former IAEA Deputy Director General for Safeguards, Heinonen, stresses that an Additional Protocol provides increased access and information to the IAEA, but there are still a lot of limitations for the IAEA to detect undeclared nuclear material or activities[198]. Ferguson's analysis is insightful in this regard: he argues that there are decision factors in order to implement safeguards measures, namely political acceptability, technical feasibility and effectiveness and resource constraints[199]. Technical feasibility and effectiveness are more relevant for the purposes of this study, as we are focusing on the technical aspects of possible shortcomings. Ferguson indicates, for example, the technical difficulties in detecting an undeclared enrichment plant[200], showing that even with an Additional Protocol and other additional measures, the IAEA is simply not technically able to detect enrichment activity, despite the fact that it is one of the key

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197 Daniel H. Joyner, *International Law and the Proliferation of Weapons of Mass Destruction* (New York: Oxford, 2009), p.22.

198 Interview with Olli Heinonen, October 12, 2015, Washington DC.

199 Charles Ferguson, "Steps towards a Deal On Enhanced Safeguards For Iran's Nuclear Program," *Arms Control Today*, March 2011, pp.8-16.

200 He argues: "Physical constraints impede the capability to detect clandestine enrichment plants. Enrichment plants that use the centrifuge technique emit few if any strong signs, such as uranium leakage, heat emissions, and electronic signals, to indicate that enrichment is occurring. Modern centrifuge enrichment plants emit very little uranium hexafluoride, the gas used in the enrichment process. (The gas is "enriched" by separating U-235 hexafluoride from U-238 hexafluoride and thus increasing the U-235 concentration.) Detection of leakage from the previous stage of the nuclear fuel cycle—the uranium-conversion plant that makes uranium hexafluoride—may be possible, although high-efficiency particulate filters could significantly reduce this leakage.

The energy consumption of a centrifuge enrichment plant is small. Thus, the heat emissions, as shown by infrared radiation, are not easily distinguishable from non-nuclear industrial facilities. Electronic signals might be more detectable. The electrical systems in a centrifuge plant would affect the electrical signals carried by the power lines coming into a plant. In particular, the operation of the spinning centrifuges would impose voltage and frequency distortions—a sort of electronic "fingerprint"—on the power lines. To see this fingerprint, however, the inspectors would need access to these lines, and appropriate electronic filters could reduce or eliminate these signals. Satellite images might reveal buildings that house enrichment facilities, but without human intelligence, confirmation cannot be definitive. In sum, off-site detection of centrifuge enrichment is extremely challenging.", Ibid., pp.9-10.

issues for nuclear non-proliferation. Likewise, Ferguson argues that the limited budget available to the IAEA is also a crucial element affecting the IAEA's capability to detect undeclared activities. As an international organization, the IAEA does not have an unlimited budget, and, as examined in Section 1 of this Chapter, many budgetary constraints stem from its institutional shortcomings.

3. Technologies available to the IAEA and future perspective

Experts in the US Government and in the IAEA have also raised questions as to whether the IAEA has the most relevant and advanced technology to effectively implement its mandate. A senior US Government official with more than twenty years in the field of nuclear non-proliferation notes two main technical shortcomings of the IAEA: one is continuity of knowledge, in other words the continuity of safeguards experts and inspectors; and the other is the IAEA's dependence on commercial actors for procurement of necessary equipment[201].

Regarding continuity of experts and inspectors, the IAEA, like the United Nations. has a staff rotation policy, and with only limited exceptions all staff must leave the organization after a maximum of seven years service. Though inspectors are exempted from this requirement, high-ranking officials are usually recruited from outside the organization, and they also change every five to ten years. In the interview, it was noted that because of this frequent change of personnel, the IAEA is not able to develop a consistent strategy for safeguards technology.

Perkovich has a positive view with regard to the future of the current international safeguards system, although he also admits that technical shortcomings are inherent in the IAEA safeguards system[202]. He stresses possibilities that might mitigate the shortcomings of the current IAEA safeguards system. In his view, additional political arrangements such as a clear agreement on a possible consequence (such as effective sanctions) in the event of non-compliance could help to overcome the technical problems in order to safeguard countries' nuclear activities

[201] Interview with Richard Goorevich, October 9, 2015 and with Kevin Veal, October 15, 2015, Washington DC.
[202] Interview with George Perkovich, October 13, 2015, Washington DC.

more effectively.

In his interview, Acton[203] emphasized that the largest technical challenge of the IAEA safeguards system is the detection of undeclared activities. He stressed that, although there are no promising safeguards measures that enable an international organization to effectively detect undeclared nuclear activities in a country, the importance of the role of the IAEA as an international safeguards institution should not be underestimated. In this connection, he also pointed to the difference between verification and safeguards. Acton suggested examining the verification measures set in force for effective verification in the relevant nuclear disarmament treaties between the United States and the Russian Federation. The most intrusive parts of the verification under these treaties are the verification of warheads. Should one side insist that the object concerned is not a warhead, it is technically extremely difficult to verify this claim. However, when it comes to safeguards, technically perfect verification is not necessarily required. The objective of nuclear safeguards is to prevent a country from acquiring nuclear weapons: it is not necessarily meant to be a perfect verification. He believes confidence-building measures would play an important role in this regard, and suggested examining the Treaty on Conventional Armed Forces in Europe (CFE Treaty) documents as they include extensive confidence building measures.

Goorevich presented insightful views with regard to other types of safeguards systems that could possibly complement the current IAEA safeguards system[204]. He also noted that the discontinuity of staff results in technical problems for the IAEA, stating bluntly that there is no continuity of the technological capabilities in the IAEA.

3.5. Conclusion

As examined above, a number of nuclear experts recognize various technical shortcomings of the IAEA safeguards system. However, the majority of them seem to believe that we can

[203] Interview with James Acton, October 14, 2015, Washington DC.
[204] Interview with Richard Goorevich, October 9, 2015, Washington DC.

overcome such shortcomings by developing the IAEA safeguards system. Perhaps this would be possible if we could drastically change the system, even to its core.

However, most of the technical shortcomings articulated above would be difficult to overcome as long as the IAEA has a large number of countries to which its safeguards must be applied. The universality of the IAEA safeguards undermines its technical effectiveness and capability, as it does not have enough resources to implement technically effective safeguards. The requirement to be cost effective as an international organization also hinders the IAEA to apply the strongest safeguards measures.

The nature of the universal international organization also hinders the development of the most appropriate technologies for safeguards, and the maintenance or training of capable staff

In a similar fashion as its institutional and political shortcomings, technical shortcomings are also inherent in the IAEA safeguards system.

Section 4

CONCLUSION

International safeguards for nuclear non-proliferation refers usually to the safeguards of the International Atomic Energy Agency (IAEA).

As examined in the previous Sections, especially in Section 1 of this Chapter, strengthening safeguards for nuclear non-proliferation has been always discussed in terms of strengthening the IAEA safeguards.

The aim of the international community after the Second World War from the beginning has been to establish an international, in other word, a universal safeguards system, and the IAEA was created to substantiate this aim. In particular, after the NPT entered into force and the IAEA was entrusted to verify the compliance of the NPT non-nuclear weapon states with their non-proliferation obligations, the IAEA safeguards has been regarded as the only system which could ensure non-diversion of nuclear material to weapons. It therefore seems natural that the discussion on how to strengthen safeguards for nuclear non-proliferation has centered on strengthening the existing IAEA safeguards system.

However, as examined in this Chapter, the IAEA, as a universal international organization, has fundamental problems in all relevant aspects: institutional, political, and technical. It seems that these shortcomings stem from the nature of the IAEA safeguards system. Institutional and political shortcomings stem mainly from the lack of political support, the lack of flexibility to change as an established organization, the lack of reciprocity, and the lack of effective enforceability. Technical shortcomings stem mainly from the requirements of cost-effectiveness and the institutional constrains of the IAEA as a universal international organization that covers a large number of countries, which have various political, industrial and economic situations.

As identified in this Chapter, for shortcomings of the IAEA safeguards system, the lack of reciprocity seems to be the main problem, which is inherent in the IAEA safeguards system.

With regard to the lack of enforceability, given the gravity of the consequence should the safeguards fail, it is essential to have effective enforcement to deter countries from not complying

with non-proliferation obligations. In addition, the element of non-discrimination, which is required for the international safeguards system in order to make it as universal as possible, should be also reconsidered as it causes constrains to implement effective safeguards.

As for rationality and cost-effectiveness, these could be also reexamined under a new system that could be quantitatively much smaller and qualitatively more homogenous.

Chapter IV

MUTUAL SAFEGUARDS SYSTEM AS A MEANS TO COMPLEMENT THE TRADITIONAL INTERNATIONAL SAFEGUARDS

In Chapters II and III of this paper, the IAEA safeguards system was examined as a means to assure nuclear non-proliferation, and the institutional, political and technical shortcomings of this system were identified.

In this Chapter, existing regional safeguards systems will be examined, with a view towards considering whether those systems could function as a means to complement the international safeguards system.

Section 1

BRAZILIAN-ARGENTINE AGENCY FOR ACCOUNTING AND CONTROL OF NUCLEAR MATERIAL (ABACC)[205]

1.1. Introduction

In 1997, the IAEA Board of Governors adopted a Model Additional Protocol (AP) after almost three years of extensive discussions on how to strengthen the IAEA safeguards system through creating additional legal authority for the IAEA to obtain more information and more access. These discussions were mainly a result of the Iraq case, where the IAEA had not been able to detect clandestine activities in that country.

As of the end of 2014, 124 additional protocols with the IAEA are in force[206]. Among the 48 Participating Governments of the Nuclear Suppliers Group, only Brazil and Argentina have not yet concluded an Additional Protocol (AP), and Brazil in particular has a clear position not to do so in the near future[207]. The argument of these two countries is that the Brazilian-Argentine Agency

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[205] In Portuguese "Agência Brasileiro-Argentina de Contabilidade e Controle de Materiais Nucleares (ABACC)" and in Spanish "La Agencia Brasileño-Argentina de Contabilidad y Control de Materiales Nucleares (ABACC)".

[206] IAEA Annual Report for 2014, https://www.iaea.org/sites/default/files/gc59-7_en.pdf.

[207] Mark Hibbs, "Nuclear Suppliers Group and the IAEA Additional Protocol," *Nuclear Energy*

for Accounting and Control of Nuclear Material (ABACC) is in force between them, and therefore they do not require an AP [208]. It is also important to note that the Common System for Accounting and Control of Nuclear Materials (SCCC)[209], which the ABACC is based on, was established in 1991, before the aforementioned discussions on strengthening the IAEA safeguards system and the negotiations on the Model Additional Protocol started.

Marzo[210], the former inspector of the ABACC and the former Director of Safeguards Department of the IAEA, stressed the merits of regional safeguards arrangements as a complement to the international safeguards system. He articulated how, even though the international community still believes that the IAEA safeguards system is the sole appropriate safeguards system for nuclear non-proliferation, in reality the needs of safeguards have changed since the 1990s. Marzo stated that a symmetrical relationship among member states is required for a safeguards system to effectively function: for example, he noted that the safeguards of the Treaty for the Prohibition of Nuclear Weapons in Latin America and Caribbean did not function well, but argued that was because of asymmetrical nature of two of its member states, namely Chile and Uruguay[211]. He also noted that the ABACC does not suffer from the discontinuity of staff that the IAEA does.

Marzo expressed his regret that the IAEA and the international community was not willing to recognize adequately the importance of the inspection mechanism of the ABACC and other such regional arrangements. He stressed that bilateral safeguards arrangements were often more effective than broader international ones. In Marzo's view, the ABACC was a "game changer" of the international safeguards system when it was established in the early 1990s, and yet it had not

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Brief, August 18, 2010, http://carnegieendowment.org/2010/08/18/nuclear-suppliers-group-and-iaea-additional-protocol/ep.

[208] Statements by the Brazilian representative at the 2010 and 2015 NPT Review Conference

[209] In Portuguese "Sistema Comum de Contabilidade e Controle de Materiais Nucleares (SCCC). (SCCC)" and in Spanish "El Sistema Común de Contabilidad y Control de Materiales Nucleares (SCCC)".

[210] Interview with Marco Marzo, October 17, 2015, Boston.

[211] Uruguay does not have any nuclear program, and its constitution does not allow the utilization of nuclear power. Chile, on the other hand, has a extensive nuclear programs.

gained appropriate recognition.

This section will examine the background of the establishment of the ABACC, its work, and the main differences with the IAEA safeguards system.

1.2. Establishment of the ABACC

The ABACC was established in December 1991, based on the "Agreement Between the Republic of Argentina and the Federative Republic of Brazil For the Exclusively Peaceful Use of Nuclear Energy", signed at Guadalajara, Mexico, on July 18, 1991[212]. Before the conclusion of this agreement, there were two important steps leading to the creation of the ABACC, namely the Joint Communiqué of Buenos Aires[213] in July 1990, and the Declaration on a Common Nuclear Policy[214] in November 1990. Both the Communiqué and the Declaration were signed by the Presidents of Brazil (President Fernando Collor) and Argentina (President Carlos Menem).

In the Communiqué of Buenos Aires, the Presidents jointly emphasized the importance of the Argentinian and Brazilian nuclear programs, and the need to strengthen cooperation and complementation between both countries in this field.

In the Declaration on a Common Nuclear Policy, both Presidents decided: 1) to approve the Common System for Accounting and Control of Nuclear Materials (SCCC); 2) to establish activities related to the nuclear safeguards; 3) to start negotiations with the International Atomic Energy Agency (IAEA) for promoting the signature of a joint safeguards agreement based on the SCCC; and 4) to take initiative on allowing the full enforcement of the Treaty for the Prohibition of Nuclear Weapons in Latin America (Tlatelolco Treaty), once the safeguards agreement with the IAEA was concluded.[215]

The activities for nuclear safeguards include: 1) exchange of the respective descriptive

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[212] "Agreement Between the Republic of Argentina and the Federative Republic of Brazil For the Exclusively Peaceful Use of Nuclear Energy", 18 July 1991, http://www.abacc.org.br/wp-content/uploads/2009/10/bilateral_agreement.pdf.
[213] "Joint Communiqué of Buenos Aires", July 6 1990, http://www.abacc.org.br/?p=621&lang=en
[214] "Declaration on a Common Argentine-Brazilian Nuclear Policy", 28 November 1990, http://www.abacc.org.br/?p=629&lang=en.
[215] Ibid.

listings of all their nuclear facilities; 2) exchange of the statements of initial inventories of the nuclear materials existing in each country; 3) first reciprocal inspections to the centralized record systems; and 4) presentations of the system of records and reports to the IAEA. These lead to the establishment of the bilateral safeguards system between Argentina and Brazil. In fact, both countries already had a mutual inspection regime, under which one inspection of each country had been implemented, in December 1990 and December 1991 respectively. The ABACC started its official work in July 1992.

In January 1991, Brazil and Argentina exchanged nuclear material inventory report lists and nuclear facilities lists, and started ad hoc inspections..

Subsequent to this process, Brazil and Argentina signed the Agreement for the Exclusively Peaceful Use of Nuclear Energy (Bilateral Agreement) on July 18, 1991, which created the ABACC for the application and management of the SCCC. This Bilateral Agreement entered into force on December 13, 1991. The ABACC was formally established in the same month, and commenced full operations in July 1992.

Immediately after the establishment of the ABACC, the Agreement between the Republic of Argentina, the Federative Republic of Brazil, the Brazilian-Argentine Agency for Accounting and Control of Nuclear Materials and the International Atomic Energy Agency for the Application of Safeguards[216], the so called "Quadripartite Agreement", was signed by Brazil, Argentina, the IAEA and the ABACC on 13 December 1991, to implement the IAEA safeguards in consistency with the SCCC in both countries. It was remarkable that the Quadripartite Agreement was negotiated and concluded almost in parallel with the work to establish the ABACC, and required only six months after the bilateral agreement was signed.

1.3. Work of the ABACC

[216] "Agreement between the Republic of Argentina, the Federative Republic of Brazil, the Brazilian-Argentine Agency for Accounting and Control of Nuclear Materials and the International Atomic Energy Agency for the Application of Safeguards," http://www.abacc.org.br/wp-content/uploads/2009/10/quadripartite_ingles.pdf.

1.3.1. Structure of the ABACC

The ABACC consists of a Commission and a Secretariat. The Commission's function is similar to that of the Board of Governors of the IAEA: its main task is guiding and setting the technical and political direction for the activities of the Secretariat, and it is responsible for the approval of the decisions, resolutions and regulations applied to the performance of the ABACC. The Commission also approves the General Procedures and the Manuals for application of nuclear safeguards, prepared by the Secretariat and used in safeguard missions. This is one of the differences between the ABACC Commission and the IAEA Board of Governors: the IAEA Board tasks the IAEA Secretariat with such procedural and technical work, and generally does not review in detail such documents. The Commission has the responsibility to inform both the Governments of Argentina and Brazil of any eventual abnormalities occurring within the SCCC, similar to how the IAEA reports to the UN Security Council. The Commission has four members, with each of the two countries having two members. The current Commission consists of: 1) the Director General of the Brazilian Ministry of Foreign Affairs; 2) the President of the National Commission of Nuclear Energy of Brazil; 3) the General Director of the International Security, Nuclear and Space Affairs of the Ministry of Foreign Affairs and Worship of Argentina; and 4) the Chairman of the Board of the Nuclear Regulatory Authority of Argentina[217].

The ABACC Secretariat is responsible for performing the activities required for the application of the SCCC on the basis of the guidelines established by the Commission, and it represents the ABACC in relation with the Argentine and Brazilian national authorities.

The Secretary and the Deputy Secretary are the highest ranking officials in the Secretariat. One of these officials is of Argentinean nationality, and the other Brazilian. Each technical section of the ABACC is jointly managed by both an Argentinian and a Brazilian officer. The other two sections, administrative financing on the one hand and institutional relations on the other, are each managed by only one officer, which may be from either country. The inspectors of the ABACC are temporary officers who only perform ABACC functions during the ABACC

[217] ABACC website, http://www.abacc.org.br/?page_id=1875&lang=en.

safeguards missions.

1.3.2. Task of the ABACC

In practice, the activities of the ABACC are categorized under three pillars: applying safeguards; training of technical staff and inspectors; and technical cooperation with organizations in related areas. However, as Article VII of the Bilateral Agreement stipulates, the objective of the ABACC is "to administer and implement the SCCC in accordance with the provisions of the present Agreement", meaning that the application of safeguards is the most important mission of the ABACC. The objectives of the IAEA enshrined in its Statute, in contrast, include not only safeguarding peaceful nuclear activities against military uses but also promoting peaceful nuclear activities. Therefore, while the IAEA has both promotion and regulation as its objectives, the ABACC has only one objective, namely the safeguards. In this connection, it is also important to mention that the Argentine-Brazil Bilateral Agreement has a basic undertaking that binds both countries to use their nuclear materials and facilities exclusively for peaceful purposes. All military activities in Brazil in the nuclear field are subject to ABACC safeguards. For example, if a centrifuge enrichment plant is on a Navy base, the plant will be subject to inspection.

1.3.3. Common System for Accounting and Control (SCCC)

As mentioned above, the objective of the ABACC is to administer and implement the SCCC. The Bilateral Agreement entitles the ABACC to agree on "General Procedures" and "Implementation Manuals" of the SCCC to fulfill these tasks. The General Procedures of the SCCC consist of three parts: the first part contains the requirements for the licensing of a nuclear facility from the safeguards viewpoint; the second part includes the procedures for the application of the SCCC by the national authorities in the nuclear field; and the third part is the procedures for the regional application of the SCCC by the ABACC[218]. The General Procedures define: 1) the

[218] ABACC website, http://www.abacc.org.br/?page_id=157&lang=en.

starting point of safeguards in a given facility; 2) procedures for the presentation of data on the design of the facilities to the ABACC; 3) accounting and operational records; 4) national and international transfers of materials; and 5) the purpose, intensity and scope of inspections for verification of the nuclear material inventories and their variations, in addition to the provisions for the application of containment and surveillance measures. The Manuals complementing the General Procedures, namely the Design Information Questionnaire and the Application Manual, are regarded as the instruments used for verification and control[219]. The General Procedures and the two Manuals can be understood as comparable to the Subsidiary Arrangements of the IAEA comprehensive safeguards agreement.

1.3.4. Safeguards

Based on the SCCC, the ABACC conducts its safeguards activities and verifies that there are no discrepancies between declared and existing materials. If any discrepancy is found, they take the necessary steps to resolve the situation. In the ABACC system, Brazilian inspectors perform the inspections in Argentina and Argentinian inspectors in Brazil.

The types of inspections by the ABACC are almost the same of those of the IAEA, and include, for example, "Physical Inventory Verification" or "Design Information Verification" similar to the IAEA. However, the "Interim Inspections" provision of the ABACC does not exist in the IAEA safeguards. The Interim Inspections of the ABACC take place several times between two Physical Inventory Verifications, and aim at verifying the production and/or transfer of nuclear material between the Physical Inventory Verifications. In addition, the "Unannounced Inspections" of enrichment facilities under the ABACC is a unique measure of the ABACC, and, again, one of the key differences with the IAEA. This unannounced inspection system started at the beginning of 1995. Under this system, the facility operators will be notified of the inspection only when the inspectors arrive at the facility, and they can delay the inspection for a maximum of only two hours. This kind of unannounced inspection is only possible because neither country

[219] http://www.abacc.org.br/?page_id=162&lang=en.

requires prior permission to enter the other country. The IAEA Model Additional Protocol provides for IAEA inspectors to obtain multiple entry visas precisely to address this issue.

The ABACC has conducted 118 inspections in the two countries (70 in Argentina and 48 in Brazil), amounting to a total availability of 1,160 inspector-days in 2013[220].

1.3.5. Quadripartite Agreement

As the Government of Argentina and the Government of Brazil decided in the 1990 Declaration on a Common Nuclear Policy, both Governments and the ABACC have signed a safeguards agreement with the IAEA in 1991[221], based on the provisions of the SCCC. This safeguards agreement, referred to as the Quadripartite Agreement, is an INFCIRC/153 type agreement, and it includes essentially all measures required as a full-scope safeguards agreement. In addition, however, the agreement covers also military activities. Since the entry into force of this Quadripartite Agreement in 1994, safeguards inspections in Argentina and in Brazil have generally been conducted jointly by the ABACC and the IAEA, so as to optimize human, financial and material resources. Inspections such as short-term notification inspections and unannounced inspections, or those classified within the criteria of the SCCC, may be conducted independently from the IAEA. Even when the inspections are conducted jointly, the evaluation of the results is always independent, as established in the Quadripartite Agreement.

1.4. Differences between the ABACC and the IAEA

Marzo, a former planning and evaluation officer of the ABACC and the former Director of the IAEA Safeguards Department, explained at a workshop organized by the Institute for Science and International Security (ISIS) in 1996 that, as a practical matter, it was difficult for any

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[220] ABACC Annual Report 2013, available at, http://www.abacc.org.br/wp-content/uploads/2014/08/relatorio2013Site.pdf.

[221] "Agreement between the Republic of Argentina, the Federative Republic of Brazil, the Brazilian-Argentine Agency for Accounting and Control of Nuclear Materials and the International Atomic Energy Agency for the Application of Safeguards," http://www.abacc.org.br/wp-content/uploads/2009/10/quadripartite_ingles.pdf.

clandestine activities not to be detected under the ABACC, as the Brazilian and Argentinian nuclear communities are very small.[222] Marzo described also that, in his view, it was much easier to obtain access to places and information in a bilateral regime than in an international one[223]. There generally already exists, or is relatively easily built, a relationship of mutual trust in bilateral regimes, so as to allow inspectors for access informally. This mechanism works also in case of solving anomalies. In the ABACC system, if inspectors find an anomaly, it will inform the ABACC's Secretary immediately, which then informs the members of the Commission. The member of the Commission from the Foreign Ministry then informs the Foreign Minister, and the Foreign Minister informs the President, who acts accordingly to resolve the issue. This entire process requires only two or three days. In contrast, multiple political and procedural issues within the IAEA result in a potential delay of years before an anomaly is solved.

Goorevich pointed out that the Brazilian-Argentine Agency for Accounting and Control of Nuclear Material (ABACC) has continuity in its institution, and he also stressed that the ABACC safeguards have much higher standards than those of the IAEA. He concluded that there is a significant role for regional arrangements to play[224].

1.5. Conclusion

The ABACC's safeguards measures are very similar to those of the IAEA. However, because it is a bilateral arrangement that is relatively unaffected by the complexities of international politics and because there are aspects that are only possible in a bilateral relationship, the ABACC's safeguards can not be considered comparable to the IAEA's in terms of its practice, implementation and effect.

Since the purpose of safeguards is to deter countries from developing a nuclear weapon, the safeguards must have capabilities for both adequate deterrence and timely detection. As the IAEA's experiences in relation with North Korea, Iraq and Iran show, it is also crucial, perhaps

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222 Interview with Marco Marzo, October 17, 2015, Boston.
223 Ibid.
224 Interview with Richard Goorevich, October 17, 2015, Washington DC.

even more crucial, that any safeguards system has enforcement capability, namely the ability to force a country to comply with its obligations, or to reconcile the situation once any clandestine activity is detected. The IAEA does not have this power. Whether the ABACC does have such power is a topic for further debate. Marzo also agreed with Goorevich regarding the lack of continuity of IAEA safeguards experts, which compares unfavorably with the ABACC. Marzo stressed that bilateral safeguards arrangements are often more effective than a broader international arrangement.[225].

[225] Interview with Marco Marzo, October 17, 2015, Boston.

Section 2

THE EUROPEAN ATOMIC ENERGY COMMUNITY (EURATOM)

2.1. Introduction

The EURATOM (the European Atomic Energy Community) is a regional nuclear safeguards arrangement similar to the ABACC. The obvious difference between the two is that while the ABACC covers only two countries, the EURATOM covers all EU Member countries, and also more importantly the EURATOM is a supranational institution with the authority to impose sanctions directly on nuclear operators[226].

In the context of Nuclear Weapons Free Zones, Kane refers to the EURATOM along with the ABACC as two distinct regional verification approaches that could inform the Middle East WMD Free Zone negotiators[227]. Howlett suggests that the EURATOM is a very interesting "empirical example" [228] of what might be termed a regional nuclear control or monitoring organization that monitors the activities of nuclear operators throughout the territorial boundaries of the Member States, while the Governments of these Member States are not directly involved that process. Mallard argues that the EURATOM Treaty, which the EURATOM is based on, provides interesting technical provisions, particularly regarding: 1) safeguards against the diversion of fissile materials by state and non-state actors; 2) confidence-building measures for state actors when they establish research and development in nuclear technologies; and 3) fuel supply assurances for state actors[229].

In this section, firstly, the background of the establishment of the EURATOM will be reviewed; secondly, the work of the EURATOM as a regional and supranational safeguards

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[226] Piotr Szymanski, "The EURATOM Regional Safeguards System," presentation to the IAEA Forum on a Middle East NWFZ, Vienna, Austria, November 21, 2011, p.1.
[227] Chen Kane, "Planning Ahead: A Blueprint to Negotiate and Implement a Weapon-of-Mass-Destruction-Free Zone in the Middle East," *CNS Occasional Paper No. 22*, April 2015, p.54.
[228] Darryl A. Howlett, *EURATOM and Nuclear Safeguards* (New York: Palgrave Macmillan, 1990), P.6.
[229] Gregoire Mallard, "Can The EURATOM Treaty Inspire The Middle East? The Political Promises of Regional Nuclear Communities," *Nonproliferation Review*, Vol.15, No.3, November 2008, p.459.

organization will be examined; and thirdly, a comparison will be made with the IAEA safeguards system.

2.2. Establishment of the EURATOM

The EURATOM was established as a result of the initiative of six European Countries (France, West Germany, Italy, The Netherlands, Belgium and Luxembourg) in January 1958, in order to meet energy challenges after the Second World War.

Cooperation between the six countries in the field of nuclear energy had already started in 1955. Prior to that, the European Coal and Steel Community (ECSC) was established in July 1952, as the first achievement of a supranational Europe. A cooperation framework in the nuclear field was initiated due to the fear that the ECSC would not function as an integrated community to the extent that had been hoped. Szymanski explains that it was also a reflection of the then prevailing concerns about the security of energy supplies. Developing nuclear energy represented a challenge for any medium or small state on its own, and international cooperation was thought to provide a model for developing this new industry.[230]

To prepare a report on the creation of a European common market, a preparatory committee was established in 1956. This committee proposed two projects in April 1956: 1) the creation of a generalized common market; and 2) the creation of an atomic energy community. These proposals were adopted as the Treaties of Rome in March 1957 and one of these treaties, the European Atomic Energy Community (EURATOM) Treaty, which established the EURATOM, entered into force on January 1, 1958. EURATOM commenced its operation as a safeguards organization in 1960.

2.3. Work of the EURATOM

The EURATOM is a legal entity of 28 Member States governed by the EU institutions,

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[230] Piotr Szymanski, "The EURATOM Regional Safeguards System," presentation to the IAEA Forum on a Middle East NWFZ, Vienna, Austria, November 21, 2011, p.1.

mainly the European Council, the European Parliament, the European Commission, and the Court of Justice of the European Union. While it is an independent institution from the EU, its structure is almost identical with that body, and the EURATOM's membership covers all EU member states, regardless of whether a particular state engages in the use of nuclear energy.[231] Under the EURATOM Treaty, the European Commission is charged with the implementation of the EURATOM safeguards.[232] The EUARATOM Safeguards Inspectorate, based in Luxembourg, is an organization of the European Commission.

The EURATOM's main objectives are to: 1) contribute to the formation and development of Europe's nuclear industry; 2) enhance security of energy supply; 3) guarantee high standards of safety for the public and workers; and 4) ensure that nuclear materials are not diverted from intended purposes[233].

With regard to the safeguards, the EURATOM Treaty stipulates basic undertakings under Chapter 7. The relevant articles of this Chapter are from 77 to 85.

Article 77 stipulates the obligations of the EURATOM as below:

"In accordance with the provisions of this Chapter, the Commission shall satisfy itself that, in the territories of Member States: (a) ores, source materials and special fissile materials are not diverted from their intended uses as declared by the users; (b) the provisions relating to supply and any particular safeguarding obligations assumed by the Community under an agreement concluded with a third State or an international organization are complied with."

In this sense, it is understood that the EURATOM safeguards have two main objectives: one, ensuring that nuclear material is not diverted from its intended use as declared by the users, and second, guaranteeing that the Community complies with its international obligations concerning

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231 Nuclear power plants generate almost 30% of the electricity produced in the EU. There are 130nuclear reactors in operation in fourteen EU countries, https://ec.europa.eu/energy/en/topics/nuclear-energy.

232 Directorate E under the Directorate-General for Energy of the Commission is in charge of the EURATOM safeguards. Paul Meylemans, "Verification of correctness and completeness of operators' declarations by EURATOM Safeguards," European Commission paper, October 21, 2014.

233 European Nuclear Society "50 years of the EURATOM Treaty: reflecting on the past, safeguarding the future," http://www.euronuclear.org/e-news/e-news-16/euratom-treaty.htm.

the supply and use of nuclear materials, including the non-proliferation of nuclear weapons[234].

Other Articles of Chapter 7 of the EURATOM Treaty important for the purposes of this study are Articles 78, 79, 81, 82 and 83. Article 78 stipulates the obligation of operators to declare to the Commission their nuclear activities and the obligation of the Commission to approve the technique to be used for chemical processing of irradiated materials, which could be sensitive for nuclear non-proliferation.

Article 79 is about operating records to be kept and produced, though it stipulates the nature and extent of the requirements shall be defined in a regulation made by the Commission and approved by the Council. Article 81 stipulates inspection procedures, Articles 82 outlines the procedures in case of any infringement in verification, and Article 83 concerns the sanctions in the event of an infringement to be imposed by the Commission.

Under the EURATOM safeguards, 1,234 nuclear installation inspections were carried out in 2014, equaling 3,793 person-days on inspection (PDI). Out of the 1,234 inspections carried, 643 were joint inspections together with the IAEA as foreseen by the Safeguards Agreements with the IAEA.[235]

2.4. Differences between the EURATOM and the IAEA

While the objective of the ABACC is to control nuclear activities so that they remain peaceful, the EURATOM's main objectives include not only to safeguard nuclear activities, but also to promote such activities. In this sense, the EURATOM has the same tasks as the IAEA. However, the difference between their respective objectives in terms of safeguards is significant: the EURATOM's safeguards are designed to prevent nuclear material to be diverted to unintended purposes,[236] regardless what kinds of purpose those may be. The IAEA safeguards,

[234] EURATOM "Nuclear Safeguards Brochure", October 2014, p.1.
[235] Report on the Implementation of Euratom Safeguards in 2014, https://ec.europa.eu/energy/sites/ener/files/documents/20151211%20Annual_Report%202014.pdf.
[236] Article 77 of the EURATOM treaty stipulates, that ores, source materials and special fissile materials are not diverted from their intended uses as declared by the users.

on the other hand, aims at preventing diversion from peaceful purposes to military ones[237]. In addition, the EURATOM safeguards cover not only source materials and special fissile materials, but also ores under its safeguards system.

More importantly, in contrast to the IAEA's limited access even with the IAEA Additional Protocol, EURATOM inspectors have access rights at all times to all places, data, and persons dealing with materials, equipment, or facilities subject to safeguards in order to verify compliance. The EU Court of Justice, if necessary, can enforce this right of access.[238] This is similar to the freedom of movement enjoyed by nationals of Argentina and Brazil with respect to their two countries and, henceforth, by inspectors under the ABACC – freedom of movement within the territory is a fundamental pillar of the EU, meaning that, being nationals of EU countries, inspectors are also able to travel freely across EU borders, and can engage in inspections at any time.

Article 88 of the EURATOM treaty stipulates the sanctions mechanism of the EURATOM.[239] The fundamental difference with the IAEA system, under which any Permanent

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[237] The IAEA NPT safeguards' objective is to prevent diversion of nuclear material required to be safeguarded under the Agreement to nuclear weapons or other nuclear explosive devices (Paragraph 19 of the IAEA NPT safeguards (INFCIRC/153)).

[238] Article 81 of EURATOM Treaty.

[239] Article 88 of EURATOM Treaty.

1. In the event of an infringement on the part of persons or undertakings of the obligations imposed on them by this Chapter, the Commission may impose sanctions on such persons or undertakings.

These sanctions shall be in order of severity:

(a) a warning;

(b) the withdrawal of special benefits such as financial or technical assistance;

(c) the placing of the undertaking for a period not exceeding four months under the administration of a person or board appointed by common accord of the Commission and the State having jurisdiction over the undertaking;

(d) total or partial withdrawal of source materials or special fissile materials.

2. Decisions taken by the Commission in implementation of paragraph 1 and requiring the surrender of materials shall be enforceable. They may be enforced in the territories of Member States in accordance with Article 164.

By way of derogation from Article 157, appeals brought before the Court of Justice of the European Union against decisions of the Commission which impose any of the sanctions provided for in paragraph 1 shall have suspensory effect. The Court of Justice of the European Union may, however, on application by the Commission or by any Member State concerned, order that the decision be enforced forthwith.

There shall be an appropriate legal procedure to ensure the protection of interests that have been prejudiced.

Member of the Security Council can prevent enforcement action, there is no country that has a right of veto against sanctions or other methods of enforcement in the EURATOM system.

Furthermore, the EURATOM's safeguards covers two nuclear weapon states' nuclear activities, namely those of France and the United Kingdom. There are no differences regarding inspection obligations between those two states on the one hand, and the other, non-nuclear weapon states, on the other hand.

For EURATOM safeguards, the Commission has considerable authority to carry out its safeguards obligations in accordance with the EURATOM Treaty.

2.5. Conclusion

The EUARTOM is a regional safeguards system; however, contrary to the ABACC, it is a multilateral institution that involves both nuclear weapon states and non-nuclear weapons states as its members. More importantly, it is a supranational institution with enforcement capability. This institution provides for reciprocity between the member states and the institution, and also for reciprocity in terms of the rights and obligations between nuclear weapon states and non-nuclear weapon states.

Once again, the symmetrical nature of the relationship that is visible within the ABACC framework allows for the EURATOM to engage in more effective enforcement: though there is clearly a significant variance in political and economic might between EU member states, the formal arrangement is that all EU member states are equal, and have equal say in policy and other matters. This is a marked difference from the United Nations, in particular the Security Council, where five states wield immense (and arguably disproportionate) power to frame international action.

Finally, as the objective of the EURATOM is to prevent diversion of nuclear materials from

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3. The Commission may make any recommendations to Member States concerning laws or regulations which are designed to ensure compliance in their territories with the obligations arising under this Chapter.
4. Member States shall ensure that sanctions are enforced and, where necessary, that the infringements are remedied by those committing them.

intended purposes, one can say that it has more stringent objectives than the IAEA.

Section 3

MERITS OF MUTUAL SAFEGUARDS SYSTEM

3.1. Introduction

In Chapter III of this study, six areas inherent to the IAEA NPT safeguards system where shortcomings exist are identified. These are: 1) reciprocity; 2) necessary political support; 3) effective enforceability; 4) the flexibility to change as an established organization; 5) cost-effectiveness; and 6) technical capability.

This Section examines whether non-universal safeguards systems such as the ABACC and the EURATOM could contribute to resolving or at least minimizing these problems, and if they could, in what manner.

Among the problems listed above, 1) reciprocity, 2) necessary political support, and 3) effective enforceability are, in general, the key elements required for an effective safeguards system. These were already required for international safeguards before the establishment of the current IAEA NPT safeguards system. The other three, 4) flexibility to change as an established organization; 5) cost-effectiveness; and 6) technical capability are identified as posing specific problems that stem from the nature of the IAEA NPT safeguards system as a universal system.

We first examine the key elements and whether mutual safeguards system could meet the requirement, and then whether and how mutual safeguards system could contribute to international nuclear non-proliferation by overcoming the other three elements of the problems exhibited by the IAEA NPT system.

3.2. Mutual safeguards system and the key elements required for an effective safeguards system

3.2.1. Reciprocity

Chapter III of this study noted that there is a lack of reciprocity in the IAEA NPT safeguards system in two aspects. Firstly, there is unequal treatment with regard to safeguards obligations between nuclear weapon states and non-nuclear weapon states. In the IAEA NPT safeguards framework, only non-nuclear weapon states have the obligation to accept the IAEA

safeguards. The other lack of reciprocity is the imbalance of the "bargain" between nuclear weapon states and non-nuclear weapon states with regards to the two objectives of the IAEA. The promotion of peaceful uses of nuclear energy, one of the two objectives of the IAEA, was designed to provide non-nuclear weapon states with reciprocity; non-nuclear weapon states accept safeguards, and, in return, they can receive assistance from nuclear weapon states to promote their nuclear activities. However, strengthening safeguards and promoting uses of nuclear energy can be often contradictory, and therefore there is no truly reciprocal relation between nuclear weapon states and non-nuclear weapon states. This situation is even starker when a country does not need any assistance from the outside to promote its nuclear activities: the IAEA safeguards was originally designed so that countries would accept safeguards in return for assistance from the IAEA or other countries[240]. Should a country not require assistance to develop a nuclear program, the assumption behind the IAEA safeguards system fails.

Regarding safeguards systems other than the IAEA, experts such as Carlson, Marzo, Gonzales, Mallard, and Kane usually refer only to "regional" safeguards arrangements[241], and do not explicitly discuss the reciprocity of other possible safeguards systems. However, what could be understood from their studies is that both the ABACC and the EURATOM do not have the same issues in terms of reciprocity as the IAEA. In the case of the ABACC, it is very clear that reciprocity is ensured with regard to safeguards obligations, as both countries are non-nuclear weapon states, have the same obligations under the NPT, and also share the same objective under their bilateral agreement. There is no imbalance between haves and have-nots.

Likewise, under the EURATOM, although there are some differences in treatment between

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[240] India, one of the non-States Parties to the NPT, has nuclear facilities that are not safeguarded by the IAEA, as the country developed such facilities indigenously.

[241] John Carlson, "Possible Future Regional Safeguards Arrangements," Presentation to the Annual Meeting of the Institute of Nuclear Materials Management, Palm Desert, California, July 17-21, 2011; M. Marzo, H. Lee Gonzales, M. C. L. Iskin, H. Vicens, "Regional Safeguards Arrangements: The Argentina-Brazil experience," IAEA-SM-346/113; Chen Kane, "Planning Ahead: A Blueprint to Negotiate and Implement a Weapon-of-Mass-Destruction-Free Zone in the Middle East," *CNS Occasional Paper*, No. 22, April 2015; Gregoire Mallard, "Can the EURATOM Treaty Inspire the Middle East? - The Political Promises of Regional Nuclear Communities," *Nonproliferation Review*, Vol.15, No.3, November 2008.

two nuclear weapon states, the UK and France, and the other EURATOM member states, all member states have the obligation to accept the EURATOM safeguards, and there are no differences in the implementation of inspections. In other word, the EURATOM safeguards system is reciprocal, as it covers only civilian nuclear activities and its objective is "ores, source materials and special fissile materials are not diverted from their intended uses as declared by the users" (Article 77). However, the reciprocity of the EURATOM should also be understood in terms of the relationship between the EURATOM, as a supranational institution, and all EURATOM member states. The EURATOM provides services to its member states as stipulated in the EURATOM Treaty, and the member sates accept its safeguards in return. As long as all EURATOM member states have equal rights and obligations under the EU and the EURATOM Treaty, and as long as the EURATOM functions as a supranational institution, the reciprocity is ensured.

3.2.2. Political support

The problem of the IAEA with regard to the lack of political support stems mainly from the diversity of the member states under the system. There are diverse and different interests, not only between nuclear weapon states and non-nuclear weapon states, due to their status under the NPT, but also among nuclear weapon states, and among non-nuclear weapon states.

Sufficient political support for stringent safeguards under the IAEA NPT safeguards is in principle given by nuclear weapon states, but, as discussed in Chapter III of this paper, because of the lack of adequate reciprocity between nuclear weapon states and non-nuclear weapon states, non-nuclear weapon states are reluctant to accept stringent safeguards, and often attempt to keep a balance between the safeguards and the promotion of peaceful uses of nuclear energy.

Even among the non-nuclear weapon states, developing countries tend to be less enthusiastic about accepting stringent safeguards, compared to developed countries that already have advanced nuclear power programs.

In the case of the ABACC, however, political support exists by definition; bilateral

agreements are generally not entered into without sufficient political support. For the two countries of the ABACC, the safeguards are not something imposed by another party; rather, that have been agreed upon as being mutually beneficial. The fact that both countries share the same objective, namely the promotion of exclusively peaceful uses of nuclear energy, also serves to ensure the necessary political support for appropriate and effective safeguards.

The same applies to the EURATOM. The EURATOM safeguards are not imposed by one group of parties; it is a measure applied to all member states equally, under the rubric of a EU institution that covers nuclear weapon states and non-nuclear weapons states in the EU equally. Though it is a multilateral institution, there is no difference in the rights and obligations among the member states, no right of veto exists in the decision making process, and the EURATOM also covers EU member states that are not even engaged in the promotion of nuclear energy.

3.2.3. Enforceability

With regard to enforceability in the ABACC system, if inspectors find an anomaly, it will inform the ABACC's Secretary immediately, who then informs the members of the Commission. The member of the Commission from the Foreign Ministry then informs the Foreign Minister, who informs the President. Upon receiving such information, the President acts accordingly to solve the problem. For all this process, only two or three days are required.[242] As Marzo states, it is easy to imagine how long it would take if it is the case in an international organization. In the case of the IAEA, for example, political and procedural issues result in a potential timespan of years to solve an anomaly[243]. It is of course difficult to force a party to comply with obligations under a bilateral agreement, as it is a sovereign state; however, in the case of non-compliance of one party, the other party can decide to simply withdraw from the agreement, and it is submitted that this already functions as a strong deterrent.

In the case of the EURATOM, the EU Court of Justice functions as the enforcement

[242] Transcript, "Afternoon Session: ABACC: Designing and Implementing Bilateral Inspections in Argentina and Brazil," http://isis-online.org/596pm1.
[243] Interview with Marco Marzo, October 17, 2015, Boston.

authority (Section 4, Article 136-142, of the EURATOM Treaty), and there is no veto right for any member state. Moreover, sanctions will be imposed directly upon nuclear operators by the EURATOM. Procedurally, there is no possibility for intervention by any member state Government. In terms of safeguards, all EURATOM member states have equal rights and obligations[244].

3.3. Mutual safeguards system and the problems of the current IAEA safeguards system

3.3.1. Institutional flexibility as a safeguards implementation authority

Carasales explains how the change of Brazilian and Argentine policies from nuclear rivalry to nuclear rapprochement took place from the 1980s to the 1990s.[245] He points out that a combination of elements played a role, including favorable national political circumstances, economic difficulties, similarity of positions regarding the global non-proliferation regime, the advent of civilian governments, positive role of the foreign ministers, as well as forceful international pressure. As he describes, all these elements enabled the two countries to move radically away from competitive nuclear policies and to establish a bilateral safeguards implementation body. This process took more than a decade, and was not necessarily a simple one; however, as examined in Section 1 of this Chapter, once it was established, the ABACC has shown a high level of flexibility to meet its challenges and develop its safeguards system[246].

Mallard discusses the difficulties that the EURATOM faces as a supranational organization that involves both nuclear weapon states and non-nuclear weapon states.[247] He argues that having both categories of countries as members of a supranational safeguards organization

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[244] Regarding the institutional framework and the competence of each body of the EURATOM with regard to the safeguards, see: Wolfgang Kilb, "The Nuclear Safeguards Regime of EURATOM: A regional Cornerstone of the Verification of Non-Proliferation Obligations in the European Union," Jonathan L. Black-Branch, Dieter Fleck editors, *Nuclear Non-Proliferation in International Law*, *Volume II, Verification and Compliance* (Berlin, Heidelberg: Springer, 2016), pp.151-165.

[245] Julio C. Carasales, "The Argentine-Brazilian Nuclear Rapprochement," *The Nonproliferation Review,* Vol.2, No.3, Spring-Summer 1995, pp.39-48.

[246] Ibid.

[247] Gregoire Mallard, "CAN THE EURATOM TREATY INSPIRE THE MIDDLE EAST? The Political Promises of Regional Nuclear Communities," *Nonproliferation Review*, Vol.15, No.3, November 2008, pp.471-472.

makes it difficult to make certain decisions that can be contradictory to the interest of one of those categories. Institutionally speaking, it also seems difficult to change the legal framework of the EURATOM safeguards, given the complexity of the revision process of the EU Treaties for which unanimity amongst all member states is required, as Kilb notes.[248]

Nevertheless, despite the complexity of all the elements involved in decision-making to change established practices, change is clearly much easier for a body with fewer contracting states than for a universal organization involving a large number of countries with various political and economic backgrounds and national interests.

3.3.2. Cost effectiveness

Marzo and others articulate how cost effectively the safeguards system of the ABACC is designed.[249] This is possible because both countries can cooperate with each other on a reciprocal basis. It seems that the absolute reciprocity between both countries enables them to engage in mutual cooperation efforts to ensure such cost effectiveness. In addition, under the ABACC, the safeguards do not need to be applied to countries without nuclear activities (since both countries are engaged in such activities), while the IAEA has to apply its safeguards regardless of whether or not a country has a nuclear program. The ABACC can therefore focus its resources on the areas it regards as necessary.

In the case of the EURATOM, as the safeguards are applied not to a country but directly to nuclear operators, and as the organization has sufficient enforcement capability, it can be more cost effective than the IAEA NPT safeguards, which has to verify not only declared but also undeclared nuclear activities in more than 180 countries.

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[248] Wolfgang Kilb, "The Nuclear Safeguards Regime of EURATOM: A regional Cornerstone of the Verification of Non-Proliferation Obligations in the European Union," Jonathan L. Black-Branch, Dieter Fleck editors, *Nuclear Non-Proliferation in International Law*, Volume II, Verification and Compliance, Springer, 2016, p.151.

[249] M. Marzo, H. Lee Gonzales, M. C. L. Iskin, H. Vicens, "Regional Safeguards Arrangements: The Argentina-Brazil experience," IAEA-SM-346/113, www.abacc.org.br/artigos_antigos/iaea-sm-346-113.pdf.

3.3.3. Technical capability

Goorevich and Marzo point out that the IAEA has constrains preventing it from developing the most suitable technologies necessary to implement effective safeguards[250]. This is mainly because of the institutional problems of the IAEA as a universal international organization. The agency has a policy to recruit senior officials from member states on a rotational basis, resulting in it not being able to pursue a consistent policy for technical development as well as for the procurement of safeguards equipment.

Neither the ABACC nor the EURATOM has such personnel policies, and both hire officials for much longer durations than the IAEA[251]. This enables both institutions to have longer-term consistency, in particular with regard to the development of technical capability.

3.4. Conclusion

This section has examined whether the ABACC and the EURATOM have the same problems as the IAEA, by reviewing the six areas that are inherent in the IAEA NPT safeguards system and which result in shortcomings.

Both the ABACC and the EURATOM seem to have more effective systems to overcome the problems inherent in the IAEA NPT safeguards. However, it seems that the EURATOM system has more constraints than that of the ABACC, because of the relative diversity of the member states. While the ABACC has only two countries as parties, the EURATOM has not only two categories of nuclear weapon states and non-nuclear weapon states, but also states with relatively different nuclear and economic policies.

However, ultimately it is not the number of the participating countries that is the key difference with the IAEA. The relative statuses and purposes of the participating countries, and

[250] Interview with Richard Goorevich, October 9, 2015 and with Marco Marzo, October 17, 2015.
[251] Gregoire Mallard, "Can the EURATOM Treaty Inspire the Middle East? - The Political Promises of Regional Nuclear Communities," *Nonproliferation Review*, Vol.15, No.3, November 2008, pp.459-477; M. Marzo, H. Lee Gonzales, M. C. L. Iskin, H. Vicens, "Regional Safeguards Arrangements: The Argentina-Brazil experience," IAEA-SM-346/113, www.abacc.org.br/artigos_antigos/iaea-sm-346-113.pdf.

the relationship between them, seem to be more fundamental, and, consequently, whether reciprocity will effectively work under such arrangement. It seems that a symmetrical nature between parties is needed in order to create reciprocity, thereby enabling a safeguards system to effectively function.

The ABACC is a bilateral agreement between two countries that share not only a common purpose in terms of the control of nuclear energy, but also a similar level of economic and social development, and arguably many aspects of a common culture.

The EURATOM has a much larger number of member states, and as such, poses more potential for the kind of internal conflict that can be observed with the IAEA. Nevertheless, like the ABACC, member states of the EURATOM are generally at the same level of economic and social development; indeed, by virtue of being a EU member state, these states share a common market and allow for the freedom of movement of all EU nationals. It is within this overall framework of strong regional cooperation that the success of the EURATOM can be understood: put bluntly, EU member states are generally used to restrictions on their sovereign rights imposed by supranational institutions of the EU, and the EURATOM is simply another one of those institutions. It is also worth noting in this regard that the EU as an institution in its entirety operates on the basis of reciprocity, as member states are equal in all policy and other discussions. Therefore, member states of the EURATOM can be assured that policies that favor a particular state or group of states will not be implemented by that organization, whereby, in the UN, in particular the Security Council, this is hardly the case.

Section 4

CONCLUSION

The IAEA NPT safeguards system is designed to be a universal safeguards system by covering as many countries as possible in order to serve as a pillar of the international nuclear non-proliferation regime. As examined in Chapter II of this study, this universality created the natures of the IAEA NPT safeguards, namely: 1) non-discrimination; 2) objectivity; and 3) cost-effectiveness.

A mutual safeguards system, on the other hand, does not need to be a universal system. It is based on reciprocity and the symmetric status of contracting countries. Non-discriminatory treatment is therefore less important than it is in a universal system. The safeguards measures under such a system also do not need to so much rely on quantitative indicators to be objective, as long as they are reciprocal in their symmetric relations.

With regard to cost-effectiveness, as the cases of the ABACC and the EURATOM clearly show, a system with a much smaller number of participating countries could be more cost-effective than a universal system, as it only needs to meet the necessity of smaller numbers of countries.

This makes a mutual system free from those constrains that the IAEA NPT safeguards as a universal system faces. Of course, the universal nature of the IAEA NPT safeguards system plays an important role in the international nuclear non-proliferation regime. As a universal institution, it bestows a certain measure of authority and credibility to the countries that adhere to the system. However, as shown in this study, whether it is fully effective as a safeguards institution is highly questionable.

A mutual safeguards system might have less authority as an international organization, but it clearly can function more effectively for the purpose of nuclear safeguards, as long as it ensures the key elements: reciprocity, necessary political supports and effective enforceability. In that regard, reciprocity is the essential element for a mutual safeguards system, as the other elements, namely political support and effective enforceability, can exist only after reciprocity is established.

If such a system: 1) has enough flexibility to meet challenges in a changing environment; 2) maintains cost-effectiveness; 3) assures sufficient technical capabilities in order to implement its safeguards, then it will successfully fill the shortcomings that inherently plague the IAEA NPT safeguards system.

In this sense, a mutual safeguards system should be regarded as an effective means to complement the current universal safeguards system in the international nuclear non-proliferation regime.

Chapter V
CONCLUSION

As explained in the introduction of this paper, the aim of this research is not to criticize the role of the IAEA as an international organization to implement safeguards, or the role that the IAEA NPT safeguards have played in the international nuclear non-proliferation regime.

As a universal institution, the IAEA NPT safeguards system has contributed largely to international nuclear non-proliferation since the establishment of the NPT regime, by implementing the safeguards all over the world. However, the IAEA is facing a number of challenges since the 1990s, in particular non-compliance cases such as North Korea, Iraq, Iran and Syria.

To address these challenges and strengthen the international safeguards system, a number of discussions and studies have been conducted in the international community, including the IAEA itself[252]. These discussions and studies have mainly focused on how to strengthen the IAEA safeguards. The introduction and the universalization of the additional protocol to the IAEA

[252] Such as Richard Hooper, "Strengthening IAEA Safeguard in an Era of Nuclear Cooperation," *Arms Control Today*, November 1995, pp.14-18; David Fischer, "New Directions and Tools for Strengthening IAEA Safeguards," *The Nonproliferation Review,* Winter 1996, pp.69-76; John Carlson, Victor Bragin, John Bardsley, and John Hill, "Nuclear Safeguards As an Evolutionary System," *The Nonproliferation Review*, Winter 1999, pp.109-117; Victor Bragin, John Carlson, and Russel Leslie, "Integrated Safeguards: Status and Trends," *The Nonproliferation Review*, Summer 2001, pp.102-110; Theodor Hirsch, "The IAEA Additional Protocol: What It Is and Why It Matters," *The Nonproliferation Review*, Fall-Winter 2004, pp.140-163; P. Taylor, "Prescribing for the reform of international organization: the logic of argument for change," *Review International Studies*, 1987, vol.13, pp. 19-38; Jonathan L. Black and Dieter Fleck, "Verification of and Compliance with Nuclear Non-Proliferation Obligations: A Comprehensive Synopsis of Outstanding Issues," Jonathan L. Black-Branch, Dieter Fleck editors, *Nuclear Non-Proliferation in International Law*, *Volume II, Verification and Compliance* (Berlin, Heidelberg: Springer, 2016),pp.1-10; Laura Rockwood and Larry Johnson, "Verification of Correctness and Completeness in the Implementation of IAEA Safeguards: The Law and Practice," Jonathan L. Black-Branch, Dieter Fleck editors, *Nuclear Non-Proliferation in International Law*, *Volume II, Verification and Compliance* (Berlin, Heidelberg: Springer, 2016), pp.57-94; Masahiko Asada, "The NPT and the IAEA Additional Protocol," Jonathan L. Black-Branch, Dieter Fleck editors, *Nuclear Non-Proliferation in International Law*, *Volume II, Verification and Compliance* (Berlin, Heidelberg: Springer, 2016), pp.95-130.

safeguards agreements[253], utilizing special inspections under the IAEA safeguards agreement[254], strengthening the IAEA's authority to verify the absence of undeclared nuclear activities, or the introduction of the State-level concept in the safeguards are examples of this general philosophy[255].

The discussions and conclusions of the State Parties to the NPT and the IAEA have also been concentrating on how to strengthen the current NPT safeguards issues[256].

This research, however, has proceeded on the basis that above assumption, namely that the IAEA should be the sole body responsible for the international nuclear safeguards, is not sound. On that basis, the research has also sought to propose what would be an effective international safeguards system for the prevention of nuclear proliferation.

In this paper, Chapter II first identified the key elements that contributed to the establishment of the current international nuclear safeguards system, and then examined the nature of this system by reviewing the origin and the developments of the idea of international control of nuclear energy and of the nuclear safeguards after the World War II to date. The key elements that were necessary for establishing an international safeguards system (1945-1970), but not sufficient on their own, were: (1) reciprocity; (2) political support; and (3) enforceability,

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[253] Masahiko Asada, "The NPT and the IAEA Additional Protocol," Jonathan L. Black-Branch, Dieter Fleck editors, *Nuclear Non-Proliferation in International Law*, *Volume II, Verification and Compliance* (Berlin, Heidelberg: Springer, 2016), pp.95-130.

[254] John Carlson, Victor Bragin, John Bardsley, and John Hill, "Nuclear Safeguards As an Evolutionary System," *The Nonproliferation Review*, Winter 1999, pp.109-117.

[255] Laura Rockwood and Larry Johnson, "Verification of Correctness and Completeness in the Implementation of IAEA Safeguards: The Law and Practice," Jonathan L. Black-Branch, Dieter Fleck editors, *Nuclear Non-Proliferation in International Law*, *Volume II, Verification and Compliance* (Berlin, Heidelberg: Springer, 2016), pp.57-94; Laura Rockwood, "The IAEA's State-level Concept and the Law of Unintended Consequence," *Arms Control Today*, September 2014, pp.25-30.

[256] Except in 2011. The IAEA General Conference failed to adopt the traditional safeguards resolution in this year by vote. It only adopted two specific safeguards resolutions which covers only certain countries or region; "Application of IAEA safeguards in the Middle East", IAEA Document, GC (55)/23, and "Implementation of the NPT safeguards agreement between the Agency and the Democratic People's Republic of Korea", IAEA Document, GC (55)/24. The first resolution entitled Strengthening of the Safeguards System, GC (35)/RES/559, was adopted at the 35 IAEA General Conference on 22 September 1991; Final Document of the 2000 Review Conference of the Parties to the Treaty on the Non-proliferation of Nuclear Weapons, NPT/CONF.2000/28 (Part I and II), Article III and fourth and fifth preambular paragraphs, especially in their relationship to article IV and the sixth and seventh preambular paragraphs.

particularly within the framework of the UN and the UN Security Council. It further discussed the nature of the current international safeguards system - the IAEA NPT safeguards which was established after the formulation of the NPT. Because of the universal nature of this system, the IAEA NPT safeguards are characterized as being: (1) non-discriminatory; (2) objective (in that they are quantitative); and (3) cost effectiveness.

Upon identifying these pretexts, Chapter III discussed the challenges that the IAEA NPT safeguards system is facing in three aspects; institutional, political and technical. It further examined the reasons that strengthening the current IAEA NPT safeguards system is not an effective way to meet the challenges that the international community is facing in ensuring nuclear non-proliferation.

To summarize the conclusion of Chapter III, firstly, the following shortcomings of the system were identified: (1) lack of reciprocity, (2) lack of sufficient political support, (3) lack of enforceability, (4) lack of flexibility to change, (5) problem of cost efficiency (financial constrains), and (6) technical constraints. The IAEA, as a universal international organization, has fundamental problems in all relevant aspects: institutional, political, and technical. It seems that these shortcomings stem from the nature of the IAEA safeguards system.

Secondly, in the conclusion of Chapter III, which constitutes the main part of this research, the point is stressed that the two contradictory objectives of the IAEA make it institutionally difficult to promote the safeguards within IAEA framework. This contradiction also causes a lack of sufficient political support for the IAEA to strengthen its safeguards, as the Member States are divided into two groups. One group of the Member States, mainly constituted of developed countries, wish to strengthen nuclear safeguards. The other group, made up of mainly developing countries, attaches more importance to the promotion of peaceful uses of nuclear energy. The argument of the latter that safeguards is only one of the Agency's two main objectives and therefore should not be given more priority than the other (namely the promotion of peaceful uses of nuclear energy), is reflected in the organizational structure of the IAEA and its budget. The

result is that the allocation of more resources, both budgetary and human, to enhance safeguards related work is hindered.

The IAEA also faces constraints in its efforts to strengthen the safeguards due to the requirements to be non-discriminatory and to be objective – constraints placed on the system to make it universally acceptable. The environment surrounding international safeguards has changed considerably since the NPT IAEA safeguards were first introduced in the 1970s. The countries that are regarded as potential threats to nuclear proliferation are no longer from the group of industrialized countries. These potential threat countries have enough indigenous nuclear material that they could utilize, undeclared to the IAEA. The number of countries embarking on nuclear programs is growing. To respond to these changes, the IAEA has been trying to develop its safeguards system by building up new measures on the existing system, through, for example, the introduction of the Additional Protocol or the State-level concept. In those endeavors, however, the important requirements of the IAEA NPT safeguards system have been overlooked. These requirements are the core elements of non-discrimination and objectivity. Pursuing new tools that fall short of the fundamental requirements for the IAEA NPT safeguards as a universal system would not meet expectations, and would not strengthen the safeguards. In fact, such new approaches have raised more concerns among Member States.

Lack of sufficient political support, lack of effectiveness of safeguards due to their nature as a universal safeguards system, lack of reciprocity and lack of effective enforceability: these shortcomings are inherent in the structure of the IAEA.

Reciprocity is the most important element for an effective safeguards system. However, the IAEA cannot institutionally provide such reciprocity, due to the different status of member states, as well as the different application of safeguards between nuclear weapon states and non-nuclear weapon states under the IAEA NPT safeguards.

Enforceability in case of non-compliance is the other essential element to deter a country from violating its safeguards obligations. The IAEA NPT safeguards agreement expects the UN Security Council to play a role as the ultimate enforcement organ in case of non-compliance.

However, past precedent shows that the UN Security Council is not an effective enforcement body.

If the IAEA is not a solely technical organization, but rather an organization with political influence, the level of political support it is able to garner will be a decisive factor in order for it to function effectively as a safeguards organization.

To ensure nuclear non-proliferation, deterrence is crucial, since the gravity of the consequences if non-proliferation fails can be grave. It is therefore essential to deal with non-compliance cases in a manner so that the deterrence element functions.

As examined in this paper, however, past experience of the IAEA shows that handling of the non-compliance cases has been very much influenced by different political stances of Member States, resulting in an inability of the organization to ensure effective deterrence. The non-compliance cases of North Korea or Iraq clearly did not deter Iran from violating its safeguards obligations.

This lack of consistent political support in case of non-compliance can be also understood as inherent to universal international safeguards systems, as it mainly stems from the diversity of the countries that join the system. As more countries join the system, it naturally becomes more difficult to find common ground.

The other cause of the lack of sufficient political support for the IAEA safeguards is, again, the lack of reciprocity. As examined also in Section 1 of this Chapter, the IAEA cannot provide for the reciprocity necessary as an international organization, as it covers two groups of countries that have different status and different obligations.

Whether we can overcome the lack of political support for the IAEA safeguards is a difficult question. This question stems mainly from, again, the nature of the system. As long as we cannot change the nature of the IAEA safeguards system, in particular the elements of universality, the two contradictory objectives, and the lack of reciprocity, it seems extremely difficult to change the current situation so that the IAEA could obtain stronger support from countries.

The universality of the system has admittedly contributed to nuclear non-proliferation throughout the past decades, as it has encouraged more states to engage with the international nuclear non-proliferation regime. Nevertheless, it is also the main factor that hinders further strengthening of the safeguards.

With this in mind, Chapter IV examined whether existing regional safeguards systems, which are reciprocal in nature and do not operate on the basis of universality, could complement the international safeguards system and contribute to nuclear non-proliferation. In particular, it discussed whether non-universal but mutual safeguards systems, such as the ABACC and the EURATOM, could overcome the shortcomings inherent in the universal nature of the IAEA NPT safeguards system.

A mutual safeguards system does not need to be a universal system. It is based on reciprocity and the symmetric status of contracting countries. Non-discriminatory treatment is therefore less important than it is in a universal system. The safeguards measures under such a system do not need to rely on quantitative indicators to be objective, as long as they are reciprocal in their symmetric relations. If the contracting parties have similar political, economic and cultural backgrounds, qualitative indicators can be introduced as objective indicators.

With regard to cost-effectiveness, as the cases of the ABACC and the EURATOM clearly show, a system with a much smaller number of participating countries could be more cost-effective than a universal system, as it only needs to meet the needs of a smaller number of countries.

This makes a mutual system free from the constraints that the IAEA NPT safeguards, as a universal system, face. Of course, the universal nature of the IAEA NPT safeguards system plays an important role in the international nuclear non-proliferation regime. As a universal institution, it bestows a certain measure of authority and credibility to the countries that adhere to the system. However, as shown in this study, whether strengthening a universal safeguards institution will result in more effective non-proliferation regime is highly questionable.

A mutual safeguards system might have less authority as an international organization, but

it clearly can function more effectively for the purpose of nuclear safeguards, as long as it ensures the key elements: reciprocity, necessary political supports and effective enforceability. In this regard, reciprocity is the essential element for a mutual safeguards system, as the other elements, namely political support and effective enforceability, can exist only after reciprocity is established.

If such a system: 1) has enough flexibility to meet challenges in a changing environment; 2) maintains cost-effectiveness; and 3) ensures sufficient technical capabilities in order to implement its safeguards, then it will successfully fill the shortcomings that inherently plague the IAEA NPT safeguards system.

In this sense, a mutual safeguards system should be regarded as an effective means to complement the current universal safeguards system in the international nuclear non-proliferation regime.

With regard to the mutual safeguards arrangements, proponents such as Goorevich and Marzo express a similar view. They argue that safeguards between or among the countries that have mutual security interests function more effectively[257]. Marzo, the former inspector of the ABACC and the former Director of Safeguards Department, stressed the merits of regional safeguards arrangements, noting how the needs of safeguards have changed since the1990s, even though the international community still believes that the IAEA safeguards system is the sole appropriate safeguards system for international nuclear non-proliferation. He stressed that a symmetrical relationship between member states (contracting countries) is required in order for a safeguards system to function effectively.[258]

Indeed, as examined in Chapter IV, a mutual safeguards system that does not have a universal nature could overcome the problems of the current IAEA NPT safeguards, and complement the traditional universal international safeguards system.

Because of its universality, the traditional international safeguards system (namely the IAEA NPT safeguards system) alone cannot be effective in preventing nuclear proliferation. The

[257] Interview with Richard Goorevich, October 9, 2015, Washington DC; Interview with Marco Marzo, October 17, 2015, Boston.
[258] Interview with Marco Marzo, October 17, 2015, Boston.

introduction of mutual safeguards systems, such as regional safeguards arrangements, could be a good solution to complement the traditional international safeguards system.

To conclude, with regard to possible contributions to other international verification systems, the following two points can be made:

Firstly, this research has identified the shortcomings of the traditional international safeguards system in three different aspects: political; institutional; and technical. In particular with regard to the safeguards, which naturally include significant technical elements, discussions tend to lean too much towards technical solutions, and detract attention from political realities. The same applies to legal discussions on the subject. Proponents such as Hooper stress technical ways to strengthen the IAEA safeguards[259], and Joyner as well as Timerbaev support strengthening legal authority[260]. There are also studies focusing on institutional aspects. Taylor, for example, distinguishes between three forms of control organization, and presents a possible model that international safeguards institutions could follow.[261]

However, as Freeman attempts in his study on human rights[262], it is appropriate to adopt an inter-disciplinary approach to examine the international nuclear safeguards issue, as it involves a high level of political considerations as well as other social elements, such as economic and cultural ones.

In this regard, this research's approach in examining the issue neither legally nor solely technically should provide insights for further research on possible complementary measures to strengthen verification systems outside of the nuclear non-proliferation arena.

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[259] Hooper, "Strengthening IAEA Safeguard in an Era of Nuclear Cooperation," *Arms Control Today*, November 1995, pp.14-18.

[260] Daniel H. Joyner, *International Law and the Proliferation of Weapons of Mass Destruction* (New York: Oxford, 2009), pp.3-76; Roland Timerbraev, "IAEA Safeguards," *Nuclear Rest: Arms Reduction and Nonproliferation*, edited by Alexei Arbatov and Vladimir Dvorkin, (Moscow: Carnegie Moscow Center, 2012), pp.268-289.

[261] P. Taylor, "Prescribing for the reform of international organization: the logic of argument for change," *Review International Studies*, 1987, vol.13, Issue 1, pp. 19-38. In this study, he distinguishes three forms of control organizations: transnational; transgovernmental; and national regime.

[262] Michael Freeman, *Human Rights: An interdisciplinary approach* (Cambridge: Polity Press, 2011), p12.

Secondly, though this research has not focused on this issue, legitimate questions can surely be raised regarding the overall purpose of safeguards in the area of nuclear non-proliferation. In the case of the IAEA NPT safeguards, the purpose of the safeguards of nuclear material is to verify "such material is not diverted to nuclear weapons or other nuclear explosive devices." (Article I of "the Structure and the Content of Agreements between the Agency and States required in connection with the Treaty on the Non-proliferation of Nuclear Weapons," IAEA documents, INFCIRC153 (Corrected)). As explained in Chapter IV of this paper, the ABACC and the EURATOM have slightly different purposes, but all these safeguards arrangements are based on material accountancy.

In this regard, D. Fischer writes: "… it does suggest that besides refining the techniques of material accountancy (which are essential) the IAEA should give more attention to political realities in defining its safeguards approaches. In particular it must avoid the risk of giving ammunition to its critics by setting quantified aims that are so exacting that the IAEA cannot in practice achieve them (some of its 'timeliness goals' already fall into this category), yet being perfectly able to force any would-be NWS to come out into the open rather than to cheat. It may be countered that the principal aim of safeguards is to build confidence and not to deter, and that stringent material accountancy is essential for the confidence-building process. To this one may answer that setting aims that cannot be achieved (and that one is subsequently required to admit have not been achieved) is not a very effective way of building confidence."[263]

The Additional Protocol may be able to contribute to confidence-building, but even with the Additional Protocol in force with regard to a particular country, it is impossible to prove in any specific case that there is no undeclared material or activities. Rockwood points to this very fact in her paper, where she notes that it is impossible to prove a negative.[264]

Furthermore, as the three nations of the Joint Declaration of 1945 stated, "if control alone

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[263] David Fischer and Paul Szasz, *Safeguarding The Atom: A Critical Appraisal* (Stockholm: SIPRI, 1985), p. 45.
[264] Laura Rockwood, "The IAEA's State-level Concept and the Law of Unintended Consequence," *Arms Control Today*, September 2014, pp.25-30.

cannot prevent development of nuclear weapons, there is a question to be raised as to what exactly safeguards should achieve." In the Joint Declaration, the objective of safeguards is defined as to "protect complying states against the hazards of violations and evasions"[265]. This objective is very different from what we understand as the objective of safeguards under the IAEA safeguards system today. This must be borne in mind, so as to avoid a fixed preconception of the objective of safeguards.

If universal international safeguards by themselves are not enough to ensure nuclear non-proliferation, it is worthwhile considering what other measures, mechanisms or systems are needed to compliment such safeguards, in order to prevent nuclear proliferation. To accomplish this task, we must consider what objectives are to be achieved by this system. This research indicates that a greater acknowledgement of the role that mutual systems (such as the regional ones in force under the ABACC and the EURATOM) may play in the international nuclear non-proliferation regime, and a greater understanding of the differing objectives of those regimes that allow them to be more effective than the current approach, which is based on strengthening the IAEA NPT safeguards system, can play an important role in strengthening international nuclear non-proliferation.

[265] "Joint Declaration by the Heads of Government of the United States, United Kingdom, and Canada, November 15, 1945," *Documents on Disarmament 1945-1959 Vol.1*, Department of State Publication 7008, August 1960, V. (d).

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