

## **Safeguards and the Nuclear-Powered Submarines of the NNWS: There is no gap; There is a First Time**

*Submarinos de Propulsão Nuclear dos NNWS e as Salvaguardas da AIEA: Não Há Lacuna; Há Uma Primeira Vez*

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## ABSTRACT

Is there a gap in the Nuclear Weapons Nonproliferation Regime related to nuclear material for the propulsion of submarines by Non-nuclear Weapons States? This question arises with the steady advancement of the Brazilian nuclear-powered submarine program and within the AUKUS strategic partnership. This article argues that there is no such gap since the IAEA's Comprehensive Safeguards Agreements (CSA) addresses this issue. What happens is that no Special Procedures models for this kind of nuclear material have yet been elaborated. The article proceeds in three steps. Firstly, it focuses on the discussion regarding the existence of such a gap. Then, it addresses the CSA signed by Australia and Brazil. The final remarks present the inferences regarding this kind of gap.

**Keywords:** Nonproliferation. Nuclear-Powered Submarines. Nuclear Safeguards.

## RESUMO

Existe uma lacuna no Regime de Não Proliferação de Armas Nucleares em relação ao material nuclear utilizado para a propulsão de submarinos desenvolvidos ou operados por Estados não nuclearmente armados? Essa questão desponta com o avanço constante do programa do submarino de propulsão nuclear brasileiro, bem como em decorrência da parceria estratégica AUKUS. O argumento proposto no artigo é o de que não existe essa lacuna, uma vez que os Acordos de Salvaguardas Abrangentes (CSA) da AIEA abordam essa questão. No entanto, ainda não foram elaborados modelos de Procedimentos Especiais para esse tipo de material nuclear. O artigo está estruturado em três etapas. A primeira tem como foco a discussão sobre a existência de tal lacuna. Em seguida é feita a análise comparativa dos CSA assinados pela Austrália e Brasil com a AIEA. As considerações finais apresentam as inferências sobre a existência – ou não – dessa lacuna.

**Palavras-chave:** Não Proliferação. Submarinos de Propulsão Nuclear. Salvaguardas Nucleares.

## INTRODUCTION<sup>2</sup>

The issue of a possible gap in the nuclear weapons nonproliferation regime (NWNPR) related to the use of nuclear material for propulsion of submarines by Non-nuclear Weapons States (NNWS) is not new. Some academics have pointed out a gap, or loophole resulting from the non-inclusion, in the safeguards system, of nuclear material intended for the propulsion of naval assets of NNWS (see Hoffman & Thielmann 2012; Kelleher-Vergantini & Thielmann 2013; Kaplow 2015; Shea 2017; Von Hippel 2019).

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This issue has never been raised as a source of controversy once only the five Nuclear Weapon States<sup>3</sup> (NWS) recognized in The Treaty on the Non-Proliferation of Nuclear Weapons (NPT) and India<sup>4</sup>, which is not a signatory to the NPT, are the owners of nuclear-powered submarines.

Nevertheless, the issue of nuclear material for propulsion of submarines has gained a new perspective with the constant advancement of the Brazilian conventionally armed and nuclear-powered submarine (CNPS) program and, more recently, since September 2021, with Australia's possible receipt and development of nuclear propulsion submarines within the AUKUS<sup>5</sup> strategic partnership. Thus, these two countries are configured as the possible NNWS to start operating nuclear-powered submarines in the next 10 to 15 years.

Additionally, other Non-Nuclear Weapon States have stated their intention to develop programs of this nature – the case of the Republic of Korea and Iran – or have already expressed that intention in the past – the Canada and Argentina case. Furthermore, some countries have the technology for this – Japan is an example – and due to changes in their regional security environment, they may choose to develop this kind of weapon system.

In this context, the question arises: Is there a gap in the nuclear weapons nonproliferation regime related to the use of nuclear material for propulsion of submarines by Non-nuclear Weapons States?

The research question addressed here is part of the debate that arises from interpreting Paragraph 14 – Non-Application of Safeguards to Nuclear Material to Be Used in Non-Peaceful Activities – of the framework of all Comprehensive Safeguards Agreements (CSA) for NNWS under the NPT, that is, the INFCIRC/153.<sup>6</sup> In other words, this is a debate on whether a NNWS can invoke paragraph 14 to request the International Atomic Energy Agency (IAEA) for non-application of safeguards on nuclear material intended for the propulsion of a submarine.

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<sup>3</sup> According to Article IX, item 3 of the NPT, “a nuclear- weapon State is one which has manufactured and exploded a nuclear weapon or other nuclear explosive device prior to 1 January 1967” (see UNODA. NPT, *Text of the Treaty*). Therefore, USA, Soviet Union (now Russia), United Kingdom, France and China are the nuclear-weapon states recognized by the NPT. However, Israel, India, Pakistan, and North Korea are Nuclear-Armed States (Author’s note).

<sup>4</sup> India's case is unique since its nuclear submarine program involved strategic partnerships and leasing Soviet/Russian submarines. In the 1980s, to acquire experience operating nuclear submarines, India arranged to lease a Charlie II-class nuclear submarine from the Soviet Navy. It served as Indian Navy Ship (INS) Chakra from 1988 to 1991. Years later, India negotiated a ten-year lease for a Russian Akula-class SSN. She was formally commissioned into service in April 2012 as INS Chakra II. Later, in March 2019, a new leasing deal was signed for another Akula-class nuclear submarine to India for ten years. The new SSN will be delivered to the Indian Navy by 2025 as INS Chakra-III (see NTI 2022). The point to be noted is that the Indian submarine program involved the support of a NWS. However, the program never raised issues concerning safeguards once India is not a signatory to the NPT.

<sup>5</sup> AUKUS is an acronym formed by letters representing the names, in English, of the three countries that comprise it: Australia, the United Kingdom and the United States of America. On September 15, 2021, the strategic partnership was officially announced by their respective Heads of State/Government (Author’s note).

<sup>6</sup> INFCIRC/153/Corr – The Structure and Content of Agreements Between The Agency and States Required in Connection with the Treaty on the Non-Proliferation of Nuclear Weapons (see IAEA 1972).

For those who perceive the text of paragraph 14 of INFCIRC/153 as too vague, the existence of a gap or loophole in the NWNPR regarding the use of nuclear material for the propulsion of submarines is a reality (see Hoffman & Thielmann 2012; Kelleher-Vergantini & Thielmann 2013). Nevertheless, on the other hand, for those who interpret paragraph 14 as containing clear procedures for negotiating with the IAEA, this gap is not as comprehensive as one might imagine regarding the risks of diverting fissile material from a nuclear-powered submarine program developed by a NNWS (see VCDNP 2021).

Summarily, the debate over whether – or not – a gap in the NWNPR regarding the use of nuclear material for naval propulsion continues to be a hot topic, both in academia and in the foreign ministries of several Member States to the NPT. However, this article argues that there is no such gap since the IAEA's Comprehensive Safeguards Agreements address this issue. What happens is that given the unprecedented nature of this issue, no Special Procedures models for the application of safeguards for this kind of nuclear material have yet been elaborated.

Therefore, the article aims to highlight what is provided for in the reference document for the CSA of the States Parties to the NPT (the INFCIRC/153), as well as what is foreseen in the CSA signed by Australia (the INFCIRC/217) and Brazil (the INFCIRC/435) regarding the expected safeguards to be applied to nuclear material for the propulsion of submarines. Thus, at the end of this comparative analysis, it will be possible to identify with greater precision the existence – or not – of a gap in the NWNPR resulting from the possibility of using nuclear material for the propulsion of submarines by these two States and, in a broad sense, by any other NNWS.

This article is developed in three steps to achieving the proposed aim. Firstly, it focuses on broadening the discussion regarding such a gap considering what is provided for in the INFCIRC/153. In the second and third sections, the article addresses the CSA signed respectively by Australia and Brazil, highlighting the expected safeguards to be applied to nuclear material used for the propulsion of submarines by these two States. In addition, these sections discuss the working papers presented by China, Indonesia, the three AUKUS States, and Brazil at the Tenth Review Conference of the NPT regarding the development or operation of nuclear-powered submarines by a NNWS.

#### **PARAGRAPH 14 OF THE INFCIRC/153 – IS THERE A “GAP”?**

The technological challenge for developing a nuclear-powered submarine by a NNWS and its future operational challenge is driven by the fact that this kind of weapon system is a force multiplier. Therefore, as Geoffrey Till (2018, 159) remarks: “[...] larger navies are attracted by the ‘seven deadly virtues’ to be derived from nuclear propulsion, namely flexibility, mobility, stealth, endurance, reach, autonomy and punch”.

However, in addition to the technological and operational challenges and the costs involved, this kind of program must also deal with the issue of nuclear safeguards that will or will not be applied to the nuclear material used in the propulsion of a NNWS's submarine.

It is worth noting that this article does not discuss the relevance of this kind of project for any NNWS. Instead, the focus here is on the safeguard's provisions on the framework to the CSA of every NNWS Party to the NPT.<sup>7</sup>

In this context, it is essential to explain the concept of safeguards. According to the IAEA: "Safeguards are a set of technical measures applied by the IAEA on nuclear material and activities, through which the Agency seeks to independently verify that nuclear facilities are not misused and nuclear material not diverted from peaceful uses" (see IAEA 2022b, *Basics of IAEA Safeguards*).

As such, the IAEA's safeguards purpose can be seen as to ensure that any State Party to the NPT could use nuclear energy peacefully without suspicion from the other NPT parties regarding any deviation of nuclear material to develop nuclear weapons.

According to the IAEA: "the IAEA's safeguards system functions as a confidence-building measure, an early warning mechanism, and the trigger that sets in motion other responses by the international community if and when the need arises." (see IAEA, *Safeguards Overview*).

In this context, the possibility of using nuclear energy for the propulsion of submarines by NNWS raises the issue of how this option can be exercised in line with the application of IAEA's safeguards. In other words: how to reconcile the development and operation of a nuclear-powered submarine by a NNWS, ensuring that fissile material could not divert from a naval nuclear propulsion program to a nuclear weapons program.

Since the end of the first decade of the 21st century, when the Brazilian CNPS program seemed to show signs that it was finally moving forward, some scholars and specialists have pointed to a loophole in the safeguards system. This loophole would arise from the interpretation that, considering the NPT, its Member States are allowed to remove from IAEA's safeguards the nuclear material intended for submarine propulsion. In this context, it is worth highlighting some of the perceptions regarding the existence of this loophole in the NWNPR.

The NPT does not explicitly regulate the production, use, and disposition of highly enriched uranium (HEU) for naval nuclear reactors. [...] the text of the NPT does not regulate the use of fissile material for nuclear propulsion activities [...] (Kelleher-Vergantini & Thielmann 2013, 1-2).

The Treaty on the Non-Proliferation of Nuclear Weapons (NPT) allows states to exempt nuclear material from international safeguards for use in nuclear submarines. [...]. Naval nuclear propulsion, then, may represent a dangerous loophole in the NPT (Kaplow 2015, 185).

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<sup>7</sup> Under Article III of the NPT, each Non-Nuclear Weapon State (NNWS) is required to conclude a safeguards agreement with the IAEA. Article III: "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 fulfilment 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. [...]" (see UNODA, NPT, *Text of the Treaty*).

A so-called loophole might allow a non-nuclear weapon state (NNWS) to use a naval reactor program to acquire nuclear weapons by taking nuclear material outside of safeguards and then potentially diverting some of that material (Shea 2017, 4).

A point to be highlighted is that the authors who point to the existence of this loophole in the NWNPR have in common the perception that both the NPT and INFCIRC/153 present vague texts regarding the application of safeguards in nuclear material used for nuclear propulsion of submarines by a NNWS.

In this sense, based on the concerns raised by these academics, it is necessary to analyze the content of the IAEA's framework for the CSA signed by a NNWS Part to the NPT, aiming at a better understanding of this possible gap in the safeguards system.

Thus, regarding the INFCIRC/153, it is worth noting that Paragraph 14 is inserted in the subject entitled "Non-Application of Safeguards to Nuclear Material to Be Used in Non-Peaceful Activities". In summary, paragraph 14 of INFCIRC/153 provides that a NNWS that will use nuclear energy "in a non-proscribed military activity" – as a nuclear-powered submarine – shall:

- Inform the IAEA of this decision;
- "Make an Arrangement" with IAEA that should contain "the period or circumstances during which safeguards will not be applied"; and
- Keep the Agency "informed of the total quantity and composition of such unsafeguarded nuclear material in the State and any exports of such material."

It is worth noting that there is no deadline for the negotiation to be approved by the IAEA. In summary, the point to be noted here is that any NNWS will have to negotiate with the IAEA to ensure that the application of nuclear energy in a submarine's propulsion is just that and nothing else (see IAEA 1972).

Once highlighted the provisions contained in Paragraph 14 of INFCIRC/153, it is necessary to carry out a comparative analysis of this document with the CSA signed by Australia and Brazil once these two countries are currently configured as possible NNWS to operate nuclear-powered submarines. Through the proposed analysis, the following two sections focus on the obligations of these two States concerning the use of nuclear material for the propulsion of submarines. In this way, the proposed comparative analysis will allow a deeper assessment of the existence – or not – of a gap in the NWNPR.

### THE AUSTRALIAN CASE AND ARTICLE 14 OF THE INFCIRC/217 – IS THERE A "GAP"?

The CSA signed by Australia (INFCIRC/217) has the same content as Paragraph 14 of INFCIRC/153. Therefore, Australia's obligations concerning nuclear energy for submarine propulsion are precisely those indicated in the previous paragraphs of this article. Box 1 summarizes the texts of INFCIRC/217 and INFCIRC/153 regarding this issue.

Box 1 – Comparison between Article 14 of INFCIRC/217 and Paragraph 14 of INFCIRC/153.

INFCIRC/217	INFCIRC/153
Article 14	Paragraph 14
<p>14. If Australia intends to exercise its discretion <u>to use nuclear material</u> which is required to be safeguarded under this Agreement <u>in a nuclear activity which does not require the application of safeguards</u> under this Agreement, the following procedures shall apply:</p> <p>(a) <u>Australia shall inform the Agency</u> of the activity, making it clear:</p> <p>(i) That <u>the use of the nuclear material</u> in a non-proscribed military activity <u>will not be in conflict with</u> an undertaking Australia may have given and in respect of which <u>Agency safeguards</u> apply, that the nuclear material will be used only in a peaceful nuclear activity; and</p> <p>(ii) <u>That during the period of non-application of safeguards</u> the nuclear material will not be used for the production of nuclear weapons or other nuclear explosive devices.</p> <p>(b) Australia and the Agency shall make an Arrangement so that, only <u>while the nuclear material is in such an activity, the safeguards provided for in this Agreement will not be applied</u>. The Arrangement shall identify, to the extent possible, <u>the period or circumstances during which safeguards will not be applied</u>. [...] <u>The Agency shall be kept informed of the total quantity and composition of such unsafeguarded nuclear material</u> in Australia and of any export of such nuclear material; and</p> <p>(c) [...]</p>	<p>14. The Agreement should provide that if the State intends to exercise its discretion <u>to use nuclear material</u> which is required to be safeguarded thereunder <u>in a nuclear activity which does not require the application of safeguards</u> under the Agreement, the following procedures will apply:</p> <p>(a) <u>The State shall inform the Agency</u> of the activity, making it clear:</p> <p>(i) That <u>the use of the nuclear material</u> in a non-proscribed military activity <u>will not be in conflict with</u> an undertaking the State may have given and in respect of which <u>Agency safeguards</u> apply, that the nuclear material will be used only in a peaceful nuclear activity; and</p> <p>(ii) <u>That during the period of non-application of safeguards</u> the nuclear material will not be used for the production of nuclear weapons or other nuclear explosive devices.</p> <p>(b) The Agency and the State shall make an Arrangement so that, only <u>while the nuclear material is in such an activity, the safeguards provided for in the Agreement will not be applied</u>. The Arrangement shall identify, to the extent possible, <u>the period or circumstances during which safeguards will not be applied</u>. [...] <u>The Agency shall be kept informed of the total quantity and composition of such unsafeguarded nuclear material</u> in the State and of any exports of such material; and</p> <p>c) [...]</p>

Source: Prepared and highlighted by the author based on the contents of INFCIRC/217 and INFCIRC/153 (see IAEA 1974 and IAEA 1972).

In light of the content of Article 14 of INFCIRC/217, it is clear that if the Australian State intends to exercise its discretion to use nuclear material for the propulsion of a submarine, it shall: to inform the IAEA of this decision; to “make an Arrangement” with IAEA that should contain “the period or circumstances during which safeguards will not be applied”, and to keep the Agency “informed of the total quantity and composition of such unsafeguarded nuclear material in the State and of any export of such material” (see IAEA 1974).

Thus, Australia cannot simply invoke the right to apply nuclear material to propel a submarine to remove this kind of fissile material from the safeguards system. In other words, Australia must negotiate an Arrangement in terms of its CSA with the IAEA.



Regarding the AUKUS, despite being a recent strategic partnership and with little concrete information to the current date, it is known that in the 18 months following the signature of the partnership, the three States Parties must have completed the central points of the program to provide Australia with nuclear-powered submarines.

Whatever the outcome of this consultation period, it is also worth noting that technical meetings are already being held with the IAEA regarding the safeguards applicable to the future Australian nuclear-powered submarine.

According to the IAEA Director General – Rafael Mariano Grossi – in his Introductory Statement to the Board of Governors on June 6, 2022:

Turning to the topic of nuclear naval propulsion, first to the subject of AUKUS, under which the United States and the United Kingdom have agreed to assist Australia in acquiring nuclear-powered submarines. Since our meeting in March, two technical meetings were held between the three parties and the Secretariat's AUKUS team that I established last September. [...] I would like to express my satisfaction with the engagement and transparency shown by the three countries thus far. (see IAEA 2022a).

However, despite Australia's exemplary nonproliferation credentials and IAEA engaging with, there was strong opposition from some States, notably from the People's Republic of China (PRC), regarding Australia's future acquisition of nuclear-powered submarines under the AUKUS partnership. Accordingly, on October 29, 2021, the PRC presented its views on this issue to the Secretariat of the IAEA:

1. The trilateral cooperation on nuclear-powered submarines undermines regional peace and stability, and constitutes serious risks of nuclear proliferation in contravention of the objective and purpose of the Treaty on the Non-Proliferation of Nuclear Weapons (NPT). China expresses its deep concern with and strong opposition to such a cooperation.
2. The naval nuclear propulsion reactors and their associated nuclear material to be transferred by the US and the UK to Australia cannot be effectively safeguarded under the current IAEA safeguards system. And therefore there is no guarantee that such nuclear material will not be diverted by Australia to the production of nuclear weapons or other nuclear explosive devices (see IAEA 2021).

The PRC's criticisms have become more forceful and were also presented in two working papers (WP 29 and WP 50) submitted for discussion at the Tenth Review Conference of the NPT held in New York in August 2022.

In the WP 50, entitled "Nuclear submarine cooperation among Australia, the United Kingdom of Great Britain and Northern Ireland and the United States of America", the PRC expressed its opposition to the AUKUS and its concern about the compromise of the NPT:

The trilateral cooperation on nuclear-powered submarines undermines regional peace and stability, constitutes serious risks of nuclear proliferation in contravention of the object and purpose of the Treaty on the Non-Proliferation of Nuclear Weapons (NPT), [...]. China expresses its deep concern over and strong opposition to such cooperation. [...] Such cooperation may open the "Pandora's box" and stimulate other countries to



follow suit, severely undermining the international nuclear nonproliferation regime (see United Nations 2020d).

In the two working papers (WP 29 and WP 50), the PRC expresses its position that nuclear material to be transferred by the USA and the UK to Australia “cannot be effectively safeguarded under the current IAEA safeguards system” (see United Nations 2020c and 2020d).

In this context, the PRC proposed, in the two working papers, that “a special committee open to all IAEA Member States be established to deliberate on the political, legal and technical issues related to the safeguards on naval nuclear propulsion reactors and their associated nuclear material” of NNWS (see United Nations 2020c and 2020d).

In the same way as the PRC, Indonesia presented a working paper expressing concern on nuclear-powered submarines of NNWS and their possible impacts on the NWNPR. In an indirect reference to AUKUS, the working paper prepared by Indonesia states that:

Indonesia views any cooperation involving the transfer of nuclear materials and technology for military purposes from nuclear-weapon States to any non-nuclear weapon States as increasing the associated risks and the catastrophic humanitarian and environmental consequences, as well as navigation risks posed by potential proliferation and conversion of nuclear material to nuclear weapons, particularly highly enriched uranium, in the operational status of nuclear naval propulsion (see United Nations 2020e).

It is worth noting that the three AUKUS States also prepared a joint working paper for discussion at the Tenth Review Conference of the NPT, in which they confirm their commitment to providing Australia with a nuclear-powered submarine capability and claim that:

Partners are committed to doing this in a way that meets the highest possible nonproliferation standards including by providing complete, welded power units so that Australia need not conduct uranium enrichment nor fuel fabrication, and are engaging with the IAEA to find a suitable verification approach (see United Nations 2020a).

Regarding USA and UK obligations as the NWS, the joint working paper clearly states that:

The United Kingdom and the United States recognize their obligations under the Nuclear Non-Proliferation Treaty (NPT) not to assist any non-nuclear-weapon state to manufacture or otherwise acquire nuclear weapons, and will not provide Australia with any assistance in contravention of our obligations under the NPT (see United Nations 2020a).

The working paper also outlines Australia's position regarding the future operation of nuclear-powered submarines and its current commitments to the NWNPR:

Naval nuclear propulsion is consistent with Australia's NPT and IAEA safeguards obligations and its obligations under the South Pacific Nuclear Free Zone Treaty. Like the NPT, the IAEA's model agreement for NPT verification, the Comprehensive Safeguards Agreement (CSA-INFCIRC/153), does not prohibit naval nuclear propulsion activities. INFCIRC/153 is the basis for most countries' CSAs, including Australia's, and in conjunction with the application of an Additional Protocol (AP), is the IAEA's current highest verification standard (see United Nations 2020a).

Furthermore, the working paper clearly states that Australia will not develop a uranium enrichment program – or reprocessing facilities – nor will it manufacture the fuel elements used in its submarines. In this sense, the working paper clarifies that Australia would be provided with complete, welded power units. Thus, the possibility that the nuclear material used for the propulsion of its submarines be diverted is practically nil and can be easily identified by the special safeguard procedures negotiated with the IAEA.

[...] with regard to the nuclear fuel cycle, Australia has made it clear it will not pursue uranium enrichment or reprocessing in relation to this initiative. We can further confirm that Australia has no plans to undertake nuclear fuel fabrication as part of this effort.

[...] it is proposed that Australia would be provided with complete, welded power units. [...]. Further, the nuclear material inside of these reactors would not be in a form that can be directly used in nuclear weapons without further chemical processing, requiring facilities that Australia does not have and will not seek (see United Nations 2020a).

In summary, the joint working paper of the AUKUS members provides a direct answer to the points raised in the working papers presented by the PRC and Indonesia. It is worth noting that Australia has an exemplary record of commitment to the NWNPR – its CSA and Additional Protocol – to assure that the fissile material of its future nuclear-powered submarines will be used precisely to submarine propulsion and nothing more. In this sense, the possibility of a gap in the NWNPR resulting from the use of nuclear-powered submarines by Australia seems to be an exaggeration. On the contrary, the current obligations of Australia to the NWNPR seem to be more than capable of avoiding that there is no diversion of fissile material to nuclear weapons. Thus, despite the PRC's protests, it is reasonable to expect that Australia will probably negotiate an Arrangement involving Special Procedures that will meet the IAEA's necessary demands to minimize the risk of any possible diversion of nuclear material from its future submarines.

In light of existing public domain information, this is what Australia is doing within the context of the AUKUS partnership. Furthermore, to date, no indication from the IAEA that these negotiations will compromise the current safeguards system and, consequently, the NWNPR. Therefore, it is also reasonable to infer that there does not seem to be a loophole in the safeguards system regarding the use of nuclear energy for submarine propulsion in the Australian case. However, when it comes to fissile material for military application – even if not proscribed by the NPT – good credentials and good faith are not enough. In this sense, the Russian proverb “doveryai, no proveryai” or “trust, but verify” is worth remembering here.<sup>8</sup>

### THE BRAZILIAN CASE AND ARTICLE 13 OF THE INFCIRC/435 – IS THERE A “GAP”?

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<sup>8</sup> President Ronald Reagan popularized the phrase “trust, but verify” in American and world political discourse. According to Barton Swain (2016): “Trust, but verify” entered American usage when Reagan’s adviser on Russian affairs, Suzanne Massie, was preparing the president for talks with Mikhail Gorbachev in 1986. Reagan ought to learn a few Russian proverbs, Massie suggested, and the one he liked best was “Doveryai no proveryai” (Доверяй, но проверяй) — trust, but verify. This proverb rhymes in Russian and means that a responsible person always verifies everything before committing himself to a common business with anyone, even if that anyone is trustworthy.

The Brazilian State CSA with the IAEA was established in the INFCIRC/435 – the Quadripartite Agreement<sup>9</sup> – following the framework provided for INFCIRC/153. However, although INFCIRC/435 is based on INFCIRC/153, some differences exist between the two documents. Therefore, the point to be highlighted in this article are the differences regarding the safeguards applicable to the nuclear material used for the propulsion of submarines contained in the IAEA’s framework for CSA (INFCIRC/153) and the CSA signed by the Brazilian State (INFCIRC/435).

The subject of Paragraph 14 of the INFCIRC/153 is presented in Article 13 of the Brazilian CSA and entitled “Special Procedures”. The differences and common points between the two documents are apparent when comparing the text of INFCIRC/153 vis-à-vis that of INFCIRC/435. First, it is worth noting that the exercise of the State Party’s right to use nuclear energy for submarine propulsion is explicit in INFCIRC/435. However, there is a capital difference between the Arrangement for non-application of safeguards provided by INFCIRC/153 and the Arrangement for applying Special Procedures in the nuclear material used to propel the submarine foreseen in INFCIRC/435. Box 2 summarizes the main provisions of each of these documents.

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<sup>9</sup> The so-called Quadripartite Agreement is the *Agreement of 13 December 1991 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* (see IAEA 1994).

Box 2 – Comparison between Article 13 of INFCIRC/435 and Paragraph 14 of INFCIRC/153.

INFCIRC/435	INFCIRC/153
Article 13	Paragraph 14
<p>13. If a State Party intends to exercise its discretion <u>to use nuclear material</u> which is required to be safeguarded under this Agreement <u>for nuclear propulsion or operation of any vehicle, including submarines and prototypes</u>, or in such other non-proscribed nuclear activity as agreed between the State Party and the Agency, the following procedures shall apply:</p> <p>(a) that State Party <u>shall inform the Agency, through ABACC</u>, of the activity, and shall make it clear:</p> <p>(i) [...]</p> <p>(ii) that <u>during the period of application of the special procedures</u> the nuclear material will not be used for the production of nuclear weapons or other nuclear explosive devices.</p> <p>(b) the State Party and the Agency shall make an Arrangement so that, <u>these special procedures shall apply only while the nuclear material is used for nuclear propulsion</u> or in the operation of any vehicle, <u>including submarines and prototypes</u>, or in such other non-proscribed nuclear activity as agreed between the State Party and the Agency. [...]</p> <p>(c) [...]</p>	<p>14. The Agreement should provide that if the State intends to exercise its discretion <u>to use nuclear material</u> which is required to be safeguarded thereunder <u>in a nuclear activity which does not require the application of safeguards</u> under the Agreement, the following procedures will apply:</p> <p>(a) The State <u>shall inform the Agency</u> of the activity, making it clear:</p> <p>(i) [...]</p> <p>(ii) <u>That during the period of non-application of safeguards</u> the nuclear material will not be used for the production of nuclear weapons or other nuclear explosive devices.</p> <p>(b) The Agency and the State shall make an Arrangement so that, only while the nuclear material is in such an activity, <u>the safeguards provided for in the Agreement will not be applied</u>.</p> <p>(c) [...]</p>

Source: Prepared and highlighted by the author based on the contents of INFCIRC/435 and INFCIRC/153 (see IAEA 1994 and IAEA 1972).

In light of the comparison presented in Box 2, it is essential to note that Article 13 of INFCIRC/435 does not establish that nuclear material would be withdrawn from the safeguards system, unlike what is set by the terms of Paragraph 14 of INFCIRC/153, which speaks of non-application of safeguards.

Article 13 of INFCIRC/435 provides that the State Party may decide to use nuclear power for submarine propulsion and shall inform the IAEA of this decision through the the Brazilian–Argentine Agency for Accounting and Control of Nuclear Materials (ABACC). After this, the State Party shall negotiate with the IAEA an Arrangement to apply the Special Procedures to the nuclear material used for propulsion. This Arrangement shall contain the period or circumstances during which the Special Procedures shall be applied, and “the Agency shall be kept informed of the total quantity and composition of such material in that State Party and of any export of such material”. Furthermore, as in the Australian case, it is worth noting that there is no deadline for the negotiation to be concluded with the IAEA (see IAEA 1994).

The point to be noted is that Article 13 of INFCIRC/435 does not present any words such as “withdrawal” or “non-application” of safeguards, but rather the application of safeguards through establishing an Arrangement involving Special Procedures of safeguards.

Once these differences are evident, a central point should be highlighted: there is no possibility, under INFCIRC/435, that a State Party (Brazil or Argentina) unilaterally declare that the fissile material related to a nuclear-powered submarine will be excluded from the application of safeguards.

It is also worth mentioning that according to the IAEA Director General’s – Rafael Mariano Grossi – Introductory Statement to the Board of Governors, on 06 June 2022, Brazil initiated discussions with IAEA as set out in the Article 13 of INFCIRC/435.

Another important development is that related to Brazil’s formal communication to initiate discussions with the Secretariat on an arrangement for Special Procedures for the use of nuclear material under safeguards in nuclear propulsion and in the operation of submarines and prototypes, as set out in the Quadripartite Safeguards Agreement. Initial discussions on such arrangement were held between Brazil, the Brazilian–Argentine Agency for Accounting and Control of Nuclear Materials (ABACC) and the Secretariat at the end of May and another meeting is planned before the end of the year. [...]. I commend Brazil for its transparent approach and decision to work closely with the Agency on this important project (see IAEA 2022a).

In summary, the Brazilian State began discussions for the Arrangement of Special Procedures with the IAEA considering the provisions of the Quadripartite Agreement. This initial discussion appears to target Special Procedures for the prototype of the nuclear reactor and the onboard nuclear plant. In this context, it is worth mentioning that Brazil also prepared a working paper for discussion at the Tenth Review Conference of the NPT (see United Nations 2020b).

The working paper begins with a text informing that the Brazilian State submitted to the secretariat of the IAEA “its initial proposal for Special Procedures to be applied to the nuclear material used in naval nuclear propulsion, pursuant to Article 13 of the Quadripartite Agreement”, which is the Brazilian CSA with the IAEA (see United Nations 2020b).

The working paper states further that, regarding the Brazilian CNPS, “*Its reactor will use low-enriched uranium*”, and “the Brazilian Navy has a long-standing partnership with IAEA for the implementation of safeguards in its nuclear-related facilities, which are the only military facilities in the world subject to IAEA safeguards” (see United Nations 2020b).

Regarding this last statement, it is also pertinent to note that Brazil is the only country in the world with military facilities subject to IAEA safeguards, because Brazil is the only NNWS that, for example, manufactures ultracentrifuges and enriches uranium in a military facility. Thus, considering the CSA signed by the Brazilian State, these facilities are subject to IAEA safeguards. Therefore, this is not a concession, but the fulfillment of a legal obligation, as provided for in the CSA signed by the Brazilian State.

One of the main points to be highlighted in the Brazilian working paper is its statement regarding the Brazilian-Argentine Agency for Accounting and Control of Nuclear Materials (ABACC). According to the text presented, the ABACC will continue to be fundamental to ensuring the use of nuclear material in line with the safeguards that will be the subject of the Special Procedures.

The role of the Brazilian-Argentine Agency for Accounting and Control of Nuclear Materials in the implementation of special procedures will include keeping records of the total quantity and composition of nuclear material used in nuclear naval propulsion” (see United Nations 2020b).

Another central point in the working paper is the Brazilian expectation regarding the scope of the Special Procedures to be applied to the nuclear material of the Brazilian CNPS.

19. The application of special procedures to the nuclear material employed in nuclear-propelled submarines will not affect the ability of IAEA to reach its safeguards conclusions.

20. The consultation process under way between Brazil and IAEA will ensure that such special procedures will be sufficient to enable the Agency to draw the relevant safeguards conclusion on the non-diversion of nuclear material, while protecting sensitive technological and operational parameters related to the nuclear-powered submarine (see United Nations, 2020b).

It is worth noting that the Brazilian State makes it clear, through this working paper, that it is part of its obligations to ensure that the Special Procedures under negotiation with the IAEA make it possible to guarantee that no nuclear material will be diverted.

Negotiating Special Procedures with the IAEA will not be trivial and quick. Nevertheless, claiming a “gap” in the NWNPR concerning the legitimate right of a NNWS like Brazil to use nuclear energy to propel a naval asset appears to be overrated.

The point to be highlighted is that all the treaties and agreements already signed by the Brazilian State ensure the use of nuclear energy as provided for in the NPT. Moreover, as explained above, complying with what the Brazilian State has already signed is perceived as the best way to guarantee the development and future operation of its CNPS. In this context, the CSA that the Brazilian State signed with the IAEA provides a clear pathway regarding the need to negotiate with the IAEA an Arrangement of Special Procedures to be applied to the nuclear material used for the propulsion of the Brazilian CNPS.

In summary, analyzing the Brazilian case, the existence of a gap or loophole in the NWNPR appears to be overrated. Moreover, the provisions in the framework to the CSA signed by a NNWS Party to the NPT address this issue. However, no Arrangements involving Special Procedures have been negotiated between a NNWS and the IAEA regarding the use of nuclear material for the propulsion of submarines. As the Australian case these Arrangements should be negotiated with the Russian proverb “doveryai, no proveryai” in mind.

## FINAL REMARKS

The central issue underlying the use of nuclear energy in the propulsion of submarines developed or operated by a NNWS is the existence of a possible gap in the nuclear weapons nonproliferation regime related to the possibility that nuclear material could be diverted due to the absence of safeguards.

This issue has not become urgent within the NWNPR since the only nuclear-powered submarine holders are the NWS plus India. However, if the Brazilian CNPS program continues to advance and the AUKUS partnership suits Australia with a nuclear-powered submarine, this issue will probably be prioritized on the NWNPR agenda. In this context, this article analyzed the CSA signed by the Brazilian and the Australian States, highlighting what is provided in both to ensure that the nuclear material used to propel its submarines will be used only for this purpose.

In both cases – Australia and Brazil – the research points out that the existence of a gap or loophole in the NWNPR is overrated, once both States will have to negotiate an Arrangement with the IAEA.

An issue to be highlighted is that in case of successful negotiation of the Arrangement between, for example, the Brazilian State and the IAEA, or between the Australian State and the IAEA, the Agreement signed can be used as a “model” for other NNWS that decide to initiate nuclear-powered submarine programs. In other words, the first Arrangement to be negotiated between a NNWS and the IAEA could become the “ground zero” in the safeguards applied to nuclear-powered submarines.

Here it is time to return to the research question of this article: Is there a gap in the nuclear weapons nonproliferation regime related to the use of nuclear material for propulsion of submarines by Non-nuclear Weapons States?

In light of the research carried out, our research question can be answered with the argument argued in this article: there is no such gap since the IAEA’s Comprehensive Safeguards Agreements address this issue. What happens is that given the unprecedented nature of this issue, no Special Procedures models for the application of safeguards for this kind of nuclear material have yet been elaborated.

However, this issue remains open, and in this sense, the article contributes to the debate that arises from interpreting Paragraph 14 of INFCIRC/153. In this regard, the following point should be highlighted: in light of paragraph 14 of INFCIRC/153, or the case of Brazil, Article 13 of INFCIRC/435, there is no possibility that a State Party unilaterally declares that nuclear material used for the propulsion of a submarine, or any other naval means, will be excluded from the application of safeguards.

Furthermore, it is essential to note that a nuclear-powered submarine is a vector that projects power, regardless of how it is armed. Therefore, its possession or operation by other



States is probably not something that, a priori, pleases the current holders of this type of weapon system. Likewise, this cannot be an excuse for the illicit use of nuclear energy by a NNWS Party to the NPT. In this sense, the maxim “Trust, but verify” still matters.

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