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The Gamble of AUKUS: Eroding the rules of nuclear non-proliferation?

KARLA MAE PABELIÑA

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Please direct inquiries to:
Asia-Pacific Leadership Network
APLN Secretariat
4th floor, 116, Pirundae-ro
Jongno-gu, Seoul, ROK, 03035
Tel. +82-2-2135-2170
Fax. +82-70-4015-0708
Email. apln@apln.network

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Cover Photo: Astute class submarine HMS Ambush is pictured during sea trials near Scotland.(Will Haigh, UK Ministry of Defence).

THE GAMBLE OF AUKUS: ERODING THE RULES OF NUCLEAR NON-PROLIFERATION?

SUMMARY

It has been a year since Australia, the UK and the United States announced their trilateral military-technical partnership called AUKUS. Primarily an initiative to support Australia's acquisition of nuclear-powered submarines, AUKUS reinvigorated the decades-long debate on the security and proliferation risks associated with naval nuclear-propulsion programs, the use and export of highly enriched uranium (HEU) submarine fuel, and the transfer of nuclear materials and technology for military purposes from a nuclear-weapon state (NWS) to a non-nuclear-weapon state (NNWS).

While some argue that Australia's long-standing commitment to the non-proliferation regime makes it less of a risk, the possible transfer of weapons-grade uranium by the United States or UK to Australia for its naval reactor would set a precedent for the acquisition by a NNWS of fissionable materials outside of International Atomic Energy Agency (IAEA) safeguards for military purpose. This may be regarded by other states as an exploitation of the weakness of Article III.2 of the Treaty on the Non-Proliferation of Nuclear Weapons (NPT) which is silent on the imposition of safeguards in the transfer of nuclear materials for a non-proscribed non-peaceful nuclear activity. Moreover, the use of weapons-grade uranium for naval propulsions may be used by some states as a

justification to enrich uranium at higher levels, ostensibly for the same purposes. These situations pose significant challenges for the IAEA with regard to monitoring and identifying whether nuclear materials for use in non-proscribed military activities will not be diverted clandestinely to the production of nuclear weapons, if not with Australia, then in other future cases. Furthermore, the proliferation of naval reactors which rely on highly-enriched uranium (HEU) for fuel will complicate negotiations for a future Fissile Material Cut-off Treaty.

This policy brief asserts that the conclusion of AUKUS provides further impetus for the development of improved verification mechanisms and confidence-building measures to ensure that the transfer, development, or use of nuclear materials and technology for non-proscribed military activities such as naval nuclear propulsion, will be in conformity with the goal of achieving a world free from nuclear weapons. With the NPT at a critical juncture, it behoves all state parties to act in a manner that will strengthen its credibility and improve its vitality.

SUBMARINE AMBITIONS OF NNWS

The possible consequences of the spread of naval nuclear propulsion technology to NNWS for the nuclear non-proliferation regime have been examined in the literature for more than 30 years.¹ In 1987, Canada announced its intention to purchase at least 10 nuclear-powered attack submarines (SSNs) to patrol its expansive coastline which borders the Pacific, Atlantic

¹ Marie-France Desjardins and Tariq Rauf, "Opening Pandora's Box? Nuclear-powered Submarines and the Spread of Nuclear Weapons,"

Aurora Papers (Ottawa: Canadian Centre for Arms Control and Disarmament, 1988).

and Arctic oceans.² The plan nonetheless was cancelled due to budgetary constraints and lowered threat perceptions following the end of the Cold War.

Brazil, since 1970, has embarked on an ambitious goal of developing indigenous nuclear-powered submarines to “effectively exercise surveillance, control and defence of its jurisdictional waters.”³ Funding and varying political priorities nonetheless impeded its progress, resulting in significant delays from the 1980s to the 1990s.⁴ A breakthrough happened in 2008 when Brazil’s Odebrecht and France’s DNCS (later renamed as Naval Group) signed a contract to share submarine technology and assistance for the construction of four diesel-powered Scorpène-class submarines.⁵ In 2020, Brazil launched the assembly of its prototype reactor for the upcoming submarine *Álvaro Alberto*, which when completed could well be the first nuclear submarine to be owned by a NNWS.⁶

² Adam Lajeunesse, “Sovereignty, Security and the Canadian Nuclear Submarine Program,” *Canadian Military Journal* 8, no. 4, (Winter 2007-2008): 74-82.

³ Working paper submitted by Brazil, “Brazil’s naval nuclear propulsion programme and the safeguards regime under the Treaty on the Non-Proliferation of Nuclear Weapons”, 2020 Review Conference of the Parties to the Treaty on the Non-Proliferation of Nuclear Weapons, NPT/CONF.2020/WP.71, 3 August 2022.

⁴ Antonio Ruy de Almeida Silva and José Augusto Abreu de Moura, “The Long History of Brazil’s Nuclear Submarine Program”, *Wilson Center*, 16 January 2018, accessed at: <https://www.wilsoncenter.org/blog-post/the-long-history-brazils-nuclear-submarine-program>

⁵ Adriana Brasileiro and Sabine Pirone, “France, Brazil Sign EU8 Billion in Military Contracts”,

Australia’s decision to acquire nuclear-powered submarines came at the heels of Brazil’s own nuclear naval propulsion development. Compared to Brazil’s initiative, Australia indicated that it will not pursue uranium enrichment, reprocessing, and nuclear fuel fabrication, and will be acquiring complete, welded power units from either the United States or the UK.⁷

AUKUS AND ITS POSSIBLE IMPACT ON NON-PROLIFERATION

Australia’s importation of nuclear materials and technology for naval propulsion may be viewed as an exploitation of the weakness of Article III.2 of the NPT, which requires all states party to the treaty to apply safeguards on exports of nuclear materials and specialised nuclear equipment to non-nuclear weapon states but is silent on the imposition of safeguards on fissionable materials transferred for a non-proscribed non-peaceful nuclear activity. This may set a dangerous precedent that could be taken advantage of by states seeking nuclear arms, and also have negative consequences for the credibility of

Bloomberg, 24 December 2008, accessed at: <https://www.bloomberg.com/news/articles/2008-12-23/france-brazil-sign-eu8-billion-in-military-contracts>

⁶ Ian J. Stewart, “Brazil wants special treatment for its nuclear submarine program-just like Australia”, *Bulletin of the Atomic Scientists*, 28 June 2022, accessed at: <https://thebulletin.org/2022/06/brazil-wants-special-treatment-for-its-nuclear-submarine-program-just-like-australia/>

⁷ Working paper submitted by Australia, the United Kingdom of Great Britain and Northern Ireland, and the United States of America, “Cooperation under the AUKUS partnership”, 2020 Review Conference of the Parties to the Treaty on the Non-Proliferation of Nuclear Weapons, NPT/CONF.2020/WP.66, 22 July 2022.

AUKUS members' non-proliferation diplomacy, if not handled carefully. Due to the fact that the source of fissionable materials for the Australian submarine program will either be the United States or the UK – which are both NWS and therefore outside of the comprehensive safeguards system – it begs the question whether IAEA will have the capacity to identify and monitor whether nuclear materials for use in non-proscribed military activities will not be diverted clandestinely to the production of nuclear weapons, if not in the case of AUKUS, then in future arrangements of similar character.

Apart from the precedent-setting character of a direct transfer of naval reactors (or naval fissile material) from NWS to an NNWS, the technology of the reactors themselves has generated some controversy. Existing US and UK naval reactor designs use weapons-grade, highly-enriched⁸ uranium (HEU), to allow relatively compact design, and in the latest iterations, provide long service lives of 30-40 years to eliminate long-term refuelling costs. Despite the technical merits of such designs, or assurances and means to guarantee that no diversion occurs with the AUKUS program, this use of HEU for an NNWS may encourage other states to attempt acquisition of HEU ostensibly for the development of military reactors, using AUKUS as a reference.

⁸ US and UK naval nuclear reactors use fuel enriched to 93-97.3% U235. By comparison, while Russia and India also use HEU in their nuclear submarines, their grades are lower, at 20-40% U235. French naval reactors use LEU fuel at 5-7% U235. China is reportedly also using LEU in their nuclear submarines, though details on their program is extremely limited.

⁹ "Iran hits out at US, Britain over AUKUS deal", *Tehran Times*, 24 September 2021, accessed at

Following AUKUS' announcement, Iran reiterated its right to use HEU, calling out the United States for its apparent double standard.⁹ In recent years, Iran has also indicated its desire to seek nuclear-powered submarines of its own.¹⁰ Though the argument is from Iran, a state already suspected of seeking nuclear weapons, this does not detract from the evidence of a double standard, which could no doubt be raised by other states seeking HEU for non-weapons purposes.

Furthermore, the possible proliferation of naval reactors which rely on HEU for fuel will complicate the negotiation of a future Fissile Material Cut-off Treaty (FMCT) envisioned to end the production of fissile materials for nuclear weapons and other nuclear explosive devices. The FMCT is considered by many NNWS as a significant step towards nuclear disarmament.

Some states expressed concern over the initiative during the Tenth NPT Review Conference held from 1-26 August 2022 in New York. Indonesia, in its working paper, drew attention to 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" for naval nuclear

<https://www.tehrantimes.com/news/465412/Iran-hits-out-at-U-S-Britain-over-AUKUS-deal>

¹⁰ Naval Today staff, "Iranian Navy: building nuclear submarine is a 'top priority'", *Naval Today*, 16 April 2020, accessed at <https://www.navaltoday.com/2020/04/16/iranian-navy-building-nuclear-powered-submarine-is-a-top-priority/>

propulsion programs. Indonesia also called on all state parties to the NPT to “garner political will and create opportunities for IAEA member states to develop a constructive approach on verification and monitoring arrangements” for such initiatives.¹¹ China, whose very large military build-up AUKUS is widely believed to be in reaction to, strongly criticised the pact’s members, arguing that the trilateral military-technical partnership may open a Pandora’s box of proliferation and may stimulate other countries to follow suit.¹² China also suggested the creation of a “Special Committee, open to all IAEA member states” to deliberate on the political, legal and technical issues related to the safeguards of naval nuclear propulsion reactors, after which a report will then be submitted to the Board of Governors and General Conference of the IAEA.

In response to these criticisms and concerns, the AUKUS members assured other states that they are in consultation with the IAEA with respect to the development of “a suitable verification approach to confirm the non-diversion of nuclear material from the Australian nuclear-powered submarines”, in

their working paper submitted during the same NPT Review Conference.

FURTHER UNCERTAINTIES AND AMBIGUITIES

Pending the results of the 18-month trilateral consultation on the “optimal pathway” towards the implementation of AUKUS, it remains unclear whether the nuclear-powered submarines will be built in Adelaide, Australia, as mentioned by then Prime Minister Scott Morrison; or in the UK as suggested by then Prime Minister Boris Johnson.¹³ US submarine program director Rear Admiral Scott Pappano, in a webinar at the Mitchell Institute for Aerospace Studies, candidly said that adding the Australian submarines to the existing construction queue of American shipyards would be detrimental in terms of fulfilling the United States’ own orders for new submarines, due to the current capacity of the United States industrial base, without additional resources and investments for expanding said base.¹⁴ While such considerations cast doubt on whether the nuclear submarines will be built at all, other experts wonder if Australia’s pledge not to develop an indigenous nuclear fuel cycle will remain true over time.¹⁵

¹¹ Working paper submitted by Indonesia, “Naval nuclear propulsion”, 2020 Review Conference of the Parties to the Treaty on the Non-Proliferation of Nuclear Weapons, NPT/CONF.2020/WP.67, 25 July 2022.

¹² Working paper submitted by China, “Nuclear submarine cooperation among Australia, the United Kingdom of Great Britain and Northern Ireland, and the United States of America”, 2020 Review Conference of the Parties to the Treaty on the Non-Proliferation of Nuclear Weapons, NPT/CONF.2020/WP.50, 27 December 2021.

¹³ White House, *Remarks by President Biden, Prime Minister Morrison of Australia, and Prime Minister Johnson of the United Kingdom announcing the creation of AUKUS*, 15 September 2021, accessed

at: <https://www.whitehouse.gov/briefing-room/speeches-remarks/2021/09/15/remarks-by-president-biden-prime-minister-morrison-of-australia-and-prime-minister-johnson-of-the-united-kingdom-announcing-the-creation-of-aukus/>

¹⁴ Ken Moriyasu, “AUKUS submarines: A burden too big for overloaded US shipyards”, *Nikkei Asia*, 31 August 2022, accessed at: <https://asia.nikkei.com/Politics/International-relations/Indo-Pacific/AUKUS-submarines-A-burden-too-big-for-overloaded-U.S.-shipyards#>

¹⁵ Anastasia Kapetas, “Limiting the nuclear-nonproliferation blowback from the AUKUS submarine deal”, *The Strategist*, 21 September 2021, accessed at:

Some important questions, with implication to the non-proliferation issue, also remain to be answered by AUKUS: should Australia transition from importing complete, welded power units from the UK or the United States to having their own indigenous naval nuclear propulsion program, will it be covered under paragraph 14 of the INFCIRC/153 (corrected) if it was originally a military-to-military transfer?¹⁶ In the development of naval nuclear propulsion, where does the “peaceful activity” and “non-peaceful activity” begin and end? Can a state exempt safeguards in different levels of the fuel cycle due to the classified nature of information or activity? Without a viable nuclear power industry for materials to be shifted back to a status where IAEA safeguards can be applied, the nuclear materials resulting from this program can end up in a legal grey area with associated proliferation risks, which other states are sure to take notice of and exploit, even if Australia itself did not.

POSSIBLE WAYS FORWARD

To mitigate these risks to non-proliferation, the following recommendations may be considered by the AUKUS states:

Exhibit transparency and willingness to resolve misunderstanding regarding the planned nuclear-powered submarines, without exposing sensitive military information.

<https://www.aspistrategist.org.au/limiting-the-nuclear-proliferation-blowback-from-the-aukus-submarine-deal/>

¹⁶ Paragraph 14 of the INFCIRC/153 (Comprehensive Safeguards Agreement) provides for the “non-application of safeguards to nuclear materials” to be used in non-peaceful activities. States may request to cut-off safeguards of nuclear material if it will be used in a non-

The anxiety of the international community over AUKUS stems partly from the lack of prior experience in monitoring and safeguarding nuclear materials and technology in the naval sector. While some of the loudest criticisms clearly stem from states with avowed geopolitical interests against the AUKUS members, some of the suggestions articulated during the NPT Review Conference, such as adopting “constructive approach for verification and monitoring the transfer and development of naval nuclear propulsion technologies”, or the creation of “special committees” are valid in principle. The AUKUS members should be prepared to address these concerns, considering that, as the implementors of the first NWS-to-NNWS naval propulsion sharing agreement, they will predictably come under great scrutiny. The AUKUS states should therefore set the standard of responsible behavior in the transfer and use of nuclear materials and technology for non-proscribed military use.

Explore the feasibility of a naval-use safeguards agreement (NUSA) which includes confidence-building measures for the NWS and NNWS.

As articulated by Naomi Egel, Bethany L. Goldblum, and Erika Suzuki, NUSA builds on the Additional Protocol and is aimed at reducing the proliferation risk associated with naval nuclear propulsion programs.¹⁷ The NUSA may require the application of safeguards on naval nuclear material during fuel fabrication, spent fuel removal, as well as

proscribed military activity such as naval nuclear propulsion. The safeguards will be applied again as soon as the nuclear material is moved into a peaceful nuclear activity.

¹⁷ Naomi Egel, Bethany L. Goldblum, and Erika Suzuki, “A Novel Framework for Safeguarding Naval Nuclear Material”, *The Nonproliferation Review* 22, no.2 (2015): 239-251.

in fresh fuel storage and dry storage for spent fuel for NNWS. It would also promote confidence-building measures between NWS and NNWS to ensure that there will be no nuclear material diversion.

Conduct studies on the possible verification tools that would enable the IAEA inspectors to draw conclusions that no nuclear material or technologies for non-proscribed military activity were clandestinely diverted to produce nuclear weapons.

Verification tools used in the voluntary offer agreements (VOAs) of selected NWS facilities may be used as references. Such verification tools may be non-intrusive and must ensure that the proprietary and classified information are protected.

Refrain from any statement or action that may indicate that flexibility should be accorded to Australia on the basis of its good track record in non-proliferation.

Regardless of the actual state of compliance with the NPT and in cooperating with IAEA, self-made declarations of compliance will invariably invite criticism and scrutiny. For better or worse, asking for special considerations regardless of merit, on issues as sensitive as nuclear technology, only exacerbate perceptions of discrimination, and further fuel divide between and among the NWS, their allies who rely on extended deterrence for their security (such as Australia), and the non-aligned states.

Explore provision of an alternative LEU reactor for Australian and even US and UK submarines.

Australia and the United States could use AUKUS channels to provide investment towards a proposed initiative by the US Office of Naval Reactors' examining the potential for the development of an advanced fuel system with increased uranium loading using LEU.¹⁸ Such additional investment could, barring technical challenges, speed up the development of LEU reactor technology suitable for both US, UK and Australian needs from the prospective 2032 target for determining suitability and 2047 construction start to possibly a decade earlier¹⁹, and in so doing minimizing reliance on HEU and reducing the security and proliferation risks.

CONCLUSION

Recent developments such as the ongoing Russia-Ukraine war and the August crisis over Taiwan have provided further impetus to states to look to their own defenses. For maritime countries, possession of nuclear-powered submarines enables them to patrol and defend their expansive waters virtually undetected and for extended periods of time, with the mere threat of their presence being enough to give would-be aggressors pause. The combination of stealth, mobility and endurance allow nuclear-powered attack submarines to offer the best deterrence against threats for maritime states. Australia may certainly cite these considerations as well as the right of states to self-defense in justifying its decision to move forward with

¹⁸ Department of Energy/ National Nuclear Security Administration, "Conceptual Research and Development Plan for Low-Enriched Uranium Naval Fuel", *Report to Congress*, July 2016, accessed at: <https://fissilematerials.org/library/doe16.pdf>

¹⁹ Sebastian Philippe and Frank Von Hippel, "The Feasibility of Ending HEU Fuel Use in the US Navy", *Arms Control Today*, November 2016.

AUKUS together with the United States and the UK.

That being said, it is imperative that such moves be done responsibly, and ideally in a way that strengthens rather than imperils the global nuclear non-proliferation regime, which has contributed to stability and limited the spread of weapons of mass destruction. The pact between Australia, the UK and the United States has brought stark attention to loopholes within the non-proliferation regime that up until 2021 were mostly hypotheticals, as well as brought up perceptions of double-standards with certain states being allowed the privilege of possessing such systems that are, on the other hand, vigorously denied to others. The precedents set by AUKUS, whether its members like it or not, will inform

other states' decisions on abiding by non-proliferation norms moving forward.

The AUKUS partnership is a double gamble. It is at once a gamble to affect the strategic balance in the Asia-Pacific region, and at the same time a gamble to strengthen a state without weakening the non-proliferation regime. In pursuit of trying to win the former, Australia, the UK and the United States may well fail in the latter, and the consequences may reverberate far beyond just the region. If the AUKUS members wish to uphold the rules-based international order, then they must be able to mitigate the concerns surrounding their partnership in a way that will support non-proliferation and reassure non-aligned states.

ABOUT THE AUTHOR

Ms. **Karla Mae G. Pabeliña** is an Associate Fellow at APLN and a Senior Foreign Affairs Research Specialist at the Center for International Relations and Strategic Studies (CIRSS) of the Philippine Foreign Service Institute (FSI). She has been actively involved in Track II dialogues on Nonproliferation and Disarmament in the Asia-Pacific through the Council for Security Cooperation in the Asia-Pacific (CSCAP). Karla is an alumnus of the US State Department’s International Visitor Leadership Programme (IVLP); a recipient of the UN Office for Disarmament Affairs (UNODA) Women Scholarship for Peace (Global South: Asia-Pacific); as well as the 2017 United Nations Fellowships on Disarmament.

Karla obtained her Bachelor of Arts in Political Science from the University of the Philippines, Diliman in 2007. She received her Masters in Strategic and Arms Control Studies with Красный диплом or red diploma from Saint-Petersburg State University, Russian Federation. Prior to her work at the FSI, she was a Research Officer for the Presidential Commission on the Visiting Forces Agreement (PCVF). She also worked as a Research Assistant for the Institute for Strategic and Development Studies (ISDS Philippines), an independent policy research and advocacy institution affiliated with the UP Department of Political Science.

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The **Asia-Pacific Leadership Network for Nuclear Non-proliferation and Disarmament (APLN)** is a Seoul-based organization and network of political, military, diplomatic leaders, and experts from across the Asia-Pacific region, working to address global security challenges, with a particular focus on reducing and eliminating nuclear weapons risks. The mission of APLN is to inform and stimulate debate, influence action, and propose policy recommendations designed to address regional security threats, with an emphasis on nuclear and other WMD (weapon of mass destruction) threats, and to do everything possible to achieve a world in which nuclear weapons and other WMDs are contained, diminished, and eventually eliminated.



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