

Nuclear Rhetoric and Response: A Historical Analysis of Australia's Nuclear Law Evolution Considering Global Events and the AUKUS Partnership

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1. Introduction

In the realm of the global nuclear fuel cycle, Australia's experience stands distinct. Blessed with abundant uranium resources and a legacy of robust mining, Australia's engagement with nuclear technology has been nuanced and restrained. The nation exports all mined uranium without venturing into nuclear power generation or enrichment. Its contribution to nuclear medicine is globally recognised, yet it grapples with the absence of established pathways for waste disposal. This cautious, somewhat paradoxical approach to nuclear engagement reflects a broader narrative of complex political, legal, and societal dynamics.

The announcement of the AUKUS partnership on 16 September 2021 heralded a defining moment in Australia's nuclear narrative.² This trilateral security agreement involving Australia, the United Kingdom (UK), and the United States (U.S.) signalled a profound shift in Australia's approach to nuclear technology. At the heart of AUKUS is Australia's commitment to acquiring and constructing conventionally-armed, nuclear-powered submarines. This strategic decision not only strengthens Australia's alignment with key global powers but also positions the nation as a pivotal defender of its Pacific neighbours. Moreover, this initiative marks a significant advancement in Australia's nuclear sector, expanding its scope beyond nuclear medicine production that began in the 1950s.³ This move represents a crucial step in Australia's evolving role on the global nuclear stage, enhancing its strategic capabilities and ushering in a new era of nuclear industry development.

Understanding the evolution of nuclear law in Australia requires an appreciation of the country's political landscape, dominated by two major parties: the Australian Coalition Liberal Nationals Party (Coalition) and the Australian Labour Party (ALP). The interplay between these parties, each with its unique and, at times, polarising stance on nuclear policy, has significantly influenced the course of legislative and policy developments in the nuclear domain. Additionally, the country operates under a federal system, with distinct layers of state or territory and federal governments. This creates an added layer of complexity in the development of nuclear law, as the demarcation of powers under the Constitution often leads to intricate legal and policy interplays between various levels of government.

The trajectory of nuclear law in Australia has been anything but linear; it has been marked by turbulence, political manoeuvring, and, at times, radical shifts. The narrative spans from

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² The Hon Scott Morrison MP (Prime Minister) and Senator the Hon Marise Payne (Minister for Foreign Affairs and Minister for Women), (2021) "*Joint Media Statement: Australia to Pursue Nuclear-Powered Submarines Through New Trilateral Enhanced Security Partnership*," 16 September 2021, available at: <https://www.minister.defence.gov.au/statements/2021-09-16/joint-media-statement-australia-pursue-nuclear-powered-submarines-through-new-trilateral-enhanced-security-partnership>. (Accessed 16 December 2023).

³ Australian Nuclear Science and Technology Organisation, '*Our History*' (2023). Available at: <https://www.ansto.gov.au/about/what-we-do/our-history> (accessed 12 December 2023).

imposing moratoriums on uranium mining to contentious land acquisitions and litigations between state and federal governments. Each element illustrates Australia's dynamic and often contentious nature of nuclear law and policy.

As we delve into this analysis, we aim to unravel the complexities of this journey, exploring how Australia has navigated the challenging terrain of nuclear law, shaped by a confluence of historical events, political decisions, and strategic partnerships. This journey, especially in light of the transformative AUKUS partnership, offers a unique perspective on Australia's evolving role in the global nuclear arena and the shaping of its domestic nuclear law.

2. Uranium Mining

The narrative of uranium mining in Australia is not just a tale of resource extraction; it is interwoven with the country's strategic positioning in the global nuclear fuel cycle and the shifting tides of international diplomacy and domestic policy. As of the current landscape, Australia is a leading player in the global uranium market, boasting significant reserves and playing a pivotal role as a world supplier.⁴ The country's uranium resources are abundant and of high quality, placing Australia uniquely positioned to influence the global nuclear energy sector. Despite this vast potential, Australia's involvement in the nuclear fuel cycle has been predominantly confined to the mining and export of uranium. Several factors underpin this distinctive role: Australia is not a nuclear weapons state, it operates no nuclear power plants, and it lacks facilities for uranium enrichment or a centralised radioactive waste repository.

Without a broader nuclear industry, the focus on uranium mining reflects a deliberate policy choice influenced by a complex interplay of political, environmental, economic, and strategic considerations. This approach has been shaped by various domestic and international events, ranging from the heightened awareness of nuclear proliferation risks to global environmental movements and shifts in the international energy market. The political discourse around uranium mining has also been a key factor, with successive Australian governments navigating the balance between harnessing the economic benefits of uranium exports and addressing the associated environmental and security concerns. The following analysis aims to unravel the legal developments that define uranium mining in Australia. It seeks to provide a comprehensive understanding of how Australia has managed its significant uranium resources within the broader context of the global nuclear fuel cycle and the implications of its choices on both the domestic and international stage.

a. Development of law for regulating uranium mining in Australia

The discovery of nuclear fission in 1938 came against the backdrop of increasing global tensions that would culminate in World War II. The war catalysed an urgent push, particularly by the U.S., to harness the power of atomic energy for military purposes. The Manhattan Project, a covert research and development initiative by the U.S., was instrumental in this, leading to the development of the first atomic bomb.⁵ One of the essential components for these bombs was uranium, leading to a spike in its demand and initiating a worldwide

⁴ NEA (2023), 'Uranium 2022: Resources, Production and Demand', OECD Publishing, Paris.

⁵ S. Cockburn and D. Ellyard, (1981) '*Oliphant: the life and times of Sir Mark Oliphant*', Axiom Books, Australia 1981, page 369.

scramble to secure substantial stockpiles of this critical material. Australia's pivotal role in this era was significantly defined by its contribution to uranium supply, particularly from Rum Jungle and Radium Hill in South Australia. The uranium extracted was crucial for supporting the UK and U.S. weapons programs, and the first deliveries of uranium oxide occurred in 1954.⁶

The genesis of uranium regulation in Australia can be traced back to 1945, with the amendment of the South Australian *Mining Act* to facilitate the development of the Radium Hill uranium deposit.⁷ This legislative move granted the state government control over the mining, treatment, and utilisation of uranium and thorium ores, asserting state ownership of these strategic minerals. In recognising the unique and potent nature of uranium and thorium, the Parliament concluded that these materials necessitated safety, security and safeguards and a level of regulation beyond that applied to other minerals in the state, ensuring that their extraction and use were conducted under the strictest standards to prevent misuse and promote safe, beneficial applications.⁸ In parallel, the Australian Federal Government recognised atomic energy's national and international significance and sought greater control over atomic materials. The *Atomic Energy (Control of Materials) Act 1946* marked the Federal Government's early attempts to regulate atomic energy, which was further developed with the *Atomic Energy Act 1953*.⁹ The 1953 Act, drawing inspiration from the 1946 U.S. Atomic Energy Act, established the Australian Atomic Energy Commission (AAEC), focusing on ensuring the safety and security of nuclear materials.¹⁰

These legislative reforms, enacted at state and federal levels, underscored the constitutional demarcation between state and federal regulations. Specifically, while the State retains ownership of the uranium and regulates extraction within the state, the Federal Government regulates export controls, trade and the ownership and regulation of uranium in the territory.¹¹ This distinction was further solidified by the South Australian *Uranium Mining Act 1949*, which required state consultation with the federal Prime Minister for the sale or disposal of uranium ore.¹²

The 1950s represented a crucial juncture for Australia's uranium sector, with significant discoveries initiating mining operations at Rum Jungle in the Northern Territory and Mary Kathleen near Mt Isa in North Queensland.¹³ These locations, supplemented by smaller mines in the Northern Territory, swiftly set up direct supply agreements with key global powers, the UK and the U.S., maintaining Australia's prominence on the global uranium stage.¹⁴ As the

⁶ Robers, M. G. (1978) 'Government Participation in the Minerals Industry' Australian Mining and Petroleum Law Journal Volume 1, No. 2, pages 272-313 at 285

⁷ *Mining Act Amendment Act 1945 (SA)*.

⁸ Parliament of South Australia, Legislative Council, (1945) 'Second Reading Speech – Mining Act Amendment Bill', Hansard, 16 October 1945, page 482.

⁹ *Atomic Energy (Control of Materials) Act of 1946 (Cth)*; *Atomic Energy Act 1953 (Cth)* (No. 31 of 1953).

¹⁰ *Atomic Energy Act 1953 (Cth)* (No. 31 of 1953); Commonwealth Government of Australia, House of Assembly, (1953) 'Second Reading Speech – Atomic Energy Bill 1953', 26 March 1953, page 1673.

¹¹ *Australian Constitution Act 1901 (Cth)* sections 51(vi) and 122; Carney, G. (2007) 'Constitutional Framework for Regulation of the Australian Uranium Industry', Australian Resources and Energy Law Journal, Volume 26, 2007.

¹² *Uranium Mining Act 1949 (SA)*.

¹³ Nicholson, R. D. (1979) 'Commonwealth and State Controls Over Uranium Exploration and Production' Australian Mining and Petroleum Law Journal, Volume 2, no. 1, pages 33-53.

¹⁴ Berkemeier, M. Bowen, W. Hobbs, C. Moran, M. (2014) 'Governing Uranium in the United Kingdom' Danish Institute for International Studies Report, pages 11-14.

sector continued to flourish, the 1970s heralded an era of unprecedented discovery, with substantial deposits identified at Ranger, Jabiluka, Nabarlek, and Koongarra in the Northern Territory, followed by Olympic Dam in South Australia.¹⁵ It was a period marked by proactive governmental policies aimed at stimulating uranium exploration and extraction, however, beneath the surface of this economic boom, safety, security and safeguards concerns began to emerge.¹⁶

As the 1960s drew to a close, Australia faced escalating tensions over safeguard risks associated with foreign ownership of its uranium resources. Concerns peaked with fears that the Nabarlek uranium mine might fall into foreign hands due to high share turnovers. The Australian government responded in 1972 with the *Companies (Uranium Mining Companies) Ordinance*, imposing a 15 per cent cap on foreign shareholding in uranium mines.¹⁷

The 1970s and 1980s marked a paradigm shift in Australia's approach to uranium. The early 1970s saw the ALP ascend to power after 23 years, advocating for Australian ownership in uranium mining. This period was characterised by an outright denial of foreign involvement in uranium exploration and mining, coupled with strict controls on strategic mineral exports and later transitioning to state-controlled operations.¹⁸ While existing contracts were honoured, a significant uranium export embargo was introduced.¹⁹ However, this shift faced international challenges,²⁰ particularly following the 1973 oil embargo by OPEC, which necessitated a reevaluation of Australia's energy policy.²¹

The environmental, social, and geopolitical discourse around uranium mining intensified, highlighting concerns about nuclear energy, proliferation, environmental and health risks.²² In response, the Australian government initiated the Ranger Uranium Environmental Inquiry (Fox Inquiry) in July 1975.²³ The inquiry sought a balanced approach to land use in the Alligator Rivers Region, addressing conflicts between uranium mining, environmental

¹⁵ Mascher, S. (2007) *'Too Hot to Handle? Uranium and Nuclear Power in Australia's Energy Mix.'* Australian Resources and Energy Law Journal, Volume 26, no. 3 (2007) pages 330–343, at 334.

¹⁶Robers, M. G. (1978), *supra* note 6 at 286; The Parliament of the Commonwealth of Australia. (1997) *'The Report of the Senate Select Committee on Uranium Mining and Milling – Uranium Mining and Milling in Australia'*, May 1997.

¹⁷ Minister for National Development, the Hon R.W Swarts MP and the Attorney-General, Senator the Hon Ivor J. Greenwood QC. (1972) *'ACT Companies (Uranium Mining Companies) Ordinance 1970'* Press Statement, 15 March 1972.

¹⁸ Nicholson, R. D. (1979) *supra* note 13.

¹⁹ John, K. (2005) *'Uranium in South Australia – Politics and Reality'*, Journal of Australasian Mining History, Volume 3, September 2005. Pages 171-184, at 177.

²⁰ Commonwealth Parliamentary Debates (CPD), House of Representatives, 23 March 1977, p.484.

²¹ Clarke, M. (2012) *'The Fraser Government's "Uranium Decision" and the Foundations of Australian Non-Proliferation Policy: A Reappraisal'* Australian Journal of Politics and History: Volume 58 Number 2, pages 221-235 at 226.

²² Leask, A. Mason, D. *'International Law and Australian Implementation of Controls on the Production and Export of Uranium Ore Concentrate.'* Australian Resources and Energy Law Journal Volume 26, no. 3 (2007). page 249–267, at 260.

²³ John, K. (2005) *supra* note 19 at 177; The Parliament of the Commonwealth of Australia. (1976) *'Ranger Uranium Environment Inquire'* First Report, October 1976. The Parliament of the Commonwealth of Australia. (1977) *'Ranger Uranium Environment Inquire'* Second Report, May 1977.

preservation, and Indigenous land rights.²⁴ The government adopted the Fox Inquiry's recommendations, establishing a comprehensive regulatory framework.²⁵

The return of the Coalition to federal power led to the lifting of uranium embargoes, the end of state-controlled operations and the recommencement of extraction and exports of uranium under the post-Fox Inquiry uranium regulations, known as the Fraser Government 'Uranium Decision', due to its historical significance.²⁶

Nonetheless, the federal opposition ALP responded in 1977 by announcing a moratorium on uranium mining and treatment. This stance was echoed by South Australia, which had an ALP State Government at the time, implementing a moratorium in state law but allowing retention leases for explorers to preserve their investments, pending future policy shifts.²⁷ This nuanced approach by South Australia played a crucial role in maintaining a foothold for uranium mining in the region despite the broader political divides and shifting policies at the federal level.

Despite the post-Fox Inquiry legal reform to improve environmental regulation to mitigate risks and address concerns, the uranium industry was not without its incidents. The Church Rock Spill of 1979 in the U.S. underscored the catastrophic potential of uranium mining, drawing parallels with Australian projects such as Koongarra, Jabiluka, and Ranger.²⁸ The latter experienced a similar spill in 1981 at Ranger, further intensifying the call for reform and scrutiny.²⁹ The incidents at Ranger and Church Rock, along with the backdrop of India's first nuclear test and the Three Mile Island reactor accident, further intensified the scrutiny of the nuclear industry and uranium mining. These events overshadow the industry and propelled rigorous debates in Australia, driving policy towards a more conservative stance.

The 1984 'three-mine policy' represented a watershed moment in the history of uranium mining in Australia, with its impacts still resonating today. Implemented by the ALP, this policy aimed to restrict the operation of uranium mines in the country to just three.³⁰ Further international incidents like Chernobyl and domestic concerns the Mirarr Indigenous People raised concerning the Jabiluka uranium deposit in Kakadu³¹ further contributed to the rhetoric underlying this policy on uranium mining. This policy was later adjusted in the 1990s, allowing previously approved mines to proceed, and was eventually abandoned in 2007.³²

²⁴ Mascher, S. (2007) *supra* note 15; The Parliament of the Commonwealth of Australia. (1976) '*Ranger Uranium Environment Inquire*' First Report, October 1976. The Parliament of the Commonwealth of Australia. (1977) '*Ranger Uranium Environment Inquire*' Second Report, May 1977.

²⁵ Commonwealth Government of Australia. (1977) '*Uranium – Australia's Decision: What the Government Has Decided*', August 1977.

²⁶ Clarke, M. (2012), *supra* note 21.

²⁷ *Mining Act Amendment Act (No 34 of 1978) (SA)*.

²⁸ Parliament of Australia, House of Assembly, (1981) '*Second Reading Speech - Koongarra Project Area Bill 1981*' 3 June 1981, page 3065.

²⁹ Shadow Minister for Environment and Conservation, The Hon Stewart West. (1981) '*Regulation of Uranium Mining in the Northern Territory is not Working*' 24 November 1981.

³⁰ Australian Labor Party. (1984) '*Australian Labor Party Platform, Constitution and Rules as approved by the 36th National Conference, Canberra 1984*' pages 1-270, at 174.

³¹ Minister for Aboriginal Affairs, Senator the Hon. Peter Baume. (1982) '*Alligator Rivers Stage 2 Land Claim*' Press Statement 8 March 1982.

³² Australian Labor Party, (2007) '*National Platform and Constitution* pages 1-320 at 55.

The Fukushima Daiichi nuclear accident in 2011 marked another turning point, leading to a worldwide reassessment of nuclear energy and a subsequent decline in uranium demand. Amidst this backdrop of heightened scrutiny and shifting paradigms, the South Australian State Government initiated the Nuclear Fuel Cycle Royal Commission (Royal Commission) in 2015, a comprehensive inquiry to explore opportunities to expand the state's involvement in the nuclear fuel cycle.³³ This focused on several key areas across the fuel cycle, including the expanded exploration, extraction, and milling of minerals containing radioactive materials. The Commission's findings underscored that existing administrative and regulatory processes effectively support safe and expanded uranium mining activities, and these activities should continue with regulatory enhancements.³⁴ The State Government embraced the Commission's recommendations on uranium mining, leading to significant amendments to the *Mining Act 1971* in 2019.³⁵ These amendments aligned the state's assessment processes more closely with the *Environment Protection and Biodiversity Conservation Act 2000* (EPBC Act), enhanced the Minister of Energy and Mining's authority to collect and release geophysical data, and improved financial assurance measures for the complete lifecycle of uranium mining projects. These reforms reflected a commitment to a balanced approach in uranium mining, considering economic development and environmental sustainability.

Following the ALP Government's decision to move away from the three-mine policy in 2007 and considering the Royal Commission's positive outlook on expanding uranium mining in 2016, one might have expected a more streamlined approach to uranium mining nationwide. Yet, the reality presents a varied and complex legal mosaic. Currently, uranium mining is legally permitted in South Australia, Tasmania, and the Northern Territory. However, with the closure of the Ranger Mine in the Northern Territory, South Australia remains the sole active player, hosting the Olympic Dam, Honeymoon, Beverley, and Four Mile mines. The situation in Western Australia is particularly intriguing. The state, under the previous Coalition Government, greenlit several uranium projects. Contrastingly, the current State ALP Government has introduced a 'no uranium' stipulation on new mining leases, effectively halting the initiation of any new uranium mining ventures.³⁶ Victoria and New South Wales stand on the firmer ground of prohibition, with longstanding state laws explicitly barring uranium exploration.³⁷ Queensland, meanwhile, lifted its ban in 2012 under a Coalition government, but this was swiftly replaced in 2015 by an ALP Government policy refusing to issue mining leases for uranium extraction and prohibiting the processing or handling of uranium within the state.³⁸ Adding another layer of complexity is that Port Adelaide in South Australia is the only port authorised for uranium exports, presenting logistical challenges for potential mining operations in other states. Significant progress

³³ Grey, K. (2016) 'A Nuclear Future for Australia The South Australian Nuclear Fuel Cycle Royal Commission Releases Final Report.' Australian Resources and Energy Law Journal, volume 35, no. 2 pages 131–41.

³⁴ Nuclear Fuel Cycle Royal Commission, Government of South Australia, SA (Australia) (May 2016), 'Nuclear Fuel Cycle Royal Commission Report 2016' (INIS-AU--0069). Australia

³⁵ *Mining (Mineral Resources) Amendment Act 2019 (SA)*; Nuclear Fuel Cycle Royal Commission Consultation and Response Agency, Department of the Premier and Cabinet, Government of South Australia, Adelaide, SA (Australia) (2016). 'Response to the Nuclear Fuel Cycle Royal Commission 2016' (INIS-AU--0070). Australia

³⁶ Department of Energy, Mines, Industry Regulation and Safety, (n.d.) 'Uranium' [webpage] available at: <https://www.dmp.wa.gov.au/Uranium-1459.aspx> (accessed 16 December 2023).

³⁷ *Uranium Mining and Nuclear Facilities (Prohibitions) Act 1986 (NSW)* section 7; *Nuclear Activities (Prohibitions) Act 1983 (Vic)* section 5.

³⁸ Sky News, (2015) 'QLD Uranium Mining Ban Again', 15 March 2015 available at: <https://web.archive.org/web/20150716140551/http://www.skynews.com.au/news/national/2015/03/15/qld-uranium-mining-ban-on-again.html>

remains elusive despite efforts to untangle these legislative and policy knots since departing from the three-mine policy.³⁹ This ongoing scenario underscores various Australian state and territory governments' continued cautious or even prohibitive stance towards the uranium mining sector.

b. AUKUS and Australian Uranium

The recent AUKUS partnership, which includes the construction of SSN-AUKUS submarines in Adelaide, South Australia, presents an interesting dynamic in the context of Australian uranium. Despite the proximity of these submarine construction activities to South Australia's uranium resources, the nuclear fuel for these submarines will not be derived from Australian uranium. This situation is primarily due to two key factors.

Firstly, Australia lacks the capability to enrich uranium, a critical process for producing the type of nuclear fuel required for these submarines. Further, it has been confirmed that Australia will not enrich uranium or reprocess spent fuel as part of the AUKUS program.⁴⁰ Secondly, the uranium mined in Australia is strictly earmarked for export, intended solely for use in civilian nuclear energy generation and research reactors. Uranium exports are governed by stringent international agreements and protocols.

Under the current regulatory framework, Australian uranium can only be exported to nations that accept Australia's comprehensive safeguards conditions⁴¹ and, at a minimum, have established a nuclear cooperation agreement with Australia. These agreements explicitly mandate that Australian uranium be used exclusively for peaceful purposes, unequivocally excluding military applications. Furthermore, recipient countries must have a Comprehensive Safeguards Agreement and an Additional Protocol or Voluntary Offer Safeguards Agreements and Additional Protocols with the International Atomic Energy Agency (IAEA). These measures ensure that the use of Australian uranium aligns with international non-proliferation standards and is consistently monitored to prevent diversion to military programs, including those related to nuclear submarines.

c. Conclusion

The journey of uranium mining law in Australia is a story of continuous adaptation to domestic and international events, shaped significantly by political rhetoric. The narrative showcases a "yo-yo effect" of policies, particularly between the Coalition and ALP Governments. Despite the ALP abandoning its anti-uranium mining policy 16 years ago, the legacy of these policy fluctuations continues to influence the current legal and operational landscape of the uranium mining sector in Australia.

Australia's abundance of high-grade uranium resources positions it as a potential global nuclear energy market leader. However, the legacy of historical government policies,

³⁹ See failed *Uranium Mining and Nuclear Facilities (Prohibitions) Repeal Bill 2019 (NSW)* and Victoria's Legislative Council Environment and Planning Committee review of Uranium 2020.

⁴⁰ Department of Defence, (2023) *'The AUKUS Nuclear Powered Submarine Pathway. A Partnership for the Future'*, available at: <https://www.asa.gov.au/aukus> (accessed on 12 December 2023) page 35.

⁴¹ Leask, A. Mason, D. (2007) *supra* note 22 at 263; Example: Agreement between the Government of Australia and the Government of the United States of America concerning Peaceful Uses of Nuclear Energy (signed 22 December 2010) (NFCIRC/91, art 2(k)).

fluctuating with the changing tides of political leadership, has led to a complex and often restrictive regulatory environment. This situation has locked up significant potential, hindering Australia from fully capitalising on its uranium wealth. The result is a dichotomy where Australia, despite being one of the world's largest holders of uranium reserves, maintains a cautious approach to developing and exploiting these resources. The current legal framework reflects a cautious equilibrium, balancing economic opportunities with environmental and safety concerns.

The bipartisan support for the AUKUS partnership, combined with the well-established uranium mining industry in South Australia, known for its robust safety cultures, brings to the fore a critical question for Australia's uranium regulatory framework. As the world increasingly leans towards nuclear power as a key component of sustainable energy strategies—underscored by the commitment of leading global economies at the recent COP28 summit to triple nuclear generation⁴²—the demand for uranium is poised to escalate. This surge in global demand for uranium beckons Australia to reevaluate its stance, particularly in jurisdictions like Western Australia and Queensland, which harbour considerable uranium deposits yet remain constrained by restrictive legal frameworks. The current geopolitical and environmental climate presents a unique opportunity for these states to reconsider their positions on uranium mining. With Australia holding some of the world's largest reserves of high-grade uranium, the country is at a crossroads: Will it step up as a significant player in the global nuclear energy market, leveraging its uranium wealth to meet the burgeoning international demand, or will it continue to navigate the cautious path set by its historical policy and regulatory fluctuations? The answer to this holds significant implications not only for Australia's economic and strategic positioning but also for its contribution to the global pursuit of sustainable and secure energy solutions.

3. Weapons Testing, Safeguards and Non-Proliferation

Australia's approach to safeguards and non-proliferation laws has undergone a significant transformation, moving from a period marked by involvement in nuclear weapons testing to a current focus on key international treaties. This shift is evident in its stance on key international treaties such as the Nuclear Non-Proliferation Treaty (NPT), the Comprehensive Nuclear Test Ban Treaty (CTBT), and the Treaty on the Prohibition of Nuclear Weapons (TPNW). Today, Australia's commitment to nuclear non-proliferation is evident in its active participation in numerous bilateral, plurilateral, and multilateral treaties and arrangements aimed at reducing or eliminating nuclear weapons and preventing their proliferation. The country has consistently worked to bolster support for the NPT through initiatives like the Non-Proliferation and Disarmament Initiative, advancing nuclear disarmament verification and promoting risk reduction measures.⁴³ Furthermore, Australia's influential role in advocating for the CTBT and its commitment to the South Pacific Nuclear Free Zone Treaty

⁴² O'Malley, Nick. (2023) '*COP28 ends with tears, and a historic deal on transition away from fossil fuels*' The Sydney Morning Herald, 14 December 2023.

⁴³ Department of Foreign Affairs and Trade. (n.d.) 'Nuclear Weapons' [webpage] Available at: <https://www.dfat.gov.au/international-relations/security/non-proliferation-disarmament-arms-control/nuclear-weapons> (accessed 16 December 2023).

Act 1986 ratifying the South Pacific Nuclear Free Zone Treaty (Treaty of Rarotonga)⁴⁴ underscores its dedication to global disarmament efforts.

a. Safeguards and the Nuclear Non-Proliferation Treaty (NPT)

Safeguards and non-proliferation are aimed at preventing the diversion of nuclear material for non-peaceful purposes, ensuring the peaceful use of nuclear energy, and inhibiting the spread of nuclear weapons through comprehensive international regulation and monitoring.⁴⁵

In the aftermath of World War II, as the international community grappled with the implications of atomic energy, Australia emerged as a proactive participant in global atomic discussions. The establishment of the United Nations Atomic Energy Commission in 1946, with Australia's Dr. H.V. Evatt as its first chairman, signified the country's early and influential role in shaping the international atomic energy discourse.⁴⁶ This period marked the beginning of Australia's journey in nuclear non-proliferation, balancing the dual aspects of atomic energy's potential for immense destruction and unprecedented progress.

The atomic bombings in Japan during World War II were a catalyst for this global awakening to the need for atomic energy regulation.⁴⁷ In response to these events, nations worldwide, including the U.S. and the UK, enacted legislation to control and manage atomic energy. The U.S. passed the *Atomic Energy Act of 1946*, establishing civilian control over atomic energy development. Similarly, the UK's *Atomic Energy Authority Act of 1954* set up the Atomic Energy Authority to oversee its civil nuclear program.⁴⁸ These international legislative responses greatly influenced Australia's approach to nuclear law and policy.

Domestically, the *Atomic Energy (Control of Materials) Act of 1946* marked Australia's initial legislative step in managing atomic energy - predominately uranium.⁴⁹ Australia's legal and policy framework continued to evolve in response to international trends. The *Atomic Energy Act 1953*, inspired by the U.S. and UK approach, enhanced governance and security over nuclear materials and established the AAEC.⁵⁰ This period also saw Australia's increased engagement in global disarmament discussions and its accession to the IAEA in 1957, reflecting its commitment to peaceful nuclear use and non-proliferation.⁵¹

⁴⁴ *South Pacific Nuclear Free Zone Treaty Act 1986 (Cth)*; South Pacific Nuclear Free Zone Treaty (1985), 1445 UNTS 177, entered into force 11 Dec. 1986. and ratified by Australia on 11 December 1986.

⁴⁵ Stoiber, C., Baer, A., Pelzer, N., Tonhauser, W., (2003) *Handbook on Nuclear Law*, Non-serial Publications, IAEA, Vienna, Chapter 12 Safeguards, page 125.

⁴⁶ Commonwealth of Australia, House of Representatives (1946) '*United Nations - Atomic Energy Commission - Statement of Australia's Participation*', Parliamentary Debates, 1 August 1946.

⁴⁷ Haakansson, Ane; Jonter, Thomas. (2007) *An Introduction to Nuclear Non-Proliferation and Safeguards* (SKI-R--07-44). Sweden, page 20.

⁴⁸ Reynolds, W.; Lee, David. (2013) '*Australia and the Nuclear Non-Proliferation Treaty 1945-1974*.' (Australian Department of Foreign Affairs and Trade), 2013, page 17.

⁴⁹ *Atomic Energy (Control of Materials) Act of 1946* (Cth), section 6.

⁵⁰ Senate, Parliament of Australia, *Second Reading Speech – Atomic Energy (Control of Materials) Bill 1952 Debates*, 3 June 1952, page 1191-1193.

⁵¹ Anderson, David. '*The Report of the Senate Select Committee on Uranium Mining and Milling in Australia*', Chapter 12, Safeguards, (Parliament of Australia, 1997), available at: https://www.aph.gov.au/Parliamentary_Business/Committees/Senate/Former_Committees/uranium/report/c12 (accessed 11 December 2023).

The late 1950s and the 1960s were a period marked by heightened international efforts to establish a more formalised system for preventing the spread of nuclear weapons. This led to the proposal of the NPT. The NPT, entering into force in 1970, was a landmark international treaty whose primary objectives were to prevent the spread of nuclear weapons and weapons technology, to promote cooperation in the peaceful uses of nuclear energy, and to further the goal of achieving nuclear disarmament.⁵² The treaty represented a significant commitment by the signatory states to curb the proliferation of nuclear weapons while also recognising the rights of all states to access nuclear technology for peaceful purposes under appropriate safeguards.

The 1950's and 1960's also marked by a series of domestic events that further shaped Australia's nuclear policy. The British nuclear tests at Montebello Islands, Maralinga, and Emu Field, sanctioned by the Australian government, played a pivotal role in aligning Australia with the UK's nuclear ambitions.⁵³ These tests, pivotal in advancing nuclear capabilities, also precipitated profound health, environmental, and geopolitical concerns. Their legacy significantly influenced public opinion and policy in Australia, casting a lasting shadow on the societal acceptance of Australia's involvement in the nuclear fuel cycle to this day.

International events such as the Cuban Missile Crisis in 1962 and the escalating Cold War nuclear arms race further underscored the urgent need for international controls on nuclear weapons.⁵⁴ These events and growing public concern over nuclear proliferation played a pivotal role in shaping Australia's approach to the NPT.⁵⁵

Despite initial reservations,⁵⁶ Australia's decision to sign the NPT in 1970 was driven by various factors, including the anticipated international support for its peaceful nuclear program and the need to maintain strong alliances, particularly with the US.⁵⁷ This move demonstrated Australia's commitment to playing a significant role in the global non-proliferation landscape. The subsequent ratification of the NPT in 1973 under the Federal Whitlam Government was a pivotal moment, marking Australia's formal commitment to the global non-proliferation regime.⁵⁸ Australia implemented the *Nuclear Non-Proliferation (Safeguards) Act 1987* (Safeguards Act) and, as a non-nuclear weapons state, entered into a Comprehensive Safeguards Agreement with the IAEA.⁵⁹ Under the safeguards agreement, Australia reports what nuclear material it holds, the location of that material and allows IAEA inspectors to verify and inspect the material independently.

After ratifying the NPT, Australia shifted its focus towards effectively implementing NPT safeguards, a move significantly influenced by key global nuclear events and strategic

⁵² Greig, D. *The Interpretation of Treaties and Article IV.2 of the Nuclear Non-Proliferation Treaty*. (Australian International Law Journal, Volume 6, 1975) page 77.

⁵³ Reynolds, W. Lee, David. (2013) *supra* note 48, page 19.

⁵⁴ Niemann, G. (2013) 'Nuclear Weapons and the Civilian Use of Nuclear Energy' Flinders Law Journal. Volume 15, page 196.

⁵⁵ Reynolds, W. Lee, David. (2013) *supra* note 48, page 52.

⁵⁶ Walsh, J. (1997) *Surprise Down Under: The Secret History of Australia's Nuclear Ambitions*. The Nonproliferation Review, Volume 5 (1997) page 1; Reynolds, W.; Lee, David. (2013) *supra* note 48, page 53.

⁵⁷ Reynolds, W.; Lee, David. (2013) *supra* note 48, page 45.

⁵⁸ Reynolds, W.; Lee, David. (2013) *supra* note 48, page 49.

⁵⁹ Agreement Between Australia and the Agency for the Application of Safeguards in Connection with the Treaty on the Non-Proliferation of Nuclear Weapons (13 December 1974) INFCIRC/217 (Sa).

alliances. Notably, the 1974 Indian nuclear test, which utilised plutonium from an unsafeguarded reactor, underscored the dual-use nature of nuclear technology and posed a stark challenge to the international non-proliferation regime.⁶⁰ Moreover, France's persistent atmospheric nuclear testing in the Pacific further strained this regime. In response, Australia, alongside New Zealand, brought the landmark Nuclear Tests case to the International Court of Justice, a significant step that not only reinforced its commitment to the NPT's principles but also highlighted the vital role of international legal frameworks in addressing nuclear proliferation challenges.⁶¹

During this period, Australia's approach to nuclear non-proliferation and safeguards was also profoundly shaped by the broader international nuclear landscape, particularly the policies of the U.S. Carter administration.⁶² Recognising its critical role as a major uranium supplier, Australia responded to the U.S. focus on curbing the spread of reprocessing technology and the associated risks of a 'plutonium economy.' The U.S. policy aimed to shift global nuclear energy reliance towards uranium enrichment technologies, a strategy that later revealed its own proliferation risks. The Federal Fraser Coalition Government's 'Uranium Decision' in 1977, a direct response to these international dynamics and U.S. policies, underscored Australia's moral responsibility to contribute to global non-proliferation efforts, given its vast uranium reserves. This decision emphasised rigorous safeguards for uranium exports, requiring recipient countries to be parties to the NPT and to assure the non-diversion of nuclear materials for military use.

These pivotal events and the influence of international developments spurred a significant shift in Australia's engagement with international nuclear law and policy, leading to the creation of more robust legal mechanisms for regulating nuclear materials and activities. This period marked a proactive stance in Australia's nuclear policy, shaping future legal responses to nuclear challenges. The establishment of the Australian Safeguards Office within the AAEC represented a major advancement in Australia's legal and institutional framework for nuclear non-proliferation, setting the stage for the later formation of the Australia Safeguards and Non-Proliferation Office (ASNO).⁶³

Australia's ongoing commitment to nuclear non-proliferation and disarmament has been evident in its early adoption of enhanced NPT safeguards under the Modern Additional Protocol in 1997. The Additional Protocol is not a stand-alone agreement but rather an extension to Australia's existing safeguards agreement with the IAEA, providing additional tools for verification.⁶⁴ It enhances the IAEA's capacity to monitor and verify nuclear activities by granting broader access to both nuclear and non-nuclear sites and more

⁶⁰ Reynolds, W.; Lee, David. (2013) *supra* note 48, page 26.

⁶¹ Rowe, R. (2021) *The Diplomatic Dimension: Australia and the 'Nuclear Tests Case.'* Melbourne Journal of International Law 21, no. 3. Pages 536–52.

⁶² Clarke, M. (2012), *supra* note 21.

⁶³ Anderson, D. (1997) *The Report of the Senate Select Committee on Uranium Mining and Milling in Australia*, Chapter 12, Safeguards, (Parliament of Australia, 1997), available at: https://www.aph.gov.au/Parliamentary_Business/Committees/Senate/Former_Committees/uranium/report/c12 (accessed 11 December 2023).

⁶⁴ Leask, A. Mason, D. (2007) *supra* note 22, at 251.

comprehensive reporting of nuclear material, ensuring more effective checks against the diversion of nuclear materials for weaponisation.⁶⁵

In January 2023, this enduring commitment was further underscored as the Australian Government commemorated the 50th anniversary of Australia's ratification of the NPT. This milestone was marked by public statements reaffirming Australia's dedication to the principles of the treaty. The government reiterated its commitment to nuclear disarmament and the global effort to eliminate nuclear weapons, highlighting Australia's role as a responsible member of the international community in the pursuit of a nuclear-free world.⁶⁶

The development of Australia's nuclear law in relation to the NPT is a narrative of strategic adaptation, legal evolution, and diplomatic engagement in response to changing global nuclear landscapes. From its initial legislative responses to the atomic age to its current role in international non-proliferation efforts, Australia's journey reflects a dynamic balance between national interests and international commitments. As Australia continues to navigate the complex interplay of domestic legal frameworks and international treaties, its experience offers valuable insights into the challenges and opportunities inherent in the pursuit of a safe, secure, and non-proliferated nuclear future.

b. Comprehensive Nuclear Test Ban Treaty (CTBT)

The CTBT⁶⁷ is, as the name suggests, a comprehensive international agreement aimed at prohibiting all nuclear test explosions, including those for military and civilian purposes.⁶⁸ The treaty's objective is to curb the development and qualitative improvement of nuclear weapons and to prevent the proliferation of these weapons in both nuclear and non-nuclear states.⁶⁹ However, the treaty is yet to enter into force because it requires ratification by 44 specific states that participated in the negotiations of the treaty and possess nuclear research or power reactors.⁷⁰ As of now, several of these key states, including some with significant nuclear capabilities, have either not signed or not ratified the CTBT, thus impeding its global legal enactment and enforcement.⁷¹

Australia played a pivotal role in the advocacy and drafting of the CTBT.⁷² This involvement was part of a broader Australian commitment to nuclear disarmament and non-

⁶⁵ Stoiber, C. (2006) 'Nuclear Safety, Security and Safeguards in a New Century: Legal Issues and Approaches'. Australian Mining and Petroleum Law Association (AMPLA) Yearbook, page 22.

⁶⁶ Minister for Foreign Affairs and Trade, the Hon. Penny Wong. (2023) 'AUKUS won't undermine Australia's stance against nuclear weapons' (Foreign Minister, 23 January 2023) available at: <https://www.foreignminister.gov.au/minister/penny-wong/opinion/aukus-wont-undermine-australias-stance-against-nuclear-weapons> (accessed 11 December 2023)."

⁶⁷ Comprehensive Nuclear-Test-Ban Treaty (adopted 10 September 1996, opened for signature 24 September 1996) (not yet entered into force), available at: https://www.ctbto.org/sites/default/files/2023-10/2022_treaty_booklet_E.pdf (CTCT).

⁶⁸ Comprehensive Nuclear Test Ban Treaty (1996), *supra* note 67, Preamble.

⁶⁹ *Ibid.*

⁷⁰ Comprehensive Nuclear-Test-Ban Treaty (1996), *supra* note 67, Annex 2; Comprehensive Nuclear-Test-Ban Treaty Organization (CTBTO), 'States Signatories', available at: <https://www.ctbto.org/our-mission/states-signatories> (accessed 11 December 2023)

⁷¹ *Ibid.*

⁷² Australian Safeguards and Non-proliferation Office (ASNO), (2020) 'Annual Report 2019-2020', [online], available at: https://www.dfat.gov.au/sites/default/files/asno_annual_report_2019-2020.pdf (accessed 11 December 2023), p 21.

proliferation, a stance consistent in the country's foreign policy.⁷³ Australia ratified the treaty in 1998.⁷⁴ The *Comprehensive Nuclear-Test-Ban Treaty Act 1998* (CTBT Act)⁷⁵ prohibits any nuclear explosion within Australian jurisdiction or by Australian nationals anywhere in the world, with severe penalties for violations.⁷⁶ Although the CTBT has not yet entered into force internationally due to the pending ratifications by certain Annex II countries, Australia's domestic CTBT Act is operational, except for a few provisions related to the establishment of the Commission for the Comprehensive Nuclear-Test-Ban Treaty Organization (CTBTO).⁷⁷ Australia has been actively engaged in the provisional application of the CTBT, particularly through significant participation in the Preparatory Commission for the CTBTO and the International Monitoring System (IMS).⁷⁸ With Australia hosting the third-largest number of IMS stations worldwide,⁷⁹ it plays a pivotal role in bolstering the CTBT's verification regime, thereby demonstrating its strong and practical commitment to fulfilling the treaty's aims and objectives. Moreover, the CTBT Act empowers the Australian Government to establish and operate IMS stations and to provide data crucial for CTBT monitoring purposes.⁸⁰ It also facilitates the government's authority to make arrangements with the CTBTO, enhancing Australia's role in international monitoring and verification efforts.

Australia's journey with the CTBT and ratification via the CTBT Act 1998 showcase the country's consistent and progressive stance on nuclear issues. Through its legal, diplomatic, and practical measures, Australia continues to play a significant role in the global movement towards a world free from nuclear testing, aligning with its broader objectives of promoting international peace, security, and a safer global environment.

c. Treaty on the Prohibition of Nuclear Weapons (TPNW)

The TPNW, which came into force in 2021 and has garnered the support of 93 nations, represents a significant step towards global nuclear disarmament.⁸¹ The treaty aims to comprehensively prohibit nuclear weapons and establish legal obligations for their elimination, marking a pivotal development in international efforts to address the threat posed by nuclear arms.⁸²

⁷³ Minister for Foreign Affairs, the Hon Marise Payne, 'Australian elected Executive Secretary of the Comprehensive Nuclear-Test-Ban Treaty Organization', Foreign Minister for Australia, 26 February 2021, [online], available at: <https://www.foreignminister.gov.au/minister/marise-payne/media-release/australian-elected-executive-secretary-comprehensive-nuclear-test-ban-treaty-organization> (accessed 11 December 2023).

⁷⁴ Commonwealth of Australia, (1998) 'Response to the Parliament of the Commonwealth of Australia Joint Standing Committee on Treaties Fifteenth Report', June 1998, p 6.

⁷⁵ *Comprehensive Nuclear-Test-Ban Treaty Act 1998* (Cth).

⁷⁶ *Ibid*, section 8.

⁷⁷ *Ibid*, section 2.

⁷⁸ Australian Safeguards and Non-proliferation Office (ASNO), (2020) *supra* note 72.

⁷⁹ Department of Foreign Affairs and Trade (Australia), (n.d.) 'Australian IMS Stations' available at: <https://www.dfat.gov.au/international-relations/security/asno/australian-ims-stations#:~:text=Australia%20hosts%202021%20IMS%20stations,last%20was%20completed%20in%202018> (accessed 11 December 2023).

⁸⁰ *Comprehensive Nuclear-Test-Ban Treaty Act 1998* (Cth), part 4 – Monitoring Facilities.

⁸¹ *Comprehensive Nuclear-Test-Ban Treaty* (1996), *supra* note 67.

⁸² United Nations, 'Treaty on the Prohibition of Nuclear Weapons' (A/CONF.229/2017/8, 7 July 2017); Peart, I. (2021) 'The Treaty on the Prohibition of Nuclear Weapons and the Fragmentation of Nuclear Disarmament Law: Creating Conflict or Filling the Gaps?' *Australian International Law Journal* 28. Pages 33–52.

Despite the momentum behind the TPNW and its alignment with Australia's long-standing advocacy for nuclear disarmament, Australia has not signed the treaty.⁸³ This decision reflects a complex interplay of strategic, diplomatic, and security considerations, particularly in the context of Australia's alliances and its role in the international security landscape.

In December 2018, while in opposition government, the current Prime Minister of Australia, Hon. Anthony Albanese, introduced a motion at the ALP national conference committing the party to sign and ratify the TPNW upon forming the government. In his speech, Mr Albanese emphasised the moral imperative behind the treaty and the historical role of ALP governments in championing international disarmament initiatives. The motion, which highlighted nuclear weapons as "the most destructive weapons ever invented," was adopted by the party, signalling a strong commitment to the treaty's objectives.⁸⁴ Despite this commitment, which notably came before the AUKUS announcement, the Federal Albanese Government, upon assuming power, has adopted a more cautious approach. While acknowledging the shared goals with parties to the TPNW and expressing a desire to engage constructively in discussions around nuclear disarmament, the Government has emphasised the need for realistic pathways to achieve these goals.⁸⁵ The Australian government's stance reflects a pragmatic approach, considering the treaty systematically and methodically within its broader agenda to advance nuclear non-proliferation and disarmament.

Australia's attendance as an observer at the first and second Meetings of State Parties to the TPNW further demonstrates its interest in understanding the treaty's implementation and the perspectives of its signatories.⁸⁶ This engagement, while not amounting to endorsement or participation as a State Party, indicates Australia's willingness to stay informed about the treaty's developments and its potential impact on global disarmament efforts.

The position of Australia's key ally, the U.S., along with other nuclear-armed nations that oppose the TPNW, undoubtedly influences Australia's approach.⁸⁷ The alignment with these nations, particularly the U.S., has been a critical factor in shaping Australia's foreign policy and strategic decisions, including its stance on nuclear weapons treaties.

Australia's relationship with the TPNW is indicative of the challenges and complexities inherent in balancing moral imperatives, strategic alliances, and security considerations. While Australia's commitment to nuclear disarmament and non-proliferation remains steadfast, its cautious approach to the TPNW highlights the multifaceted nature of

⁸³ Minister for Foreign Affairs and Trade, the Hon. Penny Wong. (2023) '*Second Meeting of States Parties to the Treaty on the Prohibition of Nuclear Weapons*' (Foreign Minister, 26 November 2023) available at: <https://www.foreignminister.gov.au/minister/penny-wong/media-release/second-meeting-states-parties-treaty-prohibition-nuclear-weapons> (accessed 11 December 2023). Wright, T. '*Negotiations for a Nuclear Weapons Convention Distant Dream or Present Possibility*' *Melbourne Journal of International Law*, volume 10, no. 1 (2009) pages 217–45.

⁸⁴ Karp, P. (2022) '*Australia yet to sign up to treaty banning nuclear weapons but will attend UN meeting as observer*' *The Guardian* (20 June 2022) available at: <https://www.theguardian.com/australia-news/2022/jun/20/australia-yet-to-sign-up-to-treaty-banning-nuclear-weapons-but-will-attend-un-meeting-as-observer> (accessed 11 December 2023).

⁸⁵ Minister for Foreign Affairs and Trade, the Hon. Penny Wong, (2023) *supra* note 83.

⁸⁶ *Ibid.*

⁸⁷ Hood, A, and Monique C. (2020) '*Can Australia Join the Nuclear Ban Treaty without Undermining ANZUS?*' *Melbourne University Law Review*, vol. 44, no. 1, University of Melbourne - Law School, pages 132–161.

international diplomacy and the need to navigate diverse perspectives and interests in pursuing global security and peace.

d. Safeguards and AUKUS

The initiation of the AUKUS program, notably involving Australia's acquisition of nuclear-powered submarines, has initiated a critical phase in the evolution of nuclear safeguards laws in Australia. This development necessitates a detailed re-evaluation of Australia's legal commitments under its comprehensive safeguards agreement with the IAEA as it relates to nuclear material to be used in defence activity.

The comprehensive safeguards agreement between Australia and the IAEA and the additional protocol form the cornerstone of Australia's commitments to nuclear non-proliferation. Within this framework, article 14 of the agreement, dealing with the "non-application of safeguards to nuclear material to be used in non-peaceful activities," becomes particularly relevant in the context of the AUKUS program.⁸⁸ While the term 'non-peaceful activities' is not explicitly defined in the agreement, it's understood that nuclear propulsion in submarines is a non-peaceful activity and falls within the scope of Article 14.⁸⁹

The procedures outlined in Article 14 require that before any nuclear material can be withdrawn from safeguards for use in non-peaceful activities, the IAEA and the state must negotiate an arrangement.⁹⁰ This arrangement ensures that safeguards continue to apply, albeit in an altered framework that balances the protection of sensitive military information with the prevention of material diversion for prohibited purposes.⁹¹

The communication from Australia's Foreign Minister to the IAEA on 10 March 2023, signifying the intention to commence negotiations for such an arrangement and an acknowledgement of Australia that nuclear propulsion is a 'non-peaceful activity', is a pivotal moment in Australia's nuclear law history.⁹² This negotiation process is not just a formality but a critical step in ensuring that Australia's move into naval nuclear propulsion adheres to its long-standing policy of non-proliferation and commitment to nuclear disarmament, as reaffirmed during the 50th-anniversary celebrations of the NPT ratification in January 2023.⁹³

⁸⁸ Safeguards Agreement *supra* note 59, article 14.

⁸⁹ Shea, T. (2017) '*The Nonproliferation and Disarmament Challenges of Naval Nuclear Propulsion*', Federation of American Scientists, 2017, available at: <https://fas.org/wp-content/uploads/media/The-Nonproliferation-and-Disarmament-Challenges-of-Naval-Nuclear-Propulsion.pdf> (accessed 16 December 2023); Rockwood, L. (2017) '*Naval Propulsion and IAEA Safeguards*', Federation of American Scientists, 2017, <http://vcdnp.org/wp-content/uploads/2017/08/Naval-Nuclear-Propulsion-and-IAEA-Safeguards.pdf>. (accessed 16 December 2023); M.-F. Desjardins. T. Rauf (1988), '*Opening Pandora's Box? Nuclear Powered Submarines and the Spread of Nuclear Weapons*', Aurora Papers 8, The Canadian Centre for Arms Control and Disarmament.

⁹⁰ Safeguards Agreement *supra* note 59, article 14.

⁹¹ Rockwood, L. (2021) '*Australia, UK, U.S. Submarine Deal: Submarines & Safeguards*' Arms Control Association, December, 2021 <https://www.armscontrol.org/act/2021-12/features/australia-uk-us-submarine-deal-submarines-safeguards> (accessed 11 December 2023).

⁹² International Atomic Energy Agency, Communication dated 14 March 2023 received from the Permanent Mission of Australia to the Agency, INFCIRC/1079, 14 March 2023, available at: <https://www.iaea.org/sites/default/files/publications/documents/infcircs/2023/infcirc1079.pdf>. (accessed 11 December 2023).

⁹³ Minister for Foreign Affairs and Trade, the Hon. Penny Wong. (2023) *supra* note 66.

These discussions, which involve complex technical and legal considerations, highlight Australia's challenges in aligning its strategic defence interests with international non-proliferation commitments. The influence of AUKUS partners, both Nuclear Weapons States with their respective Voluntary Offer Safeguards Agreements and additional protocols, adds another layer to these negotiations, noting Australia has advised they will consult their AUKUS partner during the negotiations.⁹⁴ It raises questions about how Australia will balance its longstanding non-proliferation stance with the security considerations necessitated by the AUKUS program.

The legal and political narratives emerging from the AUKUS partnership and the impending safeguard arrangement negotiations extend beyond a bilateral dialogue between Australia and the IAEA, attracting global attention.⁹⁵ The manner and outcome of these discussions will critically shape Australia's role within the international non-proliferation regime and influence its diplomatic relations. The transparency of the process and whether the arrangement's terms will be public disclosure are being closely watched by the international community.

The AUKUS partnership represents a formidable test of Australia's commitment to nuclear non-proliferation, both legally and politically. The ongoing negotiations and the resulting arrangement will not only redefine Australia's safeguard obligations but also mirror its capacity to align strategic defence interests with international legal commitments. This scenario underscores the dynamic nature of international nuclear law and the ongoing necessity for adaptive legal and diplomatic strategies in global non-proliferation efforts.

e. Conclusion

The realm of safeguards and non-proliferation in Australian nuclear law presents a unique landscape of political consensus, distinct from other areas of nuclear policy. Historically, this field has largely transcended partisan divides, with both major political parties demonstrating a consistent commitment to non-proliferation principles and the implementation of stringent safeguards. This bipartisan approach reflects a unified national stance on a crucial aspect of global security and non-proliferation efforts.

However, the TPNW represents a notable exception in this otherwise bipartisan landscape. The TPNW has elicited divergent views within Australian politics, mirroring broader international debates and highlighting the complexities of aligning national policy with evolving global disarmament initiatives.

International politics and the management of strategic alliances heavily influence the political rhetoric in the domain of safeguards and non-proliferation in Australia. Domestic policy considerations do not solely drive Australia's approach in this arena but are also shaped by its role and relationships on the global stage. The careful management of these international relationships, particularly with key allies and within multilateral frameworks, is critical to Australia's strategic approach to nuclear non-proliferation.

⁹⁴ Department of Defence (2023) *supra* note 40, page 9.

⁹⁵ Rockwood, L. (2021) *supra* note 91.

The AUKUS partnership and the consequent safeguards arrangements represent a pivotal moment for Australia. These negotiations represent a critical juncture for Australia, challenging its capacity to uphold its long-standing commitment to stringent non-proliferation standards as an early and proactive adopter of comprehensive safeguards. Simultaneously, Australia must navigate its strategic defence interests. This delicate balancing act is poised to provide valuable perspectives on the dynamic interplay between national security priorities and the principles of international nuclear law, underscoring the evolving complexities in this vital global arena.

As Australia continues to navigate these complex and evolving challenges, its commitment to nuclear non-proliferation and disarmament remains a central pillar of its foreign policy. The country's ability to maintain this commitment while adapting to changing geopolitical dynamics and technological advancements will be crucial in shaping its future in the international nuclear landscape.

4. Safety and Security

This analysis delves into the evolution of nuclear safety and security laws in Australia, exploring how domestic factors and international events have shaped these critical areas of nuclear law. In the context of nuclear law, nuclear safety is defined as achieving proper operating conditions, preventing or mitigating accident consequences, and protecting workers, the public, and the environment from undue radiation hazards.⁹⁶ On the other hand, nuclear security involves preventing, detecting, and responding to criminal or unauthorised acts involving nuclear material, facilities, or activities.⁹⁷ While there is a broad overlap, 'security' generally deals with intentional human acts of a criminal nature, whereas 'safety' encompasses broader risks of harm from radiation, regardless of the cause. Nuclear safety and security serve as the bedrock of nuclear law, pivotal in ensuring that nuclear technology is utilised responsibly and safely.

a. Nuclear Safety

In Australia, nuclear safety regulation is constitutionally divided. Currently, nuclear safety is regulated by the Australian Radiation Protection and Nuclear Safety Agency (ARPANSA) under the *Australian Radiation Protection and Nuclear Safety Act* at the federal level for nuclear activities of government entities or on government land and state-based environmental and health regulators oversee nuclear safety within their jurisdictions.⁹⁸ Historically, nuclear safety laws focused on uranium mining, medical radiation, and the oversight of research medical reactors like the High Flux Australian Reactor (HIFAR) and MOATA, established in 1958 and 1961, respectively.⁹⁹ At the time, state and territory government regulators enforced safety in uranium mining and medical radiation, seeking consistency through bodies like the National Radiation Advisory Committee and the

⁹⁶ International Atomic Energy Agency, (2022) '*IAEA Nuclear Safety and Security Glossary*', Non-serial Publications, IAEA, Vienna.

⁹⁷ *Ibid.*

⁹⁸ See Australian Capital Territory Health Protection Services; New South Wales Environmental Protection Authority; Northern Territory Department of Health; Queensland Department of Health; South Australian Environmental Protection Authority; Tasmanian Department of Health and Human Services; Victorian Department of Health; and Western Australian Radiological Council.

⁹⁹ Australian Nuclear Science and Technology Organisation (n.d.) *supra* note 3.

Australasian Radiation Protection Society. The federal government's role in nuclear safety, under the *Atomic Energy (Control of Materials) Act of 1946* and later the *Atomic Energy Act 1953*, was primarily executed by the AAEC.¹⁰⁰ The governance of radiation safety at the federal level dates back to 1935 with the Commonwealth X-Ray and Radium Laboratory, later evolving into the Commonwealth Radiation Laboratory and then the Australian Radiation Laboratory until 1999.¹⁰¹ For this paper, we will concentrate on the development of national nuclear safety law, and not the states and territories of Australia. In 1987, the AAEC was replaced by the Australian Nuclear Science and Technology Organisation (ANSTO), as we know it today, shifting the focus towards peaceful applications of nuclear technology.¹⁰² The Atomic Energy Act, which initially established the AAEC, was amended to limit the scope of the Act to regulate uranium mining in the Northern Territory and uranium exports.¹⁰³

The Chernobyl accident in 1986 was a pivotal event, underscoring the reality that the safety risks associated with nuclear activities were not confined within national borders but had far-reaching, international ramifications.¹⁰⁴ The aftermath of this catastrophe spurred a newfound era of global collaboration in the realm of nuclear safety. This international response, orchestrated under the guidance of the IAEA, resulted in the formulation and adoption of four key nuclear safety conventions.¹⁰⁵ These conventions marked a significant shift in the approach to nuclear safety, emphasising the need for international standards and cooperation to manage and mitigate nuclear risks effectively. Australia swiftly adopted and ratified these international instruments, reflecting its commitment to global nuclear safety standards.

The 1986 Convention on the Notification of a Nuclear Accident and the Convention on Assistance in the Case of a Nuclear Accident or Radiological Emergency were among the first responses to Chernobyl.¹⁰⁶ These conventions established frameworks for international notification and assistance in the event of a nuclear accident or radiological emergency. ARPANSA administers Australia's obligations under these conventions today and is responsible for maintaining a link to the IAEA to provide or receive information relating to an accident.

The subsequent significant international development was the Convention on Nuclear Safety (CNS),¹⁰⁷ ratified by Australia in December 1996. Although Australia had no nuclear

¹⁰⁰ *Atomic Energy (Control of Materials) Act of 1946 (Cth); Atomic Energy Act 1953 (Cth)*.

¹⁰¹ Holland, I. (2003) *'Radioactive Waste and Spent Nuclear Fuel Management in Australia'*. Parliamentary Library of Australia, Information and Research Services, 2003, page 7.

¹⁰² *Australian Nuclear Science and Technology Organisation Act 1987 (Cth)*; Minister for Resources and Energy, Senator Gareth Evans Q.C. (1985) *'Australian Atomic Energy Commission to be Replaced'* Press Statement, 15 October 1985.

¹⁰³ *Atomic Energy Amendment Act 1987 (Cth)*.

¹⁰⁴ Davies, J. Sullivan, P. (2011) *'Nuclear Power Post-Fukushima A Framework for an Australian Nuclear Future.'* Australian Resources and Energy Law Journal, Volume 30, no. 2 (2011) page 199–225 at 203; Stoiber, C. (2006) *supra* note 65 page 4-5.

¹⁰⁵ Tonhauser, W. Wetherall, A. Thiele, L. (2022) *'International Legal Framework on Nuclear Safety: Developments. Challenges and Opportunities'* Principles and Practice of International Nuclear Law, NEA (2022) page 123.

¹⁰⁶ Convention on Early Notification of a Nuclear Accident (1986), IAEA Doc. INFCIRC/335, 1439 UNTS 276, entered into force 27 October 1986 and ratified by Australia on 23 October 1987; Convention on Assistance in the Case of a Nuclear Accident or Radiological Emergency (1986), IAEA Doc. INFCIRC/336, 1457 UNTS 134, entered into force 26 February 1987 and ratified by Australia on 23 October 1987.

¹⁰⁷ Convention on Nuclear Safety (1994), IAEA Doc. INFCIRC/449, 1963 UNTS 293, entered into force 24 Oct.

power plants, its involvement in the CNS negotiations and early ratification reflected its dedication to improving global nuclear safety standards and applying those standards to its medical reactors voluntarily.¹⁰⁸ In 1998, Australia passed the *Australian Radiation Protection and Nuclear Safety Act* (ARPANS Act),¹⁰⁹ introducing a comprehensive regulatory framework for all federal government radiation and nuclear activities. This Act closed regulatory gaps created by the constitutional division of powers and merged the Australian Radiation Laboratory with the Nuclear Safety Bureau to form ARPANSA, enhancing oversight and uniformity in radiation and nuclear safety across Australia.¹¹⁰

Following the CNS, Australia ratified the Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management.¹¹¹ This convention, ratified in August 2003, commits countries to maintain high safety standards in managing spent fuel and radioactive waste, further embedding Australia in the global nuclear safety regime.

In the wake of the Fukushima Daiichi nuclear power plant accident, while hard legal reforms were limited internationally and domestically, there were notable soft law improvements.¹¹²

The announcement of the AUKUS partnership in 2021 brought the next major development in Australia's nuclear safety law. The Australian Government announced in 2023 the establishment of a new statutory regulator to oversee the nuclear safety and radiological protection of Australia's nuclear-powered submarine enterprise, effectively creating two distinct nuclear safety regulators in the country, dividing civil and defence.¹¹³ The *Australian Naval Nuclear Power Safety Bill 2023* proposes to establish a regulatory framework for nuclear safety activities related to AUKUS submarines.¹¹⁴ This includes the proposed Australian Naval Nuclear Power Safety Regulator to oversee nuclear safety across the submarines' lifecycle, harmonising with existing work health and safety, nuclear non-proliferation, and civilian nuclear safety schemes. As at the date of this paper, the Bill is still before the Parliament of Australia and is yet to become law.

In 2023, Australia's nuclear safety protocols were tested, with the first significant incident to make international headlines.¹¹⁵ A radioactive source was lost during transit between a

1996 and ratified by Australia on 24 March 1997.

¹⁰⁸ *Ibid*; Minister for Foreign Affairs, the Hon Alexander Downer. (1996) 'Australia Ratifies Nuclear Safety Convention' Press Statement. 31 December 1996.

¹⁰⁹ *Australian Radiation Protection and Nuclear Safety Act 1998* (Cth).

¹¹⁰ Commonwealth of Australia, House of Representatives, Parliament of Australia. (1998) 'Second Reading Speech of Australian Radiation Protection and Nuclear Safety Bill 1998' Hansard, 11 November 1998, page 89.

¹¹¹ Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management (1997), IAEA Doc. INFCIRC/546, 2153 UNTS 357, entered into force 18 June 2001 and ratified by Australia on 3 November 2003 (Joint Convention).

¹¹² Burns, S. (2012), 'The Fukushima Daiichi Accident: The International Community Responds', Washington University Global Studies Law Review, Vol. 11, No. 4, Washington University, St. Louis, pp. 739-779.

¹¹³ Minister for Defence, The Hon Richards Marles MP. (2023) 'AUKUS nuclear-powered submarine pathway', House of Representatives, Parliament of Australia. 22 March 2023.

¹¹⁴ *Australian Naval Nuclear Power Safety Bill 2023* (Cth).

¹¹⁵ Australian Radiation Protection and Nuclear Safety Agency. (2023) 'Australian Radiation Protection and Nuclear Safety Agency Annual Report 2022-23' ARPANSA Case Study 3: Radioactive source search support (2023) available at: <https://www.transparency.gov.au/publications/health/australian-radiation-protection-and->

mine site in the Pilbara region and a repair facility in Perth. Despite the capsule's small size, the ceramic radioactive material posed a potential hazard if someone was exposed for an extended period. The successful recovery of the capsule, 2 meters off a highway after a detailed and collaborative search by the ARPANSA, ANSTO, and the Western Australian Government, showcased the efficacy of Australia's inter-agency collaboration and emergency response protocols. This incident underscored the importance of stringent management, safety protocols, and regulation of radioactive materials, highlighting the risks of accidental exposure and the need for prompt, coordinated action to respond to such challenges.

The development of Australia's nuclear safety laws has been primarily influenced by significant international incidents and aligned with global safety standards rather than being a subject of political contention. This approach is underpinned by Australia's longstanding tradition of rigorous safety culture in its mining, energy, and manufacturing industries. Australia's history with these sectors has fostered a comprehensive framework of work health and safety laws and environmental safety regulations. In the context of nuclear safety, this background has lent itself to adopting the highest level of regulation without significant political dispute, as nuclear energy is perceived as requiring stringent oversight to ensure safety and public confidence.

This established rhetoric around nuclear safety is beginning to evolve, particularly in the uranium mining sector. Here, industry voices are increasingly questioning the necessity of additional layers of environmental safety laws, specifically those under the EPBC Act concerning the nuclear trigger.¹¹⁶ This shift indicates a growing dialogue on balancing the stringent regulatory environment with the operational realities and safety track record of the uranium mining industry.

While the path of nuclear safety law in Australia has been largely non-political and deeply influenced by international standards and incidents, there are signs of an emerging debate in specific sectors, like uranium mining and are likely to emerge further as we continue along the AUKUS pathway. This shift reflects a broader re-evaluation of the balance between stringent safety regulations and industry efficiency within Australia's well-established safety culture and regulatory framework.

b. Nuclear Security

In Australia, the security of nuclear material and facilities is regulated and managed by ASNO and ARPANSA. Before the establishment of these bodies, nuclear security fell under the broader umbrella of uranium regulation, nuclear safety, and safeguards, primarily within the remit of the ASO under the AAEC.

As discussed in detail in Chapter 2, following decades of restrictions on uranium mining, the Federal Government agreed to reopen uranium mining and exports in 1977 with the promise of enhanced safety, safeguards, and security measures.¹¹⁷ This commitment sought to assure the public that nuclear energy, a potentially dangerous source, would be managed

[nuclear-safety-agency-arpansa/arpansa-annual-report-2022-23/part-3%3A-report-on-performance/arpansa-case-studies](https://www.arpansa.gov.au/arpansa-annual-report-2022-23/part-3%3A-report-on-performance/arpansa-case-studies) (accessed 12 December 2023)

¹¹⁶ Wilkinson, L. (2018) '*Mining and the EPBC Act Nuclear Trigger: A Review of its Rationale and Operation*'. A Policy Paper Commissioned by the Minerals Counsel of Australia, October 2018.

¹¹⁷ Clarke, M. (2012), *supra* note 21.

safely and protected against criminal or unauthorised human acts that could cause harm. This development reflected an increasing awareness of the need for robust security measures in the nuclear sector.

In 1987, Australia ratified the Convention on the Physical Protection of Nuclear Material (CPPNM),¹¹⁸ which aimed to protect nuclear material and facilities from theft and sabotage, thereby bolstering global nuclear security. The 2005 Amendment to the CPPNM expanded its scope to include protection against theft and sabotage of nuclear material in use, storage, and transport, as well as measures for rapid recovery of missing or stolen material.¹¹⁹ Australia ratified this amendment in 2008.¹²⁰ The Safeguards Act, in addition to giving effect to the NPT and Australia's safeguards agreement with the IAEA, provides a domestic legal framework to support the objectives of the CPPNM.¹²¹ Part 2, Division 2 of the Safeguards Act, set out the offences related to the CPPNM, including a comprehensive set of offences carrying significant penalties. These include theft of nuclear material, threats or attempts to use nuclear material to inflict public harm, actions threatening or causing damage to nuclear facilities, the use of nuclear material to cause harm, injury, or death, and illegal possession of nuclear material.¹²²

Australia's nuclear security regime has been tested through various incidents, emphasising the importance of robust security measures. Notable incidents¹²³ include:

- In 1983, explosive materials were discovered within an electrical substation at a nuclear facility, marking a serious security breach.
- In 1984, a threat to attack the HIFAR reactor using an aircraft, an incident that highlighted vulnerabilities in aerial security.
- In 1985, an act of vandalism led to the discharge of radioactive material into a nearby river, raising concerns about environmental safety and the promptness of incident reporting.
- The Sydney Olympics in 2000 saw heightened security concerns, with thwarted plots linked to international terrorism targeting nuclear facilities.
- In 2001, multiple coordinated arrests of terror suspects in Sydney and Melbourne revealed that the Lucas Heights reactor was a potential target, demonstrating the ongoing threat to nuclear installations.

These incidents have served as critical learning experiences, prompting enhancements in policies, procedures, and legal frameworks, including amendments to the Safeguards Act.

Australia's stance on nuclear security extends beyond its borders, as evidenced by its international policy objectives. This is demonstrated through its ratification of the

¹¹⁸ Convention on the Physical Protection of Nuclear Material (1980), IAEA Doc. INFCIRC/274 Rev. 1, 1456 UNTS 125, entered into force 8 Feb. 1987 and ratified by Australia on 22 October 1987 (CPPCM).

¹¹⁹ Amendment to the Convention on the Physical Protection of Nuclear Material (2005), IAEA Doc. INFCIRC/274/Rev.1/Mod.1, entered into force 8 May 2016 and as ratified by Australia on 8 May 2016 (ACPPCM).

¹²⁰ *Non Proliferation Legislation Amendment Act 2007*, an Act to amend the Safeguards Act.

¹²¹ *Nuclear Non-Proliferation (Safeguards) Act 1987 (Cth)*.

¹²² *Nuclear Non-Proliferation (Safeguards) Act 1987 (Cth)* section 33, 34, 34A, 35, 35A, 36, and 37.

¹²³ Ruff, T. (2006) 'Nuclear Terrorism', Energy Science Coalition Briefing Paper #10, Available at: www.energyscience.org.au/FS10%20Nuclear%20Terrorism.pdf (accessed 12 December 2023)

International Convention for the Suppression of Acts of Nuclear Terrorism in 2012.¹²⁴ Furthermore, Australia is a founding member of the Global Initiative to Combat Nuclear Terrorism and participates in the Global Partnership and Proliferation Security Initiative. These international engagements underscore Australia's commitment to global nuclear security and non-proliferation.

With respect to the AUKUS program, the Australian Naval Nuclear Power Safety Bill 2023 has provided some certainty on the pathway forward for nuclear safety and invoking the Article 14 process to negotiate a safeguards arrangement has provided some certainty on the pathway forward on nuclear safeguards, however, there is a distinct lack of clarity regarding the regulation of nuclear security. The CPPNM, similar to the NPT and Australia's safeguards agreement, apply to nuclear material used for peaceful purposes. Crucially, Article 2 of the CPPNM was drafted to exclude military applications from its scope, thus exempting nuclear materials used in military contexts, such as those in submarines, from its purview.¹²⁵ This exclusion has direct implications for the application of the CPPNM within Australian law, particularly the Safeguards Act. The definitions of 'nuclear material' and 'nuclear facility' in section 32 of the Safeguards Act align with the CPPNM's scope, thereby excluding military nuclear materials and facilities, such as submarines, from its offences. In its recent publication, 'The AUKUS Nuclear-Powered Submarine Pathway: A Partnership For the Future', Australia has pledged to adopt a "strong security posture" and to "meeting IAEA security requirements for nuclear material as part of Australia's safeguards agreements".¹²⁶ This commitment further emphasises "the highest security culture within its own nuclear-powered submarine enterprise, in close partnership with UK and US security and intelligence agencies, as well as defence industry and academia". Although the Department of Defence undoubtedly possesses the capability to manage nuclear material securely, the current arrangement, which circumvents oversight by an independent regulator with enforcement authority, introduces uncertainties, particularly concerning potential enforcement actions. While focused on internal management, this approach does not explicitly exclude ASNO from playing a role. ASNO's involvement, given its mandate in implementing the NPT, safeguards agreements, and obligations under the International Convention for the Suppression of Acts of Nuclear Terrorism, may still play a role within the broader scope of the AUKUS program. However, the precise nature of ASNO's involvement and how it will interface with the Defence and international partners in the context of nuclear security within the AUKUS framework remains unknown.

This lack of clarity highlights a critical gap in Australia's nuclear regulatory landscape, underscoring the need for a comprehensive approach to nuclear security that accommodates both military and civilian applications. As Australia ventures further into the realm of nuclear-powered submarines and continues its commitments under international nuclear treaties, developing a coherent and integrated regulatory framework for nuclear security will

¹²⁴ International Convention for the Suppression of Acts of Nuclear Terrorism (2005), 2445 UNTS 137, entered into force 7 July 2007 and was ratified by Australia 16 March 2012.

¹²⁵ International Atomic Energy Agency, 'Model Protocol Additional to the Agreement(s) between State(s) and the International Atomic Energy Agency for the Application of Safeguards' (International Atomic Energy Agency, 1997) available at: <https://www-pub.iaea.org/MTCD/Publications/PDF/Pub615web.pdf> (accessed 18 December 2023).

¹²⁶ Department of Defence (20230) *supra* note 40.

be imperative to ensure the safe, secure, and responsible management of nuclear materials and technologies.

The development of nuclear security law in Australia epitomises the nation's dynamic response to evolving threats and shifting international norms, underscoring a steadfast commitment to mitigating criminal and unauthorised acts. By enacting progressive legislation, participating actively in global non-proliferation efforts, and incorporating lessons from past incidents, Australia has crafted a comprehensive nuclear security infrastructure. This framework adeptly harmonises national priorities with international responsibilities, ensuring the safe and secure management of nuclear resources and facilities. Nevertheless, the advent of the AUKUS partnership introduces new complexities and uncertainties in the nuclear security domain, signalling a need for further refinement and adaptation in regulatory measures to adeptly navigate this emerging landscape.

c. Conclusion

Reflecting upon the development of nuclear safety and security laws in Australia reveals a journey marked by responsiveness to global standards and domestic necessities. The comprehensive *Australian Naval Nuclear Power Safety Bill 2023* is a testament to this evolution, introducing robust compliance and enforcement tools, stringent offence regulations, and a rigorous licensing process. Contrary to initial apprehensions, the Bill establishes a strong regulatory framework, which, while operating under the Minister for Defence, endeavours to maintain functional autonomy, thus dispelling fears of it being a mere 'toothless tiger'.

The AUKUS partnership, while heralding exciting advancements in nuclear capabilities, also brings to the fore new challenges in the realm of nuclear security. There remains a degree of uncertainty in the regulatory framework governing the security aspects of the AUKUS program. This uncertainty underscores the need for continuous refinement of Australia's nuclear laws to ensure they remain adept at addressing both current and emerging challenges in nuclear safety and security.

As Australia progresses with its nuclear-powered submarine program and maintains its commitments under various international nuclear treaties, it becomes increasingly imperative to develop a cohesive and integrated approach to nuclear security. This approach must adeptly accommodate both military and civilian applications, ensuring the safe, secure, and responsible management of nuclear materials and technologies. The ongoing evolution of Australia's nuclear safety and security laws is a clear indication of the nation's commitment to maintaining the highest standards in these crucial domains, balancing national interests with international obligations, and safeguarding against the myriad of risks associated with nuclear technology.

5. Reactors and Nuclear Energy

The development of nuclear law and policy in Australia, particularly in the context of reactors and nuclear power, has been a journey marked by varying shifts in political rhetoric and legislative evolution. This journey mirrors the nation's complex relationship with nuclear technology, balancing scientific advancement, energy considerations, and non-proliferation commitments.

In 1953, the federal government established the AAEC, marking the country's initial engagement with nuclear technology, primarily for research purposes.¹²⁷ The AAEC operated the HIFAR from 1958 and the MOATA small reactor from 1961, focusing on peaceful applications such as medical isotope production.¹²⁸

The conversation around nuclear power in Australia reached a peak in the 1970s under the Federal Coalition Gorton Government with a push for a nuclear power station at Jervis Bay, New South Wales.¹²⁹ Significantly, there was speculation that the proposed reactor fuelled by natural uranium would have produced plutonium as a by-product, providing Australia with the potential to acquire sufficient fissile material to develop a nuclear weapon.¹³⁰ This speculation stems from the global context of the time, where nuclear capabilities were a significant aspect of international power dynamics. While this was never explicitly stated as a goal, the possibility of such an ambition adds a layer of complexity to the narrative of nuclear development in Australia. Ultimately, the ambitious plan for the Jervis Bay nuclear power plant, despite progressing to substantial planning stages, was shelved due to cost concerns and a subsequent shift in political leadership.¹³¹ In parallel, the early 1970s saw proposals for a uranium enrichment plant.¹³² Uranium enrichment is the process by which the capacity of naturally existing uranium is increased to fuel a nuclear chain reaction, either for use in a nuclear power reactor or nuclear weapon. These proposals, however, did not materialise into operational facilities largely due to loss of political momentum as a result of unrelated budgetary controversies.¹³³

The discourse on nuclear power experienced a notable revival in 1998 under the Federal Coalition Howard Government. This resurgence led to a significant, albeit unexpected, amendment to the *Australian Radiation Protection and Nuclear Safety Bill*.¹³⁴ At that time, the Howard Government was endeavouring to garner legislative backing for the construction of the OPAL medical reactor at Lucas Heights. Facing no immediate plans for constructing a nuclear power station, the Government acquiesced to the amendment to facilitate progress on the new research reactor. The debate on this crucial amendment was brief, lasting less than 10 minutes.¹³⁵ This amendment effectively instituted a prohibition on the development of all nuclear facilities in Australia. As of the writing of this paper, this legislative ban remains in effect, continuing to shape Australia's nuclear policy landscape.

Political rhetoric around nuclear energy continued to ebb and flow. In 2006, the Federal Howard ALP Government reignited the debate, advocating for a discussion on nuclear

¹²⁷ *Atomic Energy Act 1953 (Cth)*.

¹²⁸ Australian Nuclear Science and Technology Organisation (n.d.) *supra* note 3.

¹²⁹ Davies, J. Sullivan, P. (2011) *supra* note 104 at 206.

¹³⁰ Walsh, J. (2023) *supra* note 56; Four Corners, “*Chronology-Australia's Nuclear Political History*”, Australian Broadcasting Corporation (2005).

¹³¹ Davies, J. Sullivan, P. (2011) *supra* note 104.

¹³² Reynolds, W. (2008) ‘*Australia's Quest to Enrich Uranium and the Whitlam Government's Loans Affair*’, Australian Journal of Politics and History, Volume 54, no. 4, pages 562-578; Reynolds, W. (2011) ‘*The Yellow Cake Road: Malcolm Fraser, the Ranger Enquiry and Australia's Role in the US International Fuel Cycle Project*’, Australian Journal of Politics and History, Volume 58, 4 (2011), pages 511-525.

¹³³ Reynolds, W.; Lee, David. (2013) *Supra* note 48 at page 51.

¹³⁴ Commonwealth of Australia, Senate, Parliament of Australia, ‘*Second Reading Speech – Environment and Other Legislation Amendment (Removing Nuclear Energy Prohibitions) Bill 2022*’, Senator Matt Canavan (28 September 2022) page 1413.

¹³⁵ *Ibid.*

power.¹³⁶ This call led to the establishment of the Prime Ministerial Taskforce to explore the potential of nuclear energy in Australia.¹³⁷ The taskforce's findings highlighted possible scenarios for nuclear power but also emphasised the need for community support and bipartisan agreement.

In discussing Australia's nuclear ambitions, it is crucial to acknowledge the profound impact that past nuclear accidents have had in undermining public confidence in nuclear energy.¹³⁸ The catastrophic explosion at the Chernobyl nuclear plant in 1986, which resulted in fatalities, long-term health issues, and widespread radioactive contamination, sent shockwaves around the world. This accident, along with the 2011 Fukushima nuclear accident, where a tsunami triggered a meltdown at a coastal nuclear plant in Japan, significantly altered the global perspective on nuclear energy. Notably, in the aftermath of Fukushima, German Chancellor Angela Merkel made a decisive move to reverse the extension of the operational life of several nuclear plants in Germany, signalling a major shift in nuclear policy.¹³⁹ These incidents have had a direct and profound impact on the nuclear debate in Australia. In 2013, it was formally confirmed to the federal parliament that Australian uranium was being used in the Fukushima complex at the time of the accident.¹⁴⁰ This revelation, coupled with declining uranium prices and escalating gas prices domestically, significantly influenced the political narrative, steering it away from nuclear ambitions. While advocates of nuclear technology continue to assert its safety and argue that the risk of accidents is decreasing due to technological advancements, these historical accidents have ingrained a deep-seated caution and scepticism within the Australian public and policymakers alike. The shadow of Chernobyl and Fukushima looms large in the nuclear discourse, shaping policy decisions and public opinion and contributing to the ongoing reluctance to fully embrace nuclear energy as a significant component of Australia's energy strategy.

In the backdrop of these developments, significant legislative frameworks, namely the ARPANS Act and the EPBC Act, have firmly maintained prohibitions on nuclear power production in Australia.¹⁴¹ These laws, alongside state and territory legislations, form the cornerstone of Australia's nuclear regulatory regime, ensuring that most nuclear activities are banned and those that are allowed, align with safety, environmental, and non-proliferation standards.¹⁴²

The conversation around nuclear power in Australia, historically marked by fluctuating interest and strategic considerations, took a significant turn with the establishment of the

¹³⁶ Davies, J. Sullivan, P. (2011) *supra* note 104.

¹³⁷ Commonwealth of Australia, (2006) '*Uranium Mining, Processing and Nuclear Energy - Opportunities for Australia*' (Report to the Prime Minister by the Uranium Mining, Processing and Nuclear Energy Review Taskforce, 2006), Commonwealth of Australia, p I.

¹³⁸ Niemann, G. (2013) *supra* note 54.

¹³⁹ BBC News. (2011) '*Germany: Nuclear power plants to close by 2022.*' BBC News. [online] 30 May 2011. Available at: <https://www.bbc.com/news/world-europe-13592208> (accessed 13 December 2023).

¹⁴⁰ Commonwealth of Australia, Senate, Parliament of Australia, (2013) '*Notice Paper - Government Business*' 13 March 2013, page 8.

¹⁴¹ *Australian Radiation Protection and Nuclear Safety Act 1998 (Cth)* section 10. *Environment Protection and Biodiversity Conservation Act 1999 (Cth)* sections 37J, 140A, 146M and 305.

¹⁴² *Uranium Mining and Nuclear Facilities (Prohibitions) Act 1986 (NSW)*; *Nuclear Facilities Prohibition Act 2007 (Qld)*; *the Nuclear Activities (Prohibitions) Act 1983 (Vic)*; *Nuclear Waste Storage Facility (Prohibition) Act 2000*; *Nuclear Waste Storage and Transportation (Prohibition) Act 1999*; *Nuclear Waste Transport, Storage And Disposal (Prohibition) Act 2004*.

Royal Commission by the South Australian State Government in 2015.¹⁴³ This independent investigation was initiated to explore the potential for increasing South Australia's participation in the nuclear fuel cycle. The commission focused on four key areas, but notably the use of nuclear fuels for electricity generation. The commission's findings and recommendations underscored the potential role of nuclear technology in Australia's energy and economic landscape.¹⁴⁴ It emphasised the need to pursue the removal of prohibitions on nuclear power generation, recognising its potential contribution to a low-carbon electricity system. Additionally, the report advocated for the promotion and collaboration in the development of a comprehensive national energy policy, which would allow all technologies, including nuclear, to contribute to a reliable and low-carbon electricity network.¹⁴⁵

Though reinvigorated by the Royal Commission, the discussion around nuclear energy in Australia remained relatively dormant until 2021. The announcement of Australia's decision to acquire nuclear-powered submarines marked a pivotal moment. This decision rekindled the nuclear debate, bringing the topic to the forefront of national discourse and highlighting the potential role of nuclear technology in Australia's strategic future. The AUKUS partnership garnered unprecedented bipartisan political support, marking a radical shift from Australia's historical stance on nuclear policy. This changing political landscape was further evidenced by the passage of the *Defence Legislation Amendment (Naval Nuclear Propulsion) Act 2023*, which amended existing laws to remove nuclear prohibitions to allow for the development of conventionally armed nuclear-powered submarines. This shift in policy heralded a reinvigorated interest in nuclear energy, fuelled by a confluence of factors: the pressing imperative to combat climate change, the need for decarbonisation in energy and manufacturing, rising national energy costs, and the practicalities of supporting a defence-based nuclear program without a parallel civilian nuclear infrastructure. Amidst this backdrop, a grassroots movement led by the 17-year-old founder of "Nuclear for Australia" has been advocating for change, reflecting a growing public sentiment towards considering nuclear energy as a viable option.¹⁴⁶ This development begs the question: is the tide finally changing in Australia's longstanding dance with nuclear energy? Historically, Australia has flirted with the idea of nuclear power but has consistently stopped short of full commitment. However, what distinguishes the current scenario from historical attempts is the existence of bipartisan support for a defence nuclear program, courtesy of the AUKUS partnership. This support might well act as a catalyst for broader changes in Australia's approach to nuclear energy.

Australia's reluctance to develop a domestic civil nuclear industry might impact its position on the IAEA Board of Governors, particularly in representing the Southeast Asia and Pacific region.¹⁴⁷ As neighbouring countries like Indonesia advance their nuclear programs¹⁴⁸

¹⁴³ Grey, K. (2016) *supra* note 33.

¹⁴⁴ *Supra* note 34.

¹⁴⁵ Grey, K. (2016) *supra* note 33.

¹⁴⁶ Shackel, W. (n.d.) 'Nuclear for Australia.' [online] Available at: https://www.nuclearforaustralia.com/will_shackel (Accessed 13 December 2023).

¹⁴⁷ International Atomic Energy Agency. (1996) 'Article VI of the Statute (b) Composition of Regional Groups.' Report by the Board of Governors. GC (40)/11. 26 June 1996. [Online]. Available at: https://www.iaea.org/sites/default/files/gc/gc40-11_en.pdf (Accessed: 14 December 2023); South Australian Chamber of Mines and Energy and Minerals Council of Australia. (2023) 'Nuclear Energy Thought Leadership Breakfast' Panel Session, Adelaide South Australia. 15 November 2023.

¹⁴⁸ U.S. Embassy & Consulates in Indonesia. (2023) 'United States, Indonesia Announce Partnership on Small Modular Reactor Nuclear Clean Energy.' 18 March 2023 [Online]. Available at:

and Singapore explores nuclear options,¹⁴⁹ they demonstrate a proactive engagement with nuclear technology. This shift in the regional nuclear landscape could challenge Australia's longstanding position on the Board, where current trends and active participation in civil nuclear technology are significant. If Australia continues to maintain its distance from nuclear energy development, its authority and relevance as the regional representative on the Board could be questioned. In contrast, countries actively pursuing nuclear initiatives might seek greater representation to align with their evolving nuclear profiles, potentially redefining the regional leadership within the IAEA.

The evolving landscape suggests a potential shift in the nation's energy policy, one that might finally integrate nuclear power into the mix. This possibility is bolstered by the international and domestic pressures of climate change, energy security concerns, and technological advancements in nuclear energy, including small modular reactors. Additionally, Australia's role in the international nuclear community, particularly its position on the IAEA Board of Governors, could be influenced by its stance on nuclear power. As the region sees advancements in nuclear technology, Australia's continued resistance to developing a civil nuclear industry may affect its authority to represent the region effectively. Yet, the question remains: will this generation witness a definitive turn in Australia's nuclear narrative? The answer, while still unfolding, hinges on the complex interplay of political will, public opinion, environmental considerations, strategic imperatives, and international nuclear diplomacy. As Australia stands at this potential crossroads, "watch this space" seems an apt directive for observers and stakeholders in the nuclear debate, both domestically and within the broader context of the IAEA.

6. Management of Radioactive Waste

Radioactive waste, defined by its inherent hazardousness due to radioactive substances, mandates specialised management and disposal protocols to ensure the protection of human health and environmental integrity.¹⁵⁰ Australia's landscape of radioactive waste, accumulating over the last seven decades, stems predominantly from varied sources. Foremost among these is the waste generated from the ANSTO operating OPAL medical reactor and the decommissioning HIFAR medical reactor. The employment of radioactive materials in medical settings, particularly for diagnostic and therapeutic purposes, further augments the national accumulation of radioactive waste. Additionally, the concentration of Naturally Occurring Radioactive Materials (NORMs) resulting from industrial endeavours, such as mining and petroleum extraction, exacerbates the generation of radioactive waste, encompassing waste rock, tailings from mining operations, and sludge from petroleum processing.

The governance of radioactive waste in Australia is demarcated by a clear jurisdictional division. The federal government is responsible for waste emanating from its activities and

<https://id.usembassy.gov/united-states-indonesia-announce-partnership-on-small-modular-reactor-nuclear-clean-energy/> (Accessed 14 December 2023).

¹⁴⁹ Singapore Business Review, (2023) 'Singapore yet to decide on nuclear energy deployment.' 24 October 2023 [Online]. Available at: <https://sbr.com.sg/energy-offshore/news/singapore-yet-decide-nuclear-energy-deployment> (Accessed 12 December 2023).

¹⁵⁰ International Atomic Energy Agency (2011). 'Disposal of Radioactive Waste Specific Safety Requirements'. International Atomic Energy Agency (IAEA): IAEA.

that which falls within the ambit of the Joint Convention.¹⁵¹ In contrast, the state and territory governments manage all other categories of radioactive wastes, including those generated by the industrial sector and NORMs.¹⁵² Predominantly, the federal-level waste is produced and maintained by entities such as ANSTO, the Department of Defence, the Commonwealth Scientific and Industrial Research Organisation (CSIRO), and ARPANSA. On the other hand, the waste under state and territorial oversight primarily derives from the mining and petroleum industries, healthcare facilities, and various industrial sectors employing radioactive materials.

As per the 2020 joint convention peer review National Report by ARPANSA, Australia harbours an estimated 4146 cubic meters of civilian radioactive waste earmarked for near-surface disposal.¹⁵³ This inventory includes 2100 cubic meters of soil lightly contaminated through ore-processing research, 1970 cubic meters of operational waste at the ANSTO facility, six cubic meters at CSIRO sites, and 70 cubic meters of assorted waste encompassing contaminated items and medical apparatus. Importantly, these estimations exclude waste that has already been consigned to legacy disposal facilities such as Mt Walton East Intractable Waste Disposal Facility in Western Australia, the South Alligator Disposal Facility in the Northern Territory, and other sites including Radium Hill, Maralinga, and the Little Forest. In addition, the current stockpile of radioactive waste unsuitable for near-surface disposal stands at approximately 535.1 cubic meters. This includes a diverse array of waste types, from irradiation cans and ion exchange resins to irradiated aluminium from spent fuel assemblies, alongside residues from radiopharmaceutical production and liquid waste from Mo-99 production at ANSTO. Also included is intermediate-level waste repatriated from overseas reprocessing facilities and miscellaneous waste stored across various Australian sites. It is also pertinent to note that ANSTO's OPAL reactor, Australia's sole operational nuclear reactor, produces spent fuel that is temporarily housed on-site before being shipped to La Hague, France, for reprocessing. The waste derived from this reprocessing, classified as intermediate-level waste, is destined for return to Australia, adding to the existing inventory of radioactive waste.

This introductory overview lays the foundation for an in-depth exploration of Australia's legislative and infrastructural journey in the realm of radioactive waste management, an area of critical importance in the context of national and environmental safety.

¹⁵¹ *Australian Radiation Protection and Nuclear Safety Act 1998 (Cth)* section 13; *National Radioactive Waste Management Act 2012 (Cth)* section 4A; *Australian Nuclear Science and Technology Organisation Act 1987 (Cth)* section 3,

¹⁵² *Radiation Protection Act 2006 (ACT)*; *Radiation Control Act 1990 (NSW)*; *Radiation Protection Act 2004 (NT)*; *Radiation Safety Act 1999 (QLD)*; *Radiation Protection and Control Act 2021 (SA)*; *Radiation Protection Act 2005 (TAS)*; *Radiation Act 2005 (VIC)*; *Radiation Safety Act 1975 (WA)*

¹⁵³ Australian Radiation Protection and Nuclear Safety Agency (ARPANSA). (2020) 'Seventh Australian National Report prepared for the Seventh Review Meeting of the Joint Convention on the Safety of Spent Fuel and on the Safety of Radioactive Waste Management'. National Report of the Commonwealth of Australia, 27 October 2020. Available at:

https://www.arpansa.gov.au/sites/default/files/joint_convention_on_the_safety_of_spent_fuel_management_and_on_the_safety_of_radioactive_waste_management-national_report_of_the_commonwealth_of_australia-october_2020.pdf (accessed 14 December 2023) page 15.

a. Australia's Waste Management Journey

Australia's journey in managing radioactive waste, characterised by its intersection with evolving nuclear law and dynamic political rhetoric, presents a multifaceted narrative of legislative progressions, government initiatives, and societal responses. Over the past seven decades, this journey has seen numerous shifts, driven by both domestic challenges and international events, as Australia grappled with the complex task of safely and securely disposing of its radioactive waste.

In the initial phase, radioactive waste management in Australia was primarily focused on the Little Forest Legacy Site near Lucas Heights.¹⁵⁴ From 1960 to 1968, the AAEC operated this site for the experimental borehole disposal of low-level radioactive waste, laying the groundwork for more systematic waste management methods. The issue of radioactive waste disposal garnered significant political and public attention in 1978 following the New South Wales government's proposal to relocate contaminated soil from a uranium smelter in Hunters Hill, Sydney, to an inland location.¹⁵⁵ This proposal was met with substantial resistance from both local communities and government entities, highlighting the contentious nature of radioactive waste management. The New South Wales Premier's request to South Australia to accommodate the waste at the decommissioned Radium Hill uranium mine was declined by the South Australian Premier. In response to these challenges, the Federal Government in 1978 committed to spearheading a national strategy for the handling of Australia's radioactive waste.¹⁵⁶ It was, however, not until 1985 that a concerted effort was made, with state and territory governments being called upon to identify suitable locations for a national radioactive waste management facility.

The Chernobyl accident in 1986 was a global wake-up call, underscoring the importance of robust radioactive waste management. This accident catalysed international cooperation and led to the adoption of various treaties and conventions, including the Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management, which Australia signed in 1998 and ratified in 2003.¹⁵⁷

The domestic efforts to establish a radioactive waste management facility in Australia following the Chernobyl disaster have been a convoluted and often contentious process, marked by political, legal, and community challenges. The preceding decades have seen various sites proposed, debated, and ultimately rejected, reflecting the complexity of finding acceptable solutions for radioactive waste disposal in a politically and socially sensitive environment.

In the late 1980s, the Northern Territory government initially suggested a site for radioactive waste disposal but withdrew it in 1991.¹⁵⁸ This withdrawal was not due to

¹⁵⁴ Australian Nuclear Science and Technology Organisation (ANSTO). (n.d.). '*Little Forest Legacy Site.*' Available at: <https://www.ansto.gov.au/little-forest-legacy-site> (accessed 14 December 2023)

¹⁵⁵ Nagzaam, G. Newman, A. (2005) '*Merely unpicking the Gordian Knot: The Ongoing Quest to Build a Federal Low Level Radioactive Waste Disposal Facility in Australia*' *The Australian Journal of Natural Resources Law and Policy*, Volume 1, No. 1, 2005. Pages 23 – 48 at 27.

¹⁵⁶ Department of Industry, Science, Energy and Resources, Australian Government, Canberra, ACT (Australia) (2020). '*Site Assessment National Radioactive Waste Management Facility*' 2020 (INIS-AU--0074) page 5.

¹⁵⁷ Joint Convention, *supra* note 111.

¹⁵⁸ Department of Industry, Science, Energy and Resources (2020) *supra* note 156.

technical deficiencies but stemmed from domestic political considerations, highlighting the significant role of local and regional politics in the decision-making process for radioactive waste management.¹⁵⁹ The absence of a national solution led the ANSTO to accept 2000 cubic meters of radioactive soil from Victoria at its Lucas Heights site. Plans were also made to relocate an additional 17 cubic meters of defence waste from St Mary's. However, these plans were halted when the Land and Environment Court of New South Wales ordered ANSTO to stop transporting radioactive waste to Lucas Heights.¹⁶⁰ In response, the Federal Government introduced the *Australian Nuclear Science and Technology Organisation Amendment Act* in 1992, which granted ANSTO immunity from future court actions and allowed the government to store radioactive waste temporarily until a national repository could be built.¹⁶¹

From 1992 to 2004, the Australian Government embarked on a comprehensive national search for appropriate locations to construct a near-surface repository for low-level and short-lived intermediate-level radioactive waste.¹⁶² This initiative was a crucial part of Australia's strategy to develop a sustainable long-term management plan for its radioactive waste. During this period, the Woomera Protected Area (WPA) in South Australia emerged as a key area of interest for the potential facility, particularly between 2000 and 2002. The WPA, one of the world's largest land-based test ranges, spans approximately 122,000 square kilometres.¹⁶³ Originally established in 1947 as a joint Australian-British venture, the WPA was primarily used for aerospace and missile testing, including activities in the Maralinga nuclear weapons test area. Over the years, its role expanded beyond military purposes to encompass civilian and commercial uses such as satellite launching and tracking, scientific research, and mining exploration. In 2002, an Environmental Impact Assessment conducted under the EPBC Act identified three potential sites for the radioactive waste facility, with one located within the WPA. The following year, the Australian government selected a specific site inside the WPA for the repository. However, this decision was met with significant opposition from the South Australian State Government, which enacted the *Nuclear Waste Storage Facility (Prohibition) Act 2000* to prohibit the facility's establishment in the state. The State Government further attempted to thwart the project by moving to designate the proposed site as a conservation park. In a controversial move, the Federal Government resorted to compulsory land acquisition in 2003 under the *Land Acquisition Act 1969*, a decision that escalated tensions with the South Australian Government. This action led to a legal challenge in the Federal Court by the State Government. In 2004, the court deemed the land acquisition process invalid, culminating in the abandonment of the WPA site for the radioactive waste facility.¹⁶⁴

¹⁵⁹ Nagztaam, G. Newman, A. (2005) *Supra* note 155 at 28.

¹⁶⁰ Panter, R. (1992) 'Radioactive Waste Disposal in Australia', Science, Technology & Environment Group, (Issues Paper No 6, Parliamentary Library, Commonwealth Parliament, 1992) page 4 available at: https://parlinfo.aph.gov.au/parlInfo/download/library/prspub/AUS00/upload_binary/AUS00.pdf;fileType=application%2Fpdf#search=%22library/prspub/AUS00%22 (accessed 14 December 2023).

¹⁶¹ *Australian Nuclear Science and Technology Organisation Amendment Act 1992 (Cth)*.

¹⁶² Department of Industry, Science, Energy and Resources, Australian Government (2020) *supra* note 156.

¹⁶³ Australian Department of Defence. (n.d.) 'History of the Woomera Prohibited Area.' Available at: <https://www.defence.gov.au/bases-locations/sa/woomera/about> (Accessed 14 December 2023).

¹⁶⁴ Brown, A J. (2007) 'When Does Property Become Territory Nuclear Waste, Federal Land Acquisition and Constitutional Requirements for State Consent.' *The Adelaide Law Review*, Volume 28, no. 1–2 pages 113–138.

In 2005, the Australian Government enacted the *Commonwealth Radioactive Waste Management Act*,¹⁶⁵ initially earmarking three Department of Defence locations for a proposed radioactive waste facility. The Act underwent a significant evolution during parliamentary debates, culminating in an amendment that allowed consideration of lands managed by Indigenous Land Councils in the Northern Territory and non-Indigenous lands, giving appropriate notice to relevant Indigenous Land Councils.¹⁶⁶ This shift in strategy marked a critical departure from the previous policy of compulsory acquisition of land, moving towards a more inclusive approach that actively involved Indigenous communities in decisions about radioactive waste management. Attention then turned to Muckaty Station in the Northern Territory, identified in 2007 as a prospective site.¹⁶⁷ This decision ignited significant controversy and opposition, particularly from local Indigenous communities, culminating in legal challenges against the site selection. The contentious plans for Muckaty Station were eventually scrapped in 2014 after an out-of-court settlement.¹⁶⁸

The contentious developments surrounding Muckaty Station precipitated the repeal of the *Commonwealth Radioactive Waste Management Act 2005*. It was superseded by the *National Radioactive Waste Management Act 2012*, which introduced a voluntary nomination mechanism for site selection.¹⁶⁹ As a result of this new framework, 30 sites were initially nominated under the 2012 Act, with Napandee, Lyndhurst, and Wallerberdina eventually emerging as the leading sites after thorough assessments. This new approach marked a significant shift from the previous, more authoritarian method of site selection, aiming to enhance community involvement and consent, albeit not the consent of the Government of South Australia. The *Nuclear Waste Storage Facility (Prohibition) Act*, which prohibited establishing a nuclear waste facility in South Australia, remained in force. To address this prohibition, the *National Radioactive Waste Management Act* incorporated legislative overrides to circumvent potential legal conflicts with the state.¹⁷⁰ These overrides stipulate that any state laws, whether written or unwritten, that aimed to regulate, hinder, prevent or interfere with the federal government's efforts to establish a waste facility would be rendered ineffective. The constitutional authority of the federal government, anchored in section 109 of the *Commonwealth of Australia Constitution Act*, forms the basis for establishing the primacy of Commonwealth laws in instances where they conflict with state legislation.¹⁷¹

Parallel to these developments, the Royal Commission was tasked with investigating the potential for South Australia's increased participation in the nuclear fuel cycle, including the storage and disposal of domestic and overseas radioactive waste.¹⁷² The commission recommended South Australia to pursue the establishment of waste storage and disposal

¹⁶⁵ *Commonwealth Radioactive Waste Management Act 2005 (Cth)*.

¹⁶⁶ Commonwealth of Australia, House of Assembly (2006) 'Second Reading Speech – Commonwealth Radioactive Waste Management Legislation Amendment Bill 2006' 29 November 2006, page 12.

¹⁶⁷ Department of Industry, Science, Energy and Resources, Australian Government (2020) *supra* note 156; Minister for Education, Science and Training, the Hon. Julie Bishop MP (2007) 'Radioactive Waste Facility Site Nomination' Media Release, 25 May 2007.

¹⁶⁸ Department of Industry, Science and Technology, (2023) 'Freedom of Information Disclosure Log: 17/006 – Documents related to Muckaty Station in the Northern Territory' available at: <https://www.industry.gov.au/sites/default/files/2022-09/disclosure-log-17-006.pdf> (accessed 16 December 2023).

¹⁶⁹ Minister for Resources and Energy, the Hon Martin Ferguson. (2010) 'Fairness Restored to Radioactive Waste Process' Media Release. 23 February 2010.

¹⁷⁰ *National Radioactive Waste Management Act 2012 (Cth)* sections 11 and 24.

¹⁷¹ *Commonwealth of Australia Constitution Act 1901 (Cth)*, section 109.

¹⁷² Grey, K. (2016) *supra* note 33.

facilities and to repeal the legislative constraint of the *Nuclear Waste Storage Facility (Prohibition) Act 2000*. The commission's analysis was not limited to domestic practices but also included a thorough evaluation of previous international attempts to establish nuclear waste facilities. However, the proposal was met with mixed reactions, with significant public opposition, particularly concerning the disposal of high-level nuclear waste from other countries and ultimately led to no notable implementation of the recommendations.

Following the Royal Commission, the Federal Government announced Napandee near Kimba in South Australia in 2020 as the preferred site for the national radioactive waste management facility. Following the announcement, the Government sought to amend the *National Radioactive Waste Management Act* to specify Napandee as the site for the proposed facility legislatively, shifting the decision-making process from the Ministerial level to the Parliamentary level.¹⁷³ This approach, however, faced strong opposition, primarily due to concerns over the lack of judicial review opportunities if the decision was entrenched in legislation. In response to these concerns, the Government reverted to the traditional ministerial declaration approach under the Act.¹⁷⁴ Subsequently, the Minister formally declared and acquired the land known as Napandee as the site for the facility and commenced site works in 2021.¹⁷⁵ However, this decision was legally challenged, citing apprehended bias in the decision-making process.¹⁷⁶ The challenge by the Barngarla Determination Aboriginal Corporation RNTBC (BDAC), representing the Indigenous people in the region, led to a ruling by the federal court against the government's decision in 2023, resulting in the project being abandoned.¹⁷⁷ BDAC's resistance was bolstered by support from anti-nuclear activists, environmental groups, and eventually the South Australian Government.¹⁷⁸ This series of events represents another setback in Australia's over four-decade-long struggle to establish a radioactive waste facility. It highlights the complexities and sensitivities in site selection, underscoring the necessity for transparent, equitable processes that respect the views and rights of all stakeholders, including Indigenous communities.

As at the date of this paper, Australia is grappling with a significant challenge in radioactive waste management. Despite decades-long endeavours, the country still does not have a dedicated national facility for disposing of radioactive waste produced or overseen by the federal government. The withdrawal of the proposed Napandee site project in South Australia has exacerbated this issue, leaving Australia without a definitive strategy for managing its radioactive waste. This impasse highlights the enduring complexities and sensitivities involved in establishing such facilities within Australia. Currently, radioactive waste in Australia is scattered across approximately 100 locations, including those managed by ANSTO, hospitals, industrial operations, and mining activities. This decentralised storage

¹⁷³ *National Radioactive Waste Management Amendment (Site Specification, Community Fund and Other Measures) Bill 2020 (Cth)*.

¹⁷⁴ *National Radioactive Waste Management Amendment (Selection, Community Fund and Other Measures) Act 2021 (Cth)*.

¹⁷⁵ Minister for Resources and Northern Australia, the Hon Keith Pitt MP. (2021) 'National Radioactive Waste Management Facility to be delivered near Kimba in South Australia' Media Statement, 29 November 2021.

¹⁷⁶ *Barngarla Determination Aboriginal Corporation RNTBC v Minister for Resources* [2023] FCA 809 (18 July 2023).

¹⁷⁷ Minister for Resources, the Hon Madeleine King MP. (2023) 'Statement on the National Radioactive Waste Management Facility' Media Statement, 10 August 2023.

¹⁷⁸ Willis, B. (2023) 'Division and Questions After Kimba Nuclear Waste Site Veto' InDaily new article, 19 July 2023. Available at: <https://indaily.com.au/news/2023/07/19/division-and-questions-after-kimba-nuclear-waste-site-veto/> (accessed 14 December 2023).

system often results in ad-hoc and less-than-ideal conditions, raising concerns about potential risks to human health and the environment. The persistent challenges in finding a widely acceptable national solution for waste disposal underscore the delicate interplay of technical expertise, environmental stewardship, social responsibility, and political diplomacy inherent in nuclear law and policy development. This multifaceted issue necessitates a holistic approach, considering diverse perspectives and balancing various concerns to achieve an effective and sustainable solution for radioactive waste management in Australia.

In contrast to the Australian Government's repeated challenges in managing radioactive waste, the private sector has shown promising progress. Tellus Holding Limited, a private entity, has made notable strides in this domain. They operate the Sandy Ridge hazardous waste facility in Western Australia, which is licensed for the permanent disposal of low-level radioactive waste.¹⁷⁹ This facility, situated near the Mt Walton East Intractable Waste Disposal Facility, a historically government-operated site in Western Australia, marks a significant private-sector contribution to addressing aspects of Australia's radioactive waste management challenge. Further extending their efforts, Tellus is also developing a project in the Northern Territory, known as the Chandler facility near Alice Springs.¹⁸⁰ This initiative is envisioned as a deep geological repository for the storage of both international and domestic chemical wastes and low-level radioactive material. Recognising the importance of community engagement, Tellus has placed a strong emphasis on obtaining social license, prioritising dialogue and consent from local communities ahead of the technical aspects of the project. In a significant development, in November 2023, Tellus announced that they had secured the approval of the Titjikala Indigenous community for the Chandler project. This consent marks a crucial milestone for the project, which is set to be Australia's first underground salt mine and deep geological waste repository.¹⁸¹ Tellus's advancements in this area represent an important private-sector contribution to Australia's broader efforts in effective and responsible radioactive waste management.

b. Radioactive waste and AUKUS

Australia's engagement in the AUKUS partnership represents a new challenge in its radioactive waste management strategies. This collaboration, which involves acquiring Virginia class and SSN-AUKUS nuclear-powered submarines, necessitates the management of radioactive waste generated through their operations, maintenance, and eventual decommissioning. Expected waste types include low-level radioactive materials, such as protective gear used in routine submarine maintenance, and a smaller quantity of intermediate-level waste. Australia's responsibility extends to handling all operational waste associated with these submarines, scheduled for acquisition in the 2030s.¹⁸² The storage of this waste, encompassing both low-level and intermediate-level waste, is planned to be conducted securely within designated Defence sites across Australia. A crucial aspect of this commitment is the eventual defueling, dismantling, and recycling of the submarines at the

¹⁷⁹ Tellus Holdings Limited (n.d.) *Sandy Ridge* [webpage] available at:

<https://tellusholdings.com/projects/sandy-ridge/> (accessed 14 December 2023).

¹⁸⁰ Tellus Holdings Limited (n.d.) *Chandler Facility Description* [webpage] available at:

<https://tellusholdings.com/projects/chandler-facility/chandler-facility-description/> (accessed 14 December 2023).

¹⁸¹ Tellus Holdings Limited (2023) *Native Title Owners Greenlight Chandler Repository In Northern Territory*

LinkedIn Post, November 2023. Available at: [https://www.linkedin.com/posts/tellus-holdings-](https://www.linkedin.com/posts/tellus-holdings-ltd_lowlevelradioactive-sociallicense-cleanenergytransition-activity-7127164248052432896-U2me?utm_source=share&utm_medium=member_desktop)

[ltd_lowlevelradioactive-sociallicense-cleanenergytransition-activity-7127164248052432896-](https://www.linkedin.com/posts/tellus-holdings-ltd_lowlevelradioactive-sociallicense-cleanenergytransition-activity-7127164248052432896-U2me?utm_source=share&utm_medium=member_desktop)

[U2me?utm_source=share&utm_medium=member_desktop](https://www.linkedin.com/posts/tellus-holdings-ltd_lowlevelradioactive-sociallicense-cleanenergytransition-activity-7127164248052432896-U2me?utm_source=share&utm_medium=member_desktop) (accessed 14 December 2023).

¹⁸² Department of Defence (2023) *supra* note 40 at 42.

end of their operational lifespan. This process will involve managing the spent nuclear fuel and radioactive components of the reactor, a significant undertaking given Australia's current absence of high-level waste. In 2023, Defence Minister Richard Marles noted that the need for disposal of spent nuclear fuel and radioactive reactor components is anticipated around the 2050s.¹⁸³ Acknowledging this long-term requirement, the Australian Government has committed to a comprehensive review process in 2023. This review aims to identify potential sites within existing or future Defence sites that could be deemed suitable for storing and disposing of intermediate-level and high-level radioactive waste.

c. Conclusion

Reflecting on Australia's journey in radioactive waste law, it's clear that it has been profoundly influenced by both domestic events and international influences, set against a backdrop of consistent societal resistance and concerns over social acceptance. The narrative began with experimental disposals at Little Forest and traversed through highly debated sites like Muckaty Station, culminating in the current state of ambiguity following the Napandee site's withdrawal. This progression epitomises the dynamic interplay of technical expertise, environmental consciousness, social considerations, and political factors in shaping nuclear law. The impact of international incidents like the Chernobyl accident, alongside treaties such as the Joint Convention, has been pivotal in steering Australia towards practices that are robust, safe, and in line with global standards. Yet, domestic political nuances, community resistance, and the rights of Indigenous communities have been equally influential in determining policy directions and legislative outcomes.

As the Federal Government ponders the future of Australia's radioactive waste management, several considerations loom large. With ANSTO's storage capacity nearing its limit by 2038,¹⁸⁴ the question arises whether the government will pivot from its traditional approaches, such as compulsory or voluntary land acquisitions. Potential alternatives might include leveraging existing infrastructure at Tellus Holdings' operational and proposed sites, combining defence and civilian waste on defence lands, exploring commercial nuclear build models like Engineering, Procurement, Construction (EPC), Engineering, Procurement, Construction Management (EPCM), or Build-Own-Operate-Transfer (BOOT) arrangements with the private sector, or revisiting the voluntary acquisition model with new parameters like adhering to Free, Prior and Informed Consent (FPIC) principles with Indigenous communities. However, the feasibility of these options remains entangled in a web of challenges, encompassing state legislative restrictions, complex political landscapes, and the imperative to respect Indigenous rights and perspectives.

The evolution of radioactive waste law in Australia underscores the intricate task of balancing diverse stakeholder interests, environmental safety, and international commitments. The path forward for managing both civilian and defence-related radioactive waste will undoubtedly be shaped by the lessons from past experiences and the continuously evolving

¹⁸³ Minister for Defence, The Hon Richard Marles MP. (2023) Press Conference, Parliament House, Canberra [Transcript] 14 March 2023, available at: <https://www.minister.defence.gov.au/transcripts/2023-03-14/press-conference-parliament-house-canberra> (accessed 18 December 2023).

¹⁸⁴ Shepherd, T. (2023) 'Most of Australia's nuclear waste comes from Lucas Heights – should it stay there?' The Guardian. New article 17 October 2022. Available at: <https://www.theguardian.com/australia-news/2022/oct/17/most-of-australias-nuclear-waste-comes-from-lucas-heights-should-it-stay-there> (accessed 14 December 2023).

global nuclear context. This situation presents an opportunity for Australia to develop a more integrated, inclusive, and sustainable approach to radioactive waste management that aligns with both national priorities and global best practices.

7. Nuclear liability

Nuclear liability is a fundamental element of nuclear law, encompassing the legal and financial responsibilities associated with third-party liability resulting from nuclear accidents. This area of law is particularly pertinent in contexts where nuclear technology is employed, as it defines the accountability framework for potential nuclear incidents. In Australia, the approach to nuclear liability is shaped by its unique engagement with nuclear technology, characterised by a focus on mining, waste management, and recent strategic developments like the AUKUS partnership rather than on nuclear power generation.

Internationally, nuclear liability is governed by several key treaties, including the Paris Convention,¹⁸⁵ the Vienna Convention,¹⁸⁶ and the Convention on Supplementary Compensation for Nuclear Damage (CSC).¹⁸⁷ These conventions establish a global framework for nuclear liability, outlining the principles for compensation and the mechanisms for addressing cross-border implications of nuclear incidents. Australia was a primary advocate for non-nuclear power generating countries in the CSC negotiations and was among the first countries in the world to sign the Convention.¹⁸⁸ Australia has not ratified the CSC and is therefore not a party, however, as a signatory, Australia must refrain from acts that would defeat the object and purpose of the convention.¹⁸⁹ Importantly, the CSC only applies to nuclear instalments for peaceful purposes, highlighting a distinct aspect of nuclear liability that Australia must navigate in this new era of defence cooperation.¹⁹⁰

Australia's approach to nuclear liability is markedly distinct, shaped by its unique nuclear landscape characterised by limited infrastructure and geographical isolation. Unlike many nuclear-powered nations with complex liability frameworks, Australia does not have specific domestic laws that address civil liability for nuclear damage. The country's nuclear legal framework primarily revolves around waste management within the mining sector and the oversight of its two key nuclear installations: the ANSTO OPAL reactor and the Tellus Sandy Ridge waste repository. In the mining sector, particularly concerning the management of industrial waste such as tailings and waste rock, liability is governed by state and territory laws. These laws establish financial assurance models that predominantly address operational

¹⁸⁵ Convention on Third Party Liability in the Field of Nuclear Energy of 29th July 1960, as amended by the Additional Protocol of 28th January 1964 and by the Protocol of 16th November 1982 (1960), 1519 UNTS 329 (Paris Convention).

¹⁸⁶ Vienna Convention on Civil Liability for Nuclear Damage (1963), IAEA Doc. INFCIRC/500, 1063 UNTS 266, entered into force 12 November 1977 (Vienna Convention).

¹⁸⁷ Convention on Supplementary Compensation for Nuclear Damage (1997), IAEA Doc. INFCIRC/567, 36 ILM 1473, entered into force 15 April 2015 (CSC).

¹⁸⁸ Department of Foreign Affairs and Trade, (1997) 'Australia signs new Convention on Compensation for Nuclear Damage' Media Release, 3 October 1997. Available at: <https://www.dfat.gov.au/news/media/Pages/australia-signs-new-convention-on-compensation-for-nuclear-damage> (access 18 December 2023)

¹⁸⁹ Vienna Convention on the Law of Treaties (1969), 1155 UNTS 331, entered into force 27 January 1980, Article 18.

¹⁹⁰ CSC supra note 187, Article 2.

liability during active mining and residual liability following closure.¹⁹¹ However, these models focus on protective mitigation measures and reducing the likelihood of accidents, and as a result, they do not fully account for contingent liabilities arising from potential nuclear waste accidents, often due to the high cost of meaning such assurances for mining operators. This framework reflects Australia's specific nuclear profile, where the broader aspects of nuclear liability, often seen in countries with extensive nuclear power generation or near nuclear neighbours, are less pronounced. As a result, Australia's nuclear liability regime is tailored to its own environmental, industrial, and infrastructural contexts, focusing on the management and assurance of operations more than the broader implications of nuclear accidents.

The liability arrangements in place for the ANSTO OPAL reactor covers ionising radiation liability up to \$50 million by Comcover, the Australian Government's self-managed insurance fund. This coverage includes responsibilities related to managing, storing, and conditioning radioactive materials, as well as their domestic and international transportation. Additionally, ANSTO has a Deed of Indemnity from the federal government for liabilities not covered by Comcover, extending to ANSTO Nuclear Medicine Pty Ltd and their employees and contractors for any claims involving ionising radiation damage. This indemnity is in effect until April 2026.¹⁹²

On the other hand, Tellus Holdings Limited, a private entity, has a layered approach to liability. It includes over \$100 million in construction insurance and over \$422 million in operational insurance, comprising general operational coverage and unique environmental liability insurance for the facility, backed by international underwriters. Further financial safeguards are provided by assurance bonds and a material trust fund managed by an independent trustee, ensuring ongoing financial security throughout the facility's operations. This fund is regularly reviewed by independent experts and the Western Australian government for accountability and adequacy.¹⁹³

The management of nuclear liability in the context of the AUKUS submarines introduces new uncertainties into Australia's nuclear legal landscape. Australia is expected to receive nuclear material in sealed power units, a design choice that lowers risk by negating the need for regular fuel stockpiles and reducing the production of spent fuel.¹⁹⁴ As for the specifics of nuclear liability associated with these submarines, the Australian government has not yet disclosed its intended approach. Given that these military nuclear installations will be operated by the government on government owned land, it is anticipated that the civil liability for third-party claims against the government will be insured by Comcover and underwritten by the government, potentially under an uncapped liability model, aligning with practices observed in countries like Germany, Japan, and Switzerland.

¹⁹¹ For example, see Financial Assurance Framework for mining in South Australia: Mining Act 1971 (SA) section 62 and 63; Department of Energy and Mining, (n.d.) 'Financial Assurance' [Webpage] available at: <https://www.energymining.sa.gov.au/industry/minerals-and-mining/mining/operational-information/financial-assurance> (accessed 18 December 2023)

¹⁹² Australian Nuclear Science and Technology Organisation, (2023) 'Annual Report 2022-2023' page 59 available at: <https://www.ansto.gov.au/media/6822> (accessed 18 December 2023).

¹⁹³ Tellus Holdings Limited, (2020) 'World class financial assurance and insurance framework' [webpage] 9 October 2020. available at: <https://tellusholdings.com/sandy-ridge-facility-now-open-for-business-providing-key-enabling-infrastructure-for-covid-19-economic-recovery/> (accessed 18 December 2023).

¹⁹⁴ Department of Defence (2023) *supra* note 40, page 45.

The implementation of Australia's procurement strategy under the AUKUS program introduces notable complexities, especially in terms of nuclear liability. The Australian Standard for Defence Contracting (ASDEFCON) generally adheres to principles that allocate risk to the party most capable of managing it.¹⁹⁵ Furthermore, ASDEFCON typically discourages indemnities from the government in favour of contractors. In the context of nuclear liability, a key challenge arises from the principle of exclusive liability, pivotal in international nuclear law. This principle posits that the operator of a nuclear installation holds sole liability for third-party damages, a concept not commonly incorporated in Australian defence contracts. This discrepancy raises significant questions about how Australia will navigate liability management within the AUKUS program, particularly for those involved in the supply chain. As Australia embarks on this new defence venture, adapting its procurement policies and legal frameworks to align with the unique demands of nuclear liability will be crucial for ensuring coherent and effective management of risks across the program's supply chain.

8. Conclusion

As explored in this analysis, Australia's journey through the complex terrain of nuclear law and policy stands as a testament to the nation's evolving relationship with nuclear technology. This progression, marked by intricate interplays between domestic political dynamics, international events, and societal responses, underscores Australia's unique position in the global nuclear narrative.

From the nuanced beginnings in uranium mining to the strategic leap signified by the AUKUS partnership, Australia's nuclear story is one of cautious advancement, strategic alignment, and, at times, contentious policymaking. The analysis highlights the critical role that political rhetoric, inter-party dynamics, and federal-state relations have played in shaping the nation's nuclear laws. The dichotomy between Australia's vast uranium resources and its restrained approach to nuclear power generation and waste management speaks volumes about the complexities inherent in nuclear law development.

The AUKUS partnership, in particular, marks a significant pivot in Australia's nuclear policy, bringing new dimensions of strategic defence and international alignment into focus. This development not only underscores Australia's evolving role in the global nuclear landscape but also propels the nation into uncharted legal and policy territories. While primarily focused on defence, this development inadvertently brings civil nuclear issues to the fore. As Australia ventures into the operational complexities of nuclear-powered submarines, the interplay between military and civilian nuclear applications becomes increasingly intricate. It raises the question: can Australia have its yellowcake and eat it too? This adage aptly captures the emerging reality – can Australia facilitate a defence nuclear industry while still imposing legislative bans on uranium mining, waste repositories and nuclear power?

In conclusion, this analysis of Australia's nuclear law evolution in the context of global events and the AUKUS partnership reveals a narrative rich in lessons and insights. It

¹⁹⁵ Department of Defence, (n.d.) 'Defence Liability Principles', available at: <https://www.defence.gov.au/sites/default/files/2020-06/defenceliabilityprinciples.pdf> (accessed 18 December 2023).

underscores the importance of adaptive legal frameworks, the need for nuanced policy development, and the imperative of balancing national interests with global commitments. As Australia continues to navigate this intricate landscape, its journey offers invaluable perspectives on the role of law in shaping a nation's nuclear policy and its impact on the global stage.

Annexure 1 – Glossary

Abbreviation / Defined Term	Full Form / Definition
IMS	International Monitoring System
AAEC	Australian Atomic Energy Commission
Additional Protocol	A supplementary agreement to a primary treaty; in this context, likely refers to an addendum to nuclear non-proliferation treaties
ALP	Australian Labor Party
ANSTO	Australian Nuclear Science and Technology Organisation
ARPANS Act	Australian Radiation Protection and Nuclear Safety Act
ARPANSA	Australian Radiation Protection and Nuclear Safety Agency
ASDEFCON	Australian Standard for Defence Contracting
ASNO	Australian Safeguards and Non-Proliferation Office
AUKUS Partnership	Australia, United Kingdom, United States
BDAC	Barnarla Determination Aboriginal Corporation RNTBC
BOOT	Build-Own-Operate-Transfer
CNS	Convention on Nuclear Safety
Coalition	Australian Coalition Liberal Nationals Party
Comcover	Australian Government's self-managed insurance fund
CPPNM	Convention on the Physical Protection of Nuclear Material
CSC	Convention on Supplementary Compensation for Nuclear Damage
CSIRO	Commonwealth Scientific and Industrial Research Organisation
CTBT	Comprehensive Nuclear Test Ban Treaty
CTBTO	Comprehensive Nuclear-Test-Ban Treaty Organization
Cth	Commonwealth of Australia
EPBC Act	Environment Protection and Biodiversity Conservation Act 2000
EPC	Engineering, Procurement, Construction
EPCM	Engineering, Procurement, Construction Management
Fox Inquiry	Ranger Uranium Environmental Inquiry
FPIC	Free, Prior and Informed Consent
HIFAR	High Flux Australian Reactor
IAEA	International Atomic Energy Agency
Joint Convention	Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management
MOATA	MOATA small reactor
NORMs	Naturally Occurring Radioactive Materials
NPT	Nuclear Non-Proliferation Treaty
OPAL	Open Pool Australian Lightwater reactor
Paris Convention	Paris Convention on Third Party Liability in the Field of Nuclear Energy
Royal Commission	Nuclear Fuel Cycle Royal Commission
Safeguards Act	Nuclear Non-Proliferation (Safeguards) Act 1987
Safeguards Agreement	An agreement between Australia and the IAEA to allow monitoring of nuclear materials and activities
SSN-AUKUS	SSN-AUKUS nuclear-powered submarines
TPNW	Treaty on the Prohibition of Nuclear Weapons
Treaty of Rarotonga	South Pacific Nuclear Free Zone Treaty
U.S.	United States
UK	United Kingdom
Vienna Convention	Vienna Convention on Civil Liability for Nuclear Damage
WPA	Woomera Protected Area