Remedying the limitations of the CTBT? Testing under the treaty on the prohibition of nuclear weapons

Article

Published Version

REMEDYING THE LIMITATIONS OF THE *CTBT*? TESTING UNDER THE *TREATY ON THE PROHIBITION OF NUCLEAR WEAPONS*

CHRISTOPHER P EVANS*

Various limitations on the testing of nuclear weapons already exist within international law, including the Treaty Banning Nuclear Weapons Tests in the Atmosphere, in Outer Space and Under Water of 1963, along with further restrictions on where testing is permitted and the maximum yield of such tests. Yet it was not until 1996 that the Comprehensive Nuclear-Test-Ban Treaty ('CTBT') was adopted, representing the first globally reaching prohibition of all forms of testing that result in a nuclear weapon 'explosion'. The CTBT does not, however, cover subcritical and computer simulated nuclear tests, which can ensure the safety and reliability of existing stockpiles, thus undermining the CTBT's implications for nuclear disarmament. More importantly, due to the onerous entry-into-force requirements under art XIV, the CTBT is not yet binding on states and is unlikely to become so in the near future. A further contribution to the legal restrictions on nuclear weapon testing has recently been provided by the Treaty on the Prohibition of Nuclear Weapons ('TPNW'), which was adopted in July 2017. Under art 1(1)(a), states party undertake never, under any circumstances, to 'develop' or 'test' nuclear weapons or other nuclear explosive devices. Given the challenges facing the CTBT, this article seeks to analyse the extent of the testing prohibition established under art 1(1)(a) as well as the scope of the prohibition of development in order to determine whether the TPNW closes the testing 'loophole' established by the CTBT by including subcritical and computer simulated testing within either of these prohibitions. The article will conclude by offering some thoughts on the TPNW's prospects for entry into force and its future relationship with the CTBT.

CONTENTS

* PhD Researcher, School of Law, Global Law at Reading, University of Reading. I am grateful to Lawrence Hill-Cawthorne for his comments on an earlier draft of this article, and both James A Green and Aurel Sari for their wider feedback in relation to this topic generally. My thanks also go to the two anonymous reviewers for their useful comments on a previous version of this article. This work was supported by the Arts and Humanities Research Council, South-West and Wales Doctoral Training Partnership. All other views and mistakes are, of course, mine.

I INTRODUCTION

The prohibition of nuclear weapon testing is an issue that states have been grappling with for decades. However, it was not until the adoption of the *Comprehensive Nuclear-Test-Ban Treaty* ('*CTBT*') in 1996 that an apparently 'comprehensive' instrument prohibiting all forms of nuclear weapon test explosions was concluded.[1] Yet, while many continue to endorse the *CTBT* as one of the most significant 'effective measures' towards nuclear disarmament pursuant to art VI of the *Treaty on the Non-Proliferation of Nuclear Weapons* ('*NPT*'),[2] prospects for its entry into force continue to look bleak in light of the onerous requirements imposed by art XIV(1) of the *CTBT*. This is despite repeated resolutions adopted by the United Nations General Assembly that have called upon states to ratify the *CTBT* as soon as possible.[3] Moreover, the *CTBT* remains hindered by its failure to prohibit all variations of nuclear weapon testing activities, instead continuing to permit subcritical and computer simulated tests. These failures of the *CTBT* have remained largely unresolved over the past two decades, providing the nuclear weapon possessing states ('NWPS') with the ability to improve and ensure the reliability of existing stockpiles.

Although the majority of states have refrained from conducting nuclear weapons tests following the negotiation of the *CTBT*, recent events have reiterated the urgency of achieving an implemented, legally binding prohibition on all nuclear weapon testing activities. The Democratic People's Republic of Korea ('DPRK') has conducted six nuclear weapon explosive tests since 2006, the latest of which took place in September 2017.[4] In May 2019, Lieutenant General Robert Ashley, Director of the United States Defense Intelligence Agency, claimed that Russia had 'probably' carried out extremely low-yield nuclear tests in its remote Novaya Zemlya Arctic testing facilities in violation of the *CTBT*, though no evidence to support such claims has been offered.[5] More recently, in April 2020,

---

1 *Comprehensive Nuclear-Test-Ban Treaty*, GA Res 50/245, UN GAOR, 50th sess, 125th plen mtg, Agenda Item 65, Supp No 49, UN Doc A/RES/50/245 (17 September 1996) ('*Resolution 50/245*'), which adopted *Letter Dated 22 August 1996 from the Permanent Representative of Australia to the United Nations Addressed to the Secretary-General*, 50th sess, Agenda Items 8 and 65, UN Doc A/50/1027 (26 August 1996) annex ('*Draft Comprehensive Nuclear-Test-Ban Treaty*') ('*CTBT*').

2 *Treaty on the Non-Proliferation of Nuclear Weapons*, opened for signature 1 July 1968, 729 UNTS 161 (entered into force 5 March 1970) art VI ('*NPT*').

3 For the most recent of these, see *Comprehensive Nuclear-Test-Ban Treaty*, GA Res 74/78, UN GAOR, 74th sess, 46th plen mtg, Agenda Item 104, Supp No 49, UN Doc A/RES/74/78 (23 December 2019) para 6; *Comprehensive Nuclear-Test-Ban Treaty*, GA Res 73/86, UN GAOR, 73rd sess, 45th plen mtg, Agenda Item 107, Supp No 49, UN Doc A/RES/73/86 (14 December 2018) para 6 ('*Resolution 73/86*'); *Comprehensive Nuclear-Test-Ban Treaty*, GA Res 72/70, UN GAOR, 72nd sess, 62nd plen mtg, Agenda Item 105, Supp No 49, UN Doc A/RES/72/70 (13 December 2017) paras 6–7 ('*Resolution 72/70*'). See also United Nations Secretary-General, 'Secretary-General's Remarks at "Article XIV Conference" on the Comprehensive Nuclear-Test-Ban Treaty [as delivered]' (Speech, Article XIV Conference, 20 September 2017) <https://www.un.org/sg/en/content/sg/statement/2017-09-20/secretary-generals-remarks-%E2%80%9Carticle-xiv-conference%E2%80%9D-comprehensive>, archived at <https://perma.cc/464S-4WHK>, again encouraging states to ratify the *CTBT* as soon as possible.

4 For a concise analysis of DPRK nuclear testing, see 'Arms Control and Proliferation Profile: North Korea', *Arms Control Association* (Fact Sheet, June 2018).

5 Daryl G Kimball, 'US Claims of Illegal Russian Nuclear Testing: Myths, Realities, and Next Steps' (Policy White Paper, Arms Control Association, 16 August 2019).

the US similarly claimed that China may have conducted secret low-yield tests at its Lop Nur test site, following increased excavation activities and the use of explosive containment chambers in 2019.[6] In light of these accusations, and given the current trend of the US withdrawing from existing arms control arrangements such as the *Intermediate-Range Nuclear Forces Treaty*,[7] the *Joint Comprehensive Plan of Action*[8] and, most recently, the *Treaty on Open Skies*,[9] it is not beyond the realm of possibility that the US may signal its intention not to ratify and no longer be bound by the *CTBT*.[10] In fact, earlier this year in May 2020, US officials reportedly met to discuss the possibility of resuming nuclear testing, though it has been stressed that there has been no policy change as of yet.[11]

However, it seems that all hope is not lost. On 7 July 2017, the *Treaty on the Prohibition of Nuclear Weapons* ('*TPNW*') was adopted at the United Nations Conference to Negotiate a Legally Binding Instrument to Prohibit Nuclear Weapons, Leading towards Their Total Elimination ('2017 Negotiation Conference').[12] The Treaty represented the outcome of efforts coordinated by a committed group of non-aligned non-nuclear weapon states ('NNWS') and civil society activists, including the 2017 Nobel Peace Prize winner, the International

---

6 Michael R Gordon, 'Possible Chinese Nuclear Testing Stirs US Concern', *The Wall Street Journal* (online, 15 April 2020) <https://www.wsj.com/articles/possible-chinese-nuclear-testing-stirs-u-s-concern-11586970435>, archived at <https://perma.cc/6TVY-R8DX>; United States Department of State, *Executive Summary of Findings on Adherence to and Compliance with Arms Control, Nonproliferation, and Disarmament Agreements and Commitments* (Executive Summary, April 2020) 8.

7 Kingston Reif, 'After the INF Treaty, What Is Next?' (2019) 49(1) *Arms Control Today* 26; Michael R Pompeo, Secretary of State, 'US Withdrawal from the INF Treaty on August 2, 2019' (Press Statement, United States Department of State, 2 August 2019) <https://www.state.gov/u-s-withdrawal-from-the-inf-treaty-on-august-2-2019/>, archived at <https://perma.cc/3GA5-562V>.

8 Michael R Pompeo, Secretary of State (US), 'On the Treaty on Open Skies' (Press Release, United States Department of State, 21 May 2020) <https://www.state.gov/on-the-treaty-on-open-skies/>, archived at <https://perma.cc/U2CR-8EWW>. See also Daniel H Joyner, 'The United States' "Withdrawal" from the Iran Nuclear Deal', *E-International Relations* (online, 21 August 2018) <https://www.e-ir.info/2018/08/21/the-united-states-withdrawal-from-the-iran-nuclear-deal/>, archived at <https://perma.cc/X2NS-4S6U>.

9 John Hudson and Paul Sonne, 'Trump Administration to Withdraw from Open Skies Treaty in a Further Erosion of Arms Control Pacts with Russia', *The Washington Post* (online, 22 May 2020) <https://www.washingtonpost.com/national-security/2020/05/21/882d460a-9b68-11ea-b60c-3be060a4f8e1_story.html>, archived at <https://perma.cc/M4XH-8K9Y>.

10 See, eg, Rebecca Johnson, 'What to Look for in the 2019 NPT Preparatory Committee', *European Leadership Network* (Commentary, 23 April 2019) <https://www.europeanleadershipnetwork.org/commentary/what-to-look-for-in-the-2019-npt-preparatory-committee/>, archived at <https://perma.cc/N8E4-48QC>; Andreas Persbo, 'Will the Trump Administration's Accusations Doom the Nuclear Test Ban Treaty?', *Bulletin of the Atomic Scientists* (online, 18 May 2020) <https://thebulletin.org/2020/05/will-the-trump-administrations-accusations-doom-the-nuclear-test-ban-treaty/>, archived at <https://perma.cc/8MEE-JQHD>.

11 Julian Borger, 'US Security Officials "Considered Return to Nuclear Testing" after 28-Year Hiatus', *The Guardian* (online, 23 May 2020) <https://www.theguardian.com/world/2020/may/23/us-security-officials-considered-return-to-nuclear-testing-after-28-year-hiatus>, archived at <https://perma.cc/4RTD-2E3M>; Aaron Mehta, 'Live Nuclear Testing Could Resume in "Months" if Needed, Official Says', *Defense News* (online, 26 May 2020) <https://www.defensenews.com/smr/nuclear-arsenal/2020/05/26/live-nuclear-testing-could-resume-in-months-if-needed-official-says/>, archived at <https://perma.cc/J5W6-2E83>.

12 *Treaty on the Prohibition of Nuclear Weapons*, Agenda Item 9, UN Doc A/CONF.229/2017/8 (7 July 2017) ('*TPNW*').

Campaign to Abolish Nuclear Weapons ('ICAN').[13] The principal objective of the humanitarian initiative, the group of non-nuclear weapons states and civil society actors behind the *TPNW*,[14] was to prohibit all aspects of nuclear weapons due to the 'catastrophic humanitarian consequences' resulting from their use, and, as such, the adoption of the prohibition treaty would constitute an 'effective measure' towards the objective of nuclear disarmament.[15] Given the challenges facing the *CTBT*, this article seeks to determine whether the undertaking never to 'test' or 'develop' nuclear weapons or other nuclear explosive devices under art 1(1)(a) of the *TPNW* addresses existing 'loopholes' within the *CTBT*'s prohibitions, and aims to offer some insights on the *TPNW*'s prospects for entry into force and its future relationship with the *CTBT*.[16]

This article proceeds as follows. Following the introduction in Part I, Part II offers a brief overview of the fragmented regulation of nuclear weapon testing implemented prior to the adoption of the *CTBT*. Part III is then dedicated to a more exclusive analysis of the *CTBT*, focusing on precisely identifying the testing prohibitions under art I(1). This section will also note the *CTBT* verification framework and highlight the challenging entry-into-force requirements imposed by art IX(3). Part IV then provides a brief account of the *TPNW*'s history and negotiation to shed light on the underlying interest and motivations that informed the adoption of the Treaty.

Following this preliminary discussion, Part V analyses the scope of the testing prohibition established under art 1(1)(a) of the *TPNW*. This will provide an examination of the ordinary meaning of the terms 'test', 'nuclear weapon' and 'other nuclear explosive devices' in the *TPNW*'s context and in light of its object and purpose, as well as investigating the *travaux préparatoires* to support the interpretation reached. Part VI will then explore an alternative means of incorporating non-explosive testing activities under the *TPNW* through the broader prohibition on 'developing' nuclear weapons or other nuclear explosive devices. As will be shown, it is the latter prohibition related to development that best captures non-explosive testing activities. Finally, Part VII discusses some prospects for the *TPNW* moving forward, particularly its potential for early entry into force, and the future relationship and compatibility of both the *TPNW* and the *CTBT* in light of the broader scope of testing prohibitions established by the new instrument.

Before proceeding, a caveat is in order. This article does not intend to touch upon the critical discussion of whether a parallel comprehensive prohibition of nuclear weapons exists under customary international law. Although it is generally

---

13 'ICAN Receives 2017 Nobel Peace Prize', *International Campaign to Abolish Nuclear Weapons* (Web Page, 22 December 2017) <https://www.icanw.org/ican_receives_2017_nobel_peace_prize>, archived at <https://perma.cc/62SN-E4L5>.

14 For further discussion of the humanitarian initiative, see Elizabeth Minor, 'Changing the Discourse on Nuclear Weapons: The Humanitarian Initiative' (2016) 97(889) *International Review of the Red Cross* 711; Rebecca Davis Gibbons, 'The Humanitarian Turn in Nuclear Disarmament and the Treaty on the Prohibition of Nuclear Weapons' (2018) 25(1) *Nonproliferation Review* 11.

15 *TPNW*, UN Doc A/CONF.229/2017/8 (n 12) Preamble para 2. See *NPT* (n 2) art VI.

16 As the number of ratifications of the *TPNW* continues to increase, the author wishes to make clear that the discussion that follows is based on the number of ratifications as of 30 September 2020. It may, however, likely be the case that the *TPNW* has achieved its required 50 ratifications in order to enter into force by the time this article is published.

agreed that there exists a customary prohibition on atmospheric, underwater and outer space nuclear testing,[17] it remains uncertain whether a customary prohibition on nuclear explosive tests in all environments, including underground testing, has crystallised at this time.[18] My intention in this article is not to analyse the extent to which the widespread support for the *TPNW* prohibitions may have an effect on this developing parallel customary prohibition, but rather to analyse the state of treaty-based obligations in relation to nuclear weapon testing prohibitions.

II EARLY NUCLEAR TESTING PROHIBITIONS

While attempts to prohibit nuclear weapon testing can be traced back to the dawn of the nuclear weapons era, multilateral negotiations towards this goal did not commence until the early 1950s.[19] With the growing awareness of the environmental harm caused by atmospheric nuclear testing, made evident by the unexpected fallout from the Castle Bravo test in the Bikini Atoll in 1954,[20] many civil society-based advocacy movements, including the Russell–Einstein Manifesto in 1955 and subsequent Pugwash Conference in 1957, helped generate

---

17 See Gabriella Venturini, 'Test-bans and the Comprehensive Test Ban Treaty Organization' in Jonathan L Black-Branch and Dieter Fleck (eds), *Nuclear Non-Proliferation in International Law* (Asser Press, 2014) 133, 151; Andrew Michie, 'Provisional Application of Non-Proliferation Treaties' in Daniel H Joyner and Marco Roscini (eds), *Non-Proliferation Law as a Special Regime: A Contribution to Fragmentation Theory in International Law* (Cambridge University Press, 2012) 55, 80; Don MacKay, 'The Testing of Nuclear Weapons under International Law' in Gro Nystuen, Stuart Casey-Maslen and Annie Golden Bersagel (eds), *Nuclear Weapons under International Law* (Cambridge University Press, 2014) 292, 317. Peter Hulsroj has even gone so far as to suggest that the prohibition on atmospheric testing has achieved the status of *jus cogens*: Peter Hulsroj, 'Jus Cogens and Disarmament' (2006) 46(1) *Indian Journal of International Law* 1, 8.

18 See generally Lisa Tabassi, 'The Nuclear Test Ban: *Lex Lata* or *de Lege Ferenda*?' (2009) 14(2) *Journal of Conflict and Security Law* 309; James A Green, 'India and a Customary Comprehensive Nuclear Test-Ban: Persistent Objection, Peremptory Norms and the 123 Agreement' (2011) 51(1) *Indian Journal of International Law* 3, 9–18, who argues that while there is evidence in support of this position, some uncertainty remains. For a contrary opinion, see Christopher Le Mon, 'Did North Korea's Nuclear Test Violate International Law?', *Opinio Juris* (Blog Post, 9 October 2006) <http://opiniojuris.org/2006/10/09/did-north-koreas-nuclear-test-violate-international-law/>, archived at <https://perma.cc/4U5Z-447H>; Masahiko Asada, 'CTBT: Legal Questions Arising from Its Non-Entry-into-Force' (2002) 7(1) *Journal of Conflict and Security Law* 85, 92–4; Daniel Rietiker, 'The (Il?)legality of Nuclear Weapons Tests under International Law: Filling the Possible Legal Gap by Ensuring the Comprehensive Test Ban Treaty's Entry into Force' (2017) 21(4) *ASIL Insights* ('The (Il?)legality of Nuclear Weapons Tests'), who expresses some scepticism towards the existence of a customary test ban.

19 David A Koplow, *Testing a Nuclear Test Ban: What Should Be Prohibited by a 'Comprehensive' Treaty?* (Dartmouth Publishing Company, 1996) 5–8 ('*Testing a Nuclear Test Ban*'); Jozef Goldblat, *Arms Control: The New Guide to Negotiations and Agreements* (SAGE Publications, 2nd ed, 2002) ch 4; David S Jonas, 'The Comprehensive Nuclear Test Ban Treaty: Current Legal Status in the United States and the Implications of a Nuclear Test Explosion' (2007) 39(4) *New York University Journal of International Law and Politics* 1007, 1010–11 ('The Comprehensive Nuclear Test Ban Treaty'); Venturini (n 17) 135.

20 For a summary of the test and its effects, see Ariana Rowberry, 'Castle Bravo: The Largest US Nuclear Explosion', *Brookings* (Blog Post, 27 February 2014) <https://www.brookings.edu/blog/up-front/2014/02/27/castle-bravo-the-largest-u-s-nuclear-explosion/>, archived at <https://perma.cc/VP6T-ESWX>.

greater public awareness of the effects of nuclear weapon testing.[21] In addition, given the growing concern over the possible horizontal proliferation of nuclear weapons to additional states, the continued escalation of the nuclear arms race and the rising Cold War tensions as a result of events such as the U-2 spy plane incident and the Cuban Missile Crisis during the early 1960s, it became increasingly clear among states that reaching an agreement on a nuclear test ban was becoming essential.[22]

In light of the more amicable stance of both the US and the Soviet Union towards restricting the proliferation of nuclear weapons,[23] some progress towards restricting nuclear weapon explosions came with the adoption of the *Treaty Banning Nuclear Weapon Tests in the Atmosphere, in Outer Space and Under Water* ('*PTBT*') in 1963.[24] Under art I(1), the *PTBT* prohibits 'any nuclear weapon test explosion, or any other nuclear explosion' in the atmosphere, outer space, under water and 'in any other environment if such explosion causes radioactive debris to be present outside the territorial limits of the State under whose jurisdiction or control such explosion is conducted'.[25] While this prohibition covers 'peaceful' nuclear tests through the inclusion of the phrase 'any other nuclear explosion', underground nuclear explosive tests remain permitted, provided that any such explosion does not result in radioactive debris spreading into the territory of another state.[26] Consequently, although the *PTBT* helped curb radioactive pollution spreading throughout the atmospheric environment,[27] David Koplow argues that it has 'not appreciably retarded the pace of explosions — it has simply driven them underground — or slowed the rate of weapons development'.[28]

Shortly after the adoption of the *PTBT*, the *NPT* was adopted in 1968 and remains the 'cornerstone' of the nuclear non-proliferation and disarmament legal framework. The *NPT* established two categories of states: the five de jure nuclear

---

21 Rebecca Johnson, *Unfinished Business: The Negotiation of the CTBT and the End of Nuclear Testing* (UNIDIR Report No UNIDIR/2009/2, 2009) 10–17 ('*Unfinished Business*'); 'London Launch of the Russell–Einstein Manifesto', *Pugwash Conferences on Science and World Affairs* (Web Page) <https://pugwash.org/1955/07/09/london-launch-of-the-russell-einstein-manifesto/>, archived at <https://perma.cc/4ZB5-CABY>.

22 Venturini (n 17) 137; Jonas, 'The Comprehensive Nuclear Test Ban Treaty' (n 19) 1011.

23 Goldblat (n 19) 48.

24 *Treaty Banning Nuclear Weapon Tests in the Atmosphere, in Outer Space and Under Water*, opened for signature 5 August 1963, 480 UNTS 43 (entered into force 10 October 1963) ('*PTBT*'). This is commonly referred to as the *Partial Test-Ban Treaty* or the *Limited Test-Ban Treaty*.

25 Ibid art I(1).

26 Goldblat (n 19) 49.

27 Ibid 51.

28 Koplow, *Testing a Nuclear Test Ban* (n 19) 8.

weapon states ('NWS') under art IX(3) and all other NNWS.[29] While the principal objective of the *NPT* was to prevent further horizontal proliferation of nuclear weapons,[30] the Treaty contains an implicit prohibition on nuclear weapon testing applicable to NNWS parties under art II by obligating these states not to transfer, 'manufacture, receive, control or otherwise acquire' nuclear weapons or other nuclear explosive devices.[31] Indeed, Lisa Tabassi notes that 'it would be difficult to imagine circumstances in which a non-nuclear-weapon State could test and still be in compliance with Article II'.[32] Moreover, this implicit prohibition under art II does not apply to the five NWS. Finally, the adoption of art VI requires states party to 'pursue negotiations in good faith on effective measures relating to cessation of the nuclear arms race at an early date and to nuclear disarmament'.[33] The *NPT* preamble similarly recognises the desire to build upon the *PTBT* in order to 'achieve the discontinuance of all test explosions of nuclear weapons for all time and to continue negotiations to this end'.[34] Though a treaty's preamble is not legally binding, this recognition generated further impetus for states to conclude a comprehensive test ban treaty, which would constitute an 'effective measure' towards nuclear disarmament as envisaged by art VI.[35]

In addition to the *PTBT*, other multilateral agreements that prohibit nuclear weapon testing in both uninhabited and inhabited regions were concluded. The *Antarctic Treaty* of 1959 prohibits the testing of any weapons, and specifically nuclear explosions, within its defined zone,[36] while the *Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, Including the Moon and Other Celestial Bodies* of 1967 prevents the testing of any

---

29 *NPT* (n 2) art IX(3). An NWS is defined as a state 'which has manufactured and exploded a nuclear weapon or other nuclear explosive device prior to 1 January, 1967'. This includes the US, the Soviet Union (and its successor state, Russia), the United Kingdom, France and China. All other states are therefore considered NNWS. At the same time, it is recognised that four states have since developed nuclear weapons after 1967 and are therefore considered de facto nuclear weapon possessing states. These are Israel, India, Pakistan and the DPRK. When collectively referring to all nine nuclear weapon possessing states, the acronym 'NWPS' will be used to differentiate from the five de jure NWS noted above. For a concise discussion that explores this distinction in the context of achieving universality under the *NPT*, see David S Jonas, 'Variations on Non-Nuclear: May the "Final Four" Join the Nuclear Nonproliferation Treaty as Non-Nuclear Weapon States while Retaining Their Nuclear Weapons?' [2005] (2) *Michigan State Law Review* 417, 433–6. See also 'Nuclear Weapons: Who Has What at a Glance', *Arms Control Association* (Fact Sheet, July 2019).

30 See, eg, Morton A Kaplan, 'The Nuclear Non-Proliferation Treaty: Its Rationale, Prospects and Possible Impact on International Law' (1969) 18(1) *Journal of Public Law* 1, 3; Guido den Dekker, *The Law of Arms Control: International Supervision and Enforcement* (Martinus Nijhoff Publishers, 2001) 74; Christopher A Ford, 'Debating Disarmament: Interpreting Article VI of the Treaty on the Non-Proliferation of Nuclear Weapons' (2007) 14(3) *Nonproliferation Review* 401. On the other hand, Daniel H Joyner has argued that the obligations permitting peaceful uses of nuclear technology under art IV and to pursue nuclear disarmament under art VI are equally as relevant and none should have prioritisation: Daniel H Joyner, *Interpreting the Nuclear Non-Proliferation Treaty* (Oxford University Press, 2011) 26, 32.

31 MacKay (n 17) 299.

32 Tabassi (n 18) 313.

33 *NPT* (n 2) art VI.

34 Ibid Preamble para 10.

35 Ibid art VI.

36 *The Antarctic Treaty*, opened for signature 1 December 1959, 402 UNTS 71 (entered into force 23 June 1961) arts I(1), V.

type of weapon, conventional or nuclear, on the moon or other celestial bodies.[37] Moreover, five nuclear weapon-free zones ('NWFZ') within inhabited regions have been established by five separate treaties,[38] each of which prohibit their respective states party from acquiring or testing nuclear weapons.[39] The NWFZ treaties also include protocols that the NWS are able to ratify, which guarantee that the NWS will similarly refrain from conducting nuclear explosive tests in each specified region.[40]

Nuclear weapon testing has also been restricted through the adoption of bilateral limitation arrangements between the US and the Soviet Union, the most significant of which was the *Treaty between the United States of America and the Union of Soviet Socialist Republics on the Limitation of Underground Nuclear Weapon Tests* ('*TTBT*') of 1974, imposing a maximum yield of 150 kts on nuclear test explosions.[41] However, while this agreement helped constrain the development of high-yield nuclear weapons, the *TTBT* failed to sufficiently restrain the nuclear arms race between the US and the Soviet Union.[42] Overall, given the extensive variety of adopted treaties addressing nuclear weapon testing, the testing prohibitory regime has rightfully been described by Tabassi as 'fragmented'[43] and similarly by Koplow as 'inchoate and incomplete'.[44]

III THE *COMPREHENSIVE TEST-BAN TREATY*

In the end, it was not until 1994 that the Conference on Disarmament decided to 'negotiate intensively a universal and multilaterally and effectively verifiable

---

37 *Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, Including the Moon and Other Celestial Bodies*, opened for signature 27 January 1967, 610 UNTS 205 (entered into force 10 October 1967) art IV.

38 *Treaty for the Prohibition of Nuclear Weapons in Latin America*, opened for signature 14 February 1967, 634 UNTS 281 (entered into force 22 April 1968) ('*Treaty of Tlatelolco*'); *South Pacific Nuclear Free Zone Treaty*, opened for signature 6 August 1985, 1445 UNTS 177 (entered into force 11 December 1988) ('*Treaty of Rarotonga*'); *Treaty on the Southeast Asia Nuclear Weapon-Free Zone*, opened for signature 15 December 1995, 1981 UNTS 129 (entered into force 27 March 1997) ('*Treaty of Bangkok*'). The other two were negotiated after the adoption of the *CTBT*: *African Nuclear-Weapon-Free Zone Treaty*, opened for signature 11 April 1996, 35 ILM 698 (entered into force 15 July 2009) ('*Treaty of Pelindaba*'); *Treaty on a Nuclear-Weapon-Free Zone in Central Asia*, opened for signature 8 September 2006, 2970 UNTS (entered into force 21 March 2009) ('*Treaty of Semipalatinsk*').

39 *Treaty of Tlatelolco* (n 38) art 1(1)(a); *Treaty of Rarotonga* (n 38) arts 3, 6; *Treaty of Bangkok* (n 38) arts 3(1)(c), (2)(a); *Treaty of Pelindaba* (n 38) arts 3, 5; *Treaty of Semipalatinsk* (n 38) arts 3, 5.

40 See, eg, *Protocol to the Treaty on the Southeast Asia Nuclear Weapon-Free Zone*, opened for signature 15 December 1995 (entered into force 16 July 1996) arts 1–3. However, it is worth noting that currently none of the NWS have ratified this specific Protocol: see 'Protocol to the Treaty on Southeast Asia Nuclear Weapon-Free Zone', *United Nations Office for Disarmament Affairs* (Web Page) <http://disarmament.un.org/treaties/t/bangkok_protocol>, archived at <https://perma.cc/2S2A-44HP>.

41 *Treaty between the United States of America and the Union of Soviet Socialist Republics on the Limitation of Underground Nuclear Weapon Tests*, signed 3 July 1974, 13 ILM 906 (entered into force 11 December 1990) art I(1).

42 Goldblat (n 19) 52–3.

43 Tabassi (n 18) 310.

44 David A Koplow, 'Sherlock Holmes Meets Rube Goldberg: Fixing the Entry-into-Force Provisions of the Comprehensive Nuclear Test Ban Treaty' (2017) 28(1) *Duke Journal of Comparative and International Law* 1, 10 ('Sherlock Holmes Meets Rube Goldberg').

comprehensive nuclear test ban treaty'.[45] Two-and-a-half years of negotiations followed before agreement could be reached on the proposed draft treaty; however, the consensus-based Conference on Disarmament remained gridlocked due to India's objection to the final treaty text.[46] As a result, Australia forwarded the finalised treaty draft to the UN General Assembly, which subsequently adopted and annexed the draft to *Resolution 50/245* on 10 September 1996.[47] Three key aspects of the *CTBT* will be discussed: first, and most significantly, the extent of the testing prohibition established; secondly, a brief overview of its verification framework; and thirdly, the challenges posed by its unique entry-into-force requirements and the attempts to circumvent this, as proposed academically.

A *Scope of the Testing Prohibition*

According to art I(1) of the *CTBT*, '[e]ach State Party undertakes not to carry out any nuclear weapon test *explosion* or any other nuclear *explosion*, and to prohibit and prevent any such nuclear explosion at any place under its jurisdiction or control'.[48] In addition, states party undertake to 'refrain from causing, encouraging, or in any way participating' in any nuclear weapon test explosions or other nuclear explosions.[49] Although the obligation under art I(1) would seem, prima facie, to offer a fully comprehensive prohibition on both military and peaceful nuclear testing, it is accepted that the *CTBT* does not prohibit nuclear weapon testing activities that *do not* result in a nuclear *explosion*.[50] Therefore, it is generally accepted that both subcritical and computer simulated testing experiments, among other activities that do not result in a self-sustaining nuclear reaction, remain permitted under the *CTBT*.[51]

At this point, it is worth noting what exactly subcritical and computer simulated testing entails,[52] as this will make clear the importance of these experiments in relation to the objectives of nuclear non-proliferation and disarmament. In subcritical experiments, fissile material used in nuclear warheads of a subcritical mass is used to simulate aspects of a nuclear explosion by exposing the nuclear material to chemical explosives under high pressure. However, rather than

---

45 *Mandate for an Ad Hoc Committee under Agenda Item 1: 'Nuclear Test Ban'*, 666th plen mtg, UN Doc CD/1238 (25 January 1994). For a summary of the negotiation of the *CTBT*, see generally Johnson, *Unfinished Business* (n 21) chs 3–6.

46 Jonas, 'The Comprehensive Nuclear Test Ban Treaty' (n 19) 1015–16. India rejected the *CTBT* for many reasons, but principally because the Treaty did not contain more concrete nuclear disarmament commitments and due to security considerations given China's nuclear weapon possession. For an excellent account of India's view of the *CTBT*, see Dinshaw Mistry, 'Domestic–International Linkages: India and the Comprehensive Test Ban Treaty' (1998) 6(1) *Nonproliferation Review* 25; Arundhati Ghose, 'Negotiating the CTBT: India's Security Concerns and Nuclear Disarmament' (1997) 51(1) *Journal of International Affairs* 239.

47 *CTBT*, UN Doc A/50/1027 (n 1).

48 Ibid art I(1) (emphasis added).

49 Ibid art I(2).

50 Asada (n 18) 87.

51 See Goldblat (n 19) 68; Venturini (n 17) 145; Asada (n 18) 87; Patricia Hewitson, 'Nonproliferation and Reduction of Nuclear Weapons: Risks of Weakening the Multilateral Nuclear Nonproliferation Norm' (2003) 21(3) *Berkeley Journal of International Law* 405, 449 n 237.

52 This author will often refer to both concepts collectively under the broader brush of 'non-explosive' tests.

resulting in a sustained nuclear chain reaction, the closely controlled configurations of subcritical experiments mean that no actual explosion of the nuclear material occurs. These tests provide information 'on the behavior of this key element [(ie plutonium or other fissile materials)] when it is subjected to the shock of an explosion'.[53] This helps to analyse the condition and deterioration of fissile material over time, allowing state officials to determine whether existing nuclear weapons will continue to perform as originally intended.

Computer simulated tests, on the other hand, are somewhat more self-explanatory. By inputting into supercomputers data on the specifications of current or newly developed nuclear weapons alongside information gathered from previous explosive testing activities and research, states are able to obtain predictions regarding the expected performance of the nuclear weapon that has been simulated. This again allows NWPS[54] to test and simulate how different components of existing or newly designed nuclear weapons will behave under certain conditions. For example, basic computer simulations of theoretical nuclear weapons explosions can be carried out on privately created interactive platforms such as NUKEMAP,[55] although the expected effects and the inputted data would not be as accurate or detailed as those of extensively state-funded computer simulation experiments. Publicly accessible 'simulation' websites and hypothetical detonations also do not provide specific details on weapon performance, unlike state-funded, military computer simulations.

This interpretive conclusion on the extent of the prohibition on testing established by art I(1) of the *CTBT* is made apparent through an application of the standard rules of treaty interpretation provided by arts 31 and 32 of the *Vienna Convention on the Law of Treaties* ('*VCLT*').[56] Article 31(1) states that a treaty shall be interpreted 'in good faith in accordance with the ordinary meaning to be given to the terms of the treaty in their context and in the light of its object and purpose'.[57] While art 31 to some degree encapsulates each of the three traditional schools of treaty interpretation,[58] the International Law Commission has reiterated that 'the text must be presumed to *be the authentic expression of the intentions* of the parties', and therefore 'the *starting point* of interpretation is the

---

53 Frank von Hippel, 'Subcritical Experiments', *Bulletin of the Atomic Scientists* (online, 14 December 2012) <https://thebulletin.org/2012/12/subcritical-experiments/>, archived at <https://perma.cc/L9X5-KU3R>.

54 For the differentiation between NWS and NWPS, see above n 29.

55 *NUKEMAP* (Website, 2012) <https://nuclearsecrecy.com/nukemap/>, archived at <https://perma.cc/39N9-YRZ5>. Though rather simplistic, this website allows the average person to input specified data on nuclear weapon yield and 'detonate' the device anywhere in the world, providing information on estimated casualties and radioactive fallouts, depending upon the type of detonation inputted.

56 *Vienna Convention on the Law of Treaties*, opened for signature 23 May 1969, 1155 UNTS 331 (entered into force 27 January 1980) ('*VCLT*') arts 31–2.

57 Ibid art 31(1).

58 Sir Ian Sinclair, *The Vienna Convention on the Law of Treaties* (Manchester University Press, 2nd ed, 1984) 114–5. See also Francis G Jacobs, 'Varieties of Approach to Treaty Interpretation: With Special Reference to the Draft Convention on the Law of Treaties before the Vienna Diplomatic Conference' (1969) 18(2) *International and Comparative Law Quarterly* 318, 318–20.

elucidation of the meaning of the text, not an investigation *ab initio* into the intentions of the parties'.[59]

It is first worth noting that what constitutes a nuclear weapon 'test' within the context of the *CTBT* is relatively clear and uncontroversial. Although undefined by the *CTBT* or *PTBT*, the word 'test' essentially refers to '[a] procedure intended to establish the quality, performance, or reliability of something, especially before it is taken into widespread use'.[60] The ordinary meaning of this term in the present context of the *CTBT* is therefore appropriate to apply, as the objective of a nuclear weapon test is to ascertain that the device being tested works as intended. This does not pose any particular challenge.

What poses greater difficulty here is the notion of 'nuclear weapon test *explosion*' and 'any *other nuclear explosion*'; in other words, precisely what device is being tested. First, the term 'explosion' is defined as '[a] violent shattering or blowing apart of something, as is caused by a bomb'[61] or 'a sudden, violent burst of energy, for example one caused by a bomb'.[62] This would seem to entail a physical event through a release of energy, caused by a device of some kind, which would generally result in some form of material damage. Taking this definition as a starting point also proves practical as it would seem to align with our ordinary understanding of what a 'nuclear weapon test explosion' actually entails: an event where a nuclear bomb is detonated, be that underground, underwater, in outer space or in the atmosphere. Moreover, it is clear that this understanding captures nuclear explosive tests of either a military or 'peaceful' nature, despite efforts by China to carve out a possible exception permitting peaceful tests.[63]

Another view advanced by Stuart Casey-Maslen and Tobias Vestner is that the prohibition under art I(1) of the *CTBT* ultimately reflects the obligation contained in art I(1) of the *PTBT* and, from their perspective, the inclusion of the phrase 'nuclear weapon test explosion' demonstrates that the 'ban is limited to a functioning nuclear explosive device' that results in a nuclear chain reaction and subsequent explosion.[64] Indeed, the general objective of any weapons test is to check the 'quality, performance, or reliability'[65] of the finalised weapon, as opposed to testing specific components or aspects that form part of the completed weapon itself, which often occurs separately.[66] Consequently, it seems clear that only the testing of a completed nuclear device that results in an explosive event

---

59 *Reports of the International Law Commission on the Second Part of Its Seventeenth Session 3–28 January 1966 and on Its Eighteenth Session 4 May – 19 July 1966*, UN GAOR, 21st sess, Supp No 9, UN Doc A/6309/Rev.1 (1966) 51 (emphasis added).

60 *Lexico* (online at 24 September 2020) 'test' (n[1], def 1).

61 *Lexico* (online at 24 September 2020) 'explosion' (def 1).

62 *Collins Dictionary* (online at 24 September 2020) 'explosion' (def 1).

63 Huw Llewellyn, 'The Comprehensive Nuclear Test Ban Treaty' (1997) 10(2) *Leiden Journal of International Law* 269, 271–2.

64 Stuart Casey-Maslen and Tobias Vestner, *A Guide to International Disarmament Law* (Routledge, 2019) 92 [5.8].

65 *Lexico* (online at 24 September 2020) 'test' (n[1], def 1).

66 A useful example in this regard would be the separate testing of intercontinental ballistic missiles and other delivery systems capable of deploying the designed nuclear warhead.

(regardless of yield size) is prohibited by art I(1) of the *CTBT*,[67] whereas any 'non-explosive' tests and experiments, including subcritical and computer simulated tests, would remain permitted by the *CTBT*.

This interpretation of art I(1) is further justified when considering both the context and the object and purpose of the *CTBT*.[68] Preambles often reflect a treaty's object and purpose and form part of a treaty's context pursuant to art 31(2) of the *VCLT*.[69] The *CTBT* preamble notes how the

> cessation of all nuclear weapon test explosions and all other nuclear explosions, by constraining the development and qualitative improvement of nuclear weapons and ending the development of advanced new types of nuclear weapons, *constitutes an effective measure of nuclear disarmament and non-proliferation in all its aspects* …[70]

This largely reflects the divergent views of the NNWS and NWS over the primary object and purpose underlying the *CTBT*: that prohibiting nuclear weapon test explosions constitutes an effective measure towards nuclear disarmament for the former and a tool in preventing further proliferation for the latter.[71]

Prohibiting *only* nuclear explosive tests under art I(1) of the *CTBT* can certainly contribute towards both these goals. With regard to non-proliferation, although it has been suggested that a potential proliferator with sufficient knowledge and access to nuclear materials could develop a first generation nuclear weapon with reasonable confidence and without requiring the need to explosively test the constructed device,[72] it remains the case that the full testing of a nuclear weapon or explosive device would be necessary in order to ensure full confidence in the capacity of the constructed device.[73] In other words, for any state that decides to construct a new nuclear device, subcritical and computer simulated tests alone would likely prove insufficient to ensure complete confidence in the developed device.

How this interpretation of art I(1) of the *CTBT* impacts the objective of achieving nuclear disarmament is perhaps more debatable. Masahiko Asada, writing in 2002, has noted that both Russia and the US have taken advantage of this testing 'loophole' in order to conduct 'safety and reliability' checks of their

---

67 See Jonathan Medalia, *Nuclear Weapons: Comprehensive Test Ban Treaty* (Issue Brief No IB92099, Congressional Research Service, United States Congress, 21 June 2006) 7 <https://fas.org/sgp/crs/nuke/IB92099.pdf>, archived at <https://perma.cc/WF8D-XENZ>.

68 Though object and purpose are identified separately, it is generally considered that both should be considered from a unitary perspective, as both terms are synonymous with the notion of 'goal': David S Jonas and Thomas N Saunders, 'The Object and Purpose of a Treaty: Three Interpretive Methods' (2010) 43(3) *Vanderbilt Journal of Transnational Law* 565, 578.

69 *VCLT* (n 56) art 31(2).

70 *CTBT*, UN Doc A/50/1027 (n 1) Preamble para 5 (emphasis added).

71 Guido den Dekker, 'Forbearance is No Acquittance: The Legal Status of the Comprehensive Nuclear Test Ban Treaty' (2000) 13(3) *Leiden Journal of International Law* 669, 673 ('Forbearance is no Acquittance'). See also Asada (n 18) 87; Jonas, 'The Comprehensive Nuclear Test Ban Treaty' (n 19) 1035–8. Both authors highlight this underlying dual object and purpose.

72 This was mentioned in relation to non-state actor nuclear proliferation by John M Shalikashvili: General John M Shalikashvili, 'Report on the Findings and Recommendations concerning the Comprehensive Nuclear Test Ban Treaty' (2001) 31(1) *Arms Control Today* 18, 27.

73 Gregory van der Vink et al, 'False Accusations, Undetected Tests and Implications for the CTB Treaty' (1998) 28(4) *Arms Control Today* 7, 8.

respective stockpiles.[74] The US, for instance, recently carried out the 'EDIZA' subcritical test in February 2019.[75] In addition, a recent study carried out by the China Academy of Engineering Physics has claimed that China has conducted approximately 200 computer simulated blasts between September 2014 and December 2017,[76] while the DPRK also admitted to carrying out subcritical experiments in 2018 before the destruction of the Punggye-ri Nuclear Test Site in May 2018.[77] However, even if the NWPS are conducting non-explosive tests for 'safety and reliability' purposes as so claimed, an obvious by-product of these experiments is that the lifespan of existing nuclear weapon stockpiles can be extended, thereby preventing the *CTBT* from realising one of its primary objectives, 'which was to halt vertical proliferation and put the nuclear-armed states on the road to nuclear disarmament'.[78] At the same time, considering that the subsequent practice of states can provide interpretative guidance as reaffirmed by art 31(3)(b) of the *VCLT*,[79] arguably the acceptance (or, at the very least, the lack of protest from the broader international community) of these non-explosive testing activities further suggests that they remain permitted under the art I(1) prohibition in the *CTBT*.

Yet, on the other hand, the *CTBT* prohibition on nuclear weapon explosive tests does still impose significant limitations on the vertical proliferation of nuclear weapons among the NWPS. Most significantly, prohibiting the NWPS from conducting full-scale nuclear weapon tests prevents the testing state from ensuring that a modernised or 'newly developed weapon in fact detonates as designed'.[80] Non-explosive activities can only provide confidence in weapon performance to a certain degree and certainly cannot replace the information gathered from actual explosive tests. Furthermore, the entry into force of the *CTBT* is regularly cited as an essential 'effective measure' to be achieved pursuant to art VI of the *NPT* and the objective of nuclear disarmament,[81] as the *CTBT* prohibition on all states conducting nuclear explosive tests can help establish a more conducive environment for nuclear disarmament. Consequently, to suggest that the 'loophole' created by the *CTBT* negates the Treaty's practical benefits altogether is certainly naive, although closing such a gap would undoubtedly bring further benefits and potential for nuclear disarmament success.

---

74 Asada (n 18) 87–8.

75 Andrew Kishner, 'Subcritical Nuclear Experiment EDIZA Conducted Last Wednesday', *'ASCENT': Andrew's SubCritical Experiment NoTifications* (Email Campaign, 21 February 2019) <https://us16.campaign-archive.com/?u=f2d7dd0154e1f5816d903f66a&id=9ec1ece28c>, archived at <https://perma.cc/3SLV-Y467>.

76 'China is Speeding Up Its Development of New Nuclear Armaments: Report', *Sputnik* (online, 29 May 2018) <https://sputniknews.com/asia/201805291064919519-china-nuclear-developments/>, archived at <https://perma.cc/9MEY-WSAA>, cited in Stuart Casey-Maslen, *The Treaty on the Prohibition of Nuclear Weapons: A Commentary* (Oxford University Press, 2019) 15.

77 Kim Tong-Hyung, 'Trump Welcomes N Korea Plan to Blow Up Nuke-Site Tunnels', *Associated Press* (online, 13 May 2018) <https://apnews.com/4ccd19689a034e6c85ca741565dad49f>, archived at <https://perma.cc/3Q5P-WNN9>.

78 Johnson, *Unfinished Business* (n 21) 180.

79 *VCLT* (n 56) art 31(3)(b).

80 Asada (n 18) 88.

81 Jenifer Mackby, 'Nonproliferation Verification and the Nuclear Test Ban Treaty' (2011) 34(4) *Fordham International Law Journal* 697, 704.

Finally, art 32 of the *VCLT* holds that the *travaux préparatoires* of a treaty can be used to confirm the meaning of a treaty's terms or to determine the meaning of a provision should its ordinary interpretation remain ambiguous or lead to a manifestly absurd result.[82] However, the International Court of Justice ('ICJ') in the *Territorial Dispute* case has reiterated that this should not displace the fact that the '[i]nterpretation must be based above all upon the text of the treaty'.[83] In relation to the present discussion, Asada has noted that Indonesia introduced an early proposal suggesting that the *CTBT* should be extended to prohibit subcritical experiments, though this was later withdrawn 'in the spirit of compromise and for the sake of consensus'.[84] India similarly supported the inclusion of computer simulated testing, arguing that the Treaty should prevent the NWS from developing 'new advanced types of nuclear-weapons', though again this proposed restriction was deemed unacceptable to the other NWPS.[85]

In light of the above, it comes as no surprise that some commentators have questioned whether the prohibitions under art I(1) of the *CTBT* are fully 'comprehensive'. Permitting subcritical and computer simulated testing allows the NWPS to take legally permitted steps through established 'loopholes' to prolong the existing lifespan of, and even qualitatively improve, existing nuclear weapon stockpiles, thus undermining the extent to which the *CTBT* can contribute to the objective of nuclear disarmament.[86] Consequently, the need to establish testing prohibitions that incorporate both subcritical and computer simulated activities constitutes an essential step towards the long-term objective of nuclear disarmament.

B *Verification and Monitoring under the CTBT*

Perhaps one of the most successful and impressive features of the *CTBT* is the verification and monitoring framework that it establishes. Although this is not the place to explore this aspect of the *CTBT* in detail, a brief overview of the proposed verification mechanisms and process clearly demonstrates the importance of this component of the *CTBT* framework,[87] especially when considering this article's later discussion of how the *TPNW* may impact the operation of the *CTBT*.

Article II of the *CTBT* establishes the Comprehensive Nuclear-Test-Ban Treaty Organization ('CTBTO'), an independent international organisation designed to oversee the implementation of the Treaty. Alongside this organisational body, the *CTBT* establishes a varied range of verification processes and mechanisms under

---

82 *VCLT* (n 56) art 32.

83 *Territorial Dispute (Libya v Chad) (Judgment)* [1994] ICJ Rep 6, 22 [41] ('*Libya v Chad*').

84 Asada (n 18) 87, quoting *Letter Dated 22 July 1997 from the Permanent Representative of Indonesia Addressed to the President of the Conference on Disarmament Transmitting a Press Release Issued by the Government of Indonesia on 18 July 1997 concerning the Subcritical Nuclear Weapon Experiment Conducted by the US Government on 2 July 1997*, UN Doc CD/1469 (24 July 1997) 2.

85 Llewellyn (n 63) 271.

86 See, eg, den Dekker, 'Forbearance is No Acquittance' (n 71) 673; Goldblat (n 19) 59. However, it has been argued that extensive 'explosive' tests would be required to ensure confidence in new weapons to perform as designed: see van der Vink et al (n 73) 8; Asada (n 18) 88.

87 For an extended analysis of verification under the *CTBT*, see Johnson, *Unfinished Business* (n 21) 145–73; Asada (n 18) 89–92; Jonas, 'The Comprehensive Nuclear Test Ban Treaty' (n 19) 1017–18.

art IV and its associated protocols and annexes, often carried out with the involvement of the CTBTO. Arguably, the most important aspect of this framework is the International Monitoring System ('IMS'), comprising 337 data collection and laboratory facilities globally[88] that are capable of conducting seismological, hydro-acoustic and radionuclide detection to monitor nuclear explosive testing activities.[89] The IMS is complemented by a system of onsite inspections, operational upon the *CTBT*'s entry into force, which allows any state party to request an inspection to determine whether another state party has conducted a nuclear test explosion contrary to its obligations under art I(1).[90] Finally, an elaborate series of consultation, clarification and confidence-building measures is also established.[91] Given this extensive detail, it is not surprising that the *CTBT* verification framework is often regarded as perhaps its most outstanding feature.[92]

Moreover, despite the fact that the *CTBT* is not yet in force,[93] the CTBTO is operating on a provisional basis following the adoption of the *Text on the Establishment of a Preparatory Commission for the Comprehensive Nuclear Test-Ban Treaty Organization*.[94] The CTBTO Preparatory Commission ('CTBTO PrepCom') has functioned as a temporary surrogate body, tasked with establishing and implementing the verification regime under art IV prior to the *CTBT*'s entry into force.[95] As such, a substantial portion of the *CTBT*'s verification system is already operational and has provided information relating to the recent DPRK nuclear tests, including data on the location, depth and magnitude of these tests.[96] However, the highly significant onsite inspection arm will only come into effect, and therefore be able to be invoked by other parties, upon the entry into force of the *CTBT* as a whole. As such, although the CTBTO PrepCom has proved a genuine success in the interim, the full potential of the *CTBT* verification framework is yet to be realised.

---

88 'Overview of the Verification Regime', *Comprehensive Nuclear-Test-Ban Treaty Organization* (Web Page) <https://www.ctbto.org/verification-regime/background/overview-of-the-verification-regime/>, archived at <https://perma.cc/6778-MJWM>. For a map, see 'International Monitoring System', *Comprehensive Nuclear-Test-Ban Treaty Organization* (Web Page) <https://www.ctbto.org/map/#mode=ims>, archived at <https://perma.cc/EN9U-RMDC>.

89 *CTBT*, UN Doc A/50/1027 (n 1) art IV(16).

90 Ibid arts IV(34)–(35).

91 Ibid arts IV(29)–(33), (68).

92 Venturini (n 17) 146.

93 See below Part III(C).

94 *Resolution Establishing the Preparatory Commission for the Comprehensive Nuclear Test-Ban Treaty Organization*, Doc No CTBT/MSS/RES/1 (27 November 1996) annex ('*Text on the Establishment of a Preparatory Commission for the Comprehensive Nuclear Test-Ban Treaty Organisation*') 2.

95 Venturini (n 17) 153–4.

96 'CTBTO Executive Secretary Lassina Zerbo on the Unusual Seismic Event Detected in the Democratic People's Republic of Korea' (Press Release, CTBTO Preparatory Commission, 3 September 2017) <https://www.ctbto.org/press-centre/press-releases/2017/ctbto-executive-secretary-lassina-zerbo-on-the-unusual-seismic-event-detected-in-the-democratic-peoples-republic-of-korea/>, archived at <https://perma.cc/B9Z8-MKGU>.

C *Entry-into-Force Obstacles*

In addition to the 'loopholes' established under art I(1), the *CTBT* is further undermined by its unique entry-into-force requirements. Under art XIV(1), the *CTBT* will enter into force 180 days after the 44 states listed under annex 2,[97] which the International Atomic Energy Agency listed in 1996 as having either nuclear power and/or research reactors,[98] have ratified the Treaty.[99] The supposed rationale here, as noted by the United Kingdom, China and Russia, was based on an intention to not accept 'restrictions on their nuclear programmes unless all "threshold" or aspirant nuclear-weapon programmes were likewise curbed',[100] thereby imposing an equal constraint on all nuclear-capable states.[101] In theory, this justification makes pragmatic sense, as it is unlikely that a NWPS will unilaterally restrict its testing activities unless all other NWPS are equally restrained. This reciprocity largely explains the success of recent moratoria on nuclear weapon testing that have been complied with by the majority of NWPS over the past 20 years.[102]

Despite the rationale behind this requirement, art XIV(1) of the *CTBT* has ultimately become a 'veto' power for the annex 2 states that has prevented the *CTBT*'s entry into force,[103] largely due to individualistic, security-driven considerations in maintaining a modernised nuclear deterrent. India, for example, has consistently and vehemently opposed the *CTBT* generally, particularly raising objection to art XIV(1) and the discriminatory nature of the Treaty itself, as it maintains the dichotomy of nuclear 'haves' and 'have nots' and it fails to emphasise the importance of achieving progress towards nuclear disarmament.[104] Other 'hold out' states have similarly offered little indication of their intention to

---

97 *CTBT*, UN Doc A/50/1027 (n 1) art XIV(1). These 44 states are Algeria, Argentina, Australia, Austria, Bangladesh, Belgium, Brazil, Bulgaria, Canada, Chile, China, Colombia, the DPRK, the Democratic Republic of the Congo, Egypt, Finland, France, Germany, Hungary, India, Indonesia, Iran, Israel, Italy, Japan, Mexico, the Netherlands, Norway, Pakistan, Peru, Poland, South Korea, Romania, Russia, Slovakia, South Africa, Spain, Sweden, Switzerland, Turkey, Ukraine, UK, US and Vietnam: at annex 2.

98 International Atomic Energy Agency, *Nuclear Power Reactors in the World* (Reference Data Series No 2, April 1996) 10–11 (Table 1).

99 Currently, China, the DPRK, Egypt, India, Iran, Israel, Pakistan and the US are yet to ratify the *CTBT* out of the 44 annex 2 states, a position unchanged since 2012 when Indonesia deposited their instrument of ratification: 'Status of Signature and Ratification', *CTBTO Preparatory Commission* (Web Page) <https://www.ctbto.org/the-treaty/status-of-signature-and-ratification/>, archived at <https://perma.cc/C45K-E28U>.

100 Rebecca Johnson, 'Is It Time to Consider Provisional Application of the CTBT?' [2006] (2) *Disarmament Forum* 29, 30.

101 Jozef Goldblat similarly notes how a simple numerical threshold would have left the testing option unconstrained for some states: Goldblat (n 19) 62.

102 In fact, the DPRK is the only state to have conducted nuclear weapons explosive tests in the 21st century: see 'The Nuclear Testing Tally', *Arms Control Association* (Fact Sheet, July 2020).

103 Venturini (n 17) 147.

104 See above n 46; Conference on Disarmament, *Final Record of the Seven Hundred and Forty-Fourth Plenary Meeting*, Doc No CD/PV.744 (8 August 1996) 10; Conference on Disarmament, *Final Record of the Seven Hundred and Fortieth Plenary Meeting*, Doc No CD/PV.740 (20 June 1996) 14–16. For a summary of India's current position in relation to the *CTBT*, see Mary Beth D Nikitin, 'Comprehensive Nuclear Test-Ban Treaty: Background and Current Developments' (CRS Report No RL33548, Congressional Research Service, United States Congress, September 2016) 10–12 <https://fas.org/sgp/crs/nuke/RL33548.pdf>, archived at <https://perma.cc/K68Q-AQ2D>.

ratify the Treaty in the near future. Despite becoming the first signatory under the Clinton administration, there has been either an inability or explicit unwillingness of the US to ratify the *CTBT* through the Senate.[105] Indeed, the 2018 US *Nuclear Posture Review* explicitly states that the Trump administration will not seek Senate ratification of the *CTBT* at this time, but notes that it 'will continue to support the Comprehensive Nuclear Test Ban Treaty Organization Preparatory Committee'.[106] Although China's current position on ratification is unclear, it has continued to cooperate in implementing the IMS verification mechanisms.[107] Overall, it is highly unlikely that the *CTBT* will enter into force in either the short- or medium-term given the fierce opposition to the Treaty among some of the 'hold out' states, which seems unlikely to change in the near future.

Although the *CTBT*'s obligations are not directly binding pending the Treaty's entry into force, both current signatories and ratified states remain under an 'interim obligation'[108] to 'refrain from acts which would *defeat the object and purpose* of' the *CTBT*, pursuant to art 18 of the *VCLT*.[109] The only exceptions are if signatories 'have made [their] intention clear not to become a party' to the *CTBT*[110] or, for ratifying states, if the entry into force has been 'unduly delayed'.[111] It has been convincingly argued, and claimed even by the NWS,[112] that any nuclear explosive tests carried out prior to the entry into force of the *CTBT* would violate its object and purpose in contributing towards both nuclear non-proliferation and disarmament by unbalancing the 'status quo' that existed at the time of signature.[113] Moreover, it is certainly foreseeable that a single nuclear

---

105 The *CTBT* was voted upon by the Senate in October 1999 but was defeated by a 51–48 vote: see Craig Cerniello, 'Senate Rejects Comprehensive Test Ban Treaty; Clinton Vows to Continue Moratorium' (1999) 29(6) *Arms Control Today* 26, 26.

106 Office of the Secretary of Defense (US), *Nuclear Posture Review* (Report, February 2018) 72.

107 'Remarkable Progress: China and the CTBT', *Comprehensive Nuclear-Test-Ban Treaty Organization* (Web Page, 31 January 2018) <https://www.ctbto.org/press-centre/highlights/2018/remarkable-progress-china-and-the-ctbt/>, archived at <https://perma.cc/P2JK-9VQ8>.

108 Jan Klabbers, 'How to Defeat a Treaty's Object and Purpose Pending Entry into Force: Toward Manifest Intent' (2001) 34(2) *Vanderbilt Journal of Transnational Law* 283, 286.

109 *VCLT* (n 56) art 18 (emphasis added); Asada (n 18) 94. See also Jonas, 'The Comprehensive Nuclear Test Ban Treaty' (n 19) 1029–40; Tabassi (n 18) 313–21; Venturini (n 17) 148; MacKay (n 17) 302–5.

110 *VCLT* (n 56) art 18(a).

111 Ibid art 18(b). Importantly, given the fact that the US is not a party to the *VCLT*, it has been argued that art 18 of the *VCLT* is reflected under customary international law, thereby binding non-parties: see Paul V McDade, 'The Interim Obligation between Signature and Ratification of a Treaty' (1985) 32(1) *Netherlands International Law Review* 5, 25; Joni S Charme, 'The Interim Obligation of Article 18 of the Vienna Convention on the Law of Treaties: Making Sense of an Enigma' (1991) 25(1) *George Washington Journal of International Law and Economics* 71, 75–8. For a contrary view, see Peter Malanczuk, *Akehurst's Modern Introduction to International Law* (Routledge, 7th rev ed, 1997) 135.

112 SC Res 2310, UN SCOR, 7776th mtg, UN Doc S/RES/2310 (23 September 2016) para 4.

113 Tabassi (n 18) 317–20; den Dekker, 'Forbearance is No Acquittance' (n 71) 677–8; Asada (n 18) 95–7; Jonas, 'The Comprehensive Nuclear Test Ban Treaty' (n 19) 1035–40; MacKay (n 17) 302–3; Hewitson (n 51) 464. Although, an argument by Anthony Aust that a state must not do anything that 'would affect its ability fully to comply with the treaty once it has entered into force' would suggest that prior testing before entry into force would not impede the ability of states to fulfil obligations after entry into force, and thus would not defeat the object and purpose of the *CTBT*: Tabassi (n 18) 317, quoting Anthony Aust, *Modern Treaty Law and Practice* (Cambridge University Press, 2000) 94–5.

weapon test by one NWPS could even trigger testing by other NWPS in response.[114]

Given the growing number of *CTBT* signatories and ratifications[115] and annual General Assembly resolutions calling for the Treaty's entry into force,[116] and with near universal state practice in conformity with the testing prohibition in art I(1) of the *CTBT*, it would seem fair to suggest that entry into force is not *currently* unduly delayed,[117] particularly when one considers the element of foreseeability of this delay based on the unprecedented and onerous entry-into-force requirements contained within art XIV(1). However, there remains a weakness in relying upon art 18 of the *VCLT*, as a signatory state can simply withdraw its consent to be bound and thereby make clear its intention not to become a party to the *CTBT*. Such withdrawal of signature by a NWPS 'would be potentially fatal to the Treaty', leading to a reciprocal resumption of testing by other nuclear weapon states.[118] Article 18 therefore offers only limited respite in this respect.

Given this state of limbo, various recommendations have been raised to address the non-entry into force of the *CTBT*.[119] Although art XIV(2) of the *CTBT* provides for conferences aimed at accelerating the ratification process, little progress has been made in bringing the remaining annex 2 states closer to ratification.[120] Other suggestions to resolve the *CTBT*'s non-entry into force include the provisional application of the entire *CTBT* pursuant to art 25 of the *VCLT*,[121] potential amendment of the *CTBT* text[122] and the possible adoption of a Chapter VII UN Security Council resolution that would '"determine" that any further nuclear weapon testing by any country would constitute a "threat to the peace" and "decide" that no such testing shall be done'.[123] Each of these proposals

---

114 Tabassi (n 18) 318; MacKay (n 17) 303, quoting United Nations Secretary-General Kofi Annan, 'Secretary-General Welcomes Launch of Ministerial Statement Supporting Nuclear-Test-Ban Treaty; Urges Ratification by Key States' (Press Release SG/SM/10648-DC/3044-L/T/4398, United Nations, 20 September 2006).

115 Tuvalu signed the *CTBT* on 25 September 2018, Thailand deposited their instrument of ratification on 25 September 2018 and Zimbabwe deposited their instrument of ratification on 13 February 2019: see 'Status of Signature and Ratification', *CTBTO Preparatory Commission* (Web Page) <https://www.ctbto.org/the-treaty/status-of-signature-and-ratification/>, archived at <https://perma.cc/PB8J-YGAB>.

116 For recent examples, see *Resolution 73/86*, UN Doc A/RES/73/86 (n 3); *Resolution 72/70*, UN Doc A/RES/72/70 (n 3).

117 For a progressive confirmation of this, see den Dekker, 'Forbearance is no Acquittance' (n 71) 676; Tabassi (n 18) 315–7; Michie (n 17) 79; Venturini (n 17) 148; MacKay (n 17) 303–4. But see Rietiker, 'The (Il?)legality of Nuclear Weapons Tests' (n 18), who suggests that the extended passage of time of 24 years is more likely to be considered as unduly delayed in the present day.

118 MacKay (n 17) 305.

119 For a useful discussion of many of these possible approaches, see David A Koplow, 'Nuclear Arms Control by a Pen and a Phone: Effectuating the Comprehensive Test Ban Treaty without Ratification' (2015) 46(2) *Georgetown Journal of International Law* 475 ('Nuclear Arms Control by a Pen and a Phone').

120 Koplow, 'Sherlock Holmes Meets Rube Goldberg' (n 44) 23.

121 See generally Johnson, 'Is It Time to Consider Provisional Application of the CTBT?' (n 100); Anguel Anastassov, 'Can the Comprehensive Nuclear-Test-Ban Treaty Be Implemented before Entry into Force?' (2008) 55(1) *Netherlands International Law Review* 73.

122 Venturini (n 17) 151.

123 Koplow, 'Nuclear Arms Control by a Pen and a Phone' (n 119) 501.

has either failed to gain sufficient state support or contains various other defects, which limit its potential utility for present purposes.

As such, although the entry into force or alternative implementation of the *CTBT* would certainly be a welcome addition to the nuclear non-proliferation and disarmament legal framework by providing a global, legally binding prohibition on nuclear weapon test explosions and effectuating its verification framework, at present, the Treaty remains stagnant with limited prospects of change in the foreseeable future. When this is coupled with the fact that non-explosive testing remains permitted by art I(1) of the *CTBT*, the Treaty ultimately fails to offer a truly comprehensive — or realistically achievable — framework prohibiting all nuclear testing activities under international law at this time. In light of this rather bleak conclusion, the importance of assessing the scope and potential impact of the prohibitions under the *TPNW* becomes apparent.

IV BACKGROUND OF THE *TREATY ON THE PROHIBITION OF NUCLEAR WEAPONS*

The *TPNW* emerged as a result of the civil society-led humanitarian initiative, consolidating a new trend towards 'humanitarian disarmament'[124] that sought to raise awareness of, and ultimately address, 'the *catastrophic humanitarian consequences* of any use of nuclear weapons'.[125] At the same time, there was an underlying sense of frustration among the non-aligned NNWS over the slow pace of disarmament efforts by the NWS pursuant to art VI of the *NPT*.[126] Despite identifying effective measures towards nuclear disarmament at both the 2000 and 2010 *NPT* review conferences, including, amongst other steps, ratification of the *CTBT*,[127] progress towards the implementation of these identified steps has been very limited.[128] Moreover, all of the NWPS continue to rely upon nuclear

---

124 For a range of more comprehensive accounts of the *TPNW* negotiation and history, see Gibbons (n 14); Alexander Kmentt, 'The Development of the International Initiative on the Humanitarian Impact of Nuclear Weapons and Its Effect on the Nuclear Weapons Debate' (2015) 97(899) *International Review of the Red Cross* 681; John Borrie, Michael Spies and Wilfred Wan, 'Obstacles to Understanding the Emergence and Significance of the Treaty on the Prohibition of Nuclear Weapons' (2018) 30(2) *Global Change, Peace and Security* 95.

125 2010 Review Conference of the Parties to the Treaty on the Non-Proliferation of Nuclear Weapons, *Final Document: Volume I*, UN Doc NPT/CONF.2010/50 (Vol. I) (2010) 19 (emphasis added) ('*2010 Review Conference Final Document: Volume I*').

126 Dan Joyner, 'The Treaty on the Prohibition of Nuclear Weapons', *EJIL: Talk!* (Blog Post, 26 July 2017) <https://www.ejiltalk.org/the-treaty-on-the-prohibition-of-nuclear-weapons/>, archived at <https://perma.cc/J52K-8BKR>.

127 2000 Review Conference of the Parties to the Treaty on the Non-Proliferation of Nuclear Weapons, *Final Document: Volume I*, UN Doc NPT/CONF.2000/28 (Parts I and II) 14–15; *2010 Review Conference Final Document: Volume I*, UN Doc NPT.CONF/2010.50 (Vol. I) (n 125) 19–24.

128 It has been widely suggested that the NWS have not done enough to fulfil their obligations under art VI of the *NPT*: see Daniel Rietiker, 'The Meaning of Article VI of the Treaty on the Non-Proliferation of Nuclear Weapons: Analysis under the Rules of Treaty Interpretation' in Jonathan L Black-Branch and Dieter Fleck (eds), *Nuclear Non-Proliferation in International Law* (Asser Press, 2014) vol 1, 47, 64–5; Daniel H Joyner, *International Law and the Proliferation of Weapons of Mass Destruction* (Oxford University Press, 2009) 65–7; Gro Nystuen and Torbjørn Graff Hugo, 'The Nuclear Non-Proliferation Treaty' in Gro Nystuen, Stuart Casey-Maslen and Annie Golden Bersagel (eds), *Nuclear Weapons under International Law* (Cambridge University Press, 2014) 374, 392, 396; Marco Roscini, 'On Certain Legal Issues Arising from Article VI of the Treaty on the Non-Proliferation of Nuclear Weapons' in Ida Caracciolo, Marco Pedrazzi and Talitha Vassalli di Dachenhausen (eds), *Nuclear Weapons: Strengthening the International Legal Regime* (Eleven International Publishing, 2016) 15, 17.

deterrence and are implementing extensive modernisation programmes for their existing nuclear stockpiles.[129]

Two paths emerged to pursue this humanitarian-based agenda. The first was a series of 'humanitarian conferences' held between March 2013 and December 2014, providing space for academic experts, civil society groups including both the International Committee of the Red Cross ('ICRC') and ICAN, and non-aligned NNWS to raise public awareness of the immediate and long-term humanitarian consequences of nuclear weapon use.[130] The final Vienna Conference on the Humanitarian Impact of Nuclear Weapons saw the endorsement of the Humanitarian Pledge, which recognised the need to '*identify and pursue* effective measures to *fill the legal gap* for the *prohibition and elimination* of nuclear weapons … in light of their *unacceptable humanitarian consequences* and associated risks'.[131]

The non-aligned NNWS were concurrently taking steps within both the *NPT* review process and the UN General Assembly through a series of joint 'humanitarian' statements, the first of which was issued by Switzerland at the 2012 Preparatory Committee for the 2015 Nuclear Non-Proliferation Treaty Review Conference. This statement welcomed the conclusions of the 2010 Review Conference for the Treaty on the Non-Proliferation of Nuclear Weapons, reiterated the '*utmost importance* that these [nuclear] *weapons never be used again*' and argued that '[t]he only way to guarantee this is the total, irreversible and verifiable elimination of nuclear weapons'.[132] The content of the subsequent statements did not change substantively.[133] However, the number of co-sponsors increased at an impressive rate, with the final statement in the *NPT* review process being supported by 159 states at the 2015 Review Conference for the Treaty on the Non-Proliferation of Nuclear Weapons ('2015 NPT Review Conference')[134] and support in the General Assembly First Committee for a near identical statement

---

129 Hans M Kristensen, 'Nuclear Weapons Modernization: A Threat to the NPT?' (2014) 44(4) *Arms Control Today* 8.

130 Daniel Rietiker, 'The Treaty on the Prohibition of Nuclear Weapons: A Further Confirmation of the Human- and Victim-Centred Trend in Arms Control Law' in Jonathan L Black-Branch and Dieter Fleck (eds), *Nuclear Non-Proliferation in International Law* (Asser Press, 2014–) vol 4, 325, 329 ('The Treaty on the Prohibition of Nuclear Weapons').

131 Michael Linhart, Austrian Deputy Foreign Minister, 'Pledge' (Speech, Vienna Conference on the Humanitarian Impact of Nuclear Weapons, 9 December 2014) (emphasis added) <http://cms.bmeia.gv.at/fileadmin/user_upload/Zentrale/Aussenpolitik/Abruestung/HINW14/HINW14_Austrian_Pledge.pdf>, archived at <https://perma.cc/8M6Y-MDGY>.

132 Ambassador Benno Laggner, 'Joint Statement on the Humanitarian Dimension of Nuclear Disarmament' (Speech, First Session of the Preparatory Committee for the 2015 Review Conference of the Parties to the Treaty on the Non-Proliferation of Nuclear Weapons, 2 May 2012) (emphasis added) <http://www.reachingcriticalwill.org/images/documents/Disarmament-fora/npt/prepcom12/statements/2May_IHL.pdf>, archived at <https://perma.cc/EAD7-7XCE>.

133 Kmentt (n 124) 687.

134 Sebastian Kurz, 'Joint Statement on the Humanitarian Consequences of Nuclear Weapons' (Speech, 2015 Review Conference of the Parties to the Treaty on the Non-Proliferation of Nuclear Weapons, 28 April 2015) <http://www.reachingcriticalwill.org/images/documents/Disarmament-fora/npt/revcon2015/statements/28April_AustriaHumanitarian.pdf>, archived at <https://perma.cc/E98U-N662>.

growing from 34 co-sponsors in 2012[135] to 155 states just two years later.[136] In addition, the General Assembly adopted *Resolution 67/56*, establishing an open-ended working group ('OEWG') in 2013 to 'develop proposals to take forward multilateral nuclear disarmament negotiations'.[137]

Despite this growing support for the humanitarian initiative and the desire to begin negotiations towards new effective measures towards disarmament, the 2015 NPT Review Conference failed to reach consensus on a final document. Consequently, the non-aligned NNWS turned back to the UN and adopted General Assembly *Resolution 70/33*, which called for the convening of a second OEWG in order 'to *substantively address concrete effective legal measures, legal provisions and norms* that will need to be concluded to attain and maintain a world without nuclear weapons'.[138] The final report of the 2016 OEWG concluded that the 'majority of States'[139] expressed support for

> the convening, by the General Assembly, of a conference in 2017, open to all States, with the participation and contribution of international organizations and civil society, to *negotiate a legally binding instrument to prohibit nuclear weapons*, leading towards their total elimination …[140]

Soon after, the General Assembly adopted *Resolution 71/258* establishing the mandate for the subsequent 2017 negotiations.[141]

The negotiations took place in two sessions in March and June–July 2017,[142] with representatives from 125 states participating alongside many experts from civil society offering further insights.[143] It was soon clear that a prohibition-style

---

135 Ambassador Benno Laggner, 'Joint Statement on the Humanitarian Dimension of Nuclear Disarmament' (Speech, 67th Session of the United Nations General Assembly First Committee, 22 October 2012) <http://www.reachingcriticalwill.org/images/documents/Disarmament-fora/1com/1com12/statements/22Oct_Switzerland.pdf>, archived at <https://perma.cc/K4GQ-3APJ>.

136 Ambassador Dell Higgie, 'Joint Statement on the Humanitarian Consequences of Nuclear Weapons' (Speech, 69th Session of the United Nations General Assembly First Committee, 20 October 2014) <http://reachingcriticalwill.org/images/documents/Disarmament-fora/1com/1com14/statements/20Oct_NewZealand.pdf>, archived at <https://perma.cc/5LEV-J4VZ>.

137 *Taking Forward Multilateral Nuclear Disarmament Negotiations*, GA Res 67/56, UN GAOR, 67th sess, 48th plen mtg, Agenda Item 94, Supp No 49, UN Doc A/RES/67/56 (4 January 2013) paras 1–2.

138 *Taking Forward Multilateral Nuclear Disarmament Negotiations*, GA Res 70/33, UN GAOR, 70th sess, 67th plen mtg, Agenda Item 97, Supp No 49, UN Doc A/RES/70/33 (11 December 2015) para 2 (emphasis added).

139 *Report of the Open-Ended Working Group Taking Forward Multilateral Nuclear Disarmament Negotiations*, 71st sess, UN Doc A/71/371 (1 September 2016) 9 [34].

140 Ibid 19 [67] (emphasis added).

141 *Taking Forward Multilateral Nuclear Disarmament Negotiations*, GA Res 71/258, UN GAOR, 71st sess, 68th plen mtg, Agenda Item 98, Supp No 49, UN Doc A/RES/71/258 (11 January 2017) paras 8–11.

142 For a discussion of the negotiations, see Casey-Maslen, *The Treaty on the Prohibition of Nuclear Weapons: A Commentary* (n 76) 47–53.

143 For a list of the participants throughout the negotiations, see *List of Participants*, UN Doc A/CONF.229/2017/INF/4/Rev.1 (25 July 2017). Interestingly, other sources cite as many as 132 participants: see Gibbons (n 14) 27 n 90, citing 'Draft UN Nuclear Weapon Ban Released', *ICAN* (Web Page) <https://www.icanw.org/draft_un_nuclear_weapon_ban_released/>, archived at <https://perma.cc/P88U-ZACX>. Casey-Maslen notes that 129 states were registered participants: ibid 51. These counts likely include the six non-state participants attending the negotiations.

treaty was generally preferred by participants as the most achievable outcome possible, particularly given the lack of participation by any of the NWPS.[144] After revising various draft texts put forward by the Conference President Ambassador Elayne Whyte Gómez of Costa Rica, the final treaty text was put to a vote before the Conference on 7 July 2017, with 122 states voting in favour, one abstaining (Singapore) and one voting against (the Netherlands).[145]

The *TPNW* preamble reiterates the negotiating states' deep concern

> about the catastrophic humanitarian consequences that would result from any use of nuclear weapons, and [their recognition of] the consequent need to completely eliminate such weapons, which remains the only way to guarantee that nuclear weapons are never used again …[146]

Moreover, para 15 of the preamble recognises that 'a legally binding prohibition of nuclear weapons constitutes an important contribution towards the *achievement and maintenance of a world free of nuclear weapons*', an end to which the states party are 'determined to act'.[147] This clearly reaffirms the underlying objective of addressing the humanitarian suffering caused by nuclear weapons through the elimination of nuclear weapons, thereby contributing towards nuclear disarmament and eventually achieving and maintaining a nuclear weapon-free world.[148]

It must be emphasised at this stage that the *TPNW* goes further than prohibiting just the testing of nuclear weapons and other explosive devices. Instead, the Treaty builds upon the existing regional NWFZ and other disarmament treaties, and incorporates perhaps the most detailed and comprehensive range of prohibitions in order to facilitate efforts towards nuclear disarmament.[149] Thus, while this article focuses solely on the breadth of the testing prohibitions, this overarching objective of facilitating the elimination of nuclear weapons must be kept in mind throughout the present discussion.

V SCOPE OF THE TESTING PROHIBITION UNDER ARTICLE 1(1)(A) OF THE *TPNW*

It was apparent throughout the *TPNW* negotiations that some reference to a prohibition on nuclear weapon testing was desired by the majority, though not all, of the participating delegations in order to reinforce the intended comprehensiveness of the prohibitions as a whole.[150] However, it soon became

---

144 Rietiker, 'The Treaty on the Prohibition of Nuclear Weapons' (n 130) 331.

145 'Voting Results on L.3/Rev.1' (Web Document, 7 July 2017) <https://s3.amazonaws.com/unoda-web/wp-content/uploads/2017/07/A.Conf_.229.2017.L.3.Rev_.1.pdf>, archived at <https://perma.cc/Y2SL-7UUU> ('Voting Record').

146 *TPNW*, UN Doc A/CONF.229/2017/8 (n 12) Preamble para 2.

147 Ibid Preamble para 15 (emphasis added).

148 See Marco Pedrazzi, 'The Treaty on the Prohibition of Nuclear Weapons: A Promise, a Threat or a Flop?' (2017) 27 *Italian Yearbook of International Law* 215, 220. See especially ibid Preamble paras 8–10 for specific reference to the need to comply with international humanitarian law.

149 For an excellent overview of the *TPNW* prohibitions and wider provisions, see generally Casey-Maslen, *The Treaty on the Prohibition of Nuclear Weapons: A Commentary* (n 76).

150 Cuba, Jamaica and Venezuela, among others, expressed support for a reference to testing within the *TPNW* prohibitions: Ray Acheson, 'News in Brief' (2017) 1(2) *Nuclear Ban Daily* 3, 4. Meanwhile, Mexico, Nigeria and Sweden in particular opposed its inclusion: Tamara L Patton, 'News in Brief' (2017) 2(4) *Nuclear Ban Daily* 3, 3 ('News in Brief Vol 2(4)').

clear that the exact form and scope of this prohibition would prove to be the subject of much debate during the negotiations.[151] Eventually the final text was reached under art 1(1)(a) of the *TPNW*, which says:

> 1. Each State Party undertakes never under any circumstances to:
>
> (a) Develop, *test*, produce, manufacture, otherwise acquire, possess or stockpile *nuclear weapons or other nuclear explosive devices* …[152]

Although the *TPNW* does not define the term 'test' at any point, based on the assessment of the ordinary meaning of the word 'test' undertaken in relation to the *CTBT*,[153] and given that all the discussed treaties in Parts II and III have a similar subject matter regarding the regulation of nuclear weapon testing activities, one can reasonably assume that the understanding of the term 'test' accepted previously was intended to carry through to the *TPNW*. Indeed, there is no indication to suggest that this would not be the case, nor was there any discussion during the negotiations clarifying precisely what 'test' means in the *TPNW* context. Thus, as with the *CTBT*, the ordinary meaning of the term 'test', that being a 'procedure intended to establish the quality, performance, or reliability of something, especially before it is taken into widespread use',[154] remains suitably applicable in the context of the *TPNW*.

However, upon closer inspection, it is apparent that the *TPNW* prohibition under art 1(1)(a) imposes a slightly different formulation of the testing prohibition in comparison to that of the *CTBT*. Whereas art I(1) of the *CTBT* prohibits each state party from carrying out any 'nuclear weapon test explosions' or 'any other nuclear explosions', art 1(1)(a) of the *TPNW* adopts a subtly different phrasing, stating: 'each State Party undertakes never under any circumstances to … test … nuclear weapons or other nuclear explosive devices'. Consequently, art 1(1)(a) seemingly prohibits (1) the testing of nuclear weapons, *without* imposing a qualification that an 'explosion' is required; and (2) the testing of other nuclear explosive devices, which includes an 'explosion' requirement as with the *CTBT*. In other words, while the concept of 'test' poses few interpretative challenges, the issue here concerns what precisely is being tested in the first place, that is, the subject matter of the test.

Dealing with the second prohibition first, the *Treaty of Rarotonga* defines a nuclear explosive device as 'any nuclear weapon or other explosive device *capable of releasing nuclear energy*, *irrespective of the purpose* for which it could be used'.[155] The term also 'includes such a weapon or device in *unassembled and partly assembled forms*'.[156] This definition, therefore, covers fission and thermonuclear devices that have not been weaponised because, for example, they are too large for existing delivery systems, as well as the use of such devices for

---

151 Casey-Maslen, *The Treaty on the Prohibition of Nuclear Weapons: A Commentary* (n 76) 132–4.

152 *TPNW*, UN Doc A/CONF.229/2017/8 (n 12) art 1(1)(a) (emphasis added).

153 See Part III(A).

154 *Lexico* (online at 24 September 2020) 'test' (n[1], def 1).

155 *Treaty of Rarotonga* (n 38) art 1(c) (emphasis added). See also *Treaty of Pelindaba* (n 38) art 1(c).

156 *Treaty of Rarotonga* (n 38) art 1(c) (emphasis added). See also *Treaty of Pelindaba* (n 38) art 1(c).

any purpose, including peaceful purposes.[157] While this certainly captures both peaceful and military nuclear explosive detonations in a comparable manner to the *CTBT*, it seems unlikely that such a definition would cover non-explosive testing activities due to the retained requirement of an explosive event.

A more challenging question is, what constitutes a nuclear weapon? Unlike the definitions of the prohibited weapons provided by the *Convention on the Prohibition of the Development, Production and Stockpiling of Bacteriological (Biological) and Toxin Weapons and on Their Destruction* ('*BWC*')[158] and the *Convention on the Prohibition of the Development, Production, Stockpiling and Use of Chemical Weapons and on Their Destruction* ('*CWC*'),[159] there is no agreed definition of the term 'nuclear weapon' under the *NPT* and *CTBT*, nor under international law more generally. A useful definition is provided by art 5 of the *Treaty of Tlatelolco*, which defines a nuclear weapon as 'any device which is *capable of releasing nuclear energy in an uncontrolled manner* and which has a group of characteristics that are appropriate for use for *warlike* purposes'.[160] *Lexico* defines 'nuclear weapon' in a more simplistic manner as '[a] bomb or missile that uses *nuclear energy to cause an explosion*'.[161] While calling for the inclusion of a definition of nuclear weapons within the *TPNW*, Sweden submitted a working paper to the 2017 Negotiation Conference[162] defining 'nuclear weapon' as a '[weapon] assembly that is capable of producing an *explosion* and massive damage and destruction by the sudden *release of energy* instantaneously released from *self-sustaining nuclear fission and/or fusion*'.[163] This directly drew upon the *P5 Glossary of Key Nuclear Terms* definition established by the permanent members of the Security Council.[164]

As a result, and similar to the understanding reached in relation to the prohibition of nuclear weapon test explosions under the *CTBT* and the *PTBT*,[165] the term 'nuclear weapon' in the *TPNW* seems to require the detonation of a *completed* nuclear device that is able to release nuclear energy (as ordinarily understood) as an essential aspect of the explosion taking place, be that through a fission- or fusion-based uncontrolled nuclear chain reaction.[166] Consequently,

---

157 See Casey-Maslen, *The Treaty on the Prohibition of Nuclear Weapons: A Commentary* (n 76) 137.

158 *Convention on the Prohibition of the Development, Production and Stockpiling of Bacteriological (Biological) and Toxin Weapons and on Their Destruction*, opened for signature 10 April 1972, 1015 UNTS 163 (entered into force 26 March 1975) art I(1) ('*BWC*').

159 *Convention on the Prohibition of the Development, Production, Stockpiling and Use of Chemical Weapons and on Their Destruction*, opened for signature 13 January 1993, 1974 UNTS 45 (entered into force 29 April 1997) arts II(1)–(3) ('*CWC*').

160 *Treaty of Tlatelolco* (n 38) art 5 (emphasis added). See also *Treaty of Pelindaba* (n 38) art 1(c); *Treaty of Semipalatinsk* (n 38) art 1(b).

161 *Lexico* (online at 19 May 2020) 'nuclear weapon' (emphasis added).

162 See generally *Definition of a Nuclear Weapon in a Treaty Prohibiting Nuclear Weapons*, Agenda Item 8(b), UN Doc A/CONF.229/2017/WP.5 (10 May 2017).

163 *Definition of a Nuclear Weapon in a Treaty Prohibiting Nuclear Weapons*, Agenda Item 8(b), UN Doc A/CONF.229/2017/WP.5 (10 May 2017) para 8 (emphasis added).

164 P5 Working Group on the Glossary of Key Nuclear Terms, *P5 Glossary of Key Nuclear Terms* (China Atomic Energy Press, 2015) 6 <https://2009-2017.state.gov/documents/organization/243293.pdf>, archived at <https://perma.cc/K7FB-H2SC>.

165 See Casey-Maslen and Vestner (n 64) 92.

166 Casey-Maslen, *The Treaty on the Prohibition of Nuclear Weapons: A Commentary* (n 76) 136.

although art 1(1)(a) of the *TPNW* is linguistically distinctive from art I(1) of the *CTBT*, it would initially seem clear that the *TPNW* prohibition, based upon its ordinary meaning alone, would only cover nuclear weapon or explosive devices tests that result in a nuclear explosion event releasing nuclear energy. This again would seem to permit subcritical and computer simulated testing on similar grounds to art I(1) of the *CTBT*.

On the other hand, when one recalls the object and purpose of the *TPNW* in facilitating nuclear disarmament generally, it would seem reasonable to give a greater degree of leniency in support of an expansive interpretation of the general prohibitions included within art 1. Although analysing the object and purpose of a treaty forms a 'secondary or ancillary process in the application of the general rule on interpretation', Ian Sinclair does suggest that the object and purpose can still be used to test, confirm and *modify* the conclusion reached from a textual approach if appropriate.[167] From this perspective, it seems somewhat counterintuitive to permit non-explosive activities that may hinder the realisation of the *TPNW*'s fundamental object and purpose of achieving nuclear disarmament.

At the same time, however, an over-reliance on a teleological approach to interpretation can risk distorting the ordinary meaning of the text, which should always remain the starting point.[168] A similar conclusion was reached during *Case No A28* by the Iran–United States Claims Tribunal, which noted that 'a treaty's object and purpose is to be used only to clarify the text, *not to provide independent sources of meaning* that contradict the clear text'.[169] Consequently, while the *TPNW*'s object and purpose may support the position that a wider prohibition on testing should be adopted, this should not come at the expense of undermining, and ultimately contradicting, the ordinary meaning of art 1(1)(a) reached above.

Another interesting argument is raised by Marco Roscini — though admittedly not in the context of the *TPNW* — when he compares the language incorporated in art 5 of the *Treaty of Semipalatinsk* (which prohibits 'nuclear weapon test explosion[s]' in a similar manner to the *CTBT*)[170] with the obligations adopted in both the *Treaty of Tlatelolco* and the *Treaty of Bangkok* (which prohibit the testing of nuclear weapons without directly referencing the need for a nuclear explosion,[171] consistent with the prohibition under art 1(1)(a) of the *TPNW*). Although Roscini suggests this may simply have been an 'oversight' by the negotiators of these treaties, he argues that the consequence of this linguistical difference is that the *Treaty of Semipalatinsk* imposes a narrower, more specific obligation prohibiting 'nuclear weapon explosions' only, whereas the *Treaty of Tlatelolco* and the *Treaty of Bangkok* impose a more general and therefore wider

---

167 Sinclair (n 58) 130.

168 A point that Sinclair also concedes: ibid 131.

169 *(United States v Iran) (Decision)* (Iran–United States Claims Tribunal, Case No A28, 19 December 2000) [58] (emphasis added) ('*Case No A28*'). See also *Golder v United Kingdom* (1979–80) 1 EHRR 524, 557–76 [23]–[47] (Judge Fitzmaurice). Judge Fitzmaurice discusses the possibility of inventing new obligations that are otherwise absent from the actual text of a treaty when adopting a teleological standard.

170 *Treaty of Semipalatinsk* (n 38) art 5.

171 See *Treaty of Tlatelolco* (n 38) art 1(1)(a); *Treaty of Bangkok* (n 38) art 3(1)(c).

obligation by referring solely to the term 'test' of nuclear weapons, which can encompass both simulated and subcritical tests.[172]

When applied to the present discussion, Roscini's argument would suggest that the *TPNW* establishes a more general, comprehensive undertaking not to test nuclear weapons in a broader sense, in contrast to the specific requirement not to conduct nuclear test explosions under art I(1) of the *CTBT*. This conclusion is similarly shared by Daniel Rietiker and Manfred Mohr, who claim that '[w]hile the [*TPNW*] refers to nuclear "test" very generally', the *CTBT*, in contrast, imposes a more specific requirement that an explosion must have occurred.[173] The authors similarly argue, albeit much more briefly, that this clear difference creates a broader prohibition that extends to subcritical and computer simulated tests, thus adopting a similar line of reasoning to that proposed by Roscini.[174] In other words, this difference of phrasing should be considered a significant and deliberate alteration from that of art I(1) of the *CTBT*, as opposed to an oversight of the negotiating delegations of the *TPNW*.

This presents an intriguing point and is particularly persuasive when one considers the preparatory history of the *TPNW*. As noted, art 32 of the *VCLT* provides for recourse to the *travaux préparatoires* of a treaty to either confirm the meaning of the treaty after applying the general rule of treaty interpretation under art 31 or to aid its interpretation if, following an assessment under art 31, the meaning remains 'ambiguous or obscure' or 'leads to a result which is manifestly absurd or unreasonable'.[175] While Sinclair notes that use of the *travaux préparatoires* is commonly referred to in international disputes related to interpretational matters,[176] the ICJ is generally cautious when resorting to the *travaux préparatoires*, reiterating that '[i]nterpretation must be based above all upon the text of the treaty'.[177] However, in light of the present ambiguity, the *travaux préparatoires* may help shed some light on the current discussion.

In the first draft of the *TPNW* submitted on 22 May 2017, Conference President Whyte Gómez included the following prohibition: 'Each State Party undertakes never under any circumstances to … [c]arry out any nuclear weapon test explosion or any other nuclear explosion'.[178] In effect, the 22 May draft would have contained a precise duplication of the prohibition under art I(1) of the *CTBT* and would have therefore presented little controversy regarding the scope of the obligation established. In explaining the first draft, President Whyte Gómez noted that she drew upon inputs from participating states during the March negotiation

---

172 See Marco Roscini, 'Something Old, Something New: The 2006 Semipalatinsk Treaty on a Nuclear Weapon-Free Zone in Central Asia' (2008) 7(3) *Chinese Journal of International Law* 593, 603.

173 Daniel Rietiker and Manfred Mohr, *Treaty on the Prohibition of Nuclear Weapons: A Short Commentary Article by Article* (Report, April 2018) 42.

174 Ibid.

175 *VCLT* (n 56) art 32.

176 Sinclair (n 58) 142.

177 *Libya v Chad* (n 83) 22 [41].

178 *Draft Convention on the Prohibition of Nuclear Weapons*, UN Doc A/CONF.229/2017/CRP.1 (22 May 2017) art 1(1)(e).

session and synthesised 'common elements' into the draft text,[179] while emphasising that the proposed treaty text 'should … in no way undermine the nuclear non-proliferation regime … but … strengthen and complement it'.[180]

However, as negotiations continued, it was clear that three separate approaches regarding the extent of the testing prohibition to be included were gradually emerging amongst the participating state delegations. First, a number of states, including Brazil, Cuba and Ecuador, called for a broader approach to the concept of testing under art 1 from an early stage.[181] Casey-Maslen notes that Ecuador in particular 'wanted to see subcritical testing explicitly prohibited'.[182] A second group of states sought to pay deference to the continued importance of the *CTBT*, which was incorporated into Preamble para 19 of the *TPNW*. Among these states, Guatemala called for the inclusion of the undertaking never to test nuclear weapons or other nuclear explosive devices,[183] which was eventually adopted. The final group sought to delete any specific obligation relating to nuclear testing. These states included both Sweden and Mexico, who argued that art 1(1)(e) as originally drafted was unnecessary, as the prohibition was already covered by the *CTBT*, and that its inclusion even risked undermining the *CTBT* framework by creating an alternative prohibitory framework.[184]

In essence, the *travaux préparatoires* clearly highlight the lack of consensus among the participating delegations throughout the negotiations as to whether an explicit reference to subcritical and computer simulated testing, and in fact testing in general, should be included within the *TPNW*. As such, the fact that the testing obligation under art 1(1)(a) remains open to some degree of interpretation comes as no surprise. Consequently, Casey-Maslen notes how the final provision incorporated within art 1(1)(a) reflected a 'compromise' for the participating

---

179 'Briefing by the President of the United Nations Conference to Negotiate a Legally Binding Instrument to Prohibit Nuclear Weapons, Leading towards Their Total Elimination' (Speech, United Nations Conference to Negotiate a Legally Binding Instrument to Prohibit Nuclear Weapons, Leading towards Their Total Elimination, 12 June 2017) 2 <https://s3.amazonaws.com/unoda-web/wp-content/uploads/2017/06/Briefing-by-President-12-June-2017.pdf>, archived at <https://perma.cc/A745-4K9N>.

180 Ibid 3.

181 Patton, 'News in Brief Vol 2(4)' (n 150) 3. Cuba, for instance, made an early declaration that testing should cover subcritical and computer simulated tests in order for the treaty to be truly comprehensive: see Ambassador Anayansi Rodríguez Camejo, 'Statement by the Permanent Representative of Cuba to the United Nations, Ambassador Anayansi Rodríguez Camejo, at the High Level Segment of the United Nations Conference to Negotiate a Legally Binding Instrument to Prohibit Nuclear Weapons' (Speech, United Nations Conference to Negotiate a Legally Binding Instrument to Prohibit Nuclear Weapons, Leading towards Their Total Elimination, 27 March 2017) 2 <https://s3.amazonaws.com/unoda-web/wp-content/uploads/2017/06/2017-03-27-Eng.-Intervenci%C3%B3n-Conferencia-de-NNUU-Eliminaci%C3%B3n-Armas-Nucleares.pdf>, archived at <https://perma.cc/NG7C-EPF3>.

182 Casey-Maslen, *The Treaty on the Prohibition of Nuclear Weapons: A Commentary* (n 76) 133.

183 Tamara L Patton, 'News in Brief' (2017) 2(3) *Nuclear Ban Daily* 3, 8 ('News in Brief Vol 2(3)').

184 Ibid. For Sweden's explanation of their vote, see 'Negotiations on a Legally Binding Instrument to Prohibit Nuclear Weapons, Leading towards Their Total Elimination: Concluding Statement by Sweden' (Speech, United Nations Conference to Negotiate a Legally Binding Instrument to Prohibit Nuclear Weapons, Leading towards Their Total Elimination, 7 July 2017) 2 <https://s3.amazonaws.com/unoda-web/wp-content/uploads/2017/07/170707-EoV-Sweden.pdf>, archived at <https://perma.cc/85BU-LT4C> ('Explanation of Vote by Sweden').

delegations,[185] but at the same time he concedes that the final prohibition was 'narrower than a number of states had advocated'.[186] This conclusion therefore suggests, at least implicitly, that the final testing prohibition, despite its alteration away from the wording of art I(1) of the *CTBT*, still remains limited to explosive testing, leaving both subcritical and computer simulated tests beyond the *TPNW*'s scope.

At the same time, if complementarity with the *CTBT* were desired by the drafters — as suggested by President Whyte Gómez — there would have been no reason to move away from the 22 May draft prohibition on testing that precisely duplicated the pre-existing *CTBT* prohibition under art I(1). In other words, given that the testing prohibition under art 1(1)(a) of the *TPNW* represents a 'compromise', as suggested by Casey-Maslen, it would seem reasonable to conclude that a conscious decision was reached amongst the negotiating states to move away from the narrower *CTBT* prohibition and instead incorporate a wider range of obligations. The fact that the negotiating delegations explicitly decided to alter the wording of testing prohibition from the initial 22 May draft text could therefore be said to be a reflection of the desire to include a broader obligation under art 1(1)(a).

Yet, although this argument seems persuasive, it remains somewhat telling that despite calls by Ecuador and Brazil for the inclusion of an explicit prohibition on subcritical and computer simulated tests within the *TPNW*,[187] ultimately no such prohibition was agreed upon and incorporated into the final treaty text. This stands in contrast to the explicit prohibition of subcritical and computer simulated tests, alongside other experimental activities, within the proposed (but now dormant) 1997 *Model Nuclear Weapons Convention*.[188]

Article 1(1)(a) of the *TPNW* instead remains both imprecise and vague in comparison to the explicit prohibition included in the *Model Nuclear Weapons Convention*, which again alludes to the lack of consensus amongst the participating states. In other words, even if an expanded testing prohibition was desired by many states, this has been poorly reflected in the final prohibition under art 1(1)(a), leaving the precise extent of this obligation open to varying degrees of interpretation.

Moreover, the subsequent practice of states, a further tool of treaty interpretation under art 31(3)(b) of the *VCLT*,[189] similarly reflects the contrasting interpretations of the scope of the testing prohibition established by art 1(1)(a) of

---

185 Casey-Maslen, *The Treaty on the Prohibition of Nuclear Weapons: A Commentary* (n 76) 134.

186 Ibid 144.

187 Patton, 'News in Brief Vol 2(4)' (n 150) 3.

188 *Letter Dated 31 October 1997 from the Chargé d'Affaires AS of the Permanent Mission of Costa Rica to the United Nations Addressed to the Secretary-General*, 52nd sess, Agenda Item 71, UN Doc A/C.1/52/7 (17 November 1997) annex ('*Model Nuclear Weapons Convention: Draft*') pt II para 68. For the definition in the current version of the model *Nuclear Weapons Convention*, see *Letter Dated 17 December 2007 from the Permanent Representatives of Costa Rica and Malaysia to the United Nations Addressed to the Secretary-General*, 62nd sess, Agenda Item 98, UN Doc A/62/650 (18 January 2008) annex ('*Model Nuclear Weapons Convention: Convention on the Prohibition of the Development, Testing, Production, Stockpiling, Transfer, Use and Threat of Use of Nuclear Weapons and on Their Elimination*') pt II para 53 ('*Model Nuclear Weapons Convention*').

189 *VCLT* (n 56) art 31(3)(b).

the *TPNW*. Upon ratifying the *TPNW*, Cuba declared its interpretation of testing, claiming that '[t]he prohibition on the testing [of] nuclear weapons contained in Article 1(a) [sic] *encompasses all forms of testing*, *including* those performed using *non-explosive* methods such as subcritical testing and computer simulation'.[190] A similar sentiment was expressed by Nigeria[191] and, towards the end of the negotiations, Ecuador.[192] At the same time, other states continued to express opposition to the inclusion of a testing prohibition altogether. Sweden, for example, noted its 'strong preference not to have nuclear testing in this Treaty',[193] while Switzerland referred to the prohibition as a 'generic reference to nuclear testing', suggesting that this clear lack of specificity may risk undermining the existing *CTBT* norm.[194] Additionally, Kazakhstan argued during the final stages of negotiations that the *TPNW* 'should have included subcritical testing',[195] and Iran wanted 'all types of testing specifically prohibited', according to one observer.[196]

Overall, it seems apparent that the final text has resulted in a vague formulation of the prohibition on testing nuclear weapons that remains open to differing interpretations by states and commentators alike. Taking a more cautious perspective, it seems difficult to confirm with any certainty that non-explosive testing activities are captured under the testing prohibition established by art 1(1)(a). This, however, does not deprive the testing prohibition in the *TPNW* of value. On the contrary, given the current frailty of the *CTBT*, its failure to enter into force and recent suggestions by the US of non-compliance of Russia and China, the prohibition on nuclear explosive tests under the *TPNW* provides a welcome duplication of the *CTBT* prohibitions. Once in force, the testing prohibitions of the *TPNW* will establish an explicit legally binding prohibition for all states that ratify the Treaty. At the same time, one cannot help but feel somewhat underwhelmed by the lack of support for an explicit provision or reference banning all non-explosive tests under the wider ambit of the testing prohibition of art 1(1)(a).

VI THE UNDERTAKING NEVER TO 'DEVELOP' NUCLEAR WEAPONS AND ITS IMPLICATIONS FOR TESTING OBLIGATIONS

Despite the inconclusive and somewhat disappointing conclusion reached above regarding the extent of the testing prohibition under the *TPNW*, there remains a second way in which subcritical and computer simulated testing could potentially be captured by art 1(1)(a): through the undertaking never to 'develop'

---

190 'Treaty on the Prohibition of Nuclear Weapons', *United Nations Treaty Collection* (Web Page) (emphasis added) <https://treaties.un.org/Pages/ViewDetails.aspx?src=TREATY&mtdsg_no=XXVI-9&chapter=26&clang=_en#EndDec>, archived at <https://perma.cc/2483-4S7X>.

191 Allison Pytlak, 'News in Brief' (2017) 2(13) *Nuclear Ban Daily* 5, 7 ('News in Brief Vol 2(13)').

192 Allison Pytlak, 'News in Brief' (2017) 2(15) *Nuclear Ban Daily* 3, 3.

193 'Explanation of Vote by Sweden' (n 184) 2.

194 Sabrina Dallafior, 'Explanation of Vote' (Speech, United Nations Conference to Negotiate a Legally Binding Instrument to Prohibit Nuclear Weapons, Leading towards Their Total Elimination, 7 July 2017) <https://s3.amazonaws.com/unoda-web/wp-content/uploads/2017/07/Swiss-Explanation-of-Vote2.pdf>, archived at <https://perma.cc/4M58-5XGZ>.

195 Pytlak, 'News in Brief Vol 2(13)' (n 191) 7.

196 Ibid 6.

nuclear weapons or other nuclear explosive devices. Whereas the prohibition on 'testing' certain weapons is generally a unique characteristic of nuclear weapons-related treaties,[197] the prohibition of development is generally preferred in disarmament instruments prohibiting both chemical and biological weapons.[198]

Despite this preference, the prohibition on developing nuclear weapons has not been incorporated consistently across different nuclear non-proliferation and disarmament instruments. The *NPT* prohibits NNWS from 'manufactur[ing] or otherwise acquir[ing]' nuclear weapons under art II, which only entails a narrow obligation covering the physical construction of a completed nuclear device.[199] Although not prohibiting development, the *Treaty of Tlatelolco* does prohibit the 'production' of nuclear weapons.[200] This term incorporates a broader scope than 'manufacturing' and has been viewed as including 'not only manufacture (ie production in a factory) but also local improvisation or adaption of weapons'.[201] Yet, as with the concept of 'manufacture', this would again fail to encompass earlier developmental steps, instead alluding only to the latter stages of the construction process.[202]

However, some NWFZ treaties contain an explicit prohibition on the development of nuclear weapons. Under art 3(a) of the *Treaty of Pelindaba*, states party are required '[n]ot to … develop [or] manufacture … any nuclear explosive device'.[203] The *TPNW* essentially takes a 'catch-all' approach under art 1(1)(a) by establishing an undertaking never to '*develop … produce,* [or] *manufacture …* nuclear weapons or nuclear explosive devices', thus following the formulation adopted in other conventional disarmament treaties such as the *Convention on the Prohibition of the Use, Stockpiling, Production and Transfer of Anti-Personnel*

197 But see *The Antarctic Treaty* (n 36) art I(1), which includes a generic prohibition on the testing of all types of weapons.

198 See, eg, *BWC* (n 158) art I; *CWC* (n 159) art I(1)(a).

199 *NPT* (n 2) art II. For those who support a narrower view of 'manufacture', see, eg, Daniel H Joyner, *Iran's Nuclear Programme and International Law: From Confrontation to Accord* (Oxford University Press, 2016) 79–86; David S Jonas, 'Ambiguity Defines the NPT: What Does "Manufacture" Mean?' (2014) 36(2) *Loyola of Los Angeles International and Comparative Law Review* 263, 266–7. David S Jonas notes that a broader approach would entail construing a state's intentions based on early steps, thus needing to go into the mind of a state, so to speak. For a contrasting approach endorsing a wider interpretation of 'manufacture', see Andreas Persbo, 'A Reflection on the Current State of Nuclear Non-Proliferation and Safeguards' (Non-Proliferation Papers No 8, EU Non-Proliferation Consortium, February 2012) 4–5.

200 *Treaty of Tlatelolco* (n 38) art 1(1)(a). Interestingly, the later *Treaty of Rarotonga* only prohibits the manufacture of nuclear weapons in a comparable way to the *NPT*: see *Treaty of Rarotonga* (n 38) art 3(a).

201 Casey-Maslen and Vestner (n 64) 37.

202 A similar argument has been made in the commentary to the *Convention on Cluster Munitions*: Virgil Wiebe, Declan Smyth and Stuart Casey-Maslen, 'Article 1. General Obligations and Scope of Application' in Gro Nystuen and Stuart Casey-Maslen (eds), *The Convention on Cluster Munitions: A Commentary* (Oxford University Press, 2010) 95, 117.

203 *Treaty of Pelindaba* (n 38) art 3(a). See also *Treaty of Semipalatinsk* (n 38) art 3(1)(a); *Treaty of Bangkok* (n 38) art 3(1)(a).

Mines and on Their Destruction[204] and the *Convention on Cluster Munitions*.[205] While this level of detail may be considered both excessive and unnecessary, it creates a welcome degree of overlap between each of the aforementioned concepts, thus helping to avoid any possible loopholes or ways to work around the prohibitions of development-related activities included under art 1(1)(a) of the *TPNW*.[206]

Like the term 'test', the term 'develop' remains undefined by disarmament treaties but is ordinarily understood as to 'create or produce especially by deliberate effort over time'[207] or 'to invent something or bring something into existence'.[208] This would seem to suggest that '[a]ll acts that amount to, or are directed towards, development of the weapon or its integral parts and components are prohibited'.[209] This definition immediately alludes to a vast array of potential activities that could be captured by the notion of development.

However, one preliminary matter relates to whether military 'research' into nuclear weapon-related technology would be captured under the auspices of the prohibition of development under art 1(1)(a) of the *TPNW*, despite its lack of explicit inclusion as an individual prohibition. In the present context, research is defined as '[t]he systematic investigation into and study of materials and sources *in order to establish facts and reach new conclusions*'.[210] The *TPNW* distinguishes between permitted and prohibited research by preserving the 'inalienable right of its States Parties to *develop research*, production and use of *nuclear energy for peaceful purposes* without discrimination',[211] thereby reaffirming the right afforded by art IV of the *NPT*.[212] Walter Krutzsch similarly argues that the term 'develop' under art I(1)(a) of the *CWC* encompasses 'a number of steps for creating a functioning weapon ready for production, stockpiling, and use, *as distinct from permitted research*',[213] therefore envisioning the possibility of some research and development activities associated with chemical materials remaining permitted. As such, so long as research and development activities by a state party do not, in any way, contribute towards any military application or advancement of nuclear weapon systems, peaceful research remains permitted under the *TPNW*.

However, given that individual prohibitions on both 'research' and 'develop[ment]' have been included as separate, though undoubtedly interconnected and overlapping, prohibitions by the *Treaty of Pelindaba* and the

---

204 *Convention on the Prohibition of the Use, Stockpiling, Production and Transfer of Anti-Personnel Mines and on Their Destruction*, opened for signature 18 September 1997, 2056 UNTS 211 (entered into force 1 March 1999) art 1(1)(b).

205 *Convention on Cluster Munitions*, opened for signature 30 May 2008, 2688 UNTS 39 (entered into force 1 August 2010) art 1(1)(b).

206 As noted in relation to the *Convention on Cluster Munitions*: see Wiebe, Smyth and Casey-Maslen (n 202) 117.

207 *Merriam-Webster* (online at 30 September 2020) 'develop' (def 2b).

208 *Cambridge Dictionary* (online at 30 September 2020) 'develop' (v^2, def 1).

209 Casey-Maslen and Vestner (n 64) 93.

210 *Lexico* (online at 30 September 2020) 'research' (n, def 1) (emphasis added).

211 *TPNW*, UN Doc A/CONF.229/2017/8 (n 12) Preamble para 21 (emphasis added).

212 *NPT* (n 2) art IV(1).

213 Walter Krutzsch, 'Article I: General Obligations' in Walter Krutzsch, Eric Myjer and Ralf Trapp (eds), *The Chemical Weapons Convention: A Commentary* (Oxford University Press, 2014) 61, 65 (emphasis added).

Treaty of Semipalatinsk,[214] one may argue that both terms should be viewed as two separate actions operating in tandem, thereby suggesting a degree of autonomy between the two concepts.[215] This seems to be the view taken by Krutzsch, who suggests that the prohibition of development in the context of the *CWC* only encompasses activities 'from an *advanced* stage onwards' with a clearly 'defined and recognizable purpose'.[216] Initial research activities may therefore be beyond the scope of the prohibition of development from this understanding, unless the purpose of such research would undermine the object and purpose of the *TPNW*.

Other commentators provide an alternative approach. Casey-Maslen and Vestner, for instance, argue that the term 'development' 'refers to the stage of *research* prior to formal production of the weapon in question'[217] and, as a result, suggest that '[r]esearch forms an *integral part of the international legal concept of development*'.[218] Therefore, despite the apparent autonomy associated with the terms 'research' and 'development', the authors here view 'research' as just one example of the numerous activities that fall within the wider ambit of 'development'. From this perspective, it can be reasonably argued that '[o]nce a state begins to develop a prohibited weapon, it violates that prohibition on development, *irrespective of how advanced the design or research* may be'.[219] In essence, the 'temporality' condition of an 'advanced' stage of development suggested by Krutzsch is not necessary. Such a temporal requirement would ultimately 'conflate the content of the prohibition with the means and ease of verification of compliance'.[220] Rather, as soon as any particular research activity can be regarded as having a military, as opposed to peaceful, purpose, such an activity would be prohibited by the broader notion of development.

The *travaux préparatoires* of the *TPNW* would seem to demonstrate support for a wider construction of the term 'develop'. First, during the *TPNW* negotiations, Austria considered 'research' and 'design' to be covered by the concept of development and warned that an explicit prohibition on research could unintentionally prohibit research into the peaceful application of nuclear energy and technology.[221] Similarly, the ICRC suggested that including similar prohibitions to art 1(1) of the *CWC*, which includes a prohibition on development

---

214 *Treaty of Pelindaba* (n 38) art 3(a); *Treaty of Semipalatinsk* (n 38) art 3(1)(a).

215 Harald Müller has suggested that the *TPNW* also fails to prohibit research through a lack of a specific inclusion of a separate prohibition under art 1: Harald Müller, 'The Future of the Non-Proliferation Treaty' in Luciano Maiani, Said Abousahl and Wolfango Plastino (eds), *International Cooperation for Enhancing Nuclear Safety, Security, Safeguards and Non-Proliferation: 60 Years of IAEA and EURATOM* (Springer Open, 2018) 139, 144.

216 Krutzsch (n 213) 65 (emphasis added).

217 Casey-Maslen and Vestner (n 64) 37 (emphasis added).

218 Ibid 91 (emphasis added).

219 Casey-Maslen, *The Treaty on the Prohibition of Nuclear Weapons: A Commentary* (n 76) 138 (emphasis added).

220 Ibid.

221 Patton, 'News in Brief Vol 2(3)' (n 183) 7. For a similar concern expressed by the Netherlands, see 'Compilation of Amendments Received from States on the Revised Draft Submitted by the President Dated 30 June 2017: A/CONF.229/2017/CRP.1/Rev.1', *United Nations Conference to Negotiate a Legally Binding Instrument to Prohibit Nuclear Weapons, Leadings towards Their Total Elimination* (Web Document) 15–16 <https://reachingcriticalwill.org/images/documents/Disarmament-fora/nuclear-weapon-ban/documents/compilation_20June.pdf>, archived at <https://perma.cc/4DNY-XX7J>.

but not on research, 'would suffice to achieve the purposes of the treaty to ban nuclear weapons' and would be sufficiently 'clear and robust'.[222] This understanding seemed to have been accepted, at least tacitly, as relatively little debate on the need for a separate prohibition on research activities followed thereafter.[223] Indeed, it is telling that Cuba, upon depositing its instrument of ratification, did not offer a comparable declaration clarifying the scope of the term 'develop' as it had done in relation to the term 'test'.[224]

In light of this broader interpretation of the prohibition on development under the *TPNW*, there is a strong case that both subcritical and computer simulated tests would be prohibited by art 1(1)(a). First, as briefly noted above,[225] non-explosive experiments would help enhance our understanding of how a newly developed or qualitatively improved existing nuclear weapon would operate under certain conditions, and therefore help ascertain the expected result of its use and affirm the reliability of current stockpiles.[226] Both of these processes would undoubtedly constitute prohibited research experiments with the aim of 'establish[ing] facts and reach[ing] new conclusions'[227] as to the performance of both existing and newly designed nuclear explosive devices, contrary to both art 1(1)(a) and the underlying object and purpose of the *TPNW* as a whole.

There is also support for the inclusion of non-explosive testing activities within the prohibition on development based upon statements issued during the negotiations. Ireland, for example, explicitly argued that the notion of 'development' included in the *TPNW* text would encompass computer simulated tests.[228] Chile similarly expressed early concern over the inclusion of 'test explosion' and instead called for 'a broader interpretation [recognising] that there is a prohibition of any kind of development of nuclear weapons'.[229] Indeed, Casey-Maslen has argued that

> [t]hose opposing the explicit prohibition of subcritical nuclear testing *were not* seeking to prevent the 2017 Treaty from rendering the activity unlawful, but were concerned that the Treaty should remain consistent with the *CTBT*. But, as they argued, such subcritical testing is prohibited by the undertaking never under any circumstances to *develop* nuclear weapons or other nuclear explosive devices.[230]

---

222 International Committee of the Red Cross, *Elements of a Treaty to Prohibit Nuclear Weapons*, Agenda Item 8(b), UN Doc A/CONF.229/2017/WP.2 (31 March 2017) 2.

223 Casey-Maslen, *The Treaty on the Prohibition of Nuclear Weapons: A Commentary* (n 76) 138.

224 'Treaty on the Prohibition of Nuclear Weapons' (n 190).

225 See above Part III(A).

226 As noted by Asada (n 18) 88.

227 *Lexico* (online at 30 September 2020) 'research' (n, def 1).

228 Helena Nolan, 'General Exchange of Views: Core Prohibitions' (Speech, United Nations Conference to Negotiate a Legally Binding Instrument to Prohibit Nuclear Weapons, Leading towards Their Total Elimination, 29 March 2017) 2 <http://www.reachingcriticalwill.org/images/documents/Disarmament-fora/nuclear-weapon-ban/statements/29March_Ireland-T2.pdf>, archived at <https://perma.cc/F6CS-6SVJ>.

229 Patton, 'News in Brief Vol 2(4)' (n 150) 3.

230 Casey-Maslen, *The Treaty on the Prohibition of Nuclear Weapons: A Commentary* (n 76) 144 (emphasis added). Although Casey-Maslen refers solely to subcritical testing, it would not be entirely unreasonable to extend this logic to capture computer simulated research activities under the broad scope of the prohibition on developing nuclear weapons under art 1(1)(a) of the *TPNW*.

Overall, given the broad interpretation and scope of activities covered under the prohibition of development, and considering the research-oriented nature of both subcritical and computer simulated testing, it seems reasonable to conclude that non-explosive testing activities would likely be captured by the wider ambit of the prohibition of development under art 1(1)(a) of the *TPNW*, thus closing the testing 'loophole' established under the *CTBT* framework. Both activities are intended to improve a state's understanding of how its nuclear weapons perform and help modify, and therefore develop, current nuclear weapons to extend their lifespan. This conclusion would also support the object and purpose of the *TPNW* in contributing towards, and ultimately achieving, nuclear disarmament.

VII *TPNW* Entry-into-Force Prospects and Its Relationship with the *CTBT*

Having determined that the *TPNW* prohibits subcritical and computer simulated nuclear weapons tests within the undertaking never to develop nuclear weapons or other nuclear explosive devices in art 1(1)(a), the following offers some more pragmatic thoughts regarding the *TPNW*'s likelihood of entry into force, while briefly examining the future relationship between the testing prohibitions under the *TPNW* and *CTBT*.

A *Entry into Force*

The *TPNW* follows the trend of most other international treaties in terms of the requirements it sets for entry into force. In accordance with art 15(1), the *TPNW* 'shall enter into force 90 days after the *fiftieth* instrument of ratification, acceptance, approval or accession has been deposited'.[231] The benefit of this simple 50-state threshold is twofold. First, and most significantly, the *TPNW* negotiators have sensibly avoided repeating the flaw present under art XIV(1) and annex 2 of the *CTBT* by removing any requirement for specific types or categories of states — such as the NWPS — ratifying the instrument before it is able to achieve entry into force. This will help ensure that the *TPNW* does not replicate the failures of the *CTBT*,[232] thereby making certain that the attainment of entry into force is not held hostage to the whim of just a few states.

Moreover, the benefits of this numerical threshold are made more obvious given the extensive opposition to the *TPNW* expressed by the NWPS and their strategic military allies. In July 2017, the UK, US and France issued a joint statement upon the adoption of the *TPNW*, which said:

> France, the United Kingdom and the United States have not taken part in the negotiation of the treaty on the prohibition of nuclear weapons. We do not intend

231 *TPNW*, UN Doc A/CONF.229/2017/8 (n 12) art 15(1) (emphasis added).

232 Tim Caughley and Gaukhar Mukhatzhanova, United Nations Institute for Disarmament Research, *Negotiation of a Nuclear Weapons Prohibition Treaty: Nuts and Bolts of the Ban* (Report, 2017) 20.

> to sign, ratify or ever become party to it. Therefore, there will be no change in the legal obligations on our countries with respect to nuclear weapons.[233]

This claim was repeated again in October 2018, this time with Russia and China joining in the statement.[234] Russia has stated that the *TPNW* 'is at variance with Russia's national interests and … vision of movement towards a nuclear free world'.[235] India has also voiced similar concerns.[236]

Given this express opposition from the NWPS, the benefits of the simple numerical threshold of the *TPNW* — in contrast to the onerous requirements of art XIV(1) of the *CTBT* — become clear. While it would undoubtedly be desirable for the NWPS to support and eventually ratify the *TPNW* — particularly as these are the states most likely to conduct nuclear weapons tests — the collective unwillingness of the NWPS to ratify the *TPNW* will not disrupt or undermine efforts to achieve its entry into force. On the contrary, at the very least, a substantial number of non-aligned NNWS that support the Treaty will be legally bound by the broader testing prohibitions it establishes and the variety of other obligations imposed by the *TPNW*. Quite simply, the *TPNW* has the potential to realise and achieve a legally binding nuclear testing prohibition much sooner than the *CTBT*.

Secondly, the numerical threshold set by the *TPNW* affords a sufficient degree of credibility and helps demonstrate both the seriousness of the instrument and the international significance of the Treaty.[237] Rather than setting a low standard that could easily be satisfied, the 50-state requirement sets almost a degree of challenge, which, if satisfied, will exemplify the legitimacy and widespread

---

233 'Joint Press Statement from the Permanent Representatives to the United Nations of the United States, United Kingdom, and France Following the Adoption of a Treaty Banning Nuclear Weapons' (Press Statement, 7 July 2017) <https://translations.state.gov/2017/07/07/joint-press-statement-from-the-permanent-representatives-to-the-united-nations-of-the-united-states-united-kingdom-and-france-following-the-adoption-of-a-treaty-banning-nuclear-weapons/>, archived at <https://perma.cc/S773-UJN7>, quoted in Claire Mills and Lauren Culpin, 'A Treaty on the Prohibition of Nuclear Weapons' (Briefing Paper No 7986, House of Commons Library, Parliament of the United Kingdom, 9 October 2018) 6.

234 United Kingdom Mission to the United Nations, 'P5 Joint Statement on the Treaty on the Non-Proliferation of Nuclear Weapons' (Press Statement, 24 October 2018) <https://www.gov.uk/government/news/p5-joint-statement-on-the-treaty-on-the-non-proliferation-of-nuclear-weapons>, archived at <https://perma.cc/99XU-E77G>.

235 Interview with Mikhail Ulyanov, Director of the Foreign Ministry Department for Non-Proliferation and Arms Control (Kommesant, 13 September 2017) <https://www.mid.ru/en/foreign_policy/news/-/asset_publisher/cKNonkJE02Bw/content/id/2862117>, archived at <https://perma.cc/PM4K-5S65>. See also 'Senior Russian Diplomat Calls Nuclear Arms Prohibition Treaty a "Mistake"', *TASS* (online, 27 September 2017) <https://tass.com/world/967659>, archived at <https://perma.cc/G3ME-CNR6>. This seems to reflect the rhetoric of Christopher Ashley Ford, Assistant Secretary to the United States Bureau of International Security and Nonproliferation: Christopher Ashley Ford, 'The Treaty on the Prohibition of Nuclear Weapons: A Well-Intentioned Mistake' (Speech, University of Iceland, 30 October 2018) <https://www.state.gov/remarks-and-releases-bureau-of-international-security-and-nonproliferation/the-treaty-on-the-prohibition-of-nuclear-weapons-a-well-intentioned-mistake/>, archived at <https://perma.cc/G5X9-NQSK>.

236 See Ministry of External Affairs (India), 'Response by the Official Spokesperson to a Media Query regarding India's View on the Treaty to Ban Nuclear Weapons' (Media Release, 18 July 2017) <https://www.mea.gov.in/media-briefings.htm?dtl/28628/Response_by_the_Official_Spokesperson_to_a_media_query_regarding_Indias_view_on_the_Treaty_to_ban_nuclear_weapons>, archived at <https://perma.cc/QN3K-7BA9>.

237 Caughley and Mukhatzhanova (n 232) 20.

support amongst states for the *TPNW*. Indeed, the threshold was raised from a lower 40-state requirement in the 22 May draft to the current threshold in the final text.[238] At the same time, by not requiring the significantly higher number of ratifications of 80 states as suggested by Sweden,[239] the *TPNW* ensures that its entry into force will not be overly delayed, which would risk dissipating support for the instrument.

The prospects for entry into force in the near future seem very promising indeed. Key supporting states of the humanitarian initiative have already ratified the *TPNW*, including Mexico and Austria (the hosts of the latter two humanitarian conferences),[240] South Africa (a former NWPS that unilaterally abandoned its own nuclear weapon programme in 1989)[241] and other supporters such as New Zealand.[242] As of 30 September 2020, 46 states have ratified the *TPNW*, the latest being Malaysia.[243]

Furthermore, the *TPNW* is achieving a similar rate of ratification as other weapons of mass destruction disarmament instruments. The *CWC* opened for signature on 13 January 1993, yet it was not until the ratification by Cuba on 29 April 1997, four years and three months after first opening for signature, that the *CWC* entered into force.[244] Similarly, the *BWC* opened for signature on 10 April 1972, yet it was not until nearly three years later on 26 March 1975 that it achieved the 22 ratifications required for its entry into force.[245] The *TPNW*, therefore, is achieving ratification at least at a comparable rate to other weapons of mass destruction disarmament instruments in force thus far.

---

238 *Draft Convention on the Prohibition of Nuclear Weapons*, UN Doc A/CONF.229/2017/CRP.1 (n 178) art 16.

239 See Eva Walder, 'Institutional Arrangements and Other Provisions' (Speech, United Nations Conference to Negotiate a Legally Binding Instrument to Prohibit Nuclear Weapons, Leading towards Their Total Elimination, 31 March 2017) <https://reachingcriticalwill.org/images/documents/Disarmament-fora/nuclear-weapon-ban/statements/31March_Sweden-T3.pdf>, archived at <https://perma.cc/QD6X-9TZZ>.

240 See Daryl G Kimball, 'Mexico Hosts Meeting on Nuclear Effects' (2014) 44(2) *Arms Control Today* 33; 'Vienna Conference on the Humanitarian Impact of Nuclear Weapons', *Federal Ministry for European and International Affairs* (Web Page) <https://www.bmeia.gv.at/en/european-foreign-policy/disarmament/weapons-of-mass-destruction/nuclear-weapons/vienna-conference-on-the-humanitarian-impact-of-nuclear-weapons/>, archived at <https://perma.cc/XZ49-UNZN>.

241 See Adolf von Baeckmann, Garry Dillon and Demetrius Perricos, 'Nuclear Verification in South Africa: Verifying South Africa's Declared Nuclear Inventory, and the Termination of Its Weapons Programme, Was a Complex Task' (1995) 37(1) *IAEA Bulletin* 42.

242 New Zealand, for example, delivered a joint humanitarian statement on behalf of 155 states to the United Nations General Assembly First Committee in October 2014: see Higgie (n 136). Each state that has ratified the *TPNW* so far supported this statement: see 'Treaty on the Prohibition of Nuclear Weapons' (n 190).

243 For details of the signature and ratification status of the *TPNW*, see 'Treaty on the Prohibition of Nuclear Weapons' (n 190).

244 For the ratification status of the *CWC*, see 'Convention on the Prohibition of the Development, Production, Stockpiling and Use of Chemical Weapons and on Their Destruction', *United Nations Treaty Collection* (Web Page) <https://treaties.un.org/pages/ViewDetails.aspx?src=TREATY&mtdsg_no=XXVI-3&chapter=26>, archived at <https://perma.cc/5CF4-KV8J>.

245 For the ratification status of the *BWC*, see 'Convention on the Prohibition of the Development, Production and Stockpiling of Bacteriological (Biological) and Toxin Weapons and on Their Destruction', *United Nations Office for Disarmament Affairs* (Web Page) <http://disarmament.un.org/treaties/t/bwc>, archived at <https://perma.cc/7QBS-XPSD>.

Although some states present during the *TPNW* negotiations have since expressed an intention to not seek ratification of the Treaty as of yet,[246] it seems probable that the *TPNW* will be ratified by at least the required 50 states. In fact, the art 15 threshold will easily be satisfied if just half of the states that voted in favour of the Treaty's adoption decide to ratify the *TPNW*.[247] Overall, prospects for the *TPNW*'s entry into force currently seem promising, and one can imagine that the Treaty will achieve legally binding status much sooner than the *CTBT*, thus imposing a legally binding prohibition on nuclear weapons test explosions and non-explosive activities for its states party.

B *Relationship with the CTBT*

Perhaps a more pressing matter is precisely how the *TPNW* will operate in relation to the *CTBT* and whether the new treaty actually poses a threat to the attainment of the *CTBT*'s entry into force and the full operationalisation of its verification and monitoring mechanisms discussed previously. Indeed, in voicing opposition to the adoption of the *TPNW*, some NWPS have claimed that the Treaty risks undermining the existing nuclear non-proliferation and disarmament legal framework.[248] The following seeks to explore and address the credibility of such concerns and determine whether the *TPNW* weakens the support and realisation of the *CTBT* regime.

It is prudent to note that the drafters of the *TPNW* went to great lengths to ensure that the Treaty would complement and strengthen the existing nuclear weapons international legal framework.[249] The *TPNW* preamble makes this clear by emphasising the continued importance of the *NPT* as the 'cornerstone of the nuclear disarmament and non-proliferation regime'[250] and recognising the 'vital importance of the *Comprehensive Nuclear-Test-Ban Treaty and its verification regime* as a core element of the nuclear disarmament and non-proliferation

---

246 Both Sweden and Switzerland have conducted internal reviews of the *TPNW* and have decided to refrain from ratifying at this stage. For Sweden, see Lars-Erik Lundin, *Utredning av konsekvenserna av ett svenskt tillträde till konventionen om förbud mot kärnvapen* [*Inquiry into the Consequences of a Swedish Accession to the Treaty on the Prohibition of Nuclear Weapons*] (Report, 18 January 2019) 35–55; Jan M Olsen, 'Sweden Says It Won't Sign UN Nuclear Ban Treaty', *Associated Press News* (online, 13 July 2019) <https://www.apnews.com/40a5b0e8d19d415f942786b0c8d647d7>, archived at <https://perma.cc/N6YY-K7QG>. Similarly, for Switzerland, see Federal Department of Foreign Affairs (Switzerland), *Report of the Working Group to Analyse the Treaty on the Prohibition of Nuclear Weapons* (Report, 30 June 2018).

247 'Voting Record' (n 145).

248 See above nn 233–5; North Atlantic Treaty Organization, 'North Atlantic Council Statement on the Treaty on the Prohibition of Nuclear Weapons' (Press Release (2017) 135, 20 September 2017) <https://www.nato.int/cps/en/natohq/news_146954.htm>, archived at <https://perma.cc/7LDU-BS9M>; Christopher Ford, 'Responding to the "Ban": Remarks from Senior Director Christopher Ford' (Speech, Carnegie Endowment for International Peace, 22 August 2017) <https://carnegieendowment.org/2017/08/22/briefing-on-nuclear-ban-treaty-by-nsc-senior-director-christopher-ford-event-5675>, archived at <https://perma.cc/TLY4-XQAU>. See also Paige KW Gasser, 'Undermining the Non-Proliferation Treaty (NPT): A Legal Analysis of the Treaty on the Prohibition of Nuclear Weapons (TPNW)' [2018] *Journal of Public and International Affairs* 113.

249 Tytti Erästö, 'The NPT and the TPNW: Compatible or Conflicting Nuclear Weapons Treaties?', *Stockholm International Peace Research Institute* (Blog Post, 6 March 2019) <https://www.sipri.org/commentary/blog/2019/npt-and-tpnw-compatible-or-conflicting-nuclear-weapons-treaties>, archived at <https://perma.cc/NSL2-FC54>.

250 *TPNW*, UN Doc A/CONF.229/2017/8 (n 12) Preamble para 18.

regime'.[251] This makes it clear that the negotiators did not intend the *TPNW* to detract from existing nuclear weapons instruments but rather to build upon, reinforce and complement both the *NPT* and *CTBT*.

How the *TPNW* will interact with existing nuclear weapons instruments in practice has created greater contention. The issue itself is covered by art 18, which states:

> The implementation of this Treaty shall not prejudice obligations undertaken by States Parties with regard to existing international agreements, to which they are party, where those obligations are consistent with the Treaty.[252]

It became apparent during the 2017 Negotiation Conference that the relationship between the *TPNW* and the *NPT* specifically would create a point of contention among the negotiating states.[253] The initial draft of this provision stated that '[t]his Convention does not affect the rights and obligations of the States Parties under the *Treaty on the Non-Proliferation of Nuclear Weapons*'.[254] This formulation received strong support from the Netherlands, who wanted to ensure that the new treaty would not undermine the existing obligations under the *NPT*.[255] Further, they sought to clarify the initial draft provision's 'hierarchy of agreements', making it clear that in any case of conflict between the terms of the *TPNW* and *NPT*, the *NPT* obligations would prevail.[256]

However, it was feared that referencing the 'rights' of states party under the *NPT* might permit NWS to join the new treaty while retaining possession of their respective nuclear weapons.[257] Daniel H Joyner, for example, notes how '[s]ome nuclear weapons states have for some time argued that the *NPT* gives them a "right" to possession and to further production and refinement of nuclear weapons', an assertion he deems completely unsupported by the text of the *NPT*.[258] Had the assertion of these states — that, by referencing 'rights', the NWS could accede to the *TPNW* whilst retaining nuclear weapons — been true, it would have certainly undermined the fundamental object and purpose of the *TPNW* in contributing towards the achievement of nuclear disarmament. Moreover, the text proposed in the initial draft was overly narrow, focusing solely on how the *TPNW* and *NPT* would interact in practice, whilst remaining quiet on the *TPNW*'s potential relationship with other agreements, including the *CTBT*.

---

251 Ibid Preamble para 19 (emphasis added).

252 Ibid art 18.

253 Stuart Maslen, 'The Relationship of the 2017 Treaty on the Prohibition of Nuclear Weapons with Other Agreements: Ambiguity, Complementarity, or Conflict?', *EJIL: Talk!* (Blog Post, 1 August 2017) <https://www.ejiltalk.org/the-relationship-of-the-2017-treaty-on-the-prohibition-of-nuclear-weapons-with-other-agreements-ambiguity-complementarity-or-conflict>, archived at <https://perma.cc/Q8WW-DZR4>.

254 *Draft Convention on the Prohibition of Nuclear Weapons*, UN Doc A/CONF.229/2017/CRP.1 (n 178) art 19.

255 Tamara L Patton, 'News in Brief' (2017) 2(5) *Nuclear Ban Daily* 5, 11 ('News in Brief Vol 2(5)').

256 Ibid.

257 Casey-Maslen, *The Treaty on the Prohibition of Nuclear Weapons: A Commentary* (n 76) 256.

258 Daniel H Joyner, 'Amicus Memorandum to the Chair of the United Nations Negotiating Conference for a Convention on the Prohibition of Nuclear Weapons' (Memorandum, 12 June 2017) 3 <https://armscontrollaw.files.wordpress.com/2017/06/amicus-memorandum.pdf>, archived at <https://perma.cc/3C2L-W6CU>.

Consequently, both Joyner and some non-aligned NNWS called for the deletion of this article, arguing that its current form would leave room for 'interpretive and implementation confusion'.[259] In the end, based on a proposal made by Malaysia[260] and endorsed by the ICRC,[261] draft art 19 was revised, incorporating the corresponding text of art 26(1) of the *Arms Trade Treaty*[262] into art 18 as it was finally drafted. This allows states party to continue to respect and lawfully implement their obligations established by pre-existing disarmament treaties, including both the *NPT* and *CTBT*, but only insofar as they are 'consistent with', and therefore do not 'supersede[,] those set out in the [*TPNW*]'.[263] In other words, in situations where there is a conflict of obligations between instruments, the *TPNW* obligations will prevail.

Newell Highsmith and Mallory Stewart have criticised this provision, arguing that it 'subordinates the *NPT* to the [*TPNW*]',[264] a position that one could similarly apply in relation to the *CTBT*. Yet, in reality, art 18 simply reaffirms general rules of international law relating to treaties concerning the same subject matter. Articles 30(3) and (4) of the *VCLT* state that for parties to two instruments of the same subject matter, 'the earlier treaty applies only to the extent that its provisions are compatible with those of the later treaty'.[265] Article 18 of the *TPNW* essentially reflects this basic approach, thereby conforming to the *lex posterior derogat priori* general principle of international law,[266] which the International Law Commission has confirmed 'is at its strongest in regard to conflicting or overlapping provisions that are part of treaties that are institutionally linked *or otherwise intended to advance similar objectives*'.[267]

Furthermore, this approach taken under art 18 of the *TPNW* is only logical and is indicative of the obligation of all states to perform their respective treaty commitments in good faith.[268] Indeed, it would be counterintuitive if earlier, more limited obligations assumed under an existing treaty could prevail *lex priori* over

---

259 Ibid; Patton, 'News in Brief Vol 2(5)' (n 255) 10–11.

260 Casey-Maslen, *The Treaty on the Prohibition of Nuclear Weapons: A Commentary* (n 76) 256.

261 *Comments of the International Committee of the Red Cross on Key Provisions of the Draft Convention on the Prohibition of Nuclear Weapons*, Agenda Item 8(b), UN Doc A/CONF.229/2017/CRP.2 (14 June 2017).

262 *Arms Trade Treaty*, opened for signature 2 April 2013, 3013 UNTS (entered into force 24 December 2014) art 26(1).

263 Maslen (n 253).

264 Newell Highsmith and Mallory Stewart, 'The Nuclear Ban Treaty: A Legal Analysis' (2018) 60(1) *Survival* 129, 141.

265 *VCLT* (n 56) arts 30(3)–(4).

266 Mirko Sossai, 'Il rapporto tra il Trattato sul divieto di armi nucleari e gli altri accordi in materia di non-proliferazione e disarmò' [The Relationship between the Treaty on the Prohibition of Nuclear Arms and Other Agreements on the Subject of Non-Proliferation and Disarmament] [2018] (1) *Rivista di Diritto Internazionale* 185, 197 [tr Rebecca Rose Nocella] (my thanks go to Rebecca Rose Nocella for her assistance in translating this article); Daniel Rietiker, 'New Hope for Nuclear Disarmament or "Much Ado about Nothing?" Legal Assessment of the New "Treaty on the Prohibition of Nuclear Weapons" and the Joint Statement by the USA, UK, and France Following Its Adoption' (2017) 59 (Fall) *Harvard International Law Journal Online* 22, 30–1; Pedrazzi (n 148) 226. Given this conclusion, Marco Pedrazzi even questions whether art 18 needed to be included at all. See also Joyner (n 258) 3.

267 *Report of the International Law Commission*, UN GAOR, 61st sess, Supp No 10, UN Doc A/61/10 (2006) 417 (emphasis added).

268 In accordance with the principle of *pacta sunt servanda*, now codified by art 26 of the *VCLT*.

the more stringent prohibitions contained in art 1 of the *TPNW*.[269] Such an approach could even risk undermining the achievement of the *TPNW*'s object and purpose in achieving a nuclear weapon-free world and avoiding any future use of nuclear weapons, including for testing purposes. Instead, the general operation of the *lex posterior* principle through art 18 is 'little more than a statement of common sense', clarifying that the Treaty's expansive obligations incorporated into art 1 cannot be derogated from by citing membership of a less restrictive nuclear weapons instrument as justification.[270]

Given the conclusions reached in Parts IV and V, one can immediately identify a possible point of contention between the scope of the testing prohibitions under the narrower *CTBT* and the wider prohibitions within art 1(1)(a) of the *TPNW*.[271] Indeed, during the 2017 negotiations, the Arms Control Association raised concerns that including a prohibition of subcritical and computer simulated tests (albeit directly under the prohibition of testing rather than development) could 'reopen the issue of *CTBT* scope, and/or create a conflict with the *CTBT*'.[272] As such, the fact that the *TPNW* establishes a broader scope of obligation in relation to testing than the *CTBT* may prima facie suggest that a conflict of obligations exists between the two treaty regimes.

At the same time, it can be argued that rather than creating a conflict of obligations or inconsistency, the *TPNW* in fact represents an 'evolution' of the pre-existing testing prohibition established by the *CTBT*. Indeed, one of the primary objectives of the *TPNW* is to strengthen and build upon pre-existing norms against nuclear weapons as a means of contributing towards nuclear disarmament and the elimination of all nuclear weapons.[273] The evolution of the testing prohibition, therefore, does not necessarily clash with the *CTBT*, but rather, it incorporates the pre-existing prohibition of all nuclear explosive tests and subsequently goes one step further by also encompassing non-explosive activities. Consequently, rather than perceiving the difference in obligation between the *CTBT* and *TPNW* as an inconsistency or subordination as a result of the operation of art 18 of the *TPNW*, the broader testing prohibition of the *TPNW* should be conceived as a necessary, complementary and timely evolution in pursuit of nuclear disarmament.

Despite this suggestion of an evolutional relationship between the *CTBT* and *TPNW*, a question does remain: given that the *TPNW* establishes a broader testing prohibition, are there any reasons why the *CTBT*'s entry into force should still be

---

269 Although this does not foreclose the application of *lex priori* elsewhere: see Study Group of the International Law Commission, *Fragmentation of International Law: Difficulties Arising from the Diversification and Expansion of International Law*, 58th sess, UN Doc A/CN.4/L.682 (13 April 2006) 122–5 [236]–[242].

270 Casey-Maslen, *The Treaty on the Prohibition of Nuclear Weapons: A Commentary* (n 76) 257.

271 Pedrazzi (n 148) 227–8.

272 Arms Control Association, *Topic 2: Core Prohibitions*, UN Doc A/CONF.229/2017/NGO/WP.18 (31 March 2017) 2 [14].

273 Stuart Casey-Maslen, 'Friend or Foe?: The Treaty on the Prohibition of Nuclear Weapons and the NPT', *Arms Control Law* (Blog Post, 20 August 2018) <https://armscontrollaw.com/2018/08/20/friend-or-foe-the-treaty-on-the-prohibition-of-nuclear-weapons-and-the-npt/>, archived at <https://perma.cc/H9F7-6L7K>; Treasa Dunworth, 'The Treaty on the Prohibition of Nuclear Weapons' (2017) 21(12) *ASIL Insights* <https://www.asil.org/insights/volume/21/issue/12/treaty-prohibition-nuclear-weapons>, archived at <https://perma.cc/QR9U-JE66>.

pursued? In other words, does the simpler entry-into-force requirement and broader scope of the testing prohibition under the *TPNW* risk detracting from the *CTBT*? There are certainly some grounds for concern here. Marco Pedrazzi, for example, has noted the issue that states may be induced to ratify the *TPNW* either without ratifying the *CTBT* or by withdrawing their signature from the *CTBT*.[274] Switzerland also suggests that the *TPNW* testing prohibition may risk further delaying the entry into force of the *CTBT* and may threaten to prevent the realisation of its extensive verification and monitoring framework.[275] Other commentators have similarly argued that the adoption of the *TPNW* may encourage 'forum shopping',[276] whereby states decide to ratify the *TPNW* while 'opting out' of existing instruments, including the *NPT* and *CTBT*. In essence, the adoption of the *TPNW* offers states the potential to choose between the different instruments currently in operation[277] and risks further fragmentation of the nuclear disarmament framework.

However, this argument neglects three key points. First, no state has currently expressed an intention to leave existing nuclear disarmament treaties, including the *CTBT*, in favour of the *TPNW*.[278] On the contrary, and as previously noted, numerous states have regularly argued that the *TPNW* will complement the existing regulatory structure.[279] In fact, ban supporters frequently urge the remaining annex 2 states to ratify the *CTBT* as a matter of urgency.[280] Moreover, should any NNWS decide to withdraw from either the *NPT* or *CTBT*, it is unlikely that the *TPNW* will be the 'sole or even primary trigger for such developments'.[281] Rather, it would likely be other reasons, such as frustration with the slow pace of disarmament and the inequality of the *NPT*, amongst other factors, which may lead NNWS to withdraw from existing commitments.

Secondly, and as noted previously, the *TPNW* preamble recognises the 'vital importance of the *Comprehensive Nuclear-Test-Ban Treaty* and its verification regime as a core element of the nuclear disarmament and non-proliferation regime'.[282] This clearly emphasises an intention of the negotiators to recognise the vital importance of achieving the *CTBT*'s entry into force and the

---

274 Pedrazzi (n 148) 228.

275 Dallafior (n 194) 2.

276 See, eg, Gasser (n 248) 124; Adam Mount and Richard Nephew, 'A Nuclear Weapons Ban Should First Do No Harm to the NPT', *Bulletin of the Atomic Scientists* (online, 7 March 2017) <https://thebulletin.org/2017/03/a-nuclear-weapons-ban-should-first-do-no-harm-to-the-npt/>, archived at <https://perma.cc/M9C8-JFLB>.

277 Erästö (n 249).

278 As similarly noted by Kjølv Egeland et al, 'The Nuclear Weapons Ban Treaty and the Non-Proliferation Regime' (2018) 34(2) *Medicine, Conflict and Survival* 74, 87–8.

279 See, eg, Ambassador Geraldine Byrne Nason, 'Statement by HE Ambassador Geraldine Byrne Nason Permanent Representative of Ireland' (Speech, 2019 Preparatory Committee Meeting of the Parties to the Treaty on the Non-Proliferation of Nuclear Weapons (NPT), 30 April 2019) <http://reachingcriticalwill.org/images/documents/Disarmament-fora/npt/prepcom19/statements/30April_Ireland.pdf>, archived at <https://perma.cc/J7SA-9BM6>.

280 See Ina H Krisnamurthi, 'Statement by HE Ms Ina H Krisnamurthi Deputy Permanent Representative of the Republic of Indonesia on Behalf of the Non-Aligned Movement' (Speech, 73rd Session United Nations General Assembly, 18 October 2018) [18] <http://statements.unmeetings.org/media2/20304073/indonesia.pdf>, archived at <https://perma.cc/G4EB-GQUL>.

281 Erästö (n 249).

282 *TPNW*, UN Doc A/CONF.229/2017/8 (n 12) Preamble para 19.

operationalisation of its extensive verification framework. In no way could the adoption of the *TPNW* therefore be considered a move against the *CTBT*. In fact, verifying compliance with the explosive testing prohibition under art 1(1)(a) of the *TPNW* can only occur in conjunction with the *CTBT* monitoring framework.

Finally, and perhaps most importantly, the *CTBT* has not yet entered into force due to the reluctance of the annex 2 'hold out' states to ratify the agreement.[283] Of these hold out states, six are current NWPS, with the DPRK, India and Pakistan not having even signed the *CTBT* thus far.[284] Yet significantly, these very same hold out states are the ones expressing the greatest opposition to the *TPNW*. By contrast, and as noted above, the majority of non-aligned NNWS that supported the *TPNW* have already ratified the *CTBT* and have not indicated an intention to withdraw from the *CTBT*. As such, it is not the non-aligned NNWS that pose a threat to the future of the *CTBT* but rather the hold out NWPS, which are equally against the *TPNW* as they are against ratifying the *CTBT*.[285] Consequently, it seems that the growth of support for the *TPNW* will not discourage efforts to promote *CTBT* entry into force and instead may provide additional reinforcement to the *CTBT*, which is held hostage by the remaining annex 2 states.

Overall, there is clear reason to believe that the effect of art 18 of the *TPNW* will allow the *TPNW* to harmoniously reinforce the *CTBT* without undermining the associated verification benefits gained from the *CTBT*'s entry into force. The broader testing prohibitions established by the *TPNW* simply expand upon and are an evolution of the earlier obligations under art I(1) of the *CTBT*. Yet this by no means replaces the importance of achieving the *CTBT*'s ratification, especially to realise the full operation of the *CTBT*'s extensive verification and monitoring framework discussed earlier. In addition, no *TPNW*-supporting NNWS has expressed any indication that the *TPNW* is viewed as a replacement of the *CTBT*; in fact, the only reason that the *CTBT*'s entry into force has been delayed is due to the lack of ratification by the NWPS and certain NNWS annex 2 states such as Egypt. In effect, the *TPNW* represents an additional layer of support to the prohibitions established by the *CTBT* and other obligations assumed elsewhere, thereby complementing existing testing prohibitions for present purposes.

VIII CONCLUSION

The adoption of the *TPNW* offers a welcome reinforcement of the international testing prohibition regime and helps complement the increasingly strained *CTBT*. The entry into force of the *CTBT* would of course represent a truly welcome development for current efforts towards nuclear disarmament, allowing the operation of the CTBTO verification framework as well as confirming a legally binding prohibition on all forms of testing. Yet pending such an event, the more achievable entry into force of the *TPNW* will provide various other benefits. First, it will create a legally binding prohibition on nuclear weapon test explosions, reflecting the prohibitions under art I(1) of the *CTBT*, which are not legally binding

283 See above Part III(C).
284 'Status of Signature and Ratification' (n 99).
285 Pedrazzi (n 148) 228.

pending entry into force.[286] Secondly, the *TPNW* will close the 'loophole' of the *CTBT* by prohibiting subcritical and computer simulated testing and thus impose broader, more restrictive obligations upon future states party. This clearly helps advance the object and purpose of both the *TPNW* and the *CTBT* in preventing nuclear proliferation and contributing towards nuclear disarmament.

Finally, the benefits of the *TPNW* are not wholly deprived of value in light of the opposition expressed by the NWPS thus far. At a minimum, upon entry into force, the *TPNW* will impose legally binding prohibitions of all forms of nuclear weapon testing upon its states party, the majority of whom will likely be NNWS. This will at least reaffirm the norm against nuclear non-proliferation and reinforce the growing norm and taboo against nuclear weapon testing. Although the NWPS remain the primary 'targets' of a testing prohibition, it would be incorrect to deprive the *TPNW* of any meaning whatsoever, particularly as these states may, in the distant future, become more amenable to ratifying the ban treaty. In addition, the evolution of the nuclear weapon testing prohibition by no means detracts from the continued importance of achieving the *CTBT*'s entry into force in order to realise the full potential benefits of its extensive verification framework. As such, the *TPNW* does not attempt to replace the *CTBT*, as many of the supporters of the Treaty and its preamble emphasise, but rather seeks to reinforce efforts to prohibit nuclear testing in a harmonious manner.

---

[286] This is subject to the obligation not to defeat the object and purpose of the treaty under art 18 of the *VCLT* as discussed in Part II(C). For any coexisting, parallel customary international law prohibition that may possibly exist, see above nn 17–18 and accompanying text.