International law relating to the Illegal Trade in Nuclear Material

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The ongoing illegal trade in nuclear material creates the potential for a nuclear terrorist attack because all material that is outside official state control could end up in criminal or terrorist hands. For this reason, the illegal trade of nuclear material is a global threat that requires a global response, making international law an important tool in addressing this issue. This chapter examines the international treaties that deal with the illegal trade of nuclear material. The scope and operation of each treaty is considered to show how it seeks to prevent the illegal trade. There has been progress in international law requirements concerning the physical protection of nuclear material and recognition of non-state actors as potential users of nuclear material. Nonetheless issues of enforceability and overlap between each treaty limit the effectiveness of international law in dealing with the illegal trade of nuclear material.

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I. Introduction

In 1946, the scientist largely responsible for weaponising nuclear technology, Robert Oppenheimer, was asked whether a small group of individuals could blow up New York City using a smuggled nuclear weapon; he responded, with certainty, in the affirmative.[1] When asked how this could be prevented, Oppenheimer's only solution was to use a screwdriver to open and check all luggage and freight being brought into the city.[2] In other words, it was an impossible feat. These statements show that as early as 1946, warning bells were sounding over the risk posed by the illegal trade of nuclear material. It was clear that each instance of nuclear smuggling created the potential for a nuclear terrorist attack.

While there are many steps between possessing nuclear material and manufacturing a nuclear bomb, experts stress that the most effective way to prevent nuclear terrorism is to stop non-state actors from obtaining nuclear material in the first place.[3] In this context, international law is an essential tool, because the global nature of a nuclear threat necessitates a global response. As then Secretary of the United Nations (UN) Kofi Annan commented, 'were a nuclear terrorist attack to occur, it would cause not only widespread death and destruction, but would stagger the world economy and thrust tens of millions of people into dire poverty'[4]. This widespread and multifaceted impact of a nuclear attack means a state is not safe simply because their own nuclear facilities are secure. Rather, 'a

1 Rolf Mowatt-Larssen, *The Armageddon Test*, (2009) 1.

2 Ibid.

3 Paige Willan, 'The Convention on the Suppression of Acts of Nuclear Terrorism: An Old Solution to a New Problem' (2008) 39 (Spring) *Georgetown Journal of International Law* 527, 534.

4 Graham Allison, 'The ongoing failure of imagination' (2006) 62(5) *Bulletin of the Atomic Scientists* 34, 37.

malicious act anywhere is a threat to everyone everywhere'[5], and nuclear security is only 'as good as its weakest link'[6]. To this effect, it is in each state's own security interests to ensure all nuclear material around the globe is secure, which means international cooperation is crucial.[7] The role of international law is to facilitate this cooperation and set a universal standard for nuclear security, so that states are not left vulnerable by the illegal trade of nuclear material occurring outside their own territory.

This chapter considers these treaties that relate specifically to the illegal trade of nuclear material, including:

- The *Treaty on the Non-Proliferation of Nuclear Weapons* (*NPT*);[8]
- The *Convention on the Physical Protection of Nuclear Material* (*CPPNM*);[9]
- UN Security Council *Resolution 1540*;[10]
- *Amendment to the Convention on the Physical Protection of Nuclear Weapons* (*Amendment to the CPPNM*);[11] and
- The *International Convention for the Suppression of Acts of Nuclear Terrorism* (*NTC*).[12]

The purpose of this chapter is to explore the scope and operation of these treaties in dealing with the illegal trade of nuclear material. To do so, the chapter presents a timeline of these treaties, individually highlighting the historical and political context which prompted their development. Provisions that deal with the illegal trade of nuclear material are identified and analysed. The strengths and weaknesses of each treaty is then discussed to assess to what extent this framework functions collectively.

5 Anthony C Wetherall, 'Strengthening the international legal framework for nuclear security: Better sooner rather than later' (2016) 2(98) *Nuclear Law Bulletin* 7, 10.
6 IAEA, *Calculating the New Global Nuclear Terrorism Threat* (27 October 2001).
7 Wetherall (n 5).
8 Opened for signature 1 July 1968, 729 UNTS 161 (entered into force 5 March 1970).
9 Opened for signature 3 March 1980, 1456 UNTS 101, (entered into force 8 February 1987).
10 UN Security Council, *Resolution 1540 (2004) adopted by the Security Council at its 4956th meeting on 28 April 2004*, UN Doc S/RES/1540 (28 April 2004).
11 Opened for signature 8 May 2016, INFCIRC/274/Rev.1/Mod.1, (entered into force 8 July 2005).
12 Opened for signature 13 April 2005, 2445 UNTS 89 (entered into force 7 July 2007).

The individual examination of these treaties has been the subject of much academic research and commentary in the early to mid 2000 s, when nuclear security was re-assessed in the post 9/11 era. This chapter fills a gap in the literature, for there has been little research specifically focused upon illegal nuclear material trade, as opposed to nuclear security as a whole. In researching this topic, the most significant challenges were the lack of specific case law or substantive information on instances of illegal trade of nuclear material. This limitation means the chapter does not include a discussion on how these treaties are being used by states in practice to prevent and suppress the illegal trade of nuclear material.

The chapter ultimately shows that the current international legal framework is not wholly effective in mitigating the nuclear terrorism threat posed by non-state actors. While these treaties establish the international community's agenda to target the illegal trade of nuclear material, the desired consistent and global response is undermined by the system's reliance on individual states to implement protection measures when there are no mandatory minimum standards of physical protection.

II. Background and Overview

The agreements discussed in this paper are the product of three main historical periods: the Cold War, the breakdown of the Soviet Union and the post-9/11 era. The ideological Cold War conflict between the United States and Soviet Union brought with it a nuclear arms race and the threat of mutually assured destruction, if either state launched a nuclear attack.[13] This context prompted the development of both the *NPT* and *CPPNM.* Negotiations for the *NTC* were kickstarted by the disintegration of the Soviet Union in 1991 which led to 'loose nuke' fears, as nuclear facilities across former Soviet States were abandoned and nuclear material began to go missing.[14] However it was not until 9/11, which made clear terrorists actors could independently plan and carry out large scale attacks

13 Hendrik A. Strydom, *Weapons of Mass Destruction*, Max Planck Encyclopedias of International Law (February 2017) [8].

14 Thomas Burch, 'Non-State Actors in the Nuclear Black Market: Proposing an International Legal Framework for Preventing Nuclear Expertise Proliferation & Nuclear Smuggling by Non-State Actors' (2004) 2(1) *Santa Clara Journal of International Law* 84, 88.

without state support, that more action was taken to target the possibility of a nuclear attack by non-state actors.[15] This context led *Resolution 1540*, the *Amendment to the CPPNM* and the *NTC* to enter into force across 2004 and 2005. There have been no further international treaties specifically targeting the illegal trade of nuclear material since 2005.

In these treaties, the term nuclear material is referring to 'weapons-grade' uranium or plutonium, which indicates it has been enriched to a level that would allow for the manufacture of a nuclear bomb.[16] These agreements characterise the illegal trade of nuclear material in several ways. It can occur between states, where one party is a designated non-nuclear state under the *NPT,* and therefore banned from possessing nuclear material for military purposes, between a state and a non-state actor, or between two non-state actors.[17] This third form, trade between two non-state actors, is the focus of this chapter and is an example of the relationship between organised crime networks and terrorist groups. This narrow scope has been chosen, as the non-traditional nature of the security threat posed by these non-state actors, challenges the effectiveness of traditional State-based mechanisms, such as international law.[18] This is because terrorist and criminal actors 'rely on the same global transportation, communication and financial infrastructures for illegal ploys. They take advantage of the same breakdowns in authority and enforcement in states under siege'.[19] This refers to the way globalisation has empowered non-state actors. Their lack of defined physical territory and exclusion from a state-centric international system means terrorist and criminal groups can take advantage of global trade networks to effectively move people and goods between states unnoticed.[20] At the

15 Christopher C Joyner, 'Countering Nuclear Terrorism: A Conventional Response' (2007) 18(2) *European Journal of International Law* 225, 226.

16 *CPPNM,* art. 1(a) and NTC, art. 1(2): '*nuclear material* means plutonium except that with isotopic concentration exceeding 80% in plutonium-238; uranium-233; uranium enriched in the isotopes 235 or 233; uranium containing the mixture of isotopes as occurring in nature other than in the form of ore or ore-residue; any material containing one or more of the foregoing'.

17 Barry Kellman and David S Gualtieri, 'Barricading the Nuclear Window: A Legal Regime to Curtail Nuclear Smuggling' (1996) 3 *University of Illinois Law Review* 667, 677.

18 Ibid.

19 Lyudmila Zaitseva, 'Organized Crime, Terrorism and Nuclear Trafficking' (2007) 6(5) *Strategic Insights* [2].

20 Ibid.

same time, a globalised world has inhibited traditional mechanisms like international law, which relies on states individually upholding protection measures and maintaining control of their sovereign borders.[21]

When considering the illegal trade of nuclear material by non-state actors, it becomes difficult to separate the illegal trade from nuclear terrorism. The fear of a 'nuclear 9/11' remains, but how likely is a nuclear terrorist attack? In 2010, President Barack Obama designated nuclear terrorism as 'the single biggest threat to US security… [in the] short-term, medium-term, and long-term'[22]. In the same year, academic John Mueller compared concern about nuclear terrorism to believing in the 'tooth fairy'[23]. Broadly, academic consensus sits somewhere between these two views. Even if a terrorist group were successfully to acquire the quantity of weapons grade uranium or plutonium needed, much technical expertise and funding would be required to turn this material into the kind of nuclear weapon seen in World War Two.[24] However, creating a more crude, yet still devastating, nuclear explosive device is said to be more than possible, 'if you had a softball-sized lump of enriched uranium, some materials mostly available at Radio Shack [an electronics store] and an engineering grad from an American university'[25]. This speaks to the capacity of non-state actors to engineer a nuclear attack should they obtain this material.

However, there is a strong view that it would not be strategically beneficial for terrorist groups to use this nuclear material due to the consequent military backlash from states.[26] It is also noted that 'there is no hard evidence to link organised crime groups with nuclear smuggling activities' and this trade is likely unprofitable for criminal groups.[27] The relative lack of data available on instances of nuclear material trade due to state secrecy over their nuclear stores makes it all the more challenging to

21 Ibid.

22 Barack Obama, as cited in, David Jackson, 'Obama: Nuclear terrorism is 'the single biggest threat' to U.S.', *USA Today* (online), 11 April 2010.

23 Mueller, John, *Atomic Obsession: Nuclear Alarmism from Hiroshima* (2010), 210.

24 World Nuclear Association, 'Safeguards to Prevent Nuclear Proliferation' (Web Page, September 2018).

25 Burch (n 14) 87.

26 Christopher McIntosh and Ian Storey, 'Between Acquisition and Use: Assessing the Likelihood of Nuclear Terrorism' (2018) 62(2) *International Studies Quarterly* 289, 294.

27 Lyudmila Zaitseva and Kevin Hand, 'Nuclear Smuggling Chains: Suppliers, Intermediaries, and End-Users' (2003) 46(6) *American Behavioural Scientist* 822, 830.

determine the scale of the illegal nuclear material trade, and whether this connection exists between organised crime and terror groups. In 2019, the IAEA confirmed 3,686 incidents of illegal trade in nuclear material since 1993.[28] The majority of these incidents, where there had been suspected involvement by organised crime networks, occurred in the former Soviet Union, specifically Ukraine, Russia, Georgia, Belarus and Kazakhstan.[29] This seems largely a legacy of the 'Cold War' which led to these states possessing a much greater amount nuclear material.[30] Per year, the number of nuclear trafficking cases confirmed by the IAEA is a very small number, with a peak of 20 cases in 2006, and only 6 known cases in 2019.[31] Despite these low numbers and lack of evidence which links these instances to organised crime and terror groups, underestimating the likelihood of nuclear terrorism is a strategic gamble. Given the potentially large scale of devastation and disruption just one attack could have upon global peace and security, 'the only acceptable level of this crime [nuclear terrorism] is zero'[32]. It is for this reason that the illegal trade of nuclear material should be considered very seriously. Similarly, despite lacking evidence, the potential involvement of organised crime has significant consequences, given their proven ability to efficiently move and sell illegal goods undetected.[33] These considerations, coupled with the instability of the current global system and the growing nuclear programs of Iran and North Korea, make clear that it is best to remain prepared for the threat of nuclear terrorism.[34] An examination of the international legal framework relating to the illegal trade of nuclear material thus remains relevant.

28 IAEA Incident and Trafficking Database, *Incidents of nuclear and other radioactive material out of regulatory control: 2020 Fact Sheet* (2020) 2.

29 Zaitseva (n 19) [Table 1].

30 Kellman and Gualtieri (n 17) 673–4.

31 IAEA Incident and Trafficking Database (n 28) 2.

32 Willan (n 3) 533.

33 Zaitseva and Hand (n 27) 830.

34 Matthew Bunn, Nickolas Roth and William H Tobey, *Revitalizing Nuclear Security in an Era of Uncertainty* (2019) 18.

III. Treaty on the Non-Proliferation of Nuclear Weapons (NPT)

1. Historical Context and Purpose

The *Treaty on the Non-Proliferation of Nuclear Weapons* is relevant to the illegal trade of nuclear material because it establishes an underlying principle of the non-proliferation regime; only states can possess and use nuclear material. A product of the Cold War, the *NPT* was the first international agreement to regulate the production and transfer of nuclear weapons.[35] Ireland was the first state to propose a resolution at the UN to manage the risk posed by the Cold War's nuclear arms race.[36] Speaking to the General Assembly in 1958, Ireland's representative argued: 'the danger now exists that an increase in the number of states possessing nuclear weapons may occur aggravating international tension and the difficulty of maintaining world peace and thus rendering more difficult the attainment of the general disarmament agreement'[37]. This references the global nuclear arms race and suggests that the *NPT* was desired not only to regulate the number of nuclear-weapon states, and thus decrease the risk of conflict, but also to act as a first step towards nuclear disarmament.[38] In 1965, negotiations for the treaty finally began, with the *NPT* open for signature in July 1968 and entering force in March 1970.[39]

2. Relevant Provisions

The goal first articulated by Ireland is reflected in the Preamble of the *NPT,* which sets out the agreement's purpose 'to further the easing of international

35 Stuart Casey-Maslen, *The Treaty on the Prohibition of Nuclear Weapons: A Commentary* (2019) 26.

36 UN General Assembly, *Question of Disarmament – Ireland: Draft Resolution*, 13th session, Agenda Item 64, UN Doc A/C.1/L.206 (17 October 1958) [2].

37 Ibid.

38 Christopher C Joyner and Alexander Ian Parkhouse, 'Nuclear Terrorism in a Globalizing World: Assessing the Threat and the Emerging Management Regime' (2009) 45(2) *Stanford Journal of International Law* 203, 224.

39 Bertrand Goldschmidt, 'The Negotiation of the Non-Proliferation Treaty' (1980) 22(3) *IAEA Bulletin* 73, 73.

tension and the strengthening of trust between states in order to facilitate the cessation of the manufacture of nuclear weapons'[40]. The treaty seeks to achieve this through the division of the global community into 'nuclear-weapon' states and 'non-nuclear-weapon' states. The Treaty contains 11 Articles that outline and regulate this division, but Article 1 and 2 are most relevant to this enquiry.

Article 1 asserts that nuclear-weapon states must not 'transfer to any recipient whatsoever nuclear weapons or other nuclear explosive devices' and must 'not in any way to assist, encourage, or induce any non-nuclear-weapon state to manufacture or otherwise acquire nuclear weapons or other nuclear explosive devices'[41]. Article 2 then places the corresponding obligations on non-nuclear states who undertake 'not to receive the transfer from any transferor whatsoever of nuclear weapons or other nuclear explosive devices' and 'not to manufacture or otherwise acquire nuclear weapons or other nuclear explosive devices'[42]. Through these two articles, the *NPT* seeks to manage the risk posed by nuclear weapons by controlling the number of states in possession of these materials and devices. While not achieving total compliance, the *NPT* has constrained state behaviour with only 8 known nuclear weapon states today, and an almost universal acceptance of the treaty by 190 states parties; the only exceptions being India, Israel, Pakistan, South Sudan and North Korea.[43]

3. Strengths and Weaknesses

In relation to the illegal trade of nuclear material, it is this almost universal acceptance that allows the *NPT* to have some impact, despite its failure to consider non-state actors. This is due to the normative effect of a universally recognised framework. The *NPT* limits what is acceptable state behaviour because a failure to comply with the norms it establishes has repurcussions from other states, such as sanctions, and inhibits a state's ability to participate in the international system.[44] This motivates state parties to take appropriate caution in protecting their nuclear stores, thus

40 *NPT*, Preamble.
41 Ibid art 1.
42 Ibid art 2.
43 Casey-Maslen (n 35) 36.
44 World Nuclear Association (n 24).

to some extent making it more difficult for non-state actors to gain access to nuclear material.

This normative influence is undermined by the *NPT*'s assumption that only state actors are capable of using nuclear material, and that by regulating which states parties have access to nuclear material, it will not be accessible to malicious actors. At its best, the *NPT* could only conceive of a rogue state passing nuclear material or weapons on to non-state actors, which continues to place emphasis upon the role of the state in support of terrorist groups. Through their independent suicide attacks, extremist groups, such as Al Qaeda and the Islamic State, have demonstrated this support is unnecessary to generate terror. The result is a 'phase-lag' between the reality envisaged by the *NPT* and the reality of today, where nuclear material is not under the sole control of designated nuclear states, but accessible to non-state actors through the illegal trade.[45] Imrana Iqbal argues that for this reason the *NPT* is incompetent in preventing non-state actors' possession and use of nuclear material.[46] David Jonas and Christopher Swift acknowledge that emphasising the role of states does accurately reflect the challenges non-state actors face in acquiring and using nuclear material.[47] However, they ultimately agree with Iqbal explaining that, 'the rouge state proliferation paradigm… risk[s] exacerbating strategic paralysis by locating the non-state proliferation threat within legal and institutional structures designed to regulate the transfer and the use of nuclear technology among sovereign states'[48]. Here, Jonas and Swift draw attention to an even greater consequence of the *NPT*'s lack of consideration of non-state actors. That with the *NPT* as its foundation, the non-proliferation framework is state-centric. This means that while later treaties may reference non-state actors, they still attempt to deal with this threat within a state system due to the ongoing influence of the *NPT*.

45 Imrana Iqbal, 'International Law of Nuclear Weapons Nonproliferation: Application to Non-State Actors' (2018) 31 (Winter) *Pace International Law Review* 1, 55.

46 Ibid.

47 David S Jonas and Christopher Swift, 'Reformulating the Nuclear Nonproliferation Regime: Al-Qaeda, Global Terrorism and the Rogue State Paradigm' (2008) 13 (Fall) *UCLA Journal of International Law and Foreign Affairs* 337, 347.

48 Ibid.

IV. Convention on the Physical Protection of Nuclear Material (CPPNM)

1. Historical Context and Purpose

The *Convention on the Physical Protection of Nuclear Material* strengthened nuclear security through its protection regime, yet key loopholes in the treaty allow the illegal trade to continue. In March 1980, the *CPPNM* opened for signature, similarly as a product of the Cold War era, and a direct result of the *NPT*'s lack of security obligations for nuclear material. While the *NPT* set out a non-proliferation regime, it did not place any obligations on nuclear states to protect their nuclear facilities.[49] This oversight was recognised by the international community at the General Conference of the IAEA in 1975 and a resolution was passed calling for options for physical protection to be explored.[50] This resolution provided for *CPPNM* negotiations and reflects the Convention's overarching purpose: to prevent the unlawful taking and use of nuclear material by creating protocols for the physical protection of nuclear material when in international transport.[51] To do so, the Convention sets out detailed protection requirements for nuclear material transport between states and criminalises the theft, smuggling, threat to use, or use, of nuclear material.[52] The *CPPNM* therefore has a dual impact: physical protection, which makes it more difficult for non-state actors to access nuclear material, and criminalisation in order to hold offenders to account.

2. Relevant Provisions

In addressing the illegal trade of nuclear material, Article 7(1)(a) is of particular importance, as it requires the criminalisation of 'an act without lawful authority which constitutes the receipt, possession, use, transfer,

49 [s.n.], 'The Incentive Gap: Reassessing U.S. Policies to Secure Nuclear Arsenals Worldwide' (2008) 121(7) *Harvard Law Review* 1864, 1869.

50 IAEA, General Conference, *Resolution adopted during the 183rd plenary meeting on 26 September 1975*, Doc No GC(XIX)/RES/328 (9 October 1975), 2 [6].

51 *CPPNM,* Preamble.

52 Ibid Annex I & II.

alteration, disposal or dispersal of nuclear material and which causes or is likely to cause death or serious injury to any person or substantial damage to property'[53]. Here receipt, transfer and dispersal cover the trade of material, making the *CPPNM* the first international law to criminalise the illegal trade of nuclear material.[54] The impact of the article is that all states parties to the *CPPNM* must legislate an equivalent offence for nuclear material trade in their domestic legislation.[55] Article 9 and 10 establish the *aut dedere aut judicare* principle, meaning states must either allow the extradition of those charged under Article 7 or themselves pursue prosecution.[56] Of importance to this is Article 11, which specifies the *CPPNM* can act as the basis for extradition if the relevant states have no existing arrangement.[57] Article 13 promotes legal assistance and cooperation between states, specifically regarding the supply of evidence.[58] These provisions complement the purpose of the *CPPNM* by giving states more mechanisms to address nuclear material trade in their territory.

3. Strengths and Weaknesses

The main strength of the *CPPNM* is its adoption under the auspices of the IAEA, which means it is supplemented by their technical guidance.[59] This allows the IAEA to inform states parties of the security measures consistent with compliance, giving the *CPPNM* strength and specificity, without these technical details needing to be agreed upon during negotiations.[60]

Several loopholes have been identified in the *CPPNM* which, in combination, mean it has little substantial impact on the illegal trade of nuclear material. Firstly, non-state actors remain without mention, restricting its ability to deal with criminal and terrorist groups, for they are not contemplated by the

53 Ibid art 7(1)(a).
54 Kellman and Gualtieri (n 17) 860.
55 D.L Siazon, 'The Convention on the Physical Protection of Nuclear Material' (1980) 22(3/4) *IAEA Bulletin* 57, 60.
56 Joyner and Parkhouse (n 38) 228.
57 *CPPNM*, art 11.
58 *CPPNM*, art 13.
59 Wetherall (n 5) 27.
60 Siazon (n 55) 60.

Convention as a potential threat. Secondly, the *CPPNM* only applies to nuclear material for peaceful purposes, and so military stockpiles are not subject to the same levels of physical security when transported internationally.[61] This means that 83% of the world's fissile material is excluded from the scope of the *CPPNM.*[62] A meaningful protection regime cannot be created by an agreement that does not apply the majority of nuclear material. Moreover, the *CPPNM* only applies to this non-military nuclear material when it is in international transport and does not create any security obligations for material being used, stored or transported within the state.[63] Instead, the protection of nuclear material domestically is left up to the state. This is considered by some to be the *CPPNM*'s 'most serious flaw', as it means 'states have unconstrained discretion to implement and enforce physical protection measures…[and] [t]here is no way to verify whether a nation is, in fact, protecting its nuclear materials or implementing suggested measures'[64]. In particular, leaving states in control results in uneven implementation because the disparity of economic and technical resources between states means some have a greater ability to implement protection measures than others.[65] Despite its impact on the efficacy of the *CPPNM*, leaving domestic protection obligations up the the individual state was never questioned during negotiations.[66] This demonstrates the maintenance of state sovereignty being prioritised over effective nuclear security. The international community was willing to compromise their response to the illegal nuclear material trade if it meant they maintained exclusive control and autonomy over nuclear stores within their territory.

The effect of this exclusion became evident in the 1990 s when the Soviet Union disintegrated. At that time, more than 30,000 weapons were held across Russia and the former Soviet republics Ukraine, Belarus and Kazakhstan.[67] These conditions created the so-called 'loose nukes' threat,

61 Wetherall (n 5) 17.
62 Ibid.
63 Nicholas D Smith, 'Guarding Pandora's Box: Strengthening physical protection at facilities that house weapons of mass destruction and related materials' (2009) 32 *Fordham International Law Journal* 1043, 1063.
64 Kellman and Gualtieri (n 17) 702.
65 Burch (n 14) 87.
66 IAEA, *Convention on the Physical Protection of Nuclear Material,* (1980) 34.
67 Joyner and Parkhouse (n 38) 207.

as former Soviet nuclear facilities were abandoned.[68] Within these facilities, nuclear material was described at the time by one US official as protected with 'the equivalent to bicycle locks'[69]. Unsurprisingly, this excess availability and minimum security led to large amounts of fissionable material disappearing to be smuggled through Europe and into the Middle East and Central Asia.[70] These events demonstrate the *CPPNM*'s limited effectiveness due to its failure to mandate the practice of states domestically. Altough the former Soviet states may not have had the resources to implement protection measures themselves at this time, required standards of protection in the *CPPNM* would have facilitated other states and the IAEA to provide assistance.

V. United Nations Security Council Resolution 1540

1. Historical Context and Purpose

In an attempt to overcome the shortcomings of the *CPPNM*, the UN Security Council was utilised to remove the treaty negotiation process, with *Resolution 1540* the resulting international agreement. The Resolution specifically targets non-state actor use of weapons of mass destruction (WMDs), either chemical, biological or nuclear, representing a great step forward from the *CPPNM* and *NPT*. Yet, despite this new mechanism, *Resolution 1540* still did not provide a specific and enforceable nuclear material protection regime.

The breakdown of the Soviet Union, and the vulnerabilities it revealed in state protection of nuclear material, was just one of many significant events leading up to *Resolution 1540*'s adoption in April 2004. In 2001, the terrorist attacks of 11 September brought a new reality where major terrorist attacks could be planned independently of a state sponsor, with these terrorist actors having both the capacity and desire to inflict

68 Burch (n 14) 87.

69 Ibid.

70 Rohan Perera, 'International Convention for the Suppression of Acts of Nuclear Terrorism: Introductory Note', *United Nations Audiovisual Library of International Law* (Webpage, 2008).

maximum destruction on civilian populations.[71] While not involving any nuclear material, 9/11 had major implications for nuclear security, as it undercut '[the] presumption, which up to [then], played a major role behind assessments of what is required to defend nuclear materials and facilities against terrorists and sabotage'.[72] This assumption was that nuclear weapons would not be sought out by terrorist organisations because of the cost of their own life in such an attack.[73]

At this point, the United States was leading calls for a revision of the *CPPNM* and increased measures to fight the global terrorist threat.[74] With the *NTC* still stalled in negotiations, the idea of utilising the Security Council to improve nuclear security was raised. At the UN General Assembly in 2003, the representative of the United Kingdom noted, 'we all know that proliferation is one of the greatest threats we face. Much good work is being done by UN agencies…but the SC itself has not addressed this issue for 10 years. It is time that it did'[75]. Yet inaction continued until 2004 upon the discovery of the 'A Q Khan' network. This discovery revealed that Pakistan's top nuclear scientist, Abdul Qadeer Khan, had been heading a global criminal network to trade nuclear material, technology and expertise for more than two decades.[76] It is at this point that the international community decided to act.

Resolution 1540 is thus both the specific response of the international community to this revelation, and more broadly a response to almost two decades of legislative paralysis in treaty negotiations, despite vast changes to the strategic climate worldwide, specifically the capacity of non-state actors.[77] It follows that the purpose of *Resolution 1540* is strictly focused on preventing non-state actors from accessing WMDs or their related material.[78]

71 Joyner (n 15) 226.

72 Larry D Johnson, 'The Threat of Nuclear Terrorism and September 11th: Wake-up Call to Get the Treaties Right' (2002) 31(Fall) *Denver Journal of International Law and Policy* 80, 80.

73 Ibid.

74 David Albright and Corey Hinderstein, 'Unraveling the A. Q. Khan and future proliferation networks' (2005) 28(2) *Washington Quarterly* 109, 121.

75 Merav Datan, 'Security Council Resolution 1540: WMD and Non-State Trafficking' (2005) 79 *Disarmament Diplomacy.*

76 Albright and Hinderstein (n 74) 111.

77 Smith (n 63) 1044.

78 UN Security Council (n 10) Preamble [8].

2. Relevant Provisions

Addressing the illegal trade of nuclear material is specifically raised as necessary to achieve the Resolution's purpose. The preamble sets out the illegal trade of nuclear material as 'a new dimension to the issue of proliferation of such weapons and also poses a threat to international peace and security'.[79] This sets *Resolution 1540* apart from the nuclear proliferation regime envisaged by the *NPT*, and continued by the *CPPNM*, which does not contemplate the capacity of this new actor as a threat to nuclear security.[80]

As a Resolution of the Security Council, *Resolution 1540* is legally binding on all UN Member states and requires them to:

1. Refrain from supporting non-state actors in endeavours 'that attempt to develop, acquire, manufacture, possess, transport, transfer or use nuclear…weapons and their means of delivery'[81].
2. 'Adopt and enforce appropriate effective laws' to prohibit non-state actors from manufacturing, acquiring, possessing, financing, transporting or using nuclear weapons;[82] and
3. Develop 'effective measures to establish domestic controls to prevent the proliferation of nuclear…weapons and their means of delivery' ncluding 'appropriate effective physical protection measures'[83].

Here, illegal trade of nuclear material is addressed by the 'appropriate effective' laws that prevent non-state actor possession and transportation of nuclear material, as well as 'appropriate effective' measures to secure the nuclear material.

79 Ibid [9].
80 Iqbal (n 45) 19.
81 UN Security Council (n 10) 1.
82 Ibid [2].
83 Ibid [3].

3. Strengths and Weaknesses

Resolution 1540 is considered by some academics as the most important part of the international framework dealing with the illegal trade of nuclear material because it specifically targets non-state actors.[84] This signalled a change in the international community's approach to nuclear security to face the reality of 21st century threats. The symbolic shift brought by the Resolution is complemented by other key strengths, which set it apart from other agreements. Firstly, as the *CPPNM* at this time only applied to nuclear material in international transport, the Resolution was 'essentially the only international legal instrument requiring physical protection of nuclear material in storage for domestic use'[85]. This not only closed a major loophole left by the *CPPNM*, but also helped the international community adjust to an international agreement interfering within a state's territory to mandate nuclear material protection measures. The Resolution created the '1540 Committee', which provides for a built-in accountability mechanism, as States are required to report on their implementation progress, so that compliance can be monitored.[86] In the most recent report from 2016, the Committee made clear that states were broadly improving their levels of compliance, but it also noted 17 States that were still to submit their first progress report.[87] The Resolution has a specific enforcement mechanism through its adoption under Chapter 7 of the *UN Charter*[88], which means the Security Council can (at least theoretically) respond to violations that they deem a threat to 'international peace and security' with a range of non-military or military options under Article 41 and 42.[89] This is another distinguishing feature of *Resolution 1540*; the other conventions impose obligations, yet do not provide explicitly for how these obligations should be enforced.[90]

84 [s.n.] (n 49) 1870.
85 Wetherall (n 5) 19.
86 [s.n.] (n 49) 1870.
87 UN Security Council, *Report of the Security Council Committee established pursuant to resolution 1540 (2004)*, Security Council Committee established pursuant to resolution 1540 (2004), UN Doc S/2016/1038 (9 December 2016) 2.
88 *Charter of the United Nations*, opened for signature 26 June 1945, 1 UNTS XVI (entered into force 24 October 1945).
89 *Charter of the United Nations*, art 39.
90 [s.n.] (n 49) 1871.

Given the difficulty of achieving consensus in the Security Council, robust enforcement action is unlikely to be politically viable. The 2016 report exemplifies this, as many states reported their compliance with the Resolution as incomplete, yet no action was taken, much less the use of military force be contemplated.[91] The political viability of enforcing *Resolution 1540* is further impacted by its vagueness. The text talks of 'appropriate effective' laws and measures, but the essential elements of an 'appropriate effective' nuclear security regime are not defined, and so the implementation approach taken by states varies greatly.[92] This lack of specificity was acknowledged by states at the time of negotiating, for example one representative criticised the text for being 'riddled with ambiguities'[93]. There are two views expressed in academia as to why this was not fixed. On one side, Jonas and Swift acknowledge the difficulty of creating a 'one size fits all' approach, thus arguing that the vagueness is representative of 'the absence of a meaningful international consensus regarding the most appropriate instrument for curbing nuclear proliferation'.[94] In comparison, Wetherall argues that specific measures and protections do exist, but international law does not facilitate their implementation, rather provisions are necessarily vague to ensure consensus can be reached.[95] Either way, for *Resolution 1540* this ambiguity means it is difficult, if not impossible, for the Security Council to consistently define when a state is in violation of the agreement, and therefore it is unlikely assertive enforcement action could be agreed upon.[96]

91 UN Security Council (n 89) 2.
92 [s.n.] (n 49) 1877.
93 Smith (n 63) 1044.
94 Jonas and Swift (n 47) 352.
95 Wetherall (n 5) 19.
96 [s.n.] (n 49) 1877.

VI. Amendment to the Convention on the Physical Protection of Nuclear Material

1. Historical Context and Purpose

The *Amendment to the Convention on the Physical Protection of Nuclear Material*, which opened for signature in July 2005, was prompted by the same political and strategic context as *Resolution 1540*.

Following 9/11, the physical protection of nuclear material was a high priority given the new recognition of threats originating from non-state actors, operating independently and outside of the target state's territory. The Academic Larry Johnson makes clear this new understanding after 9/11, stating:

> *...what happens in other parts of the world can have a direct impact upon America's safety and security. While we strive to make sure our own nuclear facilities are safe... a potential terrorist might well be able to obtain material through theft or illegal purchase in other countries for delivery to our doorstep.*[97]

This highlights the view that the physical protection of nuclear material was to be prioritised over criminalisation or other measures to prevent trade between non-state actors from even occurring in the first place. Thus, adapting the *CPPNM* to ensure it suited this new globalised world became a necessary next step.

2. Relevant Provisions

The *Amendment's* key change from the original *CPPNM* is the inserted Article 2 A, which requires States to establish a physical protection regime for nuclear material in *domestic* transport, storage or use, rather than international transport only.[98] Article 5.5 of the *Amendment to the CPPNM* facilitates State cooperation to develop and enforce these protection obligations, where it 'enables direct cooperation and consultation between

97 Johnson (n 72) 81.

98 *Amendment to the Convention on the Physical Protection of Nuclear Material* (*Amendment to the CPPNM*), opened for signature 8 July 2005, 1456 UNTS 101 (entered into force 8 May 2016) art 2 A.

state parties or…through the IAEA, with a view of obtaining guidance on the design, maintenance and improvement of physical protection systems for nuclear material'[99].

Furthermore Article 7, which defines nuclear smuggling, is altered by the *CPPNM Amendment*. Here, the scope of liability for nuclear material trade is widened to include action that causes or is likely to cause damage to the environment, rather than previously only to people or property.[100] Subsections (h) and (i) have been added, meaning that individuals are liable for attempt or directing others.[101] Subsection (k) further decrees that 'an act which contributes to the commission' of any of the offences, 'shall be intentional', and be done with the aim of furthering criminal activity or knowledge of it.[102] This means prosecutors do not have to establish the intention or actual knowledge of offenders as was required in the original *CPPNM*. The *Amendment to the CPPNM* also makes reference to non-state actors, signalling in the preamble that states are 'deeply concerned by the worldwide escalation of acts of terrorism in all its forms and manifestations, and by the threats posed by international terrorism and organised crime'[103]. This acknowledgement that terrorist organisations can access nuclear material from criminal networks, with no need of a state sponsor, makes the Convention fit for the strategic reality of the 21st century.

3. Strengths and Weaknesses

The *Amendment's* strengths come from these changes to the *CPPNM*; however, perhaps the two biggest weaknesses of the original Convention remain unchanged. Firstly, military nuclear material and facilities remain excluded from physical protection obligations. Rauf identifies that this reflects the wishes of nuclear armed states, who during negotiations proved 'unwilling to formally accept an internationally legally binding regime for the physical protection of military nuclear materials, associated

99 Peri Lynne Johnson, 'Facilitating the entry into force and implementation of the Amendment to the Convention on the Physical Protection of Nuclear Material: Observations, challenges and benefits' (2014) 2(94) *Nuclear Law Bulletin* 9, 20.

100 *Amendment to the CPPNM*, art 2 A.

101 Ibid art 7(1)(h) – (i).

102 Ibid art 7(1)(k).

103 Ibid Preamble [9].

facilities and warheads'[104]. Here, the transparency required to impose protection obligations on military nuclear material is deemed unacceptable by nuclear states, who view it as an attack on their strategic autonomy.[105] This again exemplifies state sovereignty interfering with the development of an effective protection regime.

Moreover, implementation of the protection regime remains up to the state, consequently there are the same issues of uneven implementation due to the technical capacity and political will of individual states. This is exacerbated through the lack of a specified minimum level of protection for domestic stocks and the inclusion of a legitimate 'opt out' clause.[106] Subsection 4(a) of Article 2 A provides that the *Amendment to the CPPNM* does not apply to nuclear material that the state 'reasonably decides does not need to be subject to the physical protection regime'[107]. The effect of this is significant, for it means 'states could presumably fulfill their obligations by establishing rules that provide merely a modicum of physical protection, even if these measures did not substantially reduce the likelihood of theft'[108]. This makes it clear that the *Amendment to the CPPNM* did not meaningfully improve the international legal framework's impact on the illegal nuclear material trade because states still have the power to disregard physical protection obligations for domestic nuclear stores.

VII. International Convention for the Suppression of Acts of Nuclear Terrorism (NTC)

1. Historical Context and Purpose

The *NTC* focuses upon the criminalisation of acts relating to nuclear terrorism. Opening in September 2005, this Convention was also first prompted by the collapse of the Soviet Union and fears about nuclear

104 Tariq Rauf, *The entry into force of the Amendment to Convention on the Physical Protection of Nuclear Material: A key step in strengthening nuclear security – but is it enough?* (May 2016) 3.

105 Ibid.

106 Ibid.

107 *Amendment to the CPPNM*, art 2 A(4)(a).

108 [s.n.] (n 49) 1875.

security in the 1990 s, which led to the establishment of the UN Ad Hoc Committee to Eliminate Terrorism in 1996.[109] The purpose of this committee was to 'to elaborate an international convention for the suppression of terrorist bombings and, subsequently, an international convention for the suppression of acts of nuclear terrorism, to supplement related international implements'[110].

The first draft of the *NTC* was submitted to the Committee by the Russian Federation in 1998 based on the view that existing international treaties, specifically the *CPPNM*, were insufficient to address nuclear terrorism.[111] Given the majority of nuclear trafficking incidents at the time were taking place in Russia and other parts of the former USSR, it seems likely these were more specific fears driving Russia's proposal.[112] The *NTC* is thus focused upon defining what constitutes 'nuclear terrorism'. It does so by setting out a series of offences, which it criminalises as acts of nuclear terrorism and which state parties are required to legislate into their domestic law.[113] These provisions cover the intentional and unlawful possession, threat to use or use of nuclear materials, or devices to cause injury to others.[114]

2. Relevant Provisions

Through the offences set out in the *NTC*, the illegal trade of nuclear material is designated as an act of nuclear terrorism that had not been specifically legislated by previous agreements. Under Article 2(1)(a), an offence is committed if any person lawfully and intentionally 'possesses radioactive material or makes or possesses a device' with the intent to cause death, injury, damage to property or damage to the environment.[115] Here,

109 Iqbal (n 45) 13.

110 UN General Assembly, *Resolution adopted by the General Assembly: Measures to eliminate international terrorism*, UN DOC A/RES/51/210 (16 January 1997) 5.

111 UN General Assembly, *Explanatory Note to the draft convention on the suppression of acts of nuclear terrorism submitted by the Russian Federation*, Ad Hoc Committee stablished by General Assembly Resolution 51/210, 2nd Session, UN Doc A/AC.252/L.3/Add.1 (14 January 1998) [4].

112 Perera (n 70).

113 Iqbal (n 45) 15.

114 NTC art 4.

115 Ibid art 2(1)(a), (a)(i) – (ii).

'radioactive material' is defined to include nuclear material.[116] The requirement to prove intention does make it more difficult to prosecute criminal groups who are trading in nuclear material, for when they have possession of the material, it could be argued they have no intention to use it to cause harm, merely to make a profit. Article 2(4) attempts to deal with this issue by focusing upon accomplices. Here, a person commits an offence if they organise, direct others, or contribute to the commission of an offence.[117] This covers the illegal trade as enabling terrorist actors to access nuclear material contributes to the possessory offence.[118] However, there is again an intention requirement, where the individual must have acted with the aim of furthering terrorist activity or with knowledge of the group's intention.[119] While this likely does not preclude criminal groups selling to terrorist organisations, it does make it more difficult to prosecute a nuclear facility where the criminal group acts as a middle man between nuclear facility employees and the terrorist organisation.[120]

3. Strengths and Weaknesses

It is difficult to illustrate the value of the *NTC* as the latest treaty dealing with this issue because it does not contribute any significantly different solutions or mechanisms to those established in the *NPT*, *CPPNM*, *Amendment* and *Resolution 1540*. While the *NTC* is the first Convention to designate the illegal trade of nuclear material as 'nuclear terrorism', the actual significance of this is yet unclear.[121] It is unlikely to deter either criminal networks or terrorist groups, and appears largely symbolic for the benefit of state parties.[122] Moreover, the offences covered by the *NTC* broadly already existed through the *CPPNM* and *Resolution 1540*. For example, no change was required in the Russian or American criminal laws to comply with the *NTC*.[123] Based upon IAEA statistics, the illegal trade of nuclear

116 Ibid art 1(1) and 1(2).
117 Ibid art 2(4)(a) – (c).
118 Ibid.
119 Willan (n 3) 536.
120 Ibid.
121 Burch (n 14) 86.
122 Willan (n 3) 532.
123 Ibid 537.

material continues to occur in Russia, and so this lack of change in Russian criminal provisions suggests that the *NTC* has not impacted the illegal trade or reduced the risk of nuclear terrorism.[124] Similarly, the *NTC* attempts to promote the physical protection of nuclear material, yet these provisions only require a 'best effort' from states and without any mandated minimum level of protection, they are redundant given what is covered by the *Amendment to the CPPNM.*[125] When considered alone, the *NTC* does contribute to nuclear security, however when considered in conjunction with the *CPPNM* and *Resolution 1540,* it is simply a reiteration of existing measures.

VIII. Observations and Conclusions

Assessing the impact of these international treaties against the illegal trade of nuclear material is difficult given they do not exist in isolation. There are many other state initiatives that contribute to global nuclear security. For example, the United States' Proliferation Security Initiative launched in 2003 and the Global Initiative to Combat Nuclear Terrorism jointly launched by Russia and the United States in 2006 both help to coordinate efforts to secure nuclear material.[126] These unilateral and bilateral agreements, along with the work of the IAEA, mean that despite data showing a decrease in trafficking incidents since 2006, it is unclear if this is the result of an improved international framework or other factors.[127]

The Harvard Kennedy School's *Project on Managing the Atom* produces an annual report on nuclear security and in particular considers the difficulty of measuring improvements in nuclear security. To overcome uncertainty in quantitative data, they have considered the effectiveness of these laws in contributing to agenda setting, capacity building and norm creation.[128] Firstly, there is evidence that the process of negotiating and implementing these agreements has drawn attention to nuclear security in the global community and contributed to 'nuclear security upgrades that were not

124 Ibid.
125 Ibid 534.
126 Joyner and Parkhouse (n 38) 222–3.
127 IAEA Incident and Trafficking Database (n 28).
128 Bunn, Roth and Tobey (n 34) 18; Casey-Maslen (n 35) 178.

strictly required'[129]. For example, the Global Initiative to Combat Nuclear Terrorism was prompted by the *NTC* to help achieve the Convention's purpose, despite not being required by the agreement.[130] This, secondly, contributes to capacity building, where access to resources, knowledge and assistance is improved by these international agreements because of the subsequent bilateral arrangements and elevation of the IAEA.[131] Thirdly, the framework's normative impact is demonstrated by the number of state parties, with non-signatory states in the minority globally, as Figure 1 displays. Analysis using these measures therefore suggests that these international laws have contributed to the prevention of nuclear material trade.

Figure 1: Non-Party States to International Nuclear Agreements[132]

CPPNM	*Amendment to the CPPNM*	*NTC*
Iran	Belarus	Iran
North Korea	Iran	Israel
Syria	North Korea	North Korea
	South Africa	Pakistan
	Syria	Syria

Figure 1 draws further attention to some of the limitations of this international framework, where these states were free to decline joining the agreements, despite key nuclear security risks existing in their territory. For example, Belarus has one of the highest rates of the illegal trade of nuclear material,[133] yet they are not party to the amended *CPPNM* that would require the state to focus some effort on protecting domestic nuclear facilities and stores. Similarly, a destroyed reactor site in Syria was under Islamic State control between 2014 and 2017, with the location of the reactor's uranium unknown even today.[134] Given the Syrian Civil War, it is unclear that being party to these Conventions would have prompted government action to physically protect the uranium, but it would have provided a basis for other states to intervene or offer assistance. While *Resolution 1540* is not dependent upon state ratification, it does not

129 Bunn, Roth and Tobey (n 34) 18; Casey-Maslen (n 35) 129.
130 Willan (n 3) 543.
131 Bunn, Roth and Tobey (n 34) 128.
132 Bunn, Roth and Tobey (n 35) 128; Casey-Maslen (n 35) 128.
133 Zaitseva (n 19).
134 Nuclear Threat Initiative, 'Syria' (Web Page, March 2021).

mandatorily impose any specific security obligations regarding nuclear material, meaning it does little to bridge this gap. [135] This demonstrates that in respecting state sovereignty, the framework's effectiveness is limited, as non-compliance from one high-risk state impacts upon nuclear security for all states globally.

The *Project for Managing the Atom* also makes clear that despite international law's capacity to inform a global agenda and norms, this only provides the illusion of progress rather than actual change. This report puts forward a dual critique of the international framework: that it does not force states to make any radical nuclear security improvements, yet their adoption is celebrated, consequently hiding the lack of progress actually achieved on the ground.[136] This critique is best exemplified by considering what each agreement attempts to achieve: criminalisation or prevention. With the exception of the *NPT*, they all attempt both. While each has their own specific focus, the texts of the agreements are remarkably similar and overall require the same levels of physical protection and criminalisation.

This chapter's historical analysis assists in understanding this large overlap between the international agreements. It seems to frame the current international framework as a result of political forces, rather than of deliberate and calculated legislative action. The historical timeline shows that each major event relating to nuclear security is followed by a push for action at an international level. Yet each time this occurs, the same mechanisms are used in solution. The result is multiple international agreements with no significant difference in their structure, aims, enforceability or implementation process.

While not yet achieving a consistent global response, the international legal framework regarding the illegal trade of nuclear material does form a foundation for universal nuclear security. These agreements do facilitate physical protection for nuclear material and criminalise the illegal trade. However, these measures are undermined by the state-centric nature of international law that prioritises state sovereignty over more robust measures, which would effectively manage the nuclear terrorism threat. While much progress has occurred since the *NPT*, particularly with the

135 [s.n.] (n 49) 1877.
136 Bunn, Roth and Tobey (n 34) 129.

recognition of non-state actors, necessary improvements continued to be held back by the consensus requirement of treaty negotiations and the prioritisation of state sovereignty. It remains critical that there is a consistent and universal response to the illegal trade of nuclear material because in nuclear security, insecurity anywhere is insecurity everywhere.

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