

WMD ARMS CONTROL AGREEMENTS IN THE POST-SEPTEMBER 11 SECURITY ENVIRONMENT: PART OF THE ‘COUNTER-TERRORISM TOOLBOX’

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[This think piece commences with consideration of how the major WMD arms control treaties and arrangements that were negotiated during the Cold War have been strengthened since early 2002 in response to the post-September 11 security environment. This strengthening has occurred through universalisation and more effective national implementation measures, including: domestic legislation; security of dual-use materials, equipment and technology; and outreach and codes of conduct for the relevant scientific communities. This think piece charts the recent history of arms control agreements and highlights the importance of cooperative efforts between international players, relevant domestic government agencies, and between governments and the relevant scientific and industrial communities. It concludes that while these arms control agreements have become a valuable part of the ‘counter-terrorism toolbox’, there is still a lot more to be done if the maximum benefits are to be obtained from these agreements in the current security environment.]

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I INTRODUCTION

One of the most serious current international security concerns is that of a non-state actor or terrorist group acquiring weapons of mass destruction ('WMD'), which are usually understood to refer to nuclear, biological and chemical ('NBC') weapons, and their means of delivery.¹ There have been attempts by terrorist groups to acquire and use WMD since the 1970s, including the Aum Shinrikyo's attempts to acquire and use anthrax and sarin in Tokyo in the early to mid-1990s.² However, since September 11 and the anthrax letter incidents of late 2001, the attempts of terrorist groups to acquire non-conventional weapons have become a focus of particular attention. Reports that al Qaeda has been seeking to acquire or develop improvised chemical and biological weapons, as well as nuclear weapons and radioactive dispersal devices, have exacerbated these concerns.³ There have also been recent reports of the discovery of a rudimentary chemical and biological manual in a Jemaah Islamiyah safe house in the Philippines, indicating that terrorists in Australia's region share similar ambitions.⁴

The three primary arms control treaties related to WMD are the 1968 *Treaty on the Non-Proliferation of Nuclear Weapons* ('Non-Proliferation Treaty'),⁵ the 1972 *Convention on the Prohibition of the Development, Production and Stockpiling of Bacteriological (Biological) and Toxin Weapons and on Their*

¹ For a discussion on the origins of the term 'weapons of mass destruction', see Robert J Mathews and Timothy L H McCormack, 'Weapons of Mass Destruction' in Shirley Scott and Anthony Bergin (eds), *International Law and Australian Security* (1995) 125, 125. From a scientific perspective, I prefer the term NBC (nuclear, biological or chemical) or CBRN (chemical, biological, radiological and nuclear). However, the term WMD will be used in this think piece as it is generally favoured by policy-makers and lawyers.

² For a discussion of some of the earlier attempts by terrorists to acquire and use WMD, see Robert J Mathews, 'Raising the Barriers to the Acquisition of WMD by Non-State Actors: The Role of Arms Control and UN Security Council Resolution 1540' in Robert J Mathews (ed), *Proceedings of the Biological Weapons Convention Regional Workshop: Co-Hosted by the Governments of Australia and Indonesia: 21–25 February 2005* (2005) 139; Robert J Mathews, 'Raising the Barriers to the Acquisition of WMD by Non-State Actors: The Roles of Arms Control and UN Security Council Resolution 1540' (Paper presented at The Australian and New Zealand Society of International Law, Annual Conference, International Law and Security in the Post-Iraq Era: Where to for International Law?, Canberra, Australia, 18 June 2004).

³ For example, in testimony before the US Senate in 2002, the Director of Central Intelligence, George Tenet, stated that:

As early as 1998, Bin Laden publicly declared that acquiring unconventional weapons was 'a religious duty.' ... [W]e know that al-Qa'ida was working to acquire some of the most dangerous chemical agents and toxins. Documents recovered from al-Qa'ida facilities in Afghanistan show that Bin Laden was pursuing a sophisticated biological weapons research program. ... We also believe that Bin Laden was seeking to acquire or develop a nuclear device. Al-Qa'ida may be pursuing a radioactive dispersal device — what some call a 'dirty bomb'.

Evidence to US Senate Armed Services Committee Hearing, *Worldwide Threat — Converging Dangers in a Post 9/11 World*, 107th Cong, Washington DC, 19 March 2002, 3 (George Tenet, Director of Central Intelligence).

⁴ Department of Foreign Affairs and Trade ('DFAT'), Australia, *Weapons of Mass Destruction: Australia's Role in Fighting Proliferation: Practical Responses to New Challenges* (2005) 4, available from <<http://www.dfat.gov.au>> at 18 October 2007.

⁵ Opened for signature 1 July 1968, 729 UNTS 161 (entered into force 5 March 1970 ('Non-Proliferation Treaty')).

Destruction ('*Biological Weapons Convention*')⁶ and the 1993 *Convention on the Prohibition of the Development, Production, Stockpiling and Use of Chemical Weapons and on Their Destruction* ('*Chemical Weapons Convention*').⁷ These treaties were negotiated during the Cold War to limit the horizontal proliferation of nuclear weapons,⁸ and to achieve the prohibition and total elimination of biological and chemical weapons, respectively.⁹ The disarmament and non-proliferation objectives of these treaties have been supported by a number of other international agreements, including the export control arrangements of the Nuclear Suppliers Group and the Australia Group.

By the 1990s, there was recognition of the potential role of the *Non-Proliferation Treaty*, *Biological Weapons Convention* and *Chemical Weapons Convention* and related agreements in making it more difficult for terrorist groups to acquire WMD or obtain the raw materials, production equipment and technology for the production of WMD. For example, following the use of sarin by the Aum Shinrikyo in 1995, the Organisation for the Prohibition of Chemical Weapons ('OPCW') Preparatory Commission referred to the need 'to bring the Convention ... into force at an early stage and thus reinforce the global and domestic norms against the production and use of such weapons'.¹⁰ The discovery of attempts by the Aum Shinrikyo to release anthrax and botulinum toxin in the early 1990s led to the Fourth *Biological Weapons Convention* Review Conference in 1996, reiterating that the prohibitions contained in the *Biological Weapons Convention* also apply to acts by terrorist groups.¹¹ The practical problems in preventing WMD-terrorism were recognised as: lack of universality in treaty membership;¹² incomplete national implementation of treaty obligations; and the dual-use nature of materials,

⁶ Opened for signature 10 April 1972, 1015 UNTS 163 (entered into force 26 March 1975) ('*Biological Weapons Convention*').

⁷ Opened for signature 13 January 1993, 1974 UNTS 45 (entered into force 29 April 1997) ('*Chemical Weapons Convention*').

⁸ Horizontal proliferation is the spread of WMD to states that have not previously possessed them.

⁹ Negotiation of the *Chemical Weapons Convention* commenced in 1969 and concluded in 1992, after the end of the Cold War. However, the majority of its provisions were negotiated in the late 1980s, during the latter stages of the Cold War: see Martine Letts et al, 'The Conclusion of the *Chemical Weapons Convention*: An Australian Perspective' (1993) 14 *Arms Control* 311.

¹⁰ OPCW, Preparatory Commission, *Report of the Executive Secretary*, Doc PC-X/10 (31 March 1995) 2.

¹¹ The Final Declaration stated that with respect to the review of art IV:

The Conference underlines the importance of Article IV. ... The States Parties recognize the need to ensure, through the review and/or adoption of national measures, the effective fulfilment of their obligations under the Convention in order, inter alia, to exclude use of biological and toxin weapons in terrorist or criminal activity.

BWC Conference of the States Parties, 4th Review Conference, *Final Declaration*, Doc BWC/CONF.IV/9 (25 November – 6 December 1996) 17.

¹² The importance of universality cannot be overstated. At the end of 2001, the four states not party to the *Non-Proliferation Treaty* were under no treaty obligation not to assist non-state actors in the acquisition of nuclear weapons and associated technology. Further, the states that were not party to the *Biological Weapons Convention* and/or the *Chemical Weapons Convention*, over 40 in total, were under no treaty obligation not to provide any assistance to non-state actors in the acquisition of biological or chemical weapons and associated technologies.

equipment and technology associated with WMD.¹³ However, there were fairly minimal efforts made in the 1990s to address these practical problems. For example, there was a tendency for some states (particularly smaller states with a limited industrial base) to 'sign (ratify) and forget' these treaties. Larger, more powerful, industrialised states parties tended to 'turn a blind eye' to what was then regarded as a not particularly serious oversight on the part of these typically smaller states parties.

However, since September 11, the challenges of universality and full and effective national implementation of these treaties and agreements have been taken much more seriously, including the importance of reducing the possibility of 'safe havens' for terrorist groups attempting to acquire WMD capability.¹⁴ In addition, a number of other agreements supporting the objectives of the *Non-Proliferation Treaty*, *Biological Weapons Convention* and *Chemical Weapons Convention* have been negotiated and adopted, including United Nations Security Council Resolution 1540.¹⁵ This think piece briefly discusses some of the more important arms control agreements and related activities undertaken since September 11 and considers their current status. It then reflects on the actions that should be taken by the international community in order to realise the full potential of these agreements and activities as part of the 'counter-terrorism toolbox'.¹⁶

¹³ The 'dual-use dilemma' is also a major challenge for states parties to the *Non-Proliferation Treaty*, *Biological Weapons Convention* and *Chemical Weapons Convention* in the implementation of their national obligations not to assist in any activity that would support WMD proliferation or WMD terrorism. The key issues here are the dual-use nature of much of the raw materials, production equipment, technology and knowledge required, particularly for the production of biological and chemical weapons, as well as the difficulty in recognising when an apparently innocent transaction may have a hostile intent. A major concern is the possibility of an innocent supplier of dual-use items and technology inadvertently assisting either a rogue state's WMD proliferation program or a terrorist group's efforts to develop a WMD terrorism capability: see, eg, Mathews, 'Raising the Barriers to the Acquisition of WMD by Non-State Actors', above n 2.

¹⁴ There is now greater recognition that a terrorist group seeking to develop a WMD capability may choose a location within a small state party which does not have the requisite laws in place or within a small state which is not party to the WMD treaties, that is, a 'safe haven' for terrorists: see, eg, Keith Wilson, 'No "Safe Havens": The Need to Strengthen International Control Regimes: Implications for National Implementation' (2002) *OPCW Synthesis* 18.

¹⁵ SC Res 1540, UN SCOR, 59th sess, 4956th mtg, UN Doc S/RES/1540 (28 April 2004). However, not all commentators agree that traditional arms control can be effective against terrorism:

A number of arms control processes have been re-examined to see whether and how they might contribute to denying capabilities to non-state groups that may be planning acts of mass impact terrorism. It has not proved possible to adapt the BTWC, the CWC or the NPT.

¹⁶ Ian Anthony, 'Reflections on Continuity and Change in Arms Control: Armaments, Disarmament and International Security' (2006) *SIPRI Yearbook 2006* 587, 590.

¹⁶ An effective 'counter-terrorism toolbox' will also require a variety of other measures, including accurate intelligence, effective law enforcement and scientific and technical analytical capabilities.

II ACTIVITIES RELATED TO PREVENTING NUCLEAR TERRORISM

A The Non-Proliferation Treaty and its Additional Protocol

The negotiation of the *Non-Proliferation Treaty* was concluded in 1968 and the treaty entered into force in 1970.¹⁷ By the end of 2001, there were 188 states parties¹⁸ and national implementation was generally regarded as being in reasonably good shape for most states parties, with the International Atomic Energy Agency ('IAEA') playing a major role in guiding and facilitating states parties in the implementation of their domestic obligations.¹⁹ At that time, *Additional Safeguards Protocols*, which give the IAEA wider inspection powers and greater access to information about states parties' nuclear programs, were in force in 21 states.²⁰ However, since September 11, the IAEA and many states parties to the *Non-Proliferation Treaty* have made more concerted efforts to encourage all states parties possessing relevant nuclear facilities to adopt the Additional Protocol. As a result, by mid-2007 *Additional Safeguards Protocols* were in force in 80 states.²¹

B Dual-Use Nuclear Related Export Controls

At the end of 2001, there were 39 states participating in the Nuclear Suppliers Group ('NSG'),²² all of which had export controls on dual-use nuclear materials,

¹⁷ For a more detailed discussion, see Robert J Mathews and Timothy L H McCormack, 'The Relationship between International Humanitarian Law and Arms Control' in Helen Durham and Timothy L H McCormack (eds), *The Changing Face of Conflict and the Efficacy of International Humanitarian Law* (1999) 65.

¹⁸ In 2001, only four states were not party to the *Non-Proliferation Treaty*: Cuba, India, Israel and Pakistan. Cuba subsequently acceded to the *Non-Proliferation Treaty* on 4 November 2002. However, North Korea's withdrawal from the *Non-Proliferation Treaty*, effective 10 April 2003, meant that by mid-2007 there were still four states not party to the Treaty: Arms Control Association, US, *The Nuclear Nonproliferation Treaty at a Glance* (2005) <<http://www.armscontrol.org/factsheets/nptfact.asp>> at 18 October 2007; Arms Control Association, US, 'Cuba Accedes to NPT, Joins Tlatelolco' (Press Release, December 2002) <http://www.armscontrol.org/act/2002_12/briefs_dec02.asp> at 18 October 2007; Jean du Preez and William Potter, James Martin Center for Nonproliferation Studies, *North Korea's Withdrawal from the NPT: A Reality Check* (2003) <<http://cns.miis.edu/pubs/week/030409.htm>> at 18 October 2007.

¹⁹ NPT Conference of the Parties, 2000 Review Conference, *Final Document*, Doc NTP/CONF.2000/28 (24 April – 19 May 2000) 4.

²⁰ Negotiation of a model Additional Protocol commenced following the 1991 Gulf War, based on the recognition that the limitations in the existing safeguards agreements had allowed Iraq to develop a nuclear weapons program: *Strengthening of the Safeguards System: Report by the Director General*, IAEA GC, 36th sess, Agenda Item 13, IAEA Doc GC(XXXVI)/1017 (15 September 1992).

²¹ IAEA, *Strengthened Safeguards System: Status of Additional Protocols* (2007) <http://www.iaea.org/OurWork/SV/Safeguards/sg_protocol.html> at 18 October 2007.

²² The NSG was established in 1974 to prevent the civilian nuclear trade from contributing to nuclear weapons programs in non-nuclear weapons states, regardless as to their treaty status. It also serves the *Non-Proliferation Treaty* by preventing terrorist groups from acquiring nuclear weapon related materials. Another nuclear export process, the Zangger Committee, was established in 1971 to reach common understandings on how states parties to the *Non-Proliferation Treaty* should meet their treaty obligations when transferring nuclear related materials to states not party to the *Non-Proliferation Treaty*: IAEA, *Communication of 10 May 2005 received from the Government of Sweden on behalf of the Participating Governments of the Nuclear Suppliers Group*, IAEA Doc INFCIRC/539/Rev.3 (30 May 2005) 5.

equipment and technology. However, very few other states had adopted similar export controls. At an Extraordinary Plenary Meeting in Vienna in December 2002, the NSG agreed to several amendments to strengthen its guidelines as a means to prevent the possible diversion of nuclear exports to nuclear terrorism.²³ By mid-2007, there were 45 states participating in the NSG,²⁴ and since September 11 — and particularly since the adoption of *Resolution 1540* — many other states have also adopted, or are in the process of adopting, their own national export controls on dual-use nuclear materials and equipment based on the NSG dual-use control lists.²⁵

C The Convention on the Physical Protection of Nuclear Materials

By the end of 2001, there were 61 states parties to the 1980 *Convention on the Physical Protection of Nuclear Materials*,²⁶ with another five signatory states.²⁷ In July 2005, in response to increasing international concern over acquisition of nuclear materials by, *inter alia*, terrorist groups, the Convention was amended to make it legally binding on parties to protect certain domestic nuclear activities. The amendment extends the Convention to apply to nuclear material and nuclear facilities in domestic use, storage and transport for peaceful purposes, and criminalises, *inter alia*, sabotage of nuclear facilities and trafficking, thereby strengthening global nuclear security.²⁸ By mid-2007, there were 130 states parties to the *Convention on the Physical Protection of Nuclear Materials*, ten of which had also ratified the amended Convention.²⁹

D Enhanced Security of Nuclear and Other Radioactive Materials

In March 2002, ‘the IAEA Board of Governors approved an action plan designed to upgrade worldwide protection against acts of terrorism involving nuclear and other radioactive materials’,³⁰ including improved measures for securing radioactive sources that could be used in the development of a ‘dirty

²³ NSG, ‘Nuclear Suppliers Group Extraordinary Plenary Meeting’ (Press Release, 13 December 2002), available from <<http://www.nuclearsuppliersgroup.org>> at 18 October 2007.

²⁴ NSG, ‘NSG Plenary Meeting: Cape Town, 19 – 20 April 2007’ (Press Release, 20 April 2007) (fn 1), available from <<http://www.nuclearsuppliersgroup.org>> at 18 October 2007.

²⁵ As discussed in Part V, the information on the nuclear export control procedures that have been adopted by UN member states is available in the ‘national reports’ required by *Resolution 1540*, above n 15, [4].

²⁶ Opened for signature 3 March 1980, INF/CIRC/274/Rev.1 (entered into force on 8 February 1987). This Convention applies to nuclear material used for peaceful purposes and obliges parties to protect it while in international transport.

²⁷ IAEA, *Convention on the Physical Protection of Nuclear Material* (2007) <http://www.iaea.org/Publications/Documents/Conventions/cppm_status.pdf> at 18 October 2007.

²⁸ On 8 July 2005, delegations from 88 states parties and the European Atomic Energy Community voted in favour of amending the Convention: *Nuclear Security — Measures to Protect against Nuclear Terrorism: Amendment to the Convention on the Physical Protection of Nuclear Materials*, IAEA GC, 49th sess, IAEA Doc GOV/INF/2005/10-GC(49)/INF/6 (6 September 2005) 2.

²⁹ IAEA, *Convention on the Physical Protection of Nuclear Material*, above n 27.

³⁰ IAEA, ‘IAEA Board of Governors Approves IAEA Action Plan to Combat Nuclear Terrorism’ (Press Release, 19 March 2002), available from <<http://www.iaea.org/NewsCenter/index.html>> at 18 October 2007.

bomb'.³¹ In September 2005, the IAEA Board of Governors adopted a nuclear security plan covering the period 2005–09, which built on the plan adopted in March 2002.³² The new plan was intended to increase worldwide protection against acts of terrorism involving fissile or other radioactive materials by assisting states to upgrade the physical protection of their nuclear materials and facilities, detect illicit nuclear trafficking across borders and improve control of radioactive sources.³³

The IAEA has also developed guidelines on the import and export of radioactive sources to supplement its *Code of Conduct on the Safety and Security of Radioactive Sources*.³⁴ It has more recently been working with member states to develop other codes, including a code of conduct for personnel working at nuclear facilities.³⁵

There have also been greater efforts since 2002 to increase the difficulty in acquiring weapon-usable fissile material on which the *Non-Proliferation Treaty* is based, and at combating the possible 'leakage' of nuclear weapons and nuclear materials from the former Soviet Union and elsewhere. Such efforts include the US-funded Global Threat Reduction Initiative.³⁶ In July 2006, the Global Initiative to Combat Nuclear Terrorism ('GICNT') was announced at the G8 summit in St Petersburg as a joint initiative of Russia and the United States and a group of like-minded states. The Initiative aims to increase cooperation to

improve accounting, control and physical protection of nuclear and radioactive materials and facilities; suppress illicit trafficking, especially by terrorists, in such materials; respond to and mitigate any acts of nuclear terrorism; ensure cooperation in the development of technology; deny safe havens to nuclear terrorists; and ensure effective prosecution of nuclear terrorists.³⁷

³¹ Kristie Barrow, 'Dirty Deeds Done Dirt Cheap: Dealing with RDDs' (2004) 115 *Trust and Verify* 1, 2.

³² Shannon Kile, 'Nuclear Arms Control and Non-Proliferation' (2006) *SIPRI Yearbook 2006* 607, 637.

³³ *Nuclear Security — Measures to Protect against Nuclear Terrorism: Progress Report and Nuclear Security Plan for 2006–2009*, IAEA GC, 49th sess, Agenda Item 16, IAEA Doc GC(49)/17 (23 September 2005) 1–4.

³⁴ IAEA, *Code of Conduct on the Safety and Security of Radioactive Sources and the Supplementary Guidance on the Import and Export of Radioactive Sources*, IAEA Doc INFCIRC/663 (29 December 2005).

³⁵ IAEA, 'The Code of Conduct on the Safety of Research Reactors' (Staff Report, 24 September 2004) <<http://www.iaea.org/NewsCenter/Features/ResearchReactors/conduct.html>> at 18 October 2007.

³⁶ Evidence to US House Committee on Homeland Security Committee Hearing, Subcommittee on Prevention of Nuclear and Biological Attack, *Enlisting Foreign Cooperation in US Efforts to Prevent Nuclear Smuggling*, 109th Congress, Washington DC, 25 May 2006, 1–2 (David Huizenga, Assistant Deputy Administrator, Office of International Material Protection and Cooperation, Defense Nuclear Nonproliferation National Nuclear Security Administration); Kile, above n 32, 634–7.

³⁷ Following the announcement of the GICNT, the Australian Minister for Foreign Affairs and Trade, Alexander Downer, stated that the GICNT would be open to all states on a voluntary basis: Alexander Downer, Minister for Foreign Affairs, Australia, 'Australia Joins Global Initiative to Combat Nuclear Terrorism' (Press Release, 15 July 2006) <http://www.foreignminister.gov.au/releases/2006/fa078_06.html> at 18 October 2007.

E The International Convention for the Suppression of Acts of Nuclear Terrorism

In April 2005, the UN General Assembly adopted the *International Convention for the Suppression of Acts of Nuclear Terrorism*.³⁸ The Convention is a key part of the global efforts to prevent terrorists acquiring WMD. The Convention addresses the unlawful use or possession of nuclear devices or related materials by non-state actors or their accomplices ‘with the intent to cause death or serious bodily injury’.³⁹ Under the Convention, states parties are required to develop and adopt legal frameworks to criminalise activities related to nuclear terrorism; to investigate alleged offenders; and to arrest, prosecute or extradite suspects.⁴⁰ By mid-2007 there were 22 states parties.⁴¹

III ACTIVITIES RELATED TO PREVENTING BIOTERRORISM

A The Biological Weapons Convention

The *Biological Weapons Convention* was negotiated between 1969 and 1971, opened for signature in 1972 and entered into force in 1975; by the end of 2001, there were 145 states parties to the Convention,⁴² meaning that 46 UN member states were not bound by its transfer obligations. National implementation of this treaty has also been problematic: for example, by 2003, less than half of the 145 states parties to the *Biological Weapons Convention* had enacted the necessary national legislation under art IV.⁴³

The September 11 attacks and the posting of letters containing anthrax to US Senators in late 2001 led to a decision at the reconvened Fifth *Biological Weapons Convention* Review Conference held in Geneva in November 2002 to conduct a three-year intersessional program of work. This program considered topics designed to strengthen the *Biological Weapons Convention*, including national legislation, security of pathogens and toxins, and codes of conduct for scientists.⁴⁴ The Sixth *Biological Weapons Convention* Review Conference held in Geneva in November 2006 agreed to extend this intersessional program⁴⁵ and, in addition, committed to the establishment of a three-person Implementation

³⁸ GA Res 59/766, UN GAOR, 59th sess, Agenda Item 148, UN Doc A/59/766 (4 April 2005).

³⁹ Ibid art 2.

⁴⁰ Ibid arts 5, 10, 11. The adoption of this Convention was described by the UN Secretary-General as a ‘vital step forward in multilateral efforts to prevent nuclear terrorism’: IAEA, ‘New Convention against Terrorism Bolsters Global Framework’ (Staff Report, 14 April 2005) <http://www.iaea.org/NewsCenter/News/2005/conv_nucterror.html> at 18 October 2007.

⁴¹ UN Department of Public Information, ‘Expert Forum on Countering Nuclear Terrorism, at UN Headquarters, to Highlight Entry into Force 7 July of Global Treaty on Suppressing Nuclear Terrorism’ (Press Release, 12 June 2007) <<http://www.un.org/News/Press/docs/2007/note6090.doc.htm>> at 18 October 2007.

⁴² Christer Berggren, ‘Arms Control and Disarmament Agreements’ (2002) *SIPRI Yearbook 2002* 761, 771.

⁴³ Angela Woodward, *Time to Lay Down the Law: National Legislation to Enforce the BWC* (VERTIC report, 2003).

⁴⁴ BWC Conference of the States Parties, 5th Review Conference, *Final Document*, Doc BWC/CONF.V/17 (19 November – 7 December 2001 and 11 – 22 November 2002) 17.

⁴⁵ BWC Conference of the States Parties, 6th Review Conference, *Final Document*, Doc BWC/CONF.VI/6 (20 November – 8 December 2006) 20–1.

Support Unit to promote universality and more effective implementation of the Convention.⁴⁶

In recent years there have been several regional workshops conducted to assist states in different regions to encourage universality of the *Biological Weapons Convention* and to fulfil their national obligations. These have included workshops hosted by a number of states parties to the Convention such as Australia, Indonesia and the US. In addition, there have been several regional workshops hosted by a number of international organisations including the European Union, Interpol, the International Committee of the Red Cross ('ICRC'), and the World Health Organization ('WHO').

By mid-2007, there were 159 states parties to the *Biological Weapons Convention*. Based on discussions at various *Biological Weapons Convention* meetings in Geneva, a substantial number of states parties had commenced the development of national legislation. However, because of the lack of legal resources in many smaller states parties and the delays in getting parliamentary approval, it is likely that less than half of the 159 *Biological Weapons Convention* states parties currently have the required national legislation in place.

B *Biological Weapons Related Export Controls*

The Australia Group was formed by 15 states in 1985 with the purpose of harmonising national licensing measures concerning chemical weapons and enhancing cooperation between members. In the early 1990s, the Australia Group lists were extended to include pathogens, toxins and dual-use biological equipment and technology.⁴⁷ At the end of 2001, the 33 states then participating in the Australia Group had export controls in place on dual-use biological materials, equipment and technology.⁴⁸ However, very few other states had adopted similar export controls.

In response to the increased awareness of the threat of biological terrorism following September 11 and the anthrax letters in October 2001, the different Australia Group lists have remained under regular review in an effort to further raise the barriers to biological terrorism as well as proliferation.⁴⁹ This has led to adjustments to the various control lists, including the addition of several new biological agents and new toxins to the Australia Group's biological lists as well

⁴⁶ Ibid 19–20.

⁴⁷ Robert J Mathews, 'Chemical and Biological Weapons Export Controls and the "Web of Prevention": A Practitioner's Perspective' in Brian Rappert and Caitriona McLeish (eds), *A Web of Prevention: Biological Weapons, Life Sciences and the Governance of Research* (2007) 163; Australia Group, *20 Years of Australia Group Cooperation* (Australia Group Report, April 2005) 6 <<http://www.australiagroup.net/en/20years.pdf>> at 18 October 2007.

⁴⁸ Australia Group, *Tackling the Threat of Chemical and Biological Weapons* (2007) <http://www.australiagroup.net/en/agm_october2001.html> at 18 October 2007.

⁴⁹ Robert J Mathews, 'The Development of the Australia Group Export Control Lists of Biological Pathogens, Toxins and Dual-Use Equipment' (2004) 66 *CBW Conventions Bulletin* 1, 1. There had been regular discussion of chemical and biological terrorism issues within the Australia Group since the Tokyo subway incident in 1995. However, chemical and biological terrorism has received substantially greater attention within the Australia Group following September 11.

as refinements to the *List of Dual-Use Biological Equipment for Export Control*.⁵⁰

In 2003, the Australia Group prepared the *Guidelines for Transfers of Sensitive Chemical or Biological Items* to assist non-participating states in evaluating export applications. This manual provides a list of factors to be considered before approving the export of sensitive items.⁵¹

By mid-2007, there were 40 states participating in the Australia Group.⁵² Since September 11, and particularly since the adoption of UN Security Council Resolution 1540, many other states have also adopted, or are in the process of adopting, national export controls for dual-use biological materials and equipment based on the Australia Group lists.⁵³

C Security of Pathogens and Toxins

In addition to export controls on dual-use items relevant to the *Biological Weapons Convention*, art III of the Convention also requires states parties to establish domestic regulations that cover domestic security of pathogens and toxins, transfers of pathogens, toxins, and related materials and equipment as defined in art I of the Convention, to prevent the domestic (or internal) transfer of these items for either biological weapons proliferation or bioterrorist purposes. Since September 11, several states parties have implemented regulations for the enhanced security of pathogens and toxins, and other states parties are at various stages in developing similar regulations. A major challenge facing states is formulating measures that prevent access to pathogens and toxins for bioterrorism or other hostile purposes without hampering beneficial advances in biological sciences and technologies. This is clearly still a 'work in progress' for most states parties to the *Biological Weapons Convention*,⁵⁴ although the recently published WHO report on pathogen security provides useful guidance.⁵⁵

IV ACTIVITIES RELATED TO CHEMICAL TERRORISM

A The Chemical Weapons Convention

Negotiation of the *Chemical Weapons Convention* commenced in 1969 in Geneva and concluded in 1992. By the end of 2001, the *Chemical Weapons Convention* had 145 states parties;⁵⁶ the 46 UN member states not party to the

⁵⁰ This included the reduction in the capacity of fermenters under control from 100 litres to 20 litres, reflecting the smaller scale of operation that might be employed by a terrorist group: *ibid*.

⁵¹ The Guidelines are available in Australia Group, *20 Years of Australia Group Cooperation*, above n 47, 12–15.

⁵² Australia Group, *Australia Group Participants* (2007) <<http://www.australiagroup.net/en/participants.html>> at 18 October 2007.

⁵³ See above n 25 and accompanying text.

⁵⁴ Treasa Dunworth, Robert J Mathews and Timothy L H McCormack, 'National Implementation of the *Biological Weapons Convention*' (2006) 11 *Journal of Conflict & Security Law* 93.

⁵⁵ WHO, *Biorisk Management: Laboratory Biosecurity Guidance* (WHO Epidemic and Pandemic Alert and Response Report, September 2006) <http://www.who.int/csr/resources/publications/biosafety/WHO_CDS_EPR_2006_6.pdf> at 18 October 2007.

⁵⁶ Berggren, above n 42, 778.

Convention were not bound by its transfer obligations. Implementation of domestic legislation pursuant to art VII of the Convention has also been problematic: by 2004 less than 30 per cent of the 145 states parties had enacted the necessary national legislation.⁵⁷

The final declaration of the First *Chemical Weapons Convention Review Conference* in 2003 reinforced the relevance of the *Chemical Weapons Convention* provisions to countering chemical terrorism.⁵⁸ Concerns that terrorist groups could acquire chemical weapons (including improvised devices containing toxic chemicals) have led to the *Chemical Weapons Convention Action Plan on Universality and National Implementation*, which flowed from the Review Conference,⁵⁹ and was adopted by the Eighth Conference of States Parties held in October 2003. This action plan encouraged all remaining states not party to join the Convention and encouraged all states parties to enact relevant domestic legislation, with help from the OPCW and other states parties.⁶⁰

There have been a number of high level visits as well as regional and national workshops to support the *Action Plan on Universality and National Implementation*. By mid-2007, there were 182 states parties, over 40 per cent of which had national measures in place, with many other states parties reporting that they were well advanced in their preparation of national measures.⁶¹

B *Chemical Weapons Related Export Controls*

At the end of 2001, the 33 states then participating in the Australia Group had export controls in place on dual-use chemical materials, equipment and technology,⁶² but very few other states had adopted similar export controls.⁶³ In response to increased awareness of the threat of chemical terrorism post-September 11, the Australia Group chemical weapons precursor and equipment lists have remained under regular review in an effort to further raise the barriers to chemical terrorism as well as chemical weapons proliferation.⁶⁴ As already discussed above in Part III(B), the Australia Group has prepared a set of *Guidelines for Transfers of Sensitive Chemical or Biological Items*. By mid-2007, there were 40 states participating in the Australia Group, and many other states are using the Australia Group chemical export control lists as the

⁵⁷ Lisa Tabassi and Scott Spence, 'Improving CWC Implementation: The OPCW Action Plan' in Trevor Findlay (ed), *Verification Yearbook 2004* (2004) 45, 49.

⁵⁸ *Report of the First Special Session of the Conference of the States Parties to Review the Operation of the Chemical Weapons Convention (First Review Conference)*: 28 April – 9 May 2003, OPCW Conference of the State Parties, 1st sess, OPCW Doc RC-1/5 (9 May 2003) 5 ('First Chemical Weapons Convention Review Conference').

⁵⁹ *Ibid* 7.

⁶⁰ Nicholas Dragffy and Daniel Feakes, 'News Chronology: August through October 2003' (2003) 62 *CBW Conventions Bulletin* 29.

⁶¹ OPCW, *The Chemical Weapons Ban: Facts and Figures* (2007) <<http://www.opcw.org/factsandfigures/index.html>> at 18 October 2007.

⁶² Robert J Mathews, 'A Comparison of the Australia Group List of Chemical Weapon Precursors and the CWC Schedules of Chemicals' (1993) 21 *Chemical Weapons Convention Bulletin: The Quarterly Journal of the Harvard Sussex Program on CBW Armament and Arms Limitation* 1, 1.

⁶³ Australia Group, *Australia Group Participants*, above n 52.

⁶⁴ Australia Group, *20 Years of Australia Group Cooperation*, above n 47, 8.

basis for their export licensing obligations under UN Security Council Resolution 1540.⁶⁵

C Security of Toxic Chemicals including Chemical Weapons

All states parties to the *Chemical Weapons Convention* possessing chemical weapons stockpiles are under an obligation to destroy them within 15 years of entry into force under strict verification by the OPCW.⁶⁶ While awaiting destruction, all chemical weapons stockpiles are secured and monitored by the OPCW.⁶⁷ Further, facilities within states parties that are producing small quantities of nerve and blister agents (so-called 'Schedule 1' chemicals) for chemical defence purposes are required to declare these activities annually and are subject to routine OPCW inspections.⁶⁸ OPCW inspectors also advise states parties on improved security for the storage of their Schedule 1 chemicals. These security measures reduce the risk of theft of traditional military chemical warfare agents by a terrorist group.

However, the toxic chemicals that a terrorist group could use are not limited to those military chemical warfare agents which have previously been weaponised by states (for example, sulphur mustard, sarin and VX), and likewise the prohibitions contained within the Convention are not limited to those chemical warfare agents either, but are based on a 'general purpose' definition of chemical weapons that effectively includes a prohibition on the development and use of any toxic chemical for hostile purposes, including toxic industrial chemicals.⁶⁹ Thus the recent use of chlorine as a terrorist weapon in Iraq is also prohibited by the Convention.⁷⁰

Since September 11, a number of states parties have been developing procedures to enhance the security of toxic industrial chemicals.⁷¹ The UN Institute for Training and Research ('UNITAR') and the OPCW have also conducted joint workshops to assist in the sound management of chemicals.⁷² The European Chemical Industry Council ('CEFIC') has been working with a

⁶⁵ For more information on the dual-use chemical export control procedures that have been adopted by UN member states, refer to the 'nation reports' required by UN Security Council Resolution 1540: 1540 Committee, *List of Submitting Member States as of 25 September 2007* (2007) <<http://disarmament2.un.org/Committee1540/report.html>> at 18 October 2007.

⁶⁶ *Chemical Weapons Convention*, above n 7, pt IV(A)(D).

⁶⁷ *Ibid* art IV.

⁶⁸ *Ibid* art VI.

⁶⁹ The *Chemical Weapons Convention* states that "‘Chemical Weapons’ means ... [t]oxic chemicals and their precursors, except where intended for purposes not prohibited under this Convention, as long as the types and quantities are consistent with such purposes": *ibid* art II(1)(a).

⁷⁰ See OPCW, 'OPCW Director-General Condemns Renewed Chemical Attacks in Iraq' (Press Release, 19 March 2007) <http://www.opcw.org/pressreleases/2007/PR16_2007.html> at 18 October 2007.

⁷¹ For example, the US Department of Homeland Security is developing 'Chemical Facility Anti-Terrorism Standards' to reduce the risk of the terrorist use of toxic chemicals: Department of Homeland Security, US, 'DHS Releases Comprehensive Regulations for Securing High Risk Chemical Facilities' (Press Release, 2 April 2007) <http://www.dhs.gov/xnews/releases/pr_1175527925540.shtml> at 18 October 2007.

⁷² See OPCW, 'UNITAR/OPCW Workshop on Financing the Sound Management of Chemicals' (Press Release, 16 December 2002) <http://www.opcw.org/html/global/press_releases/2k2/PR73_2002.html> at 18 October 2007.

number of other agencies and associations to develop improved industry guidelines for the security of the transport of dangerous goods by road.⁷³ The US Department of State has recently commenced the Chemical Security Engagement Program with the aim of raising awareness and improving chemical security and safety best practices in different regions.⁷⁴ With these activities, the major challenge is developing measures that prevent access to toxic industrial chemicals for chemical terrorism or other hostile purposes that do not hamper the benefits flowing from chemical sciences and products.

In 2005, the OPCW and the International Union of Pure and Applied Chemistry ('IUPAC') commenced a project to develop enhanced outreach to the chemical community on the dual-use of chemical sciences, and the development of codes of conduct for chemical scientists, as a means to reduce the possibility that scientists will inadvertently assist in chemical weapon proliferation or chemical weapon terrorism activities.⁷⁵

V UN SECURITY COUNCIL *RESOLUTION 1540*

The UN Security Council *Resolution 1540*, adopted on 28 April 2004, obliges all UN member states to refrain from providing any support to non-state actors attempting to acquire WMD. Thus *Resolution 1540* has effectively imposed the same obligations upon all UN member states as those of the states parties to the *Non-Proliferation Treaty*, the *Biological Weapons Convention* and the *Chemical Weapons Convention* with respect to the prohibition of the provision of any assistance to non-states actors in their attempts to acquire nuclear, biological or chemical weapons, respectively. This Resolution has effectively overcome the problem of lack of universality, at least insofar as not providing assistance to terrorist groups through the transfer of WMD dual-use materials, equipment and technology.

Under *Resolution 1540*, to ensure that all UN member states are implementing these domestic measures effectively, there were reporting requirements to the UN Security Council Committee, which was to convene for two years.⁷⁶ The first country reports were required within six months of adoption of *Resolution 1540*. However, by that date only 58 of the 191 UN member states had provided reports of measures that they had already taken or planned to take.⁷⁷ While more country reports were subsequently received, it was clear that many UN member states would require substantially longer than the two years anticipated by the UN Security Council. This has resulted in the UN Security Council adopting

⁷³ CEFIC, *Industry Guidelines for the Security of the Transport of Dangerous Goods by Road* (April 2005) <http://www.cefic.org/Files/Publications/security_guidelines.pdf> at 18 October 2007.

⁷⁴ For information on the US Department of State Chemical Security Engagement activities in South-East Asia, see Ian Rae, 'From the President' (October 2007) *Chemistry in Australia: Magazine of the Royal Australian Chemical Institute Inc* 27.

⁷⁵ Graham Pearson and Peter Mahaffy, 'Education, Outreach, and Codes of Conduct to Further the Norms and Obligations of the *Chemical Weapons Convention*' (2006) 78 *Pure and Applied Chemistry* 2169, 2169.

⁷⁶ *Resolution 1540*, above n 15, [4].

⁷⁷ 1540 Committee, above n 65.

Resolution 1673 on 16 April 2006, which extends the mandate of the 1540 Committee for an extra two years.⁷⁸

In terms of the actions required by *Resolution 1540*, the development of legislation to criminalise the act of assisting a terrorist group in acquiring WMD-related materials, and establishing measures related to accounting, securing and protecting relevant dual-use nuclear materials are relatively straightforward. However, as already discussed in Parts III(C) and IV(C), the establishment of measures related to accounting, securing, and the physical protection of relevant dual use biological and chemical materials is considerably more challenging.

Resolution 1540 refers to the importance of international cooperation to assist states with limited experience and resources to adopt these measures effectively.⁷⁹ There have been a number of workshops in different regions to assist UN member states in their implementation of *Resolution 1540*.⁸⁰

By mid-2007, 136 UN member states had provided one or more reports to the *Resolution 1540* Committee, and 56 UN member states had yet to provide a report.⁸¹ It was clear that full and effective implementation of *Resolution 1540* by all UN member states would require extensive cooperation with relevant international organisations at both regional and international levels. On 12 July 2007, a press conference was held on the work of the *Resolution 1540* Committee with a view to considering how non-governmental organisations could provide guidance and support to those states with insufficient national capacities to establish the necessary measures required by *Resolution 1540*.⁸²

VI REFLECTIONS

During the 1990s, following the end of the Cold War, the major arms control activities were the negotiation of new arms control treaties (including the *Chemical Weapons Convention* and the *Comprehensive Nuclear-Test-Ban Treaty*⁸³) and legally binding instruments to strengthen the existing treaties (including Protocols for the *Non-Proliferation Treaty* and the *Biological*

⁷⁸ SC Res 1673, UN SCOR, 60th sess, 2nd pt, 5429th mtg, UN Doc S/Res/1673 (27 April 2006).

⁷⁹ *Resolution 1540*, above n 15, [7].

⁸⁰ A number of *Resolution 1540* workshops have been convened, including in: Beijing in July 2006 (for Asia Pacific states); Ghana in November 2006 (for African states); San Francisco in February 2007 (for states in the Association of South-East Asian Nations Regional Forum); and Kingston in May 2007 (for Caribbean states). The requirements of *Resolution 1540* have also been discussed in a number of other workshops, including two *Biological Weapons Convention* Regional Workshops co-hosted by Australia and Indonesia in February 2005 and March 2006.

⁸¹ 1540 Committee, above n 65.

⁸² The non-governmental organisations attending the press conference included the Center for International Trade and Security, University of Georgia, Athens/Washington DC; the Center for Non-Proliferation Studies, Monterey Institute of International Studies, Monterey/Washington DC; the Council for Security Cooperation for the Asia Pacific, Honolulu/Washington DC; the Stimson Center; the Stockholm International Peace Research Institute; and Verification Research, Training and Information Centre, London: UN Department of Public Information, 'Press Conference on Work of Security Council 1540 Committee' (Press Release, 12 July 2007) <http://www.un.org/News/briefings/docs/2007/070712_1540.doc.htm> at 18 October 2007.

⁸³ Opened for signature 24 September 1996 (not yet in force) <http://www.ctbto.org/treaty/treaty_text.pdf> at 18 October 2007.

Weapons Convention), and the strengthening of the export control arrangements such as those of the NSG and the Australia Group. At that time, there was only relatively limited interest as to how well states parties were undertaking the national implementation of their existing treaty obligations. However, since September 11, the major arms control activities have been to increase the membership of the WMD-related treaties and to improve the effectiveness of domestic implementation,⁸⁴ motivated by the recognition that these are both necessary pre-requisites if the WMD-related arms control agreements are to fulfil their maximum potential as part of the ‘counter-terrorism toolbox’.⁸⁵ Thus, there is a very interesting ‘pre-September 11’ and ‘post-September 11’ aspect to arms control. In my view, September 11 was a defining event in arms control; in particular, in the way it has encouraged states to take their national implementation measures very seriously, including the domestic security of WMD-related dual-use materials and equipment, as a means to achieve national security imperatives related to the prevention of WMD-terrorism.

This is not to suggest, however, that the ‘traditional’ roles of arms control, including the *Non-Proliferation Treaty*, the *Biological Weapons Convention* and the *Chemical Weapons Convention* and related agreements, have become any less important since September 11. There is still much to be done to limit the horizontal proliferation of nuclear weapons, and to achieve the prohibition and total elimination of biological and chemical weapons, not to mention the need for substantial cuts in nuclear stockpiles in accordance with art VI of the *Non-Proliferation Treaty*.⁸⁶ But, in my view, based on the level of activities discussed in this think piece, a new objective to ‘raise the barriers to the acquisition and use of WMD by terrorist groups’ now qualifies to be added to the list of objectives and benefits of arms control.⁸⁷

Indeed it is interesting to briefly consider and compare the role of arms control in counter-proliferation and the role of arms control in counter-terrorism.

⁸⁴ The change in attitude towards national implementation of the *Chemical Weapons Convention* since September 11 is captured by Tabassi and Spence, both former legal officers with the OPCW:

In the seven years since the CWC entered into force [that is, between 1997 and 2004], the OPCW’s policymaking organs have moved from benign lack of interest in CWC national implementing legislation to being fully engaged with the issue.

Above n 57, 45.

⁸⁵ The focus on national implementation measures has coincided with a more difficult environment for the negotiation of new treaties. For example, the Conference on Disarmament has been unable to agree on a Program of Work and has thus been unable to negotiate any new arms control agreements since 1997.

⁸⁶ *Non-Proliferation Treaty*, above n 5, art VI requires states parties to

pursue negotiations in good faith on effective measures relating to the cessation of the nuclear arms race at an early date and to nuclear disarmament, and on a treaty on general and complete disarmament under strict and effective international control.

⁸⁷ According to Jozef Goldblat, arms control agreements are intended to

(a) freeze, limit or abolish specific categories of weapons; (b) prevent certain military activities; (c) regulate the deployment of armed forces; (d) proscribe the transfers of some militarily important items; (e) reduce the risk of an accidental war; (f) constrain or prohibit the use of certain weapons or methods of war; and (g) build up confidence among states through greater openness in military matters.

Arms Control: A Guide to the Negotiations and Agreements (1994) 3.

Counter-proliferation is concerned primarily with WMD-related activities taking place in another state, in particular a country of ‘proliferation concern’ (sometimes called a ‘rogue state’). The major arms control activities for this situation include encouraging the state of concern, through diplomacy, to join relevant treaties and fully comply with their provisions, and denying exports of dual-use items if there are concerns that the country of concern is attempting to import the dual-use items for a WMD program. On the other hand, because terrorist groups have generally obtained their materials and equipment from local (in-country) suppliers, the role of arms control in WMD counter-terrorism is primarily focused on domestic measures, including: domestic legislation which includes the criminalisation of attempts to acquire WMD dual-use items for terrorist purposes; regulations that provide appropriate levels of security in the handling, storing and domestic transfer of WMD dual-use items; and outreach, awareness-raising and codes of conduct for scientists to reduce the possibility of the scientific community inadvertently providing assistance to a terrorist group seeking to acquire a WMD-capability.⁸⁸

Despite considerable efforts in the past few years, it is clear that there is still a long way to go until the potential of the various arms control related measures discussed in this think piece will be fully realised. With respect to nuclear terrorism prevention activities, there has been considerable progress, with substantial activities being guided and encouraged by the IAEA. The IAEA has taken a strong lead in encouraging the security of nuclear and radiological materials. With respect to chemical terrorism prevention activities, there has been considerable progress with universality of the *Chemical Weapons Convention* through the OPCW *Action Plan*, but the majority of states parties to the *Chemical Weapons Convention* still do not have all of their national requirements fully implemented. And at this stage, the OPCW has not taken a major lead in addressing the issue of enhanced security of toxic chemicals. With respect to biological terrorism prevention activities, there has been very limited progress with either increased membership of the *Biological Weapons Convention* or necessary national implementation measures, at least in part because we do not have the benefit of an Organisation for the Prohibition of Biological Weapons ('OPBW')⁸⁹ to guide and encourage such activities. National implementation measures have been slow, even when there is motivation from within, external encouragement and direct support.

However my suggestion that September 11 was a defining event in arms control is not intended to imply that the WMD arms control related measures discussed in this think piece will ever be a ‘magic bullet’ in preventing WMD-terrorism, even when fully implemented by all UN member states.

⁸⁸ Thus, despite the differences in the characteristics (and associated science and technology) of nuclear, biological and chemical weapons, the same essential domestic measures are: legislation; security of relevant materials; and outreach and codes of conduct.

⁸⁹ The draft Protocol to strengthen the *Biological Weapons Convention*, rejected in August 2001, included the establishment of a new organisation, the OPBW, to oversee the operation of the *Biological Weapons Convention* and its proposed Protocol: see, eg, Robert J Mathews, ‘Efforts to Strengthen the *Biological Weapons Convention* through a Legally Binding Instrument: VEREX and the Ad Hoc Group’, in Robert J Mathews (ed), *Proceedings of the Biological Weapons Convention Regional Workshop: Co-Hosted by the Governments of Australia and Indonesia: 21–25 February 2005* (2005) 42.

Indeed, no single measure, or set of measures, can provide a guarantee that terrorist groups will be prevented from acquiring WMD capability. Thus the arms control related activities discussed in this think piece can only be part of the total terrorist prevention strategy. Therefore, the response by the international community needs to be based on close cooperation between government agencies with arms control responsibilities and those government agencies responsible for other tools in the ‘counter-terrorism toolbox’, including intelligence and law enforcement agencies, as well as other agencies with responsibilities for ‘conventional counter-terrorism’.

There has been a substantial increase in international cooperation on arms control related activities since September 11. The international community has recognised that for the various arms control related measures to be an effective part of the ‘counter-terrorism toolbox’, there also needs to be considerable cooperation between the arms control community⁹⁰ and other international agencies,⁹¹ as well as government officials, scientific researchers and industry representatives who have not traditionally been involved with WMD arms control activities.

One interesting example of international cooperation relates to the change of attitude of certain states to export controls. Historically, a number of states had opposed informal export control arrangements such as those coordinated by the NSG and the Australia Group. However, post-September 11 and with the adoption of *Resolution 1540*, many of these states have recognised the value of national export licensing measures in raising the barriers to WMD-terrorism, and have adopted their own national export licensing systems often based on the NSG and Australia Group lists.⁹² Support has been provided by states participating in the NSG and the Australia Group, either bilaterally or in regional workshops, to assist other states in making their export controls more effective.

Effective domestic implementation of the WMD-arms control related agreements will also require high levels of cooperation at various levels, within a range of government departments including law enforcement, health, defence and customs, as is already happening. For example, in Australia the arms control activities have been recognised as an important part of a coordinated ‘whole-of-government response’ with close coordination between the various government agencies with specific roles, ranging from representing a state’s interests

in multilateral arms control and non-proliferation fora; to managing its export control system; detecting and deterring illicit transfers of WMD-related materials; maintaining disaster response and preparedness; and collecting and analysing intelligence.⁹³

⁹⁰ For example, the IAEA, the OPCW, the UN Institute for Disarmament Research, the ICRC and government officials with arms control responsibilities.

⁹¹ This includes Interpol, the EU, the WHO, the Food and Agriculture Organization, the World Organisation for Animal Health, the International Union of Pure and Applied Chemistry, the European Chemical Industry Council, the UN Institute for Training and Research and the World Customs Organization.

⁹² Australia Group, *Fighting the Spread of Chemical and Biological Weapons: Strengthening Global Security* (Australia Group Report, July 2007) <http://www.australiagroup.net/en/agb_july2007.pdf> at 18 October 2007.

⁹³ DFAT, above n 4, 78.

It is also recognised that passing legislation and regulations is not sufficient in itself. There will also need to be effective domestic enforcement of the various pieces of legislation and regulations. This will require: a sound legislative basis; credible control lists of dual-use items; appropriate implementation and enforcement measures; effective training of law enforcement officials; and information sharing.⁹⁴ There have been a number of regional workshops and national training courses designed to assist government officials in obtaining the necessary understanding of WMD issues and skills to ensure that legislation and regulations are effectively enforced at the domestic level.

Effective domestic implementation will also require high levels of cooperation between government officials and the relevant scientific communities. While this collaboration is still a ‘work in progress’, there are already indications that it is leading to the development of measures that will prevent access to dual-use WMD-related items for WMD-terrorism or other hostile purposes without unnecessarily hampering the beneficial advances in nuclear, chemical and biological sciences and technologies. There are also clearly important roles for the relevant scientific and industry associations, including: awareness-raising among the relevant scientific communities; and supporting the development, adoption and promulgation of codes of conduct for scientists.

And there is also a role for academic institutions involved with research and teaching international arms control and other security law in supporting the activities discussed in this think piece. This has been realised by conducting training courses and workshops to support activities associated with more effective implementation of the arms control agreements. This is recognised as most important for the *Biological Weapons Convention* and related activities intended to raise the barriers to bioterrorism, as a means to at least partially fill the vacuum caused by the absence of an OPBW. For example, the Asia Pacific Centre for Military Law at the Melbourne Law School has co-hosted two *Biological Weapons Convention* Regional Workshops for states parties in the Asia Pacific region. The aim of these workshops was to discuss and develop common understandings of and promote effective action on the implementation of the *Biological Weapons Convention*, including legislation, security of pathogens and codes of conduct for scientists.⁹⁵ The Centre has also undertaken other activities to support more effective implementation of the *Non-Proliferation Treaty* and *Chemical Weapons Convention* in the Asia-Pacific

⁹⁴ Robert J Mathews, ‘A Model Legislation for the Implementation of the *Biological Weapons Convention* and UN Security Council Resolution 1540’ (Paper presented at the First Interpol Global Conference on Preventing Bioterrorism, Lyon, France, 1 – 2 March 2005); Robert J Mathews, ‘The Indonesia/Australia *Biological Weapons Convention* Regional Workshop Process: Enhancing Bio-Security and Raising the Barriers to Bio-Terrorism’ (Paper presented at the Regional Biosecurity Workshop, Singapore, 28 – 30 May 2007).

⁹⁵ For information on the *Biological Weapons Convention* Regional Workshop, see Asia Pacific Centre for Military Law, *Biological Weapons Convention* <<http://www.law.unimelb.edu.au/events/bwc/>> at 18 October 2007.

region and is currently planning further arms control related training for government officials in the Asia-Pacific region.⁹⁶

VII CONCLUDING COMMENTS

There have been very substantial efforts made since September 11 to fully implement, at the national level, the major WMD arms control treaties, including the *Non-Proliferation Treaty*, *Biological Weapons Convention* and *Chemical Weapons Convention*, and related arrangements, as a means to raise the barriers to the acquisition by terrorists of WMD as well as the dual-use materials, equipment and technology required for the production of WMD. Since September 11, these Cold War arms control agreements have been complemented by other agreements including UN Security Council *Resolution 1540*. A number of states have made considerable progress with their national implementation measures associated with these agreements. However, there are major challenges in achieving the universalisation and the full and effective national implementation of these arms control agreements (including *Resolution 1540*), particularly in developing appropriate levels of domestic security of dual-use WMD-related items.

The importance of cooperative efforts internationally, regionally, between relevant domestic government agencies, and between government and relevant scientific and industrial communities cannot be over-emphasised. For the national measures to have maximum effect, this cooperation will need to extend to international agencies, government officials, scientific researchers and industry representatives who have not traditionally been involved with WMD arms control activities.

While these arms control agreements have already become a valuable part of the ‘counter-terrorism toolbox’, there is a lot more to be done if the maximum security benefits are to be obtained from these agreements in the current security environment.

⁹⁶ The active involvement of academics from the Asia Pacific Centre for Military Law and the Melbourne Law School over the past 15 years has resulted in long-term collaborations between government officials and academics in the Asia Pacific region, which has facilitated a better understanding of the difficulties faced by some of the Asia Pacific states. As a consequence, the Centre has developed model legislation for regional countries and provided guidance on other aspects of treaty implementation.