

Research Report

Nuclear Security Summit

Preventing the acquisition of nuclear material by
non-state parties



MUNISH '14



Please consider the environment and do not print this research report unless absolutely necessary.

Forum:	Nuclear Security Summit
Issue:	Preventing the acquisition of nuclear material by non-State parties
Student Officer:	Claire Monin
Position:	President

Introduction

The use of nuclear bombs on Hiroshima and Nagasaki at the end of World War II has shown the world the destructive power of nuclear energy and its long-lasting impact. Nowadays, nuclear weapons can yield more than 2,000 times the amount of energy than that of the Nagasaki bomb. During the Cold War, the arms race considerably expanded nuclear arsenals. By the end of the Cold War, treaties had begun to be agreed upon, to secure nuclear material. It was recognised that the production of such weapons or even material, had to be legally organised. As terrorism has been expanding, states have been trying to secure nuclear weapons as well as nuclear material in any form. Indeed, with enough expertise, non-state parties could fabricate weapons out of material designated for civilian use. Nuclear weapons are seen as instruments of power and are ideal weapons of massive destruction for non-state parties to exert pressure on governments, as they can disrupt a whole country through terror. Only a minority of these parties have been seeking to acquire nuclear weapons; however, it remains a threat to the world's security and safety. Between 1993 and 2013, 419 cases of smuggled or stolen nuclear material have been reported worldwide. It is important that the international community works cooperatively to prevent any theft, fraud or smuggling of nuclear material and that no nuclear activity remains unknown.

Definition of Key Terms

Nuclear Material

According to the IAEA, nuclear materials are the metals uranium, plutonium and thorium in any form. Different categories of material are defined by the IAEA depending on the criteria taken into account. When the degree of processing is taken into account, nuclear material can be divided into two categories: source material, consisting of natural and



depleted uranium and thorium, and special fissionable material, consisting of enriched uranium-235, uranium-233 and plutonium-239. Material can also be categorised following its strategic value. Direct-use material is material that can be used without further transmutation or enrichment to make nuclear weapons. Indirect-use material consists of any nuclear material other than direct-use material.

Non-State Parties

An individual or organization that has significant political influence even though they do not belong to any established state.

Nuclear Terrorism

The International Convention on the Suppression of Acts of Nuclear Terrorism (ICSANT) defines acts of nuclear terrorism in Article 2 as the use or threat to use nuclear material or any other radioactive substance with dangerous properties, by a person, in order to kill or injure persons, damage property, or the environment, or to compel persons, states, or international organizations to do or to refrain from doing any act. It includes unauthorized receipt, theft or seizure of nuclear material and installations.

Nuclear Weapon State

Under the terms of the Treaty on the Non-Proliferation of Nuclear Weapons (NPT), there are five nuclear weapon States: the United States of America, China, the Russian Federation, the United Kingdom and France. A nuclear weapon State is a State that has detonated a nuclear device prior to 1967.

Highly Enriched Uranium (HEU) / Low Enriched Uranium (LEU)

Natural Uranium is composed of around 0.7% of the isotope U-235 and mostly U-238. HEU is uranium that has been enriched to 20 % or more in the isotope U-235. HEU is more largely used as U-235 is directly fissionable. All HEU is considered to be usable for the creation of weapons. However, for military purposes, States use weapons-grade uranium, which is uranium enriched to 90% or more. Similarly, plutonium can be differentiated into weapons-grade plutonium, containing at least 93 % of plutonium-239, and plutonium used for civilian purposes.



General Overview

Preventing non-state parties from acquiring nuclear material is an issue that must be tackled on two sides. The supply side - the production and storage of material - has to be secured. Moreover, the international community has to address the motivations of non-state parties and to take innovative measures to prevent any smuggling or theft of nuclear material. Non-state parties do not stop at borders; hence states have to act in cooperation and find solutions together.

Non-state parties

Nuclear weapons can be made out of HEU or plutonium, but building a weapon from plutonium requires greater expertise. Therefore, the international community has focused more on securing HEU. Non-State parties want to possess nuclear weapons in order to terrorize people through violence. They do not seek very precise weapons; they would rather quickly develop a few weapons that have a devastating impact. They can either steal weapons or material that they will make into a weapon. Weapons are more heavily guarded so it is very unlikely that a party would steal a weapon, however their security is of the utmost importance since they can be directly used with very little expertise. The international community must prioritize the security of nuclear warheads and plutonium and HEU in any form. It is also important to ensure other nuclear material's security as, with expertise, they could be turned into nuclear weapons.

Nuclear material

HEU

In 2013, it was considered that there were approximately 1,380 metric tons of HEU worldwide, 98% of which was in nuclear weapon states. This number is decreasing though some countries are still producing HEU. The United Kingdom ended production in 1962 and declared its military stockpiles; the United States of America (USA) ended production in 1992 and has also published an official history of its production. France has announced an end to HEU production for weapons. China has not officially announced an end in production but it is believed that production has stopped. Russia ended production in the 1980s but refuses to declare how much it has produced.

As Russia and the United States of America blend down HEU they have declared in excess of their military needs, the global HEU stockpile is decreasing. Furthermore, HEU that was given to non-nuclear weapon States as research reactor fuel is blended



down or returned to the countries of origin, mainly the USA and Russia. Research reactors are converted to LEU or closed down.

Nonetheless, India continues HEU production for naval reactors and Pakistan produces it for weapons. United Kingdom, USA, Russia and China still use HEU for naval fuel and are not willing to convert these reactors to LEU. Moreover, the Democratic People’s Republic of Korea (DPRK) has a uranium enrichment program, but it is not known if it is producing HEU. Israel may have produced HEU for military purposes but it is not proven. Despite efforts to reduce the use of HEU for civilian purposes, there are still over a hundred research reactors worldwide using HEU, some of which contain large amounts of weapons-grade material. HEU for civilian use is also more dispersed, for example, Russia uses HEU fuelled icebreakers and container ships. Additionally, facilities containing small quantities of nuclear material tend to be less protected and are therefore very attractive targets for non-state parties.

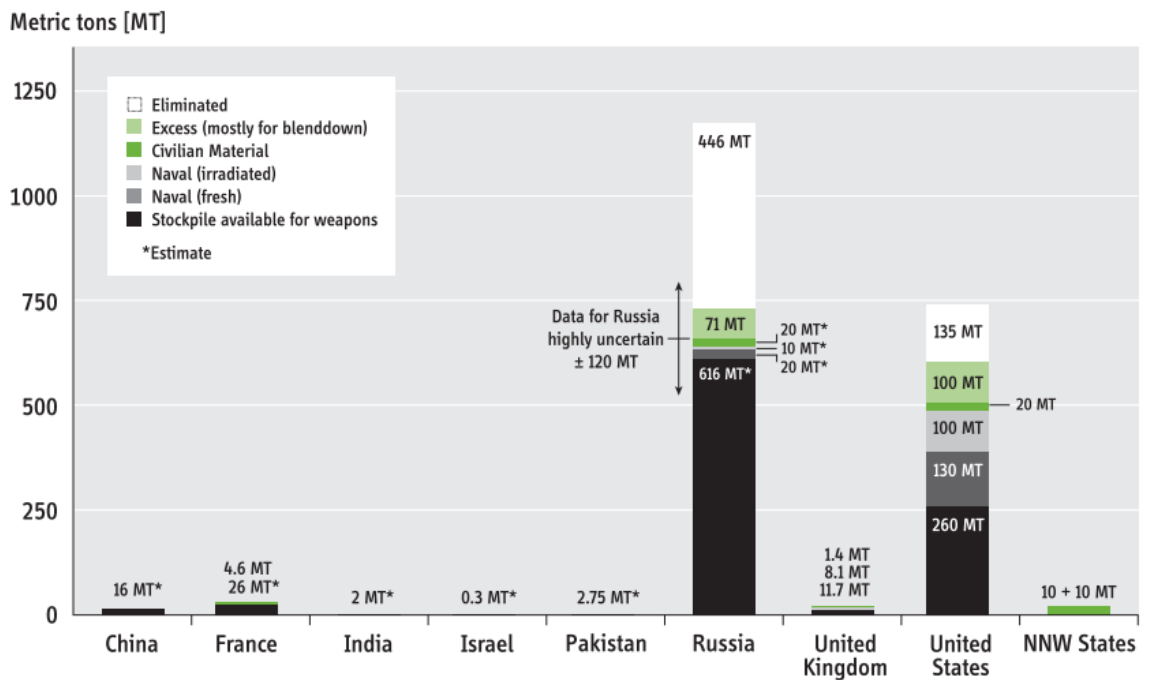


Fig. 1 “National stocks of HEU”. Column Chart. *International Panel on Fissile Material*. 2011. Web. 19 June 2014. <<http://fissilematerials.org/library/gfmr11.pdf>>.

Plutonium

The global stockpile of separated plutonium is estimated at 500 metric tons. Plutonium is a product of reactions of fission. It has to be separated, through a reprocessing, from spent nuclear fuel before it can be used. About a third of the

global stockpile is used in military programs, half in civilian nuclear programs and about 90 tons have been declared in excess, mainly by the USA and the Russian Federation.

The largest stockpiles are held by Russia, the United Kingdom, the United States of America, France and Japan. However, not all stockpiles are held in the country that owns it. Military stockpiles belong mainly to the USA and to Russia. The USA has declared its plutonium weapons and is planning to dispose of its excess of separated plutonium, while Russia has made no declaration concerning the plutonium it possesses in excess of its military needs. In addition to this, India, Pakistan, and possibly Israel, continue to produce plutonium for weapons.

Civilian stockpiles are held mainly in the United Kingdom, France and Russia. The IAEA has published Guidelines for the Management of Plutonium. Nine countries - France, United Kingdom, United States of America, China, Russia, Belgium, Switzerland, Germany and Japan - submit INFCIRC/549 declarations, where they provide information on their stockpiles and the policies they are willing to adopt concerning the management of plutonium. Nevertheless, some declarations remain incomplete: Germany and Switzerland do not provide information on their stocks overseas. Also, it is estimated that the Netherlands, Italy and Sweden possess ten tons of separated civilian plutonium. These States, along with India and Pakistan, do not submit INFCIRC/549 declarations.

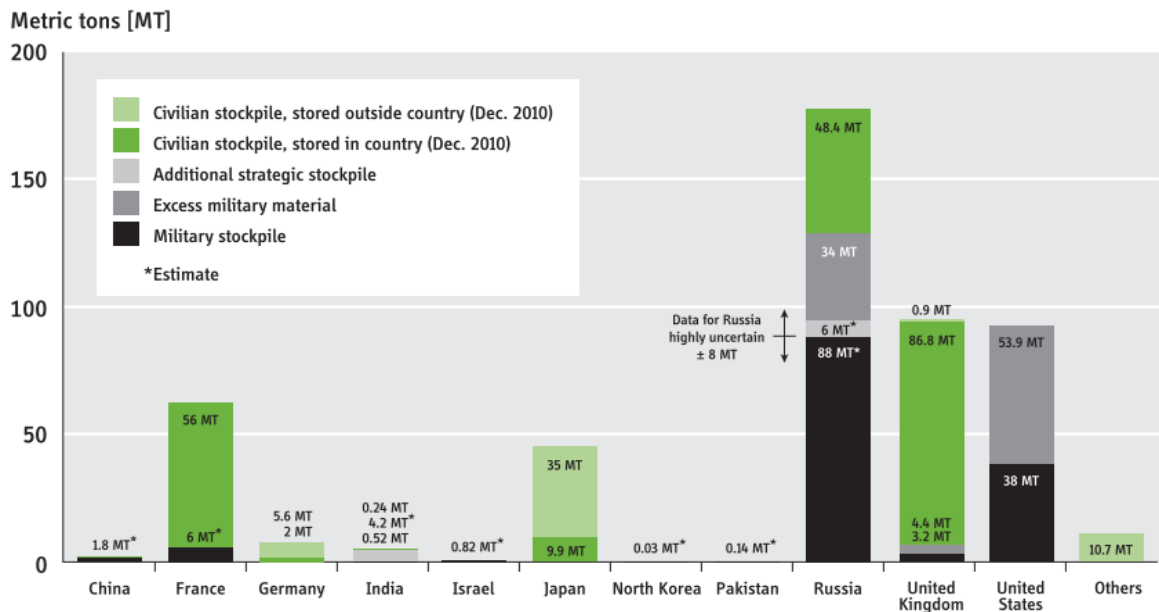


Fig. 2. “National stocks of separated plutonium”. Column Chart. *International Panel on Fissile Material*. December 2010. Web. 19 June 2014. <<http://fissilematerials.org/library/gfmr11.pdf>>.

Nuclear arsenals

There are currently nine States that possess nuclear weapons: China, France, Russia, United Kingdom, USA, Pakistan, India, DPRK and Israel.

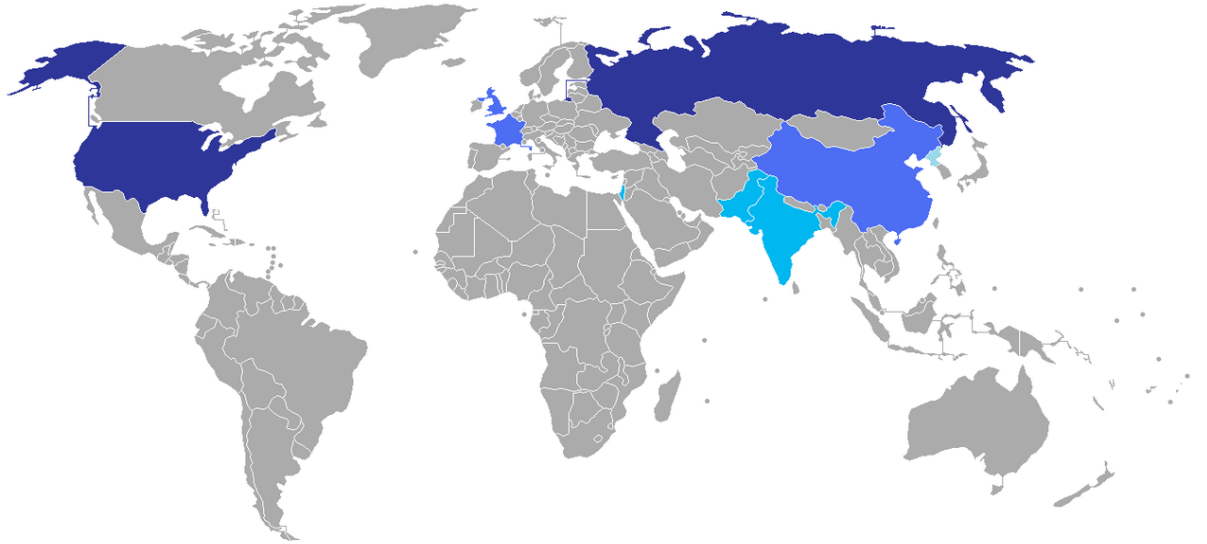


Fig. 3. "Nuclear weapons stockpiles in the world". Map. *Wikipedia*. April 2009. Web. 24 June 2014. <http://en.wikipedia.org/wiki/List_of_states_with_nuclear_weapons>.

Key: ■ Large stockpile with global range (Russia and the USA) ■ Smaller stockpile with global range (China, France, and the United Kingdom) ■ Small stockpile with regional range (India, Israel, DPRK and Pakistan)

While the United States of America, Russia, France and the United Kingdom have been reducing their arsenals; India and Pakistan are building up their stockpiles. The international community has little information on DPRK's nuclear arsenals: DPRK possesses plutonium weapons on which they perform underground tests, but it is not known if the country possesses HEU weapons.

Globally, in 2011, the nuclear weapon stockpile was of 19,000 weapons, 10,000 of which were in Russia and 8,000 in the USA. Most of these warheads are operational. Approximately, 7,000 are awaiting dismantlement, but the figure cannot be certain, as Russia does not communicate the amount of warheads that are awaiting dismantlement. Also, a great number of states are concerned with Pakistan's arsenal. It possesses more than a hundred nuclear warheads probably stored at eight sites, a dispersal that makes the material vulnerable. Pakistan has put in place a system of permissive action links to secure its weapons. The USA believes Pakistan's security measures are sufficient; however there is no system of public oversight concerning these measures.



Promoting non-proliferation

Putting physical barriers in place

An obvious way to prevent non-State parties from acquiring nuclear material is to put physical barriers between those parties and the material. Each country follows its own protocols concerning security measures, however, the IAEA has “Nuclear Security Recommendations on Physical Protection of Nuclear Material and Nuclear Facilities” (incirc/225/rev5) in which the agency gives guidelines on how to secure nuclear material. The publication reflects a consensus among the IAEA member States on requirements for nuclear security. Too often, political disputes come into the way of security. For example, the Material Protection, Control and Accounting program the USA led to secure Russian facilities just after the Cold War was delayed by larger political disagreements and a lack of transparency between the two nations. Putting efficient physical barriers into place requires more cooperation between states and transparency.

Additionally, traveling material is an attractive target for non-state parties. This material’s security is covered by the Convention on the Physical Protection of Nuclear Material (CPPNM). It is the only international legally binding convention in the area of physical protection. The CPPNM applies to nuclear material used for peaceful purposes in international transport only. An amendment was created in July 2005 to expand the Convention’s scope to cover the physical protection of nuclear material in domestic use, storage and the protection of nuclear material and facilities against sabotage. The amendment also seeks to facilitate cooperation between states and the IAEA to locate and recover stolen material. However the amendment will enter into force only once it has been ratified by two thirds of the State Parties of the Convention. Presently, only 70 States have ratified the amendment out of the 148 Parties.

Towards disarmament

The best way to prevent non-State parties from acquiring nuclear material is to reduce the quantity of nuclear material worldwide. Efforts have been made to reduce stockpiles even though there is a lack of political will to end the production of fissile material. The USA’s arsenal and Russia’s arsenal are diminishing; however others are growing, such as Pakistan’s. The Treaty on the Non-Proliferation of Nuclear Weapons (NPT) asks for States to move towards global disarmament but little effort has been made as States continue to rely on nuclear weapons for their defence.



Countering acts of nuclear terrorism

Tracking nuclear material

The amendment of the CPPNM would not only ensure a better physical protection but also help tracking stolen material. Indeed, it is essential to better monitor nuclear material. Information Circulars such as the INFCIRC/549 declarations on plutonium stockpiles permit a better evaluation of the quantity and location of material worldwide. Nonetheless, information is not transparent enough for the IAEA to draw an inventory of all stockpiles. The IAEA has established safeguards. States that have ratified certain conventions are bound to these safeguards. For example, the IAEA can conduct inspections in non-nuclear weapon states that have ratified the NPT, and has agreed to specific safeguards with nuclear weapon states. Therefore, the IAEA can monitor nuclear activity and detect undeclared usage. IAEA safeguards are a key element to non-proliferation. Moreover, the IAEA holds the Illicit Trafficking Database on which states can report cases of theft. However, because this database is public and the IAEA has no power to investigate suspicions, cases are often underreported and only a small fraction of the illicit nuclear smuggling that takes place is declared by states.

Legally prosecuting illicit trafficking

The UN Security Council resolution 1540's mandate, that has been extended several times, commits states to adopt legislative measures to prevent illicit trafficking of nuclear material. Moreover, the International Convention on the Suppression of Acts of Nuclear Terrorism (ICSANT) compels States to criminalize any act of nuclear terrorism including the theft or fraud of any nuclear material. States that have ratified the convention are requested to prohibit any assistance to illegal nuclear activities. They have to exchange information on measures taken to detect, prevent or suppress acts of nuclear terrorism. States have to inform one another on any illegal nuclear activity on its territory. The Convention further promotes cooperation between states by asking that they assist each other with the investigation of any act of terrorism. Ensuring that States ratify the ICSANT is important, as it would ensure multilateral and cooperative efforts to prevent non-State parties from acquiring nuclear material, and to prosecute these parties.



Major Parties Involved and Their Views

International Atomic Energy Agency (IAEA)

The IAEA has published various recommendations and guidelines regarding the management of nuclear material. It has jurisdiction in certain states under specific treaties. It can lead inspections following procedures specified in the IAEA's safeguards. The IAEA works towards the non-proliferation of nuclear weapons and the security and safety of a peaceful use of nuclear energy. An important text it has written up with member states is the Nuclear Security Recommendations on Physical Protection of Nuclear Material and Nuclear Facilities. There are currently 162 States that are members of the IAEA.

Pakistan

Pakistan is building up its nuclear arsenal. Its stockpiles are growing as it continues to produce fissile material for military purposes. It possesses one to two plants producing HEU and three to four reactors producing plutonium. Pakistan has ratified neither the NPT nor the ICSANT. Its HEU stockpile is of three metric tons which would permit the construction of dozens of nuclear weapons. Pakistan is seeking to convert its arsenal to plutonium weapons. Its plutonium stockpiles are estimated to be of 150 kg. Pakistan's warheads are probably stored at eight sites and are disassembled. Those sites' security is one of the main concerns for the international community, especially due to political instability in the country.

Russian Federation

The Russian Federation possesses the largest nuclear arsenal as well as large amounts of nuclear material; mainly plutonium and HEU. HEU production has stopped in the 1980s but Russia refuses to declare what amount had been produced previously and is believed to have the largest stockpile worldwide. Russia is in the process of dismantling part of its nuclear arsenal, but does not release official data on its dismantlement program. It is down blending its HEU stockpiles to LEU at a rate of over 30 tons per year. However, when the Soviet Union collapsed, securing facilities was not a priority and neither protocols nor financing was provided. Nowadays, there are still facilities that lack security measures even though Russia has been cooperating with the USA on securing nuclear material.

United States of America

The United States of America has the second largest nuclear arsenal and HEU stockpile and the third largest plutonium stockpile. It has officially declared its stockpiles to the IAEA and is repatriating HEU that it had sent to non-nuclear weapon States. Hence, there is



a lot of nuclear material in transit to the USA that has to be secured. The USA has worked closely with the IAEA and the Russian Federation to secure and track nuclear material. It has created the “Database on Nuclear Smuggling, Theft, and Orphan Radiation Sources” and has created treaties with various nations, such as India, Japan and the United Arab Emirates, putting into place cooperative security measures to organise the peaceful use of nuclear energy.

Timeline of Events

Date	Description of event
September 1975	“Physical Protection of Nuclear Material and Nuclear Facilities” (INFCIRC/225) published by the IAEA
13 April 2010	NSS in Washington
January 2011	5 th revision of the “Physical Protection of Nuclear Material and Nuclear Facilities” (INFCIRC/225/rev5) published by the IAEA
26 and 27 March 2012	NSS in Seoul
24 and 25 March 2014	NSS in the Hague

UN involvement, Relevant Resolutions, Treaties and Events

- Treaty on the Non-Proliferation of Nuclear Material (NPT), 1970
- Convention on the Physical Protection of Nuclear Material (CPPNM), 8 February 1987
- United Nations Security Council Resolution on preventing non-State actors from obtaining weapons of mass destruction, 28 April 2004, **(UNSCR 1540)**
- International Convention on the Suppression of Acts of Nuclear Terrorism (ICSANT), 13 April 2005, **(A/RES/59/290)**



Evaluation of Previous Attempts to Resolve the Issue

Most efforts have been aimed at creating physical barriers to secure nuclear material. Facilities' security is dealt with by each state individually, and while the IAEA conducts verifications, the organization cannot conduct inspections without a state's consent. Thus, there is currently no way to supervise security measures. Also, we cannot determine the exact amount of nuclear material existing since some countries are reluctant to declare how much they have produced. International transport is under the supervision of the CPPNM, however, until the amendment to the Convention enters into force, its scope remains very limited.

There have been efforts aiming to limit supplies of nuclear material. HEU production has been stopped except in Pakistan and India. Moreover, India, Russia, the USA and the United Kingdom are still using HEU fuelled submarines. An end to the production has not been agreed upon because some states, such as India, Pakistan and Israel, seek to build their stocks before agreeing to a cut off.

Finally, the international community has worked on disarmament. The NPT promotes both non-proliferation and disarmament. However, Pakistan, DPRK, Israel and India are not members. Furthermore, little action has been taken towards a "cessation of nuclear arms race" and a "treaty on general and complete disarmament under strict and effective international control" as requested in article VI of the NPT. In addition to this, the NPT deals with the proliferation of weapons, and more attention has to be directed to the proliferation of nuclear material.

The issue of securing nuclear material stems from three main problems: a lack of cooperation and coordination within each state, a lack of political momentum due to the different motivations of each State, and a need to strengthen physical barriers.

Possible Solutions

There are different levels on which the international community can act. First of all, states must continue strengthening physical barriers. Greater cooperation between states would permit sharing expertise and ensure more efficient security measures. Prioritizing security is essential.

States must work together on non-proliferative methods. Agreements concerning disarmament have to be found. Reducing arsenals' sizes has to be worked upon, since those weapons facilitate proliferation more than they act as deterrents against non-state parties.



Furthermore, limiting or ending production of material would hold back proliferation. Using material that cannot be used for weapons should be prioritised. Thus, converting HEU to LEU or blending down plutonium into mixed oxide fuel, for instance, should be promoted.

Preventing the acquisition of material by non-state parties can also be achieved by tracking those materials. Smuggling networks can be monitored by supervising money transfers. Transparency must be achieved in order to draw inventories and monitor nuclear material. Cases of theft have to be reported with more accuracy.

Furthermore, we need to better understand the motivations of non-state parties and their methods. Lines of communication could be opened with some groups. Incentives and sanctions can be put in place to persuade states not to support these groups. We must also work to undermine the sentiment of power given by nuclear weapons. As long as states rely on nuclear weapons and use them as deterrent, non-state parties will see them as privileged instruments of power and will want to acquire them.

Hence, to prevent the acquisition of material by non- state parties, states have to work both on the supply side and the demand side. Innovative measures have to be taken to prevent nuclear proliferation. Finally, the ratification of existing treaties such as the CPPNM or the ICSANT has to be accelerated and recommendations and safeguards from the IAEA must be enforced.

Bibliography

"1540 Committee." *UN News Center*. UN. Web. 25 June 2014.

<http://www.un.org/en/sc/1540/>.

"Convention on the Physical Protection of Nuclear Material (CPPNM) | NTI." *NTI: Nuclear Threat Initiative*. Web. 24 June 2014. <http://www.nti.org/treaties-and-regimes/convention-physical-protection-nuclear-material-cppnm/>.

Edited By Jung Ho Bae And Jae H. Ku. "Nuclear Weapons and Non-State Actors." *Nuclear Security* (2012): n. pag. *US-Korea Institute*. Web. 19 June 2014.

http://uskoreainstitute.org/wp-content/uploads/2011/04/NuclearWeapons_NonStateActors_Weiner.pdf.

Institute for Science and International Security. "Guidelines for the Management of Plutonium." *Choice Reviews Online* 40.08 (2003): 40-4884. Web. 25 June 2014. <http://isis->



online.org/uploads/isis-reports/documents/INFCIRC_549_Guidelines_Revision_17Sept2010.pdf.

"International Convention on the Suppression of Acts of Nuclear Terrorism | NTI." *NTI: Nuclear Threat Initiative*. Web. 24 June 2014. <http://www.nti.org/treaties-and-regimes/international-convention-suppression-acts-nuclear-terrorism/>.

"List of States with Nuclear Weapons." *Wikipedia*. Wikimedia Foundation, 19 June 2014. Web. 24 June 2014. http://en.wikipedia.org/wiki/List_of_States_with_nuclear_weapons.

Nuclear Security Recommendations on Physical Protection of Nuclear Material and Nuclear Facilities (INFCIRC/225/Revision 5): Recommendations. Vienna: International Atomic Energy Agency, 2011. Web. 25 June 2014. http://www-pub.iaea.org/MTCD/publications/PDF/Pub1481_web.pdf.

"Nuclear Weapon and Fissile Material Stockpiles and Production." *International Panel on Fissile Material*. International Panel on Fissile Material, 2011. Web. 19 June 2014. <http://fissilematerials.org/library/gfmr11.pdf>.

"Uranium Enrichment." *World Nuclear Association*. World Nuclear Association, May 2014. Web. 19 June 2014. <http://www.world-nuclear.org/info/Nuclear-Fuel-Cycle/Conversion-Enrichment-and-Fabrication/Uranium-Enrichment/>.

Appendix or Appendices

I. "Communiqué of the Washington Nuclear Security Summit." *Nuclear Security Summit 2014*. Web. 22 June 2014. <https://www.nss2014.com/sites/default/files/documents/11.communique.pdf>.

II. "The Hague Nuclear Security Summit Communiqué." (2014): *Nuclear Security Summit 2014*. Web. 22 June 2014. https://www.nss2014.com/sites/default/files/documents/the_hague_nuclear_security_summit_communique_final.pdf.

III. "Seoul Nuclear Security Summit Communiqué." (2012): *Nuclear Security Summit 2014*. Web. 22 June 2014. https://www.nss2014.com/sites/default/files/documents/seoul_communique_final.pdf

