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Hiroshima Report

—Evaluation of Achievement in Nuclear Disarmament, Non-Proliferation and Nuclear Security: 2010-2012—

Center for the Promotion of Disarmament and Non-Proliferation
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Preface and Acknowledgements

(1) Purpose

This *Hiroshima Report* is the result of a research project on Evaluating Performances of Selected Countries in the Fields of Nuclear Disarmament, Non-Proliferation and Nuclear Security commissioned to the Japan Institute of International Affairs (JIIA) by the Hiroshima Prefecture.

The momentum created by U.S. President Barack Obama's speech in Prague in April 2009 for a world without nuclear weapons seems to be weakening. The number of nuclear weapons has been reduced to around 20,000, equivalent to one-third of the peak at the height of the Cold War. However, the prospects of eliminating nuclear weapons are still distant at best. Even more worrying, the situation regarding nuclear weapons is becoming more and more complex. On the positive side, the New START, a U.S.-Russian bilateral strategic nuclear weapons reduction treaty, was signed in April 2010. In the following month, the Nuclear Non-Proliferation Treaty (NPT) Review Conference (RevCon) unanimously adopted a Final Document, which contained a specific action plan for nuclear disarmament, non-proliferation and nuclear security, along with key recommendations related to the Middle East. After these positive movements, however, the negotiation on a post-New START bilateral nuclear reduction treaty has yet to be launched, and other nuclear weapons possessors do not even seem to have the intention to start further, if any, reduction of their arsenals. The goals of early entry into force of the Comprehensive Nuclear-Test-Ban Treaty (CTBT) and the immediate commencement and early conclusion of Fissile Material Cut-Off Treaty (FMCT) negotiations have been reiterated for more than a decade without meaningful progress. Iran and North Korea seem to consolidate their respective nuclear (weapons) capabilities. Notwithstanding gradual reinforcement of nuclear security, the threat of nuclear terrorism remains a high security concern. While problems regarding nuclear disarmament, non-proliferation and nuclear security continue to accumulate, efforts toward solving them have progressed at a snail's pace.

In order to revitalize the momentum, this project first tries to clarify the current status of issues surrounding nuclear disarmament, non-proliferation and nuclear security, as well as efforts made by each country. By doing so, it aims to encourage increased debate on these issues by policy makers, experts in and outside governments, and civil society. Furthermore, by issuing the "Report" and the "Evaluation" from Hiroshima, where a nuclear weapon was once used, it aims to help promote further actions in various fields to realize a world without nuclear weapons.

(2) Research Design

(a) Items

Items for study, analysis and evaluation of the selected countries' performance are built mainly upon the following documents that reflect views with wide support on the issues of nuclear disarmament, non-proliferation and nuclear security. Items are also chosen with the aim of providing a certain degree of objective measurements for evaluation.

- The Action Plan and recommendations pertaining to the implementation of the 1995 Middle East resolution contained in the Final Document adopted in the 2010 NPT Review Conference;
- Seventy-six recommendations contained in the 2009 International Commission on Nuclear Non-proliferation and Disarmament (ICNND) report titled "Eliminating Nuclear Threats: A Practical Agenda for Global Policymakers";
- Proposals sponsored or co-sponsored by Japan at the 2012 NPT Preparatory Committee (PrepCom); and
- "Resolution towards the Abolition of Nuclear Weapons" launched by the Mayors for Peace in 2011.

A number of measures have been proposed internationally on nuclear disarmament, non-proliferation and nuclear security issues. Among them, the 64-point Action Plan contained in the Final Document adopted by consensus at the 2010 NPT Review Conference is certainly one of the most important reflecting the commitment of the 190 states parties to the NPT. The Action Plan, however, is a result of compromise and bargaining needed to reach a consensus, and does not necessarily contain strong and clearly stated measures for action. Thus, the Research Committee of this project described below decided to refer to the three other documents mentioned above in tandem with the 64-point Action Plan. The three additional sources fit with the project's intent to contribute to Hiroshima's and Japan's efforts to lay out "the roadmap for the abolition of nuclear weapons."

The following items were selected for measuring countries' performances.

- Nuclear disarmament
  - The status of nuclear forces (estimates)
  - Commitment to achieve a world without nuclear weapons
  - The reduction of nuclear weapons
  - Diminishing the role and significance of nuclear weapons in the national security strategies and policies

- De-alerting or measures for maximizing decision time to authorize the use of nuclear weapons
- CTBT and nuclear tests
- FMCT
- Transparency in nuclear forces, fissile material for nuclear weapons, and nuclear strategy/doctrine
- Verification of nuclear weapons reductions
- Irreversibility
- Disarmament and non-proliferation education and cooperation with civil society

- Nuclear non-proliferation
  - Acceptance and compliance with the nuclear non-proliferation obligations under the NPT and nuclear-weapon-free zone treaties
  - IAEA safeguards
  - Cooperation with the IAEA
  - Implementing appropriate export controls on nuclear-related items and technologies
  - Transparency in the peaceful use of nuclear energy
- Nuclear security
  - Amount of fissile material
  - Accession to and participation in multilateral frameworks regarding nuclear security/safety and the establishment of the national implementation system
  - Efforts to maintain the highest possible standards of nuclear security/safety

(b) Countries Surveyed in This Project

The following 19 countries were surveyed for this project, based on their nuclear significance and geographical distribution, as well as the limited time and resources available for the project:

- Five nuclear-weapon states under the NPT (China, France, Russia, United Kingdom and United States);
- Non-state parties to the NPT (India, Israel and Pakistan);
- Non-nuclear-weapon states under the NPT (Iran, Syria, Australia, Brazil, Germany, Japan, South Korea, South Africa, Sweden and Switzerland; and
- Other: North Korea*

* North Korea declared its suspension from the NPT in 1993 and its withdrawal in 2003, and conducted nuclear tests in 2006, 2009 and 2013, while the NPT states parties have reserved interpretation of the North's official status under the Treaty

(c) Approach

This project focuses on the time period from the conclusion of the 2010 NPT RevCon until the end of 2012. Reference documents are basically open sources, such as speeches, remarks, and working papers delivered at disarmament fora (e.g., NPT Preparatory Committee, UN General Assembly, and Conference on Disarmament) and official documents published by governments and international organizations.

As for the evaluation section, a set of objective evaluation criteria is established by which the respective country's performance is assessed.

The Research Committee of this project mentioned below recognizes the difficulties, limitations and risk of "scoring" countries' performances. In the meantime, however, it also considers that an indicative approach is useful to draw attention to nuclear issues so as to prompt debates over priorities and urgency.

The different numerical value within each area (i.e., nuclear disarmament, nuclear non-proliferation and nuclear security) reflects each activity's importance in that area, which was determined through deliberation by the Research Committee of this project. However, the different overall value given to each of the three areas does not necessarily reflect the relative importance of the area vis-à-vis the other areas. Rather, it mostly relates to the number of items in each area surveyed in this project. Thus, the value assigned to nuclear disarmament (full points 101) does not mean that it is more than twice as important as nuclear non-proliferation (full points 44) or nuclear security (full points 41).

Evaluation of the three areas was made separately because of their different characteristics. As for nuclear disarmament and non-proliferation, for example, comparison was hard to make between nuclear-weapon/armed states and non-nuclear-weapon states. Thus, they had to be measured separately. Among the weapon-holders and among the non-holders, total scores may make some sense for comparison.

Regarding "the number of nuclear weapons" (in the nuclear disarmament section) and "the amount of fissile material" (in the nuclear security section), the assumption is that the more nuclear weapons or fissile material usable for nuclear weapons a country possesses, the greater the task of reducing them and ensuring their security. The Research Committee recognizes that the "number" or the "amount" are not the sole decisive factors. It is definitely true that other factors—such as implications of missile

defense, chemical and biological weapons, or conventional force imbalance—would affect the issues and the process of nuclear disarmament, non-proliferation and nuclear security. However, they were not included in our criteria for evaluation because it was difficult to make objective scales of measurement about those factors.

After all, there is no way to mathematically compare the different factors contained in the different areas of disarmament, non-proliferation and nuclear security. Therefore, the evaluation points should be taken as indicative of the performances in general but by no means as an exact representation or precise assessment of different countries' performances.

(3) Project Members

The Research Committee was established to conduct this project, namely producing the "Report" and the "Evaluation." This Committee met four times within the Japanese Fiscal Year 2012 to discuss their content.

The members of the Research Committee are as follows:

Chairperson

Nobuyasu Abe (Director, CPDNP, JIIA)

Research Members

Nobumasa Akiyama (Professor, Hitotsubashi University)
Akira Kawasaki (Executive Committee Member, Peace Boat)
Masahiro Kikuchi (Board Member, Nuclear Material Control Center)
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The Research Committee appreciates the comments and advice to the "Report" given by the following experts:

Dr. Alexey G. Arbatov (Director of Center for International Security, Institute of World Economy and International Relations);
the Hon. Yoriko Kawaguchi (Member of the House of Councilors);
Dr. William C. Potter (Sam Nunn and Richard Lugar Professor of Nonproliferation Studies and Founding Director of the James Martin Center for Nonproliferation Studies at the Monterey Institute of International Studies);

Professor John Simpson (Emeritus Professor of International Relations, University of Southampton); and
Dr. Hiromichi Umebayashi (Director, Research Center for Nuclear Weapons Abolition, Nagasaki University)

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Views or opinions expressed in the "Report" and "Evaluation" are those of the members of the Research Committee and do not necessarily represent the view of the Hiroshima Prefecture, the JIIA or the organizations to which they belong. Not all of the members necessarily agree on all of the points discussed.

Appreciation is also expressed to the James Martin Center for Nonproliferation Studies of the Monterey Institute of International Studies, the Nuclear Threat Initiative, Reaching Critical Will, and the Stockholm International Peace Research Institute, all of which have conducted similar evaluation projects on nuclear-related issues, for sharing their experiences, and Mr. Michiru Nishida (Foreign Ministry of Japan) and Ms. Junko Horibe (IAEA) for valuable technical comments.

Report*

Surveying Trends of Nuclear Disarmament, Non-Proliferation and Nuclear Security: 2010-2012

1. Nuclear Disarmament

(1) The Status of Nuclear Forces (estimates)

As of December 2012, 8 countries have declared that they have nuclear weapons. According to Article IX-3 of the Nuclear Non-Proliferation Treaty (NPT), "a nuclear-weapon State is one which has manufactured and exploded a nuclear weapon or other nuclear explosive device prior to 1 January 1967." China, France, Russia, the United Kingdom, and the United States meet this requirement, and have acceded to the NPT as nuclear-weapon States (NWS) which are permitted to possess nuclear weapons under the treaty.

The three other countries that have tested nuclear weapons—after January 1, 1967—and declared having nuclear weapons are India, Pakistan and North Korea. India and Pakistan have never been parties to the NPT. North Korea declared its suspension from the NPT in 1993 and its withdrawal in 2003. Israel, a non-NPT state, has maintained a so-called "ambiguous policy" by neither confirming nor denying having nuclear weapons, although it is widely considered that it has a nuclear weapons capability (no evidence has yet been found that Israel ever conducted a nuclear test). In this report these 4 states that have publicly declared or are believed to own nuclear weapons are referred to as "nuclear-armed states."

None of the nuclear-weapon/armed states has declassified the exact number of nuclear weapons in its arsenal. The status of nuclear forces shown in table 1-1 below is based on the estimates produced by research institutions in the United States and Europe. According to the data, approximately 20,000 nuclear weapons still exist on the earth, and the United States and Russia's nuclear stockpiles together constitute more than 90 percent of them.

* This report was written by Hirofumi Tosaki.

Table 1-1: The Status of Nuclear Forces (estimates, as of January 2012)

	Total nuclear stockpile	Breakdown				(Number of nuclear warheads)	(Delivery vehicles)
U.S.	~8,000	Retired／Awaiting dismantlement 3,100					
		Operational 4,900	Non-deployed nuclear warheads 2,750				
			Deployed nuclear warheads 2,150	Non-strategic nuclear warheads 200			
				Strategic nuclear warheads 1,950	ICBM	500	500
					SLBM	1,152	288
					Strategic bomber	300	60
Russia	~10,000	Retired／Awaiting dismantlement 5,500	(including2,000 non-strategic nuclear warheads)				
		Operational 4,500	Non-deployed nuclear warheads 2,700	(including 2,000 non-strategic warheads)			
			Deployed nuclear warheads ~1,800	Strategic nuclear warheads ~1,800	ICBM	1,087	322
					SLBM	352	144
					Strategic bomber	300	72
U.K.	225		Deployed <160		SLBM	225	48
France	~300		Deployed 290		SLBM	240	48
					Attack aircraft(including carrier-based aircraft)	50	50
China	~240				Land-based medium- and long- range ballistic missile	130	130
					SLBM	48	48
					Attack aircraft	40	20

			Cruise missile	n/a	150～350
India	80～100		Land-based ballistic missile Sea-based ballistic missile Attack aircraft		
Pakistan	90～110		Land-based ballistic missile Attack aircraft Cruise missile		
Israel	～80		Ballistic missile Attack aircraft		
North Korea	?				
World	19,000	(Deployed nuclear warheads) 4,400			

Source） The table is based on data from *SIPRI Yearbook 2012: Armaments, Disarmament and International Security* (Oxford: Oxford University Press, 2012), chapter 7.

(2) Commitment to Achieve a World without Nuclear Weapons

a) Commitment of the nuclear-weapon/armed states

In the preamble of the NPT, states parties declare "their intention to achieve at the earliest possible date the cessation of the nuclear arms race and to undertake effective measures in the direction of nuclear disarmament." Furthermore, in Article VI of the NPT, "Each of the Parties to the Treaty undertakes to pursue negotiations in good faith on effective measures relating to cessation of the nuclear arms race at an early date and to nuclear disarmament, and on a treaty on general and complete disarmament under strict and effective international control." The 2000 NPT Review Conference (RevCon) agreed that implementing the commitment to disarmament provided in Article VI needs some concrete actions including "[a]n unequivocal undertaking by the nuclear-weapon States to accomplish the total elimination of their nuclear arsenals leading to nuclear disarmament to which all States parties are committed under Article VI."

No country, including the NWS, openly opposes the goal of the total elimination of nuclear weapons or the vision of a world without nuclear weapons. After U.S. President Obama "state[d] clearly and with conviction America's commitment to seek the peace and security of a world without nuclear weapons"[1] in his Prague speech in April 2009, the five NWS have reiterated their commitments to the creation of a world without nuclear weapons at various meetings, including the NPT RevCon and the Conference on Disarmament (CD). In September 2009 the UN Security Council, chaired by President Obama, unanimously adopted Resolution 1887, in which it expressed its "resolv[e] to seek a safer world for all and to create the conditions for a world without nuclear weapons, in accordance with the goals of the [NPT], in a way that promotes international stability, and based on the principle of undiminished security for all."[2] The NWS' commitment to achieve a world without nuclear weapons was reaffirmed at the 2012 NPT Preparatory Committee (PrepCom), in which the NWS "reaffirm[ed their] commitment to the goal of seeking a safer world for all and creating the conditions for a world without nuclear weapons in accordance with the goals of the NPT."[3]

The four nuclear-armed states' stances on the issue are as follows. India has been a long-time supporter of "nuclear disarmament in a time-bound, universal,

[1] "Remarks by President Barack Obama," Prague, Czech Republic, April 5, 2009, http://www.whitehouse.gov/the_press_office/Remarks-By-President-Barack-Obama-In-Prague-As-Delivered/.

[2] S/RES/1887, 24 September 2009.

[3] "Statement by the People's Republic of China, France, the Russian Federation, the United Kingdom of Great Britain and Northern Ireland, and the United States of America to the 2012 Non-Proliferation Treaty Preparatory Committee," May 3, 2012, http://vienna.usmission.gov/120503p5.html.

non-discriminatory, phased and verifiable manner,"[4] at least rhetorically. As for Pakistan, a Pakistani Representative asserted at the CD in May 2012 that nuclear disarmament was the top priority for Pakistan and pressed the Conference to start the negotiation of a Nuclear Weapons Convention, echoing the stance of the Group of 21 and the Non-Aligned Movement (NAM) countries.[5] Israel has refused to join the NPT by citing the security situation in the Middle East and the proliferation of chemical and biological weapons in the region. However, Israel has voted in favor of the UN General Assembly (UNGA) resolution on the establishment of a zone free of weapons of mass destruction in the Middle East (MEWMDFZ) since 1980.

With regard to North Korea, it "committed to abandoning all nuclear weapons and existing nuclear programs and returning, at an early date, to the Treaty on the Non-Proliferation of Nuclear Weapons and to IAEA safeguards"[6] in the Joint Statement of the Fourth Round of the Six-Party Talks in September 2005. In January 2009, however, a spokesperson for the North Korean Foreign Ministry said that it would "never do such a thing as showing our nuclear weapons first, even in 100 years, unless the U.S. hostile policy and nuclear threat to the North are fundamentally terminated."[7] In April 2010 North Korea reinforced this position in an official statement on its nuclear policy on the Korean Peninsula by saying that "[i]t will join the international nuclear disarmament efforts with an equal stand with other nuclear weapons states."[8]

b) Voting Behavior on the UNGA Resolutions on Nuclear Disarmament

Frustrated by the slow pace of progress toward the total elimination of nuclear weapons, the NNWS have in various ways urged the nuclear-weapons/armed states to take concrete steps toward nuclear disarmament, while demonstrating their own commitment to nuclear disarmament. Proposing resolutions on nuclear disarmament at the UN General Assembly symbolizes those actions taken by the non-nuclear-weapon States (NNWS). For over a decade, the UN General Assembly has adopted the following resolutions: "United action towards the total elimination of nuclear weapons" promoted by Japan; "Towards a

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[4] See, for example, "Statement by Mr. L K Advani, Honourable Member of Parliament and Member of the Indian Delegation," The 67th Session of the First Committee of the General Assembly, New York, 11 October 2012.

[5] "Statement by Ambassador Zamir Akram, Permanent Representative of Pakistan to the UN and Other International Organizations on Nuclear Disarmament at the Conference on Disarmament," Geneva, 22 May 2012.

[6] "Joint Statement of the Fourth Round of the Six-Party Talks," Beijing, 19 September 2005, http://www.mofa.go.jp/region/asia-paci/n_korea/6party/joint0509.html.

[7] "DPRK Foreign Ministry's Spokesman Dismisses U.S. Wrong Assertion," *KCNA*, January 13, 2009, http://www.kcna.co.jp/item/2009/200901/news13/20090113-13ee.html.

[8] "Foreign Ministry Issues Memorandum on N-Issue," *Korean News*, April 21, 2010, http://www.kcna.co.jp/item/2010/201004/news21/20100421-27ee.html.

nuclear-weapon-free world: accelerating the implementation of nuclear disarmament commitments" proposed by the New Agenda Coalition (NAC); and "Nuclear disarmament" of the NAM members. (The titles of the resolutions are those of 2012.) The voting behavior of the countries surveyed in this project on the three resolutions at the 67th session of the UNGA in 2012 is presented below.

- "United action towards the total elimination of nuclear weapons"
  - Co-sponsors: Australia, Germany, Japan, Switzerland, the U.S. and others
  - 174 in favor, 1 against (North Korea), and 13 abstentions (Brazil, China, India, Iran, Israel, Pakistan, Syria and others)
- "Towards a nuclear-weapon-free world: accelerating the implementation of nuclear disarmament commitments"
  - Co-sponsors: NAC (Brazil, South Africa, Sweden and others)
  - 175 in favor, 6 against (France, India, Israel, Russia, the U.K. and the U.S.), and 5 abstentions (China, Pakistan and others)
- "Nuclear disarmament"
  - Co-sponsors: NAM (Iran and others)
  - 124 in favor, 44 against (Australia, France, Germany, Israel, Switzerland, the U.K., the U.S. and others), and 18 abstentions (India, Japan, Pakistan, South Korea, Russia, South Africa, Sweden and others)

At this session, the usual UNGA Resolution titled "Follow-up to the advisory opinion of the International Court of Justice on the Legality of the Threat or Use of Nuclear Weapons" called on "all States immediately to fulfill [an obligation to pursue in good faith and bring to a conclusion negotiations leading to nuclear disarmament] by commencing multilateral negotiations leading to an early conclusion of a nuclear weapons convention prohibiting the development, production, testing, deployment, stockpiling, transfer, threat or use of nuclear weapons and providing for their elimination."[9] The resolution was adopted by 135 in favor, 22 against (France, Germany, Israel, Russia, the U.S. and others), with 26 abstentions (Australia, Japan, South Korea and others). (The United Kingdom was absent.) Japan explained its abstention in the First Committee of the UN General Assembly by saying, "Japan believes that their use clearly does not comply with the spirit of humanitarianism which has its philosophical foundation in international law; Japan supports the unanimous conclusion of the judges of the ICJ that there exists an obligation

[9] A nuclear weapons convention raised international interest in October 2008 when UN Secretary-General Ban Ki-moon delivered a speech in which he referred to the "consideration of negotiations on a nuclear weapons convention" as his five-point plan for nuclear disarmament. For the UN Secretary-General Ban Ki-moon's five-point proposal (October 2008), see Ban Ki-Moon, "Five Steps to a Nuclear-Free World," *Guardian*, November 23, 2008, http://www.guardian.co.uk/commentisfree/2008/nov/23/nuclear-disarmament-united-nations.

to pursue in good faith and bring to a conclusion negotiations leading to nuclear disarmament; on the other hand, [Japan is] convinced that realistic measures are required in order to achieve steady progress in nuclear disarmament and non-proliferation."[10] The International Campaign to Abolish Nuclear Weapons (ICAN) has conducted a study on states' responses to the proposal of negotiating a Nuclear Weapons Convention. According to the ICAN report, among the 19 countries surveyed for this project, France, Israel, Russia, the United Kingdom and the United States "don't support" the NWC, while Australia, Germany, Japan, South Korea and others are "on the fence" (undecided).[11]

At the 2010 NPT RevCon, the words "nuclear weapons convention" were mentioned in the Final Document of the NPT review process for the first time. Specifically, "the Conference note[d] that the five-point proposal for nuclear disarmament of the Secretary-General of the United Nations, which proposes, inter alia, consideration of negotiations on a nuclear weapons convention or agreement on a framework of separate mutually reinforcing instruments, backed by a strong system of verification." Additionally, the chair's summary for the 2012 NPT PrepCom stated, "[m]any States parties stressed the need for the negotiation of a phased programme for the complete elimination of nuclear weapons with a specific time frame, including a nuclear weapons convention."

c) Other Significant Initiatives

One of the noteworthy developments in nuclear disarmament in recent years is the establishment of the Non-Proliferation and Disarmament Initiative (NPDI). The NPDI is a cross-regional, ministerial-level group, comprising ten countries.[12] The NPDI was launched by Australia and Japan to promote the action plans agreed in the 2010 NPT RevCon. At the 2012 Preparatory Committee (PrepCom), the NPDI submitted four working papers covering transparency in nuclear forces, among other subjects. In its fifth ministerial meeting in September 2012 the NPDI members agreed on developing six joint working papers to be submitted at the 2013 NPT PrepCom, covering such issues as the Comprehensive Nuclear-Test-Ban Treaty (CTBT), non-strategic nuclear weapons, the reduction of the role of nuclear weapons, export controls, nuclear-weapon-free zones (NWFZs), and a wider application of safeguards in NWS.[13] The NPDI is thus actively

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[10] "Explanation of Vote by Japan: 'Follow-up to the advisory opinion of the International Court of Justice on the Legality of the Threat or Use of Nuclear Weapons.'"

[11] Tim Wright, "Towards a Treaty Banning Nuclear Weapons: A Guide to Government Position on a Nuclear Weapons Convention," International Campaign to Abolish Nuclear Weapons, January 2012.

[12] Australia, Canada, Chili, Germany, Japan, Mexico, Netherland, Poland, Turkey and the UAE.

[13] "The Fifth Ministerial Meeting of the Non-proliferation and Disarmament Initiative (NPDI) (Summary and Evaluation)," Ministry of Foreign Affairs of Japan, September 26, 2012, http://www.mofa.go.jp/mofaj/gaiko/npdi/5th1209/gh.html; "Non-Proliferation and Disarmament Initiative 5th Ministerial Meeting Joint Statement," New York, 26 September 2012, http://www.mofa.go.jp/policy/un/disarmament/arms/npdi_5th_statement.html.

engaged in the advancement of nuclear disarmament and non-proliferation.

In addition, at the 2012 PrepCom, the "Joint Statement on the Humanitarian Dimension of Nuclear Disarmament" issued by 16 countries,[14] and Norway's announcement to convene a conference in 2013 focusing on the humanitarian dimension of the use of nuclear weapons, caught the attention of participating states. Issues regarding the humanitarian aspect of the use of nuclear arms had been raised in the Final Document, which says that the 2010 NPT RevCon "expresses its deep concern at the catastrophic humanitarian consequences of any use of nuclear weapons and reaffirms the need for all States at all times to comply with applicable international law, including international humanitarian law." In the above mentioned joint statement released in May 2012, the 16 countries argued that "[a]ll States [had to] intensify their efforts to outlaw nuclear weapons and achieve a world free of nuclear weapons," and that "it [wa]s essential that the humanitarian consequences of nuclear weapons [we]re thoroughly addressed" in the NPT review cycle. These 16 states also drafted a joint statement on the issue for submission to the UNGA First Committee. Thirty-four co-sponsors of the joint statement, including Brazil, South Africa and Switzerland (plus the Holy See), called on all states to "intensify their efforts to outlaw nuclear weapons and achieve a world free of nuclear weapons."[15] Norway explained that the purpose of the proposed conference was to "create an arena to discuss immediate humanitarian effects, longer term impacts and consequences, and the actual state of preparedness to provide adequate humanitarian response in case of a nuclear detonation."

The NWS seem to be closely following such movements. For instance, in its 2010 Nuclear Posture Review (NPR) Report the United States emphasized that it would "only consider the use of nuclear weapons in extreme circumstances to defend the vital interests of the United States or its allies and partners."[16] The United Kingdom also stated during the 2012 PrepCom that "[t]he use of nuclear weapons is governed by the same principles of international humanitarian law that govern the use of other weapons [, which] was confirmed by the International Court of Justice in their 1996 Advisory Opinion."[17] The

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[14] "Joint Statement on The Humanitarian Dimension of Nuclear Disarmament," 2012 NPT PrepCom, 2 May 2012. This statement was issued by Austria, Chile, Costa Rica, Denmark, the Holy See, Egypt, Indonesia, Ireland, Malaysia, Mexico, New Zealand, Nigeria, Norway, the Philippines, South Africa, and Switzerland.

[15] "Joint Statement on the Humanitarian Dimension of Nuclear Weapons," 67th Session of the United Nations General Assembly First Committee, New York, 22 October 2012. In a meeting held in its Foreign Ministry, Japan explained that the country "refused to endorse the Joint Statement, as its content was not necessarily consistent with Japan's national security which relies on the U.S. extended deterrence while pursuing a realistic approach for nuclear disarmament." "An informal meeting with NGOs regarding the First Committee of the 67th Session of the UN General Assembly and the Oslo Conference (Summary)," Ministry of Foreign Affairs of Japan, November 21, 2012, http://www.mofa.go.jp/mofaj/gaiko/kaku/ngo_1211.html.

[16] U.S. Department of Defense, *Nuclear Posture Review Report*, April 2010, p. 16.

[17] "Statement by Ambassador Jo Adamson, UK Ambassador to the Conference on Disarmament," Cluster I—Disarmament, 2012 Preparatory Committee for the Nuclear Non-Proliferation Treaty, Vienna, 3 May 2012.

Chairman's Factual Summary of the 2012 NPT PrepCom underscored that: "Many States parties expressed a concern that any use of or threat of use of nuclear weapons would be inconsistent with fundamental rules of international humanitarian law. Some nuclear-weapon States outlined that under their respective national policies any use of nuclear weapons would only be considered in extreme circumstances in accordance with applicable international humanitarian law."

(3) The Reduction of Nuclear Weapons

a) Trends of Nuclear Arms Reduction

Obviously, one of the most important steps toward a world without nuclear weapons is to cut back the existing nuclear arms stockpile. Irrespective of the arguments that may be presented, without reduction elimination will never take place. To date, only Russia and the United States have agreed on and implemented the reduction of their nuclear arsenals under legally binding treaties. The two states concluded the Strategic Arms Reduction Treaty (START) I, signed in July 1991 and entered into force in December 1994, agreeing to reduce the number of deployed strategic nuclear warheads to 6,000 each. The START I was followed by the START II (signed in January 1993 but has not entered into force), which would lower the number of deployed strategic nuclear warheads to 3,000-3,500 each. Subsequently, both parties negotiated the Strategic Offensive Reductions Treaty (signed in May 2002 and entered into force in June 2003) and agreed to reduce operationally deployed strategic warheads to 1,700-2,200 for each side. Most recently, Russia and the United States concluded the New START (signed in April 2010 and entered into force in February 2011) and have undertaken obligations to reduce their stockpiles to the aggregate limits below, as counted by Article III of the Treaty, within seven years after the entry into force of the Treaty:

(a) 700, for deployed Intercontinental Ballistic Missiles (ICBMs), deployed Submarine-Launched Ballistic Missiles (SLBMs), and deployed heavy bombers;

(b) 1550, for warheads on deployed ICBMs, warheads on deployed SLBMs, and nuclear warheads counted for deployed heavy bombers; and

(c) 800, for deployed and non-deployed ICBM launchers, deployed and non-deployed SLBM launchers, and deployed and non-deployed heavy bombers.

However, while limiting the number of warheads and delivery systems, the New START, like the previous ones, does not require dismantlement of any warheads.

The status of the reduction of Russian and U.S. strategic (nuclear) delivery vehicles and warheads under the Treaty has been periodically updated in the U.S. State Department homepage (see table 1-2 below).

Table 1-2:

Russian and U.S. strategic (nuclear) delivery vehicles and warheads under the New START

	Aggregate limits	U.S.				Russia			
		Feb 2011	Sep 2011	Mar 2012	Sep 2012	Feb 2011	Sep 2011	Mar 2012	Sep 2012
Deployed strategic (nuclear) warheads	1,550	1,800	1,790	1,737	1,722	1,537	1,566	1,492	1,499
Deployed strategic delivery vehicles	700	882	822	812	806	521	516	494	491
Deployed/non-deployed strategic delivery vehicles	800	1,124	1,043	1,040	1,034	865	871	881	884

Sources) U.S. Department of State, "New START Treaty Aggregate Numbers of Strategic Offensive Arms," Fact Sheet, October 25, 2011, http://www.state.gov/t/avc/rls/176096.htm; U.S. Department of State, "New START Treaty Aggregate Numbers of Strategic Offensive Arms," Fact Sheet, April 6, 2012, http://www.state.gov/t/avc/rls/178058.htm; U.S. Department of State, "New START Treaty Aggregate Numbers of Strategic Offensive Arms," Fact Sheet, October 3, 2012, http://www.state.gov/t/avc/rls/198582.htm.

The number of warheads cited above does not accurately reflect the actual situation of nuclear forces in both countries due to the Treaty's counting rule.[18]

Regarding the post-New START nuclear reduction, President Obama said at the New START signing ceremony, "we hope to pursue discussions with Russia on reducing both our strategic and tactical weapons, including non-deployed weapons."[19] As of the end of December 2012, however, such "discussions" have yet to be launched, and neither country has proposed concrete figures for further reductions. The reasons for this paralysis seem to stem partially from the fact that the presidential elections were held both in Russia and the United States in 2012, and each side was waiting to see the policy of the next administration. In addition, Russia seems to be passive about reducing its nuclear arsenal beyond the New START level. Russia has criticized the U.S. missile defense policy and program, in particular the European Phased Adaptive Approach (EPAA), and sometimes threatened to withdraw from the bilateral nuclear arms control treaties, including the New START. Also, Russia is not enthusiastic about limiting its non-strategic nuclear weapons (NSNW), which outnumber those of the U.S. and compensate for its inferior conventional forces.

As mentioned above, neither Russia nor the United States has clarified the total number of

[18] The New START treaty counts a heavy bomber as one delivery system and one nuclear warhead, despite the fact that the bombers can actually load 6-20 warheads. Also, according to its counting rule, "for ICBMs and SLBMs, the number of warheads shall be the number of reentry vehicles emplaced on deployed ICBMs and on deployed SLBMs."

[19] "Remarks by President Obama and President Medvedev of Russia at New START Treaty Signing Ceremony and Press Conference," Prague, Czech Republic, April 10, 2010, http://www.whitehouse.gov/the-press-office/remarks-president-obama-and-president-medvedev-russia-new-start-treaty-signing-cere.

their nuclear weapons arsenals. In May 2010 the United States disclosed previously classified information, which indicated that it had 5,113 warheads (not including several thousand retired warheads awaiting dismantlement) as of September 30, 2009, and that it had dismantled 8,748 nuclear warheads from fiscal years 1994 through 2009. This is an 84 percent reduction compared to the peak level (31,255 nuclear warheads) at the end of fiscal year 1967. Furthermore, the declassified information stated that the number of U.S. NSNW declined by approximately 90 percent from September 30, 1991 to September 30, 2009.[20] Russia, on the other hand, explained at the 2012 PrepCom that its NSNW did "not exceed 25% of the amount possessed by the USSR in 1991," and all of them were "no longer deployed" and "located … mostly in centralized storage facilities with highest security regime."[21]

The United Kingdom has unilaterally cut back its nuclear arsenals—estimated to have reached about 350 nuclear warheads at its peak—following the end of the Cold War. The United Kingdom keeps only SLBMs as a nuclear weapons delivery system. In his statement in the House of Commons on May 26, 2010, Foreign Secretary William Hague revealed that, as the U.K.'s nuclear policy, its "total number of nuclear warheads would not exceed 225, including the maximum 160 already declared as 'operationally available.'"[22] In the Strategic Defence and Security Review (SDSR), published in October 2010, the United Kingdom unveiled a policy which aims to further reduce its nuclear forces, saying that it would "cut the maximum number of nuclear warheads onboard each deployed submarine from 48 to 40," "reduce [its] requirement for operationally available warheads from fewer than 160 to no more than 120," and "reduce [its] overall nuclear warhead stockpile ceiling from not more than 225 to not more than 180 by the mid 2020s."[23] At the 2012 PrepCom, the United Kingdom mentioned that it "expect[ed] the reduction in operationally available warheads to 120 to take place by the time of the next Review Conference in 2015," as its reduction plan was proceeding ahead of schedule.[24]

France has also voluntarily limited its nuclear arms stockpiles, e.g. by reducing the

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[20] Department of Defense, "Increasing Transparency in the U.S. Nuclear Weapons Stockpile," Fact Sheet, May 3, 2010.

[21] "Statement by the Delegation of the Russian Federation at the first session of the Preparatory Committee for the 2015 Nuclear Non-Proliferation Treaty Review Conference: Cluster 1 (nuclear disarmament)," Vienna, May 2012.

[22] "Britain's nuclear arsenal is 225 warheads, reveals William Hague," *Guardian*, 26 May 2010, http://www.guardian.co.uk/world/2010/may/26/uk-nuclear-weapons-stockpile-warheads.

[23] "Securing Britain in an Age of Uncertainty: The Strategic Defence and Security Review," Presented to Parliament by the Prime Minister by Command of Her Majesty, October 2010, p. 38.

[24] "Statement by Ambassador Jo Adamson, UK Ambassador to the Conference on Disarmament," Cluster I—Disarmament, 2012 Preparatory Committee for the Nuclear Non-Proliferation Treaty, Vienna, 3 May 2012.

number of nuclear warheads (estimated 540 at the peak) and eliminating ground-based ballistic missiles. In 2008 President Sarkozy announced that France's arsenal would be reduced to the level of "fewer than 300 nuclear warheads."[25] France also made it clear at the 2010 RevCon that it did not possess any reserve nuclear warheads.[26] After Sarkozy's remarks in 2008, France did not make additional comment on its plan or the actual reduction of nuclear arms until the 2012 PrepCom, when the French delegation stated that "in the last 15 years, [France] has cut the number of nuclear warheads by half, and … announced the ceiling of nuclear warheads in [its] possession, which now number less than 300."[27]

Among the 5 NWS, China is the only country which has provided no information on the number of nuclear weapons deployed or possessed, its nuclear modernization program, or reduction plans, although it has repeatedly stated that it "has always exercised utmost restraint in the development of nuclear weapons" and "kept its nuclear capabilities at the minimum level required for national security."[28] The current thinking among research institutes is that China has not necessarily increased or reduced its nuclear arsenal numerically. It has insisted that "[s]tates possessing the largest nuclear arsenals should take the lead in drastically reducing their nuclear arsenal," and "when conditions are ripe, other nuclear weapon States should also join the multilateral negotiations on nuclear disarmament."[29] However, China has yet to clarify the concrete conditions to be met, particularly the size of the U.S. and Russian nuclear arsenals, before China joins the multilateral nuclear weapons reduction process.

While the situation of India, Israel, Pakistan and North Korea are not clear, no analysis has indicated that they have reduced their nuclear weapons (capabilities) or that they have concrete plans to do so.

b) Reinforcement and Modernization of Nuclear Arsenals

While France, Russia, the United States and the United Kingdom have taken steps to reduce their nuclear stockpiles, they continue to modernize their nuclear forces and

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[25] "French President Nicolas Sarkozy Nuclear Policy Speech, March 2008," Presentation of Le Terrible in Cherbourg, 21 March 2008, http://www.acronym.org.uk/proliferation-challenges/nuclear-weapons-possessors/france/french-president-nicolas-sarkozy-nuclear-policy-speech-march-2008?page=3.

[26] NPT/CONF.2010/WP/33, 14 April 2010.

[27] "Statement by the Head of the French Delegation," General Debate, First Meeting of the Preparatory Committee for the 2015 NPT Review Conference, Vienna, 30 April-11 May 2012.

[28] "Statement by H.E. Mr. Wu Haitao, Chinese Ambassador for Disarmament Affairs on the Issue of Nuclear Disarmament," at the First Session of the Preparatory Committee for the 2015 Review Conference of the Nuclear Non-Proliferation Treaty, Vienna, May 3, 2012.

[29] Ibid.

nuclear-related infrastructure.

In the 2010 NPR, the United States clearly states that it "will study options for ensuring the safe, secure, and reliable nuclear warheads on a case-by-case basis, consistent with the congressionally mandated Stockpile Management Program" and that it "will not develop new nuclear warheads."[30] The U.S. explanation for the need to reconstitute its nuclear forces is that "[t]o sustain a safe, secure, and effective stockpile today, with the ultimate goal of a world free of nuclear weapons in the future, [the United States] must prudently manage our nuclear stockpile and related Life Extension Programs (LEPs), while cultivating the nuclear infrastructure, expert workforce, and leadership required to sustain it."[31] The United States considers that modernizing the nuclear weapons infrastructure enables the country to carry out deeper cuts in its nuclear arsenals while maintaining effective deterrence. The United States has undertaken a life extension program and modernization of strategic delivery vehicles, and has been studying the development of new delivery vehicles.[32] Moreover, the decision has been made to build a Chemical and Metallurgy Research Replacement facility for producing plutonium pits, and the construction is ongoing. Furthermore, prior to submitting the New START to the Senate for its advice and consent to ratification in May 2010, the Obama administration "provided to Congress a classified report … on the comprehensive plan to: (1) maintain delivery platforms; (2) sustain a safe, secure, and reliable U.S. nuclear weapons stockpile; and (3) modernize the nuclear weapons complex." The report laid out the U.S. plan to make "investments of $80 billion to sustain and modernize the nuclear weapons complex" and "over $100 billion in nuclear delivery systems to sustain existing capabilities and modernize some strategic systems" in the coming decade.[33]

Russia has established programs to replace its aging delivery vehicles. As for ICBMs, a new single-warhead RS-12M (Topol, SS-27) and multiple-warhead RS-24 (Yars, SS-27 Mode 2) seem to have been deployed since 2005 and 2011, respectively. The RSM-56 (Brava, SS-NX-32), new Russian SLBMs loaded onto the Borey class Ballistic Missile Nuclear-Powered Submarines (SSBNs), also have been deployed since the first half of 2012. Russia's new ICBMs and SLBMs are believed to be equipped with a maneuverable reentry

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[30] U.S. Department of Defense, *Nuclear Posture Review Report*, pp. 38-39.

[31] Ibid., p. 37.

[32] Amy F. Woolf, "Modernizing the Triad on a Tight Budget," *Arms Control Today*, Vol. 41, No. 1 (January/February 2012), p. 8-13.

[33] For a summary of the U.S. plan, see "The New START Treaty—Maintaining a Strong Nuclear Deterrence," http://www.bits.de/NRANEU/docs/New%20START%20section%201251%20fact%20sheet.pdf. The modernization of the American nuclear forces is discussed in Tom Z. Collina, "Fact Sheet: U.S. Nuclear Modernization Programs," Arms Control Association, November 4, 2011, http://www.armscontrol.org/factsheets/USNuclear Modernization.

vehicle (MaRV) for penetrating the opponent's missile defense. In February 2012 Russian Prime Minister Putin, speaking on the development and modernization of the national defense system, declared that Russia would "deploy more than 400 advanced ground and sea-based intercontinental ballistic missiles, [and] eight nuclear-powered ballistic missile submarines" during the next decade.[34] Furthermore, in September 2012 Strategic Missile Forces commander Col. Gen. Sergei Karakayev reportedly said that Russia would construct a new silo-based, liquid-propellant heavy ICBM by 2018 to replace the SS-18.[35] The development of the new ICBM, with a loading capacity of 10 warheads, could be a concern for its potential in first use or counterforce attack operations.

The United Kingdom plans to replace its Vanguard class SSBNs with a new class, retaining Trident missiles. Driven by the need to reduce its fiscal deficit, however, the United Kingdom has decided to postpone the final decision regarding "the detailed acquisition plans, design and number of submarines" for 4 years.[36] The French efforts to modernize its nuclear forces and nuclear weapons-related infrastructure are not clear. However, France has constructed four ballistic missile submarines of a new types. The last one entered into service in 2010. In November 2010 France and the United Kingdom concluded an agreement regarding a joint project on "the modeling of the performances of nuclear warheads" and "carry[ing] out laboratory experiments that are essential to guarantee the functioning of nuclear arms and their safety" without having to conduct nuclear tests.[37]

China has been actively promoting the modernization program of delivery vehicles. Aiming to bolster the survivability of strategic nuclear forces, China started to deploy a new road-mobile, solid-propellant ICBM DF-31A, and continues to develop a new SLBM JL-2 which will equip the Type 094 (Jin-class) SSBNs. According to the U.S. Defense Department's report on China's military in 2012, "[t]he JL-2 program has faced repeated delays, but may reach initial operating capability within the next two years."[38] China also reportedly continues to develop a multiple-warhead ICBM DF-41. Such reinforcement may greatly transform not only the size of China's strategic nuclear forces but also the characteristics of its nuclear strategy from the current moderate posture to a more

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[34] Vladimir Putin, "Being Strong: National Security Guarantees for Russia," *Rossiiskaya Gazeta*, 20 February 2012, http://premier.gov.ru/eng/events/news/18185/.

[35] "Russia to Build New ICBM by 2018 - SMF Chief," *RIANovosti*, 3 September 2012, http://en.rian.ru/mlitary_news/20120903/175742805.html.

[36] "Securing Britain in an Age of Uncertainty: The Strategic Defence and Security Review," Presented to Parliament by the Prime Minister by Command of Her Majesty, October 2010, p. 38.

[37] Adrian Croft and Emmanuel Jarry, "France, UK agree to unprecedented military cooperation," Reuters, November 1, 2010, http://www.reuters.com/article/2010/11/02/britain-france-idUSLAG00638720101102.

[38] Office of the Secretary of Defense, *Annual Report to Congress: Military and Security Developments Involving the People's Republic of China*, May 2012, p. 23.

aggressive one, including a first strike option. China's efforts to strengthen mobile, dual-capable (nuclear and conventional) S/MRBMs have continued.

Among the nuclear-armed states, Pakistan seems to be expanding its nuclear stockpile most actively. The construction of a reprocessing plant and two nuclear reactors for producing plutonium suggests that Pakistan intends to develop a weapon-grade plutonium production capability.[39] Pakistan has been speeding up the construction of the fourth nuclear reactor for military purpose. Analysts at the Institute for Science and International Security (ISIS) consider that completion of these three new nuclear reactors "will allow Pakistan to double its annual output of nuclear weapons" from approximately 7-14 to 19-26 per year.[40] India's nuclear forces have also gradually increased. Some express concern about the negative effect of promoting nuclear cooperation for peaceful purposes between India and other countries: should India receive nuclear fuel for peaceful purposes from foreign suppliers, it would be able to use more indigenous uranium for military purposes.

North Korea agreed to take steps to disable the Yongbyon nuclear facility, including the 5 megawatt research reactor, the reprocessing facility (radiochemical laboratory), and the fuel fabrication plant, in accordance with the Second-Phase Actions for the Implementation of the Joint Statement agreed at the Six-Party Talks in October 2007. However, this process was suspended after the implementation of about 80 percent of the agreement. Moreover, North Korea seems to have been simultaneously and clandestinely constructing a uranium enrichment facility. In October 2010 North Korea invited Stanford University Professor Siegfried S. Hecker to visit and showed him what they claimed to be an enrichment facility for peaceful purposes. The level of North Korea's engagement in enrichment activities is not certain. If North Korea has constructed enrichment facilities in addition to the one so far revealed, and HEU is produced there, theoretically, it can be used to increase the number of nuclear warheads. North Korea is believed to have worked on miniaturizing its nuclear warheads to mount on ballistic missiles, although the details are unclear.

All four nuclear-armed states have delivery vehicles capable of carrying nuclear weapons which they continue to develop. India successfully conducted a test launch of the Agni-4 Intermediate-Range Ballistic Missile (IRBM) (with 3,500km range) in November 2011, and the Agni-5 (with 5,000km range) in April 2012. India has also developed a ballistic missile

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[39] Hans M. Kristensen and Robert S. Norris, "Pakistan's Nuclear Forces, 2011," *Bulletin of the Atomic Scientists*, Vol. 67, No. 4 (July/August 2011), p. 91.

[40] David Albright and Paul Brannan, "Pakistan Doubling Rate of Making Nuclear Weapons: Time for Pakistan to Reverse Course," *ISIS Imagery Brief*, May 16, 2011.

submarine. In July 2012 Prime Minister Manmohan Singh announced that India succeeded in producing its first SLBM.[41] Pakistan has also been pushing ahead with the development of land-based ballistic missiles, Shaheen-2 (2,000km range) and Shaheen-1A (2,500-3,000km range). Israel's ground-launched Jericho-3 (5,000km range) has reportedly become operational. In addition, one report said that Germany sold four submarines that can load nuclear-capable cruise missiles and will sell two more submarines to Israel by 2017.[42] North Korea has been actively involved with the development of longer-range ballistic missiles. After a failed attempt in April 2012, North Korea launched the Unha 3 rocket from the Sohae Satellite Launch Station in December 2012 and successfully put a "satellite" into orbit. This was considered a significant breakthrough for North Korea in its effort to acquire an ICBM capability. North Korea currently deploys from 100 to 200 nuclear-capable Nodong Medium-Range Ballistic Missiles (MRBMs).

(4) Diminishing the Role and Significance of Nuclear Weapons in National Security Strategies and Policies

a) Trends of Declaratory Policies

In the Final Document of the 2010 RevCon, the NWS were called upon "to further diminish the role and significance of nuclear weapons in all military and security concepts, doctrines and policies" (Action 5 (c)). It is not easy to objectively evaluate how the nuclear-weapon/armed states consider the role and significance of nuclear weapons as part of their national security strategies and policies. The declaratory policies may not reflect the actual "employment policies," yet they provide a basis for further analysis. Recognizing such a constraint, this report attempts to analyze the current status of nuclear arms in national security policies based on the nuclear-weapon/armed states' declaratory policies.

Perhaps the United States is most aware of the diminished role and significance of nuclear weapons in its national security, as its nuclear and conventional forces have no equivalent in the world. In the 2001 NPR Report, the Bush administration argued that the United States needed the "New Triad" consisting of "offenses" (nuclear and non-nuclear), "defenses" (active and passive), and "defense infrastructure" in the new security environment. The New Triad was intended to strengthen deterrence with reduced dependence on nuclear weapons.[43] The Obama administration did not use the term "New Triad" in the 2010 NPR report, but it proposed enhancing "regional security architectures,"

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[41] "India quietly gate crashes into submarine-launched ballistic missiles club?" *Time of India*, July 31, 2012, http://articles.timesofindia.indiatimes.com/2012-07-31/india/32960409_1_agni-v-slbms-ins-arihant.

[42] "Israel Deploys Nuclear Weapons on German-Built Submarines," *Spiegel*, 3 June 2012, http://www.spiegel.de/international/world/israel-deploys-nuclear-weapons-on-german-submarines-a-836671.html.

[43] The 2001 NPR is classified; however, its excerpts are posted in an American think tank's homepage. (http://www.stanford.edu/class/polisci211z/2.6/NPR2001leaked.pdf)

comprising "effective missile defense, counter-WMD capabilities, conventional power-projection capabilities and integrated command and control." It argued that this "[wa]s a key part of the U.S. strategy for strengthening regional deterrence while reducing the roles and numbers of nuclear weapons." [44]

As for its declaratory policy, the United States indicates in the 2010 NPR report that "[t]he United States is…not prepared at the present time to adopt a universal policy that the 'sole purpose' of U.S. nuclear weapons is to deter nuclear attack on the United States and [its] allies and partners, but will work to establish conditions under which such a policy could be safely adopted."[45] It also said that "[t]he fundamental role of U.S. nuclear weapons, which will continue as long as nuclear weapons exist, is to deter nuclear attack on the United States, [its] allies, and partner."[46] In the past, the United States reserved the right to use nuclear weapons in response to conventional as well as non-nuclear WMD attacks. However, as depicted in the 2010 NPR, the Obama administration recognizes that "the role of U.S. nuclear weapons to deter and respond to non-nuclear attacks…has declined significantly," and thus it "will continue to reduce the role of nuclear weapons in deterring non-nuclear attack."[47] (The relationship of such a declaratory policy and negative security assurances (NSAs) will be discussed later.)

At the Nuclear Security Summit in March 2012, President Obama reaffirmed the U.S. policy of "not develop[ing] new nuclear warheads" and "not pursu[ing] new military missions for nuclear weapons."[48] At the NPT PrepCom in May 2012, the United States said that in order to diminish the role of nuclear weapons in the national security strategy, "further steps can and should be taken."[49] One of the steps would be the ongoing review of the U.S. nuclear weapons employment policy, including targeting. This review was launched around summer 2011. It is expected that options to reduce the number and role of U.S. nuclear weapons will be presented, as an outcome of this review,[50] although details have yet to be reported at the time of writing.

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[44] U.S. Department of Defense, *Nuclear Posture Review Report*, pp. 32-33.

[45] Ibid., p. 16.

[46] Ibid., p. 15.

[47] Ibid.

[48] "Remarks by President Obama at Hankuk University," Seoul, March 26, 2012, http://www.whitehouse.gov/the-press-office/2012/03/26/remarks-president-obama-hankuk-university.

[49] "Statement by Ambassador Laura Kennedy, Permanent Representative of the United States to the Conference on Disarmament, Department State, United States of America," Cluster 1 Special Issue, First Session of the Preparatory Committee, 2015 Review Conference of the State Parties to the Treaty on the Non-Proliferation of Nuclear Weapons, Vienna, May 4, 2012.

[50] Hans M. Kristensen and Robert S. Norris, "Reviewing Nuclear Guidance: Putting Obama's Words into Action," *Arms Control Today*, Vol. 41, No. 9 (November 2011), https://www.armscontrol.org/act/2011_11/Reviewing_Nuclear_Guidance_Putting_Obama_Words_Into_Action.

In contrast, Russia has been increasing its reliance on nuclear weapons in its national security doctrine in the post-Cold War era. The Soviet Union declared in 1982 a no first use policy, pledging not to use nuclear weapons first, although this declaratory policy was seen as propaganda in response to the antinuclear movements spread across the Western countries at that time. In 1993, Russia published a new doctrine, which did not mention that the country would not use nuclear weapons first, so the understanding was that the possibility of "first use" was open. In the April 2000 and February 2010 versions of its military doctrines, Russia clearly indicated the option of nuclear first use. According to the 2010 military doctrine, "[t]he Russian Federation reserves the right to [use] nuclear weapons in response to the [use] of nuclear and other types of weapons of mass destruction against it and (or) its allies, and also in the event of aggression against the Russian Federation involving the use of conventional weapons when the very existence of the state is under threat."[51] From its modified declaratory policy, one can interpret Russia's intent to compensate for its inferior conventional weapons with nuclear forces in the face of the erosion of its strategic capabilities, following such developments as the demise of the Warsaw Treaty Organization, the collapse of the Soviet Union, and the eastward expansion of NATO. To date, no significant change has been observed in Russian security policies in relation to the reduced role of nuclear weapons.

In the case of the United Kingdom, it reiterated its post-Cold War nuclear policies in the 2010 Strategic Defence and Security Review (SDSR) that the United Kingdom maintains "a minimum effective nuclear deterrence as the ultimate means to deter the most extreme threats," and "would only consider using [its] nuclear weapons in extreme circumstances of self defence, including the defence of [its] NATO allies."[52] The U.K.'s statements made on nuclear policies at the 2012 NPT PrepCom also reflected such a position.[53]

The French declaratory policy on nuclear deterrence was outlined in the Livre Blanc (the French White Paper on Defence and National Security) published in 2008. According to this government publication, French nuclear deterrence is "the ultimate guarantee of

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[51] "The Military Doctrine of the Russian Federation Approved by Russian Federation Presidential Edict," February 5, 2010 (unofficial translation) , http://carnegieendowment.org/files/2010russia_military_doctrine.pdf .

[52] "Securing Britain in an Age of Uncertainty: The Strategic Defence and Security Review," Presented to Parliament by the Prime Minister by Command of Her Majesty, October 2010, p. 37.

[53] "General Statement by Ambassador Jo Adamson, UK Ambassador to the Conference on Disarmament, Head of the United Kingdom Delegation," at the 2012 Preparatory Committee for the Nuclear Non-Proliferation Treaty, Vienna, 30 April 2012; "Cluster 1 by Ambassador Jo Adamson, UK Ambassador to the Conference on Disarmament, Head of the United Kingdom Delegation," at the 2012 Preparatory Committee for the Nuclear Non-Proliferation Treaty, Vienna, 3 May 2012.

national security and independence" and "strictly defensive."[54] France stresses that it "will continue to maintain its nuclear forces at a level of strict sufficiency and will constantly scale them at the lowest possible level compatible with its security."[55] Nevertheless, France is not in the position of adopting a no-first-use or a "sole purpose" policy, arguing that the "sole function [of nuclear deterrence] is to prevent a state-originated aggression against the vital interests of the country, from whatever direction and in whatever form."[56] Furthermore, while explaining that "[t]he use of nuclear weapons would be conceivable only in extreme circumstances of self-defence," France is of the view that "[it] has the capability to deliver a nuclear warning within the framework of its policy of deterrence."[57]

China declared a no-first-use policy of nuclear weapons and the unconditional NSA of not using or threatening to use nuclear weapons against a NNWS following its first nuclear testing in 1964. Since then, China has demanded that other NWS adopt the same policies and negotiate and conclude a mutual no-first-use treaty. As mentioned later, it is assumed that China's nuclear warheads are de-mated from delivery vehicles. Although China does not use the term "minimum deterrence," it has repeatedly stated that its nuclear weapons are of defensive and retaliatory nature. The China Defense White Paper in 2008 describes that "[i]f China comes under a nuclear attack, the nuclear missile force of the Second Artillery Force will use nuclear missiles to launch a resolute counterattack against the enemy.[58] However, the credibility of China's no-first-use policy "at any time and in any circumstances" could be questioned. Some experts have pointed out that the country might be tempted to use nuclear weapons when an opponent conducts conventional counterforce attacks against Chinese nuclear forces, or when its vital interests are seriously threatened by conventional attacks.[59]

India—which frequently spoke about its nuclear policies after testing its nuclear arms in May 1998—stated that it adopted the "credible, minimum nuclear deterrent policy" and was committed to no-first-use and non-use against the NNWS in its 1993 and 2003 nuclear doctrines. India, however, makes it a condition that "in the event of a major attack against India, or Indian forces anywhere, by biological or chemical weapons, India will retain the

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[54] *The French White Paper on Defence and National Security*, 2008, p. 64.

[55] Ibid., p. 162.

[56] Ibid., p. 64.

[57] Ibid., p. 65.

[58] Information Office of the State Council of the People's Republic of China, "China's National Defense in 2008."

[59] Hans Kristensen, "China Defense White Paper Describes Nuclear Escalation," FAS Strategic Security Blog, January 23, 2009, http://www.fas.org/blog/ssp/2009/01/chinapaper.php; Jing-dong Yuan, "Chinese Perspectives of the Utility of Nuclear Weapons: Prospects and Potential Problems in Disarmament," *Proliferation Papers*, Spring 2010, p. 18.

option of retaliating with nuclear weapons."[60] Pakistan, whose conventional military power is inferior to India's, has not declared a no first use policy.

Israel, which has maintained an "opaque nuclear posture," apparently has not clearly mentioned the role of nuclear weapons in its security strategy and policies. It is assumed that Israel, by at least not denying the possession of nuclear weapons, expects that the potential adversaries will exercise caution when taking action against the state.

Last, North Korea has stated that "[t]he mission of the nuclear armed forces of the DPRK is to deter and repulse aggression and attack on the country and the nation till the nuclear weapons are eliminated from the peninsula and the rest of the world."[61] North Korea has often emphasized that its nuclear force is a deterrent against the U.S. "hostile policy" toward North Korea and it would continue to maintain this force as long as such a policy exists.

b) Negative Security Assurances

China is the only NWS that has declared an unconditional negative security assurance (NSA) for NNWS and has supported the request of some NNWS, mainly the NAM countries, that the NWS provide legally-binding NSAs. Other NWS have refused such a request, except in the context of the ratification of the protocols of the NWFZ treaties. The NWS have made unilateral NSAs, however.

Previously, the United States declared the NSA of "not us[ing] nuclear weapons against non-nuclear-weapon States Parties to the Treaty on the Non-Proliferation of Nuclear Weapons except in the case of an invasion or any other attack on the United States, its territories, its armed forces or other troops, its allies, or on a State towards which it has a security commitment, carried out or sustained by such a non-nuclear-weapon State in association or alliance with a nuclear-weapon State." In this connection, senior U.S. officials have occasionally suggested the possibility of using nuclear weapons against a NNWS that used chemical and biological weapons. However, the 2010 NPR Report introduced a major change to the U.S. doctrine stating that "the United States [wa]s now prepared to strengthen its long-standing 'negative security assurance' by declaring that the United States w[ould] not use or threaten to use nuclear weapons against non-nuclear weapons states that are party to the Nuclear Non-Proliferation Treaty (NPT) and in

[60] Prime Minister's Office, "Cabinet Committee on Security Reviews Progress in Operationalizing India's Nuclear Doctrine," Press Releases, 4 January 2003, http://pib.nic.in/archieve/lreleng/lyr2003/rjan2003/ 04012003/ r040120033.html.

[61] "Foreign Ministry Issues Memorandum on N-Issue," *Korean News*, April 21, 2010, http://www.kcna.co.jp/ item/ 2010/ 201004/ news21/20100421-27ee.html.

compliance with their nuclear non-proliferation obligations."[62] In other words, the 2010 NPR report specifically stated that under the new NSA, the United States will not use or threaten to use nuclear weapons against NNWS possessing non-nuclear WMD as long as they comply with nuclear non-proliferation obligations, yet they "would face the prospect of a devastating conventional military response" in the case of chemical or biological attacks.[63] Thus, the revised NSA policy implies increased reliance on conventional forces. Still, "[g]iven the catastrophic potential of biological weapons and the rapid pace of bio-technology development, the United States reserves the right to make any adjustment in the assurance that may be warranted by the evolution and proliferation of the biological weapons threat and U.S. capacities to counter that threat," according to the 2010 NPR.[64] Furthermore, the United States concludes its explanation on its NSA policy in the NPR as, "[i]n the case of countries not covered by this assurance—states that possess nuclear weapons and states not in compliance with their nuclear non-proliferation obligations—there remains a narrow range of contingencies in which U.S. nuclear weapons may still play a role in deterring a conventional or CBW attack against the United States or its allies and partners."[65]

The United Kingdom has declared similar NSA, reserving the nuclear option against attacks delivered by the NNWS "in association or alliance with a NWS." In its SDSR in 2010, the United Kingdom declared "to give an assurance that the U.K. will not use or threaten to use nuclear weapons against non-nuclear weapon states parties to the NPT" on the condition of "universal adherence to and compliance with the NPT." In other words, the U.K.'s NSA "would not apply to any state in material breach of those non-proliferation obligations."[66] In regard to non-nuclear WMD, the United Kingdom explains that they do not directly threaten the country or its vital national interests, although it "reserve[s] the right to review [its NSA] if the future threat, development and proliferation of these weapons make it necessary."[67]

France and Russia maintain their respective unilateral NSAs made in 1995, pledging that they will not use or threaten to use nuclear weapons against the NNWS parties to the NPT unless they or their allies are invaded or attacked by a NNWS in cooperation with a NWS.

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[62] U.S. Department of Defense, *Nuclear Posture Review Report*, p. 15.

[63] Ibid., p. 16.

[64] Ibid.

[65] Ibid.

[66] "Securing Britain in an Age of Uncertainty: The Strategic Defence and Security Review," Presented to Parliament by the Prime Minister by Command of Her Majesty, October 2010, pp. 37-38.

[67] Ibid.

The protocols to the NWFZ treaties include the provision of legally-binding NSAs. At the time of writing, only the Protocol of the Treaty for the Prohibition of Nuclear Weapons in Latin America and Caribbean (the Treaty of Tlatelolco) has been ratified by all NWS, as shown in the Table 1-3 below.

Table 1-3 :

The Status of the Signature and the Ratification of Protocols to NWFZ Treaties on NSAs

		France	U.K.	Russia	U.S.	China
1	Treaty of Tlatelolco	○	○	○	○	○
2	Treaty of Rarotonga	○	○	○	△	○
3	Southeast Asian NWFZ Treaty					
4	Treaty of Pelindaba	○	○	○	△	○
5	Central Asia NWFZ Treaty					

○ : Ratified　　△ : Signed

Protocols to the South Pacific Nuclear-Free Zone Treaty (Treaty of Rarotonga) and the African Nuclear-Weapons-Free Zone Treaty (Treaty of Pelindaba) concerning the provision of NSAs await the U.S. ratification. In May 2011 President Obama submitted these Protocols to the U.S. Senate for ratification,[68] but the Senate has yet to consider them.

No NWS has signed the Protocol to the Southeast Asian NWFZ Treaty or the Protocol to the Central Asia NWFZ Treaty. In consultation with the Southeast Asian countries in November 2011, the NWS agreed to take necessary measures for the signing and entry into force of the protocol, including the scheduling of signature on July 12, 2012. However, France, Russia and the U.K.'s submission of reservations just before the signing ceremony resulted in its postponement, as the Southeast Asian countries needed time to examine them.[69] The reservations, which the United States supported, pertained to "the treaty's negative security assurances and the inclusion of the parties' continental shelves and exclusive economic zones in its coverage."[70] The chair's statement of the Association of Southeast Asian Nations (ASEAN) summit in April 2012 reports that China's concerns were noted in a memorandum of understanding (MOU) negotiated between China and the ASEAN states, but the nature of the Chinese concerns has not been clarified.[71]

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[68] U.S. White House, "Statement on Nuclear Free Zones in Asia and Africa," May 2, 2011, http://www.whitehouse.gov/the-press-office/2011/05/02/statement-nuclear-free-zones-asia-and-africa .

[69] "Four Powers Not Ready to Back Southeast Asia Nuke-Free Zone Treaty," *Global Security Newswire*, July 9, 2012, http://www.nti.org/gsn/article/four-powers-not-ready-back-nuke-free-zone-treaty/ .

[70] "SE Asian Nuclear Protocol Falters," *Arms Control Today*, Vol. 42, No. 7 (September 2012), p. 6.

[71] Ibid.

In regard to the Protocol to the Central Asia NWFZ Treaty (CANWFZ), France, the United Kingdom and the United States have raised questions about the provision in the Treaty which accords priority to previously concluded agreements affecting the region, including the collective security treaty (1992 Tashkent Treaty). The latter might possibly allow Russia's deployment of nuclear weapons within the CANWFZ, subject to interpretation of the treaty.

In September 2012, Mongolia and the 5 NWS signed a political declaration that formally recognizes Mongolia's nuclear-weapon-free status. With their signature, NWS pledge to formally recognize Mongolia's status and not to use nuclear weapons against Mongolia,[72] yet their NSAs are not legally binding.

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One of the purposes of the NSAs provided by NWS to NNWS is to alleviate the imbalance of rights and obligations between NWS and NNWS under the NPT. In this context, to assent to the offer of NSAs by the nuclear-armed states might be interpreted as recognizing their status as equivalent to that of the official NWS under the NPT. On the other hand, declarations of NSAs by the non-NPT nuclear-armed states are carried out with the aim of legitimizing their nuclear status or making a point that they are "responsible nuclear-armed states." India declared that it would not use nuclear weapons against NNWS in its 2003 nuclear doctrine, however, it also stated that "in the event of a major attack against India, or Indian forces anywhere, by biological or chemical weapons, India will retain the option of retaliating with nuclear weapons."[73] Pakistan has declared its unconditional NSA.[74] In addition, North Korea has upheld a "policy [of] not […] us[ing] nuclear weapons against non-nuclear states or threaten[ing] them with nukes as long as they do not join nuclear weapons states in invading or attacking it."[75]

c) Dependence on extended nuclear deterrence

The issue of reducing the role and significance of nuclear weapons in national security

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[72] "Mongolia Recognized as Nuclear-Free Zone," *Arms Control Today*, Vol. 42, No. 8 (October 2012), p. 6.

[73] "Cabinet Committee on Security Reviews on Progress in operationalizing India's Nuclear Doctrine" Prime minister office of India, 4 January 2003, http://pib.nic.in/archieve/lreleng/lyr2003/rjan2003/04012003/r040120033.html .

[74] Pakistan's unconditional NSA policy is also confirmed in "Statement by Pakistan: Thematic Debate on Negative Security Assurances (NSAs)," CD Plenary Meeting, 12 June 2012.

[75] "Foreign Ministry Issues Memorandum on N-Issue," *Korean News*, April 21, 2010, http://www.kcna.co.jp/item/2010/201004/news21/20100421-27ee.html, accessed on April 23, 2010.

strategies and policies is not limited to nuclear-weapon/armed states. It also concerns the NNWS that rely on the U.S. extended nuclear deterrence, or nuclear umbrella. One of the reasons that the United States has opposed taking measures for reducing the importance of nuclear weapons in its strategic planning is that such a reduction might affect the credibility of its nuclear deterrence, and hence the allies' confidence in its extended deterrence.

The 2010 U.S. NPR report clarified the apparently conflicting requirements between its extended deterrence and its non-proliferation efforts by stating that "security relationships" with its allies and partners, including the provision of the extended deterrence, "are critical not only in deterring potential threats, but can also serve [its] non-proliferation goals."[76] Furthermore, the United States, while acknowledging the "role [of nuclear weapons] in the deterrence of regional states so long as those states have nuclear weapons," asserts that "the decision taken in the NPR, [Ballistic Missile Defense Review (BMDR)], and [Quadrennial Defense Review (QDR)] reflect the U.S. desire to increase reliance on non-nuclear means to accomplish [their] objectives of deterring such states and reassuring [its] allies and partners."[77] In fact, aside from "retain[ing] the capability to forward-deploy U.S. nuclear weapons on tactical fighter-bombers…and heavy bombers," most of the components of the U.S.' "regional security architectures" discussed earlier have non-nuclear dimensions, including conventional forces, such as missile defenses, discussions with its allies and partners, the development and deployment of surveillance and reconnaissance capabilities.[78]

The main U.S. allies protected under its nuclear umbrella are the NATO countries, Japan, South Korea, and Australia. In the case of NATO member countries, the Deterrence and Defense Posture Review (DDPR) issued in May 2012 reaffirms that "[t]he supreme guarantee of the security of the Allies is provided by the strategic nuclear forces of the Alliance, particularly those of the United States; the independent strategic nuclear forces of the United Kingdom and France…contribute to the overall deterrence and security of the Allies."[79] Currently, the United States deploys from 150 to 200 B-61 nuclear gravity bombs in five NATO countries, including Germany, and thus maintains nuclear sharing arrangements with them. The United States considers that such arrangements "contribute to Alliance cohesion and provide reassurance to allies and partners who feel exposed to

[76] U.S. Department of Defense, *Nuclear Posture Review Report*, p. 31.

[77] Ibid., p. 28.

[78] Ibid., pp. 33-35.

[79] North Atlantic Treaty Organization, "Deterrence and Defense Posture Review," May 20, 2012, http://www.nato.int/cps/en/natolive/official_texts_87597.htm?mode=pressrelease.

regional threats."[80] On the other hand, in the DDPR, NATO shows its readiness to discuss major cuts in forward-based non-strategic nuclear weapons stationed in NATO on a mutual basis with Russia.[81]

In Northeast Asia, the nuclear developments in China and North Korea, coupled with an increased destabilization of the regional security environment, have contributed to Japan's and South Korea's increased interest in maintaining credibility or obtaining reassurance of the U.S. defense guarantee. In the Joint Vision for the Alliance agreed in June 2009, the United States and South Korea reaffirmed that "[t]he continuing commitment of extended deterrence, including the U.S. nuclear umbrella, reinforces [the] assurance" of their security interests.[82] Subsequently, in October 2010, at the South Korea-U.S. Security Consultative Meeting, both governments agreed to establish the Extended Deterrence Policy Committee that "serve[s] as a cooperation mechanism to enhance the effectiveness of extended deterrence." Additionally, in December 2012, South Korea and the United States carried out the second tabletop exercise (the first one took place in 2011) on the extended deterrence against a nuclear crisis on the Korean Peninsula. Specifically, its participants examined the "concepts, crisis decision-making and the requirements of employing extended deterrence assets in response to a nuclear threat scenario."[83]

With regard to Japan, the Joint Statement of the Security Consultative Committee (so-called 2+2) titled, "Alliance Transformation: Advancing United States-Japan Security and Defense Cooperation," released in May 2007, clearly mentions that "the full range of U.S. military capabilities—both nuclear and non-nuclear strike forces and defensive capabilities—form the core of extended deterrence and support U.S. commitments to the defense of Japan."[84] In the new National Defense Program Guidelines issued in December 2010 Japan stated that:

> "To address the threat of nuclear weapons, Japan will play a constructive and active role in international nuclear disarmament and non-proliferation efforts, so as to achieve the long-term goal of creating a world without nuclear weapons. At the same time, as long as nuclear weapons exist, the extended deterrence provided by the

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[80] U.S. Department of Defense, *Nuclear Posture Review Report*, p. 32.

[81] North Atlantic Treaty Organization, "Deterrence and Defense Posture Review."

[82] "Joint Vision for the Alliance of the United States of American and the Republic of Korea," June 16, 2009, http://www.whitehouse.gov/the_press_office/Joint-vision-for-the-alliance-of-the-United-States-of-America-and-the-Republic-of-Korea/.

[83] "U.S., South Korea Participate in Nuke Deterrence Exercise," American Forces Press Service, December 5, 2012 , http://www.defense.gov//news/newsarticle.aspx?id=118716.

[84] "Alliance Transformation: Advancing United States-Japan Security and Defense Cooperation," Joint Statement of the Security Consultative Committee, May 1, 2007, http://www.mofa.go.jp/region/n-america/us/security/scc/joint0705.html.

> United States, with nuclear deterrent as a vital element, will be indispensable. In order to maintain and improve the credibility of the extended deterrence, Japan will closely cooperate with the United States, and will also appropriately implement its own efforts, including ballistic missile defense and civil protection."[85]

In the 171st Diet Session in March 2009, the Japanese government made a general statement that "'the National Defense Program Guidelines, FY2005-' says that 'to protect its territory and people against the threat of nuclear weapons, Japan will continue to rely on the U.S. nuclear deterrent.'" This prompted House Member Kiyomi Tsujimoto to question whether the statement was intended to deter nuclear attacks against Japan by alluding to the possibility of the U.S. retaliation while saying that Japan does not expect to be protected by the United States in case of attack by biological, chemical, and conventional weapons. The Aso cabinet explained that the Japanese government considered that the Japan-U.S. security arrangements protect the country from nuclear and other attacks by the extended deterrence, which includes the U.S. nuclear and conventional forces.[86] In February 2010 a consultative meeting on extended deterrence was held between the two countries under the framework of the Japan-U.S. Security Consultative Committee. The consultative framework still continues.

Australia has formed a defense alliance with the United States under the Australia, New Zealand, United States Security Treaty. Australia spelled out the importance of the U.S. extended deterrent for its national security in its 2009 Defense White Paper as follows:

> "…[F]or so long as nuclear weapons exist, we are able to rely on the nuclear forces of the United States to deter nuclear attack on Australia. Australian defence policy under successive governments has acknowledged the value to Australia of the protection afforded by extended nuclear deterrence under the US alliance. That protection provides a stable and reliable sense of assurance and has over the years removed the need for Australia to consider more significant and expensive defence options" [87]

(5) De-Alerting or Measures for Maximizing Decision Time to Authorize the Use of Nuclear Weapons

Since the Cold War era, Russia and the United States have maintained their nuclear forces at high alert levels, called launch on warning (LOW) or launch under attack (LUA). Before his inauguration as president in January 2009, Obama had pledged to "work with Russia

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[85] "National Defense Program Guidelines for FY2011 and beyond," Approved by the Security Council and the Cabinet on December 17, 2010.

[86] "Written answer to written draft of question on the issue of nuclear weapons, etc., submitted by Kiyomi Tsujimoto, member of the House of Representatives" March 19, 2009, http://www.shugiin.go.jp/itdb_ shitsumon.nsf/ html/shitsumon/b171202.htm.

[87] Department of Defence, Australian Government, *Defending Australia in the Asia Pacific Century: Force 2030*, 2009, p. 50.

in a mutual and verifiable manner to increase warning and decision time prior to the launch of nuclear weapons."[88] To this end, in the 2010 NPR the United States reexamined its nuclear posture and concluded that it would "[m]aintain the current alert posture of U.S. strategic forces: U.S. capable heavy bombers off full-time alert, nearly all ICBMs on alert, and a significant number of SSBNs at sea at any given time" while "[m]ak[ing] new investments in the U.S. command and control system to maximize Presidential decision time in a nuclear crisis."[89] It is believed that Russia has maintained the deployed ICBMs and SLBMs on submarine at bases on LOW alert,[90] while the alert status of its nuclear arsenals has not been identified. Russian non-strategic nuclear weapons are unlikely to be kept under an alert posture in peacetime if they are stored in the central storage facilities, as Russia has declared.

The United Kingdom retains the alert posture, "Continuous at Sea Deterrence" (CASD), stipulated in the 1998 Strategic Defence Review; that is, maintaining a full-time patrol by SSBN but de-targeting the loaded ballistic missiles and placing them on a several days "notice-to-fire."[91] France lowered the alert levels of the two components of nuclear forces, sea- and air-launched, in 1992 and 1996.[92] Nevertheless, one SSBN is always on patrol, and France has yet to clarify the status of its alert postures.

According to the China's National Defense White Paper of 2008, "[i]n peacetime the nuclear missile weapons of the Second Artillery Force are not aimed at any country." (The 5 NWS declared they would de-target their nuclear weapons during the 2000 NPT RevCon.) It proceeds to say, however, "if China comes under a nuclear threat, the nuclear missile force of the Second Artillery Force will go into a state of alert, and get ready for a nuclear counterattack to deter the enemy from using nuclear weapons against China."[93] It is assumed that since the state keeps nuclear warheads de-mated from delivery vehicles, Chinese nuclear forces are not on a hair-trigger alert posture. What is unclear is the time required for China to prepare for launching and the kind of alert posture it adopts for the nuclear forces ready to launch. The key questions are whether Chinese nuclear warheads

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[88] "Arms Control Today 2008 Presidential Q&A: President-elect Barack Obama," *Arms Control Today*, Vol. 38, No. 10 (December 2008), http://www.armscontrol.org/2008election.

[89] U.S. Department of Defense, *Nuclear Posture Review Report*, pp. 25-26. The nuclear postures described do not seem to take into account LOW, however. *Eliminating Nuclear Threats: A Practical Agenda for Global Policymakers*, Report of the International Commission on Nuclear Non-Proliferation and Disarmament (ICNND Report), 2009, p. 27.

[90] ICNND Report, p. 27.

[91] United Kingdom, *Strategic Defence Review*, Presented to Parliament by the Secretary of State for Defence by Command of Her Majesty, July 1998, paras. 66 and 68).

[92] France TNP, "Adapting operational features of French forces," http://www.francetnp2010.fr/spip.php?article91.

[93] Information Office of the State Council of the People's Republic of China, "China's National Defense in 2008."

will be de-mated from the new SLBM JL-2 loaded onto the deployed Type 094 SSBN and whether China will maintain the current low-alert posture for the silo-based DF-41s after deployment, even if silos are considered vulnerable against preemptive strikes.

Although there is no credible information, the alert status of India, Pakistan, Israel and North Korea is likely to be kept low in peacetime. Indian and Pakistani nuclear warheads are perhaps stored separately from their delivery vehicles. Whether North Korea has succeeded in miniaturizing nuclear warheads that can be mounted on ballistic missiles is not clear.

(6) CTBT and Nuclear Tests

a) CTBT

The CTBT was opened for signature in 1996. It has not yet entered into force. As of November 2012, 157 countries have deposited their instruments of ratification. Among the 44 states listed in Annex 2 of the CTBT, whose ratification is prerequisite for the treaty's entry into force, five states (China, Egypt, Iran, Israel, and the U.S.) have signed but not ratified, and three (India, North Korea, and Pakistan) have not even signed. Among the nuclear-weapon/armed states, only France, Russia and the United Kingdom ratified the Treaty, and France is the only one to have closed its testing facilities. The United Kingdom, which had used the US testing facility from 1962 to 1991, does not have its own nuclear test site. As for the countries covered in this project, Syria remains a non-signatory of the CTBT.

The U.S. Senate rejected the ratification of the CTBT in 1999 during Clinton's presidential term, and the succeeding Bush administration clearly indicated its policy not to pursue the ratification. However, President Obama in his 2009 Prague speech pledged to "immediately and aggressively pursue U.S. ratification of the Comprehensive Test Ban Treaty." While the Obama administration has repeatedly assured that it has made continuous efforts for the passage of the CTBT in the Senate, it did not submit it to the Senate for ratification during its first term.

The other NWS holdout is China. China announced that it submitted the CTBT to the National People's Congress (NPC) for its review and ratification in September 2003. However, the NPC seems not to have begun deliberations on the treaty, and thus the prospect for China's ratification remains unclear. Meanwhile, China proclaimed in the 2012 PrepCom that it "ha[d] actively supported and participated in the preparatory work of the [Comprehensive Nuclear-test-ban Treaty Organization (CTBTO)], and steadily promote[d]

the preparatory work for national implementation for the CTBT."[94]

As for the non-NPT states, Israel stated in the First Committee of the UN General Assembly in 2011 that it had contributed to the work of establishing the verification system at the Preparatory Commission for the CTBTO, without touching upon the prospect of its ratification.[95] Since it opposed the conclusion of the CTBT at the CD in August 1996, India has not shown any intention to sign the treaty. While India made a remark that it would not block the entry into force of the CTBT in the UN General Assembly in 1998, this could be construed as an intention to ratify the treaty only when the rest of the Annex 2 countries have done so. On the other hand, Pakistan has been suggesting that it will sign the Treaty only when India signs it.

The ratifying states have been implementing activities toward the promotion of the CTBT's early entry into force, including convening the Conferences on Facilitating Entry into Force of the CTBT, or the Article XIV Conference, every two years since 1999. A document, "Activities Undertaken by Signatory and Ratifying States under Measure (I) of the Final Declaration of the 2009 Conference on Facilitating the Entry into Force of the Treaty in the Period September 2009-August 2011," distributed at the seventh Conference in September 2011, contains a summary of activities implemented between September 2009 and August 2011 by ratifying and signatory states to promote the Treaty's entry into force. It highlights the bilateral activities related to the Annex 2 states (conducted by Australia, France, Germany, Japan, Russia, the U.K., and others), those pertaining to the non-Annex 2 states (conducted by Australia, France, Germany, the U.K., and others), the global-level activities (conducted by Australia, France, Germany, Japan, Russia, Switzerland, the U.K., and others), and the regional-level activities (Australia, France, Germany, the U.K., and others)[96]. In September 2012, the Sixth CTBT Ministerial Meeting was convened by the "Friends of the CTBT," including Australia, Japan, and Sweden. About 80 states that participated in the meeting agreed on a joint statement "call[ing] upon all States that have not done so to sign and ratify the Treaty, in particular the remaining eight Annex 2 States" in their Joint Ministerial Statement on the CTBT.[97]

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[94] "Statement by H.E. Mr. Wu Haitao, Chinese Ambassador for Disarmament Affairs on the Issue of Nuclear Disarmament," at the First Session of the Preparatory Committee for the 2015 Review Conference of the Nuclear Non-Proliferation Treaty, Vienna, May 3, 2012.

[95] "Statement by Mr. Eyal Propper, Director, Arms Control Department, Ministry of Foreign Affairs, Israel," First Committee, 66th Session of the General Assembly, United Nations, New York, 4 October 2011.

[96] CTBT-Art.XIV/2011/4/Rev.1, 19 September 2011.

[97] "Joint Ministerial Statement on the CTBT," New York, September 27, 2012, http://www.ctbto.org/fileadmin/user_upload/statements/CTBT_Joint_Ministerial_Statement_27_September_2012.pdf .

An effective verification regime is another element that needs to be addressed, because the CTBT stipulates that such a regime is to be operational at the entry into force of the Treaty. Regarding the countries surveyed in our study, nearly all International Monitoring System (IMS) stations in Australia, Brazil, France, Germany, Japan, South Korea, Russia, South Africa, Sweden, Switzerland, the United Kingdom and the United States have been certified as required by the Treaty. In comparison, the pace of establishing the IMS stations in China, Egypt and Iran is lagging behind.[98] The 5 NWS, Australia, Brazil, Germany, Iran, Israel, and Japan actively participate in the discussion on the development of an operational manual for an on-site inspection system during the CTBTO Preparatory Commission and working group meetings.

Regarding the countries surveyed in this study, the status of payments of contributions to the Preparatory Commission for the CTBTO for 2011 is as follows.[99]

- Fully-paid: Australia, Brazil, China, France, Germany, Israel, Japan, South Korea, Russia, South Africa, Switzerland, Sweden and the U.K.
- Partially-paid: U.S.
- Voting right in the Preparatory Commission suspended because arrears are equal to or larger than its contributions due for the last two years: Iran

b) Nuclear Testing

The 5 NWS have all declared moratorium on nuclear-test explosions. As noted above, France, Russia and the United Kingdom are ratifiers of the CTBT, while China and the United States remain only signatories. Under Article 18 of the Vienna Convention on the Law of Treaties, however, "[a] State is obliged to refrain from acts which would defeat the object and purpose of a treaty […] until it shall have made its intention clear not to become a party to the treaty." Thus, although the CTBT has not yet entered into force, it may be interpreted that signatories, including the five NWS, are legally prohibited from conducting nuclear test explosions.

On the other hand, the United States has developed and conducted experiments to maintain the safety and reliability of its nuclear stockpile in the framework of the Stockpile Stewardship Program, including subcritical tests. Russia has also conducted subcritical tests. The five NWS agreed during the negotiations that, since subcritical experiments do not reach criticality, these tests do not violate the CTBT. The National Nuclear Security

[98] See the homepage of the Preparatory Commission for the Comprehensive Nuclear-Test-Ban Treaty Organization under "Station Profile," http://www.ctbto.org/verification-regime/station-profiles/.

[99] "CTBTO Member States' Payment As at 31-Dec-2011," http://www.ctbto.org/fileadmin/user_upload/treasury/31Dec2011_Member_States_payments_01.pdf.

Administration (NNSA), which is part of the U.S. Department of Energy, has released quarterly reports on such experiments.[100] Based on the NNSA's press release dated December 6, 2012, the United States has conducted subcritical experiments in December 2012 and in the third quarter of 2011. Moreover, the NNSA has developed a new experimental measure using the Z machine, which generates X-rays by fast discharge of capacitors, thus allowing exploring the properties of plutonium materials under extreme pressures and temperatures.

The status of the other NWS' nuclear testing activities in this respect is not well-known. It was reported that "Russia has conducted a series of subcritical nuclear tests…at its test range on Novaya Zemlya" in 2004.[101] Also, in October 2012 an informed source indicated the likelihood of Russia to resume subcritical experiments at the same nuclear test site.[102]

Aside from the five NWS, India and Pakistan have maintained a nuclear testing moratorium declared after conducting nuclear test explosions in May 1998. Israel, which has kept its nuclear policy opaque, has not disclosed the possibility of conducting nuclear tests.

North Korea conducted underground nuclear tests in 2006 and 2009. Immediately after its test launch of a long-range ballistic missile ended in failure in April 2012, the concern grew about the possibility of North Korea's third nuclear test. A spokesman for the North Korean Foreign Ministry denied ever having had such a plan, saying "[f]rom the beginning, [it] did not envisage such a military measure as a nuclear test as [it] planned to launch a scientific and technical satellite for peaceful purposes." The official, however, alluded to the possibility of undertaking the third atomic-bomb test, "[i]f the U.S. persists in its move to ratchet up sanctions and pressure upon us despite our peace-loving efforts, we will be left with no option but to take counter-measures for self-defence."[103]

(7) Fissile Material Cut-off Treaty (FMCT)

"The immediate commencement and early conclusion" of discussions on an FMCT was

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[100] See the NNSA's website under "Stockpile Stewardship Program Quarterly Experiments," http://nnsa.energy.gov/ourmission/managingthestockpile/sspquarterly.

[101] "Russia Has Conducted Subcritical Nuclear Tests This Year, Atomic Energy Official Says," *Global Security Newswire*, August 12, 2004, http://www.nti.org/gsn/article/russia-has-conducted-subcritical-nuclear-tests-this-year-atomic-energy-official-says/.

[102] "Revival of Nuclear Arms Race: US Conducts New Underground Nuclear Tests," *Global Research*, September 30, 2012, http://www.globalresearch.ca/revival-of-nuclear-arms-race-us-conduct-new-underground-nuclear-tests/5306645; "Russia May Resume Subcritical Atomic Testing: Sources," *Global Security Newswire*, October 1, 2012, http://www.nti.org/gsn/article/russia-may-resume-subcritical-atomic-testing-sources/.

[103] "Declaration of G8 Summit Pulling up DPRK over Satellite Launch Refuted," KCNA, May 22, 2012, http://www.kcna.co.jp/item/2012/201205/news22/20120522-22ee.html.

included in the "Principles and Objectives for Nuclear Non-Proliferation and Disarmament" adopted at the 1995 NPT Review and Extension Conference.

However, no substantive negotiation has taken place to date. The adoption of the CD's program of work, including the establishment of an Ad Hoc Committee on an FMCT negotiation, has been blocked almost every year under the CD rule of consensus, preventing negotiations from starting. Various factors come into play regarding the commencement of deliberations on the FMCT, but the current most notable obstacle is Pakistan's strong objection to the adoption of the program of work. Pakistan has insisted that the mandate of the FMCT negotiation must not only prohibit the fissile material production for nuclear weapons but also cover the existing stockpiles. During the 2012 session of the CD in March, under the presidency of Egypt, Pakistan repeated its position, in spite of Egyptian mediation efforts and, as a result, the Conference once again failed to adopt a program of work. Pakistan's attitude has further hardened, especially after the decision of the Nuclear Suppliers Group (NSG) to grant a waiver for India from its rules (i.e. requirement of the application of the International Atomic Energy Agency (IAEA) comprehensive safeguards).[104]

Meanwhile, concern persists about the increasing amount of fissile material for nuclear weapons in Pakistan, since it continues to produce weapon-grade highly enriched uranium (HEU) and builds facilities for producing plutonium. It has constructed a fourth nuclear reactor for this purpose.

Among the nuclear-weapon/armed states, France, Russia, the United Kingdom and the United States have been actively pushing for the immediate commencement of a negotiation on an FMCT at the CD. All of these states also have declared a moratorium on the production of fissile material for nuclear weapons purposes, pending the conclusion of a FMCT.

- France: Has suspended the production of plutonium in 1992 and HEU for weapons purposes in 1996. Has taken steps to dismantle production facilities for weapon-grade fissile material.
- Russia: The production stopped in 1994. ADE-2 in Krasnoyarsk, the last nuclear

[104] At present, Pakistan's fissile material stockpile is smaller than India's. Under the Indo-U.S. civilian nuclear deal, India is allowed to import uranium fuel for peaceful purpose, which may lead the country to use more of its indigenous production of uranium for nuclear weapons. Thus, an imbalanced fissile material stockpile can potentially create disparity in the two nations' nuclear weapons capabilities—which is a concern for Pakistan. Pakistani Ambassador Akram noted in January 2010 that "If we are going to negotiate a treaty which only bans future production, then that asymmetry or imbalance between [India and Pakistan] will be frozen forever[, which] presents us with a clear and present danger." ("Pakistan Seen Undermining Prospects for Fissile Material Pact," *Global Security Newswire*, January 27, 2010, http://gsn.nti.org/gsn/nw_20100127_4214.php.)

reactor for producing weapon-grade plutonium in the country, was closed in April 2010, based on an agreement concluded with the United States in March 2003 to shut down Russia's remaining plutonium producing reactors.[105]

- The United Kingdom: Has maintained an official moratorium since 1995.
- The United States: Has suspended the production of HEU for nuclear weapons since 1964 and plutonium for them since 1998.

China, India, and Israel also support the commencement of the negotiations on a FMCT prohibiting the future production of fissile material for nuclear weapons, but they do so less actively than the above four NWS. Although China is widely considered to have suspended the production of fissile material for weapon use, it has not declared a moratorium and strongly opposed it at the 2010 NPT RevCon. Consequently, "many analysts and CD representatives suspect China of hiding its concerns behind Pakistan's veto in the CD."[106] Neither India nor Israel has declared a moratorium, and the status of the production of fissile material in these countries is not always clear. North Korea argued that the uranium enrichment facility in Yongbyong is to produce low enriched uranium (LEU) for a light water reactor under construction, although doubts remain about the true purpose of this facility and questions remain about the possible existence of additional facilities.

The Western and some other countries have been seeking ways to overcome the impasse over the FMCT. In February, March, and May-June 2011, Japan and Australia hosted expert meetings on an FMCT and discussed the verification and technical issues surrounding the treaty (about 45 countries participated in the May-June meeting).[107] Australia, France, Germany, Japan, South Korea, Sweden, the United Kingdom and the U.S. sent experts to those meetings. In keeping with UN General Assembly Resolution 66/44 (December 2011), Germany and the Netherlands also organized scientific expert meetings in Geneva in May and August 2012 (57 countries participated in the August meeting) to promote the technical work on an FMCT and support the commencement of negotiations.[108]

(8) Transparency in Nuclear Weapons (warhead, delivery vehicles, fissile material for weapon,

[105] "Russia Shuts Last Weapons-Grade Plutonium Reactor," *Reuters*, April 15, 2010, http://www.reuters.com/article/idUSTRE63E1VW20100415.

[106] Andrea Berger, "Finding the Right Home for FMCT Talks," *Arms Control Today*, Vol. 42, No. 8 (October 2012), p. 9.

[107] Reports of the meetings were submitted to the CD respectively as: CD/1906, 14 March 2011; CD/1909, 27 May 2011; CD/1917, 2 September 2011.

[108] Reports of the meetings were submitted to the CD respectively as: CD/1935, 26 June 2011; CD/1943, 13 September 2012.

nuclear strategy/policies)

Increasing transparency regarding nuclear weapons is vital for promoting nuclear disarmament. However, there are concerns that transparency may lead to the release of sensitive information. Since the nuclear-weapon/armed states consider their nuclear weapons as a key component of their national security, transparency in terms of exchanging data or information related to them has been limited.

Russia and the United States have been exchanging notifications on their strategic offensive arms, as required by Article 7 of the New START and Part 2 and 4 of its Protocol, through the Nuclear Risk Reduction Center. However, data exchanged are not made available to the public except for the aggregate number of their deployed/non-deployed strategic nuclear delivery vehicles and the deployed strategic (nuclear) warheads. In terms of transparency, this could be judged as a step backward compared to the previous START I, under which they both disclosed the aggregate numbers, including a breakdown by individual nuclear weapon systems and delivery vehicles.[109] Nevertheless, the United States disclosed numbers under New START in November 2012.[110]

The United States has been making unilateral efforts to increase transparency regarding its nuclear weapons. For example, in May 2010, the Department of Defense declassified for the first time the information that: "[a]s of September 30, 2009, the U.S. stockpile of nuclear weapons consisted of 5,113 warheads"; "[f]rom fiscal year 1994 through 2009, the United States dismantled 8,748 nuclear warheads"; and "[t]he number of U.S. non-strategic nuclear weapons declined by approximately 90 percent from September 30, 1991 to September 30, 2009."[111] The number of nuclear warheads does "not include ones retired and awaiting dismantlement (several thousand as of September 30, 2009)." As for fissile material, in June 2012 the Department of Energy published a report on its production and use of plutonium from 1944 through 2009.[112] The U.S. government has also issued a report in January 2001 on its HEU production, acquisition, and utilization activities from 1945 through 1996,[113] and another report in January 2006 on HEU

[109] The last data released under the START is found in U.S. Department of State, "START Aggregate Numbers of Strategic Offensive Arms (As of July 1, 2009)," Fact Sheet, http://www.fas.org/programs/ssp/nukes/armscontrol/aggregate2009.pdf.

[110] On data that the United States disclosed, see U.S. Department of State, "New START Treaty Aggregate Numbers of Strategic Offensive Arms," Fact Sheet, November 2012, http://www.state.gov/t/avc/rls/201216.htm.

[111] DOD Background Briefing with Senior Defense Official from the Pentagon, Washington D.C., May 3, 2010; Department of Defense, "Increasing Transparency in the U.S. Nuclear Weapons Stockpile," Fact Sheet, May 3, 2010. www.defense.gov/news/d20100503stockpile.pdf.

[112] National Nuclear Security Administration, "The United States Plutonium Balance, 1944-2009," June 2012. This is an update of the "Plutonium: The First 50 Years" released in February 1996.

[113] U.S. Department of Energy, National Nuclear Security Administration, and Office of the Deputy Administrator for Defense program, "Highly Enriched Uranium: Striking a Balance—A Historical Report on the

inventory covering the period from 1996 through 2004.[114]

Declassifying the entire text of the 2010 NPR by President Obama was also remarkable. (The 1994 and 2001 NPR reports issued under the Clinton and Bush administrations were classified; their outlines were briefed by government officials and included in the Defense White Papers.) While the 2010 NPR report does not contain the details on the U.S. employment policy, it indicates the U.S. nuclear strategy, deterrence policy, and future of its nuclear forces and related infrastructure.

Russia has not publicized information regarding its nuclear forces or fissile material for nuclear weapons. Russian nuclear strategy and policy was referred to in the Military Doctrine issued in February 2010, albeit much less detailed than the information declassified by the United States.

France and the United Kingdom have announced their targets for nuclear weapons reductions (see, section (3)-a) of this chapter). Their nuclear strategy was publicized respectively in the U.K. SDSR and the French Defense White Paper. In addition, the United Kingdom published a white paper on the future of its nuclear deterrent in December 2006.[115] Regarding fissile material, the United Kingdom declared the total amount of plutonium for military in 1998 and 2000 (as a follow-up), and that of HEU in 2006.[116] France declares only its civilian HEU stockpile.[117]

China has been criticized for being the least transparent about nuclear weapons among the five NWS since, contrary to the other NWS, China has never released any information on the number of nuclear weapons and delivery vehicles it possesses. In April 2004, China just stated that "[it] has performed the least number of nuclear tests and possesses the smallest nuclear arsenal" in a fact sheet issued by its Foreign Ministry.[118]. At the 2010 NPT RevCon,

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United States Highly Enriched Uranium Production, Acquisition, and Utilization Activities from 1945 through September 30, 1996," January 2001.

[114] U.S. Department of Energy, "Highly Enriched Uranium Inventory: Amounts of Highly Enriched Uranium in the United States," January 2006

[115] "The Future of the United Kingdom's Nuclear Deterrent, Cm 6994," Presented to Parliament by the Secretary of State for Defence and the Secretary of State for Foreign and Commonwealth Affairs by Command of Her Majesty, December 2006.

[116] UK Ministry of Defence, "Plutonium and Aldermaston: A Historical Account," 2000, http:// fissilematerials.org/library/mod00.pdf ; UK Ministry of Defence, "Historical Accounting for UK Defence: Highly Enriched Uranium," March 2006.

[117] International Panel on Fissile Materials (IPFM), "Global Fissile Material Report 2011: Nuclear Weapons and Fisile Material Stockpile and Production," International Panel on Fissile Materials, January 2012, p. 8.

[118] Ministry of Foreign Affairs of the People's Republic of China, "Fact Sheet: China: Nuclear Disarmament and Reduction of [Nuclear Weapons]", 27 April 2004, http://www.fmprc.gov.cn/eng/wjb/zzjg/jks/cjjk/2622/t93539.htm .

the initial draft on transparency in the report was significantly reduced mainly because of China. China has argued that transparency in intentions is more important than that in capabilities, and it put emphasis on a "no first use" policy and NSA. Also, the description of how the Second Artillery Force responds when China faces nuclear threats is included in China's Defense White Paper in 2008, as mentioned above (see p. 25).

India, Pakistan, and North Korea have not declared their nuclear weapons capabilities—including the number of nuclear warheads, the number and types of delivery vehicles, and the amount of fissile material they possess. India issued its nuclear doctrine in 2003, but regarding the other two states, government officials have occasionally referred to only fragmented information on their nuclear policies. Israel, as mentioned before, maintains a policy of nuclear ambiguity.

In the Final Document of the 2010 NPT RevCon, the NWS were called upon to report on actions taken towards "accelerat[ion of] concrete progress on the step leading to nuclear disarmament" to the 2014 PrepCom (Action 5), and "were encouraged to agree as soon as possible on a standard reporting form and to determine appropriate reporting intervals for the purpose of voluntarily providing standard information without prejudice to national security" (Action 21). To facilitate these actions, the NPDI submitted a working paper "Transparency of Nuclear Weapons" to the 2012 PrepCom, which included a draft form for standard nuclear disarmament reporting on nuclear warheads, delivery vehicles, fissile material for nuclear weapons, and nuclear strategy/policies.[119]

Before the 2010 RevCon, the five NWS held a Conference on Confidence Building Measures towards Disarmament and Non-Proliferation Issues, proposed and hosted by the U.K, in September 2009. According to the statement:[120]

> [T]he P5 considered the confidence-building, verification and compliance challenges associated with achieving further progress toward disarmament and non-proliferation, and steps to address those challenges. They looked at ways to increase mutual understanding by sharing definitions of nuclear terminology and information about their nuclear doctrines and capabilities. They made presentations on enhancing P5 strategic stability and building mutual confidence through voluntary transparency and other measures. They also considered the international challenges associated with responding to nuclear accidents and undertook to consider ways to co-operate to address these challenges.

The five NWS also held P5 Conferences in Paris in June 2011 and Washington DC in June

[119] NPT/CONF.2015/PC.I/WP.12, 20 April 2012.

[120] "P5 Statement on Disarmament And Non-Proliferation Issues," 4 September 2009, http://ukinaustria.fco.gov.uk/en/news/?view=News&id=20804873.

2012, in which they discussed nuclear disarmament and non-proliferation issues, including the issues of transparency and mutual confidence. In June 2012, they considered the NPDI's proposal on a reporting form. They also "agreed on the work plan for a P5 working group led by China, assigned to develop a glossary of definitions for key nuclear terms that will increase P5 mutual understanding and facilitate further P5 discussions on nuclear matters."[121]

(9) Verifications of Nuclear Weapons Reductions

Verification measures of nuclear weapons reductions have been applied only in the framework of the U.S.-Russian nuclear disarmament treaties. The New START stipulates various verification measures, including national technical means, a comprehensive database, short-notice on-site inspections, and exhibitions. The Treaty specifies two types of on-site inspections. Type One inspections are conducted at ICBM bases, submarine bases, and air bases in order to "confirm the accuracy of declared data on the numbers and types of deployed and non-deployed strategic offensive arms subject to this Treaty; the number of warheads located on deployed ICBMs and deployed SLBMs; and the number of nuclear armaments located on deployed heavy bombers." The purpose of Type Two inspections is "to confirm the accuracy of declared data on the numbers, types, and technical characteristics of non-deployed strategic offensive arms subject to this Treaty and to confirm that strategic offensive arms have been converted or eliminated" and also to "confirm that [formerly declared] facilities are not being used for purposes inconsistent with this Treaty." Each party can conduct ten Type One inspections and eight Type Two inspections per year. Inspections under the New START started in April 2012, and have been steadily implemented. By February 2013, each side will have conducted 18 inspections in a year.[122]

Regarding the verification of the dismantlement of nuclear warheads, Russia, the United States and the IAEA established a trilateral initiative to look into technical and legal aspects of verification by the Agency of classified forms of fissile material. The work was performed between 1996 and 2002. A key difficulty was the verification technique whereby NWS could allow IAEA inspectors to make measurements on the components of nuclear weapons without any possibility for the inspectors to gain access to nuclear-weapon design secrets, while ensuring the credibility and the independence of the verification.

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[121] "A Joint Statement Issued by China, France, Great Britain, Russia, and the United States of America at the Conclusion of the Third P5 Conference: Implementing the NPT June 27-29, 2012 in Washington, DC," http://www.state.gov/r/pa/prs/ps/2012/06/194292.htm.

[122] U.S. Department of State, "New START Treaty Implementation Update," Fact Sheet, May 17, 2012, http://www.state.gov/t/avc/rls/183335.htm.

The United Kingdom and Norway, with the initial participation of the Verification Research, Training and Information Centre (U.K.) as an independent observer, have established in 2007 a technical cooperation initiative for the verification of nuclear warheads dismantlement.[123] They submitted a working paper for the 2010 NPT RevCon, which "details the outcome of three years of collaboration between experts from Norway and the United Kingdom to investigate technical and procedural challenges associated with a possible future nuclear disarmament verification regime."[124] At the 2012 PrepCom, the U.K. delegation reported on a managed access exercise that took place in the United Kingdom in 2010, a technically-focused workshop in December 2011, and a meeting among the five NWS in April 2012 during which the outcomes and lessons from the U.K.-Norway Initiative were shared.[125]

Only the United States and the United Kingdom have communicated to the IAEA about fissile material in excess of military requirements in accordance with IAEA INFCIRC/549 Guidelines. Furthermore, the United States places part of such material under IAEA verification, and the United Kingdom puts plutonium declared excess for weapons purposes under the European Atomic Energy Community (EURATOM) safeguards system. Other nuclear-weapon-armed states have not even expressed any intent to do so.

(10) Irreversibility

Just like their previous nuclear arms control agreements, the New START requires the United States and Russia to dismantle or convert strategic (nuclear) delivery vehicles beyond the limits set in the Treaty in a verifiable way. The New START does not oblige them to dismantle nuclear warheads, but the two states have partially dismantled retired nuclear warheads as unilateral measures.

Neither country has provided comprehensive information regarding the dismantlement of nuclear warheads, including the exact numbers of dismantled warheads. However, the United States has publicized some information. According to the NNSA fact sheet in 2010, the United States dismantled 8,748 nuclear warheads between 1994 and 2009. In the NNSA Strategic Plan in May 2011, the United States indicated its plan to complete dismantlement of B53 warheads by 2012, and all weapons systems retired prior to 2009 by

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[123] The outcome of the collaborative work is discussed in David Cliff, Hassan Elbahtimy and Andreas Persbo, "Verifying Warhead Dismantlement: Past, Present, Future," *VERTIC Research Reports*, No. 9 (September 2010).

[124] NPT/CONF.2010/WP.41, 26 April 2010.

[125] "Statement by Ambassador Jo Adamson to the First Preparatory Committee for the Ninth Review Conference of the Treaty on the Non-Proliferation of Nuclear Weapons: Vienna, 30 April-11 May 2012," 3 May 2012.

2022.[126] The NNSA also announced in December 2012 that "it has accomplished 112 percent of its goal for planned stockpile dismantlement in FY2012."[127]

As for the disposition of fissile material designated as no longer required for military purposes, or its conversion to peaceful uses, a total of 209 metric tons of U.S. HEU has been declared surplus to U.S. defense needs, which was to be down-blended to LEU for commercial nuclear reactors. NNSA has down-blended 119 metric tons of the HEU.[128] At the IAEA General Conference in September 2012, the United States updated the information, stating that it "has down-blended more than 130 metric tons of surplus HEU" to LEU.[129] Thirty-four metric tons of the U.S. surplus weapons-grade plutonium is to be disposed of by conversion to MOX fuel under the U.S.-Russian Plutonium Management and Disposition Agreement (PMDA), which entered into force in July 2011. For the disposition of surplus U.S. plutonium, the NNSA plans to "construct three major facilities at its Savannah River Site (SRS) in South Carolina: a facility that will disassemble the cores, or 'pits' of surplus nuclear weapons; a MOX Fuel Fabrication Facility…; and a Waste Solidification Building to dispose of the liquid waste from the other two disposition facilities."[130]

Regarding the Russian efforts, no official information on dismantlement of nuclear warheads is available. One study estimated that Russian 3,000 strategic nuclear warheads and 1,600-3,000 non-strategic nuclear warheads were awaiting dismantlement as of 2011.[131] According to the International Panel on Fissile Materials (IPFM) report, "it has been estimated that the current net dismantlement rate in Russia is on the order of 200-300 warheads a year, with another 200 warheads being dismantled but then replaced with remanufactured warheads."[132]

In September 2012, Senator Luger announced the accomplishment under the Cooperative

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[126] NNSA, *The National Nuclear Security Administration Strategic Plan*, May 2011, p. 8.

[127] NNSA, "NNSA Exceeds 2012 Goal for Nuclear Weapons Dismantlements," December 3, 2012, http://nnsa.energy.gov/mediaroom/pressreleases/dismantlements120312.

[128] NNSA, "Surplus U.S. Highly Enriched Uranium (HEU) Disposition", http://nnsa.energy.gov/aboutus/ourprograms/nonproliferation/programoffices/fissilematerialsdisposition/surplusheudispositio.

[129] "U.S. Statement Delivered by Secretary of Energy Steven Chu," 2012 IAEA General Conference, Vienna, September 17, 2012.

[130] NNSA, "Plutonium Disposition," http://www.nnsa.energy.gov/aboutus/ourprograms/nonproliferation/programoffices/fissilematerialsdisposition/plutoniumdisposition.

[131] Hans M. Kristensen and Robert S. Norris, "Russian Nuclear Forces, 2011," *Bulletin of the Atomic Scientists*, Vol. 68, No. 3 (2011), p. 68.

[132] International Panel on Fissile Materials, "Global Fissile Material Report 2011: Nuclear Weapons and Fissile Material Stockpile and Production," International Panel on Fissile Materials, January 2012, p. 5

Threat Reduction program (CTR), among others, as:[133]

- 7,659 strategic nuclear warheads deactivated;
- 902 ICBMs destroyed, 498 ICBM silos eliminated, and 191 ICBM mobile launchers destroyed;
- 155 bombers eliminated;
- 492 SLBM launchers eliminated, 684 SLBMs eliminated, and 33 nuclear submarines capable of launching ballistic missiles destroyed;
- 194 nuclear test tunnels eliminated;
- 584 nuclear weapons transport train shipments secured; and
- Security at 24 nuclear weapons storage sites upgraded.

450 metric tons of Russian HEU extracted from nuclear weapons were converted to LEU and sold to the United States from 1993 through 2012 under the Megatons to Megawatts program. By 2013, 500 metric tons of Russia's HEU will have been recycled into LEU.[134] As mentioned above, Russia stopped production of fissile material for weapons in 1994, and has almost closed its production facilities. "The Zheleznogorsk reprocessing plant will complete reprocessing of the final spent fuel from the ADE-2 reactor in 2012,"[135] according to one report. However, Russia has yet to indicate a plan to dismantle these facilities used for fissile material production for nuclear weapons.

In terms of U.S.-Russian bilateral disposal of their surplus fissile material for weapons purposes, PMDA was signed in 2000 and a protocol, which amends the PMDA, was signed in April 2010 and entered into force in July 2011. Under the amended Agreement, the United States and Russia each agreed to dispose of 34 metric tons of weapons-grade plutonium extracted from nuclear weapons by converting it to MOX fuel for commercial nuclear power plants. While the implementation has been delayed due to financial and legal issues, the United States, Russia, and the IAEA are working on a verification arrangement for the surplus plutonium, including monitoring and inspection. Both countries plan to begin disposition by 2018.[136]

The United Kingdom has dismantled retired nuclear warheads, including WE177 and

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[133] "Lugar Announces Latest Elimination of Weapons of Mass Destructions through Nunn-Lugar," Press Release, September 11, 2012, http://lugar.senate.gov/news/record.cfm?id=337587&&.

[134] Megatons to Megawatts, Program Status," http://www.usec.com/russian-contracts/megatons-megawatts.

[135] IPFM, "Global Fissile Material Report 2011," p. 18.

[136] Office of the Spokesman, U.S. Department of State, "2000 Plutonium Management and Disposition Agreement," April 13, 2010, http://www.state.gov/r/pa/prs/ps/2010/04/140097.htm; "U.S., Russia Sign Deal to Cut Plutonium Stocks," *Reuters*, April 14, 2010, http://in.reuters.com/article/worldNews/idINIndia-47667620100413.

Chevaline SLBM warheads.[137] The surplus fissile material extracted from the dismantled warheads has been placed under the EURATOM safeguards. It indicates that surplus HEU will be used to produce fuel for nuclear submarines, but has not declared the amount of surplus HEU to be converted. All of the U.K. plutonium production facilities for military purposes have been shut down. The United Kingdom used the U.S. test site because it had no test site of its own since 1962.

No declaration has been made by France regarding the dismantlement of nuclear warheads or the amount and the status of fissile material designated as no longer needed for military purposes. On the other hand, France announced that its facilities for producing fissile material for nuclear weapons—Marcoule for plutonium and Pierrelatte for uranium—were decommissioned and dismantled by 2008.[138] France also dismantled irreversibly its nuclear test sites in the South Pacific after its last nuclear test in January 1996.

It is not clear whether China, India, Israel and Pakistan carried out any measures on irreversibility since they have not declassified any information regarding the dismantlement of nuclear warheads or nuclear weapons-related facilities.

North Korea proceeded to shut down and disable the Yongbyon nuclear facility, including the reprocessing facility, in accordance with the Second-Phase Actions for the Implementation of the Joint Statement agreed at the Six-Party Talks in October 2007. Although disablement work has been suspended since mid-August 2008, it is reported that eight of the 11 disablement steps have been completed.[139]

(11) Disarmament and Non-Proliferation Education, and Cooperation with Civil Society

Most countries have not made available information on their activities undertaken for disarmament and non-proliferation education and cooperation with civil society or the outcome of these efforts. Only 21 UN Member States submitted 28 reports on the implementation status of the recommendations included in the Secretary-General's report on "United Nations study on disarmament and non-proliferation education" between 2004

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[137] See "Disarmament Measures Taken by NPT Nuclear Weapon State," Nuclear Treat Initiative, Updated in August 2011, http://www.nti.org/media/pdfs/disarmament_measures_taken_by_npt_nuclear_weapon_states.pdf?_=1340643721&_=1340643721

[138] "General Statement by the Head of the French Delegation," at the 2012 Preparatory Committee for the Nuclear Non-Proliferation Treaty, Vienna, 30 April 2012.

[139] Peter Crail, "North Korea Moves to Restart Key Nuclear Plant," *Arms Control Today*, Vol. 38, No. 8 (October 2008) , http://armscontrol.org/act/2008_10/DPRKrestart.

and 2010.[140] During the 67th session of the General Assembly in July 2012, Secretary-General Ban Ki-moon issued a report stating that only nine countries (only Japan among the countries included in this project) had informed the UN on their implementation of his recommendations.[141]

In the 2010 NPT RevCon states parties were also encouraged to report on the implementation status of the above-mentioned UN Secretary-General's report under Action 22 of the Final Document. Towards this end, at the 2012 PrepCom, the NPDI submitted a working paper highlighting the group's commitment to actively promote disarmament and non-proliferation education, the importance of passing on the experience of hibakushas to the next generation, and the good practices of disarmament and non-proliferation education by its members, namely Canada, Japan, Netherlands and Poland.[142] Austria and Japan, in a joint working paper, introduced the efforts made in this area.[143] Specifically, the two countries shared their recent experiences on disarmament and non-proliferation education. Among others, Japan reported that it co-hosted the Global Forum on Disarmament and Non-Proliferation Education in Nagasaki with the United Nations University in August 2012.

During the First Committee of the 67th session of the General Assembly in October 2012, a resolution titled the "UN study on disarmament and non-proliferation education," co-sponsored by Australia, Brazil, Germany, India, Japan, Pakistan, the United Kingdom and others, was adopted without a vote.

Side events held during the NPT RevCon and PrepCom, and the First Committee of the UN General Assembly where NGOs can also participate are also important elements of the efforts toward nuclear disarmament and non-proliferation education and civil society cooperation. Among the states surveyed in this project, Australia, France, Russia, Japan, South Africa, Switzerland, the United Kingdom and the United States hosted such events during the 2010 NPT RevCon. Russia, Switzerland, the United Kingdom and the United States held similar events at the 2012 PrepCom, and Japan and Switzerland during the 67th session of the UN General Assembly First Committee in October 2012.[144]

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[140] Gaulhar Mukhatzhanova, "Inplication of the Conclusions and Recommendations for Follow-On Actions Adopted at the 2010 NPT Review Conference Disarmament Actions 1-22: Monitoring Report," Monterey Institute of International Affairs, April 2012, p. 64.

[141] A/67/138, 12 July 2012.

[142] NPT/CONF.2015/PC.I/WP.14, 20 April 2012.

[143] NPT/CONF.2015/PC.I/WP.11, 19 April 2012.

[144] See, for example, the following reports on "NPT News in Review" (2010); "NPT News in Review" (2012); "First Committee Monitor" (2012) produced by Reaching Critical Will (http://www.reachingcriticalwill.org/).

2. Nuclear Non-Proliferation

(1) Acceptance of and Compliance with Nuclear Non-Proliferation Obligations

a) Accession to the NPT

Among the 194 UN Member States today, 190 (including North Korea) have acceded to the Nuclear Non-Proliferation Treaty (NPT), long regarded as the cornerstone of the nuclear non-proliferation regime. Except South Sudan, which declared its independence and joined the United Nations in July 2011, states remaining outside the Treaty are: India and Pakistan, both of which tested and declared having nuclear weapons in 1998; and Israel, which is widely believed to possess them.

While all states parties to the NPT are called upon to "exert all efforts to promote universal adherence to the Treaty" in the Final Document of the 2010 NPT Review Conference (RevCon) (Action 23), it is highly unlikely that the three states mentioned above will join the NPT as non-nuclear weapon States (NNWS) in the near future. Since the NPT was opened for signature in 1968, India has repeatedly stated its position that the country has no intention to participate in what it considers to be a discriminatory treaty. Pakistan's stance on joining the Treaty has changed over time. Pakistani Foreign Ministry Spokesperson Abdul Basit said in an interview in February 2010 that,"[a]t one point in time, we were ready to sign the treaty, provided it was also done by India," but this position, he said, "has become outdated." He explained that Pakistan's increasing reliance on nuclear weapons was due to "a conventional imbalance between Pakistan and India" and clearly indicated that it would sign the NPT only if Pakistan is recognized as a legitimate nuclear power.[145] Israel proposed at the Arms Control and Regional Security Working Group of the Middle East Peace Process in 1990s that it would start discussions on an establishment of a Nuclear-Weapon-Free Zone (NWFZ) in the Middle East and consider acceding to the NPT two years after signing peace treaties with all counties in the region, including Iran and Iraq.[146] However, due to Iran's nuclear issues as well as the long-stalled peace process, few could expect an Israeli accession to the NPT soon.

North Korea acceded to the NPT in 1985 but declared its suspension from the Treaty in March 1993 and its withdrawal in January 2003. North Korea has insisted that it is no longer a state party to the NPT, but other NPT states have reserved interpretation on the North's official status under the Treaty. In the Joint Statement of the Fourth Round of the Six-Party Talks held in September 2005, North Korea "committed to abandoning all

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[145] "Pakistan Rules Out Joining Nonproliferation Treaty," *Global Security Newswire*, February 23, 2010, http://www.nti.org/gsn/article/pakistan-rules-out-joining-nonproliferation-treaty/.

[146] Emily Laudau, "Egypt and Israel in ACRS: Bilateral Concerns in a Regional Arms Control Process," *Memorandum*, Jaffee Center for Strategic Studies, No. 59 (June 2001), p. 20.

nuclear weapons and existing nuclear programs and returning, at an early date, to the Treaty on the Non-Proliferation of Nuclear Weapons and to IAEA safeguards." However, later, North Korea asserted that it had no intention to renounce its nuclear weapons in the near future, and, furthermore, called itself "a nuclear-armed state" in the Preamble of its Constitution amended in April 2012.[147]

It is the sovereign right of any state party to the NPT to withdraw from the Treaty, as stipulated in Article X of the Treaty. However, the concern that a state may abuse this provision by withdrawing from the NPT after having taken advantage of Article IV to develop its nuclear capability has led some states—mostly Western countries—to explore measures to address such a legal loophole in the Treaty. The UN Security Council adopted Resolution 1887 in September 2009, in which the Security Council:[148]

> *Undertakes* to address without delay any State's notice of withdrawal from the NPT, including the events described in the statement provided by the State pursuant to Article X of the Treaty, while noting ongoing discussions in the course of the NPT review on identifying modalities under which NPT States Parties could collectively respond to notification of withdrawal, and affirms that a State remains responsible under international law for violations of the NPT committed prior to its withdrawal; and
>
> *Encourages* States to require as a condition of nuclear exports that the recipient State agree that, in the event that it should terminate, withdraw from, or be found by the IAEA Board of Governors to be in non-compliance with its IAEA safeguards agreements, the supplier state would have a right to require the return of nuclear material and equipment provided prior to such termination, non-compliance or withdrawal, as well as any special nuclear material produced through the use of such material or equipment.

While this is a significant achievement, the provisions of the resolution stopped short of being legally binding.

The subject of a state party's withdrawal from the NPT was also discussed at the 2010 RevCon and the 2012 PrepCom. However, it is clear from the Chairman's summary of the 2012 PrepCom below[149] that the views of the states parties to the Treaty on this issue are yet to converge.

> "A number of States parties called for further discussion pertaining to article X of the Treaty, including possible responses to a notice of withdrawal, and the continued application of IAEA safeguards and the disposition of equipment and materials acquired or developed under safeguards while Party to the Treaty, in the event of a withdrawal.

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147 Citing from "We ARE a nuclear power: North Korea's chilling claim in new constitution," *Mail Online*, 31 May 2012, http://www.dailymail.co.uk/news/article-2152718/New-constitution-declares-North-Korea-nuclear-armed-nation-indomitable-military-power.html.

148 UNSCR 1887, 24 September 2009.

149 NPT/CONF.2015/PC.I/WP.53, 10 May 2012.

> Some States parties stressed that a State party remained responsible under international law for violations committed while Party to the Treaty.
>
> Some States parties did not support efforts to reinterpret or restrict the sovereign right of withdrawal, as these could be detrimental to the implementation of the Treaty. A number of States parties emphasised the importance of encouraging States to remain in the Treaty by various[ly] reaffirming the role of the Treaty and achieving its universality, implementing all the conclusions and recommendations for follow-on actions adopted at the 2010 Review Conference, and addressing the root causes that might lead a State party to withdraw."

b) Compliance with Article I and II of the NPT and the UNSC Resolutions on Non-Proliferation

Article I of the Treaty provides that, "Each nuclear-weapon state party to the NPT undertakes not to transfer to any recipients nuclear weapons or any other nuclear devices or control over them and not to assist, encourage or induce any NNWS to manufacture or otherwise acquire nuclear weapons or any other nuclear devices or control over them.". Each NNWS, for its part, "undertakes not to receive from any transferors nuclear weapons or any other nuclear devices or control over them, not to manufacture or acquire nuclear weapons or any other nuclear devices, and not to seek or receive any assistance in the manufacture of nuclear weapons or any other nuclear devices," under Article II of the NPT. NNWS are also obliged to accept IAEA comprehensive safeguards (Article III-1), and all states parties to the Treaty undertake not to supply source or special fissionable material and equipment or material related to the production of special fissionable material to any NNWS for peaceful uses, unless the source or special fissionable material is made subject to safeguards (Article III-2).

Since the NPT entered into force, no case of non-compliance with Article I and II of the Treaty has been officially reported by the UN or the rest of the international community. This may be due in part to the fact that most NPT states parties have indeed fully complied with the Treaty obligations, and partly because the NPT provides no rule or mechanism for deciding on non-compliance.

With regard to North Korea's declaration of its withdrawal from the Treaty, if such withdrawal is not interpreted as legally valid or if the North acquired nuclear weapons before announcing its withdrawal from the NPT, such acquisition of nuclear weapons would constitute a non-compliance with Article II. North Korea has failed to respond to the UN Security Council's calls for, among others, "abandon[ing] all nuclear weapons and existing nuclear programmes in a complete, verifiable and irreversible manner, shall act strictly in accordance with the obligations applicable to parties under the Treaty on the Non-Proliferation of Nuclear Weapons and the terms and conditions of its International

Atomic Energy Agency (IAEA) Safeguards Agreement (IAEA INFCIRC/403) and shall provide the IAEA transparency measures extending beyond these requirements, including such access to individuals, documentations, equipments and facilities as may be required and deemed necessary by the IAEA."[150]

In the case of Iran, it is believed that the country has not acquired nuclear weapons yet, and it may, therefore, be provisionally concluded that the state is not in violation of Article II of the NPT. A report issued by the U.S. State Department underlines this point: The report mentions that "Iran is in violation of obligations under the NPT, its IAEA Safeguards Agreement, and relevant UN Security Council (UNSC) resolutions"[151] but does not specifically point out Tehran's violation of Article II. In the same report, the U.S. government concludes that "North Korea was in violation of its obligations under the Articles II and III of the NPT and under its IAEA Safeguards Agreement before its announced withdrawal from the NPT in 2003."[152]

Iran has repeatedly emphasized that it has no intention to acquire nuclear weapons. For instance, Iranian Foreign Minister Salehi stated at the Conference on Disarmament (CD) in February 2012 that Iran does "not see any glory, pride or power in the nuclear weapons, quite the opposite based on the religious decree issued by our supreme leader, the production, possession, use or threat of use of nuclear weapons, are illegitimate, futile, harmful, dangerous and prohibited as a great sin."[153] The IAEA reports on Iran have, however, indicated that Iran is likely to have conducted alleged nuclear weapons-related activities and that Iran's cooperation with the IAEA was insufficient to clarify the unresolved issues. In response, the UN Security Council has called for Iran to suspend "all enrichment-related and reprocessing activities, including research and development," and "work on all heavy water-related projects, including the construction of a research reactor moderated by heavy water."[154] Iran, however, has not complied with the subsequent UN Security Council resolutions; rather, it continues to produce enriched uranium, install further cascades in its centrifuge enrichment plants, and construct the heavy water reactor,

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[150] UNSCR 1718, 14 October 2006. The UNSC Resolution 1874, adopted on June 12, 2009, in response to North Korea's nuclear test in April 2009, also "[*d*]*emands* that the DPRK immediately comply fully with its obligations under relevant Security Council resolutions, in particular resolution 1718 (2006)."

[151] U.S. Department of State, "Adherence to and Compliance with Arms Control, Nonproliferation and Disarmament Agreements and Commitments," August 2011, p. 20.

[152] Ibid., p. 22.

[153] "Statement by H.E. Dr. Ali Akbar Salehi, the Minister for Foreign Affairs of the Islamic Republic of Iran," before the Conference on Disarmament, Geneva, 28 February 2012.

[154] UNSCR 1737, 23 December 2006. Similar demands were made in the UNSC Resolutions 1747 (2007), 1803 (2008), 1835 (2008), and 1929 (2010) adopted in response to Iran's nuclear issue.

according to the IAEA reports on Iran.[155]

As for India and Pakistan, the UNSC Resolution 1172 (1998) demands that they, among other things, refrain from further nuclear tests, stop their nuclear weapons development programs, refrain from the deployment of nuclear weapons, cease any further production of fissile material for nuclear weapons, and accede to the NPT and the CTBT without delay. However, both states have not followed most of the requests contained in the resolution, except for declaring their moratorium on nuclear testing.

c) Establishment of Nuclear-Weapon-Free Zones

The treaties establishing nuclear-weapon-free zones (NWFZs) have entered into force in Latin America (Tlatelolco Treaty), the South Pacific (Rarotonga Treaty), Southeast Asia (Bangkok Treaty), Africa (Pelindaba Treaty), and Central Asia (Central Asian NWFZ Treaty). In addition, Mongolia declared its territory a nuclear-weapon-free zone at the UN General Assembly (UNGA) in 1992, and the UNGA has been adopting a resolution entitled "Mongolia's International Security and Nuclear-Weapon-Free-Status" since 1998 in support of Mongolia's declaration.[156] All the states eligible to join the NWFZ in Latin America, Southeast Asia and Central Asia are parties to the respective NWFZ treaties.

The common obligation stipulated in the NWFZ treaties is to secure a "total absence of nuclear weapons" in the respective regions. The treaties prohibit not only states within the zones from acquiring nuclear weapons but also any countries from deploying nuclear weapons in the respective territories of the zones.[157] In addition, each NWFZ treaty includes provisions that reflect the regional characteristics or regional countries' interests. As of this writing, there is no indication that a state party has sought to acquire nuclear weapons in violation of the NWFZ treaties.

The establishment of new NWFZs has been proposed by regional states in South Asia until 1998, and in the Middle East, and by the private sector in Northeast Asia. In particular, the UNGA Resolutions calling for establishing an NWFZ in the Middle East have been adopted

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[155] See, for example, GOV/2012/37, 30 August 2012.

[156] 53/77D, 4 December 1998. As mentioned before, in September 2012, Mongolia and the 5 NWS signed a political declaration that formally recognizes Mongolia's nuclear-weapon-free status.

[157] The Central Asian Nuclear-Weapon-Free Zone (CANWFZ) treaty contains a provision which says, "[t]his Treaty does not affect the rights and obligations of the Parties under other international treaties which they may have concluded prior to the date of the entry into force of this Treaty." This raises a concern for some that the provisions of the CANWFZ treaty could be overridden by other agreements, such as the 1992 Treaty on Collective Security Treaty (Tashkent treaty) concluded between Russia and the regional states, creating a condition for legitimizing Russia's deployment of nuclear weapons within the CANWFZ.

by consensus since 1980.[158] The Arab countries, which see Israel's refusal to join the NPT as a grave problem, have repeatedly asked for the establishment of such a zone on various occasions, including the NPT RevCons. Their proposal has been included in the Resolution on the Middle East in the 1995 NPT Review and Extension Conference and the Final Document of the 2000 RevCon in the form of a Zone Free of WMD. In a positive move, at the 2010 RevCon, participating states agreed to "convene a conference in 2012, to be attended by all States of the Middle East, on the establishment of a Middle East zone free of nuclear weapons and all other weapons of mass destruction" with a view to implementing the 1995 Middle East Resolution.

However, soon after the 2010 NPT RevCon ended, the difficulty of moving forward with the convening of the Middle East Conference emerged. The Israeli government strongly criticized the 2010 NPT RevCon consensus document—which only makes reference to Israel, urging to join the NPT, without mentioning Iranian non-compliance with the Safeguards Agreement—as "deeply flawed and hypocritical," and expressed the view that "as a non-signatory state of the NPT, Israel is not obligated by the decisions of this Conference."[159] In the closing statement of the 2010 NPT RevCon, Ellen Tauscher, U.S. Under Secretary of State for Arms Control and International Security, said that the U.S. ability to "create conditions for a successful" Middle East Conference in 2012 "has been seriously jeopardized because the final document singles out Israel in the Middle East section."[160] The next day the U.S. government also took the stance that "[a]s a cosponsor charged with enabling this conference, the United States will ensure that a conference will only take place if and when all countries feel confident that they can attend. Because of gratuitous way that Israel has been singled out, the prospect for a conference in 2012 that involves all key states in the region is now in doubt …"[161]

The appointment of a facilitator for the Middle East Conference for establishing a NWFZ also proved to be difficult. It took more than a year after the conclusion of the 2010 RevCon, in October 2011, to appoint Finnish Under Secretary Jaakko Laajava in that role, with the designation of his government to host the Conference. At the 2012 NPT PrepCom,

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158 Most recently, a resolution A/RES/66/25 on the establishment of a nuclear-weapon-free zone in the region of the Middle East was unanimously adopted in the 67th session of the UNGA on December 11, 2012.

159 "Statement by Government of Israel on NPT Review Conference Middle East Resolution," 29 May 2010, Israel Ministry of Foreign Affairs, http://www.mfa.gov.il/MFA/Government/Communiques/2010/Statement_Government_Israel_NPT_Review_Conference_29-May-2010, accessed on January 29, 2011.

160 Ellen Tauscher, "United States Closing Statement at the 2010 NPT Review Conference," New York City, May 28, 2010, http://www.state.gov/t/us/142370.htm.

161 "Statement by the National Security Advisor, General James L. Jones, on the Non-Proliferation Treaty Review Conference," May 28, 2010, http://www.whitehouse.gov/the-press-office/statement-national-security-advisor-general-james-l-jones-non-proliferation-treaty-.

Ambassador Laajava admitted that "there [was] still need for intensified consultations in order to finalize the agenda, modalities and rules of procedure of the Conference" while noting that "[a]ll States of the region have engaged in a constructive manner in the facilitation process" where he "carried out over one hundred consultations…with all stakeholders."[162] At that point, Iran and Israel did not clarify their intentions as to whether they would participate in the Conference.

Since the 2012 PrepCom, Ambassador Laajava consulted with relevant states and continued to exert tremendous efforts to convene the Conference. At the IAEA General Conference in September 2012, at the urging of the Western countries, the Arab states refrained from proposing a resolution on the Israeli nuclear issue with the aim of creating a favorable environment for the convening of the Middle East Conference. At the European Union (EU) Non-proliferation Consortium event held in Brussels in November 2012, Iranian IAEA Representative Soltanieh announced, "[t]he Islamic Republic of Iran now finally has decided to participate at the conference in Finland, in Helsinki, in December on a Middle East (nuclear) free zone."[163] However, on November 23, U.S. State Department Spokesperson Victoria Nuland issued a press statement saying, "As a co-sponsor of the proposed conference … the United States regrets to announce that the conference cannot be convened because of present conditions in the Middle East and the fact that states in the region have not reached agreement on acceptable conditions for a conference."[164] On the following day, Ambassador Laajava pledged to "continue our efforts to prepare the ground together with the conveners and the States of the region for the earliest possible convening of a successful conference, to be attended by all states of the region" and "propose[d] multilateral consultations to be held as soon as possible."[165]

(2) IAEA Safeguards Applied to the NPT NNWS

a) Conclusion of the IAEA Safeguards Agreements

Under Article III-1 of the NPT, "[e]ach Non-nuclear-weapon State Party to the Treaty undertakes to accept safeguards as set forth in an agreement to be negotiated and concluded with the International Atomic Energy Agency in accordance with the Statute of

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[162] "Report of the Facilitator to the First Session of the Preparatory Committee for the 2015 Conference of the Parties to the Treaty on the Non-Proliferation of Nuclear Weapons," 8 May 2012.

[163] "Iran Pledges to Attend Planned WMD Summit," *Global Security Newswire*, November 6, 2012, http://www.nti.org/gsn/article/iran-israel-join-informal-gathering-eye-wmd-summit/.

[164] Victoria Nuland, Department Spokesperson, Office of the Spokesperson, "2012 Conference on a Middle East Zone Free of Weapons of Mass Destruction (MEWMDFZ)," Press Statement, November 23, 2012, http://www.state.gov/r/pa/prs/ps/2012/11/200987.htm.

[165] Ministry for Foreign Affairs of Finland. "Helsinki Middle East Conference," Press Releases, November 24, 2012, http://formin.finland.fi/public/default.aspx?contentid=263448&nodeid=15145&contentlan=2&culture=en-US.

the International Atomic Energy Agency and the Agency's safeguards system, for the exclusive purpose of verification of the fulfillment of its obligations assumed under this Treaty with a view to preventing diversion of nuclear energy from peaceful uses to nuclear weapons or other nuclear explosive devices." The basic structure and content of the safeguards agreement are specified in the Comprehensive Safeguards Agreement (CSA). To date, 13 NPT NNWS have yet to conclude the CSAs with the IAEA.[166]

An NPT NNWS or any other state may also conclude a protocol additional to its safeguards agreement. The model Additional Protocol (AP) was developed in the wake of the Iraqi and North Korean nuclear crises in the early 1990s and adopted by the IAEA Board of Governors on 15 May 1997. It is the sovereign decision of any state to conclude an AP. However, the IAEA General Conference, with support in particular of Western countries, has been encouraging all states to conclude and bring into force APs. The IAEA argues that for states with both a CSA and an AP in force, Agency safeguards can provide increased assurances regarding the non-diversion of nuclear material placed under safeguards and the absence of undeclared nuclear material and activities within a state as a whole. The 2010 NPT RevCon also "encourage[d] all States parties which have not yet done so to conclude and to bring into force additional protocols as soon as possible and to implement them provisionally pending their entry into force," as recorded in its consensus final document (Action 28). As of November 2012, 114 NPT NNWS have ratified the APs.

The IAEA Secretariat can draw the so-called "broader conclusion" that "all nuclear material in the State has remained in peaceful activities" when the Agency finds no indications of diversion of declared nuclear material from peaceful nuclear activities and undeclared nuclear material or activities in that country. The IAEA can draw such a conclusion in a credible manner only in a state with both the CSA and the AP in force. Subsequently, the IAEA implements integrated safeguards defined as "optimized combination of all safeguards measures available to the Agency under [CSAs] and [APs], to maximize effectiveness and efficiency within available resources."

The current status of the signature and ratification of the CSAs and the APs and the implementation of the integrated safeguards by the NPT NNWS studied in this project is presented in the following table.

[166] The 13 NNWS either have nuclear material in small quantity or conduct no nuclear activity.

Table2-1: The status of the conclusion and implementation of the IAEA safeguards agreement by the NNWS party to the NPT (as of the end of December 2011)

	Australia	Brazil	Iran	Syria	Republic of Korea	Germany	Japan	South Africa	DPRK	Sweden	Switzerland
CSA	In force	In force	In force	In force	In force	In force	In force	In force	In force*1	In force	In force
AP	In force		Signed		In force	In force	In force	In force		In force	In force
Broader conclusion drawn	○				○	○	○	○		○	
Integrated safeguards	○				○	○	○			○	

*1 DPRK has refused to accept comprehensive safeguards since it announced its suspension from the NPT in 1993.

Source) IAEA, "Safeguards Statement for 2011," pp. 13-17.

Brazil, which has not concluded an AP, argued at the 2010 NPT RevCon as follows:

> It should…be stressed that the balance of obligations upon which the NPT is founded also includes the manner through which its commitments are to be verified. The Additional Protocol is not a part of that bargain. It is simply not fair to expect Non-Nuclear-Weapon States, which have already undertaken unequivocal, credible and verifiable commitments to foreswear nuclear weapons, to implement further enhanced verification measures, while the international community has yet to be presented with a timeframe within which to expect the achievement of a world free of nuclear weapons. Enhanced verification mechanisms should be devised and grafted into a future Convention on the Prohibition of Nuclear Weapons, which would level the playing field by making zero nuclear weapons the norm for all members of the international community.[167]

Brazil made similar statements on the AP at the IAEA General Conference in 2012.[168]

b) Unsolved Cases of Non-Compliance with Safeguards Agreements

Under Article XII-C of the Statute of the IAEA, the IAEA "Board shall report the non-compliance [with safeguards agreements] to all members and to the Security Council and General Assembly of the United Nations." Up to now, three cases of non-compliance have been reported to the UN Security Council and have yet to be solved: North Korea, Iran and Syria.

With regard to North Korea, the IAEA found possible indications of undeclared plutonium

[167] "Statement by Ambassador Antonio Guerreiro, Brazil," 8th Review Conference of the Treaty on Non-Proliferation of Nuclear Weapons, Main Committee II, 10 May 2010.

[168] "Statement by Brazil at the 56th General Conference of the IAEA Delivered by H.E. Ambassador Laercio Antonio Vinhas," September 2012.

production and two undeclared nuclear facilities as a result of an ad hoc inspection conducted soon after the entry into force of the North Korean-IAEA CSA in April 1992. The IAEA called on North Korea to allow a special inspection, as specified in the CSA for the two sites hosting possible undeclared facilities, in February 1993. North Korea rejected these requests. Furthermore, North Korea notified its withdrawal, then changed to suspension, from the NPT in March. Following these events, the IAEA reported North Korea's non-compliance with its safeguards agreement to the UN Security Council in April 1993. Since then, the IAEA has been unable to conduct the necessary verification activities as required by the CSA. In accordance with the US-North Korean Agreed Framework in October 1994, North Korea agreed to accept the IAEA inspectors to monitor the freeze of its graphite-moderated reactors and related facilities in Yongbyon (not based on the CSA). However, in December 2002 North Korea ordered the IAEA inspectors to leave the country. Yet, during the Six-Party Talks held in February 2007, North Korea accepted to "shut down and seal … the Yongbyon nuclear facility, including the reprocessing facility and invite back IAEA personnel to conduct all necessary monitoring and verifications as agreed between IAEA and the DPRK" (outside the scope of the CSA), as noted in the meeting's Initial Actions for the Implementation of the Joint Statement. In July 2007, monitoring by the IAEA inspectors resumed. Then, in April 2009 the DPRK asked the IAEA to remove seals and surveillance from the nuclear facilities in Yongbyon and leave the country. Since then, no safeguards measures in North Korea have been implemented by the IAEA.[169]

In Iran, the construction of two undeclared facilities (a heavy water production plant in Arak and a uranium enrichment facility in Natanz) were revealed by the National Council of Resistance of Iran in August 2002. In addition, as a result of the inspections carried out under the CSA, the IAEA found evidence that Iran had conducted undeclared activities for a prolonged period of time to enrich uranium and separate plutonium.

After this revelation, in December 2003 Iran signed an AP with the IAEA, pursuant to the EU-3 (France, Germany and the U.K.)-Iranian agreement, and agreed to suspend its enrichment and reprocessing activities as well as to provisionally implement the AP until its entry into force. However, after the talks between the EU-3 and Iran failed in August 2005, Iran resumed its uranium enrichment activities. In response, in September the IAEA Board adopted a resolution stating that Iran was in non-compliance with its safeguards agreement. In February 2006 the Board of Governors adopted a new resolution requesting the IAEA Director General to report the Iranian case to the UN Security Council.[170]

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[169] See, for example, GOV/2012/36-GC(56)/11, 30 August 2012.

[170] GOV/2006/14, 4 February 2006.

In contrast to North Korea, to date, Iran has accepted the IAEA inspections on its declared nuclear activities, including uranium enrichment, under the CSA. However, as the IAEA Secretariat explains in its Safeguards Statement for 2011, "[w]hile the Agency continue[d] throughout 2011 to verify the non-diversion of declared nuclear material at the nuclear facilities and the list of facilities (LOF) declared by Iran under its Safeguards Agreement, as Iran did not provide the necessary cooperation, including not implementing its Additional Protocol, … the Agency was unable to provide credible assurance about the absence of undeclared nuclear material and activities in Iran, and therefore, was unable to conclude that all nuclear material in Iran was in peaceful activities."[171] In November, the IAEA provided a detailed analysis of the information made available to the Agency in regard to the "possible military dimensions" of Iran's nuclear program. The analysis indicated that Iran had carried out activities relevant to the development of nuclear explosive devices.[172] In spite of the IAEA's repeated requests, Iran has not yet provided adequate information to remove these doubts. In particular, according to the IAEA report on Iran in August 2012, "Iran has not responded to the Agency's initial questions on Parchin," where the country is suspected to have conducted high-explosive experiments related to the development of nuclear weapons, has "not provide[d] the Agency with access to the location within Parchin site to which the Agency has requested," and has "been conducting activities at that location that will significantly hamper the Agency's ability to conduct effective verification."[173] The same report further points out that "Iran is not implementing the provisions of the modified Code 3.1 of the Subsidiary Arrangement General Part to Iran's Safeguards Agreement, which provides for the submission to the Agency of design information for new facilities as soon as the decision to construct, or to authorize construction of, a new facility has been taken, whichever is the earlier."[174]

As for Syria, the international community as well as the IAEA increasingly suspect that the Dair Alzour site, which was destroyed by an Israeli air raid in September 2007, was a clandestinely constructed undeclared nuclear reactor. Syria has denied this allegation. But, in June 2011, the IAEA Board of Governors adopted a resolution, in which it noted "with serious concern" the lack of evidence to support Syria's claim on the destroyed building, the

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171 IAEA, "Safeguards Statement for 2011," p. 7.

172 GOV/2011/65, 8 November 2011.

173 GOV/2012/37, 30 August 2012. The Institute for Science and International Security (ISIS), a U.S. think-tank, regularly provides satellite imagery analysis on the Parchin site. Based on the ISIS report of July 2012, "Satellite imagery from June 21, 2012 that ISIS has obtained from Digital Globe shows that suspected sanitization activities at the Parchin site has continued to progress." (David Albright and Robert Avagyan, "Activity at Parching Explosive Testing Site Continues: Time is Running for a Sound IAEA Inspection," *ISIS Imagery Brief*, July 2, 2012).

174 GOV/2012/37, 30 August 2012.

country's failure to respond to the Agency's repeated calls for cooperation, and the Agency's conclusion that "the building … was very likely a nuclear reactor and should have been declared by Syria."[175] In this resolution the IAEA Board decided to report the matter to the UN Security Council on the basis "that Syria's undeclared construction of a nuclear reactor at Dair Alzour and failure to provide design information for the facility in accordance with Code 3.1 of Syria's Subsidiary Arrangements [we]re a breach of Articles 41 and 42 or Syria's NPT Safeguards Agreement, and constitute non-compliance with its obligations under its Safeguards Agreement with the Agency in the context of Article XII.C of the Agency's Statute." In August 2012 the IAEA reported that the Agency had not obtained new information that impacted its assessment of the destroyed building at Dair Alzour and that no assessment had been possible for three other places alleged to be functionally related to the site. Hence, "[t]he Director General urge[d] Syria to cooperate fully with the Agency in connection with unresolved issues related to the Dair Alzour site and other locations."[176]

(3) IAEA Safeguards Applied to the NWS and Non-NPT States

A NWS is not required to conclude the CSA with the IAEA. However, to alleviate the concerns about the discriminatory nature of the NPT, the NWS have voluntarily agreed to apply safeguards to some of their nuclear facilities and fissile material that are not involved in military activities. Under a voluntary offer agreement (VOA) with NWS, the IAEA selects eligible facilities from a list submitted by each NWS and applies safeguards to nuclear material in them, in order to verify that such material is not removed from peaceful activities. The NWS may add or delete facilities on the list. Since this is a voluntary measure, the IAEA draws limited conclusions only on facilities and nuclear material made eligible for safeguards.

All NWS have concluded an AP with the IAEA. However, the NWS' APs cannot be compared to those of the NNWS. In fact, NWS have APs that follow the model AP in varying degrees. For instance, NWS agree on the "provision of information" only when it relates to cooperation or exchange of nuclear-related items and material with NNWS. Provisions for complementary access are included in the APs of the United States, France, and the United Kingdom, but not in the Russian or Chinese APs. Still, conclusion of the AP by the NWS is crucial, not only because it helps to alleviate the concerns about the discriminatory nature of the NPT between the haves and have-nots, but also because it may increase the possibility of detecting proliferant undeclared activities carried out by

[175] GOV/2011/41, 9 June 2011.

[176] GOV/2012/42, 30 August 2012.

states or non-state actors from the information provided by NWS.

The IAEA Annual Report 2011 lists facilities under Agency safeguards or containing safeguarded nuclear material in NWS as of 31 December 2011 as below.[177]

- China: A power reactor, a research reactor, and an enrichment plant
- France: A fuel fabrication plant, a reprocessing plant, and an enrichment plant
- Russia: A separate storage facility
- The United Kingdom: An enrichment plant and three separate storage facilities
- The United States: A separate storage facility

While the IAEA does not publish the number of inspections conducted in the NWS, according to an expert on the IAEA safeguards, the United Kingdom has accepted more inspections than other NWS.

The IAEA does not publish the number of facilities that the NWS have made eligible for safeguards either. France stated at the 2012 PrepCom that all of its "civil nuclear facilities for commercial or research purposes, including its 58 nuclear reactors, are under Euratom or IAEA safeguards."[178] At the same meeting, the United States reported that it "ha[d] made nearly 300 nuclear facilities eligible for IAEA safeguards" and had "declared over 370 activities to the IAEA" under the Additional Protocol in 2011. The United States also said that it had "hosted two complementary access visits by the IAEA under [its] Additional Protocol" since the 2010 NPT RevCon.[179] The United States is the only NWS that has accepted the complementary access.

The non-NPT states have concluded safeguards agreements based on INFCIRC/66. These non-NPT states have accepted IAEA inspections of the facilities that they declare as subject to these agreements. According to the IAEA Annual Report 2011, the facilities placed under IAEA safeguards or containing safeguarded nuclear material in non-NPT states as of 31 December 2011 are as follows.

- India: Six power reactors, two fuel fabrication plants, a reprocessing plant, and a separate storage facility
- Israel: A research reactor

[177] GC(56)/2/Annex, Table A24.

[178] "Statement by Mr. Jean-Hugues Simon-Michel, Ambassador, Permanent Representative of France to the Conference on Disarmament, Head of the French Delegation," Cluster 2, First Session of the Preparatory Committee for the 2015 Review Conference, Vienna, 30 April-11 May 2012.

[179] "Statement by Chargé d'Affaires Robert A. Wood, Acting U.S. Permanent Representative to the International Organizations in Vienna, Department of State, United States of America," Cluster 2, First Session of the Preparatory Committee, 2015 Review Conference of the States Parties to the Treaty on the Non-Proliferation of Nuclear Weapons, May 7, 2012.

- Pakistan: Three power reactors and two research reactors

Concerning the protocols additional to non-NPT states' safeguards agreements (which do not follow the model AP), India signed it in May 2009 but has not ratified it yet. No negotiation has yet begun for similar protocols with Israel or Pakistan. India, while negotiating its civil nuclear cooperation agreement with the United States, designated 14 of its 22 operating or under-construction nuclear reactors as being for civilian use and agreed to place them under the IAEA safeguards in phases. Under the India-U.S. nuclear deal, India does not accept the application of IAEA safeguards to its existing fast breeder reactor. As for nuclear reactors and fast breeder reactors built in the future, India reserves the right to declare whether they will be for civilian purposes and, therefore, need to be added to the list of facilities to be placed under Agency safeguards.

(4) Cooperation with the IAEA

One of the most important measures to strengthen the effectiveness of the IAEA safeguards system is to promote the universal application of the AP. In the Final Document of the 2010 NPT RevCon (under Action 28), "[t]he Conference encourages all States parties which have not yet done so to conclude and to bring into force additional protocols as soon as possible and to implement them provisionally pending their entry into force."

Among the countries surveyed in this project, Australia, France, Japan, South Korea, Sweden, the United Kingdom and the United States (and the EU) consider that the AP is "an integral part" of the current IAEA safeguards system.[180] Although it adopts a more moderate position, China also is of the opinion that the universality of CSAs and APs needs to be promoted. At the 2012 NPT PrepCom for the 2015 Review Conference, Switzerland explained that it had "started a process on examining how the IAEA safeguards system could be optimized" while expressing a concern that "more stringent safeguards instruments … lead to an increased burden in procedural terms."[181] Countries like Brazil, Russia and South Africa consider that the conclusion of an AP should be voluntary, not obligatory, although they acknowledge the importance of the AP with regard to safeguards as a major component of the nuclear non-proliferation regime.

Japan and the other Western countries have actively conducted outreach activities towards states that have yet to conclude an AP. In addition, the Non-Proliferation and

[180] See their statements made at the 2012 NPT PrepCom.

[181] "Statement by Ambassador Benno Laggner, Switzerland," Cluster 2, First Session of the Preparatory Committee, 2015 Review Conference of the States Parties to the Treaty on the Non-Proliferation of Nuclear Weapons, Vienna, May 7, 2012.

Disarmament Initiative (NPDI), whose members include Australia, Germany and Japan, issued a working paper on the AP at the 2012 NPT PrepCom. In the paper, the NPDI stated that it was "committed to promoting additional protocols at all levels, including by briefing Government officials to provide them with the necessary knowledge to advocate the signing of an additional protocol by their Governments," and was "proposing seminars or outreach activities tailored to specific regions to provide relevant technical assistance."[182]

In addition, bilateral civil nuclear cooperation agreements recently concluded by Japan and the United States with NNWS, respectively, stipulate that the partner states' conclusion of an AP is one of the conditions for their cooperation. Furthermore, in June 2011 the Nuclear Suppliers Group (NSG) revised its guidelines (INFCIRC/254/Rev.10/Part 1) in order to strengthen control of the transfer of enrichment and reprocessing related items as follows:

> Suppliers will make special efforts in support of effective implementation of IAEA safeguards for enrichment or reprocessing facilities, equipment or technology and should … ensure their peaceful nature. In this regard, supplier should authorise [their] transfers … only when the recipient has brought into force a Comprehensive Safeguards Agreement, and an Additional Protocol based on the Model Additional Protocol or, pending this, is implementing appropriate safeguards agreements in cooperation with the IAEA, including a regional accounting and control arrangement for nuclear materials, as approved by the IAEA Board of Governors.

In implementing its Research and Development Programme for Nuclear Verification 2010-2011, the IAEA has relied on Member State Support Programmes (MSSPs), according to the 2011 IAEA Annual Report. As of the end of 2011, 21 such support programmes were in place.[183] Among the 19 countries surveyed in this project, Australia, Brazil, China, France, Germany, Japan, South Korea, Russia, South Africa, Sweden, the United Kingdom and the United States have established a support programme with the IAEA. In 2012 the IAEA issued the Development and Implementation Support Programme for Nuclear Verification 2012-2013. Based on this new, two-year plan, 24 projects will be undertaken with the support of the 21 states that participated in the support programme under the previous biennial plan.[184] The numbers of the MSSP tasks carried out by the states studied in this project are: the United States (58), the United Kingdom (31), France (27), Germany (23), Japan (14), Sweden (13), South Korea (12), Russia (11), Australia (8), Brazil (8), South Africa (4), and China (3).[185]

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[182] NPT/CONF.2015/PC.I/WP.37, 27 April 2012.

[183] IAEA, *IAEA Annual Report 2011*, July 2012, p.93.

[184] IAEA, *Development and Implementation Support Programme for Nuclear Verification 2012-2013,* http://www.bnl.gov/ispo/docs/pdf/D-IS_ProgrammeForNuclearVerification_2012-2013.pdf.

[185] Ibid. For the MSSP tasks where a multiple number of states take part, they are counted as one task under all relevant countries. Also, those numbers do not reflect the level of importance of the tasks or budget.

Furthermore, the EU, France, Germany, Japan, South Korea, Russia, the United Kingdom and the United States have made extrabudgetary contributions to the IAEA in 2011.

(5) Nuclear Export Controls

Article III-2 of the NPT stipulates that "Each State Party to the Treaty undertakes not to provide: (a) source or special fissionable material, or (b) equipment or material especially designed or prepared for the processing, use or production of special fissionable material, to any non-nuclear-weapon State for peaceful purposes, unless the source or special fissionable material shall be subject to the safeguards required by this Article." The 2010 NPT RevCon also "encourage[d] States parties to make use of multilaterally negotiated and agreed guidelines and understandings in developing their own national export controls," as described in its consensus final document (under Action 36).

Japan serves as a member of all international export control regimes,[186] including the NSG, and it has established the relevant national implementation systems (legislative measures and implementation systems). Japan implements an advanced export control system enforcing two types of controls: Catch-all Control and List Control. Under the Japanese export control system, all countries are subject to the WMD Catch-all Control, except for countries belonging to the four international export control regimes and having a solid export control in place, including the WMD Catch-all Controls. Japan calls these countries the "white countries." Currently, Japan designates 27 white countries. Regarding states surveyed in this project, Australia, France, Germany, South Korea, Sweden, Switzerland, the United Kingdom and the United States are "white countries." Like Japan, these countries also have their national implementation systems in place and have implemented effective export controls regarding nuclear-related items and technologies. Also, as mentioned earlier, some of the bilateral nuclear cooperation agreements that Japan and the United States concluded recently with other countries make the conclusion of the AP a prerequisite for their cooperation with respective partner states.

Among other countries surveyed in this project, Brazil, China, Russia and South Africa are participating governments of the NSG. These four countries have set up their export control systems, including Catch-all Controls.[187] However, concerns have been expressed over Russia's and China's implementation of export controls. For example, the United

[186]Aside from the NSG, Australia Group (AG), Missile Technology Control Regime (MTCR), and Wassenaar Arrangement (WA).

[187] South Africa implements the Catch-all Control on the material, equipment, and technology related to WMD and their delivery vehicles

States considers as a proliferation risk the fact that "Russian entities remain key suppliers of nuclear equipment and technology to many civilian program(s)."[188] China has been criticized because its export of two nuclear power reactors to Pakistan agreed in April 2010[189] may constitute a violation of the NSG guidelines. Beijing has claimed an exemption for this transaction under the "grandfather" clause of the NSG guidelines. The United States also reports "Chinese entities—including private and state-owned firms—continue to engage in WMD-related proliferation activities."[190] The Panel of Experts established pursuant to UNSC Resolution 1874 also indicates in its report that Chinese ports, such as Dalian, have been used for shipment or transshipment of proscribed items to North Korea.[191] As a result, questions remain whether China adequately and strictly implements export controls.

Three non-NPT states also have set up national export control systems, including Catch-all Controls. In 2008 the NSG agreed to grant India a waiver, allowing nuclear trade with the state on the basis that: India was "harmonizing its export control lists and guidelines with those of the NSG and committing to adhere to the NSG guidelines;" an illicit trafficking from India is unlikely; and India is a promising nuclear market. Discussion about its membership in the NSG is still ongoing. However, Indian membership in the NSG may wrongly be interpreted as granting India a de facto "NWS" status.

With regard to Pakistan, the existence of a nuclear black market fed by the so-called Khan network has been unveiled. It is believed that, through this network, nuclear weapons-related items and technologies, including those related to uranium enrichment, were transferred to Iran, North Korea, Libya, and others. Pakistan denies the involvement of the Pakistani government in this network. If Pakistan was involved, however, an American researcher argues that this "could be even worse because it indicates that for the first time in history all of the keys to a nuclear weapon—the supplier networks, the material, the enrichment technology, and the warhead designs—were out of state oversight and control."[192] Little information is available as to whether Pakistan has subsequently enhanced its export control system and its implementation.

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188 "Unclassified Report to Congress on the Acquisition of Technology Relating to Weapons of Mass Destruction and Advanced Conventional Munitions, Covering 1 January to 31 December 2011,", http://www.fas.org/irp/threat/wmd-acq2011.pdf.

189 "China to Build Reactors in Pakistan," *Financial Times*, April 28, 2010, http://www.ft.com/cms/s/0/cf731b28-52d2-11df-a192-00144feab49a.html, accessed on May 6, 2010.

190 "Unclassified Report to Congress on the Acquisition of Technology Relating to Weapons of Mass Destruction and Advanced Conventional Munitions.

191 "Report of the Panel of Experts established pursuant to resolution 1874 (2009)," S/2012/422, 14 June 2012.

192 Christopher Clary, "Dr. Khan's Nuclear WalMart," *Disarmament Diplomacy*, No. 76 (March/April 2004), p. 31.

At the time of writing, the status of export control implementation by North Korea, Iran, and Syria is not clear, but it is widely assumed that these three states have actively cooperated in the proliferation of WMD and missiles. For example, a suspicion about North Korean support for the alleged clandestine construction of a graphite reactor in Syria has not been cleared. In September 2012 Iran and North Korea concluded an agreement on scientific and technological cooperation, "aim[ing] to establish joint scientific and technological laboratories, exchange scientific teams, and transfer technology in fields including energy, environment, information technology, agriculture and food." There is concern that this technological cooperation may result in deepening their bilateral cooperation in the areas of WMD and missile development.[193]

With regard to Iranian and North Korean nuclear issues, the UN Member States are obliged to implement measures set out in the relevant resolutions adopted by the UN Security Council, including embargos on nuclear-, other WMD-, and ballistic missile-related items, material, and technologies. In June 2012 the Panels of Experts, established pursuant to Resolutions 1874 (2009) and 1929 (2010) and reporting to their relevant UN Security Council Sanctions Committees, published reports on their findings and recommendations about the implementation of these resolutions. The reports highlight the Iranian and North Korean attempts to import and export proscribed items in violation of the resolutions and the efforts of the international community to prevent illicit trafficking.[194] Regarding the North Korean case, the Panel reported, inter alia: three cases of transfers prevented by Member States (one of them was a U.S. attempt to prevent); cases of interdictions by France, South Africa, and so on; reports by Germany, Japan and the United Kingdom on North Korean transactions of proscribed items; and the report by Japan on transfers of luxury goods to North Korea. The Panel of Experts also uncovered the fact that some of the ballistic missile- and chemical weapons-related items transferred from North Korea to Syria were shipped through Dalian (China). The UN Member States are supposed to report to the relevant committees on the implementation of the provisions of resolutions 1874 (2009) and 1929 (2010). The assessment of these reports shows that 60% of the U.N. Members States have not communicated on the Iranian question (as of April 2012), and only 48% (93 States) have reported on the North Korean issue (as of March 2012).

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[193] "Iran, North Korea Seen Deepening Nuke, Missile Collaboration," *Global Security Newswire*, September 20, 2012, http://www.nti.org/gsn/article/iran-north-korea-seen-deepening-nuke-missile-collaboration/.

[194] "Report of the Panel of Experts established pursuant to resolution 1929 (2010)," S/2012/395, 12 June 2012; "Report of the Panel of Experts established pursuant to resolution 1874 (2009)," S/2012/422, 14 June 2012.

In addition to the cases reported by the Panels of Experts, the media have reported other cases, including: China's alleged export of four 16-wheel trucks available for ballistic missile launch vehicles in the summer of 2011, in violation of UNSC Resolution 1874; interdictions in Singapore, South Korea and Malaysia of Iran-bound nuclear-related items from North Korea from 2010 to 2011;[195] and Japan's seizure—with the cooperation of the United States—of North Korean high-strength aluminum, suitable for centrifuges or missiles, bound to Myanmar in August 2012.[196]

Complete prevention of illicit trafficking of WMD, missiles, and their related items is unrealistic, even with strengthened export control systems in place. This is the reason why measures to impede and stop illegal shipment of WMD and related items become necessary, and the United States proposed the Proliferation Security Initiative (PSI) in May 2003. As of November 2012, a total of 102 countries—including 21 member states of the Operational Expert Group (Australia, France, Germany, Japan, South Korea, Russia, the U.K., the U.S. and so on) as well as Israel, Switzerland, Sweden, etc.—have expressed their support for the PSI's principles and objectives and have participated and cooperated in PSI-related activities.[197] The interdiction activities actually carried out in the framework of the PSI are often based on information provided by intelligence; therefore, most of them are classified. However, several cases of attempts to prevent shipments of WMD-related material to North Korea and Iran have been reported. Additionally, participating states have endorsed the PSI statement of interdiction principles and endeavored to reinforce their capabilities to interdict WMD through exercises and outreach activities. Australia, France, Germany, Japan, South Korea, the United Kingdom, the United States, and others have hosted interdiction exercises. In 2012, Japan and the United States each hosted exercises.

(6) Transparency in Peaceful Use of Nuclear Energy

In addition to accepting the IAEA safeguards, as described earlier, a state should aim to be fully transparent about its nuclear-related activities and future plans, in order to demonstrate that it has no intention of developing nuclear weapons. A state that concludes an AP with the IAEA is obliged to provide information on, inter alia, its general plans for

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[195] "Iran-Bound Atomic Components Intercepted: Diplomats," *Global Security Newswire*, March 17, 2011, http://www.nti.org/gsn/article/iran-bound-atomic-components-intercepted-diplomats/; "Seized Sensitive Cargo Was Bound For Iran, Malaysia Says," *Global Security Newswire*, March 17, 2011, http://www.nti.org/gsn/article/seized-sensitive-cargo-was-bound-for-iran-malaysia-says/. China insisted at the US Security Council's Committee on DPRK Sanctions that what had been exported from China to North Korea was "a lumber transport vehicle." (*Kyodo News*, December 1, 2012, http://sankei.jp.msn.com/world/news/121201/kor12120110290001-n1.htm (in Japanese))

[196] "North Korea exports WMD-related material to Myanmar," *Asahi Shimbun*, November 24, 2012 (in Japanese).

[197] Bureau of International Security and Nonproliferation, US Department of State, "Proliferation Security Initiative Participants," November 20, 2012, http://www.state.gov/t/isn/c27732.htm.

the next ten-year period relevant to the development of its nuclear fuel cycle (including nuclear fuel cycle-related R&D activities). Major countries actively promoting the peaceful use of nuclear energy have issued mid- or long-term nuclear development plans, including the construction of nuclear power plants.[198] As part of its effort to be transparent about its nuclear activities, Japan previously published the Long-Term Program for Development and Utilization of Nuclear Energy and has subsequently been issuing the Framework for Nuclear Energy Policy.[199] The international community may be concerned about the possible development of nuclear weapon programs when states conduct nuclear activities without publishing their nuclear development plans (e.g. Israel, North Korea, and Syria) or are engaged in nuclear activities which seem not consistent with their plans, capabilities and technologies (e.g. Iran).

From the standpoint of transparency, the communications received by the IAEA from certain member states concerning their policies regarding the management of plutonium, including the amount of plutonium held in each country, are also important. Using the format of the Guidelines for the Management of Plutonium (INFCIRC/549) agreed in 1997, the 5 NWS, Belgium, Germany, Japan, and Switzerland annually report the amount of civil unirradiated plutonium under their control. By November 2012, Belgium, China, France, Russia, Japan, Switzerland and the UK have declared their civilian plutonium holdings as of 2011. France, Germany and the United Kingdom have reported their holdings of not only civil plutonium but also HEU. In addition, it is worth noting that China reports having 13.8 kg of civilian plutonium in 2011, after having reported zero until 2010.

Australia, Brazil, Iran, South Korea, South Africa and Sweden have published the amount of fissile material holdings or at least have accepted placing their declared nuclear material under IAEA safeguards. From this, it may be concluded that these states have given clear evidence of transparency about their civil nuclear activities.

Finally, publishing the results of nuclear-related research could be considered one of the efforts towards increasing transparency. For example, the numbers of papers presented at the 2012 Institute of Nuclear Materials Management (INMM) Annual Meeting for countries studied in this project were: the United States (299), Japan (34), South Korea (24), Russia (15), the United Kingdom (9), Germany (8), Sweden (6), South Africa (3), Australia

[198] The World Nuclear Association's website (http://world-nuclear.org/) provides summaries of the current and future plans of civil nuclear programs around the world.

[199] Discussion on the formulation of a new Framework for Nuclear Energy Policy was suspended following the Fukushima nuclear power plant accident but resumed in August 2011.

(3), France (2), Israel (2), Brazil (1), and Pakistan (1).[200]

[200] Information courtesy of the Nuclear Material Control Center. The joint studies involving two or more countries are counted as one project under all relevant countries

3. Nuclear Security

A wide range of measures has been proposed and implemented at facility-, state-, and regional/international-levels to address nuclear security and safety concerns. In addition, a meaningful evaluation of nuclear security and safety in a country would require a thorough study of the country's national security and civilian nuclear program. Therefore, for this section of the study, it was decided to focus on such factors as the situation regarding the amount of fissile material usable for weapons, accession to treaties and other international arrangements, and participation in international cooperation efforts.

(1) The Amount of Fissile Material Usable for Weapons

The estimated amount of fissile material usable for weapons in some countries surveyed in this project, based on the International Panel on Fissile Materials (IPFM)'s data, is shown in the following table. More than 90 percent of weapon-grade plutonium and highly enriched uranium (HEU) in the world are held in Russia and the United States.

Having fissile material usable for nuclear weapons increases the levels of both vulnerability and responsibility for a country. In order to perform a relevant evaluation of the security situation in each country, experts believe that the amount of fissile material usable for weapons present in the country and the number of facilities where the material is stored should be examined.

However, a large majority of countries keep this information confidential. In particular, credible data on the number of storage facilities is not available. Therefore, this evaluation used the data published in the Global Fissile Material Report. This annual report, issued by the IPFM, provides updated estimates for global and national stockpiles of HEU and plutonium.

Table 3-1: Stockpiles of Fissile Material Usable for Weapons in 2011 (estimates)

[Metric Tons]	HEU	Stockpile available for weapons	Naval (fresh)	Naval (irradiated)	Civilian Material	Excess (mostly for blend-down)	Weapon Pu.	Military Stockpile	Excess military material	Additional Strategic stockpile	Reactor-grade Pu	Civilian stockpile, stored in country (Dec. 2010)	Civilian stockpile, stored outside country (Dec. 2010)
Russia	737±120	616	20	10	20	71	128±8	88	34	6	48.4	48.4	
U.S.	610	260	130	100	20	100	91.9	38	53.9		0		
France	30.6	26±6			4.6		6±1	6			56	56	
China	16±4	16					1.8±0.5	1.8			0.01		
U.K.	21.2	11.7		8.1	1.4		7.6	3.2	4.4		87.7	86.8	0.9
Pakistan	2.75	2.75±1					0.14	0.14			0		
India	2.0±0.8	2					4.72	0.52		4.2	0.24	0.24	
Israel	0.3	0.3					0.82±0.15	0.82			-		
N. Korea							0.03	0.03			-		
Germany							-				7.6	2	5.6
Japan							-				44.9	9.9	35
Switzerland							-				＜0.05		
Belgium							-				＜0.05		
Others	20				20.2		-				10.7		10.7

Source) International Panel on Fissile Materials, “Global Fissile Material Report 2011: Nuclear Weapons and Fisile Material Stockpile and Production,” International Panel on Fissile Materials, January 2012; Reports of the member countries under the Guidelines for the Management of Plutonium (INFCIRC/549).

(2) Accession to and Participation in Treaties and Other International Frameworks and Incorporating them into the National Implementation System

With the increasing number of countries developing peaceful nuclear programs, universal adherence to conventions and other international arrangements regarding nuclear security and safety, and enactment of relevant national legislation have become more important than ever. In the Final Document of the 2010 Nuclear Non-Proliferation Treaty (NPT) Review Conference (RevCon), states parties were called upon to accede as soon as possible to the Convention on the Physical Protection of Nuclear Material (CPPNM) and its Amendment (Action 42), the International Convention for the Suppression of Acts of Nuclear Terrorism (ICSANT) (Action 45), the Convention on Nuclear Safety (CNS), the Convention on Early Notification of a Nuclear Accident (Early Notification Convention), the Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management (Joint Convention), the Convention on Assistance in the Case of a Nuclear Accident or Radiological Emergency (Assistance Convention) (Action 59), and others. The following table describes the status of all 19 countries surveyed in this project regarding the above-mentioned treaties.

Table 3-2:

The status of accession to the main treaties on nuclear security and nuclear safety

	China	France	Russia	U.S.	U.K.	India	Israel	Pakistan	North Korea	Iran	Syria	Australia	Brazil	Germany	Japan	South Korea	South Africa	Sweden	Switzerland
CPPNM	○	○	○	○	○	○	○	○				○	○	○	○	○	○	○	○
Amendment to CPPNM (Not entered into force)	○		○		○	○	○					○		○				○	○
ICSANT	○	△	○	△	○	○	△					○	○	○	○	△	○	△	○
CNS	○	○	○	○	○	○	△	○				○	○	○	○	○	○	○	○
Early Notification Convention	○	○	○	○	○	○	○	○	△	○	△	○	○	○	○	○	○	○	○
Joint Convention	○	○	○	○	○							○	○	○	○	○	○	○	○
Assistance Convention	○	○	○	○	○	○	○	○		○	△	○	○	○	○	○	○	○	○

[○Ratified △Signed]

For the physical protection of nuclear material and facilities, in July 2005 states parties to the CPPNM adopted by consensus an Amendment to the Convention. Early entry into force of this Amendment to the CPPNM is one of the important agenda items today. Under the Amendment to the CPPNM, a state party is obliged to apply

physical protection measures to, inter alia, nuclear facilities and material in civilian domestic use, storage and transport, in addition to international transport. This Amendment complements the CPPNM, under which physical protection requirements only apply to nuclear material for peaceful use during international transit. The Amendment also obliges states parties to criminalize specified acts, such as sabotage of nuclear material or facilities.

Aside from the above conventions, countries are also called upon to incorporate the International Atomic Energy Agency (IAEA) guidelines into their national implementation systems on physical protection. The first guidelines, the Physical Protection of Nuclear Material (INFCIRC/225/Rev.1), were issued in 1977. Since then, the IAEA has updated this document in a continuous manner. In January 2011 the IAEA published its fifth revision, INFCIRC/225/Rev.5, titled "Nuclear Security Recommendations on Physical Protection of Nuclear Material and Nuclear Facilities."[201] The INFCIRC/225 itself is not a legally binding document. However, when provisions for its implementation are included in domestic legislation, bilateral nuclear cooperation agreements or other international agreements, states parties to these agreements must take required measures, as set forth in the guidelines.

At the 2010 and 2012 Nuclear Security Summit, the 2012 NPT Preparatory Committee (PrepCom) and/or the 2012 IAEA General Conference, countries such as Australia, Brazil, Germany, Japan, South Korea, South Africa, Switzerland and the United States confirmed that they were either considering or preparing the incorporation of INFCIRC/225/Rev.5 into their nuclear security regulations. India stated that it "support[ed] the fifth revision of the recommendations contained in INFCIRC/225.Rev5" at the 2012 Nuclear Security Summit (NSS), although it did not clarify whether its national regulations already reflected the revised guidelines. Regarding the situation of the other countries surveyed in this project, little relevant information was made available. However, as explained later, France, Sweden and the United Kingdom have invited an IAEA International Physical Protection Advisory Service (IPPAS) mission. During an IPPAS mission, the state's physical protection system is reviewed and compared with the CPPNM and international guidelines, including INFCIRC/225/Rev.5. Therefore, it can be reasonably assumed that these states have begun taking measures to apply the INFCIRC/225/Rev.5 domestically.[202]

[201] The INFCIRC/225/Rev.4 was titled, "Physical Protection of Nuclear Material and Nuclear Facilities," to clearly specify that nuclear facilities are subject to physical protection. The INFCIRC/225/Rev.5 was named "Nuclear Security Recommendations (on Physical Protection of Nuclear Material and Nuclear Facilities)" because it was issued under the No. 13 Nuclear Security Series Publication (No. 13).

[202] Based on an interview with a nuclear security expert.

Under the conventions mentioned above, states parties are obliged to establish national implementation measures, such as taking legislative and regulatory measures and setting up regulatory bodies, in order to implement their treaty obligations. Most of the countries studied in this project have already established the national implementation arrangements for those conventions.[203] However, the Nuclear Materials Security Index published by the Nuclear Threat Initiative (NTI) points out that North Korea does not have an independent regulatory agency; Iran, North Korea and Syria do not enact domestic legislation on nuclear material security; and Brazil and Israel have not taken adequate legislative measures.[204] The independence of Japan's Nuclear and Industrial Safety Agency came under scrutiny after the Fukushima nuclear accident. Consequently, in September 2012 a Nuclear Regulatory Commission was established in Japan in an attempt to establish a genuine independent regulatory body, in view of the lessons learned from the accident.

One of the concerns of the international community regarding nuclear security has been the possibility of attacks against nuclear facilities or theft of nuclear weapons and material in Pakistan. Its nuclear weapons related facilities are thought to be located around the tribal area, the main sanctuary for al-Qaida and Taliban fighters in the country. Pakistan has received support from the IAEA to enhance nuclear security on its territory; the United States also may have provided support, particularly for nuclear weapons-related facilities. Foreign Minister Hina Rabbani Khar reaffirmed that Pakistan "ha[d] put in place extensive physical protection measures, [and] robust command and control structures" and ensured safety of its nuclear weapons and facilities by "develop[ing] technical solutions, personnel responsibility programmes, and intelligence capabilities to deal with WMD- (Weapons of Mass Destruction) related terrorism."[205] However, it is not clear what sort of concrete measures Pakistan has taken to ensure security and safety of its nuclear weapons, their related facilities, and material.[206]

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[203] See country profiles of nuclear power programs, including the relevant national implementation systems, in the IAEA homepage. Among the countries surveyed in this project, information is available on Brazil, China, France, Germany, India, Iran, Japan, South Korea, Pakistan, Russia, South Africa, Sweden, Switzerland, Syria, the U.K., and the U.S. IAEA, "Country Nuclear Power Profiles," http://www-pub.iaea.org/MTCD/Publications/PDF/CNPP2011_CD/pages/countryprofiles.htm.

[204] Nuclear Threat Initiative, "NTI Nuclear Materials Security Index: Building a Framework for Assurance, Accountability, and Action," January 2012.

[205] "Pakistan's Nuclear Programme Fully Secure: FM Khar," *Dawn*, 29 September 2012, http://dawn.com/2012/09/29/pakistans-nuclear-programme-fully-secure-fm-khar/.

[206] Regarding Pakistan's activities on nuclear security, 2ee, for example, Pakistan Nuclear Regulatory Authority, "Nuclear Security Action Plan (NSAP),", http://www.pnra.org/nsap.asp.

(3) Efforts to Maintain the Highest Possible Standards of Nuclear Security

In April 2010, the United States hosted the Washington Nuclear Security Summit (NSS), attended by leaders of 47 states. At the NSS, each participating state reaffirmed its commitment to strengthen nuclear security, and concluded with a communiqué and a work plan. The 2010 NPT RevCon, which immediately followed the NSS, also "encourage[d] all States to maintain the highest possible standards of security and physical protection of nuclear materials and facilities" (Action 40).

The second NSS held in Seoul in March 2012 was attended by 53 states that reported the progress made on the commitments of participating states since the first NSS.[207] The Seoul Summit Preparatory Secretariat issued "the Highlights of Achievements and Commitments by Participating States," summarizing the main points reported by the participating states.[208] While measures related to nuclear security are wide-ranging, this report focuses on and outlines efforts taken at the national level to maintain the highest possible standards in nuclear security, for which international cooperation is particularly required.

a) Minimization of HEU for Civilian Purposes

HEU is used not only for military purposes but also for peaceful use in research reactors or isotope production reactors. However, unauthorized access to HEU through theft, smuggling or illicit trafficking would increase the risk of proliferation of nuclear weapons not only by states but also non-state actors. Against this background, the United States established the Global Threat Reduction Initiative (GTRI) in 2004. GTRI's missions include: removing Russian-origin HEU and spent fuel as well as U.S-origin research reactor spent fuel from recipient states; and converting research reactors from using HEU to using low enriched uranium (LEU) fuel. At the 2010 NPT RevCon, states parties were encouraged, "on a voluntary basis, to further minimize highly enriched uranium in civilian stocks and use, where technically and

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[207] See the National Progress Reports in the 2012 NSS homepage under Information on National Progress of NSS Participating States, http://www.thenuclearsecuritysummit.org/eng_media/speeches/speeches_list.jsp.

[208] The Seoul Nuclear Security Summit Preparatory Secretariat, "Highlights of Achievements and Commitments by Participating States as stated in National Progress Reports and National Statements," 2012 Seoul Nuclear Security Summit, March 23-24, 2012, Seoul, http://www.thenuclearsecuritysummit.org/userfiles/Highlights%20of%20the%20Seoul%20Nuclear%20Security%20Summit(120403).pdf. The participating states' efforts are reported in Japan Atomic Energy Agency (JAEA), "Seoul Nuclear Security Summit," *Nuclear Non-proliferation News*, No. 180 (April 27, 2012), http://www.jaea.go.jp/04/np/nnp_news/0180.html (in Japanese). See also Robert Golan-Vilella, Michaelle Marchesano and Sarah Williams, "The 2010 Nuclear Security Summit: A Status Report," An Arms Control Association and Partnership for Global Security Report, April 2011; Michelle Cann, Kelsey Davenport and Margaret Balza, "The 2010 Nuclear Security Summit: Assessment of National Commitments," An Arms Control Association and Partnership for Global Security Report, Updated and Revised March 20, 2012.

economically feasible" (Action 61). The Communiqué of the March 2012 Seoul NSS also states:

> "We encourage States to take measures to minimize the use of HEU, including through the conversion of reactors from highly enriched to low enriched uranium (LEU) fuel, where technically and economically feasible, taking into account the need for assured supplies of medical isotopes, and encourage States in a position to do so, by the end of 2013, to announce voluntary specific actions intended to minimize the use of HEU. We also encourage States to promote the use of LEU fuels and targets in commercial applications such as isotope production, and in this regard, welcome relevant international cooperation on high-density LEU fuel to support the conversion of research and test reactors."

Prior to the Seoul NSS, in January 2012 Austria, Norway and NTI, in cooperation with the IAEA, co-hosted the second International Symposium on HEU Minimization.[209] The summary of the symposium and policy recommendations by the co-hosts were submitted to the 2012 NPT PrepCom as a working paper.[210]

According to the IPFM, under the GTRI, "a total of over 1,240kg of HEU [has been removed] from 24 countries, with 15 of these countries having been cleaned out of all U.S.-origin HEU. Seven countries that were supplied with Soviet-origin HEU had been cleaned out of a total of 980 kg of HEU as of 2011."[211] An National Nuclear Security Administration (NNSA) fact sheet, dated December 11, 2012, highlights that the "GTRI has removed 3,500 kilograms of highly enriched uranium (HEU) and plutonium … and cleaned out 22 countries and areas of all HEU including" Brazil, South Korea and Sweden.[212] It has conducted 57 shipments totaling more than 1,260 kilograms of U.S.-origin HEU, and 50 shipments totaling more than 1,900 kilograms of Russian-origin HEU and plutonium. Returning HEU from Australia, Germany and Japan is also ongoing in the framework of GTRI. Another NNSA fact sheet produced also on December 11, 2012 indicates that, since President Obama delivered his Prague speech in April 2009, GTRI converted to LEU or verified the shutdown of 20 HEU-fueled research reactors in 12 countries (including China, Japan, Russia and the United States).[213] Since the GTRI was launched 2004, it has converted or verified the

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[209] "Summary of the 2nd International Symposium on HEU Minimization," January 25, 2012, http://www.nti.org/analysis/articles/summary-2nd-international-symposium-minimization-highly-enriched-uranium-heu/.

[210] NPT/CONF.2014/PC.I/WP.1, 15 March 2012.

[211] IPFM, p. 12.

[212] National Nuclear Security Administrative, "GTRI: Removing Vulnerable Civilian Nuclear and Radiological Material," Fact Sheet, December 11, 2012, http://nnsa.energy.gov/mediaroom/factsheets/gtri-remove.

[213] National Nuclear Security Administrative, "GTRI: Reducing Nuclear Threats," Fact Sheet, November 7, 2012, http://nnsa.energy.gov/mediaroom/factsheets/reducingthreats.

shutdown of 82 HEU-fueled research reactors.

At the Seoul NSS, participating countries also reported on progress achieved and made a commitment to minimizing the civil use of HEU as follows.

- Australia—Repatriation of surplus stocks of HEU in 2013
- China, Russia and South Africa—Conversion of reactors from HEU to LEU use or assessment of the feasibility of such conversion
- The United States—Conversion of 10.5 tons of HEU to LEU to be used in nuclear power plants; implementation of the Plutonium Management and Disposition Agreement (PMDA) to dispose Russian and U.S. weapons-grade plutonium, as part of their bilateral nuclear weapons reductions; and support for conversion of HEU and HEU fueled nuclear reactors
- Brazil, Israel, etc.—Return of HEU or conversion of their nuclear reactors from the use of HEU to LEU
- France and South Korea—Development of high-density LEU fuel power production technology as an alternative to HEU[214]
- Belgium, France, Netherlands and the United States (in their joint statement)—Minimization of HEU use for producing medical isotope; and support for conversion of all European facilities producing Mo-99 to LEU by 2015[215]

b) Prevention of Illicit Trafficking

Countries with nuclear material need to effectively implement measures ranging from strict controls at both state and facility levels—including nuclear material accounting and control—to the actual detection and prevention of illicit trafficking, in order to detect and prevent illicit trafficking of nuclear material to other states or non-state actors. The Communiqué of the Seoul NSS lists those measures, including: "enhance[ing] technical capabilities in the field of national inspection and detection of nuclear and other radioactive materials at the borders[;] further utilization of legal,

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[214] In March 2012 Belgium, France, South Korea and the U.S. announced their joint development project for "high-density low-enriched uranium (LEU) fuel powder production technology […] as part of an effort to convert research reactors from HEU fuel to LEU fuel." "Joint Statement on Quadrilateral Cooperation on High-density Low-enriched Uranium Fuel Production," March 26, 2012, http://www.whitehouse.gov/the-press-office/2012/03/26/joint-statement-quadrilateral-cooperation-high-density-low-enriched-uran. JAEA has also been developing a "plasma sintering" process which enables production of Mo-99 without using HEU. ("Japan Devises HEU-Free Medical Isotope Production Method," *Global Security Newswire*, November 28, 2012, http://www.nti.org/gsn/article/japan-devises-heu-free-medical-isotope-production-method/)

[215] "Belgium-France-Netherlands-United States Joint Statement: Minimization of HEU and the Reliable Supply of Medical Radioisotopes," March 26, 2012, http://www.whitehouse.gov/the-press-office/2012/03/26/belgium-france-netherlands-united-states-joint-statement-minimization-he.

intelligence and financial tools to effectively prosecute offenses[;] participation in the IAEA Illicit Trafficking Database (ITDB) program[;] provid[ing] necessary information relating to nuclear and other radioactive materials outside of regulatory control[;] and shar[ing] information […] on individuals involved in trafficking offenses of nuclear and other radioactive materials, including through INTERPOL and World Customs Organization."

Since 1995, the IAEA has maintained the ITDB to record and analyze incidents of illicit trafficking and other unauthorized activities involving nuclear and other radioactive material outside regulatory control. As of November 2011, 118 states (including Australia, Brazil, China, France, Germany, India, Iran, Israel, Japan, South Korea, Pakistan, Russia, South Africa, Sweden, Switzerland, the U.K., and the U.S.) participate in the efforts and provide information. According to the IAEA, a total of 2,164 incidents have been reported from 1995 until the end of 2011. In 2011 alone, a total of 147 incidents were reported. The breakdown of incidents in 2011 is as follows:

- 20 incidents of "illegal possession of and attempts to sell nuclear material or radioactive sources";
- 31 incidents of "thefts or losses of radioactive sources"; and
- 96 incidents of "discoveries of uncontrolled material, unauthorized movement or storage of nuclear material, radioactive sources and/or radioactive contaminated material."

Among them, four incidents involved HEU.[216]

Prevention of illicit trafficking is essentially each state's responsibility. However, the United States, more alarmed by nuclear terrorism than any other state, has expanded its efforts across international borders. As part of the Second Line of Defense (SLD) program, Washington "installs radiation detection equipment at borders, airports, and strategic feeder ports in Russia, former Soviet Union States, and other key countries. Approximately 450 sites have been identified to receive detection equipment installations under the Core Program" of the SLD.[217] Radiation detection equipment has been set up at 34 ports in countries such as Israel, Pakistan, South Korea and the United Kingdom, and its installation is in progress at ports in Japan, and some other countries.[218] Furthermore, under the Megaports Initiative of SLD, the United States

[216] IAEA Annual Report 2011, pp. 81-82.

[217] National Nuclear Security Administrative, "Core Program," NNSA homepage, http://nnsa.energy.gov/aboutus/ourprograms/nonproliferation/programoffices/internationalmaterialprotectionandcooperation/-4.

[218] National Nuclear Security Administration, "NNSA's Second Line of Defense Program," Fact Sheet, February 1, 2011, http://nnsa.energy.gov/mediaroom/factsheets/nnsasecondlineofdefenseprogram.

works with partner countries to "enhance detection capabilities for special nuclear and other radioactive materials in containerized cargo transiting the global maritime shipping network."

The United States and Japan have been cooperating in research and development (R&D) on more effective technology for detecting nuclear material. Detection of nuclear material is considered technically more challenging than the detection of radiological material.[219] At the Seoul NSS in March 2012, the United Kingdom also said that it "intend[s] to share cutting edge technology in detecting radiological and nuclear material."[220]

In August 2007 the U.S. Congress passed the so-called 100% scanning law (9/11 Commission Act of 2007) mandating that all containers entering the United States must be scanned at their ports of exit by July 2012, and that any unscanned container would not be allowed to enter the United States. In December 2009 it was announced that the enactment of the legislation was postponed for two years due to delay in developing effective scanning equipment and costs of installing such equipment. The problems still seem unresolved. It is reported that the feasibility of the 100 percent scanning has been questioned not only domestically but by countries abroad such as the EU states.[221]

c) Acceptance of Nuclear Security Review Mission

The International Physical Protection Advisory Service (IPPAS) is one kind of IAEA peer review mission that offers assistance to its member states upon their request. Specifically, it provides peer advice on a state's implementation of the CPPNM, its Amendment, and the IAEA Nuclear Security Recommendations (Nuclear Security Series Publications No. 13 (INFCIRC/225/Rev.5) and No. 14).[222] From 1996 through June 2012, 55 missions have been conducted in 37 countries, including 14 follow-up

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[219] See Jonathan Medalia, "Detection of Nuclear Weapons and Materials: Science, Technologies, Observations," *Congressional Research Service* (June 4, 2010); Bart Elias, "Screening and Securing Air Cargo: Background and Issues for Congress," *CRS Report for Congress*, December 2, 2011, p. 13.

[220] Based on the U.K.'s National Progress Report presented at the Seoul NSS. Then, in November 2012 it was reported that a prototype of the technology was undergoing testing. (Oliver Wright, "Dirty bomb terror threat breakthrough: British scientists build machine to detect smuggling of nuclear materials," *Independent*, 1 November 2012, http://www.independent.co.uk/news/uk/crime/dirty-bomb-terror-threat-breakthrough-british-scientists-build-machine-to-detect-smuggling-of-nuclear-materials-8273751.html.)

[221] Douglas P. Guarino, "Senate Action to Repeal Nuclear Detection Mandate Possible in Lame Duck," *Global Security Newswire*, October 26, 2012, http://www.nti.org/gsn/article/senate-action-repeal-nuclear-detection-mandate-possible-lame-duck/.

[222] See IAEA, "International Physical Protection Advisory Service (IPPAS)," http://www-ns.iaea.org/security/ippas.asp.

missions in 13 countries.[223] France, Sweden and the United Kingdom invited IPPAS missions in 2011,[224] and Australia, Finland, South Korea, Romania and the United States have expressed their intention to accept them. Australia and South Korea each plan to host IPPAS missions in 2013. In addition, the French representative at the 2012 NPT PrepCom indicated that, "in collaboration with the IAEA, France will welcome the first international workshop dedicated to the lessons learnt from this kind of mission" in 2013.[225]

d) IAEA Nuclear Security Plan and Nuclear Security Fund

In March 2002 the IAEA Board of Governors approved the first three-year Nuclear Security Plan as a program to combat the risk of nuclear terrorism through assistance in capacity building, guidance, human resource development, sustainability and risk reduction. The third Nuclear Security Plan covering the period 2010-2013 was approved in August 2009 and has been implemented.[226] Moreover, the IAEA established the Nuclear Security Fund (NSF), a voluntary funding mechanism to prevent, detect, and respond to nuclear terrorism, and has called for member states' contributions.[227]

According to the IAEA Annual Report 2011, 16 states (including China, France, Germany, Japan, South Korea, Sweden, Russia, the U.K. and the U.S.) and the EU made contributions, and revenue to the Nuclear Security Fund amounted to some €18 million in 2011.[228]

e) Technology Development—Nuclear Forensics

Nuclear security-related technologies have been developed for a variety of purposes, such as enhancing physical protection capabilities at nuclear facilities, or during transport, or improving capabilities for detecting nuclear material at borders to prevent smuggling. Among various technologies, focused efforts have been directed towards the development of nuclear forensics. Nuclear forensics, in short, is the technical means for identifying the origin and history of as well as pathway by which

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[223] GOV/2012/41-GC(56)/15, 31 July 2012, p. 8.

[224] "IAEA Annual Report 2011," p. 80.

[225] "Statement by Mr. Jean-Hugues Simon-Michel, Ambassador, Permanent Representative of France to the Conference on Disarmament," Cluster 3, First Session of the Preparatory Committee for the 2015 Nuclear Non-Proliferation Treaty Review Conference, Vienna, 30 April-11 May 2012.

[226] GOV/2009/54-GC(53)/18, 17 August 2009.

[227] The IAEA has an unstable budget situation. Despite its growing role in nuclear security, the Agency is obliged to depend on extrabudgetary contributions, which are not necessarily granted from one year to another.

[228] "IAEA Annual Report 2011," p. 82.

nuclear and radiological materials travelled, based on the interpretation and analysis of those materials, whether intercepted intact or extracted from post-explosion debris. In the Communiqué of the Seoul NSS, participating states "encourage[d] States … to develop and enhance nuclear forensics capabilities… [by] combin[ing] the skills of both traditional and nuclear forensics through the development of a common set of definitions and standards, undertak[ing] research and shar[ing] information and best practices, as appropriate."

The Nuclear Smuggling International Technical Working Group, established in 1996 and renamed the Nuclear Forensics International Technical Working Group (ITWG) in June 2010, continues its activities aimed at developing nuclear forensic-related technologies and methodologies and sharing common measures and techniques. Participating states of the ITWG-15, held in June-July 2010, included Australia, France, Germany, Israel, Japan, South Korea, Pakistan, Sweden, the United Kingdom and the United States In addition to these states, Russia and South Africa participated in the ITWG-16 in June 2011.[229] Besides these efforts, under the IAEA Coordinated Research Project, a research and development project named "Application of Nuclear Forensics in Illicit Trafficking of Nuclear and Other Radioactive Materials," was carried out from May 2008 through June 2012.[230]

The IAEA held an International Workshop on Nuclear Forensics Methodologies in the United States from February 27 to March 6, 2012, in which 13 states, including Brazil, China, Japan, Russia, South Africa, South Korea and the United States, took part.[231] Japan also organized an International Workshop on Nuclear Forensics Following on the Nuclear Security Summit in October 2010, aiming to promote R&A in nuclear forensics.

f) Capacity-Building and Outreach Activities

At the Washington and Seoul NSS, many participating countries reported their activities in establishing or supporting the establishment of Centers of Excellence (COE) for nuclear security training for national or international purposes. Those states include Brazil (Nuclear Security Support Center), China (National Nuclear Security

[229] The summary of the ITWG-16 is found in "16th Annual Meeting of the Nuclear Forensics International Technical Working Group (ITWG), Kyiv, Ukraine, June 14-17, 2011," http://www.pnsp-state.net/File Repository/Documents/ITWG_16.pdf.

[230] IAEA, "Coordinated Research Activities: Annual Report and Statistics for 2011 Supplement," August 2012.

[231] "NNSA, IAEA Offer Nuclear Forensics Training," *Global Security Newswire*, March 9, 2012, http:// www.nti.org/gsn/article/nnsa-iaea-offer-nuclear-forensics-training/.

Technology Center), France (International Institute of Nuclear Energy), India (Global Center for Nuclear Energy Partnership), Japan (Integrated Support Center for Nuclear Nonproliferation and Security under the JAEA), South Korea, Russia (Krasnoyarsk Regional Training Center), South Africa, Pakistan (Nuclear Security Training Center), Switzerland, the United Kingdom (National Nuclear COE)[232], and the United States In addition, countries like France and Sweden stated that they actively support the development of the EU Centers of Excellence on CBRN Risk Mitigation. In spite of these remarkable efforts, some have pointed out the risk of overlap and redundancy if centers with similar objectives are established or planned in the same region without prior coordination. To reduce such duplication and to exchange experts, information as well as training material, in 2012 it was agreed that a global network would be established among the COEs.

International conferences on nuclear security are also a key activity. The schedule of major conferences to be convened in 2012 was announced at the Seoul NSS:

- The United States to host the First International Regulators Conference on Nuclear Security in Washington D.C. in December; and
- Sweden to host the Second INTERPOL Radiological and Nuclear Trafficking and Terrorism Analysis Conference in April

Furthermore, Australia (which hosted an IAEA Regional Workshop on Radiological Crime Scene Management and Introduction to Nuclear Forensics in March 2012), Japan (which is implementing a capacity-building program for nuclear security), and other countries reported their outreach activities at the Seoul NSS. The IAEA will hold an International Conference on Nuclear Security in July 2013.

The third NSS will be held in the Netherlands in March 2014, and preparations are already underway.

g) Participation in International Efforts

In the aftermath of the attacks of September 11, 2001, nuclear terrorism has been perceived as a rapidly growing threat. Many states have acknowledged that international efforts and cooperation are essential to combat nuclear and other weapons of mass destruction (WMD) terrorism. The Cooperative Threat Reduction (CTR) program (also known as the Nunn-Lugar program) was originally launched by the United States, with the main objective of securing and dismantling nuclear

[232] It was disbanded at the end of 2010, following the change in Government.

weapons and other WMD and their delivery vehicles in the former Soviet Union states, in support of the implementation of the U.S.-Soviet (Russian) nuclear arms control treaties. The CTR initiatives—such as the destruction of nuclear warheads, control and disposal of weapons-grade nuclear fissile material, and the employment of scientists and engineers—are also effective in preventing non-state actors from acquiring nuclear weapons or fissile material usable for weapons. Thus, the program is ongoing. However, as the current term of the CTR program expires in spring 2013, Russia said that it would not renew the Russian-U.S. agreement, arguing that Moscow does not need further financial assistance, while stressing the importance of securing state secrets.[233] The United States, France, Germany, Japan and the United Kingdom have joined the project on denuclearization cooperation in the former Soviet Union. Twelve states (including Japan, South Korea and the U.S.) and the European Union (EU) are members of the International Science and Technology Center (ISTC), established for the purpose of "[p]rovid[ing] Russian and CIS former weapons scientists, particularly those with knowledge and skills related to weapons of mass destruction and their delivery systems, opportunities to redirect their talents to peaceful activities," among others.

The G8 Kananaskis Summit in 2002 created a "Global Partnership against the Spread of Weapons and Materials of Mass Destruction" (G8GP). In addition to the G8 member states (including France, Germany, Japan, the U.K., the U.S. and Russia), donor participants (Australia, South Korea, Sweden, Switzerland, etc.) have participated in the G8GP and carried out various projects, in particular denuclearization cooperation in Russia. The membership of the G8GP expanded to 24 states in 2011. The United States is planning to provide $10 billion for G8GP from 2012 to 2022.[234] It provided that amount in 2002 also.

The G8 Summit in St. Petersburg in July 2006 agreed to establish the Global Initiative to Combat Nuclear Terrorism (GICNT), proposed by Russia and the United States. The mission of the GICNT is to strengthen global capacity to prevent, detect, and respond to nuclear terrorism by conducting multilateral activities. The first meeting of the GICNT was held in Morocco in October 2006, where the G8 countries plus Australia, China, Kazakhstan, Morocco, and Turkey adopted the Statement of Principles. Since then, the GICNT has an international partnership of 85 states (including Australia,

[233] "Russia Quits Nunn-Lugar Program," *RIA Novosti*, October 10, 2012, http://en.ria.ru/mlitary_news/20121010/176527879.html.

[234] "Global Partnership Against the Spread of Weapons and Materials of Mass Destruction ('10 Plus 10 Over 10 Program')" NTI, http://www.nti.org/treaties-and-regimes/global-partnership-against-spread-weapons-and-materials-mass-destruction-10-plus-10-over-10-program/.

China, France, Germany, India, Israel, Japan, South Korea, Pakistan, Sweden, Switzerland, the U.K. and the U.S.) and 4 international organizations as official observers.[235]

Table 3-3: Status of participation in international initiatives

	China	France	Russia	U.S.	U.K.	India	Israel	Pakistan	Australia	Germany	Japan	South Korea	Sweden	Switzerland
Denuclearization cooperation project in the former Soviet Union		○		○	○					○	○			
ISTC			○	○							○	○		
G8GP		○	○	○	○					○	○			
GICNT	○	○		○	○	○	○	○	○	○	○	○	○	○

[235] See the U.S. Department of State homepage, http://www.state.gov/t/isn/c37083.htm. As for the GICNT's key multilateral meeting, workshops and exercises, see also the U.S. Department of State homepage, http://www.state.gov/documents/organization/172982.pdf.

Evaluation

—Country-by-country Analysis of Achievements in Nuclear Disarmament, Non-Proliferation and Nuclear Security: 2010-2012—

Introduction

As different sets of criteria apply to different groups of countries, full points differ according to the group each country belongs to.

Full points for each group of countries

Country Groups / Fields	(1) NWS	(2) Non-NPT parties	(3) NNWS	(4) North Korea
	China, France, Russia, The United Kingdom, The United States(5)	India, Israeli, Pakistan(3)	Iran, Syria, Australia, Brazil, Germany, Japan, South Korea, South Africa, Sweden, Switzerland(10)	North Korea
① Nuclear Disarmament	101	98	43	98
② Nonproliferation	44	47	58	58
③ Nuclear Security and Safety	41	41	41	41

Country-by-country summary

Radar charts (pages 110-111) were produced for the NWS to illustrate where each country stands in different aspects of nuclear disarmament. For this purpose the 11 evaluation criteria used for nuclear disarmament evaluation were grouped into 6 aspects; i.e.(1) the number of nuclear weapons, (2) reduction of nuclear weapons, (3) commitment to achieving a "world without nuclear weapons," (4) operational policy, (5) the status of signature and ratification of relevant treaties, and (6) transparency.

【Grouping of the 11 criteria into the 6 Aspects】

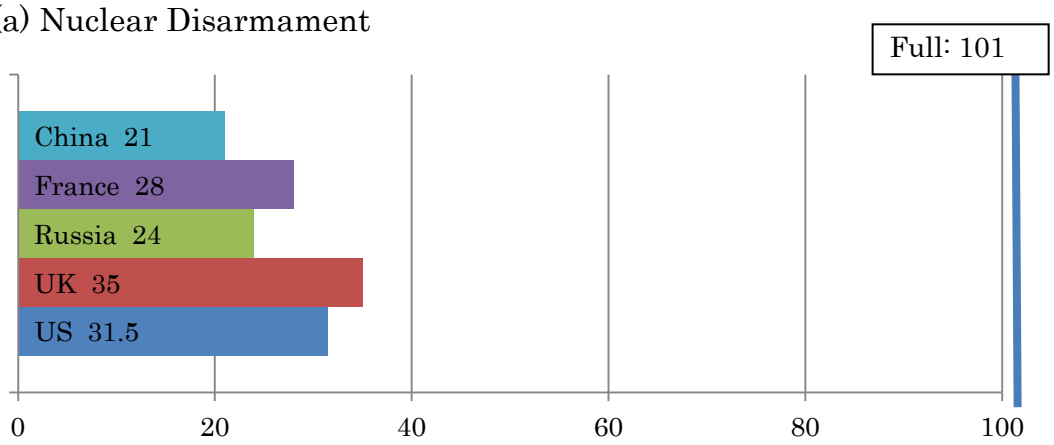
6 Aspects	11 criteria
Number	● The Number of Nuclear weapons
Reductions	● Reductions of Nuclear weapons
Commitments	● Commitments to achieving a world without nuclear weapons
	● Disarmament and non-proliferation educations; ● Cooperation with the civil society

Operational Policy	● Diminishing roles and significance of nuclear weapons in the national security strategies and policies
	● De-alerting, or measures for maximizing decision time to authorize the use of nuclear weapons
Signing and Ratifying	● CTBT
	● FMCT
Transparency	● Transparency regarding nuclear forces, fissile material for nuclear weapons, and nuclear strategy/doctrine
	● Verifications of nuclear weapons reductions
	● Irreversibility

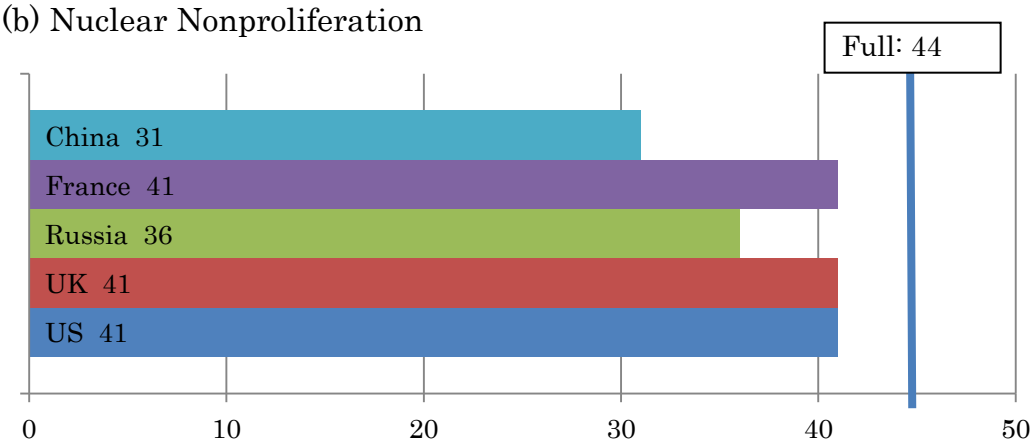
1. Group summary

(1) NWS

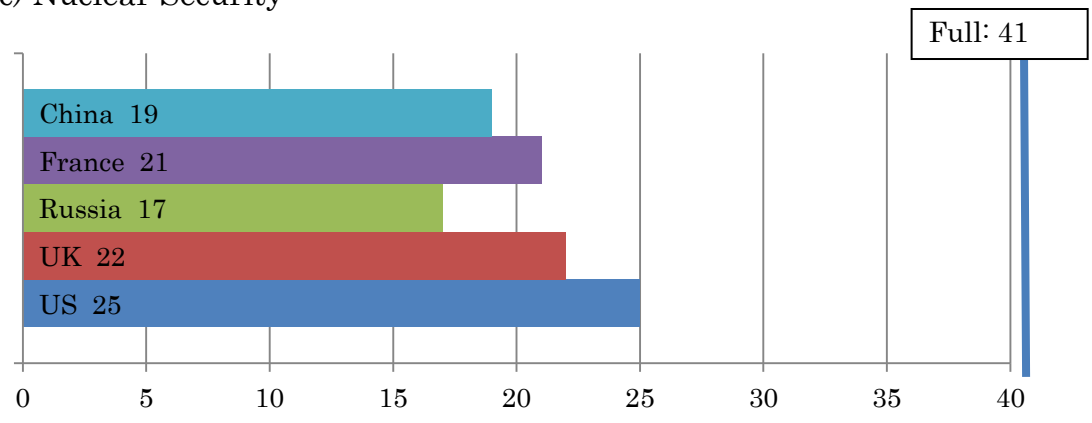
(a) Nuclear Disarmament



(b) Nuclear Nonproliferation

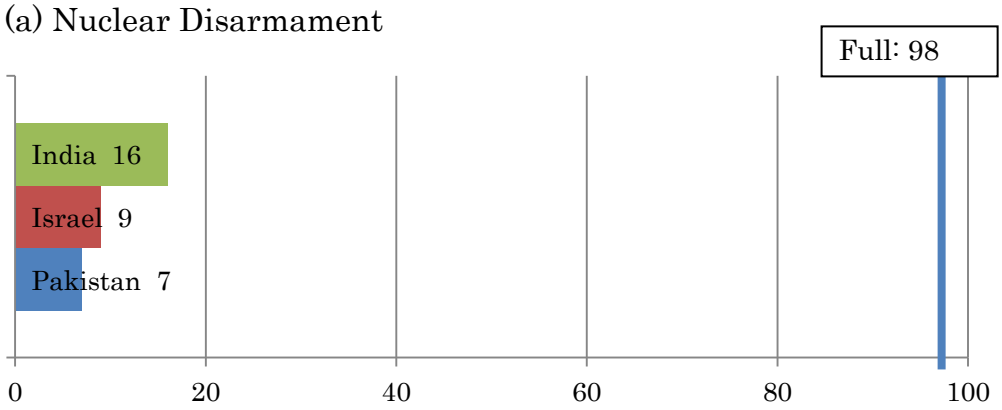


(c) Nuclear Security

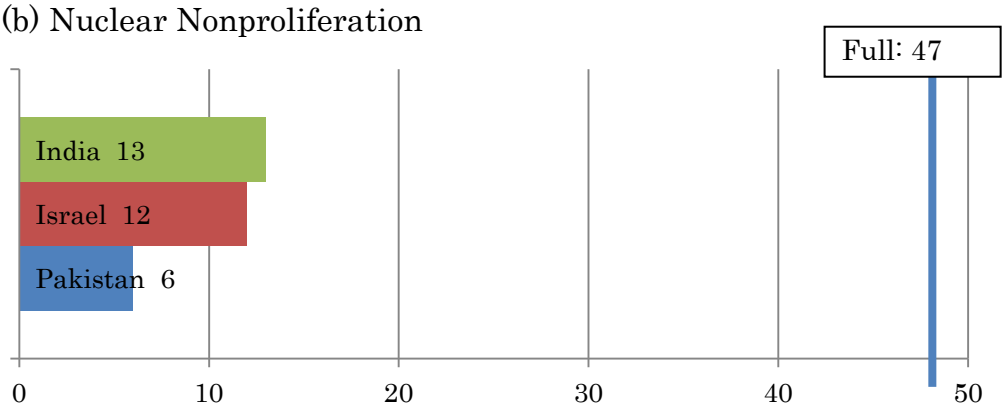


(2) Non-NPT Parties

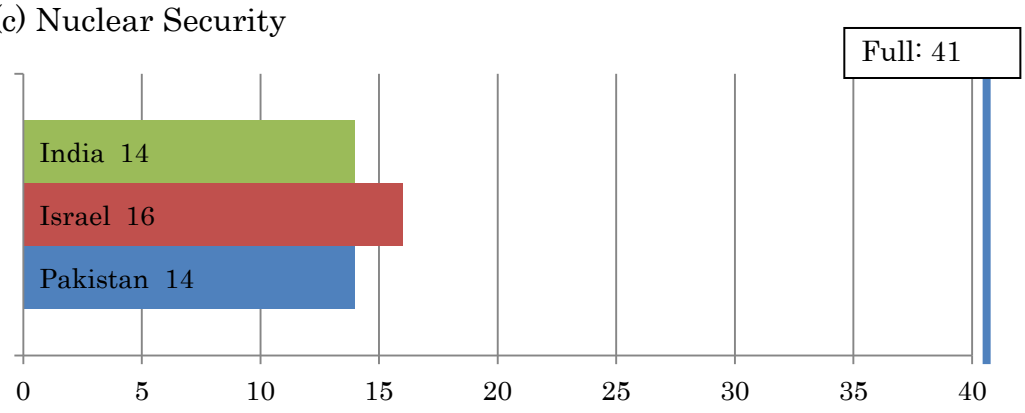
(a) Nuclear Disarmament



(b) Nuclear Nonproliferation

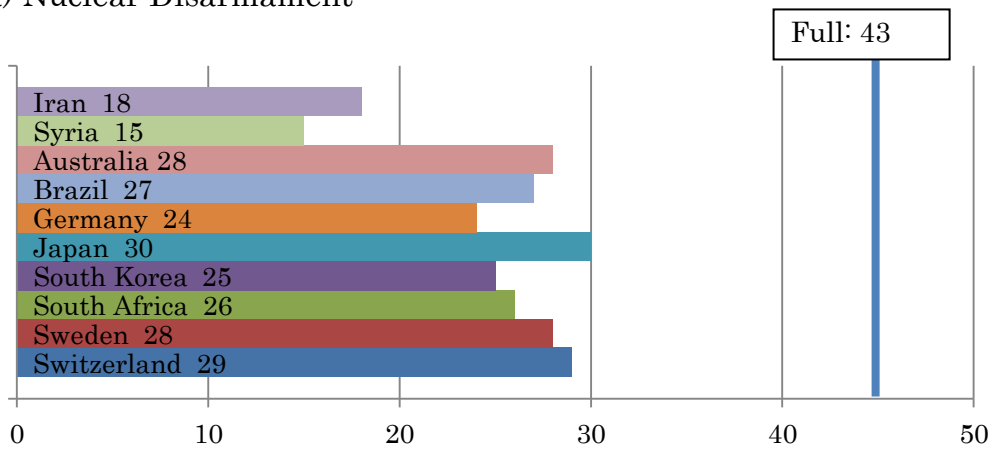


(c) Nuclear Security

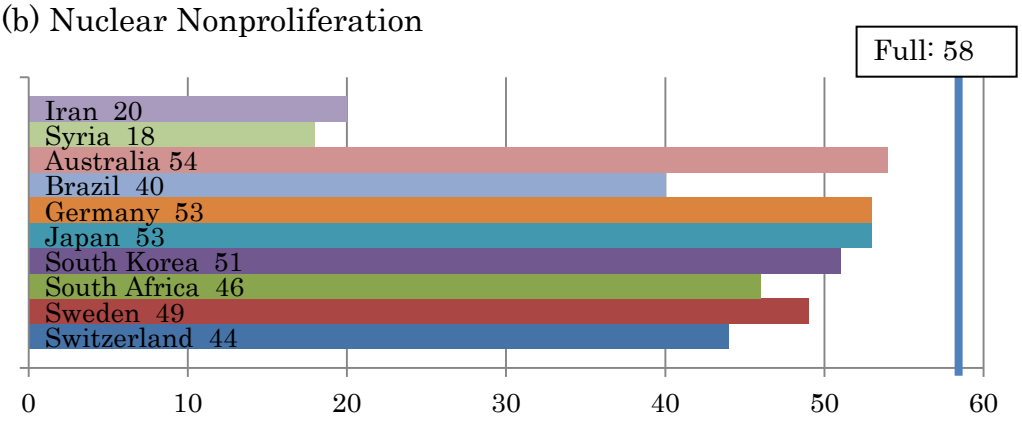


(3) NNWS

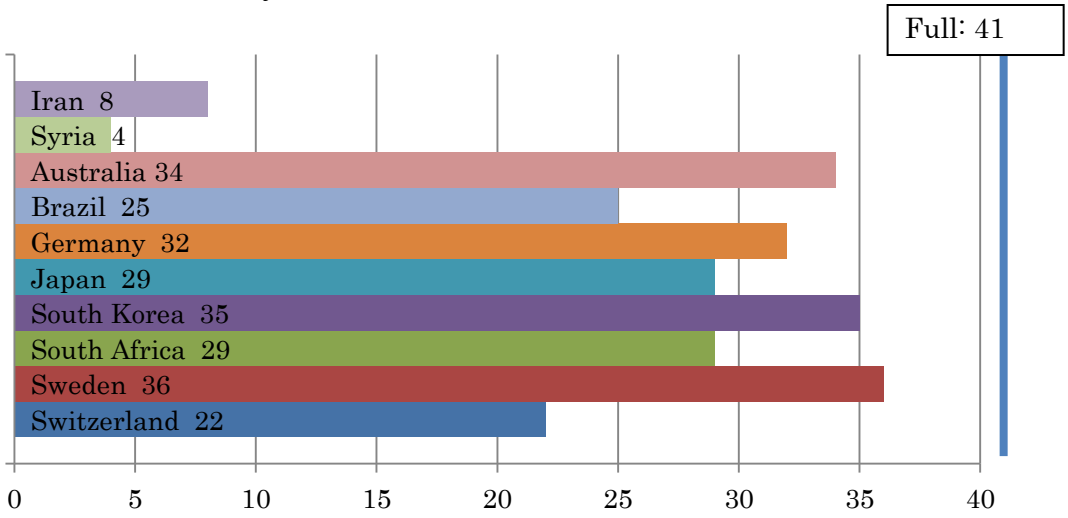
(a) Nuclear Disarmament



(b) Nuclear Nonproliferation



(c) Nuclear Security



2. Country-by-country summary

[Nuclear-Weapon States]

NWS China

China possesses estimated 240 nuclear warheads as of January 2012. While its nuclear forces are far from being comparable to those of the U.S. or Russia, China has made no efforts for their reduction, steadily continues to develop them, and remains non-transparent about their status. China's low rating in nuclear non-proliferation and nuclear security reflects the lack of effectiveness of its export control system and the significant amount of Chinese fissile material usable for nuclear weapons.

Article		Evaluation Criteria		Points
Nuclear Disarmament	The number of nuclear weapons (estimates)		−10/−20	21/101
	Commitment to achieving a world without nuclear weapons	Voting behavior on the UNGA resolutions on nuclear disarmament proposed by Japan, NAC, and NAM.	4/6	
		Voting behavior on the UNGA resolution calling for commencement of negotiations on a Nuclear Weapons Convention	2/2	
		Announcement of significant policies and important activities, such as, holding major conference	0/3	
	Reduction of nuclear weapons	Reduction of nuclear weapons in the past 5 years	0/15	
		A concrete plan for further reduction of nuclear weapons	0/3	
		Trends in strengthening/modernizing nuclear weapons capabilities	2/4	
	Diminishing the role and significance of nuclear weapons in the national security strategies and policies	The current status of the roles and significance of nuclear weapons in the national security strategies and policies, as well as military alliance	1/8	
		Commitment to the "sole purpose," no first use, and related doctrines	3/3	
		Negative security assurances	2/2	
		Signing and ratifying the protocols of the treaties on nuclear-weapon-free zones	3/3	
	De-alerting or measures for maximizing decision time to authorize the use of nuclear weapons		3/4	
	CTBT	Signing and ratifying the CTBT	2/4	

Nuclear Disarmament		The moratorium on nuclear test explosions pending CTBT's entry into force	2/3	
		Cooperation with the CTBTO Preparatory Commission: contributions to the Commission and active participation in its meeting and other activities	1/2	
		Contribution to the development of the CTBT verification systems (IMS, OSI, and other verification technologies)	1/2	
		Nuclear Testing	2/3	
	FMCT	Commitment, efforts, and proposals toward immediate commencement of negotiations on an FMCT	1/5	
		Moratorium on the production of fissile material for use in nuclear weapons	1/3	
		Contribution to the development of verification measures, including research and development	0/2	
	Transparency regarding nuclear forces, fissile material for nuclear weapons, and nuclear strategy/doctrine		1/6	
	Verification of nuclear weapons reduction	Acceptance and implementation of verification of nuclear weapons reduction	0/3	
		Engagement in research and development for verification measures of nuclear weapons reduction	0/1	
		The IAEA inspections of fissile material declared as no longer required for military purposes	0/3	
	Irreversibility	Implementing or planning dismantlement of nuclear warheads and their delivery vehicles	0/3	
		Decommissioning/conversion of nuclear weapons-related facilities	0/2	
		Measures for the fissile material declared excess for military purposes, such as disposition or conversion to peaceful purposes	0/2	
	Disarmament and non-proliferation education and cooperation with civil society		0/4	

	Non-proliferation commitment	Accession to the NPT	10/10	31/44
		Compliance with Article 1 and 2 of the NPT and the UNSC Resolutions on Non-Proliferation	7/7	

Nuclear Non-proliferation		Establishment of the Nuclear-Weapon-Free Zones	-	
	IAEA Safeguards (Applicable to the NWS and Non-Parties to the NPT)	Application of the IAEA safeguards (VOA or INFCIRC/66) to Their Peaceful Nuclear Facilities	3/3	
		Signing, ratifying, and implementing an Additional Protocol	3/4	
	Cooperation with the IAEA	Efforts for strengthening the safeguards (e.g. development of the safeguards technology and promotion of the universality of the Additional Protocol)	1/3	
		Extrabudgetary contributions to the IAEA	0/1	
	Nuclear Export Controls	Establishment and implementation of the national implementation system	3/5	
		Requiring the Conclusion of the AP for Nuclear Export	0/2	
		Implementation of the USSCR on North Korean and Iranian nuclear issues	1/3	
		Participation in the PSI	0/2	
	Transparency in the peaceful use of nuclear energy	Reporting on the peaceful nuclear activities	2/2	
		Reporting on plutonium management	1/2	

Nuclear Security	The amount of fissile material usable for nuclear weapons		－9/－16	19/41
	Accession to and Participation in Treaties and Other International Frameworks and Application to the National Implementation System	Convention on the Physical Protection of Nuclear Material and the 2005 Amendment to the Convention	3/3	
		International Convention for the Suppression of Acts of Nuclear Terrorism	2/2	
		Convention on Nuclear Safety	2/2	
		Convention on Early Notification of a Nuclear Accident	2/2	
		Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management	2/2	
		Convention on Assistance in Case of a Nuclear Accident or Radiological Emergency	2/2	
		Nuclear Security Recommendations on Physical Protection of Nuclear Material and Nuclear Facilities (INFCIRC/225/Rev.5)	0/4	
		Enactment of laws and establishment of regulations for national implementation	4/4	
	Efforts to maintain the highest possible	Efforts for further minimization of HEU for peaceful purposes	3/4	

Nuclear Security	standards of nuclear security/safety	Implementing measures (detection, deterrence, disruption, effective domestic control) for preventing illicit trafficking in nuclear materials throughout their territories	4/5	
		Acceptance of the IAEA nuclear security review missions	0/2	
		The IAEA Nuclear Security Plan and Nuclear Security Fund	2/2	
		Technology Development--Nuclear Forensics	0/2	
		Capacity-building and Outreach activities	1/2	
		Participation in initiatives such as CTR, G8 Global Partnership, GICNT, ISTC and Nuclear Security Summits	1/3	

NWS France

France has about 300 nuclear warheads as of January 2012. While having reduced its nuclear stockpile, France has maintained the level required for nuclear deterrence by promoting efficiency at the operational level. Its large stockpile of weapons-grade fissile material has lowered its points in nuclear security. France's effective export control system, compliance with the IAEA verification system, and commitments to other components of the non-proliferation regime have raised its points in nuclear non-proliferation.

Article		Evaluation Criteria		Points
Nuclear Disarmament	The number of nuclear weapons (estimates)		−10/−20	28/101
	Commitment to achieving a world without nuclear weapons	Voting behavior on the UNGA resolutions on nuclear disarmament proposed by Japan, NAC, and NAM, respectively.	2/6	
		Voting behavior on the UNGA resolution calling for commencement of negotiations on a Nuclear Weapons Convention	0/2	
		Announcement of significant policies and important activities, such as, holding major conference	0/3	
	Reduction of nuclear weapons	Reduction of nuclear weapons in the past 5 years	2/15	
		A concrete plan for further reduction of nuclear weapons	0/3	
		Trends in strengthening/modernizing nuclear weapons capabilities	3/4	
	Diminishing the role and significance of nuclear weapons in the national security strategies and policies	The current status of the roles and significance of nuclear weapons in the national security strategies and policies, as well as military alliance	1/8	
		Commitment to the "sole purpose," no first use, and related doctrines	0/3	
		Negative security assurances	1/2	
		Signing and ratifying the protocols of the treaties on nuclear-weapon-free zones	3/3	
	De-alerting or measures for maximizing decision time to authorize the use of nuclear weapons		2/4	
	CTBT	Signing and ratifying the CTBT	4/4	
		The moratorium on nuclear test explosions pending	3/3	

Nuclear Disarmament		CTBT's entry into force		
		Cooperation with the CTBTO Preparatory Commission: contributions to the Commission and active participation in its meeting and other activities	2/2	
		Contribution to the development of the CTBT verification systems (IMS, OSI, and other verification technologies)	2/2	
		Nuclear Testing	2/3	
	FMCT	Commitment, efforts, and proposals toward immediate commencement of negotiations on an FMCT	3/5	
		Moratorium on the production of fissile material for use in nuclear weapons	2/3	
		Contribution to the development of verification measures, including research and development	1/2	
	Transparency regarding nuclear forces, fissile material for nuclear weapons, and nuclear strategy/doctrine		2/6	
	Verifications of nuclear weapons reductions	Acceptance and implementation of verification for nuclear weapons reduction	0/3	
		Engagement in research and development for verification measures of nuclear weapons reduction	0/1	
		The IAEA inspections to fissile material declared as no longer required for military purposes	0/3	
	Irreversibility	Implementing or planning dismantlement of nuclear warheads and their delivery vehicles	1/3	
		Decommissioning/conversion of nuclear weapons-related facilities	1/2	
		Measures for the fissile material declared excess for military purposes, such as disposition or conversion to peaceful purposes	0/2	
	Disarmament and non-proliferation educations and cooperation with civil society		1/4	

	Non-proliferation commitment	Accession to the NPT	10/10	41/44
		Compliance with Article 1 and 2 of the NPT and the UNSC Resolutions on Non-Proliferation	7/7	

Nuclear Non-proliferation		Establishment of the Nuclear-Weapon-Free Zones	-	
	IAEA Safeguards (Applicable to the NWS and Non-Parties to the NPT)	Application of the IAEA safeguards (VOA or INFCIRC/66) to Their Peaceful Nuclear in Facilities	3/3	
		Signing, ratifying, and implementing an Additional Protocol	3/4	
	Cooperation with the IAEA	Efforts for strengthening the safeguards (e.g. development of the safeguards technology and promotion of the universality of the Additional Protocol)	3/3	
		Extrabudgetary contributions to the IAEA	1/1	
	Nuclear Export Controls	Establishment and implementation of the national implementation system	5/5	
		Requiring the Conclusion of the AP for Nuclear Export	0/2	
		Implementation of the USSCR on North Korean and Iranian nuclear issues	3/3	
		Participation in the PSI	2/2	
	Transparency in the peaceful use of nuclear energy	Reporting on the peaceful nuclear activities	2/2	
		Reporting on plutonium management	2/2	

Nuclear Security	The amount of fissile material usable for nuclear weapons		−12/−16	21/41
	Accession to and Participation in Treaties and Other International Frameworks and Application to the National Implementation System	Convention on the Physical Protection of Nuclear Material and the 2005 Amendment to the Convention	2/3	
		International Convention for the Suppression of Acts of Nuclear Terrorism	1/2	
		Convention on Nuclear Safety	2/2	
		Convention on Early Notification of a Nuclear Accident	2/2	
		Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management	2/2	
		Convention on Assistance in Case of a Nuclear Accident or Radiological Emergency	2/2	
		Nuclear Security Recommendations on Physical Protection of Nuclear Material and Nuclear Facilities (INFCIRC/225/Rev.5)	2/4	
		Enactment of laws and establishment of regulations for national implementation	1/4	
	Efforts to maintain the highest possible	Efforts for further minimization of HEU for peaceful purposes	4/4	

Nuclear Security	standards of nuclear security/safety	Implementing measures (detection, deterrence, disruption, effective domestic control) for preventing illicit trafficking in nuclear materials throughout their territories	4/5	
		Acceptance of the IAEA nuclear security review missions	2/2	
		The IAEA Nuclear Security Plan and Nuclear Security Fund	2/2	
		Technology Development--Nuclear Forensics	2/2	
		Capacity-building and Outreach activities	2/2	
		Participation in initiatives such as CTR, G8 Global Partnership, GICNT, ISTC and Nuclear Security Summits	3/3	

NWS Russia

With roughly 10,000 nuclear warheads as of January 2012, Russia is the NWS with the largest nuclear arsenal. Russia has been implementing its obligation to reduce its nuclear stockpile under New START. However, Russia is developing missiles with greater capabilities for missile defense penetration in response to the development of the U.S-North Atlantic Treaty Organization (NATO) missile defense system. Russia received high points in nuclear non-proliferation for its commitment to non-proliferation. The state's low rating in nuclear security is due to its large stockpile of fissile material usable for nuclear weapons.

Article		Evaluation Criteria		Points
Nuclear Disarmament	The number of nuclear weapons (estimates)		−20/−20	24/101
	Commitment to achieving a world without nuclear weapons	Voting behavior on the UNGA resolutions on nuclear disarmament proposed by Japan, NAC, and NAM, respectively.	3/6	
		Voting behavior on the UNGA resolution calling for commencement of negotiations on a Nuclear Weapons Convention	0/2	
		Announcement of significant policies and important activities, such as, holding major conference	0/3	
	Reduction of nuclear weapons	Reduction of nuclear weapons in the past 5 years	5/15	
		A concrete plan for further reduction of nuclear weapons	0/3	
		Trends in strengthening/modernizing nuclear weapons capabilities	3/4	
	Diminishing the role and significance of nuclear weapons in the national security strategies and policies	The current status of the roles and significance of nuclear weapons in the national security strategies and policies, as well as military alliance	1/8	
		Commitment to the "sole purpose," no first use, and related doctrines	0/3	
		Negative security assurances	1/2	
		Signing and ratifying the protocols of the treaties on nuclear-weapon-free zones	2/3	
	De-alerting or measures for maximizing decision time to authorize the use of nuclear weapons		1/4	
	CTBT	Signing and ratifying the CTBT	4/4	

Nuclear Disarmament		The moratorium on nuclear test explosions pending CTBT's entry into force	2/3	
		Cooperation with the CTBTO Preparatory Commission: contributions to the Commission and active participation in its meeting and other activities	2/2	
		Contribution to the development of the CTBT verification systems (IMS, OSI, and other verification technologies)	2/2	
		Nuclear Testing	2/3	
	FMCT	Commitment, efforts, and proposals toward immediate commencement of negotiations on an FMCT	1/5	
		Moratorium on the production of fissile material for use in nuclear weapons	3/3	
		Contribution to the development of verification measures, including research and development	0/2	
	Transparency regarding nuclear forces, fissile material for nuclear weapons, and nuclear strategy/doctrine		2/6	
	Verifications of nuclear weapons reductions	Acceptance and implementation of verification for nuclear weapons reduction	3/3	
		Engagement in research and development for verification measures of nuclear weapons reduction	0/1	
		The IAEA inspections to fissile material declared as no longer required for military purposes	0/3	
	Irreversibility	Implementing or planning dismantlement of nuclear warheads and their delivery vehicles	3/3	
		Decommissioning/conversion of nuclear weapons-related facilities	1/2	
		Measures for the fissile material declared excess for military purposes, such as disposition or conversion to peaceful purposes	2/2	
	Disarmament and non-proliferation educations and cooperation with civil society		1/4	

	Non-proliferation commitment	Accession to the NPT	10/10	36/44
		Compliance with Article 1 and 2 of the NPT and the UNSC Resolutions on Non-Proliferation	7/7	

Nuclear Non-proliferation		Establishment of the Nuclear-Weapon-Free Zones	-	
	IAEA Safeguards (Applicable to the NWS and Non-Parties to the NPT)	Application of the IAEA safeguards (VOA or INFCIRC/66) to Their Peaceful Nuclear in Facilities	3/3	
		Signing, ratifying, and implementing an Additional Protocol	3/4	
	Cooperation with the IAEA	Efforts for strengthening the safeguards (e.g. development of the safeguards technology and promotion of the universality of the Additional Protocol)	1/3	
		Extrabudgetary contributions to the IAEA	1/1	
	Nuclear Export Controls	Establishment and implementation of the national implementation system	4/5	
		Requiring the Conclusion of the AP for Nuclear Export	0/2	
		Implementation of the USSCR on North Korean and Iranian nuclear issues	2/3	
		Participation in the PSI	2/2	
	Transparency in the peaceful use of nuclear energy	Reporting on the peaceful nuclear activities	2/2	
		Reporting on plutonium management	1/2	

Nuclear Security	The amount of fissile material usable for nuclear weapons		−16/−16	17/41
	Accession to and Participation in Treaties and Other International Frameworks and Application to the National Implementation System	Convention on the Physical Protection of Nuclear Material and the 2005 Amendment to the Convention	3/3	
		International Convention for the Suppression of Acts of Nuclear Terrorism	2/2	
		Convention on Nuclear Safety	2/2	
		Convention on Early Notification of a Nuclear Accident	2/2	
		Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management	2/2	
		Convention on Assistance in Case of a Nuclear Accident or Radiological Emergency	2/2	
		Nuclear Security Recommendations on Physical Protection of Nuclear Material and Nuclear Facilities (INFCIRC/225/Rev.5)	0/4	
		Enactment of laws and establishment of regulations for national implementation	4/4	
	Effors to maintain the highest possible	Efforts for further minimization of HEU for peaceful purposes	4/4	

Nuclear Security	standards of nuclear security/safety	Implementing measures (detection, deterrence, disruption, effective domestic control) for preventing illicit trafficking in nuclear materials throughout their territories	4/5	
		Acceptance of the IAEA nuclear security review missions	0/2	
		The IAEA Nuclear Security Plan and Nuclear Security Fund	2/2	
		Technology Development--Nuclear Forensics	2/2	
		Capacity-building and Outreach activities	1/2	
		Participation in initiatives such as CTR, G8 Global Partnership, GICNT, ISTC and Nuclear Security Summits	3/3	

NWS The United Kingdom

The United Kingdom (UK) possesses about 225 nuclear warheads as of January 2012. The UK has not only cut back the number of weapons, but has also limited its nuclear weapon delivery systems to Submarine Launched Ballistic Missiles (SLBM). The UK has a policy of further reducing its nuclear forces. The UK has thus scored well under all criteria in nuclear disarmament, including with respect to the number and reduction of nuclear weapons, achieving the highest rating in this area among states possessing nuclear weapons. Furthermore, its commitment to the non-proliferation regime, support to the IAEA safeguards, and effective export control system have raised the UK's points in nuclear non-proliferation. We have also positively rated the UK in nuclear security, based on the low amount of weapons-grade fissile material present in the state and its active participation in various initiatives in this area.

Article		Evaluation criteria		Points
Nuclear Disarmament	The number of nuclear weapons (estimates)		−10/−20	35/101
	Commitment to achieving a world without nuclear weapons	Voting behavior on the UNGA resolutions on nuclear disarmament proposed by Japan, NAC, and NAM, respectively.	2/6	
		Voting behavior on the UNGA resolution calling for commencement of negotiations on a Nuclear Weapons Convention	0/2	
		Announcement of significant policies and important activities, such as, holding major conference	0/3	
	Reduction of nuclear weapons	Reduction of nuclear weapons in the past 5 years	4/15	
		A concrete plan for further reduction of nuclear weapons	0/3	
		Trends in strengthening/modernizing nuclear weapons capabilities	3/4	
	Diminishing the role and significance of nuclear weapons in the national security strategies and policies	The current status of the roles and significance of nuclear weapons in the national security strategies and policies, as well as military alliance	1/8	
		Commitment to the "sole purpose," no first use, and related doctrines	0/3	
		Negative security assurances	1/2	
		Signing and ratifying the protocols of the treaties on nuclear-weapon-free zones	3/3	
	De-alerting or measures for maximizing decision time to authorize the use of nuclear		2/4	

Nuclear Disarmament	weapons			
	CTBT	Signing and ratifying the CTBT	4/4	
		The moratorium on nuclear test explosions pending CTBT's entry into force	2/3	
		Cooperation with the CTBTO Preparatory Commission: contributions to the Commission and active participation in its meeting and other activities	1/2	
		Contribution to the development of the CTBT verification systems (IMS, OSI, and other verification technologies)	2/2	
		Nuclear Testing	2/3	
	FMCT	Commitment, efforts, and proposals toward immediate commencement of negotiations on an FMCT	3/5	
		Moratorium on the production of fissile material for use in nuclear weapons	2/3	
		Contribution to the development of verification measures, including research and development	1/2	
	Transparency regarding nuclear forces, fissile material for nuclear weapons, and nuclear strategy/doctrine		5/6	
	Verifications of nuclear weapons reductions	Acceptance and implementation of verification for nuclear weapons reduction	0/3	
		Engagement in research and development for verification measures of nuclear weapons reduction	1/1	
		The IAEA inspections to fissile material declared as no longer required for military purposes	1/3	
	Irreversibility	Implementing or planning dismantlement of nuclear warheads and their delivery vehicles	1/3	
		Decommissioning/conversion of nuclear weapons-related facilities	1/2	
		Measures for the fissile material declared excess for military purposes, such as disposition or conversion to peaceful purposes	1/2	
	Disarmament and non-proliferation educations and cooperation with civil society		2/4	

	Non-proliferation	Accession to the NPT	10/10	41/44

Nuclear Non-proliferation	commitment	Compliance with Article 1 and 2 of the NPT and the UNSC Resolutions on Non-Proliferation	7/7	
		Establishment of the Nuclear-Weapon-Free Zones	-	
	IAEA Safeguards (Applicable to the NWS and Non-Parties to the NPT)	Application of the IAEA safeguards (VOA or INFCIRC/66) to Their Peaceful Nuclear in Facilities	3/3	
		Signing, ratifying, and implementing an Additional Protocol	3/4	
	Cooperation with the IAEA	Efforts for strengthening the safeguards (e.g. development of the safeguards technology and promotion of the universality of the Additional Protocol)	3/3	
		Extrabudgetary contributions to the IAEA	1/1	
	Nuclear Export Controls	Establishment and implementation of the national implementation system	5/5	
		Requiring the Conclusion of the AP for Nuclear Export	0/2	
		Implementation of the USSCR on North Korean and Iranian nuclear issues	3/3	
		Participation in the PSI	2/2	
	Transparency in the peaceful use of nuclear energy	Reporting on the peaceful nuclear activities	2/2	
		Reporting on plutonium management	2/2	

Nuclear Security	The amount of fissile material usable for nuclear weapons		−12/−16	22/41
	Accession to and Participation in Treaties and Other International Frameworks and Application to the National Implementation System	Convention on the Physical Protection of Nuclear Material and the 2005 Amendment to the Convention	3/3	
		International Convention for the Suppression of Acts of Nuclear Terrorism	2/2	
		Convention on Nuclear Safety	2/2	
		Convention on Early Notification of a Nuclear Accident	2/2	
		Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management	2/2	
		Convention on Assistance in Case of a Nuclear Accident or Radiological Emergency	2/2	
		Nuclear Security Recommendations on Physical Protection of Nuclear Material and Nuclear Facilities (INFCIRC/225/Rev.5)	2/4	
		Enactment of laws and establishment of regulations for national implementation	4/4	
	Efforts to maintain	Efforts for further minimization of HEU for peaceful	0/4	

Nuclear Security	the highest possible standards of nuclear security/safety	purposes		
		Implementing measures (detection, deterrence, disruption, effective domestic control) for preventing illicit trafficking in nuclear materials throughout their territories	4/5	
		Acceptance of the IAEA nuclear security review missions	2/2	
		The IAEA Nuclear Security Plan and Nuclear Security Fund	2/2	
		Technology Development--Nuclear Forensics	2/2	
		Capacity-building and Outreach activities	2/2	
		Participation in initiatives such as CTR, G8 Global Partnership, GICNT, ISTC and Nuclear Security Summits	3/3	

NWS The United States

The United States (US), with a total inventory of about 8,000 warheads, has the second largest nuclear arsenal in the world as of January 2012. The US has been reducing its strategic nuclear forces as required by the new START treaty. While expressing its intention for further reduction, the US assigns significant resources for maintaining the safety and reliability of its nuclear stockpiles and modernizing its nuclear weapons-infrastructure. Moreover, the US maintains its R&D program for the modernization of its nuclear strategic delivery systems. Thus, the US' effort in nuclear disarmament has dual aspects. Because of its good records regarding its support to the non-proliferation regime and the IAEA, the reliability of its export control system, as well as its active involvement in the Global Threat Reduction Initiative (GTRI) and initiative for hosting the first Nuclear Security Summit in April 2010, the US received high points in nuclear non-proliferation and nuclear security fields.

Articles		Evaluation criteria		Points
Nuclear Disarmament	The number of nuclear weapons (estimates)		−19/−20	31.5/101
	Commitment to achieving a world without nuclear weapons	Voting behavior on the UNGA resolutions on nuclear disarmament proposed by Japan, NAC, and NAM, respectively.	2/6	
		Voting behavior on the UNGA resolution calling for commencement of negotiations on a Nuclear Weapons Convention	0/2	
		Announcement of significant policies and important activities, such as, holding major conference	1/3	
	Reduction of nuclear weapons	Reduction of nuclear weapons in the past 5 years	5/15	
		A concrete plan for further reduction of nuclear weapons	1/3	
		Trends in strengthening/modernizing nuclear weapons capabilities	3/4	
	Diminishing the role and significance of nuclear weapons in the national security strategies and policies	The current status of the roles and significance of nuclear weapons in the national security strategies and policies, as well as military alliance	1/8	
		Commitment to the "sole purpose," no first use, and related doctrines	2/3	
		Negative security assurances	1/2	
		Signing and ratifying the protocols of the treaties on nuclear-weapon-free zones	1/3	
	De-alerting or measures for maximizing decision time to authorize the use		1/4	

Nuclear Disarmament	of nuclear weapons			
	CTBT	Signing and ratifying the CTBT	2/4	
		The moratorium on nuclear test explosions pending CTBT's entry into force	2/3	
		Cooperation with the CTBTO Preparatory Commission: contributions to the Commission and active participation in its meeting and other activities	0.5/2	
		Contribution to the development of the CTBT verification systems (IMS, OSI, and other verification technologies)	2/2	
		Nuclear Testing	2/3	
	FMCT	Commitment, efforts, and proposals toward immediate commencement of negotiations on an FMCT	3/5	
		Moratorium on the production of fissile material for use in nuclear weapons	2/3	
		Contribution to the development of verification measures, including research and development	1/2	
	Transparency regarding nuclear forces, fissile material for nuclear weapons, and nuclear strategy/doctrine		5/6	
	Verifications of nuclear weapons reductions	Acceptance and implementation of verification for nuclear weapons reduction	3/3	
		Engagement in research and development for verification measures of nuclear weapons reduction	1/1	
		The IAEA inspections to fissile material declared as no longer required for military purposes	1/3	
	Irreversibility	Implementing or planning dismantlement of nuclear warheads and their delivery vehicles	3/3	
		Decommissioning/conversion of nuclear weapons-related facilities	1/2	
		Measures for the fissile material declared excess for military purposes, such as disposition or conversion to peaceful purposes	2/2	
	Disarmament and non-proliferation educations and cooperation with civil society		2/4	

Nuclear Non-proliferation	Non-proliferation commitment	Accession to the NPT	10/10	41/44
		Compliance with Article 1 and 2 of the NPT and the UNSC Resolutions on Non-Proliferation	7/7	
		Establishment of the Nuclear-Weapon-Free Zones		
	IAEA Safeguards (Applicable to the NWS and Non-Parties to the NPT)	Application of the IAEA safeguards (VOA or INFCIRC/66) to Their Peaceful Nuclear in Facilities	3/3	
		Signing, ratifying, and implementing an Additional Protocol	3/4	
	Cooperation with the IAEA	Efforts for strengthening the safeguards (e.g. development of the safeguards technology and promotion of the universality of the Additional Protocol)	3/3	
		Extrabudgetary contributions to the IAEA	1/1	
	Nuclear Export Controls	Establishment and implementation of the national implementation system	5/5	
		Requiring the Conclusion of the AP for Nuclear Export	1/2	
		Implementation of the USSCR on North Korean and Iranian nuclear issues	3/3	
		Participation in the PSI	2/2	
	Transparency in the peaceful use of nuclear energy	Reporting on the peaceful nuclear activities	2/2	
		Reporting on plutonium management	1/2	

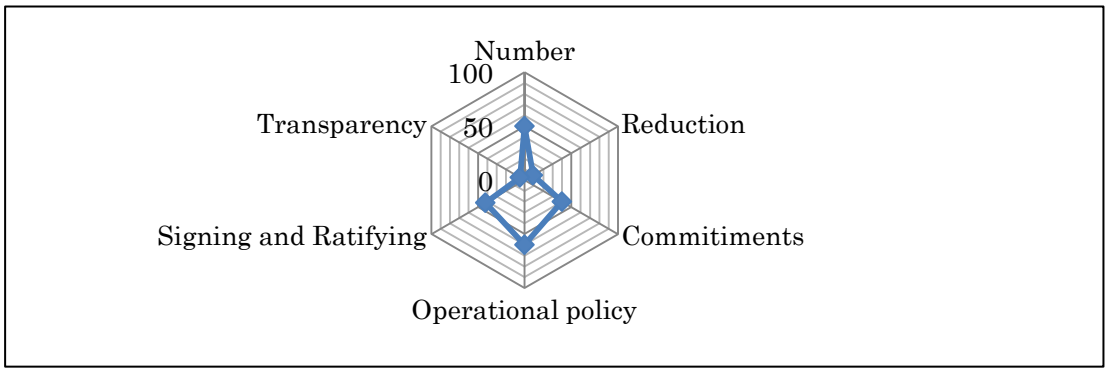
Nuclear Security	The amount of fissile material usable for nuclear weapons		−12/−16	25/41
	Accession to and Participation in Treaties and Other International Frameworks and Application to the National Implementation System	Convention on the Physical Protection of Nuclear Material and the 2005 Amendment to the Convention	2/3	
		International Convention for the Suppression of Acts of Nuclear Terrorism	1/2	
		Convention on Nuclear Safety	2/2	
		Convention on Early Notification of a Nuclear Accident	2/2	
		Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management	2/2	
		Convention on Assistance in Case of a Nuclear Accident or Radiological Emergency	2/2	
		Nuclear Security Recommendations on Physical Protection of Nuclear Material and Nuclear	2/4	

Nuclear Security		Facilities (INFCIRC/225/Rev.5)		
		Enactment of laws and establishment of regulations for national implementation	4/4	
	Efforts to maintain the highest possible standards of nuclear security/safety	Efforts for further minimization of HEU for peaceful purposes	4/4	
		Implementing measures (detection, deterrence, disruption, effective domestic control) for preventing illicit trafficking in nuclear materials throughout their territories	5/5	
		Acceptance of the IAEA nuclear security review missions	2/2	
		The IAEA Nuclear Security Plan and Nuclear Security Fund	2/2	
		Technology Development--Nuclear Forensics	2/2	
		Capacity-building and Outreach activities	2/2	
		Participation in initiatives such as CTR, G8 Global Partnership, GICNT, ISTC and Nuclear Security Summits	3/3	

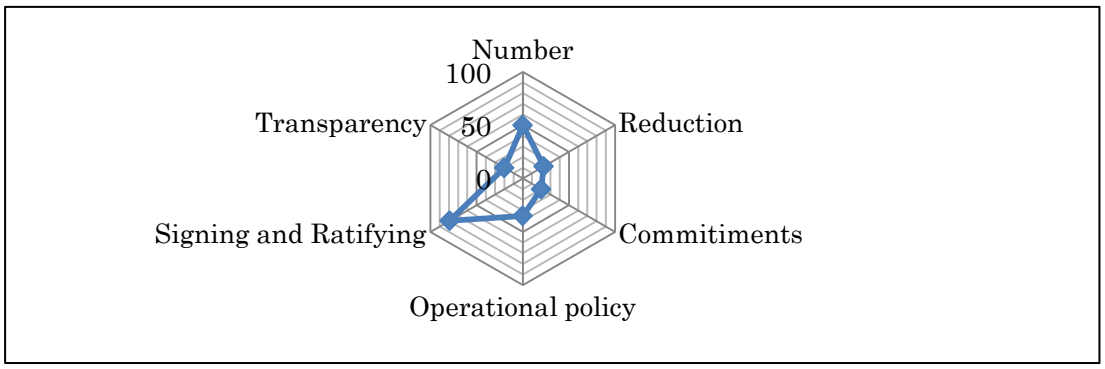
6-point Nuclear Disarmament Radar Charts (NWS)

For the breakdown of 6 points (aspects) refer to pages 85-86.

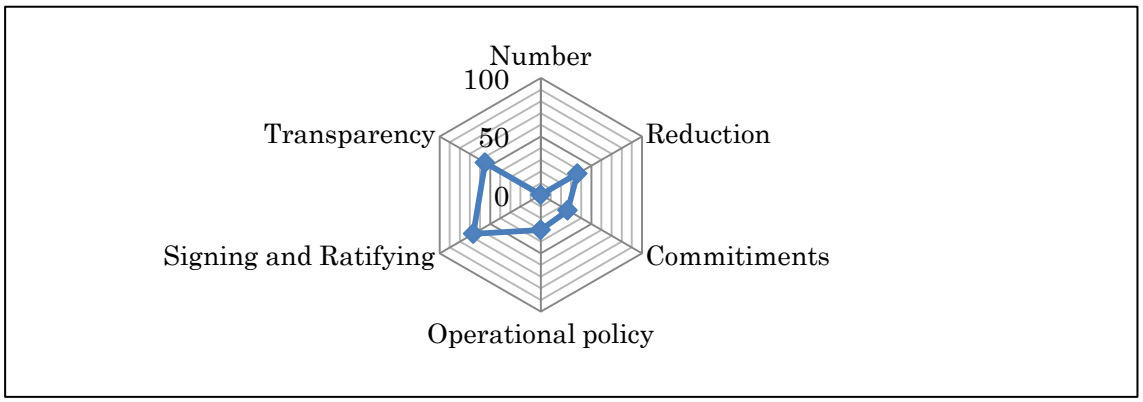
China



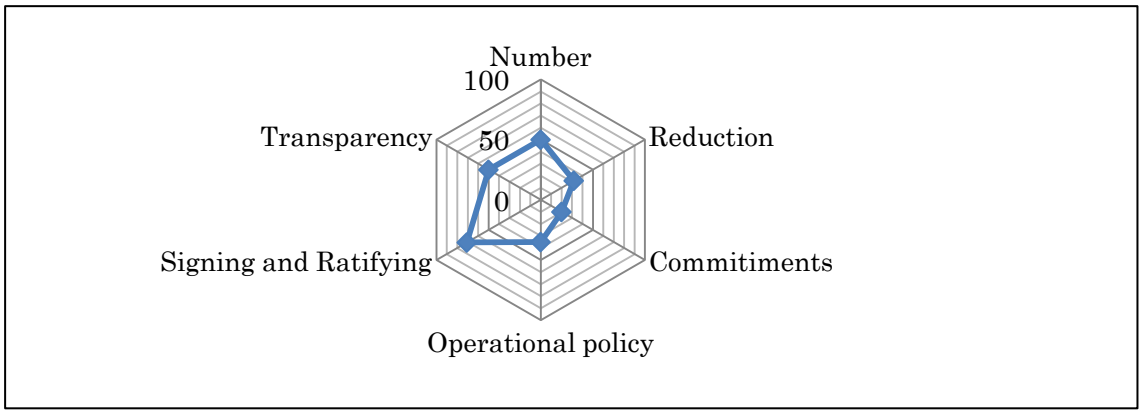
France



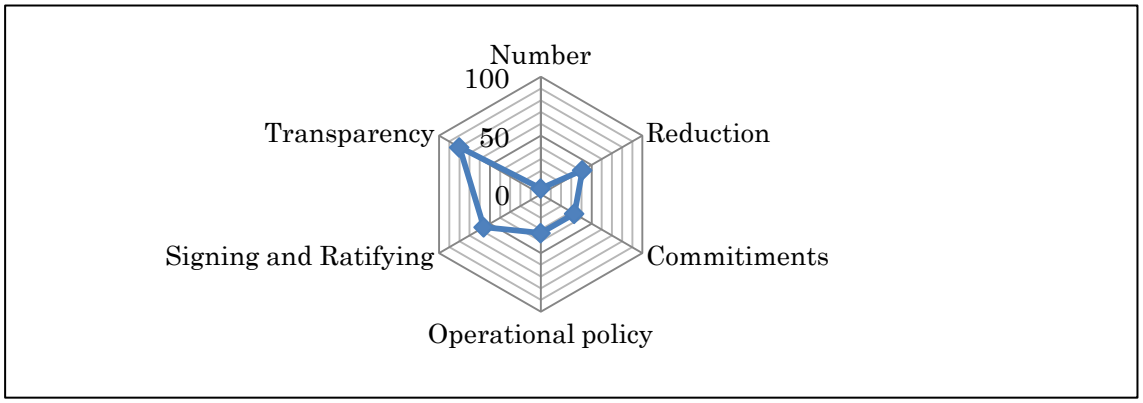
Russia



United Kingdom



United States



[Non-NPT Parties]

Non-NPT Parties　India

India is known to possess about 80-100 nuclear warheads as of January 2012. India is not a party to the NPT and has not reduced its nuclear arsenal. India is not yet a signatory of the Comprehensive Nuclear-Test-Ban Treaty (CTBT), while maintaining a moratorium on nuclear tests pending the treaty's entry into force.

While its efforts in implementing export controls are recognizable, the fact that India is not a party to the NPT and has neither comprehensive safeguards agreement nor Additional Protocol in force lowered its points in non-proliferation. India's performance in the nuclear security area is relatively positive.

Article		Evaluation criteria		Points
Nuclear Disarmament	The number of nuclear weapons (estimates)		－6/－20	16/98
	Commitment to achieving a world without nuclear weapons	Voting behavior on the UNGA resolutions on nuclear disarmament proposed by Japan, NAC, and NAM, respectively.	2/6	
		Voting behavior on the UNGA resolution calling for commencement of negotiations on a Nuclear Weapons Convention	2/2	
		Announcement of significant policies and important activities, such as, holding major conference	0/3	
	Reduction of nuclear weapons	Reduction of nuclear weapons in the past 5 years	0/15	
		A concrete plan for further reduction of nuclear weapons	0/3	
		Trends in strengthening/modernizing nuclear weapons capabilities	2/4	
	Diminishing the role and significance of nuclear weapons in the national security strategies and policies	The current status of the roles and significance of nuclear weapons in the national security strategies and policies, as well as military alliance	1/8	
		Commitment to the "sole purpose," no first use, and related doctrines	3/3	
		Negative security assurances	2/2	
		Signing and ratifying the protocols of the treaties on nuclear-weapon-free zones	-	
	De-alerting or measures for maximizing decision time to authorize the use of nuclear weapons		3/4	
	CTBT	Signing and ratifying the CTBT	0/4	

Nuclear Disarmament		The moratorium on nuclear test explosions pending CTBT's entry into force	2/3	
		Cooperation with the CTBTO Preparatory Commission: contributions to the Commission and active participation in its meeting and other activities	0/2	
		Contribution to the development of the CTBT verification systems (IMS, OSI, and other verification technologies)	0/2	
		Nuclear Testing	2/3	
	FMCT	Commitment, efforts, and proposals toward immediate commencement of negotiations on an FMCT	1/5	
		Moratorium on the production of fissile material for use in nuclear weapons	0/3	
		Contribution to the development of verification measures, including research and development	0/2	
	Transparency regarding nuclear forces, fissile material for nuclear weapons, and nuclear strategy/doctrine		1/6	
	Verifications of nuclear weapons reductions	Acceptance and implementation of verification for nuclear weapons reduction	0/3	
		Engagement in research and development for verification measures of nuclear weapons reduction	0/1	
		The IAEA inspections to fissile material declared as no longer required for military purposes	0/3	
	Irreversibility	Implementing or planning dismantlement of nuclear warheads and their delivery vehicles	0/3	
		Decommissioning/conversion of nuclear weapons-related facilities	0/2	
		Measures for the fissile material declared excess for military purposes, such as disposition or conversion to peaceful purposes	0/2	
	Disarmament and non-proliferation educations and cooperation with civil society		1/4	

	Non-proliferation commitment	Accession to the NPT	0/10	13/47
		Compliance with Article 1 and 2 of the NPT and the UNSC Resolutions on Non-Proliferation	2/7	

Nuclear Non-proliferation		Establishment of the Nuclear-Weapon-Free Zones	0/3	
	IAEA Safeguards (Applicable to the NWS and Non-Parties to the NPT)	Application of the IAEA safeguards (VOA or INFCIRC/66) to Their Peaceful Nuclear in Facilities	2/3	
		Signing, ratifying, and implementing an Additional Protocol	1/4	
	Cooperation with the IAEA	Efforts for strengthening the safeguards (e.g. development of the safeguards technology and promotion of the universality of the Additional Protocol)	0/3	
		Extrabudgetary contributions to the IAEA	0/1	
	Nuclear Export Controls	Establishment and implementation of the national implementation system	4/5	
		Requiring the Conclusion of the AP for Nuclear Export	0/2	
		Implementation of the USSCR on North Korean and Iranian nuclear issues	2/3	
		Participation in the PSI	0/2	
	Transparency in the peaceful use of nuclear energy	Reporting on the peaceful nuclear activities	2/2	
		Reporting on plutonium management	0/2	

Nuclear Security	The amount of fissile material usable for nuclear weapons		－7/－16	14/41
	Accession to and Participation in Treaties and Other International Frameworks and Application to the National Implementation System	Convention on the Physical Protection of Nuclear Material and the 2005 Amendment to the Convention	3/3	
		International Convention for the Suppression of Acts of Nuclear Terrorism	2/2	
		Convention on Nuclear Safety	2/2	
		Convention on Early Notification of a Nuclear Accident	2/2	
		Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management	0/2	
		Convention on Assistance in Case of a Nuclear Accident or Radiological Emergency	2/2	
		Nuclear Security Recommendations on Physical Protection of Nuclear Material and Nuclear Facilities (INFCIRC/225/Rev.5)	0/4	
		Enactment of laws and establishment of regulations for national implementation	4/4	
	Efforts to maintain the highest possible	Efforts for further minimization of HEU for peaceful purposes	0/4	

Nuclear Security	standards of nuclear security/safety	Implementing measures (detection, deterrence, disruption, effective domestic control) for preventing illicit trafficking in nuclear materials throughout their territories	4/5	
		Acceptance of the IAEA nuclear security review missions	0/2	
		The IAEA Nuclear Security Plan and Nuclear Security Fund	0/2	
		Technology Development--Nuclear Forensics	0/2	
		Capacity-building and Outreach activities	1/2	
		Participation in initiatives such as CTR, G8 Global Partnership, GICNT, ISTC and Nuclear Security Summits	1/3	

Non-NPT Parties　Israel

Israel not only stays out of the NPT but also has consistently pursued the policy of "nuclear opacity" regarding its widely acknowledged possession of around 80 nuclear weapons, lowering its points in disarmament as well as non-proliferation. Israel's performance in nuclear security is better in comparison.

Article		Evaluation criteria		Points
Nuclear Disarmament	The number of nuclear weapons (estimates)		－6/-20	9/98
	Commitment to achieving a world without nuclear weapons	Voting behavior on the UNGA resolutions on nuclear disarmament proposed by Japan, NAC, and NAM, respectively.	1/6	
		Voting behavior on the UNGA resolution calling for commencement of negotiations on a Nuclear Weapons Convention	0/2	
		Announcement of significant policies and important activities, such as, holding major conference	0/3	
	Reduction of nuclear weapons	Reduction of nuclear weapons in the past 5 years	0/15	
		A concrete plan for further reduction of nuclear weapons	0/3	
		Trends in strengthening/modernizing nuclear weapons capabilities	2/4	
	Diminishing the role and significance of nuclear weapons in the national security strategies and policies	The current status of the roles and significance of nuclear weapons in the national security strategies and policies, as well as military alliance	1/8	
		Commitment to the "sole purpose," no first use, and related doctrines	0/3	
		Negative security assurances	0/2	
		Signing and ratifying the protocols of the treaties on nuclear-weapon-free zones	-	
	De-alerting or measures for maximizing decision time to authorize the use of nuclear weapons		2/4	
	CTBT	Signing and ratifying the CTBT	2/4	
		The moratorium on nuclear test explosions pending CTBT's entry into force	0/3	
		Cooperation with the CTBTO Preparatory Commission: contributions to the Commission and active participation in its meeting and other activities	1/2	
		Contribution to the development of the CTBT	2/2	

Nuclear Disarmament		verification systems (IMS, OSI, and other verification technologies)		
		Nuclear Testing	2/3	
	FMCT	Commitment, efforts, and proposals toward immediate commencement of negotiations on an FMCT	1/5	
		Moratorium on the production of fissile material for use in nuclear weapons	0/3	
		Contribution to the development of verification measures, including research and development	0/2	
	Transparency regarding nuclear forces, fissile material for nuclear weapons, and nuclear strategy/doctrine		0/6	
	Verifications of nuclear weapons reductions	Acceptance and implementation of verification for nuclear weapons reduction	0/3	
		Engagement in research and development for verification measures of nuclear weapons reduction	0/1	
		The IAEA inspections to fissile material declared as no longer required for military purposes	0/3	
	Irreversibility	Implementing or planning dismantlement of nuclear warheads and their delivery vehicles	0/3	
		Decommissioning/conversion of nuclear weapons-related facilities	0/2	
		Measures for the fissile material declared excess for military purposes, such as disposition or conversion to peaceful purposes	0/2	
	Disarmament and non-proliferation educations and cooperation with civil society		1/4	

	Non-proliferation commitment	Accession to the NPT	0/10	12/47
		Compliance with Article 1 and 2 of the NPT and the UNSC Resolutions on Non-Proliferation	3/7	
		Establishment of the Nuclear-Weapon-Free Zones	0/3	
	IAEA Safeguards (Applicable to the	Application of the IAEA safeguards (VOA or INFCIRC/66) to Their Peaceful Nuclear in Facilities	1/3	

Nuclear Non-proliferation	NWS and Non-Parties to the NPT)	Signing, ratifying, and implementing an Additional Protocol	0/4	
	Cooperation with the IAEA	Efforts for strengthening the safeguards (e.g. development of the safeguards technology and promotion of the universality of the Additional Protocol)	0/3	
		Extrabudgetary contributions to the IAEA	0/1	
	Nuclear Export Controls	Establishment and implementation of the national implementation system	5/5	
		Requiring the Conclusion of the AP for Nuclear Export	0/2	
		Implementation of the USSCR on North Korean and Iranian nuclear issues	2/3	
		Participation in the PSI	1/2	
	Transparency in the peaceful use of nuclear energy	Reporting on the peaceful nuclear activities	0/2	
		Reporting on plutonium management	0/2	

Nuclear Security	The amount of fissile material usable for nuclear weapons		−6/−16	16/41
	Accession to and Participation in Treaties and Other International Frameworks and Application to the National Implementation System	Convention on the Physical Protection of Nuclear Material and the 2005 Amendment to the Convention	3/3	
		International Convention for the Suppression of Acts of Nuclear Terrorism	1/2	
		Convention on Nuclear Safety	1/2	
		Convention on Early Notification of a Nuclear Accident	2/2	
		Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management	0/2	
		Convention on Assistance in Case of a Nuclear Accident or Radiological Emergency	2/2	
		Nuclear Security Recommendations on Physical Protection of Nuclear Material and Nuclear Facilities (INFCIRC/225/Rev.5)	0/4	
		Enactment of laws and establishment of regulations for national implementation	3/4	
	Efforts to maintain the highest possible standards of nuclear security/safety	Efforts for further minimization of HEU for peaceful purposes	3/4	
		Implementing measures (detection, deterrence, disruption, effective domestic control) for preventing illicit trafficking in nuclear materials throughout	4/5	

Nuclear Security		their territories		
		Acceptance of the IAEA nuclear security review missions	0/2	
		The IAEA Nuclear Security Plan and Nuclear Security Fund	0/2	
		Technology Development--Nuclear Forensics	2/2	
		Capacity-building and Outreach activities	0/2	
		Participation in initiatives such as CTR, G8 Global Partnership, GICNT, ISTC and Nuclear Security Summits	1/3	

Non-NPT Parties Pakistan

Pakistan sticks to its decision of not joining the NPT for national security reasons. As of January 2012, it is estimated to possess about 90-110 nuclear warheads and is seen to be expanding its nuclear arsenal. While continuing to respect its nuclear testing moratorium prior to the Comprehensive Nuclear-Test-Ban Treaty (CTBT)'s entry into force, Pakistan refuses to sign the treaty. Moreover, Pakistan demonstrates less transparency compared to its neighbor, India, which resulted in low points in nuclear disarmament. However, Pakistan was rated on par with India in nuclear security, while its loose export control system resulted in low points in non-proliferation.

Article		Evaluation criteria		Points
Nuclear Disarmament	The number of nuclear weapons (estimates)	(Nuclear weapon States)	−8/−20	7/98
	Commitment to achieving a world without nuclear weapons	Voting behavior on the UNGA resolutions on nuclear disarmament proposed by Japan, NAC, and NAM, respectively.	3/6	
		Voting behavior on the UNGA resolution calling for commencement of negotiations on a Nuclear Weapons Convention	2/2	
		Announcement of significant policies and important activities, such as, holding major conference	0/3	
	Reduction of nuclear weapons	Reduction of nuclear weapons in the past 5 years	0/15	
		A concrete plan for further reduction of nuclear weapons	0/3	
		Trends in strengthening/modernizing nuclear weapons capabilities	0/4	
	Diminishing the role and significance of nuclear weapons in the national security strategies and policies	The current status of the roles and significance of nuclear weapons in the national security strategies and policies, as well as military alliance	1/8	
		Commitment to the "sole purpose," no first use, and related doctrines	0/3	
		Negative security assurances	2/2	
		Signing and ratifying the protocols of the treaties on nuclear-weapon-free zones	-	
	De-alerting or measures for maximizing decision time to authorize the use of nuclear weapons		3/4	
	CTBT	Signing and ratifying the CTBT	0/4	

Nuclear Disarmament		The moratorium on nuclear test explosions pending CTBT's entry into force	2/3	
		Cooperation with the CTBTO Preparatory Commission: contributions to the Commission and active participation in its meeting and other activities	0/2	
		Contribution to the development of the CTBT verification systems (IMS, OSI, and other verification technologies)	0/2	
		Nuclear Testing	2/3	
	FMCT	Commitment, efforts, and proposals toward immediate commencement of negotiations on an FMCT	0/5	
		Moratorium on the production of fissile material for use in nuclear weapons	0/3	
		Contribution to the development of verification measures, including research and development	0/2	
	Transparency regarding nuclear forces, fissile material for nuclear weapons, and nuclear strategy/doctrine		0/6	
	Verifications of nuclear weapons reductions	Acceptance and implementation of verification for nuclear weapons reduction	0/3	
		Engagement in research and development for verification measures of nuclear weapons reduction	0/1	
		The IAEA inspections to fissile material declared as no longer required for military purposes	0/3	
	Irreversibility	Implementing or planning dismantlement of nuclear warheads and their delivery vehicles	0/3	
		Decommissioning/conversion of nuclear weapons-related facilities	0/2	
		Measures for the fissile material declared excess for military purposes, such as disposition or conversion to peaceful purposes	0/2	
	Disarmament and non-proliferation educations and cooperation with civil society		0/4	

	Non-proliferation commitment	Accession to the NPT	0/10	6/47
		Compliance with Article 1 and 2 of the NPT and the UNSC Resolutions on Non-Proliferation	2/7	

Nuclear Non-proliferation		Establishment of the Nuclear-Weapon-Free Zones	0/3	
	IAEA Safeguards (Applicable to the NWS and Non-Parties to the NPT)	Application of the IAEA safeguards (VOA or INFCIRC/66) to Their Peaceful Nuclear in Facilities	1/3	
		Signing, ratifying, and implementing an Additional Protocol	0/4	
	Cooperation with the IAEA	Efforts for strengthening the safeguards (e.g. development of the safeguards technology and promotion of the universality of the Additional Protocol)	0/3	
		Extrabudgetary contributions to the IAEA	0/1	
	Nuclear Export Controls	Establishment and implementation of the national implementation system	1/5	
		Requiring the Conclusion of the AP for Nuclear Export	0/2	
		Implementation of the USSCR on North Korean and Iranian nuclear issues	0/3	
		Participation in the PSI	0/2	
	Transparency in the peaceful use of nuclear energy	Reporting on the peaceful nuclear activities	2/2	
		Reporting on plutonium management	0/2	

Nuclear Security	The amount of fissile material usable for nuclear weapons		−6/−16	14/41
	Accession to and Participation in Treaties and Other International Frameworks and Application to the National Implementation System	Convention on the Physical Protection of Nuclear Material and the 2005 Amendment to the Convention	2/3	
		International Convention for the Suppression of Acts of Nuclear Terrorism	0/2	
		Convention on Nuclear Safety	2/2	
		Convention on Early Notification of a Nuclear Accident	2/2	
		Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management	0/2	
		Convention on Assistance in Case of a Nuclear Accident or Radiological Emergency	2/2	
		Nuclear Security Recommendations on Physical Protection of Nuclear Material and Nuclear Facilities (INFCIRC/225/Rev.5)	0/4	
		Enactment of laws and establishment of regulations for national implementation	4/4	
	Efforts to maintain the highest possible	Efforts for further minimization of HEU for peaceful purposes	0/4	

Nuclear Security	standards of nuclear security/safety	Implementing measures (detection, deterrence, disruption, effective domestic control) for preventing illicit trafficking in nuclear materials throughout their territories	4/5	
		Acceptance of the IAEA nuclear security review missions	0/2	
		The IAEA Nuclear Security Plan and Nuclear Security Fund	0/2	
		Technology Development--Nuclear Forensics	2/2	
		Capacity-building and Outreach activities	1/2	
		Participation in initiatives such as CTR, G8 Global Partnership, GICNT, ISTC and Nuclear Security Summits	1/3	

[Non-Nuclear-Weapon States]

NNWS Iran

Iran joined the NPT as a non-nuclear weapon state in 1970, and concluded a comprehensive safeguards agreement with the IAEA the following year. However, the IAEA collected evidences that Iran had not declared several nuclear activities as required (building nuclear facilities, enrichment, and plutonium separation). Iran continues to claim its compliance with the NPT by arguing that the acquisition of the enrichment and reprocessing technologies does not violate its treaty obligations and that it has no intention of developing nuclear weapons. It may be said that the Iranian case is a serious blow to the global efforts in nuclear disarmament, non-proliferation, and nuclear security.

Article		Evaluation criteria		Points
Nuclear Disarmament	Commitment to achieving a world without nuclear weapons	Voting behavior on the UNGA resolutions on nuclear disarmament proposed by Japan, NAC, and NAM, respectively.	5/6	18/43
		Voting behavior on the UNGA resolution calling for commencement of negotiations on a Nuclear Weapons Convention	2/2	
		Announcement of significant policies and important activities, such as, holding major conference	0/3	
	Diminishing the role and significance of nuclear weapons in the national security strategies and policies	The current status of the roles and significance of nuclear weapons in the national security strategies and policies, as well as military alliance	8/8	
		Commitment to the “sole purpose,” no first use, and related doctrines	-	
		Negative security assurances	-	
		Signing and ratifying the protocols of the treaties on nuclear-weapon-free zones	-	
	CTBT	Signing and ratifying the CTBT	2/4	
		The moratorium on nuclear test explosions pending CTBT's entry into force	-	
		Cooperation with the CTBTO Preparatory Commission: contributions to the Commission and active participation in its meeting and other activities	0/2	
		Contribution to the development of the CTBT verification systems (IMS, OSI, and other verification technologies)	1/2	
		Nuclear Testing	-	
	FMCT	Commitment, efforts, and proposals toward immediate commencement of negotiations on an FMCT	0/5	
		Moratorium on the production of fissile material for use in nuclear weapons	-	
		Contribution to the development of verification	0/2	

		measures, including research and development		
	Verifications of nuclear weapons reductions	Acceptance and implementation of verification for nuclear weapons reduction	-	
		Engagement in research and development for verification measures of nuclear weapons reduction	0/1	
		The IAEA inspections to fissile material declared as no longer required for military purposes	-	
	Irreversibility	Implementing or planning dismantlement of nuclear warheads and their delivery vehicles	0/2	
		Decommissioning/conversion of nuclear weapons-related facilities	0/2	
		Measures for the fissile material declared excess for military purposes, such as disposition or conversion to peaceful purposes	-	
	Disarmament and non-proliferation educations and cooperation with civil society		0/4	

Nuclear Non-proliferation	Non-proliferation commitment	Accession to the NPT	10/10	20/58
		Compliance with Article 1 and 2 of the NPT and the UNSC Resolutions on Non-Proliferation	3/7	
		Establishment of the Nuclear-Weapon-Free Zones	0/3	
	IAEA Safeguards (Applicable to the NPT NNWS)	Signing and Ratifying a Comprehensive Safeguards Agreement	4/4	
		Signing and Ratifying an Additional Protocol	1/5	
		Implementation of the integrated safeguards	0/4	
		Compliance with the IAEA Safeguards Agreement	0/5	
	Cooperation with the IAEA	Efforts for strengthening the safeguards (e.g. development of the safeguards technology and promotion of the universality of the Additional Protocol)	0/3	
		Extrabudgetary contributions to the IAEA	0/1	
	Nuclear Export Controls	Establishment and implementation of the national implementation system	0/5	
		Requiring the Conclusion of the AP for Nuclear Export	0/2	
		Implementation of the USSCR on North Korean and Iranian nuclear issues	0/3	
		Participation in the PSI	0/2	
	Transparency in the peaceful use of nuclear energy	Reporting on the peaceful nuclear activities	1/2	
		Reporting on plutonium management	1/2	

Nuclear Security	The amount of fissile material usable for nuclear weapons		0/－16	8/41
	Accession to and Participation in Treaties and Other International Frameworks and Application to the National Implementation System	Convention on the Physical Protection of Nuclear Material and the 2005 Amendment to the Convention	0/3	
		International Convention for the Suppression of Acts of Nuclear Terrorism	0/2	
		Convention on Nuclear Safety	0/2	
		Convention on Early Notification of a Nuclear Accident	2/2	
		Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management	0/2	
		Convention on Assistance in Case of a Nuclear Accident or Radiological Emergency	2/2	
		Nuclear Security Recommendations on Physical Protection of Nuclear Material and Nuclear Facilities (INFCIRC/225/Rev.5)	0/4	
		Enactment of laws and establishment of regulations for national implementation	2/4	
	Efforts to maintain the highest possible standards of nuclear security/safety	Efforts for further minimization of HEU for peaceful purposes	0/4	
		Implementing measures (detection, deterrence, disruption, effective domestic control) for preventing illicit trafficking in nuclear materials throughout their territories	2/5	
		Acceptance of the IAEA nuclear security review missions	0/2	
		The IAEA Nuclear Security Plan and Nuclear Security Fund	0/2	
		Technology Development--Nuclear Forensics	0/2	
		Capacity-building and Outreach activities	0/2	
		Participation in initiatives such as CTR, G8 Global Partnership, GICNT, ISTC and Nuclear Security Summits	0/3	

NNWS Syria

Syria has actively supported the resolutions on nuclear disarmament at the UN General Assembly and other fora, which explains its relatively high points in nuclear disarmament. However, while using nuclear energy for peaceful purpose as an NNWS party to the NPT, Syria has not concluded an Additional Protocol. Additionally, the bombing of a Syrian site by Israel in 2007 has revealed Syria's possible construction of a nuclear reactor. Therefore, Syria's points in nuclear non-proliferation and nuclear security fields were relatively low.

Article		Evaluation criteria		Points
Nuclear Disarmament	Commitment to achieving a world without nuclear weapons	Voting behavior on the UNGA resolutions on nuclear disarmament proposed by Japan, NAC, and NAM, respectively.	5/6	15/43
		Voting behavior on the UNGA resolution calling for commencement of negotiations on a Nuclear Weapons Convention	2/2	
		Announcement of significant policies and important activities, such as, holding major conference	0/3	
	Diminishing the role and significance of nuclear weapons in the national security strategies and policies	The current status of the roles and significance of nuclear weapons in the national security strategies and policies, as well as military alliance	8/8	
		Commitment to the "sole purpose," no first use, and related doctrines	-	
		Negative security assurances	-	
		Signing and ratifying the protocols of the treaties on nuclear-weapon-free zones	-	
	CTBT	Signing and ratifying the CTBT	0/4	
		The moratorium on nuclear test explosions pending CTBT's entry into force	-	
		Cooperation with the CTBTO Preparatory Commission: contributions to the Commission and active participation in its meeting and other activities	0/2	
		Contribution to the development of the CTBT verification systems (IMS, OSI, and other verification technologies)	0/2	
		Nuclear Testing	-	
	FMCT	Commitment, efforts, and proposals toward immediate commencement of negotiations on an FMCT	0/5	
		Moratorium on the production of fissile material for use in nuclear weapons	-	
		Contribution to the development of verification measures, including research and development	0/2	
	Verifications of nuclear weapons	Acceptance and implementation of verification for nuclear weapons reduction	-	

Nuclear Disarmament	reductions	Engagement in research and development for verification measures of nuclear weapons reduction	0/1	
		The IAEA inspections to fissile material declared as no longer required for military purposes	-	
	Irreversibility	Implementing or planning dismantlement of nuclear warheads and their delivery vehicles	0/2	
		Decommissioning/conversion of nuclear weapons-related facilities	0/2	
		Measures for the fissile material declared excess for military purposes, such as disposition or conversion to peaceful purposes	-	
	Disarmament and non-proliferation educations and cooperation with civil society		0/4	

Nuclear Non-proliferation	Non-proliferation commitment	Accession to the NPT	10/10	18/58
		Compliance with Article 1 and 2 of the NPT and the UNSC Resolutions on Non-Proliferation	4/7	
		Establishment of the Nuclear-Weapon-Free Zones	0/3	
	IAEA Safeguards (Applicable to the NPT NNWS)	Signing and Ratifying a Comprehensive Safeguards Agreement	4/4	
		Signing and Ratifying an Additional Protocol	0/5	
		Implementation of the integrated safeguards	0/4	
		Compliance with the IAEA Safeguards Agreement	0/5	
	Cooperation with the IAEA	Efforts for strengthening the safeguards (e.g. development of the safeguards technology and promotion of the universality of the Additional Protocol)	0/3	
		Extrabudgetary contributions to the IAEA	0/1	
	Nuclear Export Controls	Establishment and implementation of the national implementation system	0/5	
		Requiring the Conclusion of the AP for Nuclear Export	0/2	
		Implementation of the USSCR on North Korean and Iranian nuclear issues	0/3	
		Participation in the PSI	0/2	
	Transparency in the peaceful use of nuclear energy	Reporting on the peaceful nuclear activities	0/2	
		Reporting on plutonium management	0/2	

	The amount of fissile material		0/－16	4/41

Nuclear Security	usable for nuclear weapons			
	Accession to and Participation in Treaties and Other International Frameworks and Application to the National Implementation System	Convention on the Physical Protection of Nuclear Material and the 2005 Amendment to the Convention	0/3	
		International Convention for the Suppression of Acts of Nuclear Terrorism	0/2	
		Convention on Nuclear Safety	0/2	
		Convention on Early Notification of a Nuclear Accident	1/2	
		Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management	0/2	
		Convention on Assistance in Case of a Nuclear Accident or Radiological Emergency	1/2	
		Nuclear Security Recommendations on Physical Protection of Nuclear Material and Nuclear Facilities (INFCIRC/225/Rev.5)	0/4	
		Enactment of laws and establishment of regulations for national implementation	2/4	
	Efforts to maintain the highest possible standards of nuclear security/safety	Efforts for further minimization of HEU for peaceful purposes	0/4	
		Implementing measures (detection, deterrence, disruption, effective domestic control) for preventing illicit trafficking in nuclear materials throughout their territories	0/5	
		Acceptance of the IAEA nuclear security review missions	0/2	
		The IAEA Nuclear Security Plan and Nuclear Security Fund	0/2	
		Technology Development--Nuclear Forensics	0/2	
		Capacity-building and Outreach activities	0/2	
		Participation in initiatives such as CTR, G8 Global Partnership, GICNT, ISTC and Nuclear Security Summits	0/3	

NNWS Australia

While Australia engages in active efforts for nuclear disarmament, its reliance on US' extended deterrence was a contributing factor to lower its points. Nevertheless, its active contribution to the establishment of an NWFZ in the region (Rarotonga Treaty), steady implementation of other relevant treaty obligations, and support to the IAEA safeguards raised Australia's points regarding non-proliferation and nuclear security.

Article		Evaluation criteria		Points
Nuclear Disarmament	Commitment to achieving a world without nuclear weapons	Voting behavior on the UNGA resolutions on nuclear disarmament proposed by Japan, NAC, and NAM, respectively.	4/6	28/43
		Voting behavior on the UNGA resolution calling for commencement of negotiations on a Nuclear Weapons Convention	1/2	
		Announcement of significant policies and important activities, such as, holding major conference	1/3	
	Diminishing the role and significance of nuclear weapons in the national security strategies and policies	The current status of the roles and significance of nuclear weapons in the national security strategies and policies, as well as military alliance	5/8	
		Commitment to the "sole purpose," no first use, and related doctrines	-	
		Negative security assurances	-	
		Signing and ratifying the protocols of the treaties on nuclear-weapon-free zones	-	
	CTBT	Signing and ratifying the CTBT	4/4	
		The moratorium on nuclear test explosions pending CTBT's entry into force	-	
		Cooperation with the CTBTO Preparatory Commission: contributions to the Commission and active participation in its meeting and other activities	2/2	
		Contribution to the development of the CTBT verification systems (IMS, OSI, and other verification technologies)	2/2	
		Nuclear Testing	-	
	FMCT	Commitment, efforts, and proposals toward immediate commencement of negotiations on an FMCT	4/5	
		Moratorium on the production of fissile material for use in nuclear weapons	-	
		Contribution to the development of verification measures, including research and development	1/2	
	Verifications of nuclear weapons reductions	Acceptance and implementation of verification for nuclear weapons reduction	-	
		Engagement in research and development for verification measures of nuclear weapons reduction	0/1	
		The IAEA inspections to fissile material declared as no	-	

Nuclear Disarmament		longer required for military purposes		
	Irreversibility	Implementing or planning dismantlement of nuclear warheads and their delivery vehicles	1/2	
		Decommissioning/conversion of nuclear weapons-related facilities	1/2	
		Measures for the fissile material declared excess for military purposes, such as disposition or conversion to peaceful purposes	-	
	Disarmament and non-proliferation educations and cooperation with civil society		2/4	

Nuclear Non-proliferation	Non-proliferation commitment	Accession to the NPT	10/10	54/58
		Compliance with Article 1 and 2 of the NPT and the UNSC Resolutions on Non-Proliferation	7/7	
		Establishment of the Nuclear-Weapon-Free Zones	3/3	
	IAEA Safeguards (Applicable to the NPT NNWS)	Signing and Ratifying a Comprehensive Safeguards Agreement	4/4	
		Signing and Ratifying an Additional Protocol	5/5	
		Implementation of the integrated safeguards	4/4	
		Compliance with the IAEA Safeguards Agreement	5/5	
	Cooperation with the IAEA	Efforts for strengthening the safeguards (e.g. development of the safeguards technology and promotion of the universality of the Additional Protocol)	3/3	
		Extrabudgetary contributions to the IAEA	0/1	
	Nuclear Export Controls	Establishment and implementation of the national implementation system	5/5	
		Requiring the Conclusion of the AP for Nuclear Export	0/2	
		Implementation of the USSCR on North Korean and Iranian nuclear issues	3/3	
		Participation in the PSI	2/2	
	Transparency in the peaceful use of nuclear energy	Reporting on the peaceful nuclear activities	2/2	
		Reporting on plutonium management	1/2	

Nuclear Security	The amount of fissile material usable for nuclear weapons		0/－16	34/41
	Accession to and Participation in	Convention on the Physical Protection of Nuclear Material and the 2005 Amendment to the Convention	3/3	

Nuclear Security	Treaties and Other International Frameworks and Application to the National Implementation System	International Convention for the Suppression of Acts of Nuclear Terrorism	2/2	
		Convention on Nuclear Safety	2/2	
		Convention on Early Notification of a Nuclear Accident	2/2	
		Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management	2/2	
		Convention on Assistance in Case of a Nuclear Accident or Radiological Emergency	2/2	
		Nuclear Security Recommendations on Physical Protection of Nuclear Material and Nuclear Facilities (INFCIRC/225/Rev.5)	2/4	
		Enactment of laws and establishment of regulations for national implementation	4/4	
	Efforts to maintain the highest possible standards of nuclear security/safety	Efforts for further minimization of HEU for peaceful purposes	4/4	
		Implementing measures (detection, deterrence, disruption, effective domestic control) for preventing illicit trafficking in nuclear materials throughout their territories	4/5	
		Acceptance of the IAEA nuclear security review missions	2/2	
		The IAEA Nuclear Security Plan and Nuclear Security Fund	0/2	
		Technology Development--Nuclear Forensics	2/2	
		Capacity-building and Outreach activities	1/2	
		Participation in initiatives such as CTR, G8 Global Partnership, GICNT, ISTC and Nuclear Security Summits	2/3	

NNWS Brazil

Brazil's supportive voting behavior on the nuclear disarmament issue at the United Nations and other fora contributed to its relatively high points in the nuclear disarmament field. Brazil's low rating in non-proliferation and nuclear security/safety areas reflects, respectively, its lack of support for the combination of a comprehensive safeguards agreement and an Additional Protocol as the norm in the IAEA safeguards and inadequate implementation of nuclear security measures.

Article		Evaluation		Points
Nuclear Disarmament	Commitment to achieving a world without nuclear weapons	Voting behavior on the UNGA resolutions on nuclear disarmament proposed by Japan, NAC, and NAM, respectively.	5/6	27/43
		Voting behavior on the UNGA resolution calling for commencement of negotiations on a Nuclear Weapons Convention	2/2	
		Announcement of significant policies and important activities, such as, holding major conference	1/3	
	Diminishing the role and significance of nuclear weapons in the national security strategies and policies	The current status of the roles and significance of nuclear weapons in the national security strategies and policies, as well as military alliance	8/8	
		Commitment to the "sole purpose," no first use, and related doctrines	-	
		Negative security assurances	-	
		Signing and ratifying the protocols of the treaties on nuclear-weapon-free zones	-	
	CTBT	Signing and ratifying the CTBT	4/4	
		The moratorium on nuclear test explosions pending CTBT's entry into force	-	
		Cooperation with the CTBTO Preparatory Commission: contributions to the Commission and active participation in its meeting and other activities	1/2	
		Contribution to the development of the CTBT verification systems (IMS, OSI, and other verification technologies)	2/2	
		Nuclear Testing	-	
	FMCT	Commitment, efforts, and proposals toward immediate commencement of negotiations on an FMCT	3/5	
		Moratorium on the production of fissile material for use in nuclear weapons	-	
		Contribution to the development of verification measures, including research and development	0/2	
	Verifications of nuclear weapons reductions	Acceptance and implementation of verification for nuclear weapons reduction	-	
		Engagement in research and development for verification measures of nuclear weapons reduction	0/1	

Nuclear Disarmament		The IAEA inspections to fissile material declared as no longer required for military purposes	-	
	Irreversibility	Implementing or planning dismantlement of nuclear warheads and their delivery vehicles	0/2	
		Decommissioning/conversion of nuclear weapons-related facilities	0/2	
		Measures for the fissile material declared excess for military purposes, such as disposition or conversion to peaceful purposes	-	
	Disarmament and non-proliferation educations and cooperation with civil society		1/4	

Nuclear Non-proliferation	Non-proliferation commitment	Accession to the NPT	10/10	40/58
		Compliance with Article 1 and 2 of the NPT and the UNSC Resolutions on Non-Proliferation	7/7	
		Establishment of the Nuclear-Weapon-Free Zones	3/3	
	IAEA Safeguards (Applicable to the NPT NNWS)	Signing and Ratifying a Comprehensive Safeguards Agreement	4/4	
		Signing and Ratifying an Additional Protocol	0/5	
		Implementation of the integrated safeguards	0/4	
		Compliance with the IAEA Safeguards Agreement	5/5	
	Cooperation with the IAEA	Efforts for strengthening the safeguards (e.g. development of the safeguards technology and promotion of the universality of the Additional Protocol)	1/3	
		Extrabudgetary contributions to the IAEA	0/1	
	Nuclear Export Controls	Establishment and implementation of the national implementation system	5/5	
		Requiring the Conclusion of the AP for Nuclear Export	0/2	
		Implementation of the USSCR on North Korean and Iranian nuclear issues	2/3	
		Participation in the PSI	0/2	
	Transparency in the peaceful use of nuclear energy	Reporting on the peaceful nuclear activities	2/2	
		Reporting on plutonium management	1/2	

Nuclear Security	The amount of fissile material usable for nuclear weapons		0/－16	25/41
	Accession to and Participation in	Convention on the Physical Protection of Nuclear Material and the 2005 Amendment to the Convention	2/3	

Nuclear Security	Treaties and Other International Frameworks and Application to the National Implementation System	International Convention for the Suppression of Acts of Nuclear Terrorism	2/2	
		Convention on Nuclear Safety	2/2	
		Convention on Early Notification of a Nuclear Accident	2/2	
		Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management	2/2	
		Convention on Assistance in Case of a Nuclear Accident or Radiological Emergency	2/2	
		Nuclear Security Recommendations on Physical Protection of Nuclear Material and Nuclear Facilities (INFCIRC/225/Rev.5)	2/4	
		Enactment of laws and establishment of regulations for national implementation	3/4	
	Efforts to maintain the highest possible standards of nuclear security/safety	Efforts for further minimization of HEU for peaceful purposes	3/4	
		Implementing measures (detection, deterrence, disruption, effective domestic control) for preventing illicit trafficking in nuclear materials throughout their territories	4/5	
		Acceptance of the IAEA nuclear security review missions	0/2	
		The IAEA Nuclear Security Plan and Nuclear Security Fund	0/2	
		Technology Development--Nuclear Forensics	0/2	
		Capacity-building and Outreach activities	1/2	
		Participation in initiatives such as CTR, G8 Global Partnership, GICNT, ISTC and Nuclear Security Summits	0/3	

NNWS Germany

Although Germany plays a leading role among NATO countries in efforts for reducing the role of nuclear weapons, it benefits, like other NATO members, from the U.S.' extended deterrence, which accounts for its relatively low rating in nuclear disarmament. By comparison, Germany's points in nonproliferation is high, reflecting its compliance with the NPT and its support for the IAEA safeguards.

Article		Evaluation criteria		Points
Nuclear Disarmament	Commitment to achieving a world without nuclear weapons	Voting behavior on the UNGA resolutions on nuclear disarmament proposed by Japan, NAC, and NAM, respectively.	4/6	24/43
		Voting behavior on the UNGA resolution calling for commencement of negotiations on a Nuclear Weapons Convention	0/2	
		Announcement of significant policies and important activities, such as, holding major conference	1/3	
	Diminishing the role and significance of nuclear weapons in the national security strategies and policies	The current status of the roles and significance of nuclear weapons in the national security strategies and policies, as well as military alliance	3/8	
		Commitment to the "sole purpose," no first use, and related doctrines	-	
		Negative security assurances	-	
		Signing and ratifying the protocols of the treaties on nuclear-weapon-free zones	-	
	CTBT	Signing and ratifying the CTBT	4/4	
		The moratorium on nuclear test explosions pending CTBT's entry into force	-	
		Cooperation with the CTBTO Preparatory Commission: contributions to the Commission and active participation in its meeting and other activities	1/2	
		Contribution to the development of the CTBT verification systems (IMS, OSI, and other verification technologies)	2/2	
		Nuclear Testing	-	
	FMCT	Commitment, efforts, and proposals toward immediate commencement of negotiations on an FMCT	4/5	
		Moratorium on the production of fissile material for use in nuclear weapons	-	
		Contribution to the development of verification measures, including research and development	1/2	
	Verifications of nuclear weapons reductions	Acceptance and implementation of verification for nuclear weapons reduction	-	
		Engagement in research and development for verification measures of nuclear weapons reduction	0/1	
		The IAEA inspections to fissile material declared as no	-	

		longer required for military purposes		
	Irreversibility	Implementing or planning dismantlement of nuclear warheads and their delivery vehicles	1/2	
		Decommissioning/conversion of nuclear weapons-related facilities	1/2	
		Measures for the fissile material declared excess for military purposes, such as disposition or conversion to peaceful purposes	-	
	Disarmament and non-proliferation educations and cooperation with civil society		2/4	

Nuclear Non-proliferation	Non-proliferation commitment	Accession to the NPT	10/10	53/58
		Compliance with Article 1 and 2 of the NPT and the UNSC Resolutions on Non-Proliferation	7/7	
		Establishment of the Nuclear-Weapon-Free Zones	0/3	
	IAEA Safeguards (Applicable to the NPT NNWS)	Signing and Ratifying a Comprehensive Safeguards Agreement	4/4	
		Signing and Ratifying an Additional Protocol	5/5	
		Implementation of the integrated safeguards	4/4	
		Compliance with the IAEA Safeguards Agreement	5/5	
	Cooperation with the IAEA	Efforts for strengthening the safeguards (e.g. development of the safeguards technology and promotion of the universality of the Additional Protocol)	3/3	
		Extrabudgetary contributions to the IAEA	1/1	
	Nuclear Export Controls	Establishment and implementation of the national implementation system	5/5	
		Requiring the Conclusion of the AP for Nuclear Export	0/2	
		Implementation of the USSCR on North Korean and Iranian nuclear issues	3/3	
		Participation in the PSI	2/2	
	Transparency in the peaceful use of nuclear energy	Reporting on the peaceful nuclear activities	2/2	
		Reporting on plutonium management	2/2	

Nuclear Security	The amount of fissile material usable for nuclear weapons		－4/－16	32/41
	Accession to and Participation in	Convention on the Physical Protection of Nuclear Material and the 2005 Amendment to the	3/3	

Nuclear Security	Treaties and Other International Frameworks and Application to the National Implementation System	Convention		
		International Convention for the Suppression of Acts of Nuclear Terrorism	2/2	
		Convention on Nuclear Safety	2/2	
		Convention on Early Notification of a Nuclear Accident	2/2	
		Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management	2/2	
		Convention on Assistance in Case of a Nuclear Accident or Radiological Emergency	2/2	
		Nuclear Security Recommendations on Physical Protection of Nuclear Material and Nuclear Facilities (INFCIRC/225/Rev.5)	2/4	
		Enactment of laws and establishment of regulations for national implementation	4/4	
	Efforts to maintain the highest possible standards of nuclear security/safety	Efforts for further minimization of HEU for peaceful purposes	4/4	
		Implementing measures (detection, deterrence, disruption, effective domestic control) for preventing illicit trafficking in nuclear materials throughout their territories	4/5	
		Acceptance of the IAEA nuclear security review missions	0/2	
		The IAEA Nuclear Security Plan and Nuclear Security Fund	2/2	
		Technology Development--Nuclear Forensics	2/2	
		Capacity-building and Outreach activities	2/2	
		Participation in initiatives such as CTR, G8 Global Partnership, GICNT, ISTC and Nuclear Security Summits	3/3	

NNWS Japan

While its national security policy relies on the US' extended (nuclear) deterrence, Japan has actively promoted nuclear disarmament through the UN and other multilateral frameworks, as an NPT NNWS firmly committed to the three non-nuclear principles. Japan has also pursued the peaceful use of nuclear energy in full compliance with the NPT. Japan has also established an effective export control system. These positive elements are reflected in its relatively high rating in nuclear disarmament and nonproliferation. However, its points in nuclear security were lowered in view of its possession of a large amount of plutonium despite its active involvement in relevant treaties and other new initiatives in this field.

Article		Evaluation Criteria		Points
Nuclear Disarmament	Commitment to achieving a world without nuclear weapons	Voting behavior on the UNGA resolutions on nuclear disarmament proposed by Japan, NAC, and NAM, respectively.	5/6	30/43
		Voting behavior on the UNGA resolution calling for commencement of negotiations on a Nuclear Weapons Convention	1/2	
		Announcement of significant policies and important activities, such as, holding major conference	1/3	
	Diminishing the role and significance of nuclear weapons in the national security strategies and policies	The current status of the roles and significance of nuclear weapons in the national security strategies and policies, as well as military alliance	5/8	
		Commitment to the "sole purpose," no first use, and related doctrines	-	
		Negative security assurances	-	
		Signing and ratifying the protocols of the treaties on nuclear-weapon-free zones	-	
	CTBT	Signing and ratifying the CTBT	4/4	
		The moratorium on nuclear test explosions pending CTBT's entry into force	-	
		Cooperation with the CTBTO Preparatory Commission: contributions to the Commission and active participation in its meeting and other activities	2/2	
		Contribution to the development of the CTBT verification systems (IMS, OSI, and other verification technologies)	2/2	
		Nuclear Testing	-	
	FMCT	Commitment, efforts, and proposals toward immediate commencement of negotiations on an FMCT	4/5	
		Moratorium on the production of fissile material for use in nuclear weapons	-	
		Contribution to the development of verification measures, including research and development	1/2	
	Verifications of	Acceptance and implementation of verification for	-	

Nuclear Disarmament	nuclear weapons reductions	nuclear weapons reduction		
		Engagement in research and development for verification measures of nuclear weapons reduction	0/1	
		The IAEA inspections to fissile material declared as no longer required for military purposes	-	
	Irreversibility	Implementing or planning dismantlement of nuclear warheads and their delivery vehicles	1/2	
		Decommissioning/conversion of nuclear weapons-related facilities	1/2	
		Measures for the fissile material declared excess for military purposes, such as disposition or conversion to peaceful purposes	-	
	Disarmament and non-proliferation educations and cooperation with civil society		3/4	

Nuclear Non-proliferation	Non-proliferation commitment	Accession to the NPT	10/10	53/58
		Compliance with Article 1 and 2 of the NPT and the UNSC Resolutions on Non-Proliferation	7/7	
		Establishment of the Nuclear-Weapon-Free Zones	0/3	
	IAEA Safeguards (Applicable to the NPT NNWS)	Signing and Ratifying a Comprehensive Safeguards Agreement	4/4	
		Signing and Ratifying an Additional Protocol	5/5	
		Implementation of the integrated safeguards	4/4	
		Compliance with the IAEA Safeguards Agreement	5/5	
	Cooperation with the IAEA	Efforts for strengthening the safeguards (e.g. development of the safeguards technology and promotion of the universality of the Additional Protocol)	3/3	
		Extrabudgetary contributions to the IAEA	1/1	
	Nuclear Export Controls	Establishment and implementation of the national implementation system	5/5	
		Requiring the Conclusion of the AP for Nuclear Export	1/2	
		Implementation of the USSCR on North Korean and Iranian nuclear issues	3/3	
		Participation in the PSI	2/2	
	Transparency in the peaceful use of nuclear energy	Reporting on the peaceful nuclear activities	2/2	
		Reporting on plutonium management	1/2	

	The amount of		－6/－16	29/41

Nuclear Security	fissile material usable for nuclear weapons			
	Accession to and Participation in Treaties and Other International Frameworks and Application to the National Implementation System	Convention on the Physical Protection of Nuclear Material and the 2005 Amendment to the Convention	2/3	
		International Convention for the Suppression of Acts of Nuclear Terrorism	2/2	
		Convention on Nuclear Safety	2/2	
		Convention on Early Notification of a Nuclear Accident	2/2	
		Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management	2/2	
		Convention on Assistance in Case of a Nuclear Accident or Radiological Emergency	2/2	
		Nuclear Security Recommendations on Physical Protection of Nuclear Material and Nuclear Facilities (INFCIRC/225/Rev.5)	2/4	
		Enactment of laws and establishment of regulations for national implementation	4/4	
	Efforts to maintain the highest possible standards of nuclear security/safety	Efforts for further minimization of HEU for peaceful purposes	4/4	
		Implementing measures (detection, deterrence, disruption, effective domestic control) for preventing illicit trafficking in nuclear materials throughout their territories	4/5	
		Acceptance of the IAEA nuclear security review missions	0/2	
		The IAEA Nuclear Security Plan and Nuclear Security Fund	2/2	
		Technology Development--Nuclear Forensics	2/2	
		Capacity-building and Outreach activities	2/2	
		Participation in initiatives such as CTR, G8 Global Partnership, GICNT, ISTC and Nuclear Security Summits	3/3	

NNWS South Korea

South Korea is an active supporter of the resolutions on nuclear disarmament at the United Nations General Assembly and other fora. However, South Korea has limited initiatives to achieve a "nuclear-free world" having to deal with North Korea's nuclear development program, and thus did not point well in disarmament. Nevertheless, South Korea's fulfillment of the IAEA obligations and steady implementation of various nuclear security-related treaties and measures raised its points in both nuclear non-proliferation and nuclear security.

Article		Evaluation criteria		Points
Nuclear Disarmament	Commitment to achieving a world without nuclear weapons	Voting behavior on the UNGA resolutions on nuclear disarmament proposed by Japan, NAC, and NAM, respectively.	5/6	25/43
		Voting behavior on the UNGA resolution calling for commencement of negotiations on a Nuclear Weapons Convention	1/2	
		Announcement of significant policies and important activities, such as, holding major conference	0/3	
	Diminishing the role and significance of nuclear weapons in the national security strategies and policies	The current status of the roles and significance of nuclear weapons in the national security strategies and policies, as well as military alliance	5/8	
		Commitment to the "sole purpose," no first use, and related doctrines	-	
		Negative security assurances	-	
		Signing and ratifying the protocols of the treaties on nuclear-weapon-free zones	-	
	CTBT	Signing and ratifying the CTBT	4/4	
		The moratorium on nuclear test explosions pending CTBT's entry into force	-	
		Cooperation with the CTBTO Preparatory Commission: contributions to the Commission and active participation in its meeting and other activities	2/2	
		Contribution to the development of the CTBT verification systems (IMS, OSI, and other verification technologies)	1/2	
		Nuclear Testing	-	
	FMCT	Commitment, efforts, and proposals toward immediate commencement of negotiations on an FMCT	3/5	
		Moratorium on the production of fissile material for use in nuclear weapons	-	
		Contribution to the development of verification measures, including research and development	1/2	
	Verifications of nuclear weapons reductions	Acceptance and implementation of verification for nuclear weapons reduction	-	
		Engagement in research and development for	0/1	

Nuclear Disarmament		verification measures of nuclear weapons reduction		
		The IAEA inspections to fissile material declared as no longer required for military purposes	-	
	Irreversibility	Implementing or planning dismantlement of nuclear warheads and their delivery vehicles	1/2	
		Decommissioning/conversion of nuclear weapons-related facilities	1/2	
		Measures for the fissile material declared excess for military purposes, such as disposition or conversion to peaceful purposes	-	
	Disarmament and non-proliferation educations and cooperation with civil society		1/4	

Nuclear Non-proliferation	Non-proliferation commitment	Accession to the NPT	10/10	51/58
		Compliance with Article 1 and 2 of the NPT and the UNSC Resolutions on Non-Proliferation	7/7	
		Establishment of the Nuclear-Weapon-Free Zones	0/3	
	IAEA Safeguards (Applicable to the NPT NNWS)	Signing and Ratifying a Comprehensive Safeguards Agreement	4/4	
		Signing and Ratifying an Additional Protocol	5/5	
		Implementation of the integrated safeguards	4/4	
		Compliance with the IAEA Safeguards Agreement	5/5	
	Cooperation with the IAEA	Efforts for strengthening the safeguards (e.g. development of the safeguards technology and promotion of the universality of the Additional Protocol)	2/3	
		Extrabudgetary contributions to the IAEA	1/1	
	Nuclear Export Controls	Establishment and implementation of the national implementation system	5/5	
		Requiring the Conclusion of the AP for Nuclear Export	0/2	
		Implementation of the USSCR on North Korean and Iranian nuclear issues	3/3	
		Participation in the PSI	2/2	
	Transparency in the peaceful use of nuclear energy	Reporting on the peaceful nuclear activities	2/2	
		Reporting on plutonium management	1/2	

	The amount of fissile material usable for nuclear		0/－16	35/41

Nuclear Security	weapons			
	Accession to and Participation in Treaties and Other International Frameworks and Application to the National Implementation System	Convention on the Physical Protection of Nuclear Material and the 2005 Amendment to the Convention	2/3	
		International Convention for the Suppression of Acts of Nuclear Terrorism	1/2	
		Convention on Nuclear Safety	2/2	
		Convention on Early Notification of a Nuclear Accident	2/2	
		Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management	2/2	
		Convention on Assistance in Case of a Nuclear Accident or Radiological Emergency	2/2	
		Nuclear Security Recommendations on Physical Protection of Nuclear Material and Nuclear Facilities (INFCIRC/225/Rev.5)	2/4	
		Enactment of laws and establishment of regulations for national implementation	4/4	
	Efoorts to maintain the highest possible standards of nuclear security/safety	Efforts for further minimization of HEU for peaceful purposes	4/4	
		Implementing measures (detection, deterrence, disruption, effective domestic control) for preventing illicit trafficking in nuclear materials throughout their territories	4/5	
		Acceptance of the IAEA nuclear security review missions	2/2	
		The IAEA Nuclear Security Plan and Nuclear Security Fund	2/2	
		Technology Development--Nuclear Forensics	2/2	
		Capacity-building and Outreach activities	2/2	
		Participation in initiatives such as CTR, G8 Global Partnership, GICNT, ISTC and Nuclear Security Summits	2/3	

NNWS South Africa

South Africa fully dismantled its nuclear arms (6 completed gun-type nuclear weapons and a partially-completed 7th device) and joined the NPT as a non-nuclear weapon state in 1991. Since then, South Africa has actively supported the United Nations General Assembly resolutions on nuclear disarmament as a member of the New Agenda Coalition (NAC) and the Non-Aligned Movement (NAM), raising its points in nuclear disarmament. However, the state's low rating in the nuclear non-proliferation and nuclear security areas reflected its non-participation in Proliferation Security Initiative (PSI) and other multilateral frameworks for strengthening nuclear security.

Article		Evaluation Criteria		Points
Nuclear Disarmament	Commitment to achieving a world without nuclear weapons	Voting behavior on the UNGA resolutions on nuclear disarmament proposed by Japan, NAC, and NAM, respectively.	5/6	26/43
		Voting behavior on the UNGA resolution calling for commencement of negotiations on a Nuclear Weapons Convention	2/2	
		Announcement of significant policies and important activities, such as, holding major conference	1/3	
	Diminishing the role and significance of nuclear weapons in the national security strategies and policies	The current status of the roles and significance of nuclear weapons in the national security strategies and policies, as well as military alliance	8/8	
		Commitment to the "sole purpose," no first use, and related doctrines	-	
		Negative security assurances	-	
		Signing and ratifying the protocols of the treaties on nuclear-weapon-free zones	-	
	CTBT	Signing and ratifying the CTBT	4/4	
		The moratorium on nuclear test explosions pending CTBT's entry into force	-	
		Cooperation with the CTBTO Preparatory Commission: contributions to the Commission and active participation in its meeting and other activities	1/2	
		Contribution to the development of the CTBT verification systems (IMS, OSI, and other verification technologies)	1/2	
		Nuclear Testing	-	
	FMCT	Commitment, efforts, and proposals toward immediate commencement of negotiations on an FMCT	3/5	
		Moratorium on the production of fissile material for use in nuclear weapons	-	
		Contribution to the development of verification measures, including research and development	0/2	
	Verifications of nuclear weapons	Acceptance and implementation of verification for nuclear weapons reduction	-	

Nuclear Disarmament	reductions	Engagement in research and development for verification measures of nuclear weapons reduction	0/1	
		The IAEA inspections to fissile material declared as no longer required for military purposes	-	
	Irreversibility	Implementing or planning dismantlement of nuclear warheads and their delivery vehicles	0/2	
		Decommissioning/conversion of nuclear weapons-related facilities	0/2	
		Measures for the fissile material declared excess for military purposes, such as disposition or conversion to peaceful purposes	-	
	Disarmament and non-proliferation educations and cooperation with civil society		1/4	

Nuclear Non-proliferation	Non-proliferation commitment	Accession to the NPT	10/10	46/58
		Compliance with Article 1 and 2 of the NPT and the UNSC Resolutions on Non-Proliferation	7/7	
		Establishment of the Nuclear-Weapon-Free Zones	3/3	
	IAEA Safeguards (Applicable to the NPT NNWS)	Signing and Ratifying a Comprehensive Safeguards Agreement	4/4	
		Signing and Ratifying an Additional Protocol	5/5	
		Implementation of the integrated safeguards	0/4	
		Compliance with the IAEA Safeguards Agreement	5/5	
	Cooperation with the IAEA	Efforts for strengthening the safeguards (e.g. development of the safeguards technology and promotion of the universality of the Additional Protocol)	1/3	
		Extrabudgetary contributions to the IAEA	0/1	
	Nuclear Export Controls	Establishment and implementation of the national implementation system	5/5	
		Requiring the Conclusion of the AP for Nuclear Export	0/2	
		Implementation of the USSCR on North Korean and Iranian nuclear issues	3/3	
		Participation in the PSI	0/2	
	Transparency in the peaceful use of nuclear energy	Reporting on the peaceful nuclear activities	2/2	
		Reporting on plutonium management	1/2	

	The amount of fissile material		0/－16	29/41

Nuclear Security	usable for nuclear weapons			
	Accession to and Participation in Treaties and Other International Frameworks and Application to the National Implementation System	Convention on the Physical Protection of Nuclear Material and the 2005 Amendment to the Convention	2/3	
		International Convention for the Suppression of Acts of Nuclear Terrorism	2/2	
		Convention on Nuclear Safety	2/2	
		Convention on Early Notification of a Nuclear Accident	2/2	
		Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management	2/2	
		Convention on Assistance in Case of a Nuclear Accident or Radiological Emergency	2/2	
		Nuclear Security Recommendations on Physical Protection of Nuclear Material and Nuclear Facilities (INFCIRC/225/Rev.5)	2/4	
		Enactment of laws and establishment of regulations for national implementation	4/4	
	Efforts to maintain the highest possible standards of nuclear security/safety	Efforts for further minimization of HEU for peaceful purposes	4/4	
		Implementing measures (detection, deterrence, disruption, effective domestic control) for preventing illicit trafficking in nuclear materials throughout their territories	4/5	
		Acceptance of the IAEA nuclear security review missions	0/2	
		The IAEA Nuclear Security Plan and Nuclear Security Fund	0/2	
		Technology Development--Nuclear Forensics	2/2	
		Capacity-building and Outreach activities	1/2	
		Participation in initiatives such as CTR, G8 Global Partnership, GICNT, ISTC and Nuclear Security Summits	0/3	

NNWS Sweden

Sweden's active voting behavior at United Nations and other fora on nuclear disarmament issues raised its points in the nuclear disarmament field. Its silence on certain Nuclear-Weapon-Free Zone Treaties and on special contributions to the IAEA pushed down its points in the non-proliferation field. In contrast, its steady implementation of various nuclear security-related treaties and measures raised its points in nuclear security.

Article		Evaluation criteria		Points
Nuclear Disarmament	Commitment to achieving a world without nuclear weapons	Voting behavior on the UNGA resolutions on nuclear disarmament proposed by Japan, NAC, and NAM, respectively.	5/6	28/43
		Voting behavior on the UNGA resolution calling for commencement of negotiations on a Nuclear Weapons Convention	2/2	
		Announcement of significant policies and important activities, such as, holding major conference	0/3	
	Diminishing the role and significance of nuclear weapons in the national security strategies and policies	The current status of the roles and significance of nuclear weapons in the national security strategies and policies, as well as military alliance	8/8	
		Commitment to the "sole purpose," no first use, and related doctrines	-	
		Negative security assurances	-	
		Signing and ratifying the protocols of the treaties on nuclear-weapon-free zones	-	
	CTBT	Signing and ratifying the CTBT	4/4	
		The moratorium on nuclear test explosions pending CTBT's entry into force	-	
		Cooperation with the CTBTO Preparatory Commission: contributions to the Commission and active participation in its meeting and other activities	1/2	
		Contribution to the development of the CTBT verification systems (IMS, OSI, and other verification technologies)	1/2	
		Nuclear Testing	-	
	FMCT	Commitment, efforts, and proposals toward immediate commencement of negotiations on an FMCT	3/5	
		Moratorium on the production of fissile material for use in nuclear weapons	-	
		Contribution to the development of verification measures, including research and development	1/2	
	Verifications of nuclear weapons reductions	Acceptance and implementation of verification for nuclear weapons reduction	-	
		Engagement in research and development for verification measures of nuclear weapons reduction	0/1	

Nuclear Disarmament		The IAEA inspections to fissile material declared as no longer required for military purposes	-	
	Irreversibility	Implementing or planning dismantlement of nuclear warheads and their delivery vehicles	1/2	
		Decommissioning/conversion of nuclear weapons-related facilities	1/2	
		Measures for the fissile material declared excess for military purposes, such as disposition or conversion to peaceful purposes	-	
	Disarmament and non-proliferation educations and cooperation with civil society		1/4	

Nuclear Non-proliferation	Non-proliferation commitment	Accession to the NPT	10/10	49/58
		Compliance with Article 1 and 2 of the NPT and the UNSC Resolutions on Non-Proliferation	7/7	
		Establishment of the Nuclear-Weapon-Free Zones	0/3	
	IAEA Safeguards (Applicable to the NPT NNWS)	Signing and Ratifying a Comprehensive Safeguards Agreement	4/4	
		Signing and Ratifying an Additional Protocol	5/5	
		Implementation of the integrated safeguards	4/4	
		Compliance with the IAEA Safeguards Agreement	5/5	
	Cooperation with the IAEA	Efforts for strengthening the safeguards (e.g. development of the safeguards technology and promotion of the universality of the Additional Protocol)	2/3	
		Extrabudgetary contributions to the IAEA	0/1	
	Nuclear Export Controls	Establishment and implementation of the national implementation system	5/5	
		Requiring the Conclusion of the AP for Nuclear Export	0/2	
		Implementation of the USSCR on North Korean and Iranian nuclear issues	3/3	
		Participation in the PSI	1/2	
	Transparency in the peaceful use of nuclear energy	Reporting on the peaceful nuclear activities	2/2	
		Reporting on plutonium management	1/2	

	The amount of fissile material usable for nuclear weapons		0/－16	36/41
	Accession to and	Convention on the Physical Protection of Nuclear	3/3	

Nuclear Security	Participation in Treaties and Other International Frameworks and Application to the National Implementation System	Material and the 2005 Amendment to the Convention		
		International Convention for the Suppression of Acts of Nuclear Terrorism	1/2	
		Convention on Nuclear Safety	2/2	
		Convention on Early Notification of a Nuclear Accident	2/2	
		Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management	2/2	
		Convention on Assistance in Case of a Nuclear Accident or Radiological Emergency	2/2	
		Nuclear Security Recommendations on Physical Protection of Nuclear Material and Nuclear Facilities (INFCIRC/225/Rev.5)	2/4	
		Enactment of laws and establishment of regulations for national implementation	4/4	
	Maintaining the highest possible standards of nuclear security/safety	Efforts for further minimization of HEU for peaceful purposes	4/4	
		Implementing measures (detection, deterrence, disruption, effective domestic control) for preventing illicit trafficking in nuclear materials throughout their territories	4/5	
		Acceptance of the IAEA nuclear security review missions	2/2	
		The IAEA Nuclear Security Plan and Nuclear Security Fund	2/2	
		Technology Development--Nuclear Forensics	2/2	
		Capacity-building and Outreach activities	2/2	
		Participation and contribution to initiatives such as CTR, G8 Global Partnership, GICNT, ISTC and Nuclear Security Summits	2/3	

NNWS Switzerland

Switzerland's non-reliance on nuclear weapons and its active involvement in various nuclear disarmament measures account for its high points in disarmament. Points in the nuclear non-proliferation and nuclear security fields stayed relatively low because Switzerland deals with a significant amount of plutonium.

Article		Evaluation Criteria		Points
Nuclear Disarmament	Commitment to achieving a world without nuclear weapons	Voting behavior on the UNGA resolutions on nuclear disarmament proposed by Japan, NAC, and NAM, respectively.	4/6	29/43
		Voting behavior on the UNGA resolution calling for commencement of negotiations on a Nuclear Weapons Convention	2/2	
		Announcement of significant policies and important activities, such as, holding major conference	1/3	
	Diminishing the role and significance of nuclear weapons in the national security strategies and policies	The current status of the roles and significance of nuclear weapons in the national security strategies and policies, as well as military alliance	8/8	
		Commitment to the "sole purpose," no first use, and related doctrines	-	
		Negative security assurances	-	
		Signing and ratifying the protocols of the treaties on nuclear-weapon-free zones	-	
	CTBT	Signing and ratifying the CTBT	4/4	
		The moratorium on nuclear test explosions pending CTBT's entry into force	-	
		Cooperation with the CTBTO Preparatory Commission: contributions to the Commission and active participation in its meeting and other activities	1/2	
		Contribution to the development of the CTBT verification systems (IMS, OSI, and other verification technologies)	1/2	
		Nuclear Testing	-	
	FMCT	Commitment, efforts, and proposals toward immediate commencement of negotiations on an FMCT	3/5	
		Moratorium on the production of fissile material for use in nuclear weapons	-	
		Contribution to the development of verification measures, including research and development	0/2	
	Verifications of nuclear weapons reductions	Acceptance and implementation of verification for nuclear weapons reduction	-	
		Engagement in research and development for verification measures of nuclear weapons reduction	0/1	
		The IAEA inspections to fissile material declared as no longer required for military purposes	-	

Nuclear Disarmament	Irreversibility	Implementing or planning dismantlement of nuclear warheads and their delivery vehicles	1/2	
		Decommissioning/conversion of nuclear weapons-related facilities	1/2	
		Measures for the fissile material declared excess for military purposes, such as disposition or conversion to peaceful purposes	-	
	Disarmament and non-proliferation educations and cooperation with civil society		3/4	

Nuclear Non-proliferation	Non-proliferation commitment	Accession to the NPT	10/10	44/58
		Compliance with Article 1 and 2 of the NPT and the UNSC Resolutions on Non-Proliferation	7/7	
		Establishment of the Nuclear-Weapon-Free Zones	0/3	
	IAEA Safeguards (Applicable to the NPT NNWS)	Signing and Ratifying a Comprehensive Safeguards Agreement	4/4	
		Signing and Ratifying an Additional Protocol	5/5	
		Implementation of the integrated safeguards	0/4	
		Compliance with the IAEA Safeguards Agreement	5/5	
	Cooperation with the IAEA	Efforts for strengthening the safeguards (e.g. development of the safeguards technology and promotion of the universality of the Additional Protocol)	1/3	
		Extrabudgetary contributions to the IAEA	0/1	
	Nuclear Export Controls	Establishment and implementation of the national implementation system	5/5	
		Requiring the Conclusion of the AP for Nuclear Export	0/2	
		Implementation of the USSCR on North Korean and Iranian nuclear issues	3/3	
		Participation in the PSI	1/2	
	Transparency in the peaceful use of nuclear energy	Reporting on the peaceful nuclear activities	2/2	
		Reporting on plutonium management	1/2	

	The amount of fissile material usable for nuclear weapons		−4/−16	22/41
	Accession to and Participation in Treaties and Other	Convention on the Physical Protection of Nuclear Material and the 2005 Amendment to the Convention	3/3	

Nuclear Security	International Frameworks and Application to the National Implementation System	International Convention for the Suppression of Acts of Nuclear Terrorism	2/2	
		Convention on Nuclear Safety	2/2	
		Convention on Early Notification of a Nuclear Accident	2/2	
		Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management	2/2	
		Convention on Assistance in Case of a Nuclear Accident or Radiological Emergency	2/2	
		Nuclear Security Recommendations on Physical Protection of Nuclear Material and Nuclear Facilities (INFCIRC/225/Rev.5)	2/4	
		Enactment of laws and establishment of regulations for national implementation	4/4	
	Efforts to maintain the highest possible standards of nuclear security/safety	Efforts for further minimization of HEU for peaceful purposes	0/4	
		Implementing measures (detection, deterrence, disruption, effective domestic control) for preventing illicit trafficking in nuclear materials throughout their territories	4/5	
		Acceptance of the IAEA nuclear security review missions	0/2	
		The IAEA Nuclear Security Plan and Nuclear Security Fund	0/2	
		Technology Development--Nuclear Forensics	0/2	
		Capacity-building and Outreach activities	1/2	
		Participation in initiatives such as CTR, G8 Global Partnership, GICNT, ISTC and Nuclear Security Summits	2/3	

[Other]

North Korea

North Korea joined the NPT in 1985 but has declared its withdrawal from the treaty several times after the IAEA obtained evidence of its non-compliance with its obligations under a comprehensive safeguards agreement. Moreover, from 2002, North Korea continues to take actions that shake the foundation of the NPT regime, by conducting nuclear tests, revealing a uranium enrichment program, and refusing access to IAEA inspectors. While the amount of fissile material and the number of nuclear weapons it holds are unclear, North Korea claims having strong nuclear capabilities. North Korea's subsequent actions in violation of the NPT, UNSC Resolutions, and other important international norms and agreements with relevant countries placed it at the bottom of the rating in all three fields.

Article		Evaluation Criteria		Points
Nuclear Disarmament	The number of nuclear weapons (estimates)		−5/−20	7/98
	Commitment to achieving a world without nuclear weapons	Voting behavior on the UNGA resolutions on nuclear disarmament proposed by Japan, NAC, and NAM, respectively.	4/6	
		Voting behavior on the UNGA resolution calling for commencement of negotiations on a Nuclear Weapons Convention	2/2	
		Announcement of significant policies and important activities, such as, holding major conference	0/3	
	Reduction of nuclear weapons	Reduction of nuclear weapons in the past 5 years	0/15	
		A concrete plan for further reduction of nuclear weapons	0/3	
		Trends on strengthening/modernizing nuclear weapons capabilities	0/4	
	Diminishing the role and significance of nuclear weapons in the national security strategies and policies	The current status of the roles and significance of nuclear weapons in the national security strategies and policies, as well as military alliance	1/8	
		Commitment to the “sole purpose,” no first use, and related doctrines	0/3	
		Negative security assurances	1/2	
		Signing and ratifying the protocols of the treaties on nuclear-weapon-free zones	-	
	De-alerting or measures for maximizing decision time to authorize the use of nuclear weapons		3/4	

Nuclear Disarmament	CTBT	Signing and ratifying the CTBT	0/4	
		The moratorium on nuclear test explosions pending CTBT's entry into force	0/3	
		Cooperation with the CTBTO Preparatory Commission: contributions to the Commission and active participation in its meeting and other activities	0/2	
		Contribution to the development of the CTBT verification systems (IMS, OSI, and other verification technologies)	0/2	
		Nuclear Testing	0/3	
	FMCT	Commitment, efforts, and proposals toward immediate commencement of negotiations on an FMCT	0/5	
		Moratorium on the production of fissile material for use in nuclear weapons	0/3	
		Contribution to the development of verification measures, including research and development	0/2	
	Transparency regarding nuclear forces, fissile material for nuclear weapons, and nuclear strategy/doctrine		0/6	
	Verifications of nuclear weapons reductions	Acceptance and implementation of verification for nuclear weapons reduction	0/3	
		Engagement in research and development for verification measures of nuclear weapons reduction	0/1	
		The IAEA inspections to fissile material declared as no longer required for military purposes	0/3	
	Irreversibility	Implementing or planning dismantlement of nuclear warheads and their delivery vehicles	0/3	
		Decommissioning/conversion of nuclear weapons-related facilities	1/2	
		Measures for the fissile material declared excess for military purposes, such as disposition or conversion to peaceful purposes	0/2	
	Disarmament and non-proliferation educations and cooperation with civil society		0/4	

	Non-proliferation	Accession to the NPT	0/10	4/58

Nuclear Non-proliferation	commitment	Compliance with Article 1 and 2 of the NPT and the UNSC Resolutions on Non-Proliferation	0/7	
		Establishment of the Nuclear-Weapon-Free Zones	0/3	
	IAEA Safeguards (Applicable to the NPT NNWS)	Signing and Ratifying a Comprehensive Safeguards Agreement	4/4	
		Signing and Ratifying an Additional Protocol	0/5	
		Implementation of the integrated safeguards	0/4	
		Compliance with the IAEA Safeguards Agreement	0/5	
	Cooperation with the IAEA	Efforts for strengthening the safeguards (e.g. development of the safeguards technology and promotion of the universality of the Additional Protocol)	0/3	
		Extrabudgetary contributions to the IAEA	0/1	
	Nuclear Export Controls	Establishment and implementation of the national implementation system	0/5	
		Requiring the Conclusion of the AP for Nuclear Export	0/2	
		Implementation of the USSCR on North Korean and Iranian nuclear issues	0/3	
		Participation in the PSI	0/2	
	Transparency in the peaceful use of nuclear energy	Reporting on the peaceful nuclear activities	0/2	
		Reporting on plutonium management	0/2	

Nuclear Security	The amount of fissile material usable for nuclear weapons		－4/－16	-2/41
	Accession to and Participation in Treaties and Other International Frameworks and Application to the National Implementation System	Convention on the Physical Protection of Nuclear Material and the 2005 Amendment to the Convention	0/3	
		International Convention for the Suppression of Acts of Nuclear Terrorism	0/2	
		Convention on Nuclear Safety	0/2	
		Convention on Early Notification of a Nuclear Accident	1/2	
		Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management	0/2	
		Convention on Assistance in Case of a Nuclear Accident or Radiological Emergency	0/2	
		Nuclear Security Recommendations on Physical Protection of Nuclear Material and Nuclear Facilities (INFCIRC/225/Rev.5)	0/4	
		Enactment of laws and establishment of regulations	1/4	

Nuclear Security		for national implementation		
	Efforts to maintain the highest possible standards of nuclear security/safety	Efforts for further minimization of HEU for peaceful purposes	0/4	
		Implementing measures (detection, deterrence, disruption, effective domestic control) for preventing illicit trafficking in nuclear materials throughout their territories	0/5	
		Acceptance of the IAEA nuclear security review missions	0/2	
		The IAEA Nuclear Security Plan and Nuclear Security Fund	0/2	
		Technology Development--Nuclear Forensics	0/2	
		Capacity-building and Outreach activities	0/2	
		Participation in initiatives such as CTR, G8 Global Partnership, GICNT, ISTC and Nuclear Security Summits	0/3	

Abbreviation

AG	Australia Group
ANZUS	Australia, New Zealand, United States Security Treaty
BMD	Ballistic Missile Defense
BMDR	Ballistic Missile Defense Review
BWC	Biological Weapons Convention
CD	Conference on Disarmament
COE	Center of Excellence
CTBT	Comprehensive Nuclear-Test-Ban Treaty
CTBTO	CTBT Organization
CTR	Cooperative Threat Reduction
CWC	Chemical Weapons Convention
DDPR	Deterrence and Defense Posture Review
EU	European Union
EURATOM	European Atomic Energy Communities
FMCT	Fissile Material Cut-Off Treaty
G8GP	G8 Global Partnership
GICNT	Global Initiative to Combat Nuclear Terrorism
GTRI	Global Threat Reduction Initiative
HEU	Highly Enriched Uranium
IAEA	International Atomic Energy Agency
ICAN	International Campaign to Abolosh Nuclear Weapons
ICBM	Inter-Continental Ballistic Missile
ICJ	International Court of Justice
ICNND	International Commission on Nuclear Non-proliferation and Disarmament
IMS	International Monitoring System
INTERPOL	International Criminal Police Organization
IPFM	International Panel on Fissile Materials
IPPAS	International Physical Protection Advisory Service
ISTC	International Science and Technology Center
ITDB	Illicit Trafficking Database
ITWG	Nuclear Forensics International Technical Working Group
LEU	Low Enriched Uranium
LOF	Locations outside Facilities
LOW	Launch on Warning
LUA	Launch under Attack
MaRV	Maneuverable Reentry Vehicle
MD	Missile Defense
MIRV	Multiple Independently-targetable Reentry Vehicle
MRBM	Medium-Range Ballistic Missile
MSSP	Member State Support Programme
MTCR	Missile Technology Control Regime
NAC	New Agenda Coalition
NAM	Non-Aligned Movement
NATO	North Atlantic Treaty Organization
NNSA	National Nuclear Security Administration
NPR	Nuclear Posture Review
NPDI	Non-Proliferation and Disarmament Initiative
NPT	Nuclear Non-Proliferation Treaty
NRRC	Nuclear Risk Reduction Center
NSF	Nuclear Security Fund
NSG	Nuclear Suppliers Group
NTI	Nuclear Threat Initiative
NTM	National Technical Means

PSI	Proliferation Security Initiative
QDR	Quadrennial Defense Review
SDSR	Strategic Defence and Security Review
SLBM	Submarine Launched Ballistic Missile
SLD	Second Line of Defense
SORT	Strategic Offensive Reductions Treaty
SRBM	Short-Range Ballistic Missile
SSBN	Ballistic Missile Nuclear-Powered Submarine
START	Strategic Arms Reduction Treaty (Talks)
WA	Wassenaar Arrangement
WCO	World Customs Organization
WMD	Weapons of Mass Destruction