



IPFM
INTERNATIONAL PANEL
ON FISSILE MATERIALS

Reducing and Eliminating Nuclear Weapons:

Country Perspectives on the Challenges to Nuclear Disarmament

Reducing and Eliminating Nuclear Weapons: Country Perspectives on the Challenges to Nuclear Disarmament

www.fissilematerials.org

© 2010 International Panel on Fissile Materials

This work is licensed under the Creative Commons Attribution-Noncommercial License

To view a copy of this license, visit www.creativecommons.org/licenses/by-nc/3.0

Table of Contents

About the IPFM	1
Overview	2
Country Perspectives	
China	10
France	16
Germany	22
India	26
Iran	30
Israel	36
Japan	46
North Korea	56
South Korea	63
Pakistan	67
Russia	74
United Kingdom	84
United States	93
Endnotes	102
Contributors	123

About the IPFM

The International Panel on Fissile Materials (IPFM) was founded in January 2006. It is an independent group of arms-control and nonproliferation experts from seventeen countries, including both nuclear weapon and non-nuclear weapon states.

The mission of the IPFM is to analyze the technical basis for practical and achievable policy initiatives to secure, consolidate, and reduce stockpiles of highly enriched uranium and plutonium. These fissile materials are the key ingredients in nuclear weapons, and their control is critical to nuclear disarmament, halting the proliferation of nuclear weapons, and ensuring that terrorists do not acquire nuclear weapons.

Both military and civilian stocks of fissile materials have to be addressed. The nuclear weapon states still have enough fissile materials in their weapon stockpiles for tens of thousands of nuclear weapons. On the civilian side, enough plutonium has been separated to make a similarly large number of weapons. Highly enriched uranium is used in civilian reactor fuel in more than one hundred locations. The total amount used for this purpose is sufficient to make about one thousand Hiroshima-type bombs, a design potentially within the capabilities of terrorist groups.

The Panel is co-chaired by Professor R. Rajaraman of Jawaharlal Nehru University in New Delhi and Professor Frank von Hippel of Princeton University. Its members include nuclear experts from Brazil, China, France, Germany, India, Ireland, Japan, South Korea, Mexico, the Netherlands, Norway, Pakistan, Russia, South Africa, Sweden, the United Kingdom and the United States. Professor José Goldemberg of Brazil stepped down as co-chair of IPFM on July 1, 2007. He continues as a member of IPFM.

IPFM research and reports are shared with international organizations, national governments and nongovernmental groups. It has full panel meetings twice a year in capitals around the world in addition to specialist workshops. These meetings and workshops are often in conjunction with international conferences at which IPFM panels and experts are invited to make presentations.

Princeton University's Program on Science and Global Security provides administrative and research support for the IPFM.

IPFM's initial support is provided by a five-year grant to Princeton University from the John D. and Catherine T. MacArthur Foundation of Chicago. This report was made possible by additional support from the Princeton Institute of International and Regional Studies (PIIRS) for a workshop on "The Control and Disposition of Fissile Material in a Transition to a Nuclear-Weapon Free World," held at Princeton in May 2009.

Overview

This report explores the major policy obstacles that stand in the way of the nuclear-armed states deciding to eliminate their weapons. It includes perspectives from thirteen countries: the current nine nuclear-weapon states, and four non-nuclear states (Germany, Japan, South Korea, and Iran). The report is a companion to *Global Fissile Material Report 2009: A Path to Nuclear Disarmament*, which used the lens of fissile-materials policies to examine challenges to the achievement of a nuclear-weapon-free world.

The broad subjects covered in the country perspectives presented here are:

- The commitment by states to the elimination of nuclear weapons as reflected in their public statements, their plans to modernize their weapon complexes, and their views on the potential uses of nuclear weapons;
- The linkages to other security issues that they see as standing in the way of progress towards the goal of nuclear weapon elimination;
- Their views regarding the increased transparency and verification that would be required by nuclear disarmament; and,
- Their perspectives on control of fissile materials, including a Fissile Material Cutoff Treaty, which would provide a basis for the process of nuclear disarmament.

The country perspectives are based on government statements and national debates on nuclear disarmament. The preliminary and speculative nature of the perspectives reflects the fact that, for the most part, governments have not yet focused seriously on the practical, near-term steps required by the adoption of nuclear-weapons abolition as a major policy goal.

Commitment to elimination

There is a long history of all of today's nuclear weapon states committing in principle to nuclear disarmament. Article VI of the 1970 nuclear Nonproliferation Treaty (NPT) commits its five nuclear-weapon-state parties: the United States, Russia, United Kingdom, France and China, as a matter of international law "to pursue negotiations in good faith on effective measures relating to the cessation of the nuclear arms race at an early date and to nuclear disarmament." In a 1996 Advisory Opinion, the World Court interpreted the Article VI obligation as requiring states to bring such negotiations to a successful conclusion. The weapon states outside the NPT, Israel, India, North Korea and Pakistan, also have made political commitments to disarmament.

The United States and Russia are reducing the size of their deployed arsenals but the general view among the other nuclear-armed states is that the two “nuclear superpowers” must reduce the numbers of their nuclear warheads from thousands to hundreds each before the other nuclear-armed states will consider seriously taking significant steps toward nuclear disarmament. The country studies reveal that most nuclear weapon states consider the achievement of nuclear disarmament to lie far beyond any planning horizon and are therefore investing in significant modernization of their nuclear-weapon complexes and delivery systems.

In 2009, President Barack Obama declared that the United States was committed to seeking “the peace and security of a world without nuclear weapons.”¹ He qualified this commitment, however, by stating that “This goal will not be reached quickly—perhaps not in my lifetime.” He also added that “as long as nuclear weapons exist, the United States will maintain a safe, secure, and effective arsenal.” The report of the Obama Administration’s Nuclear Posture Review (NPR) released in April 2010, formalized this perspective by establishing a goal of nuclear disarmament but also commitments to retain the U.S. triad of nuclear-weapon delivery systems, life extensions for more than one thousand nuclear warheads, and the modernization of the U.S. nuclear-weapon production complex.² In its most direct reference to nuclear disarmament, the NPR called for: “initiating a comprehensive national research and development program to support continued progress toward a world free of nuclear weapons, including work on verification technologies and the development of transparency measures.”³

In 2009, Russian President Dmitry Medvedev joined President Obama in expressing support for “a nuclear weapon free world.” But, as the chapter on Russia explains, “the prevailing view in Russia’s political-military leadership is that nuclear weapons play a key role in ensuring Russia’s security.” Indeed, Russia is replacing its aging strategic nuclear-weapon delivery systems—although not at a rate equal to their rate of retirement. President Medvedev has argued that, “The whole world is doing this ... this process will continue and our nuclear shield will always be effective and sufficient for protecting our national interest.”⁴

Similarly, in early 2009, the United Kingdom issued an official study, “Lifting the Nuclear Shadow: Creating the Conditions for Abolishing Nuclear Weapons.”⁵ This laid out a perspective on moving towards disarmament. The UK continues, however, to invest in upgrading its nuclear-warhead R&D and production complex, and is moving forward in implementing a controversial decision to replace its ballistic-missile submarines. The missiles are leased from the United States.

In July 2009, France joined the U.S., Russia the U.K. and the other G8 countries in a joint statement that “we are all committed to seeking a safer world for all and to creating the conditions for a world without nuclear weapons.” This is for France an unprecedented expression of support for nuclear weapons elimination. France has cut its nuclear arsenal since the end of the Cold War, which is now half of its Cold War peak. France also has closed its nuclear weapons test site and military fissile material production facilities. France too, however, has been deploying new warheads and delivery systems and modernizing its weapons R&D and maintenance infrastructure.

In a September 2009 Security Council Resolution, China joined the other permanent members of the UN Security Council in a commitment “to seek a safer world for all and to create the conditions for a world without nuclear weapons.”⁶ China, unlike the United States, Russia, U.K. and France, has supported calls for the negotiation of a convention to ban nuclear weapons at an early date. In the meantime, however, China is introducing more survivable land-mobile and submarine-based nuclear-armed missiles.

India, Israel and Pakistan, the three nuclear-armed states that never joined the NPT, and North Korea, which withdrew from the Treaty in 2003, have all indicated support in one way or another for the goal of nuclear disarmament. India, although an early advocate for a time-bound process for nuclear-weapon elimination, has made clear that it will maintain a nuclear arsenal until there is global nuclear disarmament. Pakistan too has called for the complete elimination of nuclear weapons within a specified time-frame, but it has made clear it will retain nuclear weapons as long as India does. Indeed, both countries are still in the process of producing fissile material for additional nuclear weapons and developing longer-range delivery systems, including ballistic missiles and cruise missiles. India also has started tests of its first ballistic-missile submarine.

Israel, the only nuclear-armed state in the Middle East, sees nuclear-weapon elimination in regional security terms. It has expressed support for a “vision of the Middle East evolving into a zone free of Chemical, Biological and Nuclear Weapons as well as ballistic missiles.” In the meantime, in 2003, Israel deployed submarine-launched nuclear-armed cruise missiles alongside its land-based missiles and nuclear-capable fighter jet delivery systems, creating its own nuclear triad.⁷

North Korea’s position on eliminating nuclear weapons has been wrapped up in its relationship with the United States. Since 2003, as part of its Six Party dialogue with China, Japan, Russia, South Korea, and the United States, North Korea has made on-again, off-again commitments to disable and dismantle its nuclear weapon facilities and ultimately eliminate its nuclear weapons.

The views on nuclear disarmament of four non-weapon states (Germany, Iran, Japan and South Korea), all parties to the NPT, are also discussed in this report. Germany, Japan and South Korea are allied to the United States and are covered by U.S. commitments to their defense, including the possible use of U.S. nuclear weapons.

The Obama Administration’s Nuclear Posture Review committed “that the United States will not use or threaten to use nuclear weapons against non-nuclear weapons states that are party to the NPT and in compliance with their nuclear non-proliferation obligations,” but then singled out Iran, along with North Korea, as not being in compliance with its nonproliferation obligations. The chapter on Iran notes that, while Iran’s nuclear-energy program continues to raise international concern because of its potential for providing Iran with a nuclear-weapon option, Supreme Leader Ayatollah Khamenei reiterated in February 2010 that “we do not believe in nuclear bomb... and we will not seek it. According to our ... religious principles, the use of this type of weapons of mass destruction is absolutely forbidden.”

Moving toward a world free of nuclear weapons

The transition to a nuclear weapon-free world will require a complex and difficult balancing of the many varied and, in some cases, opposing interests and security concerns of the nine weapon states as well as the approximately 30 non-weapon-state allies under the U.S. “nuclear umbrella.” The Obama Administration’s Nuclear Posture Review appears to extend this nuclear umbrella beyond the countries in the NATO alliance, Japan, South Korea, Australia and New Zealand, to cover states that are U.S. ‘partners,’ although these latter countries are not identified explicitly.

As the chapters on Russia, Pakistan, Israel and North Korea make clear, policy makers in these countries appear concerned that, in moving towards a world without nuclear weapons, they may be giving up their only certain deterrent to conventional military threats they perceive from other states. They worry about how they would fill the resulting gaps in their security policies.

Russia is worried that U.S. efforts to develop ballistic-missile defenses and to deploy intercontinental missiles with conventional warheads (known as 'Prompt Global Strike') could in the future neutralize Russia's shrinking nuclear deterrent. As the chapter on Germany notes, some leading German statesmen also have become concerned that the U.S. ballistic-missile-defense program is an obstacle to nuclear disarmament and have called for restoring the 1972 Anti-Ballistic Missile (ABM) treaty.

Russia's government also remains concerned that NATO's expansion into Eastern Europe has reduced its buffer against an attack by NATO and it has separate fears that the economic and military rise of China will threaten Russia's control of its far east. Russia will want these security issues addressed as part of any agreement in which it commits to give up—or even make very deep cuts in – its nuclear arsenal.

China has a much smaller nuclear arsenal than those of the U.S. and Russia and has indicated a willingness to join the disarmament process when their Cold War legacy nuclear forces are much smaller—probably less than 1000 total weapons each. Like Russia, China worries about the impact of the U.S. missile defense programs on its nuclear deterrent, including the U.S. sharing of missile defenses with Japan, and U.S. plans for a Prompt Global Strike capability. At the UN Conference on Disarmament, China and Russia have long sought talks on a treaty for the Prevention of an Arms Race in Outer Space. These efforts appear to be related to their concerns about U.S. development and deployment of missile defenses and anti-satellite weapons. China has indicated that limitations on these activities might be required if it is to join a disarmament process.

Maintaining a strategic balance with India is at the heart of Pakistan's concerns about nuclear weapons and shapes its assessment of any proposed arms control and disarmament measure. Nuclear weapons are seen as a way to balance both India's nuclear and conventional forces. In its search for parity with India, Pakistan has proposed a set of bilateral restraints covering nuclear-weapon and ballistic-missile deployment, missile defenses (an area in which the U.S. has offered to assist India), nuclear submarines, advanced conventional weapon systems such as combat aircraft and warships, and conventional force postures and deployments. In exchange for a commitment to join in a nuclear disarmament process, Pakistan may require progress on all these issues as well as broader security assurances and a resolution of its dispute with India over Kashmir. Currently, Pakistan is using the consensus rules of the Conference on Disarmament to block the launch of negotiations of a Fissile Material Cutoff Treaty, which is a key building block of a nuclear-disarmament regime.

Israel developed its nuclear weapons in the late 1960s when it saw them as a guarantee of its security from being overrun by its neighbors in the Middle East, with whom it has fought major wars. Israel also has security support from the United States, including a commitment to enhancing Israel's military capabilities, which includes large amounts of U.S. military aid, the supply of advanced weapons, and access to military technologies. Israel has argued that any commitment to its nuclear disarmament, usually seen as involving a regional arrangement such as a Middle East nuclear weapon free zone, be preceded by peace and reconciliation with its neighbors, and agreement on regional limits on conventional forces. Israel now has peace treaties with two of its neighbors, Egypt and Jordan but is concerned that Iran may acquire nuclear weapons.

North Korea has indicated that, in exchange for giving up its nuclear weapons, it seeks a settlement with the United States, including full diplomatic recognition and a formal end to the Korean War. It has, in fact, already agreed more than once to give up its nuclear weapons and started the process of doing so, only to backtrack when it saw that it was not receiving the political and economic rewards it was expecting.

For the United States, France and the United Kingdom, the elimination of nuclear weapons is tied primarily to concerns about maintaining the current international order. This order emerged with the collapse of the European empires and the rise of the United States as a global power in the early part of the last century. Nuclear weapons have served to help them secure this order. At the same time, given their global interests, these states find it important to prevent proliferation, especially to potentially hostile states in regions that are of strategic and economic importance. Traditionally, these three states have seen the transition to nuclear disarmament as a step-by-step process requiring strengthened barriers to proliferation. Now, however, the case is being made that nuclear disarmament may be necessary to secure the nonproliferation regime and to protect the international order from nuclear terrorism.

As has already been suggested, a final linkage that will need to be addressed as part of eliminating nuclear weapons is the United States' commitment to allies and partners, including Germany, Japan and South Korea, to come to their defense, including with the possible use of nuclear weapons. For many of these states, U.S. intervention was assured by maintaining U.S. troops and (in NATO Europe and South Korea) U.S. nuclear weapons on their territory. Many of these forces were removed following the end of the Cold War. Today, the U.S. only has nuclear weapons in Belgium, Germany, Italy, the Netherlands, and Turkey. Recently, Belgium, Germany, Luxembourg, the Netherlands and Norway have called for the remaining few hundred U.S. nuclear weapons to be withdrawn from Europe.⁸ The United States insists that the weapons remain in Europe as bargaining chips in future nuclear-reduction negotiations with Russia.⁹

Finally, as discussed in detail in the chapter on Japan, lawmakers there recently made clear that they desired the United States not use nuclear weapons except to deter a nuclear threat to Japan. The Obama Administration's Nuclear Posture Review proposes to continue extending U.S. protection to Japan and other allies and partners but through increased reliance on conventional arms and more effective regional missile defenses—which could exacerbate Chinese and Russian concerns about those capabilities.

Transparency and verification

Sustainable progress towards eliminating nuclear weapons will require increasingly stringent verification and transparency measures. Currently, however, the nuclear-armed states have very divergent views on the value of increased transparency.

The United States, UK and France are currently the most transparent weapon states. The United States has published information on its histories of fissile material production and disposition. The UK has made public declarations on the sizes of its total warhead stockpile and on its fissile-material stocks. France has revealed the total size of its arsenal, but not its fissile-material stocks.

Although Russia is believed to have fissile material stocks that are even larger than those of the United States, it has not declared their sizes. Russia has, however, accepted significant on-site verification on a bilateral basis with the U.S. under the 1994-2009 START and 2010 New START agreements, which limit deployed nuclear warheads and their launchers and delivery vehicles.

China sees maintaining secrecy about its weapon and fissile material stockpiles as a way to create additional uncertainty that the deterrence posed by China's modest number of nuclear weapons could successfully be neutralized. China has been concerned, in particular, about the surveillance and precision-strike capabilities of the United States.

Israel sees increased transparency as a slippery slope that would undercut the “opacity” of its nuclear weapons capabilities. Until it is ready to eliminate its nuclear weapons, Israel therefore is likely to resist disarmament initiatives that include major transparency and verification obligations.

India and Pakistan also have concerns about the possible impacts of increased transparency.

Fissile materials

States have a range of perspectives on what controls they will accept on fissile material production and stockpiles, and civilian nuclear energy programs as part of the effort to achieve nuclear disarmament. Fissile materials (highly enriched uranium and separated plutonium) are the key ingredients in nuclear weapons.

Today only India, Pakistan and perhaps Israel and North Korea are producing additional fissile material for weapons. Their stockpiles are much smaller than those held by the five major nuclear weapon states.

Inside the weapon complexes—mostly in Russia and the US—along with the approximately ten thousand warheads that are in service globally, there are a similar number awaiting dismantlement, and materials and components from tens of thousands more in storage. Some of the fissile materials in these warheads and components have already been declared excess for weapons purposes. About 500 tons of excess weapons highly enriched uranium (HEU) has been blended down to low-enriched uranium (LEU) for use in power reactor fuel and the United States and Russia recently recommitted to use in mixed-oxide power-reactor fuel the 68 tons of the weapon-grade plutonium that they have declared excess for weapon purposes.¹⁰

Nuclear disarmament would release an estimated additional 900 tons of HEU and 150 tons of plutonium. There are also huge quantities of weapon-usable HEU and plutonium in the civilian nuclear-energy and R&D complexes and reserved to fuel naval and other military reactors. As discussed in *Global Fissile Material Report 2009*, this material could destabilize a world moving towards the elimination of nuclear arsenals.

As shown by international concerns about Iran’s uranium enrichment program, civilian nuclear energy programs are a concern. Uranium enrichment plants could quickly be redirected from producing low-enriched uranium (LEU) for nuclear fuel to the production of highly enriched uranium (HEU) for weapons.

Among non-weapon states, Germany, Iran and Japan have domestic enrichment plants (as do Brazil and the Netherlands). Germany has proposed an International Nuclear Fuel Cycle Center with a commercial uranium enrichment plant to be managed by the International Atomic Energy Agency. Some such internationalization of the world’s enrichment plants will probably have to be a part of a nuclear-disarmament program.

Plutonium separated from spent power-reactor fuel by civilian reprocessing plants also could be used to make nuclear weapons. France has been recycling its separated plutonium into light-water reactor fuel and Japan is beginning to do the same. As the chapter on South Korea notes, since the North Korean nuclear tests, South Korea has cited ‘nuclear sovereignty’ to justify its right to enrich and reprocess nuclear fuel like Japan. The United Kingdom seems on the verge of abandoning reprocessing and is beginning to think about how to dispose of its enormous stockpile of separated plutonium. Russia

and India, the two other countries that currently are reprocessing power-reactor fuel, are committed to the commercialization of plutonium-fueled breeder reactors, which sustains their commitment to reprocessing.

The challenges of fissile material control were described at greater length in *Global Fissile Material Report 2008: Scope and Verification of a Fissile Material (Cutoff) Treaty* and in eleven country studies in a companion volume: *Banning the Production of Fissile Materials for Nuclear Weapons: Country Perspectives on the Challenges of a Fissile Material (Cutoff) Treaty*.

Conclusions and recommendations

If the goal of nuclear disarmament is to be taken seriously, then the nuclear-armed states will need to offer something more concrete than rhetoric about their willingness to “create the conditions for a world without nuclear weapons.” A possible path forward would be for the nuclear weapon states to agree to start work on a framework convention for the elimination of nuclear weapons.

As the first step towards a framework convention, states could carry out internal studies and develop respective national plans for the elimination of nuclear weapons. This was a step first called for in January 1946 in UN General Assembly Resolution 1.1 at a time when the United States was the only country possessing nuclear weapons. States could agree to submit to the United Nations by an agreed date their respective plans.

To give credibility to these plans, current modernization plans will need to be reconsidered and more significant resources committed to developing the technical basis for nuclear disarmament. The United Kingdom has launched a modest R&D program on the verification of nuclear disarmament and the Obama Administration, in the report of its Nuclear Posture Review committed to do so as well. These programs need to become more ambitious and other nuclear weapon states should initiate similar efforts and agree to share the results.

To reduce uncertainties about the fulfillment of their disarmament obligations and help establish a basis for verification of national accounts of the amounts of fissile material produced and the number of weapons assembled and dismantled, the nuclear-armed weapon states must preserve their nuclear production reactors, and the waste products from their enrichment and reprocessing plants, along with detailed production and dismantlement records for their warheads until international verification can be carried out. States could begin now to initiate multinational discussions to agree on what must be preserved to enable techniques of nuclear archaeology and launch joint pilot verification projects.

Progress towards nuclear disarmament also requires an end to production of fissile material for nuclear weapons, a phase out of the uses of HEU and plutonium in nuclear-reactor fuel and a drastic reduction of existing stocks. In short, it requires states to adopt fissile-material policies that support the goal of nuclear disarmament.

Country Perspectives

China

Beijing has long urged negotiation of an international legal instrument on complete prohibition and thorough destruction of nuclear weapons and to achieve a nuclear-free world at an early date.¹¹ China is the only nuclear-weapon state to support negotiation of a nuclear weapons convention.

On October 16, 1964, when China announced its first nuclear test, China also proposed that:

“a summit conference of all the countries of the world be convened to discuss the questions of the complete prohibition and thorough destruction of nuclear weapons, and that as the first step, the summit conference conclude an agreement to the effect that the nuclear powers and those countries which may soon become nuclear powers undertake not to use nuclear weapons either against non-nuclear countries and nuclear-free zones or against each other.”¹²

In its 2009 White Paper on National Defense, Beijing called on all nuclear-weapon states to make an unequivocal commitment to the thorough destruction of nuclear weapons, undertake to stop research and development on new types of nuclear weapons, and reduce the role of nuclear weapons in their national security policies.¹³

Beijing holds that “Nuclear disarmament should be a just and reasonable process of gradual reduction towards a downward balance.” Any measures of nuclear disarmament should follow the guidelines of “promoting global strategic balance and stability and undiminished security for all.”¹⁴

Historically, China’s stated purpose for developing nuclear weapons was to guard itself against nuclear coercion and blackmail. As its 2006 White Paper states, the fundamental goal of China’s nuclear strategy is:

“to deter other countries from using or threatening to use nuclear weapons against China ... China exercises great restraint in developing its nuclear force. It has never entered into and will never enter into a nuclear arms race with any other country.”¹⁵

To help constrain the role of nuclear weapons, China maintains a no-first-use doctrine. China is the only Nonproliferation Treaty (NPT) nuclear-weapon state to pledge no-first-use of nuclear weapons. It has repeatedly claimed that “China remains firmly com-

mitted to the policy of no first use of nuclear weapons at any time and under any circumstances,"¹⁶ and urged all nuclear weapon states to commit to a no-first-use policy.

China also unconditionally "undertakes not to use or threaten to use nuclear weapons against non-nuclear-weapon states or nuclear-weapon-free zones"¹⁷ and has long urged all the nuclear weapon states to agree to a legally-binding, multilateral agreement on such a negative security assurances. Moreover, it has joined with the other NPT nuclear-weapon states since April 1995 for a positive security assurance: should any non-nuclear-weapon state parties to NPT be subject to nuclear attack, China shall work with other members of the United Nations to impose strict and effective sanctions on the attacking state.¹⁸

It should be noted that while some Chinese experts and senior military officials argue that China should pursue a conditional no-first-use policy,¹⁹ there is no evidence that China will change its long-standing policy of no-first-use.²⁰

Consistent with its policy of "no first use," Beijing has maintained a minimum deterrence nuclear policy and deployed a very limited nuclear force.²¹ China's minimum deterrence policy is that, after absorbing a first nuclear strike, some nuclear warheads should survive that can retaliate against an enemy's cities. The specific number of warheads required depends on a number of factors including survivability and penetration capabilities against any attacker's missile defense system.

China continues to modernize its nuclear force in order to maintain a reliable nuclear second-strike retaliatory capability. The current effort focuses mainly on enhancing the survivability of its strategic nuclear force through deploying solid fuel and road-mobile intercontinental ballistic missiles (ICBMs) and a new-generation of ballistic-missile submarines. The size of the force has grown only modestly. The size and quality of China's nuclear forces could change significantly, however, were the United States to deploy a more comprehensive or more operationally successful missile defense.²²

Transitional measures

Given that the United States and Russia have huge nuclear arsenals, Beijing has called for these countries to take a lead on nuclear disarmament. In its 2009 White Paper, Beijing emphasizes that:

"the two countries possessing the largest nuclear arsenals bear special and primary responsibility for nuclear disarmament. They should earnestly comply with the relevant agreements already concluded, and further drastically reduce their nuclear arsenals in a verifiable and irreversible manner, so as to create the necessary conditions for the participation of other nuclear-weapon states in the process of nuclear disarmament."²³

Even with the conclusion of the New START treaty to reduce to 1550 deployed strategic warheads each by 2017, the U.S. and Russian inventories would still dwarf those of the other nuclear-weapon states. The United States and Russia therefore should take a lead and commit to make further substantial bilateral reductions of their nuclear arsenals. Beijing does not state at what point China would join in the process of nuclear reduction.²⁴ Many Chinese analysts believe, however, that Beijing will wait until the United States and Russia reduce their stockpiles to no more than about 1000 total warheads each. Then China could join with all other nuclear-weapon states to move to the next level—say a few hundred warheads.

To achieve deep cuts of nuclear weapons in moving toward a nuclear-weapon-free world, each nuclear state will have to move to a purely defensive posture and a no-first-use policy. Beijing believes that all nuclear weapons states therefore should commit to the policy of no first use of nuclear weapons at any time and under any circumstances, and unconditionally commit not to use or threaten to use nuclear weapons against non-nuclear-weapon states or nuclear-weapon-free zones, and conclude the relevant international legal instrument.²⁵

Beijing also has called for stopping development of new types of nuclear weapons, not targeting nuclear weapons and not listing any countries as nuclear targets, withdrawing all nuclear weapons from foreign countries, and abandoning the policy and practice of providing a “nuclear umbrella” and “nuclear sharing.”²⁶

China believes that the Comprehensive Nuclear-Test-Ban Treaty (CTBT) is “an important step” in the nuclear disarmament process.²⁷ China signed the CTBT in 1996 and has not yet ratified it, in part because the treaty was rejected by the U.S. Senate in 1999. The 2009 White Paper, notes that “China supports the early entry into force of the Comprehensive Nuclear Test-Ban Treaty, and will continue to honor its moratorium commitment on nuclear testing.”²⁸ Beijing has called on countries that have not done so to sign and ratify the Treaty as soon as possible so that it may enter into force at an early date, and for the nuclear-weapon states to continue to observe their moratoria on nuclear testing.²⁹ Most likely, Beijing’s ratification of the CTBT will follow immediately on Washington’s ratification of the treaty.

China is believed to have stopped its highly enriched uranium (HEU) production in 1987 and plutonium production for weapons around 1991. China has announced its support for the Fissile Material Cutoff Treaty (FMCT) negotiations. Because of its concerns about U.S. missile defense and space weapons plans, however, China, until 2003, linked its willingness to negotiate an FMCT to talks on the prevention of an arms race in outer space (PAROS). China’s current position is to support negotiation of an FMCT on the basis of the mandate agreed in 1995 at the United Nations Conference on Disarmament.³⁰ U.S. missile defense plans and space weapons issues will continue to affect China’s willingness to participate FMCT negotiations, however.

Missile defense and space weaponry

Beijing has called for any measures of nuclear disarmament to have the objective of “promoting global strategic balance and stability and undiminished security for all.” Beijing maintains in this connection that:

“the [U.S.] global missile defense program will be detrimental to strategic balance and stability, undermine international and regional security, and have a negative impact on the process of nuclear disarmament.”³¹

Chinese officials have expressed a growing concern that U.S. space and missile defense plans will stimulate a costly and destabilizing arms race. In particular, some Chinese officials are concerned that even a limited missile defense system could neutralize China’s small nuclear force. “It is evident that the U.S. [national missile defense] will seriously undermine the effectiveness of China’s limited nuclear capability from the first day of its deployment,” said Ambassador Sha Zukang, the former director-general of the Department of Arms Control and Disarmament at the Chinese Ministry of Foreign Affairs. “This cannot but cause grave concerns to China,” he said.³²

Beijing maintains that the deployment of space weapons:

“will disrupt strategic balance and stability, undermine international and national security and do harm to the existing arms control instruments, in particular those related to nuclear weapons and missiles, thus triggering new arms races.”³³

This concern is enhanced by U.S. moves in recent years to boost cooperation in research and development of missile defense with Japan. Beijing has urged that:

“the Conference on Disarmament (CD) should negotiate and conclude relevant international legal instrument(s) as soon as possible so as to prevent the weaponization of and an arms race in outer space, and to promote the nuclear disarmament process.”³⁴

China worries that the combination of future U.S. space-weapons and missile-defense systems could make China subject to political or strategic blackmail. Such systems would give the United States much more freedom to intervene in China’s affairs, including undermining China’s efforts at reunification with Taiwan. The Bush administration’s 2001 Nuclear Posture Review (NPR) specifically mentioned the possibility of using nuclear weapons during a conflict in the Taiwan Strait and the possible use of tactical nuclear weapons. In addition, the Pentagon’s 2005 draft Doctrine on Joint Nuclear Operations would have maintained an aggressive nuclear posture, including the possible use of nuclear weapons to pre-empt an adversary’s attack with weapons of mass destruction and increasing the role of such weapons in regional (theater) nuclear operations.³⁵ For its part, Beijing has never threatened nuclear use in the cross-strait conflict. If Washington and Beijing could reach agreement on ruling out the use of nuclear weapons during a Taiwan conflict, it would encourage greatly Beijing’s participation in the nuclear disarmament process.

Transparency/verification

China, like most other nuclear weapons states, has kept secret information about its stocks of fissile materials and nuclear weapons. Given that China’s nuclear force is very limited and vulnerable, Beijing believes that greater transparency about its force posture could greatly decrease survivability of its nuclear deterrent. Thus, Beijing considers the opacity of its force posture as part of its deterrent. This situation could change, however, as China deploys more survivable nuclear forces including more road-mobile ICBMs and new generation SLBMs.

Beijing often argues, however, that China has been very transparent about its nuclear doctrine, i.e. its no-first-use nuclear doctrine, ever since it became a nuclear power. Beijing believes the transparency of nuclear doctrine is more important than the transparency of details of its force posture.

China’s position on the FMCT is that the treaty should not constrain weapons use of existing stockpiles of fissile materials. Under an FMCT, China would allow international inspectors to monitor activities of its fissile material production facilities. China would be reluctant, however, to declare its total fissile-material inventory today, since that would make known the upper limit on the number of nuclear weapons it can manufacture.

As the United States and Russia move toward deeper cuts, and as nuclear arms control moved from a purely bilateral to a multinational stage, China could take a step-by-step approach toward transparency of its nuclear material inventory. Declaring its fissile-material stockpiles could be a first step for China.

With regard to verification of nuclear disarmament, China has long insisted that “disarmament agreements should provide for strict and effective international verification.”³⁶ China should not have problems with International Atomic Energy Agency (IAEA) monitoring of a nuclear disarmament agreement. China has always actively supported the IAEA’s safeguards work. China supports the IAEA taking further measures to enhance the effectiveness of its safeguards system including promoting the universality of the Additional Protocol.³⁷ China has put several of its civilian nuclear facilities under IAEA safeguards, including the Hanzhong Centrifuge Enrichment Plant, the Qinshan power reactor, and a research reactor at Tsinghua University. Beijing would not allow private IAEA questioning of its nuclear personnel in the near future, however.

Fissile materials

China currently operates eleven nuclear power reactors with combined installed capacity of 9 GWe. It plans to increase its total nuclear capacity to 40 GWe by 2020, as well as having an additional 18 GWe under construction.

In the mid 1980s, China selected a closed fuel cycle strategy to reprocess spent fuel and recycle the recovered plutonium in mixed-oxide (MOX, uranium-plutonium) fuel for its light water reactors and fast-neutron breeder reactors.³⁸ A pilot reprocessing plant with a capacity of 50–100 metric tons of spent fuel per year (tU/yr) is ready to operate. A larger commercial reprocessing plant (800tU/yr) and a MOX-fuel fabrication plant are expected to be commissioned around the year 2020. Also, the China Experimental Fast Reactor, capable of producing 25MWe of power, will be operating soon. Larger commercial-scale fast breeder reactors are planned to be commissioned around 2030–2035.³⁹ Given these plans, it could be difficult—at least in the near future—to persuade Beijing to forego its reprocessing programs.

China’s need for HEU for non-weapon uses is likely to be very small. Its nuclear-power submarines are reportedly fueled with low-enriched uranium (LEU) which can be provided by its commercial centrifuge enrichment plants.⁴⁰ Banning the construction of new HEU-fueled nuclear-propelled ships therefore would not pose a challenge to Beijing.

China may want some HEU to fuel tritium-production reactors to offset the decay of tritium in its warheads. Such a tritium production reactor could require only some tens of kilograms HEU annually, however, which could be provided from China’s HEU stocks. A proposal to phase out HEU production for all purposes therefore would likely not meet major opposition from Beijing.

China’s government supports the purposes of initiatives to establish a multinational civilian nuclear-fuel-supply regime and has actively participated in related international discussions. Beijing suggests that the international community conduct deep and wide discussions to find an approach that would be acceptable by all parties.⁴¹

Conclusion

China has called for the “complete prohibition and thorough destruction” of nuclear weapons ever since it became a nuclear power. China has been maintaining a nuclear strategy of self-defense, with a no-first-use doctrine and the pursuit of a survivable minimum deterrent. There is no evidence that China will change its nuclear policy in the future. Until complete nuclear disarmament is achieved, China will continue to maintain a very limited but reliable retaliatory force.

China suggests that “nuclear disarmament should be a just and reasonable process of gradual reduction.” Any measures of nuclear disarmament should follow the guidelines of “promoting global strategic balance and stability and undiminished security for all.” Beijing urges the United States and Russia to drastically reduce their nuclear arsenals in a verifiable and irreversible manner, so as to create the necessary conditions for the participation of other nuclear-weapon states in the nuclear-disarmament process

Beijing holds that each nuclear-weapon state must adopt a defensive nuclear doctrine and a no-first-use policy. Each weapon-state should unconditionally undertake not to use or threaten to use nuclear weapons against non-nuclear-weapon states or nuclear-weapon-free zones. Moreover, each weapon state should take measures to devalue the role of nuclear weapons in its national security policy.

U.S. missile-defense and space-weapon programs pose a major obstacle for China to participate in nuclear disarmament. Washington’s strategic intentions toward Beijing could also influence China’s willingness to participate in nuclear disarmament. China worries in particular that the United States might use nuclear weapons against China in a conflict over Taiwan.

In the meantime, China will most likely ratify the CTBT once the U.S. ratifies it. While China no longer requires linkage between the FMCT and PAROS negotiations, U.S. missile defense and space-weapons plans could have a major effect on China’s willingness to participate in FMCT negotiations.

Hui Zhang

France

Analyzing French nuclear disarmament policy has always been challenging since France combines a significant and exemplary disarmament record and a reluctance to subscribe to the logic of elimination as the ultimate objective of the disarmament process. French policy therefore tends to create mixed perceptions if not misperceptions. As an example, the sharp contrast with the United Kingdom in terms of perceptions, in spite of very similar nuclear policies, cannot be understood without understanding France's multifaceted nuclear policy.

The rather unique nuclear history and policy developed in the last 50 years by France has established a robust "French nuclear exception."⁴² This involves several key features:

- Strong political and public support for a continuation of current nuclear policy;
- A nuclear policy deeply rooted in history emphasizing independence and the relevance of deterrence; and
- An ambivalent but evolving approach to nuclear disarmament, combined with a strong proactive commitment to nonproliferation.

The most recent analyses of French proposals and of the disarmament debate detail why that general posture has remained mostly unchanged.⁴³

Between 1990 and 2008, France completed a 50-percent unilateral reduction of its nuclear forces to less than 300 warheads. This started with the non-replacement of 30 *Mirage IV-P* medium-range nuclear bombers; was followed by the dismantling of France's 18 S-3D IRBMs (Intermediate Range Ballistic Missiles with a strategic role) on the Plateau d'Albion, completed in September 1997; and finally elimination of France's 30 short-range nuclear-armed *Hadès* missiles. The number of ballistic-missile submarines was reduced from 6 to 4, with only enough missiles for three of the four submarines. To these steps taken in the 1990s by Presidents Mitterrand and Chirac, President Sarkozy added a reduction of the size of France's airborne nuclear force by one-third.

Even though some of these reductions were also motivated by budgetary constraints, they reversed 30 years of French nuclear policy. Until 1991, the French nuclear arsenal was growing in size and capacity. Subsequent reductions were all decided as an implementation of the "strict sufficiency" principle which has guided French nuclear policy since the 1960s and implies that the nuclear stockpile should be maintained at the lowest possible level to insure a credible deterrent and to fulfill the missions assigned by the President.

Halving the nuclear stockpile since 1990 was therefore possible because the strategic context changed dramatically. The political decisions to proceed to unilateral cuts by three presidents were also not taken out of context:

- The first series of cuts by Mitterrand in the early 1990s took place as France was joining the Non-Proliferation Treaty (NPT) (the decision was announced in 1991 and came into effect in 1992) and as the Intermediate Range Nuclear Forces (INF) treaty was being implemented in Europe.
- The Chirac decisions were primarily announced in the mid-1990s following the indefinite extension of the NPT and the signature of the Comprehensive Test Ban Treaty (CTBT) when many hoped the nuclear disarmament process could be rapid;
- When Sarkozy announced the further downsizing of the airborne nuclear force in 2008, it was as a contribution to support his plan for disarmament.

As far as the CTBT is concerned, France was for decades opposed to nuclear test limitations.⁴⁴ France resumed nuclear testing after a moratorium and conducted six tests in the fall and winter of 1995–96. In August 1995, France was the first nuclear-weapon state to support the “zero-yield option” in the CTBT negotiations. The announcement of this decision was immediately followed by a similar U.S. statement. Other nuclear-weapon states agreed to the same position later in 1995. France was among the first signatories of the CTBT in September 1996 and ratified it swiftly. France also took the further step of closing and dismantling its test site in the South Pacific (Mururoa and Fangataufa atolls) thereby becoming along with the UK one of only two nuclear weapon states without a national test site.

Since 1997, France also has been a strong supporter of an early start of negotiations on a Fissile Material Cutoff Treaty (FMCT). This policy is consistent with its unilateral moratorium on the production of fissile material and unique decision to dismantle its former production facilities at Pierrelatte (HEU production) and Marcoule (plutonium production), which have recently been opened to international visits.⁴⁵

France also has provided security assurances to non-weapon states, both positive and negative, in a letter, dated April 6, 1995, to the UN Secretary General, and in a statement to the CD on the same day. On negative security assurances, France clarified in 1995 its first security assurances given in 1982:

“[France] reaffirms that it will not use nuclear weapons against non-nuclear-weapon States Parties to the NPT, except in the case of an invasion or any other attack on France, its territory, its armed forces or other troops, or against its allies or a State toward which it has a security commitment, carried out or sustained by such a State in alliance or association with a nuclear-weapon State.”⁴⁶

This declaration harmonizes the French position with the statements made by the United States, the United Kingdom, and Russia.

France’s position on providing security assurances through nuclear-weapon-free zones (NWFZ) also changed in the 1990s. Although it signed and ratified both protocols of the Latin America Nuclear Weapons Free Zone Treaty, France refused until 1995 to commit itself to the other existing NWFZ, in the South Pacific. After its final testing campaign, however, on 8 March 1996, France joined the United States and the United

Kingdom as a signatory of the three protocols of the Rarotonga Treaty. A few days later, France signed, without any reservations, Protocols I, II, and III (France has some territories in Africa) of the Pelindaba Treaty on the African NWFZ at the Cairo signing ceremony on April 11th 1996. Together with other nuclear-weapon states, it has also been engaged in, at times difficult, negotiations with ASEAN and with Central Asian States to create the conditions allowing its full participation in the Bangkok Treaty establishing the South-East-Asian NWFZ and to the Central Asian NWFZ respectively.

Thus, after the end of the Cold War, French nuclear arms control policy shifted from clear opposition (no to the NPT till 1992, no to the CTBT, no to the FMCT, no to legally binding negative security commitments through NWFZ, no to nuclear reductions) to active participation in multilateral disarmament negotiations and significant unilateral reductions. In the field of nuclear reductions, all French initiatives have been taken on a unilateral and voluntary basis. In the field of nuclear and non-nuclear nonproliferation and disarmament initiatives, France is giving priority to multilateral legally binding treaties such as the CTBT and FMCT. Overall, France, together with the UK, has accepted the most complete set of legal and practical constraints on its nuclear policy among the nuclear-weapon states. France has consistently refused to endorse abolition rhetoric even though it has favored concrete steps in that direction.

The Sarkozy disarmament agenda introduced in March 2008 in his Cherbourg speech (see below) did not radically shift these basic principles, but suggests a decision to take a more proactive stance in the international debate.

Resolution of the current crisis over Iran's nuclear program is the top priority of French nuclear policy. France has taken a leading role in the EU3 (the other two states are Germany and the UK) approach to the Iran nuclear case since 2003. Deeply convinced of the reality of the emerging Iranian nuclear threat to Europe, President Sarkozy pushed this priority further after the 2007 election and never misses an opportunity to single out the importance of Iran for the future of the nonproliferation regime. His August 2008 speech during the Conference of ambassadors gave his views in a nutshell:

“In 2003, Germany, the United Kingdom and France, with the High Representative, defined on behalf of Europe a strategy of dialogue and sanctions based on one conviction: The international community cannot allow Iran to have a nuclear weapon. [...] No one has a better strategy to offer, and if we should fail, we all know the catastrophic alternative facing us, which I summed up last year in a few words: the Iranian bomb or bombing Iran. I hope the dialogue with Iran will continue and that its leaders will realize the gravity of the stakes for their country.”⁴⁷

As President Sarkozy's Cherbourg nuclear policy speech made clear, however, this does not mean that nuclear arms control and disarmament have no place in the French agenda. Other issues, such as those related to the CD agenda and US-Russia disarmament talks, are perceived as second-rank compared to the Iranian crisis.

The priority France gives to the Iranian conundrum does not mean, however, that concrete steps should not be taken to develop a serious disarmament agenda. It can lead to controversy within the EU or the UN, however, with countries more favorable to a traditional disarmament agenda.

In this regard, the Cherbourg speech innovated by covering disarmament extensively and putting forward a set of initiatives:

“[France] maintains its arsenal at the lowest possible level compatible with the strategic context... As soon as I assumed my duties, I asked for this strict sufficiency to be reassessed.

This has led me to decide on a new measure of disarmament. With respect to the airborne component, the number of nuclear weapons, missiles and aircraft will be reduced by one-third.

I have also decided that France could and should be more transparent with respect to its nuclear arsenal than anyone ever has been.

After this reduction, I can tell you that our arsenal will include fewer than 300 nuclear warheads. That is half of the maximum number of warheads we had during the Cold War. In giving this information, France is completely transparent because it has no other weapons beside those in its operational stockpile.

Furthermore, I can confirm that none of our weapons are targeted against anyone.

Finally, I have decided to invite international experts to observe the dismantlement of our Pierrelatte and Marcoule military fissile material production facilities.

But let us not be naïve; the very basis of collective security and disarmament is reciprocity.

Today, eight nations in the world have declared they have conducted nuclear tests. I am proposing to the international community an action plan to which I call on the nuclear powers to resolutely commit by the 2010 NPT Conference.

1. I invite all countries to ratify the Comprehensive Test Ban Treaty, beginning with China and the United States, who signed it in 1996. It is time for it to be ratified.
2. I urge the nuclear powers to dismantle all their nuclear testing sites in a manner that is transparent and open to the international community;
3. I call for the immediate launching of negotiations on a treaty to ban the production of fissile materials for nuclear weapons purposes, and to establish without delay a moratorium on the production of such materials;
4. I invite the five nuclear weapon States recognized by the NPT to agree on transparency measures;

5. I propose opening negotiations on a treaty banning short- and intermediate-range surface-to-surface missiles;
6. I ask all nations to accede to and implement the Hague Code of Conduct against Ballistic Missile Proliferation, as France has done.
7. At the same time, the entire international community must mobilize in all other fields of disarmament. Here too, France will make its contribution.”

As Bruno Tertrais has underlined, “The subtext of the Sarkozy speech could be summarized as follows: while remaining conservative on basic principles, France has a policy of nuclear restraint, and challenges the other nuclear weapon-States to adopt the same attitude.”⁴⁸

The speech did not offer major conceptual breakthroughs or long-term vision except for the call for a multilateral treaty banning short and intermediate-range surface-to-surface missiles and a new French openness to transparency, but it intended to put the ball back into the court of those that have not ratified the CTBT (the United States and China) and/or not declared a definite halt to the production of fissile material (China). It also demonstrated that, outside the rhetoric of abolition, there is an unfinished nuclear disarmament agenda that France intends to push forward even if it did not please some of its close allies.

During France’s EU presidency (second half of 2008), the EU endorsed France’s nuclear arms control priorities in the EU speech to the UN First Committee⁴⁹ on behalf of EU’s 27 members with 6 more countries⁵⁰ associating themselves with this statement.

France and the logic of zero

The abolition debate has had limited effect in France even in expert circles. As during the previous round of this debate (circa 1995–1999), France does not take the abolitionist perspective seriously. This explains France’s distancing itself from anything that seems to endorse the total elimination of nuclear weapons by a date certain.

During the 2000 NPT conference, France was not enthusiastic about the adoption of the “13 steps.” It preferred the document adopted during the 1995 NPT conference and always emphasized the importance of reading article VI of the NPT as putting nuclear disarmament in the context of general and complete disarmament.⁵¹

France’s view, however, is neither a flat rejection of any form of disarmament, nor a last battle to protect an asset associated with French grandeur. It has more to do with the conviction that, in today’s world, France and the world might be safer with nuclear weapons than without them, and that both the feasibility and the security benefits of a global zero are not demonstrated. In a world marked by weapon of mass destruction and missile proliferation, and of nuclear build-up or modernization in both Russia and China, France is clearly reluctant to abandon what is perceived and often described as an “insurance policy.”

France also refuses to endorse the abolition rhetoric while at the same time pursuing the modernization of its nuclear forces. This differs from the British case where a

famous 2007 speech on disarmament by Secretary of State for Foreign and Commonwealth Affairs Margaret Beckett was packaged with the decision to build a new generation of ballistic-missile submarines.⁵²

France has nevertheless proved more open in the recent months and chose the G8 L'Aquila Summit nonproliferation statement of July 2009 to accept, together with its G8 partners, new language regarding nuclear elimination:

“We are all committed to seeking a safer world for all and to creating the conditions for a world without nuclear weapons, in accordance with the goals of the NPT. We welcome the nuclear disarmament measures implemented thus far by the nuclear-weapon states among G8 members.”⁵³

It is the first time France has formally endorsed the logic of a “world without nuclear weapons,” although in a cautious and conditional manner.

Conclusion

From a French perspective, disarmament is not a goal in itself grounded in moral values, but must be tested against the benchmark of whether it enhances security. If French, European and international security are improved by a specific objective, it is worth pursuing. If the security benefits are doubtful, caution should prevail. The last 50 years of French disarmament diplomacy can be read through that very basic principle. This should not be assessed as a purely conservative or selfish policy, as France has actively supported the ban on chemical and biological weapons and many steps in the field of nuclear disarmament and is quite ready to accept heavy constraints on its national policy if it will make the world safer.

Finally, it is worthwhile to mention that the French approach to nuclear weapons has always emphasized minimum deterrence and disparaged the excesses of the U.S.-Soviet/Russian arms race. In this sense, it is likely that France would be more ready to engage in talks about deeper cuts, including in its own arsenal, than in any project targeted at achieving zero nuclear weapons.

Camille Grand

Germany

Since Germany signed the nuclear Nonproliferation Treaty (NPT), it has developed from a laggard to a responsible and active promoter of nuclear nonproliferation. Germany actively supported extension of the NPT in 1995 and promotes the Additional Protocol as the new standard for International Atomic Energy Agency safeguards. With regard to comprehensive nuclear disarmament, however, Germany was not very conspicuous for a long time.⁵⁴ The reasons included Germany's strong integration into the NATO military alliance, its past dependence on the U.S. nuclear umbrella and its close transatlantic partnership with the United States.

As long as the future role of nuclear weapons remains unclear within NATO, a large fraction of Germany's decision makers hesitate to press ahead with disarmament initiatives. There have been two major exceptions:

- In 1993, Foreign Minister Klaus Kinkel called for a nuclear weapons register at the United Nations.⁵⁵ The German government made no serious attempt to support Kinkel's suggestion, however, after it was harshly criticized by Germany's nuclear-armed allies.
- In November 1999, Foreign Minister Joschka Fischer broke a long-term taboo and advocated the adoption by NATO of a no-first-use policy.⁵⁶ The proposal was opposed, however, within the government and political parties, by academic analysts, and in a few press articles and quickly dropped.

Germany has been more proactive with less controversial nuclear arms control and nonproliferation projects such as the Comprehensive Test Ban Treaty (CTBT), Fissile Material Cutoff Treaty (FMCT), diplomatic initiatives towards Iran and recently the proposal of an International Fuel Cycle Center.

Debates on comprehensive nuclear disarmament

In January 2009, four former German politicians who had been active during the Cold War, Helmut Schmidt, Richard von Weizsäcker, Egon Bahr and Hans-Dietrich Genscher, called for a nuclear weapon free world.⁵⁷ Their call was a reaction to arguments in the United States for disarmament by George Shultz, Sam Nunn, William Perry, and Henry Kissinger.⁵⁸

The four German politicians called for reviving the vision of a nuclear weapon free world, negotiations for deep cuts in arsenals, strengthening the NPT, U.S. ratification of the Comprehensive Test Ban Treaty, destruction of all short-range nuclear weapons, implementation of Article VI of the NPT, restoring the Anti-Ballistic Missile (ABM)

Treaty, abandoning U.S. plans for installing a missile defense system in Poland and the Czech Republic, a no-first-use treaty among nuclear weapon states, and the end of deployment of nuclear weapons on German territory. It was the first time that such far-reaching demands were published by such senior elder statesmen. The community of disarmament advocates applauded. Remarkably, the declaration is posted on the web site of the German Foreign Ministry.

The debate in Germany became more lively after U.S. President Obama's speech in Prague on April 5, 2009, when he committed the United States to work toward a nuclear-weapon-free world. There were some skeptical voices. Michael Rühle, Head of the Policy Planning and Speechwriting Section of the Political Affairs Division at NATO, claimed that a nuclear-weapon-free world would not be possible because of proliferation cases like Iran.⁵⁹ He believes that nuclear weapons should continue to play a role in deterrence, and that the allies of nuclear-weapon states regard these weapons as guaranteeing their security.

The German Government, a coalition of the center-right Christian Democrats (CDU) and the centre-left Social Democrats (SPD) and the majority of the nuclear arms control community reacted positively, however. Foreign Minister Frank-Walter Steinmeier, from the SPD, called the speech "impressive, with a clear course of nuclear disarmament."⁶⁰ He stressed the importance of early concrete steps such as reductions of the U.S. and Russian arsenals. In a newspaper interview, he indirectly criticized the conservative arguments: "The credibility of appeals for nuclear abstinence remains limited, when one's own security policy is based on nuclear deterrence."⁶¹

In a speech to the German Parliament on April 27, 2009, Steinmeier announced that he "shares this vision" of "peace and security in a world without nuclear weapons," referring to the appeal of the four senior statesmen of January 2009.⁶² More explicitly, he called for "truly renewing the core of the NPT," e.g. "the nuclear disarmament of the atomic powers on the one side, and the prevention of nuclear proliferation on the other", "a verified cutoff of nuclear material", and progress on an international fuel cycle center. Steinmeier concluded by arguing that "complete protection from both proliferation and nuclear terrorism will only be possible with the comprehensive abolition of all nuclear weapons. The keyword is 'global zero.'" In February 2010, the new Foreign Minister Guido Westerwelle endorsed the need to strive for a world without nuclear weapons.

Leading politicians of the other parties commented on the same topic.⁶³ All stressed that they shared the vision of a nuclear-weapon-free world and pointed out that this is required by the NPT. The CDU, however, emphasized the importance of nuclear deterrence for an intermediate period. There was disagreement also on recommendations for next steps. None of the parliamentarians commenting on nuclear policy after Obama's Prague speech, however, went as far as the critics who rejected the vision of a nuclear weapon free world.

Next steps: nuclear reductions

On April 27, 2009, the opposition parties the Greens, Free Democrats (FDP), and the Left filed petitions demanding the withdrawal of U.S. tactical nuclear weapons from Europe and ending NATO's nuclear sharing. Their calls were rejected by the votes of the governing CDU-SPD coalition, although Foreign Minister Steinmeier spoke in favor of a withdrawal of all nuclear weapons from Germany. In February 2010, at the Munich security conference, the new Foreign Minister Westerwelle, an FDP member, also called for a withdrawal of nuclear weapons from German soil.

All parties, commentators, and academics agree that further nuclear reductions are overdue. The initial disagreement about whether this should include U.S. tactical nuclear weapons stationed on German and European soil has disappeared. A related question, whether to continue NATO's nuclear sharing, i.e. the release of U.S. nuclear bombs for delivery by the fighter-bombers of five NATO non-nuclear-weapon states (Belgium, Germany, Italy, the Netherlands, and Turkey), is still undecided and less visible in public or parliamentary debates. As long as NATO itself does not debate the future of its nuclear strategy, most politicians from Germany's governing parties will refrain from taking firm positions. In the rather small academic community, a whole spectrum of opinions can be found. Even rather conservative voices sometimes advocate the unilateral and unconditional removal of all nuclear weapons outside the nuclear weapon states. The broad public is barely interested, however. The widespread belief among the general population is that nuclear weapons disappeared with the end of the Cold War.

Those in favor of the status quo rarely raise the argument that these weapons are needed for security, since it is very unconvincing. Instead they claim that the withdrawal of U.S. weapons would endanger Germany's close ties with the United States. A counter-argument states that transatlantic ties are too strong to be endangered since they are based on many areas of common interest in addition to nuclear deterrence. Underlying the argument about the implications for transatlantic ties may be a fear that Germany might become less important within NATO's nuclear planning group.

On the other side of the debate, the Greens and several analysts demand a non-discriminatory, verifiable and enforceable Nuclear Weapons Convention that would commit the world to nuclear disarmament. But even supporters of the goal of a nuclear weapon free world express doubts about the feasibility in the near term of achieving agreement on a Nuclear Weapons Convention. Most analysts prefer smaller steps that could be more realistic. They believe that as long as more modest steps such as a CTBT, an FMCT, and verified dismantlement of warheads are not yet implemented, discussion of a Convention would trigger resistance that would be counterproductive for more realistic projects. The disagreement does not relate to the objective of a Convention, the elimination of all warheads, but the strategy of how to achieve this goal.

Consensus on some next steps

There are broad areas of agreement among German politicians, decision makers, and the nongovernmental nuclear community that are shared even by the critics of the vision of a nuclear weapon free world. These areas include the desirability of bringing the CTBT into force and the importance of urging states to ratify the treaty. Germany is investing considerable resources into further developing the verification of the CTBT. In an annual seminar, a relatively large technical community discusses research and development projects on verification technology, including improving verification methods during onsite inspections. In this way, Germany contributes substantially to the technical expertise in the CTBT Organization as well as to its budget. The first executive secretary of the CTBTO (until 2005) was Ambassador Wolfgang Hoffmann from Germany. During the CTBT negotiations, Germany advocated maximal transparency, including transparency at former test sites. There is no criticism of this attitude in the German nuclear community.

The start on negotiations on a verifiable FMCT is similarly deemed important and is uncontested. When the Bush Administration opposed international verification of an FMCT, the German Government did not endorse this position. The prevailing opinion in the nuclear community was to wait and hope that a successor Administration would

have a different position. The expectation is that FMCT verification would prepare the ground for future verification of disarmament. As a politician from the Free Democrat Party noted during a parliamentary debate, in future, we need verification that goes “deeply into the substance of national sovereignty.”⁶⁴

Another area of agreement is on the need to secure fissile materials. Since it is likely that an FMCT will focus only on production after entry into force, the German Government endorsed the proposal of a Fissile Material Control Initiative (FMCI).⁶⁵ In this initiative, states would voluntarily collaborate in order to:

“increase security, transparency, and control over fissile material stocks worldwide, to prevent their theft or diversion to non-state actors or additional states, and to move fissile materials verifiably and irreversibly out of nuclear weapons and into forms unusable for nuclear weapons.”

Germany also has proposed an International Nuclear Fuel Cycle Center.⁶⁶ This envisages the IAEA managing a site on which a commercial uranium enrichment plant would be built. The IAEA would be solely responsible for controlling exports of nuclear fuel from this area. The objective would be to ensure that all interested states have access to nuclear fuel for energy generation, while reducing the risk of proliferation of nuclear weapons.

Finally, there is also broad agreement that there should be further substantial reductions of strategic nuclear weapons as soon as possible.

Conclusion

In sum, the desire for a nuclear-weapon-free world is on the rise in Germany. President Obama’s speech in Prague triggered much support. Those who reject the goal constitute a small minority. As in the past, however, Germany pursues its foreign policy in the context of international collaboration and organizations. A reform of NATO’s security policy is therefore both required and overdue.

Germany can be expected to actively support the new U.S. nuclear disarmament policy. In this context, Germany might occasionally play the role of a leader, when international support can be expected. But the United States will have to continue to break most of the trail.

Annette Schaper

India

India has long maintained that it desires nuclear disarmament, but it has developed the capacity to produce nuclear weapons to establish its position as an equal of the other major powers in the international system. In the 1950s, under the leadership of Prime Minister Jawaharlal Nehru, even as India started creating the infrastructure to produce plutonium that could be used in nuclear weapons it was also engaged in the determined pursuit of global nuclear disarmament at the diplomatic level. Prominent among his proposals was the Comprehensive Test Ban Treaty (CTBT).⁶⁷

The simultaneous pursuit of both global disarmament and national arsenal building has been a continuing feature of India's nuclear policy. The relationship between the two was laid out in the Draft Nuclear Doctrine, the most comprehensive public Indian Government document on the subject, which states "In the absence of global nuclear disarmament India's strategic interests require effective, credible nuclear deterrence and adequate retaliatory capability should deterrence fail."⁶⁸ The document goes so far as to term "global, verifiable and non-discriminatory nuclear disarmament" a national security objective and promises to continue "efforts to achieve the goal of a nuclear weapon free world at an early date."⁶⁹

With respect to nuclear disarmament, there are two points of emphasis in Indian statements. The first is that the process through which nuclear disarmament is achieved should be global and non-discriminatory. The second point of emphasis that has marked the Indian position on nuclear disarmament is that it should be carried out in a time bound fashion with a deadline. Though with some differences, these points of emphasis have support from the national parties that dominate India's political landscape and will likely continue to be the central features of the Indian position in international negotiations.

The commitment to a time bound framework became prominent in 1996, when India linked signing the Comprehensive Test Ban Treaty (CTBT) with the nuclear weapon states committing to a time-bound plan for ridding themselves of their nuclear arsenals.⁷⁰ This has been reiterated numerous times, most recently in March 2009 in response to U.S. President Barack Obama's promise to seek senate ratification of the CTBT and to launch a diplomatic effort to bring on board other states whose ratifications are required for the treaty to enter into force. India would need to sign and ratify the CTBT to bring it into force.

Disarmament initiatives

India has a long history of supporting and advancing initiatives in favor of global nuclear disarmament. It has, for example, lent support to numerous resolutions at the United Nations General Assembly (UNGA) calling for nuclear weapon elimination.⁷¹ This included proposals advanced at special sessions of the UNGA. Important amongst them was Prime Minister Rajiv Gandhi's plan for time bound nuclear disarmament, unveiled at the third Special Session on Disarmament in 1988.⁷² The plan starts with the requirement that all countries offer a binding commitment to eliminate nuclear weapons in stages, by the year 2010 at the latest. It also calls upon all nuclear weapon states, and all other countries, to participate in the process of nuclear disarmament.

In 1996, the International Court of Justice offered a historic Advisory Opinion, ruling that "the threat or use of nuclear weapons would generally be contrary to the rules of international law applicable in armed conflict, and in particular the principles and rules of international humanitarian law" and endorsing unanimously a legal obligation on states "to pursue in good faith and bring to a conclusion negotiations leading to nuclear disarmament in all its aspects under strict and effective international control."⁷³ Earlier, as the case was being considered, India submitted a Memorial that a "better and saner way to secure everlasting peace would be to ensure that not only are such weapons never used but also not made. The security of all nations would best be safeguarded by a nuclear weapon free world. If peace is the ultimate objective, there can be no doubt that disarmament must be given priority and has to take precedence over deterrence."⁷⁴

Also in 1996, at the Conference on Disarmament (CD), India, along with the Group of 21 countries,⁷⁵ proposed a program of action for eliminating nuclear weapons in phases by 2020.

In October 2006, India put out a working paper on nuclear disarmament at the 61st session of the UNGA. The paper suggested that the UNGA explore convening a Fourth Special Session on Disarmament "to enable the emergence of a consensus and to make effective contribution to the goal of nuclear disarmament and the complete elimination of nuclear weapons worldwide."⁷⁶ The paper lists numerous steps towards this aim, including reduction of the salience of nuclear weapons in security doctrines, adoption of risk reduction measures and a no first use pact, a prohibition on nuclear threats, and:

"negotiation of a Nuclear Weapons Convention prohibiting the development, production, stockpiling and use of nuclear weapons and their destruction, leading to the global, non-discriminatory and verifiable elimination of nuclear weapons with a specified timeframe."⁷⁷

India also sought the establishment of an ad hoc committee in the CD to negotiate global nuclear disarmament.⁷⁸

India's commitment to time bound nuclear disarmament was reiterated at the 2009 meeting of the UN Disarmament Commission, where India argued that "nuclear disarmament has acquired greater urgency due to the new threat of terrorists acquiring

weapons of mass destruction.”⁷⁹ The statement also called for strengthening “the effort to achieve complete elimination of nuclear weapons, rather than ad-hoc steps in non-proliferation, an approach whose limitations we have seen in the past.”

Conditions

The conditions that India sets on nuclear disarmament are essentially that it be carried out in a global, non-discriminatory fashion. In practice, this seems to mean that India will not give up its nuclear weapons until all other nations do so as well. It has not spelt out a level to which the arsenals of the nuclear weapon states, including Russia and the United States, must come down, before India starts accepting restraints on the possible size of its arsenal or its fissile material stockpile.

The New START treaty between the United States and Russia reducing their deployed strategic arsenals is unlikely to have any significant effect on India’s buildup of fissile material stocks and nuclear weapons capabilities. These two states will not be able to put credible pressure on India to cap its arsenal until they come down at least to below a total inventory of a thousand nuclear weapons each.

Another criterion will be the nuclear forces of China, France, and the United Kingdom. Of these, China’s arsenal and fissile material stockpile may be the most relevant for Indian nuclear policy makers. China is believed to have produced about 20 tons of HEU and 4 tons of plutonium, sufficient for about 1600 fission weapons or 800 two stage fusion weapons.⁸⁰ However, China is estimated to have assembled only about 240 weapons.⁸¹ In comparison, India’s current stockpile of weapon grade plutonium is estimated as 700 kg by the IPFM, sufficient for about 140 fission weapons, and 6.8 tons of reactor-grade plutonium, sufficient for about 850 fission weapons.⁸²

Unlike the above mentioned countries, however, India is continuing to produce fissile materials at a rate of about 30 kg a year. It is constructing a fast breeder reactor, which could produce as much as 140 kg of weapon grade plutonium per year.⁸³ Therefore, if over some time in the next decade, India is to join a process of nuclear disarmament, for example, a Fissile Material Treaty or a Nuclear Weapons Convention, then it would have to decide to do so without achieving parity with China.

The Rajiv Gandhi plan also postulated that nuclear disarmament would be contingent upon a moratorium on space weapons and on the militarization of space, restraints on advancements in conventional military technology, and progress in reduction of conventional armaments and forces.⁸⁴ In recent years, India has not reiterated such conditions but it has called for a treaty “to ensure the safety and security of space assets and to prevent the placement of weapons in outer space.”⁸⁵

India has not insisted on resolving any security threats or territorial conflicts as a pre-requisite for nuclear disarmament. It is largely a status quo power in terms of its regional ambitions. It is possible, however, that regional threats might be invoked if it wishes to resist disarmament pressures.

The official Indian stance towards nuclear transparency is largely dismissive. There is little official information available on most nuclear weapons matters except at the most general level. In this, it has followed what most other nuclear nations, including Israel, Pakistan, China and the Soviet Union/Russia, have done. India maintained a posture of nuclear ambiguity for many decades, which required it not to reveal anything about its nuclear weapon activities. With regard to arms control agreements, by and large India’s

focus has been on resisting treaties that call for revealing details about either current stockpiles of weapons or fissile materials or past production histories. There is, for example, no information on how much of its plutonium stockpile has been fabricated into pits for nuclear weapons.

India considers reprocessing a key element in its future nuclear energy plans and would be unwilling to give it up as part of nuclear disarmament. Due to India's relatively small resource base of high grade uranium ore and very ambitious nuclear energy targets, its Department of Atomic Energy (DAE) has for decades advocated the construction of breeder reactors fueled by plutonium. The startup plutonium is being separated from the spent fuel of heavy water (and, in the future, light-water) reactors through reprocessing. Based on this strategy, the DAE, somewhat implausibly, envisions the construction of hundreds of breeder reactors by mid-century.⁸⁶

India has a uranium enrichment program. It produces highly enriched uranium (HEU) fuel for the nuclear submarine that India is developing. The nuclear submarine program was started over thirty years ago and has faced numerous difficulties in coming up with a working design.⁸⁷ This would make it unlikely that India would be willing to shift to low-enriched uranium (LEU) fuel, because that might set back the program significantly. On the other hand, if one of the nuclear weapon countries were to offer to help it develop an LEU-based design, India might be attracted to the offer because such cooperation might allow it to overcome the difficulties encountered in developing a nuclear submarine.

Conclusion

India is unlikely to voluntarily cap its production of either nuclear weapons or fissile materials in the near future, let alone start disarming. As things stand, the arsenals of the nuclear Nonproliferation Treaty weapon states—especially Russia and the United States—are so much larger than that of India, that they do not have the standing to demand that India limit or reduce its weapon stockpile.

If disarmament of the larger nuclear powers does proceed, however, a stage may be reached when these nations have arsenals only in the hundreds and not more. At that stage, India would be under pressure to join in cutting down its weapon stockpile. How it would respond to that pressure would depend on how it balances conflicting national and international demands. Domestically, many in India view its acquisition of nuclear weapons as evidence of its emergence as a major technological nation and a global power.⁸⁸ If one is to seek disarmament from India therefore, the terms under which disarmament is pursued are important.

Zia Mian, M. V. Ramana, R. Rajaraman

Iran

Iran is a resource-rich state with long borders and unstable neighbors. Since its 1979 revolution, it has been confronted with challenging situations in which its territorial integrity and national security were at stake. During the period 1980–88, Iran fought a costly war, during which the Baathist regime in Baghdad used chemical weapons extensively against the Iranian and Kurdish people on the battlefield and in population centers. The overthrow of Saddam Hussein in Iraq and the removal of the Taliban in Afghanistan have left Iran more secure and a more influential regional player.

Given Iran's regional importance and the impact of its foreign and domestic policies on the success of the international nonproliferation and disarmament regime, Iran's position on nuclear disarmament, the Nonproliferation Treaty (NPT), the Additional Protocol to the safeguards system of the International Atomic Energy Agency (IAEA), and international fuel banks is a matter of considerable significance.

Generally speaking, arms control and nuclear disarmament have been from the outset an important element in Iran's nuclear diplomacy. In fact, Iranian leaders have called for the elimination of the nuclear weapons accumulated by a handful of nuclear weapon states, which have been reluctant to speed up the process of nuclear disarmament despite their NPT commitments.⁸⁹ Iran's post-revolution leaders also have repeated Iran's 1974 proposal to establish a nuclear-weapon-free zone in the Middle East to eliminate the risks of a regional nuclear arms race.

The origin of the crisis over Iran's nuclear program

Iran's first reactor, the 1000 MWe Bushehr Nuclear Power Plant (BNPP), will likely become operational in 2010.⁹⁰ Germany's Siemens Company began construction of the plant in 1974 but discontinued work after the 1979 revolution. In 1995, 16 years later, Iran signed a contract with Russia to complete the plant. The Atomic Energy Organization of Iran (AEOI), established by the former regime in 1973, has a long-term plan to build more nuclear-power plants in other locations in the country.

There are unsubstantiated reports that Iran's nuclear program was restarted in 1985, while Iran was still at war with Iraq.⁹¹ In the AEOI's letter of 19 August 2003 to the IAEA, it was disclosed that "a decision to start the R&D had been taken in the early 1980s... a decision to construct a heavy water reactor had been taken in the mid-1990s."⁹²

According to news reports, the decision to build the nuclear facilities in Isfahan, Natanz and Arak was taken by the Committee for Advanced Technology in 1999 during the administration of President Mohammad Khatami.⁹³ In February 2003, President Khatami announced the country's plans to develop a nuclear fuel cycle. On 6 June 2003, IAEA Director General El-Baradei presented a report to his Board of Governors asserting that

“Iran had failed to meet its obligations under its Safeguards Agreement with respect to the reporting of nuclear material imported into Iran and the subsequent processing and use of material, and the declarations of facilities and other locations where the material were stored and processed.”⁹⁴ On 12 September 2003, the IAEA Board of Governors approved a resolution that called on Iran to:

“suspend all further uranium enrichment-related activities, including the further introduction of nuclear material into Natanz, and, as a confidence-building measure, any reprocessing activities, pending provision by the Director General of the assurances required by Member States, and pending satisfactory application of the provisions of the additional protocol.”⁹⁵

Multilateral talks on this issue between Britain, France and Germany—the three European Union states known as the EU-3—and Iran started in October 2003, and culminated in an agreed statement on 21 October 2003 (known as the Tehran Declaration or Saad’Abad Declaration). Iran voluntarily committed itself to acting in accordance with the Additional Protocol from 10 November 2003, and agreed to sign the Protocol on 18 December 2003. The Khatami government accepted the temporary suspension of all enrichment activities during talks with the EU-3 in November 2004.⁹⁶ Iran complained, however, about the lack of good will on the part of the EU concerning the transfer of nuclear technology to Iran and other promised benefits.⁹⁷

There was a heated debate over Iran’s civilian nuclear program and the nature of its nuclear talks with the EU-3 in Iran’s print media in 2003–2005, during which there were various statements on how Iranians view the value of nuclear weapons, and the benefit of remaining committed to the NPT. An example of public sentiment on nuclear weapons is as follows:

“Since we signed the NPT, we have given up our right to produce nuclear weapons. This is an unfair world where neighboring Pakistan, India and Israel have nuclear weapons, and we do not... Even if we built a nuclear bomb, we could not use it. The best policy is to denuclearize the region and eventually abolish all the world’s nuclear weapons.”⁹⁸

A few analysts advocated that Iran withdraw from the NPT and end all cooperation with the IAEA. No Iranian politicians publicly advocated the acquisition of nuclear weapons, however, or wanted to take Iran’s nuclear enrichment program to the “point of no return” with the goal of developing a “break-out” capability to make nuclear weapons. An extensive search of published materials in major Iranian newspapers and periodicals revealed only one supporter of nuclear weapons, who argued that Iran should adopt the Iraqi approach and invest in clandestine nuclear activities. This Iranian academician’s policy recommendation was given before the Bush Administration invaded Iraq as a first step in its war on nuclear proliferation.⁹⁹

In the government newspaper *Iran Daily*, the head of the National Security Council, Hassan Rowhani, reaffirmed that “We shall remain committed to the NPT, safeguards agreements, and the Additional Protocol.”¹⁰⁰ A few months later, in reply to dissenting voices that had called for a confrontational approach in dealing with the nuclear crisis, Rowhani explained that “we can withdraw from the NPT whenever we decide to do so. Naturally, some options are risky and with high cost.”¹⁰¹ He went on to state, “we need to select the option with the lowest cost.”¹⁰²

The Tehran Declaration offended many conservative politicians and activists who considered the West to be unreliable and untrustworthy. Talk of imminent preemptive military strikes against the Natanz facility and other nuclear sites in Iran provided the critics with justification to remain suspicious of the intentions of western negotiators. They wondered whether the real reason for the demands for more IAEA inspections was military intelligence gathering to pave the way for targeting Iranian command and control centers in preparation for a preemptive war.¹⁰³ The EU-3 package of incentives did not include a genuine security guarantee for the regime in Tehran.

Escalation of the nuclear crisis

In September 2005, Iran's new President Mahmoud Ahmadinejad restarted the interrupted fuel cycle work because he was convinced that the Europeans and the Americans were not willing to recognize Iran's right to have an independent nuclear enrichment facility on its territory.

On 4 February 2006, after the aborted EU-3 effort to find a solution to the impasse, the IAEA Board of Governors voted to report Iran to the UN Security Council (UNSC). Despite United Nations Security Council resolutions 1696 (2006), 1737 (2006), 1747 (2007), and 1803 (2008), however, Iran has continued its uranium enrichment at Natanz and the construction of the Arak heavy water reactor. The September 2009 unveiling of a second fuel enrichment plant under construction at Fordow near the city of Qom, together with the announcement of a plan to build 10 more enrichment facilities to produce the required nuclear fuel for 20 new nuclear reactors demonstrate the unwillingness of Iranian leaders to accept permanent or temporary suspension of their enrichment-related and reprocessing activities under threat of sanctions. Before the divisive June 2009 Iranian presidential election, the reformist candidate Mir Hossein Mousavi stated that "building nuclear weapons is out of the question."¹⁰⁴ As expected, he stressed that "I too will not suspend uranium enrichment. However, I will attempt to avoid unnecessary tensions. We have a right to enrich uranium."¹⁰⁵

The authority of Iran's top nuclear policymaker

Opponents of Iran's nuclear program have presented unsubstantiated claims that Iran is pursuing a secret nuclear-weapon program; and have claimed that negotiations have only delayed the process, and ultimately will prove useless and counterproductive. Since imposing sanctions seems a less than adequate response to Iranian nuclear activities, they recommend military options.

In response to such criticism, Iranian officials have said that they have submitted themselves to IAEA safeguards, and have permitted on-site inspections of Iranian nuclear facilities to demonstrate their compliance with treaty commitments. Contrary to the arguments set forth by their critics, Iranian leaders have been saying that they are not pursuing a nuclear military option to guarantee Iran's security and improve the security of their regional allies. On the side of denouncers of nuclear weapons, we see Foreign Minister Manouchehr Mottaki who stated in 2009 that "Our slogan is very clear: nuclear energy for everyone and nuclear weapons for no one."¹⁰⁶

In a dramatic comment on 9 November 2007, Tehran's substitute Friday prayer leader Ayatollah Emami Kashani said that Iran's Supreme Leader, Ayatollah Khamenei, has openly forbidden production and use of nuclear weapons. Since the killing of innocent people is unlawful in Islam, the "production of nuclear bomb or even having it in mind is forbidden by Islamic Sharia (law)."¹⁰⁷

In a January 2008 meeting with the visiting IAEA head Mohammad El-Baradei, Khamenei himself stated that Iran has often put emphasis on the fact that

“it does not approve of manufacturing or application of nuclear weapons in light of the Divine Statute and its principles.”¹⁰⁸

On 19 February 2010, the Ayatollah’s official website published the text of a speech he delivered as the Commander-in-Chief of Iran’s Armed Forces on the deck of a guided missile destroyer in the Persian Gulf. Khamenei declared that:

“we do not believe in nuclear bomb... and we will not seek it. According to our...religious principles, the use of this type of weapon of mass destruction is absolutely forbidden.”¹⁰⁹

To understand the importance of such declarations, it is necessary to understand the position of Iran’s Supreme Leader (*Rahbar*) in Iran’s power structure, and his influence on nuclear policy making. Iranian officials have routinely made general and ambiguous statements because they are uncertain about the domestic implications of expressing specific views that might be contrary to the Supreme Leader’s stance on the nuclear program. Ayatollah Khamenei has the final say in key foreign policy issues, even though he presumably pays attention to his top advisors. This expert team is made up of former high ranking officials such as Ali Akbar Velayati (foreign minister from 1981 to 1997), Kamal Kharazi (who worked in Khatami’s government in the same capacity from 1997 to 2005),¹¹⁰ and Yahya Rahim Safavi (the commander of the Iran Revolutionary Guard Corps from 1997 to September 2007). The extent of the Leader’s influence in the formation and implementation of nuclear policy is indicated by Iranian government officials’ frequent references to his authorization and approval.

The future of nuclear negotiations with Iran

Iran and its adversaries have shown some signs that they are amenable to the compromise necessary to resolve the controversy regarding Iran’s insistence on an indigenous nuclear fuel cycle. Iran’s President seemed more willing to bargain for a secure and reliable supply of nuclear fuel to Iran by foreign states when he visited Kazakhstan in 2009. The Obama Administration is also aware that Iran-U.S. enmity could be an obstacle to its objective of bringing stability to Iraq and Afghanistan.

During the celebration of Iran’s National Nuclear Day in April 2009, President Ahmadinejad said that Iran is ready to play a constructive role in worldwide disarmament.¹¹¹ Iran’s official statements of support for arms control and disarmament initiatives permit the following predictions for the immediate future of Iran’s nuclear program:

- Starting the operation of the Bushehr reactor;¹¹²
- Refusing to permanently freeze uranium enrichment at Natanz;¹¹³
- Indicating a willingness to hold unconditional nuclear talks with the 5+1 powers; (the five permanent members of the UN Security Council plus Germany);
- Protesting against perceived double standards in international civilian nuclear trade; and
- Calling frequently for the creation of a Middle East free of nuclear weapons.

Iran also will remain a supporter of the nonproliferation regime; it will constantly call on the nuclear weapons states to reduce their nuclear arsenals; and it will show its willingness to work with other states to bring about the universal adherence to the Additional Protocol and the development of an international fuel bank.

Given a chance, Iran could be an active partner in negotiations for a Fissile Material Cutoff Treaty (FMCT) if the adherence of all states with national capabilities to produce nuclear materials including the three remaining NPT hold-outs (i.e., India, Israel, and Pakistan) could be guaranteed.

On the occasion of the inauguration of Iran's first nuclear fuel production plant in Isfahan, Ahmadinejad reiterated that Iran welcomes the new round of nuclear talks with the major powers if they are based on "justice" and "respect for rights". He argued that "one-sided negotiations, conditional negotiations, negotiations in an atmosphere of threat are not something that any free person would accept."¹¹⁴ For the Ahmadinejad government, the preferred outcome of the nuclear crisis would include the EU and Obama Administration's acceptance of Iran's right to have indigenous uranium enrichment facilities on its territory, the removal of all sanctions imposed on Iran, and credible security guarantees for the Islamic Republic of Iran.

Since then, however, the IAEA Director General has indicated "concerns about the possible existence in Iran of past or current undisclosed activities related to the development of a nuclear payload for a missile."¹¹⁵ Not surprisingly, the key Iranian government officials have objected to this document. Favoring a diplomatic solution with regard to Iran's nuclear controversy, the IAEA report includes a final hopeful note that "through Iran's active cooperation, progress has been made in the past in certain other areas where questions have been raised; this should also be possible in connection with questions about military related dimensions."¹¹⁶

Iran has rejected a proposal to swap its low enriched uranium for 20% enriched uranium nuclear fuel for its Tehran Research Reactor (TRR) which produces medical radioisotopes. A key opponent of the fuel deal has argued that Iran should pay cash for its import of TRR fuel and save its 3.5% enriched uranium for the nuclear facility under construction in Darkhovin.¹¹⁷ The failure to reach an agreement with foreign suppliers of nuclear fuel led the Iranian government to enrich its own uranium. In a letter dated 7 February 2010, Iran informed the IAEA of its decision to increase its uranium enrichment level from 5% to 20%.¹¹⁸

Iran also declined Moscow's offer to invest in uranium enrichment in Russian facilities in exchange for full suspension of its domestic enrichment-related activities. Iran would be amenable, however, to the establishment of jointly owned and co-managed multinational facilities under full IAEA safeguards on Iranian territory under an arrangement whereby the foreign partner(s) will be in charge of spent-fuel storage outside Iran.¹¹⁹ Iran already has an agreement with Russia for the disposal of the Bushehr reactor's spent fuel. The current Iranian government is likely to regard its nuclear fuel-cycle program as a valuable bargaining chip. Given the threat perception of the hardliners who see their country as being besieged by "arrogant powers" determined to overthrow the Islamic regime, a guarantee of non-interference in the internal affairs of Iran might be at the top of the Iranian agenda in future nuclear talks.

In sum, we will not see any major change in Iran's nuclear policy without substantial concessions from the United States and Europe. It is evident that the Iranian government will not be willing to halt Iran's nuclear projects in Arak and Natanz and curtail R&D on more advanced ballistic missiles unless the cost of defying the UNSC is deemed unbearable. Iranian policymakers will continue negotiations to prevent tougher UN sanctions which might bring about the termination of Iran-Russian nuclear cooperation, a total ban on the transfer of military equipment and technology to the country, a ban on all foreign investment in Iran's oil and gas resources, and Iran's diplomatic isolation.

Saideh Lotfian

Israel

Israel is explicit about the national security concerns it has that give rise to preconditions for nuclear disarmament in the Middle East. According to stated Israeli policy, among the specific security threats that would have to be resolved before Israel would surrender its nuclear weapons is “continuing threats against the very existence of the state of Israel.”¹²⁰ Israel also points to the proliferation of weapons of mass destruction (WMD) technologies in the region as a major concern.

Israeli policy affirms the goal of the Middle East as a zone free of WMD, noting however that:

“Israel remains committed to a vision of the Middle East evolving into a zone free of Chemical, Biological, and Nuclear weapons as well as ballistic missiles. Yet Israel has always maintained that these issues, as well as all regional security issues, could only be realistically addressed within the regional context.”¹²¹

Israel is also clear about the importance of verification, including confidence-building measures (CBMs).¹²² Israel’s emphasis on effective verification in the nonproliferation context in particular suggests that Israel takes seriously or wants to be seen to be taking seriously its nuclear commitments, in spite of—or perhaps because of—the international attention to its non-commitment to the nuclear Non-Proliferation Treaty (NPT).

The Israeli perspective on the question of restrictions on nuclear power as a condition for nonproliferation and disarmament measures is necessarily unique. Israel does not fit into the category of nuclear weapon states with a civil nuclear program or into the category of non-nuclear weapon states with a civil nuclear program. Most measures or proposals restricting nuclear power for security or disarmament purposes are designed for one of those categories. Israel has a nuclear program but does not have nuclear power. Whether Israel will develop a nuclear power program depends on a variety of factors and pressures, including domestic interests and foreign policy concerns. The question is under review these days, largely behind the scenes.

Israel’s unique position, however, as a generally recognized but never confirmed nuclear weapon state outside the NPT with an advanced nuclear program but without nuclear power, has allowed it to appreciate and even voice (occasionally or indirectly) the energy-weapons link and the inescapable dilemma posed by the conflict between Articles I, II, and IV of the NPT. The very nature of Israel’s nuclear program informs Israeli thinking about anything nuclear anywhere else. In common usage, the word ‘nuclear’ by itself (without specifying weapons or energy) implies weapons.

This insight into the inherent weapons-energy link should prescribe a cautious approach to nuclear activities with acute awareness of proliferation risks. But the self-contained nature of Israel's nuclear program and the secrecy surrounding it also mean that Israel lacks the benefits of an informed civil society and debate-based democratic decision-making on any nuclear issue, military or civil. Unlike other nuclear-capable democratic countries, there is no critical movement or discourse regarding the economic, environmental and other aspects of nuclear power. How this combination of insight and ignorance shapes Israeli nuclear policy will determine what contribution Israel will make to the global nonproliferation and disarmament regime.

There is no question that Israel is interested in being an active international participant in any nuclear-power "renaissance". Israeli nuclear policy-makers have been watching developments around the US-India deal closely and consulting with Nuclear Supplier Group (NSG) members and representatives with a view to reducing the current restrictions on nuclear trade with Israel. At the same time, Israel has consistently stressed the importance of nonproliferation and the need to improve the current regime, calling attention to its own nonproliferation contributions as well as expressing its support even as a non-member for the NPT and especially the CTBT.

Within Israel, nuclear deterrence is seen and described as an insurance policy. Moreover, while Israel's nuclear policy is often described and perceived outside of Israel as aggressive, within Israel, ambiguity/opacity is perceived as a policy of restraint, a means of deterrence that does not involve flaunting its nuclear capability. Israel and Israelis do not seek to draw attention to the country's nuclear capability.

This chapter reviews Israel's position on nonproliferation and disarmament, as well as the interests and pressures behind a potential decision to pursue nuclear power domestically, in order to identify the factors that will shape Israel's engagement with nonproliferation, disarmament and nuclear trade regimes in the coming years.

Nuclear disarmament

Under current and foreseeable Israeli policy, specific security threats and political/territorial conflicts will have to be resolved before Israel will consider surrendering its nuclear weapons. Israel has named some of the transitional measures it envisions as part of the process of nuclear disarmament in the Middle East, and it is explicit about the sequencing:

"This process should begin with modest CBMs carefully selected so as not to detract from security margins of any regional state, followed by the establishment of peaceful relations, reconciliations, mutual recognition and good neighborliness, and complemented by conventional and non-conventional arms control measures. This process could, in due course, lead to more ambitious goals, such as the establishment of a mutually verifiable Nuclear Weapons Free Zone."¹²³

The "deep cuts" logic of nuclear disarmament, which requires that the United States and Russia cut their nuclear arsenals from the thousands to a couple of hundred before China, France and the United Kingdom further reduce theirs, is less relevant for Israel than are regional security considerations. International nonproliferation and disarmament efforts (including the NPT) receive almost no attention in Israel and do not form part of the security discourse.

Deep cuts might, however, have some influence on Israeli policy through their potential contribution to a global political environment with stronger universal disarmament norms and expectations, especially if these lead to U.S. pressure on Israel to engage in global disarmament initiatives. The renewed focus on nuclear disarmament suggests that such pressure is not out of the question. At present, however, U.S. priorities with respect to Israel appear more focused on the peace process, and indications are that U.S. policy towards Israel on nuclear issues has not changed. Although the United States directly named Israel for the first time at the 2009 NPT Preparatory Committee meeting, stating that “Universal adherence to the NPT itself—including by India, Israel, Pakistan and North Korea—also remains a fundamental objective of the United States”¹²⁴, the U.S. administration later clarified that the United States “has always advocated universal adherence” to the NPT and that “Israeli adherence to the NPT is only going to be possible in the context of full compliance” with the treaty in the region, adding that establishing a Middle East Nuclear Weapons Free Zone (NWFZ) depends on Iran’s compliance with the NPT and suspension of its uranium enrichment program.¹²⁵

The argument that a NWFZ could be a way to address some of the threats to Israel within the region, including ensuring that neither Iran nor any of the Arab states that have expressed an interest in nuclear power acquire nuclear weapons, while logical at face value, is unlikely to persuade Israeli policymakers. This was made clear at the UN General Assembly discussions in 2007:

“[T]he process of arms control negotiations should adequately address the threat perceptions of all participating states and must not hamper the security of any given party. This process clearly cannot begin in situations where some of the parties concerned still maintain a state of war with each other, refuse in principle to maintain peaceful relations with Israel and even call for its destruction...These circumstances and the poor track record of non-compliance with international obligations by several states of the region have a critical impact on the ability to embark on a joint process of regional security building that could eventually lead to a NWFZ in the ME.”¹²⁶

A NWFZ is seen as a remote goal because of Israel’s perception of current and ongoing threats. Israel has considered itself to be under an existential threat since its founding, which followed the Jewish history of persecution and attempted genocide in the Diaspora, a perception now symbolized by the Iranian nuclear standoff and its President’s rhetoric about Israel’s destruction. Israel does not see Iran’s nuclear policies as a reaction to Israeli nuclear policy.

Iran’s actions and words feed directly into the Israeli mindset, which does not take survival for granted. Polls show that from 66 to 82 percent of Israelis believe that Iran would use nuclear weapons to destroy Israel.¹²⁷ Israeli academic analyses have explored the arms control, defense and deterrence implications of a nuclear capable Iran for Israel, but have generally focused on prevention rather than on living with a nuclear-capable Iran.¹²⁸ Media and analysts also convey the concern that Iran’s actions could trigger the nuclearization of the Middle East, where over a dozen countries have announced plans to develop civilian nuclear energy programs.¹²⁹ Israel sees proposed civilian nuclear programs as driven by security rather than energy concerns, and therefore a cause for concern within Israel. Also complicating any hopes for a NWFZ in Israel’s view are the potential links between Pakistan and Iran, even though South Asian rather

than Middle Eastern dynamics shape Pakistan's nuclear policy. Pakistan is seen as a possible supplier of nuclear technology to the region. This would have to be addressed in any regional arrangement.

The argument that negotiating a NWFZ now would make Israel safer is also unlikely to persuade current policymakers because of "the poor track record of non-compliance with international obligations by several states of the region,"¹³⁰ and the general mistrust between Israel and other states in the region. Israel has recently been emphasizing the 'irresponsible' behavior of other states on matters related to WMD proliferation in the Middle East.¹³¹ On several recent occasions Israel has pointed out that "three out of the four recognized cases of non-compliance in the NPT have taken place in the Middle East."¹³²

It has been suggested elsewhere that extending U.S. deterrence to cover Israel would allow Israel to abandon its current nuclear policy and join the NPT as a non-nuclear weapon state. From an Israeli perspective the key question is whether it would trust even its closest ally with its defense, and it is unlikely that Israel would agree to such an arrangement.¹³³ In the first place, it would involve Israel ceding discretionary rights to determine the existence of a threat, a potentially subjective determination of a regional security matter that could well be handled differently by those directly threatened as opposed to those who would be called upon to act from outside of the region. Secondly, it would involve ceding the power to decide to act on this determination, something Israel is also unlikely to do.

Transparency and verification

Israel's policy of nuclear "ambiguity" or "opacity" results in strong resistance to increased transparency. At the same time, however, Israel places a strong emphasis on the need for verification of agreements on nuclear issues.

Although Israel's nuclear opacity had its origins in its relations with the United States thirty years ago,¹³⁴ it has taken on a life of its own. The general perception in Israel and among policymakers is that ambiguity works, although critiques and calls for its review have been voiced.¹³⁵ Despite international criticism, there are also indications that other states in the region and international policy analysts see abandonment of this policy as undesirable and dangerous if it would result in Israel's open admission that it has nuclear weapons.¹³⁶

The secrecy around Israel's nuclear program is no secret. Access to sites, records and personnel has been limited. The small nuclear facility at Nahal Soreq is under IAEA safeguards, but the facility at Dimona is not, and Israel has resisted international calls to place all its facilities under safeguards. Israel is unwilling to declare fissile-material and warhead stocks, and production, disposition and dismantlement histories.

In a disarmament context, however, increased transparency is conceivable because it would be grounded in improved relations and greater trust. Israel's policy statements reflect an appreciation of the importance of verification,¹³⁷ and transparency is an element, or a guiding principle, of verification. International monitoring of warhead and component dismantlement outside physical or information barriers is an element of verification that could address Israel's security concerns in a disarmament context and where Israel also potentially could contribute. This would include verification technologies and mechanisms that allow disclosure of sufficient information to confirm compliance with disarmament obligations, but do not reveal sensitive information or design details. Israel's preoccupation with both security and technology gives it a good

basis for developing such partially transparent mechanisms designed to reveal enough information to validate the disarmament process without creating new security risks.

Another element of verification, whistle-blowing, is less grounded in Israeli society. The Vanunu case provides a clear example of Israel's approach to whistle-blowing, or societal verification. It is highly unlikely that protection for whistle-blowers would form part of Israel's approach to verification of nuclear disarmament and nonproliferation efforts. Given its technological expertise and its experience in nuclear safety and security and secrecy, Israel is likely to favor technological over societal elements of verification.

Arguably, if Israel agreed to disarm, it should incorporate whistleblower protections as a means of implementing its obligations with the expectation that other countries do the same. Israeli society is resistant to the notion of protection for whistle-blowers in any context, however, because of a strong cultural aversion to what is known as a "shtinker", someone who "rats" on others, who reveals negative information about friends, colleagues or family to outsiders or superiors, even if that information is accurate. Loyalty is often valued above righting wrongs. Schoolchildren learn that it is socially safer not to tell the teacher that they have been picked on by classmates. Against this background, individual whistleblowing in any context is seen as despicable, a perspective that compounded the national hostility to Vanunu. His conversion to Christianity confirmed the perception that his motivation was the rejection of his people.

For Israel, the organization responsible for monitoring disarmament would probably need to be part of a NWFZ regime that "emanate[d]" from the region.¹³⁸ Other states in the region see Israel's joining the international regime—specifically the NPT—as the starting point. In addition, the international regime has the Middle East on its agenda. Therefore the monitoring organization would need to incorporate freely negotiated regional arrangements as well as adherence to international norms, and perhaps—given international interests and involvement in the region—a process for international support.

Israel's inherent distrust of international regimes and institutions is based on two factors:

1. Doubts about their competence to expose proliferation risks;¹³⁹ and
2. Doubts about their ability to be unbiased from an Israeli perspective and in light of Israel's relationship with the UN and international organizations.

Israel's concern is that regional conflicts be addressed and avoided, and it has always relied on outside support towards this end. The requirement that regional arrangements be freely negotiated does not rule out international engagement for purposes of implementation. The global nonproliferation regime, including the IAEA, could play a role as part of a body composed primarily of regional players. Decision-making processes and "two-key" model measures for access to materials or information could be designed to ensure regional consensus, with international support for matters such as conflict resolution, inspections and access to technology or information about best practices.

A key question for determining verification and transparency needs in a future disarmament regime is whether Israel undertakes a nuclear power program. A willingness to ratify the Additional Protocol (AP) and allow private IAEA questioning of nuclear personnel is not likely under current conditions, but a nuclear power program would require international support and would include demands on Israel to allow safeguards. Of the model APs, the non-nuclear-weapon-state model AP is the most unlikely unless there

are major political developments. A tailored nuclear-weapon-state-style AP could be a requirement that the international community places on Israel as a condition for increased international nuclear engagement.

Nuclear power interests and concerns

Various interests will have a bearing on Israel's decision whether to pursue nuclear power, but even at this stage, its international activities have led it to be described as "keenly interested" in nuclear power.¹⁴⁰ Opinions vary as to the political feasibility because of Israel's status outside the NPT and the potential challenges to Israel's policy of nuclear ambiguity should it try to enter the global nuclear market. But there appear to be enough domestic interests at work to keep the question in the air.

A related but separate matter is Israel's interest in participating in nuclear trade, probably as both a consumer (including for fuel for nuclear reactors) and a supplier (technology and know-how drawing on half a century of research).

Because of its nuclear history, Israel has an inherent insight as to the weapons-energy link of nuclear technology, exemplified by statements and independent commentaries coming from Israel. Examples include recent statements to the UN General Assembly First Committee:

- "The conceptual separation between Fuel Cycle Technology for military purposes and the technology for civilian purposes needs to be reviewed."¹⁴¹
- "[T]he right, granted under article IV of the NPT, to benefit from nuclear technology for peaceful purposes has been misused by some countries."¹⁴²
- "[A]n overall priority in nonproliferation should be assigned to developing a new effective nonproliferation arrangement pertaining to the nuclear fuel cycle."¹⁴³

Moreover, Israeli commentators and analysts have often noted the link between military and civilian nuclear technology. Ernst David Bergmann, who directed Israel's nuclear activities from 1948 to 1955 and founded the Israel Atomic Energy Commission in 1952, stated "it's very important to understand that by developing atomic energy for peaceful purposes, you reach the nuclear option; there are no two atomic energies."¹⁴⁴ This point is often made in Israeli media as part of background explanations of the situation in Iran or North Korea, where it is pointed out that they acquired their nuclear capability through the NPT, which promotes and enables but at the same time seeks to control the uses of nuclear technology.

At the same time the secretive nature of Israel's program has resulted in public ignorance around all nuclear issues. The ignorance is not a mere byproduct of secrecy, it has been cultivated. Ignorance is a qualification for speaking about nuclear issues: those who know, don't speak; those who speak must profess ignorance first. The secrecy around the program also means that environmental and health issues are not discussed. Health complications of nuclear workers are not known because—following legal action—part of the settlement has been an agreement of silence.

Nuclear energy is popularly perceived as clean, cheap and safe. There is attention to security around nuclear facilities, but little general awareness of direct and hidden environmental, health, and economic risks and costs, as exists elsewhere even among nuclear energy proponents. A decision-making member of the Israeli nuclear establishment was recently surprised to learn that an anti-nuclear movement exists around the world.

If Israel undertook a nuclear power program, it would likely have to forego reprocessing and to depend on uranium fuel from other countries or place its enrichment facilities under multinational or international control since it would certainly demand that other civilian programs in the Mideast be under such constraints. In any case, the implementation of a nuclear power program might require Israel to relax some of the secrecy around its nuclear infrastructure. This would necessarily affect Israel's decision regarding nuclear power.

Overall, Israel will have to balance attractions it might see in nuclear power and an increased role in nuclear trade with its concerns that such activities would place pressures on it for much greater transparency and eventually to undertake steps toward nuclear disarmament.

Disarmament diplomacy

Fear of a “slippery slope towards premature nuclear disarmament” characterizes Israel's overall approach to disarmament-related initiatives.¹⁴⁵ In recent years, however, Israel has become more proactive on disarmament diplomacy,¹⁴⁶ and has been drawing attention to its nonproliferation policies and activities. Though it has yet to ratify the CTBT, it has been actively engaged in the design of its onsite verification arrangements.¹⁴⁷ This is part of an effort to project Israel's image as a responsible nuclear state that supports “international norms on nuclear safety, security and nonproliferation.”¹⁴⁸ This effort coincides with efforts to become more engaged in nuclear trade.¹⁴⁹

Fissile Material Cutoff Treaty. Israel's approach to restrictions on fissile-material production, stockpiling and use is to avoid the issue. Current and foreseeable policy will be to strongly oppose joining an FMCT. This was a clear point of dispute between Israel and the United States even under the Bush Administration when the United States submitted an FMCT proposal to the UN Conference on Disarmament.¹⁵⁰ Israel has been evasive and contradictory on this issue. Nevertheless, Israel has not blocked international efforts on this issue when consensus was required.

In 2004, Israel's statement to the UNGA First Committee mentioned two considerations related to an FMCT:

1. Issues related to nuclear disarmament can be dealt with only after achieving lasting relations of peace and reconciliation, and within the context of the overall regional security and stability...
2. In the global context, recent developments highlight the fact that, non-compliance of states with their international obligations, as well as the misuse and un-checked dissemination of nuclear fuel cycle capabilities, have become among the most pressing challenges in the nuclear nonproliferation field. The FMCT does not address these challenges and can further complicate them.¹⁵¹

In Israel's view, a cutoff treaty would not directly affect the Iranian nuclear program.

The possible complications, according to Israel, would result from the potential for an FMCT to create a false sense of security. A cutoff treaty would also force Israel to accept verification measures that it could find troublesome and raise concerns about the continued production of non-fissile materials needed to maintain a weapons program. (See the Appendix to this chapter).

Prime Minister Netanyahu, in a previous term as prime minister, stated that: “We will never sign the [Fissile Material Cutoff] treaty, and do not delude yourselves—no pressure will help. We will not sign the treaty because we will not commit suicide.”¹⁵² That comment was made following the establishment of an ad-hoc committee at the Conference on Disarmament to begin formulating an FMCT in 1998. At the request of the US, Israel did not oppose the consensus needed to establish this committee, but made clear that this does not indicate a position on the treaty or its contents.¹⁵³

The communications between United States President Clinton and Israeli Prime Minister Netanyahu at the time reportedly included a U.S. commitment to enhancing “Israel’s defensive and deterrent capabilities” and an assurance that the United States would consult with Israel on arms control initiatives.¹⁵⁴ On May 29, 2009, when the Conference on Disarmament adopted its first program of work in ten years, including the negotiation of an FMCT, Israel again did not block the consensus.¹⁵⁵ According to unofficial reports, moreover, Israel had recently received a reaffirmation of the 1998 U.S. commitments. Thus Israel has managed to avoid being the “spoiler” who blocks consensus on steps towards FMCT negotiations even though it does not support such a treaty.

If the Nuclear Supplier Group (NSG) were to make Israel’s joining an FMCT a condition for trade exemptions,¹⁵⁶ however, Israel would have to revisit its position or abandon hopes for increased nuclear engagement. The NSG is seen in Israel as a nonproliferation mechanism, and Israel’s interest in the NSG is based on its desire for recognition of its nonproliferation policy and record.

Fuel Cycle Free Zone in the Mideast. The idea of a nuclear fuel cycle free zone in the Middle East has been proposed in various forms. In 1991, President G.H.W. Bush proposed banning the production of fissile material in the Middle East and Egypt objected because of concern that it would make Israel’s nuclear superiority in the region permanent.¹⁵⁷ In 2006, the WMD Commission headed by Hans Blix recommended again that the states of the region commit to “a verified arrangement not to have any enrichment, reprocessing or other sensitive fuel-cycle activities on their territories.”¹⁵⁸

Conceptually, such a zone could be less problematic for Israel than for other countries in the region that hope to have the means to produce fissile materials for their proposed nuclear power plants rather than rely on a guaranteed fuel supply. As with the FMCT, however, Israel would likely have some concerns about continued availability of non-fissile materials needed to maintain a nuclear arsenal, and with verification demands to assure the international community that it was not producing fissile materials.

Both the feasibility and value of a fuel cycle free zone depend on whether it is seen and accepted by all as a security-enhancing measure and a step towards disarmament or as locking in current imbalances without providing new security. To be effective and acceptable to all relevant states, it would have to include every state with a nuclear program and it would have to have a reliable verification system, a likely problem for Israel as long as its policy is based on ambiguity or opacity.

Missile and Rocket-Launcher Constraints. Israel’s statements at the United Nations and relevant treaty review meetings have been explicit about the need for restraints addressing conventional weapon systems and ballistic missiles in the Middle East. Israel has not called for restraints on space-based weapons capabilities,¹⁵⁹ and in fact hopes to break new frontiers in outer space.

Israel has the most sophisticated missile defenses in the Middle East today, and much of the country has been the target of missile attacks. Recent memory, compounded by the perceived Iranian threat, results in a strong interest in tactical missile defenses and a likely resistance to any restraints on Israel in this regard. In any case, Cold War arguments that ballistic-missile defense is destabilizing do not translate directly to the Middle East, where there is no mutual state of nuclear deterrence at this time.

Conclusion

Israel's awareness of the nuclear energy-nuclear weapon link provides it with insights into nonproliferation and disarmament efforts. As a non-party to the NPT, it has more freedom to question the logic of Article IV as an element of the nonproliferation regime. It might be helpful, therefore, for Israel to develop its own proposals on how to minimize the proliferation dangers from the spread of nuclear energy and contribute a new and potentially useful perspective to global nonproliferation efforts.

The revival of the global disarmament agenda means that there will probably be increased attention to Israel's nuclear policy and perhaps increased demands for Israel to engage in disarmament efforts, including demands that are more realistic from an Israeli point of view than the standard calls to join the NPT and place its nuclear facilities under safeguards. The renewal of interest in disarmament, combined with Israel's interest in projecting the image of a responsible non-proliferant, suggests that Israel will need to revisit its past approach of avoidance when it comes to issues such as FMCT negotiations or a regional security dialogue that includes the nuclear issue.

Merav Datan

Appendix: Israel, Tritium, and Disarmament

Under a verified fissile material cutoff treaty or a fuel cycle free zone in the Middle East, Israel could face the challenge of continuing to produce tritium for its nuclear weapons (if indeed it is now doing so) while allowing verification at Dimona or elsewhere that it was not also producing plutonium. Naturally any arrangement that appeared to give legitimacy to an Israeli nuclear-weapon program would create great problems both for Israel and its neighbors.

Gram quantities of the radioactive hydrogen isotope tritium (T) are used in advanced nuclear weapons to “boost” the energy yield due to fission, and in much smaller amounts to initiate the fission chain reaction. The mechanism in both cases is the production of highly energetic neutrons from the fusion of tritium with the stable hydrogen isotope deuterium (D). With a half-life of 12.3 years, Tritium must be frequently replenished over the typical lifecycle of a nuclear arsenal in order to maintain its viability.¹⁶⁰

The standard method of producing tritium is to irradiate lithium (Li) that has been enriched in the isotope Li-6 with slow (“thermal”) neutrons in a nuclear reactor where the enriched Li-6 is introduced in “targets” interspersed among the fuel assemblies, and periodically removed to extract the tritium. According to the testimony of Mordechai Vanunu, Israel began producing enriched Li-6 in a plant at its Dimona nuclear complex in 1984, and started making tritium using enriched Li-6 targets in the natural-uranium-fueled, heavy-water-moderated and cooled Dimona reactor soon thereafter.¹⁶¹ While the production of tritium is allowed under an FMCT,¹⁶² plutonium would simultaneously be produced in the Dimona reactor via the absorption of neutrons by the uranium U-238 in the fuel, and verifying that the plutonium isn’t being extracted in the associated reprocessing plant would be difficult without compromising Israel’s policy of opacity.

One possibility would be to monitor remotely the noble gas fission products, especially krypton-85, that are released during the reprocessing of spent fuel. It is technically feasible, however, to prevent the release of these gases, so challenge inspections might be demanded under the treaty to verify that plutonium wasn’t being produced. If Israel could be persuaded to shut down the Dimona reactor and produce tritium at a new reactor or accelerator specifically designed for this purpose,¹⁶³ it might be easier to achieve credible verification of the non-production of plutonium, though such arrangements could still be seen by Israel as compromising opacity. While these possibilities deserve further study, the fundamental political problem from the Arab/Iranian perspective remains: convincing these states that any arrangement that legitimated, if only implicitly, the retention of nuclear weapons by Israel, while precluding their own acquisition of such weapons, would be a net benefit to them.

Marvin Miller

Japan

As the only country that has suffered nuclear bombing, Japan's official policy is to promote nuclear disarmament and nonproliferation. Japan also has three non-nuclear principles:

- Not to possess nuclear weapons,
- Not to produce them, and
- Not to permit their entry into the country.

Japan's declared policy glosses over two serious difficulties, however:

1. The tension between its advocacy of nuclear disarmament and its reliance on the nuclear "umbrella" provided by the U.S.-Japan Security Treaty.
2. The tension between its support of nonproliferation and its commitment to separating and recycling plutonium, a nuclear-weapon-usable material, in its civilian nuclear-power program.

This chapter reviews how these problems arose and how they might be resolved. It should be noted that most of the quotes from Japanese government officials are from the Liberal Democratic Party government, which lost power in the House of Representatives election of 30 August 2009. The new Democratic Party of Japan government is much less ambivalent about nuclear disarmament based on its pre-election statements, a poll of DPJ members of the Japan's House of Representatives, and the letter that the new foreign minister sent to the Secretaries of States and Defense of the United States. It remains to be seen, however, whether the new government will prevail in the struggle with the bureaucrats who believe in the nuclear status quo.

Japan's three non-nuclear principles

Japan's three non-nuclear principles were formalized in 1967 by Prime Minister Eisaku Sato, who received the 1974 Nobel Peace Prize for his contribution to peace and opposition to nuclear weapons. The three non-nuclear principles were, however, actually in exchange for the U.S. "nuclear umbrella" under which the United States guarantees to defend Japan, including with the use of nuclear weapons if required.

When Prime Minister Eisaku Sato first laid out the three non-nuclear principles in the Diet on December 11, 1967, he explained the relationship between the nuclear umbrella and the principles:

“What should Japan do about its security under the three principles concerning nuclear weapons: not possessing, not producing, and not bringing in nuclear weapons?...When I met President Johnson last time in 1965, and this time too, I said: ‘Could the Japan-U.S. security treaty defend Japan against any kind of attacks?’ In other words, is it useful against nuclear attacks? President Johnson said [that the United States] will clearly defend Japan against any attacks.”¹⁶⁴

Indeed, the January 13, 1965 Sato-Johnson summit statement said:

“The President and the Prime Minister reaffirmed their belief that it is essential for the stability and peace of Asia that there be no uncertainty about Japan’s security. From this viewpoint, the Prime Minister stated that Japan’s basic policy is to maintain firmly the United States-Japan Mutual Cooperation and Security Treaty arrangements, and the President reaffirmed the United States determination to abide by its commitment under the Treaty to defend Japan against any armed attack from the outside.”¹⁶⁵

A resolution supporting the policy of “not possessing nuclear weapons, not producing them, and not permitting their entry into the country” was adopted by the House of Representatives on November 24, 1971.¹⁶⁶ The policy has been repeatedly confirmed as a national policy in various resolutions in the Diet.

The position of Japan’s government is that its policy choice under the three non-nuclear principles is not to go nuclear but that its constitution does not prohibit Japan from having nuclear weapons for self-defense purposes.¹⁶⁷ This has positive implications for nonproliferation but negative implications for nuclear disarmament: Japan will not go nuclear as long as the U.S. nuclear umbrella is seen as reliable, but might go nuclear if the umbrella were removed. Japan’s reliance on the U.S. nuclear deterrent therefore creates an obstacle to nuclear disarmament.

There are some issues as to the interpretation of the third principle, however. There is also a question concerning the scope of the nuclear umbrella that Japan has in mind.

The reality with regard to not permitting U.S. nuclear weapons to enter Japan. In reality Japan’s three non-nuclear principles are more like 2.5. The third principle of not permitting nuclear weapons to enter Japan has not been strictly adhered to.

Article VI of the Japan-U.S. Security Treaty says:

“For the purpose of contributing to the security of Japan and the maintenance of international peace and security in the Far East, the United States of America is granted the use by its land, air and naval forces of facilities and areas in Japan.”

This use is governed by a separate agreement signed by Prime Minister Nobusuke Kishi and Secretary of State Christian A. Herter in 1960:¹⁶⁸

“Major changes in the deployment into Japan of United States armed forces, major changes in their equipment, and the use of

facilities and areas in Japan as bases for military combat operations to be undertaken from Japan other than those conducted under Article V [measures against armed attacks on Japan] of the said Treaty, shall be the subjects of prior consultation with the Government of Japan.”¹⁶⁹

Documents declassified in the United States suggest, however, that there was a secret agreement that port calls by U.S. ships carrying nuclear weapons need not be subject to prior consultation. A telegram sent on April 4, 1963 to Dean Rusk, U.S. Secretary of State, by Edwin Reischauer, U.S. Ambassador to Japan, states that Reischauer had explained on that same day to Foreign Minister Masayoshi Ohira that, according to a secret agreement at the time of the 1960 revision of the Japan-U.S. Security Treaty, “introduction” would be subject to prior consultation but not “bringing in” nuclear weapons to ports by ships in transit.

In this context the Japanese word “mochikomu,” which literally means “to bring in,” was interpreted by the U.S. side as “to introduce” meaning deployment or storage of nuclear weapons on land. Ohira had not known about the secret agreement but agreed to use the word “mochikomu” in accordance with the U.S. interpretation. The Ministry of Foreign Affairs English-language website, possibly for this reason, describes the three non-nuclear principles as “the policy of not possessing, not producing and not permitting the introduction of nuclear weapons into Japan.”¹⁷⁰

A panel appointed by then Foreign Minister Yoriko Kawaguchi confirmed this reality in a report submitted to her on September 18, 2003. The panel headed by University of Tokyo professor Shinichi Kitaoka, later appointed as Japan’s ambassador and deputy permanent representative to the United Nations, said:

“The question of to what degree the deterrence (by nuclear weapons) should be limited when the North Korean nuclear weapon development program gets into stride is a serious issue. We believe that we should say that what we have had was really a policy of 2.5 principles (allowing port calls [of ships carrying nuclear weapons]), trusting the common sense of the Japanese people.”¹⁷¹

U.S. documents suggest also that there was another agreement made between Sato and President Richard Nixon in 1969 that Japan would agree to “introduction” of nuclear weapons in case of emergency.

On September 17, 2009, right after his appointment, Foreign Minister Katsuya Okada ordered the Ministry’s top bureaucrat to investigate the issue of secret pacts. On November 24, Okada announced the establishment of an expert panel, again headed by Professor Kitaoka, to examine the issue. It has been reported that the panel decided there was “not necessarily” an explicit agreement allowing Washington to bring nuclear weapons into Japan. This is based on the interpretation that the Japanese side was unaware of the United States understanding of the term “introduction” at the time of the 1960 revision of the bilateral security treaty.¹⁷²

Since the decision of President George H. W. Bush to withdraw nuclear weapons from surface ships and attack submarines in 1991, the port call issue has been moot. But there is a hitch. Hans M. Kristensen of the Federation of American Scientists has pointed out that Japan was being cited as the main reason for the potential life extension of

the nuclear-tipped Tomahawk land attack missiles (TLAM/N) reserved for attack submarines. These weapons have been virtually retired since 1992 and are scheduled to be completely retired in 2013. Japan's alleged call for the life extension of TLAM/N would mean that Japan was endorsing potential deployment of nuclear weapons on attack submarines that frequently visit Japanese ports.

Japan's position on the scope of the U.S. nuclear umbrella and no first use. If Japan's understanding of the purpose of the U.S. nuclear umbrella is that Japan needs it solely for deterring nuclear attacks, Japan could say: Japan needs the nuclear umbrella as long as nuclear weapons exist but supports the efforts to eliminate nuclear weapons as quickly as possible. But if Japan's position is that it needs the umbrella to deter attacks of chemical, biological and conventional weapons, it would theoretically mean that Japan might go nuclear if the United States declares that the sole purpose of its nuclear weapons is to deter the use of nuclear weapons by others—or more clearly if the United States were to adopt a no first use policy. It could also be argued, theoretically, that Japan would want to be protected by U.S. nuclear weapons or its own even if everybody else gave up their nuclear weapons as long as other types of weapons exist. In other words, Japan is against the abolition of nuclear weapons.

Although most Japanese do not know, the Japanese government's understanding of the U.S. nuclear umbrella has been that it includes the option of first use of nuclear weapons. On February 26, 1999, in response to a question raised by Diet member Mizuho Fukushima, the Ministry of Foreign Affairs claimed that Japan's support of the first-use option had been officially made public on August 6, 1975, in a joint press statement by Prime Minister Takeo Miki and President Gerald Ford.

In fact, although the Miki-Ford statement mentioned the nuclear umbrella expressly for the first time, saying that Miki and Ford "recognized that the U.S. nuclear deterrent is an important contributor to the security of Japan", it did not go on to say anything explicitly about first-use.¹⁷³

In Diet meetings in 1982, however, Japan's government stated its understanding that the United States might use nuclear weapons in response to attacks on Japan that used only conventional weapons. On June 25, 1982, a government official told a Diet session:

"We believe that in the sense that all the measures are included, it would mean that the nuclear deterrent or retaliation would not be limited to nuclear attacks against Japan."¹⁷⁴

This was in response to a question raised by Diet member Takahiro Yokomichi on February 19, 1982, about a statement made in the previous year by Eugene Rostow, director of the Arms Control and Disarmament Agency, that, as with its security guarantee to West Europe, the United States might use nuclear weapons if the Soviet Union attacked Japan with conventional weapons.

Later, with the Cold War between the United States and the Soviet Union over, government officials and security experts in Japan started to consider the security implications of North Korea's chemical and biological weapons, as well as China's conventional (and nuclear) weapons buildup. In 2003, for example, the *Yomiuri Shimbun* reported that Mitoji Yabunaka, director-general of the Foreign Ministry's Asian and Oceania Affairs Bureau, filed a request with Assistant Secretary of State for East Asian and Pacific Affairs James Kelly "to make sure the United States does not again [as in 1994] promise

not to use its nuclear weapons against North Korea if Pyongyang agrees to dismantle its nuclear development program."¹⁷⁵

Japan's concern about China has a long history. Documents declassified on December 22, 2008 by the Ministry of Foreign Affairs revealed that on January 13, 1965, during a visit to the United States, Prime Minister Sato said to Secretary of Defense McNamara in effect (translated from a declassified MOFA summary record):

"Please be careful about statements concerning bringing nuclear weapons onto the land. Of course, should a war break out, it would be a different story. We expect that the U.S. will immediately retaliate with nuclear weapons."¹⁷⁶

This was about three months after China's first nuclear test (October 16, 1964).

More recently, when asked about encouraging the United States to adopt a no-first-use policy, Prime Minister Taro Aso told an August 9 press conference in Nagasaki that, "[i]n international society, there exist large arsenals including nuclear forces. It could disturb the deterrence balance and undermine security to have a discussion separating nuclear weapons from other weapons."¹⁷⁷ Aso said, "Even if a nuclear power says it won't make a pre-emptive strike, there's no way to verify its intentions. I wonder if that's a realistic way to ensure Japan's safety."¹⁷⁸

Aso's remarks were made in response to a question about U.S. policy, in the context of the United States perhaps being able to make a contribution to the efforts toward global nuclear disarmament by declaring a no-first-use policy. This declaration could reduce international tension and the role and value of nuclear weapons and perhaps prepare the way for further reductions in the number of nuclear weapons. His answer was no.

The position of the new Democratic Party of Japan (DPJ) government is very different, however. A poll taken after the 2009 election by the Kyodo News found that 87 percent of DPJ members in Japan's House of Representatives want the U.S. to adopt a no-first-use policy.¹⁷⁹ Furthermore, Foreign Minister Okada has long been known to be a supporter of the no-first-use philosophy. Okada repeated his position in the inaugural Cabinet press conference on September 16, saying, "My own personal belief has been to question whether countries which declare their willingness to make first use of nuclear weapons have any right to speak about nuclear disarmament, or nuclear nonproliferation, in particular nonproliferation."¹⁸⁰

The dilemma of nuclear disarmament for Japan

With regard to nuclear reductions, the previous government's position was that:

"While it is difficult to answer about the position of Japan concerning the concrete numbers of reduction of nuclear warheads, we consider that such a reduction of the number of nuclear weapons will be conducted in a way consistent with the commitment to the security of the allies of the United States including Japan."¹⁸¹

While it is difficult to get a straight answer about these matters from the government officially, the following summary of a meeting between experts close to the Japanese Government and U.S. experts gives a clue to the discussions between the two countries.

Ralph Cossa, president of the Pacific Forum Center for Strategic and International Studies (CSIS), said:

“At a recent Pacific Forum U.S.-Japan strategic dialogue, virtually every Japanese security specialist (and most Americans in the room) argued that a drastic reduction in the U.S. nuclear arsenal could tempt Beijing to start growing its nuclear arsenal in an attempt to achieve nuclear parity. This could have a chilling effect on America’s extended deterrence capability, they warned, and cause Tokyo to question the reliability of the American nuclear umbrella.”¹⁸²

One of the participants in the CSIS meeting, Professor Satoshi Morimoto of Takushoku University, who served in the Defense Agency and the Ministry of Foreign Affairs, warned in December 2008 that:

“[if the U.S.-Russia strategic nuclear weapon reduction goal stays at “not more than 1000” on each side] it would be OK but if it becomes 700 or 600, I think we will face a very serious problem.”¹⁸³

He stressed that other countries with nuclear weapons were not involved in the reduction process and wondered how the credibility of extended deterrence could be maintained. He also argued that, if nuclear reductions continue with the goal of achieving “minimum deterrence,” the relative weight of conventional weapons will increase, causing a problem for the security of Japan, which is exposed to the threat of conventional weapons from surrounding countries such as China and North Korea.

Another participant in the CSIS meeting, Associate Professor Ken Jimbo from Keio University, who works closely with the Ministry of Foreign Affairs, expressed similar views. Professor Jimbo suggested the regular stationing (or frequent positioning/war-time positioning) of nuclear forces in Guam with B-52/B-2 strategic bombers and basing of nuclear ballistic and cruise missile submarines in Guam as a means to ensure the credibility of extended deterrence, while arguing for strengthening “Japan’s indigenous military capability.”¹⁸⁴

Hoping that joint efforts with the United States will result in Japan obtaining “a missile defense capability that can deal with Chinese MRBMs” Jimbo said:

“Japan does not want Beijing to get the impression that rollback of Tokyo’s missile defense plans are [sic] an option. Japan wants the U.S. to take a rigid stance on the missile defense plan in Europe.”¹⁸⁵

Former Prime Minister Shinzo Abe shares the concern about China, arguing in a lecture at the Brookings Institution, in Washington DC, on April 17, 2009:

“Nuclear reductions should be carried out with China in view, not just between the U.S. and Russia.”¹⁸⁶

He went on to say that the U.S. nuclear deterrent in East Asia should not be damaged stressing that the nuclear reduction process and the maintenance of U.S. nuclear deterrence in East Asia are not incompatible.

U.S. nuclear policy and Japan's attitude

Japan's attitude about extended deterrence is cited as a factor in U.S. nuclear policy in the debate over the 2010 Nuclear Posture Review. Proponents for the status quo argued Japan is the main reason why the United States should not adopt a policy to declare that the sole purpose of the U.S. nuclear weapons is to deter the use of nuclear weapons by others. This is not the first time that Japan has become an issue in this context. On his visit to Japan in the summer of 1997, Ambassador Thomas Graham, who had just stepped down as Special Representative of the President for Arms Control, Nonproliferation, and Disarmament, emphasized that there were people in Washington who opposed a U.S. declaration of no-first-use, saying that it might lead to U.S. allies such as Japan and Germany going nuclear. He stressed the need for Japan to adopt a policy supporting no-first-use.

Japan's attitude also figures in discussions about specific weapons systems, such as the above-mentioned TLAM/N. At the May 6, 2009 House Armed Services Committee hearing on the final report of the Congressional Commission on the Strategic Posture of the United States, James R. Schlesinger, Vice Chairman of the Commission, said that "intimate discussions with the Japanese, I think, are mandatory at this stage" since Japan "has perhaps the greatest leaning, amongst the 30 odd nations that we have under the umbrella, to create its own nuclear force."¹⁸⁷ William Perry, Chairman of the Commission, said that, even if the United States does not see the need to deploy certain weapons, it should take into consideration the concerns of its allies, stating that there is:

"great concern in both Europe and in Asia about the credibility of our extended deterrence... It is important for us to pay attention to their concern and not try to judge whether deterrence is effective by our standard, but we have to take their standards into account as well. And a failure to do this, as suggested by Dr. Schlesinger, the failure to do this would be that those nations would feel that they had to provide their own deterrence. They would have to build their own nuclear weapons, so that would lead to a failure of proliferation."¹⁸⁸

In this context, it is encouraging that the new Japanese government is giving the right, albeit not completely decisive signals to the United States. On January 22, 2010, Foreign Minister Okada disclosed that he had sent a letter to Secretary of State Hillary Clinton and Secretary of Defense Robert Gates explaining the position of the present government in regard to alleged attempts by Japanese officials to influence U.S. policy concerning TLAM/N during the preparation of the report of the Congressional Commission.¹⁸⁹ The letter said:

"my understanding is that...the GOJ has never expressed its views on whether the United States should or should not possess specific weapon systems such as TLAM/N and RNEP. Even if such a statement had in fact been made, that would clearly differ with my view to strive for nuclear disarmament."¹⁹⁰

Kyodo News later reported that the United States "has informally told Japan that it will retire its sea-based Tomahawk cruise missiles carrying nuclear warheads, in line with President Barack Obama's policy to pursue a world free of nuclear weapons."¹⁹¹

In his letter to the Secretaries, Foreign Minister Okada went on to say:

“the International Commission on Nuclear Nonproliferation and Disarmament, which was established as a joint initiative of Japan and Australia, published its report on December 15. The report includes recommendations such as the following; all nuclear-armed states should retain nuclear weapons solely for purposes of deterring others from using such weapons; the use of nuclear weapons towards non-nuclear weapon states which are parties to the NPT should be prohibited. I have a keen interest in these recommendations as a first step toward “a world without nuclear weapons”. While it may not be possible to realize these immediately, I would like to have, between the two governments, further discussion on the possibility of adopting such measures in present or future policy.”¹⁹²

On February 19, 2010, 204 Diet members, including 164 members from the DPJ, sent a similar letter to President Obama. The letter said:

“We strongly desire that the United States immediately adopt a declaratory policy stating that the “sole purpose” of U.S. nuclear weapons is to deter others from using such weapons against the United States or U.S. allies, in accordance with the recommendation of the International Commission on Nuclear Nonproliferation and Disarmament (ICNND) Report.”¹⁹³

The letter added: “We are firmly convinced that Japan will not seek the road toward possession of nuclear weapons if the United States adopts a “sole purpose” policy.”

Japan’s civil nuclear energy policy and nonproliferation

Japan’s official commitments to both peaceful use of nuclear energy and the non-proliferation regime are very strong. At the 2008 Hokkaido G8 Summit, as a way to strengthen the nonproliferation regime, Japan proposed an international “3S” initiative on nonproliferation safeguards, nuclear safety and nuclear security-based nuclear energy infrastructure.¹⁹⁴

As a follow up activity, Japan, in collaboration with the IAEA, held a regional seminar on 3S in 2008. Japan also decided to increase its budget to the IAEA to support 3S activities. Japan also supports efforts to universalize the Additional Protocol, and continues to host Asian Senior-Level Talks on Nonproliferation (ASTOP).

With regard to civilian nuclear cooperation with India, which is not a party to the NPT, Japan’s position is still not clear. Japan has a de-facto moratorium in cooperating with India, Pakistan and Israel. Although Japan has endorsed the decision by the Nuclear Supplier Group to make an exception for India-U.S. nuclear cooperation, it has not yet decided on its own civilian nuclear cooperation with India. In his statement on this issue, Iwao Matsuda, Japan’s Special Envoy at the 52nd General Conference of the IAEA said:

“The international nuclear disarmament and nonproliferation regime must not be weakened by civil nuclear cooperation to India. Japan ... urges India to take further actions in order to maintain and strengthen the international nuclear nonproliferation

regime. Japan also continues to urge India to accede to the NPT as a non-nuclear weapon state, and to sign and ratify the CTBT at the earliest possible date.”¹⁹⁵

Japan’s nuclear-fuel cycle policy. Despite Japan’s strong support for the nonproliferation regime, its nuclear-fuel cycle policy creates problems for the regime. Japan is the only non-weapon state that reprocesses spent power-reactor fuel to recover plutonium, a nuclear-weapon material, for recycle in reactor fuel. Japan’s commitment to this “closed” fuel cycle remains strong.

To strengthen international confidence in the purely peaceful purposes of its plutonium-separation activities, however, Japan announced enhanced transparency measures in 2003, right before the start up of its first commercial scale reprocessing plant at Rokkasho in Aomori Prefecture. It also requires all private utilities to annually submit their “plans” for recycling the separated plutonium as a condition for reprocessing their fuel at the Rokkasho plant. Unfortunately, however, Japan’s plutonium stockpile continues to grow as its recycling programs have been delayed by more than a decade with “plans” being just plans. The plutonium stockpile is now more than 40 tons (6 tons in Japan, 34 tons in Europe).

Japan also has a national uranium-enrichment plant that produces low-enriched uranium for its nuclear power plants. In this case, Japan is not unique. Brazil, Iran, the Netherlands and Germany also have domestic enrichment plants. But, as the current controversy over Iran’s acquisition of a uranium enrichment plant shows, such facilities too can be dangerous to the nonproliferation regime because they could quickly be converted to the production of highly enriched uranium for weapons.

One solution to this problem proposed by IAEA Director General Mohammed El-Baradei would be to put all reprocessing and enrichment plants under multinational control.¹⁹⁶ Japan’s reaction to multilateral nuclear fuel cycle proposals has not been warm, however, as Japan has been concerned that they might adversely affect its national nuclear fuel cycle programs. In 2004, President Bush proposed to restrict reprocessing and enrichment to countries that “already possess full-scale, functioning enrichment and reprocessing plants.”¹⁹⁷ After Japan received assurances from the Bush Administration that the United States considered Japan to be one of the “fuel cycle states,” Japan decided to support the idea of multinational arrangements in principle.

With regard to arrangements to assure countries that renounce national enrichment plants of the security of their supply of low enriched uranium, in 2006 Japan’s government proposed an “IAEA Standby Arrangements System for the Assurance of Nuclear Fuel Supply.” Its basic aim is to improve transparency and confidence in the international nuclear fuel supply system, while ensuring the right of all countries to the peaceful uses of nuclear energy.

Conclusion

With regard to nuclear disarmament and nonproliferation, Japan is facing two fundamental dilemmas.

1. While Japan's non-nuclear weapon policy is strongly backed by its public, its three non-nuclear principles are based on the assumption that Japan will be protected by the "extended nuclear deterrence" of the United States, which should include a first use option in Japan's traditional understanding.
2. Japan has committed to a stronger nonproliferation regime and has proposed a 3S (safety, security and safeguards) regime as a condition for civilian nuclear cooperation. But, Japan has put herself in an awkward position by promoting a multilateral nuclear fuel cycle approach while at the same time committing itself at home to a national closed fuel cycle with a large plutonium stockpile.

Japan needs to overhaul its nuclear policy to solve these fundamental dilemmas soon. Although the new government seems to be making progress on the first dilemma, it will need to work much faster to assure that the window of opportunity created by the emergence of new governments in both Japan and the United States countries is not lost. On the second dilemma there has not been much discernible difference from previous administrations yet. The new government should pay more attention to proliferation concerns when examining Japan's own nuclear power policy.

Masa Takubo, Tadahiro Katsuta and Tatsujiro Suzuki

North Korea

North Korea is the only country to withdraw from the nuclear Nonproliferation Treaty to openly pursue a nuclear weapon program. North Korea's nuclear capabilities are viewed by many as a serious threat to its neighbors. Japan and South Korea are reacting by strengthening their alliances with the United States, and Japan also by building a missile defense system with the United States. It has a growing potential to ignite a second Korean War.

The motivations of North Korea in pursuing nuclear and missile capabilities are often misunderstood and regarded by some just as simply a bluff or attempts to obtain bargaining chips for negotiations with the United States. This paper explains the specific political situation of North Korea as a part of a divided nation and focuses on the political motivations of the leadership for acquiring nuclear capabilities. It offers some possible solutions to North Korea's challenge to the nonproliferation regime.

Historical background

Koreans, next to the Japanese, suffered the greatest losses in the nuclear holocausts of Hiroshima and Nagasaki,¹⁹⁸ and Koreans have lived in constant danger of a nuclear war ever since. Most Koreans believe that their country was divided unfairly in 1945 and therefore national reunification remains the highest goal of the two Korean states. The division of Korea remains the root cause for the current trouble in Korea.

The Republic of Korea (South Korea) was founded on 15 August 1948 in the Southern part of the peninsula occupied by U.S. forces. The People's Democratic Republic of Korea (North Korea) was founded on 9 September 1948. After establishing two ideologically competing regimes, the U.S. and Soviet forces withdrew from Korea in 1949. The two Koreas, emerging from 35 years of Japanese occupation and born fresh with foreign ideologies, did not accept each other. Each claimed to be the sole legitimate representative of all Koreans.

Being militarily stronger than the South, North Korea tried to unify the country by military means by launching an invasion on 25 June 1950 with the help of the Soviet Union. It almost succeeded, but the United States with the support of some other UN members rushed to rescue South Korea. A UN mandate for this rescue mission was possible only because the Soviet Union was absent at the time from the UN Security Council in protest at the fact that Taiwan (Republic of China) was representing China at the UN.

The United States and the UN forces succeeded in freeing South Korea within two months. Seeing an opportunity, however, South Korea persuaded the U.S. Commander to march into the North and impose unification under the South and, more importantly, rollback the Communist expansion in East Asia. This time, however, the newly founded People's Republic of China intervened to rescue its ally, North Korea.¹⁹⁹

The devastating fratricidal war lasted three years. After the death of Stalin in early 1953, fighting stopped and a truce agreement was signed between the US, representing the UN on one hand, and China and North Korea on the other. South Korea refused to sign the truce agreement, however. This is why North Korea believes that the South could resume the war of national unification at any time.

During the war, U.S. Commander General MacArthur was authorized to use eight nuclear bombs but found that US conventional bombing had been so thorough that there were no more targets left in North Korea.²⁰⁰

After the war, until the early 1960s, the two Koreas were preoccupied with the reconstruction of their devastated countries. Although many million Koreans had divided families, neither country allowed its people to have contacts with the other side. As a result, each country has very limited understanding of the other.

After persuading the United States to remain in South Korea and being brought under the U.S. "nuclear umbrella," South Korea felt safe from a possible North Korean invasion. For its part, however, North Korea has turned into a garrison state on constant military alert. Although North Korea signed security treaties with China and the Soviet Union in 1961, since the Soviet and Chinese rivalry and conflicts in the late 1960s North Korea has felt weak and vulnerable. Feeling threatened by the presence of U.S. forces and tactical nuclear weapons in the South, North Korea decided to acquire nuclear capabilities of its own to defend against a possible United States/South Korean invasion. It sent thousands of students to the Soviet Union to study nuclear physics and nuclear engineering and other critical subjects.

Until the early 1970s, North Korea was economically and militarily stronger than the South. It therefore expected a Socialist Revolution in the South and prepared for rapid unification on its own terms. On the other side, South Korea dropped national unification as a priority and, starting in 1962, its military government focused on the industrialization and modernization of South Korea's backward economy. Only in 1972, as a result of the shock of the surprise 1972 rapprochement between China and the United States, did representatives of the leaders of the two Koreas meet secretly for the first time since the Korean War. They agreed on free exchanges and agreed on three principles for unification:

- Unification shall be achieved through independent efforts without external imposition or interference;
- Unification shall be achieved through peaceful means, and not through use of force against one another; and
- National unity as a homogeneous people shall be sought first, transcending differences in ideas, ideologies and systems.²⁰¹

Both Koreas even agreed on free exchanges and a wide range of cooperation in all fields with each other.

Initially, the South, feeling weaker than the North at the time, refused to open the border. By the end of the 1970s, however, the South surpassed the North, both economically and militarily, through South Korea's successful export-oriented industrialization and close military cooperation with the United States, including sending many troops to Vietnam. In addition, starting in the late 1970s, the South was successful in using nuclear technology to generate a significant fraction of its electrical power. The 1988 Summer Olympics in Seoul were the turning point, clearly showing to the world who was the winner.

Watching closely, the North wanted to do the same things to rapidly advance its economy and solve its chronic energy problem. It signed a technical cooperation agreement with the Soviet Union and joined the Nonproliferation Treaty (NPT) in late 1985, hoping to import four nuclear power plants. North Korea refused to sign the required safeguards agreement with the International Atomic Energy Agency (IAEA) for seven years, however, until 1992. Its main argument was that the United States was stationing tactical nuclear weapons in the South. Only after the United States and South Korea declared in December 1991 that all U.S. tactical nuclear weapons stationed in South Korea had been withdrawn, did North Korea sign its safeguards agreement with the IAEA.

With the rapid political changes in Europe and peaceful unification of Germany, the two Koreas tried again to accommodate with each other. Both Koreas finally gave up their claims to sole representation of Korea in the UN and joined the international community as separate states. But they failed to recognize each other or give up their unification policies. The biggest diplomatic blow to North Korea, however, was the diplomatic success of South Korea. After successfully hosting the 1988 Seoul Summer Olympics, most Eastern Bloc countries including the Soviet Union recognized South Korea and finally, in August 1992, even the People's Republic of China, North Korea's principal ally, recognized South Korea as a sovereign state. China had been delaying normalization of relations with South Korea until the United States recognized North Korea. Recognizing South Korea's growing economic strength, however, China decided to establish normal relations with South Korea without prior consultation with North Korea.

Being aware of the changing global political environment, North Korea took the initiative to reach out to the South and asked for deputy prime-minister-level negotiations. Since there is no deputy prime minister in South Korea, South Korea offered to have the dialogue at the prime minister level. North and South Korea negotiated directly from 1990 to 1992 in Pyongyang and Seoul. In December 1991, they reached agreements on Reconciliation, Non-Aggression, Exchanges and Cooperation, and, in January 1992, a Declaration on Denuclearization of the Korean Peninsula. Many Koreans in both sides believed that unification was near.

After signing these two agreements, North Korea expected massive economic help from the South, but its high-level delegation returned home empty handed. The South believed at that time that extending help to the North would only help the regime avoid collapse, meaning that unification would be delayed. The consequence of this failure in inter-Korean reconciliation was the first nuclear crisis. North Korea discovered that it was surrounded by a hostile world and its stronger brother in the South was hoping and waiting for its collapse, so that it could unify the nation by absorption as West Germany had done with East Germany in 1990.

With the dissolution of the Soviet Union and the Eastern Bloc, North Korea lost all its allies. This made North Korea feel extremely isolated and vulnerable to attack by the South, which was now stronger economically and politically as well as militarily, even without the United States. Unification on the South's terms seemed possible and near.

During this same period, international suspicions about a potential North Korean nuclear-weapon program were growing as was international pressure on North Korea. Since North Korea was a member of the NPT at that time, the IAEA conducted six ad hoc inspections that hardened the suspicion. The IAEA had just had a bad experience in Iraq. Therefore, for the first time in IAEA history, it demanded special inspections of two suspect sites. North Korea withstood strong international and U.S. pressures to give up its nuclear ambition and, in 1993, even threatened to withdraw from the NPT.²⁰² It decided to remain only after the United States promised to consider North Korea's security concerns. Their first ever bilateral negotiations in Geneva ended with the Framework Agreement on the nuclear issue in October 1994.²⁰³ North Korea agreed to freeze the 5-MWe reactor and stop construction on its radio-chemical (reprocessing) laboratory as well as on two new reactors (50 and 200 MWe).²⁰⁴ In return, the United States promised to normalize relations with North Korea, accept it as a sovereign state, to end the Korean War, and not to threaten North Korea with nuclear weapons. Peace in Korea seemed near.

The two Koreas also came closer to each other when South Korea's President Kim Dae Jung addressed numerous peace gestures and called for accommodation with the North. The first ever summit between two leaders of the divided nation took place 50 years after the outbreak of the Korean War.²⁰⁵ The three-day summit in Pyongyang resulted in a "North-South Joint Declaration of June 15, 2000" which basically repeated what they had agreed in 1972 without solving the basic problem of non-recognition and terminating the Korean War. Although the two leaders failed to recognize each other as sovereign states and to formally change their unification policies, they declared their intentions for peaceful unification, which increased hope for peaceful coexistence and free exchanges between the North and South.

High-level bilateral negotiations between the United States and North Korea continued in an effort to solve the missile problem and U.S. President Clinton even planned to visit North Korea in December 2000. But these positive developments ended when President G.W. Bush named North Korea as one of the "Axis of Evil" countries and, in the leaked portions of the Nuclear Posture Review, the Defense Department included North Korea as a possible target of U.S. nuclear weapons. In December 2002, the U.S. government nullified the 1994 Geneva Framework Agreement, accusing North Korea of having a secret HEU-production program, which North Korea strongly denied until recently.²⁰⁶ On 10 January 2003, North Korea withdrew from the NPT and announced that it was developing nuclear weapons. This open challenge to the United States and to the NPT regime was a provocative North Korean attempt to engage the United States in direct dialogue as in 1994. This time, however, the United States did not react and pressured China to persuade North Korea to give up its nuclear ambition.

With the growing tension on the Korean peninsula, China initiated three-party talks in Beijing in April 2003 and Six-Party Talks in August to solve the North Korean nuclear issue peacefully. The Six-Party Talks process achieved its first success in an Agreement on Principles on 19 September 2005. North Korea agreed, as in 1994, to give up its nuclear option in return for political concessions from the US. For their parts, Japan and the United States promised to normalize their relations with North Korea if it gave up its nuclear program. This time, however, each side agreed to a step-by-step process.

Just as the agreement was reached, however, the U.S. Treasury started financial sanctions against some fifty accounts of North Korean leaders in the Banco Delta Asia in Macau. North Korea felt that it had been cheated again by the United States and boycotted the Six-Party Talks.

In July 2006, North Korea test fired its *Daepodong* ICBM, which failed. On 6 October 2006, it tested a nuclear device. North Korea was demonstrating its capabilities and deploying them as bargaining chips in its negotiations with the United States. In November 2006, in Hanoi, during the APEC Summit, the United States offered a bilateral dialogue with North Korea.

The chief negotiators met first in January 2007 in Berlin. This brought a breakthrough in the Six-Party Talks. On 13 February 2007, North Korea agreed to disable its key nuclear installations in return for energy compensation in the form of heavy fuel oil for its fossil-fuelled electrical power plants by other members of the Six-Party Talks. In the process of the step-by-step-implementation of the agreement, however, Japan refused to supply its portion of the heavy oil to North Korea until the question of its kidnapped citizens was resolved.

In October 2007, the second inter-Korean Summit took place in Pyongyang between South Korean President Roh Moo Hyun and North Korean Leader Kim Jong Il. A peace declaration was signed. The document called for international talks to replace the Korean War Armistice with a permanent peace treaty. Unfortunately, with the change of the government in the South in early 2008, relations between the two Koreas began to deteriorate again. President Lee Myung Bak of South Korea refused to accept the results of the two inter-Korean summits, and all official dialogues between the two countries broke down. Military tension has been increasing, with each side blaming the other for breaking promises.

North Korea's launch of a multi-staged rocket on 5 April 2009—purportedly to put a satellite into space—was condemned by the UN Security Council in a presidential statement. In response, North Korea decided to halt the process of disabling its nuclear facilities, to stop participating in the Six-Party Talks and expelled the IAEA inspectors, reactivating the reactors as well as its reprocessing plant and conducted its second nuclear test in May 2009. But the second test did not have the desired effect of a dialogue with the new U.S. President Barack Obama but instead brought about total isolation of the country including UN sanctions which even China supported.

In summer 2009, North Korea changed its policy from confrontation to a peace offensive by making overtures to the United States and South Korea. When former U.S. President Clinton visited North Korea in August 2009, he met with North Korean Leader Kim Jong-Il and gained the release of two U.S. journalists. It is likely that the Six Party Talks will resume sometime in the future.

South Korea's attempt at nuclear proliferation

After barely surviving the Korean War, South Korea entered into a Mutual Defense Treaty with the United States, which established a number of military bases in Korea in 1953. In addition to the deployment of numerous tactical nuclear weapons in South Korea, the US reserved the right of first use of nuclear weapons. As a small country surrounded by hostile neighbors armed with nuclear weapons, South Korea believed it necessary to have a US nuclear umbrella to survive. It disregarded North Korea's allegations that these weapons were a threat to the DPRK's existence.

Shortly after North Korean commandos nearly succeeded in mounting an attack on the presidential palace in January 1968, President Park Chung Hee announced his determination to seek a “self-reliant national defense.” His determination was strengthened after the announcement by U.S. President-elect Richard Nixon in 1969 of his decision to disengage from Asia, including Korea. After learning of the U.S. decision to withdraw its Seventh Infantry Division around 1971, President Park decided to start a nuclear weapons program.²⁰⁷ Although he was forced by the US to put it on hold, he continued to seek technical aid from France.

In 1975, President Park made it known openly that South Korea would begin nuclear-weapon development if the United States removed its nuclear umbrella from the Korean Peninsula. He indicated that South Korea was only refraining from developing nuclear weapons in conformity with the NPT. Subsequently, South Korea signed a one-billion dollar contract with France to purchase a reprocessing plant, which would be placed under IAEA safeguards. Under U.S. pressure, President Park cancelled the deal in early 1976. Nevertheless, he kept the option by continuing secret nuclear research.

When U.S. President Jimmy Carter decided in 1977 to reduce U.S. ground forces in South Korea, President Park threatened again that, if North Korea went nuclear and if the United States pulled out its troops from Korea, South Korea would reconsider its own nuclear option.²⁰⁸ This represented an attempt by President Park to pressure the United States to remain in South Korea as long as the tension on the Korean peninsula continued. President Carter put pressure on South Korea to stop the nuclear program, and in return, cancelled the plan to withdraw U.S. troops from Korea. President Park maintained a secret nuclear program, however. A military coup in 1980 brought President Chun Doo Hwan to power, who stopped the project and disbanded the nuclear research group.

Possible solutions

It is unlikely that the North Korean proliferation problem will be resolved without considering the specific security needs of North Korea. Stronger pressure from the UN Security Council and further isolation of North Korea will only make the situation worse and the regime may even profit from it.

Termination of the Korean War and elimination of the danger of another war on the Korean peninsula are prerequisites to any improvement in the inhumane and tragic situation of the people of North Korea, and should be the top priority of all parties. As long as the two Koreas envision unification without ending their military confrontation, the danger of war will persist.

To resolve the conflict, several steps need to be taken by the United States, China, Japan and the two Koreas:

- The two Koreas and the United States should finally put an end to their unfinished war and commit themselves not to use military means to achieve unification. North and South Korea agreed to this in 1992. They could formalize it by signing a basic treaty recognizing each other as separate systems, each with its own sole jurisdiction, and exchange representatives.
- After normalization of relations, North and South Korea should start negotiations to reduce their armed forces to a level at which neither could be a military threat to the other. The present strength of their military forces makes them a threat to each other as well as to other neighbors such as Japan.²⁰⁹ U.S. forces in Korea should guarantee the security of *both* Koreas.

- Only North and South Korea should sign a peace treaty to replace the 1953 truce agreement. Since China and the United States were involved in the Korean War mainly in support of their allies, it is only essential for the two Koreas to sign a peace treaty. By the way, China did not sign a peace treaty with South Korea before they recognized each other in 1992.
- The United States and Japan should establish diplomatic relations with North Korea, just as China recognized South Korea in 1992. This will influence North Korea to behave normally and to foster peace and stability in the region.
- China could develop the Six-Party Talks process into a multilateral security cooperation mechanism not only to deal with North Korea but also to deal with other serious problems such as environmental problems, territorial disputes and the effects of climate change in the region.

Mark Suh

South Korea

Today, South Korea supports the nuclear Nonproliferation Treaty (NPT) and the broader nuclear disarmament and nonproliferation regime. In addition, in its 1992 Joint Declaration with North Korea on the Denuclearization of the Korean Peninsula, South Korea committed to not acquire nuclear reprocessing or uranium enrichment facilities.²¹⁰ In the past, however, South Korea's nuclear establishment has pursued nuclear weapons and today it is interested in reprocessing, which some in South Korea may see as providing a path to a possible nuclear weapon option.

South Korea had a clandestine nuclear-weapon-development program in the 1970s. President Park Chung Hee launched this program in response to concerns about the proposed withdrawal of U.S. troops from South Korea. The program was ended under U.S. pressure after the U.S. canceled its withdrawal plan in 1978 and definitively after President Park was assassinated in October 1979.²¹¹

Since 1978, in order to reduce South Korea's motivation to pursue its own nuclear weapon capability, the United States has promised, in annual meetings between South Korea's Minister of Defense and the U.S. Secretary of Defense, that the United States will provide nuclear deterrence for South Korea against attack by North Korea.²¹² Following North Korea's May 2009 nuclear test, U.S. President Barack Obama reaffirmed that the U.S. would provide "extended nuclear deterrence" against a North Korean nuclear attack at his 16 June 2009 summit in Washington, DC, with South Korea's President Lee Myung-bak. The U.S. extended nuclear deterrent is understood also to apply to any North Korean attacks with chemical and biological weapons or conventional missiles. This, unfortunately, gives North Korea an additional rationale for acquiring its own nuclear deterrent.²¹³

In the 1980s and in 2000, the Korea Atomic Energy Research Institute (KAERI) performed undeclared laboratory-scale experiments on the enrichment of uranium and separation of plutonium.²¹⁴ Although the quantities of nuclear material involved in the experiments were not significant and the International Atomic Energy Agency (IAEA) found no indication that the experiments have continued, the IAEA expressed serious concern about them because of the sensitive nature of the activities involved: uranium enrichment and plutonium separation, and the failures by South Korea to report these activities in a timely manner in accordance with its safeguards agreement.²¹⁵ The IAEA found no indications, however, that there had been specific political or military direction of this program.

Today, there is some concern about South Korea's interest in reprocessing its spent power-reactor fuel using a technology called pyroprocessing. The resulting separated transuranics (mostly plutonium) would be used to fuel fast-neutron reactors, which, depending upon the configuration of the reactor cores could be used to either reduce or increase the amount of plutonium ("burner" or "breeder" reactors). If desired, however, weapon-usable plutonium could be quickly extracted from the transuranics.

South Korea's support of the disarmament and nonproliferation regime

South Korea joined the NPT in 1975. Since its clandestine nuclear weapon program ended in 1979, South Korea has joined many other international nonproliferation and disarmament agreements: these include becoming a member of the Nuclear Suppliers Group (1995), signing the Comprehensive Test Ban Treaty (1999), and signing an Additional Protocol to its IAEA safeguards agreement (2004).²¹⁶

In January 1992, South and North Korea agreed in addition to:²¹⁷

- Not test, manufacture, produce, receive, possess, store, deploy or use nuclear weapons;
- Use nuclear energy solely for peaceful purpose; and
- Not acquire nuclear reprocessing and uranium enrichment.

Although, North Korea has broken the 1992 denuclearization declaration, thus far, South Korea has kept its word.

In September 2004, in response to international concerns after the disclosure of KAERI's past undeclared R&D on uranium enrichment and reprocessing, South Korea's government announced "Four Principles on the Peaceful Use of Nuclear Energy," reconfirming that it:²¹⁸

- Has no intention to develop or possess nuclear weapons;
- Will maintain nuclear transparency through IAEA safeguards and the Additional Protocol;
- Will abide by international nonproliferation norms, including the NPT and the 1992 denuclearization declaration; and
- Will seek to strengthen international confidence in its peaceful use of nuclear energy.

On May 4, 2009, at the 2009 Preparatory Conference for 2010 NPT Review Conference, South Korea's Deputy Minister for Multilateral and Global Affairs Oh Joon, indicated that South Korea supports:²¹⁹

- Agreement of all non-nuclear-weapon states to Comprehensive Safeguards Agreements and the Additional Protocol with the IAEA;
- Early entry into force of the Comprehensive Nuclear Test Ban Treaty (CTBT) and the commencement of negotiations for a Fissile Material Cut-off Treaty (FMCT);
- The right to the peaceful uses of nuclear energy along with effective safeguards against potential misuse;

- Multilateral approaches to the nuclear fuel cycle, based on objective and fair criteria and implemented in a way that does not deny or limit the legitimate right for the peaceful use of nuclear energy; and
- Effective and collective mechanisms to prevent the misuse of the right of withdrawal from the NPT.

South Korea's current interest in reprocessing

South Korea became an official member of the U.S.-led Global Nuclear Energy Partnership (GNEP) in December 2007. According to a White Paper published by the Ministry of Foreign Affairs and Trade (MOFAT), GNEP would establish a foundation for the development of new proliferation-resistant plutonium recycling technologies in order to produce more energy from spent fuel and reduce nuclear waste.²²⁰ This indicates that MOFAT had decided to support South Korea's reprocessing of spent fuel and recycling the recovered fissile materials even though it would contradict the 1992 Korean Peninsula Denuclearization Agreement.

This policy is driven in part by concerns in South Korea's nuclear utility that some of its nuclear power plants will run out of spent-fuel storage capacity in 2016.²²¹

KAERI has been doing R&D on pyroprocessing technology since 1997. Pyroprocessing would dissolve spent fuel in molten salt. The plutonium, mixed with some rare-earth fission products and other transuranic elements, would then be collected for recycling in fast reactors.²²² KAERI claims that pyroprocessing technology can reduce the volume of South Korea's high-level radioactive waste problem by 95 percent, and the long-term radio-toxicity of the waste to such an extent that the required period of monitoring of the disposal site could be reduced from hundreds of thousands to hundreds of years.²²³ KAERI also argues that pyroprocessing is "proliferation resistant" because it is impossible to extract pure plutonium from the process.²²⁴

These claims are greatly exaggerated. With regard to proliferation resistance, even with the other transuranic elements mixed with plutonium the gamma radiation dose rate at one meter from a few kilograms of the mixture would be one thousand times lower than the IAEA's self-protection standard.²²⁵ It would therefore be possible to separate out the plutonium in a glovebox.

Nevertheless, KAERI has been able to win support from the Ministry of Education, Science and Technology (MEST) for its proposal to build a prototype pyroprocessing plant that would annually separate transuranics containing more than one ton of plutonium, starting in 2026, enough to make more than one hundred Nagasaki nuclear weapons annually. At the same time, KAERI proposes to deploy only a single demonstration fast-neutron reactor in 2028 to use the separated transuranics as fuel.²²⁶ Fast-neutron reactors would be "commercialized" only around 2050. It should be noted that France, Germany, India, Japan, Russia and the United Kingdom all launched reprocessing programs with the same rationale in the 1970s but, thus far, all efforts to commercialize them have failed.²²⁷ The result has been huge stockpiles of separated civilian but weapon-usable plutonium that will complicate disarmament efforts. KAERI's proposal could create another such stockpile in South Korea.²²⁸

MEST and MOFAT have also been preparing for the renewal of the 1974 Agreement for Nuclear Cooperation between the U.S. and South Korea, which will expire in 2014. They hope to obtain for KAERI blanket permission to pursue pyroprocessing, similar to

the advance permission for reprocessing given to Japan in its 1988 Agreement of Nuclear Cooperation with the United States. After North Korea's nuclear test in May 2009, the political opposition in South Korea has been calling for "nuclear sovereignty" i.e. the right to enrich and reprocess nuclear fuel like Japan. Japan already has such facilities, which are widely viewed as providing it with a virtual nuclear deterrent.²²⁹

The MEST pyroprocessing and breeder program would be hugely costly and is opposed by South Korea's second R&D ministry, the Ministry of Knowledge and the Economy (MKE), which is closely aligned with South Korea's nuclear-power utility. MKE would prefer direct disposition of the unprocessed spent fuel. In January 2009, MKE established the Korea Radioactive Waste Management Corporation (KRMC) that has started a public consensus building process to formulate a national policy on the long-term management of spent fuel,²³⁰ although it was halted by the Blue House (the South Korean President's Office) on the excuse that expert opinion would have to be solicited first.²³¹

Conclusion

South Korea has committed to not acquiring nuclear weapons. Despite its clandestine nuclear weapons program in the 1970s and undeclared research activities on laboratory-scale reprocessing and uranium enrichment in the 1980s and 2000, South Korea has been supporting the international disarmament and nonproliferation regime.

With South Korea's already large nuclear power capacity continuing to grow and a growing stock of spent fuel at its reactor sites, however, South Korea's Ministry of Education, Science and Technology, with support from its Ministry of Foreign Affairs and Trade, has been pursuing pyroprocessing of spent fuel and recycling of the recovered fissile materials.

This would contradict the 1992 denuclearization declaration between South and North Korea, provide a path to nuclear weapon option and, as with reprocessing in Japan and elsewhere, could undercut the stability of a disarming world.

Jungmin Kang

Pakistan

Pakistan is one of the three states, all with nuclear weapons, outside the nuclear Non-proliferation Treaty. Pakistan's nuclear weapon program is tied fundamentally to its security concerns with regard to India. While it was still developing nuclear weapons, Pakistan offered to negotiate various bilateral or regional nonproliferation steps with India.²³² India refused on all counts. With both countries having acquired nuclear weapons, there is little evidence of support from Pakistan for unilateral or bilateral initiatives.

With India and Pakistan producing fissile materials for weapons and testing ballistic and cruise missiles and engaged in a conventional arms race, and given the powerful political role of Pakistan's army, there is little prospect of Pakistan initiating a serious domestic debate about nuclear disarmament. Pakistan has said, however, that it supports "Negotiation of a nuclear weapons convention along with a phased programme for the complete elimination of nuclear weapons within a specified time frame."²³³ This position mirrors the one taken by India, of not giving up nuclear weapons short of the global abolition of nuclear weapons in a time-bound framework through an international treaty. By staking out this position, Pakistan seeks to ensure that it does not have to accept any obligations that do not also bind India.

It is now not clear, however, that Pakistan would sign the Comprehensive Test Ban Treaty, consider a Fissile Material Cutoff Treaty, and give up its nuclear weapons if India were also to do so. The central idea that appears to underlie Pakistan's policy is what it calls "strategic stability." Seeking to offset India's much larger conventional military forces with nuclear weapons, Pakistan has refused Indian offers of a "No First Use" agreement, proposing instead a "strategic restraint regime" that would involve the two countries balancing both nuclear and conventional capabilities.²³⁴ In the absence of such restructuring of South Asian military capabilities, Pakistan may resist a bilateral denuclearization arrangement with India.

The overwhelming focus on India and on balancing India's conventional forces reflects the dominant position of the Pakistan Army in determining national security policy. The Army has directly ruled Pakistan for about half of its sixty years as an independent state, with all three military regimes headed by a Chief of Army Staff.²³⁵ The Army has continued to dominate policymaking in key areas, including foreign policy, relations with India, national security and military spending, even when civilian governments have been in charge. The other armed services are much smaller and have had a much less significant role in Pakistan's politics.²³⁶

There has been little challenge to the dominant role of the army from major political parties in Pakistan, particularly on nuclear weapon policy. The parties that command the largest public support, the Pakistan Peoples Party and the Pakistan Muslim League, both claim Pakistan's nuclear arsenal as their achievement. The Peoples Party cites the role of its founder, Zulfikar Ali Bhutto, in launching the nuclear weapons program in 1972. The Muslim League takes credit for its leader, Nawaz Sharif, having ordered the nuclear tests in May 1998. Pakistan's Islamist parties, the third major political force, are strong supporters of nuclear weapons. Only Pakistan's minority nationalist parties, progressive civil-society groups and some retired military officers oppose the nuclear program and call for disarmament.²³⁷

Pakistan may agree to nuclear disarmament in the context of global abolition of nuclear weapons because it would also bind India and because Pakistan could not resist the political pressure from the great powers and the international community to comply. It is likely, however, to seek security guarantees with regard to India.

Time is not on Pakistan's side. In recent years, India has rapidly increased its military spending, its rate of economic growth, and the technological capabilities of its military forces, creating a growing imbalance with Pakistan. India has also developed a new strategic relationship with the United States, which had previously been Pakistan's principal political, economic and military supporter.

In January 2004, the United States and India announced a "Next Steps in Strategic Partnership" agreement, declaring that the United States and India would "expand cooperation" in civilian nuclear activities, civilian space programs, and high-technology trade, as well as on missile defense. A senior U.S. official announced that "Its goal is to help India become a major world power in the 21st century. ... We understand fully the implications, including military implications, of that statement."²³⁸ This was followed in 2005 by a ten-year "New Framework for the U.S.-India Defense Relationship" signed by the U.S. Secretary of Defense and India's Minister of Defense.²³⁹ This has been followed in turn by unprecedented U.S. arms sales and cooperation with India.²⁴⁰ Pakistan's former Army chief General Jahangir Karamat has warned that:

"the balance of power in South Asia should not become so tilted in India's favor, as a result of the U.S. relationship with India, that Pakistan has to start taking extraordinary measures to ensure a capability for deterrence and defense."²⁴¹

Pakistan cannot sustain nuclear parity and conventional balancing with India without increasing levels of military and economic aid from the United States and from Pakistan's other major ally, China. This dependence on external military, economic and political support makes Pakistan vulnerable to pressure on a range of issues, including nuclear disarmament, if they are agreed upon by the major nuclear weapon states.

Pakistan's susceptibility to external pressure is also increased by the many internal political conflicts it faces and by its domestic economic weakness. The Taliban militancy in the Federally Administered Tribal Areas adjacent to the Afghanistan border is now spilling over into towns and cities across the country. Religious militants allied to the Taliban appear ready to challenge the authority of the state in Pakistan's most populous province (Punjab) and in the country's largest city, Karachi. Ethnic movements in the provinces of Balochistan and Sindh are openly talking of secession and, in Balochistan, have taken up arms. Pakistan's economy is in severe recession with high unem-

ployment and chronic inflation. Under these difficult conditions, Pakistan might be persuaded to lower its strategic expectations and agree to go along with international disarmament efforts.

The prospect of Islamist insurgents in Pakistan posing such a serious a threat to Pakistan's nuclear weapons complex that Pakistan's leaders consider dismantling and destroying the weapons, or the United States considers attempting to seize the weapons, is not considered here.

Transitional measures and scope of the disarmament process

Pakistan's critical security concerns are directed towards India. The two states have had four wars (1947, 1965, 1971, and 1999) and numerous crises, many over the status of the disputed region of Kashmir. The conflict over the affiliation of this Muslim-majority region emerged at the time of partition in 1947 and remains unresolved.

Pakistan has always expressed concerns about its relatively weaker military capacity compared to India. Pakistan initially sought to overcome this disparity by signing a Cold War military cooperation agreement with the United States in 1954, gaining access to U.S. military aid, weapons, and training. The United States failed to come to Pakistan's assistance, however, in the 1965 and 1971 wars against India, arguing that its military assistance was meant to counter threats from the Soviet Union, not India.

The tipping point for Pakistan in its decision to acquire nuclear weapons came in the wake of a major military defeat by India in December 1971, when India aided a secessionist movement to win independence for East Pakistan and establish the state of Bangladesh. Nuclear weapons were seen as an essential equalizer for Pakistan against overwhelming Indian superiority in conventional weapons. India also was seen as having nuclear weapon ambitions, a judgment confirmed by India's May 1974 nuclear test.

Pakistan continues to regard its nuclear weapons as both a counter to Indian's nuclear weapons and as a means to offset the imbalance in conventional weapons. Thus, beyond nuclear disarmament, Pakistan also wants to balance conventional forces. Its proposed "Strategic Restraint Regime" for South Asia includes "nuclear and missile restraint," "conventional arms balance" and a "political mechanism for resolving bilateral conflicts."²⁴²

As part of nuclear and missile restraints, Pakistan has proposed that India and Pakistan continue their moratorium on nuclear testing, keep nuclear weapons de-alerted, not operationally deploy conventionally-armed missile systems, and not acquire or deploy anti-ballistic missile systems.²⁴³ Pakistan has also stated that "we need a stable balance of conventional forces to ensure strategic stability." It has argued that:

"Massive induction of sophisticated weaponry including combat aircraft, aircraft carriers, airborne early warning and control system, missile defense, nuclear submarines and warships will accentuate conventional asymmetries and compel greater reliance on nuclear and missile deterrence."²⁴⁴

To prevent such an imbalance Pakistan suggests that there be "restraint in the demand and supply of such weapons in South Asia." Furthermore, if these weapon systems are to be supplied to India or developed by it indigenously, Pakistan "demands and deserves parity of treatment."

Pakistan also has proposed a series of conventional arms control measures “to preserve strategic stability.” These proposals cover weapon systems, military postures, deployments and doctrines, and include:²⁴⁵

- Maintenance of an acceptable ratio in the armed forces of India and Pakistan;
- Restrictions on the introduction of heavy weapons within certain border zones;
- Further limits on the size and deployments in military exercises;
- Renunciation of limited war, surgical strikes, and hot pursuit doctrines;
- Ensuring that neither country has the capacity to launch “surprise attacks;” and
- An eventual agreement on the non-use of force or a non-aggression pact.

Pakistan has been concerned about the Indian army’s adoption of a new doctrine called “Cold Start,” which aims to give India the ability to carry out a decisive conventional attack on Pakistan in less than the two to three weeks that might be required for international intervention to stop the conflict.²⁴⁶ This doctrine was war-gamed in 2006, as the *Sanghe Shakti* (Joint Power) exercise involving strike aircraft, tanks, and over 40,000 soldiers, which an Indian commander said aimed “to test our 2004 war doctrine to dismember a not-so-friendly nation effectively and at the shortest possible time.”²⁴⁷

Given Pakistan’s concern about conventional forces, it is possible that Pakistan might be interested in a South Asian treaty modeled on the 1990 Conventional Forces in Europe (CFE) agreement that imposed ceilings for conventional weapons systems including tanks, artillery vehicles, fighter aircraft and helicopters from the Atlantic to the Urals and within zones on each side of the boundary between the NATO and Warsaw Pact countries. Pakistani officials have indicated that they see it as a “model” that can be “emulated or adapted” as a regional security agreement.²⁴⁸

Finally, on the issue of conflict resolution, Pakistan has argued that “An early solution to the Jammu & Kashmir dispute holds the key to peace and security in South Asia.”²⁴⁹ There have been back-channel talks between the two countries since 2003 on Kashmir, after Islamist militants linked to radical Kashmiri groups attempted to assassinate General Pervez Musharraf. Agreement was reached but not formalized on some basic principles that could underlie a settlement. These principles included Kashmiris being given special rights to move and trade freely across the Line of Control dividing the two parts of Kashmir; autonomy for the regions within Kashmir to help protect the different minority communities; gradual withdrawal of troops from the region; establishment of a body that would bring together Kashmiris, Indians and Pakistanis to manage issues that affect people on both sides of the Line of Control, such as water rights; and perhaps eventually for the Line of Control to be recognized by both countries as an international border.²⁵⁰

In short, Pakistan will be reluctant to join the nuclear disarmament process until India joins. In addition, it would likely seek a conventional balance, and a system of security assurances, including perhaps a “non-aggression pact” as well as resolution of the Kashmir dispute and a formal dispute resolution mechanism for other potential conflicts, such as over water rights, before it would accept eliminating its nuclear weapons.

Transparency and verification

Pakistan, like most other nuclear-weapon states has sought to keep secret the size of its fissile material stocks and the number of its nuclear weapons, as well as information about its fissile materials and weapons production facilities and their production history. It is unlikely to reveal this information unilaterally. Under a 1988 agreement, however, Pakistan and India exchange annually a list of nuclear facilities that are not to be attacked.²⁵¹ But it is reported that both states left at least one facility off their respective lists.²⁵² The list is not made public.

Despite its practice of keeping nuclear information secrets, in laying out its position on a Fissile Material Cutoff Treaty (FMCT), Pakistan has argued for the importance of declaring fissile-material stocks. Pakistan has suggested that an FMCT should deal with “past production of fissile material and, through their progressive and balanced reduction, promote the goal of nuclear disarmament.”²⁵³ Pakistan also has argued that “existing stockpiles, unless accounted for and monitored, could be used for the development of new and most sophisticated [sic] nuclear weapons.”²⁵⁴ In June 2007, its representative at the Conference on Disarmament said “we insist on the verification of current stocks” of fissile materials.²⁵⁵ These statements demonstrate Pakistan’s concerns about India’s large accumulation of reactor-grade but weapon-usable plutonium, originally to provide start-up fuel for India’s plutonium-breeder reactor program. Pakistan’s statements also appear to imply that it would accept an obligation to declare, account for and allow monitoring of existing stocks of fissile materials for weapons.

In keeping with its history of arms control and disarmament diplomacy, Pakistan will likely insist on non-discriminatory arrangements as a way to ensure its equal treatment with India. Pakistan may be willing to accept any declarations and monitoring arrangements concerning fissile materials and warheads as long as India also accepts them.

Pakistan may be reluctant, however, to provide access, at least in the near term, to scientists and managers in its nuclear weapons program. There remain questions about the role of A.Q. Khan, the key administrator of Pakistan’s enrichment program, who provided uranium enrichment technology as well as nuclear-weapon designs to several countries. It remains unclear how much of this traffic was free-lance and how much was national policy. Pakistan may wish to continue to keep this aspect of its foreign policy secret.

Pakistan may be comfortable with International Atomic Energy Agency (IAEA) monitoring of a nuclear disarmament agreement. It has a long history of working with the Agency and is familiar with its decision-making processes, with its representatives having served on the Board of Governors for many years. Pakistan’s civilian nuclear facilities (notably the power reactors at Karachi and Chashma) are under IAEA safeguards and it is also among the major beneficiaries of IAEA Technical Assistance programs.²⁵⁶

Pakistan has apparently been considering signing the IAEA Additional Protocol. India signed an Additional Protocol agreement in 2009 as a condition for Nuclear Suppliers Group (NSG) approval of the U.S.-India nuclear deal lifting nuclear trade restrictions on India. Pakistan has sought a similar deal and NSG waiver and been refused. A Foreign Office representative explained “The matter of signing the Additional Protocol has been under consideration for some time. However no decision has been taken on this matter.”²⁵⁷ The Additional Protocol that Pakistan might consider would probably

be similar to the one signed by India, which is much more similar to the Additional Protocols signed by the NPT nuclear weapon states than the Model Additional Protocol for non-weapon states. The NPT nuclear weapon state Additional Protocols, other than that of the United States, oblige the countries primarily to provide the IAEA with information about their nuclear-related exports but not about their unsafeguarded domestic nuclear activities.²⁵⁸

The principle of parity with India also could shape Pakistan's decisions about foregoing reprocessing and placing uranium enrichment facilities under multinational or international control. Pakistan is planning a large nuclear energy program, with a goal to increase its nuclear generating capacity from about 400 MWe today to 8800 MWe by 2030. It has proposed building a large civilian enrichment plant and a uranium conversion facility as part of this expansion, both of which will be offered for safeguards.²⁵⁹ If a safeguarded enrichment plant is ever built, in the context of nuclear disarmament Pakistan might consider offering it for multinational or international control. Pakistan has already proposed a form of multinational ownership and operation of nuclear power plants, offering to allow foreign companies to build, own and operate nuclear power plants in Pakistan with equity sharing in "nuclear power parks."²⁶⁰

The future of Pakistan's civil nuclear energy program may become tied to India's plan for its nuclear program in other ways. Pakistan has expressed concerns about India's large stock of unsafeguarded separated power reactor plutonium and spent fuel.²⁶¹ If India persists in its pursuit of a civilian plutonium fuel cycle and the deployment of large scale reprocessing and fast breeder reactors even under safeguards Pakistan may seek to follow, albeit on a smaller scale.

For Pakistan, the issue of enforcement of an international prohibition on nuclear weapons is also tied up with its rivalry with India. India has long sought a permanent seat on the UN Security Council, which would give it a privileged position with regard to decisions concerning international peace and security, including the use of sanctions and force, even if it was without veto power.²⁶² Pakistan has lobbied to prevent such an outcome.²⁶³ If India were to gain a permanent seat at the Security Council, Pakistan may feel less comfortable with international agreements that rely on a role for the Security Council.

Conclusion

In a statement in 2007 at the Conference on Disarmament, Pakistan laid out a broad vision of what it sees as the proper goals for meaningful negotiations in the context of nuclear weapons abolition. These include:²⁶⁴

- A commitment by all nuclear-armed states to complete, irreversible and verifiable nuclear disarmament;
- Non-discriminatory rules ensuring the right to peaceful uses of nuclear energy;
- Specific security arrangements for South Asia “to establish and maintain a stable and balanced security environment;” and
- Revitalization of the UN disarmament machinery to address international security, disarmament and proliferation challenges.

These demands were presented as required for “equal security” for all states. For Pakistan, this means equal security and entitlements relative to India. This strong security coupling to India suggests that Pakistan would have little option but to agree to nuclear disarmament if India were to do so in the context of a global abolition of nuclear weapons.

Pakistan is likely to seek security guarantees with regard to India as part of any agreement to give up nuclear weapons. These assurances could include both limits on conventional forces and postures, as well as assurances that new strategic relationships between India and the great powers and the reform of international institutions will not come at the expense of Pakistan. Given its worsening political and economic situation and its declining position with respect to India, however, Pakistan’s capacity to garner such assurances is increasingly limited. The rise of India as a major new power, and its new economic and security capacities and relationships with other powers that will attend this emergence, will further reduce Pakistan’s ability to shape the nuclear-disarmament agenda. It is likely that within a few years, Pakistan may have to settle for whatever it can get as security guarantees rather than what its army may feel is warranted.

A.H. Nayyar and Zia Mian

Russia

In April 2009, Russian President Dmitry Medvedev and U.S. President Barack Obama issued a joint statement committing their “two countries to achieving a nuclear free world”. The attitude of Russia’s government toward achieving this goal was outlined by Russian Foreign Minister Sergei Lavrov at a Plenary Meeting of the Conference on Disarmament in Geneva on March 7, 2009:²⁶⁵

“Russia appreciates the focus of these initiatives on solving global security issues on a multilateral basis and is willing to positively contribute to their consideration.

“However, progress towards ‘global zero’ can only be achieved through strengthened strategic stability and strict adherence to the principle of equal security for all. In its turn this suggests the need to carry out a set of measures required for a sustainable and consistent disarmament process. Among such measures:

- advancement of nuclear disarmament by all nuclear-weapon states, with their ‘gradual’ engagement in efforts already being undertaken by Russia and the United States;
- to prevent weaponization of outer space;
- to prevent operational deployment of conventionally tipped strategic offensive weapons, i.e. the building of the so-called ‘compensatory’ potential;
- to ensure that states do not possess a ‘nuclear upload’ potential;
- to prevent attempts aimed at using membership of the nuclear Nonproliferation Treaty to implement military nuclear programs; and
- to ensure verifiable cessation of conventional capabilities’ development coupled with efforts to resolve other international issues, including settlement of regional conflicts...”

The Russian Foreign Minister also underscored the importance of limiting strategic defenses, saying:

“I would like to draw particular attention to the relationship between offensive and defensive arms. Real progress in nuclear disarmament cannot be achieved in a situation where unilateral efforts to develop strategic ABM [Anti-Ballistic Missile] systems undermine this relationship. This is fraught with erosion of strategic stability and disbalancing of the system of checks and balances that ensures global parity.”

Russia’s Ambassador to the United States, Sergei Kislyak, characterized the complexity of the issues to be resolved in moving towards eliminating nuclear weapons:²⁶⁶

“in order to achieve this goal, a lot of things need to be done. Certainly the lower you go, the more complex the situation becomes, I think for the United States, and that would definitely be important to Russia. It is important that if we go down, we need to be sure that nuclear weapons are not going to appear in other countries. You need to work toward increasing the guarantees of nonproliferation at first. Secondly, we need to have all others on board. Third, while we are moving toward this goal, we need to know what are the components of security to be assured? It is complex. It is a very, very complex goal, but it is a noble goal. We can work toward this goal. It has always been our commitment in the nuclear Nonproliferation Treaty.”

Below, we analyze in more detail the views of Russian decision makers on the role of nuclear weapons in the international security regime and on the conditions necessary for their elimination.

Role of nuclear weapons in Russia’s national security

On February 5, 2010, President Medvedev approved a new military doctrine for Russia. It 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.²⁶⁷

While the new Russian military doctrine limits the scope of the use of nuclear weapons, the prevailing view in Russia’s political-military leadership is that nuclear weapons play a key role in ensuring Russia’s security. This is because Russia’s general-purpose forces continue to degrade as a result of the deep economic crisis and the incompetent reforms of the 1990s. The relative weakness in Russia’s conventional forces is likely to persist for the next 15 to 20 years. The main reason is Russia’s limited ability to equip its military with modern weapons at a time when the United States and other leading powers are integrating information technologies and high-precision weapons into their militaries.²⁶⁸ To some extent, possession of nuclear weapons allows Russia to delay the costly process of equipping its military with such systems until its economic situation improves.

Russia's leadership regards a large-scale conflict with the United States or NATO as extremely unlikely. At the same time, the new Russian military doctrine identifies NATO expansion as a major danger that might evolve into a threat to national security.

Russia's armed forces are considerably inferior to those of NATO, which has three to four times the quantity of conventional arms of Russia. NATO's qualitative superiority is even more significant. With the incorporation of the Central and East European states, NATO's armed forces are within range of Russia.²⁶⁹ Since there are well-grounded doubts that Russia's general-purpose forces could deter such potential threats, reliance on nuclear weapons seems to be the logical alternative.

Some Russian experts also believe that the importance of non-strategic nuclear weapons is growing because of Russia's geo-strategic position and an increased threat of regional conflicts involving the use of weapons of mass destruction.²⁷⁰ In particular, there is a widely shared opinion that, in case of a large-scale military conflict between the Russian Federation and China, Russia would not today be able to guarantee the security of its Far East without nuclear weapons. Given the rapid growth in China's economic and military capabilities and the rising imbalance in populations in the frontier territories, the situation will get worse for the next 20 to 30 years.

Russia's views on further cuts in nuclear weapons

As evidenced by the 2010 New START agreement with the United States, Russia's government is willing to make further cuts in its nuclear arms.²⁷¹ Going into the negotiations, Russia sought a treaty that treats both sides equally and respected Russia's security concerns. Its position has been that such a treaty should be legally binding and should limit not only warheads, but also strategic delivery systems: intercontinental ballistic missiles (ICBMs), submarine launched ballistic missiles (SLBMs) and heavy (long-range) bombers. Russia insists on limiting delivery means because, unlike Russia, the United States did not eliminate its excess strategic launchers under the 2002 Strategic Offensive Reductions Treaty (SORT). This left the United States with the ability to relatively quickly re-deploy its deactivated nuclear forces.

Over the past few years, Russia has also become concerned about the growing counterforce capability of *conventional* strategic weapons.²⁷² These concerns increased after the U.S. Department of Defense decided to develop the capability for a "Prompt Global Strike" with precision-guided conventionally-armed land and submarine based ballistic missiles. Russia also insists on banning possible deployment of strategic offensive arms on the territories of other nations. Finally Russia made it clear that its willingness to conduct further reductions will strongly depend on setting up limits on ballistic missile defenses. Russia views the 2001 U.S. abrogation of the ABM Treaty and plans to deploy missile defenses in Europe as potentially harmful to Russian security.²⁷³

Preliminary analysis of the New START agreement shows that some of Russia's demands have been taken into consideration. In particular, the United States has agreed to limit strategic delivery vehicles and their launchers as well as strategic warheads. However, a more careful investigation of the documents signed in Prague suggests that Russia is unlikely to achieve many of its objectives.²⁷⁴ This fact, in turn, could create obstacles for involving Russia into the next round of negotiations on nuclear weapons reduction.

Limits on the U.S. upload potential. U.S. ability to quickly build up its number of deployed nuclear weapons (upload potential) has been long a major concern of opponents of the START and START-II agreements in Russia. Analysis of New START suggests that the U.S. will retain such a capability. Moreover, the recently released U.S. Nuclear

Posture Review considers such a capability as important, claiming it offers a “*technical hedge against any future problems with U.S. delivery systems or warheads, or as a result of a fundamental deterioration of the security environment...*”²⁷⁵

The New START sets the following limits:

- a) 700, for deployed ICBMs, deployed SLBMs and deployed heavy bombers;
- b) 1550, for warheads on deployed ICBMs, warheads on deployed SLBMs and nuclear warheads counted for deployed heavy bombers;
- c) 800, for deployed and non-deployed ICBM launchers, deployed and non-deployed SLBM launchers and deployed and non-deployed heavy bombers.

According to the START data exchange, as of July 1, 2009, the United States had 5916 warheads on 1188 deployed strategic delivery vehicles: 550 deployed ICBMs and their associated launchers, 432 deployed SLBMs and their associated launchers, and 206 deployed heavy bombers. New START will count all of these systems. However, in contrast to the existing START agreement, the new treaty counts actually deployed warheads for ICBMs and SLBMs (START counted the maximum number of warheads assigned to each type of strategic missile). The new Treaty counts heavy bombers equipped for nuclear armaments as one deployed warhead each, though the actual number of weapons carried by a bomber can be up to 20.²⁷⁶ Finally, the new Treaty has relatively “relaxed” provisions for excluding items from being counted, that allows reconstitution of the force over the period from a few days to several months.

In particular, a possible configuration of future U.S. strategic force could consist of 400 deployed Minuteman-3 ICBMs carrying one warhead each, 264 deployed Trident SLBMs carrying four warheads each and 36 deployed heavy bombers. Such a force would be counted as 1492 warheads, which is below the level permitted by New START. At the same time the United States would retain a capability to upload up to 2540 nuclear warheads (800 on Minuteman-3, 1056 on Tridents and up to 684 on bombers), if need be. Moreover, the remaining 58 B-2 and B-52H heavy bombers,²⁷⁷ as well as some B-1Bs could be converted back to nuclear missions relatively rapidly, significantly contributing to the numbers above. Thus, the new Treaty does not achieve the Russian goal of setting any limit on “upload potential.” Also, the new counting rules generate doubts that Russia and the United States are really going to reduce their nuclear forces.

Limits on U.S. conventionally-armed strategic delivery vehicles. During New START negotiations Russia raised a concern that the United States is going to deploy some of its excess strategic ballistic missiles with precision guided conventional warheads. Such missiles, unless limited, could be used to attack Russia’s strategic launchers. The existing START agreement does limit such conventionally-armed missiles because it does not differentiate between nuclear or conventionally armed strategic ballistic missiles. All ICBMs and SLBMs count toward its limits. Like the old treaty, New START limits deployed ICBMs and SLBMs regardless of the types of weapons they carry. However, unlike old START, the new treaty permits deployment of soft-site launchers, that are not accounted as “deployed” or “non-deployed” launchers. Thus, if the U.S. decides to deploy conventionally armed ICBMs at soft sites, such systems would not be limited.

The new U.S. Nuclear Posture Review proposes to eliminate nuclear long range sea launched cruise missiles (SLCMs), but many Russian experts are concerned about the growing counterforce capability of conventional SLCMs.²⁷⁸ In particular, Trident submarines converted to long range sea-launched cruise missile (SLCM) carriers are con-

sidered as a potential threat to the Russian ICBM force. As in old START, the new Treaty counts the four submarines that the United States has converted so far. At the same time the New START has provisions allowing excluding these submarines from counting by demonstrating that the launchers of converted submarines are incapable of launching SLBMs. Thus, in fact, the new treaty does not limit conventional SLCMs either.

Finally, New START excludes from counting the heavy bombers that are not equipped for nuclear armaments.

Limits on U.S. strategic ballistic missile defense. Russia put significant effort into including a provision on the interrelationship of strategic offensive and strategic defensive arms. It is well known that all previous U.S.-Soviet (Russian) strategic arms control agreements were linked with the 1972 ABM Treaty. The United States abrogated the ABM Treaty in 2002, and Russia had a legal right to withdraw from START, but choose not to do so. Perhaps, the Russian negotiators also hoped to get commitments from the United States to limit its ballistic missile defenses. The Obama administration however, refused to make ballistic missile defenses a bargaining chip in the New START talks.

The new treaty states the relationship between strategic offensive and strategic defensive arms in its preamble. In addition, the parties' obligation is laid down not to convert and not to use ICBM launchers and SLBM launchers to contain missile-interceptors, and vice versa. However, the United States declared that the new treaty "does not contain any constraints on testing, development or deployment of current or planned U.S. missile defense programs."²⁷⁹ Russia, in its turn, stated that the new treaty "can operate and be viable only if the United States of America refrains from developing its missile defense capabilities quantitatively or qualitatively" and "the exceptional circumstances referred to in Article 14 of the Treaty include increasing the capabilities of the United States of America's missile defense system in such a way that threatens the potential of the strategic nuclear forces of the Russian Federation."²⁸⁰ The United States does not consider the Russian statement as legally binding and a part of the Treaty, as the Russian side probably expected.²⁸¹

Non-strategic nuclear weapons. Reductions of non-strategic nuclear weapons too have been excluded from the negotiations of New START.²⁸² The attitude of the Russian government regarding possible steps on reducing non-strategic nuclear weapons has not changed significantly in recent years.²⁸³ Russia's position is that, prior to the beginning of any negotiations on mutual reduction of Russian and US non-strategic nuclear weapons, all nuclear weapons should be withdrawn from foreign territories. That means withdrawal of U.S. bombs from NATO bases in Europe.

Russia also plans to insist that the nuclear arms of the UK and France be taken into account in any future discussion on non-strategic weapons. President Sarkozy's decision to have France rejoin the NATO command will most likely harden Moscow's position. Another linkage in Russia's position on non-strategic nuclear weapons is to conventional arms. The future of negotiations on reductions of non-strategic nuclear weapons will therefore be closely related with the development of the Russian-NATO dialogue that was cut short after the August 2008 events in Georgia. It also will depend on prospects for the Adapted Treaty on Conventional Forces in Europe, that was signed in 1999 but has still not come into force because of NATO concerns about Russian deployments in Georgia and Moldova.²⁸⁴ Finally, any unilateral step by NATO to enlarge its membership by including Georgia or Ukraine would block a dialogue on non-strategic nuclear weapons for the indefinite future.

Though Russia's official statements frequently state that, at some point, other nuclear states will have to join the nuclear disarmament process, the requirement on when China would have to join has never been explicitly formulated. If negotiations on non-strategic nuclear weapons are launched, however, Russia might raise one more condition for their successful conclusion: that China join the ban on ground-to-ground intermediate and shorter range ballistic missiles in the 1987 Russia-U.S. Intermediate Nuclear Forces Treaty.

Russia's fissile-material stocks

Russia has huge stocks of fissile materials but has never officially released information on how much HEU and weapon-grade plutonium it produced. Estimates by non-governmental analysts, which are highly uncertain, suggest that, when the Soviet Union collapsed, Russia possessed something in the range of 1270 tons of highly enriched uranium (HEU) and over 120 tons of weapons-grade plutonium, including the material in the warheads that were repatriated from the Ukraine, Kazakhstan and Belarus after the Soviet Union collapsed.

As of mid-2009, Russia had an estimated 850 ± 300 tons of unirradiated HEU and 145 ± 25 tons of weapon-grade plutonium.²⁸⁵ In the mid-1990s, as a contribution to making its nuclear weapon reductions irreversible, Russia declared 500 tons of weapon-grade HEU and 34 tons of weapons-grade plutonium excess for weapons purposes. Under the Russian-U.S. HEU Purchase agreement, the 500 tons of excess weapons HEU is being blended down at a rate of 30 tons per year to 4–5% U-235 and shipped to the U.S. Enrichment Corporation (USEC) for making power-reactor fuel. This contract is accompanied by a transparency protocol to assure the United States that it is indeed weapon-grade uranium that is being blended down. As of the end of-2009, 382 tons had been blended down.²⁸⁶ Russia's excess weapon-grade plutonium is to be mixed with uranium and mostly used to fuel the fast-neutron BN-600 reactor and the under construction BN-800 power reactor.

While Russia is annually providing declarations to the IAEA of its stock of separated civilian plutonium, Rosatom, which is responsible for all of Russia's nuclear activities — both military and civilian—and Russia's Ministry of Defense both oppose declarations of stocks of nuclear materials in weapons or designated for weapons. Both these agencies believe that this would be counter-productive because such declarations could not be verified and therefore would not enhance confidence. Any attempt to verify such declarations indirectly through reconstruction of past production and disposition would require an enormous effort to examine records and physical evidence from several decades of large-scale activities. In private conversations, the governmental officials have also argued that the declaration of stocks would be counterproductive to achieving agreement on a Fissile Material Cutoff Treaty because the information would fuel efforts by some countries to add to the Treaty limits on fissile material stocks produced by the nuclear weapon states before the treaty entered into force.

In the mid-1990s, Russia expressed a readiness to consider exchanges among nuclear-weapon states of information on the quantities and storage locations of fissile materials released in the process of dismantlement of excess nuclear weapons. It also was willing to consider subjecting these materials under IAEA monitoring.²⁸⁷ Since 2000, however, this idea has not reappeared in Russia's nuclear-arms reduction proposals.

Further reductions in HEU stocks

There is no public indication that Russia has set specific requirements for the quantities of weapon-grade fissile materials it needs for its arsenal and for future naval-reactor use. That makes it difficult to estimate how much additional HEU and weapons plutonium might be declared excess as a result of further reductions in Russia's warhead stocks. But, the New START agreement to reduce their stocks of deployed strategic nuclear warheads to 1550 each, could free up hundreds of tons of additional material for disposition.

It is unlikely that Russia will continue any version of the U.S.-Russian HEU Purchase Agreement after it expires in 2013.²⁸⁸ With a growing economy and greatly increased federal funding for the nuclear sector, Russia does not need the revenue from the HEU deal in the way it did in the early 1990s. Moreover, the current deal is less profitable for Russia than marketing enrichment services commercially.

Several options could be considered for reducing Russia's stockpile of excess HEU other than continuation of the HEU deal in its current form. Russia could use blended-down HEU to fuel some of the reactors it plans to build in its ambitious plan for expansion of nuclear power in Russia and abroad. Indeed, some Russian nuclear-energy experts have expressed concern that, without LEU blended down from Russia's excess HEU, limited uranium production in Russia could constrain Russia's nuclear development. If global demand for low-enriched uranium is high enough, Russia might also blend excess HEU down to LEU and sell it on the international market—i.e., no longer through an exclusive deal with USEC—to supplement new-production enrichment.

Reductions in plutonium stocks

Russia has always seen its excess plutonium as an asset that should be used to produce energy. In the Russian-U.S. plutonium-disposition agreement of 2000, each side committed to eliminate 34 tons of weapon plutonium. Russia's plan was that 14.5 tons of its excess plutonium would be used to fuel the BN-600 fast-neutron reactor and the rest as mixed-oxide (MOX uranium-plutonium) fuel in VVER-1000 light-water reactors.

Because the use of MOX fuel in light-water reactors was not part of its strategy of nuclear power development, Russia took the view that, if other countries want Russia to burn excess weapons plutonium in this way, they should pay for the design, construction and operation of the facilities to produce mixed-oxide (MOX) fuel, and for the modifications required to adapt the VVER-1000 light-water reactors to use the MOX fuel. Such provision of financial assistance was a part of the 2000 plutonium-disposition agreement. Early after conclusion of this agreement the Joint U.S.-Russian working group on cost analysis estimated that the total cost for the Russian disposition program would be in the range of \$2.1 billion.

There has always been a strong view within Russia's nuclear establishment, however, that the plutonium should be saved for fast-breeder reactors, where it could be recycled repeatedly to generate more plutonium without building up anywhere near the same amount of troublesome higher transuranic elements (americium and curium). This position was partially supported by the G.W. Bush Administration when it proposed a Global Nuclear Energy Partnership (GNEP) that would promote international cooperation on the development of fast-neutron reactors.

After the United States informed Russia in April 2007 that U.S. financial assistance will not be more than \$850 million, the Russian government decided to abandon the idea

of using MOX fuel in light-water reactors and to move in the direction of using the BN-600 *and* the BN-800 reactor that is now under construction to consume all excess weapons plutonium covered by the year-2000 agreement. The United States and Russia have renegotiated the 2000 plutonium-disposition agreement to take into account this and other changes in their plutonium-disposition programs and the amendment to this agreement was signed on April 12, 2010.²⁸⁹ It is expected that the construction of the BN-800 and modification of the BN-600 reactor will be finished by 2014. The completion of a facility to produce plutonium-containing fuel for these reactors is planned in 2012. The program envisions that the total rate of plutonium disposition will be no less than 1.3 metric tons per year. But some Russian experts doubt that plutonium fuel production could start even by 2014, the currently planned completion date for the BN-800. In such a case, it will be fueled initially with HEU as is currently the case with the BN-600.

Fissile material production

Russia's production of fissile materials for weapons ended in 1994 and Russia has confirmed its continuing commitment to this production moratorium. Russia has four enrichment plants with a total annual capacity of about 22 million separative work units (SWU/year). Currently only one facility at Novouralsk is licensed to produce HEU – but only up to 30% enrichment, perhaps for the BN-600 reactor and naval-reactor fuel.

Russia has not produced weapon-grade uranium since 1989. Ten of Russia's thirteen plutonium production reactors were shut down by 1992. The two plutonium production reactors at Seversk were shut down in the summer of 2008. Completion of work on coal-fired plants to replace the heat and electric power from the third reactor at Zheleznogorsk is expected by the end of 2010. After that, Russia will have fully ended its production of weapon-grade plutonium.

In addition to the reprocessing plants that have been associated with the plutonium-production reactors, Russia also has the RT-1 spent fuel reprocessing plant at Mayak that reprocesses the spent fuel of first-generation VVER-440 power reactors and HEU fuel from the BN-600 fast-neutron reactor, naval and research reactors. Based on Russia's annual declarations to the IAEA, the RT-1 currently separates about 1.5 tons of plutonium per year. Based on the vision that fast breeder reactors and closed fuel cycle will be the future of Russia's nuclear power program, Rosatom is interested in developing advanced reprocessing technology. For this purpose it initiated the construction of the Experimental Demonstration Center for spent fuel reprocessing at Zheleznogorsk.

Fissile-material use

Most of Russia's research reactors and all of its submarine and icebreaker propulsion reactors use HEU fuel. Russia's government understands the importance of reducing the accessibility of HEU, the fissile material that could be most easily converted into terrorist nuclear weapons. It therefore supports the collaborative effort between Rosatom and the U.S. Department of Energy to convert Soviet-designed research reactors in third countries from HEU to LEU fuel and repatriate their Russian-origin HEU fuel.

In the past several years, about 700kg of Russian-origin HEU fuel has been returned to Russia. Unused HEU fuel has been removed from Serbia, Bulgaria, Romania, Libya, the Czech Republic, Uzbekistan, Latvia, Vietnam and East Germany. Spent fuel has been removed from research reactors in Uzbekistan, the Czech Republic, Latvia, Bulgaria and Hungary.²⁹⁰ In 2009, spent fuel was planned to be returned from Kazakhstan, Ukraine, Romania, Libya and Poland. The HEU from the fresh fuel is down-blended to

LEU and used for civilian power-reactor fuel. The spent fuel is reprocessed at the Mayak RT-1 plant and the recovered uranium is blended down to produce various LEU fuels. Rosatom has developed and tested LEU fuel for some types of Soviet-designed research reactors and such fuel has already been used to convert reactors in Libya, the Czech Republic, Vietnam, Uzbekistan, and Ukraine. During 2009, conversions to LEU fuel are planned in Bulgaria, Hungary and the Czech Republic.

Research reactors are converted to LEU primarily by developing high-uranium-density LEU fuel that contains at least the same density of U-235 as the HEU fuel being replaced and that therefore has approximately the same fuel life. Some of the LEU fuel that has been developed by Russia for converting Soviet-designed research reactors in other countries could also be used to convert some of Russia's own research reactors. Russia has 70 HEU-fueled research reactors and critical assemblies.²⁹¹

While Rosatom is considering reducing the number of HEU-fueled reactors in Russia, it is not giving high priority to either shutting down research reactors that are no longer needed or converting to LEU fuel the HEU-fueled research reactors that are still needed. A Federal Targeted Program "On providing nuclear and radiation safety for 2008 and further to 2015" approved in July 2007 plans the shutdown of only 12 research reactors and critical assemblies of which 9 are fueled by HEU fuel. This program also plans the modernization of 3 critical assemblies. In addition, Rosatom and the U.S. Department of Energy recently reached an agreement to carry out a study on the feasibility of converting six Russian research reactors to LEU.²⁹² One obstacle to conversion of some research reactors in Russia, the United States and Europe is that suitable LEU fuel is not yet available.

Russia currently has no interest in converting its naval propulsion reactors to LEU. Rosatom has expressed interest, however, in constructing and exporting floating nuclear power plants to developing countries and realizes that it would be inappropriate to use HEU fuel in such reactors. It therefore has designed floating nuclear power plants with two LEU-fueled 70 MWe KLT-40S reactors each. Currently, the first two floating nuclear power plants are under construction. One is going to be used in Pevek (Chukotka) and other in Viluychinsk (Kamchatka peninsula). The design of the KLT-40S reactor is based on an HEU-fueled ice-breaker reactor, which is in turn related to HEU-fueled naval reactors. The development of LEU fuel for the floating nuclear power plants could therefore help open the way to converting naval propulsion reactors to LEU as well.

Multinational fuel-cycle facilities

In the context of former President Putin's proposed Global Nuclear Infrastructure Initiative, Russia and Kazakhstan in 2007 established an International Uranium Enrichment Center (IUEC) as a joint stock company at Russia's Angarsk enrichment plant. Armenia and Ukraine are interested in joining IUEC.²⁹³ Russia has offered participation in the IUEC to India to assure it fuel for its Russian-origin power reactors.

The Angarsk enrichment plant, which has never produced HEU, is currently the smallest of Russia's enrichment plants, with a capacity of only 2.6 million SWU/yr. Rosatom is planning to increase the enrichment capacity of the plant to 4.2 million SWU/yr. Including the additional new capacity of 5 million SWU/yr associated with the Russian-Kazakh joint venture to enrich uranium from Kazakhstan, the capacity of the Angarsk plant could reach 9.2 million SWU/yr by 2015.²⁹⁴

The possibility of converting Russia's other three enrichment plants (Novouralsk, Seversk, Zelenogorsk) into international enrichment centers is currently not clear. In principle, it would be possible to do so for the plants in Zelenogorsk and Seversk after 2013 when these plants will have ended their involvement with military-origin material associated with the HEU blend-down agreement. It may not be possible to convert the Novouralsk plant, however, because it is licensed to produce HEU to fuel the BN-type and naval propulsion reactors. In any case, Russia's willingness to convert its other enrichment plants into international centers will depend on the success of Angarsk.

To give countries an alternative to developing their own enrichment technology and to ensure supplies of LEU for nuclear fuel, the International Atomic Energy Agency and Russia agreed to set up the world's first nuclear fuel bank. The agreement on establishing a fuel bank was signed in Vienna in March 29, 2010 by Sergei Kirienko, the head of ROSATOM with the IAEA Director Yukiya Amano.²⁹⁵ In accordance with this agreement Russia will establish a stock of 120 tons of LEU at the IUEC in Angarsk, and the IAEA will provide this material to countries whose supply of nuclear fuel is interrupted.

Anatoli S. Diakov and Eugene V. Miasnikov

United Kingdom

In March 2007, the United Kingdom adopted a twin track strategy of laying the groundwork for replacing its Trident nuclear weapon system while committing to foster positive conditions for the global abolition of nuclear weapons. The decision to renew Trident was opposed by the majority of members of the governing Labour Party, including 88 of its Members of Parliament, and contributed to the Labour Party's defeat by the Scottish National Party (SNP) in elections for the Scottish Parliament a few months later. The change of administration in Scotland is significant because the entire UK nuclear force is based near Glasgow in the West of Scotland and the SNP campaigned on a commitment to make Scotland nuclear free. In addition to deep-seated opposition to nuclear weapons in Scotland and the Labour Party in Britain, other political parties are now also challenging the costs and rationale associated with building a similar submarine-based nuclear system to replace Trident. There is public and political pressure to delay the follow-on for Trident and throw political weight behind global efforts to reduce the value accorded to nuclear weapons and build more effective mechanisms for cooperative security and threat reduction.

The United Kingdom's relationship with nuclear weapons goes back more than 65 years, when British scientists participated in the Manhattan Project. After the Cold War got underway and it became clear that nuclear weapons would not be abolished, the Labour government led by Clement Attlee decided to develop Britain's own nuclear forces. Carried forward by successive governments, this expensive policy rested on the perceived ability of nuclear weapons to deliver independent deterrence and international prestige to offset the loss of empire and decline in the UK's political and military standing. Although the United States initially opposed Britain's ambitions to become a nuclear power, the two countries signed a Mutual Defense Agreement (MDA) in 1958 to improve "design, development and fabrication capability".²⁹⁶ Britain's nuclear weapons have been heavily dependent on U.S. technology and delivery systems ever since and are viewed by traditionalists as cementing the so-called "special relationship". Collaborative work on nuclear weapons has been carried out under the MDA through Joint Working Groups that cover a range of areas including warhead design, development and maintenance. The MDA also has facilitated extensive visits and contacts between British and U.S. personnel, particularly nuclear scientists from the weapon laboratories and officials from government and industry.

The end of the cold war gave impetus to the Conservative government's cost-cutting defense review, entitled "Options for Change" and the removal and dismantlement of the UK's remaining battlefield and WE-177 free-fall nuclear bombs. That left Trident, which had been commissioned at the height of the Cold War with a Soviet threat in mind. When the first of four Vanguard-class nuclear submarines equipped with U.S.

Trident II (D-5) missiles came into service in 1994, the Cold War had been over for three years.

Soon after being elected to government in 1997, the Labour Party undertook a Strategic Defence Review (SDR). Published in July 1998, the SDR announced changes in operational policy, most notably, de-targeting the missiles and putting the Trident system at a “reduced notice to fire measured in days rather than the few minutes’ quick reaction alert sustained throughout the Cold War”.²⁹⁷ But it stopped short of implementing more stringent proposals for de-alerting such as separation of warheads from missiles. The SDR also announced that the number of operationally available UK warheads was capped at 200. This ceiling was lowered to 160 as part of Labour’s 2007 twin-track strategy on Trident replacement. Though welcomed, this further reduction has no impact on Britain’s deployment doctrine, which continues to be based on having at least one nuclear submarine on patrol somewhere in the oceans with an always-ready capability to fire up to 48 100-kt nuclear warheads, a posture known as “continuous-at-sea deterrence” (CASD).

The decision to renew Trident was pushed through by Prime Minister Tony Blair, despite a diminished, if not invisible, military-strategic role for Trident since the end of the cold war and strong public opposition to the planned renewal of the UK’s nuclear weapons, estimated to cost nearly a hundred billion pounds.²⁹⁸ Where Blair had combatively asserted that Britain had a right to nuclear weapons, Gordon Brown took a more nuanced position when he became Prime Minister in July 2007. Like Blair, Brown wanted to see a major expansion in nuclear energy production, but he recognized that this would need to be linked with more progress on nuclear disarmament as well as improved controls on fissile materials and the measures and institutions to prevent diversion and proliferation.

During 2009, the Prime Minister and the Foreign Secretary, David Miliband, each issued policy statements to demonstrate their commitment to multilateral nuclear disarmament, though neither openly suggested revisiting the decision to renew Trident. In late April, the Conservative Party indicated that it would review defense projects like Trident in light of financial considerations. Reports of a public interview with Conservative leader David Cameron suggested that he “backed a nuclear deterrent in principle [but] had to consider what form would deliver the best value for money”.²⁹⁹ The Conservative question mark over Trident replacement was followed in June by an announcement by the leader of the Liberal Democrats, Nick Clegg, that his party opposed replacing Trident with a “like-for-like” system. The Liberal Democrats do not have the electoral strength to form the next government, but could hold a balance of power. The announcement that they are consulting to determine how best to ensure security and deterrence in the 21st century without Trident has upped the ante in Britain’s sharpening nuclear debate. In February 2010, General Sir Richard Dannatt, a close adviser to Cameron on defense issues, cast further doubt on the wisdom of rushing the decision now. Dannatt told the BBC’s *Today* program that the decision to replace Trident may not look right “in 5 or 10 years’ time”.³⁰⁰

Senior politicians from all parties are also raising questions about how U.S. decisions about its nuclear forces could affect UK options, and whether continuous at sea patrols are necessary to maintain the illusion of deterrence. As public and high-level political support for building security without nuclear weapons continues to grow and the United States and Russia make progress towards further deep cuts in their arsenals, there is growing pressure on the UK to rethink its nuclear policies.

Replacing Trident

The UK currently deploys four Vanguard-class nuclear-powered ballistic-missile submarines (SSBNs), with up to 160 nuclear warheads operationally available for delivery on some 50 U.S.-made Trident II (D5) ballistic missiles.³⁰¹ The submarines, which were built at the BAE Systems Shipyard in Barrow-in-Furness, Cumbria, are due to be retired in the 2020s. The warheads, made at the Atomic Weapons Establishment (AWE) in Aldermaston and Burghfield, near London, are based on the 100-kiloton W76 warhead deployed aboard the U.S. Trident fleet. Unsurprisingly, since they must fit U.S. missiles, the UK warheads are designed, manufactured and maintained in close collaboration with the US nuclear laboratories.

In December 2006, the government issued a White Paper, *The Future of the United Kingdom's Nuclear Deterrent*, which argued for Trident to be replaced with a similar submarine-based ballistic system that would begin to be deployed as the Vanguard submarines were taken out of service in the 2020s. In advance of this decision, steps had already been taken to upgrade the weapons production infrastructure, including investment in a new 'Orion' laser-fusion facility and supercomputer at Aldermaston, a new uranium handling facility at Burghfield known as 'Pegasus', and an extended 25-year contract with AWE Management Ltd, worth £5.3 billion. The critical AWE sites at Aldermaston and Burghfield have been plagued by safety problems, compounded by widespread flooding in 2007.³⁰²

On 14 March, 2007, the House of Commons voted in favor of the government's decision. The government presented Trident renewal as compatible with the UK's non-proliferation obligations and promised at the time that MPs would have another chance to debate and vote on the issue before a final decision is taken on questions such as new warheads and the number of the submarines. In addition to opposition by over a third of Labour's Members of Parliament, it was noteworthy that a majority of MPs from all parties representing constituencies in Scotland voted against Trident renewal. As noted above, this is significant because any submarine-based replacement of Trident would need to rely on two co-located naval bases in Scotland: Faslane, where the nuclear submarines are home-ported, and Coulport, where the warheads are stored.

The UK decision to replace Trident was an important factor in the Scottish Parliamentary elections in May 2007 that ended the Labour Party's dominance in Scotland. In June 2007, the Scottish Parliament overwhelmingly passed a motion calling on the UK government not to renew Trident.³⁰³ Under the devolution settlement contained in the 1998 Scotland Act, however, decisions relating to defense and foreign policy, including nuclear weapons, are reserved to London. Therefore, though the Scottish government can convey its opposition to nuclear weapons being deployed in Scotland, it has no decision-making powers to prevent this. The Scottish government subsequently appointed a Working Group on "Scotland Without Nuclear Weapons", which reported in November 2009, raising concerns about Trident deployment on areas within Scotland's devolved authority, including health and safety, employment, environment, road safety, law and community education.³⁰⁴

The economic crisis of 2008–9, combined with crippling defense expenditure arising from the wars in Afghanistan and Iraq, has prompted politicians of all parties to reconsider the high cost of renewing Trident—estimated by the government at £20 billion, by the Liberal Democrat Party at £76 billion and, more recently calculated by Greenpeace to exceed £97 billion over the submarines' lifetimes.³⁰⁵ In June 2009, soon after senior Conservatives and Liberal Democrats questioned the affordability

and appropriateness of Trident replacement, the influential Institute for Public Policy Research (IPPR) published the final report of the IPPR Commission on National Security in the 21st Century.³⁰⁶ This high-level Commission, co-chaired by Lord (Paddy) Ashdown and former NATO Secretary-General Lord (George) Robertson, argued that Britain should keep open the possibility of “refreshing” the Trident system “while a fundamental review of all options” is carried out as part of a broader Strategic Review of Security. They strongly pressed that the major contracts for new ballistic submarines did not need to be decided before 2014 and that irrevocable financial decisions should not be taken until the issues surrounding Trident renewal have been freshly and comprehensively reviewed in the wider security context.³⁰⁷

According to government planning, it was envisaged that a Ministry of Defence (MoD) report assessing various submarine design options and recommending a preferred design would be submitted to the MoD’s Investment Appraisals Board in late 2009. Detailed design work was intended to follow agreement on the recommended option, known as the “Initial Gate”. With more than a hundred and fifty MPs signing a parliamentary “early day motion” calling for a debate and vote before going ahead with Trident replacement, there were press reports that the government might delay the Initial Gate decision until after the 2010 Nonproliferation Treaty (NPT) Review Conference. Contradictory statements from government spokespeople suggest that while the Initial Gate was delayed beyond 2009, that is chiefly to allow more time to evaluate different technical and design options and not connected with the NPT Review Conference or the UK General Election that is also likely to be held in May 2010.

Promoting disarmament

The tone of speeches on nuclear policy changed markedly when Gordon Brown replaced Tony Blair as Prime Minister in July 2007. Where Blair had argued that the NPT “makes it absolutely clear that Britain has the right to possess nuclear weapons”,³⁰⁸ Brown understood that the NPT’s Article VI means that “countries that do possess nuclear weapons agree to divest themselves of them over time”.³⁰⁹ While Brown is as keen as Blair to expand the role of nuclear energy “safely, securely and subject to proper multilateral verification processes with tougher sanctions brought to bear on those who break the rules”, he also accepts “that nuclear weapons states must set out much more clearly the responsibilities that we too must discharge.”³¹⁰

In a major policy statement on nuclear energy and proliferation in March 2009, Brown sought to square Britain’s obligations under the NPT with the decision to replace Trident on grounds that “No single nuclear weapons state can be expected to disarm unilaterally.”³¹¹ Such a statement suggests that Brown is still trapped in 1980s thinking in which unilateral and multilateral disarmament steps were portrayed as mutually exclusive, instead of the modern recognition that they are interconnected and mutually dependent, and that leadership often requires one country to kick-start a multilateral process with unilateral initiatives.

In a speech in Delhi the previous year, Brown had given the first public indication of his stance on nuclear policy, pledging that:

“in the run-up to the Non Proliferation Treaty review conference in 2010 we will be at the forefront of the international campaign to accelerate disarmament amongst possessor states, to prevent proliferation to new states, and to ultimately achieve a world that is free from nuclear weapons.”³¹²

Following up in February 2008, at the Conference on Disarmament, Defense Secretary Des Browne elaborated on the concept of Britain becoming a “disarmament laboratory”, and underscored the need for “a transparent, sustainable and credible plan for multilateral nuclear disarmament ... that also addresses proliferation, so that disarmament and counter-proliferation both move forward together, each supporting the other.”³¹³

Not to be outdone, in early 2009, Foreign Secretary David Miliband published an official study, “Lifting the Nuclear Shadow: Creating the Conditions for Abolishing Nuclear Weapons”. The executive summary stated that:

“Achieving a global ban on all nuclear weapons requires the creation of conditions which will give confidence to all those who are covered by a nuclear deterrent (over half of the world’s population) that their security will be greater in a world without nuclear weapons than with them.”³¹⁴

The Foreign and Commonwealth Office (FCO) identified three conditions and six specific steps that it viewed as attainable within the near future. The conditions were:

- 1) “watertight means to prevent nuclear weapons from spreading to more states or to terrorists at the same time as nuclear energy is expanding”;
- 2) “minimal arsenals and an international legal framework which puts tight, verified constraints on nuclear weapons”; and,
- 3) “finding solutions to the challenges of moving from small numbers of nuclear weapons to zero in ways which enhance security.”³¹⁵

The steps divide into three types. There were multilateral aspirations, such as “stopping further proliferation,” bringing the Comprehensive Test-Ban Treaty (CTBT) into force, and starting negotiations on a Fissile Material Cut-off Treaty (FMCT). There were also objectives that other states needed to work on, such as the U.S.-Russian negotiations on further reductions to their arsenals. In this regard, it was noted that Britain and France have already made significant reductions, whereas China, India and Pakistan are still believed to be expanding their arsenals. Only two of the specified steps seemed to require UK action.

The UK government welcomes the commitment by the United States and Russia to undertake further deep reductions in their nuclear arsenals following on from the START and SORT treaties. Where in an earlier era British diplomats would make it a condition that the largest arsenals needed to be counted in hundreds rather than thousands before the UK would consider engaging in multilateral negotiations on disarmament, current policy focuses more on developing the right political and security conditions for disarmament.

In pursuit of solutions to the challenges of nuclear disarmament, the UK has taken the lead in exploring some of the technical and verification questions. The second phase of a verification project initiated in 2001 was broadened after 2005 to encompass joint work with Norway and the nongovernmental organization VERTIC, to look at means of verifying warheads and their dismantlement without revealing any information that might be proliferation-sensitive or contrary to the national security of the inspected state.

The UK also hosted a special conference on disarmament verification among the five declared NWS, which took place in early September 2009. The meeting was designated as closed-door, ostensibly to encourage the other NWS to participate, but from the few hints that have been dropped it appears that it was not as productive as its advocates had hoped and there are no immediate plans for a follow on.

The FCO has floated the possibility of the nuclear-weapon states making a voluntary commitment not to increase their nuclear arsenals.³¹⁶ Noting that UK weapons are at “several days readiness” to fire and not targeted, and that France has a similar posture, the FCO also suggests that it would be useful for the other NWS to agree on mutual steps in that direction.³¹⁷ Recognizing that there were “some powerful arguments for reducing the role of nuclear weapons solely to deterring the use of nuclear weapons by others” the FCO nevertheless took the position that narrowing the nuclear deterrent doctrine in this way would need states to feel more confidence in other means for ensuring their security if faced with superior conventional or other types of weapons.³¹⁸ Depending on how it is translated into policy and operations, such a posture might amount to a declaration that the sole purpose for nuclear weapons was to deter the use of nuclear weapons by others, or it could entail little more than a clarification that nuclear weapons would not be considered for deterrence or use against adversaries armed only with conventional, biological or chemical weapons. The government is careful not to refer to “no first use”, a declaratory policy advocated by some of Britain’s disarmament NGOs, including the Campaign for Nuclear Disarmament (CND). If the United States took the lead and in the context of key NATO states being willing to revise NATO’s nuclear posture, there are indications that Britain could be willing to play a positive role in bringing about a constructive reduction of the nuclear role. It is recognized, however, that France could have more fundamental difficulties, and that alliance considerations might hold such doctrinal changes back.

The UK regards itself as having taken the lead in transparency among the nuclear weapon states. Rather than declaring exact numbers of warheads in the stockpile, the UK chose to declare a ceiling. Following the decision in the 2006 White Paper to reduce the stockpile ceiling from 200 to 160 warheads, by the end of 2007 the government announced that the lower number had been achieved.³¹⁹ Since there is evidence that the stockpile did not actually hold 200 warheads at the time, groups that monitor AWE activities reported that fewer than 20 warheads were dismantled to reach the lower ceiling. There are no indications that the government will designate a further quantity of fissile material as excess. The UK recognizes that, in order to move collectively towards verified disarmament, it will be necessary to address parameters and agreed mechanisms for declaring fissile material and warhead stocks, the histories of production, dismantlement and disposition, and access to sites, records and personnel, but believes that such questions are some way down the track and do not need to be resolved at this stage. In this context, it would be useful to bring together experts to hammer out agreed definitions and terminology and get some common understandings of what is meant by “operationally available warheads”, stored warheads and so on.

The UK does not in principle object to international monitoring of warhead and component dismantlement in the context of multilateral disarmament and treaty obligations binding on all relevant states. As the UK-Norway verification project highlights, the government believes that some information barriers are necessary to ensure that sensitive and proliferant technologies and information are not revealed in a way that would compromise national or international security. Although the current UK position is that it is too early to talk about a verification organization for nuclear disarma-

ment, some indications of preferences have emerged from various discussions on and off the record. Because a safe verification regime would need to be carefully bounded and confined to a relatively narrow group of experts, it is not considered that the International Atomic Energy Agency (IAEA) with its current structure and mandate would be the appropriate organization to monitor and verify nuclear disarmament, though it is envisaged that the Agency would continue to have a role to play in safeguarding civil programs and fissile materials. While the UK-Norway verification project is predicated on the recognition that sustainable disarmament scenarios envisage (at some point) negotiations on a nuclear weapons convention that would establish an independent implementing organization with equal rights for all participating states, the UK has expressed particular interest in the verification regime allowing some form of “mutual verification” among nuclear-armed states (to avoid widening the proliferation risks). Though the FCO considers such talk to be premature, when the time comes, the UK might also be willing to consider the merits of including some form of societal verification, including international and legal protections for whistleblowers.

In Chapters 8 and 9 of “Lifting the Nuclear Shadow”, the FCO discusses some of the key elements that would need to be taken into account when working towards a world free of nuclear weapons. In particular, it identifies three interlinked challenges, described as doctrinal and technical: maintaining the strategic balance as the number of weapons goes down; reducing the importance of nuclear weapons in military doctrines; and building transparency and confidence.³²⁰ More broadly, emphasis is placed on developing the political and security conditions to promote and underpin a world free of nuclear weapons. For example, arguing from one direction that “a global ban will not be successfully achieved and sustained without removing or at least significantly improving the political tensions which have led states to maintain their nuclear weapons”, the FCO report specifies the importance of “substantial improvement in the relationship between India and Pakistan”, and “a just, durable and comprehensive peace settlement in the Middle East”.³²¹ It also refers to the need for further international controls on chemical and biological weapons and further progress on curbing conventional weapons and better mechanisms for enforcing international laws and rules and detecting violations. The UK therefore proclaimed its support for reforms “to build more open, credible, accountable and effective global and regional institutions, and to equip them with the capabilities they need for the challenges of the twenty-first century”.³²²

Controlling fissile materials

The UK is a long-time advocate of an FMCT and argues for multilateral negotiations to commence in the Conference on Disarmament without conditions. The UK regards such a treaty as “an essential building block towards an eventual global ban on nuclear weapons” and sees it as verifiable, applying arrangements “probably in the form of IAEA safeguards, to all enrichment and reprocessing facilities... and on any fissile material they produced for peaceful purposes”.³²³ The UK also argues that for full confidence there would need to be a verification system that will detect any undeclared enrichment or reprocessing, though it does not take the further step of advocating controls on uranium enrichment and reprocessing for civilian purposes.

In order to prepare the ground for a fissile material cut off, in 1995 the UK, together with France, Russia and the United States, declared a moratorium on production of fissile material for nuclear weapons or other explosive devices. It has also ended its practice of withdrawing fissile material from safeguarded stocks for nuclear weapons purposes.³²⁴ As part of the 1998 Strategic Defence Review, the UK also made public the total size of its stocks of nuclear materials held outside international safeguards for

“national security purposes”.³²⁵ Widely welcomed as useful confidence-building measures, such initiatives were able to be undertaken without affecting the UK’s nuclear forces because of the large quantities of fissile material already accumulated for the larger nuclear stockpile of the 1980s.

While not advocating that broader controls on fissile materials should be brought into the FMCT negotiations, the FCO notes that “an essential condition of an eventual nuclear weapons ban will be the tightest possible controls of all fissile material worldwide”, and that this will be necessary to stem proliferation and prevent nuclear terrorism as well. Among the envisaged controls, the FCO identifies: placing the civil fissile materials held by all states—whether in or out of the NPT—under IAEA controls and declarations of all military fissile materials, including in nuclear weapons. It does not specify whether these declarations should identify quantity and location. It also advocates regularly placing fissile materials “excess to nuclear weapons purposes” under IAEA safeguards pending conversion or disposal, which could be interpreted as a mechanism to place a ceiling on future increases in arsenals and to encourage further reductions, though these purposes are not specified. In addition, it advocates application of the highest standards of security for all fissile materials.³²⁶ With regard to engaging other nuclear-armed states, the FCO suggests holding discussions among states that have unsafeguarded fissile materials, and to “negotiate incrementally bringing these under safeguards”.³²⁷

The current Trident system has a propulsion system fueled with highly-enriched uranium (HEU), and the UK would not consider changing this during the lifetime of the Vanguard submarines. Whilst acknowledging that the French nuclear fleet runs on low-enriched uranium (LEU), the UK argues that using LEU means the propulsion system is bigger, noisier and requires more frequent refueling than with HEU. However, the design work for the proposed new submarines to carry the next generation of Trident missiles is in early stages, and even the decision for a submarine-based replacement may be revisited, as concerns grow over the costs and relevance of Trident replacement. Unlike the United States and Russia, the UK does not use nuclear propulsion for its aircraft carriers, icebreakers or other surface ships. Some HEU continues to be used in some research reactors and for medical/isotope production.

While presently reluctant to change over to LEU, the UK acknowledges that this would be theoretically possible. The FCO report acknowledges that current HEU users could be converted to run on LEU “with some compromises in performance and increased costs”.³²⁸ It is deduced from this that if a submarine-based replacement for Trident goes ahead at all, public or international opposition to HEU-fuelled propulsion could likely be effective. At present there appears to be no governmental enthusiasm for the idea of banning the construction of new HEU-fuelled nuclear-propelled ships, but that could be changed by concerted civil society and international action, especially if progress were being made towards concluding a fissile materials treaty and international agreements to discontinue the production of HEU for other purposes.

The UK may be interested in finding ways to increase controls over enrichment and reprocessing facilities and any transfers of equipment and technology.³²⁹ At present, however, the government does not appear willing to forego reprocessing, which is carried out at the Sellafield reprocessing facility in Cumbria, despite significant operational and financial problems including a major scandal resulting from the falsification of safety documentation on fuel containing recycled plutonium in the late 1990s. The FCO justifies its continuing support for reprocessing by noting the “valuable energy

potential” of plutonium and that several countries, notably France, Japan, Russia and India as well as Britain, have invested heavily in reprocessing. If reprocessing were to be banned, such countries “would need to be persuaded to accept the considerable costs involved”.³³⁰ In light of the various different suggestions being put forward on multinational fuel cycle arrangements, the UK seems willing to consider all reasonable proposals. The UK points out that all its uranium enrichment is conducted through URENCO, which is already multinational.

Nuclear abolition: contradictions and commitments

2010 will be a critical year for clarifying the choices for UK nuclear policy. The fact that the FCO chose “Creating the Conditions for Abolishing Nuclear Weapons” as the subtitle for its report “Lifting the Nuclear Shadow” was not just an exercise in public diplomacy. Although much of the report focused on the difficulties and the political and security conditions that others would have to meet before UK nuclear disarmament could be undertaken in earnest, the significance of the government’s recognition that the goal is not just nonproliferation but the *abolition* of nuclear weapons should not be overlooked.

On November 17, 2009, the Scottish Government published its response to the report of its Working Group on Scotland without Nuclear Weapons.³³¹ Welcoming the report, a government media advisory underlined, “The Scottish Government remains firmly opposed to the possession, threat and use of nuclear weapons and will continue to play a part in ending nuclear proliferation and promoting early disarmament to the extent that it is able to under current constitutional arrangements. We do not believe that the UK’s determination to spend billions on ensuring a nuclear deterrent and global offensive reach is the right one for our security needs in the 21st century.” Citing President Obama’s speech in Prague, the Scottish Government recommended, “The UK Government should now genuinely lead the world on nonproliferation—and make real budget savings—by scrapping Trident renewal plans completely.”³³²

Rebecca Johnson

United States

On 5 April 2009, in a speech in Prague, President Obama committed that his Administration would work toward a nuclear-weapon-free world: “First, the United States will take concrete steps toward a world without nuclear weapons. To put an end to Cold War thinking, we will reduce the role of nuclear weapons in our national security strategy, and urge others to do the same.” On the question of proliferation, Obama went on to note: “The basic bargain is sound: Countries with nuclear weapons will move towards disarmament, countries without nuclear weapons will not acquire them, and all countries can access peaceful nuclear energy.”

Obama was encouraged by the advocacy for disarmament in the widely-cited *Wall Street Journal* op-eds by George Shultz, Sam Nunn, William Perry, and Henry Kissinger,³³³ who argued that moving toward nuclear disarmament is vital to efforts to strengthen the nonproliferation regime and prevent the acquisition of nuclear weapons by terrorist groups. Advocates of nuclear disarmament also believe that, with the end of the Cold War, nuclear weapons have no plausible role for any country other than to deter their use by others.

The most sustained official discussion of nuclear weapon issues by the Obama Administration is the Nuclear Posture Review (NPR) released in April 2010.³³⁴ The review was mandated by Congress in the FY 2008 National Defense Authorization Act, which called for the Secretary of Defense to submit to Congress a comprehensive analysis of U.S. nuclear deterrent policy and strategy by the end of 2009.³³⁵ Although the terms of reference for the review as set out in the legislation did not refer explicitly to nuclear disarmament, as discussed further below, parts of the review do touch on disarmament questions.

The United States also was active in 2009 and the early months of 2010 in negotiating a follow-on agreement with Russia to the START Treaty, which expired in December 2009. The so-called New START agreement was concluded on April 8.³³⁶ Its focus is on verification arrangements and relatively modest reductions in strategic warheads and delivery vehicles over a period of seven years.

The new disarmament debate

A report of the Secretary of Defense’s Task Force on Nuclear Weapons Management, chaired by former Secretary of Defense, James Schlesinger, released in December 2008 at the end of the Bush Administration, set forth a set of arguments strongly supporting a continuing broad deterrent mission for the U.S. nuclear deterrent.³³⁷ President Obama has kept on Secretary of Defense Robert Gates who commissioned that study.

Two other fairly comprehensive and ultimately conservative bi-partisan studies chaired by former senior U.S. national security officials should also be noted:

- *U.S. Nuclear Weapons Policy*, a Council on Foreign Relations report co-chaired by William Perry, a former Secretary of Defense in the Clinton Administration, and Brent Scowcroft, National Security Advisor to the first President Bush,³³⁸ and
- *America's Strategic Posture*, a report of the Congressional Commission on the Strategic Posture of the United States chaired by William Perry with James Schlesinger as vice-chair.³³⁹

It should be noted that Perry was one of the co-signatories of the 2007 *Wall Street Journal* oped calling for the United States to take seriously the goal of eliminating all nuclear weapons.

The cover letter by the co-chairmen accompanying the Council on Foreign Relations report sets out its perspective pretty clearly:

“[W]hile President Obama has called for the eventual global abolition of nuclear weapons, they will remain a fundamental element of U.S. national security in the near term. This task force report makes recommendations, therefore, on how to ensure the safety, security, and reliability of the U.S. deterrent nuclear force.”

The report on America's Strategic Posture similarly notes:

“As we have debated our findings and recommendations, it has become clear that we have very different visions of what might be possible in the long term. Fundamentally, this reflects our differences over whether the conditions can ever be created that might enable the elimination of nuclear weapons. But our debates have also brought home to us that, despite our differences over the long term, we share to a very significant degree a vision of the nearer term.”³⁴⁰

On the non-government front a number of efforts have been mounted exploring the requirements and strategies for achieving total nuclear disarmament.

- The Carnegie Endowment has produced a valuable set of readings, *Abolishing Nuclear Weapons: A Debate*,³⁴¹ responding to an Adelphi Paper by George Perkovich and James Acton.³⁴²
- The Nuclear Security Project co-sponsored by the private Nuclear Threat Initiative and Stanford University's Hoover Institute has been following up on the Shultz, Perry, Kissinger, Nunn proposals with several commissioned studies.³⁴³ These studies focus not on how to get to zero but on deep cuts and related measures designed to get to a “base camp” for the final assault on the peak of nuclear disarmament.
- The Center for Defense Information and the Stimson Center have organized a “Global Zero” initiative with the explicit goal of achieving a multilateral disarmament treaty by 2018 and the elimination of all nuclear weapons by 2030.³⁴⁴ Under this umbrella, the Stimson Center during 2009 published a series of country studies on how the

postures of specific countries relate to nuclear disarmament; and in 2010, published two books: one bringing together the country studies³⁴⁵, and the other offering commissioned studies on critical issues that will have to be faced as the world moves toward disarmament, including verification, enforcement, governance and the role of civilian nuclear energy.³⁴⁶

In addition to these multi-authored studies, a number of foreign policy and defense experts including Jonathan Schell,³⁴⁷ Ivo Daalder and Jan Lodal,³⁴⁸ and Harold Brown³⁴⁹ have contributed shorter articles pro and con on the objective of nuclear abolition. There also have been a number of more narrowly focused but related efforts including on:

- Consolidation of the U.S. nuclear-weapon design and production infrastructure as the nuclear weapons arsenal is sharply reduced by the non-governmental Nuclear Weapons Complex Consolidation Policy Network,³⁵⁰ and
- The imperative of changing U.S. nuclear targeting doctrine from an emphasis on nuclear war fighting (“counterforce”) to one aimed at minimal deterrence as a step on the way to a nuclear-weapon-free world by the Federation of American Scientists and the Natural Resources Defense Council.³⁵¹

So far, the discussions on nuclear disarmament have been mostly within policy circles and non-governmental organizations with specialized interest in the issue; there has been little broad public debate. Among the non-governmental organizations, the NGO Committee on Disarmament, Peace, and Security, and the Global Security Institute (encompassing four action-oriented programs—the Bipartisan Security Group, the Disarmament and Peace Education Initiative, the Middle Powers Initiative and the Parliamentarians for Nuclear Nonproliferation and Disarmament) have been particularly active in promoting the disarmament agenda.³⁵²

The following briefly describes some of the potential fault lines of the emerging debate in the U.S. with regard to:

- Ultimate goals, including the potential uses of nuclear weapons,
- Modernization of the nuclear complex,
- Intermediate steps, including a fissile material production cutoff and a Comprehensive Nuclear Test Ban Treaty (CTBT),
- Transparency and declarations, and
- Deep cuts and verification

Those who have joined the debate on disarmament can be roughly categorized into camps holding the following three positions:

1. Disarmament is a counter-productive and dangerous goal because nuclear weapons play a significant national security role beyond simply deterrence of the use of nuclear weapons by others;
2. Deep cuts are a far more realistic goal than a nuclear-weapon-free world and could reap much of the value sought by advocates of complete disarmament; and
3. Nuclear disarmament is a realistic and achievable goal.

Intriguingly, the three camps appear to agree on the key finding that today the U.S. military does not give much attention to nuclear weapons. Most explicitly, the Schlesinger Task Force found “a distressing degree of inattention to the role of nuclear weapons in deterrence among many senior DoD [Department of Defense] military and civilian leaders,” and that “there has been a shedding of nuclear capabilities by the Military Services ... sometimes abetted by combatant commands and by service components in order to free up resources to use elsewhere.”³⁵³

The Schlesinger Task Force, which is in the first camp described above, advocated a renewed commitment by the nuclear establishment to four specific missions:

- “deter weapons of mass destruction threat,”
- “assure allies of our continuing commitment to their security,”
- “dissuade potential adversaries from embarking on programs or activities that could threaten our vital interests,” and
- “defeat threats that are not deterred.”³⁵⁴

To achieve these objectives, the Task Force recommended various ways to modernize and sustain the U.S. deterrent force.

The Council on Foreign Relations and the Congressional Commission report chaired by Perry and Scowcroft took a similar if more muted tack. It perceived a role for nuclear weapons beyond simply deterrence of nuclear attacks on the United States and its allies and therefore opposed a no-first-use policy and refused to exclude the option of the United States developing new nuclear weapons.

In a brief dissent to the Council on Foreign Relations report, George Perkovich, one of the members of the task force, drew the distinction between the report’s overall view and that of the abolitionists as follows: “[T]his report allows for the unhelpful and unnecessary perception that the United States should be more concerned about perpetuating its nuclear arsenal than it is about creating the conditions that would allow all states to live free from the terrifying threat of nuclear war.”³⁵⁵

The intermediate view that the role of nuclear weapons can be further deemphasized, but that the goal of nuclear disarmament is unrealistic is well represented by former Secretary of Defense, Harold Brown. In Brown’s view, “it will take a global political and social order quite different from the current situation to make a world without nuclear weapons possible.”³⁵⁶ He bases this judgment principally on the grounds that in a world that is not already “peaceful and orderly,” countries could always hide some nuclear weapons. In addition, Brown argued that elevating disarmament to a central goal could hurt nonproliferation efforts:

“The assertion that we intend to abolish nuclear weapons is likely to gain less in goodwill and cooperation in nonproliferation programs from others than it will lose when it becomes clear that there is no believable program or prospect for doing so. Such a backlash has already occurred in the case of Article VI of the NPT [which commits the nuclear powers to pursuing negotiations on nuclear disarmament]. The fact that nuclear disarmament has not been achieved during the 37 years since the

commitment entered into force continues to provide proliferators with a rationalization to their own publics for proliferation and an excuse for others to avoid cooperation with U.S. nonproliferation efforts. The elevation of a zero nuclear weapons goal to a driving force would intensify those effects. ... [Z]ero nuclear weapons as a central commitment severely distorts the debate [over proliferation]. Such distortion is inevitable when a practical impossibility is adopted as a goal.”

Better in Brown’s view is to push for a fissile production cutoff, a comprehensive nuclear test ban, some form of de-alerting of nuclear forces, and deep cuts in nuclear weapons; he also opposes the development of new nuclear weapons.

Although former Secretaries of Defense Schlesinger and Brown oppose the goal of a nuclear-weapon-free world, there is considerable support for this goal from other former U.S. national security officials. These include former Secretaries of Defense, William Cohen, Frank Carlucci, and Melvin Laird, (and included Robert McNamara before his death), and former Secretaries of State Madeline Albright, James Baker, Warren Christopher, and Colin Powell.

The most complete analytic efforts published so far are those by Perkovich and Acton in *Abolishing Nuclear Weapons* and the responses to their work noted earlier, and the Stimson Center books. These studies examine a number of challenges, including the stability of a nuclear-weapon-free world, verification, compliance, modernization of the nuclear-weapon complexes, and the role of nuclear energy in a disarmed world.

The Obama Administration’s Nuclear Posture Review (NPR) embraces the vision of a nuclear-weapon-free world as a real, though long-term, goal. The review identifies the threats of nuclear proliferation and nuclear terrorism as the most pressing nuclear dangers today.³⁵⁷ It narrows the role played by nuclear weapons in U.S. defense policy by declaring that the U.S. “will 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 compliance with their nuclear non-proliferation obligations.”³⁵⁸ The review stopped short of declaring that the only use of nuclear weapons is to deter their use by others. In addressing explicitly a “world without nuclear weapons,” the review asserts that the conditions that would ultimately allow such a world include:

“halting the proliferation of nuclear weapons, much greater transparency into the programs and capabilities of key countries of concern, verification methods and technologies capable of detecting violations of disarmament obligations, enforcement measures strong and credible enough to deter such violations, and ultimately the resolution of regional disputes that can motivate rival states to acquire and maintain nuclear weapons. Clearly, such conditions do not exist today. But we can—and must—work actively to create those conditions.”³⁵⁹

This is a very demanding list of conditions and suggests that, in the view of the drafters of the NPR, the achievement of total nuclear disarmament is well beyond any realistic planning horizon. Indeed, the NPR also foresees the introduction of a new generation of U.S. ballistic-missile submarines beginning in 2020 and a new generation of intercontinental ballistic missiles starting in 2027.

Modernization of the nuclear-weapon complex

The arena of the most immediate conflict among the competing strategic views relates to questions concerning the U.S. nuclear-weapon design and production complex, including the Stockpile Stewardship Program and whether or not the United States should develop new nuclear warheads.

The Nuclear Weapons Complex Consolidation report proposed a detailed program to shrink the complex, as a step toward the goal of nuclear disarmament. Its recommendations include consolidating the nuclear weapon complex from eight to three sites (Los Alamos National Laboratory, Sandia National Laboratory, and the Pantex Plant); that no change be made to existing nuclear weapons, “unless there is a compelling reason to do so;” and canceling most large new facilities now in planning stages.³⁶⁰

The Schlesinger, Council on Foreign Relations, and Congressional Commission studies by contrast, support a strengthened weapons complex. The Schlesinger Task Force argued for maintaining the ability to design and build new warheads:

“The Secretary of Defense should direct the NWC [Nuclear Weapons Council] as newly re-charted to develop and maintain a nuclear capabilities roadmap for the modernization and sustainment of the nuclear deterrent force. ... There is legitimate near-term concern about the nation’s ability to design and build nuclear warheads, given the past and prospective loss of intellectual capital and critical skills.”³⁶¹

Both the Council on Foreign Relations report and that of the Congressional Commission chaired by Perry and Schlesinger support the possible future need for what its advocates call a “Reliable Replacement Warhead” (RRW).³⁶²

The implication of this name, which was developed by the nuclear-weapon laboratories is to question their ability to maintain the reliability of the existing U.S. warhead designs. This implication has been challenged by the Jason group of defense consultants, which was asked by the U.S. National Nuclear Security Administration to review the Stockpile Stewardship Program and concluded in 2009 that:³⁶³

“Lifetimes of today’s nuclear warheads could be extended for decades, with no anticipated loss in confidence, by using approaches similar to those employed in [warhead Life Extension Programs] to date.”

The Directors of the three nuclear-weapon laboratories cast doubt on this conclusion in letters responding to a request by the ranking Republican Representative on the Subcommittee on Strategic Forces of the House Armed Services Committee. Some of the letters emphasized the importance of the challenge of designing new warheads to the maintenance of their skills and for increased funding.³⁶⁴ They also emphasized the importance of safety improvements (that would reduce the chances of a plutonium dispersal accident) and “intrinsic” security improvements that would require new warhead designs. During the 1990s, the Defense Department had decided that the safety improvements would be unnecessary.³⁶⁵

The NPR put the manufacture of new warhead components last on its list of options, after refurbishment of existing components or reuse of components from excess warheads. It also specified that authorization by the President and approval by Congress would be required before new components could be manufactured.

The NPR does, however, support robust Stockpile Stewardship and Life Extension Programs for nuclear weapons. This support included funding for a multi-billion Chemistry and Metallurgy Research Replacement Project at Los Alamos National Laboratory, which would greatly expand the ability of the United States to make new plutonium components for warheads and a new Uranium Processing Facility at the Y-12 Plant at Oak Ridge National Laboratory which would modernize the ability of the U.S. to make thermonuclear secondary components for warheads.³⁶⁶ These initiatives had been linked to ratification of the New START Treaty in a December 2009 letter to President Obama from 40 Republican Senators and Democratic Senator Lieberman³⁶⁷ and were already included in the Obama Administration's FY 2011 Budget Request for Nuclear Weapons, Nonproliferation, and Nuclear Energy. This budget request was sharply criticized by some NGOs. The NRDC analysis of the budget request, for example, commented that, "in what amounts to a stunning fallback from his 'world without nuclear weapons' rhetoric of only 9 months ago,' President Obama has proposed a nuclear weapons budget that is significantly larger, in real terms, than the last budget of the very nuclear-weapons-minded Bush Administration."³⁶⁸

Intermediate steps

In President Obama's Prague speech, he stated that:

"To reduce our warheads and stockpiles, we will negotiate a new Strategic Arms Reduction Treaty with the Russians this year. President Medvedev and I began this process in London, and will seek a new agreement by the end of this year that is legally binding and sufficiently bold. And this will set the stage for further cuts, and we will seek to include all nuclear weapons states in this endeavor.

To achieve a global ban on nuclear testing, my administration will immediately and aggressively pursue U.S. ratification of the Comprehensive Test Ban Treaty. After more than five decades of talks, it is time for the testing of nuclear weapons to finally be banned.

And to cut off the building blocks needed for a bomb, the United States will seek a new treaty that verifiably ends the production of fissile materials intended for use in state nuclear weapons. If we are serious about stopping the spread of these weapons, then we should put an end to the dedicated production of weapons-grade materials that create them."

President Obama's call for a *verifiable* fissile cutoff departs from the policy of the Bush Administration, which only reluctantly supported a fissile cutoff, and one without verification measures.

The NPR confirms the U.S. support for these initiatives, including ratification of the CTBT and negotiation of a verified fissile material cutoff treaty. However, it remains unclear whether the Administration will press for early ratification of the CTBT.

Transparency and declarations

With respect to transparency, the United States has gone beyond any other nuclear weapon state in providing public information on its holdings of fissile material and weapons and the history of their production and disposition. The UK also has made public declarations of its fissile stocks but with much less detail than in the U.S. reports.

In 1993, the U.S. Department of Energy (DOE) made public the total amount of highly enriched uranium (HEU) it had produced and used. At the same time, it also made public the quantities of HEU at all DOE sites other than the Pantex warhead assembly/disassembly facility in Amarillo, Texas. In 1996, the United States updated these data. A much fuller history of HEU production and disposition was completed in January 2001 but only released five years later as a result of Freedom of Information Act appeals by the Federation of American Scientists. The report declared that as of September 30, 1996 the U.S. had an inventory of 740.7 tons of HEU, containing 620.3 tons of U-235. It provided an accounting of total production, with annual production data for each enrichment facility (Oak Ridge and Portsmouth) organized into four enrichment ranges, from 20–70% to over 96%. This history reported the amount of HEU consumed in plutonium and tritium production reactors, down-blended for research-reactor fuel and disposal, and transmuted into uranium-236. The uses of HEU in nuclear tests and in naval reactors were reported as a combined number rather than separately “for national security reasons.” The Bush Administration also declared in 2006 the amount of weapon-grade uranium that it was transferring from its weapon stockpile into a stockpile reserved for future use in naval reactor fuel.³⁶⁹

The U.S. Department of Energy published, in 1996, the size of its total plutonium stockpile as of the end of September 1994 (99.5 tons). It reported that approximately two-thirds of this material (66 tons) was in weapons or in weapon components at the Pantex warhead plant and gave the quantities of plutonium at other DOE sites. The U.S. declaration also included a table of production by year and site (Hanford and Savannah River).

With respect to nuclear weapons the United States has been less open, but has periodically released some data, allowing independent analysts to make informed judgments on the weapon stockpiles and deployments.³⁷⁰

Deep cuts and verification

The United States clearly plans for further cuts in its nuclear arsenal, as evidenced by President Obama’s Prague speech and the conclusion of the New START agreement with Russia. New START caps deployed strategic warheads at 1550 and START-counted strategic delivery vehicles at 800, both below present levels, but modestly so.³⁷¹

The NPR suggests that the United States will be prepared in future treaties to seek further reductions in total nuclear weapons, including non-deployed and non-strategic warheads.³⁷² The NPR also called for “Initiating a comprehensive national research and development program to support continued progress toward a world free of nuclear weapons, including expanded work on verification technologies and the development of transparency measures. Such technologies will help us manage risk as we continue down this path by ensuring that we are able to detect potential clandestine weapons programs, foreign nuclear materials, and weapons production facilities and processes.”³⁷³

The United States should be willing to accept strong verification measures to monitor reductions in nuclear weapons and fissile material stockpiles. It has already offered most of its peaceful nuclear activities to be safeguarded by the International Atomic Energy Agency (IAEA) and has acceded to the Additional Protocol to its safeguards agreement, albeit with a national security exemption and managed access.³⁷⁴ In addition, between 1996 and 2002, the United States worked with Russia and the IAEA under the so-called Trilateral Initiative to develop approaches to allow the IAEA to monitor excess plutonium-containing warhead components, without divulging information that the United States and Russia considered sensitive.³⁷⁵ (The Bush and Putin Administrations abandoned this initiative, however, before it was implemented.)

Conclusion

The Nuclear Posture Review represents the first concrete manifestations of how President Obama's vision of a nuclear-weapon-free world will impact on near-term U.S. nuclear policy. The review does seek to reduce the role of nuclear weapons in U.S. strategic policy and eschews (or nearly so) the need for new nuclear weapons. It also strongly supports a CTBT and a verified fissile material production cutoff. On the other hand, the review puts forward a substantial and expensive plan to modernize the nuclear weapons complex, a plan which many critics believe is inconsistent with a determination to work toward a nuclear-weapon-free world.

Harold Feiveson

Endnotes

Overview

1. President Barack Obama, Speech at Hradcany Square, Prague, Czech Republic, April 5, 2009.
2. U.S. Department of Defense, *Nuclear Posture Review Report* April 2010, www.defense.gov/npr, p. iii.
3. *Ibid.*
4. Maxim Tkachenko, "Putin: Russia to Develop Offensive Weapons to Keep Balance with U.S.," CNN, December 29, 2009.
5. *Lifting the Nuclear Shadow: Creating the Conditions for Abolishing Nuclear Weapons* United Kingdom, Foreign and Commonwealth Office, 2009.
6. United Nations Security Council Resolution, S/RS/1887, September 24, 2009, www.ipfmlibrary.org/unsc1887.pdf.
7. Douglas Frantz, "Israel's Arsenal is Point of Contention," *Los Angeles Times*, October 12, 2003.
8. Pascal Mallet, "Allied Bid for Obama to Remove US European Nuclear Stockpile," *AFP*, February 19, 2010.
9. "U.S. Signals Its Nuclear Arms Stay In Europe For Now," *New York Times*, April 22, 2010.
10. "2000 Plutonium Management and Disposition Agreement" U.S. State Department, April 13, 2010, www.state.gov/r/pa/prs/ps/2010/04/140097.htm.

Country perspectives: China

11. "Recommendations for Achieving the Objective of Nuclear Disarmament and Nonproliferation of Nuclear Weapons," working paper submitted by China, A.CN.10/2006/WG.I/WP.3, United Nations Disarmament Commission, April 10–28, 2006.
12. Statement of the Government of the People's Republic of China, October 16, 1964, *People's Daily*, October 17, 1964.
13. Information Office of the State Council of the People's Republic of China, "China's National Defense in 2008," January 2009, www.gov.cn/english/official/2009-01/20/content_1210227.htm.
14. Statement of Chinese delegation, Third PrepCom for 2010 NPT Review Conference, New York, May 6, 2009, www.china-un.org/eng/chinaandun/disarmament_armscontrol/npt/t562620.htm.
15. Information Office of the State Council of the People's Republic of China, "China's National Defense in 2006," Beijing, December 29, 2006, www.chinadaily.cn/china/2006-12/29/content_771191.htm

- ¹⁶ Statement of Chinese delegation, 2009, *op. cit.*
- ¹⁷ *Ibid.*
- ¹⁸ Statement on Security Assurances issued by the People's Republic of China, April 5, 1995.
- ¹⁹ For instance, in a meeting with foreign journalists in July, 2005, Major-General Zhu Chenghu of China's National Defense University reportedly expressed the view that China would have no choice but to respond with nuclear weapons if the United States attacked Chinese territory with conventional forces during a conflict over the Taiwan Straits. See, Joseph Kahn, "Chinese General Sees U.S. as Nuclear Target," *New York Times*, July 15, 2005.
- ²⁰ Statement of Chinese delegation, 2009, *op. cit.*
- ²¹ Statement of Chinese delegation, Second PrepCom for 2005 NPT Review Conference, April 30, 2003.
- ²² Hui Zhang, "Action/Reaction: U.S. Space Weaponization and China," *Arms Control Today*, December 2005, pp. 7–9.
- ²³ Information Office of the State Council of the People's Republic of China, "China's National Defense in 2008," January 2009.
- ²⁴ Beijing proposed in the 1980s a condition of "three stops and one 50% reduction" which is now obsolete. See, e.g. "If the two superpowers take the lead in halting the testing, improving or manufacturing of nuclear weapons and in reducing their nuclear weapons by 50 per cent, the Chinese Government is ready to join all other nuclear states in undertaking to stop the development and production of nuclear weapons and to further reduce and ultimately destroy them altogether" Huang Hua, Speech at the Second Special Session of the US General Assembly Devoted to Disarmament, New York, June 11, 1982, www.nti.org/db/china/engdocs/ch0682.html.
- ²⁵ Statement of Chinese delegation, 2009 *op. cit.*
- ²⁶ Statement of Chinese delegation, the third PrepCom for 2010 NPT Review Conference, New York, May 4, 2009, www.china-un.org/eng/chinaandun/disarmament_armscontrol/npt/t560530.htm.
- ²⁷ "Recommendations for Achieving the Objective of Nuclear Disarmament and Nonproliferation of Nuclear Weapons," working paper submitted by China, Disarmament Commission, United Nations, 2006 substantive session, April 10–28, 2006
- ²⁸ Information Office of the State Council of the People's Republic of China, "China's National Defense in 2008," January 2009, www.gov.cn/english/official/2009-01/20/content_1210227.htm.
- ²⁹ "Recommendations for Achieving the Objective of Nuclear Disarmament and Nonproliferation of Nuclear Weapons," working paper submitted by China, Disarmament Commission, United Nations, 2006 substantive session, April 10–28, 2006
- ³⁰ Statement of Chinese delegation, Third PrepCom for 2010 NPT Review Conference, New York, May 6, 2009, *op. cit.*
- ³¹ Information Office of the State Council of the People's Republic of China, "China's National Defense in 2008," January 2009, www.gov.cn/english/official/2009-01/20/content_1210227.htm.
- ³² Sha Zukang, "The Impact of the U.S. Missile Defense Programme on the Global Security Structure," CPAPD/ORG Joint Seminar on Missile Defense and the Future of the ABM Treaty, Beijing, March 13–15, 2000.
- ³³ Statement by Ambassador Hu Xiaodi at the Plenary of the 2nd Part of the 2005 Session of the Conference on Disarmament, June 30, 2005.
- ³⁴ Information Office of the State Council of the People's Republic of China, "China's National Defense in 2006," December 29, 2006.

- ³⁵ Hans Kristensen, "The Role of U.S. Nuclear Weapons: New Doctrine Falls Short of Bush Pledge," *Arms Control Today*, September 2005.
- ³⁶ "Proposal on Essential Measures for an Immediate Halt to the Arms Race and for Disarmament", Working Paper submitted by the Chinese delegation at the Second Special Session of the UN General Assembly on Disarmament, June 21, 1982, www.nti.org/db/china/engdocs/ch0682.html.
- ³⁷ See, e.g. "Additional Protocol to IAEA Safeguards," Permanent Mission of China to the United Nations and other international organizations in Vienna, January 2006, www.fmprc.gov.cn/ce/cgvienna/eng/xnyfgk/t230769.htm.
- ³⁸ See, e.g. Renkai Zhao, et al., *The Energy Technology Area Research Progress of the National 863 Programme*, The Atomic Energy Press, Beijing, 2001; Mi Xu, "The Role of Nuclear Power in China," Presentation at Conference of International Engineering, November 2000, Beijing, China.
- ³⁹ See, e.g. Hui Zhang, "On China's Commercial Reprocessing Policy," presentation at 50th INMM meeting, Tucson, AZ, July 12–17, 2009.
- ⁴⁰ David Albright, Frans Berkhout, and William Walker, *Plutonium and Highly Enriched Uranium 1996: World Inventories, Capabilities, and Policies*, SIPRI, Oxford University Press 1996, p.129, note 114.
- ⁴¹ Statement of Chinese delegation, Third PrepCom for 2010 NPT Review Conference, New York, May 4, 2009.

Country perspectives: France

- ⁴² On the historical background of the French approach to nuclear weapons, see Camille Grand, "A French Nuclear Exception?", *Occasional Paper No. 38*, Henry L. Stimson Center, Washington, DC, 1998.
- ⁴³ In English, see Bruno Tertrais "French Perspectives on Nuclear Weapons and Nuclear Disarmament" in Barry Blechman (ed.), *Unblocking the Road to Zero: Perspectives of Advanced Nuclear Nations*, Henry L. Stimson Center, 2009, www.stimson.org/nuke/pdf/Nuclear_Security_FINAL_Complete_PDF.pdf, and Camille Grand, "France, Nuclear Weapons and Nonproliferation" in Camille Grand, Stefan Kornelius, Mark Smith, Tomas Valasek and Arcin Zaborowski, *US-European Nonproliferation Perspectives: A Transatlantic Conversation*, Center for Strategic and International Studies (CSIS), Washington, DC, April 2009 www.csis.org/media/csis/pubs/090408_grand_useurononpro_web.pdf.
- ⁴⁴ Thérèse Delpech, "France's Last Tests: A Catalyst for New Policies," *Nonproliferation Review*, Vol. 3, No. 1, Fall 1995.
- ⁴⁵ All CD Permanent Representatives were invited on September 16, 2008. For more on this visit, see www.delegfrance-cd-geneve.org/spip.php?article327.
- ⁴⁶ Letter, dated 6 April 1995, to the UN Secretary General.
- ⁴⁷ Speech by Nicolas Sarkozy, President of the French Republic at the opening of the Sixteenth Ambassadors Conference, Paris, August 27, 2008, www.elysee.fr/documents/index.php?mode=cview&press_id=1726&cat_id=7&lang=fr.
- ⁴⁸ Bruno Tertrais, "France and Nuclear Disarmament: The Meaning of the Sarkozy Speech", Carnegie Proliferation Analysis, May 1 2008, www.carnegieendowment.org/publications/index.cfm?fa=view&id=20090&prog=zgp&proj=znpp.
- ⁴⁹ See the full statement in French and English at www.delegfrance-cd-geneve.org/IMG/pdf/General-bilingue2_pdf.pdf.
- ⁵⁰ Croatia, Former Yugoslav Republic of Macedonia, Albania, Serbia, Ukraine and Moldova.
- ⁵¹ For an analysis of this approach see Bruno Tertrais, "The Last to Disarm? The Future of France's Nuclear Weapons," *Nonproliferation Review*, Vol. 14, No. 2, July 2007.

- ⁵² Margaret Beckett, "A World Free of Nuclear Weapons?" Keynote address, Carnegie International Non-proliferation Conference, June 25, 2007.
- ⁵³ The G8 L'Aquila Statement on Nonproliferation, July 8, 2009, can be found at www.g8italia2009.it/static/G8_Allegato/2._LAquila_Statent_on_Non_proliferation.pdf.

Country perspectives: Germany

- ⁵⁴ Harald Müller, Alexander Kelle, Katja Frank, Sylvia Meier, Annette Schaper, *Nuclear Disarmament: With what End in View? The International Discourse about Nuclear Arms Control and the Vision of a Nuclear-Weapon-Free-World*, PRIF Reports No. 46, Frankfurt, 1996.
- ⁵⁵ German Foreign Minister Klaus Kinkel, "German 10-Point Initiative for Nuclear Nonproliferation," Declaration, Bonn, December 15, 1993, Summary in: *Nuclear Proliferation News* 5, June 10, 1994.
- ⁵⁶ Interview with Foreign Minister Fischer in *Der Spiegel*, November 23, 1998, p. 84.
- ⁵⁷ Helmut Schmidt, Richard von Weizsäcker, Egon Bahr und Hans-Dietrich Genscher, "Für eine atomwaffenfreie Welt," *Frankfurter Allgemeine Zeitung*, January 8, 2009, www.auswaertiges-amt.de/diplo/de/Aussenpolitik/Themen/Abruestung/090116-AtomwaffenFAZ.pdf.
- ⁵⁸ George P. Shultz, William J. Perry, Henry A. Kissinger and Sam Nunn, "A World Free of Nuclear Weapons," *Wall Street Journal*, January 4, 2007; January 15, 2008.
- ⁵⁹ Michael Rühle, "Irans Nuklearprogramm lässt sich nicht aufhalten" ("Iran's Nuclear Program Cannot be Stopped"), Interview in *Zeit Online*, April 30, 2009, www.zeit.de/online/2009/18/atomwaffensicherheit.
- ⁶⁰ Website of the German Foreign Office: "Mutige Schritte bei der Abrüstung" ("Courageous Steps in Disarmament"), www.auswaertiges-amt.de/diplo/de/Aussenpolitik/Themen/Abruestung/090406-Abruestung-nach-Obama-Rede.html.
- ⁶¹ Frank-Walter Steinmeier, Interview with *Zeit*, "Ziel atomarer Abrüstung ist Vision und Realismus zugleich" ("Goal of Atomic Disarmament is Both Vision and Realism") on the website of the Foreign Office: www.bundesregierung.de/Content/DE/Interview/2009/04/2009-04-08-steinmeier-die-zeit,layoutVariant=Druckansicht.html.
- ⁶² Frank-Walter Steinmeier, speech to the German Parliament, April 27, 2009, www.auswaertiges-amt.de/diplo/de/Infoservice/Presse/Reden/2009/090424-BM-BT-Abruestung.html.
- ⁶³ The parties present in the German Federal Parliament are Christian Democrats (CDU), Social Democrats (SPD), Greens, Free Democrats (FDP) and the Left (whose origin is the communist party of the former GDR). CDU and SPD are the governing parties. For the speeches see www.uni-kassel.de/fb5/frieden/themen/Atomwaffen/bt-debatte2.html.
- ⁶⁴ FDP-Parliamentarian Werner Hoyer, speech to the Federal Parliament, April 27, 2009.
- ⁶⁵ Proposal by Robert Einhorn, *Fissile Material Control Initiative – A CSIS proposal*, December 2007, "Creating a new momentum for A Fissile Material Cut-Off Treaty (FMCT)," Working Paper submitted by Germany, Preparatory Committee for the 2010 Review Conference of the Parties to the Treaty on the Nonproliferation of Nuclear Weapons, NPT/CONF.2010/PC.II/WP.21, April 30, 2008.
- ⁶⁶ German Foreign Office, "Federal Government submits proposal on multilateralization of the fuel cycle to the IAEA," Press release, May 2, 2007; Frank-Walter Steinmeier, "Safe uranium enrichment for all," translation of article in *Handelsblatt*, May 2, 2007, www.auswaertiges-amt.de/diplo/en/Infoservice/Presse/Interview/2007/070502-Handelsblatt.html.

Country perspectives: India

- ⁶⁷ Statement in the Lok Sabha, May 10, 1954, reprinted in *India and Disarmament: An Anthology of Selected Writings and Speeches*, Government of India/Ministry of External Affairs, New Delhi, 1988, pp. 33–37.

- ^{68.} “Draft Report of National Security Advisory Board on Indian Nuclear Doctrine,” www.indianembassy.org/policy/CTBT/nuclear_doctrine_aug_17_1999.html.
- ^{69.} *Ibid.*
- ^{70.} Earlier Indian statements and plans, most notably the Rajiv Gandhi plan from 1988, also envisioned nuclear disarmament being achieved within a limited time, but it was only following the debate at the Conference on Disarmament during the negotiations over the CTBT that this has become a central feature of the Indian position on nuclear disarmament.
- ^{71.} Praful Bidwai and Achin Vanaik, *South Asia on a Short Fuse*, Oxford University Press, New Delhi, 1999, pp. 63–75.
- ^{72.} Prime Minister Rajiv Gandhi, address at the United Nations General Assembly, New York, June 9, 1988, www.indianembassy.org/policy/Disarmament/disarm15.htm.
- ^{73.} International Court Of Justice Advisory Opinion of 8 July 1996 on “Legality Of The Threat Or Use Of Nuclear Weapons,” www.icj-cij.org/icjwww/idecisions/isummaries/iunanaummary960708.htm. See also, John Burroughs, *The (Il)legality of Threat or Use of Nuclear Weapons*, International Association of Lawyers Against Nuclear Arms, Lit Verlag, Munster, 1997.
- ^{74.} “Indian Memorial Submitted to the International Court of Justice on Status of Nuclear Weapons in International Law: Request for Advisory Opinion of the International Court of Justice,” reproduced in *Seminar*, August 1998, pp.71–74.
- ^{75.} The G21 is the group of countries that were historically not aligned to either the U.S. or Soviet blocs during the cold war.
- ^{76.} “Working Paper by India on Nuclear Disarmament,” UN General Assembly, October 6, 2006, www.reachingcriticalwill.org/political/1com/1com06/docs/indiapaper.pdf
- ^{77.} *Ibid.*
- ^{78.} “Governmental Positions on the Core Issues at the Conference on Disarmament,” Reaching Critical Will, www.reachingcriticalwill.org/political/cd/positions_matrix.html#india.
- ^{79.} Statement by Hamid Ali Rao to Conference on Disarmament, April 15, 2009, www.reachingcriticalwill.org/political/dc/statements09/15April_India.pdf
- ^{80.} International Panel on Fissile Materials, *Global Fissile Material Report 2009*, pp. 13–16.
- ^{81.} *Global Fissile Material Report 2009*, p.9.
- ^{82.} *Global Fissile Material Report 2009*, pp. 16–19. During the negotiation of the Indo-US nuclear deal, India explicitly insisted on keeping its reactor grade plutonium stockpile outside of safeguards, and could be used for weapons. In our judgment, this plutonium stockpile is unlikely to be placed under safeguards in the foreseeable future.
- ^{83.} This assumes that the breeder reactor will operate at 75 percent efficiency. Alexander Glaser and M.V. Ramana, “Weapon-grade Plutonium Production in the Indian Prototype Fast Breeder Reactor,” *Science & Global Security* vol. 15, No. 2, 2007, p. 85.
- ^{84.} Prime Minister Rajiv Gandhi, address at the United Nations General Assembly, New York, June 9, 1988, www.indianembassy.org/policy/Disarmament/disarm15.htm.
- ^{85.} Statement by Hamid Ali Rao at the Conference on Disarmament, February 28, 2008, www.reachingcriticalwill.org/political/cd/speeches08/1session/Feb28India.pdf
- ^{86.} R. B. Grover and Subash Chandra, “Scenario for Growth of Electricity in India,” *Energy Policy* 34, no. 17, 2006.
- ^{87.} For a useful history of the program, see T. S. Gopi Rethinaraj, “ATV: All at Sea Before it Hits the Water,” *Jane’s Intelligence Review*, 1 June 1998, pp. 31–35.

⁸⁸ Similar dynamics have characterized the acquisition of nuclear arsenals by all nuclear-weapon states.

Country perspectives: Iran

⁸⁹ Iran's Deputy Foreign Minister, Mohammad-Ali Hosseini, at the Third Preparatory Committee for the NPT Review Conference, on May 4, 2009, criticized "the non-compliance of Nuclear Weapon States with their obligations of nuclear disarmament, stipulated in article VI," www.reachingcritical-will.org/legal/npt/prepcom09/statements/4May_Iran.pdf.

⁹⁰ Iran had notified the IAEA that it was preparing to load nuclear fuel into the Bushehr reactor on Sept/Oct 2009.

⁹¹ Ebrahim Yazdi, "Iran va fan'avari haste'i," (Iran and Nuclear Technology), *Aftab*, 3, 29, October 2003, pp. 4-7.

⁹² IAEA Board of Governors, Report by the Director General, *Implementation of the NPT Safeguards Agreement in the Islamic Republic of Iran*, GOV/2003/63, August 26, 2003, para. 46, www.iaea.org/Publications/Documents/Board/2003/gov2003-63.pdf.

⁹³ "Hozor-e raees jomhour dar esfahan va lahze shomari baray-e elam-e khabarha-ye khosh-e haste'i," (The Presence of the President in Isfahan and the Expectation for the Good Nuclear News), *IRNA*, April 8, 2009.

⁹⁴ IAEA Board of Governors, Report by the Director General, *Implementation of the NPT Safeguards Agreement in the Islamic Republic of Iran*, GOV/2003/63, August 26, 2003, p. 1.

⁹⁵ *Implementation of the NPT Safeguards Agreement in the Islamic Republic of Iran*, Resolution adopted by the IAEA Board, September 12, 2003.

⁹⁶ According to the Iran-EU agreement on Iran's nuclear program signed on November 14, 2004, the E3/EU recognized that Iran's suspension was "a voluntary confidence building measure and not a legal obligation."

⁹⁷ "Iran will not Bargain on Nuclear Enrichment," *Iran Mania*, July 20, 2005.

⁹⁸ "Miz-e gerd-e mahaneh Iran mehr darbare-ye chalesh-ha-ye haste'i-ye Iran," (The Roundtable of the Iran Mehr Monthly about Iran's Nuclear Challenges), *Iran Mehr*, September and October 2005, p. 12

⁹⁹ Kamran Taremi, "Selah-ha-ye koshtar-e jam'i dar khavar-e miyaneh va naqsh-e konvansion-ha," (The WMD in the Middle East and the Role of the Conventions), *Rahbord*, 19, Spring 2001, p. 110.

¹⁰⁰ Iran Daily, September 2004, quoted in *Jumhuri-ye Eslami*, October 2004; quoted in Sepideh Pooraghaee, "Faaliat-ha-ye haste'i-ye Iran az didgah-e dastandarkaran," (Iran's Nuclear Activities from the Point of View of Practitioners), *Gozaresh*, 157, October 2004. Rowhani was appointed the Secretary of the Supreme National Security Council (SNSC) responsible for Iran's nuclear negotiations on October 5, 2003.

¹⁰¹ Hassan Rowhani, "Sokhanrani dar jam'i nokhbegan-e mashhad-e moghadas dar 83/11/21- tadbirha-ye Iran tavan-e ayandehnegari ra az amrica gereft," (The Lecture in Front of the Elites in the Holy Mashhad in February 2004: Iran's Policies took away the Power of Forecasting from the US), *Rahbord*, 35, Spring 2005, p. 13.

¹⁰² *Ibid*, p. 17.

¹⁰³ "Asgar-Owlad, dabir koll-e Mo'talefeh-ye Islami: Emza'-e protokol-e elhaqi rah-e jadidi bara-ye ferestadan-e jasusan be keshvar ast," (Asgar-Owlad, the Secretary General of Mo'talefeh-ye Islami: The Signing of the Additional Protocol is a New Way of Sending Spies to the Country), *Resalat*, August 9, 2003.

- ^{104.} Teymoor Nabili, "Mousavi Revives Reformist Vote," *Al Jazeera*, June 13, 2009, <http://english.aljazeera.net/focus/2009/06/2009612102154262910.html>. If Iran's nuclear program started in 1985 at the time Mousavi was the Prime Minister, he is probably a long-time advocate of such a costly endeavor.
- ^{105.} "Iranian Elections: The Answer to Ahmadinejad," *Spiegel Online International*, April 27, 2009, www.spiegel.de/international/world/0,1518,622225,00.html.
- ^{106.} "Mottaki: All Should Enjoy Peaceful Nuclear Energy," *IRNA*, April 29, 2009.
- ^{107.} "Thought of Making Nuclear Bomb Forbidden in Islam: Kashani," *MNA*, November 9, 2007.
- ^{108.} The Office of the Supreme Leader, Sayyid Ali Khamenei, "No More Justified to Retain Iran's Nuclear Case in UNSC," *Payegah-e etella'a resani-ye magham-e moazam-e rahbari* (The Official Website of the Supreme Leader), 12 January 2008. www.leader.ir/langs/en/?p=contentShow&id=3668.
- ^{109.} See, "Bayanaat dar didaar-e dastandarkaran-e sakht-e navshekan-e jamaran," (the Statement in the Meeting with those Involved in the Construction of Jamaran Naval Destroyer), *daftar-e nashr va hefz-e aasar-e ayatollah seyyid ali khamenei*, February 18, 2010. <http://farsi.khomeni.ir/speech-content?id=8906>.
- ^{110.} Khamenei appointed Kamal Kharazi as the head of the newly established Strategic Council for Foreign Affairs (SCFA) in 2006. The main function of the SCFA as a consultative body is to provide expert advice to the Leader. Initially, there were concerns that this Council might impede the function of the Supreme National Security Council or the Foreign Ministry.
- ^{111.} "Ahmadinejad: Iran Welcomes Partnership in Global Disarmament," *IRNA*, April 10, 2009.
- ^{112.} While considerable disagreement exists among the proponents and opponents of the nuclear energy program regarding the timing and the extent of its expansion, they do seem to agree on the desirability of asserting Iran's right to use nuclear technology for peaceful purposes. Energy security has become one of Iran's prime goals since the early 1990s. The questions now may be how many and what type of nuclear power plants will be built in the country.
- ^{113.} Iran will soon start building two new enrichment facilities with the same capacity as the Natanz Fuel Enrichment Plant (NFEP) which became operational in February 2007. This site has been subject to international surveillance and monitoring. According to Section A, para. 6 of the February 18, 2010 IAEA report on Iran's current nuclear enrichment related activities, the IAEA has conducted 35 unannounced inspections at the NFEP since March 2007. In October 2009, the head of the Atomic Energy Organization of Iran, Ali Akbar Salehi mentioned precautionary measures of constructing Iran's new nuclear facilities underground and in well-protected sites to deter attacks against these highly valued targets. "Salehi's Exclusive Interview with Channel 2," *Press TV*, October 1, 2009. www.presstv.ir/pop/Print/id=107553.
- ^{114.} "Iran Opens Nuclear Fuel Facility," *BBC News*, April 9, 2009.
- ^{115.} IAEA Board of Governors, Report by the Director General, *Implementation of the NPT Safeguards Agreement and Relevant Provisions of Security Council Resolutions 1737 (2006), 1747 (2007), 1803 (2008) and 1835 (2008) in the Islamic Republic of Iran*, GOV/2010/10, February 18, 2010, Section E, para. 41.
- ^{116.} GOV/2010/10, section E, para. 45.
- ^{117.} "Iran should Pay for Nuclear Fuel and Reject Swap Deal: Rowhani," *Tehran Times*, February 22, 2010.
- ^{118.} Iran provided the Agency's inspectors with "mass spectrometry results which indicates that enrichment levels of up to 19.8% were obtained [at the Natanz Pilot Fuel Enrichment Plant] between 9 and 11 February 2010." See, GOV/2010/10, Section A, para.11.
- ^{119.} In 2006, a former Iranian Ambassador to the United Nations, Javad Zarif enumerated Iranian proposals which entailed "refraining from reprocessing or producing plutonium", "limiting the enrichment of nuclear materials", and "accepting foreign partners, both public and private" in Iran's uranium enrichment facilities." Iran had also proposed "the establishment of regional consortiums on

fuel cycle development that would be jointly owned and operated by countries possessing the technology." Javad Zarif, "We do Not Have a Nuclear Weapons Program," *New York Times*, April 6, 2006.

Country perspectives: Israel

120. "Establishment of a NWFZ in the Region of the Middle East" Explanation of vote by Israel, UN General Assembly First Committee, 2008, www.reachingcriticalwill.org/political/1com/1com08/EOV/IsraelL1.pdf.
121. *Ibid.*
122. "Comprehensive Test Ban Treaty Resolution" Explanation of vote by Israel, UN General Assembly First Committee, 2008, www.reachingcriticalwill.org/political/1com/1com08/EOV/IsraelL55.pdf.
123. "Establishment of a NWFZ in the Region of the Middle East" Explanation of vote by Israel, UN General Assembly First Committee, 2008. *op. cit.*
124. Statement by US Assistant Secretary of State Rose Gottemoeller, Third Session of the Preparatory Committee 2010 Review Conference of the States Parties to the Treaty on the Nonproliferation of Nuclear Weapons, May 5, 2009.
125. "Major Powers Reaffirm Backing for Nuclear Nonproliferation Pact," *AFP*, May 16, 2009
126. "Establishment of a NWFZ in the Region of the Middle East," Explanation of vote by Israel, UN General Assembly First Committee, 2007, www.reachingcriticalwill.org/political/1com/1com07/EOV/L1Israel.pdf.
127. Alan Dowty, "Iran and the Bomb: Israel's Analogies" May 8, 2009, Middle East Strategy at Harvard, <http://blogs.law.harvard.edu/mesh/2009/05/iran-and-the-bomb-israels-analogies/>.
128. Ephraim Kam, ed., *Israel and a Nuclear Iran: Implications for Arms Control, Deterrence, and Defense*, Memorandum No. 94, Institute for National Security Studies, July 2008, www.inss.org.il.
129. Shlomo Brom, "Israeli Perspectives on the Global Elimination of Nuclear Weapons" in *Unblocking the Road to Zero: Pakistan/Israel*, Vol. III, Stimson Center, April 2009, pp 37–59, <http://cts.vresp.com/c/?TheHenryL.StimsonCen/a0c427aa6b/0b7feaa342/0864f4969c>.
130. *Ibid.*
131. "These threats are significantly exacerbated by the irresponsible behavior of certain states concerning the export of WMDs and WMD-related technologies to the region and the discrepancies between their commitments and their actual behavior." *Ibid.*
132. *Ibid.* "The Risk of Nuclear Proliferation in the Middle East" Explanation of vote by Israel, 2008, *op. cit.*
133. Brom, p. 53, *op. cit.*
134. Avner Cohen, *Israel and the Bomb*, Columbia University Press, New York, 1998.
135. Cohen, *op. cit.* Alan Dowty, "The Enigma of Opacity: Israel's Nuclear Weapons as a Field of Study," *Israel Studies Forum*, vol. 20. No. 2, Winter 2005, pp. 3–21.
136. "Israel" in *Banning the Production of Fissile Materials for Nuclear Weapons: Country Perspectives on the Challenges to a Fissile Material (Cutoff) Treaty*, International Panel on Fissile Materials, Princeton, 2008, p.31.
137. "Comprehensive Test Ban Treaty Resolution" Explanation of vote by Israel, UN General Assembly First Committee, 2008, *op. cit.*
138. "Establishment of a NWFZ in the Region of the Middle East" Explanation of vote by Israel, UN General Assembly First Committee, 2008, *op. cit.*

- ¹³⁹. It is significant for Israel that the cases of Iran, the AQ Khan network, and Libya were not discovered by the IAEA
- ¹⁴⁰. *Ibid.*
- ¹⁴¹. Statement of Israel to UNGA First Committee, October 7, 2005.
- ¹⁴². *Ibid.*
- ¹⁴³. “Fissile Material Cutoff Treaty” Explanation of Vote by Israel, UN General Assembly First Committee, 2004
- ¹⁴⁴. Avner Cohen, *Israel and the Bomb*, Columbia University Press, New York, 1998, p. 403, n. 37.
- ¹⁴⁵. “Israel” in *Banning the Production of Fissile Materials for Nuclear Weapons*, 2008 *op. cit.*
- ¹⁴⁶. In 2008 Israel co-sponsored five resolutions at the UNGA First Committee, whereas in 2006 and 2007 it did not co-sponsor any First Committee resolutions.
- ¹⁴⁷. “Comprehensive Test Ban Treaty Resolution” Explanation of vote by Israel, UN General Assembly First Committee, 2008, *op. cit.*
- ¹⁴⁸. *Ibid.* See also Israel Atomic Energy Agency website: www.iaec.gov.il/pages_e/english.asp.
- ¹⁴⁹. “Some NSG states would Condition Israeli Waiver on Dimona Shutdown,” *Nuclear Fuel*, December 15, 2008.
- ¹⁵⁰. Aluf Benn, “Israel and U.S. at Odds over Nuclear Treaty Proposal,” *Ha’aretz*, May 19, 2006. “Some NSG States Would Condition Israeli Waiver on Dimona Shutdown” *Nuclear Fuel*, December 15, 2008
- ¹⁵¹. “Fissile Material Cutoff Treaty” Explanation of Vote by Israel, UN General Assembly First Committee, 2004, www.reachingcriticalwill.org/political/1com/1com04/EOV/L34Israel.html.
- ¹⁵². Aluf Benn, “The Struggle to Keep Nuclear Capabilities Secret,” *Ha’aretz*, September 14, 1999, cited in “Israel” in *Banning the Production of Fissile Materials for Nuclear Weapons*, 2008, n. 78, *op. cit.*
- ¹⁵³. PM Netanyahu’s Remarks Regarding Media Reports Concerning Israel’s Nuclear Policy (Communicated by the Prime Minister’s Media Adviser), Jerusalem, August 11, 1998.
- ¹⁵⁴. Shai Feldman, “Israel and the Cut-Off Treaty,” *Strategic Assessment*, January 1999, Vol. 1, No. 4, Institute for National Security Studies.
- ¹⁵⁵. In fact Israel’s representative was not present as it was a Jewish holiday.
- ¹⁵⁶. “Some NSG States would Condition Israeli Waiver on Dimona Shutdown” *Nuclear Fuel*, December 15, 2008.
- ¹⁵⁷. Shai Feldman, “Israel and the Cut-Off Treaty,” *op. cit.*
- ¹⁵⁸. Recommendation 12 in *Weapons of Terror: Freeing the World of Nuclear, Biological and Chemical Arms*, The Weapons of Mass Destruction Commission, Stockholm, Sweden, 2006.
- ¹⁵⁹. In recent years Israel has been the sole consistent abstainer on the annual UNGA resolution “Prevention of an Arms Race in Outer Space” and the US has consistently been the only state voting against this resolution.
- ¹⁶⁰. The D-T gas mixture required for boosting is stored in a reservoir external to the core of the weapon and introduced into the core just prior to its intended use, while the D-T initiators are small, sealed units that are also placed external to the core.
- ¹⁶¹. See, e.g., Frank Barnaby, *The Invisible Bomb*, I. B. Tauris, London, 1989, pp. 38–40. Tritium is also produced via neutron absorption in deuterium (D) during the normal operation of reactors that use heavy water (D₂O) as a moderator/coolant. Because of the small probability (“cross section”) for neutron absorption in deuterium, the buildup of tritium in heavy water is slow. However, over time

the amount of accumulated tritium in large heavy water reactors can be substantial, and since it constitutes an occupational hazard, the technology to strip it from heavy water and simultaneously produce a concentrated stream of tritium has been developed and deployed in both Canada and India which both have large numbers of heavy-water power reactors. The amount of tritium that accumulates in the heavy water of the Dimona research reactor is small, however, relative to that which can be produced via neutron irradiation of enriched Li-6 targets.

- ¹⁶² Since boosted weapons can achieve yields similar to that of unboosted weapons using smaller amounts of fissile materials, allowing the production of tritium undercuts the effectiveness of an FMCT. It also permits the use of “reactor-grade plutonium” in weapons with minimal performance penalty. These considerations are more relevant to India and Pakistan, however, particularly the former, which is reportedly in the process of upgrading its nuclear arsenal, both qualitatively and quantitatively.
- ¹⁶³ A pulsed proton linear accelerator with a 5mA average current at 1.1 GeV and neutron multiplication in a spallation target could produce about 30 g of tritium annually, and about 2 kg of plutonium if the lithium targets were replaced by natural uranium, see e.g. R. Scott Kemp, “Nuclear Proliferation with Particle Accelerators,” *Science & Global Security* Vol. 13, 2005, p. 183. A reactor fueled with 19.75-percent enriched uranium, i.e. just below the boundary between low and highly enriched uranium, would produce about one 1/70 as much plutonium per gram of tritium produced as a production reactor fueled with natural uranium mostly because its fuel contains 1/35 as much U-238 per U-235 atom as a natural-uranium-fueled reactor, see e.g. Alexander Glaser, “On the Proliferation Potential of Uranium Fuel for Research Reactors at Various Enrichment Levels,” *Science & Global Security*, Vol. 14, 2006, p. 1.

Country perspectives: Japan

- ¹⁶⁴ <http://kokkai.ndl.go.jp/SENTAKU/syugiin/057/0514/05712110514002a.html>.
- ¹⁶⁵ www.ioc.u-tokyo.ac.jp/~worldjpn/documents/texts/JPUS/19650113.D1E.html.
- ¹⁶⁶ <http://kokkai.ndl.go.jp/SENTAKU/syugiin/067/0001/06711240001018a.html>.
- ¹⁶⁷ At a budget committee meeting of the Upper House on May 7, 1957, Prime Minister Kishi said that, although the so-called nuclear weapons such as atomic and hydrogen bombs of the day were against the Constitution, all the nuclear weapons might not be against the Constitution just because they were called nuclear weapons. Such comments have been made in various meetings at the Diet since then. At a meeting of the Special Committee on Japan-US Security, on May 18, 1960, Kishi said:

“We maintain the interpretation that Japan’s Constitution allows Japan to have the minimum force that supports self-defense power... I do not think there is any ground to interpret that possession of anything that is called nuclear weapon as self-defense power of the Self-Defense Forces is prohibited or that all nuclear weapons are prohibited under the Constitution,” May 18, 1960 Diet session record (in Japanese):

<http://kokkai.ndl.go.jp/SENTAKU/syugiin/034/0404/03405180404036a.html>.

See also Shinzo Abe’s explanation about his talk at Waseda University (May 13, 2002) at the Diet June 10, 2002 (House of Representatives)

“I talked about the relationship between nuclear weapons and the constitution in the context of the longstanding government interpretation of the Constitution. This was in response to questions. Since questions came from the student side or the professor side, I had to answer with sincerity in front of the students.

“In that, I said: ‘It is not prohibited by Article 9 Section 2 of the Constitution for us to possess a force within the minimum level necessary for self-defense; therefore, with the condition of being within such a limit, it is not prohibited by the Constitution to possess weapons whether they are nuclear ones or conventional ones.’ Before saying that, I talked about the three non-nuclear principles. So, after saying that, as a policy measure, Japan has renounced it, I talked about the interpretation of the Constitution in front of the students. The government has expressed its view of the Cabinet Legislation Bureau in 1978 and 1982. So wouldn’t it be natural to explain that?

“And at the same time, I explained the view of the Kishi cabinet of 1959 and 1960. Moreover, after that, I said that the discussion on the interpretation of the constitution is different from the policy discussion and, further, after that, I gave additional comments about the three non-nuclear principles. Therefore I do not think there is anything wrong about what I said.”

168. Exchanged Notes Regarding the Implementation of Article VI of Treaty of Mutual Cooperation and Security between Japan and the United States of America, January 19, 1960.
169. www.ioc.u-tokyo.ac.jp/~worldjpn/documents/texts/docs/19600119.T2E.html.
170. www.mofa.go.jp/policy/un/disarmament/nnp/index.html.
171. www.mofa.go.jp/mofaj/annai/honsho/kai_genjo/pdfs/hyoka_panel.pdf.
172. “Govt ‘Misread’ U.S. View of Secret Nuke Pact,” *Yomiuri Simbun*, March 1, 2010.
173. www.ioc.u-tokyo.ac.jp/~worldjpn/documents/texts/JPUS/19750806.O1E.html.
174. <http://kokkai.ndl.go.jp/SENTAKU/syugiin/096/0380/09606250380022a.html>.
175. “Govt Wants U.S. to Keep North Korea N-Deterrent,” *Daily Yomiuri*, August 23, 2003.
176. http://yamagata-np.jp/news_core/index_pr.php?kate=Detail&no=2008122101000153&keyword=.
177. “Shusho Kaku Senseifushiyo niwa Hiteiteki” [Prime Minister Negative About No First Use], *Nihon Hoso Kyokai* [Japan Broadcasting Corporation], August 9, 2009.
178. *Ibid.*
179. “Many in DPJ Want Japan to Cut Link to U.S. Nukes,” *The Japan Times*, October 11, 2009.
180. Katsuya Okada, Remarks at ministers’ inaugural press conference, September 16, 2009. See Seifu Intanet Terevi [Government Internet TV], “Daijin Shunin Kaiken” [Ministers’ inaugural press conference], September 16, 2009, <http://nettv.gov-online.go.jp/prg/prg2758.html>.
181. www.shugiin.go.jp/itdb_shitsumon.nsf/html/shitsumon/b171202.htm.
182. “Nuclear Stand-down or nuclear Standoff?” *Honolulu Advertiser*, April 5, 2009, <http://pacificfreeze.ips-dc.org/2009/04/nuclear-stand-down-or-nuclear-standoff>. Cossa also said that “China has not officially announced what those numbers are, but intelligence estimates put Beijing’s holdings at around 300 to 400 weapons.” The estimate by the Federation of American Scientists and Natural Resources Defense Council is about 240. www.fas.org/programs/ssp/nukes/nuclearweapons/nukes-tatus.html.
183. www.kokubou.jp/news-44-2.html.
184. www.csis.org/media/isis/pubs/pac0909a.pdf.
185. www.csis.org/media/isis/pubs/pac0909a.pdf.
186. www.brookings.edu/~media/Files/events/2009/0417_shinzo_abe/20090417_abe.pdf.
187. <http://armedservices.edgeboss.net/wmedia/armedservices/fc2050609.wvx>.
188. *Ibid.*
189. www.mofa.go.jp/mofaj/press/kaiken/gaisho/g_1001.html#4-A.
190. The website of the Ministry of Foreign Affairs has only the Japanese version of the letter. www.mofa.go.jp/mofaj/press/kaiken/gaisho/pdfs/g_1001_01.pdf.
191. “U.S. to Retire Nuclear Tomahawk Missiles, Japan Told,” *Kyodo News*, February 22, 2010.

- ¹⁹². About the ICNND and its report see www.icnnd.org/index.html.
- ¹⁹³. Masami Ito, "Diet Members Send Obama Nuclear Letter," *Japan Times*, February 20, 2010. <http://search.japantimes.co.jp/cgi-bin/nn20100220a3.html>.
- ¹⁹⁴. www.mofa.go.jp/policy/economy/summit/2008/doc/pdf/0708_04_en.pdf.
- ¹⁹⁵. Statement by Mr. Matsuda Iwao, Special Envoy of the Government of Japan, at the 52nd General Conference of the IAEA, September 29, 2008. www.mofa.go.jp/policy/energy/state0809.html.
- ¹⁹⁶. "Mohamed ElBaradei's Vision of a Safer World," *The Economist*, October 16, 2003.
- ¹⁹⁷. President George W. Bush, Remarks on nuclear proliferation delivered at the National Defense University, February 11, 2004, www.command-post.org/gwot/2_archives/010298.html.

Country perspectives: North Korea

- ¹⁹⁸. Until 1945 Korea was part of Japan and therefore many Koreans lived in Hiroshima and Nagasaki. In addition, many forced laborers worked in Japan's arms factories at that time. It is estimated that some 50,000–100,000 Koreans died or suffered from the blasts. Some 2000 victims are still alive in North and South Korea.
- ¹⁹⁹. Although North Korea claims that the United States and South Korea invaded the North on June 25, 1950, there is clear evidence on Kim Il Sung's preparation for the war. See the *Cold War International History Project Bulletin*, Issue 14/15, Winter 2003-Spring 2004 including the "Introduction" by Kathryn Weathersby.
- ²⁰⁰. General MacArthur wanted to bomb Manchuria to stop Chinese intervention. President Truman, however, not wanting further expansion of the war, dismissed General MacArthur. Fifty years later in 1996 then South Korean president Kim Young Sam made the controversial remark that "if the bombing of Manchuria had been carried out, Korean unification may have already been achieved". AP, June 30, 1996; see also, I. F. Stone, *The Hidden History of the Korean War*, Monthly Review Press, 1970.
- ²⁰¹. See for the full text of the Joint Communiqué of July 4, 1972, Se-Jin Kim (ed.), *Korean Unification: Source Materials with an Introduction*, Seoul: Research Center for Peace and Unification, 1976, p. 319.
- ²⁰². Secretary of Defense William Perry subsequently revealed in Congress details of a plan to fight a war with North Korea in summer 1994 after bombing the nuclear complex in Yonbyon, *UPI*, January 24, 1995.
- ²⁰³. For a detailed account of the negotiations, see Joel Wit, Daniel Poneman and Robert Gallucci, *Going Critical: The First North Korean Nuclear Crisis*, Brookings Institution, Washington, DC, 2004.
- ²⁰⁴. The "freeze" included commitments by North Korea not to reload the reactor with new fuel, not to reprocess the spent fuel, and to allow inspectors continuous access to the spent-fuel storage pond.
- ²⁰⁵. See Don Oberdorfer, *The Two Koreas: A Contemporary History*, Basic Books, New York, p. 409–435.
- ²⁰⁶. North Korea sent a letter on September 3, 2009 to the UNSC informing that it has entered the final phase of uranium enrichment. *BBC*, September 4, 2009.
- ²⁰⁷. For a detailed report on this issue, see Robert Gillette, "US Squelched Apparent S. Korea A-Bomb Drive," *Los Angeles Times*, November 4, 1978, p. 1, 14–15; Young-Sun Song, "North Korea's Potential to Develop Nuclear Weapons," *Vantage Point*, Volume 14, No. 8, August 1991, p. 2; Won-Chol Oh, "Nuclear Development in Korea in the 1970s", *Pacific Research*, November 1994, pp. 11–18; Mark B.M.Suh, "Nuclear Policy of the Republic of Korea: Nonproliferation and Denuclearization of the Korean Peninsula," Carin A. Wedar et. al (eds.), *Towards a Nuclear-Weapon-Free World*, Swedish Initiatives, Stockholm, 1993, pp. 215–222.
- ²⁰⁸. See Joachim Glaubitz, *Zur Frage des Abzugs der amerikanischen Landesstreitkräfte aus Südkorea: Beweggründe, Konzepte und Revision einer asienpolitischen Entscheidung*. Stiftung Wissenschaft und Politik, Ebenhausen, 1980, pp. 61–63.

²⁰⁹. The main reason why Japan is participating in the Missile Defense System with the United States is the threat posed by North Korean ballistic missiles.

Country perspectives: South Korea

- ²¹⁰. *Joint Declaration on the Denuclearization of the Korean Peninsula*, January 20, 1992.
- ²¹¹. Jungmin Kang and H.A. Feiveson, "South Korea's Shifting and Controversial Interest in Spent Fuel Reprocessing," *The Nonproliferation Review*, Spring 2001.
- ²¹². Sung-Ki Jung, "US Nuclear Umbrella: Double-Edged Sword for S. Korea," *Korea Times*, June 24, 2009, www.koreatimes.co.kr/www/news/nation/2009/06/120_47427.html).
- ²¹³. *Ibid.*
- ²¹⁴. Jungmin Kang, et al., "South Korea's Nuclear Surprise," *Bulletin of the Atomic Scientists*, January/February 2005.
- ²¹⁵. International Atomic Energy Agency, *Implementation of the NPT Safeguards Agreement in the Republic of Korea*, GOV/2004/84, November 11, 2004.
- ²¹⁶. Ministry of Foreign Affairs and Trade, *2008 Diplomatic White Paper*, September 2008, p.122; IAEA, *Status of Safeguards Agreement & Additional Protocols*, April 2009.
- ²¹⁷. *Joint Declaration on the Denuclearization of the Korean Peninsula*, January 20, 1992.
- ²¹⁸. *Four Principles on the Peaceful Use of Nuclear Energy*, 300th National Security Council Meeting, September 18, 2004 (Korean).
- ²¹⁹. Oh Joon, a Deputy Minister for Multilateral and Global Affairs of the ROK, "Delegates' Statements," Preparatory Committee for the 2010 NPT Review Conference Third Meeting, May 4, 2009.
- ²²⁰. Ministry of Foreign Affairs and Trade, *2008 Diplomatic White Paper*, September 2008, p.123.
- ²²¹. Ki-Chul Park, "Status and Prospect of Spent Fuel Management in South Korea," *Nuclear Industry*, August 2008 (Korean).
- ²²². <http://ehome.kaeri.re.kr/snsd/>.
- ²²³. www.kaeri.re.kr/english/sub/sub04_03.jsp; and <http://ehome.kaeri.re.kr/snsd/eng/organization/organization2.htm>.
- ²²⁴. www.kaeri.re.kr/; Number of news media in the ROK.
- ²²⁵. Jungmin Kang and Frank von Hippel, "Limited Proliferation-resistance Benefits From Recycling Unseparated Transuranics and Lanthanides From Light-Water Reactor Spent Fuel," *Science & Global Security*, No. 13 (2005); Edwin Lyman and Frank von Hippel, "Reprocessing Revisited: The International Dimensions of the Global Nuclear Energy Partnership," *Arms Control Today*, April 2008.
- ²²⁶. Frank N. von Hippel, "South Korean Reprocessing: An Unnecessary Threat To the Nonproliferation Regime," *Arms Control Today*, March 2010, pp.15–22.
- ²²⁷. Thomas B. Cochran et al, *Fast Breeder Reactor Programs: History and Status* (International Panel on Fissile Materials, February 2010).
- ²²⁸. Frank N. von Hippel, "South Korean Reprocessing: An Unnecessary Threat To the Nonproliferation Regime," *Arms Control Today*, March 2010, pp.15–22.
- ²²⁹. "Nuclear Sovereignty: Hardliners Urged to Refrain From Irrational Demands," *Korea Times*, 29 May 2009. www.koreatimes.co.kr/www/news/opinion/2009/09/202_45910.html; Jungmin Kang, "The North Korean Nuclear Test: Seoul Goes on the Defensive," *Bulletin of the Atomic Scientists*, June 12, 2009

- ²³⁰. "Establishing Korea Radioactive Waste Management Corporation (KRMC)," MKE Press Release, December 31, 2008 (Korean).
- ²³¹. "Why Delay the Public Consensus Process of Spent Fuel," *Dong-a Ilbo*, August 13, 2009, p. 8 (in Korean).

Country perspectives: Pakistan

- ²³². These proposals included in 1978, a joint Indo-Pakistan declaration renouncing the acquisition or manufacture of nuclear weapons, in 1978, a South Asian Nuclear Weapons Free Zone; in 1979, mutual inspections by India and Pakistan of each other's nuclear facilities; in 1979, simultaneous adherence to the NPT and acceptance of full-scope IAEA safeguards by India and Pakistan; in 1987, a bilateral or regional nuclear test-ban treaty; and, in 1994, a South Asia Missile Free Zone.
- ²³³. Statement by Ambassador Masood Khan, Pakistan's Permanent Representative, at the Informal Meeting on Nuclear Disarmament, Geneva, February 5, 2008, http://missions.itu.int/~pakistan/2005_Statements/CD/cd/stcdinf_5feb08.htm.
- ²³⁴. Pakistan currently has about 2500 main battle tanks, almost 400 combat aircraft, six frigates and eight submarines. India has about 4000 main battle tanks, about 600 combat aircraft, and 47 major surface ships, including an aircraft carrier, and 16 submarines. It is developing a nuclear submarine fleet. Data from *Military Balance 2009*, International Institute for Strategic Studies, London, 2009.
- ²³⁵. Pakistan became independent in 1947. Military rule lasted from 1958-1971, 1977-1988 and 1999-2008.
- ²³⁶. Pakistan's armed forces are 617,000 strong, with the Army having 550,000, the Navy 22,000 and the Air Force 45,000 members. There are a further 304,000 members of the paramilitary forces. For comparison, India has almost 1.3 million members of its regular military forces and 1.1 million in its reserves. *Military Balance 2009*, International Institute for Strategic Studies, London, 2009.
- ²³⁷. Recently, Air Marshal Asghar Khan, the former head of Pakistan's Air Force argued against keeping nuclear weapons, suggesting that nuclear weapons had been a costly and dangerous mistake for Pakistan, and "If we did not have nuclear weapons, declared ourselves to be a non-nuclear state, and opened ourselves to international inspection, there would be no possibility of India or any other country using nuclear weapons against us." Ardeshir Cowasjee, "Wise Words From an Old Warrior," *Dawn*, April 26, 2009.
- ²³⁸. "US Unveils Plans to Make India 'Major World Power'," *Reuters*, March 26, 2005.
- ²³⁹. *New Framework for the U.S.-India Defense Relationship*, Signed on June 28, 2005 in Washington DC, <http://newdelhi.usembassy.gov/ipr062805.html>.
- ²⁴⁰. K. Alan Kronstad, *India-U.S. Relations*, Congressional Research Service, January 30, 2009, www.fas.org/sgp/crs/row/RL33529.pdf
- ²⁴¹. Foster Klug, "Pakistan Wants Civilian Nuclear Deal," *AP*, September 8, 2005.
- ²⁴². Statement by Ambassador Munir Akram, UNGA First Committee, New York, October 10, 2003, www.pakun.org/statements/First_Committee/2003/10102003-01.pdf.
- ²⁴³. *Ibid.*
- ²⁴⁴. Statement by Ambassador Masood Khan, Permanent Representative of Pakistan to the Conference on Disarmament, Geneva, to General Debate of the UNGA First Committee, New York, 5 October 2005. www.pakun.org/statements/First_Committee/2005/10052005-01.pdf.
- ²⁴⁵. Statement by Ambassador Munir Akram, UNGA First Committee, New York, 10 October 2003, www.pakun.org/statements/First_Committee/2003/10102003-01.pdf.

- ^{246.} For details see Walter Ladwig III, "A Cold Start for Hot Wars?: The Indian Army's New Limited War Doctrine," *International Security*, Vol. 32, No. 3, Winter 2007/08, pp. 158–190; Harsh V. Pant, "India's Nuclear Doctrine and Command Structure: Implications for Civil-Military Relations in India" *Armed Forces & Society* Vol. 33, No. 2, 2007, pp.238–264.
- ^{247.} "Indian Military Rehearse Pakistan's Dissection in Mock Battles," *Defense News*, May 3, 2006.
- ^{248.} Statement by Raza Bashir, First Committee, 63rd UN General Assembly, New York, October 21, 2008. www.reachingcriticalwill.org/political/1com/1com08/statements/21OctPakistan.pdf.
- ^{249.} Statement by Ambassador Munir Akram, UNGA First Committee, New York, October 10, 2003, www.pakun.org/statements/First_Committee/2003/10102003-01.pdf.
- ^{250.} Steve Coll, "The Back Channel," *The New Yorker*, March 2, 2009.
- ^{251.} *Agreement between India & Pakistan on Prohibition of Attack Against Nuclear Installations and Facilities*, 1988, www.indianembassy.org/South_Asia/Pakistan/Prohibition_Attack_Nuclear_Dec_31_1988.html. The facilities that each state can include in its list are "nuclear power and research reactors, fuel fabrication, uranium enrichment, isotopes separation and reprocessing facilities as well as any other installations with fresh or irradiated nuclear fuel and materials in any form and establishments storing significant quantities of radio-active materials.
- ^{252.} www.stimson.org/southasia/?SN=SA2001112047.
- ^{253.} Ambassador Masood Khan, Statement to the Conference on Disarmament, May 16, 2006. www.reachingcriticalwill.org/political/cd/speeches06/statements%2016%20may/16MayPakistan.pdf.
- ^{254.} Ambassador Masood Khan, Statement to the Conference on Disarmament, March 30, 2007, www.reachingcriticalwill.org/political/cd/speeches06/30MarchPakistan.pdf.
- ^{255.} Pakistan statement to Conference on Disarmament, June 28, 2007, www.reachingcriticalwill.org/political/cd/speeches07/2session/June28Pakistan.html.
- ^{256.} Pakistan Atomic Energy Commission website, www.paec.gov.pk/news-archive-pakatom/na-p-so07.htm.
- ^{257.} Record of the Press Conference Addressed by the Foreign Office Spokesperson on November 20, 2006, Pakistan Ministry of Foreign Affairs, www.mofa.gov.pk/Spokesperson/Nov_o6/Spokes_20_11_06.htm.
- ^{258.} Peter Crail, "IAEA Approves India Additional Protocol," *Arms Control Today*, April 2009, www.armscontrol.org/act/2009_04/IndiaProtocol. The text of the draft agreement is at www.carnegieendowment.org/files/India_safeguards20080709.pdf.
- ^{259.} Mark Hibbs and Shahid-ur-Rehman, "Pakistan Civilian fuel Cycle Plan Linked to NSG Trade Exception," *Nuclear Fuel*, August 27, 2007. The offer to place the uranium conversion and enrichment plants under safeguards was repeated by Pakistan's representative at the 52nd IAEA General Conference, Vienna, October 1, 2008. www.iaea.org/About/Policy/GC/GC52/Statements/pakistan.pdf.
- ^{260.} "Nuclear Power Programme Meets Standards," *Daily Times*, March 26, 2005.
- ^{261.} See Zia Mian and A.H. Nayyar, "Pakistan," in *Banning the Production of Fissile Materials for Nuclear Weapons: Country Perspectives on the Challenges to a Fissile Material (Cutoff) Treaty*, IPFM, 2008, pp. 37–41.
- ^{262.} Warren Hoge, "U.N. Report Urges Big Changes: Security Council Would Expand," *New York Times*, December 1, 2004. India has joined with Germany, Japan and Brazil to establish a 'Group of 4,' these states seek permanent seats, but without a veto, on the Security Council.
- ^{263.} "UNSC Reforms Discussed: 'Uniting for Consensus' Group Meeting," *Dawn*, September 22, 2006. The Uniting for Consensus group includes Italy, Pakistan, South Korea, Spain, Mexico, Argentina, Turkey, Canada and Malta, some of which are rivals of the members of the Gang of 4, opposes adding new permanent members to the Security Council.

^{264.} Statement by Ambassador Masood Khan, UN First Committee, New York, October 15, 2007, <http://reachingcriticalwill.org/political/1com/1com07/statements/15octpakistan.pdf>.

Country perspectives: Russia

^{265.} Address by Russian Minister of Foreign Affairs Sergey Lavrov at a Plenary Meeting of Conference on Disarmament, Geneva, 7 March 2009, [www.unog.ch/80256EDD006B8954/\(httpAssets\)/B8B531BA899341A4C12575720037E61D/\\$file/1030_Lavrov.pdf](http://www.unog.ch/80256EDD006B8954/(httpAssets)/B8B531BA899341A4C12575720037E61D/$file/1030_Lavrov.pdf).

^{266.} Daryl Kimball and Miles Pomper, "A Fresh START? An Interview with Russian Ambassador Sergei Kislyak," *Arms Control Today*, December, 2008.

^{267.} http://merln.ndu.edu/whitepapers/Russia2010_English.pdf.

^{268.} A discussion of the roles of Russian nuclear weapons can be found in: Anatoli Diakov, Eugene Miasnikov and Nikolay Sokov, "Nuclear Arms Reductions and Arms Control, in U.S.-Russian Bilateral Relations: Current Status and Future," Occasional Paper, Center for Arms Control, Energy and Environmental Studies at the Moscow Institute of Physics and Technology, Dolgoprudny, 2006.

^{269.} Alexei Arbatov, *The Nuclear Turning Point – A Blueprint for Deep Cuts and De-Alerting of Nuclear Weapons*, Brookings Institution, Washington, DC, 1999, p. 320.

^{270.} It is quite symptomatic that at one of the meetings organized by the Ministry of Defense for the members of the State Duma in February 2009, General Nikolay Makarov, the Head of the General Staff of the Russia's Military Forces noted that, in the near term, nuclear weapons will continue to be the main stabilizing factor, and its role might well grow (Viktor Yesin, "Novyy Dogovor o SNV: Bazovyye Prinzipy Documenta," ("New START Treaty: Basic Principles of the Document"), *Nezavisimoye Voyennoye Obozreniye*, 27, February 2009.

^{271.} Treaty Between the United States of America and the Russian Federation on Measures for the Further Reduction and Limitation of Strategic Offensive Arms, www.state.gov/documents/organization/140035.pdf.

^{272.} Anatoli Diakov and Eugene Miasnikov, "US-Russian Strategic Arms Control After 2009. Room For The Compromise?" *Security Index*, vol. 4, Winter 2008.

^{273.} Address by Russian Minister of Foreign Affairs Sergey Lavrov at Plenary Meeting of Conference on Disarmament, Geneva, March 7, 2009.

^{274.} Anatoli Diakov and Eugene Miasnikov, On Some Aspects of the The Joint Understanding for the START Follow-on Treaty, signed by U.S. and Russian Presidents During the Recent Summit Meeting, *Nezavisimoye Voyennoye Obozreniye*, August 7, 2009; www.armscontrol.ru/pubs/adem-080709.pdf.

^{275.} *Nuclear Posture Review Report*, April 2010, www.defense.gov/npr/docs/2010%20Nuclear%20Posture%20Review%20Report.pdf.

^{276.} Hans Kristensen, "New START Treaty Has New Counting," FAS Strategic Security Blog, March 29, 2010.

^{277.} As of April 2010, the United States had 94 heavy bombers (76 B-52H and 18 B-2) that can be equipped with nuclear weapons (*Nuclear Posture Review Report*, April 2010).

^{278.} See, for example: V.Yu. Volkovitskiy, Prikrytiye Strategicheskikh Yadernykh Sil – Vazhneishaya Zadacha Voyenno-Vozdushnykh Sil (Screening Strategic Nuclear Forces is a Most Important Task For the Air Forces), part 2, *Vozdushno-Kosmicheskaya Oborona (Air and Space Defense)*, N 1, January – February 2010.

^{279.} "Ballistic Missile Defense and New START Treaty," Bureau of Verification, Compliance, and Implementation Fact Sheet, April 8, 2010, www.state.gov/t/vci/rls/139899.htm.

^{280.} Statement by the Russian Federation on Missile Defense, Prague, April 8, 2010.

- ²⁸¹. “Ballistic Missile Defense and New START Treaty,” Bureau of Verification, Compliance, and Implementation Fact Sheet, April 8, 2010, www.state.gov/t/vci/rls/139899.htm; Transcript of Remarks and Response to Media Questions by Russian Foreign Minister Sergey Lavrov at Press Conference in Relation to the Upcoming Signing of a Treaty between Russia and the USA on Measures to Further Reduction and Limitation of Strategic Offensive Arms, Moscow, April 6, 2010, www.mid.ru/brp_4.nsf/0/F45DC88975370C9DC32576FE003B0772.
- ²⁸². Peter Baker, Amb. Sergei Kislyak, Rose Gottemoeller, Luncheon: “Whither U.S. – Russian Relations?” Carnegie International Nonproliferation Conference, April 7, 2009.
- ²⁸³. For more details, see: Anatoli Diakov, Eugene Miasnikov and Timur Kadyshev, “Non-Strategic Nuclear Weapons. Problems of Control and Reduction,” Occasional Paper of Center for Arms Control, Energy and Environmental Studies at the Moscow Institute of Physics and Technology, Dolgoprudny, 2004.
- ²⁸⁴. “The Adapted Conventional Armed Forces in Europe Treaty at a Glance,” Arms Control Association Factsheet, 2007.
- ²⁸⁵. *Global Fissile Material Report 2009*. This is the number of tons of 93% equivalent material; the actual number of tons of HEU may be larger.
- ²⁸⁶. www.usec.com/megatonstomegawatts.htm.
- ²⁸⁷. “Setting the Context for the Cut-Off Treaty,” Statement by Ambassador Berdennikov at the Canadian workshop, Toronto, Canada, January 17, 1995.
- ²⁸⁸. Alexander Emeliyanov, “Renaissance on Kirienko”, *Rossiyskaya Gazeta*, July 5, 2006.
- ²⁸⁹. www.nuclear.ru/rus/press/other_news/2116116/.
- ²⁹⁰. “Russia does not consider reasonable a total end to the use of HEU in the civil nuclear sector,” *Atom-Info*, April 12, 2009, www.atominfo.ru/news/air6298.htm.
- ²⁹¹. Ole Reistad, and Styrrkaar Hustveit, “HEU Fuel Cycle Inventories and Progress on Global Minimization,” *Nonproliferation Review*, Vol. 15, No. 2, 2008, p. 265.
- ²⁹². These six reactors are: IR-8 (8 MWt), OR (0,3 MWt) and Argus (20 kWt) at the Kurchatov institute, IRT (2,5 MWt) at the Moscow Institute of Physics and Engineering, IRT-T(6 MWt) at the Tomsk’s Polytechnical Institute, MIR (100 MWt) at the NIIAR.
- ²⁹³. As of the time of this writing, the necessary exchange of notes had been initiated but not yet been completed.
- ²⁹⁴. Sergei Kirienko, “Enrichment Capacity at Angarsk to Be Boosted,” *Details*, (Angarsk) June 28, 2007.
- ²⁹⁵. www.nuclear.ru/rus/press/nuclear_cycle/2115971/.

Country perspectives: United Kingdom

- ²⁹⁶. “Agreement between the Government of the United Kingdom of Great Britain and Northern Ireland and the Government of the United States of America for Co-operation on the Uses of Atomic Energy for Mutual Defense Purposes,” Washington DC, July 3, 1958.
- ²⁹⁷. Ministry of Defence, Directorate of Defence Policy, *The Strategic Defence Review, Supporting Essays*, The Stationery Office, July 1998, p 5–2.
- ²⁹⁸. Greenpeace, *In the Firing Line*, September 17, 2009. www.greenpeace.org.uk/ITFL.
- ²⁹⁹. Joe Murphy, “We May Not have Cash for Trident, Says Cameron”, *Evening Standard*, April 30, 2009. See also, Patrick Wintour and Nicholas Watt, “Tories Cast Doubt on £21bn Trident Nuclear Missile Upgrade”, *The Guardian*, May 1, 2009.

- ^{300.} James Blitz, "Dannatt Questions Need for Trident Subs," *Financial Times*, February 24, 2010.
- ^{301.} Though Britain originally purchased the right to 58 of the American-built Trident missiles from a common fleet maintained in the United States, it is believed that after test firings only about 50 remain in the UK allocation. See Nick Ritchie, "Trident: Still the Wrong Weapon at the Wrong Time for the Wrong Reasons", *Disarmament Diplomacy*, 90, Spring 2009, p 39.
- ^{302.} See Henrietta Wilson, "Renewing Trident: Can the UK's Atomic Weapons Establishment Cope?" *Disarmament Diplomacy* 88, Summer 2008, pp 32–39.
- ^{303.} The vote was carried by a majority of 71 votes to 16, with 39 abstentions.
- ^{304.} The Working Group on Scotland Without Nuclear Weapons: Report to Scottish Ministers, published November 17, 2009, www.scotland.gov.uk/Publications/2009/10/14095137/0.
- ^{305.} These figures come from government and Liberal Democrat Party calculations respectively. The government figure appears to be a parsimonious estimate of the cost of constructing a minimum of 3 nuclear submarines. In addition to the cost of replacing the submarines, the Liberal Democrat figure takes into account the costs of the warheads, missiles and nuclear weapons infrastructure over a planned lifetime of 30 years. A report by Greenpeace, published in September 2009, calculated "hidden costs" that would take the overall cost of Trident replacement to more than £97 billion. See Greenpeace, *In the Firing Line*, September 17, 2009, www.greenpeace.org.uk/ITFL.
- ^{306.} Lord (Paddy) Ashdown, a former marine officer and leader of the Liberal Democrat Party, was High Representative for Bosnia and Herzegovina 2002–06. Lord (George) Robertson was formerly a Labour Secretary of State for Defence and Secretary-General of NATO. The other members of the Commission included a prominent Conservative MP, a retired Chief of the Defence Staff, a former UK ambassador to the United Nations, a retired Chief Constable and several senior academics.
- ^{307.} *Shared Responsibilities: The Final Report of the Commission on National Security in the 21st Century*, IPPR, London, June 30, 2009, www.ippr.org/security.
- ^{308.} Reply to Chris Mullin MP, Prime Minister's Questions, House of Commons February 21, 2007, Hansard Official Reports, vol. 457, col. 260.
- ^{309.} Gordon Brown, Speech on "Nuclear Energy and Proliferation," Lancaster House, , March 17, 2009.
- ^{310.} *Ibid.*
- ^{311.} *Ibid.*
- ^{312.} Gordon Brown, speech at the Chamber of Commerce, Delhi, January 21, 2008.
- ^{313.} Des Browne MP, UK Secretary of State for Defence, Statement to the Conference on Disarmament, "Laying the Foundations for Multilateral Disarmament", Geneva, February 5, 2008.
- ^{314.} Executive Summary, "Lifting the Nuclear Shadow: Creating the Conditions for Abolishing Nuclear Weapons", Foreign and Commonwealth Office, February 4, 2009.
- ^{315.} Executive Summary, "Lifting the Nuclear Shadow," *op. cit.*
- ^{316.} "Lifting the Nuclear Shadow," *op. cit.* p 37.
- ^{317.} "Lifting the Nuclear Shadow," *op. cit.*, p 39. All five declared NWS pledged that their weapons were not targeted in a joint statement to the 2000 NPT Review Conference.
- ^{318.} "Lifting the Nuclear Shadow," *op. cit.*, p 39.
- ^{319.} Des Browne, Secretary of State for Defence, response to questions from Mike Hancock MP, Hansard Official Report, column 1033W, 22 November 2007, and Hansard Official Report, Column 843W, 3 Dec 2007.

- ³²⁰. "Lifting the Nuclear Shadow,": Creating the Conditions for Abolishing Nuclear Weapons", FCO, pp 36–40.
- ³²¹. "Lifting the Nuclear Shadow," *op. cit.*, p 46.
- ³²². "Lifting the Nuclear Shadow," *op. cit.*, p 50.
- ³²³. "Lifting the Nuclear Shadow," *op. cit.*, p 32.
- ³²⁴. UK Foreign & Commonwealth Office, webpage on the Fissile Material Cut-Off Treaty, <http://ukunarmscontrol.fco.gov.uk/en/the-uk-disarmament/fissile-material-cut-off-treaty>.
- ³²⁵. Ministry of Defence, Directorate of Defence Policy, *The Strategic Defence Review, Supporting Essays*, (London: The Stationery Office, July 1998) p 5–10.
- ³²⁶. "Lifting the Nuclear Shadow," *op. cit.*, p 33.
- ³²⁷. "Lifting the Nuclear Shadow," *op. cit.*, p 36. One advantage of such an approach is that it would not require those states to declare possession of nuclear weapons or appear to legitimize their status.
- ³²⁸. "Lifting the Nuclear Shadow," *op. cit.*, p 25.
- ³²⁹. "Lifting the Nuclear Shadow," *op. cit.*, p 24.
- ³³⁰. "Lifting the Nuclear Shadow," *op. cit.*, p 25–6.
- ³³¹. "Report of the Working Group on Scotland Without Nuclear Weapons," Report To Scottish Ministers August 2009.
- ³³². "Scottish Government Response to the Report of the Working Group on Scotland Without Nuclear Weapons," November 2009.

Country perspectives: United States

- ³³³. George P. Shultz, William J. Perry, Henry A. Kissinger and Sam Nunn, "A World Free of Nuclear Weapons," *Wall Street Journal*, January 4, 2007; January 15, 2008. Earlier calls by prominent former U.S. officials that this should be the declared goal of US policy include those by Robert McNamara in 2005, Paul Nitze in 1999, and by the former head of Strategic Command, Lee Butler, and former NATO Supreme Allied Commander Andrew Goodpaster in 1996. With respect to non-government advocacy, Jonathan Schell's book, *Abolition*, of 1984 stands out. It should also be noted that Presidents Reagan and Gorbachev at the Reykjavik summit in October 1986 came close to endorsing a nuclear-weapon-free world.
- ³³⁴. U.S. Department of Defense, *Nuclear Posture Review Report*, April 2010, www.defense.gov/npr/docs.
- ³³⁵. "Revised Nuclear Posture Review," 1070 FY 2008 Defense Authorization Act. See also Andrew Grotto and Joe Cirincione, "Orienting the 2009 Nuclear Posture Review: A Roadmap," November 2008: www.americanprogress.org.
- ³³⁶. The New START treaty. www.state.gov/documents/organization/140035.pdf; Protocol, www.state.gov/documents/organization/140047.pdf.
- ³³⁷. *Report of the Secretary of Defense Task Force on DoD Nuclear Weapons Management* (Chairman, James Schlesinger), December 2008.
- ³³⁸. *U.S. Nuclear Weapons Policy*, William Perry and Brent Scowcroft, co-chairs; Council on Foreign Relations, Independent Task Force Report No. 62, 2009, www.cfr.org/publications. The task force included two persons now in the Department of Defense, Ashton Carter and Michelle Flournoy, and also some persons more sympathetic to disarmament than the overall report suggests. The report did not seek a complete consensus on all its findings and recommendations.

- ³³⁹ *America's Strategic Posture*, The final report of the Congressional Commission on the Strategic Posture of the United States, William Perry, Chairman, and James Schlesinger, Vice-Chairman, United States Institute of Peace Press, 2009, www.usip.org/reports.
- ³⁴⁰ *America's Strategic Posture*, *op. cit.*, p. xix.
- ³⁴¹ George Perkovich and James Acton, eds., *Abolishing Nuclear Weapons: A Debate*, Carnegie Endowment for International Peace, Washington DC, 2009.
- ³⁴² George Perkovich and James Acton, *Abolishing Nuclear Weapons*, Adelphi Paper 396, International Institute for Strategic Studies, Routledge, 2008.
- ³⁴³ www.nuclearsecurityproject.org.
- ³⁴⁴ *Global Zero Action Plan*, www.globalzero.org, released June 29, 2009. Though a U.S.-driven initiative, Global Zero has many foreign adherents. In February 2010, it held an international conference in Paris, at which event, it received endorsements for its efforts from, among others, Presidents Obama and Medvedev.
- ³⁴⁵ Barry Blechman and Alexander Bolfrass, eds., *National Perspectives on Nuclear Disarmament*, The Henry L. Stimson Center, Washington, DC, 2010.
- ³⁴⁶ Barry Blechman and Alexander Bolfrass, eds., *Elements of a Nuclear Disarmament Treaty*, The Henry L. Stimson Center, Washington, DC, 2010.
- ³⁴⁷ Jonathan Schell, "The Abolition of Nuclear Arms: An Idea Whose Time Has Come," Delivered at Yale University, International Strategic Studies, March 25, 2009.
- ³⁴⁸ Ivo Daalder and Jan Lodol, "The Logic of Zero: Toward a World Without Nuclear Weapons," *Foreign Affairs*, November/December 2008.
- ³⁴⁹ Harold Brown, "New Nuclear Realities," *The Washington Quarterly*, Winter 2007–08.
- ³⁵⁰ *Transforming the U.S. Strategic Posture and Weapons Complex for Transition to a Nuclear Weapons-Free World*, prepared by the Nuclear Weapons Complex Consolidation Policy Network, lead author, Robert Civiak, April 2009, www.pogo.org.
- ³⁵¹ Hans Kristensen, Robert Norris, and Ivan Oelrich, *From Counterforce to Minimal Deterrence: A New Nuclear Policy on the Path Toward Elimination of Nuclear Weapons*, Federation of American Scientists, Occasional Paper No. 7, April 2009, www.fas.org.
- ³⁵² See <http://disarm.igc.org>, and www.gsinsitute.org
- ³⁵³ *Report of the Secretary of Defense Task Force*, *op. cit.*, pp. iv and vi.
- ³⁵⁴ *Report of the Secretary of Defense Task Force*, *op. cit.*, p. iii.
- ³⁵⁵ *U.S. Nuclear Weapons Policy*, *op. cit.*, p. 99.
- ³⁵⁶ Harold Brown, "New Nuclear Realities," *The Washington Quarterly*, Winter 2007–08.
- ³⁵⁷ NPR, p. 3.
- ³⁵⁸ NPR, p. 15.
- ³⁵⁹ NPR, pp. 48–49.
- ³⁶⁰ *Transforming the U.S. Strategic Posture and Weapons Complex*, *op. cit.*, pp. 8–15.
- ³⁶¹ *Report of the Secretary of Defense Task Force*, *op. cit.*, p. vi.

- ³⁶². For example, the Council of Foreign Relations report advocates “Be transparent about any proposed changes to the nuclear weapons complex. This means that any decision for or against a particular program, such as the reliable replacement warhead, should be coupled with vigorous diplomatic outreach to allies to explain clearly why these decisions were made,” *U.S. Nuclear Weapons Policy*, *op. cit.*, p. 92.
- ³⁶³. Jason Group, *Lifetime Extension Program (LEP) Executive Summary*, JSR-09-334E, September 9, 2009.
- ³⁶⁴. Letters to Representative Michael R. Turner from: George H. Miller, Director, Lawrence Livermore National Laboratory, January 7, 2010; Michael R. Anastasio, Director, Los Alamos National Laboratory, January 25, 2010; and Thomas O. Hunter, Director Sandia National Laboratory, January 21, 2010.
- ³⁶⁵. The safety issue relates to the fact that the sensitive high explosives are used in the warheads of the Trident submarine. The 1992 Hatfield-Exon-Mitchell amendment to the Energy and Water Development Appropriations Act for Fiscal Year 1993 ended U.S. nuclear testing but allowed for a total of up to 15 tests over the following three years to install “modern safety features” in warheads that would remain in the U.S. stockpile. Warheads with insensitive high explosive would have been heavier and therefore required costly new flight tests. The Navy decided that the safety improvement would not be sufficiently significant to justify the new design and no tests were carried out.
- ³⁶⁶. NPR, p. 42
- ³⁶⁷. Letter to President Obama from Senator Kyl and 40 other Senators, 15 December 2009.
- ³⁶⁸. NRDC “Analysis of the Department of Energy FY 2011 Budget Request for Nuclear Weapons, Nuclear Nonproliferation, and Nuclear Energy,” February 19, 2010, www.connectusfund.org/blogs/obama-fy-2011-budget-request-nuclear-weapons-nonproliferation-and-nuclear-energy.
- ³⁶⁹. This amount was later reduced to 128 tons when it was found that not all of the HEU matched the Navy’s specifications, Robert M. George, Office of Fissile Materials Disposition, NNSA, “U.S. HEU Disposition Program,” Institute for Nuclear Materials Management Annual Meeting, July 2009.
- ³⁷⁰. See *Global Fissile Material Report 2008*, Chapter 1; *Global Fissile Material Report 2006*, Chapter 6.
- ³⁷¹. The Bush-Putin Strategic Offensive Reductions Treaty would have reduced the number of Russian and U.S. deployed strategic warheads below 2200 each by the end of 2012. New START would reduce the number below 1550 seven years after ratification. Part of the reduction, however, would be accomplished by a change in counting rules. Under the START, US and Russian bombers carrying air-launched cruise missiles were counted as carrying 10 and 8 warheads each. Under New START, they are counted as carrying one each. Based on the April 2009 declarations under the START Treaty, this accounting change would reduce the count of Russian and U.S. deployed strategic warheads by 539 and 855 respectively. According to one non-governmental estimates, the United States count of bomber warheads under the SORT Treaty was only 350, however, so the U.S. reduction relative to SORT would be about 300, Robert Norris and Hans Kristensen, “Nuclear Notebook: U.S. Nuclear Forces, 2009,” *Bulletin of the Atomic Scientists*, March/April 2009. The NPR also announced that all 450 US Minuteman ICBMs would be reduced to carrying a single warhead. According to the same non-governmental source, this would require the downloading of 100 warheads.
- ³⁷². Department of Defense START negotiating team, private conversation, June 9, 2009; also see the Federation of American Scientists strategic security blog, www.fas.org/blog; and Amy Woolf, “U.S. Strategic Nuclear Forces: Background, Developments, and Issues,” Congressional Research Service, July 14, 2009.
- ³⁷³. NPR, p. 13.
- ³⁷⁴. *Global Fissile Material Report 2008*, Chapter 8.
- ³⁷⁵. *Global Fissile Material Report 2008*, Chapter 6.

Contributors

Merav Datan is a graduate student in the School of Public Policy and Government at Hebrew University of Jerusalem. She was Greenpeace International's Middle East Advisor, based in Tel Aviv from 2005–2009. She has worked as a consultant to the United Nations Department for Disarmament Affairs, as director of the UN Office of the Women's International League for Peace and Freedom, as program director and as UN office director for the International Physicians for the Prevention of Nuclear War, and as research director for the Lawyers' Committee on Nuclear Policy. She was the principal drafter of the Model Nuclear Weapons Convention.

Anatoli Diakov is a Professor of physics and, since 1991, Director of the Center for Arms Control of the Moscow Institute of Physics and Technology. Diakov has written papers on nuclear-arms reductions, the history of Russia's plutonium production, disposition options for excess plutonium, and the feasibility of converting Russia's icebreaker reactors from highly enriched to low-enriched uranium as well as on many other topics relating to nuclear-arms control and disarmament. He is a member of IPFM.

Harold Feiveson is a Senior Research Scientist and Lecturer in Princeton University's Woodrow Wilson School. Feiveson is the editor of the journal *Science & Global Security*. Along with Professor von Hippel, he was the co-founder and co-director of the Program on Science and Global Security until July 2006.

Camille Grand is Director of the Fondation pour la Recherche Stratégique, Paris. He served as deputy director for disarmament and multilateral affairs in the directorate for strategic, security and disarmament affairs of the French Ministry of Foreign Affairs (2006–08) and was a deputy diplomatic adviser to the French Minister of Defence (2002–06). He also served as an expert on nuclear policy and non-proliferation in the strategic affairs department of the French Ministry of Defense. He has been a Research Fellow at the *Institut de Relations Internationales et Stratégiques* (IRIS), *Université Paris-Nord* and been a Lecturer in Strategic Studies at the *Ecole Spéciale militaire* (the French Army Academy). He was the Editor of the journal *La Revue Internationale et Stratégique*.

Rebecca Johnson is Executive Director and co-founder of the Acronym Institute for Disarmament Diplomacy, and editor of the journal *Disarmament Diplomacy*, which provides reporting and analyses of international arms negotiations, including the nuclear Nonproliferation Treaty and the Comprehensive Test Ban Treaty. From 2004 to 2006 she was senior advisor to the Weapons of Mass Destruction Commission headed by Hans Blix. Johnson has had extensive experience as a grassroots activist and organizer and is a member of the International Institute for Strategic Studies (IISS) and Women in Black.

Jungmin Kang is with the Korea Studies program at the Paul H. Nitze School of Advanced International Studies, Johns Hopkins University. He was the lead South Korean analyst in the MacArthur-Foundation-funded East-Asia Science-and-Security Initiative. He has served as an advisor to South Korea's National Security Council on North Korean nuclear issues during 2003 and on South Korea's Presidential Commission on Sustainable Development where he advised on nuclear energy policy. He is a member of IPFM.

Tadahiro Katsuta is Assistant Professor in the School of Law, Meiji University, Tokyo. A recipient of the prestigious Abe Fellowship, he spent the academic year 2007-2008 at Princeton University's Program on Science and Global Security. He has a PhD in plasma physics from Hiroshima University (1997). He has been a Research Associate at the University of Tokyo and an analyst at the Citizens Nuclear Information Center in Tokyo.

Saideh Lotfian is Professor of political science at the Faculty of Law and Political Science, University of Tehran, Iran. She is Chair of the Pugwash Council. She was Deputy Director of the Center for Middle East Strategic Studies in Tehran, and the Director of the Middle East Program at the Center for Strategic Research.

Zia Mian is a Research Scientist in Princeton University's Program on Science and Global Security and directs its Project on Peace and Security in South Asia. His research interests are in nuclear weapons and nuclear energy policy in South Asia.

Eugene Miasnikov is Senior Research Scientist with the Center for Arms Control, Moscow Institute of Physics and Technology. He has PhD in Physics from Moscow Institute of Physics and Technology. He has been a visiting fellow with the Security studies program at MIT, and at with the Program on Science and Global Security at Princeton University.

Marvin Miller was a member of the MIT Department of Nuclear Science and Engineering (NSE) from 1976 until his retirement in 1996. Previously, he was on the faculty of the Department of Electrical Engineering at Purdue University, working on laser theory and applications including isotope separation which was the bridge to his research on nuclear nonproliferation. He is now a Research Associate in the Science, Technology, and Society Program at MIT, where he continues his research on nuclear power and nuclear proliferation.

Abdul H. Nayyar is Director of the Ali Institute of Education, Lahore. He was a Senior Research Fellow at the Sustainable Development Policy Institute, Islamabad and served as a member of the faculty of the Department of Physics at Islamabad's Quaid-i-Azam University from 1973 to 2005. He has been a summer visitor with Princeton's Program on Science and Global Security since 1998, working on nuclear reactor safety, fissile-material production in South Asia, and nuclear weapons issues in South Asia. He served as President of Pakistan's Peace Coalition and the Co-convenor of Pugwash Pakistan. He is a member of IPFM.

R. Rajaraman is professor emeritus of physics at Jawaharlal Nehru University in Delhi. He is a Fellow of both the Indian Academy of Science and the Indian National Science Academy. He has been contributing articles to India's nuclear-weapons debate since 1970 and has been a regular summer visitor with Princeton's Program on Science and Global Security since 2000. In recent years his focus has been on capping South Asia's nuclear arsenals. He is co-chair of IPFM.

M. V. Ramana is currently a Visiting Scholar with the Program in Science, Technology and Environmental Policy and the Program on Science and Global Security at the Woodrow Wilson School of Public and International Affairs, Princeton University. His research focuses on India's nuclear energy and weapon programs. He is actively involved in the peace and anti-nuclear movements, and is associated with India's Coalition for Nuclear Disarmament and Peace as well as Abolition-2000, a global network to abolish nuclear weapons. He is a member of IPFM.

Annette Schaper is a senior research associate at the Peace Research Institute Frankfurt (PRIF). Her research covers nuclear arms control and its technical aspects, including the test ban, a fissile material cutoff, verification of nuclear disarmament, fissile materials disposition, and nonproliferation problems arising from the civilian-military ambivalence of science and technology. She was a part-time member of the German CD delegation in Geneva during the CTBT negotiations and a member of the German delegation at the 1995 NPT Review and Extension Conference. She is a member of IPFM.

Mark Suh is a political scientist based in Berlin, Germany. He was formerly a Senior Researcher, 1984–2005, and Korean Coordinator, the Free University of Berlin in Germany and a member of the South Korean Presidential Advisory Council on Peaceful and Democratic Unification of Korea. He is Chairman of the Korean Pugwash Group and a member of the International Pugwash Council. He is Co-Chairman of the Organizing Committee of the Korean Summit of Honor on Atoms for Peace and Environment (SHAPE) 2010, Seoul, and Chairman of the Corea Trust Fund, Berlin/Seoul.

Tatsujiro Suzuki is a Commissioner (Vice Chairman) of the Japan Atomic Energy Commission. At the time he co-authored the chapter in the report he was Associate Vice President in the Central Research Institute of Electric Power Industry (CRIEPI) as well as a Senior Research Fellow at the Institute of Energy Economics of Japan and Visiting Professor at the Graduate School of Public Policy, University of Tokyo. He was Associate Director of MIT's International Program on Enhanced Nuclear Power Safety from 1988–1993 and a Research Associate at MIT's Center for International Studies (1993–95). He was a member of the Advisory Committee on Energy (Nuclear Policy Subcommittee) of Japan's Ministry of Economy, Trade and Industry. He was a member of IPFM.

Masa Takubo is an independent nuclear policy analyst. He manages the nuclear information website Kakujoho, which he established in 2004. He was affiliated with the Japan Congress Against A-and H-Bombs (GENSUIKIN), a leading grass-roots organization for over thirty years, including as the Senior Researcher in the International Division and as a consultant. He has written widely on Japanese nuclear policy, including on spent-nuclear fuel reprocessing and on the U.S. "nuclear umbrella" over Japan.

Hui Zhang is a Research Associate at the Project on Managing the Atom in the Belfer Center for Science and International Affairs at Harvard University's John F. Kennedy School of Government. He leads a research initiative on China's nuclear policies and his work includes verification techniques for nuclear arms control, the control of fissile material, nuclear terrorism, nuclear safeguards and non-proliferation, and the nuclear fuel cycle. He was a post-doctoral fellow at the Center for Energy and Environmental Studies, Princeton University from 1997–1999. He received his Ph.D. in nuclear physics in Beijing.

Over the past six decades, our understanding of the nuclear danger has expanded from the threat posed by the vast nuclear arsenals created by the superpowers in the Cold War to encompass the proliferation of nuclear weapons to additional states and now also to terrorist groups. To reduce this danger, it is essential to secure and to sharply reduce all stocks of highly enriched uranium and separated plutonium, the key materials in nuclear weapons, and to limit any further production.

The mission of the IPFM is to advance the technical basis for cooperative international policy initiatives to achieve these goals.

A report published by
The International Panel on Fissile Materials (IPFM)
www.fissilematerials.org

Program on Science and Global Security
Princeton University
221 Nassau Street, 2nd Floor
Princeton, NJ 08542, USA

May 2010

ISBN 978-0-9819275-5-8



9 780981 927558