

# Nuclear Energy, Nonproliferation, and Disarmament: Briefing Notes for the 2010 NPT Review Conference

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## Foreword

Four decades ago, on March 5, 1970, the *Treaty on the Non-Proliferation of Nuclear Weapons* (NPT) entered into force. As foreshadowed in Article VIII, paragraph 3, the states party to the treaty have met every five years “to review the operations of the Treaty with a view to assuring that the purposes of the Preamble and the provisions of the Treaty are being realized.” These periodic check-ups, however, have been anything but routine. Sometimes it has been impossible to agree on an agenda, much less to produce agreed results. Yet, in what has become a classic demonstration of the power of faith over experience, the 189 states party to the treaty will gather in May 2010 for the eighth time—this round at United Nations headquarters in New York City—to take stock and to look ahead with some combination of apprehension and modest expectation.

Though one of the world’s more widely subscribed security conventions, the NPT has also proved to be one of the more controversial. Its provisions define the core bargain between those few countries that have long admitted to having nuclear weapons and the many that have declared that they have no intention of acquiring them. All have pledged not to help others to do so. On the one hand, it is an inherently asymmetrical bargain among states with diverse interests and capacities. Different capitals are bound to have divergent perceptions of who is or is not living up to their end of the bargain, or of priorities, timing, and trade-offs among its planks. On the other hand, only one state party—North Korea—has ever sought to exercise its right of withdrawal under the provisions of Article X, paragraph 1, of the treaty. This record suggests that the treaty regime, whatever its shortcomings, has served the common security interests of its state parties, whether large or small, nuclear or non-nuclear, well enough over four quite turbulent decades to persuade them to keep sustaining the enterprise.

Each of the eight Review Conferences, according to contemporary pundits, has come at a pivotal moment in the evolution of efforts to curb both horizontal and vertical proliferation. Each time, the stakes were high, the threats of further proliferation all too real. Hyperbole aside, the commentators were right each time to stress the fragility of the NPT regime, as it has had a contested existence for much of its lifetime. It has faced dissension within its ranks and acute challenges from three hold-outs—India, Israel, and Pakistan—that have refused to join precisely because they wanted to be free to acquire nuclear weapons if they deemed that their security required it. There is, moreover, the ongoing struggle to try to keep North Korea within the NPT regime and Iran without nuclear weapons.

This time, the stakes—whether measured in terms of downside risk or upside potential—are even higher than usual. The danger of nonstate actors, such as transnational criminal or terrorist networks, gaining possession of nuclear materials or technology has moved from a back burner to a front burner in terms of high-level political attention. President Barack Obama’s convening of the first Nuclear Security Summit in April 2010, a month before the NPT review, testified to the urgent nexus among issues of nuclear security, safety, disarmament, and proliferation. The pledges made there by a number of countries to secure nuclear facilities and reduce stockpiles of nuclear materials demonstrated the potential of such broad-based summits for spurring parallel action, as well as setting the bar higher for the Review Conference. The conclusion of the long-awaited Russian-American *New Strategic Arms Reduction Treaty* (START), also in the month preceding the Review Conference, underscored the need to maintain momentum on both sides of the NPT bargain. Though these steps appear modest compared to the magnitude of the nuclear challenge, they may encourage the states party to the treaty to look forward instead of backward at the review and to go beyond the kind of small thinking and defensive finger-pointing that has too often dominated these events in the past.

The review comes, as well, at a time when environmental, financial, and political factors are propelling a fresh look at civilian nuclear power as a source of energy and economic development in many places. Though talk of a “nuclear renaissance” may be overblown, some delegates are sure to remind others of their Article IV obligation “to facilitate...the fullest possible exchange of equipment, materials, and scientific and technological information for the peaceful uses of nuclear energy.” The proliferation of power and research reactors, however,

is bound to compound concerns about its implications for less benign forms of proliferation, as well as for security and safety. These concerns, in turn, have spurred further consideration of ways to bolster the International Atomic Energy Agency (IAEA) safeguards regime, and, further down the road, of the possibility of developing multilateral arrangements for handling the nuclear-fuel cycle.

As always, global aspirations and standards can run into speed bumps or even detours when applied to the regions with the most acute problems and the least promising politics. The declaration of a nuclear-weapon-free zone, for instance, has served as a confidence-building measure in many regions, but not yet in the Middle East, where, like so many other things, it remains a bone of contention. Whatever aggregate good the nonproliferation regime has done in slowing the global spread of nuclear weapons—and most long-time observers would give it fairly high marks—publics, parliamentarians, and pundits alike will question its value if it cannot handle the toughest and most visible cases, as in Iran, North Korea, South Asia, and the Middle East.

Given this mix of promise and peril, and acutely aware of the potential costs of another failed Review Conference, the International Peace Institute (IPI) decided to redouble its policy research and dialogue on nuclear disarmament and proliferation issues in 2008-2010. This has taken three forms. The first was the convening in 2008 of a series of meetings with leading UN ambassadors and independent experts on ways of strengthening multilateral capacities and institutions for curbing weapons of mass destruction. The product of this work, under the banner of IPI's flagship *Coping with Crisis* program, was IPI *Blue Paper* No. 3, published in early 2009. It contained a number of recommendations for improving the prospects for the Review Conference and for reinforcing the nonproliferation regime. The second step was to devote IPI's annual New York Seminar—an intensive three-day retreat for mid-career diplomats from forty to fifty countries—in 2009 to the theme of "Weapons of Mass Destruction: Can the UN Build Momentum for Disarmament and Nonproliferation?" Much of the discussion at the retreat, naturally, revolved around preparations for the 2010 Review Conference. Several participants urged IPI, as a trusted partner for the UN community, to organize an off-the-record dialogue among a diverse group of delegations on some of the core questions that would face the Review Conference.

This publication emerged from this third phase of IPI's work. Over ten months, from June 2009 to March 2010, IPI's NPT Roundtable Series held six meetings of delegates from twenty countries, along with a few officials from the UN Secretariat and the IAEA. Having had the honor of chairing those sessions, I can attest to the loyalty of the panelists to the process and to the intensity and candor of the exchanges. The dialogue benefitted immensely from the substantive preparatory work and uniformly well-received background papers by François Carrel-Billiard, IPI's managing director, and Christine Wing, a senior adviser to IPI. Their background papers, which provided the starting point for each of the meetings, form the basis for this publication as well. It should be emphasized that the views expressed in the pages that follow are those of the authors and do not necessarily reflect those of any of the other participants in the roundtables. IPI, however, is pleased to present them to a wider audience in the expectation that they will contribute constructively to preparations for the upcoming NPT Review Conference.

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## Acronyms

CSA	comprehensive safeguards agreement
CTBT	<i>Comprehensive Nuclear-Test-Ban Treaty</i>
CTBTO	Comprehensive Nuclear-Test-Ban Treaty Organization
DPRK	Democratic People's Republic of Korea
FMCT	<i>Fissile Material Cut-Off Treaty</i> (a proposed treaty)
HEU	highly enriched uranium
IAEA	International Atomic Energy Agency
INF Treaty	<i>Intermediate-Range Nuclear Forces Treaty</i>
IPI	International Peace Institute
IUEC	International Uranium Enrichment Centre
KEDO	Korean Peninsula Energy Development Organization
LEU	low-enriched uranium
MW	megawatt
NPT	<i>Nuclear Non-Proliferation Treaty</i> (full title: <i>Treaty on the Non-Proliferation of Nuclear Weapons</i> )
NTI	Nuclear Threat Initiative
NWFZ/s	nuclear-weapon-free zone/s
ROK	Republic of Korea
SORT	<i>Strategic Offensive Reductions Treaty</i>
START	<i>Strategic Arms Reduction Treaty</i>
U <sub>235</sub>	uranium 235 isotope (fissile)
U <sub>3</sub> O <sub>8</sub>	triuranium octoxide (yellowcake)
UF <sub>4</sub>	uranium tetrafluoride (also known as green salt)
UF <sub>6</sub>	uranium hexafluoride
UN	United Nations
WMD/s	weapon/s of mass destruction
WNA	World Nuclear Association





## Introduction

The *Nuclear Non-Proliferation Treaty* (NPT) Review Conference that is being held in New York in May 2010 coincides with the fortieth anniversary of the entry into force of the treaty.<sup>1</sup> Although the NPT is commonly hailed as an essential pillar of international security, opinions greatly diverge when it comes to assessing the implementation of the treaty's three main objectives: promoting the peaceful use of nuclear energy, preventing the diversion of nuclear materials to weapons, and committing states to engage in disarmament.

For the most part, the NPT has proved largely effective in pursuing its goals. Over the years, it has reached an almost universal status, with only three states (India, Israel, and Pakistan) remaining outside, and one state (North Korea) in an unclear situation. The Non-Proliferation Treaty is one of the very few multilateral instruments with such an extended membership, which is larger than, for instance, the *Biological and Toxin Weapons Convention* or the *Chemical Weapons Convention*.<sup>2</sup> The central importance of the NPT was also reinforced by its indefinite extension in 1995.

The treaty has accompanied successfully the development of nuclear power on an industrial scale in around thirty countries, and a substantial expansion of the nuclear industry is projected to take place in the coming years. The overwhelming majority of countries which are currently running or planning to run a nuclear-energy program are in good standing with the NPT and do not raise proliferation concerns. The International Atomic Energy Agency (IAEA) has effectively monitored compliance with the treaty, although experience has shown that its verification powers need to be strengthened. Solutions were found when proliferation problems occurred, except in a couple of very specific cases (currently, North Korea and Iran). Results on the disarmament side are less convincing. Yet the total number of nuclear weapons worldwide is less than half of what it was twenty-five years ago, the number of deployed strategic warheads has been cut by five, and some nuclear-weapon states are already close to assuming

a posture of minimal deterrence.

In spite of these major achievements, questions and criticisms are being raised about the implementation of the NPT and its overall strength. In a world which is becoming increasingly multipolar, the discriminatory structure of the treaty (between those that have nuclear weapons and those that do not) is less accepted today than it was during the Cold War. Many non-nuclear states are frustrated by insufficient progress on disarmament, and they wonder about the commitment of nuclear-weapon states to ultimately eliminate their weapons. A number of non-nuclear states also see additional discrimination in the way that countries outside the NPT have developed nuclear weapons, avoided pressure to disarm, and, in the case of India since 2008, have nonetheless obtained access to nuclear technologies.<sup>3</sup>

Apart from these criticisms and frustrations, the NPT is directly challenged by the proliferation crises in North Korea and Iran. The Democratic People's Republic of Korea (DPRK) announced in 2003 its withdrawal from the treaty, and tested a nuclear weapon in 2006 and another in 2009. For its part, Iran was found in breach of its NPT safeguards agreement in 2003, after the existence of its clandestine nuclear program was disclosed. The IAEA has, since that time, reported "consistent and credible" information on possible military dimensions to Iran's nuclear program. The international community has taken steps to address these two issues, but in neither case has a solution been reached. Both situations could deteriorate further, which would put the solidity of the NPT to the test.

In reviewing the implementation of the Non-Proliferation Treaty, the 2010 Conference will have to define how to consolidate its achievements, reduce the divergence of views on its implementation, and address the current proliferation crises. Five years ago, the Conference failed to agree on a common way forward. This year, it needs to forge a new consensus among the parties to the NPT so that the treaty can overcome the many challenges it faces.

Based on a series of roundtable meetings with

1 The *Treaty on the Non-Proliferation of Nuclear Weapons* was opened for signature on July 1, 1968, and entered into force on March 5, 1970.

2 Thirty-one states remain outside the *Biological and Toxin Weapons Convention*, and nine outside the *Chemical Weapons Convention*.

3 The Nuclear Suppliers Group decided in September 2008 to exempt India from earlier restrictions, and agreed to authorize the transfer of nuclear items and technologies to India for use in IAEA-safeguarded civil nuclear facilities.

member states held in New York between June 2009 and March 2010, these briefing notes aim to help promote a more constructive discussion by providing analyses of the issues at stake and by suggesting areas of common ground. The focus has been narrowed to a selection of topics related to nuclear energy, nonproliferation, and disarmament. Issues concerning the organization of the work of the Review Conference or the strengthening of the review process, however important, have not been included in the scope of these notes.

## NUCLEAR ENERGY

A substantial growth of the nuclear industry worldwide, often portrayed as a “nuclear renaissance,” is generally expected to take place in the coming years. Available information on the number of reactors currently under construction, planned, or proposed to be in operation within fifteen years shows a more nuanced picture, with a striking concentration of nuclear growth in countries that already have nuclear programs (China, India, Japan, Russia, South Korea, and the US). Yet at least eight countries expect to build their first operable nuclear reactors over the same period.

By and large, the number of reactors worldwide may double in the next fifteen to twenty years, and their geographical distribution will expand significantly. Even if most countries concerned are NPT members in good standing, proliferation risks cannot be excluded, including the possibility of the theft and trafficking of materials. Effective verification by the IAEA will remain essential, and it will be a major challenge to ensure that the agency has adequate resources and authority to continue its mission in a credible way. The Review Conference could support this goal by encouraging states to ensure that comprehensive safeguards agreements together with the Additional Protocol become the universal standard for verification.

The expansion of the nuclear industry may lead some countries to consider how to secure the supply of nuclear fuel. Although the development of fuel enrichment facilities is allowed by the NPT, it raises proliferation concerns, recently highlighted by the Iranian crisis. In this context, the debate over the multilateralization of the fuel cycle has taken on renewed importance. Proposals on this theme have

been received with interest, but also with concern that they could be used to limit rights guaranteed by the NPT. Nevertheless, some progress was made last year, when the IAEA board of directors authorized the agency to cooperate with Russia for the creation of a fuel reserve at Angarsk. This first step will show whether such formulas can adequately meet the needs of states which plan to develop nuclear-energy programs.

## NUCLEAR DISARMAMENT

President Obama’s commitment to a “world without nuclear weapons” and the recent conclusion of the US-Russia *New Strategic Arms Reduction Treaty* (START) have created a positive context for the Review Conference. But further concrete progress needs to be achieved in order to establish a new dynamic. Despite past reductions, stockpiles of nuclear weapons, especially for US and Russia, remain at high levels.<sup>4</sup> Fourteen years after its signature, the *Comprehensive Nuclear-Test-Ban Treaty* (CTBT) has not yet entered into force. The *Fissile-Material-Cut-Off Treaty* (FMCT) may not be concluded for years, and its entry into force seems even more remote.

At this stage, the priority is to move forward US-Russia negotiations on reducing their strategic arsenals and to break the deadlock over the CTBT and FMCT. In parallel, all nuclear-weapon states should take voluntary initiatives in anticipation of the entry into force of multilateral instruments. These could include a moratorium on the production of fissile material for nuclear weapons, transparency measures on their stocks, and the dismantling of facilities for the production of fissile material for weapons and of nuclear-testing facilities. The US and Russia should also start disarmament negotiations to reduce their nonstrategic nuclear weapons. Progress in these areas would help restore trust among states party to the NPT and would thus go a long way in strengthening the treaty.

In the longer term, states need to reflect on how to encourage further disarmament and to bring into this process the nuclear-armed states that are not parties to the NPT. In order to move toward lower levels of nuclear forces, progress will be required on a wide range of issues, which include

4 The US and Russia’s total inventories of nuclear weapons amount to 9,400 and 13,000 respectively.

focusing on the effective and verifiable dismantling of weapons, strengthening the multilateral enforcement system, and improving global and regional security and stability conditions.

Regional approaches may contribute to this process. The establishment of nuclear-weapon-free zones (NWFZs) has played an important role in support of disarmament and nonproliferation efforts since the conclusion of the *Treaty of Tlatelolco* (Latin America and the Caribbean zone). Recent developments include the entry into force in July 2009 of the *Pelindaba Treaty* creating the African zone. Further progress can be expected as the US should, in the near future, be able to join the protocols, already ratified by the other weapon states, of the NWFZ in Africa and in the South Pacific.<sup>5</sup> Discussions should be encouraged to solve the legal issues relating to the two other zones, in Southeast Asia and Central Asia.

Efforts toward the creation of a Middle East zone free of nuclear weapons as well as other weapons of mass destruction, which were endorsed by the 1995 Review Conference, are facing more complex obstacles. The Middle East zone will again be a major issue at this year's conference. An agreement on some concrete steps, such as the appointment of an independent coordinator, might help initiate progress.

### PROLIFERATION CRISES

Both the North Korean and Iranian crises represent major challenges to the NPT. North Korea is the first, and up to this point the only, state to have announced its withdrawal from the treaty and to have built nuclear weapons. Iran's nuclear program raises questions about the possible development of

a military capability under cover of the NPT and in contravention of treaty obligations. In both cases, past years have seen a succession of efforts by multilateral institutions to enforce the treaty by combining restrictive measures and proposals for long-term arrangements. These efforts have not succeeded so far.

The Review Conference is not the place where these issues can be resolved, but it cannot ignore them. At the same time, these two crises are different and they will not have the same impact on the work of the conference. The DPRK has expressed that it does not consider itself bound by the NPT, and it does not participate in the review process. Iran, however, remains within the NPT, has reiterated its commitment to it, and will most likely play an active role in the discussions in New York.

In this context, several topics that the conference will consider have already taken on enhanced importance. This is in particular the case with issues such as the fuel-supply assurances, the need to strengthen the authority of the IAEA to conduct its verification activities, and the reflection on how the international community should react to cases of withdrawal from the NPT (Article X). The question remains open on how the Review Conference should discuss the challenges directly posed by the DPRK and Iran. Debate over these two crises, and in particular over the Iran issue and its ramifications for the larger situation in the Middle East, could derail the session. If it manages to navigate through these sensitivities, however, the 2010 Review Conference could well provide useful support for the solution of these crises in line with the terms of the Non-Proliferation Treaty.

<sup>5</sup> Obstacles to a US ratification of Protocol I of the Africa zone have been removed since Libya's decision in 2004 to abandon its nuclear-weapon program. A US ratification of the CTBT would open the way to US ratifications of the protocols relating to nuclear testing in Africa and South Pacific zones.

## Nuclear Power and the NPT

### SUMMARY

- Given growing global energy demands and concerns about climate change, many analysts predict substantial growth in reliance on nuclear power, and in nuclear-power-plant construction.
- Many also expect that such an expansion would pose significant proliferation challenges.
- New reactor construction over the next decade will be concentrated in countries that already have nuclear-power programs, nearly all of which are members in good standing of the *Treaty on the Non-Proliferation of Nuclear Weapons* (NPT). Eight states plan to build nuclear plants for the first time in the next decade. All are NPT members in good standing.
- Therefore, if the risk of state-level proliferation associated with an expansion in nuclear power cannot be discounted, it may not be as high as is frequently implied. The main proliferation risks (theft and illicit trade in nuclear materials) associated with a growth in nuclear power may be largely outside the purview of the NPT.
- Nonetheless, it will be essential to ensure that NPT commitments continue to be met in a verifiable fashion, and that the International Atomic Energy Agency (IAEA) has the resources and authority to carry out its mission. Key issues at the NPT Review Conference taking place in May 2010 include the adequacy of existing safeguards agreements; the terms and conditions of export-control regimes; and whether there can be any limits on the development of indigenous fuel-cycle capabilities.

### BACKGROUND: THE ANTICIPATED EXPANSION IN NUCLEAR POWER

The nuclear-power industry, and many governments, advocate and anticipate growth in nuclear power as a source of electricity production. They would like to see an increase in both the amount of nuclear power produced, and its relative proportion of electricity production. Proponents of greater reliance on nuclear power make several assertions, among them that climate change necessitates the development and widespread use of clean, noncarbon energy sources, including nuclear power; that economic growth, especially in

emerging and developing economies, requires substantial energy inputs, which cannot be met through reliance on existing carbon-based sources; that nuclear power can be cost-competitive; and that past concerns about the safety of nuclear power have been greatly ameliorated through improved technology and operating procedures.

These factors suggest a rising demand for nuclear-power production, which will clearly be the case in some countries. But the picture is mixed. Some analysts dispute the claims for climate mitigation, as well as the economic viability of nuclear power—especially in the next decade. In some countries, public opposition to nuclear-power-plant construction, or to waste-disposal plans, may also limit the industry's expansion. Other factors, such as limited sources of supply for important reactor components, may constrain the speed and breadth of any nuclear expansions. New reactor construction is taking longer in at least one closely watched case, and it has higher costs than promised. And of course, a major accident at a nuclear power plant—such as those at Three Mile Island and Chernobyl—could unexpectedly and quickly alter the prospects for nuclear power.

### PROJECTED GROWTH IN NUCLEAR POWER AND ITS IMPLICATION FOR PROLIFERATION

While the question of the actual extent of any nuclear renaissance remains open, it is nonetheless useful to look at existing projections and consider their proliferation implications. One way to gauge the future expansion of nuclear power is to look at the data about plans for new reactor construction.

According to the World Nuclear Association (WNA),<sup>6</sup> there are 439 operable (i.e., connected to the grid) nuclear reactors worldwide, located in thirty countries. Another fifty-two reactors are currently under construction.

Over the next eight to ten years, the WNA reports that construction of at least 143 additional reactors

<sup>6</sup> The World Nuclear Association is an industry group that provides information on various aspects of the nuclear-power industry. All figures in this discussion are from their frequently updated "World Nuclear Power Reactors and Uranium Requirement." See World Nuclear Association, "World Nuclear Power Reactors and Uranium Requirement," April 1, 2010, available at [www.world-nuclear.org/info/reactors.html](http://www.world-nuclear.org/info/reactors.html).



is planned. “Planned” in this sense refers to anticipated construction of units with “approvals, funding, or major commitment in place, mostly expected in operation within 8 years, or construction well advanced but suspended indefinitely.”<sup>7</sup> Although it is possible that some of the projects represented by these figures will fall through, nonetheless, they represent the firmest prediction available for new nuclear building in the next decade. If all became operable, and if construction were finished on those plants now being built, nearly 200 new reactors would be added over the coming decade. Although this may not mean a net increase of 200 reactors (since some older reactors would be decommissioned) it still suggests a substantial increase.

The WNA also presents data on new reactors “proposed,” i.e., “specific program or site proposals, expected operation within 15 years.”<sup>8</sup> A total of 344 additional reactors are “proposed” using these terms. Were most of these reactors actually constructed, this would represent a very substantial increase in the number of operational reactors, but there is great variability among these projections in terms of the scope and the firmness of states’ intentions. Some seem quite ambitious, for example, a proposal to build ten new reactors in a country that currently has no operable reactors and none under construction or in the planning stage. Others, however, are more conservative; and it is difficult to draw conclusions about the likelihood that all these programs will develop.

To sum up: a large number of new reactors are planned and proposed over the next decade, although it is hard to know how much of this new construction will actually occur. Advocates of nonproliferation, who are concerned about the potential proliferation risks associated with an expansion of nuclear power, will therefore face considerable uncertainty about the scale of any nuclear expansion.

However, it is possible, using this data, to establish at least a starting point for thinking about the proliferation implications of existing construction and plans for new projects. We can do this by looking at the geographic distribution of current

and planned new construction.

**Reactors currently under construction.** Fifty-one of the fifty-two reactors under construction are in countries that already have nuclear-power programs in operation. Iran is the one country that does not currently have operable reactors. Over half of these fifty-two reactors under construction are in four countries: China (twenty); India (four); Russia (eight); and South Korea (six).

Nearly all of these fifty-two reactors are being built in states that are NPT members in good standing, with required safeguards agreements in place. India and Pakistan—both of which are building new reactors—are not NPT members. Iran is an NPT member, but faces outstanding claims of NPT noncompliance.

Thus, among those states with reactors under construction, there are no newly added states that may be considered “of proliferation concern” or outside the NPT.

**Reactors planned.** Of the 143 planned new reactors, over 70 percent are located in six countries that already have operating nuclear-power programs: China (thirty-seven), India (twenty), Russia (sixteen), Japan (thirteen), the United States (nine), and South Korea (six). Of these, five are NPT parties in good standing; India is not an NPT member.

Other countries that have existing nuclear power programs, and expect to add from one to four reactors are Argentina, Armenia, Brazil, Bulgaria, Canada, France, Pakistan, Romania, South Africa, Ukraine, and the UK. All but Pakistan are in the NPT. All that are in the NPT are in compliance with NPT obligations.

There are eight countries that have relatively firm plans to build nuclear reactors, but which do not currently have operating reactors. These are Egypt (one); Indonesia (two); Belarus (two); Kazakhstan (two)<sup>9</sup>; Thailand (two); Turkey (two); the United Arab Emirates (four); and Vietnam (two). All are NPT members in good standing.

Thus again, the majority of planned construction would take place in NPT member states in good standing—most of which already have functioning

<sup>7</sup> Ibid.

<sup>8</sup> Ibid.

<sup>9</sup> Kazakhstan had one operating reactor that was shut down in 1999.

nuclear-power programs and have therefore made and kept safeguards agreements with the IAEA.

**Reactors proposed.** Although the figures for proposed construction are uncertain at best, it is worth noting also that in the WNA information presented, in only one case (Bangladesh) would proposed construction be new, i.e., take place in a country with no previous experience in nuclear-reactor construction.

Clearly, an existing nuclear-power program and NPT status do not guarantee that a state will never use its civilian nuclear program to develop a military program. Yet there is no a priori reason to assume that states will do so. Moreover, when we look at the total set of existing, planned, and proposed new construction, no new states are added to the list of existing proliferation worries.

Does this mean that proliferation will not occur? No, and effective verification of nuclear activities by the IAEA will remain essential to confirm in each case their peaceful purposes. But it does suggest that the proliferation risks posed by an expansion in nuclear power may not derive principally from state behavior that is proscribed by the NPT. Theft of and illicit trade in nuclear materials is a major concern, including within numerous NPT member states. But those risks are affected by a state's willingness and ability to control access to nuclear material—and these are not issues that are directly within the NPT's purview.

## NUCLEAR POWER AND THE NPT REVIEW CONFERENCE

In a sense, then, for the NPT, the main proliferation implication of a growth in nuclear power is to assure that states continue to adhere to their NPT commitments, and that the IAEA continues to have the resources and authority to do its job. Given the large projected increase over the coming years in the number of nuclear installations and in the dissemination of nuclear know-how, this will be a major challenge. The agency will need increased human and financial resources as well as proper

technical and legal tools to keep up with its verification tasks.

In the context of the NPT review process, this puts several issues on the agenda. These include the adequacy of existing safeguards agreements; the terms and conditions of export-control regimes; and whether there can be any limits on the development of indigenous fuel-cycle capabilities.

### Safeguards

The NPT rests on the assumption that its parties' compliance with treaty terms can be verified by the IAEA. The obligation of states party to the treaty to conclude verifiable safeguards agreements with the IAEA is outlined in Article III of the NPT.<sup>10</sup>

In the early 1990s, in the wake of revelations about Iraq's nuclear-weapons program, and the difficulty of verifying the nuclear activities of the DPRK, the IAEA secretariat began a process of strengthening the implementation of existing safeguards, and considering additional authority for the conduct of inspections activities. Later in the decade the agency's board of governors adopted a *Model Additional Protocol for Safeguards Agreements*, which, if adopted by a state party, would give the agency greater power to seek information about undeclared nuclear materials and activity. For example, with an Additional Protocol in place, the IAEA could have information about, and access to, all parts of the nuclear fuel cycle within the country; short-notice access to all buildings on a nuclear site, even if those buildings had not been declared; and the right to take environmental samples "at locations beyond declared locations when deemed necessary by the Agency."<sup>11</sup>

As of April 2010, twenty-one states in the NPT had not concluded a comprehensive safeguards agreement; forty-four did not have an Additional Protocol in place. The IAEA secretariat has said that comprehensive safeguards agreements together with the Additional Protocol should become the "universal standard" to verify nonproliferation.<sup>12</sup>

10 In its first paragraph, Article III states that "Each Non-nuclear-weapon State Party to the Treaty undertakes to accept safeguards, as set forth in an agreement to be negotiated and concluded with the International Atomic Energy Agency in accordance with the Statute of the International Atomic Energy Agency and the Agency's safeguards system, for the exclusive purpose of verification of the fulfilment of its obligations assumed under this Treaty with a view to preventing diversion of nuclear energy from peaceful uses to nuclear weapons or other nuclear explosive devices." See *Treaty on the Non-Proliferation of Nuclear Weapons*, March 5, 1970, Article III. The full text of the treaty is Annex I of this report.

11 IAEA, *IAEA Safeguards Overview: Comprehensive Safeguards Agreements and Additional Protocols*. Available at [www.iaea.org/Publications/Factsheets/English/sg\\_overview.html](http://www.iaea.org/Publications/Factsheets/English/sg_overview.html).

12 IAEA, Statement by Director-General ElBaradei, *Nuclear Energy: The Need for a New Framework*, Berlin, April 17, 2008.

Although many states share this view, the question of universalizing the Additional Protocol remains contentious, with some states arguing that the protocol represents a further restriction on the rights of non-nuclear-weapon states, and should be voluntary only.

### Export Controls

After the NPT entered into force in the early 1970s, states that supplied nuclear-related materials created two voluntary groups to advise and/or develop guidelines for export. The Zangger Committee refers specifically to the second paragraph of Article III of the NPT, which prohibits the provision of nuclear-related material to any non-nuclear-weapon state, unless the material will be safeguarded by the IAEA. The Nuclear Suppliers Group (NSG) develops guidelines for exports of nuclear and nuclear-related material.

Export-control organizations have also been controversial throughout the history of the NPT. Some states see these agreements among nuclear suppliers as nontransparent and limiting the choices, in a potentially discriminatory way, of states seeking peaceful nuclear technology. Others see them as a means to guide the practical implementation of requirements that the NPT places on states that have the potential to export nuclear-related materials.

### Article IV Rights and Obligations

Article IV of the NPT says that nothing in the treaty can be taken to affect the “inalienable right of all Parties to the Treaty to develop, research, production and use of nuclear energy for peaceful

purposes without discrimination and in conformity with articles I and II...” It also says that all parties will “facilitate and have the right to participate in the fullest possible” development of peaceful nuclear energy.

The discussion of this Article piques both general and more specific concerns. At a general level, there is ongoing debate about whether or not the Article IV reference to an “inalienable right” means that all states party to the NPT are allowed to develop and hold full fuel-cycle capabilities, if they so choose. The debate takes various forms, questioning what is meant by “inalienable” and whether it applies to states parties that are found in noncompliance of their safeguards agreements (and by extension, at what point in the IAEA process does noncompliance exist?). Another dimension is whether the article obligates states parties to assist non-nuclear-weapon states, and whether they must do so equally.

At a more specific level, recent discussion has focused on the question of whether any conditions can be placed on the right of states to develop full fuel-cycle capabilities. This question has been raised particularly in relation to the IAEA’s exploration of the possibility of creating a guaranteed supply of nuclear fuel. The idea of a multilaterally controlled nuclear-fuel supply has existed since the inception of nuclear power. It gained new momentum earlier this decade, when then Director-General Mohamed ElBaradei called attention to the difficulties of conducting oversight of civilian nuclear-energy activities, in the context of an increase in reliance on nuclear power and



## Multilateral Approaches to the Nuclear Fuel Cycle

### SUMMARY

- Proposals to multilateralize the nuclear fuel cycle date back to the 1950s, but they acquired new salience as of 2003.
- Most proposals that have emerged since 2003 are focused on guaranteeing against a cut-off in supply of nuclear fuel to states for reasons other than proliferation concerns.
- States hold a range of views on these fuel-supply proposals, and only two proposals have been actively considered by the International Atomic Energy Agency (IAEA) board of governors.
- One of these, a reserve of low-enriched uranium (LEU) fuel at Angarsk, Russia, was recently agreed to between the IAEA and Russia.
- The board of governors has also discussed an LEU fuel bank that would be held by the IAEA, with financing from the Nuclear Threat Initiative and several governments.
- Although decisions about fuel supply are not formally within the remit of the NPT review process, the question has mirrored larger debates about nonproliferation and disarmament and it is sometimes perceived as an effort to erode Article IV rights. It may arise in that context at the Review Conference.

### THE ISSUE

Since 2003, there has been significant attention paid to the questions of whether and how to multilateralize the nuclear fuel cycle. Discussion of this question is long standing, reaching back to the first few years of the nuclear era, and emerging periodically in subsequent decades. The tenacity of the issue reflects its importance. The difficulty in addressing it reflects the degree to which it touches on both security and economic interests of states.

In its most developed form, a multilateralized fuel cycle would mean that the production and disposal of nuclear material took place under international controls—for all states, including those that now have their own fuel production and disposal capabilities. This is the long-term goal that Dr. Mohamed ElBaradei, then director-general of the IAEA, articulated in an October 2003 article:

...it is time to limit the reprocessing of weapons-usable material (separated plutonium and high-enriched uranium) in civilian nuclear programmes, as well as the production of new material through reprocessing and enrichment, by agreeing to restrict these operations *exclusively to facilities under multinational control*. These limitations would need to be accompanied by proper rules of transparency and, above all, by an assurance that legitimate would-be users could get their supplies.<sup>13</sup> [emphasis added]

The near-term barriers to such an arrangement are substantial: unwillingness among many states to surrender this sensitive industrial activity to multilateral control; countervailing interests of the nuclear industry; and skepticism that a truly nondiscriminatory arrangement could emerge and persist.

Partly because a discussion of true multilateralization seemed premature, the discussions that were prompted by Dr. ElBaradei's comments eventually narrowed to the question of assured supplies of nuclear fuel: is there a way to assure that countries that have civilian nuclear programs, and that buy fuel in the global market, can be confident that their fuel supplies will not be cut off for political reasons? And is that achievable in the short term, even if the goal of broader multilateralization is not yet possible? Numerous proposals have come forward that attempt to answer both questions affirmatively.

### BACKGROUND: THE SUPPLY OF NUCLEAR FUEL

Proposals for fuel assurances grew out of, and would be implemented in, an active commercial market for nuclear fuel; it may be useful briefly to characterize the products and structure of that market:

#### Fuel-cycle facilities: what is needed for nuclear power?

For most nuclear reactors used in energy production, natural uranium must be enriched and placed into fuel assemblies that then form the reactor

<sup>13</sup> This was one part of a three-part proposal by Dr. ElBaradei. The other two concerned (1) the need to develop proliferation-resistant nuclear-energy systems; and (2) multilateral approaches to handling spent fuel and waste management. Mohamed ElBaradei, "Towards a Safer World," *The Economist*, October 16, 2003.

core.<sup>14</sup> The uranium-fuel-production process entails several steps:

- *Mining and milling* of the uranium, yielding “yellowcake” ( $U_3O_8$ ).
- *Conversion* of the yellowcake to uranium hexafluoride ( $UF_6$ ).
- *Enrichment* of the  $UF_6$  to increase the proportion of  $U_{235}$  isotopes to 3 to 5 percent (low-enriched uranium or LEU). (It is this stage that is considered most sensitive, in that the enrichment technologies can be used to produce fuel for civilian power plants or for nuclear-weapon development).
- *Fabrication of the reactor fuel*, by converting the enriched uranium to uranium dioxide ( $UO_2$ ), forming it into fuel, and loading it into fuel rods.

In addition to these “front-end” steps, an operating reactor will produce spent fuel, which must be disposed of or otherwise managed safely. With *reprocessing*, this spent fuel can be a further source of reactor fuel.

### The nuclear-fuel market

Thirty countries currently have operating nuclear-power reactors, with a combined total of 439 reactors worldwide. In some cases, these programs are owned and operated by states, either directly as a national enterprise, or indirectly through equity ownership; fuel may be produced for domestic consumption primarily, but also for the global market. In other cases, the power is produced largely in the private sector, for commercial purposes. In all cases, however, the government is heavily involved in the regulation of planning, construction, and operation of nuclear-power plants, and also monitors the international trade that relates to those plants.

State and commercial producers of nuclear power may purchase one or more of front-end fuel-cycle products from the global market. They buy fuel at all four stages of the uranium-fuel-production process, negotiating directly with sellers or brokers. Analysts both inside and outside the industry say that the global nuclear fuel market is healthy and functions effectively (and many want to ensure that

any fuel-supply arrangements do not disrupt the existing market).

The production of uranium fuel for the global market is concentrated in a relatively small number of companies and countries:

- *Mining and Milling*. Eight companies accounted for over 80 percent of total world production of  $U_3O_8$  as of 2007, the most recent year for which we have data. The eight produced 85 percent of a total production of 109 million pounds. Companies based in Australia and Canada alone produce over 40 percent; other countries with substantial yellowcake production include Kazakhstan, Namibia, Russia, and Uzbekistan.<sup>15</sup>
- *Conversion to  $UF_6$* . Five companies account for most of the conversion services on the global market. Their facilities are in Canada, France, Russia, the United Kingdom, and the United States.<sup>16</sup> Brazil, China, and Iran also have conversion facilities.
- *Enrichment*. Four companies produce most enriched uranium for global markets, operating in France, Germany, the Netherlands, Russia, the United Kingdom, and the United States. Other countries with enrichment capabilities are Brazil, the Democratic People’s Republic of Korea (DPRK), India, Iran, Israel, and Japan.
- *Fuel fabrication*. Different reactors require different fuel assemblies, and production processes are therefore more diverse and facilities somewhat more widespread. Locations for major fabrication activities for the global market include France, Germany, Kazakhstan, Russia, and the United States,<sup>17</sup> although there are also operating fabrication facilities in more than ten other countries, including China, India, Japan, and the United Kingdom.

These figures suggest two things about the context for proposals to multilateralize the fuel cycle: very few countries have all stages of the fuel cycle within their own borders—which means that most are purchasing at least some fuel services or products from the global market; and commercial conversion and enrichment services are concentrated in a few countries.

14 Heavy water reactors, such as those in Canada and India, use natural uranium; there are fewer than thirty of these reactors worldwide. Some reactors are also fueled by a combination of uranium and plutonium that has been separated from spent fuel.

15 See, Cameco, “Uranium 101,” 2008, available at [www.cameco.com/uranium\\_101/](http://www.cameco.com/uranium_101/).

16 WISE Uranium Project, “World Nuclear Fuel Facilities,” January 27, 2009, available at [www.wise-uranium.org/efac.html](http://www.wise-uranium.org/efac.html).

17 Ibid.

## PROPOSALS FOR FUEL ASSURANCES

In 2004, the director-general of the IAEA appointed a diverse experts group to explore options for multilateral approaches to both front- and back-end fuel-cycle activities. The experts group released a comprehensive and rather complex report in February 2005.<sup>18</sup> It analyzed options ranging from fully multilateral arrangements, which put all fuel production and waste management under international control, to minimally disruptive arrangements that relied first on assurances by suppliers.

With this increasing attention to multilateral fuel-cycle approaches, states and two nongovernmental organizations began proposing ways to guarantee the supply of uranium fuel. By 2009, there were eleven such proposals for fuel-assurance arrangements. States contributing these proposals (some as sole author, some with other countries) included Austria, France, Germany, Japan, the Netherlands, Russia, the United Kingdom, and the United States. It is worth noting that most of these are supplier states, i.e., that they are home to commercial fuel-supply capabilities. The World Nuclear Association (WNA), an industry group, also put a proposal forward, as did the Nuclear Threat Initiative (NTI), a private foundation. Norway, the United Arab Emirates, and the European Union committed financial support to the NTI project (discussed below), and in that sense are part of its proposal.

The proposals share some similarities—e.g., most include an active role for the IAEA—but are different in other ways that make comparison somewhat complex and lengthy. For this reason we do not discuss all the proposals here. It may be helpful, nonetheless, to summarize the key variables at play as plans for fuel-supply arrangements are developed. Six questions are particularly important:<sup>19</sup>

1. **What is being assured?** Is it access to yellowcake, to uranium hexafluoride, to enriched uranium, and/or to fabricated fuel for specific reactors? Most existing proposals focus on enriched uranium.
2. **To whom are assurances being directed?** Is it to all states that have, or want to have, nuclear power facilities? Only those that do not currently have enrichment or reprocessing capabilities? As suggested above, most proposals are directed at new nuclear-power states, although they do not necessarily preclude access by any nuclear-power producer.
3. **How would fuel access be assured?** Possibilities incorporated into existing proposals include the following:
  - back-up agreements by governments and/or suppliers (such that one supplier could step in, if another were prohibited from delivering contracted fuel);
  - fuel banks, either virtual or real;
  - fuel-leasing arrangements;
  - joint investment in multilateral enrichment activities (whereby interested states become co-owners of an enrichment facility, and have access to enriched fuel by virtue of that co-ownership);
  - an extraterritorial multilateral fuel-production center, under the ultimate authority of the IAEA.
4. **Who would assure the access?** There are three possibilities: some combination of existing commercial fuel producers; governments or consortia of governments; and/or the IAEA. Typically the multilateral proposals set out a prominent role for the IAEA.
5. **Under what conditions could a state access the fuel?** The fundamental condition would be that an existing contract was not being filled, due to political disagreements between the supplier state and the customer state. Existing proposals tend to agree that any state accessing the fuel-supply mechanism would need to comply with NPT obligations or ones similar to those of the NPT. Proposals diverge over whether these customer states would have to have signed the Additional Protocol and/or agreed to forgo the development of enrichment capabilities.
6. **Who decides on eligibility?** The question here is who decides whether a state is eligible to access the fuel assurance mechanism—whether the

<sup>18</sup> IAEA, "Multilateral Approaches to the Nuclear Fuel Cycle," Expert Group Report submitted to the Director General of the IAEA, INF/CIRC/640, February 22, 2005. Available at [www.iaea.org/publications/documents/infcircs/2005/infirc640.pdf](http://www.iaea.org/publications/documents/infcircs/2005/infirc640.pdf).

<sup>19</sup> See Yuri Yudin, *Multilateralization of the Nuclear Fuel Cycle: Assessing the Existing Proposals* (Geneva: UNIDIR, 2009). Most of the proposals can also be found on the IAEA website, available at [www.iaea.org](http://www.iaea.org).

supply disruption is indeed due to political factors; and whether the customer state meets the conditions of the fuel-supply arrangement. If producers or governments are providing the fuel assurance, then presumably it is they who would decide to whom this decision-making authority is delegated. If the IAEA were the guarantor, then the determination of eligibility would presumably be with the IAEA, likely the director-general, within the context of guidelines from the board of governors.

The latter two questions go to the heart of states' disagreements about both current attention to fuel-assurance proposals, and the nonproliferation regime more broadly.

## THE SITUATION TODAY

### National and multinational initiatives

Several proposals, essentially national or multinational, do not require approval by the IAEA or other international bodies.

**International Uranium Enrichment Centre (IUEC) at Angarsk.** Led by Russia, the center would, as a "commercial joint stock company," guarantee access to enriched uranium for participating organizations. The IUEC was officially formed in May 2007 when Kazakhstan joined. The original intent was that the IUEC would be "oriented chiefly to States not developing uranium enrichment capabilities on their territory." Moreover "in so doing, the Russian side will not transfer to IUEC participants the uranium enrichment technology or information that constitutes a State secret."<sup>20</sup> (It is possible that these terms have changed somewhat, although not in any readily available open-source document.) Armenia and Ukraine are also said to be considering the IUEC.

**US fuel bank.** Another proposal that does not depend on international action is the US plan to establish a fuel bank of seventeen metric tons of LEU, down-blended from highly enriched uranium (HEU) surplus. The fuel bank would be available only to states that forego enrichment and reprocessing. The down-blending is expected to be completed this year.

### Multilateral initiatives

At the multilateral level, two suggestions for fuel assurances have been developed to the point where they received active review from the IAEA board of governors in 2009. These are the proposal for an IAEA LEU fuel bank (originating with NTI); and the project of a fuel reserve at Angarsk, proposed by Russia. The other proposals continue to be elaborated. In general, most advocates of guaranteed fuel supplies argue that the suggested arrangements are not mutually exclusive, and in fact may complement and reinforce one another.

**IAEA LEU fuel bank.** In September 2006, the idea of an agency-controlled LEU fuel bank was proposed by NTI, which also pledged financial support. The fuel stockpile would be controlled by the IAEA, which would make decisions about its dispersal. Over \$150 million has been dedicated to the creation of this stockpile, by NTI, the US, Norway, the United Arab Emirates, the European Union, and the UK. According to a 2009 article in the IAEA Bulletin, "...any Member State could request supply when its LEU supplies are disrupted for reasons not related to technical or commercial considerations, it has brought into force a safeguards agreement that applies to any LEU supplied from the IAEA bank, has a conclusion on peaceful use / non-diversion of nuclear material in the latest IAEA Safeguards Implementation Report, and no specific safeguards implementation issues are under discussion in the IAEA Board of Governors."<sup>21</sup> Although the agency secretariat was closely involved in developing this proposal and had strongly supported it under Director-General ElBaradei, to date the fuel bank has not been approved by the board of governors. Its status is unclear at this point.

**LEU fuel reserve at Angarsk,** from which fuel could be made available, under IAEA auspices and control, to IAEA member states. The IAEA board of governors approved this arrangement in November 2009, authorizing the director-general to conclude agreements with Russia, and future agreements with member states that it considers eligible for the LEU supply. At the end of March, the IAEA and

20 IAEA, *Communication Received from the Resident Representative of the Russian Federation to the IAEA on the Establishment, Structure and Operation of the International Uranium Enrichment Centre*, IAEA doc. INF/CIRC/708, June 8, 2007.

21 IAEA, "A Secure Nuclear Future," 2010, available at [www.iaea.org/Publications/Magazines/Bulletin/Bull511/51104871013.html](http://www.iaea.org/Publications/Magazines/Bulletin/Bull511/51104871013.html).



Russia signed an agreement establishing the fuel reserve—the first such fuel bank created.

According to the Russian proposal,<sup>22</sup> this fuel reserve would be “a guaranteed physical reserve of 120 tons of LEU, in the form of UF<sub>6</sub>, with an enrichment level ranging from 2.0 per cent to 4.95 per cent, which will be stored at the International Uranium Enrichment Centre [IUEC—see above] under IAEA safeguards which will be financially covered by Russia for the use of the member States of IAEA experiencing a disruption of LEU supply [for reasons other than commercial or technical ones].” The criteria are the same as those for the IAEA LEU fuel bank, except for the requirement that a requesting state must be a non-nuclear-weapon state and a member of the agency, which has placed all of its peaceful nuclear activities under IAEA safeguards. According to a recent report, “About one-third of the site’s planned stockpile would be ready for purchase before the end of 2010.”<sup>23</sup>

#### FUEL ASSURANCES AND THE NPT REVIEW CONFERENCE

The question of fuel assurances has been controversial in discussions at both the IAEA board of governors and in the NPT review process. In the November 2009 meeting of the board of governors, even though the next steps on the LEU fuel reserve at Angarsk were approved, eight states voted against it, and three abstained—suggesting substantial reservations about establishing even this level of fuel arrangement. The range of opinion on the fuel-assurance proposals—and on the fact of their consideration at this time—has reflected the considerably different interests held by states. It has also mirrored larger debates, notably about nonpro-

liferation and disarmament commitments, which take place in the NPT context.

To advocates of fuel-assurance arrangements, the implementation of one or more of these proposals would be valuable in its own right, and also represent progress toward the long-delayed process of multilateralizing the fuel cycle. To critics, the very development of the proposals has been flawed, emerging out of the concerns of supplier states, prioritizing fuel assurances above other pressing needs, and creating the possibility of a process that leads to an erosion of Article IV rights<sup>24</sup>—and not necessarily to a truly multilateralized fuel cycle.

The importance of these issues to the 2010 NPT Review Conference is not entirely clear, although debates at the preparatory committees suggest their continuing salience. But the discussion may be entering a new phase: The IAEA’s focus on multilateralizing the fuel cycle was driven substantially by Dr. ElBaradei’s commitment to it. Whether his successor, Director-General Yukiya Amano, will take it up, or whether fuel assurances will retreat as an important topic at the IAEA, is uncertain.

Moreover, the proposals that appear politically feasible, including the recently approved Angarsk fuel reserve, may have relatively little effect on states’ decisions about whether and how they develop nuclear power. Nor does it seem likely that there will be a large demand for these guaranteed fuel supplies: as noted earlier, the market works well and the denial of fuel supplies for political reasons is rare. Thus if considered only in terms of direct consequences, the question of fuel assurances may have limited relevance to the central challenges facing the NPT and the Review Conference itself.

22 The Russian paper was prepared for the 2009 PrepCom, June 2009, UN doc. NPT/CONF:2010/PCIII/WP.25.

23 Global Security Newswire, “Agreement Signed for First International Nuclear Fuel Bank,” March 30, 2010, available at [www.globalsecuritynewswire.org/gsn/nw\\_20100329\\_6830.php](http://www.globalsecuritynewswire.org/gsn/nw_20100329_6830.php).

24 Article IV of the NPT states that “Nothing in this Treaty shall be interpreted as affecting the inalienable right of all the parties to the Treaty to develop research, production and use of nuclear energy for peaceful purposes without discrimination and in conformity with Articles I and II of this Treaty.” *Treaty on the Non-Proliferation of Nuclear Weapons*, Article IV. The full text of the treaty is in Annex I of this report.

## Nuclear Disarmament

### SUMMARY

- The total number of nuclear weapons worldwide (23,000) is currently less than half of the level reached at the end of the Cold War. The US and Russia hold together more than 95 percent of the global stockpile, including 2,200 and 2,780 deployed strategic warheads respectively.
- To achieve further progress states will need to establish (1) a verification process to monitor the reduction and dismantlement of nuclear weapons; (2) an enforcement system to ensure the implementation of agreements and deal with cases of noncompliance; and (3) security and stability conditions where countries will trust that they can safely reduce and ultimately eliminate their weapons.
- Each of these steps raises difficult and complex challenges. The chances of addressing them successfully will depend on the ability of states to develop cooperative security relationships.
- US President Barack Obama's commitment to a "world without nuclear weapons" and the conclusion of the US-Russia New START treaty have created a more positive context. Yet further concrete progress needs to be achieved in order to establish a new dynamic.
- The existing frameworks of negotiations, at the United Nations and between nuclear-weapon states, have their respective advantages and limitations; among the latter are the protracted delays for multilateral agreements to enter into force. At this stage, the prospect of agreeing on a more radical approach seems remote.
- A wide range of steps should be pursued to combine treaty negotiations and voluntary initiatives on reductions of nuclear weapons, as well as increased efforts to prevent the emergence of additional nuclear-armed states.

### STATE OF PLAY

Nuclear disarmament is one of the three pillars of the NPT, along with nonproliferation and the peaceful use of nuclear energy. The commitment to pursue nuclear disarmament is expressed in Article VI of the treaty. It has been reaffirmed by the 1995

NPT Review Conference in its decision on "Principles and Objectives for Nuclear Non-Proliferation and Disarmament" and by the 2000 NPT Review Conference in the thirteen "practical steps" outlined in the final document of the conference.<sup>25</sup> Some progress has been achieved toward this objective (indeed more substantial than what is usually acknowledged), but much more remains to be done.

### Nuclear arsenals

The total number of nuclear weapons worldwide is currently estimated to be around 23,000, which is less than half of what it was in the last years of the Cold War (65,000 nuclear weapons in 1986).<sup>26</sup>

Official data on the categories of weapons (strategic versus nonstrategic) as well as the exact status of the stockpiles (in operational stockpiles, in reserve, or awaiting dismantlement) are seldom available, and there are no international mechanisms to verify the data related to nuclear forces and their reduction.

Current estimates of the total **national inventories of warheads**<sup>27</sup> in 2009 are Russia, 13,000; US, 9,400; France, 300; China, 240; United Kingdom, 185; Israel, 80; India, 60 to 70; Pakistan, 60; and North Korea, 5 or 6.

The numbers of **warheads in operational stockpiles**<sup>28</sup> are Russia, 4,834; US, 2,702; France, 300; China, 186; United Kingdom, 160; Israel, 80; India 60 to 70; and Pakistan 60.

These numbers illustrate the following:

1. The continued massive predominance of Russian and American nuclear stockpiles (more than 95 percent of the global inventories) compared to the other nuclear powers;
2. A general trend over the last twenty years toward a reduction of nuclear arsenals, due in particular to US and Russian bilaterally agreed reductions, and—on a much smaller scale—to British and

25 See excerpts in Annex II.

26 All figures for 2008 and 2009 in this section are from the *SIPRI Yearbook 2009* (Stockholm: SIPRI, 2009).

27 Including warheads in reserve or awaiting dismantlement.

28 The stockpiles of India, Pakistan, and Israel are thought to be only partly deployed.

French unilateral reductions.

3. A marked reduction in the number of *deployed* strategic warheads in US and Russian nuclear forces (from 10,000 to 6,000 each with the 1991 *Strategic Arms Reduction Treaty* [START], down to 1,700-2,200 each by 2012 with the 2002 *Strategic Offensive Reductions Treaty* [SORT], and to 1,550 each with the New START treaty within seven years from the date the treaty will enter into force).
4. The elimination by the US and Russia of all their ground-launched ballistic and cruise missiles with ranges between 500 and 5,500 kilometers, as a result of the 1987 *Intermediate-Range Nuclear Forces (INF) Treaty*. The US and Russia dismantled a total of around 2,700 missiles.
5. The continued presence of nonstrategic weapons in the arsenals of Russia (2,000 deployed nonstrategic warheads and several thousand held in reserve) and of the US (500 active nonstrategic warheads, including approximately 200 bombs deployed in Europe, and 800 in storage). Nonstrategic weapons are currently not limited by arms-control agreements.
6. The importance of reserve stockpiles, in particular for Russia (around 8,160 warheads in reserve or to be dismantled) and for the US (2,500 warheads in reserve and 4,200 awaiting dismantlement). The pace of dismantlement of weapons appears to be slower today in both countries than it was in the 1990s.

### Fissile materials

The total stock of weapons-grade fissile materials worldwide is estimated to be, as of 2008, 1,370 tons of highly enriched uranium (HEU), 255 tons of separated plutonium in military stock, and 246 tons of separated plutonium in civilian stock.

As with weapons, official data on fissile-material inventories are seldom available, except for civilian stock (most of which is placed under IAEA safeguards) and stock declared in excess of military purposes. Current estimates are approximate and include significant margins of uncertainty. The estimated breakdown is the following:

- **highly enriched uranium:** Russia, 770 tons; US, 508 tons (declared); France, 35 tons; United Kingdom,

23.3 tons (declared); China, 20 tons; Pakistan, 2 tons; India, 0.6 ton; Israel, 0.1 ton; and non-nuclear-weapon states 10 tons (under IAEA safeguards).

- **separated plutonium in military stocks:** Russia, 145 tons; US, 92 tons; United Kingdom, 7.9 tons; France, 5 tons; China, 4 tons; India, 0.7 ton; Israel, 0.6 ton; Pakistan, 0.09 ton; and North Korea, 0.03 ton.
- **separated plutonium in civilian stocks:** United Kingdom, 77.7 tons; France, 54.9 tons; Japan, 46.7 tons; Russia, 44.9 tons; Germany, 15 tons; India, 6.4 tons; Switzerland, 0.05 ton; and US, zero.

These figures can be compared with the quantity of fissile materials necessary to build a warhead. For the IAEA, the “approximate amount of nuclear material for which the possibility of manufacturing a nuclear explosive device cannot be excluded” is 25 kilograms for HEU and 8 kg for plutonium.<sup>29</sup>

American and Russian stockpiles amount to approximately 90 percent of HEU stock and separated plutonium in military stock. American and Russian holdings include a large proportion of stock reserved for naval reactor fuel (around 100 tons of HEU each) and of stock declared in excess of weapon needs (around 50 tons of plutonium each and around 150 tons of HEU to be blended down for each country). US and Russian stocks in excess of weapon needs will increase in the coming years as both countries continue to dismantle weapons.

The five nuclear-weapon states recognized by the NPT have all stopped their production of fissile materials for nuclear weapons, and—with the exception of China—all of them have declared that they have no plans to resume such production. Both India and Pakistan appear to be continuing their production of fissile materials for nuclear weapons.

### WHAT ARE THE SUBSTANTIVE ISSUES?

To achieve further progress in nuclear disarmament, nuclear-weapon and non-nuclear-weapon states will need to cooperate on three main sets of issues. They will need to establish

- a verification process to monitor the reduction and dismantlement of weapons;
- an enforcement system to ensure the implementation of reductions and deal with cases of noncompliance; and

<sup>29</sup> International Atomic Energy Agency (IAEA), “IAEA Safeguards Glossary,” 2001, available at [www-pub.iaea.org/MTCD/publications/PDF/nvs-3-cd/PDF/NVS3\\_scr.pdf](http://www-pub.iaea.org/MTCD/publications/PDF/nvs-3-cd/PDF/NVS3_scr.pdf).



- security and stability conditions where countries will trust that they can safely reduce and ultimately eliminate their nuclear weapons.

### Verification

To agree to further cuts in their arsenals, nuclear states that are parties to an agreement will want to make sure that the other parties effectively carry out the agreed reductions and that they are not retaining a capacity to quickly reconstitute their forces.

The verification of reductions in the number of nuclear warheads in military arsenals and their effective dismantlement will then become a key requirement. This has not been the case so far. Previous US-Russia agreements focused on the limitations on levels of deployed warheads and did not include an obligation to destroy warheads removed from deployment. So states will have to innovate to establish a comprehensive verification system.

Typically, reduction agreements would be based on declarations by nuclear-weapon states of their numbers of deployed and nondeployed warheads, delivery vehicles, and fissile materials. A set of measures would have to be agreed upon in order to verify these declarations and to monitor the dismantling of warheads and delivery systems as well as the conversion of fissile material.

This would require putting in place a “chain of custody” to track warheads from deployment to dismantlement.<sup>30</sup> This process would include, in particular, the verification of records of past production of fissile materials, the establishment of tagging schemes to identify warheads, the inspection of facilities and monitoring of movements of materials in and out of facilities, and the adoption of measures to ensure that the dismantlement is irreversible.

### Protection of classified information

At each step in the verification process, inspectors will have to ascertain that the devices that they monitor are indeed real warheads. A first hurdle is that inspectors will not be allowed to inspect the warheads themselves. To avoid risks of prolifera-

tion, the design of warheads will have to be protected, and inspectors will only be allowed to inspect the containers.

To overcome this difficulty, the inspectors will have to use “information barrier” technologies that, without revealing classified information, will allow them to authenticate warheads. States will have to agree on the use of such technologies.

This challenge is not only technological but also political. An adequate level of cooperation between parties will be needed so that each can trust the reliability of inspections based on “information barrier” technologies. Authentication procedures will be based on parameters related to the warhead given by the inspected party, and other parties will have to trust that these parameters are honest and accurate.<sup>31</sup>

### Accuracy and completeness of declarations

Another challenge will be ascertaining that states effectively declare all their holdings, and that they do not divert some of them from the verification process. Warheads or fissile materials could be easily hidden in undeclared facilities, where they would be hard to detect.

Verification of stocks of fissile materials poses specific and difficult challenges. To verify holdings, inspectors will have to compare the quantity of nuclear material held according to accounting books of past production and the quantity measured by a physical inventory.

This will be an extremely difficult task. Even when records are well kept, discrepancies between records of past production and the current physical inventory are inevitable, due to measurement uncertainties and recording errors. For instance, the survey of the plutonium produced for weapons in the United States between 1944 and 1994 shows, for a production of more than 100 tons, an inventory difference of 2.8 tons.<sup>32</sup> This would be the equivalent of several hundred warheads.

In many states, records of past production might not be complete, and discrepancies would be more important. This would make it even harder for

30 See Harold A. Feiveson, ed., *The Nuclear Turning Point: A Blueprint for Deep Cuts and De-Alerting of Nuclear Weapons* (Washington, DC: Brookings Institution, 1999).

31 See Georges Perkovich and James M. Acton, *Abolishing Nuclear Weapons*, Adelphi Paper 396 (Abingdon, UK: Routledge, 2008).

32 US Department of Energy, “Plutonium: the First 50 Years,” 1996, available at [www.doeal.gov/SWEIS/DOEDocuments/004%20DOE-DP-0137%20Plutonium%2050%20Years.pdf](http://www.doeal.gov/SWEIS/DOEDocuments/004%20DOE-DP-0137%20Plutonium%2050%20Years.pdf).

inspectors to ascertain whether these discrepancies are due to inventory differences of a technical nature or whether they indicate possible dissimulation of fissile material.

States may also pursue uranium enrichment in undeclared facilities. Such activities would be hard to detect. This problem is not specific to disarmament but also exists in the nonproliferation context, and inspectors will have to use similar tools to those developed in the framework of the IAEA strengthened-safeguards system.

To address the risks of diversion and dissimulation, challenge inspections will be needed. But challenge inspections themselves have their own limitations, and states will have to agree on mechanisms of managed access to facilities to protect classified information.

Ultimately, the level of confidence that states have in the verification system will depend on the degree of transparency that the state parties themselves demonstrate. Developing such confidence will take time. The adoption of transparency measures should take place at an early stage in the disarmament process, so that state parties can progressively develop trust in each other's declarations.<sup>33</sup>

### Enforcement

There is currently no international process for monitoring nuclear disarmament. This contrasts with the architecture in place to ensure nonproliferation. The implementation of Russian and US agreements is left to mutual verification by the parties themselves. The involvement of the UN Security Council and of the IAEA in ensuring the disarmament of Iraq remains a unique case.

States will need to create an enforcement system to achieve progress in reductions and ultimately move to zero. This system will have to be robust enough to detect and deter noncompliance and to act against a possible break-out.

### Monitoring disarmament

The verification measures described above could be implemented through a great variety of arrangements. This will very much depend on the format of disarmament negotiations, which could be bilateral in some cases and multilateral in others. As

states achieve further progress in nuclear disarmament, monitoring will probably combine activities carried out by the parties themselves and by an international authority.

In the early stages—as is currently the case with US-Russia negotiations—nuclear-weapon states may tend to keep verification activities to themselves in order to protect classified information. They may also establish verification bodies staffed by the parties themselves.

But more transparency and more international involvement will be needed for the international community to be able to trust arms-control and disarmament measures. The Preparatory Commission of the Comprehensive Nuclear-Test-Ban Treaty Organization (CTBTO) is a first instance, although on an interim basis, of such international involvement. The issue of international verification will also have to be addressed by the upcoming negotiations on a treaty to ban the production of fissile materials for nuclear weapons. The IAEA could play a role in this field, given that the verification system that would be required to monitor a ban would be quite similar to the IAEA safeguards system.<sup>34</sup>

Whatever monitoring arrangements of arms-control and disarmament agreements are developed, verification bodies will have to be granted robust mandates for inspections, and they will need to be backed by equally robust mechanisms to enforce compliance if need be.

### Enforcing disarmament

States will need to decide whether they wish to grant authority to a specific body to settle disputes that may arise in the implementation of disarmament agreements. They will also have to decide whether cases of noncompliance should be reported to a specific body or to the Security Council. Given the nature of the issues at hand, the Security Council itself may consider that they fall within its purview.

During the process of reduction of nuclear forces, the responsibility of enforcing disarmament agreements, whether trusted to the Security Council or another specific body, will be particularly difficult to assume. The Security Council has

<sup>33</sup> See Feiveson, *The Nuclear Turning Point*.

<sup>34</sup> Tariq Rauf, "A Cut-Off of Production of Weapon-Usable Fissionable Material: Considerations, Requirements and IAEA Capabilities," Statement at the Conference on Disarmament, Geneva, 2006, available at [www.fissilematerials.org/ipfm/site\\_down/rauf06.pdf](http://www.fissilematerials.org/ipfm/site_down/rauf06.pdf).

only limited experience in dealing with nuclear issues (mostly the disarmament of Iraq and the proliferation crises in North Korea and Iran), and its overall record is mixed. The ability of the Council to act depends on the degree of consensus among its members. When the Council is united, as it was on Iraq in the early 1990s, the degree of performance is good. When there are significant differences between its members, as has so far been the case with Iran, the Council is less effective.

At the ultimate stage of the elimination of weapons, enforcing compliance will be equally complex. The renewal of the debate on a nuclear-weapon-free world has helped identify the issues at stake.<sup>35</sup> Questions have been raised about how the Security Council would be able to deal with nuclear break-outs: What degree of proof will Security Council members require to decide on action, and how quickly will they be able to act? What sanctions would be effective? Would the Security Council be able to take action if one of the (former) nuclear-weapon states is noncompliant? In a nuclear-weapon-free world, what international military action would be possible against a nuclear break-out?

There are no easy answers at this stage to these questions. But the discussion on how to enforce nuclear disarmament points to two areas where progress can be achieved:

- Much will depend on the capacity of the UN membership to reform the Security Council in a way that will strengthen its legitimacy as well as its efficiency. Increased efforts to improve the methods of work of the Council and the tools at its disposal will also matter.
- Developing a consensus on disarmament measures is equally needed. States will have to ensure that each step in the disarmament process is backed by a strong consensus among all the parties, and that these views are adequately expressed to the members of the Security Council.

### Stability and security

To reduce their nuclear forces, nuclear states will need to be convinced that such reductions enhance

their security. The objective of progressing toward nuclear disarmament “in a way that promotes international stability, and based on the principle of undiminished security for all,”<sup>36</sup> as reaffirmed at the 2000 NPT Review Conference, remains a complex one.

### Addressing regional or global tensions

In the current strategic context, many analysts question the relevance of nuclear weapons, and subscribe to the view of the authors of the Shultz-Perry initiative, that “with nuclear weapons more widely available, deterrence is decreasingly effective and increasingly hazardous.”<sup>37</sup>

Yet, in the eye of their possessors, nuclear forces remain the ultimate guarantee against the threat of aggression, be it nuclear, conventional, chemical, or biological. Nuclear-armed states (as well as the thirty or so countries that rely on a US or Russian nuclear umbrella) continue to widely accept the notion that their arsenals will deter major conflict. Proponents of deterrence also credit nuclear weapons with having “moderated the behavior of the great powers toward one another” and do not see a realistic substitute for them in this role.<sup>38</sup>

In fact—independent of steps taken by some of them to reduce their forces—all nuclear powers, whether recognized by the NPT or not, have continued modernizing their weapons and their means of delivery.

Continued reliance on nuclear weapons stems from regional tensions (as in the Middle East and South Asia) or from global security imbalances (as illustrated by concerns voiced by Russia and China over US conventional dominance). It also reflects the need to defend against the emergence of future risks, as expressed by US Defense Secretary Robert Gates: “Our nuclear arsenal is vital for a final reason: we simply cannot predict the future. (...) We have to be prepared for contingencies we haven't even considered.”<sup>39</sup>

The main challenge in progressing toward disarmament will be to address effectively these insecurities. Disarmament steps may themselves

35 Perkovich and Acton, *Abolishing Nuclear Weapons*.

36 See Annex II of this report, “2000 NPT Review Conference (Excerpt from the Final Document)—Thirteen steps.”

37 Georges Shultz, William Perry, Henry Kissinger, and Sam Nunn, “Toward a Nuclear-Free World,” *Wall Street Journal*, January 15, 2008, p.13-A.

38 Franck Miller, “Disarmament and Deterrence: A Practitioner’s View,” part of “Abolishing Nuclear Weapons: A Debate,” Carnegie Endowment for International Peace, 2009, available at [www.carnegieendowment.org/publications/index.cfm?fa=view&id=22748](http://www.carnegieendowment.org/publications/index.cfm?fa=view&id=22748).

39 Robert Gates, “Nuclear Weapons and Deterrence in the 21st Century,” speech delivered at the Carnegie Endowment for International Peace, October 2008.

contribute to easing tensions. But no long-term progress can be achieved without increased efforts to settle regional conflicts and to establish a system of cooperative security to resolve tensions between states.

### Moving toward lower levels of forces

Not all these difficulties can be easily resolved and they will require increased cooperative efforts. But they should not stand in the way of further reductions toward a point where nuclear weapons could be counted in hundreds rather than in thousands.

In agreeing to disarmament measures, states will want to make sure that reductions will be carried forward in a way that preserves their security, and does not create imbalances. Some nuclear powers already assume a posture of minimal deterrence, and they may consider it difficult to move beyond that point.

As levels of forces are lowered, preserving stability may become increasingly complex. Small imbalances may have a stronger destabilizing effect than they did at previous levels. States will need to trust that their reduced forces are not exposed to the risk of a preemptive strike by other parties, should the situation deteriorate. One way to do so could be to allow each nuclear-weapon state to maintain at all stages of the reduction process “a core of invulnerable weapons, for example on submarines at sea.”<sup>40</sup>

## WHAT ARE THE OPPORTUNITIES FOR, AND OBSTACLES TO, PROGRESS?

### A new mindset

President Obama's commitment expressed in Prague in April 2009 “to seek the peace and security of a world without nuclear weapons”—and the endorsement of this goal by most nuclear-weapon states—has created a new context in favor of disarmament.

If indeed significant steps are taken toward disarmament, this new mindset will also help increase support among the UN membership for nonproliferation efforts. This would create a more positive dynamic on nuclear issues, where disarma-

ment and nonproliferation efforts would reinforce each other.

### New START treaty

A first step is the signature on April 8, 2010, by the US and Russia of a new treaty on reducing and limiting strategic offensive arms to replace START, which expired in December 2009. The new treaty commits the United States and Russia to limiting their deployed strategic warheads to a maximum of 1,550 each (from a range of 1,700–2,200 in the 2002 Moscow *SORT Treaty*), and their deployed strategic delivery vehicles to a maximum of 700 each.

### Work Program of the Conference on Disarmament

Another source of optimism was the agreement reached in May last year by the Conference on Disarmament on its 2009 annual work program,<sup>41</sup> ending a twelve-year deadlock. In particular, the Conference agreed to establish a working group tasked with negotiating a treaty banning the production of fissile material for nuclear weapons. It also agreed to create a working group to exchange views on practical steps to reduce and ultimately eliminate nuclear weapons, and another one on negative security assurances, and to appoint a special coordinator on a comprehensive program of disarmament. The Conference, however, was not able to begin implementation of this program last year. Difficulties reappeared in 2010, and the Conference has yet to agree on its work program.

### Not yet a new dynamic

The next steps will be crucial to test the determination of the US and Russia to lead toward further nuclear-arms reductions and to engage the other nuclear powers.

### Pursuing deeper US and Russian reductions

The US and Russia have agreed in principle to “pursue new and verifiable reductions in (their) strategic offensive arsenals in a step-by-step process.”<sup>42</sup> The New START treaty, concluded this year, should be followed by other negotiations to achieve deeper cuts in the nuclear forces of both countries.

<sup>40</sup> Feiveson, ed., *The Nuclear Turning Point*.

<sup>41</sup> Conference on Disarmament, Doc. CD/1864, May 29, 2009.

<sup>42</sup> Dimitriy A. Medvedev and Barack Obama, “Regarding Negotiations on Further Reductions in Strategic Offensive Arms,” joint statement released on April 1, 2009, available at [www.whitehouse.gov/the\\_press\\_office/Joint-Statement-by-Dmitriy-A-Medvedev-and-Barack-Obama/](http://www.whitehouse.gov/the_press_office/Joint-Statement-by-Dmitriy-A-Medvedev-and-Barack-Obama/).



Future US-Russian strategic negotiations will have to break new ground:

- In order to move toward substantially lower levels of forces, both countries will have to establish a more robust verification system. The New START treaty builds on the verification measures of the 1991 START treaty relating to deployed warheads, to which new elements have been added. But it does not require the parties to destroy the warheads that will be removed from deployment. The verification of the reductions in the overall number of warheads (and not only the number of weapons in deployment) and their dismantlement should become the focus of future negotiations.
- The two countries will have to address changes in the global security situation and their respective responses to it. Whereas the US used to put the emphasis on nuclear capabilities to defend against Soviet conventional superiority, it is now the turn of Russia to rely increasingly on its nuclear force to compensate for American conventional dominance.
- The US and Russia will have to reach a clearer understanding on the issue of missile defense. The New START treaty does not constrain current or planned US missile-defense programs. But the issue remains contentious.<sup>43</sup> A limited missile defense, aimed at intercepting a handful of missiles from a proliferating state, would not affect the balance of forces between the two countries at their current, and even lower, levels. However, an enlarged missile-defense system would probably not be compatible with deeper cuts. The US will have to alleviate the concerns expressed by Russia as well as by others, including China. In the longer term, missile defense could however be an interesting option to defend against break-outs in a nuclear-weapon-free world.

### Engaging the other nuclear powers

The pledge of the US administration to secure authorization by the Senate to ratify the *Comprehensive Nuclear-Test-Ban Treaty* (CTBT) gives new hope for the promotion of multilateral arms-control and disarmament instruments. A failure to ratify the CTBT would be a hard blow to current efforts to move disarmament forward. But a success would encourage the eight other states (China, Egypt, India, Indonesia, Iran, Israel, North

Korea, and Pakistan) whose ratification is needed for the treaty to enter into force. Indonesia has already announced it would ratify the CTBT if the US does, and it is quite likely that China would also follow. Increased efforts would still be needed to bring on board the remaining countries for which the issue of CTBT ratification is often linked to regional considerations.

The agreement at the Conference on Disarmament on its 2009 work program briefly opened the way to the negotiation of a treaty banning the production of fissile material for nuclear weapons (a *Fissile-Material Cut-off Treaty*). The Conference has yet to renew in 2010 its agreement for this year's program. The FMCT negotiation will be an arduous process as some nuclear powers (India and Pakistan in particular) are still reluctant to accept a cap on their production of fissile material. Members of the Conference will also have to find common ground on many contentious issues:

- Negotiators will have to agree on the scope of the treaty and decide whether it should be limited to future production of fissile material for weapons or whether it should also cover existing stocks (a step that is opposed by most nuclear-armed states). One option for avoiding a deadlock would be to provide for separate arrangements on the existing stocks.
- They will also have to agree on verification measures. One hurdle has been removed by the current US administration, which supports a "verified" treaty, whereas its predecessor opposed international verification. Robust verification measures will be needed to monitor compliance with the treaty. They should be similar to those existing in the framework of the strengthened IAEA safeguards for monitoring compliance with the NPT in order to avoid discrepancies between the two regimes.

### Further steps to develop trust

To gain momentum, progress toward nuclear disarmament will need to be supported by increased efforts to strengthen the nonproliferation regime and to renovate international security relationships.

<sup>43</sup> At the time of the conclusion of the New START treaty, both sides issued unilateral statements on missile defense. The US statement emphasizes that nothing in the treaty would limit current or planned US missile-defense programs. Russia's statement specifies that "the exceptional circumstances referred to in Article 14 of the Treaty [on withdrawal from the Treaty] include increasing the capabilities of the USA's missile defence system in such a way that threatens the potential of the strategic nuclear forces of the Russian Federation."

### Need to resolve the current proliferation crises

Resolving the nuclear crises in North Korea and Iran should be a priority. A failure to do so would make further progress toward disarmament very unlikely, as current nuclear-armed states would want to preserve their own forces to defend against new threats.

If unchecked, the two crises could generate proliferating cascades in Northeast Asia and in the Middle East, with neighboring countries hedging against these emerging risks or even deciding to develop their own nuclear capacity. This would complicate further disarmament efforts.

The current proliferation crises also represent a test of the capacity of the international community, and specifically the Security Council, to react effectively to nuclear challenges and to serve in the future as the backbone of an enforcement system for nonproliferation and disarmament.

More generally, a strengthened nuclear nonproliferation regime will be an essential requirement in order to progress toward a nuclear-weapon-free world. The reduction of existing arsenals should be matched by adequate measures to prevent the emergence of new ones. Strengthening the IAEA verification authority, as well as developing international control of fuel-cycle activities, is of particular importance in this regard.

### Need to establish cooperative relationships among nuclear powers

Trust among nuclear states will be essential to move the disarmament process forward. In the absence of mutual trust, states could be tempted to develop alternative strategies to hedge against possible destabilizing effects of force reductions. The adoption of transparency measures in nuclear stockpiles could, for instance, become an incentive for some nuclear powers to increase their stocks in order to reach parity with their competitors. Reductions in nuclear arsenals could be compensated by a new race in conventional armaments. One can think of many ways in which things could go wrong.

However crucial, trust will be extremely difficult to instill between state parties that in many cases are also potential or former adversaries. Trust can

only develop over time. States will also need a proven record of reliability to gain confidence in the verification process and in the enforcement system.

A wide range of efforts will be needed to support this process:

- In the international security system, steps toward nuclear disarmament should be supplemented by other disarmament efforts to ensure that nuclear-force reductions would not create imbalances. In this regard, the clause in Article VI of the NPT obligating all states to pursue “general and complete disarmament” should not be considered an empty one, and more attention should be given to the interplay between nuclear disarmament and the other areas of cooperative security.<sup>44</sup>
- In each state, internal regulations will also be needed to carry out disarmament commitments. One area of particular interest will be the promotion of transparency, openness, and access to information. In this spirit, many analysts support the idea of offering specific protection to whistleblowers who would report undeclared activities.

## DO WE HAVE THE RIGHT FRAMEWORKS?

### Existing frameworks

Progress toward nuclear disarmament can be pursued along two main tracks: (1) the “United Nations track,” which includes the General Assembly with the First Committee, the NPT with its review cycle, and the Conference on Disarmament; and (2) the “ad hoc track” of nuclear-armed states, which is currently limited to US-Russia negotiations and to unilateral steps taken by other nuclear states (mostly the UK and France).

Both tracks offer their specific advantages: universality and legitimacy for the UN; flexibility and adaptability for the ad hoc formats. Yet both have their own limitations: progress can be blocked at the UN by the lack of consensus; and it is dependent on the goodwill of the nuclear states in the ad hoc track.

In this context, recent efforts toward nuclear disarmament could very much lose their momentum when it comes to concrete implementation:

- In the UN track, fourteen years after its signature,

<sup>44</sup> See Randy Rydell, “Nuclear Disarmament and General and Complete Disarmament,” in *The Challenge of Abolishing Nuclear Weapons*, edited by David Krieger (New York: Transaction, 2009).

the CTBT has not yet entered into force and the FMCT may not be concluded for years (not to mention its entry into force).

- In the ad hoc track, much depends on the ability of the US and Russia to achieve deep reductions. The question will then arise on how to include the other nuclear states in a multilateral effort toward further reductions. Deep cuts will most likely not be possible unless all nuclear powers join the disarmament process. If discussions among the five permanent members of the Security Council (P5) can constitute a possible format for the nuclear states recognized by the NPT, there is no obvious solution for the inclusion of the non-NPT nuclear powers.

### Are there alternative fora and instruments?

The limitations of the existing formats lead one to consider which other options could either replace or supplement them.

#### The Model Nuclear-Weapon Convention

One option would be to replace the current step-by-step approach with a more radical one, which would be to prohibit all nuclear weapons, as is the case with biological and chemical weapons.

This is what is proposed by the *Model Nuclear Weapons Convention* co-sponsored by Costa Rica and Malaysia:<sup>45</sup> The convention would prohibit the production, stockpiling, use, and threatened use of nuclear weapons, as well as the production of weapon-usable fissile material. States would be required to destroy their arsenals and their delivery vehicles.

Nuclear weapons would be eliminated through a series of five phases ranging from taking the weapons off alert and removing them from deployment, to dismantling the warheads and placing the fissile material under international control. These phases will be linked to a precise calendar starting with the entry into force of the convention, which would itself be dependent on the ratification by all nuclear-weapon and nuclear-capable states.

The convention would establish a verification system under the responsibility of an international

agency. Cases of noncompliance would be brought to the attention of the UN General Assembly and the Security Council. The convention would also grant protection to citizens who reported suspected violations of its obligations.

The attraction of a *Model Nuclear Weapons Convention* is its offering a comprehensive plan integrating all aspects of nuclear disarmament. It is also its main weakness, as the prospect of securing the agreement of all nuclear powers on such a plan seems in the present context quite remote. At this stage, China is the only nuclear-weapon state who has expressed interest in this concept.

#### Other options

Other options would be to propose voluntary measures to accelerate the adoption of steps toward disarmament.

This is, for instance, already the case with the de facto moratorium on nuclear testing pending the entry into force of the CTBT. All NPT nuclear-weapon states, as well as India, currently adhere to this moratorium.

A similar moratorium could be established for the production of fissile material for nuclear weapons, pending the conclusion and entry into force of the FMCT. At this stage all the NPT nuclear-weapon states, except China, have declared that they have ceased their production and have no plans to resume it. None of the non-NPT nuclear powers has done so.

Other voluntary, informal arrangements have been proposed in the area of fissile material, such as the establishment of guidelines to which nuclear powers would be invited to subscribe on a voluntary basis.<sup>46</sup> These guidelines would call on states to make regular declarations of their fissile-material stocks and to apply the highest standards of accountancy and physical protection to these stocks. States would also make regular declarations of their stocks in excess of weapons needs, which they would place under IAEA safeguards and convert to non-weapon-usable forms.

<sup>45</sup> United Nations, *Letter Dated 17 December 2007 From the Permanent Representatives of Costa Rica and Malaysia to the United Nations Addressed to the Secretary-General*, UN Doc. A/62/650, January 18, 2008.

<sup>46</sup> See Robert J. Einhorn, "Controlling Fissile Materials and Ending Nuclear Testing," paper presented to International Conference on Nuclear Disarmament, Oslo, February 26-27, 2008, available at [www.ctbto.org/fileadmin/user\\_upload/pdf/External\\_Reports/paper-einhorn.pdf](http://www.ctbto.org/fileadmin/user_upload/pdf/External_Reports/paper-einhorn.pdf).



## DISARMAMENT AND THE NPT REVIEW CONFERENCE

### Context

Disarmament is at the heart of what is often described as the “grand bargain” of the NPT: the idea that non-nuclear states have committed not to seek nuclear weapons and that nuclear powers have, in return, committed to pursue the elimination of their weapons. There are three other “bargains” stemming from the treaty. In exchange for their pledge not to acquire atomic weapons, non-nuclear states can expect (1) the promotion of nuclear cooperation and of exchanges in technologies and materials; (2) assurances from the weapon states that they will not use nuclear arms against non-nuclear states; and (3) the confidence that other non-weapon states will also not seek nuclear weapons, thereby increasing regional and global security. But the reciprocal commitment not to acquire weapons on one side and to pursue their elimination on the other is seen by a majority of states as the cornerstone of the treaty and of its indefinite extension in 1995.

Against this backdrop, the lack of progress in nuclear disarmament has generated considerable frustration among non-nuclear states. Many of them argue that they have to meet increasingly stringent nonproliferation requirements whereas nuclear-weapon states do not seem to be keeping their part of the grand bargain.

Over the recent years, nuclear-weapon states have taken some of the thirteen “practical steps” toward nuclear disarmament adopted at the 2000 NPT Review Conference.<sup>47</sup> Three weapon states (France, Russia, and UK) have ratified the CTBT and all of them observe a moratorium on nuclear testing. All weapon states have stopped their production of fissile materials for nuclear weapons and two states (UK and USA) have declared their stocks of fissile materials. Three states (France, UK, and USA) have announced unilateral reductions in their stockpiles and have increased transparency about their weapons. And three states (Russia, UK, and USA) have taken steps to develop verification capabilities for the achievement of a nuclear-weapon-free world. However, progress is unequal among

weapon states, and much more still needs to be done.

As in previous conferences, nuclear disarmament will be among the most intensely debated issues at the Review Conference. A successful outcome in this area will be essential to restore confidence in the nonproliferation regime and to strengthen the NPT. The renewed commitment, endorsed by all weapon states, to “create the conditions for a world without nuclear weapons”<sup>48</sup> and the recent conclusion of the US-Russia New START treaty provide for a more positive atmosphere. But it will be a difficult task for the conference to define the way forward.

### Perspectives

At this stage, the most promising approach seems to combine step-by-step treaty negotiations on reductions of nuclear forces and less formal, voluntary measures with a quicker impact: (1) the main priority is to move forward US-Russia negotiations on reducing their strategic arsenals and to break the deadlock over the CTBT and FMCT; (2) in support of these steps, the five nuclear-weapon states should agree on voluntary initiatives such as a moratorium on the production of fissile material for nuclear weapons, transparency measures on their existing stocks of fissile material, and the dismantling of their nuclear-testing sites as well as of their facilities for the production of fissile material for weapons; and (3) in addition to reductions in strategic offensive forces, efforts should be undertaken to begin treaty negotiations on reducing and eliminating nonstrategic weapons (2,000 in Russian operational stockpiles and several thousand in reserve, and 500 in US operational stockpiles and 800 in reserve). The idea of a multilateral treaty to eliminate intermediate-range ground-launched missiles could also be explored.

To reach an agreement, the Review Conference will have to identify goals that will be both ambitious and realistic. It will also have to take into account the variety of actors that are required to take disarmament steps: primarily the weapon states, but also the non-nuclear states, and the nuclear-armed states that are not party to the NPT.

47 Sharon Squassoni, “Grading Progress on 13 Steps Toward Disarmament,” Carnegie Endowment for International Peace, May 8, 2009, available at [www.carnegieendowment.org/files/13\\_steps.pdf](http://www.carnegieendowment.org/files/13_steps.pdf).

48 UN Security Council Resolution 1887 (September 24, 2009), UN Doc. S/RES/1887.

These categories are more heterogeneous than it seems. Weapons states have different approaches and records in disarmament. So do the non-nuclear states for instruments which apply to them (for instance, the CTBT and the future FMCT). On their part, non-NPT states have remained outside international disarmament frameworks, and are at times in a position to block progress, as the discussion in Geneva on an FCMT shows. Although the Review Conference has little bearing on non-NPT states, these countries should be incited to join disarmament efforts.

More generally, a prerequisite for the success of

further disarmament is to restore and promote trust between the nuclear-armed states, as well as between them and the non-weapon states. In this regard, steps toward nuclear disarmament cannot be considered separately from larger efforts to strengthen cooperative security and to promote disarmament in other areas. To this end, progress is needed on a wide range of issues, from improving international frameworks for conflict resolution to increasing internal transparency within states. These issues go beyond the scope of the NPT review process, but they should be taken into account in defining the way forward.

## Nuclear-Weapon-Free Zones

### SUMMARY

- Five nuclear-weapon-free zones (NWFZs) cover territory in most of the Southern Hemisphere and in Central Asia.
- Over 100 states have ratified the NWFZ treaty for their region; another twenty-four have signed but not ratified.
- Nuclear-weapon states recognized by the NPT have not fully ratified the protocols to most of the treaties. Nuclear-armed states that are outside the NPT are also outside the NWFZs.
- The key issues for NWFZs and for the NPT Review Conference are the extension of the geographic coverage of the zones, including to the Middle East, and the gaps in ratification of NWFZ treaties and their protocols.

### BACKGROUND

Nuclear-weapon-free zones (NWFZs) represent important contributions to the achievements of the NPT's broader goals of nonproliferation and disarmament. The NPT discusses regional nuclear-weapon-free zones in Article VII, which states that "nothing in this Treaty affects the right of any group of States to conclude regional treaties in order to assure the total absence of nuclear weapons in their respective territories."

There are now five zones in force, covering territories in most of the Southern Hemisphere and in Central Asia. Antarctica and Mongolia are also nuclear-weapon free. Discussions of NWFZs are a frequent part of the NPT review process.

Proposals for NWFZs pre-date negotiation of the NPT. In the late 1950s and early 1960s, such zones were proposed for Central and Northern Europe, and for Latin America. Zones in Europe never materialized, but the Latin American and Caribbean treaty (the *Treaty of Tlatelolco*) opened for signature in 1967—before the NPT was finally negotiated. The *Treaty of Tlatelolco* entered into force in April 1969. The process of negotiating that treaty made an important contribution to thinking about the NPT.

In subsequent years, treaties for zones in the South Pacific, Southeast Asia, Africa, and Central

Asia were created. By July 2009, all had entered into force (see Annex III).

### The purpose of NWFZs

Although each zone has particular and sometimes unique characteristics, their purposes are similar. NWFZs attempt to achieve several goals:

1. To prevent the development of new nuclear-armed states or capabilities in their region, achieved through bans on production, testing, use, or other acquisition of nuclear weapons.
2. To keep nuclear weapons out of the zone (or, in some cases, to allow sovereign decisions by governments about whether foreign countries can ship nuclear materials through their territory).
3. To prevent nuclear-weapon states from using or threatening to use nuclear weapons against countries in the zone.

Governments in the region concerned can readily choose whether or not to join a NWFZ; thus the obligations that are adopted by states within the zone go into effect when these states ratify the NWFZ treaty and it enters into force. More complicated are the goals that require action by states outside of the region. These are embodied in protocols that are additional to the treaty—the treaty itself cannot require external states to sign the protocols and commit to the actions therein.

### Relationship to the NPT

Although NWFZs are not formally organized to support the NPT, the full implementation of the treaties and their protocols would support nonproliferation and disarmament objectives in a number of ways. For example, NWFZs' compliance and verification obligations typically require that states negotiate safeguards agreements with the IAEA if they have not already done so; they prohibit testing within the zone, by states both in and outside the zone, thereby creating additional prohibitions on vertical and horizontal proliferation; and they strengthen norms in support of nonproliferation and disarmament. Moreover, the full implementation of NWFZs could have the more direct effect of requiring that the NPT nuclear-weapon states adjust doctrine and weapons deployments (notably by restricting the movement of weapons and related

materials through the zones), which would in turn support efforts toward broader nuclear disarmament.

## KEY ISSUES

### Geographic coverage

Nearly 100 states within existing zones have ratified a treaty establishing a NWFZ in their region; another twenty-four have signed but not ratified. Thus the first goal of NWFZs discussed above—to prohibit nuclear-weapon development or presence in the zonal area—has been achieved for a large number of states. States that are currently outside a NWFZ are the following:

- states in the Middle East that would be included in a Middle East Nuclear-Weapon-Free Zone were it to be negotiated;
- those that have nuclear weapons (the five NPT nuclear-weapon states, plus DPRK, India, Israel, and Pakistan);
- those in alliance relationships with a nuclear power that include an implicit or explicit assumption of extended deterrence; and
- a small number of states that are neither in a NWFZ nor in an alliance with a nuclear power.

Assuming one sought greater coverage of NWFZs, achieving that would present different kinds of tasks:

- For states that have signed but not ratified a NWFZ treaty, the issue would be how to encourage them to ratify, an issue that comes up particularly in the Africa zone.
- For states in the Middle East, it would mean finding a way out of the longstanding deadlock on a Middle East NWFZ.
- And it would require supporting the development of NWFZs among states that are not formally protected by the extended deterrent of a nuclear power.

### Effective coverage

**The role of NPT nuclear-weapon states.** To accomplish the full goals of NWFZs requires that nuclear-weapon states adopt protocols giving assurances that they will not attack states in the zone with nuclear weapons, nor threaten such an attack; and that they will not move nuclear-weapon-related materials through their territories without permission. As the attached charts discuss, in only one case (the *Treaty of Tlatelolco*) have all five nuclear-weapon states signed all protocols, and

even in that case, several have held out reservations. Although the depth of their reluctance to sign the protocols varies (both by state and by NWFZ), two situations are particularly problematic, and rapid progress is not certain:

- *The Southeast Asia NWFZ* has been ratified by all relevant states in the region but no weapon state has signed its protocol. The reason is that the Southeast Asia zone applies to the Exclusive Economic Zone of its states parties. A first problem is that, because of its wider coverage, the zone may include the territory of states to which a weapon state has alliance commitments. A second difficulty is the transport issue, and potential constraints on movements of ships with nuclear weapons or related materials.
- *The Central Asian NWFZ* has been ratified by all relevant states, but three weapon states (France, UK, and US) have objections to the treaty creating the zone. In particular, they object to its Article 12 which says that this treaty does not affect treaties that were concluded before its entry into force. Their concern has been that Russia would retain its rights to transport, and possibly deploy, nuclear weapons in the zone under the 1992 *Tashkent Collective Security Agreement*.

Negotiations among parties continue, although they are difficult and go to the heart of the issue: the point where NWFZ interests and the interests of weapon states do not converge.

**The role of nuclear-armed states that are not parties to the NPT.** All of the NWFZ treaty protocols concern only the five weapon states recognized by the NPT. This, too, has profound consequences for the approach taken by NWFZs, as long as non-NPT nuclear-armed states (India, Israel, and Pakistan) are also not requested to—and do not—sign protocols.

### Verification and compliance

These issues are important and addressed in each NWFZ treaty. Several points are worth noting:

- The treaties typically mandate that states parties negotiate safeguards agreements with the IAEA, if they have not already done so, and it is expected that the IAEA will conduct ad hoc and routine inspections as normal. The Central Asian NWFZ, the most recently negotiated, also requires state parties to ratify an Additional Protocol with the IAEA.
- In addition, with the exception of the Central Asian NWFZ, treaties establish some verification

and/or compliance mechanisms of their own, ranging from the elaborate to the more perfunctory. There may be useful lessons in these more diverse approaches to verification and compliance, and particularly in the role of regional actors. Although the treaties rely on the IAEA for verification, they also sometimes go beyond the agency's prerogatives.

## NWFZs AND THE NPT REVIEW CONFERENCE

Two issues are particularly salient, in both the preparatory committees and at the conferences themselves:

### Negative security assurances

An important principle of the global nonproliferation and disarmament regime is that those states renouncing the nuclear option should know that nuclear-weapon states will not threaten to use, or actually use, nuclear weapons against their country. As discussed, this has been difficult to achieve fully in the NWFZs.

For many non-nuclear states, concerns about this only deepened over the past decade, as some weapon states articulated doctrine that did not rule out nuclear retaliation on states that were seen to have used weapons of mass destruction against them. Thus it is likely that the 2010 Review Conference will see continued attention put on the question of a legally binding instrument granting negative security assurances to NPT non-nuclear states. This will likely include discussion of the implications of the recently released US Nuclear Posture Review, in which the United States says that it will not use or threaten to use nuclear weapons against NPT non-nuclear states that are in compliance with nonproliferation commitments.<sup>49</sup>

With agreement on the work program of the Conference of Disarmament, there can again be a working group to take up the question of negative security assurances—although actual agreement on a legally binding instrument seems remote. At the same time, to the extent that fuller implementation of NWFZs is possible, including the adoption of protocols by weapon states, this would have the effect of extending legally binding assurances to a larger number of states. Should states place greater

emphasis on achieving full implementation of NWFZs, as an additional, if not primary, route to realizing negative security assurances?

### The Middle East as a nuclear-weapon-free zone

The possibility of creating a Middle East NWFZ has been a contentious issue at Review Conferences for many years.

The initial call for a Middle East NWFZ came in the form of a proposal from Iran, co-sponsored by Egypt, to the 1974 UN General Assembly. In December of that year, the General Assembly adopted a resolution commending the idea of such a zone, calling on all parties to “proclaim” their intention to refrain from developing nuclear weapons and to join the NPT. The resolution passed unanimously, with Israel and Burma abstaining. The resolution was regularly agreed upon in subsequent General Assembly sessions. In 1980, it was adopted without a vote for the first time.

In 1988, at the third special session on disarmament, Egypt offered a proposal that (1) called on all nations within and outside the region to commit to not introduce nuclear weapons into the region; (2) requested that the secretary-general appoint a representative to consult with all governments in the region on drafting a model treaty; and (3) suggested asking the IAEA to develop recommendations for compliance and verification. In 1990, President Hosni Mubarak proposed a zone free of weapons of mass destruction, to be considered along a parallel track. Thus the key elements of discussion and debate have been in place for over twenty years.

The question of a Middle East NWFZ was key to the 1995 extension decision, with an agreement reached only in the last days of the conference. The final statement of “Principles and Objectives for Nuclear Non-Proliferation and Disarmament,” included the following point: “The development of nuclear-weapon-free zones, especially in regions of tension, such as in the Middle East, as well as the establishment of zones free of all weapons of mass destruction, should be encouraged as a matter of priority, taking into account the specific character-

<sup>49</sup> US Department of Defense, “Nuclear Posture Review Report,” April 2010, available at [www.defense.gov/npr/docs/2010%20Nuclear%20Posture%20Review%20Report.pdf](http://www.defense.gov/npr/docs/2010%20Nuclear%20Posture%20Review%20Report.pdf).



istics of each region.”<sup>50</sup>

In addition, conference parties adopted a resolution proposed by Russia, the UK, and the US, which stated that the conference “endorses the aims and objectives of the Middle East peace process and recognizes that efforts in this regard, as well as other efforts, contribute to inter alia, a Middle East zone free of nuclear weapons as well as other weapons of mass destruction...”<sup>51</sup>

Other language reaffirmed the need for non-NPT parties “that operate unsafeguarded nuclear facilities,”<sup>52</sup> to put them under full-scope safeguards; and for all states in the region that had not acceded to the NPT to do so. The 2000 Review Conference reaffirmed and elaborated these commitments.

The question of a Middle East NWFZ has remained a contentious issue through the 2000’s, including at the 2005 Review Conference. There has been little progress and the question is expected to remain difficult and potentially divisive. The issues and points of disagreement—at least in the

public debate—are well known, essentially concerning whether a NWFZ, and broader peace measures, can be negotiated before or after all states in the region accede to the NPT.

Still, the underlying security conditions in the Middle East have changed substantially since the proposal for a Middle East NWFZ first emerged.<sup>53</sup> This perhaps could allow for more flexibility in states’ approaches, and there is now considerable discussion about ways to get beyond the stalemate of the past twenty-five years. This includes, for example, proposals to appoint an independent “coordinator” who could hold consultations, on a bilateral basis, with states in the region, about how to move forward and about the drafting of a model treaty; and/or to request the UN secretary-general to convene a conference of states in the region to explore new ways, including confidence-building measures to facilitate progress on the Middle East resolution.

50 1995 Review and Extension Conference of the Parties to the Treaty on the Non-Proliferation of Nuclear Weapons, doc. NPT/CONF.1995/32 (Part I), decision 2.6.

51 NPT Review Conference 1995, “Resolution on the Middle East,” NPT/CONF.1995/32/RES.1, 1995.

52 Ibid.

53 As discussed by Rebecca Johnson, “Rethinking Security Interests for a Nuclear Weapon-Free Zone in the Middle East,” *Disarmament Diplomacy* No. 86 (Autumn 2007).

## North Korea and the NPT

### SUMMARY

- The Democratic People's Republic of Korea (DPRK) became a state party to the NPT in 1985, but announced in 2003 that it would no longer be bound by the treaty. Since that time, negotiations over the North Korean nuclear program have not resolved the dispute between the DPRK and the international community.
- North Korea tested a nuclear weapon in 2006 and in 2009. Subsequently the Security Council adopted two Chapter VII resolutions condemning the tests and imposing sanctions.
- Both the DPRK's withdrawal from the NPT and its nuclear-weapon tests constitute significant challenges to the NPT regime.
- Issues of particular concern in the NPT Review Conference will be the status of the DPRK within the NPT; the adequacy of the NPT's rules governing treaty withdrawal; and the ability of the international community to require compliance with NPT terms.

On January 10, 2003, the Democratic People's Republic of Korea (DPRK) said that it could "no longer remain bound to the NPT." The DPRK was the first, and is still the only, NPT state party to make this declaration. The fact of the DPRK's treaty withdrawal poses short-term questions about the DPRK's status (if any) within the NPT, and about the adequacy of the NPT's provisions for treaty withdrawal. It also poses longer-term questions about the ability of existing international institutions to oversee implementation of treaty obligations related to nuclear nonproliferation and disarmament.

### EARLY PROGRAM HISTORY

The DPRK took initial steps toward the development of a civilian nuclear program in the 1950s.<sup>54</sup> With the end of the Korean War, North Korean leaders began promoting the development of scientific and engineering expertise, including in the area of nuclear physics. They signed several agreements to cooperate on training with the Soviet

Union. In 1959, the Soviets agreed to supply the DPRK with a research reactor, and to assist in the development of a nuclear-research center. By the early 1960s, the DPRK had received the research reactor and construction of the Yongbyon Nuclear Research Complex was underway. The research reactor is believed to have come on line in 1967.

In the 1970s, the DPRK strengthened its indigenous capabilities; this included upgrading the research reactor and constructing a university-based "experimental nuclear facility." Toward the end of the decade, the North Koreans started work on the experimental 5 MW(e) reactor at Yongbyon, which was indigenously designed. It would use natural uranium,<sup>55</sup> mined in North Korea.

By the beginning of the 1980s, the DPRK therefore had within its borders all the necessary elements for an indigenous program: expertise, i.e., trained scientists and engineers; their own supplies of natural uranium; and experience in building and operating nuclear facilities. During the 1980's they began to build a 50 MW(e) and a 200 MW(e) reactor. The 5 MW(e) reactor came online by mid-decade. The DPRK also started construction of a "radiochemical laboratory," essentially a reprocessing facility. And they requested two additional reactors from the Soviet Union.

Outside experts are divided about when the DPRK may have begun applying these indigenous capabilities to the development of a nuclear-weapons program: some would say it was in the 1970s, others put it considerably later. The decision may have been a gradual one, where options were kept open but not necessarily pursued right away. In any case, two points are important here: the DPRK's nuclear program is longstanding, beginning only a few years after the founding of the country itself; and although the DPRK had external assistance in the very early days of its program, it had developed its indigenous capabilities quite early in the program's history. Both of these factors

<sup>54</sup> The analysis of the historical background is adapted from Christine Wing, "The IAEA and the DPRK," in *Dismantle and Disarm: Lessons from the IAEA*, by Christine Wing and Fiona Simpson (forthcoming 2010, tentative title). It also draws from contemporaneous news reports and subsequent NGO reporting. Detailed sources provided on request.

<sup>55</sup> Natural uranium does not have to be enriched before it can be used as reactor fuel in certain kinds of reactors.



would shape how international institutions and other governments later interacted with the North Koreans.

### IAEA INSPECTIONS (1992-1994)

The emergence of DPRK nuclear capabilities did not go unobserved, and increasingly through the 1970s and the 1980s, the country was urged to participate in the international agreements that deal with civilian nuclear programs. The Soviets wanted the research reactor to be safeguarded, which it was in 1977 (the DPRK had joined the IAEA in 1974). By the mid-1980s, the North Koreans were under growing pressure to join the NPT. They did so in 1985, at the urging of the Soviet Union, which, apparently, would agree to supply the two requested reactors only if the DPRK had joined the NPT.

The DPRK did not sign a safeguards agreement with the IAEA until April 1992, at which time it also submitted an initial inventory of its nuclear holdings. The IAEA then took the routine next step of inspecting nuclear facilities and materials, to verify that the DPRK's initial declaration was correct. The origin of the current impasse concerning the DPRK's nuclear program can be found in that early effort at verification.

The IAEA's inspection activities in the DPRK began in May 1992, and went relatively smoothly at first. But eventually the agency identified significant discrepancies between the DPRK's initial declaration, and the analysis of the information collected through inspections. The agency asked to visit and take samples from two waste sites, so the discrepancies could be resolved. But the DPRK would not allow them to do so.

In early 1993, the IAEA invoked the heretofore unused part of the safeguards agreement that allows the agency to carry out "special inspections," when necessary for verification of a country's reported nuclear holdings. The DPRK was still unwilling to grant access, and as the disagreement continued, the North Koreans announced, in March 1993, that they planned to withdraw from the NPT in three months time, as allowed by the treaty in Article

X(1).<sup>56</sup> Eventually, through discussions between the North Koreans and the US, the DPRK agreed to "suspend the effectuation" of their withdrawal from the treaty.

The IAEA and the DPRK continued to disagree about access, however, and the situation deteriorated such that, by March 1994, the IAEA removed inspectors from the DPRK. In May 1994, the North Koreans began to unload fuel rods from the 5MW(e) reactor, without the presence of the IAEA—which the agency had repeatedly requested, saying it was essential for making determinations about the history of the program; and to assure that none of the spent fuel was diverted.

A major crisis ensued, in which there were real fears that the inspection regime could not be made to work; and the US seriously contemplated military action against the DPRK. In part through the intervention of former President Jimmy Carter, the crisis was defused in June 1994. Subsequent discussions between the DPRK and the US resulted in the "Agreed Framework" in the fall of 1994.

### THE AGREED FRAMEWORK (1994-2002)

In the Agreed Framework, the US said that it (with the Republic of Korea and Japan) would help the DPRK to build two light water reactors, in exchange for a freeze on all nuclear activities by the DPRK. It was agreed that the IAEA would verify that freeze; that the DPRK would also allow verification of its initial declaration; and that the consortium led by the US would supply fuel oil to the DPRK as the process moved forward.

Implementation of the Agreed Framework was bumpy at times, especially later in this period, but there were important achievements. The DPRK did freeze its nuclear activities, which meant that it was not producing plutonium throughout this period. The freeze was verified by the IAEA. Fuel oil was shipped to North Korea by participating countries. Through the activities of the Korean Peninsula Energy Development Organization (KEDO), substantial progress was made in building the infrastructure for a light water reactor in North

<sup>56</sup> The relevant part of Article X says: "Each Party shall in exercising its national sovereignty have the right to withdraw from the Treaty if it decides that extraordinary events, related to the subject matter of this Treaty, have jeopardized the supreme interests of its country. It shall give notice of such withdrawal to all other Parties to the Treaty and to the United Nations Security Council three months in advance. Such notice shall include a statement of the extraordinary events it regards as having jeopardized its supreme interests."

Korea.

Still, the IAEA never was able to verify the DPRK's initial declaration. Moreover, as governments in the key countries changed over time, support for implementation of the Agreed Framework waned, including in the US—which became lukewarm to the Agreement when administrations changed in 2001.

The final blow to the Agreed Framework came in the fall of 2002, when the US, in the first set of bilateral talks for some time, told the North Koreans that the US had evidence that the DPRK was developing a uranium enrichment capability. Initially the North Koreans appeared to confirm this, although later they would claim that it was not the case. Uranium enrichment would have violated the terms of the Agreed Framework, and by the end of the year, fuel supplies were suspended. The IAEA asked for North Korean cooperation in clarifying the recent reports concerning an enrichment program, but this did not occur. The DPRK declared its intention to resume operations at nuclear facilities—though saying that they did not plan a weapons program. They removed passive verification measures and told the inspectors to leave. Early in January 2003, the DPRK said it could “no longer be bound” by the NPT. Within a few months the US claimed evidence of activity at the RadioChemical Laboratory, and suspected that the North Koreans were starting to re-process fuel rods that had been in storage.

### THE SIX-PARTY TALKS (SINCE 2003)

Despite these developments, talks were soon underway among the DPRK, China, and the US. In August of 2003, the Republic of Korea, Japan, and Russia joined in, as the “Six-Party Talks” came into being. This remains the framework for efforts to resolve the dispute between the DPRK on the one hand, and the US and regional states on the other.

Six-party talks continued through the middle of 2004, with no visible progress. In February 2005, the North Koreans said that they had nuclear weapons and were going to suspend their participation in six-party talks, due to hostile policies by the US. The talks did not begin again until mid-July of that year. In the meantime, the North Koreans unloaded spent fuel from the 5 MW(e) reactor.

Analysts estimate that they could have produced enough plutonium for one to three nuclear devices from the reprocessed fuel. The reactor apparently went back into operation by September 2005.

At that point there was a breakthrough of sorts at the six-party talks, resulting in an agreement in which the DPRK said it would abandon all nuclear weapons and programs, and return to the NPT and to safeguards. The US “affirmed that it has no nuclear weapons on the Korean Peninsula and has no intention to attack or invade the DPRK with nuclear or conventional weapons.” In addition, “...The DPRK stated that it has the right to peaceful uses of nuclear energy. The other parties expressed their respect and agreed to discuss, at an appropriate time, the subject of the provision of light water reactor to the DPRK.”<sup>57</sup>

Almost immediately the statement was undermined by differing interpretations about “provision of light water reactors.” It did not help when, in mid-September 2005, the US signaled its intention to sanction a Macao-based bank for money laundering and its dealing with North Korea. The DPRK, for its part, said that it would not abandon its weapons and programs as long as their Banco Delta Asia funds remained frozen. One more round of talks was held in November 2005 but the parties did not meet again until December 2006.

By that time, the DPRK had announced and then conducted its first test of a nuclear weapon. The October 2006 test, thought to be less than 1 kiloton, removed any doubt about whether the DPRK had a weapons program. It was widely condemned in the international community, including by the Security Council, which passed Resolution 1718 denouncing the test and calling for sanctions and embargoes on some goods and equipment. The resolution was passed under Chapter VII of the United Nations Charter.

Shortly thereafter, China announced an agreement among the parties to resume the Six Party dialogue. By mid-2007, the agreements reached had led to significant change: the DPRK closed, and began dismantling, its nuclear facilities, with verification by the IAEA; substantial quantities of fuel oil were supplied to the DPRK; and the frozen funds at Banco Delta Asia were returned to

<sup>57</sup> “Full text of Six party talks joint statement,” Kyodo September 19, 2005.

North Korea. In 2008, the US removed the DPRK from its list of “State Sponsors of Terrorism.”

Again, however, the process derailed, partly over questions about the completeness of North Korea’s declaration of nuclear materials, but also in the context of increasing concerns about alleged North Korean nuclear-related assistance to Syria, and, by early 2009, to the DPRK’s decision to launch a communications satellite (thought by some to be a cover for missile development). The DPRK then announced that it would resume the operation of its nuclear facilities, and begin reprocessing fuel rods again. They conducted another weapons test in May 2009. This was followed by the adoption of Security Council Resolution 1874 and additional sanctions. Since that time, the efforts at negotiation have continued their on-again, off-again character.

### THE DPRK AND THE NPT REVIEW CONFERENCE

The issues at stake in the impasse over the DPRK’s nuclear program are not ones that can be resolved in the NPT review process. A resolution will come, if it comes at all, through agreements among the six parties and a lasting implementation of those agreements.

Nonetheless, the DPRK’s withdrawal from the NPT, the difficulties that the international community has had in addressing that withdrawal, and the failure to find a lasting resolution to disputes over the North Korean program, constitute a significant challenge to the NPT and the non-proliferation/disarmament efforts of which it is a part. Those challenges range from the specific to the systemic, and all will arise for discussion, in some form, at the 2010 Review Conference.

**The DPRK’s status.** First, there is the question of whether the DPRK is in or out of the NPT. Its withdrawal from the treaty would seem to make clear that it is no longer a state party. However, relevant institutions, including the Security Council, have been reluctant to acknowledge that withdrawal; and North Korea is still listed among the state parties to the NPT in United Nations documents (although with a mention that the “status of the membership of the DPRK is uncertain”). In the 2005 Review Conference—the first after the DPRK’s decision to leave the NPT—when the North Koreans did not participate, the chair addressed the question of status by holding

the DPRK’s nameplate aside.

This reluctance to acknowledge the DPRK’s use of Article X has several rationales. If the DPRK chooses to return to the NPT, it might be preferable to have never had an “official” NPT withdrawal: a possible precedent-setting event would have been avoided. In addition, to accept that the DPRK left the NPT, after developing (what became) a nuclear-weapons program, leaves two unattractive alternatives: not to do anything in response to the withdrawal, suggesting it is an acceptable practice to develop the basis for a weapons program and then leave the treaty; or to do something, i.e., to create consequence for withdrawal—for which the legal basis is unclear, since the DPRK “simply” exercised a right that Article X affirms. Finally, to acknowledge the DPRK’s withdrawal from the treaty is to establish an additional “category” of nuclear-weapon state, i.e., a former NPT non-nuclear-weapon state that is now a nuclear-weapon state outside the NPT. It is a category that contradicts the purposes of the NPT and that, if it acquires additional members, will further erode the credibility of the treaty.

The DPRK’s withdrawal from the treaty raises a slightly different problem, as well: it has created a situation in which a “return to the NPT” has become a bargaining point, as noted in one occasion discussed earlier.

**Reconsidering Article X?** These various issues have led to discussion within the NPT review process about whether Article X should be amended or supplemented by certain “consequences”; perhaps, for example, to attach conditions that say states that leave the treaty must return any outside materials received, and used, to develop their nuclear program.

Two concerns come immediately to mind. If the goal of these conditions is to thwart a country’s nuclear-weapon program, then its effectiveness depends in large measure on the extent to which the state had received external support for the development of its program, and to which it continues to rely on that support. The DPRK is a good example of a state with indigenous capabilities that can be accessed when necessary—witness their progress in developing a weapons program in the period after the January 2003 treaty withdrawal. Secondly, there is great reluctance to open the NPT

for any amendment, for fear other provisions in the treaty might become open to amendment as well—a process that most observers think could lead to disarray in, if not collapse of, the NPT. One question is whether some additional measures related to, but not amending, Article X, would be desirable and possible.

**Effectiveness of the larger system.** For nearly twenty years, multilateral institutions, coalitions, and national governments have been actively working to ensure that the DPRK, an NPT State Party until 2003, does not have a nuclear-weapon program. From 1995-2002, when the Agreed Framework was in place, these efforts had some real effect, as the DPRK verifiably halted its production of plutonium. Nonetheless, the DPRK eventually resumed plutonium production, it says it has an enrichment program in development, and it has produced nuclear weapons. Although these weapons are presumably not yet deliverable, the multilateral effort has, to date, resulted in failure.

Regardless of how NPT states parties ultimately handle the DPRK's withdrawal from the treaty, this case raises a larger and more fundamental question: whether, and under what conditions, existing multilateral institutions are able to stop a state from developing a nuclear-weapons capability, short of military action against that state. The Security Council, where these issues ultimately arrive, has been relatively attentive to the question of the DPRK's nuclear (and missile) program—passing four resolutions and two presidential statements since 1993 concerning actions by the DPRK. But the Council has been reticent about the DPRK's NPT withdrawal (perhaps for the reasons discussed

above), and a solution to the dispute over the DPRK's program remains elusive.

How important is this? One could argue that there are only a few situations in which an NPT state is alleged to have a nuclear-weapon program—and that this small number of cases does not necessarily imply that the system as a whole is inadequate. However, since we are talking about *nuclear* weapons, and since their introduction into any regional context may promote regional insecurity and nuclear proliferation, it seems risky to dismiss the few “hard cases.” Presumably it is this dilemma that in part drives the new attention to disarmament in some nuclear-weapon states, as they come to believe that, in the world of the twenty-first century, the only guarantee against nuclear proliferation is nuclear disarmament.

Yet plans for longer-term disarmament are not an answer to the challenges posed by the DPRK's program. Global disarmament will not be quickly obtained, particularly to the extent that it is pursued in an equitable and nondiscriminatory way. And in any case, even if the world were peacefully disarmed by 2020, similar issues of compliance, verification, and enforcement would remain. It is important, therefore, to re-visit the evolution of these “hard cases” and to see if there are points where the outcome could have been different: if states and international institutions had taken different positions, could a resolution have been achieved? The DPRK experience may be particularly useful in this regard, since it contains within it a period of substantial success, as well as a later experience of actual program dismantlement. Could those have been sustained in any way?



## Iran and the NPT

### SUMMARY

- Since the disclosure in 2002 of its clandestine nuclear program, Iran has been repeatedly found in breach of its NPT safeguards agreement and subsidiary arrangements, by conducting nuclear activities which it had not declared to the IAEA and by failing to declare the construction of nuclear facilities.
- The IAEA board and the UN Security Council have both required Iran to take steps to restore confidence in its nuclear program. Some progress was achieved in the first years of the crisis. But since 2006 Iran has ignored these calls, despite proposals for a long-term arrangement and enforcement measures taken by the Security Council.
- The Iranian program represents a major challenge to the NPT as the IAEA has reported "consistent and credible" information on its possible military dimensions. A further deterioration of this situation (including risks that other countries engage in similar activities or that Iran withdraws from the NPT) would deeply weaken the treaty.
- The Review Conference cannot ignore the issues raised by the Iranian crisis. But discussions on this topic will be particularly complex, given the links to larger questions such as Article IV rights and the Middle East nuclear-weapon-free zone.

### DEVELOPMENT OF A CLANDESTINE NUCLEAR PROGRAM (MID-1980s-2002)

Iran was among the original signatories of the *Nuclear Non-Proliferation Treaty* (NPT), which it ratified in 1970, and it concluded a safeguards agreement with the IAEA which entered into force in 1974. In the mid 1970s, the country planned a major nuclear power program, and started the construction of two nuclear power plants at Bushehr. This program was suspended after the revolution in 1979, and resumed in the early 1990s. Iran signed an agreement with the Russian Federation in 1992 for the completion of one reactor. The Bushehr power plant, which is projected to start operating in summer 2010, remains today the only ongoing nuclear power plant project in Iran.<sup>58</sup>

In August 2002, the existence of a clandestine program of nuclear fuel enrichment and reprocessing was revealed by an Iranian opposition group in exile. In February 2003, the IAEA visited the fuel enrichment facilities at Natanz (a pilot plant near completion and a large commercial-scale plant under construction). Iran declared these facilities for the first time to the agency during that visit, and confirmed the construction of a heavy-water production plant in Arak. The IAEA inquired about the importing of natural uranium to Iran and the processing of such material, which also had not been declared to the agency.

The director-general of the IAEA reported to the board in June 2003 that Iran had "failed to meet its obligations under its Safeguards Agreement," and noted that, although the quantities of nuclear material involved were not large, the number of failures by Iran was a matter of concern.<sup>59</sup> Following further investigation, the IAEA reported in November 2003 that Iran acknowledged that it had been developing, for eighteen years, a uranium centrifuge enrichment program, and, for twelve years, a laser enrichment program. Dr. ElBaradei noted "Iran's policy of concealment," and he expressed his "serious concern" at the fact that Iranian breaches dealt with the "most sensitive aspects of the nuclear fuel cycle."<sup>60</sup>

These two elements, Iran's lack of transparency and its involvement in the sensitive parts of the nuclear fuel cycle, are at the heart of the Iranian nuclear issue. Their combination raised doubts about the purposes of Iran's activities. After the disclosure of Iran's enrichment and conversion activities, it appeared that there was no economic justification for Iran to process and to enrich nuclear fuel: the country had only one nuclear power plant under completion at Bushehr, for which Russia had committed to supply fuel during the full life of the reactor. Given Iran's lack of transparency, the question was then raised, and remains, of the risk that Iran could also conduct

58 IAEA, "Iran: Nuclear Power Profile," 2004, available at [www-pub.iaea.org/MTCD/publications/PDF/cnpp2004/CNPP\\_Webpage/pages/countryprofiles.htm](http://www-pub.iaea.org/MTCD/publications/PDF/cnpp2004/CNPP_Webpage/pages/countryprofiles.htm).

59 IAEA, *Report by the Director General*, Doc. GOV/2003/40, June 6, 2003.

60 IAEA, *Report by the Director General*, Doc. GOV/2003/75, November 10, 2003.



fuel enrichment in nondeclared facilities with a goal of producing weapon-grade nuclear material.

Concerns over possible military dimensions of Iran's nuclear activities were reinforced later, in 2005, when the IAEA reported on Iran's contacts in the mid-1980s with a "foreign intermediary" (i.e., the A. Q. Khan network) and indicated that Iran had in its possession a document on the production of uranium metal hemispheres, "a process which is related to the fabrication of nuclear weapons components."<sup>61</sup>

### INITIAL ATTEMPTS TO FIND A NEGOTIATED SOLUTION (2003-2006)

In June 2003, the board of governors of the IAEA reacted to the report of the director-general by encouraging Iran not to introduce nuclear material at the Pilot Fuel Enrichment Plant at Natanz and by urging Iran to conclude and implement an Additional Protocol with the agency, in order to enhance the agency's ability to "provide credible assurances regarding the peaceful nature of Iran's nuclear activities."<sup>62</sup>

The initial reaction of the IAEA board in June 2003 and its first resolution<sup>63</sup> in September 2003 thus defined the two main steps that the board (and subsequently the Security Council) has been constantly requiring from Iran since 2003:

- suspend all enrichment-related activities and reprocessing activities,
- provide full transparency on its nuclear activities and cooperate with the IAEA, and in particular sign and fully implement the Additional Protocol.

Both steps were conceived as confidence-building measures to restore trust between Iran and the international community. During the two and a half years that followed the first discussion on Iran by the IAEA board in June 2003, some progress was made at times, but neither of these two steps was fully implemented.

In the very first months of the crisis, as the IAEA was identifying a number of additional failures by Iran to comply with its Safeguards Agreement, the

option of reporting these failures to the Security Council was considered.<sup>64</sup> The IAEA board alluded to this possibility in its November 2003 resolution.<sup>65</sup> But rather than doing so, preference was given to the search for a negotiated solution with Iran.

In October 2003, Dr. ElBaradei held discussions in Tehran with Dr. Hassan Rohani, secretary of the Supreme National Security Council of Iran, on the conclusion of an Additional Protocol. Shortly after, the foreign ministers of France, Germany, and the United Kingdom (the "E3") met in Tehran with Dr. Rohani, and Iran agreed to cooperate fully with the IAEA, to sign and implement the IAEA Additional Protocol, and to suspend enrichment and reprocessing related activities. Iran signed the Additional Protocol in December 2003, and indicated it would implement it pending ratification.

A second agreement was concluded in Paris in November 2004 between Iran and the "E3" with the support of the high representative of the European Union. The Paris agreement<sup>66</sup> launched a negotiating process with a view of reaching "long-term arrangements" between Iran and the E3/EU, including cooperation in three areas: political and security issues, economy and technology, and nuclear issues. Iran reiterated that it would implement the Additional Protocol pending ratification. Iran also agreed to "continue and extend its suspension to include all enrichment-related and reprocessing activities (...) and all tests or production at any uranium conversion installation." The agreement was followed at the end of 2004 and during the first half of 2005 by a series of meetings between European and Iranian experts to prepare a long-term arrangement.

The search for a negotiated solution was not an easy one, however, as on numerous occasions Iran took steps contrary to the Tehran and Paris agreements and to the resolutions of the IAEA board:

- In spring 2004, Iran started uranium conversion activities at its Isfahan facility (which it agreed to

61 IAEA, *Resolution adopted by the Board of Governors*, Doc. OV/2006/14, February 4, 2006.

62 IAEA, *Report by the Director General*, Doc. GOV/2003/63, August 26, 2003.

63 IAEA, *Implementation of the NPT Safeguards Agreement in the Islamic Republic of Iran*, Doc. GOV/2003/69, September 12, 2003.

64 Article XII.C of the statute of the IAEA stipulates that the board shall report to the Security Council the noncompliance of a state with its safeguards agreement.

65 IAEA, *Implementation of the NPT Safeguards Agreement in the Islamic Republic of Iran*, Doc. GOV/2003/81, November 26, 2003.

66 IAEA, *Communication Dated 26 November 2004 Received from the Permanent Representatives of France, Germany, the Islamic Republic of Iran and the United Kingdom Concerning the Agreement Signed in Paris on 15 November 2004*, Doc. INF/CIRC/637, November 26, 2004.

suspend in November 2004), and launched the construction of a research reactor moderated by heavy water in Arak.

- In June 2004, Iran resumed the manufacturing of centrifuge components and the assembling and testing of centrifuges (which it also agreed to suspend in November 2004).
- In May 2005, Iran announced it would resume conversion activities, but agreed to hold off pending communication by the E3 of their proposal for a long-term arrangement.

The failure of the negotiating process became clear in summer 2005. Iran remained determined to resume its fuel-cycle activities (which it considers an inalienable right under the NPT), and had only accepted suspension as a short-term concession until the conclusion of long-term arrangements. On their part, the Europeans considered that suspension was necessary as long as the international community would not receive credible assurances of the peaceful nature of Iran's nuclear program. In their eyes, confidence-building would require an "extensive period."

At the beginning of August 2005, Iran announced its intention to resume conversion activities in Isfahan. The E3/EU requested Iran to continue to hold off, and they transmitted to Iran their framework proposal for a long-term agreement.<sup>67</sup> The E3/EU proposed to support Iran's civil nuclear program (including fuel supply assurances), to cooperate in the areas of regional security, and to develop economic, trade and technological cooperation. In exchange, Iran would commit not to withdraw from the NPT, and to ratify and fully implement its Additional Protocol. It would also "make a binding commitment not to pursue fuel cycle activities other than the construction and operation of light water power and research reactors." It was proposed that this commitment would be reviewed jointly every ten years.

Iran rejected the European proposal three days after receiving it, and resumed conversion activities in Isfahan. A meeting in New York in September between the E3/EU foreign ministers and President Mahmoud Ahmadinejad (elected in June) confirmed the end of the negotiating process.

Meanwhile the IAEA board found that Iran's breaches of its obligations under its NPT safeguards agreement constituted "non-compliance" in the context of Article XII.C of the Statute of the IAEA, and agreed in principle to report the issue to the Security Council but without deciding a date.<sup>68</sup> As a last attempt, Russia tried in November 2005 to renew the dialogue with Iran by proposing a "joint venture" for enrichment in Russia. But Iran did not respond positively.

After the announcement by Iran in January 2006 that it would soon resume its enrichment activities in Natanz, the board of governors of the IAEA then decided to refer the issue to the Security Council.<sup>69</sup> The board recalled that "after nearly three years of intensive verification activity, the IAEA was not yet in a position to clarify some important issues relating to Iran's nuclear program or to conclude that there were no undeclared nuclear material or activities in Iran."

The day after the board resolution, Iran decided to end implementing the Additional Protocol and to resume fuel enrichment in Natanz.

#### THE SECURITY COUNCIL AND THE DUAL-TRACK APPROACH (SINCE 2006)

The action of the Security Council in dealing with the Iranian crisis was meant to reinforce the authority of the IAEA process. With the adoption in July 2006 of Resolution 1696, the immediate effect of the involvement of the Security Council was to give force of law to the requests of the IAEA board of governors addressed to Iran, and in particular:

- the suspension of all enrichment-related and reprocessing activities;
- the ratification and implementation of the Additional Protocol and of all transparency measures required by the IAEA.

The principal requirements for a solution to the crisis remained the same, but became mandatory. The Security Council also endorsed the way forward initially proposed by the E3/EU, which was to offer to Iran the perspective of a long-term agreement.

In the first half of 2006, the three European

67 IAEA, *Communication Dated 8 August 2005 Received from the Resident Representatives of France, Germany, and the United Kingdom to the Agency*, Doc. INF/CIRC/651, August 8, 2005.

68 IAEA, *Resolution Adopted by the Board on 24 September 2005*, Doc. GOV/2005/77, September 24, 2005.

69 IAEA, *Resolution Adopted by the Board of Governors on 4 February 2006*, Doc. GOV/2006/14, February 4, 2006.

foreign ministers and Mr. Javier Solana intensified their coordination with their counterparts in China, Russia and the United States. In June 2006, the Six reached an agreement in Vienna on “a set of far-reaching proposals as a basis of discussion with Iran”. They also made clear that they would propose to adopt sanctions in the Security Council, should Iran refuse to engage in negotiations. This defined the basis of the “dual-track approach,” which has since been followed by the Security Council. At the same time, the group formed by the Six (the three Europeans with the support of the EU high representative, China, Russia, and the US) became the leading format in dealing with Iran and in preparing Security Council’s actions.

The elements of a long-term agreement proposed by the Six built on the framework proposal presented to Iran by the E3/EU the year before. This package carried more weight as it had been endorsed by China, Russia and the United States, and, in particular, included for the first time since 1979 the perspective of the lifting of American sanctions against Iran.

The Six proposed to Iran:<sup>70</sup> to cooperate in the development of its civil nuclear power program (including supporting the construction of light water power reactors in Iran and giving assurances of fuel supply), to support a new conference to promote dialogue and cooperation on regional security issues, and to cooperate in the areas of trade, investment, energy, high technology and agriculture, including the possible removal of US restrictions on exports of civil aircraft and on telecommunication infrastructure. On its part, Iran was required to suspend all enrichment-related and reprocessing activities, to fully cooperate with the IAEA and to resume the implementation of the Additional Protocol. The Six also proposed that the long-term agreement would be reviewed following confirmation by the IAEA of the resolution of all outstanding issues and of the absence of undeclared nuclear activities or materials in Iran.

The proposal was presented to the Iranians by the EU High Representative on behalf of the Six. Mr. Solana met with the Iranians before and after the adoption of Resolution 1696 by the Security Council, but the continuing disagreement with Iran

on the issue of suspension prevented further progress. The offer of the Six has since remained on the table, and has been regularly reiterated, including by the Security Council in its subsequent resolutions.

As the director-general of the IAEA reported that Iran continued to refuse to take the steps required by the IAEA board and by the Security Council, the Council proceeded with the adoption of sanctions aimed at persuading Iran to comply with its resolutions and at constraining Iran’s development of sensitive technologies in support of its nuclear and missile programs. Between December 2006 and March 2008, the Council adopted three resolutions (1737, 1747, and 1803) imposing sanctions on Iran.

The field of the measures adopted by the Security Council has been progressively extended to include the following:

- a ban on exports to and imports from Iran of equipment and technology related to proliferation-sensitive nuclear activities (enrichment-related, reprocessing or heavy-water related activities) and nuclear-weapon delivery systems, and on financial and technical assistance related to these activities;
- vigilance and restrictions on travel by individuals engaged in these activities in Iran, including individuals listed by the Council;
- a freeze of funds and assets owned or controlled by persons and entities involved in the Iranian nuclear and ballistic missile programs and listed by the Council (such as the Atomic Energy Organisation of Iran, the Aerospace Industries Organisation, and Bank Sepah), and by Iran Revolutionary Guard Corps persons and entities also listed by the Council;
- a ban on imports of arms and related materials from Iran and vigilance and restraints in the supply of categories of conventional arms to Iran;
- a call on all states to inspect cargoes to and from Iran operated by Iran Air Cargo and Islamic Republic of Iran Shipping Lines when they are suspected of transporting prohibited goods;
- a call upon states and international financial institutions not to enter into new commitments for grants and financial assistance to Iran, except for humanitarian and developmental purposes, and to exercise vigilance in entering into new commitments for public financial support to trade;

<sup>70</sup> IAEA, *Letter Dated 13 July 2006 from the Permanent Representative of France to the United Nations Addressed to the President of the Security Council*, Doc. S/2006/521, July 13, 2006.

- a call on all states to exercise vigilance over the activities with all banks domiciled in Iran, in particular Bank Melli and Bank Saderat, suspected to be involved in proliferation activities.

In adopting these measures, the Council noted that sanctions would be suspended if Iran suspended all its enrichment-related and reprocessing activities (suspension for suspension), and they would be terminated if the Council determined that Iran had complied with its obligations under the relevant resolutions of the Council.

Drawing lessons from the Iraq crisis, the Security Council was careful to design targeted sanctions, focused on proliferation-sensitive activities and on persons or entities involved in them. The emphasis was also put on the political dimension of the Security Council process. The main goal has remained to keep the Security Council united in addressing the Iranian issue. In this regard, the actual content of the sanctions has been considered less of a priority than the continued unity of the Six, despite diverging views among them.

In parallel to the Security Council process and the continuation by the IAEA of its investigations of Iran's nuclear activities, dialogue between Iran and the Six episodically resumed during the period. In 2008, the Six prepared a new version of the package of incentives that they had proposed two years before. The new package was presented to Iran in July 2008 at a meeting in which, for the first time, a US representative was present. But no real discussion ensued.

In October 2009, the Six met again with Iran. The meeting took place after the disclosure of a clandestine fuel enrichment facility near Qom. Discussions were more substantial, and opened the way to a proposal, presented by the IAEA, that Iran would export its stockpile of low-enriched uranium to be further enriched in Russia, converted into fuel rods in France, and later returned to Iran for use in a medical reactor. Iran initially agreed with the proposal, but retracted its agreement, and announced in February 2010 that it would start on its own territory the process of enrichment of UF<sub>6</sub> up to 20 percent of U<sub>235</sub>.

## RECENT DEVELOPMENTS

The handling of the Iranian crisis by the IAEA and the Security Council is today at a critical point.

Iran has kept developing its fuel-enrichment program despite the injunctions addressed to it by the Security Council. According to the IAEA:<sup>71</sup>

- Iran has produced 371 tons of uranium in the form of UF<sub>6</sub> since March 2004 at its conversion facility in Isfahan.
- It has enriched 2065kg of UF<sub>6</sub> (with an enrichment level of 3.47 percent U<sub>235</sub>) since February 2007 at the Fuel Enrichment Facility in Natanz.
- It has started to produce UF<sub>6</sub> enriched up to 20 percent U<sub>235</sub> since February 2010 at its Pilot Fuel Enrichment Plant in Natanz.

Iran allows the IAEA to verify the non-diversion of declared nuclear material. The IAEA has, for instance, conducted thirty-five unannounced inspections at the Fuel Enrichment Facility in Natanz since March 2007.<sup>72</sup> But questions remain on activities conducted in undeclared facilities, as was illustrated last September with the revelation of the enrichment plant near Qom (the Fordow Fuel Enrichment Plant).

The IAEA considers that Iran does not provide the necessary cooperation to permit it to confirm that all nuclear material in Iran is intended for peaceful activities. The IAEA continues to request the implementation of the Additional Protocol and of other transparency measures (endorsed by the board and the Security Council) in support of its ongoing investigations, including access to all relevant individuals, documentation, equipment, and sites.

Important questions remain on the purpose of Iran's nuclear activities, and on their possible military dimensions. The IAEA has been trying to clarify three main sets of issues:

- the circumstances of the acquisition by Iran in the mid-1980s of a document on the production of uranium metal hemispheres, a process which is related to the fabrication of nuclear-weapons components;
- the issue of "alleged studies," on the basis of documentation provided to the agency by other

71 IAEA, *Report by the Director General dated 18 February 2010*, Doc. GOV/2010/10, February 18, 2010.

72 Ibid.



member states, relating to the production of UF<sub>4</sub>, the testing of high explosives, detonators, and systems that could be applicable to a nuclear device, and the design of a missile re-entry vehicle to accommodate a nuclear warhead.

- the procurement and R&D activities of military-related institutes as well as the production of nuclear-related equipment by companies belonging to the defense industries.

In particular, the director-general noted in his most recent report his concerns “about the possible existence in Iran of past and current undisclosed activities related to the development of a nuclear payload for a missile.”<sup>73</sup> He also mentioned that activities related to nuclear explosives and other projects seemed to have continued beyond 2004.

## IRAN AND THE NPT REVIEW CONFERENCE

### NPT issues

Contrary to the North Korean case, the Iranian nuclear program has, so far, clearly remained an issue within the NPT. Despite occasional threats of withdrawal, Iran has continuously reiterated its commitment to the treaty. It has continued to allow the agency to conduct its verification activities in declared facilities, even if its cooperation with the agency remains insufficient to clarify the outstanding issues.

At the same time, the Iranian crisis represents a major challenge to the NPT on several different levels:

**Verification of the fulfillment of Non-Proliferation Treaty obligations.** Iran has, repeatedly in recent years, been found in breach of its NPT safeguards agreement and subsidiary arrangements, by conducting nuclear activities that it had not declared to the agency and by failing to declare in a timely manner the construction of nuclear facilities. Such failures were, for instance, exposed in 2003 with the disclosure of the two fuel enrichment plants in Natanz, as well as more recently with the revelation of a third enrichment plant near Qom in September 2009.

**Possible existence of activities violating the treaty.** After seven years of investigation, the IAEA is still unable to confirm that all nuclear material in

Iran is for “peaceful activities.” On the contrary, the agency has reported information, which it considers “consistent and credible,” on possible military dimensions to Iran’s nuclear program.<sup>74</sup> Whether or not Iran has actually decided to build a bomb, available information suggests that it is, most probably, seeking the capability to do so, in contradiction to its NPT commitment.

**Enforcement of the treaty.** In a way which is similar to the North Korean case, the Iranian crisis raises the question of the ability of the multilateral system to enforce the NPT. The IAEA board and the UN Security Council have both required Iran to take steps to restore confidence in its nuclear program. Some progress was achieved in the first years of the crisis, but since 2006 Iran has ignored these calls despite enforcement measures taken by the Security Council.

**Further risks of erosion of the nonproliferation norm.** In the absence of a negotiated solution, the NPT risks being deeply weakened by the crisis with Iran. A military strike against Iran’s nuclear sites would mark the failure of the multilateral institutions to enforce the treaty peacefully. A continuation of Iran’s suspected activities could incite other countries in the region to emulate it and develop, under cover of the treaty, a capability to build a weapon. On its part Iran, if it achieves the enrichment of weapon-grade uranium, might decide at some point to break out of the treaty and test a weapon.

### Context at the Conference

For all these reasons, the Iranian crisis is not an issue that can be ignored by the Review Conference. Indeed, several topics that the Conference will consider have already taken on an enhanced importance in the context of the Iranian nuclear program. This is in particular the case with issues such as the fuel supply assurances, the need to strengthen the authority of the IAEA to conduct its verification activities, and the reflection on how the international community should react to cases of Article X withdrawal from the treaty. An agreement at the Conference on these topics could help efforts to avoid further deterioration of the Iranian crisis and prevent the emergence of other ones.

<sup>73</sup> Ibid.

<sup>74</sup> IAEA, *Report of the Director General of 18 February 2010*, Doc. GOV/2010/10, February 18, 2010.



The question remains open on how the Review Conference could directly discuss the challenges posed by the Iranian program. Other proliferation crises were previously debated within the review process, and in 2000 the Conference adopted considerations on Iraq as well as on North Korea in its final document. In a similar way, the 2010 Conference could address the Iranian nuclear crisis and stress the importance of the issue for the NPT.

As with other major questions facing the nonproliferation regime, a discussion on Iran's nuclear program would be a difficult one. There are real divergences among states on how to tackle the Iranian crisis. Some see it as a clear priority that has to be addressed. Others emphasize the complexity of the issue and the need also to address other priorities.

**Article IV.** The complexity of the Iranian case comes from the fact that it raises the issue of the right to nuclear energy. Some states point out that fuel-enrichment activities, which are at the center of the Iranian crisis, are not forbidden by the NPT, and should be considered as part of the "inalienable right" stated by Article IV of the treaty.<sup>75</sup> Others propose another reading of Article IV which puts the emphasis on the need to demonstrate the "peaceful purposes" of nuclear activities, which the IAEA cannot confirm for Iran's nuclear program.

**Nuclear-Weapon-Free Zone in the Middle East.** Another source of divergence among NPT members comes from the specific difficulties in dealing with nuclear issues in the Middle East given that Israel remains outside the NPT. Many states are frustrated at the lack of progress in the implemen-

tation of the resolution, adopted by the 1995 Review Conference, on a "Middle East zone free of nuclear weapons as well as other weapons of mass destruction." They consider that efforts should not focus on Iran, but should embrace the situation in the region as a whole. Others point out that if progress in implementing the 1995 resolution is needed, this cannot become a condition for addressing the Iranian crisis. Indeed the emergence of a nuclear Iran could only complicate progress toward a nuclear-weapon-free zone in the Middle East.

Both debates over Article IV and over the Middle East are sensitive issues for the NPT review process, with deep divides among the membership, and positions that are quite entrenched. There are real risks that a discussion at the Review Conference about the Iranian nuclear crisis could become a hostage to these issues. The experience of the 2005 Review Conference shows that the issues at stake have the potential to derail the session.

In order to address in a meaningful way the challenges posed to the NPT by the Iranian nuclear program participants at the Conference will have to navigate through the sensitivities about these larger questions. At a minimum, the Conference could call on a negotiated solution to the crisis that would guarantee that Iran's nuclear activities are exclusively for peaceful purposes, and it could invite Iran to take the steps required by the board of the IAEA and to fully cooperate with the agency. The review process may not be the place to resolve the current Iranian crisis, but it could make a useful contribution to efforts toward a peaceful solution.

<sup>75</sup> Article IV of the NPT states that "Nothing in this Treaty shall be interpreted as affecting the inalienable right of all the parties to the Treaty to develop research, production and use of nuclear energy for peaceful purposes without discrimination and in conformity with Articles I and II of this Treaty."

## Annex I:

### Treaty on the Non-Proliferation of Nuclear Weapons

The States concluding this Treaty, hereinafter referred to as the “Parties to the Treaty”,

Considering the devastation that would be visited upon all mankind by a nuclear war and the consequent need to make every effort to avert the danger of such a war and to take measures to safeguard the security of peoples,

Believing that the proliferation of nuclear weapons would seriously enhance the danger of nuclear war,

In conformity with resolutions of the United Nations General Assembly calling for the conclusion of an agreement on the prevention of wider dissemination of nuclear weapons,

Undertaking to co-operate in facilitating the application of International Atomic Energy Agency safeguards on peaceful nuclear activities,

Expressing their support for research, development, and other efforts to further the application, within the framework of the International Atomic Energy Agency safeguards system, of the principle of safeguarding effectively the flow of source and special fissionable materials by use of instruments and other techniques at certain strategic points,

Affirming the principle that the benefits of peaceful applications of nuclear technology, including any technological by-products which may be derived by nuclear-weapon States from the development of nuclear explosive devices, should be available for peaceful purposes to all Parties to the Treaty, whether nuclear-weapon or non-nuclear-weapon States,

Convinced that, in furtherance of this principle, all Parties to the Treaty are entitled to participate in the fullest possible exchange of scientific information for, and to contribute alone or in co-operation with other States to, the further development of the applications of atomic energy for peaceful purposes,

Declaring their intention to achieve at the earliest possible date the cessation of the nuclear arms race and to undertake effective measures in the direction of nuclear disarmament,

Urging the co-operation of all States in the attainment of this objective,

Recalling the determination expressed by the Parties to the 1963 Treaty banning nuclear weapon tests in the atmosphere, in outer space and under water in its Preamble to seek to achieve the discontinuance of all test explosions of nuclear weapons for all time and to continue negotiations to this end,

Desiring to further the easing of international tension and the strengthening of trust between States in order to facilitate the cessation of the manufacture of nuclear weapons, the liquidation of all their existing stockpiles, and the elimination from national arsenals of nuclear weapons and the means of their delivery pursuant to a Treaty on general and complete disarmament under strict and effective international control,

Recalling that, in accordance with the Charter of the United Nations, States must refrain in their international relations from the threat or use of force against the territorial integrity or political independence of any State, or in any other manner inconsistent with the Purposes of the United Nations, and that the establishment and maintenance of international peace and security are to be promoted with the least diversion for armaments of the world’s human and economic resources,

Have agreed as follows:

## ARTICLE I

Each nuclear-weapon State Party to the Treaty undertakes not to transfer to any recipient whatsoever nuclear weapons or other nuclear explosive devices or control over such weapons or explosive devices directly, or indirectly; and not in any way to assist, encourage, or induce any non-nuclear-weapon State to manufacture or otherwise acquire nuclear weapons or other nuclear explosive devices, or control over such weapons or explosive devices.

## ARTICLE II

Each non-nuclear-weapon State Party to the Treaty undertakes not to receive the transfer from any transferor whatsoever of nuclear weapons or other nuclear explosive devices or of control over such weapons or explosive devices directly, or indirectly; not to manufacture or otherwise acquire nuclear weapons or other nuclear explosive devices; and not to seek or receive any assistance in the manufacture of nuclear weapons or other nuclear explosive devices.

## ARTICLE III

1. Each Non-nuclear-weapon State Party to the Treaty undertakes to accept safeguards, as set forth in an agreement to be negotiated and concluded with the International Atomic Energy Agency in accordance with the Statute of the International Atomic Energy Agency and the Agency's safeguards system, for the exclusive purpose of verification of the fulfilment of its obligations assumed under this Treaty with a view to preventing diversion of nuclear energy from peaceful uses to nuclear weapons or other nuclear explosive devices. Procedures for the safeguards required by this Article shall be followed with respect to source or special fissionable material whether it is being produced, processed or used in any principal nuclear facility or is outside any such facility. The safeguards required by this Article shall be applied on all source or special fissionable material in all peaceful nuclear activities within the territory of such State, under its jurisdiction, or carried out under its control anywhere.

2. Each State Party to the Treaty undertakes not to provide: (a) source or special fissionable material, or (b) equipment or material especially designed or prepared for the processing, use or production of special fissionable material, to any non-nuclear-weapon State for peaceful purposes, unless the source or special fissionable material shall be subject to the safeguards required by this Article.

3. The safeguards required by this Article shall be implemented in a manner designed to comply with Article IV or this Treaty, and to avoid hampering the economic or technological development of the Parties or international co-operation in the field of peaceful nuclear activities, including the international exchange of nuclear material and equipment for the processing, use or production of nuclear material for peaceful purposes in accordance with the provisions of this Article and the principle of safeguarding set forth in the Preamble of the Treaty.

4. Non-nuclear-weapon States Party to the Treaty shall conclude agreements with the International Atomic Energy Agency to meet the requirements of this Article either individually or together with other States in accordance with the Statute of the International Atomic Energy Agency. Negotiation of such agreements shall commence within 180 days from the original entry into force of this Treaty. For States depositing their instruments of ratification or accession after the 180-day period, negotiation of such agreements shall commence not later than the date of such deposit. Such agreements shall enter into force not later than eighteen months after the date of initiation of negotiations.

## ARTICLE IV

1. Nothing in this Treaty shall be interpreted as affecting the inalienable right of all the Parties to the Treaty to develop research, production and use of nuclear energy for peaceful purposes without discrimination and in conformity with Articles I and II of this Treaty.

2. All the Parties to the Treaty undertake to facilitate, and have the right to participate in the fullest possible exchange of equipment, materials and scientific and technological information for the peaceful uses of nuclear energy. Parties to the Treaty in a position to do so shall also co-operate in contributing alone or together with other States or international organizations to the further development of the applications of nuclear energy for peaceful purposes, especially in the territories of non-nuclear-weapon States Party to the Treaty, with due consideration for the needs of the developing areas of the world.

#### ARTICLE V

Each Party to the Treaty undertakes to take appropriate measures to ensure that, in accordance with this Treaty, under appropriate international observation and through appropriate international procedures, potential benefits from any peaceful applications of nuclear explosions will be made available to non-nuclear-weapon States Party to the Treaty on a non-discriminatory basis and that the charge to such Parties for the explosive devices used will be as low as possible and exclude any charge for research and development. Non-nuclear-weapon States Party to the Treaty shall be able to obtain such benefits, pursuant to a special international agreement or agreements, through an appropriate international body with adequate representation of non-nuclear-weapon States. Negotiations on this subject shall commence as soon as possible after the Treaty enters into force. Non-nuclear-weapon States Party to the Treaty so desiring may also obtain such benefits pursuant to bilateral agreements.

#### ARTICLE VI

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

#### ARTICLE VII

Nothing in this Treaty affects the right of any group of States to conclude regional treaties in order to assure the total absence of nuclear weapons in their respective territories.

#### ARTICLE VIII

1. Any Party to the Treaty may propose amendments to this Treaty. The text of any proposed amendment shall be submitted to the Depositary Governments which shall circulate it to all Parties to the Treaty. Thereupon, if requested to do so by one-third or more of the Parties to the Treaty, the Depositary Governments shall convene a conference, to which they shall invite all The Parties to the Treaty, to consider such an amendment.

2. Any amendment to this Treaty must be approved by a majority of the votes of all the Parties to the Treaty, including the votes of all nuclear-weapon States Party to the Treaty and all other Parties which, on the date the amendment is circulated, are members of the Board of Governors of the International Atomic Energy Agency. The amendment shall enter into force for each Party that deposits its instrument of ratification of the amendment upon the deposit of such instruments of ratification by a majority of all the Parties, including the instruments of ratification of all nuclear-weapon States Party to the Treaty and all other Parties which, on the date of the amendment is circulated, are members of the Board of Governors of the International Atomic Energy Agency. Thereafter, it shall enter into force for any other Party upon the deposit of its instrument of ratification of the amendment.

3. Five years after the entry into force of this Treaty, a conference of Parties to the Treaty shall be held in Geneva, Switzerland, in order to review the operation of this Treaty with a view to assuring that the purposes of the Preamble and the provisions of the Treaty are being realised. At intervals of five years thereafter, a majority of the Parties to the Treaty may obtain, by submitting a proposal to this effect to the Depositary Governments, the convening of further conferences with the same objective of reviewing the operation of the Treaty.

## ARTICLE IX

1. This Treaty shall be open to all States for signature. Any State which does not sign the Treaty before its entry into force in accordance with paragraph 3 of this Article may accede to it at any time.

2. This Treaty shall be subject to ratification by signatory States. Instruments of ratification and instruments of accession shall be deposited with the Governments of the United Kingdom of Great Britain and Northern Ireland, the Union of Soviet Socialist Republics and the United States of America, which are hereby designated the Depositary Governments.

3. This Treaty shall enter into force after its ratification by the States, the Governments of which are designated Depositories of the Treaty, and forty other States signatory to this Treaty and the deposit of their instruments of ratification. For the purposes of this Treaty, a nuclear-weapon State is one which has manufactured and exploded a nuclear weapon or other nuclear explosive device prior to 1 January, 1967.

4. For States whose instruments of ratification or accession are deposited subsequent to the entry into force of this Treaty, it shall enter into force on the date of the deposit of their instruments of ratification or accession.

5. The Depositary Governments shall promptly inform all signatory and acceding States of the date of each signature, the date of deposit of each instrument of ratification or of accession, the date of the entry into force of this Treaty, and the date of receipt of any requests for convening a conference or other notices.

6. This Treaty shall be registered by the Depositary Governments pursuant to Article 102 of the Charter of the United Nations.

## ARTICLE X

1. Each Party shall in exercising its national sovereignty have the right to withdraw from the Treaty if it decides that extraordinary events, related to the subject matter of this Treaty, have jeopardized the supreme interests of its country. It shall give notice of such withdrawal to all other Parties to the Treaty and to the United Nations Security Council three months in advance. Such notice shall include a statement of the extraordinary events it regards as having jeopardized its supreme interests.

2. Twenty-five years after the entry into force of the Treaty, a conference shall be convened to decide whether the Treaty shall continue in force indefinitely, or shall be extended for an additional fixed period or periods. This decision shall be taken by a majority of the Parties to the Treaty.

## ARTICLE XI

This Treaty, the English, Russian, French, Spanish, and Chinese texts of which are equally authentic, shall be deposited in the archives of the Depositary Governments. Duly certified copies of this Treaty shall be transmitted by the Depositary Governments to the Governments of the signatory and acceding States.

IN WITNESS WHEREOF the undersigned, duly authorised, have signed this Treaty.

DONE in triplicate, at the cities of London, Moscow and Washington, the first day of July, one thousand nine hundred and sixty-eight.



## Annex II:

### Past Review Conference Documents on Nuclear Disarmament

1995 NPT Review Conference - Decision on “Principles and Objectives for Nuclear Non-Proliferation and Disarmament,” paragraphs 3 and 4:

3. Nuclear disarmament is substantially facilitated by the easing of international tension and the strengthening of trust between States which have prevailed following the end of the cold war. The undertakings with regard to nuclear disarmament as set out in the Treaty on the Non-Proliferation of Nuclear Weapons should thus be fulfilled with determination. In this regard, the nuclear-weapons States reaffirm their commitment, as stated in article VI, to pursue in good faith negotiations on effective measures relating to nuclear disarmament.
4. The achievement of the following measures is important in the full realization and effective implementation of article VI, including the program of action as reflected below:
  - a. The completion by the Conference on Disarmament of the negotiations on a universal and internationally and effectively verifiable Comprehensive Nuclear-Test Ban Treaty no later than 1996. Pending the entry into force of a Comprehensive Test-Ban Treaty, the nuclear weapon States should exercise utmost restraint;
  - b. The immediate commencement and early conclusion of negotiations on a non-discriminatory and universally applicable convention banning the production of fissile material for nuclear weapons or other nuclear explosive devices, in accordance with the statement of the Special Coordinator of the Conference on Disarmament and the mandate contained therein;
  - c. The determined pursuit by the nuclear-weapon States of systematic and progressive efforts to reduce nuclear weapons globally, with the ultimate goals of eliminating those weapons, and by all States of general and complete disarmament under strict and effective international control.

2000 NPT Review Conference (Excerpt from the Final Document)—Thirteen steps:

The Conference agrees on the following practical steps for the systematic and progressive efforts to implement article VI of the Treaty on the Non-Proliferation of Nuclear Weapons and paragraphs 3 and 4 (c) of the 1995 Decision on “Principles and Objectives for Nuclear Non-Proliferation and Disarmament:”

1. The importance and urgency of signatures and ratifications, without delay and without conditions and in accordance with constitutional processes, to achieve the early entry into force of the Comprehensive Nuclear-Test-Ban Treaty.
2. A moratorium on nuclear-weapon-test explosions or any other nuclear explosions pending entry into force of that Treaty.
3. The necessity of negotiations in the Conference on Disarmament on a nondiscriminatory, multilateral and internationally and effectively verifiable treaty banning the production of fissile material for nuclear weapons or other nuclear explosive devices in accordance with the statement of the Special Coordinator in 1995 and the mandate contained therein, taking into consideration both nuclear disarmament and nuclear non-proliferation objectives. The Conference on Disarmament is urged to agree on a programme of work which includes the immediate commencement of negotiations on such a treaty with a view to their conclusion within five years.
4. The necessity of establishing in the Conference on Disarmament an appropriate subsidiary body with a mandate to deal with nuclear disarmament. The Conference on Disarmament is urged to agree on a

programme of work which includes the immediate establishment of such a body.

5. The principle of irreversibility to apply to nuclear disarmament, nuclear and other related arms control and reduction measures.
6. An unequivocal undertaking by the nuclear-weapon States to accomplish the total elimination of their nuclear arsenals leading to nuclear disarmament, to which all States parties are committed under article VI.
7. The early entry into force and full implementation of START II and the conclusion of START III as soon as possible while preserving and strengthening the Treaty on the Limitation of Anti-Ballistic Missile Systems as a cornerstone of strategic stability and as a basis for further reductions of strategic offensive weapons, in accordance with its provisions.
8. The completion and implementation of the Trilateral Initiative between the United States of America, the Russian Federation and the International Atomic Energy Agency.
9. Steps by all the nuclear-weapon States leading to nuclear disarmament in a way that promotes international stability, and based on the principle of undiminished security for all:
  - Further efforts by the nuclear-weapon States to reduce their nuclear arsenals unilaterally;
  - Increased transparency by the nuclear-weapon States with regard to the nuclear weapons capabilities and the implementation of agreements pursuant to article VI and as a voluntary confidence-building measure to support further progress on nuclear disarmament;
  - The further reduction of non-strategic nuclear weapons, based on unilateral initiatives and as an integral part of the nuclear arms reduction and disarmament process;
  - Concrete agreed measures to further reduce the operational status of nuclear weapons systems;
  - A diminishing role for nuclear weapons in security policies to minimize the risk that these weapons will ever be used and to facilitate the process of their total elimination;
  - The engagement as soon as appropriate of all the nuclear-weapon States in the process leading to the total elimination of their nuclear weapons.
10. Arrangements by all nuclear-weapon States to place, as soon as practicable, fissile material designated by each of them as no longer required for military purposes under IAEA or other relevant international verification and arrangements for the disposition of such material for peaceful purposes, to ensure that such material remains permanently outside military programmes.
11. Reaffirmation that the ultimate objective of the efforts of States in the disarmament process is general and complete disarmament under effective international control.
12. Regular reports, within the framework of the strengthened review process for the Non-Proliferation Treaty, by all States parties on the implementation of article VI and paragraph 4 (c) of the 1995 Decision on “Principles and Objectives for Nuclear Non-Proliferation and Disarmament”, and recalling the advisory opinion of the International Court of Justice of 8 July 1996.
13. The further development of the verification capabilities that will be required to provide assurance of compliance with nuclear disarmament agreements for the achievement and maintenance of a nuclear-weapon-free world.

## Annex III:

## Tables of Nuclear-Weapon-Free Zones

<b>LATIN AMERICA &amp; CARIBBEAN Nuclear-Weapon-Free Zone</b> <i>Treaty of Tlatelolco</i>			
<b>History</b>	<b>Coverage</b>	<b>Principal obligations of states within the zone</b>	<b>Principal obligations of nonregional states (upon ratification of relevant protocols)</b>
<p>Discussions underway by the late 1950s</p> <p>Opened for signature: 1967</p> <p>Entered into force: 1969</p> <p>Last state ratified: June 2002</p>	<p>All thirty-three states in Latin America and Caribbean</p>	<p>To use nuclear materials and facilities exclusively for peaceful purposes.</p> <p>Not to test, manufacture, produce, acquire, or receive nuclear weapons, either directly or indirectly.</p>	<p>1. <i>Protocol I</i> extends the obligations to territories for which the ratifying state is de jure or de facto internationally responsible within the zone.</p> <p>(These were France, the Netherlands, the UK, and the US.)</p> <p>2. <i>Protocol II</i>: not to use or threaten to use nuclear weapons against the contracting parties.</p> <p><b>Status:</b></p> <p><i>Protocol I:</i> All four relevant states have ratified.</p> <p><i>Protocol II:</i> All five nuclear-weapon states have ratified, with some reservations.</p> <p>The US reservations concerned the rights of transit. They also stated that the negative security assurances would not apply if a contracting party were to attack the US with support from a nuclear-armed ally.</p> <p>Reservations were made by other nuclear-weapon states as well.</p>

<b>SOUTH PACIFIC Nuclear-Weapon-Free Zone</b> <i>Treaty of Rarotonga</i>			
History	Coverage	Principal obligations of states within the zone	Principal obligations of nonregional states (upon ratification of relevant protocols)
<p>Discussions underway by the late 1970s</p> <p>Opened for signature: August 1985</p> <p>Entered into force: December 1986</p> <p>Last state ratified: December 2000</p>	<p>Thirteen states:</p> <p>Australia Cook Islands Fiji Kiribati Nauru New Zealand Niue Papua New Guinea Samoa Solomon Islands Tonga Tuvalu Vanuatu</p>	<p>Not to manufacture, acquire, receive, or otherwise possess any nuclear explosive device.</p> <p>Not to provide source or special fissionable materials to any non-nuclear state.</p> <p>To prevent testing of any nuclear explosive device.</p> <p>Not to dump radioactive or other material in the sea, and to prevent others from so doing.</p>	<ol style="list-style-type: none"> <li>1. <i>Protocol I</i>: to apply to prohibitions of the treaty to territories for which it is internationally responsible. (France, the UK, the US.)</li> <li>2. <i>Protocol II</i>: "...not to use or threaten to use any nuclear explosive device against (a) parties to the Treaty; or (b) any territory within the South Pacific Nuclear Free Zone for which a state that has become a party to Protocol I is internationally responsible."</li> <li>3. <i>Protocol III</i>: "...not to test any nuclear explosive device anywhere within [the zone]."</li> </ol> <p><b>Status:</b></p> <p>All three protocols have been ratified by France and by the UK.</p> <p>Protocols II and III have been ratified by China and Russia.</p> <p>The US has signed but not ratified the three protocols.</p>

<b>SOUTHEAST ASIA</b> <b>Nuclear-Weapon-Free Zone</b> <i>Treaty of Bangkok</i>			
History	Coverage	Principal obligations of states within the zone	Principal obligations of nonregional states (upon ratification of relevant protocols)
<p>Discussions underway by early 1970s</p> <p>Opened for signature: December 1995</p> <p>Entered into force: March 1997</p> <p>Last state ratified: June 2001</p>	<p>Ten states:            Brunei            Darussalam            Cambodia            Indonesia            Laos            Malaysia            Myanmar            Philippines            Singapore            Thailand            Vietnam</p> <p>Includes Exclusive Economic Zones of each party in zone</p>	<p>Not to develop, manufacture, or otherwise acquire or possess nuclear weapons inside or outside of the treaty zone.</p> <p>Not to transport or station nuclear weapons.</p> <p>Not to test or use nuclear weapons.</p> <p>Not to allow any other state to transport, or test nuclear weapons.</p> <p>Not to dump or discard radioactive materials in the sea, on land, or in the atmosphere.</p>	<p>Article 2 of the protocol prohibits states that ratify the protocol from using or threatening to use nuclear weapons against any state party or within the Zone.</p> <p>Article 3 opens the protocol for signature for China, France, Russia, the UK, and the US.</p> <p><b>Status:</b></p> <p>None of the five nuclear-weapon states has signed the protocol.</p>



<b>AFRICA</b> <b>Nuclear-Weapon-Free Zone</b> <i>Pelindaba Treaty</i>			
<b>History</b>	<b>Coverage</b>	<b>Principal obligations of states within the zone</b>	<b>Principal obligations of nonregional states (upon ratification of relevant protocols)</b>
<p>UN General Assembly resolution in 1961 calls on states to respect Africa as a denuclearized zone</p> <p>Opened for signature: April 1996</p> <p>Entered into force: July 2009</p> <p>Ratification pending in twenty-four states</p>	<p>Fifty-two African states have signed the treaty.</p> <p>Twenty-eight of these states have ratified it.</p> <p>Includes land, territorial seas and archipelago waters, airspace above, seabed and subsoil beneath.</p>	<p>Not to conduct research, develop, test, acquire, possess, or have control over any nuclear explosive devices.</p> <p>To prohibit the stationing of nuclear explosive devices in the state party's territory—decisions about visits by foreign ships and aircraft are left up to states party.</p> <p>To declare and dismantle any nuclear explosive devices or facilities for their manufacture.</p> <p>To prevent dumping of radioactive materials.</p>	<p><i>Protocol I</i>: not to use or threaten to use nuclear explosive devices against any state party or within the zone.</p> <p>(This protocol was open to the five nuclear-weapon states.)</p> <p><i>Protocol II</i>: not to test within the zone.</p> <p>(Also opened to the five nuclear-weapon states.)</p> <p><i>Protocol III</i>: extends the obligations to territories for which the ratifying state is de jure or de facto internationally responsible within the zone.</p> <p>(This protocol was opened for signature by France and Spain.)</p> <p><b>Status:</b></p> <p><i>Protocol I</i> has been ratified by China, France, and the UK.</p> <p>The US has signed but not yet ratified.</p> <p><i>Protocol II</i> has been ratified by China, France, and the UK.</p> <p>Russia and the US have signed but not ratified it.</p> <p><i>Protocol III</i>: France has ratified.</p> <p>Spain has neither signed nor ratified.</p>

<b>CENTRAL ASIA</b> <b>Nuclear-Weapon-Free Zone</b> <i>Treaty of Semipalatinsk</i>			
History	Coverage	Principal obligations of states within the zone	Principal obligations of nonregional states (upon ratification of relevant protocols)
<p>Discussions began early 1990s</p> <p>Opened for signature: September 2006</p> <p>Entered into force: March 2009</p> <p>Last state ratified: December 11, 2008</p>	<p>Five states:</p> <p>Kazakhstan</p> <p>Kyrgyzstan</p> <p>Tajikistan</p> <p>Turkmenistan</p> <p>Uzbekistan</p>	<p>Not to possess, research, or develop nuclear weapons, or nuclear explosive devices; or to receive assistance in doing so.</p> <p>Not to test or support testing.</p> <p>Not to allow the stationing of such weapons and devices except where permitted by state party.</p> <p>To assist in environmental clean-up from past contamination.</p> <p>Not to allow the disposal in its territory of radioactive waste of foreign countries.</p> <p>To ratify the IAEA Additional Protocol</p>	<p>The Protocol requires states not to use or threaten to use nuclear weapons against parties of the treaty.</p> <p><b>Status:</b></p> <p>The protocol is not yet open for signature.</p> <p>China and Russia support the protocol.</p> <p>France, the UK, and the US continue to have some objections to the treaty (particularly concerning what they see as the possibility that Russia could ship nuclear-related cargo through the region based on a past treaty).</p>



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