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INTERNATIONAL RELATIONS
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**NUCLEAR DISARMAMENT,
NON-PROLIFERATION, ENERGY:
DEVELOPING FURTHER
U.S.–RUSSIAN COOPERATION**

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FOREWORD

In December 2009 in Washington, D.C. there was held experts meeting of the Institute of World Economy and International Relations Russian Academy of Sciences (IMEMO) and the Brookings Institution devoted to possible Russian and American steps in nuclear disarmament after signing the new bilateral Strategic Arms Reduction Treaty. It was expected to formulate expert proposals regarding further actions of the two countries even *before* the conclusion of the new Treaty by them – to avoid emerging intervals and slowing down in this important process for international security. The main attention was decided to focus on further strategic arms reductions, nuclear non-proliferation and the development of peaceful atomic energy.

From Russian side in the meeting there participated Igor Ivanov (former Minister for Foreign Affairs of the Russian Federation) and the leading specialists of IMEMO: Vladimir Baranovsky (Corresponding Member of the Russian Academy of Sciences, Deputy Director of the Institute), Alexander Pikayev (Head of the Department of Disarmament and Conflict Resolution), Vladimir Dvorkin (Principal Research Associate, Major General (ret.)). From American side in the meeting there participated Madlene Albright (U.S. Secretary of State, President Clinton Administration), Strobe Talbott (former Deputy Secretary of State, now the President of the Brookings Institution), Joseph Cirincione (President, Ploughshares Foundation) and the leading specialists of the Brookings Institution – Steven Pifer (formerly U.S. Ambassador to Ukraine) and Clifford Gaddy.

The Russian and American participants prepared working materials for the workshop, in which they stated their vision of possible further steps of the two countries as well as practical recommendations for this account. From the Russian side besides the participants of the meeting there was made a contribution by the Head of the Center for International Security of the IMEMO, Corresponding Member of the Russian Academy of Sciences Dr. Alexey Arbatov as well as by Abatoly Dyakov, Head, Center for the Arms Control, Energy and Environment of the Moscow Physics and Engineering Institute. In the process of “brain storming” which took place on the basis of the submitted papers the participants of the discussions formulated joint recommendations, which then were sent by I. Iva-

nov, M. Albright and S. Talbott to the leadership of Russia and the United States. This initiative met understanding and support. In his reply to Igor Ivanov, Russian Foreign Minister Sergey Lavrov expressed his hope for the efficiency of establishing of the partnership relations between the IMEMO and the Brookings Institution and considered the joint statement prepared within its framework as “highly useful”.

Taking into account the urgent nature of the questions considered, the two institutions took the decision on publicizing the materials of the meeting. The Brookings Institution published the revised version of the works prepared by American participants. In the present edition the IMEMO publishes revised Russian materials both in Russian and English languages. Besides that here the paper issued by the Brookings Institution as well as its Russian translation, prepared at the IMEMO, are being reprinted.

I express my thanks to the organizers and participants to the December meeting in Washington, D.C., to all authors of the papers included into the present edition as well as to Anatoly S. Dyakov for the materials submitted. The employees of the Brookings Institution, who edited the English version of the texts, prepared by Russian participants to the project deserve special words of gratitude. Also I would like to express my thanks to the IMEMO employees: Vladimir Sotnikov – for the translation of the work into Russian, Natalia Vladimirova – for editing and layout of this book and Dmitry Svarichovsky – for publishing of the present edition.

IMEMO Director,
Academician
Alexander A. Dynkin

PART I

**Nuclear disarmament, non-proliferation,
energy: further steps**

Alexey Arbatov

Vladimir Baranovsky

Alexander Pikayev

Vladimir Dvorkin

(Recommendations of Russian experts)

1.1. MEASURES ON FURTHER NUCLEAR DISARMAMENT

Recommendation. Depending on the successful achievement of the START I follow-on treaty and ratification, a next step could be concluding a new SORT/START Treaty (SORT II). It could, for example, reduce the number of operationally deployed warheads down to approximately 1,000-1,200 by the year 2020.

The deadline of 2020 is defined by our opinion that the START follow-on timeframe (7 years implementation and 10 years duration) is too relaxed in view of the modest reductions envisaged in relation to the parties' actual forces deployed or in relation to the SORT ceilings. Thus, START follow-on reductions should be implemented by the year 2015, and the next treaty should be concluded by that time and envisage further cuts by the year 2020.

The 1,000-1,200 warheads level would not just be another, lower ceiling for mutual deterrent capability. It is of particular significance inasmuch as it is apparently as low as the two powers – Russia and the United States – can go without worrying about the size of the nuclear arsenals of third countries, the counterforce capability of highly accurate long-range conventional weapons, and the capabilities of potential missile and air defense systems.

Reducing American and Russian strategic nuclear forces to such a level would imply that they would no longer be primarily assigned to attacking each other's military targets and administrative/industrial centers. Taking into account that, generally, a portion of strategic nuclear forces is always undergoing repair, reequipping or routine maintenance, the forces on operational alert would be more evenly distributed against targets in the United States and Russia, on the territories of other nuclear powers, their allies and "threshold" states. With the use of rapid retargeting systems, Russian and American strategic nuclear forces would be intended not only for multiple options of attacks against each other, but also to the same extent for scenarios involving various other potential opponents. In some of these scenarios, American and Russian forces could be neutral toward each other or even possibly work in concert. In that case, the nuclear balance would no longer be primarily bilateral, but would be increasingly multilateral, which would begin a process of freeing American and Russian forces from their traditional focus on mutual nuclear deterrence.

Moreover, the above cuts would probably require a transfer from a triad to a dyad in strategic force structures.

Reduction to a level below 1,000-1,200 warheads could require implementing radical measures intended to maintain stability. These measures would affect the structure of armed forces and the operational doctrines of both countries, but these have always been difficult questions in light of the differences in the countries' geo-strategic positions. With a very low number of weapons, these differences would take on greater significance, and the resulting problems would become more difficult to resolve. Moreover, a simple linear reduction of 700 to 500 to 300 warheads would cause growing problems stemming from the strategic impact of tactical nuclear weapons, the forces of other nuclear powers, defense systems, conventional armed forces, highly-accurate conventional systems, etc.

Furthermore, if such deep reductions (below a level of 1,000-1,200 strategic warheads) were carried out within the traditional paradigm of mutual deterrence, it could destabilize the strategic balance, making nuclear forces more vulnerable and increasing the effectiveness of counterforce attacks. Even if this were not the case, the inexorable logic of getting the highest effect from the use of minimal force would place an overriding emphasis on attacking the relatively vulnerable and numerically few systems of command-control-communication and information-support (decapitation strikes), which would be even more destabilizing. Finally, within the mutual deterrence paradigm, the transition to a very low level of armaments would mean that nuclear war would cease to be unthinkable in its devastating consequences, thus lowering the restraining influence of nuclear deterrence.

Reducing American and Russian strategic nuclear forces to around 1,000-1,200 warheads would make it possible to avoid these negative consequences, while opening the door to further steps for revising the very paradigm of mutual deterrence between the two countries.

***Recommendation.* Informal commitment by third-country nuclear weapon states not to increase their nuclear forces and also to provide some confidence-building and transparency measures would be very welcome to facilitate future US-Russian reductions.**

In the 1990s, after a series of US-Russian nuclear arms reductions agreements, the UK and, later France took unilateral voluntary measures, which resulted in reductions of their deployed nuclear forces. Also, some classes of nuclear weapons (tactical arms for the UK and land-based missiles for France) have been completely abandoned. In contrast to this, China continued modernization of its nuclear arsenal with a clear aim of obtaining a full-scale triad. However, Beijing has demonstrated some restraint and so far has avoided a significant numerical build-up.

The new round of US-Russian reductions could cause additional pressure on the UK and France to reduce further their nuclear forces. UK Prime Minister Gordon Brown has already stated that this might be an option. President Sarkozy of France promised not to increase the French *force de frappe* above 300 warheads. There are also signs of a more active Chinese position on nuclear disarmament. The conduct of more consultations with Beijing, along with its completion of the development of a sea leg of its nuclear triad, might stimulate it to gain higher international status by imposing unilateral voluntary self-restraints.

Unilateral measures by NPT nuclear-weapon states could in fact lead to informal upper ceilings for the non-recognized nuclear powers – India, Israel and Pakistan. The P-5 should use its diplomatic and other leverage for stimulating that process.

The North Korean nuclear arsenal *per se* does not represent a direct challenge to further US-Russian nuclear reductions as well as for voluntary self-restraint measures to be undertaken by other nuclear weapon states. In the foreseeable future, it seems unlikely that North Korean nuclear capabilities could reach more than a few dozen warheads. However, rolling the DPRK back to a non-nuclear status should remain a top priority. Otherwise, that country's unpunished nuclearization could create an attractive precedent for other potential proliferators. Further proliferation would create a negative international framework for the readiness, desire, and also the observation of NPT-related obligations on the part of the eight existing nuclear powers to disarm or demonstrate self-restraint.

***Recommendation.* The US and Russia might mutually abandon plans to launch missiles based on data from early warning systems (“launch-on-warning”). That could be followed by the development of qualitatively new arms control treaties, lowering the alert levels of**

strategic nuclear forces through several technical measures, and altering their operational deployment.

Even though nuclear deterrence is not limited to the concept of launch based on early warning systems, which have been created by both the United States and the USSR/Russia, this concept certainly embodies deterrence in its most dangerous and least politically-controlled form. After receiving information from early warning systems, national leaders would have only a few minutes to decide whether or not to launch missiles. Therefore, there is always the risk of miscalculation or technical error, which could lead to the accidental, inadvertent outbreak of nuclear war.

At first glance, abandoning launch-on-warning may seem a purely declarative step, given that there is no way to verify it. But in practice, it could be confirmed with a sufficient degree of reliability through technical verification of the reduction of the high combat readiness of any of the components of the nuclear triad, especially of the components that are specifically intended for launch-on-warning.

In addition to and even before agreeing on dealerting, several measures could be taken that would lend real content to such an agreement. One would be an agreement to invite the other side's representatives to all major strategic nuclear force exercises, in order to verify that the exercises are not meant to rehearse launch-on-warning. Going even further, the sides could agree to the permanent stationing of the other's liaison officers at their strategic nuclear force command centers (Offutt in the United States, Vlasikha in Russia), as well as at NORAD (in the United States) and the Russian Missile and Space Defense command centers (the liaison representation would be similar to Russia-NATO missions, but with the permanent presence of foreign officers at command centers).

In developing the initiative to turn away from the launch-on-warning mode, it would be wise to proceed with lowering the high combat readiness level of strategic forces. This would eventually lead to a qualitative transformation of strategic relations. A significant portion of the organizational and technical measures needed for such dealerting were already informally explored in the context of the START II Treaty. At a certain stage, this treaty provided for early "deactivation" of delivery systems that were earmarked for elimination. During the study, the term "deactivation" was interpreted in a way so as to mean that elements of each party's missiles had to be put into a state in which their launch would be impossible without returning them to their initial state of alert.

Russian experts developed a series of procedures for reducing the alert levels of missiles, various forms of inspection, and notifications on the changes of alert status acceptable for Russian strategic nuclear forces. The majority of these procedures might be also applicable for US forces, but American experts must review them. Calculations show that, depending on the initial size of strategic nuclear forces, methods of deactivation and other characteristics, the time required to restore alert levels (reconstitution capability) ranges from 100-500 days, with shorter times obviously needed for smaller-scale forces.

After reducing forces to around 1,000 warheads, moving towards progressively deeper mutual dealing seems to be an effective method of consolidating strategic stability, while gradually transforming the model of mutual nuclear deterrence.

***Recommendation.* The US and Russia might make an agreement to place all tactical nuclear weapons (TNWs) in centralized storages located on national territory (which would include transferring American weapons from European to US territory). In order to facilitate Russia's security concerns, this should be linked with revitalization of the Adapted Conventional Armed Forces in Europe (CFE) Treaty.**

Such an agreement would essentially become a formalization of part of the unilateral and parallel, politically-binding initiatives taken by the United States and the USSR/Russia in 1991-1992 on TNWs. The agreement could be verified by national technical means of verification, or even more easily by agreeing on simple measures of transparency and confidence-building. Such an approach seems to be a more straight-forward alternative to reducing the TNWs.

Physical elimination (of TNWs) is not verifiable without highly intrusive measures. The issue, essentially, is the dismantlement of the warheads, because the majority of these weapons use dual-purpose delivery systems, and the latter would be hard to reduce or eliminate. For the same reasons, SALT, START and SORT never envisioned eliminating nuclear warheads. Monitoring the destruction of nuclear missiles' nose-cones and warheads, which was provided for by the 1987 INF Treaty, is not applicable in this case. At that time, several classes of missiles were completely and simultaneously eliminated. It made covert production of nose-cones

for warheads of missiles that had been destroyed pointless. As previously noted, this is not possible for TNWs due to the dual-use nature of their delivery systems.

Reliable oversight over the elimination of nuclear warheads would not only place the most important military and technological secrets under the risk of disclosure. It would also be meaningless (other than symbolically) without verifying that there are no similar reserve warheads in storage and that they are not being reproduced at manufacturing facilities. Hence, elimination should be accompanied by an agreement to terminate the production of nuclear weapons materials, to ban the recycling of such materials from old warheads, and to monitor stockpiles of weapons-grade uranium and plutonium. These problems are discussed in the context of the fissile materials cut-off treaty, but that topic is much broader and more complicated than TNW arms control.

The removal of TNWs to centralized storage, if such a measure were applied to all tactical weapons without exception, would be entirely verifiable. The TNW storage facilities at army, navy, air force and air defense bases are unique and well-protected sites, which makes them easily identifiable. The removal of all TNWs to centralized storage sites located on national territory would represent deep TNW dealtering, with reconstitution time amounting to weeks or months, and with the practical impossibility of doing so secretly.

Given that Russia is apparently planning to rely heavily on TNWs, in view of the weakness of its conventional armed forces deployed vis-à-vis NATO and China, an agreement on tactical nuclear arms would affect Russia a great deal more than the United States. Revitalization of the Adapted CFE Treaty would ease Moscow's fears about its vulnerabilities. An even more positive effect could be achieved by developing a new agreement on conventional forces in Europe. It would provide for the further reduction (by no less than 50%) of conventional arms in the national and territorial quotas defined by the Adapted CFE Treaty. The situation in the east is sufficiently stable, as long as the treaty limiting conventional forces and armaments in a 100-km zone on both sides of the Sino-Russian border remains in force.

***Recommendation.* The United States and Russia should start a process of integrating their early warning and defense systems.**

The recommended strategic nuclear reductions and radical dealerting of nuclear force would push both sides away from mutual deterrence based on a hair-trigger alert. But that would not mean the total abandonment of nuclear deterrence. Such measures would remain reversible, even after factoring in the long time and unavoidable financial and organizational resources required.

In order to make changes irreversible, additional measures are needed, going beyond reductions and dealerting, to address early warning and defense systems. Gradual integration of such US and Russian systems could mean doing away with mutual nuclear deterrence definitively and irrevocably. The countries that have common early warning and BMD systems are simply incapable of waging war against one another, and thus do not even have a theoretical reason to rely on nuclear deterrence.

The proliferation of nuclear weapons and missiles generated a common understanding in the United States and the USSR/Russia of a new and serious threat, as well as of the need to combat it.

As early as 1998, Presidents Boris Yeltsin and Bill Clinton made an important decision to create a center in Moscow for the mutual exchange of data received from early warning systems. On July 4, 2000, both parties signed a memorandum on the creation of the Joint Data Exchange Center (JDEC), to exchange data from early warning systems on missile launches, which was to go into effect for a 10-year period from the moment of signing until 2010. Nevertheless, the Center did not become operational.

To speed up such collaboration in the face of new security threats, the Center's function could be expanded by a broader exchange of real-time information as a first step on the path toward the continuous presence of Russian and US representatives at early warning and command centers of various levels. Collaboration on missile defenses might be a natural path for widening the Center's mission of interfacing early warning systems in order to report information to missile defense systems (which is not provided for in the current agreement on the Center).

An exceptionally important last step in the process of moving away from bilateral nuclear deterrence could be moving beyond the current joint US-Russian computer missile defense simulation exercises (which have been ongoing for many years) towards full-scale collaboration between the two countries on the development and deployment of missile defenses capable

of intercepting any ballistic missile. Just such a major initiative was envisioned by the official US-Russian declaration, “On the New Strategic Relationship between the United States of America and the Russian Federation” (May 2002).

Indeed, countries that develop and deploy joint missile defenses simply cannot, by definition, become adversaries, deterring one another with the help of nuclear weapons. Rather, they must be full-scale and very close military allies. Such an arrangement assumes a much greater degree of shared interests in foreign policy and security than currently exists between the United States and Russia, and even greater than practiced between the United States and its European NATO allies (with the possible exception of the UK). Obviously, this project is for the longer term. Joint early-warning systems are for the 2015-2020 timeframe and common missile defense for 2020-2030 timeframe.

1.2. STRENGTHENING THE NON-PROLIFERATION REGIME

Recommendation. Raise the effectiveness of International Atomic Energy Agency (IAEA) safeguards by broadening adherence to the Additional Protocol and reinforcing the Agency's scientific, technical and financial resources for conducting safeguards activities.

In the short term (over the next 2-3 years), the IAEA's main task is indisputably to detect any *undeclared* nuclear activities in countries around the world. With this goal, it is essential to ensure that all countries, especially countries carrying out nuclear activities of any kind, sign the 1997 Additional Protocol on safeguards. The Additional Protocol should become a universal standard for verifying countries' nuclear non-proliferation obligations. Given that IAEA efforts to make progress in this area have not produced the desired results thus far, several major measures should be implemented.

Measure 1. The possibility should be examined of involving the UN Security Council directly in resolving this issue in its capacity as the institution directly responsible for maintaining international peace and security. Stringent verification regimes should be established right from the first stages of development of peaceful national nuclear programs, and a state's refusal to abide by the Additional Protocol should be seen as a "presumption of guilt" and should be considered as valid grounds for imposition of sanctions.

Measure 2. The nuclear-weapons states-parties to the Nuclear Non-Proliferation Treaty (NPT) should encourage this process by applying the Additional Protocol safeguards not only to their international cooperative efforts but to all their peaceful nuclear activities, including nuclear fuel cycle activities (uranium enrichment and plutonium separation). This will also help to improve the prospects for achieving a multilateral Fissile Materials Cut-Off Treaty.

Measure 3. The Nuclear Suppliers Group should adopt a common guideline that makes joining the Additional Protocol an obligatory condition for receiving imports of nuclear materials, equipment and technologies.

With regard to states which have joined the Additional Protocol, the IAEA should step up work to introduce the practice of integrated safeguards, which make safeguards more effective and also more economic and cost-effective.

The scientific, technical and financial base for IAEA safeguards activities needs to be reinforced¹. The Agency must have modern facilities for analyzing samples and proper conditions for scientific research work on safeguards – something it lacks at present. It is time to provide the IAEA with its own independent means for carrying out satellite monitoring of state nuclear activities (through contracts with existing national and international space agencies, for example) and, in any case, for independent analysis of the satellite information received from states.

Recommendation. The United States and Russia, together with other partners, should work on strengthening existing multilateral export control regimes and universal adherence to UN Security Council Resolutions 1540 and 1887.

The experience of North Korea, and especially of Iran, in acquiring nuclear technology and materials not just in Pakistan but in a number of European countries, bypassing export controls, clearly demonstrates the need for joint measures by the nuclear suppliers. Some important nuclear suppliers remain outside both of the most important multilateral nuclear and missile export control regimes – the Nuclear Suppliers Group and the Missile Technology Control Regime (MTCR). At the same time, extending participation in the regimes to countries with controversial proliferation records could undermine the regimes' efficiency. Furthermore, a radical increase in the number of member states complicates the decision-making process. Therefore, a right balance should be found between inclusiveness and efficiency.

UN Security Council Resolutions 1540 and 1887 establish *inter alia* binding obligations on all the UN member states to increase the effectiveness of their national export control systems. The United States and Russia should work together to achieve universal compliance with the resolutions. The UN through its relevant committees should be given more resources and responsibilities for monitoring implementation. A new UN Security Council Resolution might possibly be needed for establishing an international legal base for enforcing the implementation of UNCR Resolutions 1540 and 1887.

¹ Former IAEA Director General Mohamed El-Baradei has raised the issue of doubling the Agency's safeguards budget from its current figure of around \$130 million.

At the same time, more positive motivations are required to help states willing to implement the resolutions but which lack the resources and expertise for doing so. The G-8 Global Partnership for Countering Proliferation of Weapons and Materials of Mass Destruction could be refocused and expanded for that. Also, the G-8 might take measures in assisting the UN in monitoring the implementation of the resolutions.

Recommendation. In coming years, it is necessary to introduce strict formalities for, and increasing the political significance of, procedures for withdrawal from the Non-Proliferation Treaty.

Improving IAEA safeguards and universalization of the 1997 Additional Protocol should act to reliably prevent countries from violating the NPT in secret, thereby ruling out withdrawal from the Treaty in order to conceal past violations. However, an analysis of the North Korean and Iranian cases enables us to recommend additional measures.

Measure 1. A country's declaration that it intends to withdraw from the NPT should be considered as grounds for (1) an intensive IAEA check of possible violations of the Treaty or of safeguards agreements; (2) convening an extraordinary conference of states-parties to the NPT to examine the country's motives for withdrawal; and (3) in the event that these motives are deemed not to conform to the provisions of Article X.1 of the NPT, or that the problem cannot be resolved without withdrawal from the NPT, the case should be immediately referred to the UN Security Council for examination pursuant to Chapter VI, Article 41 of the UN Charter.

Measure 2. Obstructing IAEA verification, giving invalid motives for withdrawal from the Treaty and not observing notification procedures for withdrawal should be grounds for immediately raising the issue of sanctions in the UN Security Council.

Measure 3. All materials and technologies in the country at the moment of its withdrawal from the NPT, regardless of their origin, must be used only for peaceful purposes and remain under IAEA safeguards.

Measure 4. All dual-use technologies and materials (uranium enrichment, plutonium extraction), obtained from abroad or developed indigenously while the country was a party to the NPT, must be immediately frozen and subsequently dismantled or returned to the suppliers under IAEA control. This applies all the more so to materials and technologies obtained during the period outside of the NPT framework, that is to say, in violation of the

NPT and IAEA safeguards. Refusal to fulfill these last two conditions should lead to a UN Security Council decision on sanctions pursuant to Chapter VII, Article 41, of the UN Charter, up to military action in line with its Article 42.

Measure 5. The NSG, for its part, should include an obligatory clause on "return or dismantlement" in the event of withdrawal from the NPT in all future contracts for the supply of such technology within the framework of Article IV of the NPT.

Recommendation. The United States and Russia should take a lead in achieving denuclearization of the Korean Peninsula and convincing Iran to refrain from the controversial components of its nuclear program.

North Korea became the first case when a non-nuclear NPT member state secretly developed military nuclear capabilities and, when the activity was discovered, withdrew from the Treaty. Until such time as Pyongyang is convinced to return to the Treaty, this can create a dangerous precedent for other potential proliferators. The Iranians closely monitor developments around the North Korea nuclear program, and actively exploit loopholes in the NPT regime in order to move as far as possible in their nuclear ambitions. Without clear and fast progress towards denuclearization of the Korean peninsula, stopping potential followers of the DPRK example would be more problematic.

In that context, greater urgency should be given to resuming the Six Party Talks, including direct bilateral US-DPRK interaction within this framework. Both Washington and Moscow could make more efforts to achieve even greater involvement by China. Negative actions by Pyongyang should always be followed by punitive actions, including tacit sanctions to be imposed by the Chinese and more rigorous searches of North Korean ships and planes. The North Koreans could possibly be warned that their refusal to resume the talks could lead to US-South Korean maneuvers. If necessary, the five participants of the Six Party Talks – the US, Russia, China, Japan and South Korea – might consider conducting joint and parallel naval maneuvers in the Yellow Sea and Sea of Japan. The United States should reconfirm its security commitments to South Korea and Japan and stop discussing plans on potential further reductions of its military presence on the Korean Peninsula.

Recent initiatives by the Obama administration, including its decision to participate directly in a dialogue with Iran on its nuclear program, helped to revive the diplomatic process aimed at convincing Iran to refrain from the controversial components of its nuclear program. However, the existing diplomatic framework still lacks adequate sticks and carrots for motivating Tehran to change its behavior. Its aggressive denunciation of UNSC resolutions undermines the authority and credibility of the UN Security Council.

The United States, Russia and the other four powers participating in a dialogue regarding the Iranian nuclear program should further coordinate their positions. They need to create a new, more attractive package of benefits, which Iran could receive in exchange for limiting its nuclear program. More convincing sticks should involve greater participation by China, potentially the largest investor in Iranian energy sector. As in the case of North Korea, provocative Iranian actions could be answered by large-scale naval maneuvers in the Arabian Sea and the Gulf with the participation of all six countries involved in dialogue with Iran, as well as other influential Asian actors such as Japan and India.

Recommendation. Additional multilateral agreements should be concluded and brought into force.

An important measure aimed at strengthening the NPT regime involves concluding and bringing into force a number of additional multilateral agreements that would help bolster the NPT and create additional barriers to countries seeking to violate or withdraw from it. In the short-term, the following two agreements are the most important:

The Comprehensive Test Ban Treaty (CTBT). The US and China should ratify the CTBT as a key link between “vertical” and “horizontal” nuclear disarmament. This would be an incentive for India, Pakistan and Israel to also join the CTBT and would limit the capacity of states that already possess nuclear weapons to develop them further. It would also create a serious obstacle for other open or secret threshold countries potentially seeking to develop nuclear weapons. This is all the more realistic as the entire monitoring and verification infrastructure for the CTBT has already been put in place.

The Fissile Material Cut Off Treaty (FMCT). Steps should be taken to conclude at the earliest date a “narrow-scope” treaty prohibiting the production of fissile materials (above all, weapons-grade uranium) for mili-

tary purposes. The scope of this treaty should then be gradually expanded and its monitoring mechanisms should be applied to all nuclear and non-nuclear parties to the NPT and to three states not party to the NPT (Israel, India and Pakistan). Along with the CTBT, this would create another link between vertical and horizontal proliferation. All parties to the NPT, including the United States and Russia, should ratify the 1997 Additional Protocol and extend its application to their entire peaceful nuclear infrastructure, including all uranium enrichment and plutonium extraction facilities.

Recommendation. In the shortest possible time, the nuclear powers must demonstrate consistent progress towards fulfilling their nuclear disarmament obligations under Article VI of the NPT.

Strengthening the NPT regime would be possible only if there is a unity between the great powers and the members of the UN Security Council, and unity is possible only if these countries make nuclear non-proliferation a genuine cornerstone of their international security strategy. Given that the measures outlined above impose even stricter non-proliferation rules on the non-nuclear countries, an essential condition, if the great powers are to maintain a strong moral and political position, is that they make consistent progress towards fulfilling their nuclear disarmament obligations under Article VI of the NPT. Detailed possible recommendations in this area can be found in the (accompanying) paper devoted to nuclear reductions.

1.3. CIVIL NUCLEAR COOPERATION

Introduction

US-Russian cooperation in the civil nuclear area has been concentrated in three areas:

- (1) Promoting Russia's disarmament and non-proliferation efforts;
- (2) Strengthening international non-proliferation regimes; and
- (3) Bilateral commercial cooperation.

Megatons to Megawatts

***Recommendation.* Although the highly successful Megatons to Megawatts project will expire in 2012, it has helped Russian to take a significant share of the US domestic commercial nuclear fuel market. After 2012, it is advisable to continue permitting Russia commercial access to the US market or even increasing it. This would help maintain interdependence between US and Russian civilian nuclear actors, and would contribute to the overall improvement of bilateral relations.**

Cooperation in the first area (promoting Russia's disarmament and non-proliferation efforts) has been the most successful. One of the most famous projects here, known as Megatons to Megawatts, requires extraction of highly enriched uranium (HEU) from eliminated nuclear warheads. After blending down the HEU, it is transferred to the United States for further use as fuel for commercial nuclear reactors. As a result, Russian deliveries under the deal have secured about half of the US domestic market. It is expected that, during implementation of the deal, the Russian side could gain around ten billion US dollars. In exchange, Moscow eliminated several thousand warheads, probably more than required by the START I agreement.

However, its main benefit was the establishment of the largest bilateral cooperative commercial civilian nuclear program. Unlike some other cooperative threat reduction projects, the Megatons to Megawatts program does not require the expenditure of US taxpayers' money. The Russian fuel is paid for from the revenues generated by selling electricity to commercial consumers. The program's considerable size created interdependence between the US and Russian civilian nuclear complexes. Although the deal will ex-

pire in 2012, continuing to permit Russian commercial access to the US market or even increasing it is recommended. This would help maintain interdependence between US and the Russian civilian nuclear actors, and would contribute to the overall improvement of bilateral relations.

Safety and Security of Russia's Nuclear Assets and Expertise

Recommendation. Although US access to Russian facilities, where projects are aimed at improving safety and security measures, is not agreed following the projects' completion, doing so would contribute to ensuring the continuing safety and security of the nuclear assets and expertise. The United States might make maintaining access a condition for Russian low-enriched uranium (LEU) fuel deliveries to the US civil nuclear market after expiration of the Megatons to Megawatts program in 2012.

Most likely, maintaining and improving the safety and security of Russia's nuclear assets and expertise represents the most important bilateral US-Russian projects aimed at preventing leakage of nuclear materials and expertise to the international nuclear black market, and thus to strengthening the international nuclear non-proliferation regime. As a result, the emergence of that black market was delayed, and the scope of materials and know-how available there was limited. Implementation of bilateral projects has helped to improve physical protection, control and accounting systems at hundreds of Russian nuclear facilities. It also helped to prevent a mass exodus of Russian nuclear experts and expertise to the potential proliferators.

Cooperative efforts aimed at guaranteeing the safety and security of the most sensitive Russian nuclear assets were completed in 2008. In any case, the improved economic situation in Russia eased pressure on nuclear experts to emigrate. The cooperative projects will be finished at the beginning of the decade that starts in 2010. However, the United States is concerned that, after ending the projects, the Russians will not adequately finance maintenance of the technologies and hardware provided, or would misuse. Therefore, Washington remains interested in maintaining access to the facilities where the cooperative projects were implemented, even after their completion.

Although such future access is not guaranteed under existing agreements, it would contribute to ensuring the continuing safety and security of the

nuclear assets and expertise. The United States might make maintaining access a condition for Russian low-enriched uranium (LEU) fuel deliveries to the US civil nuclear market after expiration of the Megatons to Megawatts program in 2012.

Bilateral Scientific Cooperation

Recommendation. During the implementation of cooperative threat reduction projects, US and Russian nuclear scientists established a wide cooperative network. Its importance goes beyond narrow scientific partnership and positively affects political relations between the two countries. The anticipated completion of assistance programs in coming years could damage the network with all its negative consequences. The United States and Russia should continue to support bilateral scientific nuclear cooperation by preserving temporarily tax benefits and other privileges, as well as by providing grants for bilateral projects.

During implementation of the cooperative threat reduction projects, US and Russian labs and other research centers established a broad network of cooperation on a broad spectrum of research and development projects. This brings benefits for the development of science in general, as well as increases mutual confidence between the nuclear establishments of the powers. This latter represents a positive factor for developing bilateral political relations.

Some of the cooperative projects have been commercialized. However, progress in commercialization was not as successful as expected. The risk remains that, after completing cooperative assistance projects in next decade, the existing network would not be able to sustain a dramatic decrease of funding. Since they make a positive impact on bilateral political relations and contribute to the development of science, the US and Russian authorities should consider continuing to support them. For instance, both countries might maintain temporarily tax benefits and exemptions in order to help scientific cooperation to adapt to the new environment. They could also provide grants for implementing bilateral scientific projects.

Bilateral Commercial Cooperation

Recommendation. Reviving the US-Russian 123 Agreement would open Russia's market for US civil nuclear goods and services. It will also permit Russia to import US-origin spent reactor fuel. The conclusion of the agreement was linked by the Bush administration to Russian cooperation in curbing the controversial components of the Iranian nuclear program. Moscow believes that it fulfilled its part of the deal. The continuing reluctance of the United States to bring the 123 Agreement into force could undermine confidence between the US and Russia and complicate achieving potential informal bilateral deals in the future, perhaps involving Iran.

In 2008 the United States and Russia signed a bilateral agreement on civil nuclear cooperation (123 Agreement), which provided the legal base for exporting US civil nuclear technologies and materials to Russia. However, as a consequence of the war in August 2008 (between Russia and Georgia) and partisan disagreements, the Bush administration decided to withdraw the agreement from the approval process in the US Congress.

If approved, the agreement could remove a peculiar asymmetry. While Russians can sell their civil nuclear technologies, materials and expertise in the United States, US companies are denied access to the potentially attractive Russian market due to domestic legal restrictions. Russia elaborated an ambitious program to develop national commercial nuclear power capabilities, and hinted that it could distribute potentially lucrative sub-contracts among foreign companies. Although the implementation of the program will be delayed as a result of recent global economic crises, in a few years it might be back on track.

For their part, the Russians are interested in the 123 Agreement not because they desperately need US technologies in this area, but due to their plans to import foreign spent fuel for long-term storage. So far, Russia is the only country willing to do so, and Russian companies estimate the potential market for such services at around a few billion US dollars a year. Most of the spent fuel available worldwide is of US origin, and under US legislation and bilateral supply agreements concluded between the United States and possessing countries, it cannot be exported to Russia in the absence of the 123 Agreement.

Conclusion of the 123 Agreement was linked by the Bush administration to Russia's support of UN Security Council sanctions against Iran. Indeed,

Moscow supported the sanctions resolutions despite strong domestic opposition. In that context, U.S. failure to approve the document could undermine Moscow's confidence in Washington and, consequently, potential chances for achieving US-Russian informal deals in some important areas, possibly including Iran.

Internationalizing Nuclear Fuel Cycle

Recommendation. Establishing international uranium enrichment centers represents an interesting idea aimed at guaranteeing broad access to the benefits of peaceful nuclear energy, while preserving non-proliferation regimes. However, the idea is not sufficiently developed. The United States and Russia, together with other responsible suppliers, should establish an international group of high-level experts with the goal of defining several well-considered options for developing such centers. At a later stage, multilateral political talks might start. They would be based on the proposed options.

The growing development of nuclear energy throughout the world requires measures to minimize the risks for the non-proliferation regime. One of the biggest risks to the regime is represented by the spread of nuclear fuel cycle technologies. There can be no doubt that the spread of uranium enrichment and spent fuel reprocessing technologies to an ever-greater number of countries will create serious threats for the non-proliferation regime. This is because, even if a country is a party to the NPT and places its nuclear fuel cycle facilities under IAEA safeguards, the very fact that it has enrichment and/or reprocessing facilities gives it a real capability for developing a nuclear weapon in a short period of time.

Several possible solutions to this problem have been proposed over the past years. For instance, in 2003 the IAEA put forward the idea of carrying out uranium enrichment and spent fuel reprocessing exclusively at facilities under international control. Two other proposals were delivered by the United States in 2004 and 2006. Basically, they were aimed at preventing a spread of uranium enrichment and spent fuel-reprocessing technologies to countries which so far do not possess them. In 2006, Russia delivered its own initiative on establishing an international uranium enrichment complex in Angarsk (Irkutsk region). The center was established in practice and put under IAEA safeguards. Several post-Soviet states joined the facility as co-founders. In June 2006, six countries with enrichment plants (France, Germany, the Netherlands, Russia, the United

States, and the United Kingdom) put forward a project that proposed guaranteed access to nuclear fuel for countries which renounced the development of national enrichment facilities. In September 2006, Japan proposed the creation of an IAEA reserve system for guaranteeing nuclear fuel supplies, an idea which complemented the proposal made by the six countries, and which envisaged the creation of an information system to prevent a collapse of the nuclear fuel market. Finally, in September 2006, the United Kingdom proposed its own idea of “enrichment obligations,” which would provide better guarantees for countries requiring enrichment services.

The Angarsk project is at an advanced state of development. However, so far it failed to start operation. This likely reflects a lack of development of the concept of guaranteed international fuel supply. The international uranium enrichment centers (IUECs) only partially solve the problem of internationalization of the fuel cycle. So far, it is not planned that Angarsk could provide services for two other stages – assembly of fuel rods and reprocessing of spent fuel. Beyond that, the concept of “guaranteed” supplies of fuel and services raises a number of questions: (1) Will the guarantees be made at the company, state or international level? (2) Will special measures to back up these guarantees be developed and adopted? (3) What is reliability of the guarantees? (4) How will the competitiveness of international markets be maintained in conditions of actual monopolization of fuel production and services by an international cartel of suppliers? (5) Would it be possible for a consumer of the services to lose the right to these guarantees, and if so, under what circumstances?

These and other questions should be addressed multilaterally. Initially, they require intellectual brainstorming rather than political negotiations. The United States and Russia, together with other interested suppliers, should form a high-level international working group of experts. It would develop several options for internationalizing the nuclear fuel cycle. Later, these options might become a basis for political negotiations between potential suppliers, and later between suppliers and possible recipients.

1.4. RECAP ON RECOMMENDATIONS

1. Depending on the successful achievement of the START I follow-on treaty and ratification, a next step could be concluding a new SORT/START Treaty (SORT II). It could, for example, reduce the number of operationally deployed warheads down to approximately 1,000-1,200 by the year 2020.
2. Informal commitment by third-country nuclear weapon states not to increase their nuclear forces and also to provide some confidence-building and transparency measures would be very welcome to facilitate future US-Russian reductions.
3. The US and Russia might mutually abandon plans to launch missiles based on data from early warning systems (“launch-on-warning”). That could be followed by the development of qualitatively new arms control treaties, lowering the alert levels of strategic nuclear forces through several technical measures, and altering their operational deployment.
4. The US and Russia might make an agreement to place all tactical nuclear weapons (TNWs) in centralized storages located on national territory (which would include transferring American weapons from European to US territory). In order to facilitate Russia’s security concerns, this should be linked with revitalization of the Adapted Conventional Armed Forces in Europe (CFE) Treaty.
5. The United States and Russia should start a process of integrating their early warning and defense systems.
6. Raise the effectiveness of International Atomic Energy Agency (IAEA) safeguards by broadening adherence to the Additional Protocol and reinforcing the Agency’s scientific, technical and financial resources for conducting safeguards activities.
7. The United States and Russia, together with other partners, should work on strengthening existing multilateral export control regimes and universal adherence to UN Security Council Resolutions 1540 and 1887.

8. In coming years, it is necessary to introduce strict formalities for, and increasing the political significance of, procedures for withdrawal from the Non-Proliferation Treaty.
9. The United States and Russia should take a lead in achieving denuclearization of the Korean Peninsula and convincing Iran to refrain from the controversial components of its nuclear program.
10. Additional multilateral agreements should be concluded and brought into force.
11. In the shortest possible time, the nuclear powers must demonstrate consistent progress towards fulfilling their nuclear disarmament obligations under Article VI of the NPT.
12. Although the highly successful Megatons to Megawatts project will expire in 2012, it has helped Russia to take a significant share of the US domestic commercial nuclear fuel market. After 2012, it is advisable to continue permitting Russia commercial access to the US market or even increasing it. This would help maintain interdependence between US and Russian civilian nuclear actors, and would contribute to the overall improvement of bilateral relations.
13. Although US access to Russian facilities, where projects are aimed at improving safety and security measures, is not agreed following the projects' completion, doing so would contribute to ensuring the continuing safety and security of the nuclear assets and expertise. The United States might make maintaining access a condition for Russian low-enriched uranium (LEU) fuel deliveries to the US civil nuclear market after expiration of the Megatons to Megawatts program in 2012.
14. During the implementation of cooperative threat reduction projects, US and Russian nuclear scientists established a wide cooperative network. Its importance goes beyond narrow scientific partnership and positively affects political relations between the two countries. The anticipated completion of assistance programs in coming years could damage the network with all its negative consequences. The United States and Russia should continue to support bilateral scientific nuclear cooperation by preserving temporarily tax benefits and other privileges, as well as by providing grants for bilateral projects.

15. Reviving the US-Russian 123 Agreement would open Russia's market for US civil nuclear goods and services. It will also permit Russia to import US-origin spent reactor fuel. The conclusion of the agreement was linked by the Bush administration to Russian cooperation in curbing the controversial components of the Iranian nuclear program. Moscow believes that it fulfilled its part of the deal. The continuing reluctance of the United States to bring the 123 Agreement into force could undermine confidence between the US and Russia and complicate achieving potential informal bilateral deals in the future, perhaps involving Iran.
16. Establishing international uranium enrichment centers represents an interesting idea aimed at guaranteeing broad access to the benefit of peaceful nuclear energy, while preserving non-proliferation regimes. However, the idea is not sufficiently developed. The United States and Russia, together with other responsible suppliers, should establish an international group of high-level experts with the goal of defining several well-considered options for developing such centers. At a later stage, multilateral political talks might start. They would be based on the proposed options.

PART II

**Resetting Russian – U.S. Leadership on
Nuclear Arms Reductions and
Non-Proliferation**

Joseph Cirincione

Clifford Gaddy

Steven Pifer

(Recommendations of American experts)

Resetting U.S.-Russian Leadership on Nuclear Arms Reductions and Non-Proliferation*

Foreword

U.S.-Russian relations have been “reset” over the past eleven months, and the renewed bilateral negotiations on reducing strategic nuclear forces have played a major role in this. At the beginning of 2010, Washington and Moscow are getting close but must still complete the Strategic Arms Reduction Treaty (START) follow-on treaty. They face, moreover, a busy calendar topped by the April nuclear security summit in Washington and May Non-Proliferation Treaty review conference. Clearly, nuclear arms reductions and non-proliferation will be major themes in the coming year, and this is a key reason why we established the Brookings Arms Control Initiative at the end of 2009.

In December 2009, Brookings organized a discussion between former Secretary of State Madeleine Albright and former Russian Foreign Minister Igor Ivanov to look at how the United States and Russia might lead in promoting further nuclear arms reductions and strengthening the nuclear non-proliferation regime. I also took part. Our discussion was informed by papers prepared by three U.S. experts—Joseph Cirincione, Clifford Gaddy and Steven Pifer—and three counterpart papers prepared by Russian experts—Vladimir Baranovsky, Vladimir Dvorkin and Alexander Pikayev. Those papers examined the principal issues and offered recommendations. Secretary Albright, Minister Ivanov and I discussed the two sets of papers and, drawing from them, agreed on a set of joint recommendations, which we transmitted to senior U.S. and Russian officials.

When organizing this U.S.-Russian dialogue, Brookings decided to focus on nuclear arms reductions and non-proliferation not just because those issues offered an opportunity for strengthened cooperation between Washington and Moscow. We chose these questions because they are fundamentally about improving American national security. The spread of nuclear weapons and the risk that they might fall into the hands of terrorists represent grave threats to the United States. Washington must act to contain and reduce this threat, and Russia can be a critical partner in this effort.

* Foreign Policy at Brookings // Arms Control Series / Paper 1 / January 2010.

This paper, the first in the Brookings Arms Control Series, is based on the submissions by the three U.S. experts for the December meeting. It identifies some 40 possible recommendations for moving forward on nuclear arms reduction, strengthening the non-proliferation regime, and making nuclear energy available in a proliferation-resistant manner. We offer it with the goal of stimulating discussion, both official and public, as to how the United States and Russia can together lead in shaping a safer and more secure world.

We are grateful to the Norwegian Ministry of Foreign Affairs for its support of the Albright-Talbott-Ivanov meeting, as well as to the MacArthur Foundation and Ploughshares Fund for their support of our new Arms Control Initiative.

Strobe Talbott

2.1. Introduction**

The “Reset”

Vice President Biden announced the Obama administration’s intention to reset relations with Russia in a February 7, 2009 speech to the Munich Security Conference. Reset thereafter became the watch word as the administration set about restoring a U.S.-Russian relationship that, by the end of 2008, had fallen to its lowest point since the collapse of the Soviet Union in 1991.

During their first meeting in London on April 1, 2009, Presidents Obama and Medvedev discussed ways to build a more positive relationship. They attached particular importance to nuclear arms reductions and non-proliferation:

“As leaders of the two largest nuclear weapons states, we agreed to work together to fulfill our obligations under Article VI of the Treaty on the Non-Proliferation of Nuclear Weapons (NPT) and demonstrate our leadership in reducing the number of nuclear weapons in the world. We committed our two countries to achieving a nuclear free world... We agreed to pursue new and verifiable reductions in our strategic offensive arsenals in a step-by-step process... We intend to carry out joint efforts to strengthen the international regime for non-proliferation of weapons of mass destruction and their means of delivery... Together, we seek to secure nuclear weapons and materials, while promoting the safe use of nuclear energy for peaceful purposes.”¹

The focus on nuclear weapons is understandable. Detonation of a nuclear device in an American or Russian city would be a catastrophic event, to say nothing of the consequences of large-scale use of nuclear weapons in an inter-state conflict. The risk increases with the spread of nuclear wea-

** We want to express our gratitude to Matthew Bunn, Fiona Hill, Daryl Kimball, Michael O’Hanlon and Strobe Talbott for taking the time to review a draft of this paper and for the helpful comments and suggestions that they provided. Of course, the views and recommendations contained here are our own. We appreciate Gail Chalef’s assistance in the production of this paper.

¹ The White House, Office of the Press Secretary, “Joint Statement by President Dmitriy Medvedev of the Russian Federation and President Barack Obama of the United States of America,” April 1, 2009.

pons and the threat that they could fall into the hands of a terrorist group that might not be deterrable. It is difficult to imagine anything that would pose a greater threat to American national security.

Broadened and sustained U.S.-Russian leadership on nuclear arms reductions and nuclear non-proliferation is necessary to strengthen global security and the NPT regime. As the United States and Russia control 95 percent of the world's nuclear weapons, their efforts to enhance the NPT regime at the May 2010 NPT review conference will have little credibility if they are not reducing their nuclear arsenals.

U.S.-Russian leadership on nuclear issues can also be good for the broader bilateral relationship between Washington and Moscow. U.S. and Russian interests coincide on many issues regarding nuclear non-proliferation, including finding ways to make civil nuclear energy available while minimizing the attendant proliferation risks. Expanding cooperation on these issues, including leading joint efforts in the non-proliferation field, can contribute to a more positive and cooperative bilateral relationship as well as reducing the risks of nuclear proliferation.

The START Follow-on Treaty

Faced with the looming expiration in December of the 1991 Strategic Arms Reduction Treaty (START), the two presidents in London agreed to make negotiating a follow-on treaty a high priority. Although the 2002 Strategic Offensive Reductions Treaty (SORT) will continue in force until December 31, 2012, that treaty contains no counting rules or monitoring measures; it is unverifiable. The presidents in April issued a joint statement focused on strategic arms negotiations in which they set the goal of working out "a new, comprehensive legally binding agreement on reducing and limiting strategic offensive arms to replace the START treaty."²

Formal U.S.-Russian negotiations began in May. When the presidents met in Moscow on July 6, they signed a joint understanding setting out the basic provisions for the START follow-on treaty. Among other things, the joint understanding provided that each side would reduce to no more than

² The White House, Office of the Press Secretary, "Joint Statement by Dmitriy A. Medvedev, President of the Russian Federation, and Barack Obama, President of the United States of America, Regarding Negotiations on Further Reductions in Strategic Offensive Arms," April 1, 2009.

1500-1675 strategic warheads on no more than 500-1100 strategic nuclear deliver vehicles, with the intention to agree on specific numbers before conclusion of the treaty.³ The joint understanding further stated that the new treaty would, inter alia, contain provisions on counting rules, verification, the interrelationship between strategic offensive and strategic defensive arms, and non-nuclear warheads on strategic ballistic missiles.

As December came to a close, U.S. and Russian negotiators had moved into the end-game on a new treaty. On December 4, the day before the START Treaty expired, the presidents issued a joint statement expressing “our commitment, as a matter of principle, to continue to work together in the spirit of the START Treaty following its expiration, as well as our commitment to ensure that a new treaty on strategic arms enters into force at the earliest possible date.”⁴ The sides were reportedly close to agreement on numbers (approximately 1500-1600 warheads and 700-800 strategic nuclear delivery vehicles, or SNDVs), with the major remaining issues having to do with verification questions, such as access to telemetry. Negotiations were set to resume in early 2010 with hopes that they could quickly resolve the outstanding differences.

Looking Forward in 2010

By the end of 2009, U.S.-Russian relations had significantly improved compared to their low point in 2008. Progress on a START follow-on treaty had contributed greatly to this, as had the Obama administration’s September decision to reconfigure plans for U.S. missile defense in Europe.

The year 2010 promises to be a busy year in the areas of nuclear arms reduction and non-proliferation. Early in the year, the United States and Russia should conclude a START follow-on treaty, which will require ratification by the U.S. Senate and Russian Duma (parliament). The Ob-

³ For purposes of comparison, the 1991 START Treaty required that each side deploy no more than 1600 strategic nuclear deliver vehicles capable of carrying no more than 6000 warheads. The 2002 SORT Treaty limited each side to no more than 1700-2200 strategic nuclear warheads; that treaty did not specify a limit for strategic nuclear delivery vehicles.

⁴ The White House, Office of the Press Secretary, “Joint Statement by the President of the United States and the President of the Russian Federation on the Expiration of the Strategic Arms Reduction Treaty (START),” December 4, 2009.

ama administration will announce the results of its Nuclear Posture Review, which should outline the place of nuclear weapons in the administration's overall national security policy and provide options for further nuclear reductions. The review will offer an opportunity for the president to transform U.S. nuclear policy and take account of changes that have taken place since the end of the Cold War. In April, President Obama will host the Washington nuclear security summit, and the NPT review conference begins in New York in May. President Obama has called for ratification of the Comprehensive Test Ban Treaty, which failed to achieve ratification in 1999, and his administration will have to decide when to ask the Senate to reconsider it. Developments in Iran and North Korea will surely add to the crowded nuclear arms control calendar.

The United States and Russia should consider how they can build on the START follow-on treaty to pursue further step-by-step reductions, as the two presidents agreed in London. While mutual deterrence and the concept of rough equivalence continue to characterize the U.S.-Russian nuclear relationship and will do so for the foreseeable future, deep reductions in nuclear forces combined with cooperation in the area of missile defense can help transform the nuclear relationship and move toward the goal articulated by the presidents of a world free of nuclear weapons. As the sides reduce their deployed strategic offensive arms, the relevance of tactical nuclear weapons, non-deployed strategic warheads, missile defense and third-country nuclear forces will increase, as will the pressure to address these issues in U.S.-Russian negotiations.

The two countries should consider steps they can take, individually and jointly, to strengthen the NPT regime, advance the prospects for a successful NPT review conference, and ensure the NPT's enforcement. This will require in particular that the United States and Russia demonstrate their willingness to make further nuclear arms cuts in fulfillment of their obligations under Article VI of the NPT "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."

Finally, given the expected growth in global demand for nuclear power as an energy source, the United States and Russia should cooperate to ensure that the expansion of civil nuclear power is done in a manner that minimizes the risks of accidents, terrorism and proliferation of nuclear arms and nuclear arms-related technologies. This could include U.S.-Russian leadership to promote internationalization of the nuclear fuel cycle.

This paper examines possible measures the United States and Russia could take in 2010 in three areas: next steps in nuclear arms reductions, strengthening the non-proliferation regime and promotion of proliferation-resistant nuclear energy. The paper offers specific suggestions that the U.S. and Russian governments might pursue in each of these three areas with the objectives of promoting nuclear arms control and non-proliferation and, by developing U.S.-Russian leadership on these questions, a stronger and more cooperative U.S.-Russian bilateral relationship. The recommendations are recapped in Chapter 5.

2.2. Next Steps in U.S.-Russian Nuclear Arms Reductions

Building on the START Follow-on Treaty

Assuming that the START follow-on treaty will shortly be completed and submitted by both countries for ratification by their respective legislative bodies, the question will be: what next for U.S.-Russian nuclear arms negotiations? Washington and Moscow should continue the negotiating process, as the presidents agreed in London, with a goal of further cutting nuclear arms and bolstering U.S.-Russian leadership on nuclear non-proliferation. Further negotiations may well get into new issues, including tactical nuclear weapons, non-deployed strategic nuclear weapons and missile defense. Moreover, at some point, as strategic nuclear arms reductions proceed, third-country nuclear forces will need to be factored into the equation.

Such issues have less relevance when there are high limits on deployed strategic nuclear warheads. However, as the limits on deployed strategic nuclear forces are reduced, these questions assume greater importance. A Russian tactical nuclear arsenal of 2000-5000 weapons or a U.S. "responsive force" of 2000-2400 non-deployed strategic nuclear warheads will have greater relevance for the strategic nuclear equation when the limit on deployed strategic nuclear warheads is 700 or 1000 than when the limit is 1500-1600, to say nothing of START's limit of 6000. Unless these issues are addressed, it will at some point become impossible for Washington or Moscow, or both, to continue reducing deployed strategic nuclear forces.

This subsequent negotiation will also need to deal with any loose ends left from the current talks on the START follow-on treaty. A subsequent negotiation also presupposes a readiness on Moscow's part to continue the

nuclear arms reduction process. Although President Medvedev joined President Obama in committing to the goal of a nuclear-free world, to be achieved in a step-by-step process, some analysts question how eager the Russian government will be to reduce below the limit set in the START follow-on treaty.

Further Strategic Nuclear Arms Reductions

The START follow-on treaty will reduce U.S. and Russian strategic nuclear forces to levels well below those of the START agreement (6000 strategic warheads on 1600 SNDVs) and to somewhat below the SORT Treaty (1700-2200 operationally deployed strategic warheads). The United States and Russia will still hold nuclear forces that dwarf those of third countries; France, the next largest strategic nuclear power, maintains some 300 nuclear warheads.

It may be difficult to launch a new round of negotiations immediately after concluding, but before ratification of, a START follow-on treaty. The U.S. and Russian governments instead could shortly after conclusion of the follow-on treaty begin *consultations* on the issues that they would have to address in negotiations to reduce each side's deployed strategic nuclear warheads to no more than 1000, and perhaps fewer, with appropriate reductions in the numbers of strategic nuclear delivery vehicles.⁵ These consultations would frame the issues and prepare the ground for subsequent formal negotiations.

A new treaty (after the START follow-on agreement) will not be concluded before the NPT review conference begins in May, and negotiations likely will not yet be underway. However, as a signal of their commitment to further nuclear cuts in line with Article VI of the NPT, Presidents Obama and Medvedev could issue a joint statement upon conclusion of the START follow-on treaty announcing that the next round of negotiations will have the goal of an agreement reducing each side's deployed strategic nuclear warheads to no more than 1000.

⁵ SNDVs traditionally include intercontinental ballistic missile launchers, submarine-launched ballistic missile launchers and heavy bombers.

Tactical (Non-Strategic) Nuclear Weapons

Although the United States and Russia previously have not negotiated on tactical nuclear weapons, U.S. officials indicated in 2009 that Washington plans to raise these in the round of negotiations following conclusion of the START follow-on treaty. Tactical nuclear weapons will be a complicated issue. Due to conventional force reductions, demographics and restrained budgets, the Russian military believes it faces significant shortcomings compared to U.S., NATO and Chinese conventional forces. Russian military policy now places greater reliance on tactical nuclear weapons, and maintains the option of first use in the event of a conventional conflict, much in the same way that NATO policy has included the option of first use of nuclear weapons in response to a conventional attack.

Moscow's calculation of its defense needs may limit how far it is prepared to go in reducing tactical nuclear weapons, but reductions in strategic nuclear arms can only proceed so far without taking tactical weapons into account. After all, the principal difference between a strategic and a tactical nuclear weapon lies in the range of the delivery system; ultimately, the United States and Russia should consider a regime limiting all nuclear weapons, strategic and tactical, deployed and non-deployed.

There is a wide range of estimates regarding the size of the Russian tactical nuclear stockpile. A Congressional Research Service study puts the number at between 3000 and 8000.⁶ A Federation of American Scientists report puts the number at 5390, of which 2050 are operational.⁷ While large, these numbers are significantly below the estimates in the early 1990s. As for the U.S. tactical nuclear stockpile, a Bulletin of Atomic Scientists report puts the number at 1100,500 operational and 600 in the inactive stockpile.⁸ This leaves room for reductions, though Moscow may be unwilling to cut too far without limits on conventional forces, for example, in the form of an adapted Conventional Forces in Europe Treaty. There are also tactical warheads that have been removed from military service but await dismantlement.

⁶ Amy F. Woolf, *Nonstrategic Nuclear Weapons*, Congressional Research Service, January 28, 2009.

⁷ Hans M. Kristensen, "Russian Tactical Nuclear Weapons," FAS Strategic Security Blog, March 25, 2009. <<http://www.fas.org/blog/ssp/2009/03/russia-2.php>>.

⁸ Robert S. Norris & Hans M. Kristensen, "Nuclear Notebook: U.S. Nuclear Forces, 2009," *Bulletin of the Atomic Scientists*, March/April 2009, vol. 65, no. 2, pp. 59-69.

A major challenge for any negotiation on tactical nuclear weapons will be monitoring and verification. Most deployed strategic nuclear warheads are counted by their association with deployed SNDVs, particularly for inter-continental ballistic missiles (ICBMs) and submarine-launched ballistic missiles (SLBMs). Tactical nuclear weapons, such as bombs for tactical aircraft, do not have that direct link. Monitoring warheads—whether tactical or strategic—poses daunting verification challenges.

A negotiation that included reductions in and limits on U.S. and Russian tactical nuclear weapons, moreover, would invariably address U.S. tactical nuclear weapons deployed in Europe. There is no official number for these, though one estimate puts the figure at 200 gravity bombs deployed in Belgium, Germany, Italy, the Netherlands and Turkey.⁹ Including these weapons in any U.S.-Russian negotiation would be an issue that would first require NATO consultation.

In anticipation that tactical nuclear weapons could become the subject for U.S.-Russian negotiations, the United States could begin consultations now with NATO regarding how to maintain nuclear deterrence in Europe and the possibility of including U.S. nuclear weapons in Europe in U.S.-Russian arms negotiations. This could fit in well with the current NATO effort to develop a new strategic concept by the end of 2010.

The United States and Russia could agree in principle to address tactical nuclear weapons in the next negotiating round of U.S.-Russian nuclear arms reductions. This would require that they consider some difficult issues, including how to verify eliminations and the residual numbers of tactical nuclear weapons, which neither sides knows how to do at this point.

The United States and Russia could each declare to the other now the total number of tactical nuclear weapons in its stockpile. Declarations could include the broad type (air defense, naval, bombs, cruise missiles, etc.). This would establish a database—even if it could not be verified at this point—for use in a subsequent negotiation.

⁹ Bob van der Zwann and Tom Sauer, “Time to Reconsider U.S. Nuclear Weapons in Europe,” *Bulletin of the Atomic Scientists*, November 23, 2009. <<http://www.thebulletin.org/web-edition/op-eds/time-to-reconsider-us-nuclear-weapons-europe>>.

Non-deployed Nuclear Warheads

Bilateral nuclear arms control efforts to date have focused on limits on deployed strategic systems. In addition to strategic warheads deployed on operational systems, the United States and Russia maintain additional warheads for use as spares (should a problem develop in an operational warhead) and in their operational reserve. The Bush administration planned a “responsive force” of about 2350 non-deployed strategic warheads which could, if necessary, be redeployed to operational launchers.¹⁰ (Redeploying these warheads would take the U.S. strategic force above the 1700-2200 limit in the SORT Treaty.) There are also strategic warheads that have been removed from military service but await dismantlement.

At some point, perhaps in the negotiation that comes after the START follow-on treaty, the sides will have to deal with all nuclear warheads (strategic, tactical, deployed and non-deployed). The United States intends to seek reductions in and limitations on tactical nuclear weapons; it may be impossible to achieve this unless the United States is prepared to negotiate non-deployed strategic warheads as well, an issue of considerable interest to the Russian side.¹¹ Indeed, there may be the possibility of a trade-off between U.S. interest in reducing Russian tactical nuclear weapons and Russian interest in reducing U.S. non-deployed strategic warheads.

If Washington and Moscow decide to limit non-deployed warheads, they will face two challenges. First, what will be that limit and what form will that limit take? This will depend in part on the different types of warheads in the sides’ arsenals and considerations of stockpile reliability. If, for example, a country has concerns about the reliability of a particular warhead type, it may want to maintain a greater number of non-deployed warheads of that type. At some point in the process, the sides may simply decide to

¹⁰ Robert S. Norris & Hans M. Kristensen, “Nuclear Notebook: U.S. Nuclear Forces, 2009.”

¹¹ The United States may reach its START follow-on warhead limit by downloading warheads from missiles—removing warheads from the missile—but keeping the missiles in the operational force (e.g., a Trident II missile can carry up to eight warheads but might be downloaded so that it carries only three, leaving five “empty” warheads spots on the warhead platform). The Russians have expressed concern that downloaded warheads could be returned to the missiles in a manner that would allow the United States to break out from the treaty’s limits and rapidly increase its warhead numbers.

limit total numbers of nuclear warheads rather than attempting to distinguish between tactical and strategic warheads or between deployed and non-deployed warheads.

Second, how can the limit be verified? As with tactical nuclear weapons, monitoring strategic warhead eliminations and residual numbers of warheads will require very intrusive verification measures that the sides have not employed to date. U.S. and Russian officials discussed ways to make warhead dismantlement transparent and irreversible in the early 1990s. The 1997 Helsinki summit statement noted that START III would include warhead dismantlement measures, but those negotiations never reached an agreement. Monitoring the numbers of tactical and non-deployed strategic warheads will pose even more difficult challenges.

The United States and Russia could each declare to the other now the total number of strategic nuclear weapons in its stockpile, and break the total into three categories: deployed, non-deployed (including spares and reserves) and awaiting dismantlement. The sides should each have flexibility to characterize weapons in accordance with their own internal practices, with the understanding that all nuclear weapons would be included in this declaration or the associated tactical (non-strategic) warhead declaration. This would establish a database for use in a subsequent negotiation.¹²

In anticipation that non-deployed nuclear warheads may become the subject for U.S.-Russian arms reductions negotiations, the United States and Russia could begin consultations on ways to ensure the elimination of warheads can be made transparent and irreversible. They could also begin consultations on different approaches to verifying declarations of warheads numbers, building on earlier exchanges in the 1990s.

¹² Edward Ifft, in his paper “Next Steps in U.S.-Russian Arms Control” prepared for a March 5, 2009 PIR Center conference in Moscow, noted the value of each side declaring its total stockpile even if the numbers could not be verified; the sides could begin to use their national technical means of verification to try to establish the validity of the declaration during the period before an actual negotiation that would include all warheads, non-deployed as well as deployed.

Missile Defense

Presidents Obama and Medvedev agreed in April that their governments should discuss the interrelationship between strategic offensive and defensive arms. They stated in July that the START follow-on treaty would have a provision addressing that interrelationship. Most expect that the treaty will note the interrelationship in its preamble but not operationalize the provision with specific limits on missile defense.

This issue has a long history. The first U.S.-Soviet strategic arms agreement in 1972, the Strategic Arms Limitation Talks (SALT) Interim Offensive Agreement, was accompanied by the Anti-Ballistic Missile (ABM) Treaty, which strictly limited each side's missile defenses. Both sides at that time accepted the interrelationship, the concerns being (1) that unlimited ABM systems might lead a side to conclude that it could launch a first strike and count on its missile defense systems to blunt a weakened retaliatory response, and (2) that unlimited ABM systems would encourage the other side to further expand its offensive ballistic missile force, making arms limitation impossible.

The United States and Russia also attempted in the late 1990s to delineate strategic from theater missile defense, as both developed increasingly capable defenses against theater ballistic missiles. This offense-defense logic prevailed until 2001, when the Bush administration announced its intention to withdraw from the ABM Treaty, which it formally did in June 2002.

Current strategic missile defenses on each side are relatively low in number. The Russians maintain some 65 nuclear-armed interceptor missiles around Moscow. The United States deploys approximately 30 ground-based kinetic-kill interceptors in Alaska and California designed to defeat a rudimentary North Korean or Iranian intercontinental ballistic missile.

Both the United States and Russia also deploy increasingly capable systems against shorter-range ballistic missiles. These include the American Standard SM-3, THAAD and Patriot C interceptor missiles and the Russian S-300 and S-400. Some may be upgradeable to a point where they could deal with ICBMs. For example, the new U.S. plan for missile defense envisages ultimately (in 2020) giving the Standard missile a capability against ICBMs.

At some point, one side or the other will be unready to agree to further reductions in its strategic ballistic missile warheads without a good understanding, and probably some regulation, of missile defense. Another element of the missile defense discussion is possible U.S.-Russian or NATO-Russian cooperation. The Obama administration's September decision to reconfigure U.S. missile defense plans for Europe took some of the heat out of this issue between Washington and Moscow. It may have opened the possibility for positive cooperation on missile defense, either on a bilateral basis or between NATO and Russia.

A U.S.-Russian memorandum signed in 2000 agreed to establish a Joint Data Exchange Center to share information on ballistic missile launches. However, due to technical tax and liability issues, it has never been implemented. Resolving those issues and actually establishing the center is an area for potential cooperation. The United States and Russia should activate the Joint Data Exchange Center as soon as possible.

Cooperation against theater ballistic missiles has long been on the NATO-Russia agenda, and both NATO Europe and Russia face an existing threat posed by Iranian ballistic missiles. The U.S. system now planned for Europe has no capability against Russian strategic missiles, but should be able to offer Europe some protection against an Iranian missile attack. The Russian early warning radar at Armavir could make an important contribution to a Europe wide (including Russia) missile defense system.

The United States and Russia could begin consultations with the goal of clarifying the extent and nature of their respective missile defenses with capabilities against strategic ballistic missiles. Such consultations could give each a better understanding of the other's capabilities and frame issues for possible further discussion or negotiation.

The United States and Russia could urge that missile defense cooperation be given priority as a subject on the NATO-Russia agenda. This could be an important element of the effort to reset the NATO-Russia relationship.

Third-Country Nuclear Forces

There is also the subject of third-country nuclear forces. Britain's strategic nuclear forces number some 160 warheads.¹³ French President Nicholas Sarkozy has stated that France will maintain no more than 300 nuclear warheads in its arsenal.¹⁴ China is estimated to deploy a total of some 175 warheads on its strategic and intermediate-range systems.¹⁵ Moreover, Israel, India, Pakistan and North Korea also possess nuclear arms. While the United States and Russia are discussing bilateral reductions, at some point they will not be willing to reduce their forces further without addressing the nuclear forces of third countries, particularly Britain, France and China. Ultimately, all nuclear weapons states would need to be included. Pakistan's current nuclear build-up, for example, has provoked concern well beyond the South Asia region.

There are various models to address third countries: multilateralizing the U.S.-Russian negotiations to include other states, beginning with Britain, France and China; negotiation of separate limits on third country nuclear forces; or unilateral undertakings by third countries. The third option might offer a good starting point. For example, Britain, France and China could make unilateral undertakings to freeze their warhead levels or not increase above a certain number (for example, 300).

Although British Prime Minister Gordon Brown has indicated London's readiness to participate in future nuclear arms reductions, persuading China and France to join will not be easy. If the next step in negotiations reduces U.S. and Russian deployed strategic warheads to no more than 1000, there will be no need to bring in third country forces at this point, but negotiation of a lower limit would likely raise the third-country question.

The United States and Russia could consult with Britain, France and China as to those countries' future nuclear forces plans. This would help in-

¹³ Phillip Webster and Tony Halpin, "Gordon Brown Offers to Cut Britain's Nuclear Arsenal," TimesOnline, March 18, 2009. <<http://www.timesonline.co.uk/tol/news/uk/article5927160.ece>>.

¹⁴ Robert S. Norris and Hans M. Kristensen, "French Nuclear Forces, 2008," Bulletin of the Atomic Scientists, September/October 2008, vol. 64, no. 4, pp. 52-54.

¹⁵ Robert S. Norris and Hans M. Kristensen, "Chinese Nuclear Forces, 2008," Bulletin of the Atomic Scientists, July/August 2008, vol. 64, no. 3, pp. 42-45.

form U.S.-Russian bilateral negotiations on further nuclear arms reductions.

2.3. Strengthening the Nuclear Non-Proliferation Regime

A Non-Proliferation Regime in Need of Help

The nuclear non-proliferation regime is at risk. Presidents Obama and Medvedev acknowledged the critical need to strengthen the regime in their joint statements in April and July 2009. The heads-of-state of the 15 members of the UN Security Council acknowledged the same at their summit meeting in September 2009. Strengthening the regime requires multiple, simultaneous actions: U.S. and Russian nuclear reductions; measures to enforce existing non-proliferation obligations; an end to nuclear testing; steps to secure fissile materials; and a halt to the production of fissile materials for weapons.

Presidents Obama and Medvedev recognize that restoring and strengthening the regime begins with bold reductions in their respective nuclear arsenals, which together represent over 95 percent of the world's total. Both cited the importance of such leadership in statements following their November bilateral meeting in Singapore.¹⁶ Experts differ on the relationship between reducing arsenals and stopping proliferation, but most analysts would agree with Secretary Clinton that, "Clinging to nuclear weapons in excess of our security needs...gives other countries the motivation or the excuse to pursue their own nuclear options."¹⁷

Beyond negotiated reductions, joint U.S. and Russian actions in four critical areas could help prevent the spread of nuclear weapons to new nations: enforcement of existing non-proliferation obligations, ending nuclear testing, securing fissile material stockpiles, and ending the production of fissile material for weapons. These efforts could be coordinated through working groups of the Bilateral Presidential Commission, including the Nuclear Energy and Nuclear Security Working Group, co-chaired by Director of Rosatom Kiriyenko and Deputy Secretary of Energy Poneman,

¹⁶ The White House, Office of the Press Secretary, "Statements by President Obama and President Medvedev of Russia After Bilateral Meeting," November 15, 2009.

¹⁷ Hillary Clinton, "The United States Institute of Peace Dean Acheson Lecture," Washington, D.C., October 21, 2009.

and the Arms Control and International Security Working Group, co-chaired by Deputy Foreign Minister Ryabkov and Under Secretary of State for Arms Control and International Security Affairs Tauscher.

Enforcement of Existing Non-Proliferation Obligations

Monitoring and verification efforts are absolutely vital for effective enforcement of non-proliferation policy. The International Atomic Energy Agency (IAEA) is the only international actor with the capabilities, mandate and legitimacy to execute these functions. The resources that the nations of the world provide the IAEA do not match the importance of its crucial efforts. The IAEA operates its verification and safeguards regime on a shoestring annual budget of about \$220 million—slightly more than the payroll for the New York Yankees baseball team.

Even with established and funded monitoring and verification measures, as the Iran case illustrates, too frequently the great powers, and often the United States and Russia, cannot agree on how to address violations. Violations go uncorrected because the UN Security Council, the designated “enforcer,” is unable to act. Over time, as violators have remained unpunished, this neglect has eroded the credibility of the NPT.

The United States and Russia can together urge several practical steps to increase the enforcement of existing proliferation laws and obligations. The two nations can cooperate to enhance the authority of international institutions and, particularly, on-going multilateral efforts to address the two most egregious current cases—North Korea and Iran.

Building on 2009’s modest overall budget increase and increased voluntary contributions from the United States and Russia, the United States and Russia could continue working together to further increase the budget for the IAEA. This would seem as essential step. As former IAEA Director-General ElBaradei warned last year, “I would be misleading world public opinion to create an impression that we are doing what we are supposed to do, when we know that we don’t have the money to do it.”¹⁸

The United States and Russia could have regular discussions on concrete measures to implement the goals and norms set forth by the United Na-

¹⁸ Statement of Director General Mohamed ElBaradei, IAEA Board of Governors, June 16, 2009.

tions Security Council in Resolutions 1540 and 1887. These establish binding obligations on all UN members to take steps to counter the proliferation of weapons of mass destruction and establish other measures to strengthen the nuclear non-proliferation regime. This may include, at some point, how to address Israel's undeclared nuclear capability.

The United States and Russia could build on the non-governmental May 2009 U.S.-Russian expert threat assessment on Iran to develop a joint assessment of the Iranian nuclear and ballistic missile programs.¹⁹ They should increase their bilateral discussions to fully implement United Nations Security Council and IAEA Board of Governors resolutions on Iran, including direct diplomacy and the Permanent Five plus Germany (P5+1) negotiations.

While recognizing the difficulties of dealing with North Korea, the United States and Russia could increase efforts to resume the Six-Party Talks with North Korea as soon as possible in order to work towards the verifiable denuclearization of the Korean Peninsula.

The United States and Russia could cooperate to ensure that the May 2010 NPT Review Conference endorses and further develops the elements of UNSC Resolution 1887, in particular: (1) promote universal adherence to IAEA comprehensive safeguards; (2) develop new provisions to deter withdrawal from the NPT and assure that any state that does withdraw is held responsible for violations of the NPT committed prior to withdrawal; and (3) require adherence to the Additional Protocol as a precondition for continuing access to peaceful nuclear technologies (the Additional Protocol strengthens IAEA safeguards against proliferation, for example by giving the IAEA broader inspection authorities).

The United States and Russia could consider Secretary Clinton's proposal for automatic penalties for violations of safeguards agreements, such as suspension of all international nuclear cooperation, until compliance has been restored.²⁰

¹⁹ "Iran's Nuclear and Missile Potential: A Joint Threat Assessment by U.S. and Russian Technical Experts," East-West Institute, May 2009. Available at: <<http://docs.ewi.info/JTA.pdf>>.

²⁰ Clinton, "The United States Institute of Peace Dean Acheson Lecture."

Ending Nuclear Testing

The universal acceptance of the Comprehensive Test Ban Treaty (CTBT) is one of the most important steps in blocking the spread of nuclear weapons.

Russia has signed and ratified the treaty; the United States has signed but not yet ratified. (Although President Obama has called for ratification of the CTBT, it is not clear at this point when he will resubmit the treaty to the Senate.) The two principal questions that will need to be addressed when the Senate considers the CTBT are the ability of the United States to maintain a reliable nuclear stockpile in the absence of testing and the ability to monitor and detect nuclear tests. While the U.S. stockpile must be continuously monitored, recent studies suggest that the reliability of the existing stockpile can be maintained without nuclear testing.

Some U.S. critics claim that the CTBT text does not explicitly define the nature of a nuclear test explosion, leaving room for interpretation. These critics contend that Russia believes low-yield and “hydro-nuclear” tests are still permitted. Opponents of the CTBT even posit that Russia and China are conducting such tests.²¹

The criticism does not appear to have any basis in the negotiating record. In 1999, U.S. CTBT negotiator Ambassador Ledogar told the Senate Foreign Relations Committee that the CTBT negotiating record was clear on the point of banning all tests. “The Russians, as well as the other weapon states, did commit themselves,” he testified, “That answer is substantiated by the record of the negotiations at almost any level of technicality (and national security classification) that is desired and permitted.”²²

Russian officials have supported this reading of the record. In 2000, the Foreign Ministry’s Security and Disarmament Department Director Kapralov stated that “qualitative modernization of nuclear weapons is only possible through full-scale and hydro-nuclear tests with the emission of

²¹ For example, Senator Jon Kyl (R-AZ) argued in the October 20, 2009 *Wall Street Journal* that the CTBT “does not define what it purports to ban, which is nuclear-weapons testing. This ambiguity leaves countries free to interpret the treaty (and act) as they see fit. Thus, if the U.S. ratified the treaty, it would be held to a different standard than other nations.”

²² Statement by Ambassador Stephen J. Ledogar (Ret.), Chief U.S. Negotiator of the CTBT, Prepared for the Senate Foreign Relations Committee Hearing on the CTBT, October 7, 1999.

fissile energy, the carrying out of which directly contradicts the CTBT.” In July 2009, President Medvedev reiterated this understanding, noting that, “under the global ban on nuclear tests, [Russia] can only use computer-assisted simulations to ensure the reliability of Russia’s nuclear deterrent.”²³

The United States and Russia could reaffirm their understanding that the CTBT bans all test explosions of nuclear weapons, including low-yield and hydro-nuclear experiments, regardless of the amount of energy released.

The United States and Russia could also design additional confidence-building measures outside the confines of the CTBT to create greater stability and mutual trust. These could include cooperative arrangements for on-site inspections in areas of concern. Igor Sergeev, advisor to the Russian president on issues of strategic stability, advocated just such measures at the second Conference on Facilitating the Entry into Force of the CTBT in November 2001. The United States and Russia could discuss and implement measures to build confidence and increase transparency with regard to activities at nuclear test sites.

The United States should ratify the CTBT as soon as possible. U.S. Senate ratification is seen by many nations as the litmus test of U.S. adherence to its NPT obligations. In addition, there are indications that U.S. ratification could encourage ratification by other nations, including a December 2009 statement by Indian Prime Minister Manmohan Singh that U.S. ratification could generate momentum within India in favor of accession to the treaty.²⁴

After U.S. Senate ratification, the United States and Russia could cooperate to jointly encourage the other hold-out nations to ratify the treaty. It is in U.S. and Russian national security interests to do everything possible to prevent nuclear weapons testing by other nations and to improve the implementing organization’s ability to identify, prevent and respond to possible cheating.

²³ RIA Novosti, “Russia to Test its Nuclear Deterrent with Supercomputers,” July 22, 2009.

²⁴ The Hindu, “Manmohan Signals Return to Vajpayee Line on CTBT,” December 30, 2009.

Secure Fissile Materials Stockpiles

Presidents Obama and Medvedev pledged joint efforts to secure nuclear materials and weapons in April 2009. President Obama said later at the UN Security Council that it is “each nation’s responsibility to secure nuclear material on its territory, and to help those who can’t—because we must never allow a single nuclear device to fall into the hands of a violent extremist.” At the UN General Assembly on September 23, 2009, President Medvedev called for “joint steps for further progress in such aspects of nuclear security as prevention of nuclear terrorism” and “collective cooperation on these matters.”

The two nations should agree to a series of steps leading up to the April Washington nuclear security summit that will bring together some 40 world leaders to address how to secure nuclear materials. This would put meat on the bones of these statements of intent, underscore U.S.-Russian leadership in securing all vulnerable nuclear material in the world in the next four years, and set an example for other nations attending the summit to declare their own concrete contributions and benchmarks. In addition to a joint communiqué, the summit should conclude with a joint plan of action, which would include measures such as achieving effective global nuclear security standards; consolidating nuclear weapons and materials in fewer locations and eliminating as much material as possible; and a commitment to reconvene in two years to assess progress.

The United States and Russia could continue to support, fund and complete the Nunn-Lugar Cooperative Threat Reduction programs. New efforts should concentrate on sustaining what has been achieved and helping develop a nuclear security culture in all states with weapons-usable fissile material.

The United States and Russia could cooperate on additional measures, such as promotion of the Global Initiative to Combat Nuclear Terrorism and the Global Threat Reduction Initiative; work to expand and extend the G8 Global Partnership; and strengthen the Proliferation Security Initiative (PSI) and further cooperation under the Megaports Initiative.

Ending the Production of Fissile Material for Weapons

The verifiable end to the production of weapons grade fissile materials is a crucial element in preventing global proliferation. Negotiating—and ratifying—the Fissile Materials Cut-off Treaty would be a major step toward securing, monitoring and eventually eliminating fissile materials that can be used to build nuclear weapons.

Washington and Moscow have already announced their support for ending the production of new materials, while simultaneously taking action to monitor existing stockpiles, including in the presidents' April 2009 joint statement. On March 7, 2009, Foreign Minister Lavrov declared, "We are prepared to start negotiation on a treaty banning the production of fissile material for nuclear weapons purposes (FMCT), which would become an important milestone in the processes of nuclear disarmament and strengthening the nuclear non-proliferation regime." Secretary Clinton endorsed the FMCT in similar terms on October 21, 2009.

One of the key hurdles in negotiating and implementing an FMCT will be convincing the countries that continue to produce fissile materials—India and Pakistan (and probably Israel and North Korea)—to end this practice. While this will be a challenge, it also presents an opportunity for significant U.S.-Russian cooperation and leadership.

In order to jump-start stalled negotiations on an FMCT at the Conference on Disarmament, the United States and Russia could urge their respective allies and friends to adhere to a work plan for negotiations.

The United States and Russia could work together to jointly convince countries to adopt a moratorium on the production of fissile materials for weapons purposes until an FMCT can be negotiated.

A U.S.-Russia working group could explore technologies and develop concrete plans to minimize and, eventually eliminate, the use of highly-enriched uranium for civilian purposes and in naval reactors.

2.4. Promotion of Proliferation-Resistant Nuclear Energy

The Growing Interest in Nuclear Energy

Concerns about energy security and military security have led to renewed interest in civil nuclear power worldwide. The 30 nations with operating power plants may soon be joined by ten new nations that are either already building reactors (Iran) or have concrete plans to begin.

The prospects for a global nuclear renaissance are not certain. The economic advantages of nuclear power are far from clear, and progress in global disarmament and in constraining nuclear proliferation might reduce the military security incentive for new nations to acquire nuclear technology as a hedge. But the fact remains that the number of new nations already committed to civilian nuclear power raises concerns. The most important single issue is whether the new nations will choose to develop their own full-cycle nuclear programs—there by spreading sensitive technologies and materials to new geographical regions, countries and corporate entities—or whether the proliferation danger can be reduced by radical international approaches to fuel cycle management.

Ensuring the latter approach will require leadership from the United States and Russia. These two countries have special status by virtue of their massive weapons programs and long history as users of civilian nuclear power. They will remain in the forefront of the world nuclear industry in terms of the scale of their domestic generating and fuel cycle sectors and their exports of reactors, fuel and fuel services. The pressing global issues associated with a global nuclear renaissance present a unique responsibility and opportunity for U.S.-Russian cooperation.

An Opportunity to Take Stock

The United States and Russia have an impressive record of bilateral cooperation in civilian nuclear power, a cooperation that has weathered numerous crises. Under Presidents Bush and Putin, both countries supported civil nuclear cooperation efforts. Each side launched major global initiatives in 2006—President Bush’s Global Nuclear Energy Partnership (GNEP) and President Putin’s Global Nuclear Power Infrastructure (GNPI). The programs were similar in goals and institutional approaches. Both sought to encourage expansion of nuclear power worldwide and establish an international infrastructure of nuclear fuel cycle services as an

alternative to national fuel cycle facilities. They were both envisioned as multinational consortia with IAEA involvement. Both emphasized the importance of R&D to develop proliferation-resistant fuel cycle and reactor technologies.

The United States and Russia sought to harmonize the two programs, and joint efforts reached a peak in early 2008 when the countries signed an agreement on civilian nuclear cooperation, often referred to as the 123 Agreement. Since then the situation has changed considerably. The 123 Agreement was submitted to the U.S. Congress but was then withdrawn in response to the August 2008 Russia-Georgia war. The Obama Administration has effectively, though not formally, terminated GNEP. Russia has also been less active in promoting GNPI, concentrating more on its ambitious domestic program and export efforts.

While many lament the loss of momentum in pursuing the ambitious programs of recent years, the situation that has emerged since 2008 may provide a needed opportunity for the United States and Russia not only to clarify their current attitudes towards bilateral cooperation and global leadership on civil nuclear power but also to take stock of the various past efforts to see if they have a common assessment. Which of the many proposals made in the past five years have worked? Which have potential and which do not?

Presidents Obama and Medvedev could declare that the goal of providing nuclear energy in ways that limit the proliferation risk continues to be a priority for both countries and state that, as a preliminary step in setting an agenda for future cooperation in this area, the two countries will undertake a joint assessment of the relevant unilateral, bilateral and multilateral initiatives with which the countries have been associated over the past five years.

The United States and Russia could bolster their commitment to ensuring that civil nuclear materials and facilities receive the highest levels of physical protection, including by reviving the U.S.-Russian civil nuclear cooperation agreement. President Obama could resubmit the 123 Agreement to Congress and work to ensure that it enters into force as soon as possible, providing a legal framework for commercial, non-proliferation and R&D cooperation that would benefit both sides.

Ensuring Fuel Security

It is often argued that, if countries deem that there is a risk they will be denied access to enriched uranium fuel, whether for commercial, technical or political reasons, they will feel compelled to insure themselves by developing their own enrichment and/or reprocessing capability. An often discussed solution to this perceived proliferation risk—one pursued in recent years' U.S.-Russian collaborative efforts—is to provide, on a multilateral basis, a guaranteed supply of low-enriched uranium to new nuclear power states and other countries with smaller nuclear programs. Doing so, it is argued, would minimize the number of enrichment facilities worldwide. One idea is the creation of an international enrichment facility; a separate but complementary idea is creation of an international fuel bank either overseen by or run by the IAEA.

In fact, these may be solutions to a problem that does not exist. Countries pursuing nuclear power for purely energy security reasons have been able to acquire adequate supplies of fuel through market mechanisms. There has yet to be a case of a country being denied nuclear fuel for its power reactors as a result of a commercial dispute, technical disruption of supply or any political reason other than suspicion that the country in question was pursuing a weapons program. For countries pursuing nuclear power for military security reasons—as a hedge to be able to develop nuclear weapons if they see a need to—the idea of forgoing domestic enrichment and reprocessing is illogical: the whole point of the nuclear program is precisely to acquire such technology.

A radically different approach would be based on the recognition that the only way forward is a “one-rule-for-all” model, one in which enrichment and reprocessing will be done in the same way for the United States, Russia, France and other existing nuclear nations as for any new country that adopts nuclear power. Russia has taken an important step in this direction by proposing a multinational enrichment facility, the International Uranium Enrichment Center (IUEC), in the eastern Siberian city of Angarsk. Several other nations of the region have agreed to participate on an equity basis.

The United States could reiterate support for Russia's proposed IUEC enrichment center in Angarsk and encourage its full internationalization under IAEA auspices.

The United States could follow the Russian lead by offering to similarly internationalize at least one of the new enrichment facilities it is currently

building. The United States and Russia could work toward internationalizing all their enrichment activities.

Discouraging Sensitive Fuel Cycle Technology Transfers

The United States and Russia, as leading members of the Nuclear Suppliers Group (NSG), have an opportunity and responsibility to establish commonsense and consistent norms regarding civilian nuclear trade. Both states should continue to support the recent policy approved by the G8 in July 2009 not to transfer sensitive nuclear fuel cycle technologies, including reprocessing and enrichment technologies, to any state that does not have a comprehensive safeguards agreement in place, is not party to the NPT, and/or has been found to be in noncompliance with its safeguards violations. The United States and Russia could also continue to work together to strengthen the guidelines of the NSG in this regard, in part to prevent potential indirect assistance to non-NPT states parties or states of proliferation concern and to encourage NPT universality.

Reprocessing of Used Fuel

Reprocessing (recycling) of spent nuclear fuel is highly contentious. Proponents cite a fuel security argument. Some have also argued that, because reprocessing burns up hazardous materials, it helps solve the waste problem. The United States and other opponents of reprocessing counter that it is not cost-effective and that any other advantages it may have are far outweighed by the risk of proliferation of the most sensitive nuclear materials and technologies.

Reprocessing involves even more urgent proliferation issues than enrichment. South Korea is a case in point. South Korea has an agreement with the United States, which will expire in 2014, not to reprocess spent fuel it received from the United States. A South Korean decision to reprocess its spent fuel domestically after 2014 could increase incentives for other countries to pursue reprocessing. This case exemplifies the danger that, when a country chooses reprocessing for economic security reasons, it may trigger efforts by other nations to seek the technology for military security reasons.

Under the Bush Administration's GNEP initiative, the United States retreated from its traditional stance of opposing all reprocessing. The Ob-

ama administration has returned to the traditional U.S. position. Since Russia has long been a stalwart supporter of reprocessing and fast reactors, this again puts the United States and Russia on opposite sides of the reprocessing debate.

The United States and Russia could engage in a frank discussion aimed at clarifying and ultimately reconciling their positions on reprocessing of spent nuclear fuel as a prerequisite to any substantial joint action in reducing the proliferation risk from reprocessing.

Long-Term Nuclear Waste Management

Regardless of whether or not nations choose to develop their own enrichment and reprocessing facilities, the problem of disposal and storage of nuclear waste will continue to grow. Long-term storage of the most hazardous and militarily sensitive nuclear waste materials is the paradigmatic problem requiring not only cooperation among states but bold leadership to achieve that cooperation. No country has yet been willing to definitively offer its territory for an international waste storage center. Russia has come closest, with a proposal for an international long-term waste storage and disposal facility.

The United States could back previous Russian proposals for an international long-term waste storage and disposal facility in Russia.

R&D Cooperation

New technology can help reduce the proliferation risk inherent in expansion of nuclear power by developing more proliferation-resistant fuel cycles (including use of the relatively proliferation-resistant fuel, thorium), new reactor designs (for instance, “battery-like,” replaceable modular units) and technologies for waste management. Both GNEP and GNPI have strong R&D components. The United States has kept the R&D component of GNEP, albeit at a reduced funding level.

The U.S. and Russian governments could continue to fund and expand domestic and multinational R&D programs related to proliferation-resistant technologies for the fuel cycle and reactor design.

Commercial Cooperation

Increasing integration of the world nuclear industry, both through mergers and acquisitions and through commercial partnerships, can lead to greater efficiency in the sector and is generally to be welcomed. Integration also calls for more government-industry coordination and cooperation on a multilateral basis.

The United States and Russia could support further collaboration between their countries' commercial suppliers in the nuclear industry. They should remove barriers to such collaboration.

The U.S. and Russian governments could encourage their countries' members of the NSG to take the lead in strengthening the NSG's role in enforcing non-proliferation among corporate vendors.

The United States and Russia could coordinate and share information with each other and with the IAEA on their export-control regimes.

The United States and Russia could coordinate their financial and criminal penalties for violation of non-proliferation laws.

Megatons to Megawatts

Megatons to Megawatts has been a highly successful U.S.-Russian program to convert weapons-grade highly enriched uranium from Russian nuclear warheads into low enriched uranium for use in American civil power reactors. The program has so far converted the equivalent of over 15,000 warheads, providing nearly fifty percent of the fuel used in U.S. reactors.

The agreement governing the program expires in 2014. Russia has announced, and the United States has agreed, that the program will not be renewed. Instead, Russia may continue to convert the nuclear material from dismantled nuclear weapons but market the enriched uranium itself. If there is success in third-country nuclear disarmament, the example of the U.S.-Russian program—maybe even that program—might be used for that material as well.

The United States and Russia could explore the possibility of applying their joint Megatons to Megawatts program to nuclear materials from warheads of other countries as they disarm.

2.5. Recap of Recommendations

Washington and Moscow have a rich menu of possible measures to strengthen their leadership on nuclear arms reductions and non-proliferation. This chapter recaps the recommendations that the United States and Russia could consider to advance nuclear arms reduction, strengthen the non-proliferation regime, and make proliferation-resistant civil nuclear energy available.

Next Steps in U.S.-Russian Nuclear Arms Reductions

1. Consultations on negotiations to reduce each side's deployed strategic nuclear warheads to no more than 1000, and perhaps fewer, with appropriate reductions in the numbers of strategic nuclear delivery vehicles.
2. Presidential joint statement, issued upon completion of the START follow-on treaty (and hopefully prior to the Non-Proliferation Treaty review conference), announcing that the next round of negotiations will have the goal of an agreement reducing each side's deployed strategic nuclear warheads to no more than 1000.
3. U.S. consultations with NATO regarding how to maintain nuclear deterrence in Europe and the possibility of including U.S. nuclear weapons in Europe in U.S.-Russian arms negotiations.
4. Agreement to address tactical nuclear weapons in the next negotiating round of U.S.-Russian nuclear arms reductions.
5. U.S. and Russian declarations to the other of the total number of tactical nuclear weapons in its stockpile. Declarations could include the broad type (air defense, naval, bombs, cruise missiles, etc.).
6. U.S. and Russian declarations to the other of the total number of strategic nuclear weapons in its stockpile, with a breakdown into three catego-

ries: deployed, non-deployed (including spares and reserves) and awaiting dismantlement.

7. Consultations on ways to ensure the elimination of warheads can be made transparent and irreversible, and on different approaches to verifying warhead numbers.

8. Activation of the Joint Data Exchange Center.

9. Consultations with the goal of clarifying the extent and nature of their respective missile defenses with capabilities against strategic ballistic missiles.

10. Missile defense cooperation as a priority subject on the NATO-Russia agenda.

11. Consultations with Britain, France and China as to those countries' future nuclear forces plans, with a view to informing U.S.-Russian bilateral negotiations on further nuclear arms reductions.

Strengthening the Non-Proliferation Regime

1. Joint work to further increase the budget for the International Atomic Energy Agency, building on 2009's modest overall budget increase and increased voluntary contributions from the United States and Russia.

2. Regular discussions on concrete measures to implement the goals and norms set forth by the United Nations Security Council in Resolutions 1540 and 1887, which establish binding obligations on all UN members to take steps to counter the proliferation of weapons of mass destruction and establish other measures to strengthen the nuclear non-proliferation regime.

3. Intensified bilateral discussions to fully implement United Nations Security Council and IAEA Board of Governors resolutions on Iran, including direct diplomacy and P5+1 negotiations.

4. Increased efforts to resume the Six-Party Talks with North Korea as soon as possible in order to work towards the verifiable denuclearization of the Korean Peninsula.

5. Cooperation to ensure that the May 2010 NPT Review Conference endorses and further develops the elements of UNSC Resolution 1887, in particular: (1) universal adherence to IAEA comprehensive safeguards; (2) new provisions to deter withdrawal from the NPT and assure that any state that does withdraw is held responsible for violations of the NPT committed prior to withdrawal; and (3) adherence to the Additional Protocol as a precondition for continuing access to peaceful nuclear technologies.

6. Consideration of Secretary Clinton's proposal for automatic penalties for violations of safeguards agreements, such as suspension of all international nuclear cooperation, until compliance has been restored.

7. U.S. and Russian reaffirmation of their understanding that the Comprehensive Test Ban Treaty bans all test explosions of nuclear weapons, including low-yield and hydro-nuclear experiments, regardless of the amount of energy released.

8. Discussion and implementation of measures to build confidence and increase transparency with regard to activities at nuclear test sites.

9. U.S. ratification of the CTBT as soon as possible.

10. Cooperative diplomatic efforts to convince the eight other nations that have not yet ratified the CTBT to do so.

11. Build on the Washington nuclear security summit to bolster cooperation to ensure that all nuclear weapons and weapons-usable materials worldwide are effectively secured and accounted for within four years.

12. Continued support and funding for Nunn-Lugar Cooperative Threat Reduction programs.

13. Cooperation on measures such as the promotion of the Global Initiative to Combat Nuclear Terrorism, the Global Threat Reduction Initiative, expansion and extension of the G8 Global Partnership, strengthening the Proliferation Security Initiative, and under the Megaports Initiative.

14. In order to jump-start stalled negotiations on a Fissile Materials Cutoff Treaty at the Conference on Disarmament, joint efforts to urge respective U.S. and Russian allies and friends to adhere to a work plan for negotiations.

15. Cooperative diplomatic efforts to convince countries to adopt a moratorium on the production of fissile materials for weapons purposes until an FMCT can be negotiated.

16. Establishment of a working group to explore technologies and develop concrete plans to minimize and, eventually eliminate, the use of highly-enriched uranium for civilian purposes and in naval reactors.

Proliferation-Resistant Nuclear Energy

1. Presidential reaffirmation that the goal of providing nuclear energy in ways that limit the proliferation risk continues to be a priority and, as a preliminary step, a joint assessment of the relevant unilateral, bilateral and multilateral initiatives with which the countries have been associated over the past five years.

2. Bolstered commitment to ensuring that civil nuclear materials and facilities receive the highest levels of physical protection, including by reviving the U.S.-Russian civil nuclear cooperation agreement (123 Agreement) at the earliest possible date.
3. Reiteration of U.S. support for Russia's proposed IUEC enrichment center in Angarsk and encouragement of its full internationalization under IAEA auspices.
4. Consideration of the United States' offering to internationalize at least one of the new enrichment facilities it is currently building.
5. Work toward internationalizing all U.S. and Russian enrichment activities.
6. Continued support for the G8 policy not to transfer enrichment or reprocessing technology to any non-NPT state or any state of proliferation concern.
7. Frank discussion aimed at clarifying and ultimately reconciling the U.S. and Russian positions on reprocessing of spent nuclear fuel as a prerequisite to any substantial joint action in reducing the proliferation risk from reprocessing.
8. U.S. support for previous Russian proposals for an international long-term waste storage and disposal facility.
9. Continued funding for and expansion of domestic and multinational R&D programs related to proliferation-resistant technologies for the fuel cycle and reactor design.
10. Joint support for further collaboration between U.S. and Russian commercial suppliers in the nuclear industry.
11. Governmental encouragement for U.S. and Russian members of the Nuclear Suppliers Group to take the lead in strengthening the NSG's role in enforcing non-proliferation among corporate vendors.
12. Coordination and information sharing with each other and with the IAEA on export-control regimes.

13. Coordination on financial and criminal penalties for violation of non-proliferation laws.

14. Exploration of the possibility of applying the U.S.-Russian Megatons to Megawatts program to nuclear materials from warheads of other countries as they disarm.

Acronyms

ABM	Anti-Ballistic Missile
CTBT	Comprehensive Test Ban Treaty
FMCT	Fissile Materials Cut-off Treaty
GNEP	Global Nuclear Energy Partnership
GNPI	Global Nuclear Power Infrastructure
IAEA	International Atomic Energy Agency
ICBM	Intercontinental Ballistic Missile
IUEC	International Uranium Enrichment Center
NATO	North Atlantic Treaty Organization
NPT	Treaty on the Non-Proliferation of Nuclear Weapons
NSG	Nuclear Suppliers' Group
P5+1	(UNSC) Permanent Five plus One (Germany)
PSI	Proliferation Security Initiative
R&D	Research and Development
SALT	Strategic Arms Limitation Talks
SLBM	Submarine-Launched Ballistic Missile
SNDV	Strategic Nuclear Delivery Vehicle
SORT	Strategic Offensive Reductions Treaty
START	Strategic Arms Reduction Treaty
UN	United Nations
UNSC	United Nations Security Council

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