An Arms Control Association and Partnership for Global Security Report

The 2010 Nuclear Security Summit: A Status Update

April 2011

Robert Golan-Vilella, Michelle Marchesano, and Sarah Williams

An Arms Control Association and Partnership for Global Security Report

The 2010 Nuclear Security Summit: A Status Update

April 2011

Robert Golan-Vilella, Michelle Marchesano, and Sarah Williams

About the Authors

Robert Golan-Vilella is a Herbert Scoville Jr. Peace Fellow at the Arms Control Association. He is a graduate of Yale University and has previously interned at the Center for Strategic and International Studies and the James Martin Center for Nonproliferation Studies.

Michelle Marchesano is a senior budget and policy analyst at the Partnership for Global Security (PGS). She has been with PGS since graduating from Drexel University in 2007. She is currently earning a graduate degree in international science and technology policy from the Elliott School of International Affairs at the George Washington University.

Sarah Williams is a Herbert Scoville Jr. Peace Fellow in the Center for Science, Technology and Security Policy at the American Association for the Advancement of Science. She is also the Coordinator of the Fissile Materials Working Group. She holds a graduate degree in global policy studies from the LBJ School of Public Affairs at the University of Texas-Austin and a bachelor's degree from the University of Maryland - College Park.

Acknowledgements

The authors would like to thank Tom Collina and Kenneth Luongo for reviewing drafts of this report. We would also like to thank Margaret Balza for her research assistance and fact-checking and Lovely Umayam for her general assistance in the early stages of this project. Special thanks go to Brian Creamer for his excellent work in the report's layout and design. We would also like to thank the Fissile Materials Working Group and its members for designing the initial survey for foreign ministries and embassies. Finally, Robert and Sarah would like to express their sincere gratitude to the Scoville Fellowship.

The Arms Control Association is grateful for the generous support of our members and donors, without which this report would not have been possible. In particular, we wish to thank the John D. and Catherine T. MacArthur Foundation, the Carnegie Corporation of New York, and the Ploughshares Fund which provide support for ACA's research and public education programs.

The Partnership for Global Security wishes to thank the Carnegie Corporation of New York, the Connect U.S. Fund, and the Ford Foundation.

Cover Photo

White House photo.

TABLE OF CONTENTS

"With about one year to go before the next Nuclear Security Summit in Seoul in spring 2012, we are very confident that we will be able to demonstrate significant progress toward fulfilling the work plan agreed to in Washington."

—Tom Donilon, *National Security Advisor to the President, March 29, 2011*

Executive Summary

This report highlights the progress made in nuclear material security since the April 2010 Nuclear Security Summit (NSS) and serves as a status update halfway to the next summit in 2012.

- A core achievement of the 2010 summit was that the 47 nations in attendance reached consensus that nuclear terrorism is among the top global security challenges and that strong nuclear material security measures are the most effective way to prevent it.

- The White House released a highlights document last April listing 54 national commitments made by 29 of the countries at the summit. Some countries, including the United States, made additional commitments in their national statements. However, not all of these statements are publicly available.

- Important progress has been made in a number of areas and states are generally on track to meeting their key commitments by 2012. Based on our assessment of open source information, we conclude that approximately 60 percent of these national commitments have been completed, and notable progress has been made on another 30 percent.

- Examples of completed national commitments include:

    - Chile sent all of its highly enriched uranium (HEU) to the United States.

    - Kazakhstan secured enough HEU and plutonium to make 775 nuclear weapons.

    - Russia ended its plutonium production and signed a plutonium disposition protocol with the United States.

- Examples of progress made on national commitments include:

    - China signed a memorandum of understanding with the United States to work together on establishing a nuclear security Center of Excellence in China.

    - Ukraine removed over half of its HEU, putting it on track to meet its pledge to eliminate all of its HEU by the 2012 summit.

- The progress made in implementing the national commitments demonstrates the promise of the NSS process in generating concrete outcomes and improvements in global nuclear material security. The NSS process offers a unique vehicle with great potential for moving the nuclear security agenda forward.

- However, it is important to recognize that the nuclear security challenge will not be solved once the commitments made in 2010 are completed. An objective for the next summit should be to gain acknowledgement that nuclear material security is an ongoing, long-term challenge that will require new initiatives, funding streams, and collaborations to confront evolving threats and prevent nuclear terrorism.

Introduction

The 2010 Nuclear Security Summit (NSS), held on April 12-13 in Washington, D.C., marked an important step toward improving nuclear material security around the world. Forty-seven nations, 38 of them represented by their head of state or head of government, attended the summit and signed on to joint documents outlining goals for strengthening the global nuclear security regime. Countries plan to share progress on meeting these objectives at a second summit, planned for 2012 in the Republic of Korea. U.S. President Barack Obama, who set a goal for securing all vulnerable nuclear material within four years in his landmark April 2009 speech in Prague, has made the summit process a central part of his nuclear security agenda.

While President Obama's four year timeframe helped to galvanize support and bring urgency to this cause, this issue has a longer time-horizon. Efforts to strengthen nuclear material security must adapt to evolving threat environments over the long term, and it is crucial to understand the threats posed by insufficient control over nuclear material.

The prospect of nuclear terrorism is a global concern; a nuclear weapon detonated in any of the world's major cities would have dramatic economic, political, and human consequences. There is currently enough highly enriched uranium (HEU) in the world to make more than 60,000 nuclear weapons.[1] Moreover, the level of security over this material varies widely.

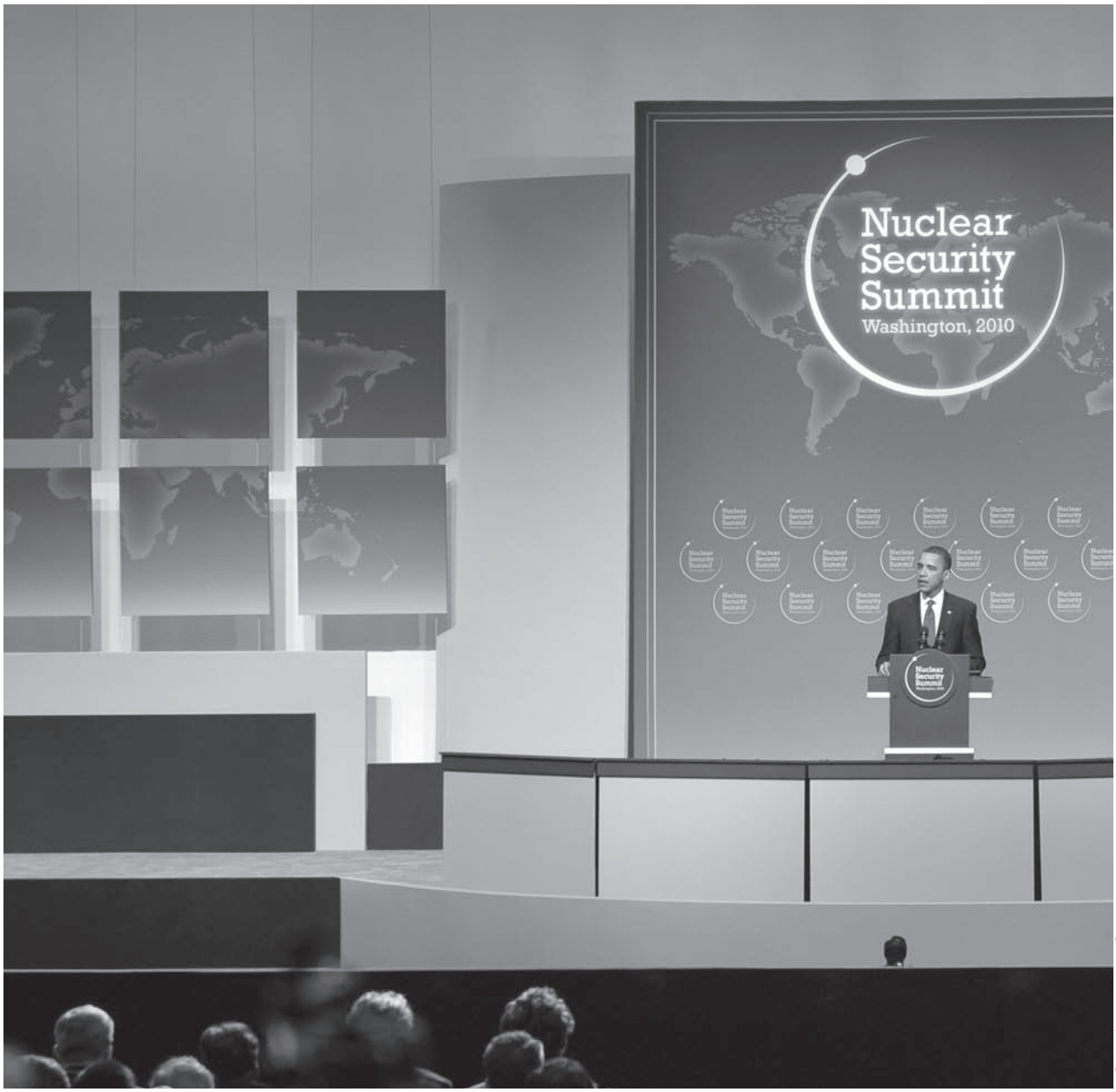
Increasing the ability of states to prevent theft or diversion of material is the primary goal of the nuclear material security regime. The NSS process has helped to generate immediate results and improvements in nuclear security by focusing on gaining compliance with the existing structures and mechanisms. The summit process is valuable because it elevates the issue of nuclear security to a major international priority and allows countries to monitor and recognize progress with open lines of dialogue.

This report seeks to highlight the progress that has been made in nuclear material security and serve as a status update halfway between the Washington summit and the next summit in 2012. It focuses on the national commitments made last April, but also includes instances where significant progress has been made outside of these commitments. Although additional commitments were made in the April 2010 summit's communiqué and work plan, their language is generally vague, and they do not contain clear or specific goals that might be tracked with open source documents. The roughly 60 national commitments listed in the highlights document and U.S. national statement, by comparison, are more concrete. For example, national commitments include specific states promising to pass legislation to strengthen export control laws, ratify certain international agreements, and remove and repatriate nuclear material.

While the nuclear security challenge will not be solved by the next meeting in 2012, important progress has been made in a number of areas and the states are on track to meeting their key commit-

ments. Eight countries have removed all or some of their remaining nuclear material, 13 countries have signed on to one of two major international agreements, and four have joined the Global Initiative to Combat Nuclear Terrorism. In addition, 12 countries have made domestic improvements to their regulatory systems, engaged in nuclear security training initiatives, or hosted international conferences on nuclear security issues. In doing so, these states reinforce the idea that the summit process' very nature—repeated meetings and continued dialogue—can be effective in generating concrete actions and outcomes.

We recognize that nuclear security improvements are difficult, require sustained political and financial support from the international community, and are often not publicized in open sources. The extent to which non-governmental organizations can be involved in the monitoring and tracking of commitments made at the first NSS is largely dependent on items reported in open sources. The information contained in this report is accurate and up to date to the best of our knowledge as of March 2011. Given that the summit process is the main mechanism by which the Obama administration is coordinating efforts to implement its nuclear security agenda, we hope to play a constructive role in taking stock of what progress has and has not been made. Our aim is to provide a broad audience with information on the status of commitments made at the 2010 summit as well as a basis for looking forward to the 2012 meeting.



Mandel Ngan/AFP/Getty Images

U.S. President Barack Obama holds a press conference at the conclusion of the Washington Nuclear Security Summit on April 13, 2010.

National Commitments by Category

By Michelle Marchesano

The United States and 29 other countries participating in the April 2010 Nuclear Security Summit (NSS) made over 60 specific national commitments to bolster global nuclear security. The United States' commitments were included in its national statement, and those of the 29 nations were listed in a highlights document released by the White House.[2] These national commitments include pledges consistent with the declarations in the NSS communiqué and work plan and others that go beyond the summit's consensus outcomes. While over 50 non-binding commitments were agreed to by all 47 summit participants in the work plan, most are caveated and require nations to fulfill them "as appropriate," when "technically and economically feasible," and "as soon as possible." Communiqué and work plan commitments are not tracked here.[3]

Specific commitments made in the U.S. national statement and the highlights document have been tracked and categorized in this section of the report as follows:

- International Conventions
- Removing and Securing HEU
- Reactor Conversions or Shut Downs
- New IAEA Cooperation
- New Centers, Conference, and Training Activities
- New National Laws
- Global Initiative to Combat Nuclear Terrorism
- Preventing Nuclear Smuggling
- G-8 Global Partnership

To see the commitments organized by country, see "National Commitments by Country."

International Conventions

The communiqué and work plan recognize the importance of the International Convention on the Suppression of Acts of Nuclear Terrorism (ICSANT), Convention on the Physical Protection of Nuclear Material (CPPNM), and the CPPNM's 2005 Amendment as legally-binding, multilateral mechanisms for enhancing material security and preventing nuclear terrorism. Summit participants called for their universal adoption, as even a number of countries attending the summit had not yet ratified them (see country profiles for details).

Results

In line with their national commitments, **Armenia**, **Georgia**, and the **United Kingdom** have ratified the nuclear terrorism convention.[4] **Germany** and the **United Kingdom** ratified the CPPNM's 2005 Amendment, and **France** recently confirmed that it is still working to ratify the 2005 Amendment.[5]

Though **Argentina** committed to moving toward the ratification of ICSANT and the 2005 CPPNM Amendment, its progress in doing either is not clear. Similarly, **Australia** committed to move toward ratifying the nuclear terrorism convention, but any progress in doing so has not been publicly reported.

The **United States** also pledged to accelerate its ratification of ICSANT and the 2005 CPPNM Amendment. According to the United States' NSS national statement, legislation that would update U.S. law to comply with the treaties has been submitted to Congress, and ratification instruments will be submitted after the new laws are in place. Neither convention has been ratified yet.

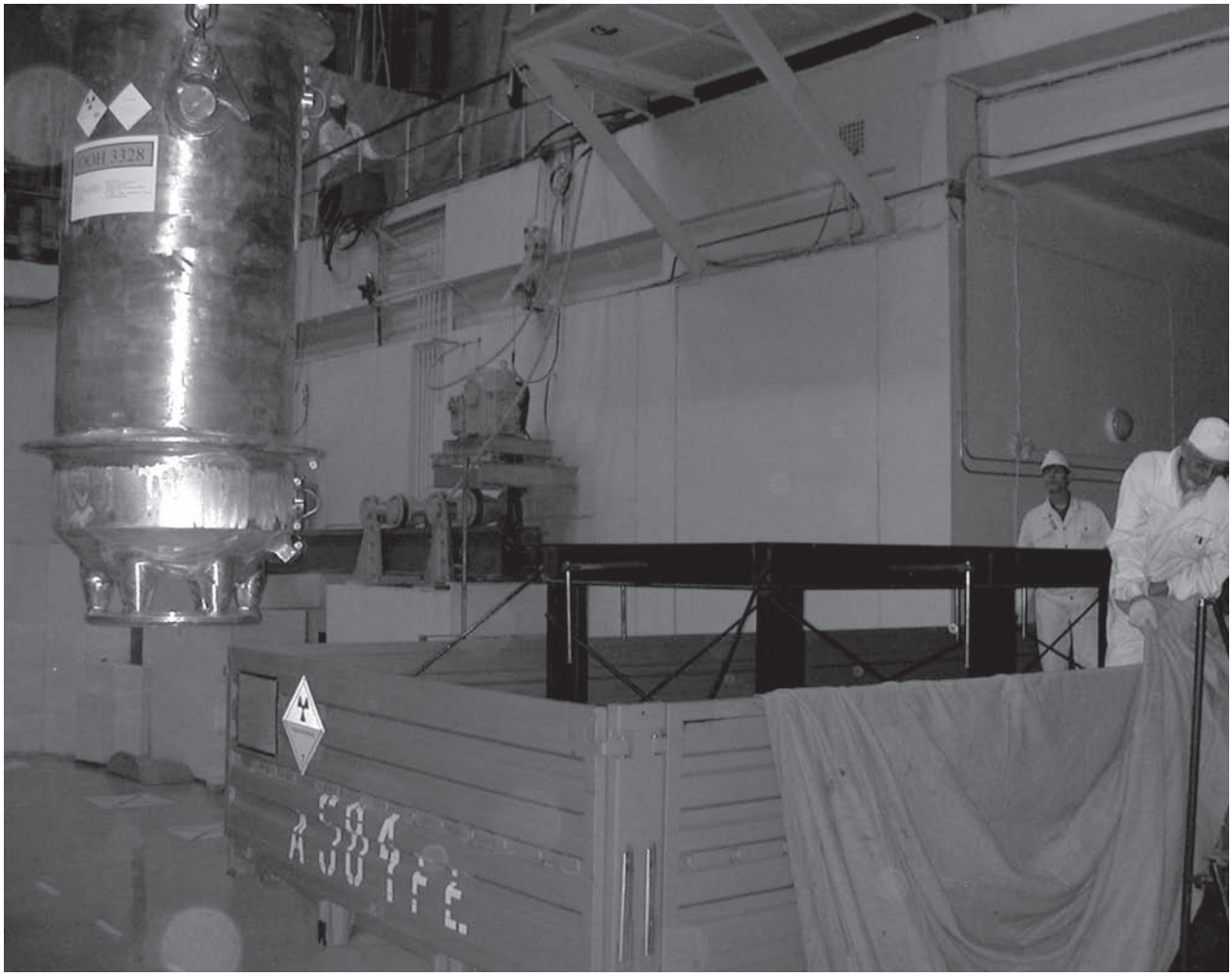
Removing and Securing HEU

Summit documents recognize that the use and management of nuclear materials and facilities are under the jurisdiction of individual states but encourage steps to keep them secure, including consolidating national sites where material is stored and removing and disposing of materials no longer in use. In this vein, a number of participants made national commitments to consolidate, secure, or remove highly enriched uranium (HEU) in their territory, and notable progress has been achieved.

Chile, Mexico, and Ukraine committed to a full clean out of their HEU stocks. Kazakhstan pledged to cooperatively work on BN-350 reactor shutdown and fuel security as well as the elimination of HEU from a reactor that will undergo conversion. Canada committed to funding HEU removal activities in Mexico and Vietnam. Canada will also return HEU spent fuel to the United States. Additionally, the United States pledged to convert its six remaining HEU-fueled research reactors.

Results

In February 2010, **Chile** collaborated with the U.S. National Nuclear Security Administration (NNSA) to remove all HEU from the country.[6] The removal operation included approximately 13 kilograms (kg) of HEU from the La Reina Nuclear Center, 4 kg of slightly irradiated HEU and less than 1 kg of fresh fuel from Lo Aguirre Nuclear



NNSA

The U.S. National Nuclear Security Administration announced the removal of 73.6 kg of Russian-origin HEU spent fuel from Kazakhstan in May 2009.

Center, and more than 400 radiological sources.

Ukraine committed to give up all of its HEU by the 2012 NSS, and half by the end of 2010. On December 31, 2010, NNSA announced that it had worked with Ukrainian, Russian, British, and International Atomic Energy Agency (IAEA) authorities to remove 50 kg of HEU fresh fuel from three sites in Ukraine, including Sevastopol National University of Nuclear Industry and Energy.[7] The material was returned to Russia, and NNSA provided low-enriched uranium (LEU) to replace the HEU that had been removed from the Kiev Institute for Nuclear Research and Kharkiv Institute for Physics and Technology. Earlier in the year, NNSA and Ukraine worked together to return another 56 kg of HEU spent fuel to Russia. These removals have placed the country on track to meet its 2012 goal.

Kazakhstan has also been working with NNSA to secure its HEU, including by completing the transport of spent fuel from its BN-350 reactor facility to a new storage facility in eastern Kazakhstan in November 2010.[8] The spent fuel, which was packaged and transported in specially designed dual-use transportation and storage casks, will remain under IAEA safeguards at this new secure facility.

On the final day of the NSS, **Mexico** announced that it would eliminate all HEU from its territory. According to a trilateral agreement, it will work with the United States and Canada under the auspices of the IAEA to convert its HEU-fueled research reactor to use LEU.[9] Negotiations among the countries have been initiated.[10] In support of this agreement, **Canada** made a national commitment to fund Mexico's removal efforts, as well as another planned HEU removal operation in Vietnam. **Vietnam** signed a memorandum of understanding with the United States in December 2010 reaffirming its pledge to remove HEU fuel from its Dalat research reactor.[11]

Canada also committed to returning a large amount of HEU spent fuel to the United States that was used to produce medical isotopes. The project to return material that is currently stored at Chalk River Laboratories in Ontario is scheduled to occur between 2010 and 2018.[12] The **United States** completed the conversion of all 20 HEU-fueled research reactors that are able to be converted to use existing LEU-fuel in 2009.[13] However, there are six more HEU-fueled research reactors in the country that have not been converted because alternative fuel has yet to be developed.

The 2010 NSS has also spurred at least one country outside of the summit process to commit to fully eliminate its stocks of HEU. Less than a year after **Belarusian** President Alexander Lukashenko rejected the notion of returning all of his country's HEU to Russia, Belarusian Foreign Minister Sergei Martynov announced in a December 1, 2010 joint statement with U.S. Secretary of State Hillary Clinton that Belarus would give up its entire stocks prior to the 2012 NSS. [14] Reports indicate that classified operations by NNSA in October and November 2010 removed over 84 kg of weapons-grade uranium from a research facility in Sosny, prior to committing to a full clean out. While Belarus was not invited to the 2010 NSS, experts speculate that it is leveraging the HEU removal to gain a seat at the table in 2012.[15] The Republic of Korea (ROK), which is hosting the 2012 summit, has tentatively agreed to invite Belarus if the clean out occurs.[16] However, U.S. National Security Council staff has indicated that plans to remove all of Belarus' HEU by the 2012 summit are at risk.[17] This is due to federal budget battles in the U.S. Congress that have frozen the budgets for critical nuclear security programs within NNSA at the fiscal year (FY) 2010 level, which does not include funding for new opportunities such as the Belarus clean out.

Additionally, other significant material removals have occurred independent of countries' publicized national summit commitments. For instance, **Poland**, a NSS participant, completed the removal of over 450 kg of Russian-origin HEU spent fuel in October 2010 in collaboration with NNSA.[18] Overall, since President Obama announced a four year, international effort to secure vulnerable nuclear materials in his April 5, 2009 speech in Prague, NNSA's Global Threat Reduction Initiative (GTRI) has removed all of the HEU from six countries: Serbia, Chile, Romania, Libya, Taiwan, and Turkey.[19]

Reactor Conversions or Shut Downs

Summit participants encouraged the conversion of HEU-fueled reactors to LEU in the communiqué and work plan as part of efforts to minimize the use of HEU. They recognized that the HEU used in these reactors, even for civilian purposes, carried higher risks than other nuclear materials. They also agreed to shut down reactors that were no longer required. In the spirit of this summit commitment, Russia, Kazakhstan, Mexico, Vietnam, and the United States pledged to shut down or convert reactors that use or produce weapons-usable materials.

Results

Russia's ADE-2 plutonium production reactor in Zheleznogorsk was shut down on April 15, 2010 in fulfillment of the country's national commitment to end plutonium production.[20] This reactor had once produced plutonium for the Soviet Union's

nuclear weapons program, but its main purpose since 1995 had been supplying heat for the city with the plutonium produced as a byproduct of its operation.[21] The Zheleznogorsk ADE-2 reactor was the last of three Soviet-era reactors that the United States and Russia have worked together to close.

Additionally, **Russia's** Foreign Minister Sergey Lavrov and **U.S.** Secretary of State Hillary Clinton signed the Plutonium Disposition Protocol on April 12, 2010, fulfilling another of their countries' national pledges.[22] The signing enables both countries to move forward in implementing the September 2000 Plutonium Management and Disposition Agreement which commits each country to eliminate 34 metric tons of excess military plutonium.[23]

A memorandum of understanding was signed on December 8, 2010 by the United States and **Vietnam** in which Vietnam reaffirmed its 2010 NSS national commitment to convert its HEU-fueled Dalat research reactor to LEU fuel.[24] NNSA had previously worked with Vietnam to partially convert the reactor in September 2007, but this new agreement establishes the legal framework for its full conversion and the return of its spent fuel to Russia.

Kazakhstan committed to convert a HEU research reactor and eliminate the remaining HEU fuel. Sources indicate that the Institute of Nuclear Physics' research reactor in Alatau is the intended target and that Kazakhstan is talking with Russia and the United States about its conversion.[25] However, no conversion timeline has been made public. Kazakhstan continues to make progress on securing and eliminating its HEU, as detailed in the previous section.

Mexico also committed to convert its research reactor, and made a trilateral announcement with the United States and Canada on working collaboratively to complete the conversion on April 13, 2010.[26] The conversion will be completed under the auspices of the IAEA. Negotiations have been initiated to determine the terms of the conversion.[27]

Finally, the **United States** also noted in its NSS national statement that it is in the "final stages of approval to bring up to 100 kg of plutonium from sites of concern into the United States pending disposition."[28]

New IAEA Cooperation

The essential role that the IAEA plays in advancing nuclear security was highlighted in the 2010 summit documents. The work plan detailed the valuable services, including the International Physical Protection Advisory Service (IPPAS), and guidance documents, including the Nuclear Security Series, that the agency offers. NSS participants were encouraged to take advantage of these resources and also to provide support to the IAEA and member states' nuclear security efforts. Belgium, Japan, Norway, New Zealand, Russia, and the United Kingdom made national commitments to provide additional funding to the IAEA's Nuclear Security Fund (NSF). France, Finland, and the United Kingdom announced their intentions to invite an IPPAS security review.

Brendan Hoffman/Getty Images

U.S. Secretary of State Hillary Clinton and Russian Foreign Minister Sergey Lavrov sign a plutonium disposition protocol at the Washington Nuclear Security Summit on April 13, 2010.

Belgium committed to provide the NSF with $300,000, and Norway committed to contribute $3.3 million to the NSF over four years for use in developing countries. The United Kingdom committed to provide $6 million to the NSF, but it did not specify the timeframe. Japan, New Zealand, and Russia did not specify dollar amounts or timeframes in their national commitments to contribute to the NSF.

Results

A December 5, 2010 announcement revealed that **Russia** had signed an agreement with the IAEA to contribute $6.5 million to the NSF between 2010 and 2015.[29] On March 8, 2011, the IAEA announced that it had signed an agreement with the **United Kingdom** for a £4 million (approxi-

mately $6.4 million) contribution to the NSF.[30] The top contributors to the NSF are the United States, the European Union, the United Kingdom, and Canada.

The IAEA's "Nuclear Security Report 2010" notes that as of June 30, 2010, new pledges or contributions to the NSF had been made or announced by **Japan**, **Norway**, and the **United Kingdom** (as well as Denmark, Finland, France, Ireland, Italy, the ROK, the Netherlands, Spain, Sweden, and the United States).[31] **Belgium** and **New Zealand** have also made contributions.[32]

The Nuclear Security Report also indicates that the **United Kingdom** requested an IPPAS mission to their Sellafield Nuclear Reprocessing Facility, and **France** and the **United States** announced their intentions to request IPPAS missions.[33] **Finland** received an IPPAS mission in June 2009 and is implementing its recommendations.[34] A follow-up mission is planned for 2012.[35]

Additionally, the **United States** noted in its NSS national statement that it had led the efforts in 2009 to create a dedicated line item for nuclear security in the IAEA's regular budget. Before this, the agency's nuclear security work had been almost entirely funded with voluntary contributions from member states. Since 2007, the United States' voluntary contribution to IAEA nuclear security activities has risen nearly 60 percent.[36]

New Centers, Conferences, and Training Activities

Summit documents emphasized the importance of the human dimension of nuclear security, and countries responded with a series of national commitments to enhance nuclear security culture and build human capacity through hosting or establishing new training and educational centers, conferences, and activities.

The United States pledged to continue to support the work of the World Institute for Nuclear Security (WINS), and Canada and Japan committed to fund and host nuclear security best practices workshops with WINS. Japan said it would launch an integrated regional support center and conduct research and development on nuclear detection and forensic techniques. China announced that it would be opening a nuclear security Center of Excellence, and India announced that it would establish a Nuclear Energy Center with a nuclear security component. Kazakhstan said it would consider hosting an International Nuclear Security Training Center and committed to hosting a Global Initiative to Combat Nuclear Terrorism (GICNT) activity. The ROK also committed to host a GICNT activity. Italy committed to establish a school of nuclear security in Trieste, and France said it would incorporate nuclear security training into the curriculum of the European Nuclear Safety Training and Tutoring Institute (ENSTTI) and International Nuclear Energy Institute. Saudi Arabia pledged to host a United Nations Security Council Resolution (UNSCR) 1540 conference for the Gulf Cooperation Council (GCC). And perhaps most notably, the Republic of Korea announced that it would be hosting the 2012 Nuclear Security Summit.

Results

U.S. support for the activities of WINS began with an initial pledge of $3 million in 2009 and continues with a new award from the Department of State for $900,000 over two years.[37] According to WINS' 2010 Annual Report, the U.S. Department of Energy provided €1,112,942 to the organization last year.[38] A WINS workshop on "Guard Force Recruitment, Training, Deployment, and Exercises" took place in Ontario, **Canada** in June 2010. Another WINS workshop on "Corporate Governance and Security Leadership" took place in Tokyo, **Japan** in September 2010.[39]

Japan's new Integrated Comprehensive Support Center for Non-proliferation and Nuclear Security for Asia opened at the Japan Atomic Energy Agency (JAEA) facility in Tokai-muria on February 4, 2011.[40] The center will be operated by JAEA and offer lectures, seminars, hands-on training courses, and e-learning opportunities.[41] In support of the center and related efforts, the **United States** and Japan established a bilateral Nuclear Security Working Group in November 2010 to help facilitate cooperation and tangible outcomes for the 2012 NSS.[42] This interaction supports the international effort that the United States has launched to develop a nuclear forensics library, common lexicon, and other foundational elements of nuclear forensic cooperation.[43] Additionally, Japan hosted an "International Workshop on Nuclear Forensics Following on the Nuclear Security Summit" in October 2010 in Tokai as part of its efforts to advance research and development on nuclear detection and forensics.[44]

China and the **United States** announced the signing of a memorandum of understanding on January 19, 2011 that paves the way for NNSA to work with China's Atomic Energy Authority on a Center of Excellence in China that will promote effective nuclear security and safeguards throughout Asia.[45] NNSA will provide some equipment to the center and help develop training programs and best practice exchanges.[46] It is not clear when the center will open. This center

in China is a part of the United States' broader effort to create new Centers of Excellence in Nuclear Security in countries outside of the former Soviet Union (FSU). As part of an overall requested budget increase for international weapons of mass destruction (WMD) security programs in FY 2011, the Obama administration requested $30 million to establish these centers under the Department of Defense's Cooperative Threat Reduction program.[47]

A press release from **India's** Press Information Bureau in August 2010 indicated that India's Global Centre for Nuclear Energy Partnership would be owned and operated by the government, but open to international participation.[48] A "phased approach" for setting up the center will be pursued, and India's Atomic Energy Commission (AEC) chairman explained that the center will consist of four different schools dedicated to topics that include nuclear security, nuclear energy systems, and radiation safety.[49] Over 200 acres of land in Bahadurgarh, Haryana is being purchased by AEC for the center's campus.[50] Additionally, a November 2010 Joint Statement by President Obama and Prime Minister Singh acknowledged a memorandum of understanding between the two countries for cooperating on the center.[51]

Kazakhstan fulfilled its pledge to host a GICNT activity by co-hosting an "Exercise on Countering the Financing of Nuclear Terrorism" in September 2010 and the "Inaugural Implementation and Assessment Group (IAG) Meeting" in October 2010.[52] No new information about Kazakhstan's plans to consider hosting an International Nuclear Security Training Center is available.[53]

The **Republic of Korea** hosted GICNT's "Workshop on Detecting and Responding to Illicit Transport and Trafficking of Nuclear and Radioactive Materials" and the "3rd Exercising Planning Group Meeting" in April 2009. The ROK will also host the group's next Plenary meeting in Seoul in 2011.[54]

On November 8, 2010, the Nuclear Energy Management School was opened at the International Centre for Theoretical Physics (ICTP) in Trieste, **Italy**.[55] The school, a collaboration between ICTP and the IAEA, will provide specialized management training to young professionals from developing countries.

In March 2010, **France's** President Nicolas Sarkozy announced that his country would create an International Nuclear Energy Institute that would interact with the budding array of nuclear centers of excellence being established around the world and expand training opportunities for nuclear professionals.[56] At the 2010 summit France made a commitment to incorporate nuclear security into this Institute and reaffirmed it in January 2011.[57] France also committed to incorporating nuclear security training into ENSTTI's curriculum. The school's 2011 curriculum now includes this training as part of its "Induction to Nuclear Safety" program.[58]

Saudi Arabia satisfied its commitment to host a UNSCR 1540 conference for the GCC on December 11-12, 2010.[59] The regional workshop took place in Riyadh and focused on implementing UNSCR 1540 to prevent terrorist acquisition of WMDs. Additionally, in February 2011, NNSA and the Department of State announced that a new Gulf Nuclear Energy Infrastructure Institute (GNEII) would be created within the Khalifa University of Science, Technology, and Research in Abu Dhabi.[60] GNEII will provide classroom instruction and hands on training in nuclear energy security, safeguards, and safety infrastructure. Currently, GNEII is only open to three nuclear-related GCC organizations, but it will expand to accommodate all six in 2012.

Preparation is underway for the 2012 NSS to be hosted by the **Republic of Korea**. An inter-minis-

Philippe Wojazer/AFP/Getty Images

French President Nicolas Sarkozy delivers a speech at the International Conference on Access to Civilian Nuclear Energy in Paris, France on March 8, 2010.

terial preparatory committee headed by the prime minister has been convened which will oversee the general planning, management, protocol, and public relations aspects of the 2012 summit.[61] The event's agenda and participants list is under development in consultation with the representatives from other countries—"sherpas" and "sous sherpas." The scope of the summit is expected to include an evaluation of commitment implementation from the 2010 summit and may also be broadened to include a greater emphasis on radiological material security and other topics like information technology security. Side events with civil society and the nuclear industry will likely be held on the margins of the summit, similar to what took place around the Washington summit. Additionally, the ROK announced in September 2010 that it will open an International Nuclear Security Training Center in 2014.[62] Though it was not among their national commitments, the center is intended to support the ROK's plans to spread the benefits of nuclear energy while mitigating the risks of its misuse.

Regional meetings have taken place to support the summit process and include countries beyond those present at the 2010 NSS, including one in Warsaw, **Poland** on August 30, 2010 and one planned for **Chile** in spring 2011.[63] Also, a sherpa meeting took place in Buenos Aires, **Argentina** on November 2, 2010 and another occurred in Vienna, **Austria** in March 2011.[64]

New National Laws

Given that it is primarily the responsibility of states to ensure that the nuclear material on their territory is protected, summit documents encouraged participants to maintain and enforce effective national laws and regulations to keep materials secure and criminalize any misuse or misconduct. In advance of the 2010 summit, Armenia, Egypt, and Malaysia passed new export controls laws and regulations to govern their nuclear activities.

Results

Egypt enacted a law in March 2010 on "Regulating Nuclear and Radiological Activities" that confirms the country's adherence to all international, regional, and bilateral treaties and agreements that Egypt has ratified.[65] The law was passed as part of preparation to achieve the country's goal of building four nuclear reactors by 2025.[66]

In April 2010, **Malaysia** passed the "Strategic Trade Bill 2010" which includes new export controls and authorizes state action against anyone involved with designing, developing, or producing WMDs.

Armenia passed new export control laws beginning in November 2009. The legislation updated the country's export control laws and regulations to comply with international standards and was accomplished over a period of approximately 15 months.[67]

Global Initiative to Combat Nuclear Terrorism (GICNT)

The value of the GICNT in promoting nuclear security was recognized in summit documents, and participants were encouraged to work together and expand cooperation under this and other multilateral initiatives that support improved nuclear security. Since its creation in 2006, GICNT has grown to include 82 countries and four official observers who voluntarily commit to implementing a set of nuclear security goals articulated in the group's Statement of Principles.[68]

Results

Argentina, the **Philippines**, **Thailand**, and **Vietnam** all made national commitments to join the initiative. All four countries, plus **Mexico** and **Singapore**, were welcomed as new members of GICNT at its June 2010 Plenary Meeting.[69]

In its NSS national statement, the **United States** reiterated its April 2009 pledge to turn GICNT into a "durable international institution." Ideas under consideration by the GICNT for achieving this goal, which the group has termed "enhancing implementation," include "clearly identifying a policy making body, having a decision making mechanism that is open to all partners, better coordinating exercise planning, and…facilitating capacity building."[70] At the 2010 GICNT plenary meeting, five accomplishments aimed at "enhancing implementation" were highlighted: 1) adopting a revised Terms of Reference to define participant roles, responsibilities, and implementation mechanisms, 2) endorsing the continuation of the United States and Russia as the group's co-chairs, 3) agreeing to activate the Implementation and Assessment Group (IAG) to provide strategic oversight, 4) selecting Spain as the first IAG Coordinator, and 5) identifying nuclear detection and nuclear forensics as priority issue areas for 2011.[71]

Preventing Nuclear Smuggling

Summit documents emphasized the need for states to work together to prevent and respond to incidents of nuclear smuggling. One mechanism that supports this objective is the United States' Megaports Initiative. It is part of the United States' Second Line of Defense (SLD) program within NNSA that provides equipment, training, and technical

Government of Vietnam

Vietnam's Vice Minister of Finance Do Hoang Anh Tuan and U.S. Ambassador Michael Michalak sign a Megaports Agreement on July 2, 2010.

support to partner countries to help prevent nuclear and radioactive material smuggling at maritime ports. Another mechanism is the United States' Nuclear Smuggling Outreach Initiative (NSOI). NSOI engages with countries to create Joint Action Plans to improve anti-smuggling capabilities and facilitate donor partnerships that fortify human and capital resources to prevent nuclear smuggling. The GICNT also offers resources and expertise to help its members bolster capacity to counter nuclear smuggling. Additionally, UNSCR 1540, unanimously passed in 2004, requires UN member states to enforce measures to prevent WMD proliferation. The United States has proposed a voluntary fund to help countries meet this obligation.

Italy and the United Arab Emirates (U.A.E.) both listed their recently signing Megaports agreements with the United States as national commitments at the 2010 NSS. New Zealand committed to contributing to NSOI, and Norway pledged $500,000 in additional resources to support GICNT efforts to upgrade radiation portal monitors in Kazakhstan. The United States pledged to contribute to the UNSCR 1540 voluntary fund that it proposed.

Results

The **United Arab Emirates** signed its agreement with the United States in December 2009 to begin cooperative efforts to install radiation detection equipment and infrastructure at the ports of Abu Dhabi and Sharjah.[72] This agreement was signed in Abu Dhabi, and it builds on a Megaports agreement signed with Dubai in 2005.[73]

Italy signed its agreement in March 2010 under which NNSA will work with the Customs Agency of the Italian Republic to deter, detect, and interdict nuclear trafficking at several Italian ports, including Genoa and Gioia Tauro.[74] The agreement will enable NNSA to provide equipment and training for the ports and includes cost-sharing arrangements.[75]

Under NSOI, **New Zealand** provided radiological monitoring equipment for the Boryspol International Airport in Kyiv, Ukraine in 2010.[76] Funding for this project, as well as two earlier ones in 2007 and 2009, was provided under NSOI and implemented by the U.S. SLD program.[77]

In December 2010, **Norway's** $500,000 contribution to upgrading portal monitors in Kazakhstan through the GICNT was announced.[78] The funding under GICNT will be used by the U.S. SLD program on radiation detection equipment at the Almaty airport.[79]

In its FY 2011 budget request, the **United States** included $3 million for the proposed UNSCR 1540 implementation fund, but Congress had not appropriated this funding at the time of this report. For FY 2012, the Obama administration has requested $1.5 million for the voluntary fund. Additionally, the United States is

working to develop new neutron detection technologies. According to the U.S. NSS national statement, the development timeframe for these new detectors has been shortened from five years to 18 months.[80]

G-8 Global Partnership

The role and contributions of the G-8 Global Partnership Against the Spread of Weapons and Materials of Mass Destruction (Global Partnership) were recognized in summit documents. The work plan welcomed additional programming to enhance nuclear material security by partners in this multilateral initiative. The Global Partnership was created in 2002 by the G-8 to provide $20 billion over ten years for WMD safety, security, and nonproliferation projects in Russia and the FSU. It currently has 15 partners outside of the G-8. The Global Partnership's geographic mandate was broadened in 2008, but operationally, its work continues to be focused in the FSU.

With the Global Partnership set to expire in 2012, Canada pledged to champion its extension. U.S. President Obama expressed his support for a 10 year extension and mission expansion of the Global Partnership at the 2010 NSS and committed another $10 billion in funding for new projects.[81]

Results

At the June 2010 G-8 summit in Muskoka, Canada, the **United States** supported **Canada's** efforts to extend and expand the initiative. However, the G-8 only agreed for an expert group to examine the initiative's future.[82] Canadian officials are working to build support for the initiative through diplomatic channels and public outreach events.[83] One such event took place on March 11, 2011 at the Canadian embassy in Washington D.C., titled "Global Efforts in WMD Threat Reduction: Perspectives on the Nuclear Security Summit and G-8 Global Partnership."[84]

National Commitments by Country

By Robert Golan-Vilella

This section of the report provides brief profiles of the 47 nations that attended the 2010 Nuclear Security Summit (NSS), as well as Belarus (for reasons explained in the Belarusian profile). The profiles list the status of the national commitments made in Washington, the states' membership in the relevant international conventions, and their fissile material holdings. The profiles also contain brief notes about why certain countries are relevant to the broader nuclear security agenda. The purpose is not to single countries out for criticism, but rather to provide readers with context for understanding the commitments.

The profiles cover the major commitments made at the 2010 NSS, as outlined in the White House document "Highlights of the National Commitments made at the Nuclear Security Summit" and the American national statement.

As the profiles demonstrate, roughly 60 percent of the commitments made in 2010 have already been met, and notable progress has been made on another 30 percent. Very few commitments have seen no progress at all. In short, countries are doing what they committed to do in Washington and are generally on track to complete these commitments by 2012. This is not to say that the world's nuclear security problems are on the cusp of being solved – far from it. There will still be much left to do even if every one of the commitments is completed. Hopefully, these findings can serve a useful function in terms of laying out the significant progress that has been made in the past year and pointing towards what is left to be done in the lead-up to the Seoul summit and beyond.

Notes and Sources:

National commitments made in 2010 are from: "Highlights of the National Commitments made at the Nuclear Security Summit," The White House, April 13, 2010, http://www.whitehouse.gov/the-press-office/highlights-national-commitments-made-nss

All information on fissile material holdings is from one of the following two sources unless otherwise noted:

- International Panel on Fissile Materials, "Global Fissile Materials Report 2010: Balancing the Books: Production and Stocks," December 2010, http://www.ipfmlibrary.org/gfmr10.pdf.

- "Highly Enriched Uranium: Who Has What?," Nuclear Threat Initiative, April 22, 2010, http://www.nti.org/db/heu/Heu_Who_Has_What.pdf.

Unless otherwise noted, all information on nuclear weapons stockpiles is from: "Status of World Nuclear Forces," Federation of American Scientists, February 19, 2011, http://www.fas.org/programs/ssp/nukes/nuclearweapons/nukestatus.html.

All data for membership in the Convention on the Physical Protection of Nuclear Material (CPPNM) is from: "Convention on the Physical Protection of Nuclear Material," International Atomic Energy Agency, January 11, 2011, http://www.iaea.org/Publications/Documents/Conventions/cppnm_status.pdf.

All data for the 2005 amendment to

the CPPNM is from: "Amendment to the Convention on the Physical Protection of Nuclear Material," International Atomic Energy Agency, March 29, 2011, http://www.iaea.org/Publications/Documents/Conventions/cppnm_amend_status.pdf.

All data for the International Convention for the Suppression of Acts of Nuclear Terrorism (ICSANT) is from: "15. International Convention for the Suppression of Acts of Nuclear Terrorism," United Nations Treaty Collection, April 1, 2011, http://treaties.un.org/Pages/ViewDetailsIII.aspx?&src=UNTSONLINE&mtdsg_no=XVIII~15&chapter=18&Temp=mtdsg3&lang=en#Participants.

All information on membership in the Global Initiative to Combat Nuclear Terrorism (GICNT) is from: "Partner Nations List," U.S. Department of State, http://www.state.gov/t/isn/c37083.htm.

In the fall of 2010, the Fissile Materials Working Group (FMWG) sent out a questionnaire to the embassies and foreign ministries of the 47 countries attending the Washington summit. The survey asked questions regarding nuclear security in each of the countries and the actions that they had taken toward meeting the commitments they made in Washington. Some of their responses have been incorporated into this report.

Throughout this section, tons refer to metric tons.

Algeria

National Commitments Made at NSS
None

International Instruments
CPPNM: State Party
CPPNM 2005 Amendment: State Party
ICSANT: State Party (acceded March 2011)

Fissile Material Holdings
None

Argentina

National Commitments Made at NSS

1. Joined the Global Initiative to Combat Nuclear Terrorism (GICNT)
   - Status: COMPLETED

2. Moving toward the ratification of ICSANT
   - Status: Unclear / No progress evident

3. Moving toward the ratification of the CPPNM 2005 Amendment
   - Status: Unclear / No progress evident

International Instruments
CPPNM: State Party
CPPNM 2005 Amendment: No action
ICSANT: Signatory

Fissile Material Holdings
HEU: 1-10 kilograms (kg). Argentina's stocks are "in the final stages of cleanout."[85]

Armenia

National Commitments Made at NSS

1. Ratified International Convention on Suppression of Acts of Nuclear Terrorism
   - Status: COMPLETED (ratified September 2010)

2. Passed new export control law
   - Status: COMPLETED[86]

International Instruments
CPPNM: State Party
CPPNM 2005 Amendment: No action
ICSANT: State Party

Fissile Material Holdings
None

Australia

National Commitments Made at NSS

1. Moving toward the ratification of ICSANT
   - Status: Unclear / No progress evident

International Instruments
CPPNM: State Party
CPPNM 2005 Amendment: State Party
ICSANT: Signatory

Fissile Material Holdings
HEU: 1-10 kg. Australia's stocks are "in the final stages of cleanout."[87]

Belarus

National Commitments Made at NSS
None (did not attend summit)

International Instruments
CPPNM: State Party
CPPNM 2005 Amendment: No action
ICSANT: State Party

Fissile Material Holdings
HEU: 85-285 kg (see below)

Notes
Prior to 2010, Belarus was estimated to have 170-370 kg of HEU. Belarus was not invited to attend the Washington summit. At the time, its president Alexander Lukashenko declared that his country would never give up its HEU. Nevertheless, in late 2010 the United States helped remove 85 kg of HEU from Belarus in two secret operations, and in December 2010 Belarus pledged to eliminate all of its stocks of HEU by the time of the 2012 Nuclear Security Summit.[88] As a result, South Korea "has agreed to invite Belarus" to the next summit, "contingent upon the completion of its highly enriched uranium removal."[89]

Belgium

National Commitments Made at NSS

1. Contributing $300,000 to the International Atomic Energy Agency's Nuclear Security Fund
   - Status: COMPLETED[90]

International Instruments
CPPNM: State Party
CPPNM 2005 Amendment: No action
ICSANT: State Party

Fissile Material Holdings
HEU: 700-750 kg

Notes
In addition to its HEU stocks, Belgium hosts an estimated 10-20 American tactical nuclear weapons at Kleine Brogel Air Base.[91]

Brazil

National Commitments Made at NSS
None

International Instruments
CPPNM: State Party
CPPNM 2005 Amendment: No action
ICSANT: State Party

Fissile Material Holdings
HEU: <1 kg

Canada

National Commitments Made at NSS

1. Returning a large amount of spent HEU fuel from its medical isotope production reactor to the United States
   - Status: In progress. The fuel is scheduled to be repatriated to the United States "between 2010 and 2018."[92]

2. Championing the extension of the G-8 Global Partnership
   - Status: In progress. Canada has advocated for the Global Partnership's extension, but it has so far not occurred. The Global Partnership will expire in 2012 if it is not extended.

3. Funding highly enriched uranium removals from Mexico and Vietnam
   - Status: In progress. Canada pledged to provide $8 million in funding to the U.S. Global Threat Reduction Initiative to support the two projects.[93] A trilateral agreement between the United States, Mexico, and Canada was reached concerning the Mexican removals.[94]

4. Hosting and funding a World Institute of Nuclear Security best practices workshop
   - Status: COMPLETED (hosted June 2010)[95]

5. Unveiling $100 million in new bilateral security cooperation with Russia
   - Status: Unclear / no progress evident

International Instruments
CPPNM: State Party
CPPNM 2005 Amendment: No action
ICSANT: Signatory

Fissile Material Holdings
HEU: About 1,350 kg

Notes
Canada is the world's leading producer of the medical isotope molybdenum-99 (Mo-99), which is widely used in treating cancer, heart disease, and brain disorders.[96] Canada produces this isotope at its National Research Universal (NRU) reactor in Chalk River, which uses HEU targets.[97] The NRU's operating license is currently set to expire in 2016; it is unclear how Canada will proceed after this date.

Chile

National Commitments Made at NSS

1. Removed all HEU (18 kg) in March 2010
   - Status: COMPLETED[98]

International Instruments
CPPNM: State Party

CPPNM 2005 Amendment: State Party
ICSANT: State Party (ratified September 2010)

Fissile Material Holdings
HEU: <1 kg

China

National Commitments Made at NSS

1. Announce cooperation on a nuclear security Center of Excellence
   - Status: In progress. China and the United States signed a memorandum of understanding on the creation of the center in January 2011.[99]

International Instruments
CPPNM: State Party
CPPNM 2005 Amendment: State Party
ICSANT: State Party (ratified November 2010)

Fissile Material Holdings
HEU: 16 ± 4 tons
Plutonium: 1.8 ± 0.5 tons

Notes
Little is officially known about the status of China's nuclear weapons and fissile material stockpiles, which Beijing has never disclosed. China is estimated to possess approximately 240 nuclear warheads. China is thought to have stopped producing fissile materials for weapons around 1990, but has never formally made a declaration to this effect.[100] Beijing's current stocks of fissile materials are believed to be entirely devoted to military activities; this may change in the upcoming years if China goes ahead with plans to develop a commercial-scale reprocessing plant.[101]

Czech Republic

National Commitments Made at NSS
None

International Instruments
CPPNM: State Party
CPPNM 2005 Amendment: State Party (accepted December 2010)
ICSANT: State Party

Fissile Material Holdings
HEU: 10-100 kg. The Czech Republic's stocks are "on track to be cleaned out in the next few years."[102]

Egypt

National Commitments Made at NSS

1. Passed new comprehensive nuclear law in March 2010 that includes nuclear security, criminalization of sabotage and illicit trafficking provisions as well as envisaging an independent regulatory authority
   - Status: COMPLETED[103]

International Instruments
CPPNM: No action
CPPNM 2005 Amendment: No action
ICSANT: Signatory

Fissile Material Holdings
None

Finland

National Commitments Made at NSS

1. Invited an International Physical Protection Advisory Service (IPPAS) security review from the IAEA
   - Status: COMPLETED (review completed in June 2009)[104]

International Instruments
CPPNM: State Party
CPPNM 2005 Amendment: No action
ICSANT: State Party

Fissile Material Holdings
None

France

National Commitments Made at NSS

1. Ratifying the 2005 Amendment to the CPPNM
   - Status: In progress. According to the French government, "We are currently amending our national legislation in order to be able to ratify … the amendment to the Convention on the Physical Protection of Nuclear Material."[105]

2. Inviting an IPPAS security review from the IAEA
   - Status: In progress. "France will soon request the IAEA to conduct an International Physical Protection Advisory Service (IPPAS) mission to assess its system."[106]

3. Incorporating training in nuclear security at the European Nuclear Safety Training and Tutoring

Institute and the International Nuclear Energy Institute

- Status: In progress. France's ENSTTI summer 2011 training program is scheduled to include courses on "Nuclear security and non-proliferation objectives."[107]

International Instruments
CPPNM: State Party
CPPNM 2005 Amendment: No action
ICSANT: Signatory

Fissile Material Holdings
HEU: 30.9 ± 6 tons
Plutonium: 61.9 ± 1 tons

Notes
France has an arsenal of approximately 300 nuclear warheads and extensive civilian stockpiles of fissile materials. France possesses 55.9 tons of plutonium and 4.9 tons of HEU as of its most recent declaration of civilian stocks.[108] In addition, roughly 26 tons of foreign-owned plutonium, principally owned by Japan, is stored on French territory. France is also one of the few countries to continue reprocessing spent nuclear fuel.

Georgia

National Commitments Made at NSS

1. Signed instrument of approval for ICSANT
   - Status: COMPLETED (acceded April 2010)

International Instruments
CPPNM: State Party
CPPNM 2005 Amendment: No action
ICSANT: State Party

Fissile Material Holdings
HEU: <1 kg

Germany

National Commitments Made at NSS

1. Moving toward ratifying the 2005 Amendment of the CPPNM
   - Status: COMPLETED (ratified October 2010)

International Instruments
CPPNM: State Party
CPPNM 2005 Amendment: State Party
ICSANT: State Party

Fissile Material Holdings
HEU: About 920 kg
Plutonium: 9.5 tons (7.5 tons stored outside country)

Notes
Germany's HEU stockpiles are predicted to increase in the coming years and cross the 1,000 kg threshold. This is due to the operation of its FRM-II research reactor in Bavaria. Should the reactor continue functioning, Germany "could become the last non-weapon state with a HEU-fueled reactor."[109] The United States is also believed to store 10-20 nuclear weapons in Germany.[110]

India

National Commitments Made at NSS

1. Announcing the creation of a Nuclear Energy Center with a nuclear security component
   - Status: In progress. A memorandum of understanding was signed with the United States in November 2010.[111]

International Instruments
CPPNM: State Party
CPPNM 2005 Amendment: State Party
ICSANT: State Party

Fissile Material Holdings
HEU: 1.3 ± 0.5 tons
Plutonium: 4 ± 0.65 tons

Notes
India is one of the few countries today that continues to produce both HEU and plutonium. India's production of HEU is chiefly intended to fuel its nuclear submarine propulsion program, which is believed to be working toward a fleet of three to five nuclear submarines.[112] Its nuclear weapons arsenal, believed to contain roughly 80-100 warheads, is based on plutonium. It is estimated that 0.5 tons of its plutonium stockpile are weapons-grade, while the remaining 3.5 tons are reactor-grade.[113]

Indonesia

National Commitments Made at NSS
None

International Instruments
CPPNM: State Party
CPPNM 2005 Amendment: State Party (ratified May 2010)
ICSANT: No action

Fissile Material Holdings
HEU: <1 kg

Israel

National Commitments Made at NSS
None

International Instruments
CPPNM: State Party
CPPNM 2005 Amendment: No action
ICSANT: Signatory

Fissile Material Holdings
HEU: 0.3 tons
Plutonium: 0.8 ± 0.15 tons

Notes
Israel's government maintains extreme secrecy over every aspect of its nuclear development, from its still-unacknowledged nuclear arsenal to its fissile material stockpiles to its nuclear security arrangements. As a result, estimates of its stockpiles are highly uncertain. Israel is believed to possess approximately 80 nuclear weapons.

Italy

National Commitments Made at NSS

1. Signed a Megaports agreement with the United States
   - Status: COMPLETED (signed March 2010)[114]

2. Establishing a school of nuclear security in Trieste
   - Status: COMPLETED (opened November 2010)[115]

International Instruments
CPPNM: State Party
CPPNM 2005 Amendment: No action
ICSANT: Signatory

Fissile Material Holdings
HEU: 100-200 kg

Notes
Italy's HEU stocks are chiefly accounted for by its Tapiro fast-neutron reactor, whose fuel type makes it difficult to convert to LEU fuel. The reactor is used only intermittently.[116] Italy also hosts an estimated 60-70 American nuclear weapons at two locations.[117]

Japan

National Commitments Made at NSS

1. Launching an integrated regional support center
   - Status: COMPLETED[118]

2. Research and development on detection and forensics
   - Status: COMPLETED (hosted the "International Workshop on Nuclear Forensics Following on Nuclear Security Summit" in October 2010)[119]

3. Contributing new resources to the Nuclear Security Fund
   - Status: COMPLETED[120]

4. Hosting a WINS best practices workshop
   - Status: COMPLETED (hosted September 2010)[121]

International Instruments
CPPNM: State Party
CPPNM 2005 Amendment: No action
ICSANT: State Party

Fissile Material Holdings
HEU: About 2,000 kg
Plutonium: 46.1 tons (36.1 tons stored outside country)

Notes
Japan accounts for the lion's share of the separated plutonium located outside of the nuclear weapon states. It is "the only non-weapon state that reprocesses spent fuel and fabricates plutonium-containing fuel."[122]

Jordan

National Commitments Made at NSS
None

International Instruments
CPPNM: State Party
CPPNM 2005 Amendment: State Party
ICSANT: Signatory

Fissile Material Holdings
None

Kazakhstan

National Commitments Made at NSS

1. Converting an HEU research reactor and eliminating remaining HEU
   - Status: In progress. Sources indicate that the research reactor in Alatau is the intended target and that Kazakhstan is engaged in discussions with Russia and the United States about its conversion.[123] However, no timeline for conversion has been made public.

2. Cooperative work on BN-350 reactor shutdown and fuel security
   - Status: COMPLETED (completion announced in November 2010)[124]

3. Hosting a GICNT activity
   - Status: COMPLETED[125]

4. Considering an International Nuclear Security Training Center
   - Status: In progress. Kazakhstan's president, Nursultan Nazarbaev, has promoted Kazakhstan as a potential location for the proposed center,[126] but its status remains unclear.

International Instruments
CPPNM: State Party
CPPNM 2005 Amendment: No action
ICSANT: State Party

Fissile Material Holdings
HEU: At least 10,000 kg
Plutonium: At least 3 tons (see below)

Notes
Kazakhstan has by far the largest holdings of HEU of any non-weapon state. This is almost entirely due to the fact that Kazakhstan inherited the Soviet Union's BN-350 reactor. Most of the country's 10,000 kg of HEU consists of spent fuel from that reactor, which was also used to breed plutonium for the Soviet Union's nuclear weapons program.[127] In November 2010 the United States and other international partners completed a long-term effort to shut down the reactor and provide long-term storage for its spent fuel in a facility in eastern Kazakhstan. This included securing more than 10 tons of HEU and three tons of weapons-grade plutonium.[128]

Malaysia

National Commitments Made at NSS

1. Passed new export control law
   - Status: COMPLETED (passed in April 2010)[129]

International Instruments
CPPNM: No action
CPPNM 2005 Amendment: No action
ICSANT: Signatory

Fissile Material Holdings
None

Mexico

National Commitments Made at NSS

1. Converting an HEU research reactor and eliminating remaining HEU working through IAEA
   - Status: In progress. Mexico, Canada, and the United States signed a trilateral agreement at the Washington summit which provides for the elimination of Mexico's HEU.[130]

International Instruments
CPPNM: State Party
CPPNM 2005 Amendment: No action
ICSANT: State Party

Fissile Material Holdings
HEU: 10-100 kg. Mexico's stocks of HEU are "on track to be cleaned out in the next few years."[131]

Morocco

National Commitments Made at NSS
None

International Instruments
CPPNM: State Party
CPPNM 2005 Amendment: No action
ICSANT: State Party (ratified March 2010)

Fissile Material Holdings
None

Netherlands

National Commitments Made at NSS
None

International Instruments
CPPNM: State Party
CPPNM 2005 Amendment: No action
ICSANT: State Party (accepted June 2010)

Fissile Material Holdings
HEU: 730-810 kg

Notes
The Netherlands is a major producer of Mo-99 at its HFR research reactor in Petten. The reactor has been converted to use LEU fuel, but still uses HEU targets; as a result, the Netherlands continues to require stockpiles and shipments of HEU.[132] The Netherlands also hosts an estimated 10-20 American nuclear weapons.[133]

New Zealand

National Commitments Made at NSS

1. Contributing to the International Atomic Energy Agency's Nuclear Security Fund
   - Status: COMPLETED[134]

2. Contributing to the U.S. Nuclear Smuggling Outreach Initiative (NSOI)
   - Status: COMPLETED. According to the NSOI, "In 2010, New Zealand supplied radiological monitoring equipment for Boryspol International Airport in Kyiv, Ukraine."[135]

International Instruments
CPPNM: State Party
CPPNM 2005 Amendment: No action
ICSANT: Signatory

Fissile Material Holdings
None

Nigeria

National Commitments Made at NSS
None

International Instruments
CPPNM: State Party
CPPNM 2005 Amendment: State Party
ICSANT: No action

Fissile Material Holdings
HEU: About 1 kg

Norway

National Commitments Made at NSS

1. Contributing $3.3 million over the next four years to the IAEA Nuclear Security Fund (flexible funds for use in developing countries)
   - Status: COMPLETED[136]

2. Contributing $500,000 in additional support to Kazakhstan's efforts to upgrade portal monitors to prevent nuclear smuggling as part of the GICNT
   - Status: COMPLETED[137]

International Instruments
CPPNM: State Party
CPPNM 2005 Amendment: State Party
ICSANT: Signatory

Fissile Material Holdings
HEU: 1-10 kg

Pakistan

National Commitments Made at NSS
None

International Instruments
CPPNM: State Party
CPPNM 2005 Amendment: No action
ICSANT: No action

Fissile Material Holdings
HEU: 2.6 ± 1 tons
Plutonium: About 100 kg

Notes
Pakistan is thought to possess an arsenal of 90-110 nuclear weapons. This number reflects a significant recent increase, as Pakistan is believed to have doubled its nuclear arsenal over the past several years.[138] Virtually all of its fissile material stockpiles are designated for military use; Islamabad "does not have a civilian plutonium program,"[139] and its civilian stocks of HEU are estimated at only 17 kg.[140]

Analysts have expressed concern over the status of nuclear security in Pakistan due to the "extraordinary threats" it faces as a result of the presence of al-Qaeda and other extremist organizations in the country.[141] However, Pakistan has also taken a number of significant steps to improve its nuclear security over the past decade.[142]

Philippines

National Commitments Made at NSS

1. Joining the GICNT
   - Status: COMPLETED

International Instruments
CPPNM: State Party
CPPNM 2005 Amendment: No action
ICSANT: Signatory

Fissile Material Holdings
HEU: <1 kg

Poland

National Commitments Made at NSS
None

International Instruments
CPPNM: State Party
CPPNM 2005 Amendment: State Party
ICSANT: State Party (ratified April 2010)

Fissile Material Holdings
HEU: 100-1000 kg

Notes
Over the past several years, there have been a number of high-profile HEU removals from Poland. Most notably, in October 2010 the NNSA announced that over 450 kg of HEU had been removed from Poland in five shipments over the previous year.[143] It is unclear how much HEU remains following these removals, which involved clearing out all HEU from Poland's "Ewa" research reactor.[144] The material left is concentrated in the "Maria" reactor, which uses HEU fuel to produce Mo-99, but is on track to convert to LEU fuel in mid-2012.[145]

Republic of Korea

National Commitments Made at NSS

1. Hosting the 2012 Nuclear Security Summit.
   - Status: In progress. Will presumably happen.

2. Hosting a GICNT activity
   - Status: In progress. The GICNT's next plenary session is scheduled for 2011 in Seoul.[146]

International Instruments
CPPNM: State Party
CPPNM 2005 Amendment: No action
ICSANT: Signatory

Fissile Material Holdings
HEU: <1 kg

Notes
The Republic of Korea possesses an extensive nuclear power program and is seeking to become a major exporter of nuclear reactors, setting a goal of exporting 80 nuclear power reactors by 2030.[147]

Russia

National Commitments Made at NSS

1. Signing Plutonium Disposition protocol
   - Status: COMPLETED[148]

2. Ending plutonium production
   - Status: COMPLETED[149]

3. Contributing to the IAEA's Nuclear Security Fund
   - Status: COMPLETED[150]

International Instruments
CPPNM: State Party
CPPNM 2005 Amendment: State Party
ICSANT: State Party

Fissile Material Holdings
HEU: 770 ± 120 tons
Plutonium: About 175.7 tons

Notes
As Harvard University's Matthew Bunn notes, "Russia has the world's largest stockpiles of nuclear weapons, plutonium, and HEU, located in the world's largest numbers of buildings and bunkers."[151] Its estimated 11,000 nuclear warheads and hundreds of buildings containing nuclear materials alone mean that Russia is central to the broader nuclear security agenda.

The United States has a wide variety of programs in Russia whose functions include conducting security upgrades at nuclear facilities, consolidating Russian HEU, and converting Russian reactors to use LEU. These efforts have made varying degrees of progress in recent years. The Government Accountability Office (GAO) reported that the Material Protection, Control and Accounting program has had the greatest success, conducting security upgrades at over one hundred sites. However, progress in terms of consolidating Russian HEU and converting Russian reactors to use LEU has been more limited.[152]

Saudi Arabia

National Commitments Made at NSS

1. Hosting a UNSCR 1540 conference for Gulf Cooperation Council
   - Status: COMPLETED (hosted in Riyadh in December 2010)[153]

International Instruments
CPPNM: State Party
CPPNM 2005 Amendment: State Party (accepted January 2011)
ICSANT: State Party

Fissile Material Holdings
None

Singapore

National Commitments Made at NSS
None

International Instruments
CPPNM: No action
CPPNM 2005 Amendment: No action
ICSANT: Signatory

Fissile Material Holdings
None

South Africa

National Commitments Made at NSS
None

International Instruments
CPPNM: State Party
CPPNM 2005 Amendment: No action
ICSANT: State Party

Fissile Material Holdings
HEU: 610-760 kg

Notes
South Africa is "the only non-weapon state that produced its own stockpile of HEU," which is a legacy of its nuclear weapons program of the 1980s.[154] South Africa is also a major producer of Mo-99, and it is leading the transition to produce it with LEU. In December 2010, South Africa's Nuclear Energy Corporation delivered the first large-scale shipment of Mo-99 to the United States made using both LEU fuel and targets.[155]

Spain

National Commitments Made at NSS
None

International Instruments
CPPNM: State Party
CPPNM 2005 Amendment: State Party
ICSANT: State Party

Fissile Material Holdings
HEU: <1 kg

Sweden

National Commitments Made at NSS
None

International Instruments
CPPNM: State Party
CPPNM 2005 Amendment: No action
ICSANT: Signatory

Fissile Material Holdings
HEU: <1 kg

Switzerland

National Commitments Made at NSS
None

International Instruments
CPPNM: State Party
CPPNM 2005 Amendment: State Party
ICSANT: State Party

Fissile Material Holdings
HEU: 1-10 kg
Plutonium: <0.05 tons[156]

Thailand

National Commitments Made at NSS

1. Joining the Global Initiative to Combat Nuclear Terrorism
   - Status: COMPLETED

International Instruments
CPPNM: No action
CPPNM 2005 Amendment: No action
ICSANT: Signatory

Fissile Material Holdings
HEU: <1 kg

Turkey

National Commitments Made at NSS
None

International Instruments
CPPNM: State Party
CPPNM 2005 Amendment: No action
ICSANT: Signatory

Fissile Material Holdings
HEU: <1 kg. Turkey was formally "cleaned out" of HEU in January 2010.[157]

Notes
Turkey is believed to host approximately 60-70 American nuclear weapons.[158]

Ukraine

National Commitments Made at NSS

1. Removing all HEU by next Summit — half of it by year's end
   - Status: In progress (see below)

International Instruments
CPPNM: State Party
CPPNM 2005 Amendment: State Party
ICSANT: State Party

Fissile Material Holdings
HEU: Less than 62 kg (see below)

Notes

Prior to 2010, Ukraine's HEU was stored at three locations: a research reactor in Kiev, an experimental facility in Kharkiv, and a critical assembly in Sevastopol. Following on Ukraine's commitment at the Washington summit, the United States completed two removals of HEU from Ukraine in 2010. In May 2010, 56 kg of HEU spent fuel were removed. According to the GAO, this represents "more than a third of Ukraine's HEU inventory."[159] In December 2010 an additional 50 kg of HEU fresh fuel were removed.[160]

United Arab Emirates

National Commitments Made at NSS

1. Signed a Megaports Agreement with the United States
   - Status: COMPLETED (signed December 2009)[161]

International Instruments
CPPNM: State Party
CPPNM 2005 Amendment: State Party
ICSANT: State Party

Fissile Material Holdings
None

United Kingdom

National Commitments Made at NSS

1. Contributing $6 million to the IAEA Nuclear Security Fund
   - Status: COMPLETED[162]

2. Inviting an IPPAS security review from the IAEA
   - Status: COMPLETED[163]

3. Ratification of ICSANT
   - Status: COMPLETED (ratified September 2009)

4. Ratification of 2005 CPPNM Amendment
   - Status: COMPLETED (ratified April 2010)

International Instruments
CPPNM: State Party
CPPNM 2005 Amendment: State Party
ICSANT: State Party

Fissile Material Holdings
HEU: 21.2 tons
Plutonium: 92.9 tons

Notes
The United Kingdom possesses a stockpile of 225 nuclear warheads, of which less than 160 are operationally available. According to the most recent British defense review, these numbers are scheduled to be reduced to 180 and 120, respectively, by the mid-2020s.[164]

In addition, the United Kingdom also possesses extensive civilian stockpiles of fissile materials, the result of "an extensive program of reprocessing spent fuel from power reactors."[165] The bulk of London's plutonium (84.4 tons) is civilian, which makes it the largest stockpile of civilian plutonium in the world.[166]

United States

National Commitments Made at NSS[167]

1. Request an IPPAS mission
   - Status: In progress. The United States has formally declared its intention to request an IPPAS mission.[168]

2. Accelerate efforts to ratify ICSANT and the CPPNM 2005 Amendment
   - Status: In progress. According to Washington's national statement, legislation that would bring U.S. laws into line with both treaties has been submitted to Congress. Neither treaty has been ratified.

3. Convert its six remaining HEU-fueled reactors
   - Status: In progress. The United States is currently developing new fuel that will allow it to convert the final six reactors.

4. Sign Plutonium Disposition protocol
   - Status: COMPLETED[169]

5. Bring up to 100 kg of plutonium from sites of concern into the United States pending disposition
   - Status: In progress. This project is in the "final stages of approval."[170]

6. Develop and deploy new neutron detection technologies
   - Status: In progress. The U.S. Domestic Nuclear Detection Office has begun "performance tests of 11 neutron detector variations to identify promising technologies."[171]

7. Launch an international effort to develop a nuclear forensics library, exercises, common lexicons, and other foundational elements for cooperation in nuclear forensics
   - Status: In progress. In November 2010 the United States and Japan established a bilateral Nuclear Security

Working Group, and agreed "to expand joint activities in the fields of nuclear forensics."[172]

8. Provide financial support for WINS
   - Status: COMPLETED[173]

9. Requested the largest ever amount for nuclear security programs in its fiscal year 2011 budget
   - Status: COMPLETED. However, the increased funding has not been appropriated, as the U.S. Congress has not yet approved a final budget for fiscal year 2011.

10. Proposing a voluntary fund to help countries meet their obligations under Resolution 1540
   - Status: COMPLETED. The United States proposed the fund, and the White House requested $3 million for it in fiscal year 2011 and $1.5 million in fiscal year 2012.[174]

11. Led efforts at the IAEA to establish for the first time a dedicated line item for nuclear security in 2009
   - Status: COMPLETED

12. Support extension of the Global Partnership
   - Status: In progress. The United States has advocated for a 10-year extension of the Global Partnership and pledged to commit an additional $10 billion to support it, but it has so far not occurred.

International Instruments
CPPNM: State Party
CPPNM 2005 Amendment: No action
ICSANT: Signatory

Fissile Material Holdings
HEU: 614 tons
Plutonium: 91.9 tons

Notes
The United States has been a leading force in helping to remove and secure nuclear materials in other nations. In recent years, its Global Threat Reduction Initiative has worked to shut down or convert 72 HEU research reactors and remove a cumulative total of 2,852 kg of HEU around the world.[175] The United States has worked with 19 countries to remove "all HEU material," and is working with 16 additional nations "to remove the last of their material."[176]

As of September 2009, the United States had 5,113 nuclear weapons deployed and in reserve, plus several thousand awaiting dismantlement.[177] The majority of its fissile material stockpile is designated for military purposes. For HEU, 260 tons is used for weapons and 230 tons reserved as fuel for naval reactors.[178] When it comes to plutonium, 38.3 tons are either in weapons or weapons laboratories; the rest has been declared as "excess."[179] As part of its plan to dispose of these materials, the United States concluded an agreement with Russia for each country to dispose of at least 34 tons of weapons-grade plutonium starting in 2018. The United States is also in the process of blending down large amounts of its HEU: it has designated 235 tons of its HEU for blend-down, of which 131 have already been blended down and 104 tons remain to be eliminated.[180]

Vietnam

National Commitments Made at NSS

1. Converting a highly enriched uranium research reactor
   - Status: In progress. The reactor, located in Dalat, was partially converted from HEU to LEU in 2007. The United States and Vietnam reached an agreement "to complete the full conversion" of the reactor in December 2010.[181]

2. Joining the Global Initiative to Combat Nuclear Terrorism
   - Status: COMPLETED

International Instruments
CPPNM: No action
CPPNM 2005 Amendment: No action
ICSANT: No action

Fissile Material Holdings
HEU: 1-10 kg

2010 Nuclear Security Summit

Progress on National Commitments

Education, Training, and Cooperation Initiatives

Canada, Kazakhstan, Saudi Arabia, Japan, and South Korea have either held or plan to hold international conferences related to nuclear security.

The IAEA is conducting International Physical Protection Advisory Service (IPPAS) missions in the United Kingdom and Finland.

France is incorporating nuclear security into the curriculum at the European Nuclear Safety Training and Tutoring Initiative and Italy opened a nuclear security training center for developing world professionals.

India, China, and Japan are establishing centers of excellence to encourage regional and multilateral cooperation on nuclear security.

Treaties and Conventions

Armenia, Georgia, and the United Kingdom ratified the International Convention for the Suppression of Acts of Nuclear Terrorism (ICSANT). Germany and the United Kingdom ratified the 2005 Amendment to the Convention for the Physical Protection of Nuclear Material.

Plutonium Disposition

Russia and the United States signed the protocol to the PMDA and Russia ceased its remaining Plutonium production.

Domestic Legal Action

Egypt, Armenia, and Malaysia strengthened export control laws and increased penalties for nuclear material smuggling.

Italy and the United Arab Emirates signed Megaports agreements with the U.S. to improve nuclear and radiological detection capabilities at major shipping ports.

HEU Removal and Reactor Conversion

HEU removal is underway in Canada, Mexico, Poland, Ukraine, Kazakhstan, and Vietnam. Chile gave up its remaining HEU and non-NSS attendee Belarus returned half of its HEU.

Reactor conversions are underway in Mexico, Kazakhstan, and Vietnam. The U.S. will convert six HEU reactors when technology allows.

National Commitment Categories

- Plutonium Management and Disposition Agreement
- Education, Training, and Cooperation Initiatives
- HEU Removal in progress or completed
- Domestic Legal Action
- International Treaties and Conventions
- Summit Attendee
- Reactor Conversion Underway or Completed

Source details indicated in report's endnotes. Sarah J. Williams/March 2011

Conclusion

One year after the 2010 Nuclear Security Summit, many countries have made considerable progress implementing their summit commitments. Notable completed national commitments include:

- Chile sent all of its highly enriched uranium (HEU) to the United States.
- Kazakhstan secured enough HEU and plutonium to make 775 nuclear weapons.
- Russia ended its plutonium production and signed a plutonium disposition protocol with the United States.

Countries that have made important progress implementing their commitments include:

- China signed a memorandum of understanding with the United States to work together on establishing a nuclear security Center of Excellence in China.
- Ukraine removed over half of its HEU, putting it on track to meet its pledge to eliminate all of its HEU by the 2012 summit.

Additionally, in fulfillment of their national commitments:

- Six countries hosted educational activities such as conferences and workshops.
- Three states passed new export control laws to protect nuclear materials against misuse.
- Three countries ratified the International Convention on the Suppression of Acts of Nuclear Terrorism.
- Two countries ratified the Amendment to the Convention on the Physical Protection of Nuclear Material.
- Four new countries joined the Global Initiative to Combat Nuclear Terrorism.
- Five countries implemented activities to prevent and interdict nuclear smuggling.
- Two countries initiated or completed an IAEA International Physical Protection Advisory Service mission.
- Six countries provided the IAEA with additional nuclear security funds.

In short, most participants are on their way to fulfilling their national pledges. In addition, South Africa stands out as having made commendable progress on the work plan objective of minimizing the use of HEU. After working with the NNSA to convert HEU reactors, the South African Nuclear Security Corporation (NECSA) shipped the first batch of Mo-99 produced with low-enriched uranium (LEU) to the United States in December 2010.[182] NESCA's subsidiary, NTP Radioisotopes, Ltd., is now the world's first and only large-scale LEU-based Mo-99 supplier in the global marketplace.

Less progress appears to have been made on some of the work plan's more ambitious objectives, such as the consolidation of national sites that hold nuclear materials. However, due to the sensitive nature of nuclear issues, complete information on all of the actions taken by countries may not be publicized or disclosed to those outside of government. While governments are likely to publicize actions such as

ratifying treaties and making funding commitments, they are less likely to discuss physical protection upgrades, for example, in open sources. Additionally, negotiations on bilateral or multilateral agreements may take years to yield results, and the status of ongoing negotiations is unlikely to be known until breakthroughs are achieved. As a result of these barriers, a transparent review of commitment implementation at the 2012 summit will be important to fully understand how the NSS process has advanced global nuclear security.

The countries participating in the NSS process are still finalizing their approach to tracking and reporting on the implementation of commitments made in Washington. Nevertheless, the scheduling of a second summit in 2012 is acting as a forcing mechanism to spur commitment implementation. Developing ways to demonstrate the progress that has been made—not only to summit participants but also to the public and countries outside the process—is crucial to building on the summit's momentum, making the process credible, and furthering the nuclear security agenda.

However, if the 2012 NSS focuses solely on achieving compliance with existing nuclear material security arrangements—as the Washington summit did—we will have missed an important opportunity to push the regime beyond its current limits to better address twenty-first century threats. The NSS process has brought high-level political attention to a previously obscure issue that was the domain of technical and policy experts. This attention through the summit process should be preserved and used as a vehicle for sustained nuclear security advancement. As the 2012 NSS approaches, countries should be considering what new initiatives, funding mechanisms, and collaborations could be initiated in 2012. Of course, such proposals are predicated on recognition among summit participants that more needs to be done at an international level over the long term to prevent nuclear terrorism.

A core achievement of the 2010 NSS was forging the consensus that nuclear terrorism is among the top global security challenges today and that strong nuclear security measures are the most effective way to prevent it. The objective for the 2012 NSS should be to gain international agreement that the current regime needs to be further fortified and harmonized to prevent nuclear terrorism. States will need to acknowledge that nuclear material security is an ongoing challenge, and international efforts to protect sensitive materials must continually improve and evolve to address new threats. The NSS process offers a unique vehicle with great potential for moving the agenda forward.

APPENDIX

Glossary of Terms

Convention on the Physical Protection of Nuclear Material (CPPNM): The only international legally binding undertaking in the area of physical protection of nuclear material. Signed in Vienna and New York on March 3, 1980, it establishes measures related to the prevention, detection, and punishment of offenses relating to nuclear material. A diplomatic conference in July 2005 was convened to amend the convention and strengthen its provisions. The amended convention makes it legally binding for states-parties to protect nuclear facilities and material in peaceful domestic use and storage as well as transport. It provides for expanded cooperation between and among states regarding rapid measures to locate and recover stolen or smuggled nuclear material, mitigate any radiological consequences of sabotage, and prevent and combat related offenses. The amendments will take effect once they have been ratified by two-thirds of the states-parties of the convention.

Cooperative Threat Reduction (CTR / Nunn-Lugar): Since 1991, the CTR program has worked to secure and eliminate weapons of mass destruction and their related materials, especially in the states of the former Soviet Union. Initially seen as an immediate response to the chaos as the Soviet Union was collapsing, it later came to be seen as part of a broader effort to keep nuclear weapons and materials out of the hands of terrorists. The program is run by the Defense Threat Reduction Agency in the Department of Defense.

Enrichment: Uranium enrichment increases the percentage of fissile uranium-235 in a batch of nuclear fuel. Low levels of enrichment are suitable for use in civilian nuclear power reactors, while highly enriched uranium (HEU) can be used to build a nuclear weapon.

Fissile material: Material that contains elements whose nuclei are able to be split by neutrons of various speeds. Uranium-233, uranium-235, and plutonium-239 are all fissile materials. Fissile materials undergo fission more easily than other fissionable materials and are more desirable for most reactor types and essential for nuclear explosives.

Global Initiative to Combat Nuclear Terrorism (GICNT): A voluntary association of states, established in 2006, committed to sharing information and expertise in order to prevent nuclear terrorism. Eighty-two states currently participate in the initiative.

Global Partnership Against the Spread of Weapons and Materials of Mass Destruction: An initiative launched in 2002 at the Group of Eight summit in Kananaskis to prevent terrorists or those who harbor them from acquiring or developing nuclear, chemical, radiological, and biological weapons; missiles; and related materials, equipment, and technology.

Global Threat Reduction Initiative (GTRI): A collaborative program aimed at reducing and protecting vulnerable nuclear and radiological materials located at civilian sites worldwide. Launched in 2004, the GTRI helps the U.S. Department of Energy achieve its nuclear security goal to prevent the acquisition of nuclear and radiological materials for use in weapons of mass destruction and other acts of terrorism by repatriating or otherwise securing nuclear fuel and converting reactors to use new, more proliferation-resistant technology. Three key subprograms of the GTRI—convert, remove, and protect—provide a comprehensive approach to denying terrorists access to nuclear and radiological materials. The program is run by the National Nuclear Security Administration.

Highly Enriched Uranium (HEU): Uranium that has been processed to increase the proportion of the U-235 isotope to more than 20 percent. HEU is required for the construction of a gun-type nuclear device, the simplest type of nuclear weapon. The greater the proportion of U-235, i.e., the higher the enrichment level, the less material that is needed to cause a nuclear detonation. Weapons-grade uranium generally refers to uranium enriched to at least 90 percent, but material of far lower enrichment levels can be used to create a nuclear explosive device.

IAEA Nuclear Security Fund: A voluntary funding mechanism, to which International Atomic Energy Agency (IAEA) member states are called on to contribute. The fund was established to support, among others things, the implementation of nuclear security activities to prevent, detect, and respond to nuclear terrorism. The fund's lifetime has been extended twice; the current Nuclear Security Plan is scheduled to run through 2013.

International Atomic Energy Agency (IAEA): International organization based in Vienna charged with monitoring and safeguarding nuclear material and facilities under the nuclear Nonproliferation Treaty and with helping states pursue peaceful nuclear programs through technical cooperation. It was set up as the world's Atoms for Peace organization in 1957 within the UN structure. The IAEA Secretariat is a team of 2,200 multidisciplinary professional and support staff from more than 90 countries. The agency is led by Director-General Yukiya Amano and six deputy directors-general who head the major departments.

International Convention for the Suppression of Acts of Nuclear Terrorism (ICSANT): International agreement opened for signature in 2005 that criminalizes the planning, threatening, or implementation of acts of nuclear terrorism and requires states-parties to pass national legislation to that effect.

International Physical Protection Advisory Service (IPPAS): This service was created by the IAEA in order to assist states in strengthening nuclear security within their borders. During an IPPAS review, IAEA experts will examine facilities within a country where nuclear or radioactive materials are kept. They will compare the facilities' systems of physical protection with international guidelines and best practices, and make suggestions for follow-on activities or security upgrades.

Megaports Initiative: A U.S. government program that works with foreign partners to enhance security at ports around the world. The initiative helps equip major ports with radiation detection equipment, as well as provide training for foreign personnel. Foreign cooperation with the initiative is typically formalized by signing a bilateral "Megaports agreement." The program is run by the National Nuclear Security Administration.

2010 Nuclear Security Summit (NSS): A meeting of 47 national delegations and the European Union, the International Atomic Energy Agency (IAEA), and the United Nations held in Washington, DC, April 12–13, 2010, to enhance international cooperation in preventing nuclear terrorism. The participants agreed on a communiqué and a work plan. In their national statements, many states described specific steps they will take to advance nuclear security. The summit was first proposed by President Barack Obama in an April 2009 speech in Prague where he outlined his vision of a world free of nuclear weapons and nuclear threats.

Nuclear Smuggling Outreach Initiative (NSOI): A U.S. government program which collaborates with foreign governments to prevent, detect, and respond to incidents of nuclear smuggling. The program is housed in the State Department's Bureau of International Security and Nonproliferation.

Research reactor: Small nuclear reactors used for scientific research and the production of radioactive materials used in medicine and industry. Many utilize highly enriched uranium as a fuel, unlike larger civilian power reactors, which operate on low enriched uranium.

Resolution 1540: A UN Security Council resolution passed in 2004 mandating that states establish domestic controls to prevent nonstate actors from acquiring nuclear, chemical, and biological weapons or related materials.

World Institute for Nuclear Security (WINS): A nongovernmental body that aims to provide a forum for nuclear security professionals to discuss and exchange best security practices. As of August 2010, WINS has over 400 corporate and individual members from over 50 countries.

NOTES

1. International Panel on Fissile Materials, "Global Fissile Materials Report 2010: Balancing the Books: Production and Stocks," December 2010, p. 9, http://www.ipfmlibrary.org/gfmr10.pdf.

2. "National Security Summit National Statement of the United States," The White House, April 13, 2010, http://www.whitehouse.gov/the-press-office/nuclear-security-summit-national-statement-united-states; "Highlights of National Commitments made at the Nuclear Security Summit," The White House, April 13, 2010, http://www.whitehouse.gov/the-press-office/highlights-national-commitments-made-nss.

3. "Communiqué of the Washington Nuclear Security Summit," The White House, April 13, 2010, http://www.whitehouse.gov/the-press-office/communiqu-washington-nuclear-security-summit; "Work Plan of the Washington Nuclear Security Summit," The White House, April 13, 2010, http://www.whitehouse.gov/the-press-office/work-plan-washington-nuclear-security-summit.

4. "International Convention for the Suppression of Acts of Nuclear Terrorism," United Nations Treaty Collection, Status as of January 31, 2011, http://treaties.un.org/Pages/ViewDetailsIII.aspx?&src=IND&mtdsg_no=XVIII-15&chapter=18&Temp=mtdsg3&lang=en.

5. France reiterated its national commitment to ratify the 2005 Amendment in May 2010 Nuclear Nonproliferation Treaty Review Conference (http://www.francetnp2010.fr/spip.php?article79) and in a survey response to the Fissile Materials Working Group dated January 4, 2011; Amendment to the Convention on the Physical Protection of Nuclear Material,", Status as of December 30, 2010, International Atomic Energy Agency, http://www.iaea.org/Publications/Documents/Conventions/cppnm_amend_status.pdf.

6. "Ahead of Nuclear Security Summit, NNSA Announces Removal of All Highly Enriched Uranium from Chile," National Nuclear Security Administration (hereafter "NNSA"), April 8, 2010, http://nnsa.energy.gov/mediaroom/pressreleases/04.08.10.

7. "NNSA Achieves Milestone in Removal of HEU from Ukraine," NNSA, December 31, 2010, http://nnsa.energy.gov/mediaroom/pressreleases/ukraineheuremoval.

8. "Joint Statement by Co-Chairs of the U.S.-Kazakhstan Energy Partnership On Successful Completion of the U.S.-Kazakhstan BN-350 Spent Fuel Program," NNSA, November 17, 2010, http://nnsa.energy.gov/mediaroom/pressreleases/spentfuelstatement111710.

9. "Trilateral Announcement Between Mexico, the United States, and Canada on Nuclear Security," The White House, April 13, 2010, http://www.whitehouse.gov/the-press-office/trilateral-announcement-between-mexico-united-states-and-canada-nuclear-security.

10. Fissile Materials Working Group survey response provided by the Embassy of Mexico in Washington, D.C., February 23, 2011.

11. "U.S. and Vietnam Cooperate on Nuclear Non-Proliferation in Dalat," U.S. Embassy Hanoi, Vietnam, December 8, 2010, http://vietnam.usembassy.gov/pr120810.html.

12. "PM announces a nuclear cooperation project with the United States to further secure inventories of spent highly enriched uranium," Prime Minister of Canada's Office, April 12, 2010, http://www.pm.gc.ca/eng/media.asp?category=1&id=3278.

13. "Nuclear Security Summit National Statement of the United States."

14. "U.S.-Belarus Bilateral Meeting," Department of State, December 1, 2010, http://www.state.gov/r/pa/prs/ps/2010/12/152168.htm; Glenn Kessler and Mary Beth Sheridan, "Belarus agrees to give up stockpile of highly enriched uranium," *Washington Post*, December 1, 2010, http://www.washingtonpost.com/wp-dyn/content/article/2010/12/01/AR2010120101198.html.

15. Kessler and Sheridan, "Belarus agrees to give up stockpile of highly enriched uranium."

16. "Press Briefing by Press Secretary Robert Gibbs, 12/1/2010," The White House, December 1, 2010, http://www.whitehouse.gov/the-press-office/2010/12/01/press-briefing-press-secretary-robert-gibbs-1212010.

17. Martin Matishak, "Global Nuclear Materials Lockdown Take Longer Than Four Years," February 22, 2011, http://gsn.nti.org/gsn/nw_20110222_2593.php.

18. "NNSA Completes Largest Highly Enriched Uranium (HEU) Fuel Return Campaign in Program's History," NNSA, October 12, 2010, http://nnsa.energy.gov/mediaroom/pressreleases/polandheu101210.

19. "NNSA Announces Removal of All Highly Enriched Uranium (HEU) from Serbia," NNSA, December 22, 2010, http://nnsa.energy.gov/mediaroom/pressreleases/serbiaheu122210; "Ahead of Nuclear Security Summit, NNSA Announces Removal of All Highly Enriched Uranium from Chile," NNSA, April 8, 2010, http://nnsa.energy.gov/mediaroom/pressreleases/04.08.10; "NNSA Announces Highly Enriched Uranium Removed from Turkey," NNSA, January 12, 2010, http://nnsa.energy.gov/mediaroom/pressreleases/01.12.10; "NNSA Announces Removal of Last Highly Enriched Uranium from Romania; Air Shipment of Russia-Origin Spent Fuel," NNSA, June 30, 2009, http://nnsa.energy.gov/mediaroom/pressreleases/06.30.09; "Nuclear Nonproliferation: Comprehensive U.S. Planning and Better Foreign Cooperation Needed to Secure Vulnerable Nuclear Materials Worldwide," Government Accountability Office, GAO-11-227, December 2010, http://www.gao.gov/new.items/d11227.pdf.

20. "Russia shuts down last plutonium reactor: officials," *Nuclear Power Daily*, April 15, 2010, http://www.nuclearpowerdaily.com/reports/Russia_shuts_down_last_plutonium_reactor_officials_999.html.

21. Ibid.

22. "Signing of the Plutonium Disposition Protocol," Department of State, April 13, 2010, http://www.state.gov/secretary/rm/2010/04/140120.htm.

23. Elena Sokova, "Plutonium Disposition," Issue Brief, Nuclear Threat Reduction Initiative, September 16, 2010, http://www.nti.org/e_research/e3_plutonium_disposition.html.

24. "U.S. and Vietnam Cooperate on Nuclear Non-Proliferation in Dalat."

25. Personal communications with a knowledgeable expert,

January 2011.

26. "Trilateral Announcement Between Mexico, the United States, and Canada on Nuclear Security."

27. Fissile Materials Working Group survey response provided by the Embassy of Mexico in Washington, D.C., February 23, 2011.

28. "Nuclear Security Summit National Statement of the United States."

29. "Russia to allocate over $6mln to IAEA's Nuclear Security Fund," *Interfax*, December 5, 2010, http://interfax.com/newsinf.asp?id=206844.

30. "UK Signs Agreement to Contribute to IAEA Nuclear Security Fund," IAEA, March 8, 2011, http://www.iaea.org/newscenter/news/2011/uknsfund.html.

31. "Nuclear Security Report 2010," *IAEA*, GOV/2010/42-GC(54)/9, August 12, 2010, http://www.iaea.org/About/Policy/GC/GC54/GC54Documents/English/gc54-9_en.pdf.

32. Personal communication with White House staff indicates that Belgium and New Zealand are among the countries that have "donated significant amounts of money and resources to nuclear security related causes such as the G8 Global Partnership and the IAEA."

33. Nuclear Security Report 2010.

34. H.E. Marjatta Rasi, "Statement by Finland," 53rd General Conference of the IAEA, September 2009, http://www.iaea.org/About/Policy/GC/GC53/Statements/finland.pdf.

35. Fissile Materials Working Group survey response by the Embassy of Finland in Washington, D.C., January 31, 2011.

36. "Nuclear Security Summit National Statement of the United States."

37. Personal communications with WINS staff, February 2011.

38. "Annual Report 2010: Sharing the Knowledge," The World Institute for Nuclear Security, March 2011, http://www.wins.org/content.aspx?id=119.

39. Roger Howsley, "Promoting Nuclear Security Best Practices and Security Leadership Around the World," Presented at "Prospects for Nuclear Non-Proliferation and Disarmament: Beyond the NPT Review Conference and Nuclear Security Summit," Cairo, Egypt, October 21, 2010, http://fmwg.presstools.org/sites/default/files/Howsley%20-%20WINS%20-%20Cairo%20Meeting.pdf.

40. "Nuclear nonproliferation support center opens," *The Denki Shimbun*, February 8, 2011, http://www.shimbun.denki.or.jp/en/news/20110208_01.html.

41. N. Kimura, Y. Naoi, and S. Wakabayashi, "Integrated support center for nuclear nonproliferation and security for Asia," IAEA, November 2010, http://www.iaea.org/OurWork/SV/Safeguards/Symposium/2010/Documents/AbstractsRepository/052.pdf.

42. "Fact Sheet on U.S.-Japan Cooperation on Reducing Nuclear Risks," The White House, November 12, 2010, http://www.whitehouse.gov/the-press-office/2010/11/12/fact-sheet-us-japan-cooperation-reducing-nuclear-risks.

43. "Nuclear Security Summit National Statement of the United States."

44. "International Workshop on Nuclear Forensics Following on Nuclear Security Summit," Techno Community Square "Ricotti," Tokai, Japan, October 5-6, 2010, http://www.jaea.go.jp/04/np/activity/2010-10-05/index_en.html.

45. "Fact Sheet: U.S. China Sign Agreement to Establish Center of Excellence on Nuclear Security," The White House, January 19, 2011, http://www.whitehouse.gov/the-press-office/2011/01/19/fact-sheet-us-china-sign-agreement-establish-center-excellence-nuclear-s.

46. "U.S., China Sign Agreement to Establish Center of Excellence on Nuclear Security," NNSA, January 19, 2011, http://nnsa.energy.gov/mediaroom/pressreleases/chinacenterofexcellence01.19.11.

47. "Experts Praise Proposed Nuclear Security Centers," Partnership for Global Security, February 3, 2010, http://www.partnershipforglobalsecurity.org/PDFFrameset.asp?PDF=centers_of_excellence.pdf.

48. "Global Centre for Nuclear Energy Partnership," Press Information Bureau, August 12, 2010, http://pib.nic.in/release/release.asp?relid=64718.

49. Ibid; "World's first nuclear energy partnership centre in state," *The Times of India*, December 4, 2010, http://timesofindia.indiatimes.com/city/gurgaon/Worlds-first-nuclear-energy-partnership-centre-in-state/articleshow/7038644.cms.

50. World's first nuclear energy partnership centre in state," *The Times of India*, December 4, 2010, http://timesofindia.indiatimes.com/city/gurgaon/Worlds-first-nuclear-energy-partnership-centre-in-state/articleshow/7038644.cms.

51. "Joint Statement by President Obama and Prime Minister Singh of India," The White House Office of the Press Secretary, November 8, 2010, http://www.whitehouse.gov/the-press-office/2010/11/08/joint-statement-president-obama-and-prime-minister-singh-india

52. "Global Initiative to Combat Nuclear Terrorism Key Multilateral Workshops and Exercises," U.S. State Department, http://www.state.gov/documents/organization/145498.pdf.

53. Nursultan Nazarbayev, "Global World and Nuclear Security," *European Dialogue*, April 2010, http://eurodialogue.org/Global-World-and-Nuclear-Security.

54. "Global Initiative to Combat Nuclear Terrorism Key Multilateral Workshops and Exercises;" "Joint Co-Chair Statement Regarding the 2010 Global Initiative to Combat Nuclear Terrorism Plenary Meeting," U.S. State Department, Abu Dhabi, United Arab Emirates, June 29, 2010, http://www.state.gov/r/pa/prs/ps/2010/06/143754.htm; "Statement by Dr. Ju-Ho LEE Mister of Ministry of Education, Science and Technology Head Delegate of the Republic of Korea At the 54th General Conference of the International Atomic Energy Agency," IAEA, September 9, 2010, pg 5-6, http://www.iaea.org/About/Policy/GC/GC54/Statements/rok.pdf.

55. Peter Kaiser, Bruna Lecossois, and Andrey Pryakhin, "IAEA and ICTP Open Nuclear Energy Management School," IAEA, November 22, 2010, http://www.iaea.org/newscenter/news/2010/nemschool.html.

56. "Opening speech by Nicolas Sarkozy, President of the Republic," International Conference on access to civil nuclear energy, Paris, March 8, 2010, http://ambafrance-us.org/spip.php?article1547.

57. Fissile Materials Working Group survey response from France's Nuclear Disarmament and Non-proliferation Unit in the Ministry of Foreign and European Affairs in Paris, January 4, 2011.

58. "Programme 2011," ENSTTI, accessed March 14, 2011, http://www.enstti.eu/Pages/Training.aspx.

59. "Saudi Arabia Set to Host Workshop on the Implementation of Security Council Resolution 1540 (2004) in Riyadh, 11-12 December," United Nation Department of Public Information, December 9, 2010, http://www.un.org/News/Press/docs//2010/dc3275.doc.htm.

60. "NNSA Launches Gulf Nuclear Energy Infrastructure Institute to Promote Nuclear Safety and Security," NNSA Press Release, February 22, 2011, http://nnsa.energy.gov/mediaroom/pressreleases/gneii02.22.11.

61. CHO Hyun, "Preparation for Nuclear Security Summit 2012 and Possible Deliverables," The 9th ROK-UN Conference on Disarmament and Non-Proliferation Issues, Jeju, December 3, 2010.

62. "Statement by Dr. Ju-Ho LEE Mister of Ministry of Education, Science and Technology Head Delegate of the Republic of Korea At the 54th General Conference of the International Atomic Energy Agency," IAEA, September 9, 2010, pg 5-6, http://www.iaea.org/About/Policy/GC/GC54/Statements/rok.pdf.

63. Bonnie D. Jenkins, "Readout on 2012 Nuclear Security Summit Preparations," Foreign Press Center Briefing, Washington, D.C., September 8, 2010, http://www.state.gov/t/isn/rls/rm/150043.htm.

64. Ibid.

65. "Egypt bank to raise funds for nuclear power plants," *Al-Shorfa*, April 6, 2010, http://www.al-shorfa.com/cocoon/meii/xhtml/en_GB/features/meii/features/main/2010/04/06/feature-02; "Mubarak approves nuclear radioactive law," *Egypt State Information Service*, March 31, 2010, http://www.us.sis.gov.eg/En/Story.aspx?sid=47479.

66. "Egypt bank to raise funds for nuclear power plants."

67. Communications with U.S. Department of State export control and related border security assistance staff, February 2011.

68. "The Global Initiative to Combat Nuclear Terrorism," U.S. Department of State, accessed February 4, 2011, http://www.state.gov/t/isn/c18406.htm.

69. "Joint Co-Chair Statement Regarding the 2010 Global Initiative to Combat Nuclear Terrorism Plenary Meeting," U.S. State Department, Abu Dhabi, United Arab Emirates, June 29, 2010, http://www.state.gov/r/pa/prs/ps/2010/06/143754.htm.

70. C.S Eliot Kang, "Enhancing International Partnerships," Remarks at the 2009 Plenary Meeting of the Global Initiative to Combat Nuclear Terrorism, June 16, 2009, http://www.state.gov/t/isn/rls/rm/125349.htm.

71. "Joint Co-Chair Statement Regarding the 2010 Global Initiative to Combat Nuclear Terrorism Plenary Meeting."

72. "U.S. and United Arab Emirates Sign Megaports Initiative Agreement Aimed at Preventing Nuclear Smuggling," NNSA, December 16, 2009, http://nnsa.energy.gov/mediaroom/pressreleases/12.16.09.

73. Ibid.

74. "U.S. and Italy Sign Megaports Initiative Agreement to Prevent Smuggling of Nuclear and Radioactive Material," NNSA, March 29, 2010, http://www.nnsa.energy.gov/mediaroom/pressreleases/03.29.10.

75. Ibid.

76. "Details of Assistance Being Provided to NSOI-Developed Projects: New Zealand," Nuclear Smuggling Outreach Initiative, accessed February 4, 2011, http://www.nsoi-state.net/ourpartners/newzealand.asp.

77. Ibid.

78. "Norway Increases Support of NNSA Work to Combat Nuclear Smuggling," NNSA, December 3, 2010, http://nnsa.energy.gov/mediaroom/pressreleases/norway120310.

79. Ibid.

80. "Nuclear Security Summit National Statement of the United States."

81. Bonnie Jenkins, "The Future Role of the G-8 Global Partnership: Combating Weapons of Mass Destruction," *Stanley Foundation Policy Analysis Brief*, June 2010, http://www.stanleyfdn.org/publications/pab/Jenkins_610.pdf; "Nuclear Security Summit National Statement of the United States."

82. Chris Schneidmiller, "G-8 Nonproliferation Program Faces Uncertain Future," *Global Security Newswire*, August 16, 2010, http://www.globalsecuritynewswire.org/gsn/nw_20100815_3867.php.

83. Fissile Material Working Group communications with Canadian officials.

84. "Global Efforts in WMD Threat Reduction," Fissile Materials Working Group, accessed February 28, 2011, http://fmwg.presstools.org/node/36600.

85. International Panel on Fissile Materials, "Global Fissile Materials Report 2010: Balancing the Books: Production and Stocks" (hereafter "GFMR 2010"), December 2010, p. 142.

86. "EXBS Director Visits Armenia and Praises Legislative Reform," *EXBS Quarterly Newsletter* 2 (January 2011), p. 5, http://www.state.gov/documents/organization/155368.pdf.

87. "GFMR 2010," p. 142.

88. "U.S.-Belarus Bilateral Meeting."

89. "Press Briefing by Press Secretary Robert Gibbs, 12/1/2010."

90. Personal communications with White House staff, April 2011.

91. Robert S. Norris and Hans M. Kristensen, "U.S. Tactical Nuclear Weapons in Europe, 2011," *Bulletin of the Atomic Scientists* 67 (January/February 2011), p. 68.

92. "Backgrounder: Repatriation of U.S.-origin highly enriched uranium from Chalk River," Canada News Center, April 12, 2010, http://news.gc.ca/web/article-eng.do?m=/index&nid=524689.

93. "Canada's initiatives under the G-8 Global Partnership," Prime Minister of Canada, April 14, 2010, http://pm.gc.ca/eng/media.asp?id=3289.

94. "Trilateral Announcement Between Mexico, the United States, and Canada on Nuclear Security."

95. Howsley, "Promoting Nuclear Security Best Practices and Security Leadership Around the World."

96. "Canada," Nuclear Threat Initiative, May 2009, http://www.nti.org/db/heu/canada.html.

97. Miles A. Pomper and William C. Potter, "Medical isotope production: The US must follow South Africa's lead," *Bulletin of the Atomic Scientists*, December 17, 2010, http://www.thebulletin.org/web-edition/features/medical-isotope-production-the-us-must-follow-south-africas-lead.

98. "Ahead of Nuclear Security Summit, NNSA Announces Removal of All Highly Enriched Uranium from Chile."

99. "U.S., China Sign Agreement to Establish Center of Excellence on Nuclear Security."

100. "GFMR 2010," p. 97.

101. Ibid, p. 106.

102. Ibid, p. 142.

103. "Egypt banks to raise funds for nuclear power plants," Al-Shorfa, April 6, 2010, http://www.al-shorfa.com/cocoon/meii/xhtml/en_GB/features/meii/features/main/2010/04/06/feature-02.

104. H.E. Marjatta Rasi, "Statement by Finland," 53rd General Conference of the IAEA.

105. French response to FMWG questionnaire, January 4, 2011.

106. Ibid.

107. "Programme 2011," European Nuclear Safety Training and Tutoring Institute, http://www.enstti.eu/Pages/Training.aspx.

108. "GFMR 2010," p. 13, 19.

109. Ibid, p. 142.

110. Norris and Kristensen, "U.S. Tactical Nuclear Weapons in Europe, 2011," p. 66.

111. "Joint Statement by President Obama and Prime Minister Singh of India."

112. "GFMR 2010," p. 14.

113. Ibid, p. 21.

114. "U.S. and Italy Sign Megaports Initiative Agreement to Prevent Smuggling of Nuclear and Radioactive Material."

115. Kaiser, Lecossois, and Pryakhin, "IAEA and ICTP Open Nuclear Energy Management School."

116. "GFMR 2010," p. 142.

117. Norris and Kristensen, "U.S. Tactical Nuclear Weapons in Europe, 2011," p. 69.

118. "Nuclear nonproliferation support center opens."

119. "International Workshop on Nuclear Forensics Following on Nuclear Security Summit," Japan Atomic Energy Agency, October 5, 2010, http://www.jaea.go.jp/04/np/activity/2010-10-05/index_en.html.

120. The IAEA's "Nuclear Security Report 2010" noted a new pledge or contribution from Japan in the time period from July 2009 to June 2010. See: "Nuclear Security Report 2010," *IAEA*, GOV/2010/42-GC(54)/9, August 12, 2010, http://www.iaea.org/About/Policy/GC/GC54/GC54Documents/English/gc54-9_en.pdf.

121. "Promoting Nuclear Security Best Practices and Security Leadership Around the World."

122. "GFMR 2010," p. 136.

123. Communications with a knowledgeable expert, January 2011.

124. "Joint Statement By Co-Chairs of the U.S.-Kazakhstan Energy Partnership On Successful Completion of the U.S.-Kazakhstan BN-350 Spent Fuel Program."

125. "Global Initiative to Combat Nuclear Terrorism Key Multilateral Workshops and Exercises."

126. Nursultan Nazarbaev, "Global World and Nuclear Security," European Dialogue, http://www.eurodialogue.org/Global-World-and-Nuclear-Security.

127. "NNSA Secures 775 Nuclear Weapons Worth of Weapons-Grade Nuclear Material from BN-350 Fast Reactor in Kazakhstan," NNSA, November 18, 2010, http://nnsa.energy.gov/mediaroom/pressreleases/bn35011.18.10.

128. Ibid.

129. "Parliament: Strategic trade bill is passed," The Star Online, April 5, 2010, http://thestar.com.my/news/story.asp?file=/2010/4/5/nation/20100405172919&sec=nation.

130. "Trilateral Announcement Between Mexico, the United States, and Canada on Nuclear Security."

131. "GFMR 2010," p. 142.

132. Pomper and Potter, "Medical isotope production: The US must follow South Africa's lead."

133. Norris and Kristensen, "U.S. Tactical Nuclear Weapons in Europe, 2011," p. 69.

134. Personal communications with White House staff, April 2011.

135. "Details of Assistance Being Provided to NSOI-Developed Projects: New Zealand."

136. The IAEA's Nuclear Security Report noted a contribution from Norway between July 2009 and June 2010. In addition, in Norway's statement to the 54th IAEA General Conference, it stated that "Today, we have formalized a commitment to allocate 2.5 million Euros over four years in an agreement with the Agency." See Statement of Norway to the 54th General Conference of the International Atomic Energy Agency, p. 4, http://www.iaea.org/About/Policy/GC/GC54/Statements/norway.pdf.

137. "Norway Increases Support of NNSA Work to Combat Nuclear Smuggling."

138. Karen DeYoung, "Pakistan doubles its nuclear arsenal," *The Washington Post*, January 31, 2011, http://www.washingtonpost.com/wp-dyn/content/article/2011/01/30/AR2011013004682.html.

139. "GFMR 2010," p. 130.

140. "Highly Enriched Uranium: Who Has What?," Nuclear Threat Initiative, April 22, 2010, http://www.nti.org/db/heu/Heu_Who_Has_What.pdf.

141. See, for example: Matthew Bunn, *Securing the Bomb 2010: Securing All Nuclear Materials in Four Years* (Cambridge, MA and Washington, DC: Harvard University and Nuclear Threat Initiative, 2010), p. 30.

142. Kenneth N. Luongo and Naeem Salik, "Building Confidence in Pakistan's Nuclear Security," *Arms Control*

Today 37 (December 2007), p. 11-17.

143. "NNSA Completes Largest Highly Enriched Uranium (HEU) Fuel Return Campaign in Program's History."

144. Ibid.

145. Pomper and Potter, "Medical isotope production: The US must follow South Africa's lead."

146. "Joint Co-Chair Statement Regarding the 2010 Global Initiative to Combat Nuclear Terrorism Plenary Meeting."

147. "South Korea seeks to boost reactor exports," World Nuclear News, January 13, 2010, http://www.world-nuclear-news.org/NP-South_Korea_seeks_to_boost_reactor_exports-1301104.html.

148. "Clinton, Russia's Lavrov Sign Plutonium Disposition Protocol," America.gov, April 13, 2010, http://www.america.gov/st/nonprolif-english/2010/April/20100413172713xjsnommis0.9075238.html.

149. "Russia closes last weapons-grade plutonium plant," BBC News, April 15, 2010, http://news.bbc.co.uk/2/hi/8622631.stm.

150. "Russian Federation Supports IAEA Nuclear Security Fund," International Atomic Energy Agency, December 7, 2010, http://www.iaea.org/NewsCenter/News/2010/nsf.html.

151. *Securing the Bomb 2010*, p. 31

152. Government Accountability Office, "Nuclear Nonproliferation: Comprehensive U.S. Planning and Better Foreign Cooperation Needed to Secure Vulnerable Nuclear Materials Worldwide," December 2010.

153. "Outreach Events," 1540 Committee, http://www.un.org/sc/1540/outreachevents.shtml.

154. "GFMR 2010," p. 136.

155. "First LEU-Produced Molybdenum-99 Approved for Patient Use Arrives in U.S.," NNSA, December 6, 2010, http://nnsa.energy.gov/mediaroom/pressreleases/leumoly120610.

156. "Appendix 8A: Global stocks of fissile materials, 2009," in SIPRI, *SIPRI Yearbook 2010: Armaments, Disarmament and International Security* (Oxford: Oxford University Press, 2010), p. 369.

157. "NNSA Announces Highly Enriched Uranium Removed from Turkey."

158. Norris and Kristensen, "U.S. Tactical Nuclear Weapons in Europe, 2011," p. 69.

159. GAO, "Nuclear Nonproliferation: Comprehensive U.S. Planning and Better Foreign Cooperation Needed to Secure Vulnerable Nuclear Materials Worldwide," p. 27.

160. "NNSA Achieves Milestone in Removal of HEU from Ukraine."

161. "U.S. and United Arab Emirates Sign Megaports Initiative Agreement Aimed at Preventing Nuclear Smuggling."

162. "UK Signs Agreement to Contribute to IAEA Nuclear Security Fund."

163. "PM invites IAEA officials to Sellafield," Sellafield Ltd, March 23, 2010, http://www.sellafieldsites.com/news/2010-03-23/pm-invites-iaea-officials-to-sellafield.

164. "Securing Britain in an Age of Uncertainty: The Strategic Defence and Security Review," Her Majesty's Government, October 2010, p. 38-39, http://www.direct.gov.uk/prod_consum_dg/groups/dg_digitalassets/@dg/@en/documents/digitalasset/dg_191634.pdf?CID=PDF&PLA=furl&CRE=sdsr.

165. "GFMR 2010," p. 71.

166. Ibid.

167. The White House did not list the United States as having made any national commitments in its highlights document. However, the United States did make a number of commitments in its national statement at the 2010 NSS, which are listed here. The U.S. national statement is available at: "Nuclear Security Summit National Statement of the United States," The White House, April 13, 2010, http://www.whitehouse.gov/the-press-office/nuclear-security-summit-national-statement-united-states.

168. "Nuclear Security Report 2010."

169. "Clinton, Russia's Lavrov Sign Plutonium Disposition Protocol."

170. "Nuclear Security Summit National Statement of the United States."

171. "FY 2012 Budget in Brief," Department of Homeland Security, p. 82, http://www.dhs.gov/xlibrary/assets/budget-bib-fy2012.pdf.

172. "Fact Sheet on U.S.-Japan Cooperation on Reducing Nuclear Risks."

173. According to WINS' 2010 annual report, the U.S. Department of Energy was the largest contributor to WINS in the year 2010. See: "Annual Report 2010: Sharing the Knowledge," The World Institute for Nuclear Security, March 2011, http://www.wins.org/content.aspx?id=119.

174. For fiscal year 2011, see "Executive Budget Summary: Function 150 & Other International Programs, Fiscal Year 2011," Department of State, p. 82, http://www.state.gov/documents/organization/135888.pdf. For fiscal year 2012, see "Executive Budget Summary: Function 150 & Other International Programs, Fiscal Year 2012," Department of State," p. 105, http://www.state.gov/documents/organization/156214.pdf.

175. "Department of Energy FY 2012 Congressional Budget Request: National Nuclear Security Administration," February 2011, Department of Energy, p. 424, http://nnsa.energy.gov/sites/default/files/nnsa/inlinefiles/FY%202012%20NNSA%20Congressional%20Budget%20Submission_0.pdf.

176. E-mail from NNSA spokesman, February 15, 2011.

177. "Increasing Transparency in the U.S. Nuclear Weapons Stockpile," Department of Defense, May 3, 2010, http://www.defense.gov/npr/docs/10-05-03_fact_sheet_us_nuclear_transparency__final_w_date.pdf.

178. "GFMR 2010," p. 34.

179. Ibid, p. 37.

180. Ibid, p. 34.

181. "U.S. and Vietnam Cooperate on Nuclear Non-Proliferation in Dalat."

182. "First LEU-Produced Molybdenum-99 Approved for Patient Use Arrives in the U.S.," NNSA Press Release, December 6, 2010, http://nnsa.energy.gov/mediaroom/pressreleases/leumoly120610.

The Arms Control Association (ACA), founded in 1971, is a national nonpartisan membership organization dedicated to promoting public understanding of and support for effective arms control policies. Through its public education and media programs and its magazine, *Arms Control Today (ACT),* ACA provides policy-makers, the press and the interested public with authoritative information, analysis and commentary on arms control proposals, negotiations and agreements, and related national security issues. In addition to the regular press briefings ACA holds on major arms control developments, the Association's staff provides commentary and analysis on a broad spectrum of issues for journalists and scholars both in the United States and abroad.

The Partnership for Global Security (PGS) analyzes the convergence of the security, technological, and economic issues that are shaping the 21st century's global nuclear and biological challenges. Its focus is on creating the broad and integrated networks of private and public partnerships that are necessary to strengthen international security and fight transnational threats. Its global reputation and reach, focus on key emerging global security challenges and trends, and development of actionable policy initiatives and recommendations have resulted in the creation of new international security programs and increased by millions of dollars the funding for important global security initiatives.

Arms Control Association
1313 L Street, NW Suite 130
Washington, D.C. 20005
www.armscontrol.org

Partnership for Global Security
1025 Connecticut Avenue, NW, Suite 506
Washington, DC 20036
www.partnershipforglobalsecurity.org