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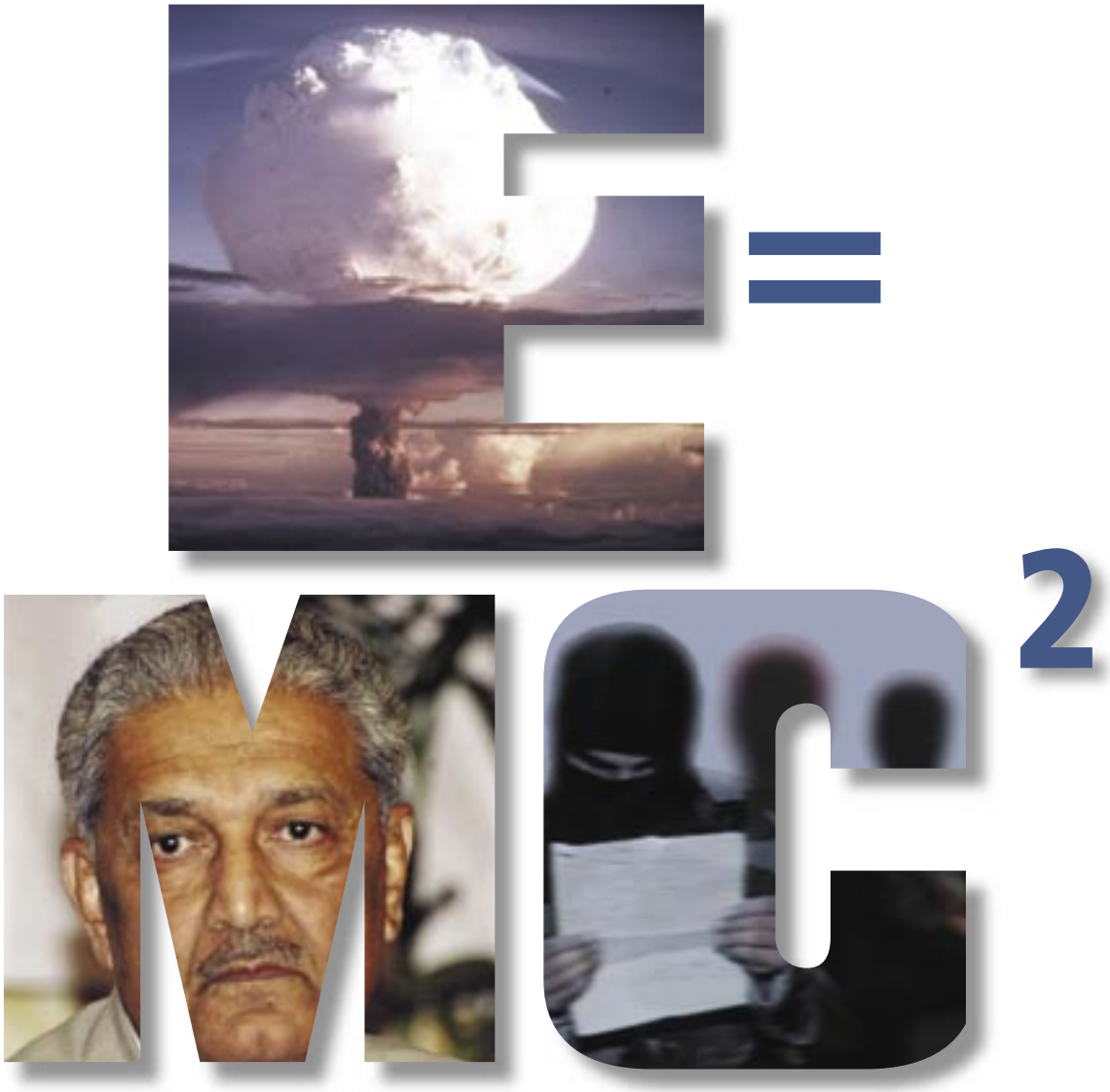

TODAY'S NUCLEAR EQUATION

U.S. DEPARTMENT OF STATE / BUREAU OF INTERNATIONAL INFORMATION PROGRAMS

FOREIGN POLICY AGENDA

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Cover: An adaptation of Albert Einstein's famous equation $E=mc^2$ in which the explosive energy (E) of a splitting atom is equal to the mass (m) of the atom times the speed of light squared (c^2). In *Today's Nuclear Equation*, illicit sellers of nuclear technology and materials (such as Pakistan's A.Q. Khan) finding buyers (represented by the masked terrorist) could wreak nuclear havoc.

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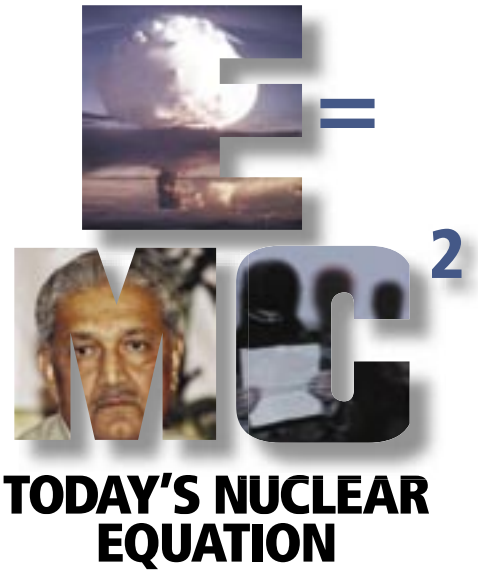

Just when we thought that the end of the Cold War also meant the end of nighttime terrors about nuclear annihilation, that evil atomic specter, rising out of a terrible mushroom-shaped cloud, has reappeared. In the calculus of the Cold War, the world lived with the threat of two superpowers unleashing thousands of megatons of destructive power at each other – and thereby threatening the existence of the human race.

While that threat has receded, this edition of *Foreign Policy Agenda* examines the elements in today's nuclear equation. Instead of superpowers facing off, we encounter rogue states, stateless terrorist organizations bent on acquiring the means of mass murder, and black-market networks of renegade suppliers (like Pakistani nuclear scientist A.Q. Khan pictured on the cover) willing to deal in the materials and technical expertise that lead to nuclear weapons. The ensuing nightmare could materialize quite unexpectedly in any large city, wreaking death and destruction on thousands or tens of thousands of ordinary people going about their daily routine.

Since the end of the Cold War, the main barrier hemming in the nuclear nightmare has been the 35-year-old Nuclear Non-Proliferation Treaty (NPT). Under its terms, a review conference is held every five years to assess the status of nuclear proliferation dangers and nonproliferation progress. The next month-long review begins on May 2, 2005, in New York City.

This electronic journal, "Today's Nuclear Equation," is published in advance of the conference to offer the U.S. position on critical treaty-related issues as well as a range of expert opinion on the thorniest current issues in nuclear nonproliferation.

The Editors

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U.S. FIRMLY COMMITTED TO NPT

George W. Bush

In a statement issued March 7, 2005, President George W. Bush reaffirmed America's commitment to carry out its obligations under the Nuclear Non-Proliferation Treaty (NPT). The president urged NPT members to "close the loopholes that allow states to produce nuclear materials that can be used to build bombs under the cover of civilian nuclear programs."

Thirty-five years ago, the Treaty on the Non-Proliferation of Nuclear Weapons entered into force. Today, almost all nations are party to the Treaty. The NPT represents a key legal barrier to nuclear weapons proliferation and makes a critical contribution to international security.

In May, the parties to the NPT will convene the Seventh Review Conference of the treaty. In the context of this review, I reaffirm the determination of the United States to carry out its treaty commitments and to work to ensure its continuance in the interest of world peace and security.

NPT Parties must take strong action to confront the threat of noncompliance with the NPT in order to preserve and strengthen the treaty's nonproliferation undertakings. We cannot allow rogue states that violate their commitments and defy the international community to undermine the NPT's fundamental role in strengthening international security. We must therefore close the loopholes that allow states to produce nuclear materials that can be used to build bombs under the cover of civilian nuclear programs.

For international norms to be effective, they must be enforced. It is the charge of the International Atomic Energy Agency to uncover banned nuclear activity and to report these violations. The IAEA safeguards system is therefore an important means of detecting and preventing NPT violations. The IAEA must have the tools it needs to do its work, especially universal adherence to the Additional Protocol.

The United States remains firmly committed to its obligations under the NPT. Our record demonstrates this commitment, including the Moscow Treaty concluded in 2002. The United States will continue to play a leading role in strengthening the nonproliferation regime. We have undertaken concrete actions and made several proposals to strengthen the NPT, the IAEA, and the broader nonproliferation regime, including launching the Proliferation Security Initiative.

It is essential in these times of great challenge to international security, particularly when rogue states and terrorists seek to acquire weapons of mass destruction, that the international community work together to confront the dangers of nuclear proliferation. I call upon all states that are party to the treaty to act promptly and effectively to meet the challenges to the NPT and our common security. By doing so, we can ensure that it remains an effective instrument of global security. ■

CONTROLLING THE WORLD'S MOST DANGEROUS WEAPON

STEPHEN G. RADEMAKER

Members of the Nuclear Non-Proliferation Treaty "cannot stand by and allow North Korea and Iran to… arm themselves with nuclear weapons," says Stephen Rademaker, Assistant Secretary of State for Arms Control and Acting Assistant Secretary of State for Nonproliferation, in this lead-off article. NPT signatories, Rademaker asserts, must insist that the two regimes "abandon their nuclear weapons ambitions and return to compliance with the NPT." Prior to joining the State Department, he was Chief Counsel to the Select Committee on Homeland Security of the U.S. House of Representatives.

A new world emerged on September 11, 2001—a world more uncertain and dangerous than the one we knew before. In countries around the world, innocents are the target of a new type of war. Terrorists, including al-Qaida, are trying to acquire weapons of mass destruction. Terrorists demonstrated their willingness to use these devastating weapons even before September 11th with the use of poison gas in Tokyo's subway. These weapons have become the terrorists' weapons of choice precisely because they seek to destroy innocent life on an indiscriminate, mass scale. The greatest threat before humanity today is the nexus of terrorism and weapons of mass destruction proliferation.

Rogue states, with close ties to terrorist organizations, also seek to acquire these destructive weapons. North Korea has defied the world, expelled international inspectors, announced its withdrawal from the Nuclear Non-Proliferation Treaty (NPT), and recently claimed to possess nuclear weapons. Iran hid its NPT violations from the world for nearly two decades in an effort to master the technology necessary to build nuclear weapons. It refuses to abandon this effort despite strong international opprobrium.

We cannot stand by and allow North Korea and Iran to flout their obligations, arm themselves with nuclear weapons, and threaten the peace and stability of their regions and the world. Equally troubling is the prospect that they may transfer sensitive nuclear technology or weapons to other rogue states or terrorist organizations.

We know that unscrupulous black marketeers seek to supply the lucrative demand for weapons of mass destruction. They are at work in more countries than we previously suspected. The A.Q. Khan supply network is now known to have manufactured and moved dangerous materials through unsuspecting countries that never would have knowingly allowed this. A sophisticated, clandestine operation such as this increases the probability that terrorists might obtain the weapons they desire most. While we are learning more every day, there is still much to be done to unravel the Khan network and prevent other clandestine proliferation networks from forming or continuing to operate.

Threats of global proportion require a global response. President Bush made this core principle clear in the National Security Strategy of the United States, indicating that we are "guided by the conviction that no nation can build a safer, better world alone. Alliances and multilateral institutions can multiply the strength of freedom-loving nations."

These challenges demand our full attention and action now. We must support and uphold the system of international rules and treaties that keep us safe and secure. This requires a commitment to enforce those rules—to show that there are serious consequences for violations. It also requires that all responsible nations must strengthen their laws and controls to prevent proliferation, including securing and controlling their ports and borders. This is our shared responsibility, for none of us wants inadvertently to help terrorists obtain the terrible weapons they seek.

We must remain united in insisting that Iran and North Korea abandon their nuclear weapons ambitions and return to compliance with the NPT. Libya provided a positive model. In December 2003, Libya admitted to

Signing ceremony. Negotations on the Nuclear Non-Proliferation Treaty were completed in 1968. In this photo from July 1 of that year, U.S. Ambassador Llewellyn E. Thompson, left, signs the treaty in Moscow with Soviet Foreign Minister Andrei A. Gromyko. Among U.S. embassy and Soviet government officials witnessing the ceremony is Soviet Premier Alexei N. Kosygin, standing third from right. (AP Wide World Photos)

having sought nuclear weapons and violating the NPT, but made the strategic choice to renounce weapons of mass destruction. This demonstrates that it is possible for states to abandon the pursuit of illegal weapons, enhance their national security and rejoin the international community.

New and serious proliferation threats require new tools and a willingness to improve and creatively adapt the nonproliferation regime that helps protect us all. The Proliferation Security Initiative is one such new arrangement. It promotes cooperation among states to interdict illicit weapons and materials before they reach their intended destinations. This is one of the major successes in the global effort to stop the spread of weapons of mass destruction.

NPT parties have an important opportunity to strengthen the treaty at a month-long Review Conference in May 2005. This is the seventh such conference since the NPT entered into force in 1970. Never before have the members of the treaty faced the scope of violations that occurred in recent years. In a separate article, Ambassador Jackie Sanders, Special Representative of the President for the Non-Proliferation of Nuclear Weapons, will highlight U.S. goals for the Review Conference. Much work is already under way in many fora to address the new threats to nuclear nonproliferation, and the Review Conference can provide important political affirmation and momentum to this work. We must cooperate closely to preserve the role of the NPT in promoting international peace and security in the decades ahead.

Throughout the 20th century, the international community was repeatedly called upon to meet and overcome fundamental threats to peace and security. We prevailed. In this new century, let us rise to the challenge of our time: preventing the proliferation of weapons of mass destruction and thwarting terrorists' deadly aims. If we work together, I have no doubt that we, in our time, shall also prevail. Through constructive collaboration and determination we can keep our citizens safe and build a more secure future for our children. ■

HOW TO STRENGTHEN THE NPT

JACKIE WOLCOTT SANDERS

In order to strengthen the Nuclear Non-Proliferation Treaty (NPT), we must deal with today's reality. NPT parties must maintain pressure on existing violators and strengthen efforts to deter future noncompliance, according to Ambassador Jackie Wolcott Sanders, U.S. Representative to the Conference on Disarmament in Geneva and the Special Representative of the President for the Non-Proliferation of Nuclear Weapons. She summarizes here six specific actions that NPT parties could take to reinforce the treaty's nonproliferation obligations.

Countries that are party to the Treaty on the Non-Proliferation of Nuclear Weapons (NPT) will gather in New York City in May 2005 for the 1970 treaty's Seventh Review Conference. A key barrier to nuclear weapons proliferation, the NPT has made a critical contribution to peace and security.

The NPT provides a collective security framework in which nearly 190 countries undertake reciprocal nonproliferation commitments to prevent the spread of nuclear weapons. It requires the application of International Atomic Energy Agency (IAEA) safeguards to help ensure that nuclear programs for peaceful purposes are not being diverted to other uses. IAEA safeguards are applied to nearly 900 facilities in 64 NPT member countries.

The treaty also provides for NPT parties to pursue peaceful nuclear programs, but mandates that their nuclear activities must comply with the treaty's nonproliferation obligations. The treaty has facilitated peaceful nuclear cooperation among NPT parties, ranging from billion-dollar reactors that generate electricity to expanding the use of nuclear medicine in developing countries.

All parties to the treaty are obligated to pursue negotiations in good faith on effective measures related to cessation of the nuclear arms race and to nuclear disarmament, and on a treaty on general and complete disarmament under strict and effective international control.

TODAY'S THREAT

The NPT has delivered considerable benefits to its parties over the 35 years it has been in force. Noncompliance with the treaty's nonproliferation obligations, however, poses a grave challenge to its continued viability. While some violations began 20 years ago, the extent of this noncompliance came to light only in the years since the 2000 NPT Review Conference.

Noncompliance undermines the security benefits of the NPT. Other benefits such as the peaceful uses of nuclear energy and progress on disarmament will not be fully realized over the long run if strong action is not taken to confront this threat.

North Korea was first cited by the IAEA for noncompliance in 1993. When confronted with new violations in 2002, North Korea expelled international inspectors and announced its intention to withdraw from the treaty.

In 2002 the world also learned more about the Iranian regime's long pursuit of a secret nuclear weapons program, even as it claimed to be engaged solely in peaceful nuclear activity. Despite seven IAEA resolutions urging compliance with its obligations, the government of Iran continues to cover up its violations, to avoid full disclosure, and to insist on retention of capabilities obtained through violation of the treaty.

On a positive note, Libya abandoned its nuclear weapons program, and Iraq is returning to compliance with the NPT. The international community also recently discovered the global reach of A.Q. Khan's illicit nuclear procurement network.

This is today's NPT reality, one that is far different from that which its parties have faced in the past. Responsible governments cannot allow states to violate their NPT commitments and defy the international community. NPT members must maintain pressure on existing violators and strengthen efforts to deter future noncompliance. The loopholes that allow states to produce nuclear material for bombs under the cover of a civilian nuclear program must be eliminated. President Bush recently

Landmark agreement. President Vladimir Putin, left and President George W. Bush shake hands May 24, 2002, as they exchange signed documents committing Russia and the United States to the largest reductions ever in their nuclear arsenals. (Alexander Zemlianichenko, AP Wide World Photos.)

reaffirmed the determination of the United States to carry out its NPT commitments and to work to assure the treaty's continuance in the interest of world peace and security.

Nonproliferation and Noncompliance

At the Review Conference, the United States will seek a broader understanding from member states of the nonproliferation obligations of Articles I, II and III and of their relationship to the peaceful uses of nuclear energy noted in Article IV. We will discuss actions that NPT parties should take to implement these obligations and describe activities that send a warning signal of possible noncompliance with these undertakings.

The United States believes, for example, that nuclear-weapon states should establish and implement effective export controls in order to ensure rigorous compliance with their Article I obligation not "in any way" to assist any non-nuclear-weapon state to manufacture nuclear weapons. They should cut off nuclear assistance to any non-nuclear-weapon state in violation of its NPT nonproliferation obligations and seek a halt in the use of any previously supplied nuclear items. Supplier states should also reserve the right to require the return of such items or their elimination.

Non-nuclear-weapon states should have the necessary laws and regulations to enforce their Article II undertaking not to acquire nuclear weapons and should provide transparency sufficient to demonstrate their peaceful intent. Effective enforcement of Article II also requires a close examination of what constitutes a violation. It makes no sense to wait until a non-nuclear-weapon state has secretly assembled a nuclear weapon before taking action. Facts indicating that the purpose of a particular activity was the acquisition of a nuclear explosive device would tend to show noncompliance. Examples of such facts include clandestine facilities or procurement, willful IAEA safeguards violations, and a nuclear program with no legitimate justification for peaceful purposes. NPT parties must rigorously comply with their IAEA safeguards obligations (Article III) and cooperate fully and promptly with the IAEA in the event of investigations into possible noncompliance.

Efforts are underway in international fora and among like-minded states to convince Iran and North Korea to make the strategic decision to eliminate their nuclear weapon programs. All NPT parties must continue to hold both states accountable.

The United States has responded to these new threats by taking concrete actions to strengthen the NPT, the IAEA, and the broader nonproliferation regime. We would urge the Review Conference to endorse measures such as the following

- adoption of policies to discourage future noncompliance, including a cutoff of nuclear cooperation

- enactment of effective controls to ensure compliance with NPT nonproliferation obligations and to keep territories free of illicit activities, such as those of the Khan network

- implementation of the provisions of U.N. Security Council Resolution 1540 (which requires states to enact and enforce legal and regulatory measures to prevent proliferation of weapons of mass destruction, their delivery systems, and related materials)

- strengthen export controls on enrichment and reprocessing technology

- cooperation to interdict illegal transfers of nuclear mate-

rial and equipment that is fully consistent with domestic legal authorities and international law and relevant frameworks, such as the Proliferation Security Initiative

- universal acceptance of comprehensive NPT safeguards agreements along with the Additional Protocol (which expands the ability of the IAEA to inspect and monitor nuclear-related activities), and the adoption of that safeguard standard as a condition of nuclear supply

Peaceful Uses of Nuclear Energy

The Review Conference should further encourage cooperation in the peaceful uses of nuclear energy among compliant NPT parties. This cooperation is an important treaty benefit. The United States pursues peaceful nuclear cooperation with up to 100 NPT parties—bilaterally, multilaterally and through the IAEA.

The United States maintains 22 agreements that permit the export of reactors and fuel to 40 NPT countries and a separate agreement for similar cooperation through the IAEA. In 2004, we provided over $20 million to fund the IAEA's Technical Cooperation Program and related IAEA projects. These IAEA activities assist member states through nuclear applications in fields such as medicine, agriculture, and water management.

The United States also will emphasize the clear linkages established in Article IV between peaceful uses of nuclear energy and compliance with the NPT's nonproliferation obligations, and the parameters for nuclear cooperation spelled out in that article. Some NPT parties have used the treaty as a façade to develop and acquire assistance for an allegedly peaceful nuclear program while pursuing nuclear weapon capabilities.

An NPT party's nuclear program must comply with the treaty. Sound NPT implementation and enforcement should entail reducing violators' access to nuclear technology. NPT parties should seek to halt the use of nuclear material acquired or produced as a result of a material violation of the NPT's nonproliferation obligations. These items should be eliminated or returned to the original supplier.

The plain language of Article IV creates no "right" to any particular nuclear activities or facilities, nor does it require the transfer of any particular technology. Indeed, nuclear suppliers should not approve a transfer unless they are fully satisfied that it would not contribute to proliferation. Moreover, noncompliant states have no basis for asserting that Article IV provides them immunity from actions taken against their nuclear program.

Disarmament

The Review Conference can strengthen the NPT's disarmament undertakings by honestly appraising the current status of implementation and considering how best to move forward. The United States remains firmly committed to its Article VI obligations. We are proud of our record of reducing nuclear forces.

At the signing of the Strategic Arms Reduction Treaty (START) in 1991, the United States and Russia each had deployed around 10,000 strategic nuclear warheads. Both reduced this level to 6,000 by December 2001. U.S. and Russian strategic nuclear warheads will be reduced further to 1,700-2,200 by 2012, as stated by Presidents Bush and Putin and codified in the 2003 Moscow Treaty. In total, this represents an 80% reduction from the early 1990s.

The overall United States nuclear stockpile is shrinking at the same time that its operationally deployed weapons are being reduced. In May 2004, President Bush approved a plan that will cut the current stockpile almost in half. By 2012, the U.S. stockpile will be the smallest it has been in several decades.

The United States continues to eliminate launchers and delivery vehicles. Since 1997, we have eliminated 64 heavy bombers and 150 intercontinental ballistic missile (ICBM) silos, converted four ballistic missile submarines to other uses, and deactivated or retired 37 of the 50 ICBM Peacekeepers. These systems are not being replaced.

The United States has made even more dramatic reductions of non-strategic nuclear weapons (NSNW). We have reduced the U.S. NSNW stockpile by over 90% since the fall of the Berlin Wall in 1989. In 2004, we dismantled the last of the 3,000-plus warheads that President George H.W. Bush in 1991 ordered eliminated.

The United States does not produce fissile material for nuclear weapons and has removed more than 200 tons of such material from its military stockpile, placing some of it under IAEA safeguards and converting approximately 60 tons to civilian reactor fuel.

When discussing the critical importance of compliance with the nonproliferation provisions of the NPT, it is sometimes asserted that this is a way for the United States to avoid discussion of compliance with Article VI. The United States has not de-emphasized Article VI, and promotion of nonproliferation does not denigrate disarmament, nor does addressing very real threats to all Parties' security. Besides, pressing on the nonproliferation front is also critical for the NPT's long-term disarmament goals.

Even though most understand the risk posed by

violations of the NPT's nonproliferation provisions on an intellectual basis, some choose to react in a less than productive way. It is self-defeating to suggest, as some do, that support for efforts to strengthen the treaty against proliferation should be withheld because of concerns about implementation of Article VI.

The idea of pitting various articles of the treaty against one another is simply wrong. Compliance with all articles of the treaty is essential if the NPT is to meet all of its goals.

U.S. actions over the past 15 years have established an excellent record of meeting our Article VI obligations in a transparent manner. As we have done throughout the preparatory process, the United States will demonstrate its commitment to Article VI at the Review Conference. [Editor's note: For more on U.S. Article VI implementation, use this link:
http://www.state.gov/t/ac/rls/or/42126.htm]

Universality

The Review Conference should reinforce the goal of universal NPT adherence and reaffirm that India, Israel and Pakistan may join the NPT only as non-nuclear-weapon states. Just as South Africa and Ukraine did in the early 1990s, these states would have to forswear nuclear weapons and accept IAEA safeguards on all nuclear activities to join the treaty. At the same time, we recognize that progress toward universal adherence is not likely in the foreseeable future. The United States continues to support the goals of the Middle East resolution adopted at the 1995 NPT Review and Extension Conference, including the achievement of a Middle East free of weapons of mass destruction.

Conclusion

The 2005 NPT Review Conference will provide an opportunity for the international community to determine how best to strengthen the treaty to face the challenges that have come to light since it was reviewed five years ago. President Bush called for cooperation in this endeavor in his March 7, 2005, statement marking the 35th anniversary of the NPT:

"It is essential in these times of great challenge to international security, particularly when rogue states and terrorists seek to acquire weapons of mass destruction, that the international community work together to confront the dangers of nuclear proliferation."

In order to meet the challenges to the NPT and our common security, we must act urgently together to ensure that this important treaty remains an effective instrument of global security. The United States is committed to doing its part. ■

TAKING LEGISLATIVE AIM AT WEAPONS OF MASS DESTRUCTION

RICHARD G. LUGAR

The world is awash with nuclear, chemical, and biological weapons and material, says U.S. Senator Richard Lugar, chairman of the Senate Foreign Relations Committee. He is the author of three laws which initiated and then expanded U.S. efforts to help the former Soviet Union "safeguard and dismantle its enormous stockpiles of nuclear, chemical, and biological weapons, as well as its means of delivery and related materials." But more must be done, he asserts, "to control threats from biological and chemical weapons" around the world and to address numerous remaining nuclear proliferation issues—among them, Russian short-range tactical weapons, stockpiles of spent reactor fuel, the absence of nuclear agreements with India and Pakistan, and the need for U.S. and European companies to provide "sustainable private sector jobs" for scientists who otherwise may be " tempted to find work helping others acquire dangerous weapons."

Senator Lugar, a Republican, was first elected to the U.S. Senate from the state of Indiana in 1976 and is the longest-serving U.S. senator in the state's history.

Photo above: An excavator with giant scissors attached cuts off the nose of a Tu-160 strategic bomber at a Ukraine airbase some 200 miles from the capital Kiev, February 2, 2001. Elimination of the last Tu-160 was carried out under terms of the U.S.-Ukrainian Cooperative Threat Reduction Program. (Efrem Lukatsky, AP Wide World Photos)

At their recent summit in Bratislava, President Bush and Russia's President Vladimir Putin agreed to conclude cooperative security enhancements at Russia's nuclear warhead- and material-storage facilities by no later than the year 2008. This new, accelerated deadline is a welcome development that underscores the importance of stopping proliferation of weapons of mass destruction (WMD).

Since the fall of the Soviet Union, the proliferation of WMD has been the top national security challenge facing the United States. Unfortunately, few people have recognized this fact. During the 1990s, the nuclear terrorist threat barely registered in surveys of public opinion and, as recently as the 2000 presidential election, neither political party's candidate had clearly stated positions on nuclear terrorism or nonproliferation strategies.

In the face of widespread apathy, the Nunn-Lugar Act, which I co-sponsored with then-Senator Sam Nunn in 1991, has required constant vigilance to obtain funding and support for its work in securing Soviet-era nuclear materials.

The attacks of September 11, 2001, and the subsequent revelations about global terrorism changed all that. During the 2004 presidential campaign, President Bush and his main challenger, Senator John Kerry, delivered major speeches on counterproliferation. In their debates, they agreed that our greatest national security threat was weapons of mass destruction falling into the hands

of terrorists. The report of the 9/11 Commission, an independent panel that examined the September 11 attacks, noted that "preventing the proliferation of [weapons of mass destruction] warrants a maximum effort" and that "Nunn-Lugar ... is now in need of expansion, improvement, and resources."

A Fourth Installment

Earlier this year, to do just that, I introduced the fourth installment of Nunn-Lugar legislation in Congress. The original initiative, officially named the Cooperative Threat Reduction Program, took effect in 1993 and provided U.S. funding and expertise to help the former Soviet Union safeguard and dismantle its enormous stockpiles of nuclear, chemical, and biological weapons, as well as its means of delivery and related materials. In 1997, Senator Nunn and I, along with Senator Pete Domenici of New Mexico, introduced the Defense Against Weapons of Mass Destruction Act, which expanded Nunn-Lugar's scope in the former Soviet Union and provided WMD expertise to first responders in American cities.

In 2003, President Bush signed the Nunn-Lugar Expansion Act, which authorized Nunn-Lugar to operate outside the former Soviet Union. My new bill will provide more flexibility to pursue Nunn-Lugar projects outside the former Soviet Union, and it will eliminate congressionally imposed conditions on legislation that have impeded time-sensitive projects. We need to cut the red tape and friction within the U.S. government that hinder speedy responses to nonproliferation opportunities.

Despite these achievements and the success at Bratislava, there is much more to do. The world is awash with nuclear, chemical, and biological weapons and materials. Fortunately, the Bush administration is moving on several fronts. In the area of cooperative threat reduction, the president's fiscal year (FY) 2006 budget proposal seeks $415.5 million for Nunn-Lugar, an increase from FY 2005 and enough to carry out all scheduled activities.

Soon after the budget request was released in February 2005, Presidents Bush and Putin announced important steps to increase cooperative efforts to enhance the security of Russia's nuclear stockpile against terrorists. This progress further underscores the need for expanding the Nunn-Lugar program and eliminating the congressionally imposed conditions and certifications that have consistently slowed down implementation of its efforts.

Seize the Opportunity

Even as recent international attention has been focused on the nuclear programs in North Korea and Iran, we need to seize this opportunity to control threats from biological and chemical weapons and to make major breakthroughs in the following areas of nuclear proliferation:

- Bring Russian short-range tactical nuclear weapons into the Nunn-Lugar program. For all the success we have had in deactivating Russian intercontinental missiles and strategic warheads, Moscow has so far refused to discuss tactical weapons, which may be even more dangerous.

- Control nuclear materials worldwide. Large amounts of weapons-grade material outside the former Soviet Union pose a threat to international security. We should accelerate the current international programs to

AN IMPRESSIVE RECORD

Despite obstacles, Nunn-Lugar has made a considerable contribution to nonproliferation. To date, the program has deactivated or destroyed

- 6,564 nuclear warheads
- 568 intercontinental ballistic missiles (ICBMs)
- 477 ICBM silos
- 17 ICBM mobile missile launchers
- 142 bombers
- 761 nuclear surface-to-air missiles
- 420 submarine missile launchers
- 543 submarine-launched missiles
- 28 nuclear submarines
- 194 nuclear test tunnels

In addition

- 260 tons of fissile material have received either comprehensive or rapid security upgrades
- some 60 nuclear warhead sites have received security upgrades
- 208 metric tons of highly enriched uranium have been blended down to low-enriched uranium
- the International Science and Technology Centers in Russia and Ukraine, of which the United States is the leading sponsor, have engaged 58,000 former weapons scientists in peaceful work
- the International Proliferation Prevention Program has funded 750 projects involving 14,000 former weapons scientists and created some 580 new peaceful high-tech jobs
- Ukraine, Belarus, and Kazakhstan are nuclear weapons-free as a result of cooperative efforts under Nunn-Lugar

Standing in a cornfield near Holden, Missouri, on October 28, 1995, U.S. Secretary of Defense William Perry, left, and Russian Minister of Defense Pavel Grachev watch a cloud of smoke rise after they pushed a detonation button setting off an implosion that destroyed an underground Minuteman 11 missile silo. The event symbolized the ending of the Cold War. (Cliff Schiappa, AP Wide World Photos)

An explosion of 100 tons of TNT seals the final remaining tunnel of a Soviet-era nuclear testing facility in Semipalatinsk, Kazakhstan, July 29, 2002. In the foreground, Kazak and American flags fly from a satellite communications tower. The explosion marked the end of the nuclear era in Kazakhstan. (Michael Rothbart, AP Wide World Photos)

eliminate stockpiles of spent reactor fuel and to convert research reactors to low-enriched uranium.

• Win nuclear agreements with India and Pakistan. The United States should devote sustained efforts to promote confidence-building measures and support the encouraging steps these two nuclear-armed foes have already made, while taking care to adhere to Nuclear Non-Proliferation Treaty obligations.

• Eliminate U.S. and Russian bureaucratic roadblocks to cooperatively securing vulnerable fissile materials and warhead sites. If the two sides are to meet their Bratislava commitments, Russia will have to stop denying access to sites and refusing to provide tax-free status on contributions from participating countries, and it will have to conclude liability protections for G-8 partners.

• Get more U.S. and European companies to hire weapons scientists. The tens of thousands of scientists we have employed are mostly working at government-sponsored or government-subsidized jobs. We must move many more of these men and women into sustainable private sector jobs so they are not tempted to find work helping others acquire dangerous weapons.

• Secure Russian ratification of the Nunn-Lugar umbrella agreement. This agreement, which underpins all U.S. threat reduction work in the former Soviet Union, needs to be formally extended, but President Putin has so far refused to present it to the Duma for a vote. Without its guarantees, which prevent weapons clean-up contributions from being taxed by Russian authorities and protect U.S. contractors from liability while undertaking this risky endeavor, work could come to a halt.

• Finalize a plutonium disposition agreement. At the Bratislava summit, issues of liability continued to stymie efforts to destroy 34 metric tons of Russian plutonium, despite a fresh U.S. push to resolve the matter.

• Increase the pace of activities under the G-8 Global Partnership Against Weapons and Materials of Mass Destruction created in 2002. The United States is living up to its agreement to provide $10 billion over 10 years for weapons clean-up, but our partners in this community of major industrial democracies are still working to meet

their equivalent pledge. More importantly, we need to concentrate on turning pledges into projects.

The window of opportunity to address these threats will not remain open indefinitely. Our political leadership and nonproliferation experts must act now to follow up on the recent summit and work with Russian authorities to unlock the last doors to the dismantlement of its nuclear weapons program. I hope Congress will do its part by passing the new Nunn-Lugar bill to eliminate potential obstacles to the Bratislava timetables. Further, we should scour the globe to identify and create opportunities to dismantle dangerous programs outside the former Soviet Union. Only by working night and day to find and eliminate weapons of mass destruction can we fulfill our obligations to protect the American people and, indeed, the people of all nations. ■

NUCLEAR TERRORISM
Weapons for Sale or Theft?

GAVIN CAMERON

The theft of a tactical nuclear weapon or the purchase of weapons-grade nuclear material by terrorists is a 21st-century nightmare that may well come true, says Dr. Gavin Cameron. An assistant professor of political science at the University of Calgary, Canada, Cameron is the author of Nuclear Terrorism: A Threat Assessment for the 21st Century *(2001) and has written numerous articles on the threats posed by the terrorist use of weapons of mass destruction. In this article he takes readers through four distinct nuclear terrorist scenarios: stealing an intact nuclear weapon; stealing or buying weapons-grade fissile material; attacking a nuclear site in order to cause a contamination incident; and using radioactive material to make a "dirty bomb."*

Although nuclear terrorism has been a source of speculation and concern from the mid-1970s onward, the end of the Cold War heralded additional fears about the ability of sub-state actors to acquire weapons of mass destruction. At one time experts argued that terrorists wouldn't try to maximize casualties, employing violence instead as a means of coercing concessions from governments. Top terrorism analyst Brian Jenkins, of the RAND think tank, once observed of 1970s-era terrorist objectives: "Terrorists want a lot of people watching, not a lot of people dead."

Since 9/11, the "rules" have changed, and few experts would suggest that there are not at least some terrorists who do want to inflict mass casualties. In that context, nuclear terrorism does not only represent an effort to intimidate and coerce, but also poses a critical threat to states and peoples around the world.

Nuclear terrorism incorporates four distinct types of terrorist activity:

- the theft and use of an intact nuclear device
- theft or other acquisition of fissile material which would then be used to make a nuclear weapon
- attacks on reactors or other nuclear facilities with the goal of causing radiological contamination of surrounding areas
- the use of radiological material to make a radiological dispersal device (RDD)

Of these, the RDD, or "dirty bomb," is the easiest to achieve and thus most likely to occur, but the theft of an intact nuclear device or of the fissile material with which to make a nuclear device represent the deadliest risks.

THE THEFT OF AN INTACT NUCLEAR DEVICE

Roughly 30,000 nuclear weapons exist worldwide. Several hundred weapons are vulnerable to theft by terrorists or criminals who might sell them to terrorist organizations. It is clear that some such groups are interested in acquiring a nuclear device: Aum Shinrikyo and al-Qaida have both actively sought to purchase a weapon.

It seems improbable that a state would deliberately provide a nuclear weapon to a terrorist group. Fear of retribution from the attacked state and international community, potential loss of control over the nuclear-armed terrorist group, and a reluctance to surrender nuclear weapons to another party due to the intrinsic difficulty of acquiring them all mitigate against such state sponsorship. Nevertheless, North Korea's February 2005 announcements that it possesses nuclear weapons

Rescue workers and medical personnel attend to subway passengers in Tokyo affected by a sarin gas attack, March 20, 1995. Aum Shinrikyo, the terrorist group that carried out the attack that killed 12 persons and injured thousands, has sought to acquire nuclear material that could be used to build weapons. (Chikumo Chiaki, AP Wide World Photos)

and intends to build more underscore particular concerns in this context, given that state's history of selling missile technology to other states. More likely than state sponsorship, however, is the possibility that military or scientific elites in some states might be willing, for ideological or financial reasons, to provide nuclear weapons, materiel, or expertise to terrorist organizations.

Still, the United States and Russia maintain the world's largest nuclear stockpiles. While many nuclear weapons in Russia are adequately protected from theft, others are not. Many Soviet-era tactical nuclear devices are especially vulnerable, and given the smaller size of such weapons, would be particularly suitable for use by terrorists.

The Theft of Fissile Material to Build a Nuclear Device

Obtaining fissile material represents the second, and more probable, route to the possession by terrorists of a nuclear device. It is this acquisition of material that represents the chief barrier to such a weapon. Nuclear devices with military-level efficiency may go beyond the capability of most terrorist organizations. The U.S.-led War on Terror has meant that few states are likely to grant terrorist organizations the time, space, resources and expertise necessary for such a sophisticated device. Therefore, the more likely scenario would be terrorist construction of an Improvised Nuclear Device (IND). This would be less sophisticated than a military-level weapon but could be highly effective in causing mass casualties. An IND also would not require knowledge beyond that which is already available in the open literature. It assumes that the most likely device is the relatively simpler gun-type weapon, using uranium (U-235), rather than a more complex implosion weapon that requires plutonium (Pu-239). Such a gun-type device does, however, require large quantities (approximately 50 kg) of highly enriched uranium (HEU). Without state assistance, it is unlikely that even the most sophisticated terrorist organization could enrich nuclear materials in the

volume needed for a full-scale weapon. Therefore, the primary risk comes from the terrorist acquisition, whether through sale or theft, of state-produced fissile material.

As with intact nuclear devices, nuclear materials have been the target of several groups, most notably al-Qaida and Aum Shinrikyo. Both sought to acquire weaponizable material from the states of the former Soviet Union in the 1990s, although Aum Shinrikyo also tried and failed to enrich natural uranium. In spite of the difficulties both experienced in their acquisition efforts, the risk of terrorists gaining access to nuclear material remains considerable.

The amount of existing nuclear material scattered around the world in military and civilian sectors is enormous. Harvard University's Graham Allison says there is sufficient plutonium and highly enriched uranium to produce 240,000 nuclear weapons. Of course, security practices vary. In many states, such material is adequately protected, controlled, and accounted for, but elsewhere security measures are much looser.

Consequently, there have been regular reports of the embezzlement, theft, or smuggling of nuclear materials from facilities. In this respect, the Newly Independent States of the former Soviet Union represent a particular concern, largely due to the quantities of material present there; but similar reports have emanated from states around the world. So far, the majority of incidents have involved small quantities of weapons-grade material, or larger quantities of non-weapons-grade nuclear material. The risk, however, is clearly present. Moreover, given that accounting standards are not universally high in all states, it is far from clear whether authorities would know in all cases if a significant quantity of weapons-grade material, sufficient to construct a nuclear device, were to go missing.

Attacks on Reactors or Other Nuclear Facilities

Reactors and other parts of the nuclear fuel cycle —such as enrichment, storage, or spent-fuel reprocessing facilities—are vulnerable to attack by terrorists, and offer the potential to cause significant radiological contamination in the vicinity. Theoretical scenarios include not only suicidal airplane or truck-bomb attacks to cause dispersal of nuclear materials from the facilities via an explosion, but also the possibility of a group with knowledge of the design of a facility causing a leak by compromising a facility's safety systems, such as those relating to cooling and containment. Nuclear facilities have been regularly threatened by terrorist groups with a range of motivations. Traditionally, single-issue, anti-nuclear groups have formed a significant part of this trend, although politically motivated groups, such as the separatists of ETA [Basque Fatherland and Liberty], have also attacked facilities. ETA targeted facilities before they went "on-line," and anti-nuclear or environmental groups are unlikely to cause precisely the type of incident that they most fear. However, more worrying has been the regular threats made against Russian facilities by Chechen separatists. The planners for the 9/11 attack also considered targeting a U.S. nuclear facility, although they ultimately rejected the idea.

Radiological Dispersal Devices —"Dirty Bombs"

Even low-grade nuclear material would have value as part of a dirty bomb. Materials in this category are readily available within a wide range of applications in both the civilian and military sectors (cesium-137, for example, is commonly used in hospitals for x-rays). Such low-grade nuclear materials, or radioactive sources, are used widely, are far less protected than weapons-grade material, and are consequently vulnerable to exploitation by terrorist groups. This availability makes a radiological dispersal device (RDD) the most accessible type of nuclear weapon for terrorism, since such a device need only be a radiological source placed next to a conventional explosive. The most notable terrorist use of radiological material was in 1995, when Chechen separatists left a case of cesium in a Moscow park as a demonstration of capability.

What Is To Be Done?

The priority for all states must be accurately to account for and safeguard nuclear weapons and weapons-grade nuclear material. Strengthening the protection of nuclear facilities, such as reactors, against attack and safeguarding low-grade nuclear materials is also a key priority. Actively supporting the International Atomic Energy Agency (IAEA) "Action Plan for the Safety and Security of Radiation Sources" would certainly be helpful. Beyond accounting, however, there is a limit to the ability of states to protect fully all radioactive material within each's territory. Providing assistance to states to reinforce reactors and other facilities against terrorist attack would also help counter the potential for catastrophic incidents, but it can only be a partial solution.

States should focus primarily on preventing a terrorist from gaining access to or using a nuclear device because of the devastating effects of an explosion. Meaningful protection, control, and accounting, not only of all weapons but also of all weapons-grade nuclear material, is essential. It is clearly a vast undertaking, both financially and logistically. Securing international stockpiles of material is a priority for many states, and that must continue and be expanded. This necessitates not only one-time expenditures to secure such materials, but also ongoing commitments to ensure that storage facilities continue to be secure and, wherever possible, nuclear material and nuclear weapons are kept from terrorists or those who would provide them to terrorists.

Finally, it is essential to limit the growth of newly minted weapons and material from reaching market. That links with the broader nonproliferation regime and necessitates promoting the goals of the Nuclear Non-Proliferation Treaty (NPT) and the work of the IAEA by encouraging disarmament and the destruction of existing stockpiles, along with campaigning for universal membership of the NPT. It also necessitates, in my view, promoting actively the Comprehensive Test-Ban Treaty and the Fissile Materials Cutoff Treaty.

The alternative is too grave to permit otherwise. ■

The opinions expressed in this article do not necessarily reflect the views or policies of the U.S. government.

LIBYA RENOUNCES WEAPONS OF MASS DESTRUCTION

PAULA A. DESUTTER

Libya's decision to give up its weapons of mass destruction programs is a real nonproliferation success story of the new millennium, Assistant Secretary of State for Verification and Compliance Paula DeSutter says. Perhaps the single most telling example of the Libyan strategic change of heart is its decision to convert its notorious Rabta chemical weapons factory into a pharmaceuticals plant to combat infectious diseases.

DeSutter became assistant secretary of state in August 2002, after a series of senior positions in the former U.S. Arms Control and Disarmament Agency, and then as a professional staff member of the U.S. Senate Select Committee on Intelligence. She is the author of Denial and Jeopardy: Deterring Iranian Use of NBC Weapons.

Photo above: President Bush holds a centrifuge component from Libya being shown to him by Jon Kreykes, head of the national security advanced technology group at the Oak Ridge National Laboratory in Oak Ridge, Tennessee. President Bush visited the laboratory July 12, 2004, to examine weapons parts turned over by Libya. (Susan Walsh, AP Wide World Photos)

Libya's public announcement on December 19, 2003, that it was abandoning its weapons of mass destruction (WMD) and long-range missile programs was viewed by many with not a little surprise. As the story unfolded, however, it became clear that Libya's historic announcement was an outgrowth of long-term international and U.S. pressure, including economic sanctions and travel restrictions, coupled with a demonstrated U.S. and U.K. ability to collect and act upon detailed intelligence about Libya's WMD and missile programs.

In March 2003, when the United States and its allies were demonstrating their commitment to reducing WMD threats around the world, Libya indicated an interest in discussing WMD issues, and quiet discussions began with British and U.S. officials. In October 2003, the U.S. and its allies interdicted a clandestine shipment of nuclear equipment on its way to Libya.

UNAMBIGUOUS U.S. EXPECTATIONS

The United States had been publicly raising concerns about Libyan WMD programs for many years. U.S. officials criticized Libya for its chemical weapons program in the 1980s, and at least as early as 1993 the

Among the nuclear weapons-related material that Libya permitted the United States to remove were these centrifuges acquired from Pakistan. (National Nuclear Security Administration)

United States warned publicly that Libya wished to acquire nuclear weapons and "may be attempting to lay the foundation for a more serious effort to produce them." In 2003, after the defeat of Saddam Hussein's government in Iraq by coalition forces, the United States continued its warnings about Libya. As Under Secretary of State for Arms Control and International Security John Bolton stated in his testimony before the House International Relations Committee on June 4, 2003, "We have long been concerned about Libya's long-standing efforts to pursue nuclear, chemical, and biological weapons, and ballistic missiles."

In that same testimony, Bolton set forth a way out for Libya, stating that "Libya must understand that improved relations with the United States means forgoing its WMD and missile programs." During the course of 2003, the United States and United Kingdom in fact offered Libya the possibility of taking such a path. On December 19, 2003, President Bush clearly stated U.S. policy, observing that "leaders who abandon the pursuit of chemical, biological, and nuclear weapons, and the means to deliver them, will find an open path to better relations with the United States and other free nations." Libya's historic announcement earlier that day made clear that Libya had chosen to take this path.

Among the reasons for Libya's historic decision was its understanding that pursuit of WMD and support for terrorism brought not security but insecurity. As Colonel Muammar Qadhafi himself put it in a media interview in February 2004, Libya chose to declare its WMD program to the United States and the U.K. and seek their help in dismantling it "because it's in our own interest and security."

Coming Clean and WMD-Free

There was very little precedent for a country voluntarily eliminating all its WMD and long-range missile programs, but Libya's clear strategic commitment to fulfilling its December 2003 pledge made this process a success. The sincerity of Libya's strategic commitment was shown by its actions. Libya invited American and British experts to visit a wide range of sites and gave them access to key program personnel. Libya dismantled its nuclear weapons program, surrendered bomb designs illicitly procured from renegade Pakistani nuclear scientist A.Q. Khan, and allowed its most advanced missiles, the Scud-Cs, to be removed promptly. Libya joined the Chemical Weapons Convention (CWC), destroyed thousands of unfilled chemical munitions under international supervision, and began the process of destroying its chemical weapons stockpile pursuant to CWC rules. Libya also committed itself to the staged elimination of its remaining long-range missile force of Scud-Bs.

Libyan cooperation was extremely good. Libyan officials answered questions with candor and volunteered information that provided valuable insight into the global proliferation network. During the course of this cooperative Libyan/U.S./U.K. elimination project, the Libyans demonstrated the good faith of their December 2003 commitment. They made themselves a model for the cooperative return of an isolated state to the broader international community through the verifiable elimination of illicit WMD and long-range missile programs. Libya's clear strategic commitment to a new path also illustrated the centrality of demonstrable cooperation and good faith to verifying the fulfillment of such promises.

The Benefits of a Sound Decision

It is also important to recognize that Libya's decision was not an easy one, and that providing the transparency shown by Libya required wisdom, discipline, and sincere commitment. Libya had previously believed its pursuit of WMD and missile programs was essential to its national security strategy, and it had invested large amounts of

Cameramen film the control room of Libya's Tajura Nuclear Reactor east of Tripoli, January 26, 2004. U.S. congressmen and journalists toured the 10-megawatt reactor site east of Tripoli where Libyan scientists had been doing research since 1983. (John Moore, AP Wide World Photos)

money in these programs for many years. It could not have been easy for Libya to decide to seek new ways to ensure its security. Likewise, it could not have been easy for Libya voluntarily to open up some of its most sensitive facilities to foreign experts. But Libya did all these things—and is more secure today for it.

The United States and the United Kingdom did not offer specific promises or rewards to Libya. We promised only that Libya's good faith, if shown, would be reciprocated—and that renouncing WMD would be a path to improved relations with the rest of the world. In effect, therefore, we held out the most attractive incentive available: the opportunity for Libya to reap the benefits that naturally flow from participating more fully in the community of nations.

Those benefits have turned out to be substantial. Libya has received many tangible benefits from better relations with the United States and the United Kingdom. The United States, for example, is no longer enforcing some of its most important sanctions against Libya, including travel restrictions and trade in oil and other important industries. Already, hundreds of millions of dollars in oil contracts have been made with private American firms. On the diplomatic front, the United States has opened a liaison office in Tripoli, and Libya has opened offices in Washington. Libya now participates in international meetings like those held by the Organization for the Prohibition of Chemical Weapons, the International Atomic Energy Agency, and in connection with the Hague Code of Conduct Against Ballistic Missile Proliferation. It participates not as a pariah nation, but as a genuine partner in the pursuit of the laudable goals of these organizations.

Chemical Weapons Plant Will Combat HIV/AIDS, Malaria

The United States and Britain have sent doctors and experts in biosafety and biosecurity matters to assist the Libyans in their efforts to modernize and redeploy their scientific and health care industries. In addition, we continue to assist in redirecting Libyan scientific efforts from WMD toward more productive activities with the full support of the international community. With Italian assistance—and thanks to an international diplomatic effort led by the United States to enact a technical change to the Verification Annex of the CWC—the Libyans are converting the infamous Rabta plant, under international supervision, from a chemical weapons factory to a pharmaceutical plant that will produce anti-malaria and anti-HIV/AIDS drugs for sub-Saharan Africa.

The United States government has used all of the tools at its disposal to change dramatically the cost-benefit calculations of rogue countries and proliferators around the world. We have penalized proliferators by aggressively imposing sanctions on them; we have coordinated with like-minded friends to improve our collective abilities to interdict WMD-related shipments; and we have shown ourselves more than willing to take dramatic action—even to the point of deposing a cruel dictator in Iraq who had previously used chemical weapons on his own people and would not hesitate to do so again if he had the capability. These new realities were recognized by Qadhafi who, explaining his dramatic decision to abandon his WMD programs, said in February 2004 "there are new realities. We are adapting to the new realities." The United States and the international community have welcomed and applauded his decision, and the Libyan people are benefiting from the wisdom of this choice.

Libya's strategic commitment is a model, and presents a roadmap, for rogue countries that have been appropriately isolated by the international community due to their pursuit of WMD. The Libyan model shows a path out of this isolation achievable by making a genuine commitment to verifiably eliminating such dangerous weapons. ■

AFTER IRAN
Keeping Nuclear Energy Peaceful

HENRY SOKOLSKI

The best chance for nations seeking to prevent further nuclear proliferation is to enforce the original presumption of the Nuclear Non-Proliferation Treaty's Article IV, says author Henry Sokolski. Article IV presumes "against the unnecessary spread of unsafeguardable nuclear activities and materials." In the case of Iran, Sokolski writes that "Tehran's operation of an enrichment plant … should be regarded as being neither peaceful nor protected under Article IV of the NPT."

Sokolski is executive director of the Nonproliferation Policy Education Center, a nonprofit educational organization in Washington, and is editor with Patrick Clawson of Getting Ready for a Nuclear-ready Iran *(U.S. Army War College, Spring 2005).*

Photo above: A Shahab 3 missile is put on parade in Tehran, September 21, 2000. The Shahab 3 is capable of carrying a nuclear warhead and has a 1,300-kilometer range. (Vahid Salemi, AP Wide World photos)

Iran's claim that it has a "peaceful" right to acquire all it needs to come within days of having a bomb should remind us of what the Nuclear Non-Proliferation Treaty (NPT) was meant to avoid. As the diplomat who first proposed the treaty, Irish Foreign Minister Fred Aiken, explained in 1959, a world of nuclear-ready states would resemble a town full of armed residents pointing guns at each other's heads. At some point, mutual suspicion and the advantage of firing first would give way to mayhem.

This was what the NPT was supposed to prevent. In l965, the United Nations General Assembly resolved that the NPT was to be "void of loop-holes which might permit nuclear or non-nuclear power to proliferate, directly or indirectly, nuclear weapons in any form." As a result, the treaty's negotiators rejected proposals by Mexico and Spain to make the nuclear-weapon states' sharing of "the entire technology of reactors and fuels," including the means to produce nuclear weapons-usable materials, a "duty" under the NPT.

The treaty's negotiators understood that although nations should be free to develop "peaceful" nuclear energy under the NPT, whether or not a particular activity met

this criterion depended upon a number of factors. First, could the activity in question be safeguarded, as the NPT required, to prevent it from being diverted "from peaceful uses to nuclear weapons?" Could the NPT's nuclear watchdog, the International Atomic Energy Agency (IAEA), monitor it in a manner that could reliably detect the loss or theft of enough nuclear material to make a bomb before this material could actually be fabricated into an explosive?

Meeting this timely detection criteria, which the IAEA has adopted to define its safeguard procedures, is still untenable at nuclear facilities that handle or can quickly produce large amounts of nuclear weapons-usable fuel. Such industrial units include plutonium separation plants, uranium-enrichment facilities, and factories that fabricate highly enriched uranium (HEU) and plutonium-based fuels.

Missing in Japan, Britain

Why are inspections at such plants insufficient to safeguard against such diversions? Consider Japan's recent experience. In January of 2003, Japanese officials admitted that their pilot plutonium reprocessing plant at Tokai-mura "lost" 206 kilograms of weapons-usable plutonium (roughly 40 crude bombs' worth) over the previous 15 years. The Japanese hadn't diverted the material; they simply were at loss as to where this material might have gone. One popular theory is that the material was "stuck in the pipes;" another theory is that it remains dissolved in chemical solution. These reported losses were in addition to the 70 kilograms of plutonium Japan previously conceded remained unaccounted for at a plutonium-based fuel fabrication plant it was operating. The British, meanwhile, have experienced similar losses at their plutonium reprocessing plant at Sellafield. There, 19 kilograms of separated plutonium went missing in 2003 and another 30 kilograms of separated plutonium went unaccounted for in 2004.

All of these plants operated under the watchful eye of the IAEA. This highlights two major safeguards deficiencies. First, with the unaccounted amounts of weapons-usable plutonium each year being many times what is needed to make a bomb, there is no way to be sure this material might not have already been diverted. Second, any nation operating such plants could at any time take any of the nuclear material they had produced (both accounted for and unaccounted for) and convert it into bombs well before any inspector or outside authority could step in to block the diversion.

With commercial uranium-enrichment facilities and highly enriched uranium fuel fabrication plants, which process tons of enriched uranium annually, equally hair-raising material loss scenarios are possible. For example, IAEA inspectors still cannot independently verify the production capacity of any given centrifuge-enrichment plant. As such, an enrichment plant operator could "lowball" his facility's capacity to IAEA inspectors and, in between IAEA inspections visits, covertly produce and divert enriched uranium for military purposes without being detected. Such diversions, moreover, could take place without IAEA inspectors necessarily being tipped off.

Also (as with plutonium bulk-handling facilities), there is the problem of how quickly a non-nuclear weapons state could break out of its NPT obligations and make bombs with these plants. All of the facilities mentioned process materials that could be converted into bombs in days or weeks – well before any outside authority could intervene even if the diversion was detected.

With these activities, unless there is a compelling economic need to proceed, then, there are obvious security imperatives for holding back. Clearly falling into this category are the reprocessing of plutonium, the fabrication of plutonium and HEU-based fuels, and the production of HEU. All of these nuclear activities generate or handle nuclear weapons-usable materials, are not essential to having civilian nuclear power, and, in most cases, are sure-fire money losers.

A Surplus of Enrichment Capacity

As for lightly enriching natural uranium to contain 3 percent-to-5 percent uranium-235, this is required to fuel the world's light water reactors. What's unnecessary, however, is to expand the current surplus of enrichment capacity, which is more than able to supply world demand for at least the next 10-to-15 years. Given that it takes no more than five years to build substantial additional enrichment capacity, the time for any nation to build or invest in creating more net capacity is still at least 5-to-10 years away. That and concerns about the spread of this technology are why both President George W. Bush and IAEA Director-General Mohamed ElBaradei have proposed restricting the construction of new enrichment plants.

Certainly, there is no economic justification for nuclear novices like Iran to enrich uranium. Tehran only has one nuclear power station that requires lightly enriched uranium fuel, and Russia has promised to supply Iran with all the enriched uranium it needs for the entire lifetime of the reactor. Separate from the matter of Iran's trustworthi-

ness (even after two years of intensive investigations, the IAEA has not yet been able to say whether Tehran is in the bomb-making business), Tehran's operation of an enrichment plant is neither safeguardable nor economically defensible. As such, this undertaking should be regarded as being neither peaceful nor protected under Article IV of the NPT.

Again, if Iran had a legal right to acquire such unnecessary, unsafeguardable nuclear facilities, what would keep Tehran's neighbors from following suit and becoming nuclear-weapons-ready as well? Indeed, what would prevent the world ElBaradei has repeatedly warned against from emerging: one with 20 or more states only days or weeks from a bomb, all primed to believe their nuclear capabilities might keep them safe? We know where the military build-up and mutual suspicions of 1914 led – to World Wars I and II, with over 100 million dead. Imagine a similar powder keg – only this time with nuclear-armed contestants stretching from Beijing to Washington and Algeria to Japan.

Back to NPT Basics

If we wish to avoid the worst, we should back the NPT's original presumption in Article IV against the unnecessary spread of unsafeguardable nuclear activities and materials. In specific, states before, at, and after the NPT Review Conference should consider proposals to put the original view of Article IV into play for nuclear supplier- and nuclear recipient-states alike and, to the extent possible, for nonmembers of the NPT as well.

Among the steps that ought to be considered are:

- An indefinite freeze on any expansion anywhere of existing plutonium separation efforts, and of fuel fabrication plants that handle nuclear weapons-usable fuels, until methods can be devised to provide appropriate, timely detection and warning of diversions from these plants.

- A five-year, renewable moratorium on the expansion of any nation's net uranium enrichment capacity. Under this proposal, states could modernize existing capacity, but whatever new capacity they put up would have to be balanced by bringing down an equivalent amount of old capacity.

- A call for all states to compare openly any proposal to build or complete a large nuclear facility against alternatives that could produce similar benefits at less cost. Here the U.S. could best take the lead by upholding title V of the U.S. Nuclear Nonproliferation Act of 1978. Under this law, the U.S. is "to cooperate with other nations, international institutions, and private organizations in establishing programs to assist in the development of non-nuclear energy resources." To date, key provisions of this law have not been implemented.

- An indefinite suspension of international transfers of nuclear weapons-usable materials, i.e., of highly enriched uranium or separated plutonium, unless the transfer's purpose is to dispose of the material or to make it less accessible for weapons use.

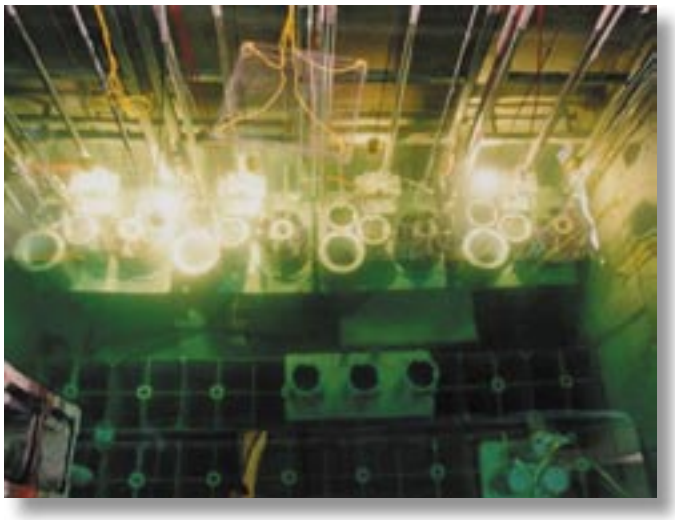
- A reassessment of the limitations of the IAEA's ability to safeguard the nuclear facilities and materials it monitors.

In each case, the NPT Review Conference could evaluate the merits of instituting or of extending each of these proposals every five years. This would give the NPT Review Conference important operational issues to focus on. More importantly, adopting one or more of these proposals would go a long way to making Article IV and "peaceful" nuclear power meaningful, i.e., to achieving the NPT's ultimate purpose. The alternative is to wait not only for more Irans, but the clear undoing of the NPT. ■

The opinions expressed in this article do not necessarily reflect the views or policies of the U.S. government.

NORTH KOREA
A Rogue State Outside the NPT Fold

RALPH C. HASSIG AND KONGDAN OH



Problems with North Korea over nuclear proliferation are nothing new, say Ralph Hassig and Kongdan Oh. The regime started building nuclear reactors in the 1960s and did not join the 1970 Nuclear Non-Proliferation Treaty until 1985. It announced in the early 1990s that it was withdrawing from the treaty, but suspended its withdrawal one day before it became effective. Then came the period under the Agreed Framework, which collapsed in 2002.

Ms. Oh is a research staff member at the Institute for Defense Analyses in Alexandria, Virginia, and a nonresident senior fellow at the Brookings Institution. Hassig is a Washington-based consultant on North Korean affairs. He has co-authored a book on North Korea and written numerous articles with Ms. Oh, his wife and research partner. Their website maybe accessed at http://mysite.verizon.net/kohrch/

Photo above: This 1996 file photo shows spent nuclear fuel rods in a cooling pond at facilities in Yongbyon, North Korea. The photo was released in 2003 by the South Korean news agency, Yonhap. (AP Wide World Photos/Yonhap)

The government of the Democratic Peoples Republic of Korea (DPRK)—or North Korea—has never been in full compliance with the Nuclear Non-Proliferation Treaty (NPT), to which it acceded in 1985. The signing of a safeguards agreement that would permit International Atomic Energy Agency (IAEA) inspections of its nuclear program was postponed until 1992. When the overdue inspections suggested that the North Koreans were hiding nuclear material, the DPRK became the first country to announce its withdrawal from the NPT. Thanks to persuasion from the United States, in 1993 that withdrawal was "suspended" one day before it became effective. But under the Agreed Framework that North Korea negotiated with the United States in 1994, the IAEA was prevented from conducting the inspections it had requested. When the Agreed Framework finally collapsed in late 2002, North Korea pulled out of the NPT and the IAEA and boasted that it had begun building a nuclear deterrent.

North Korea's nuclear program began in the mid-1950s, when a group of North Korean nuclear scientists received training in the Soviet Union. In the mid-1960s North Korea built two small nuclear research reactors with Soviet assistance and technology. Another nuclear reactor, generating five megawatts of electricity, was completed in 1986. [Editor's note: According to the U.S. Energy Information Administration, such a plant could generate

enough electricity to service about 4,000 U.S. households for a full year, if operated at full power continuously.] Although this reactor was too small to be connected to an electrical power grid, its spent fuel began to be reprocessed into weapons-grade plutonium—a clear violation of North Korea's NPT obligations. In 1984, construction began on a 50-megawatt reactor, and in 1991, on a 200-megawatt reactor, neither of which was ever completed. In the 1980s, the Soviets agreed to construct a light-water reactor (LWR) capable of generating 1,760 megawatts of electricity on the condition that the North Koreans join the NPT. Work stopped at an early stage when the North Koreans fell behind in their payments.

Under the 1994 Agreed Framework with the United States, North Korea's 5-megawatt reactor as well as its fuel reprocessing plant and associated facilities at Yongbyon were shut down, and construction on the 50-megawatt and 200-megawatt reactors was halted. The IAEA monitored the shut-down but was not permitted to conduct a complete investigation of North Korea's nuclear program until two 1,000 megawatt light-water reactors, to be built by a new consortium called the Korean Peninsula Development Organization, were well on their way to completion. The reactors would be constructed by the South Koreans, based on U.S. designs, and financed largely by South Korea and Japan. Light-water reactors are more "proliferation-resistant" than North Korea's gas-graphite reactors because the former require enriched uranium for fuel and, under normal operating conditions, the spent fuel produced by light-water reactors could not be reprocessed into weapons-grade plutonium with North Korea's present technology.

Called to Account

For a variety of reasons, construction on the two reactors, originally expected to be completed by 2003, fell far behind schedule. In the meantime, U.S. intelligence came to believe that the North Koreans were developing a clandestine uranium-enrichment program; such a program would be contrary to the North-South Denuclearization Declaration and therefore would violate the Agreed Framework. Called to account in an October 2002 meeting between the two governments, a North Korean official admitted the existence of the uranium program, but later denied the admission. The following month, the United States announced it was halting shipments of the half-million tons of heavy fuel oil it had been providing annually to North Korea as compensation for "lost" energy generating capacity. In December 2002, the North Koreans expelled IAEA inspectors and removed IAEA seals and cameras from Yongbyon. In January 2003, the North Koreans announced that they had lifted their earlier "suspension" of their withdrawal from the NPT and asserted that their withdrawal was therefore effective the next day. They re-started their 5-megawatt reactor and later claimed that they had completed reprocessing the reactor's 8,000 spent fuel rods that had been under IAEA seal. Construction of the two light-water reactors, still at the foundation stage, was suspended in November 2003.

From fuel reprocessed before the Agreed Framework took effect in 1994, the North Koreans are thought to have accumulated at least 6-to-10 kilograms of plutonium, sufficient for one or two small nuclear bombs. Another half-dozen nuclear devices could be constructed from the estimated 20-35 kilograms of plutonium reprocessed from the 8,000 spent fuel rods. In a few years, when fuel can be unloaded from the re-started 5-megawatt reactor and reprocessed into plutonium, sufficient plutonium for one additional nuclear device a year could become available. If the 50-megawatt reactor is ever completed, it could —eventually—produce enough plutonium for 5-to-10 weapons a year, and of course the 200-megawatt reactor could produce even more. The output of North Korea's alleged uranium enrichment program is purely speculative because the scope of that program is unknown. Yet another possible source of nuclear material or ready-made weapons would be purchases from other countries or through a clandestine proliferation network.

The first U.S.-DPRK talks of substance convened in 1993 and continued on a stop-and-go basis into 1994, culminating in the signing of the Agreed Framework. Six four-party meetings (U.S., DPRK, South Korea, and China) were held between 1997 and 1999 to discuss North Korea's demand that the Korean War armistice be replaced by a peace treaty, but the talks eventually collapsed.

In April 2003, in the face of a U.S. refusal to meet bilaterally with North Korea, China played the host and arranged a three-party meeting, which expanded into a six-party forum (adding South Korea, Japan and Russia) for three six-party meetings beginning in August 2003.

In the six-party meetings, North Korea has offered to freeze its nuclear weapons program as soon as the United States resumes its fuel oil deliveries, lifts its economic embargo, and removes the DPRK from Washington's list of terrorist-sponsoring states. Learning from its experience with the Agreed Framework, the United States has insisted that only when North Korea verifiably freezes its nuclear program can the U.S. begin negotiating an economic aid package and a multilateral non-aggression pact.

AP Wide World Photos

The art of making threats. Showing missiles demolishing the U.S. Capitol building, the poster above was mounted on a shoe-factory wall in the North Korean city of Sinuiju. The text vows to "crush" the United States "if someone starts an invasion war." The poster below is titled "The Targets are Clear" and depicts North Korean missiles closing in on a plane bearing the markings "Washington, Seoul, Tokyo."

AP Wide World Photos/Korea News Service

North Korea's neighbors—China, Russia, Japan, and South Korea—have on many occasions declared that they will not tolerate a North Korean nuclear weapons program. The United States has voiced its unalterable opposition as well. Yet no one has been able to stop North Korea from accumulating more nuclear material, and presumably building nuclear weapons. The Agreed Framework, negotiated by the Clinton administration, slowed but did not stop North Korea's nuclear program. The Bush administration has avoided one-on-one talks because it considers North Korea's proliferation to be a regional rather than bilateral issue, but the United States has agreed to meet with North Korea in a multilateral setting. Washington's initial expectation was that the other members of the six-party talks would join the United States in pressuring North Korea to halt its nuclear program. What has happened in our view, however, is that Russia, China, and South Korea have shown a degree of sympathy for North Korea's claim that it is a target of U.S. aggression in the Bush administration's war on terrorism. These countries have called on the United States to compromise with North Korea, although no one has clearly laid out what that compromise would look like.

North Korea has offered to abandon its nuclear weapons program and accept an unspecified type of verification regime when the United States replaces its hostile policy toward the Kim Jong-il regime with acceptance, non-interference, and even support. But because U.S. policy is based not only on North Korea's nuclear proliferation but also on its past behavior, its forward-deployed conventional weapons, and its abysmal human rights policies, there seems to be little prospect that any American administration would grant Kim Jong-il the respect and support he feels he deserves.

Most North Korea observers in the United States can agree that the North Koreans would stop producing more plutonium in return for a smorgasbord of rewards, but they doubt that "CVID" — a complete, verifiable, and irreversible dismantling of North Korea's entire nuclear program — could ever be accomplished as long as the Kim regime remains in power. So in practical terms, the issue becomes whether the U.S. will settle for another agreement that partially contains North Korea's nuclear program, or whether the proliferation will be allowed to continue—at least until China, North Korea's primary benefactor, becomes sufficiently alarmed to end its economic aid and diplomatic support for Kim's regime. ■

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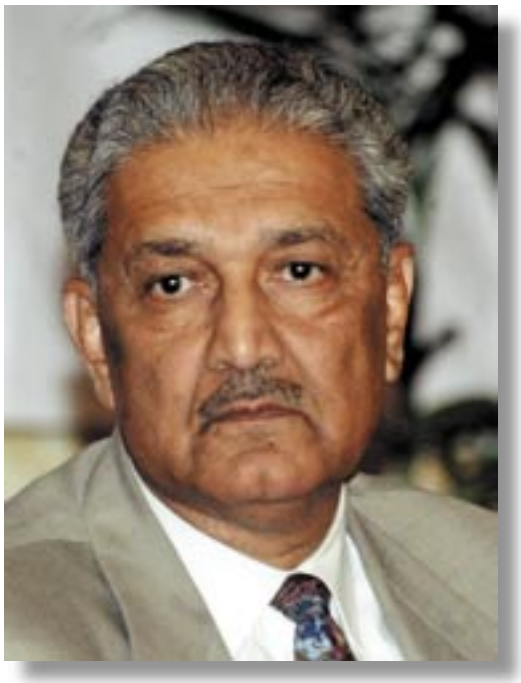
NEW PLAYERS ON THE SCENE
A.Q. Khan and the Nuclear Black Market

COLONEL CHARLES D. LUTES



Current nonproliferation regimes "may be inadequate to deal with the emerging threat of non-state proliferation" that Pakistani nuclear scientist A.Q. Khan represents, according to U.S. Air Force Colonel Charles D. Lutes. He says that's because these regimes are based on international norms, which in turn are based on the assumption that only governments are able to develop nuclear weapons.

A Senior Military Fellow at the Institute for National Strategic Studies at the National Defense University, Washington, D.C., Lutes says the Bush administration, recognizing this flawed assumption, has begun employing a two-tracked approach, attacking both supply of and demand for nuclear materials.

Photo above: An undated photo from Islamabad, Pakistan, of Abdul Qadeer Khan, founder of Pakistan's nuclear program. (AP Wide World Photos)

In October 2003, Italian coast guard cutters pulled alongside a German-flagged cargo vessel bound for Libya called the *BBC China*. Upon inspection, authorities found precision machine tools, aluminum tubes, molecular pumps, and other components for building approximately 10,000 "P-2" gas centrifuges designed for enriching uranium to specifications required for a nuclear weapon.

These components were traced back to a publicly traded Malaysian engineering company called Scomi Precision Engineering. Scomi had manufactured the parts at the behest of a Sri Lankan, Buhary Sayed Abu Tahir. Via his front company in Dubai, SMB Computers, Tahir arranged to deliver the parts to Libya for its hidden nuclear weapons program.

The Italian authorities ensured that the cargo never arrived at its destination. The seizure of the *BBC China's* cargo was a key part in a chain of events that led Libyan President Muammar Qaddafi to "come out of the cold" and renounce his weapons of mass destruction (WMD) programs in December 2003.

Just as significantly, this interdiction operation was the strand that unraveled the shadowy proliferation network of Tahir's boss and mentor, Pakistani scientist Abdul Qadeer Khan. [Note: The details on the *BBC China* seizure and the Khan network were derived from published sources. Specifically, see Bill Powell and Tim McGirk, "The Man Who Sold the Bomb," *Time*, February 14, 2005, pp. 22-30. Also see Barton Gellman and Dafna Lizner, "Unprecedented Peril Forces Tough Calls: President Faces a Multi-Front Battle Against Threats Known, Unknown," *The Washington Post*, October 26, 2004, p. A1.]

A Nuclear Marketplace

The godfather of Pakistan's nuclear weapons program, A.Q. Khan is a legendary and celebrated figure in his country for his years of secretive work in developing the first "Islamic bomb" to counter the threat from long-time rival India.

As a scientist working for the Dutch Urenco firm in the 1970s, Khan had access to blueprints for uranium enrichment technology, which he stole and brought back to Pakistan when he returned home.

Khan was appointed by then-Pakistani Prime Minister Ali Bhutto to run Pakistan's nuclear-research program, with the goal of countering India's nuclear aspirations with a weapon of its own. Running counter to the nonproliferation norms of the international community, Khan was forced to pursue this goal with the utmost secrecy. However, Pakistan's indigenous scientific and engineering infrastructure was underdeveloped for the task. So Khan did what any good entrepreneur would do: he outsourced.

He cultivated a network of suppliers and manufacturers, many of whom did not realize the ultimate objective of the science project undertaken at the Khan Research Laboratories. By 1998, however, there was no doubt. To the surprise of the international community, Pakistan completed five underground nuclear tests and joined an elite club of nuclear weapon states.

For A.Q. Khan, the patriotic fervor surrounding this achievement was only the beginning. A shrewd businessman, he saw potential for financial gain between his network of suppliers and a burgeoning market for nuclear arms. North Korea, Iran, Iraq, Syria, and Libya were foremost on a list of those at least window-shopping for such capability.

An ongoing investigation reveals that the Khan network played a significant role, beginning in the early 1990s, in the development of Iranian and North Korean enrichment technology. In exchange, North Korea appears to have shared its ballistic missile technology with Pakistan.

The investigation of the Libyan program continues to reap an intelligence bonanza uncovering the extent of Khan's cooperation with rogue regimes worldwide. While there is considerable debate over the role of the Pakistani government with regard to Khan's activities, it is unlikely that officials in Islamabad had full knowledge of the scope and scale of the Khan network.

As it continues to be exposed, the web of alleged Khan sponsors and suppliers is breathtaking. Starting with the stolen centrifuge designs from the Netherlands, and augmented by weapons designs from China, the syndicate also included engineering assistance from Britain; vacuum pumps from Germany; specialized lathes from Spain; furnaces from Italy; centrifuge motors and frequency converters from Turkey; enrichment parts from South Africa and Switzerland; aluminum from Singapore; and centrifuge parts from Malaysia, all orchestrated from an administrative hub in Dubai.

Despite mounting evidence, however, it is unlikely that the full extent of the network that International Atomic Energy Agency (IAEA) Director General Mohamed El-Baradei dubbed "the nuclear Wal-Mart" will ever be fully known.

Supply Always Meets Demand

Now that A.Q. Khan is under house arrest in Pakistan, but unavailable to Western authorities for interrogation, vexing questions remain. It is clear that Khan met with, and possibly sold components to, officials in a number of nuclear-aspiring states. Ongoing investigation has linked Khan to nuclear programs in Iraq, Iran, North Korea, and Libya. Additionally, published reports have identified Khan meetings with potential customers in Egypt, Saudi Arabia, Sudan, Malaysia, Indonesia, Algeria, Kuwait, Myanmar, and Abu Dhabi. The wider the spread of this dangerous knowledge and expertise, the greater the opportunity exists for terrorists or criminals to become armed with a nuclear bomb.

Clearly, al-Qaida and its affiliates are in the market for nuclear weapons. On the one hand, Khan's far-flung conglomeration of shady manufacturers, unsavory middlemen, and illicit traffickers seems the ideal supplier to meet the terrorist demand for nuclear arms. Its loosely coupled network mirrors the cellular structure favored by al-Qaida-affiliated terrorists. This structure facilitates surreptitious and relatively untraceable transactions among those who wish to wreak catastrophic violence.

This building in Almaty, Kazakhstan, photographed on February 18, 2004, was reported to house an office of SMB Computers, a Dubai company linked to the global nuclear black market. In a February 11, 2004, speech, President George W. Bush said, "a man named B.S.A. Tahir ran SMB Computers…as a front for the proliferation activities of the A.Q. Khan network." (Serik Kovlanbayev, AP Wide World Photos)

On the other hand, in considering the terrorist link it is important to look at the wares that Khan and his cronies offered for sale. Primarily, Khan purveyed the necessary materiel for a state nuclear program: centrifuge components and designs, weapons blueprints, and technical expertise. There are no published reports of Khan dealing in nuclear fissile material itself, the final product of the enrichment process that fuels a nuclear weapon.

Presumably terrorists would prefer to purchase a finished weapon or, at a minimum, the fissile material, as they likely have little ability or patience to develop a program infrastructure. To a terrorist, then, dealing with Khan would be tantamount to asking for AK-47s and bullets, and instead receiving steel, metal casts and molds, and a fabrication instruction manual.

As much damage as the black market may have done in bringing North Korea and Iran closer to membership in the nuclear club, the present danger lies in how the supplier network adapts now that Khan is no longer at the helm.

Although President Bush has stated that Khan's network has been shut down, it remains possible that parts of it may have just burrowed more deeply underground. While it is unlikely that Khan Research Laboratories will engage in any further black market activity, it remains to be seen what will become of its associates.

Just as terrorist networks re-form and adapt, so too can the supplier network. The predominant commodity will be the knowledge base and expertise resident in the remaining supplier nodes. Cut off from Khan's access to the rogue state market, a new network of nuclear scientists and engineers may coalesce around the terrorist market.

To the extent that these profiteers may have any access to fissile material or even a finished weapon, the risk of proliferation to terrorists increases exponentially. Unfortunately in the case of terrorist actors, unlike state actors, possessing a nuclear weapon probably has only one purpose: for detonation into a visible mushroom cloud.

From Cooperative Agreements to Cooperative Action

Existing nonproliferation regimes may be inadequate to deal with the emerging threat of non-state proliferation as exemplified by the Khan nuclear smuggling network. International norms—the basis of these regimes—are predicated on an assumption that only states have the requisite resources to develop nuclear weapons.

The Khan experience, viewed through a new set of assumptions in a post-9/11 world, indicates that this basic premise is flawed. For this reason, the Bush administration has begun prodding the international community to move from a position of cooperative agreements to one of cooperative action.

Accordingly, the United States and its partners have developed a more proactive approach to attack both ends of the problem. To curb demand, the war on terrorism seeks to defeat terrorist groups in the short term, while undermining terrorist ideology and support over the long term. Against rogue states, international diplomatic pressure backed by threat of force is aimed at isolating outlaw regimes. The experience in Iraq shows the challenges of this policy when conducted with limited international consensus.

On the supply front, two approaches are currently in play. The first is to round up the relatively limited supply of fissile material. Threat reduction techniques applied to the former Soviet states have been extended on an international scale through the G-8 Global Threat Reduction Initiative. A recent agreement between the U.S. and Russia to enhance cooperation in the fight against nuclear terrorism is another example.

The second approach is embodied by the Proliferation Security Initiative (PSI), under which participating gov-

U.S. Navy photo

ernments collaborate to interdict shipments of components and material needed to construct weapons of mass destruction. The slogan that PSI is "an activity, not an organization" reflects the paradigm shift toward cooperative action. It was cooperation under the PSI principles that led to the interception of the *BBC China* and the unraveling of the Khan network.

However, the black-market activities of A.Q. Khan may only be the tip of the iceberg. As long as there is significant demand for nuclear capability, suppliers will try to find ways to meet it. The international community must be flexible in its approach in order to confront the ever-changing nature of the nuclear supplier network. The shift from cooperative agreements to cooperative action to curb both demand and supply is a necessary ingredient for success. ■

The views expressed in this article are those of the author and do not necessarily reflect those of the National Defense University, the U.S. Air Force, or the United States government.

U.S. Navy photo
Below: Katsumi Kasahara, AP Wide World Photos

Proliferation Security Initiative training. International forces practice interdiction techniques. Top, Special Operations Forces from Spain search a sailor after boarding the USNS Saturn during the 15-nation Sea Saber 2004 exercise, January 17, 2004. Middle, Inspectors from Japan's National Police Agency wear protective suits to analyze materials loaded in a container during an export control exercise in Tokyo, October 22, 2004. Bottom, Italian firefighters wearing protective suits against chemical, biological, and radiological contaminants set up warning signs around a container suspected of carrying weapons of mass destruction during the exercise Clever Sentinel 2004 on April 22, 2004, in Sicily.

NOT WITH A WHIMPER
Visions of Mass Destruction in Fiction and Film

RICHARD PELLS

It has so far proven very "difficult for novelists or filmmakers to portray the mentality of the stateless terrorist, the messianic fanatic who seeks to murder people indiscriminately, for no obvious purpose except to pile up the bodies," says Richard Pells, professor of history at the University of Texas at Austin. Particularly during the Cold War, Pell says, many novelists and filmmakers worked "with utmost seriousness" to "make comprehensible our universal peril."

The author of three books, Pells is currently at work on From Modernism to the Movies: The Globalization of American Culture in the Twentieth Century.

Photo above: Pablo Picasso's painting *Guernica* hangs in the Reina Sofia art museum in Madrid, Spain. (Santiago Lyon, AP Wide World Photos)

One of the most famous paintings of the 20th century is Pablo Picasso's *Guernica*. There is a good, if frightening, reason for its fame. A commemoration of the bombing of a Basque town by German and Italian planes during the Spanish Civil War, the painting portrays the agony and terror of people and animals being obliterated by modern weapons of mass destruction. *Guernica* is also a premonition of the even more savage attacks on civilian populations during World War II, as well as of a world filled with nuclear and biological weapons —a world in which we all now live.

Since the end of World War II, we have often depended on artists to make comprehensible our universal peril, to measure our chances for survival in an age when innocent people can be instantly gassed, asphyxiated with deadly toxins, or incinerated. And many novelists and filmmakers have done so with the utmost seriousness, particularly during the Cold War.

The prospect of nuclear war between the Soviet Union and the United States yielded at least two best-selling novels in the 1950s and early 1960s. Nevil Shute's *On the*

Beach (published in 1957, and made into a movie with an all-star cast in 1959, then remade as a mini-series for U.S. television in 2000) described the effects of radiation as the planet slowly died in the aftermath of a nuclear exchange between the superpowers. Eugene Burdick's *Fail Safe* was published in 1962, the same year as the Cuban missile crisis, the one moment in the Cold War when the United States and the Soviet Union might have actually used their nuclear arsenals against each other. The movie version of *Fail Safe*, in 1964, starred Henry Fonda as an American president confronted with an accidental attack on the Soviet Union; he decides to drop an atomic bomb on New York in compensation for the annihilation of Moscow.

Yet it is impossible for people to live in perpetual fear. Or to imagine the insanity of a nuclear war without a dose of dark humor. In 1958, the great satirical song-writer, Tom Lehrer, composed an ode to the end of the world, titled "We Will All Go Together When We Go." A sample verse: "We will all burn together when we burn/There'll be no need to stand and wait your turn/When it's time for the fall-out and Saint Peter calls us all out/We'll just drop our agendas and adjourn."

But no novel or film during the Cold War captured the lunacy of our situation more memorably than Stanley Kubrick's *Dr. Strangelove* (1964). Its subtitle was *How I Learned to Stop Worrying and Love the Bomb.* This time nuclear war, "toe to toe with the Russkies," is no accident; it's launched by a crazed American General, Jack D. Ripper, worried about a "Commie plot" to put fluoride in the drinking water and cause the loss of his bodily essences. With Peter Sellers in three roles—as a British officer (the lone voice of reason in the movie) detailed to General Ripper and frantically trying to figure out the code that will recall the American bombers, the U.S. president (far more muddled than Henry Fonda), and an ex-Nazi scientist who understands not only the "Doomsday" machine that will blow up the world but the postwar mine shafts that will house the survivors—*Dr. Strangelove* ends with mushroom clouds and images of oblivion more mordant, and more chilling, than any other work of art or entertainment in the Cold War years.

Actor Peter Sellers sits in a wheelchair portraying the titular character in director Stanley Kubrick's 1964 movie, *Dr. Strangelove or: How I Learned to Stop Worrying and Love the Bomb.* (AP Wide World Photos)

Still, the Cold War—however grim—was familiar and oddly comforting. It was, after all, a contest between two nation-states, each with a lot to lose. Policymakers on both sides understood the rules of the game, and the limits beyond which they couldn't go. General Ripper may have gone "a little funny in the head," but most of the Cold War protagonists—in art and reality—weren't psychopaths. They were, like Henry Fonda, cool customers, rational custodians of terrifying weapons, trying never to miscalculate. Or, as Peter Sellers' American President tells the Soviet Premier: "We're in this together, Dmitri. Don't say you're sorrier than I am; I'm just as sorry as you."

This sense of the Cold War as a competition between adversaries, rather than as a hunger for Armageddon, explains why so many of the era's spy novels are really psychological thrillers, with agents maneuvering for tiny advantages against their equals in an interminable chess match where ultimate "victory" is not achievable. The focus here is on the tradecraft, duplicity, and cleverness of the spy—as in the novels of John Le Carré, whose British agent George Smiley plays intricate intelligence games with his Soviet KGB counterpart, Karla. Both behave with restraint and mutual respect, befitting professional spies with peculiar codes of honor in the midst of the Cold War, but who can never come in from the cold.

The Cold War, and the dangers of a nuclear conflagration, were at least imaginable in fiction and films. Perhaps this was because nuclear weapons were always seen as the property of and controllable by a state. States are not suicidal—not even "rogue" states like Iran or North Korea. So their governments are normally susceptible to negotiation or pressure. The conflicts between members of the nuclear "club," we assume, can somehow be managed by experts in throw-weights and multiple warheads.

It has, however, been much more difficult for novelists or filmmakers to portray the mentality of the stateless terrorist, the messianic fanatic who seeks to murder people indiscriminately, for no obvious purpose except to pile up the bodies. And who is willing to use any means—from car bombs to hijacked planes to nuclear and biological weapons—to accomplish the mission.

From the 1960s on, there have been efforts to penetrate the terrorist's mind. The James Bond films usually featured a megalomaniac bent on obtaining a weapon of mass destruction with which he could take command of the planet. Yet the Bond movies, with their spectacular explosions amid the vodka martinis, exuded amusement and charm rather than horror. In 1983, Le Carré, taking a vacation from the intrigues of Smiley and Karla, sought to decipher the psychology of Palestinian terrorists in *The Little Drummer Girl*. But the novel (and the 1984 film on which it was based) was more about the cerebral struggle between Israeli intelligence agents and their Palestinian foes than about mass murder.

More recently, films like *The Rock* and *The Devil's Own* portray the quest for weapons in the service of either a political movement or personal grievance. In the case of *The Rock*, Ed Harris is the leader of a gang of ex-military thugs who've taken over Alcatraz Island in the middle of San Francisco Bay, once a federal prison site, and are threatening to unleash chemical weapons on San Francisco. But Harris and his band are out for money and revenge; they don't yearn to ascend to heaven through an act of martyrdom. Meanwhile, in *The Devil's Own*, Brad Pitt plays an Irish Republican Army operative who comes to the U.S. to purchase guns and rockets, not nuclear or biological weapons. And, like the Palestinians in *The Little Drummer Girl*, he's a killer because he wants to create a state. His targets are deliberate (the British and Northern Ireland Protestants); he's not thirsting to massacre everyone in sight. In yet another film, 1997's *The Peacemaker*, starring George Clooney and Nicole Kidman, Russian nuclear warheads are stolen, and a weaponized backpack eventually ends up in the hands of a Bosnian Serb terrorist determined to destroy Manhattan. His motivation is also revenge and money.

Above all, these terrorists are not in love with death; they concoct strategies that, however implausible, will allow them to escape and continue to fight for the "cause." What novelists and filmmakers have not yet fully envisioned is terror for its own sake—without rules, codes, or limits. Nor have they imagined a state of mind in which suicide is the road to sainthood. And so all of us, not just in the West, are in a frightening void, without the "comforts" of the Cold War or the art forms it inspired.

Clearly, the international community needs to strengthen the treaties and protocols that will control the proliferation of nuclear and biological weapons developed by countries and by non-state terrorists, and to continue to deal with the menace of terrorism through a variety of legal means. But we also need, in the 21st century, another Pablo Picasso or a Stanley Kubrick to warn us of what our fate will be if we don't superintend the horrific weapons we have created. Otherwise, as Picasso and Kubrick both knew, our world may end with a bang, not with a whimper. ■

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Duck and Cover

Starring Bert the Turtle

Dan Grossi, AP Wide World Photos

In 1951, the newly established Federal Civil Defense Administration (FCDA) commissioned production of a film to instruct children how to react in the event of a nuclear attack. The result was *Duck and Cover*, a film lasting nine minutes that was shown in schools throughout the United States during the 1950s and beyond. It featured a cartoon character, Bert the Turtle, who "was very alert" and "knew just what to do: duck and cover." At the sound of an alarm or the flash of a brilliant light signaling a nuclear explosion, Bert would instantly tuck his body under his shell. Above, in a photo from November 21, 1951, sixth-grade students and their teacher at Public School 152 in the Queens borough of New York City, act out a scene depicted in the film by crouching under or beside their desks.

Other FCDA initiatives of the early 1950s led to creation of the Emergency Broadcast System, food stockpiles, civil defense classes, and public and private bomb shelters. At right, a mother and her children practice running to their steel-walled fallout shelter in the back yard of their Sacramento, California, home on October 5, 1961.

Sal Veder, AP Wide World Photos

The FCDA commissioned other civil defense films, but *Duck and Cover* became the most famous of the genre. In 2004, the U.S. Library of Congress added it to the National Film Registry of "culturally, historically, or aesthetically" significant motion pictures, a distinction it now shares with such feature-film classics as *Birth of a Nation, Casablanca,* and *Schindler's List*. ■

(You can see *Duck and Cover* on your computer screen by going to this Internet site: *http://usinfo.state.gov/journals/itps/0305/ijpe/fullversion.htm*)

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INTERNET RESOURCES

Online resources for information about nonproliferation and terrorism issues

ACADEMIC

Harvard University: John F. Kennedy School of Government: Belfer Center for Science and International Affairs: Managing the Atom
http://bcsia.ksg.harvard.edu/research.cfm?program=STPP&ln=home&pb_id=240&gma=27&gmi=47

Monterey Institute of International Studies: Center for Nonproliferation Studies
http://cns.miis.edu/

Princeton University: The Program on Science and Global Security
http://www.princeton.edu/~globsec/

Stanford University: Institute for International Studies: Center for International Security and Cooperation
http://cisac.stanford.edu/

INTERNATIONAL

British American Security Information Council: Nuclear and WMD
http://www.basicint.org/nuclear/nucindex.htm

International Atomic Energy Agency
http://www.iaea.org/

International Science and Technology Center
http://www.istc.ru/

Proliferation Security Initiative
http://www.proliferationsecurity.info/introduction.php

United Nations: Peace and Security through Disarmament
http://disarmament2.un.org/

U.S. GOVERNMENT

National Defense University: Center for the Study of Weapons of Mass Destruction
http://www.ndu.edu/WMDCenter/

U.S. Department of Defense: Weapons of Mass Destruction
http://www.defenselink.mil/specials/destruction/

U.S. Department of Energy: Initiatives for Proliferation Prevention
http://ipp.nn.doe.gov/

U.S. Department of Energy: National Nuclear Security Administration: Office of Defense Nuclear Nonproliferation
http://www.nnsa.doe.gov/na-20/program.shtml

U.S. Department of State: Bureau of Nonproliferation: 2005 NPT Review Conference
http://www.state.gov/t/np/wmd/nnp/c10602.htm

U.S. Department of State: Bureau of Nonproliferation: Nonproliferation and Disarmament Fund
http://www.ndf.org/

U.S. Department of State: Bureau of Nonproliferation: Proliferation Security Initiative
http://www.state.gov/t/np/c10390.htm

U.S. Department of State: International Information Programs: Arms Control and Non-Proliferation
http://usinfo.state.gov/is/international_security/arms_control.html

U.S. Department of State: Under Secretary for Arms Control and International Security
http://www.state.gov/t/

U.S. ORGANIZATIONS

Arms Control Association: 2005 Campaign to Strengthen the NPT: NPT Resources
http://www.armscontrol.org/NPT2005/resources.asp

Carnegie Endowment for International Peace: Proliferation News and Resources
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Chemical and Biological Arms Control Institute
http://www.cbaci.org/cbaci/

Council on Foreign Relations: Weapons of Mass Destruction
http://www.cfrterrorism.org/weapons/

Nonproliferation Policy Education Center
http://www.npec-web.org/

Nuclear Control Institute
http://www.nci.org/

The Stimson Center: Current Projects: Reducing the Threat of WMD
http://www.stimson.org/?SN=TI20011220106

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http://usinfo.state.gov/journals/journals.htm

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