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Emily Diez
Akribis Group and the Center for Terrorism and Intelligence Studies

Terrance Clark
Akribis Group and the Center for Terrorism and Intelligence Studies

Caroline Zaw-Mon
Akribis Group and the Center for Terrorism and Intelligence Studies

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Global Risk of Nuclear Terrorism

By Emily Diez, Terrance Clark, and Caroline Zaw-Mon

Introduction

The emergence of nuclear terrorism, a threat that President Obama called "the gravest danger we face," has signaled a paradigm shift in international security.[1] Since the collapse of the Soviet Union, sensitive nuclear technologies and materials have become increasingly available. Globalization and the inadequate enforcement of treaties and export controls have allowed the proliferation of nuclear weapons materials.[2] Today, international terrorist organizations seek to employ weapons of mass destruction (WMD) as a means to influence national policies around the world. Al-Qaida spokesman Suleiman Abu Gheith declared that in order to balance the injustices that have been inflicted on the Muslim population worldwide, al-Qaida's new objective is "to kill 4 million Americans–2 million of them children."[3] As political scientist Graham Allison notes, this could be achieved with either 1,334 attacks similar in magnitude to those of 9/11, or one nuclear bomb.[4]

Building a nuclear program is an arduous task that requires tacit knowledge, the recruitment of nuclear scientists, engineers, and machinists, and the resources and time to obtain nuclear materials and components.[5] While it is unlikely that terrorist organizations have the capacity to develop full-fledged programs in the near term, terrorist development and acquisition of nuclear weapons remains a long-term threat that requires international action.[6]

State-Based Nuclear Programs: The Supply Chain

Unstable countries with successful or burgeoning nuclear weapons programs that support or refuse to control terrorism have engendered an ominous security threat to the world community. Pakistan and North Korea's refusal to participate in the Nuclear Non-Proliferation Treaty (NPT) has not only disrupted regional security in East and Central Asia, but has also contributed to second-tier proliferation, or the illicit nuclear trade between developing nations with limited indigenous nuclear resources and technologies.[7] Nuclear proliferation experts believe that second-tier networks are pervasive, interconnected, highly effective, and

possibly linked to terrorist organizations.[8] These networks have profited from unsecured Russian stockpiles and contributed to the development of illicit weapons programs in non-nuclear states.[9]

Ultimately, terrorist organizations lack the capacity to develop nuclear arms independently and must seek assistance from states, private industries, and individuals. In order to minimize nuclear proliferation to terrorist groups, states should continue to strengthen export controls worldwide, improve incentives for governments to enter into and fulfill their obligations under the non-proliferation regime, and more carefully monitor noncompliant states and individuals. This report considers the roles that Russia, Pakistan, and North Korea play in nuclear proliferation and identifies measures that should be taken to reduce the spread of nuclear weapons and prevent nuclear terrorism.

Case Study: Russia

The collapse of a major nuclear state followed by instability and infighting in the early 1990s resulted in a significant nuclear proliferation problem. Russian leaders faced the challenge not only of securing nuclear material but also of creating a new system of export controls in a newly minted capitalist society. Although Russia has made significant strides in nuclear non-proliferation with its heavy involvement in international agreements and in establishing strong export controls, these measures have proven to be inadequate.

At the end of the Cold War, Moscow controlled only eighty percent of its strategic nuclear weaponry, with remaining materials and supplies located in the Ukraine, Belarus, and Kazakhstan.[10] Today, the Russian Ministry of Defense maintains and consolidates these warheads located in a small number of storage sites and facilities. Russia owns the world's largest stockpile of weapons-usable fissile materials, including at least 950 metric tons of highly enriched uranium (HEU) and approximately 145 tons of weapons-grade plutonium (plus or minus 30 percent).[11] Of this amount, Moscow has 350 tons of HEU and 55 tons loaded on nuclear warheads.[12] Although the government has decreased its number of nuclear warheads since the mid-1980s, Russia's nuclear supply still remains a major security problem.[13]

Moscow revised export legislation in 1999 and established the Export Control Commission of the Russian Federation to coordinate export control lists for weapons materials and dual-use technologies. The Russian Government recently enacted a number of controls aimed specifically at

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limiting nuclear proliferation. The passage of these measures demonstrates progress, but Russia continues to support missile programs and civilian nuclear projects in high-risk nations for nuclear proliferation and terrorist activities.[14] Without effective nuclear material safeguards in the Former Soviet Union (FSU), second-tier proliferation will increase.

Although Russia has a strong strategic interest in supporting nuclear non-proliferation, Moscow has not prioritized or provided sufficient resources for effective export controls to stop the unauthorized export of nuclear and sensitive dual-use technology and equipment. Not only does Russia lack political will, but corruption and a scarcity of resources have also hindered non-proliferation efforts.[15] Furthermore, as Russia has attempted to expand its economy, the country has developed a business culture that is averse to regulations, and firms have been slow to implement effective compliance systems.[16] Accountability and control are Russia's greatest challenges, and safeguarding a large quantity of nuclear materials remains a daunting task since Moscow lacks a comprehensive strategy for accountability and security.

Case Study: Pakistan

As a nation racked with security problems, characterized by corruption and instability, and firm in its defiance of the NPT, Pakistan is a particularly high-risk nation for nuclear proliferation. Pakistan is also a front line for the War on Terror with a high prevalence of terrorist organizations operating within its borders. Terrorism experts have long suspected that individuals within the government and the military associate with al-Qaida. Pakistani nuclear scientist Dr. Abdul Qadeer Khan's 2004 confession of his involvement in black market nuclear trade unearthed serious problems at high levels of government.

Pakistan is estimated to have 55–90 nuclear weapons and increasing stockpiles of HEU and plutonium.[17] Many of its nuclear weapons are stored disassembled, which increases the risk of theft, smuggling, and illegal export.[18] Although Pakistan is not considered to be a major export nation of WMD-related goods, the country's history of evading international non-proliferation agreements, lax nuclear export controls, and the A.Q. Khan scandal demonstrate Islamabad's high risk.[19] During the last several decades of nuclear development, Pakistan acquired vital information and materials including uranium enrichment from Europe and missile technology and weapons blueprints from China.[20] Those involved in the nuclear program used front companies and intermediaries, falsified documents, and purchased critical components for nuclear technolo-

gies.[21] These capabilities combined with weak export controls and other vulnerabilities make Pakistan one of the most difficult cases for nuclear proliferation. Pakistan is party to such international agreements as the Nuclear Safety Convention and the Convention on Physical Protection of Nuclear Material. Islamabad's export controls are decidedly weak despite the nation's attempts to reorganize and restructure both its nuclear programs and export controls.[22] Pakistan participates in other WMD conventions but continues to defy the international community by refusing to participate in the NPT.[23]

Pakistan's proliferation history, nuclear capabilities and stockpiles, inability to maintain control over its territory, and the prevalence of terrorist activity within its borders are causes for concern. The U.S. and the international community should work closely with Pakistan to improve security within Southeast Asia and pave the way to Islamabad's acceptance into the "nuclear club." This would increase regulations on Pakistani nuclear and dual-use materials, possibly decrease the availability of sensitive material and technologies on the black market, and potentially reduce illicit activities and terrorist access to nuclear weapons.

Case Study: North Korea

The Democratic People's Republic of Korea (DPRK, commonly known as North Korea) remains one of the most challenging nuclear proliferations cases. Although the United States and other developed countries have banned trade with North Korea, Pyongyang continues to export missiles and other potentially dangerous technologies. North Korea withdrew from the NPT and is currently party to few (if any) international and regional non-proliferation efforts.

Nuclear weapons experts believe that North Korea has developed one or two nuclear weapons, and that Pyongyang has the capability to produce 6–8 more by reprocessing spent fuel stockpiles.[24] Pyongyang claims to have acquired significant plutonium stockpiles, but there is debate about the amount and the potential threat posed by this supply.[25] The DPRK has also been a major exporter of ballistic missiles since the 1980s. The regime has prioritized this program because it has brought considerable revenue to the isolated country.[26] There is great uncertainty surrounding the North Korean nuclear program, but the instability of the nation and Pyongyang's nuclear developments and missile tests are troubling.

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North Korea will likely continue to develop and produce ballistic missiles with superior range and sophistication in order to maintain trade and improve economic stability.[27] The problem of spent fuel is also worrying for the international community. Excess spent fuel could be sold on the black market to second-tier countries or even directly to terrorist organizations.[28] To date, there is no evidence that North Korea has sold or transferred plutonium to other countries, but the possibility remains a concern.[29] Six Party Talks have failed to provide adequate assurance that Pyongyang will not engage in such illicit activities.

Recommendations

To mitigate the nuclear proliferation risks posed by Russia, Pakistan, and North Korea, the United States and other NPT nations should work to tighten export controls, more effectively track Russian stockpiles, eliminate nuclear networks, and expand the non-proliferation regime.

Effective Export Controls

In 2003, following revelations that Libya would abandon its nuclear weapons program, International Atomic Energy Agency (IAEA) officials discovered components for nuclear weapons worth hundreds of millions of dollars including blueprints for a half-ton nuclear weapon in Libya. While it is unlikely that a terrorist organization like al-Qaida will develop weapons independently, small nuclear bombs could be smuggled or purchased on the black market for the right price. It is imperative that export controls be strengthened to limit the illegal proliferation of nuclear materials.

Devising effective export controls that allow nuclear trade for peaceful purposes without increasing the proliferation of nuclear arms is a challenge given the relative ease with which nuclear technologies could be converted for use as weaponry. Although bilateral and multilateral arrangements assist governments in developing and enforcing export controls, it is ultimately the responsibility of an individual nation to limit nuclear proliferation. States will not maintain effective export controls without the political will, incentives, and the resources to enforce them.[30] Governments must also balance export controls with international trade, as strict regulations could also hinder trade relationships by making the export process excessively onerous.

Political scientist Matthew Fuhrmann wrote in a 2007 *World Affairs* article, "To be truly effective, non-proliferation export controls must be

implemented globally. Otherwise, a state wishing to acquire sensitive dual-use technologies merely has to shop around to find a supplier with weak or nonexistent controls."[31] International agreements to curb the illegal trade of nuclear materials such as the NPT, the Wassenaar Arrangement on Export Controls for Conventional Arms and Dual-Use Goods and Technologies, and United Nations Resolution 1540, are only as effective as the export controls of Russia, Pakistan, and North Korea, the weakest links in the nuclear supply chain.

Policing non-compliant states remains a serious challenge. International cooperation is just one component in developing a comprehensive non-proliferation export control system. Other important factors include licensing, border and port security and enforcement, and collaboration between national governments and private industry.[32]

Russian Stockpiles

Russian stockpiles are a major source in the nuclear supply chain, as terrorist organizations are able to acquire nuclear weapons and materials through a network of providers in the FSU. The Wassenaar Arrangement requires Moscow to be transparent in the transfer of conventional arms and dual-use items and to use export controls as a counterterrorism tool. However, Russia has failed to fulfill its obligations. Moscow has generally prioritized domestic economic development over international security. Encouraging Russia to be more proactive in its counterterrorism and non-proliferation efforts continues to be a challenge.

Tracking Russian stockpiles more closely would enhance non-proliferation efforts worldwide. During the 2000 Clinton-Putin Summit, the United States and Russia agreed to share real-time information on missile launches and weapons-grade materials. To date, the plan has not been implemented. Russia has made some progress in securing nuclear materials by revising export legislation in 1999 and by establishing the Export Control Commission of the Russian Federation to coordinate export control lists for missiles and related dual-use technologies and equipment. However, Moscow has failed to effectively regulate, consolidate, and secure its nuclear materials.[33]

Nuclear material accounting is a fundamental measure needed to ensure compliance with international agreements. More stringent safeguards that include containment and surveillance are examples of ways to significantly diminish the threat posed by Russian stockpiles. Developing precision instruments for measuring sensitive materials and a more complex

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system to track their movements are other essential steps that can be taken to mitigate this threat.

Illegal Nuclear Supply Networks

While it would be difficult to fully eliminate illegal nuclear supply networks, targeting key elements within the illicit trade would reduce terrorist access to nuclear materials and weapons. Nuclear forensics, cutting supply, monitoring tacit knowledge holders, strengthening regulations, and consolidating materials in Russia are methods that could be used to diminish illegal nuclear supply networks.

Nuclear forensics is a relatively new science wherein analysts collect debris from a bomb explosion or a sample of black market fissile material and trace it to the source by identifying "nuclear fingerprints."[34] While this method has improved in sophistication and accuracy over the last several years, there are limitations to its use as a deterrent. In order to be effective, a deterring force must have commitment, credibility and military and/or law enforcement authority over national governments. The current international non-proliferation regime's authority is limited by the states that support it.

Acquiring tacit knowledge, or the expertise to develop nuclear weapons, remains one of the greatest barriers that second-tier nations or non-state actors face in building a successful nuclear program. In the short term, these players lack the know-how to develop nuclear weapons.[35] However, this is changing. The consolidation, regulation, and security of materials, as well as the restriction of tacit knowledge transfers, are vital to limiting nuclear proliferation. It is imperative that illegal nuclear networks are destroyed before they expand. International non-proliferation entities attacking these networks must understand their unique structure, and target the critical points within the structure, in order to effectively eliminate them. Nuclear supply networks are becoming increasingly dangerous as they devise new ways to transmit knowledge and technology without detection.

Ultimately, the most effective way to limit second-tier proliferation is to strengthen regulations in Russia and consolidate materials. While nuclear forensics has promise, it faces challenges of credibility, capability, and commitment. Eliminating the supply to second-tier networks is a difficult task, but it could delay nuclear proliferation to high-risk nations or non-state actors. Efforts should be made to expand the nuclear supply regime by offering high-risk nations greater incentives to denuclearize.

Nuclear Non-Proliferation Regime

International nuclear non-proliferation efforts are hindered by the refusal of countries such as Pakistan and North Korea to participate in the international regime. These nations continue to produce, sell, and trade WMD technologies without formal constraints, facilitating the emergence of second-tier proliferation networks.[36] Diplomatic strategies have been employed with little success, and economic sanctions have yielded mixed results.[37]

Working harder to expand the "nuclear club" to include Pakistan could motivate Islamabad to become a more responsible nuclear state. If Pakistan were to join the Missile Technology Control Regime (MTCR), the international community could assist Islamabad in maintaining domestic controls of nuclear and missile technology and more effectively regulate the nation's nuclear trade.[38] Reassessing the standards required for joining organizations like the Zangger Committee and the Nuclear Suppliers Group would allow more nations to participate.[39] The United States should also consider establishing a Fissile Material Cutoff Treaty (FMCT). This agreement would require NPT nations to follow more specific arms control measures.[40]

Understanding the diverse motivations that drive nuclear countries to proliferate is key to limiting the spread of nuclear technologies and ultimately combating the threat of nuclear terrorism. Regional security concerns and economic constraints are frequently at the heart of nuclear proliferation. Pakistan developed nuclear weapons to compete with India. North Korea joined the NPT in 1985, abandoned it in 2003, and continues to sell ballistic missiles today because the associated revenue stream is integral to the country's economy.[41] In this case, the Asian nation's economic interests have trumped international pressure.[42] Islamabad and Pyongyang have supported one another's nuclear endeavors by swapping Pakistani weapons materials and technologies for North Korean missiles.

There is speculation that Pakistan will continue its weapons trade with North Korea as Islamabad seeks missiles with greater accuracy, mobility, and payload.[43] It is important that the international community address the regional nuclear imbalances of East and South Asia to decrease WMD trade between these two nations.[44] Limiting nuclear weapons material production in Asia could help to mitigate the security concerns that drive illegal nuclear production. North Korean economic interests should be at the heart of the next round of Six Party Talks.

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The fight against nuclear proliferation is a challenge on all levels. While supply side strategies directly address the problem of proliferation, a renewed focus on the causes of demand for nuclear weapons would play a critical role in combating future proliferation. A combination of supply and demand side efforts would ideally influence the decision-making processes of current and prospective nuclear states and encourage adherence to the nuclear non-proliferation regime.[45]

Conclusions

The War on Terror is the new Great Game where terrorist acquisition of nuclear weapons is the ultimate threat, and our military installations, places of work and homes are the new frontier. Nuclear non-proliferation is a multifaceted problem that requires innovative solutions. To meet this ominous new threat, the United States should lead the international community in strengthening export controls through improved cooperation, expanding incentives to encourage nations to fulfill their obligations under the existing nuclear non-proliferation regime, and policing those states and individuals that fail to meet their obligations.

The United States should layer supply and demand side tactics in order to counter the latest wave of proliferation. Continued support of export controls, agreements, and the establishment of new treaties are effective methods to limit supply. The United States should also address demand by encouraging high-risk nations to participate in the international nuclear non-proliferation regime. These measures will likely improve the security of sensitive nuclear technologies and reduce the risk of terrorist acquisition of nuclear weapons.

According to former U.S. Senator Sam Nunn, the likelihood of a single nuclear bomb exploding in a single city is greater today than at the height of the Cold War.[46] From "mutually assured destruction" to modern-day suicide terrorism, we have entered a new era in international security. Nuclear terrorism poses a significant challenge to U.S.-led counterterrorism and counter-proliferation efforts. Only international cooperation and proactive measures will effectively limit the dangers of this 21st century threat.

About the Authors

Emily Diez is a researcher for the Akribis Group and the Center for Terrorism and Intelligence Studies. She is also a graduate student at the Sam Nunn School of International Affairs at the Georgia Institute of Technol-

ogy. Her research has focused on counterterrorism, nonproliferation, and the causes of ethnic conflict. Prior to her studies at Georgia Tech, she taught English in Spain and traveled extensively throughout Europe. She received Bachelor's degrees in Spanish and International Studies, with a concentration in Social and Cultural Identity, from the University of Mississippi and studied abroad in Salamanca and Valencia, Spain.

Caroline Zaw-Mon is a researcher for the Akribis Group and the Center for Terrorism and Intelligence Studies. She recently completed her graduate degrees in International Studies and International Business at the University of Denver's Korbel School of International Studies and the Daniels College of Business. She earned her Bachelor's degree in History from Vanderbilt University and has worked in emergency management and international development.

Terrance Clark is a researcher for the Akribis Group and the Center for Terrorism and Intelligence Studies. He received his Master of Science in International Affairs from the Sam Nunn School of International Affairs at the Georgia Institute of Technology. His research has focused on international security, counterinsurgency, and conflict resolution. During his studies at Georgia Tech, he worked for the Center for Strategy, Technology, and Policy (CISTP) and studied abroad in Europe. He obtained his Associate of Arts and Science and Bachelor of Arts in Political Science from Emory University. In his spare time, Mr. Clark is a creative writer of poetry.

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