



NATIONAL INSTITUTE FOR PUBLIC POLICY

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**Section III. Minimum Deterrence:
U.S. Nuclear Weapons and the Priority Threat Facing the United States**

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Section III. Minimum Deterrence: U.S. Nuclear Weapons and the Priority Threat Facing the United States

Introduction

Nuclear terrorism is a threat that Democratic and Republican administrations, military and civilian defense analysts have called, “today’s most immediate and extreme danger,”¹ and “the ultimate nightmare.”² Only a month after the attacks on September 11, 2001, President Bush identified the possibility of nuclear terrorism as “the most horrifying prospect of all.”³ Since 2001, there continues to be a seeming high-level consensus that nuclear terrorism remains America’s number one threat. As former Secretary of State Colin Powell has declared, nuclear terrorism is “the real threat now.”⁴

Minimum Deterrence proponents similarly assert that nuclear terrorism is the greatest threat to the United States. Based on this claim, Minimum Deterrence proponents ask: ‘What can U.S. nuclear weapons do to deter or defeat the nation’s greatest threat: nuclear terrorism?’ Their answer is, ‘nothing.’ They conclude, therefore, that U.S. nuclear weapons are of greatly reduced value because they have no use vis-à-vis the priority threat of the 21st century.

Minimum Deterrence advocates have a vested interest in this claim that nuclear terrorism is the most immediate and extreme danger to the United States: if so, and as claimed, nuclear weapons have no value in deterring or defeating that threat, then the United States can safely reduce the role and number of its nuclear weapons without degrading its capacity to address its greatest threat. These Minimum Deterrence claims regarding the priority threat facing the United States and the related conclusion about the lack of value of U.S. nuclear forces are central to

¹ U.S. Department of Defense, *Nuclear Posture Review Report* (Washington, D.C.: Department of Defense, April 2010), p. iv, available at <http://www.defense.gov/npr/docs/2010%20nuclear%20posture%20review%20report.pdf>.

² Steven Pifer, “Senator Hagel and Nuclear Weapons,” Brookings Institution, January 30, 2013, available at <http://www.brookings.edu/blogs/up-front/posts/2013/01/30-hagel-nuclear-weapons-pifer>.

³ George W. Bush, “Statement by H.E. Mr. George W. Bush, President, at the 56th Session of the United Nations General Assembly,” UN.org, November 10, 2001, available at <http://www.un.org/webcast/ga/56/statements/011110usaE.htm>.

⁴ Colin Powell as quoted in “Interview/ Colin Powell: Nuclear Option Suicidal for North Korea,” *The Asahi Shimbun*, July 11, 2013, available at <http://ajw.asahi.com/article/views/opinion/AJ201307110007>.

contemporary Minimum Deterrence assurances that the United States can now prudently undertake deep nuclear force reductions.

Minimum Deterrence proponents do not explain why nuclear terrorism should be deemed the most immediate and extreme danger. This Section assesses the question of whether nuclear terrorism can reasonably be considered the most immediate and extreme danger to the United States. It uses a specific methodology to examine how the threat of nuclear terrorism compares to the threat of state-based nuclear attack, and then examines implications of this comparison for the Minimum Deterrence narrative.

Minimum Deterrence Claims

U.S. Nuclear Weapons Irrelevant to the Priority Threat

Minimum Deterrence advocates discuss the threat of nuclear terrorism in a manner that advances their policy recommendation of deep U.S. nuclear force reductions. First, is the claim that nuclear terrorism is the greatest threat facing the United States, especially in light of the dissolution of the Soviet Union and (perceived) relatively benign relations with Russia and China. In a study advocating Minimum Deterrence, former Strategic Command (STRATCOM) Commander General James Cartwright summarized this position stating, “The risk of nuclear confrontation between the United States and either Russia or China belongs to the past, not the future, while nuclear proliferation and nuclear terrorism present real and growing risks...”⁵ And also that, the U.S. nuclear arsenal is “unable to reliably deter or defeat terrorist organizations with no return address...”⁶ a sentiment that other Minimum Deterrence advocates widely share.⁷ As a former analyst at the Los Alamos National Laboratory observes in this regard, “Al-Qaeda has attacked the United States, Great Britain, Pakistan, several NATO countries, and Israeli

⁵ James Cartwright, et. al., *Modernizing U.S. Nuclear Strategy, Force Structure and Posture* (Washington, D.C.: Global Zero, May 2012) p. 6, available at http://www.globalzero.org/files/gz_us_nuclear_policy_commission_report.pdf.

⁶ *Ibid.*, p. 2.

⁷ See Bruce Blair, Damon Bosetti, and Brian Weeden, “Bombs Away,” *New York Times*, December 6, 2010, available at http://www.nytimes.com/2010/12/07/opinion/07blair.html?_r=0; James E. Doyle, “Why Eliminate Nuclear Weapons?,” *Survival: Global Politics and Strategy*, Vol. 55, No. 1 (February 2013), p. 16.

citizens and interests. Russia has also suffered terror attacks. All these states possess nuclear arms or are in alliance with nuclear powers.”⁸ Still others assert that U.S. nuclear weapons “will clearly not dissuade al Qaeda from attempting to make or steal them.”⁹

Second, by concluding that the threat of nuclear terrorism is the “real” threat and also that nuclear weapons are irrelevant to countering this threat, Minimum Deterrence advocates portray U.S. nuclear weapons as an anachronistic leftover of the Cold War;¹⁰ they do not contribute to countering the priority threat. In addition, Minimum Deterrence proponents claim that deep nuclear reductions would help address that threat of nuclear terrorism: “A nuclear arsenal of many thousands of weapons will do nothing to deter terrorists from using a nuclear bomb should they acquire one; indeed, the more nuclear weapons there are in the world, the more likely it is that terrorists will get their hands on one.”¹¹ Some Minimum Deterrence proponents go so far as to suggest that the U.S. government no longer plan against the possibility of state-based nuclear threats: “The nightmares [scenarios] continue on and on, until any advocate of minimum deterrence must concede that there is some scenario in which a nuclear war with Russia or China is possible, in which case we will ostensibly be left wishing we had kept the doctrine, plans, and systems of the Cold War. At some point, however, the parlor game of imagining horrible alternatives must end. Not everything that is possible is probable.”¹²

Third, Minimum Deterrence advocates subsequently and correspondingly assert that because U.S. nuclear weapons cannot deter or defeat nuclear terrorism, but that deep nuclear reductions will help address that threat, the U.S. nuclear arsenal can and should be reduced significantly. For example, a recent article in the *New York Times* claims, “Today, the real nuclear threats facing both nations [the United States and Russia] are small arsenals in the hands of weak governments and ‘loose’ weapons that might fall into the hands of terrorists. In comparison with these threats,

⁸ Doyle, “Why Eliminate Nuclear Weapons?,” op. cit., p. 16.

⁹ Sidney D. Drell and James E. Goodby, *What are Nuclear Weapons for? Recommendations for Restructuring U.S. Strategic Nuclear Forces* (Washington, D.C.: Arms Control Association, October 2007), p. 7, available at http://www.armscontrol.org/pdf/20071104_Drell_Goodby_07_new.pdf.

¹⁰ *Ibid.*, p. 1.

¹¹ Ivo Daalder and Jan Lodal, “The Logic of Zero: Toward a World Without Nuclear Weapons,” *Foreign Affairs*, Vol. 87, No. 6 (November / December 2008) p. 84.

¹² Thomas M. Nichols, *No Use: Nuclear Weapons and U.S. National Security* (Philadelphia, PA: University of Pennsylvania Press, 2014), p. 102.

and given the irrelevancy of nuclear weapons in dealing with terrorism, the remaining American and Russian stockpiles of some 20,000 total warheads are bloated and should be drastically cut. A nuclear arsenal beyond the bare minimum adds no protection...¹³

In short, Minimum Deterrence proponents advocate deep U.S. nuclear reductions on the underlying arguments that the U.S. nuclear arsenal is useless against the threat of nuclear terrorism, but its reduction would help mitigate that threat.

Thus, the logic of the Minimum Deterrence position can be summarized as:

- Nuclear terrorism is the greatest threat;
- U.S. nuclear weapons are of no value for countering this threat;
- Reducing the number of U.S. nuclear weapons will help reduce the prospects for nuclear terrorism; and,
- The United States can and should deeply reduce the number of U.S. nuclear weapons.

The 2013 assessment of Minimum Deterrence, *Minimum Deterrence: Examining the Evidence*,¹⁴ examined the veracity of this set of Minimum Deterrence propositions and arguments and noted two major problems. These can be summarized briefly.

First, even if it is granted that nuclear terrorism is the greatest threat confronting the United States and that U.S. nuclear weapons are of little or no value for countering that threat, it is a non sequitur for Minimum Deterrence proponents to claim, therefore, that U.S. nuclear weapons are of little or reduced value for U.S. national security. If nuclear terrorism represents an additional and unprecedented threat to the United States, as opposed to being the *only* serious threat facing the United States, then other threats, including continuing state-based threats, can still demand robust U.S. nuclear capabilities for deterring foes and assuring allies. To suggest that U.S. nuclear weapons are now largely irrelevant and may now largely be eliminated because they are not pertinent to the “real” threat of nuclear terrorism would be to suggest the same lack of value for other elements of U.S. military capabilities that similarly are not obviously directly pertinent to countering the threat of nuclear terrorism. By logical extension, this same lack of value could

¹³ Blair, Bosetti, and Weeden, “Bombs Away,” op.cit.

¹⁴ Keith B. Payne and James R. Schlesinger, *Minimum Deterrence: Examining the Evidence* (Fairfax, VA: National Institute Press, 2013), pp. 34-38, available at <http://nipp.org/Final%20for%20Distro%207.17.pdf>.

also be attributed to much of the U.S. military establishment—with considerable potential financial savings with its elimination. That argument, however, is not made by Minimum Deterrence proponents, perhaps because it appears self-evidently preposterous. In short, even if the first two parts of this Minimum Deterrence argument are granted as valid—nuclear terrorism is the greatest threat and U.S. nuclear weapons are irrelevant to that threat—it does not follow that U.S. nuclear weapons can be deeply reduced because *other threats* exist that may demand robust U.S. nuclear capabilities—just as main battle tanks and carrier task forces continue to have value vis à vis other threats.

Second, even if granted that nuclear terrorism is the greatest threat confronting the United States, the subsequent claim that U.S. nuclear weapons are of little or no value for countering this threat and thus may prudently be reduced dramatically is highly questionable. For example, U.S. deterrence, including nuclear deterrence, may provide a critical contribution to countering the threat of nuclear terrorism: nuclear-armed state powers who might otherwise consider supporting a terrorist organization's drive to acquire a nuclear weapon may be deterred from doing so by the totality of U.S. deterrent capabilities, including U.S. nuclear capabilities. Established U.S. policy already seeks to take advantage of deterrence for this purpose, and U.S. nuclear capabilities may contribute importantly to that deterrent goal.

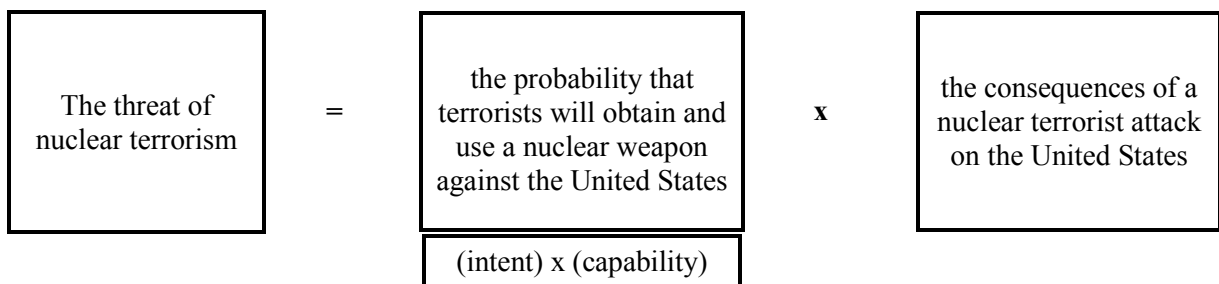
The points above certainly are pertinent to this mainstay of the contemporary Minimum Deterrence argument for deep U.S. nuclear force reductions. This Section will not repeat this earlier analysis beyond the summary above. Rather, this Section will examine the initial proposition of this Minimum Deterrence argument by addressing the question: can nuclear terrorism reasonably be deemed the most immediate and severe threat facing the United States. In particular, this Section will compare the threat of nuclear terrorism to the threat from nuclear-armed states—the latter threat traditionally establishing a U.S. requirement for robust U.S. nuclear capabilities.

Assessing the Threat of Nuclear Terrorism

The National Research Council (NRC), in its report *Radiation Source Use and Replacement: Abbreviated Version*, measured the risk associated with a threat via a specific methodology.¹⁵

$$\text{RISK} = \text{PROBABILITY} \times \text{CONSEQUENCE}$$

The methodology used in this report to examine the risk associated with the threat of nuclear terrorism follows this NRC formula:



As is reflected in the graphic above, this NRC methodology focuses on probability and consequences to understand the cumulative risk of nuclear terrorism.

Probability of a Terrorist Nuclear Attack

The NRC report cited above posits that the probability of a terrorist nuclear attack is the product of two factors: intent and capability.¹⁶ The following discussion examines both factors.

Intent

Multiple terrorist groups over the past two decades have expressed interest in acquiring and using a nuclear weapon against the United States, as well as other countries. For example, Al-

¹⁵ Committee on Radiation Source Use and Replacement, National Research Council, *Radiation Source Use and Replacement: Abbreviated Version* (Washington, D.C.: National Academies Press, 2008), pp. 43-44, available at http://www.nap.edu/openbook.php?record_id=11976.

¹⁶ Committee on Radiation Source Use and Replacement, National Research Council, *Radiation Source Use and Replacement: Abbreviated Version*, op. cit., p. 48.

Qaeda and its affiliates have publicly announced their intention to build or obtain a nuclear device to use against the United States as well as other countries.¹⁷ There are reports that Al-Qaeda and its affiliates have attempted to buy tactical nuclear weapons and that they have tried to buy nuclear material in an attempt to build their own weapon.¹⁸ There appears to be little doubt about the general intent of Al-Qaeda in this regard.

When Minimum Deterrence proponents discuss a terrorist nuclear attack it is clear that they are referring to an actual nuclear detonation rather than to other possible types of attacks such as spreading radiation and radioactive materials.¹⁹ There are, however, no open-source reports that suggest Al-Qaeda and its affiliates have succeeded in either obtaining a nuclear weapon or acquiring enough fissile material to build their own weapon.²⁰ As the Commission on the Prevention of WMD Proliferation and Terrorism said in 2008 regarding the terrorist nuclear threat, “Today, all of this still points to intent but not capability.”²¹ As such, most analyses of

¹⁷ These announcements and the multitude of official and unofficial reports about other incidents have been recounted and compiled in multiple sources. See, for example: Keith B. Payne, Thomas K. Scheber, Kurt R. Guthe, and Cynthia L. Storer, *Deterrence and Al-Qa'ida* (Fairfax, VA: National Institute Press, October 2012) p. 47, available at

http://nipp.org/Publication/Downloads/Downloads%202012/Deterrence%20and%20AlQaida_for%20web.pdf; and Sammy Salama and Lydia Hansell, “Does Intent Equal Capability? Al-Qaeda and Weapons of Mass Destruction,” *Nonproliferation Review*, Vol. 12, No. 3 (November 2005), pp. 620-621; and Evan Braden Montgomery, *Nuclear Terrorism: Assessing the Threat, Developing a Response* (Washington, D.C.: Center for Strategic and Budgetary Assessments, 2009), pp. 17-19, available at <http://www.csbaonline.org/publications/2009/04/nuclear-terrorism/>.

¹⁸ See, Salama and Hansell, “Does Intent Equal Capability? Al-Qaeda and Weapons of Mass Destruction,” op. cit., pp. 620-621; and, Central Intelligence Agency, “Subj: Usama Bin Ladin’s Attempts to Acquire Uranium,” March 18, 1997, Secret, Approved for Release April 25, 2012, available at <http://www.gwu.edu/~nsarchiv/nukevault/ebb388/docs/EBB003.pdf>.

¹⁹ The possibility of radiological terrorist attacks has been studied fairly extensively and there is a general consensus that while radiological attacks would most likely result in fewer fatalities than a nuclear attack, the possibility is no less concerning. Because radiological material is generally less secure than nuclear material, most academics and multiple government studies note that a radiological attack is much more feasible than a nuclear terrorist attack. For other studies concerning radiological terrorism, see, Defense Science Board Task Force on Unconventional Nuclear Warfare Defense, *2000 Summer Study Volume III* (Washington, D.C.: Office of the Under Secretary of Defense for Acquisition, Technology, and Logistics, July 2001), available at <http://www2.gwu.edu/~nsarchiv/nukevault/ebb388/docs/EBB008.pdf>; and, Committee on Radiation Source Use and Replacement, National Research Council, *Radiation Source Use and Replacement: Abbreviated Version*, op. cit.

²⁰ Two recent official reports imply that terrorist organizations have yet to acquire a nuclear capability. See, U.S. Department of Defense, *Nuclear Posture Review Report*, p. iv, op.cit.; and, White House, *National Security Strategy* (Washington, D.C.: The White House, May 2010), p. 20, available at http://www.whitehouse.gov/sites/default/files/rss_viewer/national_security_strategy.pdf.

²¹ Bob Graham, Chairman, Commission on the Prevention of WMD Proliferation and Terrorism, *World at Risk* (New York: Vintage Books, December 2008), p. 20.

nuclear terrorism focus on whether non-state actors have the *capability* of obtaining or building a nuclear weapon.

Capability

The capability of a terrorist group to conduct a nuclear attack on the United States depends in part on its obtaining a nuclear weapon. Several paths to acquiring a nuclear weapon are possible.²² One such path would be purchasing (or being given) a nuclear weapon. States may, however, be reluctant to be involved in such activities. The United States has a long-standing policy of holding a state-sponsor of terrorism responsible for the actions of the terrorist group.²³ There is some evidence that deterrence can help dissuade a state sponsor of terrorism from aiding terrorists, but the effectiveness and reliability of such deterrent threats is unclear.²⁴

A second option for terrorists to obtain a nuclear weapon is to steal one from a state's nuclear arsenal. Pakistan is usually cited as the country most likely to experience one of these attempts because of its fragile political state and the presence of multiple terrorist groups operating within its borders.²⁵

There are safeguards against nuclear theft. For example, officials in the U.S. government, including President Obama, have expressed their confidence in the Pakistani government and military to continue providing security for their nuclear weapons.²⁶ With enough "insider" help, terrorist groups may be able to overcome these safeguards. But it is unknown if or when terrorist groups will be successful in obtaining a nuclear weapon in this fashion.

²² Charles D. Ferguson, William C. Potter, Amy Sands, Leonard S. Spector, and Fred L. Wehling, *The Four Faces of Nuclear Terrorism* (New York: Routledge, 2005).

²³ White House, *National Strategy for Combating Terrorism* (Washington, D.C.: The White House, February 2003), p. 17, available at https://www.cia.gov/news-information/cia-the-war-on-terrorism/Counter_Terrorism_Strategy.pdf.

²⁴ Payne and Schlesinger, *Minimum Deterrence: Examining the Evidence*, op. cit., pp. 34-38.

²⁵ Joseph Cirincione, *Nuclear Nightmares: Securing the World before it is too Late* (New York: Columbia University Press, 2013) p. 119.

²⁶ Paul K. Kerr and Mary Beth Nitikin, *Pakistan's Nuclear Weapons: Proliferation and Security Issues* (Washington, D.C.: Congressional Research Service, March 19, 2013), p. 1, available at <http://fas.org/sgp/crs/nuke/RL34248.pdf>.

The third, and perhaps the most studied option, is acquiring highly-enriched uranium (HEU) or reprocessed plutonium for use in a “gun-type” or “implosion-type” device respectively. A gun-type device, while possibly difficult for terrorists to construct, is thought to be more within the technical means of a sophisticated terrorist group (even lacking state-sponsorship).²⁷ Thus, as one analyst notes, “The truly onerous barrier for nuclear terrorists is acquiring enough HEU.”²⁸ Both Democratic and Republican administrations have focused recently on the risk of terrorist theft of fissile material. Thus there are multiple efforts underway to secure existing stockpiles of HEU and separated plutonium as well as to reduce reliance on the materials in civilian research projects.

In short, there are multiple potential routes to terrorist acquisition of a nuclear weapon. If and when a terrorist organization will be able to do so is unclear. It should be noted in this regard, however, that, the Commission on the Intelligence Capabilities of the United States Regarding Weapons of Mass Destruction reported that, “technical collectors often have great difficulty tracking weapons of mass destruction efforts. This is especially true for non-state actors.”²⁹ It may ultimately be difficult to assess if and when terrorists have obtained a nuclear weapon.

With that important caveat in mind, if terrorist groups have not yet obtained a nuclear weapon, the threat of nuclear terrorism is not today’s most immediate and extreme danger because such a threat (as the term is used in the Minimum Deterrence narrative) presupposes access to, or possession of, a nuclear weapon. Should a terrorist group, in the future, obtain a nuclear weapon, *then* it almost certainly would become a threat to the United States. Until that point, however, it

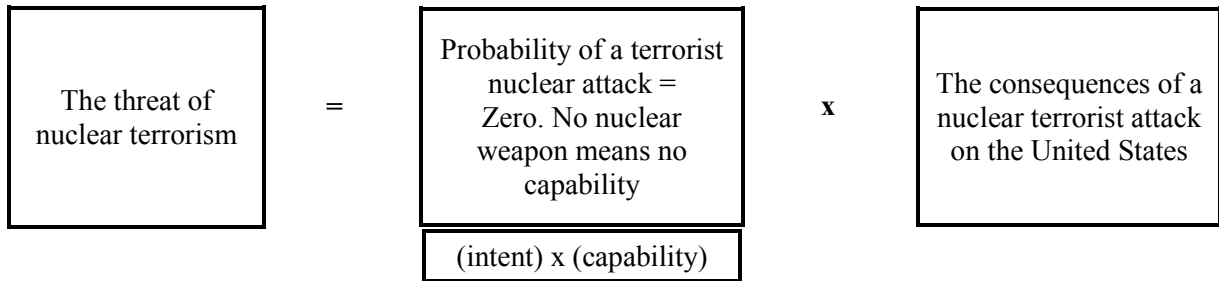
²⁷ For a discussion of gun-type and implosion-type devices and the level of terrorist technical sophistication needed for each device, see, Charles D. Ferguson, *Preventing Catastrophic Nuclear Terrorism* (Washington, D.C.: Council on Foreign Relations, March 2006), pp. 6-8, available at <http://www.cfr.org/weapons-of-mass-destruction/preventing-catastrophic-nuclear-terrorism/p10067>; and, Matthew Bunn and Anthony Wier, “Terrorist Nuclear Weapon Construction: How Difficult?,” *Annals of the American Academy of Political and Social Science*, Vol. 607 (September 2006), pp. 138-143. There is a general agreement among experts that terrorists are unable to produce enough fissile material for their own device because of the difficulty in obtaining and maintaining the right equipment: “Given these underlying physical realities, it is virtually inconceivable that a terrorist group would be able to produce separated plutonium or HEU on its own.” Bunn and Wier, “Terrorist Nuclear Weapon Construction: How Difficult?,” *op. cit.*, p. 137.

²⁸ Ferguson, *Preventing Catastrophic Nuclear Terrorism*, *op. cit.*, p. 8.

²⁹ Laurence H. Silberman and Charles S. Robb, Co-Chairmen, The Commission on the Intelligence Capabilities of the United States Regarding Weapons of Mass Destruction, *Report to the President of the United States* (Washington, D.C., The Commission on the Intelligence Capabilities of the United States Regarding Weapons of Mass Destruction, March 31, 2005) p. 274, available at http://www.ise.gov/sites/default/files/wmd_report_0.pdf.

is a prospective threat, and the Minimum Deterrence claim regarding its immediacy and relative priority seems to be fallacious.

Consequently, the NRC methodology can be updated in the probability box as follows:



Probability

Some analysts have recently attempted to quantify the probability (intent x capability) of a successful nuclear terrorist attack against the United States. For example, Richard Garwin estimated there is a 20 percent probability per year of a successful terrorist nuclear (not radiological) attack.³⁰ Senator Richard J. Lugar commissioned a survey in 2005 to study what experts thought were the greatest WMD and proliferation threats facing the United States. According to the results of the survey, the experts believed on average that there was a 16.4% chance of a nuclear (again, not radiological) terrorist attack on the United States in the next five years, and a 29.2% chance in the next 10 years.³¹ Harvard professor Matthew Bunn, in his article “A Mathematical Model of the Risk of Nuclear Terrorism,” writes that there is approximately a three percent yearly chance of a successful terrorist nuclear attack and a 29.2% chance over a ten year period.³² While both studies coincidentally came to the same numerical probability, Bunn’s study used mathematical modeling while the Lugar survey averaged the probabilities included in

³⁰ This estimation also includes the risk to European cities. Richard Garwin testimony in, “Rep. Peter J. Visclosky Holds a Hearing on Nuclear Weapon Activities,” *Political/Congressional Transcript Wire*, Washington, D.C., March 30, 2007. In the same hearing, former Defense Secretary William Perry, speaking of the chances of nuclear terrorism occurring, says, “In any event, I would say it is not a remote possibility. It’s a very real probability, much, much higher probability than the nuclear exchange during the Cold War.”

³¹ Richard J. Lugar, *The Lugar Survey on Proliferation Threats and Responses* (Washington, D.C.: United States Senate, June 2005), pp. 13-14, available at http://www.fas.org/irp/threat/lugar_survey.pdf.

³² Matthew Bunn, “A Mathematical Model of the Risk of Nuclear Terrorism,” *Annals of the American Academy of Political and Social Science*, Vol. 607 (September 2006), p. 107.

the multiple responses to the survey. Graham Allison, Director of the Belfer Center at Harvard, estimated in 2004 that there was a “greater than 50 percent” chance of a successful nuclear terrorist attack in the “next decade.”³³

While these experts to some extent recognize the limits of their predictions, the inherent problem with quantifying the probability of such complex human actions with this type of precision is that the knowledge required to make these claims credibly spans the areas of psychology, sociology, history, physics, chance, and unknown/unknowable factors that can affect the system under study. Indeed, the National Research Council, when asked to assess the probability of a radiological terror attack, wrote that, “In the context of terrorism and other malevolent misuses, it may still be possible to evaluate the consequences (in terms of the number of fatalities, economic losses, and social effects) for specific scenarios with relative rigor. Evaluation of probabilities, however, lies beyond the reach of traditional analytic techniques because the probability of a successful terrorist attack involves many factors that cannot be objectively quantified.”³⁴

Indeed, there is “unquantifiable uncertainty” in studying such human interactions. Former Wall Street quantitative analyst (“quant”) and physicist, Emanuel Derman, explains, “Unquantifiable uncertainty is, for example, the likelihood of a revolution in China or the detonation by terrorists of a nuclear bomb in midtown Manhattan. These events are unlikely, but there is no reliable method of estimating their odds.”³⁵ Derman continues his assessment saying, “For frequentist probabilities to be meaningful, one must be able to subject a system to repeated independent identical circumstances. You can do this with [flipping] coins because their history is unimportant. In human affairs, history matters, and people are altered by every experience.”³⁶

³³ Graham T. Allison and Michael Levi, “How Likely is a Nuclear Terrorist Attack on the United States?,” Council on Foreign Relations, April 16, 2007, available at <http://www.cfr.org/weapons-of-mass-destruction/likely-nuclear-terrorist-attack-united-states/p13097>.

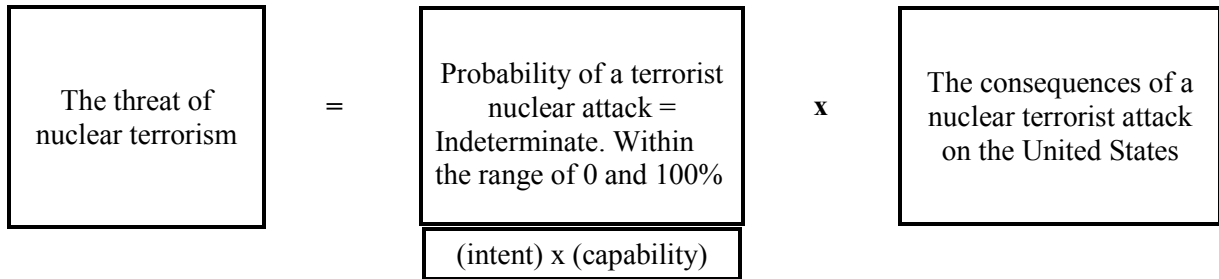
³⁴ Committee on Radiation Source Use and Replacement, National Research Council, *Radiation Source Use and Replacement: Abbreviated Version*, op. cit., p. 44.

³⁵ Emanuel Derman, *Models. Behaving. Badly.: Why Confusing Illusion with Reality Can Lead to Disaster, on Wall Street and in Life* (New York: Free Press, 2011), p. 154.

³⁶ *Ibid.*, p. 156.

What then can policy-makers do in the face of this uncertainty regarding probabilities? According to Derman, “The best you can do with unquantifiable uncertainty is to be aware of it and aware of your inability to quantify it, and then act accordingly.”³⁷

Assuming a terrorist group acquires a nuclear weapon, then the NRC formula would appear as below:



The Consequences of a Nuclear Terrorist Attack

Forecasting the probability of a terrorist nuclear attack with precision is not possible; however, some analysts have attempted to calculate the possible destructive consequences of such an attack. The Department of Homeland Security describes the targets at high-risk of terrorist attack as, “military and civilian government facilities, international airports, large cities, and high-profile landmarks.”³⁸ As such, most studies of the effects of a terrorist use of a nuclear weapon place the detonation of the weapon in an urban setting.

The RAND Corporation produced a study that considered the effects of a 10-kt nuclear detonation in the Port of Long Beach, CA. In short, RAND estimated there would be 60,000 fatalities from the initial blast and subsequent radiation poisoning, along with approximately 150,000 injured. The projected initial economic costs could reach \$1 trillion.³⁹ In another scenario, analysts at the Belfer Center at Harvard University examined the effects of a 10-kt

³⁷ Ibid., p. 154.

³⁸ Federal Emergency Management Agency, *Are You Ready?* (Washington D.C.: Department of Homeland Security, August 2004), p. 148, available at http://www.fema.gov/pdf/areyouready/areyouready_full.pdf.

³⁹ Charles Meade and Roger C. Molander, *Considering the Effects of a Catastrophic Terrorist Attack* (Santa Monica, CA: RAND Corporation, 2006), pp. xv-xvi, available at http://www.rand.org/content/dam/rand/pubs/technical_reports/2006/RAND_TR391.pdf.

nuclear detonation in New York City, with ground zero at Grand Central Station. They determined there would be over 500,000 fatalities, hundreds of thousands more injured, and nearly \$1 trillion in total economic damages.⁴⁰ In a final scenario, analysts at the Lawrence Livermore National Laboratory examined the possible effects of a 10-kt nuclear detonation in downtown Washington, D.C.⁴¹ The report concluded that the 10-kt blast would result in more than 45,000 fatalities from radiation and trauma, plus nearly 300,000 injuries.⁴²

Most analyses of the effects of nuclear terrorism choose to model a 10-kt explosion, apparently because it fits within the range of possibilities for a stolen Pakistani weapon⁴³ as well as the fact that “most homeland security experts agree on 10 KT as a useful assumption for planning.”⁴⁴ Figure 1 below summarizes the scenarios outlined above of the projected consequences of a 10-kt nuclear detonation in three different cities.

Figure 1. Summary of the Projected Consequences of a Nuclear Terrorist Attack

Location	Yield	Fatalities	Injuries	Financial Cost
Washington, D.C.	10-kt	45,000+	300,000+	Not examined
Long Beach, CA	10-kt	60,000+	150,000+	\$1 trillion
New York, NY	10-kt	500,000+	200,000+	\$1 trillion

Each study listed above makes explicit that their figures of fatalities, injuries, and financial costs are estimates and that actual effects cannot be forecast with precision given the range of variables involved. For example, the assumed terrorist-use of a 10-kt nuclear device may be a

⁴⁰ Matthew Bunn, Anthony Wier, and John P. Holdren, *Controlling Nuclear Warheads and Materials: A Report Card and Action Plan* (Cambridge, MA: Harvard University, March 2003), pp. 15-18, available at http://www.nti.org/media/pdfs/controlling-nuclear-warheads-and-materials-2003.pdf?_=1322768605.

⁴¹ B.R. Buddemeir, J.E. Valentine, K.K. Millage, and I.D. Brandt, *National Capital Region Key Response Planning Factors for the Aftermath of Nuclear Terrorism* (Livermore, CA: Lawrence Livermore National Laboratory, November 2011), p. 2, available at <http://fas.org/irp/agency/dhs/fema/ncr.pdf>.

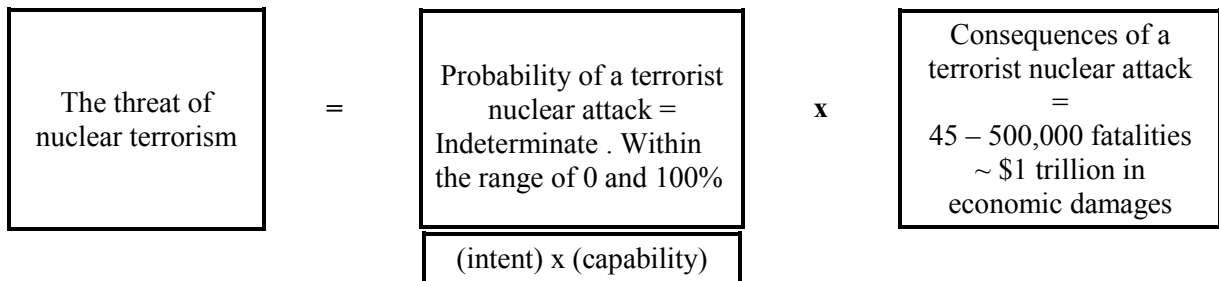
⁴² It is important to note that this report did not attempt to calculate the fatalities from the initial blast effects. Ibid., pp. 44, E-5.

⁴³ Timothy McDonnell, “Nuclear Pursuits: Non-P-5 Nuclear-armed States, 2013,” *Bulletin of the Atomic Scientists*, Vol. 69, No. 1 (January 2013), pp. 64-65; and, Kerr and Nitikin, *Pakistan’s Nuclear Weapons: Proliferation and Security Issues*, op. cit., p. 4.

⁴⁴ Federal Emergency Management Agency, *Planning Guidance for Response to a Nuclear Detonation* (Washington, D.C.: Federal Emergency Management Agency, June 2010) 2nd edition, p. 11, available at <http://www.epa.gov/rpdweb00/docs/er/planning-guidance-for-response-to-nuclear-detonation-2-edition-final.pdf>.

“worst case” nuclear terrorism scenario.⁴⁵ When modeling the effects of a terrorist nuclear attack the Federal Emergency Management Agency (FEMA) says, “experts assume a low-yield nuclear device detonated at ground-level. Low yield in this context ranges from fractions of a kiloton (KT) to 10 KT.”⁴⁶ As FEMA adds, however, “The impacts of a nuclear explosion less than 10 KT would be less [compared to a 10 KT nuclear explosion]; however, the relation is not linear.”⁴⁷ While it may be useful for planning purposes to assume terrorist use a 10-kt yield nuclear device, it is not necessarily the most likely scenario of a terrorist nuclear attack and the projected consequences of such an attack with a smaller yield weapon could be reduced accordingly.

Assuming a terrorist group obtains a nuclear weapon, the risk of such a threat according to the NRC methodology may be characterized as follows:



What does the application of the NRC formula tell us about the threat of nuclear terrorism? First, it shows that for nuclear terrorism to become the most immediate and extreme threat, a terrorist group must first have access to a nuclear weapon, thus giving it a “capability.” Second, given the frequent presence of what Derman calls “unquantifiable uncertainty” in complex human decision making and behavior, the attribution of a precise probability to an attack cannot reasonably be done in the absence of very detailed information about an enemy’s intent and decision making—information that may well be beyond all practical reach. This limitation certainly does not mean that threats are not real, but that precise numeric prediction of

⁴⁵ Buddemeir, Valentine, Millage, and Brandt, *National Capital Region Key Response Planning Factors for the Aftermath of Nuclear Terrorism*, op. cit., p. 35.

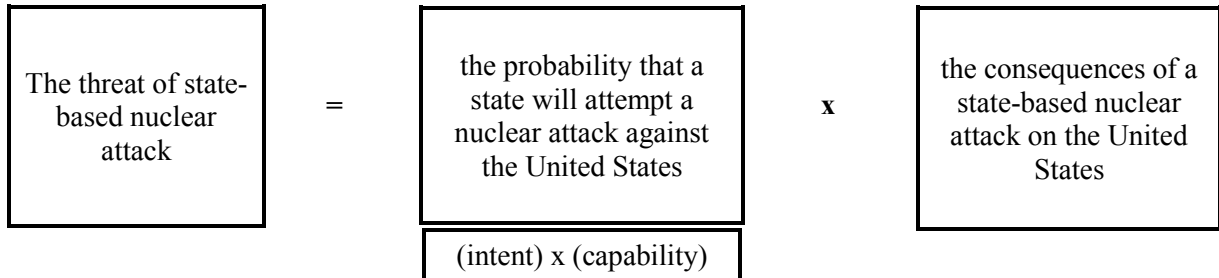
⁴⁶ Federal Emergency Management Agency, *Planning Guidance for Response to a Nuclear Detonation*, op. cit., p. 15.

⁴⁷ *Ibid.*, p. 15.

probabilities likely will be infeasible. Finally, the physical consequences of a terrorist nuclear attack may be assessed, again with some caveats with regard to precise conclusions: the range of destruction offered by several such efforts suggest fatalities from 45,000 to 500,000.

Assessing the Threat of a State-based Nuclear Attack

The following discussion examines the threat of a state-based nuclear attack against the United States, a threat that Minimum Deterrence proponents have dismissed as largely ending with the conclusion of the Cold War. The same NRC methodology can be used to assess the threat of a state-based nuclear attack in comparison to the threat of nuclear terrorism.



Probability of a State-based Nuclear Attack

As noted above, the National Research Council defines “probability” as the product of two factors: intent and capability. As such, this section examines the possible intent a state may have to engage in actions that could lead to a nuclear crisis with the United States, and whether it has the nuclear capability to do so.

Intent

As already discussed, properly anticipating an opponent’s future decision making and behavior is limited by the potential for unknown/unknowable factors driving that decision making, and by the possibility of “unquantifiable uncertainties.” For example, Director of National Intelligence James R. Clapper’s February 2014 report “Worldwide Threat Assessment of the Intelligence Community” correctly predicted Ukraine’s President Yanukovich would resort to “extralegal means” to stay in power, but that this would only lead to a “further erosion of democratic

norms,” not his eventual overthrow, which happened within days of the report’s release date. The report also failed to anticipate Russian President Vladimir Putin’s subsequent occupation of Crimea and support of rebels in eastern Ukraine.⁴⁸ Pointing to this recent history is not intended as criticism, rather it demonstrates that foreign “intent” and subsequent associated behavior can be very difficult to anticipate, and can change, sometimes quickly and unexpectedly.

It is possible, nevertheless, to examine opponents’ stated goals and the methods they use to attain those goals. A “potential flashpoint” is when/where a foreign leader’s intentions, goals and methods are in sharp opposition to U.S. national security interests. Examining these possible flashpoints, based on the stated goals of Russia, China, and North Korea, can help reveal possible paths toward nuclear crises and escalation with the United States – thus contributing to an understanding of the potential for a state-based nuclear crises or attack.

Russia’s Goals and Potential Flashpoints with the United States

America’s most recent ambassador to the Russian Federation, Michael McFaul, recently explained in an op-ed that Russian President Vladimir Putin has multiple foreign policy goals, including, to:

- “Check American power around the world, including most importantly our alleged policies of regime change in the Middle East and Eurasia”;
- “Nurture the image of the United States as an enemy, as a way of strengthening Putin’s domestic supporters and weakening his domestic critics”;
- “Check the expansion of American missile defenses”;
- “Reclaim Russia’s role as a respected, pivotal power in the international system.”⁴⁹

Putin’s former chief economic adviser claims openly that Putin’s recent actions in Ukraine indicate that he also intends to conquer, “Belarus, the Baltic states, and Finland.”⁵⁰ Whatever

⁴⁸ James R. Clapper, “Statement for the Record, Worldwide Threat Assessment of the US Intelligence Community,” before the Senate Armed Services Committee, February 11, 2014, pp. 22-25, available at http://www.dni.gov/files/documents/2014%20WWTAA%20SFR_SASC_11_Feb.pdf.

⁴⁹ Michael McFaul, “Putin the (Not So) Great,” Politico.com, August 4, 2014, available at <http://www.politico.com/magazine/story/2014/08/putin-the-not-so-great-109711.html>.

⁵⁰ Adam Withnall, “Vladimir Putin ‘wants to regain Finland’ for Russia, adviser says,” *The Independent (UK)*, March 30, 2014, available at <http://www.independent.co.uk/news/world/europe/vladimir-putin-wants-to-regain-finland-for-russia-adviser-says-9224273.html>.

Putin's territorial intentions may be, Russian military doctrine and official statements make clear that the United States and the North Atlantic Treaty Organization (NATO) are regarded as Russia's preeminent adversaries.⁵¹ Russian officials, including President Putin and Prime Minister Medvedev, have threatened nuclear use against U.S. missile defense facilities in Europe as well as NATO allies on multiple occasions.⁵² Putin himself has threatened to "strangle" NATO,⁵³ and has apparently "succeeded in convincing most Russians that the United States is an enemy of Russia."⁵⁴

There are multiple possible flashpoints between the United States and Russia that have the potential to escalate quickly. First, Russian aggression towards U.S. allies in NATO has the potential to invoke Article V of the North Atlantic Treaty which states in part: "The Parties agree that an armed attack against one or more of them in Europe or North America shall be considered an attack against them all..."⁵⁵ Such an event would indeed have the potential to escalate. Russia's official military doctrine uses the concept of "de-escalation" (developed in its modern form under Putin's leadership) wherein if Russia were faced with an attack "that exceeded its capacity for defense" then it reserves the right to respond with a limited nuclear strike against the attacker either near Russian territory or, more likely, against the attacker's homeland.⁵⁶ Also, Russia's multiple "military exercises" near the borders of Ukraine and NATO allies concern NATO Secretary General Anders Fogh Rasmussen, who recently said, "We have

⁵¹ "NATO says Russia considers it an opponent, prepares Ukraine aid," Reuters.com, June 15, 2014, available at <http://www.reuters.com/article/2014/06/15/us-nato-ukraine-russia-idUSKBN0EQ0G020140615>; and, David Martosko, "Russian prime minister warns Obama is brining the world to the brink of 'a second Cold War that nobody needs'," *The Daily Mail (UK)*, May 20, 2014, available at <http://www.dailymail.co.uk/news/article-2634099/Russian-prime-minister-warns-Obama-bringing-world-brink-second-Cold-War-needs.html>.

⁵² Keith B. Payne, "Prepared Statement," before the United States Senate, Senate Appropriations Subcommittee on Energy and Water Development, July 25, 2012, pp. A-1 – A-5, available at <http://www.nipp.org/National%20Institute%20Press/Current%20Publications/PDF/July%2025%20testimony%20for%20web.pdf>.

⁵³ "Direct Line with Vladimir Putin," Office of the President of Russia, April 17, 2014, available at <http://eng.kremlin.ru/news/7034>.

⁵⁴ McFaul, "Putin the (Not So) Great," op. cit.

⁵⁵ North Atlantic Treaty Organization, "The North Atlantic Treaty," signed April 4, 1949, available at http://www.nato.int/cps/en/natolive/official_texts_17120.htm.

⁵⁶ Russia's nuclear exercises regularly simulate a counterforce attack against various countries, thus indicating a willingness to attack a nation's homeland in order to "de-escalate" a local conflict. Nikolai N. Sokov, "Why Russia calls a limited nuclear strike 'de-escalation'," *Bulletin of the Atomic Scientists*, March 13, 2014, available at <http://thebulletin.org/why-russia-calls-limited-nuclear-strike-de-escalation>.

seen the Russians improve their ability to act swiftly. They can within a very, very, short time convert a major military exercise into an offensive military operation.”⁵⁷

The National Intelligence Council, in its report *Global Trends 2030: Alternative Worlds*, estimates that “Russia’s strategic calculations will depend to a great extent on whether Russian leaders decide to increase Russia’s integration into the international system and mitigate the threat of future armed conflict or whether they choose to continue Russia’s relative isolation and mistrust of others, exacerbating interstate tensions.”⁵⁸ Based on Russia’s recent nuclear threats to European states, violation of the INF Treaty, forcible annexation of Crimea, and “flagrant disregard for international law,”⁵⁹ it appears that Russia has chosen the latter course.

China’s Goals and Potential Flashpoints with the United States

China currently maintains several general foreign policy and security goals, including, “to blunt destabilizing influences from abroad, to avoid territorial losses, to reduce its neighbors’ suspicions, and to sustain economic growth.”⁶⁰ The Department of Defense, however, identifies a less defensive orientation: “Despite China’s desire to project the image of a benign developing country, its efforts to defend ‘national sovereignty and territorial integrity,’ underpinned by growing economic strength and military capabilities, have been manifest in more forceful rhetoric and confrontational behavior in recent years.”⁶¹

As China pursues these goals, Chinese strategists have studied U.S. actions in Asia and have apparently concluded that, “as China rises, the United States will resist.”⁶² It appears that the

⁵⁷ Ian Traynor, “Ukraine crisis: Nato plans east European bases to counter Russia,” *The Guardian (UK)*, August 26, 2014, available at <http://www.theguardian.com/world/2014/aug/26/nato-east-european-bases-counter-russian-threat>.

⁵⁸ National Intelligence Council, *Global Trends 2030: Alternative Worlds* (Washington, D.C.: Director of National Intelligence, December 2012), p. 62, available at http://www.dni.gov/files/documents/GlobalTrends_2030.pdf.

⁵⁹ Rose Gottemoeller, “Remarks at the Annual Deterrence Symposium,” U.S. State Department, August 14, 2014, available at <http://www.state.gov/t/us/2014/230636.htm>.

⁶⁰ Andrew J. Nathan and Andrew Scobell, “How China Sees America,” *Foreign Affairs*, Vol. 91, No. 5 (September / October 2012), p. 32.

⁶¹ U.S. Department of Defense, *Military and Security Developments Involving the People’s Republic of China 2014* (Washington, D.C.: Department of Defense, 2014), p. 16, available at http://www.defense.gov/pubs/2014_DoD_China_Report.pdf.

⁶² Nathan and Scobell, “How China Sees America,” op. cit., p. 36.

dominant view in China is that “China must stand up to the United States militarily and that it can win a conflict, should one occur, by outpacing U.S. military technology and taking advantage of what they believe to be superior morale within China’s armed forces. Their views are usually kept out of sight to avoid frightening both China’s rivals and its friends.”⁶³ Assessing the overall direction China is expected to take, the National Intelligence Council states, “Historical parallels with other great power rises suggest that Chinese assertiveness might increase as its economic growth slows and there is political need at home to demonstrate China’s standing in the world.”⁶⁴ This “assertiveness” is particularly manifest in China’s involvement in multiple flashpoints with its neighbors.

For example, a major potential flashpoint between China and the United States is China’s recent claim that it should control the Ryukyu Islands, a chain of islands in the East China Sea that includes the Japanese island of Okinawa (where over 15,000 American troops are stationed).⁶⁵ One analysis indicates that in the territorial disputes over islands in the East and South China Seas, “China has usually only used force in territorial disputes with its most militarily capable neighbors,” and adds, “Japan is now China’s most powerful maritime neighbor...”⁶⁶

The United States is bound by the Japan-U.S. Security Treaty, signed in 1960, to aid Japan in the event of an attack on “territories under the administration of Japan.”⁶⁷ President Obama has confirmed that any advances on the Senkaku islands, which China also claims, would fall under the provision of the treaty.⁶⁸

⁶³ Ibid., p. 37.

⁶⁴ National Intelligence Council, *Global Trends 2030: Alternative Worlds*, op. cit., p. 62.

⁶⁵ Justin McCurry, “China lays claim to Okinawa as territory dispute with Japan escalates,” *The Guardian (UK)*, May 15, 2013, available at <http://www.theguardian.com/world/2013/may/15/china-okinawa-dispute-japan-ryukyu>.

⁶⁶ M. Taylor Fravel, “The Dangerous Math of Chinese Island Disputes,” *Wall Street Journal*, October 28, 2012, available at <http://online.wsj.com/news/articles/SB10001424052970203922804578082371509569896>.

⁶⁷ Article V, quoted in part in, “Treaty of Mutual Cooperation and Security Between Japan and the United States of America,” Ministry of Foreign Affairs of Japan, signed January 19th, 1960, available at <http://www.mofa.go.jp/region/n-america/us/q&a/ref/1.html>.

⁶⁸ Justin McCurry and Tania Branigan, “Obama says US will defend Japan in island dispute with China,” *The Guardian (UK)*, April 24, 2014, available at <http://www.theguardian.com/world/2014/apr/24/obama-in-japan-backs-status-quo-in-island-dispute-with-china>.

Chinese officials also have also declared a “red line” with regard to the Korean peninsula: “The Korean peninsula is right on China’s doorstep. We have a red line, that is, we will not allow war or instability on the Korean peninsula.”⁶⁹ Thus, China may in fact be sending the message that it will not tolerate a repeat of the Korean War where it almost lost the buffer state of North Korea.

In addition, the Department of Defense notes that, in relation to Taiwan, “China’s overall strategy continues to incorporate elements of persuasion and coercion to deter or repress the development of political attitudes in Taiwan favoring independence.”⁷⁰ The United States has consistently supported a peaceful resolution to the China-Taiwan issue “in a manner acceptable to the people on both sides.”⁷¹

In short, there undeniably are multiple potential flashpoints between China and the United States and any one may provide an opportunity for crisis and escalation, be it intended or not.

China’s No First Use (NFU) pledge is often brought up as reassurance that China will not be the first to break the “nuclear taboo.” Some Chinese analysts have suggested, however, that “NFU policy may conform to the rule of morality, but it does not necessarily conform to the law of survival.”⁷² Chinese military officials have even asserted that a conventional attack on their nuclear weapons or a conventional attack with “strategic effects” may force the Chinese leadership to consider nuclear first use.⁷³ Thus, even seemingly localized conflicts around China may have the potential to escalate.⁷⁴

⁶⁹ “China draws ‘red line’ on North Korea, says won’t allow war on peninsula,” Reuters.com, March 8, 2014, available at <http://uk.reuters.com/article/2014/03/08/uk-korea-north-china-idUKBREA2703T20140308>.

⁷⁰ U.S. Department of Defense, *Military and Security Developments Involving the People’s Republic of China 2014*, op. cit., p. 53.

⁷¹ Ibid., p. 57.

⁷² Rong Yu and Peng Guangqian, “Nuclear No-First-Use Revisited,” *China Security*, Vol. 5, No. 1 (Winter 2009), p. 86.

⁷³ Yao Yunzhu, “China Will Not Change Its Nuclear Policy,” *China-US Focus*, April 22, 2013, available at <http://www.chinausfocus.com/peace-security/china-will-not-change-its-no-first-use-policy/>; and, Dan Blumenthal and Michael Mazza, “China’s Strategic Forces in the 21st Century: The PLA’s Changing Nuclear Doctrine and Force Posture,” Nonproliferation Policy Education Center, April 6, 2011, available at <http://www.npolicy.org/article.php?aid=813>.

⁷⁴ The Pentagon notes with concern that it is “unclear how China views the potentially escalatory nature of force posture.” U.S. Department of Defense, *Military and Security Developments Involving the People’s Republic of China 2014*, op. cit., p. 22.

North Korea's Goals and Potential Flashpoints with the United States

The U.S. Department of Defense's most recent report on North Korea includes a list of goals that it believes North Korea's leader, Kim Jong Un, will pursue: "international recognition as a nuclear-armed state, maintenance of a viable deterrent capability, and reunification of Korea under North Korea's control."⁷⁵ The report also states, "North Korea's stated intent to advance its nuclear program and continue ballistic missile / space launch vehicle efforts implies that it will eventually return to coercive actions to achieve its goals in the future."⁷⁶

North Korea's territorial ambitions combined with "a political culture that is defined by an unending existential struggle with outside forces," and a belief that "it can control escalation," makes the situation on the Korean peninsula dangerous for both U.S. and Republic of Korea (ROK) forces stationed on the border.⁷⁷ North Korea has threatened to launch nuclear strikes against the United States and South Korea for perceived aggression towards North Korea's leaders and the North Korean people;⁷⁸ and while this behavior may seem irrational and/or suicidal to the Western mind, some South Korean analysts have discerned the possible North Korean motivation, explaining: "What is unusual is that Pyongyang seems to be very much concerned about such non-tangible values as recognition, status, and esteem, almost equal to power and interests. It is willing to sacrifice its economic gains and to risk even security interests at times if its sovereignty, national pride, and the supreme leader's dignity and honor, are violated. In particular, blasphemy against the leader is tantamount to disrespect against the being of the nation and the North Korean people as a whole."⁷⁹

⁷⁵ U.S. Department of Defense, *Military and Security Developments Involving the Democratic People's Republic of Korea* (Washington, D.C.: Office of the Secretary of Defense, 2013), p. 6, available at http://www.defense.gov/pubs/North_Korea_Military_Power_Report_2013-2014.pdf.

⁷⁶ U.S. Department of Defense, *Military and Security Developments Involving the Democratic People's Republic of Korea*, op. cit., pp. 3-4.

⁷⁷ U.S. Department of Defense, *Military and Security Developments Involving the Democratic People's Republic of Korea*, op. cit., pp. 4, 6.

⁷⁸ *Ibid.*, pp. 8, 10.

⁷⁹ Chung-in Moon and Ildo Hwang, "Identity, Supreme Dignity, and North Korea's External Behavior: A Cultural/Ideational Perspective," *Korea Observer*, Vol. 45, No. 1 (Spring 2014), p. 3.

In short, while North Korea's leadership decision-making process may remain opaque, its intentions clearly are hostile to U.S. security interests at home and abroad.

Potential flashpoints between the United States and North Korea are both numerous and serious. First, and most obvious, is North Korea's stated intention of reunifying Korea with force if necessary. As a treaty ally under the U.S. "nuclear umbrella," South Korea remains the primary target of North Korea's war plans. However, North Korean officials recently stated that if a conflict broke out on the Korean peninsula that "the American troops in South Korea will be the main target" even if "the US recklessly start[s] a war with huge strategic forces involved."⁸⁰

South Korea is not the only neighbor that North Korea regularly provokes, however. Japan and its leaders are also publically reviled and North Korea has threatened to attack Japan if war breaks out on the Korean peninsula or if Japan intercepts one of its missile tests.⁸¹ A final flashpoint between North Korea and the United States is North Korea's continual nuclear threats against the United States, going so far as to call for a "nuclear sea of fire" and posting a map of "likely aspirational" targets in the United States for their nuclear missiles.⁸² The Department of Defense is concerned about the possibility for escalation given the fact that North Korea retains "significant capabilities for small-scale attacks that could rapidly spiral into a larger conflict."⁸³

In sum, there is ample evidence that Russia, China, and North Korea's stated goals are at odds with key U.S. interests. Each also has an active nuclear weapons program which has been given priority in defense planning. In short, the potential for crisis and conflict with the United States exists in multiple flashpoints with multiple state-based actors.

The following typical assertion from Minimum Deterrence proponents mistake the views of these prospective opponents: "Nuclear planning for Cold War-style nuclear conflict between our

⁸⁰ "US troops in South Korea to be North Korea's primary target in case of armed conflict," ITAR-TASS, August 20, 2014, available at <http://en.itar-tass.com/world/745796>.

⁸¹ "'Consumed in nuclear flames': N. Korea threatens strike on Tokyo," RT.com, April 12, 2013, available at <http://rt.com/news/north-korea-tokyo-strike-748/>.

⁸² U.S. Department of Defense, *Military and Security Developments Involving the Democratic People's Republic of Korea*, op. cit., p. 8.

⁸³ *Ibid.*, p. 8.

countries [United States and Russia], driven largely by inertia and vested interests left over from the Cold War, functions on the margins using outdated scenarios that are implausible today. There is no conceivable situation in the contemporary world in which it would be in either country's national security interest to initiate a nuclear attack against the other side."⁸⁴ Russia, China and North Korea may well anticipate "conceivable situations" for the use of nuclear weapons against the United States and allies.

Capability

For Russia, China, and North Korea, this analysis will describe in general terms strategic systems that could be used for coercive or strike purposes in the potential nuclear flashpoints described above.

Russia. Under the leadership and direction of President Putin, Russia is undertaking a vast military modernization effort and "the largest Russian program is the modernization of its strategic missile forces."⁸⁵ Russia maintains a triad of intercontinental ballistic missiles (ICBMs), submarine launched ballistic missiles (SLBMs) and bomber-delivered air launched cruise missiles (ALCMs). Russia is reportedly able to deliver as many as 1,500 currently deployed nuclear warheads against the United States with its three strategic delivery systems.⁸⁶ Though they dismiss the possibility of a nuclear threat from Russia, even Minimum Deterrence proponents agree that Russia is one of the only (China being the other) states that "technically pose existential threats to the United States."⁸⁷

China. China is continuing to modernize its nuclear forces, strategic and theater. As the most recent annual Pentagon report on Chinese military power describes it, China, "is developing and testing several new classes and variants of offensive missiles, forming additional missile units,

⁸⁴ Cartwright, et. al, *Modernizing U.S. Nuclear Strategy, Force Structure and Posture*, op. cit., p. 2.

⁸⁵ Bill Sweetman, "Russia Develops Multiple Nuclear Systems," *Aviation Week and Space Technology*, November 11, 2013, available at <http://aviationweek.com/awin/russia-develops-multiple-nuclear-systems>.

⁸⁶ Hans M. Kristensen and Robert S. Norris, "Russian nuclear forces, 2014," *Bulletin of the Atomic Scientists*, Vol. 70, No. 2 (March 2014), p. 77.

⁸⁷ Cartwright, et. al, *Modernizing U.S. Nuclear Strategy, Force Structure and Posture*, op. cit., p. 10.

upgrading older missile systems, and developing methods to counter ballistic missile defenses.”⁸⁸ The Department of Defense expects the Chinese to develop and deploy a new MIRV’d ICBM, the DF-41, as well as Type 094 *Jin Class* SSBNs which will carry the JL-2 SLBM with an estimated range of 7,400 km.⁸⁹ In addition, the Chinese People’s Liberation Army Air Force recently reportedly received 15 of its new nuclear-capable H-6K bombers.⁹⁰ Chinese military officials have confirmed these modernization trends and even emphasize their asymmetric capabilities (presumably against the United States) saying they will, “appropriately increase the number of nuclear warheads” in their force while increasing their “capability to attack enemy satellites and destroy enemy missiles.”⁹¹ The number of warheads that could potentially reach the United States often is estimated publicly to be about 60,⁹² but some estimates suggest much greater possible numbers.⁹³ U.S. officials expect the number of Chinese strategic nuclear weapons to grow over the next 15 years.⁹⁴ These factors produce a picture of a China that is increasing its nuclear capabilities against the United States and U.S. allies both quantitatively and qualitatively.

North Korea. North Korea, under the leadership of Kim Jon-Un, is continuing to modernize its ballistic force and apparently is attempting to miniaturize nuclear devices so that they can fit an ICBM. The U.S. Department of Defense has identified the Hwasong-13 (KN-08) and TD-2 as ballistic missiles that, if configured properly and successfully tested, may be able to “reach the United States.”⁹⁵ The Pentagon also believes that “Advances in ballistic missile delivery systems, coupled with developments in nuclear technology... are in line with North Korea’s stated

⁸⁸ U.S. Department of Defense, *Military and Security Developments Involving the People’s Republic of China 2014*, op. cit., p. 6.

⁸⁹ *Ibid.*, pp. 7-8.

⁹⁰ Chen Boyuan, “H-6K Bombers Delivered to PLA Air Force,” China.org.cn, June 22, 2013, available at http://www.china.org.cn/china/2013-06/22/content_29197824.htm.

⁹¹ “China ‘increasing number of missile warheads,’” *South China Morning Post*, August 4, 2014, available at <http://www.scmp.com/news/china/article/1566294/china-increasing-number-missile-warheads>.

⁹² Hans M. Kristensen and Robert S. Norris, “Chinese nuclear forces, 2013,” *Bulletin of the Atomic Scientists*, Vol. 69, No. 6 (November 2013), p. 79.

⁹³ U.S.-China Economic and Security Review Commission, *2012 Report to Congress* (Washington, D.C.: U.S. Government Printing Office, November 2012), p. 176.

⁹⁴ National Air and Space Intelligence Center, *Ballistic and Cruise Missile Threat* (Wright-Patterson Air Force Base, OH: National Air and Space Intelligence Center, 2013), p. 19.

⁹⁵ U.S. Department of Defense, *Military and Security Developments Involving the Democratic People’s Republic of Korea*, op. cit., p. 10.

objective of being able to strike the U.S. homeland.”⁹⁶ There are also unconfirmed reports that North Korea may have already mastered the technology of warhead miniaturization, but the reliability of its systems may be low.⁹⁷

Probability

Some academics have attempted to model the probability of a nuclear war between the United States and Russia. For example, prominent Minimum Deterrence proponents claim that deterrence between Russia and the United States could remain stable (i.e., no probability of nuclear war) if 10 cities are credibly threatened with destruction.⁹⁸ Another study postulates that there is an eight percent chance of inadvertent or accidental nuclear war between the United States and Russia annually.⁹⁹ Another study estimates there may be a six percent chance of a nuclear crisis between Russia and the United States annually.¹⁰⁰

However, as discussed above, such precise probabilities cannot, as generalities, reasonably be attached to the probability of nuclear attack, including by states—such events may be described as “Black Swan events” – which have three traits: “rarity, extreme impact, and retrospective (though not prospective) predictability.”¹⁰¹ As risk analyst, Nassim Taleb explains, summarizing the work of French mathematician Henri Poincaré: “as you project into the future you may need an increasing amount of precision about the dynamics of the process you are modeling, since your error rate grows very rapidly. The problem is that near precision is not possible since the degradation of your forecast compounds abruptly – you would eventually need to figure out the

⁹⁶ Ibid., p. 11.

⁹⁷ Richard Lloyd Parry, “North Korea ‘could reach US with nuclear arms’: Pentagon,” *The Times (UK)*, February 10, 2014, available at: <http://www.thetimes.co.uk/tto/news/world/asia/article3755406.ece>.

⁹⁸ Bruce Blair, Victor Esin, Matthew McKinzie, Valery Yarnich, and Pavel Zolotarev, “One Hundred Nuclear Wars: Stable Deterrence between the United States and Russia at Reduced Nuclear Force Levels Off Alert in the Presence of Limited Missile Defenses,” *Science and Global Security*, Vol. 19, No. 3 (2011), pp. 167-194.

⁹⁹ Anthony M. Barrett, Seth D. Baum, and Kelly Hostetler, “Analyzing and Reducing the Risks of Inadvertent Nuclear War Between the United States and Russia,” *Science and Global Security*, Vol. 21, No. 2 (2013), pp. 106-133.

¹⁰⁰ Martin E. Hellman, “Risk Analysis of Nuclear Deterrence,” *The Bent of Tau Beta Pi*, Spring 2008, p. 21.

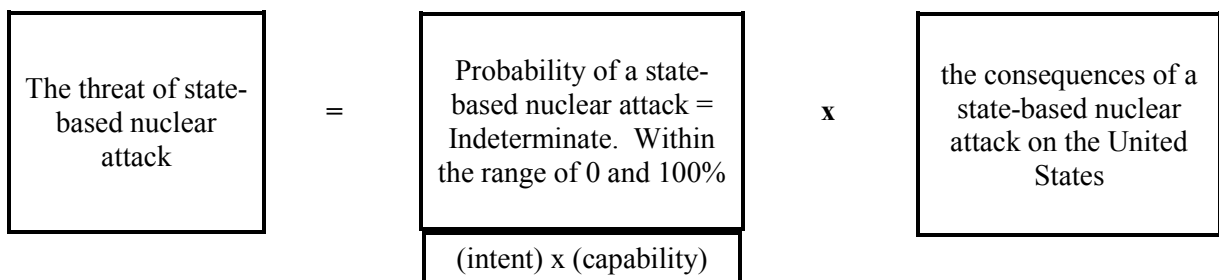
¹⁰¹ Nassim Nicholas Taleb, *The Black Swan: The Impact of the Highly Improbable* (New York: Random House, 2007, First edition), p. xviii. The author also notes: “The highly expected *not happening* is also a Black Swan. Note that, by symmetry, the occurrence of a highly improbable event is the equivalent of the nonoccurrence of a highly probable one.” [Emphasis original].

past with infinite precision.”¹⁰² Taleb summarizes saying, “If you know all possible conditions of a physical system you can, in theory (though not, as we saw, in practice), project its behavior into the future. But this only concerns inanimate objects. We hit a stumbling block when social matters are involved. It is another matter to project a future when humans are involved, if you consider them living beings and endowed with a free will.”¹⁰³

To get around this thorny problem of predicting complex human behavior, academics developed the “rational actor model” and largely *assumed* rational or optimal behavior. Some, however, have since acknowledged that, “Legions of empirical psychologists of the heuristics and biases school have shown that the model of rational behavior under uncertainty is not just grossly inaccurate but plain wrong as a description of reality.”¹⁰⁴

In sum, events such as nuclear war and a terrorist nuclear attack (assuming the acquisition of such a capability) may be Black Swan events – inherently difficult to reduce to probabilistic events with any precision. They should be acknowledged as such for planning purposes.

Thus, the methodology in the NRC “formula” can be updated to show that there is some chance of an attack, but the precise probability of a state-based nuclear attack cannot be forecast. As noted above, assuming a terrorist organization acquires a nuclear weapon, the probability of an attack similarly will not be forecast with precision.



¹⁰² Ibid., pp. 176-177.

¹⁰³ Ibid., p. 183.

¹⁰⁴ Taleb, *The Black Swan: The Impact of the Highly Improbable*, op. cit., p. 185.

The Consequences of a State-based Nuclear Attack

The consequences of a potential terrorist nuclear attack on the United States would certainly be horrific, but the consequences of a state-based nuclear attack against the United States would likely be dramatically higher.

Official government studies, as well as some academic reports, have attempted to estimate the potential effects of limited and large state-based nuclear attacks on the United States. These casualty estimates may be helpful in characterizing the likely significant differences between the consequences of a state-based nuclear attack and those of nuclear terrorism.

Beginning from the least to the greatest number of casualties (fatalities plus injuries), the Office of Technology Assessment (OTA) issued a report titled *The Effects of Nuclear War* in May 1979 that examined the effects of a 1 Megaton (mt) (1,000 kilotons) air burst and ground burst over Detroit. OTA found that a 1-mt ground burst in Detroit would result in approximately 220,000 fatalities and 420,000 injuries. They also found that a 1-mt air burst would result in 470,000 fatalities and 630,000 injuries.¹⁰⁵ Another study produced in 2006 by the Federation of American Scientists and the Natural Resources Defense Council examined the effects of a possible Chinese nuclear attack on various U.S. cities. A single Chinese CSS-4 Mod 2 ICBM with a 4-mt air burst warhead over Los Angeles, CA would produce approximately 2.8 – 3.0 million fatalities and 1.8 million injuries. In the same scenario, an attack on New York, NY would produce 2.9 – 5.0 million fatalities and 2.8 – 4.8 million injuries.¹⁰⁶

The Federation of American Scientists and the Natural Resources Defense Council also calculated the potential effects of a “limited nuclear strike” by China against 20 U.S. cities. Their analysis shows that a 4 -mt warhead air burst over each of the 20 cities would produce 15.8 – 26.1 million fatalities and 15.2 – 24.8 million injuries.¹⁰⁷ If the Chinese missiles were fused to

¹⁰⁵ Office of Technology Assessment, *The Effects of Nuclear War* (Washington, D.C.: Office of Technology Assessment, May 1979), p. 37, available at <http://ota.fas.org/reports/7906.pdf>.

¹⁰⁶ Hans M. Kristensen, Robert S. Norris, and Matthew G. McKinzie, *Chinese Nuclear Forces and U.S. Nuclear War Planning* (Washington, D.C.: Federation of American Scientists and Natural Resources Defense Council, November 2006), p. 188, available at <http://fas.org/nuke/guide/china/Book2006.pdf>.

¹⁰⁷ *Ibid.*, p. 190.

ground burst, the fallout would be significantly higher and the resulting casualties would be two to four times higher than the air burst scenario.¹⁰⁸ Should China develop smaller yield warheads for its newer missile systems (DF-31 and DF-41) then the resulting casualty estimates presumably could be revised to a lower (though still devastating) level.

In a then-secret hearing held in 1974, Secretary of Defense James R. Schlesinger briefed the Senate Subcommittee on Arms Control, International Law and Organization on the effects of a hypothetical Soviet attack on U.S. strategic weapon systems and cities. With the obvious caveats that current U.S. populations and strategic targets have changed significantly since 1974, it is still instructive to present casualty estimates for a purely “counterforce” attack (only against U.S. nuclear systems) and a mixed attack (against both U.S. strategic systems as well as cities). Dr. Schlesinger testified that should the Soviets attack U.S. missile silos, SSBN bases, and SAC (Strategic Air Command) bases, the prompt and fallout fatalities would reach about 5 – 6 million. Should the Soviets launch an attack against both U.S. counterforce targets and cities, the fatalities could be expected to reach approximately 95 – 100 million.¹⁰⁹

The Office of Technology Assessment, cited above, also produced a study that analyzed the expected effects of a Soviet attack on various U.S. targets. Again, with the caveats that much has changed since the report was published in 1979 and that casualty estimates are intended only to provide a rough estimate, there are some pertinent data points within the study. In one scenario, OTA examined the effects of a hypothetical Soviet attack against U.S. oil refineries using 10 SS-18 ICBMs that were fitted with eight warheads each, with each warhead having a 1-mt yield. Assuming an airburst, the United States could expect over 5 million fatalities; or assuming a ground burst, a total of approximately 3.2 million fatalities could be expected.¹¹⁰ In a counterforce attack scenario, wherein the Soviets attacked U.S. ICBM silos, SSBN bases, and SAC bases with ground-burst weapons, the OTA expected 2 – 22 million fatalities depending on

¹⁰⁸ Ibid., p. 191.

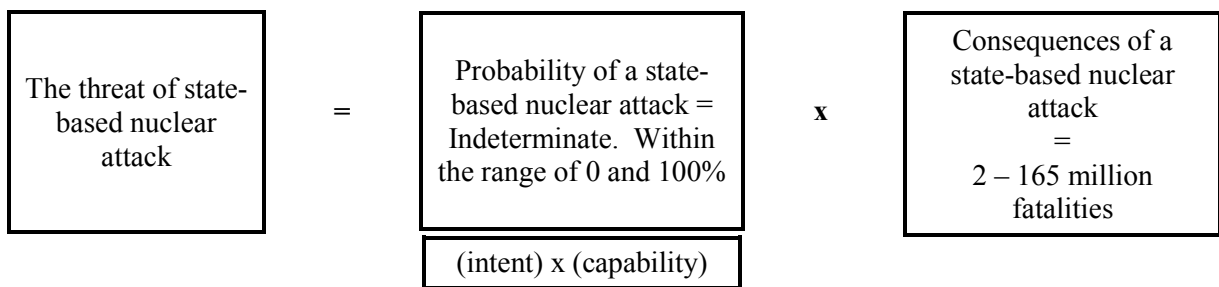
¹⁰⁹ James R. Schlesinger, “Briefing by Secretary of Defense James R. Schlesinger on Casualties and Destruction Expected to Result from so-called Nuclear Counterforce Attacks against Military Installations in the United States,” U.S. Senate Subcommittee on Arms Control, International Law and Organization, Committee on Foreign Relations, 93rd Cong., 2nd Sess., hearing held on September 11, 1974, published January 10, 1975, pp. 11-12.

¹¹⁰ Office of Technology Assessment, *The Effects of Nuclear War*, op. cit., pp. 64-65.

a number of factors. Injuries were expected to be approximately the same number as fatalities or possibly higher.¹¹¹

In the final scenario examined, OTA estimated the effects of a large-scale nuclear attack wherein Soviet targeting included U.S. strategic systems as well as economic targets. Depending on various factors such as weather, air burst or ground burst weapons, and sheltering assumptions, “U.S. fatality estimates range from a high of 155 million to 165 million to a low of 20 million to 55 million.”¹¹² The study also noted that executive level reports did not attempt to estimate the number of injuries that would result from such an attack.

Thus the NRC “formula” used in this Section can be updated to include the possible consequences of a state-based nuclear attack:



Based on the NRC methodology, the risks of nuclear terrorism cannot reasonably be deemed the most immediate and extreme danger. Given indeterminate probabilities, but the dramatically higher expected fatalities from even a “limited” state-based nuclear attack, the risks associated with the threat of a state-based nuclear attack may reasonably be thought to exceed those of a terrorist nuclear attack.

Comparison of a Terrorist Nuclear Attack and State-based Nuclear Attack

How does the claim by Minimum Deterrence proponents that a terrorist nuclear attack is the greatest threat to the United States fare against the available evidence concerning the risks of attack? The answer may be found in a direct comparison of the two types of attacks.

¹¹¹ Ibid., pp. 84-86.

¹¹² Ibid., pp. 94-95.

Intent

As shown above, terrorist groups have explicitly and publicly proclaimed their intent to acquire weapons of mass destruction, particularly nuclear weapons. Al-Qaeda may have tried on multiple occasions to obtain such a capability. Likewise, North Korea has also proclaimed its intent to acquire a deliverable nuclear weapon to use against the United States. Russia and China have also explicitly and implicitly declared their intention to use nuclear weapons to defend their core interests, some of which apparently include potential flashpoints with the United States.

Former Commander of STRATCOM, Gen. Kevin P. Chilton, recognized that when countries calculate how to achieve their foreign policy goals, the levels of importance they place on each goal may be dramatically different: “During the Cold War the U.S. and the Soviets had similar stakes in the game—national survival. That and the fact that we both valued that national survival brought some balance to the deterrent equation. Today there may be some actors, and there certainly are, who are more willing to use nuclear weapons in a given circumstance given the imbalance of what is at stake when they consider conflict with the United States of America. We may not be facing a regime's survival decision. They may be. And in that context they may be more willing to use a nuclear weapon in a conflict with the United States.”¹¹³ This observation certainly appears to apply to some state leaders, and correspondingly, the Minimum Deterrence claim that the threat of a state-based nuclear attack largely ended with the conclusion of the Cold War must be considered overstated.

Capability

Despite multiple possible attempts to acquire a nuclear weapon or the appropriate fissile material needed for one, there reportedly are no known terrorists groups with a nuclear capability—possibly due to the multiple obstacles discussed briefly above. In contrast, Russia appears to have approximately 1,500 deployed strategic nuclear weapons. China reportedly has scores of

¹¹³ Kevin P. Chilton, “‘Challenges to Nuclear Deterrence’ Air & Space Conference,” U.S. Strategic Command, September 13, 2010, available at http://www.stratcom.mil/speeches/2010/50/Challenges_to_Nuclear_Deterrence_Air_Space_Conference/.

such weapons and a modernization program that will reportedly double its long-range nuclear capability within the next 10-15 years. North Korea has conducted three nuclear tests so far and reportedly is actively attempting to build ICBM-range missiles with the intended capability to deliver a nuclear weapon against the United States.

A terrorist group with aspirations to acquire a nuclear weapon certainly is a severe potential threat, but the immediate threat appears to be from hostile states that have the nuclear capability to inflict massive destruction and the potential for flashpoints that could escalate.

If/when the United States faces a nuclear armed terrorist group, it is not clear even then that nuclear terrorism should be considered the “greatest threat” since the resulting casualties from a terrorist nuclear attack as typically assessed would be significantly lower than that of a state-based nuclear attack. Vice Chairman of the Joint Chiefs of Staff, Adm. James A. Winnefeld Jr., recognized this in a recent speech, saying, “If we consider that at the top of our list of national security interests is probably the survival of our nation, then at the top of the list of threats to that interest is obviously a massive nuclear attack from Russia.”¹¹⁴

Probability

The confident Minimum Deterrence assertion that a nuclear terrorist attack is the “real” threat over that of a state-based nuclear attack also proves untenable in light of the limits on predicting with precision the probabilities of such human behavior as described above. The best that the United States can do is, as author Emanuel Derman notes, to be aware of “unquantifiable uncertainty,” and, “aware of your inability to quantify it, and then act accordingly.”¹¹⁵

¹¹⁴ James A. Winnefeld Jr., “Adm. Winnefeld’s remarks at Atlantic Council’s U.S. Missile Defense Plans and Priorities Conference,” Joint Chiefs of Staff, May 28, 2014, available at <http://www.jcs.mil/Media/Speeches/tabid/3890/Article/9068/adm-winnefelds-remarks-at-atlantic-councils-us-missile-defense-plans-and-priori.aspx>.

¹¹⁵ Derman, *Models. Behaving. Badly.*, op. cit., p. 156.

Consequences

Estimating the potential consequences of nuclear attack is difficult because of the multitude of variables in the calculations, a difficulty that is compounded when estimating the potential effects of a state-based nuclear attack. Yet even with rough estimates, there are important data points to consider when assessing the relative severity of threats facing the United States. Figure 2 below summarizes the potential consequences of terrorist nuclear attacks and state-based nuclear attacks as detailed in the studies cited above.

Figure 2. Summary of the Effects of Terrorist and State-based Nuclear Attacks

	Terrorist Nuclear Attacks			State-based Nuclear Attacks			
Location	Washington, D.C.	Long Beach, CA	New York, NY	Oil Refineries	20 U.S. Cities	Only Strategic Targets	Strategic and Economic Targets
Weapon(s)	One 10-kt bomb	One 10-kt bomb	One 10-kt bomb	80 1-mt warheads	20 4-mt warheads	Various weapons and yields	Various weapons and yields
Fatalities	45,000+	60,000+	500,000+	5 million	15.8-26.1 million	5 – 6 million	95 – 100 million
Injuries	250,000+	150,000+	200,000+	Not examined	15.2-24.8 million	Not examined	Not examined
Financial Cost	Not examined	\$1 trillion	\$1 trillion	Not examined	Not examined	Not examined	Not examined

It is obvious from the data represented in Figure 2 that the consequences of even a limited state-based nuclear attack against the United States could far exceed the damage caused by a terrorist nuclear attack as modeled. In a workshop convened by the National Academy of Sciences, medical and emergency management professionals issued a blunt summary of the effects of a terrorist use of a 10-kt nuclear weapon, “Detonation of a 10-kt-yield IND [improvised nuclear device] in the central business district of a large U.S. city would be catastrophic for most people within a few miles, but it would not kill or even injure most people in the city or metropolitan

area.”¹¹⁶ In contrast, a nuclear attack by a state could produce much greater damage as seen in Figure 2 above.

The Minimum Deterrence focus on the terrorist nuclear threat and general dismissal of state-based nuclear threats is advantageous to its rationale for the policy recommendation of deep U.S. nuclear reductions. However, given the likely more severe consequences of the latter and the inability to realistically calculate the probabilities of either with precision, the Minimum Deterrence focus appears mistaken.

Summary and Conclusion

Minimum Deterrence proponents claim that nuclear terrorism is the greatest threat to the United States, that U.S. nuclear weapons have no role to play in countering this greatest threat, and that U.S. nuclear capabilities “will clearly not dissuade al Qaeda from attempting to make or steal them.”¹¹⁷ On this basis, they conclude that the United States should reduce its nuclear arsenal dramatically. Minimum Deterrence arguments for reducing the U.S. nuclear triad to a dyad or monad follow from the claim that, “Because less is asked of nuclear deterrence, it demands fewer weapons.”¹¹⁸

However, as Democratic and Republican administrations have long recognized, limiting forces based on optimistic predictions of the future security environment is a risky planning choice. Recently, M. Elaine Bunn, Deputy Assistant Secretary of Defense for Nuclear and Missile Defense Policy, stated in testimony, “The force structure choices we make today will determine the capabilities a President will have in twenty, thirty, and forty years. We cannot say what mix of capabilities the United States will need that far into the future, but modernizing the Triad will provide the next generation of U.S. policymakers with a flexible and resilient range of

¹¹⁶ Georges C. Benjamin, Michael McGeary, and Susan R. McCutchen, eds., *Assessing Medical Preparedness to Respond to a Terrorist Nuclear Event: Workshop Report* (Washington, D.C.: National Academies Press, 2009), pp. 24-25, available at <http://www.ncbi.nlm.nih.gov/books/NBK215188/pdf/TOC.pdf>.

¹¹⁷ Drell and Goodby, *What are Nuclear Weapons for? Recommendations for Restructuring U.S. Strategic Nuclear Forces*, op. cit., p. 7.

¹¹⁸ Benjamin Friedman, Christopher Preble, and Matt Fay, *The End of Overkill? Reassessing U.S. Nuclear Weapons Policy* (Washington, D.C.: Cato Institute, 2013), p. 13, available at http://object.cato.org/sites/cato.org/files/pubs/pdf/the_end_of_overkill_wp_web.pdf.

capabilities.”¹¹⁹ And, the United States requires a nuclear arsenal, “that is an effective deterrent against the advent of regional nuclear powers whose intentions and decisions processes are far from transparent.”¹²⁰

This administration comment seems precisely right, especially because the threat of a state-based nuclear attack, so often minimized by Minimum Deterrence proponents, cannot be calculated with precision as less probable than the threat of nuclear terrorism. Indeed, as noted above, if open-source accounts are accurate, there is no immediate nuclear threat from terrorists groups because no terrorists groups have yet acquired a nuclear weapon. In contrast, Russia, China, and North Korea all have nuclear arms and potential flashpoints with the United States that could escalate to nuclear crises. Minimum Deterrence assertions that since the Cold War ended, “fewer states have revisionist territorial agendas, let alone the capability to act on them”¹²¹ are demonstrably false. Other Minimum Deterrence assertions that Russia’s ability to unleash a large-scale nuclear war is “a technical risk divorced from political realities”¹²² also seem increasingly questionable.

Confident Minimum Deterrence assertions that “There is no imaginable objective worth Moscow or Beijing risking this level of destruction short of Russian or Chinese national survival”¹²³ appear simply to ignore the fact that the United States does not and can not know with accuracy just how far Russia, China, or North Korea will be willing to provoke and escalate the use of force in any given flashpoint, or how they will perceive threats to their national survival and respond. As such, U.S. nuclear-force sizing considerations should indeed be shaped by the deterrence, assurance and defense requirements deemed necessary by the spectrum of state-based nuclear threats, while also acknowledging and preparing for the potential for nuclear terrorism.

¹¹⁹ M. Elaine Bunn, “Prepared Statement,” before the Senate Committee on Armed Services Subcommittee on Strategic Forces, March 5, 2014, p. 5, available at http://www.armed-services.senate.gov/imo/media/doc/Bunn_03-05-14.pdf.

¹²⁰ Bunn, “Prepared Statement,” op. cit., pp. 2-3.

¹²¹ Friedman, Preble, and Fay, *The End of Overkill?*, op. cit., p. 12.

¹²² Cartwright, et. al, *Modernizing U.S. Nuclear Strategy, Force Structure and Posture*, op. cit., p. 8.

¹²³ Nichols, *No Use*, op. cit., p. 113.