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Center for Strategic and Budgetary Assessments

NUCLEAR-CONVENTIONAL FIREBREAKS AND THE NUCLEAR TABOO



BARRY D. WATTS

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Acknowledgments

The idea of exploring systematically why the leaders of various nations have chosen to maintain, or aspire to acquire, nuclear weapons was first suggested to me by Andrew W. Marshall. In several cases, the motivations attributed to national leaders in this report are undoubtedly speculative and open to debate. Nevertheless, it is a fact that the rulers of at least some nations entertain strong reasons for maintaining or acquiring nuclear weapons that have nothing to do with the nuclear competition between the United States and the former Soviet Union, either before or after 1991.

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CHAPTER 1 > INTRODUCTION AND SUMMARY

There are very large and very clear “firebreaks” between nuclear and conventional war.

— Herman Kahn, 1984¹

Starting with President John F. Kennedy’s announcement of “flexible response” in 1961, successive U.S. administrations have sought to reduce American reliance on nuclear weapons and to make the post-Nagasaki “taboo” against their use permanent. As Thomas Schelling commented during his Nobel Prize lecture in December 2005:

The most spectacular event of the past half century is one that did not occur. We have enjoyed sixty years without nuclear weapons exploded in anger. . . . [But can] we make it through another half dozen decades?²

Underlying the non-use of nuclear weapons since 1945 is the perception that atomic—and, especially, thermonuclear—weapons are qualitatively different from conventional weapons due to their sheer destructiveness. The view that nuclear weapons are “special” and qualitatively different from other weapons was originally articulated by Bernard Brodie in 1949:

1 Herman Kahn, *Thinking about the Unthinkable in the 1980s* (New York: Simon & Schuster, 1984), p. 29. Kahn’s broader point was that even within a nuclear conflict, there were firebreaks, such as “no homeland attacks” or “no attacks on cities,” that nuclear-armed adversaries could, in theory, choose to observe.

2 Thomas C. Schelling, “An Astonishing Sixty Years: The Legacy of Hiroshima,” Nobel Prize lecture, December 8, 2005, in Karl Grandin, ed., *The Nobel Prizes 2005* (Stockholm: Nobel Foundation, 2006), p. 365.

. . . the first and most vital step in any American security program for the age of atomic bombs is to take measures to guarantee to ourselves in the case of attack the possibility of retaliation in kind. The writer in making that statement is not for the moment concerned with who will *win* the next war in which atomic bombs are used. Thus far the chief purpose of our military establishment has been to win wars. From now on its chief purpose must be to avert them. It can have almost no other useful purpose.³

In the United States and Western Europe, this judgment about the non-usability of nuclear weapons became, over time, the conventional wisdom. It produced a conceptual “firebreak” between conventional and nuclear arms. Conventional arms, as subsequent history has shown, could still be used to win wars and achieve meaningful political objectives. But atomic and thermonuclear weapons, especially after the Soviet Union achieved rough nuclear parity with the United States, could not. Indeed, so accepted did the qualitative firebreak between conventional and nuclear arms become that when Brodie looked back at the development of nuclear strategy in 1978, he began by quoting the same passage about the chief purpose of the U.S. military establishment in the nuclear age that he had written in *The Absolute Weapon*.⁴

This paper explores how firebreaks between nuclear and conventional conflict are affecting the taboo against nuclear use that has held since 1945. Particularly in the United States and Western Europe, any discussion of nuclear matters tends to be infected with Cold War convictions about nuclear arms and deterrence that are more articles of faith than fact, as well as the understandable desire to rid the earth of nuclear weapons altogether. Consequently, the intellectual burden confronting this paper is to focus on what has *actually* been happening to nuclear-conventional firebreaks and the taboo against nuclear use, as opposed to what so many American and European observers *wish* has been happening.

If, however, one focuses on what has actually been occurring rather than widespread hopes about the future of nuclear arms, the conclusion that emerges is both troubling and controversial. Despite the enormous emotional appeal of a world without nuclear weapons, in the cases of the Russian Federation, Pakistan, India, possibly China, and Iran, the evidence suggests that the once strong firebreaks between nuclear and conventional conflict are narrowing and the taboo against nuclear use is growing weaker rather than stronger. If so, then the second

³ Bernard Brodie, “Implications for Military Policy,” in Frederick S. Dunn, Bernard Brodie, Arnold Wolfers, Percy E. Corbett, and William T. R. Fox, *The Absolute Weapon: Atomic Power and World Order* (New York: Harcourt, Brace & Company, 1946), p. 76.

⁴ Bernard Brodie, “The Development of Nuclear Strategy,” *International Security*, 2, No. 4, Spring 1978, p. 65.

nuclear age⁵ that has been emerging since 1991 is likely to be more dangerous than the first. True, the first nuclear age that spanned the U.S.-Soviet Cold War was perilous enough—especially during the 1962 Cuban missile crisis and, again, in September 1983 when a Soviet missile warning satellite mistakenly reported a massive U.S. launch of intercontinental ballistic missiles (ICBMs) against the Soviet Union.⁶ But whether by prudent decisions or sheer luck—or both—nuclear weapons were not used from August 1945 to the Cold War’s end in 1991. A second nuclear age in which the leaders of one or more nations may deliberately choose to use atomic or thermonuclear weapons would be quite different from the first.

This report is structured as follows. Chapter 2 describes the U.S. search during the Cold War for alternatives to massive nuclear retaliation following the Eisenhower administration’s decision to rely first and foremost on a massive atomic capability to contain Soviet expansionist tendencies. The primary motivation behind massive retaliation was to achieve “a maximum deterrent at a bearable cost” to the U.S. economy.⁷ Chapter 2 also highlights the absence of a comparable search on the Soviet side of the nuclear arms competition, and can be read as a history of the Cold War U.S.-Soviet race in nuclear arms as seen through the prism of the dominant nuclear-conventional firebreak.

Chapter 3 reviews the main changes in the nuclear postures and policies of the United States and the Russian Federation since 1991. The reason for focusing on these two countries is that they possess 89 to 94 percent of the world’s nuclear arms (depending on whether U.S. and Russian warheads awaiting dismantlement are included).⁸ Insofar as the nuclear-conventional firebreak between Russia and the United States is concerned, the two countries have chosen very different paths regarding the roles, utility, and usability of nuclear weapons since the Cold War ended. The thrust of American policy has long been to reduce dependence on nuclear weapons. Since President Barack Obama’s 2009 speech in Prague, U.S. policy has been to eliminate them altogether. Russian leaders, by comparison, show

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⁵ Keith Payne credits his colleague Colin Gray with originating the term “second nuclear age” in Keith B. Payne, *Deterrence in the Second Nuclear Age* (Lexington, KY: University Press of Kentucky, 1996), p. 8. This paper uses the term “first nuclear age” to refer to U.S.-Soviet competition in nuclear arms during the Cold War, and the “second nuclear age” to refer to the changes in nuclear matters that have taken place since 1991. Paul Bracken has produced a better definition, characterizing the second nuclear age as “the spread of the atomic bomb for reasons that have nothing to do with the cold war.” See Paul Bracken, *The Second Nuclear Age: Strategy, Danger, and the New Power Politics* (New York: Henry Holt, 2012), p. 94. Using Bracken’s definition, the second nuclear age may have started as early as 1964 when China detonated its first nuclear device.

⁶ For the Soviet perspective on the October 1962 Cuban missile crisis, see Steven J. Zaloga, *The Kremlin’s Nuclear Sword: The Rise and Fall of Russia’s Strategic Nuclear Forces, 1945-2000* (Washington, DC: Smithsonian Institution Press, 2002), pp. 82-87.

⁷ John Foster Dulles, “The Evolution of Foreign Policy,” speech before the Council on Foreign Relations, January 12, 1954.

⁸ The United States and Russia are estimated to possess a combined total of about 8,000 nuclear weapons awaiting dismantlement.

no inclination to abandon their nuclear arms, and their current doctrine envisions situations in which a few very-low-yield nuclear weapons could actually be used to “de-escalate” a conventional conflict.

Chapter 4 has two aims. First, it explores the diverse reasons why the leaders of countries such as France, Israel, China, India, Pakistan, North Korea, and Iran have pursued nuclear arms. Here it is worth recalling Thucydides’ conclusion, based on his study of the Peloponnesian War, that polities arm themselves or go to war for three fundamental reasons: “interest, fear and honour.”⁹ In other words, there are legitimate, enduring reasons why the leaders of some countries may see far more value in the acquisition and possession of nuclear arms than do their American counterparts. These motivations and incentives raise profound doubts about the prospect of abolishing nuclear weapons without “a fundamental transformation of the world political order.”¹⁰ Second, Chapter 4 endeavors to assess the state of the nuclear-conventional firebreak from the perspective of various national governments. A “wide” or “robust” firebreak means that a country’s leaders are quite reluctant to employ nuclear weapons. Equivalently, they perceive the nuclear threshold to be relatively high and the psychological taboo against nuclear use strong.

Finally, Chapter 5 draws some conclusions about the current state of the taboo against nuclear use and the various nuclear-conventional firebreaks that will determine the taboo’s fate in the decades ahead. As already suggested, the evidence argues that the taboo looks increasingly frail. The possibility appears to be growing that nuclear weapons will be used in the foreseeable future, meaning within the next ten or twenty years. If the post-Nagasaki taboo is broken, and if its violation is judged to have been successful, the world could well be propelled into a second nuclear age whose dangers and uncertainties will dwarf those of the first.

⁹ Michael Howard, “When Are Wars Decisive?” *Survival*, Spring 1999, p. 127; and Thucydides, “The History of the Peloponnesian War,” Book I, Chapter 2 in Robert Maynard Hutchins, chief ed., *Great Books of the Western World*, Vol. 6, *Herodotus Thucydides* (Chicago, IL: Encyclopædia Britannica, 1952), pp. 355-365.

¹⁰ William J. Perry (chairman) and James R. Schlesinger (vice-chairman), *America’s Strategic Posture: Final Report of the Congressional Commission on the Strategic Posture of the United States* (Washington, DC: United States Institute of Peace Press, 2009), pp. xvi, 17, 75.

CHAPTER 2 > THE AMERICAN SEARCH FOR ALTERNATIVES TO GENERAL NUCLEAR WAR

Context

In August 1945, only the United States possessed the atomic bomb. President Harry S. Truman elected to employ two of these weapons against Japan, one on Hiroshima and one on Nagasaki, in an effort to end the war. America's atomic monopoly, however, proved short lived. By the time of the two atomic bombings, the Soviets had several agents, notably Klaus Fuchs, inside the U.S. Manhattan Project at Los Alamos. Fuchs succeeded in passing dimensioned drawings of the American "Fat Man" plutonium implosion bomb dropped on Nagasaki. When in late July 1945 Truman casually mentioned to Joseph Stalin at Potsdam that the United States had developed "a new weapon of unusual destructive power," the Soviet dictator, forewarned by his spies, showed no special interest.¹¹ We now know that the Soviet effort to develop atomic weapons had been initiated in the autumn of 1942,¹² and that in August 1945 Joseph Stalin put his ruthless security chief, Lavrenti Beria, in charge of the program "with orders to build the bomb as soon as possible."¹³ When the Soviet Union detonated its atomic device, RDS-1, in August 1949, it was internally an exact copy of Fat Man.¹⁴

¹¹ Richard Rhodes, *Dark Sun: The Making of the Hydrogen Bomb* (New York: Simon & Schuster, 1995), p. 176. After Fuchs was released from a British prison in 1959, he immigrated to East Germany. There he met with Qian Sanqiang, China's chief A-bomb scientist, and gave him a full tutorial on the design of Fat Man. Thomas C. Reed and Danny B. Stillman, *The Nuclear Express: A Political History of the Bomb and Its Proliferation* (Minneapolis, MN: Zenith Press, 2009), pp. 3, 102-103.

¹² Rhodes, *Dark Sun*, p. 66.

¹³ Reed and Stillman, *The Nuclear Express*, p. 29.

¹⁴ Steven J. Zaloga, *The Kremlin's Nuclear Sword: The Rise and Fall of Russia's Strategic Nuclear Forces, 1945-2000* (Washington, DC: Smithsonian Institution Press, 2002), p. 10.

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While it is often said that the American atomic monopoly ended on August 29, 1949, with the detonation of RDS-1, the Soviets did not field long-range bombers capable of delivering atomic bombs against the continental United States until the mid-1950s. The Tupolev Tu-4 bomber that the Soviets had copied from early versions of the B-29 only had a combat radius of 820 nautical miles and, on a round-trip profile, could not reach any targets in the continental United States even from bases as far north as Anadyr in the upper Chukotsky Peninsula in eastern Siberia.¹⁵ The alternative was a one-way mission. But even launching from the Kola Peninsula on a one-way mission, the Tu-4 could not reach targets in the northeastern United States.¹⁶ Not until the Tu-95 entered service in late 1955 did the Soviet Union have a bomber with the combat radius to deliver atomic bombs against the continental United States from Soviet bases and return. Furthermore, the Tu-95's teething problems were not resolved until August of 1957.¹⁷ Notwithstanding American concerns in the mid-1950s over a "bomber gap," the U.S. homeland did not become substantially vulnerable to atomic attack by Soviet bombers until the late 1950s.

While the U.S. monopoly on intercontinental nuclear attack persisted some years beyond the Soviet Union's detonation of RDS-1, Truman's announcement in January 1950 that the United States would pursue thermonuclear weapons presaged a very different strategic environment from that during the first decade of the nuclear age. The early years of the nuclear age had been one of American monopoly and atomic scarcity, which meant that neither side was able to stockpile very many atomic weapons. By 1952, thermonuclear weapons promised yields "measured in TNT [trinitrotoluene] equivalents, ranging from 1 million to 25 million tons" as compared with the 20,000-ton yield of the atomic bomb dropped on Nagasaki.¹⁸ In addition, there was every reason to believe that the Russians could build "*many* megaton H-bombs," which meant that the U.S.-Soviet nuclear competition would, in all likelihood, evolve from atomic scarcity and the near monopoly by the United States, to thermonuclear plenty and U.S.-Soviet parity.¹⁹

The United States detonated the world's first hydrogen device using the principles of staged radiation implosion on November 1, 1952. The test, known as Mike, was part of the Operation Ivy series in the Pacific. The 82-ton Mike device used

¹⁵ Ibid., p. 15. With 20,000 pounds of bombs, the combat radius of the original B-29 was 1,410 nautical miles. The Tu-4's combat radius was less than 60 percent of the B-29's (less than 846 nautical miles).

¹⁶ Steven J. Zaloga, *The Kremlin's Nuclear Sword*, p. 16.

¹⁷ Ibid., p. 29.

¹⁸ Bernard Brodie, Charles Hitch, and Ernst Plesset, "Implications of Large-Yield Nuclear Weapons," RAND, R-237, July 10, 1952, p. iii.

¹⁹ Ibid., p. 2.

liquid deuterium and produced a 10.4 MT explosion, more than 500 times the yield of Fat Man. The United States' first operational thermonuclear bombs entered the stockpile in early 1954, and the first live test of one of these weapons, a Mark 15 dropped from a B-52B on the Bikini atoll, took place in May 1956.²⁰ By then the Soviets had also exploded their first fusion-boosted device (RDS-6 in August 1953) and had successfully air dropped a "de-rated" radiation implosion thermonuclear bomb (RDS-37 in November 1955) from a Tu-16 bomber.²¹

These developments comprise the background against which the Eisenhower administration sought to exploit the U.S. atomic monopoly to end the Korean conflict, and opted for a national security policy to contain the Soviet Union based on the threat of massive nuclear retaliation. The problem with this policy, as Eisenhower recognized, was that if deterrence failed and the United States had to go to general nuclear war, the result would have been "an unimaginable catastrophe for both sides."²² This dilemma, in turn, was the impetus that drove subsequent administrations to search for alternatives to nuclear war with the Soviet Union.

Atomic Blackmail and Massive Nuclear Retaliation

During a campaign speech in Detroit on October 24, 1952, presidential candidate Dwight Eisenhower promised that, if elected, his first priority would be to end the Korean War.²³ At the end of November, the president-elect flew to Korea. Prominent among those who accompanied him were General Omar Bradley, Chairman of the Joint Chiefs of Staff (JCS), Charles Erwin Wilson, whom Eisenhower had selected to be his defense secretary, and Herbert Brownell, Eisenhower's pick for attorney general.²⁴ They were joined in Iwo Jima by Admiral Arthur Radford, then Commander in Chief, Pacific. In Korea, Eisenhower visited frontline units and talked with senior commanders and their men, just as he had done during World War II. He left Korea convinced that the mountainous terrain along the 38th Parallel meant that any major conventional offensive aimed at pushing the Chinese up the peninsula would present great difficulties, and that the remaining choices were either to continue fighting on a static front and accept casualties without any

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²⁰ Marcelle S. Knaack, *Encyclopedia of U.S. Air Force Aircraft and Missile Systems*, Vol. II, *Post-World War II Bombers 1945-1973* (Washington, DC: Office of Air Force History, 1988), p. 243; and Department of Energy (DoE), "United States Nuclear Tests: July 1945 through September 1992," DOE/NV-209-REV 15, December 2000, p. 6.

²¹ Reed and Stillman, *The Nuclear Express*, pp. 36-37, 50. RDS-37 was designed to yield 3 megatons (MT), but in the 1955 live test the yield was scaled down to about 1.6 MT.

²² Robert R. Bowie and Richard H. Immerman, *Waging Peace: How Eisenhower Shaped an Enduring Cold War Strategy* (Oxford: Oxford University Press, 1998), p. 179.

²³ Stephen E. Ambrose, *Eisenhower: Soldier and President* (New York: Simon & Schuster, 1990), p. 285.

²⁴ Dwight D. Eisenhower, *Mandate for Change 1953-1956* (Garden City, NY: Doubleday, 1963), p. 93.

visible results or else negotiate an armistice.²⁵ By then the main obstacle to an armistice was the Communists' insistence on the forcible repatriation of Chinese and North Korean prisoners of war in United Nations (UN) hands.

In February 1953, President Eisenhower began discussing ways to end the Korean conflict with his National Security Council (NSC). The first discussion occurred at an NSC meeting on February 11th. The session began with briefings by acting Director of Central Intelligence, Allen W. Dulles, and General Bradley. Bradley emphasized that the "Kaesong sanctuary" had been created to facilitate armistice negotiations but the Communists had used the arrangement to amass troops and material in the 28-square-mile sanctuary. Secretary of State John Foster Dulles suggested that the time had come to end this arrangement. Eisenhower directed Dulles to begin prompt consultations on this option with allies and then went on to express his view that the United States "should consider the use of tactical atomic weapons" on the Kaesong sanctuary.²⁶ General Bradley thought it unwise to raise this possibility with U.S. allies, and Eisenhower agreed. Regarding the usability of atomic weapons, however, Dulles argued that the United States should try to break down the "false distinction" between atomic weapons and all other weapons. This was a position that had some plausibility so long as the U.S. monopoly on intercontinental nuclear strike persisted.²⁷ Nevertheless, Bernard Brodie had begun undermining Dulles' view in 1946, and it became less and less tenable in the 1960s as the Soviets developed a secure second-strike capability.

In the end, of course, Eisenhower did not choose to employ so-called "tactical" atomic weapons in Korea or China. Analysis and discussion of this possibility, including its military and political advantages and disadvantages, continued into April 1953.²⁸ The disadvantage of greatest concern was undoubtedly the prospect that if the United States used atomic weapons in Korea, much less in China, the Soviets might use them in Europe or Korea. And, as Eisenhower himself observed on March 31, 1953, "there were not many good targets [for atomic weapons] in Korea."²⁹ In any case, by the spring of 1953 much had changed. Stalin had died on March 5 and, on March 30, China's foreign minister, Zhou Enlai, had responded to General Mark Clark's February proposal for the exchange of sick and injured

²⁵ Ambrose, *Eisenhower: Soldier and President*, p. 295; and Eisenhower, *Mandate for Change 1953-1956*, p. 95.

²⁶ "Memorandum of Discussion at the 131st Meeting of the National Security Council, Wednesday, February 11, 1953," in John P. Glennon and Edward C. Keefer, eds., *Foreign Relations of the United States [FRUS] 1952-1954*, Vol. XV, *Korea*, Part 1 (Washington, DC: U.S. Government Printing Office, 1984), pp. 769-770.

²⁷ *Ibid.*, p. 770.

²⁸ "Analysis of Possible Courses of Action in Korea," NSC 147, April 2, 1953, in Glennon and Keefer, *FRUS 1952-1954*, Vol. XV, *Korea*, Part 1, pp. 838-857.

²⁹ "Memorandum of Discussion at a Special Meeting of the NSC on Tuesday, March 31, 1953," NSC 147, April 2, 1953, in Glennon and Keefer, *FRUS 1952-1954*, Vol. XV, *Korea*, Part 1, p. 826.

prisoners while the war was still being fought. Zhou's communiqué ended with the proposal that once the fighting had ceased, those UN prisoners who refused to be repatriated would be turned over to a neutral state.³⁰

However, as late as May 20, 1953, Eisenhower was still considering options to use atomic weapons against North Korea, Manchuria, and the Chinese coast.³¹ At that time, Dulles was in New Delhi discussing the armistice negotiations with Prime Minister Nehru. Nehru acquiesced to the U.S. request that Indian troops take custody of UN prisoners not desiring to be repatriated. Dulles then suggested to Nehru that if the armistice negotiations collapsed, the United States "would probably make a stronger rather than a lesser military exertion, and that this might well extend the area of conflict."³² "Nehru later denied knowledge of the U.S. atomic threat, but most accounts agree that some message did reach Beijing, probably through the Indian ambassador there."³³ Whatever American messages did or did not actually get through to Beijing and Moscow, both Eisenhower and Dulles were convinced that their vague threats to use atomic weapons had helped to end the senseless fighting in Korea. They believed that American atomic threats were conveyed to the communist governments, and that these threats influenced China's willingness to negotiate a ceasefire that satisfied the American unwillingness to forcibly repatriate all of the UN's prisoners of war.³⁴

Much subsequent scholarship has disputed both the later claims of Eisenhower and Dulles that atomic blackmail had worked.³⁵ The American threats were "vague—very vague" and the timing of Zhou Enlai's concession on the repatriation of prisoners of war raises further doubts about their efficacy assuming they were clearly received in Beijing and Moscow. Signs of Chinese and North Korean willingness to accept an armistice first appeared in March 1953, before any explicit American threats to use atomic weapons were made. Regarding Eisenhower's and

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³⁰ "Zhou Enlai: Prisoner of War Settlement Proposal," March 30, 1953, ABC-CLIO, available at <http://www.historyandtheheadlines.abc-clio.com/contentpages/ContentPage.aspx?entryId=1498221¤tSection=1498040&productid=33>, accessed on November 2, 2012.

³¹ "Memorandum of Discussion at the 145th Meeting of the NSC, Wednesday, May 20, 1953," in Glennon and Keefer, *FRUS 1952-1954*, Vol. XV, *Korea*, Part 1, pp. 1065-1067.

³² "Memorandum of Conversation, by the Secretary of State," May 21, 1953, in Glennon and Keefer, *FRUS 1952-1954*, Vol. XV, *Korea*, Part 1, p. 1068.

³³ Richard K. Betts, *Nuclear Blackmail and Nuclear Balance* (Washington, DC: Brookings Institution, 1987), p. 43.

³⁴ Eisenhower, *Mandate for Change 1953-1956*, p. 181.

³⁵ For a summary of scholarship on Eisenhower's attempts to use atomic blackmail to bring the Korean War to an end, see Lester H. Brune, "Truman and Eisenhower: Strategic Options for Atomic War and Diplomacy in Korea," in Lester H. Brune, ed., *The Korean War: Handbook of the Literature and Research* (Greenwood, CT: Greenwood Press, 1996), pp. 286-294. Two good reviews of the evidence are Rosemary J. Foot, "Nuclear Coercion and the Ending of the Korean Conflict," *International Security*, 13, No. 3, Winter 1988-89, pp. 92-112; and Roger Dingman, "Atomic Diplomacy during the Korean War," *International Security*, 13, No. 3, Winter 1988-89, pp. 50-91. Brune discusses both papers in his survey on the literature on U.S. atomic coercion in 1953.

Dulles' belief that atomic blackmail worked, Richard Betts' conclusion in 1987 was that it "represented the first implementation of the massive retaliation doctrine" that became official U.S. policy in October 1953 and was publicly proclaimed by Dulles before the Council on Foreign Relations in January 1954.³⁶ Whatever actually motivated the Chinese to accept an armistice in Korea, U.S. threats to use atomic weapons were aimed at achieving a political solution to a conventional conflict. They were also directed against a country that had no nuclear weapons at the time.

In any event, Betts seems to have a point in linking the perception that atomic blackmail had worked in Korea with the Eisenhower administration's subsequent adoption of massive retaliation. Completed in October 1953, NSC 162/2, "Basic National Security Policy," based America's military posture

on massive atomic capability, including necessary bases; an integrated and effective continental defense system; ready forces of the United States and its allies suitably deployed and adequate to deter or initially to counter aggression, and to discharge required initial tasks in the event of a general war; and an adequate mobilization base; all supported by the determined spirit of the U.S. people.³⁷

Eisenhower's main reasons for selecting this strategy were two. First, because the Soviet Union would soon have enough nuclear forces to deal "a crippling blow" to both America's economy and military forces, Eisenhower rejected alternative strategies that accepted any greater risk of a suicidal U.S.-Soviet nuclear exchange.³⁸ Second, only by relying on the deterrent capability of U.S. offensive nuclear forces—at the time the Air Force's Strategic Air Command (SAC)—did the president believe that military spending could be kept sufficiently under control to ensure the "strong, healthy and expanding U.S. economy" that he considered "essential to the security and stability of the free world" over the long haul.³⁹ Defense expenditures were necessary to contain Soviet power, but they could not be allowed to impair the basic soundness of the U.S. economy. The result was NSC 162/2's reliance on massive nuclear retaliation to minimize the long-term costs of containment to the American

³⁶ Betts, *Nuclear Blackmail and Nuclear Balance*, p. 47. The essential goal of Eisenhower's "New Look" was to find a way to contain Soviet power while holding "military expenditures to a minimum consistent with safety, so that maximum of liberty may operate as a dynamic force against despotism." John Foster Dulles, "Policy for Security and Peace," *Foreign Affairs*, April 1954, p. 354. Given the manpower advantages of the Soviet bloc of Communist-controlled countries, it was incumbent on the United States and the free world to base their defense strategy on their own special assets, which "include especially, air and naval power and atomic weapons." *Ibid.*, pp. 357-358.

³⁷ National Security Council (NSC), "Basic National Security Policy," NSC 162/2, October 30, 1953, p. 19. On December 9, 1953, the Joint Chiefs formally declared that the policies in NSC 162/2 would "adequately provide for the security of the US." Herman S. Wolk, "The 'New Look,'" *AIR FORCE Magazine*, August 2003, p. 82.

³⁸ NSC 162/2, p. 2; and Bowie and Immerman, *Waging Peace*, p. 137.

³⁹ NSC 162/2, p. 23.

economy. Of course, the Eisenhower administration did not interpret NSC 162/2 as implying that every act of Soviet aggression would trigger general nuclear war. As Dulles explained in 1954, while there were areas of the world in which “any open assault by Communist forces could only result in starting a general war,” it was important to have the flexibility to respond in others selectively so that the free world was not in the position “where the only response open to it” was “general war.”⁴⁰

Flexible Response and Assured Destruction

Despite Dulles’ caveat, the latter half of the 1950s saw increasing skepticism about massive retaliation. Critics argued that it offered two stark choices in response to Soviet aggression: acquiescence or nuclear war. Even before he was elected president, John Kennedy rejected the assumption that strategic nuclear forces could be relied upon as a universal deterrent to war and aggression. The United States, he insisted, needed to be able to resist Soviet initiatives to make small gains on the periphery of the free world through “limited brush-fire wars, indirect non-overt aggression, intimidation and subversion, internal revolution, increased prestige or influence, and the vicious blackmail” of American allies.⁴¹ After all, in 1950 the United States’ atomic monopoly had not deterred Kim Il Sung’s attempt to seize South Korea. And Senator Kennedy was by no means alone in criticizing massive retaliation for leaving the United States with choosing between “world devastation or submission” in response to communist advances. Others who voiced this concern included Paul Nitze, who had overseen drafting of the original containment policy (NSC-48⁴²) during the Truman administration, William W. Kaufman in his 1954 paper “The Requirements of Deterrence,” a number of RAND civilian strategists,⁴³ General Maxwell Taylor, Henry Kissinger in his 1957 *Nuclear Weapons and Foreign Policy*,⁴⁴ and the British military historian B. H. Liddell Hart.⁴⁵

John Kennedy rejected the assumption that strategic nuclear forces could be relied upon as a universal deterrent to war and aggression.

⁴⁰ Dulles, “Policy for Security and Peace,” p. 358.

⁴¹ Alan Enthoven and K. Wayne Smith, *How Much is Enough? Shaping the Defense Program, 1961-1969* (New York: Harper & Row, 1971), p. 165.

⁴² “A Report to the President Pursuant to the President’s Directive of January 31, 1950,” NSC-68, April 7, 1950. NSC-68 recommended a “more rapid build-up of political, economic, and military strength” to frustrate Soviet aggressive tendencies. NSC-68, p. 21. Nitze, as head of the State Department’s policy planning staff, was put in charge of drafting NSC-68. George Kennan, based on his 1946 and 1947 diagnoses of the nature of Soviet conduct, is credited with originating the policy of “a long-term, patient but firm and vigilant containment of Russian expansive tendencies.” X, “The Sources of Soviet Conduct,” *Foreign Affairs*, July 1947, p. 575.

⁴³ See, for example, B. Brodie, C. J. Hitch and A. W. Marshall, “The Next Ten Years,” RAND D2700, December 30, 1954, p. 27.

⁴⁴ Kissinger argued in 1957 that it was imperative for U.S. strategic doctrine “to create alternatives less cataclysmic than a thermonuclear holocaust.” Henry A. Kissinger, *Nuclear Weapons and Foreign Policy* (New York: W. W. Norton, abridged edition 1969), p. 14.

⁴⁵ Enthoven and Smith, *How Much is Enough?* pp. 122-123.

The decision to decrease reliance on a massive nuclear response to a Soviet attempt to overrun Western Europe created much anxiety and controversy within the North Atlantic Treaty Organization (NATO).

Early in Kennedy's presidency, the 1961 Berlin crisis, which culminated in the erection of the Berlin Wall to prevent East Germans from escaping to the West, provided further confirmation that strategic nuclear forces, by themselves, were not an effective deterrent against all forms of Soviet aggression. Consequently, one of the first major policy changes the Kennedy administration sought "was to reduce reliance on nuclear weapons for deterrence and defense and increase reliance on conventional forces."⁴⁶ This impulse has been a persistent theme in subsequent U.S. administrations, culminating in President Barack Obama's April 2009 announcement that his administration's policy would be to "take concrete steps toward a world without nuclear weapons."⁴⁷

Publicly, the Kennedy administration's desire to reduce reliance on nuclear arms came to be advertised as a policy shift from massive nuclear retaliation to flexible response. Conceptually at least, flexible response had two components: one conventional and one nuclear. Secretary of Defense Robert McNamara and his staff made programmatic decisions to bolster across-the-board deterrence of Soviet aggression in both areas. Conventionally, the Department of Defense (DOD) increased the number of U.S. Army divisions from eleven to sixteen, active U.S. Air Force tactical air wings from sixteen to twenty-one, added over 100,000 personnel to the U.S. Marine Corps (enough for a fourth division-wing team), and greatly expanded special forces. In addition, the procurement of conventional weapons and ammunition was almost doubled.⁴⁸ Over time, these changes increased the capability of the U.S. military to fight conflicts below the level of general nuclear war.

Nevertheless, the decision to decrease reliance on a massive nuclear response to a Soviet attempt to overrun Western Europe created much anxiety and controversy within the North Atlantic Treaty Organization (NATO). From the perspective of the Western Europeans, the policy of flexible response⁴⁹ suggested that the Kennedy administration might be backing away from the Eisenhower administration's commitment to minimizing the risk of Soviet aggression based primarily on the United States' "massive atomic capability." The perception in Western European capitals was that NATO's conventional forces were hopelessly outnumbered. At the time of the 1961 Berlin crisis, NATO had only 21 2/3 active divisions compared to an estimated total of 175 Soviet divisions, of which 140 were thought to be active. Granted, over time, analysis of the size and capabilities of the Soviet army revealed that the perception of NATO being hopelessly outnumbered was

⁴⁶ Enthoven and Smith, *How Much is Enough?* p. 117.

⁴⁷ "Remarks by President Barack Obama," Hradcany Square, Prague, Czech Republic, April 5, 2009.

⁴⁸ Enthoven and Smith, *How Much is Enough?* p. 167.

⁴⁹ The term "flexible response" was vague, rarely used in private by senior U.S. officials, and its use was banned by General Lyman Lemnitzer while he was NATO's supreme allied commander charged with implementing flexible response. Francis J. Gavin, "The Myth of Flexible Response: United States Strategy in Europe during the 1960s," *The International History Review*, December 2001, p. 849.

exaggerated.⁵⁰ At the time, however, the Western Europeans saw the American guarantee of massive retaliation as a cheap, affordable way of offsetting what they perceived to be overwhelming Soviet quantitative superiority.

The upshot was that NATO did not formally acquiesce to flexible response until late 1967. However, the strategic concept adopted by NATO's Military Committee (MC) at that point assumed possible nuclear use at all three levels of response to a Soviet conventional attack: direct defense, deliberate escalation, and general nuclear response.⁵¹ In the hope of developing plausible responses short of general nuclear war, the Kennedy administration pointed to the thousands of "tactical" nuclear weapons that had been deployed to Europe by the early 1960s. Examples ranged from the nuclear Davy Crockett recoilless rifle and various atomic artillery shells, to nuclear warheads for the Nike-Hercules surface-to-air missile (which also had a surface-to-surface mode), and the Mark 7 nuclear bomb for tactical aircraft. These weapons were integrated into conventional U.S. Army maneuver battalions, air defense units, and tactical air wings. From the U.S. perspective they "seemed in many ways very much like conventional weapons, only with a bigger punch," thereby offering the possibility of defending Western Europe without escalating to general nuclear war.⁵² For a variety of reasons, starting with the unavoidable frictions of war, the potential of "tactical nuclear war" to escalate and produce massive collateral damage was enormous. After all, whereas U.S. analyses isolated intercontinental nuclear forces from all others, the Soviet General Staff included long-range nuclear systems within the geographic boundaries of land and oceanic theaters of military action (театры военных действий or TVDs) along with "tactical" nuclear and conventional forces.⁵³ By the spring of 1962, even Maxwell Taylor and McNamara were entertaining doubts about the viability of the "flexible" use of battlefield nuclear weapons in Central Europe.⁵⁴ As Francis Gavin concluded in 2001, U.S. "nuclear strategy did not become more 'flexible' in the 1960s, and the United States did not rely less on nuclear escalation and more on conventional weapons."⁵⁵

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⁵⁰ For discussion of what came to be known in the Pentagon's Office of Systems Analysis as the "PEMA (Procurement of Equipment and Missiles, Army) Paradox," see Enthoven and Smith, *How Much is Enough?* pp. 132-142. The crux of this paradox was that Soviet divisions turned out to be very different from U.S. or NATO divisions in their manning, costs, and readiness.

⁵¹ Military Committee, "Military Decision on MC 14/3: A Report by the Military Committee to the Defence Planning Committee on Overall Strategic Concept for the Defense of the North Atlantic Treaty Organization Area," January 16, 1968, pp. 10-11. MC 14/3 remained in effect until 1991.

⁵² Enthoven and Smith, *How Much is Enough?* p. 124.

⁵³ Fritz W. Ermarth, "Contrasts in American and Soviet Strategic Thought," *International Security*, 3, No. 2, Autumn 1978, p. 147.

⁵⁴ David W. Mahon and David S. Patterson, eds., *Foreign Relations of the United States, 1961-1963*, Vol. VIII, *National Security Policy* (Washington, DC: U.S. Government Printing Office, 1996), pp. 272, 278-279.

⁵⁵ Gavin, "The Myth of Flexible Response," p. 872.

The primary U.S. objective in the nuclear competition with the Soviet Union was to have “a secure, protected retaliatory force” that, after absorbing the worst possible Soviet attack, would still be able to destroy Soviet urban society “in a controlled and deliberate way” and deny the Soviet Union the prospect of military victory.

While this observation also applies to the Kennedy administration’s handling of intercontinental nuclear forces, progress was made on developing better measures of sufficiency. Early on, McNamara decided to “shift from the liquid-fuel, first-generation ICBMs, Atlas and Titan, to solid-fuel, second generation missiles, Polaris and Minuteman”; in addition, he turned down the Air Force recommendation to buy more B-52s and elected to phase out the large B-47 force.⁵⁶ The American shift to solid-fuel ICBMs and submarine launched ballistic missiles (SLBMs) dates from 1962 with the initial deployments of Minuteman ICBMs and nuclear ballistic missile submarines (SSBNs). By comparison, the first Soviet solid-fuel ICBM, the RT-2P (SS-13), did not enter service until 1971 and only 60 were deployed due to the difficulties the missile encountered during testing.⁵⁷ Similarly, the first Soviet solid-fuel SLBM, the R-31 (SS-N-17), did not enter service until 1977 and only one of the 34 Yankee (Project 667A) SSBNs was converted to carry this missile.⁵⁸ Thus, the Kennedy administration’s early decisions to emphasize missiles rather bombers, to move away from liquid-fueled ICBMs, and the U.S. Navy’s rejection of liquid-fueled SLBMs provided the United States with long-term advantages in readiness and reaction times.

Beyond these programmatic choices, McNamara and the Office of Systems Analysis developed a measure for sufficiency of U.S. strategic nuclear forces. The vehicle by which such notions were conveyed to the president was the Draft Presidential Memorandum (DPM).⁵⁹ The nuclear DPM McNamara sent Kennedy in late November 1962 provides a good summary of the defense secretary’s thinking about nuclear requirements less than a month after the Cuban Missile Crisis. Specific programmatic recommendations aside, the DPM argued that the primary U.S. objective in the nuclear competition with the Soviet Union was to have “a secure, protected retaliatory force” that, after absorbing the worst possible Soviet attack, would still be able to destroy Soviet urban society “in a controlled and deliberate way” and deny the Soviet Union the prospect of military victory.⁶⁰ A U.S. nuclear force that could achieve these goals constituted “assured destruction,” which in turn provided the best way of deterring nuclear war. The 1962

⁵⁶ Enthoven and Smith, *How Much is Enough?* p. 168.

⁵⁷ Zaloga, *The Kremlin’s Nuclear Sword*, pp. 108, 233-234, 241.

⁵⁸ Ibid., pp. 117-118, 244-245. Due to the difficulties the Soviets had casting large-diameter solid-fuel rocket engines the majority of their ICBMs and SLBMs used hypergolic fuels—principally unsymmetric dimethylhydrazine (UDMH) and the corrosive oxidizer inhibited red fuming nitric acid (IRFNA). Not until the RT-2P (SS-13) did the Soviets achieve a solid-fuel ICBM with a three-to-five minute launch time comparable to the Minuteman’s one-minute launch time. Ibid., pp. 68, 105. The use of UDMH and IRFNA also limited how long first- and second-generation Soviet ICBMs could be kept fueled before they had to be defueled and returned to the factory. Ibid., 103-104.

⁵⁹ Enthoven and Smith, *How Much is Enough?* p. 53.

⁶⁰ Robert S. McNamara, “Recommended FY 1964-FY 1968 Strategic Retaliatory Forces,” Memorandum for the President, November 21, 1962, p. 5, available at http://www.dod.mil/pubs/foi/homeland_defense/strategic_offensive_defensive_forces/, accessed January 24, 2013.

DPM explicitly rejected the Air Force's evident desire for a first-strike capability. McNamara's analysis indicated a first-strike capability was "almost certainly infeasible" and "would be extremely costly" to try to achieve.⁶¹ Even if the Air Force managed to eliminate 93 percent of the Soviet Union's ICBMs in a first strike, McNamara argued, the roughly 200 surviving Soviet ICBMs and SLBMs could still inflict 50 million direct fatalities on the United States, which he did not consider acceptable. As for how much offensive nuclear capability was enough, McNamara argued that nuclear forces capable of destroying 50 percent of Soviet industry and 20 to 25 percent of the Soviet population in a retaliatory second strike were sufficient.⁶² He added that additional offensive nuclear capability, as recommended by the individual Service proposals, ran up against "strongly diminishing returns" and yielded "very little in terms of extra target destruction."⁶³

While the shift to flexible response aspired to provide the president with alternatives to massive retaliation, it appears that McNamara and the OSD staff had little success. Given the fragile nature of nuclear command and control (C2) on both sides of the Iron Curtain in the 1960s, it is unlikely that so-called "tactical" nuclear war in Europe could have been controlled.⁶⁴ Granted, McNamara's DPMs on offensive nuclear forces managed to put an upper bound on U.S. launcher levels (ICBMs, heavy bombers, and SSBNs). But the development of multiple independent re-entry vehicles (MIRVs), which would first be deployed on Minuteman III in 1970, obviated American efforts to curb the arms race with the Soviet Union by limiting warheads. As for more limited nuclear options, by the late 1960s the Single Integrated Operational Plan (SIOP) for nuclear war included the ability to withhold individual Communist-bloc countries. But withholding North Korea or even China at the beginning of a U.S.-Soviet nuclear exchange was not much of an alternative to general nuclear war.

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The Long Range Research and Development Planning Program

A more realistic alternative to nuclear war at any level emerged from the Long Range Research and Development Planning Program (LRRDPP). N. "Fred" Wikner

⁶¹ Ibid., pp. 7, 9.

⁶² The corresponding Soviet damage criteria for deterrence appear to have "destruction of up to 70 percent of [U.S.] industry and 30 percent of the population." See Valery E. Yarynich, *C²: Nuclear Command, Control, Cooperation* (Washington, DC: Center for Defense Information, May 2003), p. 59.

⁶³ McNamara, "Recommended FY 1964-FY 1968 Strategic Retaliatory Forces," p. 3; Enthoven and Smith, *How Much is Enough?* p. 207. The same phrase about "strongly diminishing returns" can be found in McNamara's "Recommended Long Range Nuclear Delivery Forces, 1963-1967," September 23, 1961, p. 5.

⁶⁴ In the early 1960s, command and control networks were vulnerable to the effects of electromagnetic pulses generated by nuclear detonations. As for warning of missile launches or nuclear detonations, the first U.S. Defense Support System satellite was launched in late 1970 and the first Soviet Oko satellite was orbited in 1972.

proposed this project to the Defense Advanced Research Projects Agency (DARPA) and the Defense Nuclear Agency (DNA) following his return from a tour in Vietnam as science advisor to General Creighton Abrams. The LRRDPP's original aim was to conduct a research-and-development effort to address what were seen as long-term changes in military affairs. More specifically the LRRDPP's "purpose . . . was to identify and characterize, in a systematic manner, those technologies that would have to be undertaken to provide the National Command Authority with a variety of response options as alternatives to massive nuclear destruction."⁶⁵

The LRRDPP ran from June 1973 through February 1975. Its deliberations and analyses were conducted by three panels⁶⁶ and four defense contractors.⁶⁷ The effort was overseen by a Steering Committee headed by Stephen J. Lakasik and Jack Rosengren, and the workshop and panel meetings included representatives from the military Services.

As part of the program, various panels and contractors considered integrated nuclear and conventional concepts, technologies, systems, and doctrine to meet a variety of military contingencies. The Strategic Alternatives Panel articulated potential conflict scenarios in Europe and Asia using real maps, detailed information about actual targets, and realistic time sequences, while also taking into account political considerations. The Advanced Technology Panel and Munitions Panel described specific weapons capabilities that would be needed to address these threat scenarios in new and strategically superior ways. A subsequent effort sponsored by DNA developed and verified detailed predictions of how the Warsaw Pact would actually assault NATO and suggested ways of disrupting these attacks by using only a few nuclear weapons per Army division, or—importantly—by using sufficiently accurate conventional weapons. The key idea that came out of these efforts was that there were alternatives to a primarily nuclear response to the Soviet threat. In particular, these deliberations began to converge around various new defense concepts that emphasized standoff precision strike.⁶⁸

The technological possibilities explored by the LRRDPP included remotely piloted vehicles for reconnaissance and strike; nuclear and nonnuclear ballistic missiles that used inertial guidance aided by a global positioning satellite system to achieve a circular error probable (CEP) of 100 feet without terminal guidance;

⁶⁵ Dominic A. Paolucci, "Summary Report of the Long Range Research and Development Planning Program," Lulejian and Associates, Falls Church, VA, February 7, 1975, p. 2.

⁶⁶ The three working panels were: Strategic Alternatives chaired by Albert Wohlstetter, Advanced Technology under Donald Hicks, and Munitions led by Jack Rosengren.

⁶⁷ The contractors were: Braddock, Dunn & McDonald (BDM); General Research Corporation, Lulejian and Associates; and Science Applications, Inc. (SAI, later SAIC).

⁶⁸ Richard H. Van Atta (project leader) and Michael J. Lippitz with Jasper C. Lupo, Rob Mahoney and Jack H. Nunn, *Transformation and Transition: DARPA's Role in Fostering an Emerging Revolution in Military Affairs*, Vol. 1, *Overall Assessment* (Alexandria, VA: Institute for Defense Analyses, 2003), p. 7.

missiles able to deliver low-yield, accurate, earth-penetrating nuclear warheads; all-weather sensor systems; advanced submunitions dispensed from missiles; guided projectiles; and precision munitions with “near zero miss.”⁶⁹ At a time when the Soviet Union had achieved parity in offensive nuclear weapons with the United States, the goal of all these technological prospects was to be able to deter a wider range of Soviet challenges than an all-out nuclear attack on the United States or a conventional assault on Western Europe that could escalate to general nuclear war. Given the escalatory risks of using even a few low-yield nuclear weapons to disrupt a Warsaw Pact conventional attack in Western Europe, the LRRDPP’s Advanced Technology Panel concluded that the “most attractive counter is the use of smart weapons which have the capability of very high kill probability due to their very high delivery accuracy.”⁷⁰ The LRRDPP summary report went even further:

Lastly, and perhaps most importantly, the analysis of this study strongly suggests that non-nuclear weapons with near zero miss may be technically feasible and militarily effective. If so, such non-nuclear weapons, under a wide range of circumstances, might satisfy the current United States and Allied damage requirements that now require the use of nuclear weapons. Near zero miss, non-nuclear weapons could provide the National Command Authority with a variety of strategic response options as alternative to massive nuclear destruction. In fact, it is not outside the realm of possibility for the United States, while maintaining or improving present military capabilities, safely to take the lead in reducing the world inventory of theater nuclear weapons as it once led the world in the introduction of nuclear weapons.⁷¹

The prospect that, in a wide range of circumstances, non-nuclear precision weapons could be substituted for nuclear ones potentially strengthened the nuclear-conventional firebreak. This idea would eventually emerge as U.S. policy in the 2001 Nuclear Posture Review (NPR). By broadening strategic strike to include both nuclear and non-nuclear weapons, the 2001 NPR implicitly embraced the conclusion of the LRRDPP. More explicitly, the 2001 NPR sought to reduce U.S. dependence on nuclear weapons, and the 2010 NPR followed suit.⁷² However, while the American desire to reduce dependence on nuclear weapons has led to

⁶⁹ Paolucci, “Summary Report of the Long Range Research and Development Planning Program,” pp. 29-30, 32, 34, 36, 38, 41, 44.

⁷⁰ Donald A. Hicks, “Final Report of the Advanced Technology Panel,” April 30, 1975, p. vi.

⁷¹ Paolucci, “Summary Report of the Long Range Research and Development Planning Program,” p. 45.

⁷² J. D. Crouch, Special briefing on the results of the Nuclear Posture Review, DoD News Transcript, January 9, 2002, slides 9 and 15. The transcript of Crouch’s briefing is available at <http://www.defense.gov/transcripts/transcript.aspx?transcriptid=1108>, accessed on December 21, 2012. The 2001 NPR has yet to be declassified. However, Donald Rumsfeld’s accompanying cover letter when the 2001 Nuclear Posture Review was sent to Congress and is available at <http://www.defenselink.mil/news/Jan2002/d20020109npr.pdf>.

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lower limits on the U.S. and Russian strategic arsenals, theater nuclear weapons have yet to be included in arms control negotiations with Moscow. The 2010 New START (Strategic Arms Reduction Treaty) with the Russian Federation focused exclusively on intercontinental nuclear weapons. Thus, in terms of tactical (or theater) nuclear weapons, the nuclear-conventional firebreak has widened from a U.S. perspective due to the small number of operational theater nuclear weapons the United States has retained. But, as will be discussed further in the next chapter, the firebreak has grown narrower from Russia's viewpoint due to Moscow's development of a new generation of more usable theater weapons.

The other consequential outcome of the LRRDPP was DARPA's Assault Breaker program, which started in 1978. Assault Breaker's aim was to investigate the feasibility of integrating targeting networks and standoff MTI/SAR (Moving Target Indicator/Synthetic Aperture Radar) sensors with missiles able to deliver precision-guided submunitions initially to ranges of 50-65 nautical miles behind enemy lines. Soviet theorists termed such systems reconnaissance-strike complexes (разведывательно-ударные комплексы or RUKs). In the final phase of Assault Breaker in December 1982 a standoff precision-strike capability was demonstrated at the White Sands Missile Range in New Mexico.⁷³ But while the validation program was a technical success, implementation as an integrated acquisition did not immediately follow due to the close cooperation required between the U.S. Air Force and the U.S. Army.⁷⁴ Instead, both Services preferred to pursue their own, stand-alone strike systems.

In the meantime, however, Soviet fears of the American capacity to field RUKs appear to have strengthened the nuclear-conventional firebreak in Central Europe. By 1984 Fred Wikner, who had instigated the LRRDPP, began publicly arguing that precision-guided submunitions could approach the effectiveness against Soviet follow-on echelon forces of a low-yield nuclear weapon, and the head of the Soviet General Staff, Marshal Nikolai V. Ogarkov, agreed.⁷⁵ This consensus, in turn, affected the nuclear-conventional firebreak in Central Europe. As late as 1983, General Bernard W. Rogers, the Supreme Allied Commander Europe (SACEUR), had stated

⁷³ Van Atta et al., *Transformation and Transition: DARPA's Role in Fostering an Emerging Revolution in Military Affairs*, Vol. 1, Overall Assessment, p. 20.

⁷⁴ *Ibid.*, pp. 20-21.

⁷⁵ N. F. (Fred) Wikner, "ET' and the Soviet Union," *Armed Forces Journal International*, November 1984, p. 100; Marshal N. V. Ogarkov, "The Defense of Socialism: Experience of History and the Present Day," *Красная звезда [Red Star]*, May 9, 1984; trans. Foreign Broadcast Information Service, *Daily Report: Soviet Union*, Vol. III, No. 091, Annex No. 054, May 9, 1984, p. R19. During the Assault Breaker program, Martin Marietta's T-16 and Vought's T-22 missiles had ranges of 100 and 120 kilometers (54 and 65 nautical miles), respectively. The missiles were to carry the Avco "Skeet" (later the Textron BLU-108/B Sensor Fuzed Weapon) and the General Dynamics Terminally Guided Sub-Munition, both of which were designed to kill main battle tanks.

publicly that NATO could only hold out against an all-out Warsaw Pact (WP) conventional attack for a relatively short time, after which he would be forced to ask for the authorization from NATO political authorities to use nuclear weapons.⁷⁶ But by 1986 NATO's military committee had embraced Assault Breaker-like capabilities, now designated Follow-On Forces Attack (FOFA), as one key element in the alliance's efforts to improve its conventional forces through the application of new technology. As General Rogers explained, FOFA's goal was to "reduce to manageable proportions the number of Warsaw Pact forces arriving at our General Defensive Position[s]" by attacking WP forces stretching from just behind the front lines to as far into the enemy's rear as target acquisition and precision-strike systems could reach.⁷⁷ In conjunction with the U.S. Army's AirLand Battle doctrine and the advanced strike systems such as the stealthy F-117, FOFA promised to increase NATO's conventional capabilities, thereby reducing the likelihood that SACEUR would have to resort to nuclear weapons to halt a Warsaw Pact attack.

Selective Nuclear Options and Presidential Directive/NSC-59

The administrations of Richard Nixon and Jimmy Carter both endeavored to broaden the nuclear-conventional firebreak by giving the president additional options. Recall that Nixon's national security advisor, Henry Kissinger, had argued in 1957 that the United States needed to devise alternatives to massive nuclear retaliation.⁷⁸ In mid-1973, Nixon appointed James Schlesinger, who had also headed the Atomic Energy Commission, as Secretary of Defense and Schlesinger agreed with Kissinger's desire for more flexible nuclear options than executing the SIOP or acquiescing to lesser acts of Soviet aggression.

In January 1974, Nixon issued National Security Decision Memorandum (NSDM)-242, which directed that U.S. planning for nuclear employment be revised to include limited nuclear options in hopes of terminating nuclear conflicts at the lowest possible level of violence.⁷⁹ The following April Schlesinger issued revised policy guidance for the employment of nuclear weapons. Beyond the desire for nuclear options short of massive retaliation, the new policy was motivated by the Soviets' attainment of nuclear parity coupled with accuracy improvements that offered the USSR the possibility of

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⁷⁶ Anthony H. Cordesman and Benjamin F. Schemmer, "AFJ Interview with General Bernard W. Rogers," *Armed Forces Journal International*, September 1983, p. 74.

⁷⁷ Alan Shaw (project director) et al., Office of Technology Assessment, *Technologies for NATO's Follow-On Forces Attack Concept—Special Report* (Washington, DC: U.S. Government Printing Office, July 1986), OTA-ISC-312, p. 1.

⁷⁸ Kissinger, *Nuclear Weapons and Foreign Policy*, pp. 143, 145-168.

⁷⁹ Richard M. Nixon, "Policy for Planning the Employment of Nuclear Weapons," NSDM-242, January 17, 1974, p. 2. NSDM-242 is available in the Nixon Presidential Library and Museum at <http://nixon.archives.gov/virtuallibrary/documents/nationalsecuritydecisionmemoranda.php>, accessed January 24, 2013.

nuclear options other than attacking U.S. cities. Schlesinger's guidance proposed four broad categories of options for the employment of nuclear weapons: major, selected, limited nuclear, and regional nuclear attack options.⁸⁰ These four categories emphasized efforts to incorporate greater flexibility into U.S. plans for nuclear conflict. For example, the limited and regional attack options categories prohibited or withheld attacks on major urban centers, countries, and national governments.⁸¹ The primary intent behind these restrictions was to control escalation.

Once Nixon approved DoD's new nuclear employment guidance, Schlesinger began announcing publicly that, rather than one or two massive nuclear options, U.S. nuclear war plans would evolve in the direction of giving the president "a wider set of much more selective targeting options."⁸² Specifically, if deterrence of a Soviet nuclear attack on the United States should fail for whatever reason, Schlesinger wanted

the planning flexibility to be able to respond selectively to the attack in such a way as to (1) limit the chances of uncontrolled escalation, and (2) hit meaningful targets with a sufficient accuracy-yield combination to destroy only the intended target and to avoid widespread collateral damage.⁸³

While Schlesinger believed that the U.S. second-strike capability would almost certainly deter the Soviets from a deliberate nuclear attack against American cities, to ensure deterrence of more discriminate Soviet nuclear options such as a disarming counterforce strike, the United States also needed a range of more selective options. Yet, as sensible as these doctrinal changes appeared to be, they had little influence on the pre-planned SIOP. Among other reasons, precisely how limited nuclear options (LNOs) were supposed to work "was never made clear," and the capability to develop LNOs after a nuclear conflict had begun simply did not exist.⁸⁴

⁸⁰ DoD, "Policy Guidance for the Employment of Nuclear Weapons," April 3, 1974, p. 4.

⁸¹ *Ibid.*, p. A-8.

⁸² James R. Schlesinger, *Annual Defense Department Report to the Congress on the FY 1975 Defense Budget and FY 1975-1979 Defense Program* (Washington, DC: U.S. Government Printing Office, March 4, 1974), p. 4. For extended discussion of the thinking behind selective and limited nuclear options, see James R. Schlesinger, *Report of the Secretary of Defense on the FY 1975 Defense Budget and FY 1975-1979 Defense Program*, February 26, 1974, pp. 57-63, 69-70, 134, available at http://www.dod.mil/pubs/foi/logistics_material_readiness/acq_bud_fin/243.pdf, accessed on January 25, 2013. For Kissinger's views on selective nuclear options, see Henry A. Kissinger, *The White House Years* (Boston: Little, Brown and Company, 1979), pp. 115, 198, 217-219, 391.

⁸³ Schlesinger, *Annual Defense Department Report to the Congress on the FY 1975 Defense Budget and FY 1975-1979 Defense Program*, p. 5. For Schlesinger's 1991 retrospective reflections on LNOs, see John G. Hines, Ellis M. Mishulovich and John F. Shull, *Soviet Intentions 1965-1985*, Vol. II, *Soviet Post-Cold War Testimonial Evidence* (McLean, VA: BDM Federal, September 22, 1993), pp. 128-130.

⁸⁴ William E. Odom, "The Origins and Design of Presidential Decision-59: A Memoir," in Henry D. Sokolski, ed., *Getting MAD: Nuclear Mutual Assured Destruction, Its Origins and Practice* (Carlisle, PA: Strategic Studies Institute, November 3004), p. 177.

In February 1977, newly elected President Jimmy Carter issued Presidential Review Memorandum (PRM)-10, which called for a comprehensive net assessment of how the United States was doing in the long-term competition with the Soviet Union. In August, Carter issued Presidential Directive (PD)/NSC-18, a U.S. national strategy that emphasized taking advantage of American economic strength, technological superiority and popular political support to counterbalance Soviet military power and adverse influence, especially in Europe, the Middle East, and East Asia.⁸⁵ However, PD/NSC-18 deferred revising the nuclear targeting guidance in NSDM-242 pending a targeting review.

Not until July 1980 did Carter approve a new policy for nuclear employment, PD/NSC-59. It declared that in order to continue to deter nuclear and conventional attacks on the United States, its forces overseas, and American friends and allies in an era of strategic nuclear equivalence, the United States needed the flexibility to “design nuclear employment plans on short notice in response to the latest and changing circumstances.”⁸⁶ The following October, defense secretary Harold Brown issued updated nuclear employment guidance. The new guidance emphasized the flexibility to respond to Soviet aggression “over the continuum of nuclear weapon employment options, ranging from the use of a small number of strategic and/or theater nuclear capable weapon systems in a contingency operation, to a war employing all elements of our nuclear forces in attacks against a broad spectrum of enemy targets.”⁸⁷ Besides endorsing a continuum of nuclear response options, Brown’s countervailing strategy recognized the need to bolster the endurance and supporting C3I (command, control, communications, intelligence) of U.S. nuclear forces so that the United States would not find itself in a “use or lose” situation that might spark unwarranted escalation.

Much like Schlesinger’s limited nuclear options, PD/NSC-59 did little to change the focus of actual U.S. nuclear war plans, especially the pre-planned SIOP. As William Odom observed in March 1980 while PD/NSC-59 was being iterated between the Pentagon and the NSC:

The big effort in NSDM-242 to move toward flexibility achieved a number of things, but it did not deprive the SIOP of its autonomy. It yielded the appearances of flexibility without the substance. “LNOs” and “escalation control” were terms that suggested flexibility but left out the key elements of genuine flexibility: strategic defense (if you shoot an LNO, are you going to sit calmly with no civil defense and take the Soviet LNO response? Does anybody really believe such an LNO is credible? It is less credible than the SIOP!), C3I to include more than communications (meaning an enduring staffing capability

⁸⁵ Jimmy Carter, “U.S. National Strategy,” Presidential Directive/NSC-18, August 24, 1977, pp. 1-2.

⁸⁶ Jimmy Carter, “Nuclear Weapons Employment Policy,” PD/NSC-59, July 25, 1980, pp. 1-2, available at <http://www.gwu.edu/~nsarchiv/nukevault/ebb390/>, accessed January 7, 2013.

⁸⁷ DoD, “Policy Guidance for the Employment of Nuclear Weapons (NUWEP),” October 24, 1980, p. 3.

at the national level and intelligence acquisition for shifting targets), and interaction with general purpose force operations (meaning that strategic forces would be put in a “supporting role” and not allowed to fight the war alone or as the primary force).⁸⁸

From a policy or doctrinal perspective, Odom viewed PD/NSC-59 as a “responsible attempt to make massive nuclear exchanges of thousands of nuclear warheads less probable.”⁸⁹ Like Schlesinger’s LNOs, PD/NSC-59 sought to widen the nuclear-conventional firebreak by making some of the “rungs” in Herman Kahn’s escalation “ladder” real.⁹⁰ However, “little or nothing of consequence was done to pursue this doctrinal change.”⁹¹ Except for additional investment in assuring the continuity of the U.S. government, the wherewithal for planning and executing limited nuclear responses in the midst of an ongoing nuclear exchange—especially against new or fleeting targets—was not developed.⁹² As for the preplanned SIOP, Odom had a point in arguing that it was an autonomous war plan that thrust aside all other unified commands and forces, or made them subservient to the SIOP.⁹³ The SIOP was also prone to overkill.⁹⁴ General Lee Butler, the last head of Strategic Air Command before it was disestablished, commented in 1990 that the war plan included “over 12,000 targets, many struck with repeated nuclear blows, some to the point of complete absurdity.”⁹⁵

⁸⁸ William E. Odom, “Draft PD on Nuclear Targeting,” memorandum for Zbigniew Brzezinski, March 22, 1980, p. 2 (emphasis in the original).

⁸⁹ Odom, “The Origins and Design of Presidential Decision-59: A Memoir,” in Sokolski, *Getting MAD*, p. 195, available at <http://www.gwu.edu/~nsarchiv/nukevault/ebb390/>, accessed January 7, 2013.

⁹⁰ In 1965, Herman Kahn described an escalation ladder with no less than 44 rungs containing six “firebreaks,” each of which constituted a basic escalatory threshold. See Herman Kahn, *On Escalation: Metaphors and Scenarios* (New Brunswick, NJ: Transaction Publishers, 2010), pp. 38-41.

⁹¹ Odom, “The Origins and Design of Presidential Decision-59: A Memoir,” in Sokolski, *Getting MAD*, p. 175.

⁹² Nevertheless, Harold Brown and others believed that NSC/PD-59 was intended to make it clear to Soviet leaders that they personally, the economic and social structures of the Soviet state, and the Soviet’s external empire would all be at risk in a global nuclear war. Hines, Mishulovich and Shull, *Soviet Intentions 1965-1985*, Vol. II, *Soviet Post-Cold War Testimonial Evidence*, pp. 13-14. “PD-59 was developed to reinforce deterrence by making it clear to the Soviet leadership that they would not escape destruction in any exchange.” Andrew W. Marshall in *Ibid.*, p. 118.

⁹³ Odom, “Draft PD on Nuclear Targeting,” p. 2.

⁹⁴ During McNamara’s February 1961 visit to the Joint Strategic Targeting Planning Staff (JSTPS) in Omaha, he asked what the result of applying current JSTPS targeting procedures to Hiroshima would be. The answer was “3 DGZs [desired ground zeros] of 80 KT each.” “Secretary McNamara’s Visit to JSTPS,” 4 February 1961, Memorandum for the Record, February 6, 1961, p. 3.

⁹⁵ Lynn Eden, *Whole World on Fire: Organizations, Knowledge, and Nuclear Weapons Devastation* (Ithaca: Cornell University Press, 2004), p. 273.

The Strategic Defense Initiative

From Truman to Carter, U.S. administrations pursued containment as the “guiding policy”⁹⁶ for dealing with Soviet expansionist tendencies. Ronald Reagan came to the presidency believing that the Soviet system was fatally flawed whereas that of the United States was not. Based on this belief, his administration developed a national security strategy that explicitly sought to “reverse Soviet expansionism” and, within the limits available to the United States, promote the transformation of the Soviet Union into “a more pluralistic political and economic system in which the power of the privileged ruling elite is gradually reduced.”⁹⁷

An early component of Reagan’s efforts to implement a national security strategy that went beyond containment involved modernizing U.S. strategic nuclear forces. In the fall of 1981, he issued a National Security Decision Directive (NSDD) that called for fielding 100 MX ICBMs, modernizing the bomber force with B-1Bs and the Advanced Technology Bomber (the B-2), expanding civil defense, and undertaking vigorous research on ballistic missile defense.⁹⁸ Reagan had originally been attracted to ballistic missile defense during a 1979 visit to the Air Force’s command center under Cheyenne Mountain in Colorado as he began his campaign for the presidency.⁹⁹ Once in office, however, he did not push missile defense until members of both the NSC and the Joint Chiefs of Staff began advocating it due to the inability to find a secure basing mode for the MX ICBM. In 1975 Soviets had begun deploying the heavy R-36M (SS-18 Mod 1) ICBM with eight 600-kiloton MIRVs.¹⁰⁰ By the time Reagan succeeded Carter, there was growing concern in the United States that in a counterforce first strike by the R-36M force, with a total of over 2,000 warheads, the Soviets could eliminate the entire U.S. Minuteman force in their silos in a first strike.¹⁰¹ One motivation for the MX was to address this vulnerability, but by late 1982 the administration had not been able to come up with a basing mode for the MX that would make the new ICBM more survivable than the 1,000 Minuteman missiles. Ballistic missile defense, therefore, emerged as an

Ronald Reagan came to the presidency believing that the Soviet system was fatally flawed whereas that of the United States was not.

⁹⁶ Identifying containment as the overall approach or “guiding policy” that U.S. administrations from Truman through Carter pursued for dealing with the Soviet challenge follows Richard Rumelt’s view that good strategies have three elements: a diagnosis that defines or explains the challenge; a guiding policy for dealing with the challenge; and a set of coherent actions designed to carry out the guiding policy. See Richard Rumelt, *Good Strategy/Bad Strategy: The Difference and Why It Matters* (New York: Crown Business, 2011), p. 77.

⁹⁷ Ronald Reagan, “U.S. Relations with the USSR,” National Security Decision Directive (NSDD)-75, January 17, 1983, p. 1. NSDD-75 was drafted by Richard Pipes.

⁹⁸ Ronald Reagan, “Strategic Forces Modernization Program,” NSDD 12, October 1, 1981, p. 2.

⁹⁹ Donald R. Baucom, *The Origins of SDI 1944-1983* (Lawrence, KS: University of Kansas Press, 1992), pp. 129-134.

¹⁰⁰ Zaloga, *The Kremlin’s Nuclear Sword*, pp. 149, 235, 241. The estimate of over 2,000 SS-18 Mod1 warheads by early 1981 assumed that no more than 36 of these missiles were deployed with a single 24-megaton warhead.

¹⁰¹ Baucom, *The Origins of SDI 1944-1983*, pp. 128, 142, 171, 180.

alternative to exploit American technological advantages to counter the USSR's growing advantage in land-based ICBMs.

The meeting that precipitated Reagan's decision to commit his administration to developing ballistic missile defense took place in the White House on February 11, 1983. The principals were the president; National Security Advisor Robert C. McFarlane; Defense Secretary Caspar Weinberger; and the Joint Chiefs of Staff. After Weinberger presented his recommendations on the MX, he told the president that the Joint Chiefs had a different view, which he believed Reagan ought to hear.¹⁰² General John Vessey, JCS Chairman, then presented a version of the ballistic missile defense briefing Admiral James Watkins had given the JCS on February 5. The support of the Joint Chiefs for developing missile defenses appears to have been decisive in securing President Reagan's support and commitment.¹⁰³

Having made up his mind, Reagan moved rapidly ahead. On the evening of March 23, 1983, he announced his Strategic Defense Initiative (SDI) in a televised speech on national security. "What if," Reagan asked, "free people could live secure in the knowledge that their security did not rest upon the threat of instant U.S. retaliation to deter a Soviet attack, that we could intercept and destroy strategic ballistic missiles before they reached our own soil or that of our allies?"¹⁰⁴ Two days later he directed "the development of an intensive effort to define a long-term research and development program aimed at an ultimate goal of eliminating the threat posed by nuclear ballistic missiles."¹⁰⁵

Given the fact that the deployed Soviet ICBMs could launch over 6,400 re-entry vehicles (RVs), the defensive goal Reagan set for the United States was formidable, if not bordering on the impossible.¹⁰⁶ After delivering what became known as his "Star Wars" speech, the president recorded in his diary that it might take twenty years to develop the capability he sought.¹⁰⁷ Three decades

¹⁰² Baucom, *The Origins of SDI 1944-1983*, p. 191.

¹⁰³ Reagan was especially taken by a line Vessey had taken from Watkins' briefing: "Wouldn't it be better to protect the American people rather than avenging them?" *Ibid.*, p. 191. Reagan's diary entry for that day confirms his enthusiasm: "An almost 2 hr. lunch with Joint Chiefs of staff. . . . Out of it came a super idea. So far the only policy worldwide on nuclear weapons is to have a deterrent. What if we tell the world we want to protect our people, not avenge them; that we're going to embark on a program of research to come up with a defensive weapon that would make nuclear weapons obsolete?" Ronald Reagan, *The Reagan Diaries* (New York: Harper, 2007), p. 130.

¹⁰⁴ Ronald Reagan, "Address to the Nation on National Security," March 23, 1983, available at <http://www.fas.org/spp/starwars/congress/1996/s960329a.htm>, accessed on November 19, 2012.

¹⁰⁵ Ronald Reagan, "Eliminating the Threat from Ballistic Missiles," NSDD-85, March 25, 1983.

¹⁰⁶ Glenn A. Kent and David E. Thaler, "First-Strike Stability: A Methodology for Evaluating Strategic Forces," RAND R-3765-AF, August 1989, Table A.2, p. 53. If all the Soviets' SSBNs were at sea and in positions to fire, they could add another 3,200 RVs to the 6,400 from ICBMs.

¹⁰⁷ Reagan, *The Reagan Diaries*, p. 140.

and \$150 billion (in current-year dollars) later, Reagan's dream of a national capability for defending the United States against nuclear-armed ballistic missiles remains, at best, only partially fulfilled.¹⁰⁸

The comprehensive missile shield Reagan envisioned would have required withdrawing from the 1972 Anti-Ballistic Missile (ABM) Treaty, and that did not occur until President George W. Bush did so in December 2001. By then, the defensive goal was a much more limited. Currently only thirty ground-based interceptors for mid-course exo-atmospheric intercepts have been deployed in Alaska and California. Of course, the Missile Defense Agency (MDA) is also developing the Standard Missile (SM)-3 Block IIB to provide a capability to intercept ballistic missiles during their boost phases.¹⁰⁹ But the resulting system, which also includes Patriot 3 and the Terminal High Altitude Area Defense (THAAD) for terminal intercepts, only aspires to defend the U.S. homeland against a very limited ballistic-missile attack by a rogue state such as North Korea. Reagan's hope of defending against a large-scale Russian ballistic missile attack still remains beyond reach. The latest declarations under New START indicate that Russian nuclear forces include roughly 300 ICBMs with over 1,000 RVs. These systems alone could easily overwhelm the limited capacity of existing U.S. ballistic missile defenses. New START explicitly specified that "current strategic defensive arms do not undermine the viability and effectiveness of the strategic offensive arms" of the United States and the Russian Federation. Even so, in February 2011, Sergey Ivanov, the Russian deputy prime minister, warned that any attempt to build a shield against Russian missiles would inevitably provoke the creation of a better sword.¹¹⁰ And in May 2011, the head of Russia's Strategic Rocket Forces, Colonel-General Sergey Karakayev, announced that by 2018 Russia would deploy a new heavy ICBM that would be capable of penetrating American ballistic missile defenses.¹¹¹

Reagan's Strategic Defense Initiative sought to obviate the threat of nuclear-tipped ballistic missiles. If this initiative had succeeded, it would have gone far to widen the nuclear-conventional firebreak. The requisite technologies, however,

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¹⁰⁸ Annual funding through fiscal year (FY) 2012 for SDIO (Strategic Defense Initiative Organization), BMDO (Ballistic Missile Defense Organization), and MDA (Missile Defense Agency) are available at http://www.mda.mil/news/budget_information.htm, accessed on November 5, 2012. In constant FY 2012 dollars, the total investment is \$183 billion.

¹⁰⁹ SM-3 Block IIB is a key component of the DoD's Phased Adaptive Array Approach for ballistic missile defense in Europe, which MDA hopes to field by 2022.

¹¹⁰ Tom Z. Collina, "New START in Force; Missile Defense Looms," Arms Control Association, March 2011 available at http://www.armscontrol.org/act/2011_03/NewSTART_MissileDefense, accessed on December 10, 2012.

¹¹¹ Voice of Russia has reported that the new ICBM prototype was flight tested from Plesetsk for the first time in May 2012. Tom Z. Collina, "Russia to Field New Heavy Missile by 2018," Arms Control Association, October 2012, available at http://www.armscontrol.org/act/2012_10/Russia-to-Field-New-Heavy-Missile-by-2018, accessed on December 8, 2012.

have turned out to be far more difficult and expensive to develop than proponents envisioned in the 1980s. An American defensive shield against a massive ballistic missile attack still does not exist. Barring a technological breakthrough, none is likely to be feasible in the foreseeable future.

The Soviet General Staff, LNOs and Launch on Warning

As the Soviets began fielding intercontinental nuclear systems, massive retaliation evolved over time into mutual assured destruction.

The Eisenhower administration adopted massive retaliation as a way of implementing the long-term containment of Soviet power while preserving a strong, healthy U.S. economy. As the Soviets began fielding intercontinental nuclear systems, massive retaliation evolved over time into mutual assured destruction. Recall that McNamara had estimated that some 200 Soviet ICBMs and SLBMs could well survive the best first strike the United States could muster. Those surviving missiles would still be able to inflict an unacceptable 50 million direct fatalities on the United States, which led McNamara to reject a U.S. first-strike capability as neither feasible nor affordable. When RAND analysts ran similar calculations in the late 1980s, their base case using all existing intercontinental nuclear forces indicated that after an all-out Soviet counterforce first strike, the United States would still have over 3,500 nuclear warheads available for retaliation; conversely, after a U.S. counterforce first strike, the USSR would have over 6,000 surviving nuclear weapons available for retaliation.¹¹²

Did Soviet political and military leaders, like their American counterparts, seek alternatives to mutual assured destruction? The available evidence indicates that they did not. Interviews after the Berlin Wall fell in 1989 with high-ranking Soviet officials, including General Staff officers, revealed that,

contrary to the view of many U.S. policy makers and analysts, the Soviet Union was not poised for strategic nuclear preemption, and the USSR did not develop initiatives designed around limited nuclear options, nor did Soviet military planners prepare elaborate plans to escalate a theater nuclear war to the global level.¹¹³

Instead of embracing LNOs, Soviet officials denounced them on the grounds that any nuclear use would, inevitably, lead to uncontrolled escalation and the destruction of both the American and Soviet homelands.¹¹⁴ True, around 1979 there was some contemplation of limited nuclear options and the possibility of intrawar bargaining by the Soviet General Staff. But no detailed planning of extended combat on a nuclear battlefield occurred and the General Staff “remained pessimistic about escalation control.”¹¹⁵

¹¹² Kent and Thaler, “First-Strike Stability,” p. 34.

¹¹³ John G. Hines and Daniel Calingaert, “Soviet Strategic Intentions, 1973-1985: A Preliminary Review of U.S. Interpretations,” RAND WD-6305-NA, December 1992, p. v.

¹¹⁴ *Ibid.*, p. 20.

¹¹⁵ *Ibid.*, pp. 21-22. See also Gen-Col (ret.) Andrian A. Danilevch in Hines, Mishulovich and Shull, *Soviet Intentions 1965-1985*, Vol. II, *Soviet Post-Cold War Testimonial Evidence*, pp. 24-25.

Not only did the Soviets fail to embrace LNOs and limited theater-nuclear combat in their own war planning, but in the late 1960s they adopted a launch-on-warning posture that, at a minimum, obviated U.S. selective nuclear options using ICBMs or SLBMs.¹¹⁶ This posture envisioned Soviet and U.S. ICBMs passing one another in space en route to their respective targets.¹¹⁷ Three main considerations prompted the Soviet military's adoption of launch on warning. First, a preemptive doctrine, which the military preferred, had "severe shortcomings," particularly given the "larger size and greater sophistication" of U.S. strategic forces and the "inherent shortcomings in the reliability of Soviet strategic forces."¹¹⁸ Second, the second generation of Soviet ICBMs, which were just coming on line at the time, promised to reduce launch times from thirty minutes to three-to-five minutes, making launch on warning technically feasible given sufficient warning.¹¹⁹ Third, annual experiments from 1964 to 1966 with massive conventional explosions at Semipalatinsk combined with computer modeling convinced General Staff analysts that the relatively light construction of U.S. Minuteman silos together with the close spacing of individual silos and their launch control centers indicated "that American ICBMs were not intended to survive an attack and were thus designed as first-strike weapons."¹²⁰ In light of these considerations, the Soviet General Staff's adoption of launch on warning made eminent sense. Ironically, this posture was based on a fundamental misunderstanding of American intentions. Nevertheless, unknown to U.S. policy makers at the time, it largely dashed American hopes of being able to avoid mutual assured destruction by employing limited nuclear strikes or other stratagems to control escalation. As a result, if U.S. decision makers had actually chosen to execute an LNO in a crisis or conflict with the USSR in order to avoid an all-out exchange, the likely Soviet response would have revealed that, for the Russians, there was virtually no firebreak between a few nuclear weapons and massive retaliation.

In June 1983 a two-week war game, *Proud Prophet*, convinced Caspar Weinberger and General Vessey that the existing American strategic concepts aimed

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¹¹⁶ Zaloga, *The Kremlin's Nuclear Sword*, pp. 139, 150; and Yarynich, C³: Nuclear Command, Control Cooperation, p. 30.

¹¹⁷ Hines and Calingaert, "Soviet Strategic Intentions, 1973-1985," p. vi.

¹¹⁸ Zaloga, *The Kremlin's Nuclear Sword*, p. 79.

¹¹⁹ *Ibid.*, p. 105. The second-generation Soviet ICBMs were the R-36 (SS-9), UR-100 (SS-11), and RT-2P (SS-13).

¹²⁰ Hines and Calingaert, "Soviet Strategic Intentions," 1973-1985, p. vi; and Vitalii Tsygichko in Hines, Mishulovich, and Shull, *Soviet Intentions 1965-1985*, Vol. II, *Soviet Post-Cold War Testimonial Evidence*, p. 151. In general, the Semipalatinsk data showed that ground bursts were extremely effective at destroying silo-based ICBM systems. Even with distant nuclear detonations, silo doors often jammed. Under certain geological conditions, a ground wave from a strike as far away as one kilometer was powerful enough to drive the entire silo three meters out of the ground, rendering the missile system inside completely inoperable. Any ground burst closer than one kilometer was highly likely to "kill" a silo-based missile system. If two silos were less than two kilometers apart, typically both would be disabled by one incoming warhead.

The breadth or robustness of the firebreak often looked different in Washington than it did in Moscow.

at preventing a U.S.-Soviet conflict in Europe from escalating to general nuclear war were “either irresponsible or totally incompatible with current U.S. capabilities.”¹²¹ Paul Bracken, who participated in Proud Prophet, maintains that in the aftermath of the game, Secretary Weinberger and General Vessey banished launch on warning, horizontal escalation, the early use of nuclear weapons, and tit-for-tat nuclear exchanges from Pentagon thinking about nuclear war.¹²² From an American perspective at least, Proud Prophet widened the conventional-nuclear firebreak by eliminating questionable options such as the early use of nuclear weapons.

Whether the same was true on the Soviet side is more difficult to assess. After all, Russian fears of a U.S. nuclear attack were so great that in May 1981 the Soviet leadership initiated an intelligence-gathering and decision-making operation, Operation RYAN, to provide warning of an impending American nuclear attack in order to preempt the attack if possible.¹²³ A series of events followed that were easily misinterpreted in Moscow as suggesting that the United States under Ronald Reagan might be contemplating nuclear war. The most alarming was NATO’s annual Able Archer exercise in November 1983, which simulated the actual buildup to nuclear conflict. In the midst of this exercise, Soviet fears of a NATO nuclear attack evidently came close to a “screaming pitch.”¹²⁴ To this day it remains unclear why the Soviets did not act upon their fears. Somehow the period of rising Soviet paranoia that began with Operation RYAN abated and a nuclear exchange did not occur. Nevertheless, it would appear that in the early 1980s the nuclear-conventional firebreak was considerably narrower in the eyes of Soviet leaders than it appeared to American officials in the aftermath of Proud Prophet.

In hindsight, there was not a single conventional-nuclear firebreak shared by U.S. and Soviet leaders during the Cold War. The breadth or robustness of the firebreak often looked different in Washington than it did in Moscow. From the Soviets’ perspective, the firebreak probably narrowed more than most Western observers imagined and remained that way once the USSR adopted launch on warning. On the American side, the breadth of the nuclear-conventional firebreak appears to have varied more than it did on the Soviet side due to the American quest for options short of massive retaliation.

¹²¹ Bracken, *The Second Nuclear Age: Strategy, Danger, and the New Power Politics*, p. 87. Proud Prophet allowed Weinberger and Vessey, to play options such as LNOs and horizontal escalation. The game went “nuclear big time” because Weinberger and Vessey “faithfully implemented the prevailing U.S. strategy.” *Ibid.*, p. 88. Little has been written about this game because Weinberger’s and Vessey’s participation was concealed from most of the players and Phillip A. Karber, who was in charge of the game, agreed to keep their participation secret for the next twenty-five years, which he did.

¹²² *Ibid.*, p. 89.

¹²³ Arnav Manchanda, “When Truth Is Stranger than Fiction: the *Able Archer* Incident,” *Cold War History*, February 2000, pp. 114, 117.

¹²⁴ *Ibid.*, p. 123.

CHAPTER 3 > POST-COLD WAR DEVELOPMENTS IN THE UNITED STATES AND RUSSIA

Chapter 2 can be understood as an alternative history of the U.S.-Soviet competition in nuclear arms viewed through the prism of the nuclear-conventional fire-break. It is based on actual national strategy and nuclear policy documents, particularly on the American side. While most comparable records concerning Soviet nuclear policies during the Cold War remain inaccessible, the 1990s witnessed a flood of new information on Russian nuclear forces from the country's aerospace industry and military institutes, including candid interviews with senior Russian defense officials and General Staff officers concerning how the Soviets viewed their Cold War nuclear competition with the United States.¹²⁵

The present chapter reviews the main changes in worldwide nuclear force postures that have occurred since the Cold War ended. Because the United States and the Russian Federation still possess the vast majority of the world's nuclear weapons, emphasis is given to the sharp reductions in American and Russian nuclear forces and changes in U.S. and Russian thinking about nuclear weapons that have occurred since 1991. However, this period also witnessed the emergence of India, Pakistan, and North Korea as nuclear states, and the evidence to date suggests that Iran aspires to acquire nuclear weapons as well.

Evolving U.S. and Russian Perceptions of Nuclear Forces and Capabilities since 1991

Once the Soviet Union achieved nuclear parity, American and Soviet leaders ba-

¹²⁵ For an insightful overview of Soviet thinking, see Vitalii Nikolaevich Tsygichko's reflections on the interviews conducted by Hines, Mishulovich, and Shull in *Soviet Intentions 1965-1985*, Vol. II, *Soviet Post-Cold War Testimonial Evidence*, Appendix E. Note that the three-page English translation of Tsygichko's remarks by Svetlana Savranskaya is inserted without page numbers at the beginning of Appendix E.

The sudden and largely unanticipated collapse of the Warsaw Pact followed by the breakup of the Soviet Union itself undermined the verities and constants of the U.S.-Soviet nuclear arms competition during the Cold War.

sically sized their intercontinental nuclear forces on the requirement to be able to mount a devastating retaliatory response to the other's first strike. For both cultural and bureaucratic reasons, however, this broad requirement was interpreted differently in Washington and Moscow and did not result in identical forces. The United States built a triad of bombers, ICBMs, and SLBMs in which each leg was equally important. Soviet strategic nuclear forces are better portrayed as tricycle: a single big wheel—the ICBM force and two smaller wheels, the heavy bomber, and SLBM forces.¹²⁶ In addition, the Soviet concept of “deep parity” required the Soviet Union to counter not only U.S. intercontinental nuclear forces, but shorter-range, “theater” American, French, British and, eventually, Chinese systems deployed on their periphery.¹²⁷ While U.S. arms control initiatives imposed limits on intercontinental launchers, the development of MIRVs made it impossible to curb strategic warheads. Except for the 1987 intermediate-range nuclear forces (INF) treaty—which eliminated NATO's ground-launched cruise missiles (GLCMs) and Pershing II medium-range ballistic missiles (MRBMs) along with the Soviets' SS-20 intermediate-range ballistic missiles (IRBMs)¹²⁸—arms control also had little success in constraining theater nuclear forces. The sudden and largely unanticipated collapse of the Warsaw Pact followed by the breakup of the Soviet Union itself undermined the verities and constants of the U.S.-Soviet nuclear arms competition during the Cold War.

In late September 1991, three months before the USSR finally disintegrated President George H. W. Bush announced his Presidential Nuclear Initiative (PNI). It committed the United States to withdrawing all land-based tactical nuclear weapons with ranges less than 300 miles from overseas bases and dismantling them as well as removing all sea-based tactical nuclear weapons from U.S. surface ships, submarines, and naval aircraft.¹²⁹ The withdrawals from Europe, Korea, and U.S. naval combatants were completed by mid-1992, but dismantlement took most of the 1990s due to capacity limits at the Pantex Plant in Texas. In addition, U.S. officials elected to store the nuclear variant of the Tomahawk Land Attack Missile (TLAM-N) rather than dismantle it.¹³⁰ However, the 2010 NPR concluded that this weapon is redundant and could be retired without affecting the extension of U.S. nuclear assurances and extended deterrence to Asian allies, especially to Japan.¹³¹

¹²⁶ Zaloga, *The Kremlin's Nuclear Sword*, p. 59.

¹²⁷ *Ibid.*, p. 170.

¹²⁸ The SS-20 Pioneer was essentially the two solid-fuel stages of the Temp-2S ICBM with a new post-boost bus. *Ibid.*, p. 171.

¹²⁹ Amy F. Woolf, “Nonstrategic Nuclear Weapons,” Congressional Research Service (CRS) RL32572, May 29, 2012, p. 10.

¹³⁰ The number of TLAM-Ns retained appears to have initially been 320. *Ibid.*, p. 16.

¹³¹ DoD, “Nuclear Posture Review Report,” April 2010, pp. xiii, 28; Woolf, “Nonstrategic Nuclear Weapons,” p. 17. In private discussions, Japanese defense officials have expressed growing uneasiness about American extended deterrence guarantees.

In early October 1991, Soviet General Secretary Mikhail Gorbachev reciprocated Bush's initiatives by stating that the Soviet Union would withdraw and eliminate its non-strategic nuclear weapons. After the Soviet Union collapsed, Russian president Boris Yeltsin stated that he would honor Gorbachev's pledge to withdraw and eliminate most of these weapons. By the late spring of 1992, all these non-strategic weapons had been removed from the Baltic states, the Central Asian republics, the Ukraine, and Belarus.¹³² Since then, however, Russian officials have been less than forthcoming about the disposition of these weapons. There is uncertainty even today as to whether the Russians actually dismantled all the non-strategic nuclear weapons that Gorbachev and Yeltsin pledged to destroy.¹³³ In addition, there is strong evidence that subsequent Russian leaders have discovered new value in advanced theater-nuclear weapons and have no intention of abandoning them. As the Central Intelligence Agency (CIA) concluded in 2000:

Judging from Russian writings since 1995 and Moscow's evolving nuclear doctrine, new roles are emerging for very-low-yield nuclear weapons—including weapons with tailored radiation output—and there are powerful advocates for [the] development of such weapons in the country's military and weapons community [emphasis in the original].¹³⁴

How many of these very-low-yield nuclear weapons may have been produced is anyone's guess. Nevertheless, Russian statements indicate that at least some have been fielded. In 2012, Vladimir Putin boasted that since the Cold War's end Russia had overtaken the United States by developing and deploying a new generation of nuclear weapons and ballistic missiles whereas the Americans, as a matter of policy, had not modernized their nuclear arsenal.¹³⁵ In 2009, the Congressional commission on America's strategic posture stated bluntly that Russia "is no longer in compliance" with the parallel commitments made in response to the PNI.¹³⁶

What might these developments suggest about the nuclear firebreak? The former head of the Russian Atomic Energy Commission and other nuclear scientists, Russian military officers, and Russian national security experts have described

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¹³² Woolf, "Nonstrategic Nuclear Weapons," pp. 11-12.

¹³³ Hans M. Kristensen, "Non-Strategic Nuclear Weapons," Federation of American Scientists, Special Report No. 3, May 2012, pp. 48-51.

¹³⁴ Office of Transnational Issues (OTI), CIA, "Evidence of Russian Development of New Subkiloton Nuclear Warheads," Intelligence Memorandum (IM) 2000-011X, August 30, 2000, p. 1, available at <http://www.foia.cia.gov/>, accessed on January 24, 2013.

¹³⁵ Pavel Felgenhauer, "Putin Declares His Defense Agenda for the Next Decade," *Eurasia Daily Monitor*, 9, Issue 38, available at [http://www.jamestown.org/programs/edm/single/?tx_ttnews\[tt_news\]=39051&cHash=5cc2c28ca8c50c06309e2ee0749774a9](http://www.jamestown.org/programs/edm/single/?tx_ttnews[tt_news]=39051&cHash=5cc2c28ca8c50c06309e2ee0749774a9), accessed on November 26, 2012.

¹³⁶ Perry and Schlesinger, *America's Strategic Posture*, p. 13.

In his January 1992 State-of-the-Union address, President Bush declared that the biggest event in his lifetime was that America had “won the Cold War” and proceeded to list significant cuts in U.S. strategic nuclear forces.

the new generation of nuclear weapons “as blurring the boundaries between conventional and nuclear war.”¹³⁷ By contrast, when George H. W. Bush directed the withdrawal and dismantlement of the bulk of U.S. tactical nuclear weapons, his decision appears to have been based on the judgment that the changing relationship with the Soviet Union had made the nuclear-conventional firebreak far wider than it had been only a few years before.

This American perception that the nuclear-conventional firebreak had widened was especially strong in the context of intercontinental nuclear forces. In his January 1992 State-of-the-Union address, President Bush declared that the biggest event in his lifetime was that America had “won the Cold War” and proceeded to list significant cuts in U.S. strategic nuclear forces. He announced his intention to halt B-2 production at 20 planes,¹³⁸ cancel ICBM production, cease production of new warheads for sea-based missiles, halt MX production, and stop purchasing any more advanced cruise missiles.¹³⁹ The president then added that he had also informed Gorbachev that if Russia would eliminate all land-based multiple-warhead ballistic missiles, he would eliminate all the MX Peacekeeper ICBMs, reduce the number of Minuteman warheads to one per missile, cut the number of MIRVs on U.S. SLBMs by about one third, and convert a substantial portion of U.S. heavy bombers (the B-1Bs) to conventional-only use. Not only did the United States subsequently do what Bush had promised, but on June 1, 1992, Strategic Air Command was disestablished and its bombers and ICBMs transferred to the newly established Air Combat Command.¹⁴⁰

The initial willingness of Gorbachev and, later, Yeltsin to accede to the American desire to “de-MIRV” Russian ICBMs may have been less an inclination to reduce the Soviet/Russian nuclear threat to the United States than a practical necessity that arose from the emergence of independent states in portions of what had formerly been parts of the Soviet Union.

[A] significant fraction of the [former USSR’s] missile and bomber forces were at bases in the newly independent republics. As a result, Russia lost control of nearly a quarter of the ICBM force—23.9 percent of all launchers, including some of the most recent fourth-generation systems. The submarine missile force remained intact, since the force was based entirely in Russian waters. The losses of the air force bomb-

¹³⁷ OTI, CIA, “Evidence of Russian Development of New Subkiloton Nuclear Warheads,” p. 7.

¹³⁸ Congress later funded an additional B-2, making the total fielded 21.

¹³⁹ George H. W. Bush, “Third State of the Union address to Congress,” January 28, 1992, available at <http://www.nytimes.com/1992/01/29/us/state-union-transcript-president-bush-s-address-state-union.html?pagewanted=all&src=pm>, accessed on November 24, 2012.

¹⁴⁰ In July 1993, a year after SAC was disestablished, the U.S. ICBM force was transferred to U.S. Space Command. In August 2009 Headquarters Air Force activated the Air Force Global Strike Command (AFGSC) to manage the two nuclear bombers, the B-52H and B-2, and the ICBM force. Air Force Historical Research Center, “Air Force Global Strike Command (USAF),” July 1, 2009. The AFGSC is a descendent of SAC.

er fleet were the most serious . . . Russia lost almost half of its aircraft to other republics. . . . Besides the loss of much of its equipment, the new Russian RSVN [Strategic Rocket Forces] suffered major setbacks in terms of its industrial base, its command-and-control facilities, and its testing facilities.¹⁴¹

While American and Russian pressure succeeded in “de-nuclearizing” the Ukraine, Belarus, and Kazakhstan by 1996, the following year the Russian RSVN was down to 112,000 troops, less than half the size it had been at its peak during the Soviet period.¹⁴² Much of the rapid decline in Russian strategic forces was driven by the dissolution of the Soviet Union.

The natural conclusion to draw from these developments is that, after 1991, both American and Russian leaders perceived rapidly diminishing value in their nuclear forces. Although the Russians subsequently rethought the value of nuclear weapons, this implication has persisted in the United States down to the present day. Indeed, the prevailing American view goes even further in downplaying the role of nuclear arms in international relations. Prominent American policy elites and government officials, both former and current, have come to believe that “mutual Soviet-American deterrence” based on the threat of nuclear retaliation is “obsolete” while the likelihood of non-state terrorists getting their hands on nuclear weaponry “is increasing.”¹⁴³ Hence the only logical solution to the growing danger posed by the existence and proliferation of nuclear weapons is to abolish them.

Even before this new orthodoxy emerged in the mid-2000s, the United States ceased developing any new nuclear warheads. Since 2009, the U.S. government has eschewed new warhead designs as a matter of official policy, limiting itself to using “only nuclear components based on previously tested designs,” and rejected fielding nuclear weapons to support new military missions or military capabilities.¹⁴⁴ A presumption underlying these policies is the belief that the post-Nagasaki taboo against use is strong and can be sustained indefinitely without any appreciable modernization the U.S. nuclear arsenal. In this view, all that is required for the taboo to hold until the world’s nuclear weapons are finally abolished, is to

¹⁴¹ Zaloga, *The Kremlin’s Nuclear Sword*, p. 215. In Ukraine, for example, the Russian Federation lost its largest and most important development and production center for ICBMs, the new solid-fuel rocket plant at Pavlograd, and the inertial guidance plant in Kharkov, which produced 90 percent of the RSVN’s ICBM guidance systems. *Ibid.*, p. 220.

¹⁴² *Ibid.*, p. 224.

¹⁴³ George P. Shultz, William J. Perry, Henry A. Kissinger, and Sam Nunn, “A World Free of Nuclear Weapons,” *The Wall Street Journal*, January 4, 2007. This viewpoint emerged from a Hoover Institution conference organized by Shultz and Sidney D. Drell to reconsider the vision of a nuclear free world that Reagan and Gorbachev brought to their Reykjavik summit in October 1986. Other participants who endorsed the view that nuclear arms had to be abolished included Michael Armacost, William Crowe, James Goodby, Thomas Graham, Jr., Max Kampelman, Jack Matlock, John McLaughlin, Henry Rowen, and Roald Sagdeev.

¹⁴⁴ DoD, “Nuclear Posture Review Report,” April 2010, pp. xiv, 7, 39.

As for the nuclear-conventional firebreak, Russian views, policies, and programs give every indication of an eroding boundary between nuclear and conventional warfare—at least in certain situations.

ensure the safety and reliability of U.S. nuclear warheads based on late Cold War designs that sought the highest yield attainable for the least warhead weight.

By contrast, Vladimir Putin vowed during his 2012 campaign for a third term as president of the Russian Federation that a principal aim of his country's defense program over the next ten years will be to develop and deploy "an entirely new generation of nuclear weapons and delivery systems."¹⁴⁵ As will be elaborated shortly, the role of nuclear weapons in Russia's national security and status as a major power argues that there is every reason to expect that Putin will do everything within his power and Russia's resources to make good on this promise. As for the nuclear-conventional firebreak, Russian views, policies, and programs give every indication of an eroding boundary between nuclear and conventional warfare—at least in certain situations.

Quantitative U.S. and Russian Force Trends

The first-order trend in American and Russian nuclear forces since 1991 has been incremental but ongoing reductions in launchers and, especially, warheads. The data are most reliable on the U.S. side. In 2010 the Department of Energy announced that, as of 2009, the United States had 5,113 active and inactive nuclear warheads, including both strategic and non-strategic weapons.¹⁴⁶ This total constituted an 84 percent reduction from the U.S. peak of 31,255 warheads in 1967, and a 77 percent reduction from the 22,217 total in 1989, the year in which the Berlin Wall fell. The sharpest decline in the U.S. nuclear stockpile took place from 1989 to 1994. During those six years the total number of active and inactive weapons was cut in half.

The Soviet/Russian nuclear stockpile underwent similarly large reductions after 1989. Unclassified sources indicate that the Soviet stockpile peaked at over 40,000 strategic and non-strategic nuclear weapons in the mid-1980s, nearly two decades after the U.S. stockpile peaked.¹⁴⁷ Recent testimony to Congressional committees by U.S. Department of Defense (DoD) officials indicates that Russia's current stockpile is between 4,000 and 6,500 nuclear weapons, of which 2,000 to 2,500 are strategic.¹⁴⁸ Russia's nuclear stockpile has undergone

¹⁴⁵ Felgenhauer, "Putin Declares His Defense Agenda for the Next Decade."

¹⁴⁶ DoE, "Increasing Transparency in the U.S. Nuclear Stockpile," Fact Sheet, May 3, 2010, p. 1. Active warheads include strategic and non-strategic weapons maintained in an operational, ready-for-use configuration, as well as warheads that must be ready for possible deployment within a short timeframe and logistics spares. They have tritium bottles and other Limited Life Components installed. Inactive warheads are maintained at a depot in a non-operational status, and have their tritium bottles removed.

¹⁴⁷ Natural Resources Defense Council (NRDC), "Table of USSR/Russian Nuclear Warheads," available at <http://www.nrdc.org/nuclear/nudb/datab10.asp>, accessed on November 29, 2012; and Perry and Schlesinger, *America's Strategic Posture*, p. 111.

¹⁴⁸ James N. Miller, Statement before the House Committee on Armed Services, November 2, 2011, p. 1; and Madelyn Creedon and Andrew Weber, Joint Statement for the Record, Strategic Forces Subcommittee, Committee on Armed Services, U.S. Senate, March 28, 2012, p. 2.

an 84 to 90 percent reduction since the mid-1980s' peak. The reduction to date since 1989 is 82 to 89 percent.¹⁴⁹ The most rapid decline in Russian nuclear weapons took place from 1989 to 1996. During this period Russia's stockpile shrank by nearly 65 percent.

Neither U.S. nor Russian officials have been completely forthcoming about their existing stockpiles of nuclear weapons. The figures both countries have recently made public under New START reporting requirements are for strategic warheads on deployed ICBMs, SLBMs, and heavy bombers. As of September 2012, the United States reported 1,722 strategic warheads on 806 deployed ICBMs, SLBMs, and heavy bombers; the Russians reported 1,499 warheads on 491 deployed strategic launchers.¹⁵⁰ These numbers, however, do not capture all the strategic warheads allowed under the treaty. New START's accounting rule for heavy bombers counts only one warhead for each nuclear-capable heavy bomber against the deployed warhead limit of 1,550.¹⁵¹ Maximum loads for the 76 B-52Hs and 20 B-2s allow over 1,700 U.S. nuclear bomber weapons to go "uncounted," and maximum loads for the 63 Tu-95s and 13 Tu-160s allow the Russians to have at least another 760 under the 1,550-warhead limit.¹⁵² A quick read of New START may give the impression that both the United States and Russian Federation are limited to 1,550 deployed strategic warheads each, for a combined total of 3,100. But the bomber counting rule allows as many as another 2,500 warheads for heavy bombers to go uncounted. In addition, New START allows both parties to have 100 non-deployed ICBMs, SLBMs, and heavy bombers over and above the 700 deployed. Any strategic warheads maintained in their stockpiles for these launchers also go uncounted. Thus, New START's accounting rules contain some significant loopholes. The treaty may constrain launchers, but its 1,550-warhead limit by no means constrains the United States and Russia to a combined total of 3,100 warheads. Ignoring warheads for non-deployed launchers, the United States could have nearly 3,330 strategic weapons and Russia over 2,300 within the 1,550-warhead limit.

What about "non-strategic" or "tactical" nuclear warheads? New START does not even mention this category, much less constrain it. A special study by the

**New START's
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warhead limit
of 1,550.**

¹⁴⁹ The NRDC's database on USSR/Russian warheads estimates that in 1989 the USSR had 12,177 strategic and 23,700 non-strategic warheads for a total of 35,817. NRDC, "Table of USSR/Russian Nuclear Warheads."

¹⁵⁰ State Department, "New START Treaty Aggregate Numbers of Strategic Offensive Arms," Fact Sheet, October 3, 2012. When the first New START data exchange occurred in February 2011, the United States reported 1,800 warheads on deployed ICBMs, SLBMs, and heavy bombers; Russia reported 1,537. Thus, from February 2011 to September 2012, Russia's deployed strategic warheads increased, whereas the United States' decreased.

¹⁵¹ "Treaty between the United States of American and the Russian Federation for the Further Reduction and Limitation of Strategic Offensive Arms," Article III, paragraph 1.(c).

¹⁵² If the load-out for the Tu-95MS Bear is limited to six Kh-55 cruise missiles carried internally to maximize range, then the Russian bomber force would only add 396 uncounted nuclear weapons.

In the early 1980s, leaders in Washington and Moscow were convinced that they had to deploy over 10,000 intercontinental nuclear warheads to keep the specter of general nuclear war at bay.

Federation of American Scientists (FAS) in May 2012 estimated that the United States has some 760 non-strategic nuclear weapons while Russia has just over 2,000. According to this study, the United States' non-strategic inventory consists of around 500 B61 bombs plus some 260 W80-0 warheads (in storage for the TLAM-N); the Russian non-strategic inventory includes nuclear bombs, torpedoes, depth charges, warheads for the SS-21 Tochka and SS-26 Iskander short-range ballistic missiles, and warheads for the A-135 and S-300 antiballistic missile systems.¹⁵³ Adding these figures for U.S. and Russian non-strategic warheads to the maximum totals allowed under New START brings the active U.S. stockpile to over 4,000 nuclear weapons and Russia's to at least 4,700. But DoD estimates of Russian non-strategic nuclear weapons range from 2,000 to 4,000 weapons, which means the active Russian stockpile could be as high as 6,500 weapons.¹⁵⁴ Based on the U.S. stockpile figure for 2009 of 5,113 weapons (reported in 2010) and the roughly 90 fewer strategic warheads the United States reported in September 2012 under New START, a reasonable estimate for the active U.S. stockpile is around 5,000 nuclear weapons. The 4,000 to 6,500 range for Russia's active stockpile stems from uncertainty about Russia's non-strategic warheads.

In the early 1980s, leaders in Washington and Moscow were convinced that they had to deploy over 10,000 intercontinental nuclear warheads to keep the specter of general nuclear war at bay. The balance of nuclear terror remained delicate, especially during 1983. March of that year witnessed President Reagan's announcement of his Strategic Defense Initiative—an American technological thrust that continues to concern the Russians to this day as deputy prime minister Sergey Ivanov made clear in 2011. Next, on September 1, 1983, a Russian interceptor shot down Korean Airlines (KAL) Flight 007 after it wandered into Soviet airspace, killing all 269 people on board. Next, in late September, one of the Soviet Oko satellites monitoring the U.S. missile fields mistakenly interpreted sunlight on high-altitude clouds as a launch of American ICBMs. Fortunately, the duty officer in the Serpukhov-15 command center, Stanislav Petrov, reported the launch warnings as a false alarm.¹⁵⁵ Finally, in November 1983, NATO's simulation of procedures for escalation leading to nuclear release during the alliance's Able Archer exercise inflamed longstanding Soviet fears of U.S. nuclear aggres-

¹⁵³ Kristensen, "Non-Strategic Nuclear Weapons," pp. 14, 53-54. A more recent study estimates the total number of operationally assigned Russian non-strategic nuclear warheads to be 860 to 1,040. See Igor Sutyagin, "Atomic Accounting: A New Estimate of Russia's Non-Strategy Nuclear Forces," Royal United Services Institute for Defence and Security Studies, Occasional Paper, November 2012, pp. 2-3. However, Kristensen's higher total is based on nominal loadings plus weapons in storage or awaiting dismantlement. Sutyagin's estimate only includes "those that have been assigned to available delivery systems." *Ibid.*, p. 1.

¹⁵⁴ Kristensen, "Non-Strategic Nuclear Weapons," Figure 12, p. 50.

¹⁵⁵ David E. Hoffman, *The Dead Hand: The Untold Story of the Cold War Arms Race and Its Dangerous Legacy* (New York: Anchor Books, 2009), p. 11; and Zaloga, *The Kremlin's Nuclear Sword*, pp. 200-201.

sion in Europe.¹⁵⁶ Given such events, it is not difficult to understand why U.S. and Soviet nuclear arsenals had grown as large as they had by 1983.

Yet, less than a decade later, the Soviet Union had collapsed and the United States and the Russian Federation were unilaterally making massive reductions in their strategic nuclear forces. From 1989 to 1995 the United States and the Soviet Union/Russia both cut their intercontinental nuclear weapons in half. In the euphoria of the time, American and Russian leaders came, in effect, to believe that the largely unanticipated end of the Cold War had greatly reduced the numbers of nuclear weapons needed to deter the other side. On the American side at least, there was dawning recognition of just how much overkill the U.S.-Soviet nuclear competition had produced. And on both sides the chances of a nuclear exchange came to be viewed as far more remote than they had been in 1983 or even early 1989. Seemingly overnight, the nuclear-conventional firebreak was perceived in both Washington and Moscow as being far wider and stronger than it had been during the 1970s and most of the 1980s.

What is striking about this perception is how quickly it came to be accepted. In short order a consensus emerged that the possibility of a direct Russian nuclear attack on the United States was remote to non-existent. “Currently,” the Congressional Commission on America’s nuclear posture chaired by William Perry and James Schlesinger wrote in 2009, “no one seriously contemplates” such an attack.¹⁵⁷ Inevitably, the growing consensus that the principal danger underlying the Cold War competition in strategic nuclear arms had all but vanished has influenced subsequent discussions of America’s nuclear posture. Today the U.S. nuclear arsenal of some 5,000 weapons has less than a quarter of the 22,217 warheads the U.S. stockpile contained in 1989.¹⁵⁸ Yet, despite the dramatic changes in the international security environment since 1991, in 2009 Perry and Schlesinger also observed that the sizing of the U.S. nuclear arsenal remained “overwhelmingly driven by [quantitative equality with] Russia.”¹⁵⁹ The New START treaty confirmed this judgment: both the United States and the Russian Federation agreed to the same limits on strategic nuclear warheads and launchers.

Since the New START treaty entered into force in February 2011, the Obama administration has signaled that it will seek further reductions in the U.S. nu-

American and Russian leaders came to believe that the largely unanticipated end of the Cold War had greatly reduced the numbers of nuclear weapons needed to deter the other side.

¹⁵⁶ In response to Soviet concerns in the late 1970s that the Warsaw Pact’s military capabilities were falling behind NATO’s, the KGB initiated an intelligence effort (Operation RYAN) to detect or preempt an American nuclear attack in Europe. For two perspectives on the 1983 “war scare,” see the comments by Vojtech Mastny and Fritz Ermarth in Bernd Schaefer and Christian Nuenlist, eds., “Stasi Intelligence on NATO,” Parallel History Project on NATO and the Warsaw Pact (PHP), Washington and Zurich, November 2003, pp. 8-12, 27-30.

¹⁵⁷ Perry and Schlesinger, *America’s Strategic Posture*, pp. 24, 99.

¹⁵⁸ DoE, “Increasing Transparency in the U.S. Nuclear Stockpile,” p. 2.

¹⁵⁹ Perry and Schlesinger, *America’s Strategic Posture*, p. 24.

A 2012 report chaired by the former vice chairman of the Joint Chiefs of Staff, General James Cartwright, argued that by 2022 the United States could reduce its strategic arsenal to 900 warheads, eliminate all tactical nuclear weapons, and shift to a dyad of B-2s and SSBNs by eliminating nuclear ICBMs.

clear arsenal.¹⁶⁰ A 2012 report chaired by the former vice chairman of the Joint Chiefs of Staff, General James Cartwright, argued that by 2022 the United States could reduce its strategic arsenal to 900 warheads, eliminate all tactical nuclear weapons, and shift to a dyad of B-2s and SSBNs by eliminating nuclear ICBMs.¹⁶¹ Moreover, the report insisted, these steps could be taken either in unison with Russia or unilaterally.

How sensible are these recommendations? The answer depends on the value and roles attributed to nuclear weapons in the second decade of the twenty-first century. The central argument in the 2012 Global Zero report is that nuclear arms alone cannot “solve” any of the major security problems now facing the United States—including failed states, proliferation, terrorism, cyber warfare and climate change.¹⁶² Hence the very existence of nuclear weapons that might one day fall into the hands of terrorists is “more a part of the problem than any solution.”¹⁶³ After all, conventional precision weapons, which are vastly more usable than nuclear warheads, can “hold at risk nearly the entire spectrum of potential targets.”¹⁶⁴

However, it does not follow from these observations that nuclear arms play no important roles in international relations. In fact, as will be argued in Chapter 4, nuclear weapons can, and do, affect strategic relationships between nations even if they are never used. For example, the leaders of Russia, France, Great Britain and China all appear to view nuclear arms as guaranteeing their nations’ great power status. Arguably the U.S. nuclear arsenal contributes to deterring direct nuclear attacks on the U.S. homeland or its forces overseas, to assuring allies through extended deterrence, and to dissuading aggression. American extended deterrence guarantees seem particularly problematic insofar as U.S. leaders seem to be implicitly signaling that the military response to a nuclear weapon being used against allies such as Japan or South Korea might be limited to conventional precision weapons. As for the U.S. nuclear triad of ICBMs, SLBMs, and bombers, the 2009 Congressional Commission recommended maintaining this triad “for the immediate future” due to its “resilience, survivability, and flexibility,” none of which are trivial qualities insofar as the credibility of American nuclear arsenal is concerned.¹⁶⁵

¹⁶⁰ David E. Sanger, “Obama to Renew Drive for Cuts in Nuclear Arms,” *The New York Times*, February 10, 2013, available at http://www.nytimes.com/2013/02/11/us/politics/obama-to-renew-drive-for-cuts-in-nuclear-arms.html?_r=0, accessed February 11, 2013.

¹⁶¹ “Modernizing U.S. Nuclear Strategy, Force Structure, and Posture,” Global Zero U.S. Nuclear Policy Commission Report, May 2012, pp. 6-8, available at http://www.globalzero.org/files/gz_us_nuclear_policy_commission_report.pdf, accessed May 20, 2012. The report argues for fielding conventional ICBMs.

¹⁶² “Modernizing U.S. Nuclear Strategy, Force Structure, and Posture,” p. 2.

¹⁶³ Ibid.

¹⁶⁴ Ibid.

¹⁶⁵ Perry and Schlesinger, *America’s Strategic Posture*, pp. xvii, 20.

In addition, there is also a relatively new risk inherent in reductions to the U.S. arsenal well below the New START limits. The deeper the cuts, the easier it would be for China's rulers to decide to match or exceed the American and Russian nuclear arsenals, thereby affecting perceptions of relative military power in capitals throughout Asia and the western Pacific. In that event, nuclear instability between China, Russia and India would likely grow, as would a narrowing of the nuclear-conventional firebreak as seen from Beijing, Moscow, and New Delhi.

There is one point on which widespread agreement exists on both sides of the debate over nuclear arms. So "long as nuclear weapons exist, the United States must sustain a safe, secure, and effective nuclear arsenal—to maintain strategic stability with other major nuclear powers, deter potential adversaries, and reassure our allies and partners of our security commitments to them."¹⁶⁶ The Global Zero recommendations only seem sensible if viewed as a waypoint toward the United States eventually exiting the nuclear business. Unfortunately, a world without nuclear weapons is unlikely to come to pass anytime soon. In his 2009 speech in the Czech Republic, President Obama himself acknowledged that nuclear global zero "will not be reached quickly—perhaps not even in my lifetime." Moreover, Russia's leaders, as well as those of most other nuclear powers, have strong incentives to retain their nuclear arms. In the meantime, therefore, great caution and thoughtful analysis would appear to be called for regarding any further cuts in the U.S. nuclear arsenal.

Strategy and Goals for U.S. Nuclear Forces

Even with access to national policy documents on nuclear issues such as the now-declassified ones cited in Chapter 2, there would still be considerable ambiguity about actual American nuclear goals and strategy as opposed to public declarations. Take the U.S. commitment during the Cold War to resort to theater nuclear weapons in the event that NATO's conventional defenses began to fail in the face of a Warsaw Pact onslaught. Would the American president *really* have been willing to risk escalation to general nuclear war to defend Western Europe? American declaratory policy extended the U.S. "nuclear umbrella" to NATO. But especially after the Soviet Union achieved strategic nuclear parity with the United States, America's European allies began to entertain understandable doubts about the U.S. nuclear guarantee. Declaratory policies made in peacetime are one thing; the decisions national leaders might make during a nuclear crisis or under the stresses of actual war are another. Hence, the following discussion of U.S. strategies and goals for the ability to deter nuclear use, assure allies, and dissuade aggression should be understood as speculative.

Great caution and thoughtful analysis would appear to be called for regarding any further cuts in the U.S. nuclear arsenal.

¹⁶⁶ DoD, "Nuclear Posture Review Report," April 2010, p. i.

Barack Obama is not the first American president to have expressed a desire to rid the world of nuclear weapons. In his January 1977 inaugural address, President Jimmy Carter vowed that the United States would, that year, move “a step toward the ultimate goal—the elimination of all nuclear weapons from this Earth.”¹⁶⁷ However, in his April 2009 speech at Hradcany Square in Prague, Obama became the first American president to make this goal official U.S. policy. He began by announcing his administration’s firm commitment “to seek the peace and security of a world without nuclear weapons.” Toward this end, the president outlined in his speech “concrete steps” his administration would undertake towards this goal:

- “To put an end to Cold War thinking,” Obama vowed that the United States would reduce the role of nuclear weapons in U.S. national security strategy, urge other nations to do the same, and begin the work of reducing U.S. warheads and stockpiles by negotiating a new Strategic Arms Reduction Treaty with the Russians, thereby setting the stage for further cuts.
- To achieve a global ban on nuclear testing, the administration would immediately and aggressively pursue U.S. ratification of the Comprehensive Test Ban Treaty.
- To cut off the building blocks needed for nuclear weapons, the United States would seek a new treaty that would verifiably end the production of weapons-grade fissile materials intended for nuclear weapons.
- In addition, the United States promised to seek to strengthen the Nuclear Non-Proliferation Treaty (NPT) as a basis for international cooperation towards the abolishment of nuclear arms: “Countries with nuclear weapons will move towards disarmament, countries without nuclear weapons will not acquire them, and all countries can access peaceful nuclear energy.”¹⁶⁸

In April 2010, the Obama administration’s National Posture Review added the following elaborations on the president’s 2009 speech aimed at detailing steps that would be taken in the next five to ten years to “reduce nuclear dangers”:

- As the United States reduces its dependence on offensive nuclear weapons, extended deterrence will depend increasingly upon missile defenses, conventional forces, forward presence, and even non-military ingredients—“strong, trusting political relationships” with allies and partners.
- The most urgent priorities for U.S. policy are to prevent nuclear terrorism and further nuclear proliferation because, while the threat of global nuclear war has become more remote, the risk of nuclear attack has increased.

¹⁶⁷ President Jimmy Carter, “Inaugural Address,” January 20, 1977.

¹⁶⁸ “Remarks by President Barack Obama,” Hradcany Square, Prague, Czech Republic, April 5, 2009.

- The U.S. nuclear triad will be maintained, but all U.S. ICBMs will be “de-MIRVed” to a single warhead to increase stability.
- In light of U.S. conventional preeminence and improving capabilities for missile defense, it will be U.S. policy not to use, or threaten to use, nuclear weapons against non-nuclear states that are party to the NPT and in compliances with its obligations.
- Although Russia and China are modernizing their nuclear forces, the United States will not conduct any nuclear tests, develop any new nuclear warheads, support new missions, or provide new capabilities.¹⁶⁹
- However, the F-35 Joint Strike Fighter will be capable of delivering tactical nuclear weapons (B61s) from forward-deployed bases.¹⁷⁰

The American presumption is that the nuclear-conventional firebreak can be made infinite by pursuing nuclear abolition.

So long as nuclear weapons exist, deep tensions exist between these policies and the credibility of the U.S. nuclear arsenal. The most fundamental is between maintaining the safe, secure, and effective nuclear arsenal required for U.S. deterrence, and its extension to remain credible to adversaries and allies alike while, at the same time, reducing U.S. offensive nuclear forces and eschewing their modernization. The hope underlying these policies in the 2010 NPR is that the “nearly 65-year record of nuclear non-use can be extended forever.”¹⁷¹ In effect, the American presumption is that the nuclear-conventional firebreak can be made infinite by pursuing nuclear abolition. But as long as nuclear weapons exist, this ambition seems to imply that the basic U.S. goal for nuclear deterrence is to deter or prevent nuclear use by anyone, anywhere, anytime. This, of course, is an ambitious goal, and the very first obstacle it runs up against is the nuclear doctrine of the Russian Federation.

Current Russian Nuclear Doctrine and Posture

In December 1988, when Mikhail Gorbachev announced his decision to begin unilaterally reducing the Soviet armed forces by 500,000 personnel and withdrawing units from Eastern Europe, the Soviet Union’s ground forces alone had around two million men, over 200 motorized rifle and tank divisions, and 53,000 tanks.¹⁷² The Soviet ground forces were also highly dependent on two-year conscripts. Until serious reforms were initiated in late 2008, Russia remained saddled with an oversized military built for large-scale mobilization and the demands of the Cold

¹⁶⁹ However, in April 2010 DoD and the NATO allies agreed to develop a version of the “tactical” B61 incorporating “a guided tail section” to provide accuracy. Government Accountability Office, “Nuclear Weapons: DoD and NNSA Need to Better Manage Scope of Future Refurbishments and Risks to Maintaining U.S. Commitments to NAO,” GAO-11-387, May 2011, p. 13.

¹⁷⁰ DoD, “Nuclear Posture Review Report,” April 2010, pp. v, viii, ix, xiii, xiv, 27.

¹⁷¹ *Ibid.*, pp. ix, 16.

¹⁷² DoD, “Soviet Military Power: Prospects for Change 1989,” February 1989, pp. 102-103.

War.¹⁷³ Today, however, Russia's armed forces are estimated to total only about 700,000-800,000 personnel, including contract-employed personnel and conscripts. Among other things, these changes reflect how ill-prepared the Russian armed forces had been earlier in 2008 to fight even a local war on its borders against a foe as small as Georgia.

Post-Cold War restructuring of the Russian armed forces began in October 2008. In the wake of the Georgia conflict, then-Russian defense minister Anatolii Serdiukov initiated a series of reforms that, by 2011, had downsized Russia's bloated officer corps, dismantled empty cadre units, and introduced a new, leaner command system as well as a new branch of arms (the Aerospace Defense Forces).¹⁷⁴ These reforms have probably weakened Russia's conventional capabilities in the short run. But Swedish observers suggest that the reforms of 2008-2011 were undertaken "to establish the structural preconditions" for a gradual "strengthening of the Army" over the next decade.¹⁷⁵

Regardless of how successful Russia's efforts to transform its conventional capabilities may prove to be, the broader strategic context in which post-Soviet Russian nuclear doctrine has evolved can be summarized as follows:

The dissolution of the Warsaw Pact and the Soviet Union brought about a major reduction in Moscow's economic, industrial and demographic resource base. At the same time, the military strategic depth to the west was reduced and the military balance of strength was radically changed, to Russia's disadvantage. This development continued up to the mid-2000s, as several former Soviet republics gravitated westwards in foreign policy terms and, in addition, five East European countries became members of NATO.¹⁷⁶

One aspect of these developments is that nuclear weapons have become one of the few guarantors of Russia's security and great power status.

Closely related to the growing importance Russia's leaders attribute to their nuclear weapons is the fact that they themselves perceive their conventional capabilities to be inferior to NATO's in the west and China's in the east. Compare, for example, the performance of the Russian armed forces against tiny Georgia in 2008 with that of the U.S.-led coalition against Iraq in 1991 or of

¹⁷³ Carolina Vendil Pallin, "Russian Military Capability in a Ten-Year Perspective" in Carolina Vendil Pallin, ed., *Russian Military Capability in a Ten-Year Perspective—2011* (Stockholm: Swedish Defence Research Agency, August 2012), FOI-R—3474-SE, p. 15.

¹⁷⁴ Pallin, "Russian Military Capability in a Ten-Year Perspective," p. 15; and Märta Carlsson and Johan Norberg, "The Armed Forces" in *Russian Military Capability in a Ten-Year Perspective—2011*, p. 115.

¹⁷⁵ Pallin, "Russian Military Capability in a Ten-Year Perspective," p. 16; and Carlsson and Norberg, "The Armed Forces," p. 109.

¹⁷⁶ Fredrik Westerlund and Roger Roffey, "Weapons of Mass Destruction" in *Russian Military Capability in a Ten-Year Perspective—2011*, p. 136.

the U.S.-led NATO campaign against Serbia in 1999. Not only did Serdiukov initiate his reforms shortly after the Georgian campaign, but in 2010 Russia formally identified NATO as a “military danger.”¹⁷⁷ And while China was not mentioned in Russia’s 2010 military doctrine, Russian generals would be myopic to ignore China as an emerging military threat. The People’s Republic of China (PRC) has the world’s second largest economy and its growth rates suggest China’s gross domestic product (GDP) will overtake U.S. GDP in the early 2020s, if not earlier.¹⁷⁸ Moreover, Chinese troops in the two military regions bordering the Russian Far East (Beijing and Shenyang) outnumber the entire contingent of conventional troops in the Russian armed forces. Furthermore, China’s population density on its side of the shared border is sixty-two times that on the Russian side.¹⁷⁹ Thus, there are legitimate grounds for Russian leaders to conclude that their military is conventionally inferior both to NATO and China.

How has this perception of conventional inferiority affected Russia’s nuclear doctrine? In 2010, Dima Adamsky argued that the Russians have adopted a two-tiered approach to deterrence:

Russia has two strategies of nuclear deterrence: the first is based on a threat of massive *launch-on-warning* and *retaliatory strikes* to deter nuclear aggression; the second is based on a threat of limited (in terms of targets and tasks) *demonstration and de-escalation strikes* to deter and terminate a large-scale conventional war.¹⁸⁰

Again, Russia’s continuing ability to inflict massive nuclear destruction on the United States even in the aftermath of a highly improbable American first-strike supports Russia’s claim to be a global great power, and parity with the United States in offensive intercontinental nuclear weapons is viewed in Moscow as maintaining nuclear stability.¹⁸¹ As a result, Russia is continuing to modernize its nuclear forces.

¹⁷⁷ President of the Russian Federation, “Military Doctrine of the Russian Federation,” February 5, 2010, II.7, II.8.a. This public document was accompanied by “Principles for Government Policy in the Field of Nuclear Deterrence, up to 2020,” which was also adopted but not published. Presumably it describes Russia’s actual nuclear doctrine. Westlund and Roffey, “Weapons of Mass Destruction,” p. 139.

¹⁷⁸ “China: How To Gracefully Step Aside,” *The Economist*, available at <http://www.economist.com/blogs/freeexchange/2011/01/china>, accessed on December 8, 2012. The online tool at this URL allows the reader to estimate when China’s economy will overtake America’s as a function of GDP growth rates, inflation, and Yuan appreciation.

¹⁷⁹ Jakob Hedenskog, “Foreign Policy” in Carolina Vendil Pallin, ed., *Russian Military Capability in a Ten-Year Perspective—2011* (Stockholm: Swedish Defense Research Agency, 2012), p. 33.

¹⁸⁰ Dima Adamsky, “Russian Regional Nuclear Developments,” Long Term Strategy Group (LTSG), September 2010, p. 20 (italics in the original). See also Mark Schneider, “The Nuclear Forces and Doctrine of the Russian Federation,” National Institute Press, publication No. 0003, 2006; and Stephen J. Blank, ed., *Russian Nuclear Weapons: Past, Present, and Future* (Carlisle, PA: Strategic Studies Institute, November 2011).

¹⁸¹ Westlund and Roffey, “Weapons of Mass Destruction,” p. 139.

The Russians' solution to a failing conventional campaign is to use low-yield weapons to step onto the lowest rung of an escalation ladder.

At the strategic level, Russia is tripling production of nuclear missiles, including new SLBMs and heavy ICBMs capable of carrying 10-15 warheads; at the tactical level, Russia has used hydro-nuclear testing to enhance the reliability of its new generation of very-low-yield theater nuclear weapons.¹⁸² Russia is relying on these new theater nuclear weapons to deter attacks on itself or its allies by regional adversaries or, should deterrence fail, to defend itself against conventionally superior opponents by employing small numbers of low-yield weapons to de-escalate a military conflict that threatens Russian territorial integrity or sovereignty.

Since 1999, the use of very-low-yield nuclear weapons has been regularly included in operational-strategic exercises conducted by the Russian General Staff.¹⁸³ In Zapad-1999 (West-1999) the Russians postulated a NATO attack on the Kaliningrad oblast and, after three days of defensive action, Russian troops resorted to a limited nuclear strike with four air-launched cruise missiles from heavy bombers to de-escalate the conflict.¹⁸⁴ More recently, in Vostok-2010 (East-2010) in eastern Russia—the largest military exercise in post-Soviet history—the exercise culminated with two live launches of nuclear-capable Tochka-U (SS-21) missiles against the command post of a “hypothetical opponent.” In the exercise, the Russians located the enemy command post using an unmanned aerial vehicle, and both missiles were reported to have hit within 12 meters of their aim points, which were on a Russian range near Mount Poltavka.¹⁸⁵ Operationally, the Russians' solution to a failing conventional campaign is to use low-yield weapons to step onto the lowest rung of an escalation ladder. Their expectation is then that Russia's strategic retaliatory capability will deter the opponent from taking a similar step, much less going further up the escalation ladder.

It is difficult to see how such a response could be deterred by U.S. conventional, much less intercontinental nuclear, forces, especially if the Russians used low-yield nuclear weapons on their own territory to prevent a conventional defeat. After all, today's Russian sub-strategic nuclear doctrine is not conceptually different from the doctrine of flexible nuclear response that NATO formally adopted

¹⁸² Mark Schneider, “The Nuclear Forces and Doctrine of the Russian Federation and the People's Republic of China,” prepared statement, U.S. House of Representatives, Armed Services Committee, Subcommittee on Strategic Forces, October 14, 2011, pp. 2-3.

¹⁸³ Miriam John and Joseph Braddock, “The Nuclear Weapons Effects National Enterprise,” Defense Science Board/Threat Reduction Advisory Committee, June 2010, pp. 8-9.

¹⁸⁴ Nikolai N. Sokov “The Evolving Role of Nuclear Weapons in Russia's Security Policy,” in Cristina Hansell and William C. Potter, eds., *Engaging China and Russia on Nuclear Disarmament* (Monterey, CA: Center for Nonproliferation Studies, April 2009), p. 78; and Gunnar Arbman and Charles Thornton, “Russia's Tactical Nuclear Weapons: Part I: Background and Policy Issues,” FOI-R-1057-SE, November 2003, pp. 29-30.

¹⁸⁵ Roger McDermott, “Reflections on Vostok 2010: Selling an Image,” *Eurasia Daily Monitor*, 7, Issue 134, July 13, 2010, available at http://www.jamestown.org/single/?no_cache=1&tx_tnews%5Btt_news%5D=36614, accessed on March 3, 2012.

in 1967.¹⁸⁶ Note, too, that Russia's theater nuclear doctrine and posture have not arisen in response to the U.S. nuclear arsenal but as a way of compensating for conventional inferiority. Moreover, because the Russians have developed a new generation of very-low-yield, accurate nuclear weapons with tailored effects, their current nuclear doctrine may carry less escalatory risk than NATO's theater-nuclear doctrine did when the U.S. began deploying nuclear weapons in Western Europe in the 1950s.¹⁸⁷ Even though many observers judge the theater component of Russian nuclear doctrine to be implausible and dangerous, it nevertheless suggests that the Russians may believe they have found a way to circumvent the nuclear-conventional firebreak. In the kinds of scenarios exercised in Zapad-1999 and Vostok-2010, a few nuclear weapons might not only be usable but strategically successful. In other words, current Russian theater doctrine has potentially reduced the nuclear-conventional firebreak—at least from Moscow's perspective. And even if the Russians never actually employ low-yield nuclear weapons to prevent a conventional defeat, their thinking may affect other nations, including Pakistan, India and Iran.

¹⁸⁶ For a review of the debate surrounding NATO's adoption of flexible nuclear response in 1967, see J. Michael Legge, "Theater Nuclear Weapons and the NATO Strategy of Flexible Response," RAND R-2964-FF, April 1983.

¹⁸⁷ John S. Foster, "The Nuclear Weapons Horizon," *Comparative Strategy*, 26, No. 1, January 2007, p. 90. The yields of the new generation of Russian "theater" nuclear weapons are speculative at best. For many point targets, a subkiloton yield would suffice if the weapons had the accuracy of a Joint Direct Attack Munition (JDAM). For attacking enemy armored or mechanized forces, however, 30 or 40 kilotons might be preferable in order to achieve wide-area effects with a single warhead.

CHAPTER 4 > LIKELY MOTIVATIONS OF OTHER NUCLEAR POWERS AND ASPIRANTS

The thrust of this chapter is that the Russians are not alone in having reasons to erode various nuclear-conventional firebreaks and endanger the post-Nagasaki taboo against nuclear use. While Russia may have the world's lowest nuclear threshold, the Russian Federation is by no means the only nuclear power whose leaders view nuclear weapons as usable—at least in certain circumstances. A widely held view among those committed to abolishing nuclear weapons is that America's nuclear arsenal has little utility or value beyond deterring the increasingly remote chance of an overt nuclear attack on the United States or its close allies. At the same time, they argue that the continued existence of nuclear weapons in countries such as Pakistan and North Korea raises a real possibility of nuclear weapons eventually falling into the hands of terrorists. This chapter offers evidence that nuclear arms continue to play a wide range of roles in the relations between nations in the early 21st century, just as they did during the second half of the 20th century.

Broader Uses of Nuclear Forces

Again, Russian leaders are quite clear in viewing their possession of intercontinental nuclear forces roughly equivalent to those of the United States as essential to Russia's status as a great power. Russia's modernized theater nuclear capabilities and doctrine are explicitly seen in Moscow as a deterrent to conventional attacks that could threaten Russian territory or sovereignty. In fact, Russian strategic thinking seems more concerned with the potential ability of American advances in ballistic missile defenses to erode Russia's capability to mount a retaliatory second strike than with U.S. offensive nuclear forces per se. Similarly, Russian theater nuclear doctrine is driven primarily by concerns about the inferiority of Russian conventional forces vis-à-vis NATO and China. These observations argue against the growing conviction among many observers that nuclear weapons no

longer play any important role in international relations. They also suggest that there are complex interrelations between offense and defense as well as between nuclear and non-nuclear forces.

Enhancing national prestige and influence in the international system, or offsetting conventional inferiority, however, are not the only reasons why various nations seek or maintain nuclear arms. Paul Bracken recently pointed out that a state need not “fire a nuclear weapon to gain a strategic advantage from it.”¹⁸⁸ Bracken bases this judgment on war games that have been played over the last five years by government officials, the military and outside strategic experts in the United States and Israel aimed at exploring the ramifications of Iran possessing a small, crude atomic capability.

The conclusion that Bracken has drawn from being involved in several of these games is that the strategic behavior of the participants playing the Israel side is changed by Iran’s possession of even a handful of primitive atomic weapons. In conventional scenarios that begin with attacks on Israel by Hamas or Hezbollah but eventually include advanced Iranian weapons and direct participation by Iranian “advisors,” the Israeli team can incrementally escalate the level of violence sufficiently to bring the conflict to an acceptable end. In strictly conventional conflicts involving the Iranians and their proxies, the superior Israeli military enjoys escalation dominance and can raise the level of violence at will without appreciable risk of catastrophic consequences—at least militarily.¹⁸⁹

However, the situation is quite different if Iran possesses a nuclear capability and exploits it intelligently. The pattern that emerged in the war games Bracken has observed is that once the conflict escalated to the point that Israel needed to apply pressure or military force directly to the Iranians, the Israeli team grew extremely reluctant to take the next escalatory step for fear of provoking a nuclear response.¹⁹⁰ By simply brandishing their nuclear weapons, the Iranian team was able to force the players on the Israeli side to hesitate or back down, thereby empowering Tehran “with a tremendous psychological victory.”¹⁹¹ The lesson Bracken drew from these war games, then, is that nuclear weapons do not have to be detonated to have strategic consequences.

The idea that the mere presence of nuclear weapons can exert constraints on strategic choice in crises or conflicts due to the horrific consequences that their actual use could produce is not, of course, new. As Bracken has noted, this was also a lesson of the first nuclear age, even if it seems to have been forgotten in discussions of a nuclear

Nuclear weapons do not have to be detonated to have strategic consequences.

¹⁸⁸ Paul Bracken, “If Iran Gets the Bomb,” *Wall Street Journal*, November 17, 2012, p. C3.

¹⁸⁹ Paul Bracken, *The Second Nuclear Age: Strategy, Danger, and the New Power Politics* (New York: Henry Holt, 2012), p. 22.

¹⁹⁰ *Ibid.*, pp. 23-25.

¹⁹¹ *Ibid.*, p. 30.

The large U.S. and Soviet/Russian nuclear arsenals have not only played a role in “precluding general war between the great powers for the last several decades,” but they have also played a role “in preventing nuclear proliferation” through such stratagems as extended deterrence.

Middle East.¹⁹² The first half of the 20th century witnessed two world wars. World War II was the more devastating of these conflicts. Estimates of the number of military personnel and civilians who died during World War II from all causes range from 50 million to over 70 million. One estimate, based on a massive review of available sources, is that the death toll from 1939 to 1945 totaled over 65 million (19.6 million Allied and Axis military personnel and 45.9 million civilians).¹⁹³ In the more than six decades since the atomic bombings of Hiroshima and Nagasaki in 1945, the world has not experienced a global conflict among the major powers with devastation approaching the loss of life and destruction experienced during the Second World War.

Why not? The existence of nuclear weapons is arguably one reason—and perhaps the main reason—the great powers have not gone to war directly against one another since 1945. James Schlesinger’s judgment in 1974 was that since 1945 nuclear weapons had been “a brake upon violence.”¹⁹⁴ Raymond Garthoff reached the same conclusion in 2001: one cannot deny that nuclear weapons “helped to keep the Cold War ‘cold,’ to prevent a third world war in the twentieth century.”¹⁹⁵ More recently, Christopher Ford has gone even further and argued that the view that the only role for nuclear weaponry is to deter the use of other nuclear weaponry is flawed. He notes the large U.S. and Soviet/Russian nuclear arsenals have not only played a role in “precluding general war between the great powers for the last several decades,” but they have also played a role “in preventing nuclear proliferation” through such stratagems as extended deterrence.¹⁹⁶

Support for these insights can be seen in the fruitless American search during much of the Cold War for alternatives to mutual assured destruction recounted in Chapter 2. Soviet skepticism about escalation control and the fact that the United States and the Soviet Union only fought one another through proxies provide further evidence for the conclusion that the U.S. and Soviet/Russian nuclear arsenals imposed an upper bound on conflict between the major powers, thereby helping “to prevent a repeat of such horrors” as the 20th century’s two world wars.¹⁹⁷ Granted, the “thermonuclear overhang” has not eliminated terrorism, insurgen-

¹⁹² Paul Bracken, *The Second Nuclear Age: Strategy, Danger, and the New Power Politics* (New York: Henry Holt, 2012), p. 20.

¹⁹³ Matthew White, “National Death Tolls for the Second World War,” February 2005, available at <http://necrometrics.com/ww2stats.htm#ww2chart>, accessed on December 8, 2012. White works as a librarian. He is the editor of the online compendium “Historical Atlas of the Twentieth Century,” at <http://users.erols.com/mwhite28/20centry.htm>.

¹⁹⁴ Schlesinger, *Report of the Secretary of Defense on the FY 1975 Defense Budget and FY 1975-1979 Defense Program*, p. 36.

¹⁹⁵ Raymond L. Garthoff, *A Journey through the Cold War: A Memoir of Containment and Coexistence* (Washington, DC: Brookings, 2001), p. 377.

¹⁹⁶ Christopher A. Ford, “Nuclear Weapons and their Role in the Security Environment,” text used for remarks at the University of Georgia, November 14-15, 2011, Section I.

¹⁹⁷ Keith B. Payne, “Maintaining Flexible and Resilient Capabilities for Nuclear Deterrence,” *Strategic Studies Quarterly*, 5, No. 2, Summer 2011, p. 9.

cies, civil wars, the use of chemical and biological weapons, or even major power conventional conflicts for limited, rather than unconditional, objectives. Regional and local conflicts persist and terrorists abound. Nevertheless, as even the writers at *The Economist* have recognized, nuclear deterrence and American's extension of it to allies appears to be "one reason why great powers have not directly gone to war against each other for 65 years."¹⁹⁸

In light of this conclusion, an important question to ask is whether a world without nuclear weapons is likely to be safer and more secure than one in which the threat of thermonuclear disaster persists. The nuclear strategist Thomas Schelling is skeptical.¹⁹⁹ In 2009 he made the following points. First, if "a world without nuclear weapons" means a world in which nuclear weapons could not be reconstituted by any nation, "there can be no such world."²⁰⁰ Second, assuming all the world's nuclear weapons had somehow been eliminated, great power conventional conflict would still be possible: "One might hope that major war could not happen in a world without nuclear weapons, but it always did."²⁰¹ Third, in the event of a major power conflict after nuclear arms had been abolished (and none had been secretly preserved), would not the leaders of all the belligerents be compelled to make every effort "to acquire deliverable nuclear weapons as rapidly as possible" in order to coerce victory?²⁰²

In summary, a "world without nuclear weapons" would be a world in which the United States, Russia, Israel, China, and half a dozen or a dozen other countries would have hair-trigger mobilization plans to rebuild nuclear weapons and mobilize or commandeer delivery systems, and would have prepared targets to preempt other nations' nuclear facilities, all in a high-alert status, with practice drills and secure emergency communications. Every crisis would be a nuclear crisis, any war could become a nuclear war. The urge to preempt would dominate: whoever gets the first few weapons will coerce or preempt. It would be a nervous world.²⁰³

¹⁹⁸ "Move the Base Camp," *The Economist*, June 18, 2011, p. 20.

¹⁹⁹ In 2005, Thomas C. Schelling shared the Nobel Prize in economics with Robert J. Aumann for "having enhanced our understanding of conflict and cooperation through game-theory analysis" (emphasis in the original). See http://www.nobelprize.org/nobel_prizes/economics/laureates/2005/, accessed on February 24, 2013. Schelling's contribution was to show that a party can strengthen its position by overtly worsening its own options, that the capability to retaliate can be more useful than the ability to resist an attack, and that uncertain retaliation is more credible and more efficient than certain retaliation.

²⁰⁰ Thomas C. Schelling, "A World without Nuclear Weapons?" *Daedalus*, Fall 2009, p. 125.

²⁰¹ *Ibid.*, p. 125.

²⁰² *Ibid.*, p. 126. The assurance by some that if the world's nuclear weapons were eliminated, "the threat that they could be rebuilt would remain a reason [for the great powers] to avoid conflict" is more indicative of wishful thinking than a realistic view of the behavior of nations and states. "Move the Base Camp," *The Economist*, June 18, 2011, p. 20.

²⁰³ Schelling, "A World without Nuclear Weapons?" p. 127.

Putin remains adamant that under no circumstances will Russia give up its nuclear weapons: to the contrary he has supported modernizing Russia's nuclear arsenal.

Proponents of “nuclear global zero” could counter Schelling by insisting that arms control agreements could be put in place that would preclude states from reconstituting nuclear weapons even under the exigencies of a major power conflict. The difficulty, as Perry and Schlesinger observed in 2009, is that even achieving the global elimination of nuclear weapons would require conditions that “are not present today and their creation would require a fundamental transformation of the world political order.”²⁰⁴ Agreements and organizations that could enforce a prohibition against reconstituting nuclear arms appear even less likely. Indeed, these very obstacles to preventing the return of nuclear weapons suggest, in themselves, that nuclear arms can, and do, serve other, broader ends than the narrow goal of deterring the direct use of nuclear weapons by American adversaries against the United States or its allies.

Regardless of whether one views the global elimination of nuclear weapons as a realistic goal or not, the fact remains nuclear weapons currently exist. Even if one is skeptical about global zero, might not the United States and Russia further reduce their arsenals? In January 2012, the Obama administration issued strategic guidance containing the observation that “*It is possible that our deterrence goals can be achieved with a smaller nuclear force*, which would reduce the number of nuclear weapons in our arsenal as well as their role in national security.”²⁰⁵ While this formulation omits the role of U.S. nuclear weapons in reassuring allies, it certainly reflects a desire to reduce the U.S. nuclear arsenal below the New START limits. It also raises the question of whether the Russians will be inclined to cooperate. Putin remains adamant that under no circumstances will Russia give up its nuclear weapons: to the contrary he has supported modernizing Russia's nuclear arsenal. Russia's Strategic Rocket Forces have now fielded an 18-launcher division of RS-24 (SS-29) “Yars” road-mobile ICBMs designed to penetrate U.S. missile defenses, and Putin hopes to add 400 new ICBMs and SLBMs to Russia's strategic forces over the next decade.²⁰⁶ Russia's leaders do not appear to view nuclear weapons as diminishing in value or assess their continued existence as a growing source of danger. As of September 2012, the Russian Federation was below the New START limits, especially in deployed launchers. Putin may therefore resist further reductions in Russia's nuclear forces. If he does, that would leave the United States with the less palatable option of making additional reductions in the U.S. arsenal unilaterally.

²⁰⁴ Perry and Schlesinger, *America's Strategic Posture*, p. xvi.

²⁰⁵ DoD, “Sustaining U.S. Global Leadership: Priorities for 21st Century Defense,” January 2012, p. 5 (emphasis in the original).

²⁰⁶ Vladimir Putin, “Being Strong: National Security Guarantees for Russia,” *Rossiyskaya Gazeta*, February 28, 2012, English translation available at <http://www.voltairenet.org/article172934.html>, accessed on December 12, 2012; and “Strategic Rocket Forces,” as of April 12, 2012, available at <http://russianforces.org/missiles/>, accessed on December 12, 2012. The original Russian is available at <http://www.rg.ru/2012/02/20/putin-armiya.html>.

Russia's leaders are not alone in ascribing greater value to nuclear arms than the Obama administration. The perception that the risks of nuclear weapons increasingly outweigh their benefits has not, as Frank Miller has testified, had great resonance in the capitals of other nuclear states.

Not in Paris. Certainly not in Moscow or Beijing, where nuclear weapons have become central to their security policies. Not in Islamabad, or Tel Aviv, or New Delhi. And definitely not in Pyongyang—or in Tehran for that matter.²⁰⁷

Given this divergence of opinion regarding the value and roles of nuclear arms, the remainder of this chapter will survey the reasons that other nuclear states and aspirants appear to have for seeking or maintaining nuclear arsenals and suggest how these incentives may affect various nuclear-conventional firebreaks.

France and Israel

When the French exploded a 70-kiloton atomic weapon at Reggane in southern Algeria on February 13, 1960, France became the world's fourth nuclear state along with the United States, the Soviet Union, and the United Kingdom. Because of the intimate relationship between the French and Israeli nuclear programs at that time, some have suggested that Israel also joined the nuclear club with this test.²⁰⁸ Half a century later, Israel has yet to acknowledge having nuclear weapons and the capability to deliver them. Nevertheless, the Israelis seem no more inclined to give up their unacknowledged nuclear capability than do the French to retire the Force de Frappe.

In France's case, the catastrophic experiences that motivated its postwar leaders to create an independent nuclear strike force were the two world wars. In World War I, the French suffered almost 1.4 million military deaths plus another 4.3 million wounded. In World War II, France's forces, along with the British Expeditionary Force, were quickly defeated in 1940 by Germany and France itself was then subjected to four years of brutal occupation.

Having been bled to death during the First World War and suffered a humiliating defeat in the Second World War, France clearly saw nuclear weapons as the best option to ensure that the past would never repeat itself, especially in the light of German rearmament in the 1950s.²⁰⁹

These experiences led Charles de Gaulle to create the world's first atomic energy commission, Commissariat à L'énergie Atomique (CEA), in October 1945. The organization's three-line charter directed CEA to develop nuclear energy for in-

²⁰⁷ Franklin C. Miller, "Sustaining Nuclear Deterrence after New START," testimony, House Armed Services Committee, Subcommittee on Strategic Forces, July 27, 2011, p. 6.

²⁰⁸ Reed and Stillman, *The Nuclear Express*, p. 79.

²⁰⁹ Corentin Brustlein, "France: The Evolution of a Nuclear Exception" in Harsh V. Pant, ed., *Handbook of Nuclear Proliferation* (London: Routledge, 2011), p. 117.

dustry, for electric power to compensate for France's lack of oil and coal, and for national security.²¹⁰ Regarding the latter goal, national security, this meant developing an atomic bomb. However, nuclear weapons development was not immediately given top priority by CEA.

The same month de Gaulle established CEA, France held its first postwar election. The socialists won and, after two months of parliamentary confrontation, de Gaulle retired to his country home. In 1947 he founded his own political party, Rally of the French People, but when it failed to win power in the early 1950s de Gaulle again retired from politics. He did not return to power until late 1958 when the French Assembly voted, during the crisis over Algeria that ended the Fourth Republic, to make de Gaulle President of the Council of Ministers. De Gaulle then led the writing of the new constitution that founded the Fifth Republic and was elected its president, a post he held until 1969.

Through the early 1950s the CEA focused on industrial and power applications of nuclear energy. What did occur was establishing the infrastructure for weapons, including reactors and plutonium separation. Until the French defeat at Dien Bien Phu on May 7, 1954, even the military was not fully supportive of developing nuclear weapons. But in the wake of that defeat and the growing revolt in Algeria, the French cabinet under Pierre Mendès-France decided in December 1954 to proceed with the development of the atomic bomb.²¹¹

What the French eventually decided to pursue was a nuclear strike capability *independent* of both NATO and the United States. When the situation at Dien Bien Phu became desperate at the end of April 1954, the Eisenhower administration explored ways of helping the beleaguered garrison. Eisenhower, who had advised the French against occupying Dien Bien Phu in the first place, later concluded that even a massive B-29 strike with conventional munitions would not have saved the garrison.²¹² As for an atomic option, when Robert Cutler, the president's special assistant for national security, brought the president a draft NSC paper exploring the possibility of using two or three atomic bombs in Vietnam, Eisenhower was appalled: the United States, he said, could not unilaterally use the atom bomb "against Asians for the second time in less than ten years."²¹³ Nevertheless, in the aftermath of France's defeat in Indochina, the French felt that the United States had let them down.

In July 1956, the Egyptian leader Gamal Abdel Nasser nationalized the Suez Canal and closed it to Israeli shipping. By October the Israelis, British, and French had agreed to a scheme that would use an Israeli thrust into the Sinai as a cover for an

²¹⁰ Reed and Stillman, *The Nuclear Express*, p. 69.

²¹¹ Reed and Stillman, *The Nuclear Express*, p. 71.

²¹² Eisenhower, *Mandate for Change*, pp. 339, 373.

²¹³ Dino A. Brugioni, *Eyes in the Sky: Eisenhower, the CIA and the Cold War: Aerial Espionage* (Annapolis, MD: Naval Institute Press, 2010), p. 84; and Ambrose, *Eisenhower: Soldier and President*, pp. 362-363.

Anglo-French effort to retake the Suez Canal by force.²¹⁴ To maintain the element of surprise, the Israelis mobilized as if they planned to attack Jordan rather than Egypt. At the same time, Eisenhower was preoccupied with the 1956 presidential election campaign and the entry of Soviet troops into Hungary to quell the rebellion there. The French in particular calculated that Eisenhower's unbreakable commitment to NATO would lead him to support the British-French-Israeli intervention to seize control of the Suez Canal. In the end, Eisenhower decided to honor the Tripartite Declaration that pledged the United States to support the victim of any aggression in the Middle East and sided with Egypt and the Soviet Union against France, Britain, and Israel even in the face of a thinly veiled Soviet threat to use nuclear missiles against London and Paris.²¹⁵ By Christmas 1956, French and British troops had withdrawn and the Egyptians were clearing the canal. Again, the French felt betrayed.

Given this history, it is hardly surprising that when de Gaulle regained power in 1959 as president of the Fifth French Republic he insisted on an independent nuclear capability. Fearing a repeat of 1940 at the hands of the Soviets and skeptical of U.S. assurances to defend Western Europe with nuclear weapons, de Gaulle proclaimed the principle of "dissuasion du faible au fort" (meaning "weak-to-strong deterrence"), which promised that by the late 1960s the Force de Frappe would be able to kill 80 million Russians should the Soviets attempt to invade or destroy France.²¹⁶ By the mid-1960s the French had fielded aircraft and MRBMs capable of delivering atomic weapons against the Soviet Union, added their first SSBN in 1972, and introduced thermonuclear warheads in the mid-1970s.²¹⁷

After the Cold War ended, the French eliminated their land-based ballistic missiles, settling for a dyad rather than a triad. Nevertheless, they have continued to modernize their nuclear forces. Their latest SSBN, *le Terrible*, is equipped with MIRVed M51 SLBMs comparable to the U.S. Trident II. Notwithstanding the growing threat of proliferation, France has not embraced "nuclear disarmament as a foreign policy objective, despite 'global zero' having been increasingly championed by the US since 2009."²¹⁸ Instead, the French remain highly skeptical of both the feasibility and utility of total nuclear disarmament. True, the French nuclear-conventional firebreak today is probably much wider than that of the Russians. But French leaders, far from being inclined to give up their nuclear arms, continue to give top priority to funding and modernizing their nuclear forces. In their view, nuclear arms remain an insurance policy against a repeat of the catastrophes of 1914-1918 and 1940-1945.

Notwithstanding the growing threat of proliferation, France has not embraced "nuclear disarmament as a foreign policy objective, despite 'global zero' having been increasingly championed by the US since 2009."

²¹⁴ Chaim Herzog, *The Arab-Israeli Wars: War and Peace in the Middle East* (New York: Vintage, 1984), pp. 113-114; and Ambrose, *Eisenhower: Soldier and President*, pp. 421, 424, 431.

²¹⁵ Ambrose, *Eisenhower: Soldier and President*, pp. 427-434.

²¹⁶ Brustlein, "France: The Evolution of a Nuclear Exception," pp. 118-119.

²¹⁷ *Ibid.*, p. 119.

²¹⁸ *Ibid.*, p. 123.

The 1956 Suez crisis was also the time when “the nuclear ambitions of aging France and newborn Israel became as intertwined as serpents in a tree.”²¹⁹ As early as 1949, the newly established Israeli government under David Ben Gurion identified six of Israel’s top physics students and dispatched them to leading centers of nuclear research, including one student sent to study with Enrico Fermi in Chicago.²²⁰ Thus began Israel’s long journey toward becoming the world’s fifth nuclear power, even if Israel’s nuclear capability remains officially ambiguous or opaque (*amimut* in Hebrew) to this day.

Despite the secrecy surrounding Israel’s pursuit of nuclear weapons, there seems little doubt over Ben Gurion’s crucial role.

Israel’s nuclear project was conceived in the shadow of the Holocaust, and the lessons of the Holocaust provided the justification and motivation for the project. Without the Holocaust we cannot understand either the depth of Ben Gurion’s commitment to acquiring nuclear weapons or his inhibitions about nuclear-weapons policy. . . . The determination not to be helpless again, a commitment to the idea that Jews should control their own fate, characterized Ben Gurion’s determined campaign for Jewish statehood after the Second World War . . . [as well as] his pursuit of nuclear weapons. . . . His preoccupation with security stemmed from his understanding of the geopolitical realities of the Arab-Israeli conflict. . . . Ben Gurion became convinced that the cessation of hostilities [in 1949] would not lead to a lasting peace, but would be only a temporary pause before the next round of Arab-Israeli conflict. Ben Gurion saw Arab hostility toward Israel as deep and long-lasting.²²¹

In the end, Ben Gurion’s fears and anxieties stemming from the Holocaust and his assessment of Arab hostility drove Israel’s pursuit of nuclear arms.

Ben Gurion retired as Israel’s prime minister in 1953, but was recalled to take over the defense portfolio in 1954 and, by April 1955, was back in full charge as prime minister. Over the next eight years he pursued an Israeli nuclear capability with single-minded determination. The effort was funded covertly, in large part by overseas donors to preclude visibility or debate, and only a handful of Israeli officials “understood the true scope or intent of the Israeli nuclear weapons program.”²²² Israel’s decision to develop a weapons capability was made in November 1956. France agreed to supply Israel with a 40-megawatt “research” nuclear reactor in October 1957, and construction at Dimona, south of Beersheba, began at the end of the year.²²³ After de Gaulle returned to power in June 1958, he ordered the Franco-Israeli collaboration

²¹⁹ Reed and Stillman, *The Nuclear Express*, p. 71.

²²⁰ *Ibid.*, p. 72.

²²¹ Avner Cohen, *Israel and the Bomb* (New York: Columbia University Press, 1998), p. 10.

²²² Reed and Stillman, *The Nuclear Express*, p. 73.

²²³ *Ibid.*, p. 76.

on nuclear weapons stopped, but nothing of substance was done, and French support did not end until 1966.²²⁴

By the end of 1963, the Dimona reactor was producing plutonium. When did Israel first acquire a nuclear capability? Avner Cohen concluded in the 1990s that on the eve of the 1967 Arab-Israeli War, Israel had two deliverable atomic weapons and may have even placed them on operational alert.²²⁵ During 1968-1969, Israel received a number of the Dassault-developed MD620 (Jericho) short-range ballistic missiles, which gave Israel a delivery capability against which its Arab adversaries had no defense. Nevertheless, Israel's nuclear capability remains unacknowledged to this day. The issue that drove this outcome was a set of understandings between Israel and the Nixon administration that emerged in 1970 in the wake of the 1968 Nuclear Non-Proliferation Treaty. If Israel did not test, declare, or acknowledge its nuclear capabilities, Israel would not be pressured to sign the NPT.

Unquestionably Israel developed a nuclear capability as a hedge against existential threats to the Jewish state. Presumably, so long as Israel's leaders do not perceive an existential threat, the nuclear taboo will hold in Israel's case. But given growing worries about Iran developing nuclear weapons, it is very difficult to predict how firm Israel's inhibitions against nuclear use may be in the years ahead, especially if Iran acquires—or is on the brink of acquiring—a nuclear capability that would enable it to pose an existential threat to Israel. In April 1963, Shimon Peres had an unplanned meeting with President Kennedy in the Oval Office. Kennedy spent their half hour together throwing questions at Peres, one of which was to ask Peres what he could share with the president about Israel's nuclear program. Peres replied: "I can tell you most clearly that we will not introduce nuclear weapons to the region, and certainly we will not be the first."²²⁶

Peres' statement from the 1960s does little to clarify the nuclear-conventional firebreak as seen today from Tel Aviv, especially should Iran acquire even a small atomic capability. The pattern Paul Bracken has synthesized from his observations of Israeli teams in war games involving a nuclear Iran suggests that Israel's loss of escalation dominance could result in a fairly wide nuclear-conventional firebreak. Whether the same might be true from Tehran's perspective is less clear. In the games Bracken witnessed, the Iranian teams opted for clever responses to Israeli pressures and actions that enabled them to gain strategic advantage by merely brandishing their nuclear weapons rather than actually using them.

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²²⁴ Avner Cohen, "Cairo, Dimona, and the June 1967 War," *Middle East Journal*, 50, No. 2, Spring 1996, p. 190.

²²⁵ *Ibid.*, p. 191; and Reed and Stillman, *The Nuclear Express*, p. 120.

²²⁶ National Security Archive, "Miscellaneous Hebrew Documents," Document 1, available at <http://www.gwu.edu/~nsarchiv/israel/documents/hebrew/index.html>, accessed on December 16, 2012.

Whether Tehran would behave similarly in an actual crisis or conflict with Israel is less clear given some of the inflammatory statements made by Iranian leaders such as President Mahmoud Ahmadinejad.

Pakistan and India

India started down the path to nuclear weapons in 1955 when the administration of Jawaharlal Nehru, India's first prime minister, negotiated the gift of a "safeguarded" 40-megawatt reactor from Canada along with twenty tons of heavy water.²²⁷ India's loss of territory to China in the two countries' Himalayan border war during October-November 1962 was followed in October 1964 by China's detonation of its first atomic device at the Lop Nur test site. In 1967, after China had exploded its first thermonuclear device, Nehru's daughter, Indira Gandhi, who was now prime minister, made a secret decision to proceed with a nuclear weapons program. On May 18, 1974, India conducted an underground test of an atomic device at the Indian Army's Pokhran test site. Code named "Smiling Buddha," the test put China on notice that India, too, was now a nuclear state.²²⁸ Looking back, India originally developed Smiling Buddha to deter Chinese aggression.

The unintended consequence of India's Pokhran I demonstration came eight years later, in 1982, after Mao Zedong had died and Deng Xiaoping had consolidated power in China. Deng Xiaoping's government

decided not only to actively tolerate, but also to support the proliferation of nuclear weapons within the Third World. China welcomed Pakistani nuclear scientists to Beijing and passed along information on the CHIC-4 A-bomb design to those visitors. Unfortunately, Pakistan's A. Q. Khan then resold that information to his customers. Drawings and specifications for CHI-4 turned up in a white plastic tailor's bag in Libya. There is also evidence the Chinese conducted an underground nuclear test for the Pakistanis at Lop Nur on May 26, 1990, well before Pakistan's announced 1998 shots in south Asia.²²⁹

India's Smiling Buddha, therefore, provided the impetus for the Sino-Pakistani collaboration, which eventually resulted in Pakistan's development of nuclear weapons as well as Abdul Qadeer Khan's proliferation network. After India's Pokhran I detonation, Pakistan's prime minister, Zulfikar Ali Bhutto, promised that if India built the bomb, "we will eat grass or leaves, even go hungry, but we will get one of our own." A. Q. Khan's reaction to the May 1974 test was to think that the Buddha had smiled in anticipation of Pakistan's destruction, and by De-

²²⁷ Reed and Stillman, *The Nuclear Express*, p. 158.

²²⁸ *Ibid.*, p. 159.

²²⁹ *Ibid.*, p. 131; see also pp. 248-250. In 1990, during the period of PRC transparency, Stillman and H. Terry Hawkins visited the Chinese nuclear facilities at Lop Nur and Malan. *Ibid.*, p. 222. At that time these facilities were "awash with Pakistani visitors." *Ibid.*, p. 250.

cember 1974 he had met with Bhutto, who placed him in charge of an effort to enrich uranium.²³⁰

Many considerations combined to motivate national leaders in Islamabad and New Delhi to develop nuclear weapons. They included the bloodbath that followed the 1947 partition, Pakistan's humiliating loss of East Pakistan (now Bangladesh) in 1971, Smiling Buddha in 1974, continued fighting between India and Pakistan over the disputed territory of Kashmir, Pakistan's turn to India's enemies (principally China) along with China's willingness to share nuclear technology, continuing acts of terrorism inside India by terrorists operating from Pakistan, and China's economic rise. From India's perspective, the motivations probably spanned everything from international prestige to deterring China, feeding populist and nationalist sentiments, and the desire of Indian politicians to impress their constituents. From Pakistan's perspective, acquiring nuclear weapons was viewed as compensating for conventional inferiority vis-à-vis India and allowing terrorist organizations such as Lashkar-e-Taiba to continue sub-conventional attacks on India. In effect, Pakistan viewed its nuclear weapons as immunizing the country from a large-scale Indian conventional response to Pakistani provocations.²³¹

In 1998, both India and Pakistan joined the nuclear weapons club. India claimed a total of five tests on May 11 and 13; within two weeks, Pakistan followed suit by detonating six boosted devices using highly enriched uranium.²³² These developments inevitably affected the next Indian-Pakistani conflict. On May 3, 1999, Pakistani forces began infiltrating the Kargil district of Kashmir on India's side of the Line of Control (LoC) that constitutes the de facto border between the two countries. The infiltration involved Pakistani soldiers and Kashmiri militants, and the Pakistani incursions seemed aimed at gaining control of the Siachen Glacier. By May 9 the Pakistani Army was shelling the Indian ammunition dump in Kargil, and on June 6 the Indian Army launched a major offensive in Kargil. The fighting between the two nuclear-armed adversaries did not end until late July.

This conflict remains the only known instance of direct conventional war between two nuclear-armed states. Once India became aware of the Pakistani incursions, New Delhi mobilized some 200,000 troops.²³³ Once India had mobilized

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²³⁰ William Langewiesche, "The Wrath of Khan: How A. Q. Khan Made Pakistan a Nuclear Power—and Showed that the Spread of Atomic Weapons Can't Be Stopped," *The Atlantic*, November 2005, available at <http://www.theatlantic.com/magazine/archive/2005/11/the-wrath-of-khan/4333/1/>, accessed on December 17, 2012. The second part of Langewiesche's account of A. Q. Khan's career as the father of Pakistan's nuclear arsenal and the world's worst nuclear proliferator appeared in the January/February 2006 issue of *The Atlantic* under the title "The Point of No Return."

²³¹ Ashley J. Tellis, C. Christine Fair, and Jamison Jo Medby, "Limited Conflicts Under the Nuclear Umbrella: Indian and Pakistani Lessons from the Kargil Crisis," RAND MR-1450, 2001, pp. 30, 56.

²³² Reed and Stillman, *The Nuclear Express*, pp. 242, 257.

²³³ However, most of the fighting by Indian forces was done by two divisions due to the mountainous terrain and high altitudes (over 15,000 feet above sea level).

and the two sides began fighting in earnest, Pakistan sought U.S. assistance to de-escalate the conflict. Toward this end, on May 31, Pakistan's foreign secretary, Shamshad Ahmed stated that Pakistan would not hesitate to use any weapon in its arsenal, which was widely interpreted to be a threat to use nuclear weapons.²³⁴ On July 3, U.S. intelligence had "disturbing evidence that the Pakistanis were preparing their nuclear arsenals for possible deployment."²³⁵ Despite American concern that the fighting might escalate to nuclear use, President Bill Clinton refused to intervene until Pakistan had removed all its forces from the Indian side of the LoC.²³⁶ The fighting ceased on July 26, 1999. After the fact Clinton praised the Indians for their restraint in not crossing the LoC.

Tensions between Pakistan and India waxed and waned in the years since the Kargil war. In May 2011, *The Economist* proclaimed the border between India and Pakistan to be the most dangerous in the world because of the potential for conflict between the two nuclear-armed states.²³⁷ Prospective triggers for another India-Pakistan war are Pakistan's continuing support of Lashkar-e-Taiba, a terrorist group whose purpose is to attack India, and India's provocative Cold Start doctrine. Lashkar-e-Taiba attacked the Indian parliament in 2001 and was responsible for the November 2008 attacks in Mumbai that killed over 160 people. India's military counter to ongoing terrorist provocations and its dispute with Pakistan over Kashmir is a doctrine—Cold Start—that envisions a swift punitive conventional campaign to destroy Pakistan's military potential and seize territory 30-50 miles deep inside Pakistan.²³⁸ Cold Start is intended to give India a military option that could be executed in response to a Pakistani provocation before the United States and the international community could intervene to restrain India, as they have in the past. The dangerous premise behind this doctrine is the belief that the Indian military could execute Cold Start without crossing any of the Pakistani "red lines" that would trigger a nuclear response.²³⁹ The alternative premise is

²³⁴ Neil Joeck, "The Kargil War and Nuclear Deterrence" in Sumit Ganguly and S. Paul Kapur, eds., *Nuclear Proliferation in South Asia: Crisis Behavior and the Bomb* (New York: Routledge, 2009), p. 134.

²³⁵ Bruce Reidel, *American Diplomacy and the 1999 Kargil Summit at Blair House*, Center for the Advanced Study of India, University of Pennsylvania, Policy Paper Series 2002, p. 8.

²³⁶ Reidel, "American Diplomacy and the 1999 Kargil Summit at Blair House," p. 6.

²³⁷ "The World's Most Danger Border," *The Economist*, May 21, 2011, p. 11. Pakistani hardliners have also cited disputes with India over water resources as a possible trigger for a nuclear conflict between the two countries. "Unquenchable Thirst," *The Economist*, November 19, 2011, p. 27.

²³⁸ Commander (ret.) Azam Khan, "India's Cold Start Is Too Hot," *U.S. Naval Institute Proceedings*, March 2011, p. 43.

²³⁹ In 2005 Pakistani General Khalid Kidwai articulated four "red lines" for triggering a nuclear response to Indian aggression: (1) an Indian attack that conquers a large part of Pakistan or (2) destroys a large part of Pakistan's land or air forces; (3) the economic strangling or (4) political destabilization of Pakistan by India. Kaushik Kapisthalam, "Pakistan Leaves Arms Calling Card," *Asia Times*, February 10, 2005, available at http://www.atimes.com/atimes/South_Asia/GB10Df06.html, accessed on March 1, 2012.

that Pakistani threats to use nuclear weapons to prevent the country's territorial, military, economic, or political dismemberment are not serious. The potentially misguided calculation on the Pakistani side is that if they elected to employ low-yield nuclear weapons on their own territory to devastate invading Indian ground forces, India would not respond with nuclear weapons.²⁴⁰

Given the questionable assumptions on both sides, it is not difficult to envision a future conventional military conflict between India and Pakistan spinning out of control and escalating to nuclear use. Perhaps the most obvious trigger would be another Mumbai-like terrorist attack that the Indians simply could not ignore. Most observers put India's nuclear stockpile at eighty to one hundred weapons, and Pakistan's slightly higher at ninety to one hundred bombs and warheads. However, the Pakistanis have been building a fourth plutonium reactor at Khushab, are working on fielding low-yield nuclear weapons for use in border skirmishes with India, and may now be able to add eight to ten nuclear weapons a year.²⁴¹

In the case of India and Pakistan the nuclear-conventional firebreak appears to be fairly narrow from the perspectives of both New Delhi and Islamabad. Neither side appears to have developed great insight into the other's red lines, and the Pakistanis give every indication of trying to field a numerically superior nuclear arsenal to India's. Worse, the United States' ability to prevent a future Indo-Pakistani conventional conflict from escalating to nuclear use by one side or the other is, at best, limited. In fact, the size, character, safety, and reliability of the American nuclear arsenal offer Washington little leverage in deterring or stopping a nuclear conflict on the Indian subcontinent.

China

Mao Zedong's casualty-tolerant view of possible Chinese fatalities in a nuclear war and his belief in the inevitability of nuclear conflict worried even Nikita Khrushchev, who had been the political advisor to Marshal Andrei I. Yeremenko during the defense of Stalingrad.²⁴² At a January 1955 meeting of China's Central Secre-

The size, character, safety, and reliability of the American nuclear arsenal offer Washington little leverage in deterring or stopping a nuclear conflict on the Indian subcontinent.

²⁴⁰ Eric Edelman, interview taped and transcribed by Barry Watts, November 4, 2011, p. 10. Edelman's assessment is that there is "a very real chance" that in the next five to ten years, the world will witness nuclear use in South Asia.

²⁴¹ Sachin Parashar, "Pakistan's Fourth Nuclear Reactor Has India Worried," *The Times of India*, May 19, 2011, available at http://articles.timesofindia.indiatimes.com/2011-05-19/india/29559529_1_nuclear-arsenal-reactor-nuclear-weapons, accessed on December 17, 2012; and David Albright and Paul Brannan, "Pakistan Doubling Rate of Making Nuclear Weapons: Time for Pakistan to Reverse Course," Institute for Science & International Security, May 16, 2011, pp.2-3.

²⁴² Reed and Stillman, *The Nuclear Express*, p. 95. Li Zhisui, Mao's personal physician, has reported that Mao would say "We have so many people. We can afford to lose a few. What difference would it make?" Li Zhisui, Tai Hung-Chao, trans., Anne F. Thurston, ed. assistant, *The Private Life of Chairman Mao* (New York: Random House, 1994), p. 217.

tariat, Mao Zedong authorized and directed the development of a Chinese atomic bomb.²⁴³ Mao's primary motivations for seeking nuclear weapons appear to have been prestige and self-interest: to return China to the central position on the world stage from which China began to retreat in 1424 when the Ming emperor Zhu Gaozhi (朱高熾) ordered the voyages of the Chinese treasure fleet stopped.²⁴⁴

Mao's view of China's rightful place in the world persists to the present day and has troubling implications. "Chinese history," as Christopher Ford interpreted it in 2010, "provides no precedent for the stable, long-term co-existence of coequal sovereigns, and its traditional ideals of moral governance and statecraft, at least, cannot even admit such a possibility."²⁴⁵ China's current leaders may not aspire to world domination, as did the Bolsheviks, but they appear to envision China eventually rising to the point of being the hegemon in East Asia. During the early decades of the Cold War, acquiring nuclear arms was seen in Beijing as a necessary step toward this end.

At the outset, China needed Soviet assistance in order to move rapidly ahead in developing atomic weapons. By April 1955, China and the Soviet Union entered a compact that called for full Soviet assistance. Beyond searching for uranium in China, the PRC devoted the next two years to evaluating technical approaches, planning the needed facilities, and recruiting the most talented Chinese scientists and engineers.²⁴⁶ Not until 1957 did Soviet advisors begin providing material assistance.

The period of Soviet cooperation only lasted until 1960. By 1957 Mao was envisioning a Great Leap Forward that would enable China to overtake Britain in industrial production within fifteen years. Mao's great economics experiment got underway in 1958.

People left the fields to build backyard furnaces in which pots and pans were melted down to produce steel. The end product was unusable. As farmers abandoned the land, their commune leaders reported hugely exaggerated grain output to show their ideological fervour. The state took its share on the basis of these inflated figures and villagers were left with little or nothing to eat. When they complained, they were labeled counterrevolutionary and punished severely. As the cadres feasted, the people starved.²⁴⁷

Yang Jisheng, whose father starved to death during the Great Leap Forward, calculates that about 36 million Chinese died as a result of Mao's folly.²⁴⁸ The Great Leap Forward offers a case study in what can happen when a regime without

²⁴³ Reed and Stillman, *The Nuclear Express*, p. 93.

²⁴⁴ Christopher A. Ford, *Mind of Empire: China's History and Modern Foreign Relations* (Lexington, KY: University of Kentucky Press, 2010), p. 108.

²⁴⁵ *Ibid.*, p. 273.

²⁴⁶ Reed and Stillman, *The Nuclear Express*, p. 94.

²⁴⁷ "Millennial Madness," *The Economist*, October 27, 2012, p. 83. This article is a review of Yang's *Tombstone: The Great Chinese Famine 1958-1962*.

²⁴⁸ *Ibid.*, p. 83.

checks and balances is infected with economic ignorance and ideological fervor.

From the Russian perspective, the Chinese had gone mad. By the autumn of 1958 the Soviet government began to have second thoughts about arming such a populous nation to its south with nuclear weapons and the Soviet Union began withdrawing technical support.²⁴⁹ Outwardly, a pretense at cooperation continued into 1959. But in May, Khrushchev stopped any further transfer of atomic secrets to China, and in June, the USSR's Central Committee advised their Chinese counterparts that "the Soviets would not be sending a prototype bomb, nuclear hardware, or any other weapons-related materials."²⁵⁰

Despite the loss of Soviet assistance and the chaos of Mao's Great Leap Forward, on October 16, 1964, China successfully detonated an implosion device that yielded around 22 kilotons using highly enriched uranium. Less than three years later, in June 1967, the Chinese program had advanced to the point of being able to detonate a three-stage thermonuclear device with a yield of 3.3 megatons. By the 1980s, they even succeeded with a neutron bomb on their fifth attempt, and their September 1992 test of a new primary employed diagnostics beyond any U.S. capability at the time.²⁵¹

In the beginning, Mao's motivation for developing nuclear weapons may well have been little more than the prestige of being the first Asian nation to join the nuclear club. After the Soviets withdrew their assistance, the deepening rift between Beijing and Moscow undoubtedly provided another incentive for China to acquire its own nuclear capability. Only Chinese nuclear weapons could counter Soviet ones. They were apparently utilized to do precisely that during the 1969 border clashes between the PRC and the USSR. In 1987 Paul Bracken was told by an aging People's Liberation Army (PLA) general that he had been in charge "of uploading atomic bombs onto aircraft in northern China to be flown to attack Soviet cities."²⁵² The border clashes were resolved without nuclear weapons, but the reported Chinese preparations for nuclear use, if true, would have surely reinforced Beijing's imperative to remain a nuclear power.

However, Bracken argues that China's fundamental, enduring interest in nuclear weapons differs fundamentally from that of the United States and the Soviet Union during the Cold War. Washington and Moscow focused on nuclear weapons as military instruments. Beijing has been more interested in their political utility, a focus that has "dwarfed any military use."²⁵³ As evidence he argues that a nuclear China was "more important than most NATO members" in deterring Soviet adventurism in Europe during the Cold War and "seriously inhibited the United States in

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²⁴⁹ Reed and Stillman, *The Nuclear Express*, pp. 100-101.

²⁵⁰ *Ibid.*, p. 101.

²⁵¹ *Ibid.*, p. 231.

²⁵² Bracken, *The Second Nuclear Age: Strategy, Danger, and the New Power Politics*, p. 99.

²⁵³ Bracken, *The Second Nuclear Age: Strategy, Danger, and the New Power Politics*, pp. 195-196.

In recent decades underground facilities have also become the preferred deployment mode for the country's land-based ballistic and cruise missiles, both nuclear and conventional, belonging to the PLA's Second Artillery Corps.

Vietnam.”²⁵⁴ Today, China's nuclear capabilities affect the strategic calculations of American allies in East Asia as well as those of the United States, Russia, and even India. The fact that China has a small inventory of ICBMs such as the road/rail mobile DongFeng (DF)-31A (CSS-9) that can reach targets in the continental United States narrows U.S. options in dealing with China's rise, military modernization, and evident aspiration to become the regional hegemon in East Asia.

Nevertheless, the PRC's actual nuclear posture and doctrine remain rather opaque as China continues to conceal details about the size and composition of its nuclear forces and stockpile. The Chinese have a long tradition of building underground military facilities—airfields, submarine bases, etc. In recent decades underground facilities have also become the preferred deployment mode for the country's land-based ballistic and cruise missiles, both nuclear and conventional, belonging to the PLA's Second Artillery Corps. In 2009, Chinese sources, including extensive television coverage, revealed that Second Artillery Corps' nuclear weapons, missiles, and launchers are deployed in some 5,000 kilometers (2,700 nautical miles) of underground tunnels, thereby giving China a highly survivable missile force.²⁵⁵ The intercontinental or strategic-nuclear portion of this force is believed to consist of fifty to seventy-five ICBMs and is being modernized by the deployment of DF-31 and DF-31A ICBMs. A three-stage, solid-fuel, ICBM, the DF-31/31A has been slowly replacing older liquid-fuel missiles such as the intermediate range DF-4 (CSS-3). A DF-31/31A brigade is thought to be equipped with six battalions, each with two launchers for a brigade total of twelve. Since 2007 at least three DF-31/31A brigades have been identified.²⁵⁶

The majority of Second Artillery Corps' ballistic missile force consists of shorter-range ballistic missiles: the DF-11 (CSS-7) and DF-15 (CSS-6) short-range ballistic missiles (SRBMs) and the two-stage DF-21 (CSS-5) MRBM.²⁵⁷ In 2012, the Pentagon estimated that the Second Artillery Corps had between 1,275 and 1,800 of these three missiles along with 310 to 405 transporter erector launchers (TELs).²⁵⁸ The DF-11s and DF-15s, with ranges less than 1,000 kilometers (540 nautical miles), comprise 94 percent of Second Artillery Corps' SRBMs and MRBMs. Although these shorter-range systems are generally assessed as being capable of delivering nuclear as well as conventional warheads, the prevailing wisdom on China's nuclear

²⁵⁴ Ibid., pp. 196, 197.

²⁵⁵ L. C. Russell Hsiao, "China's 'Underground Great Wall' and Nuclear Deterrence," *China Brief*, The Jamestown Foundation, December 16, 2009, pp. 1-2.

²⁵⁶ Mark Stokes and L. C. Russell Hsiao, "New DF-31A ICBM Brigade in Hunan?" Project 2049 Institute, September 9, 2011, available at <http://blog.project2049.net/2011/09/new-df-31a-icbm-brigade-in-hunan.html>, accessed on December 20, 2012.

²⁵⁷ The two-stage DF-21 (CSS-5) was used to destroy an inoperative Chinese weather satellite in January 2007. This anti-satellite test created a significant increase in orbital debris.

²⁵⁸ DoD, "Annual Report to Congress: Military and Security Developments Involving the People's Republic of China 2012," May 2012, p. 29.

posture, as Jeffrey Lewis argued in 2004, is that the Chinese are confident that an ICBM force of only fifty to seventy five missiles provides adequate deterrence against the United States and have not developed tactical nuclear forces of any kind.²⁵⁹ The Second Artillery Corps' "Underground Great Wall" provides China with a relatively secure retaliatory second-strike capability, and in 2011 China reaffirmed its policy of "no-first-use of nuclear weapons at any time and in any circumstances."²⁶⁰ In light of Second Artillery Corps' emphasis on shorter-range missiles, Lewis and most China watchers believe that China has opted for a minimal deterrent posture relative to both the United States and Russia.

Based on this view of China's nuclear doctrine and posture, since the 1980s most Western estimates have put China's nuclear stockpile at anywhere from 100 to more than 500 weapons.²⁶¹ Not everyone agrees with these estimates, however. In 2010, Phillip Karber began suggesting that the Chinese nuclear stockpile might be considerably larger. By 2011 he was hypothesizing that the PRC might have as many as 3,000 nuclear weapons (although he acknowledged ambiguity as to whether this total represented cumulative production or the PRC's current stockpile). Karber based his argument mainly on fragmentary Chinese statements, the steady growth in Second Artillery Corps' horizontal underground tunnels, and the numbers of ballistic missiles deployed.²⁶² To Karber it seemed implausible that China would make these substantial investments in the Second Artillery Corps' missiles and Underground Great Wall but neglect to field nuclear warheads for at least some of the country's shorter-range missiles. In November 2011 Karber's controversial thesis made the front page of *The Washington Post*.²⁶³ And in May 2012 the former head of Russia's Strategic Rocket Forces, Colonel General Viktor Yesin, published an article in a Russian journal asserting that China's nuclear stockpile contained as many as 1,800 weapons.²⁶⁴

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²⁵⁹ Jeffrey Lewis, "The Minimum Means of Reprisal: China's Search for Security in the Nuclear Age," Ph.D. dissertation, University of Maryland, 2004, pp. 1-3. Lewis' dissertation was published under the same title by MIT press in March 2007.

²⁶⁰ "China Sticks to No-First-Use of Nuclear Weapons: White Paper," News, March 31, 2011, available at http://news.xinhuanet.com/english2010/china/2011-03/31/c_13806909.htm, accessed on December 20, 2012.

²⁶¹ Dennis C. Shea (chairman) and William A. Reinsch (vice chairman) et al., *2012 Report to Congress of the U.S.-China Economic and Security Review Commission*, 112th Congress, Second Session (Washington, DC: U.S. Government Printing Office, November 2012), pp. 175-176.

²⁶² Phillip A. Karber, "Arms Control Implications of China's Underground Great Wall," September 26, 2011, slides 28-33.

²⁶³ William Wan, "Digging Up China's Nuclear Secret," *The Washington Post*, November 30, 2011, pp. A1, A12. See also Bret Stephens, "How Many Nukes Does China Have? Plumbing the Secrets of the Great Wall," *The Wall Street Journal*, October 24, 2011.

²⁶⁴ Matthew Roberson, "Nuclear Arsenal in China Much Bigger Than Believed, Says Expert," *Epoch Times*, June 28, 2012, available at <http://www.theepochtimes.com/n2/china-news/nuclear-arsenal-in-china-much-bigger-than-believed-says-expert-258565.html>, accessed on December 15, 2012. See also Bill Gertz, "China Has More Nuclear Missiles Than U.S. Thinks," *Washington Times*, June 29, 2012.

As expected, there has been considerable pushback from China experts committed to the minimal-deterrence interpretation of the PRC's nuclear posture.²⁶⁵ In August 2012 the head of U.S. Strategic Command (STRATCOM), General C. Robert Kehler, stated that based on U.S. intelligence estimates backed up by estimates of China's fissile production and assessments of China's nuclear posture, "the Chinese arsenal is in the range of several hundred" nuclear warheads and Karber's higher estimates are mistaken.²⁶⁶ Nevertheless, in December 2012 Yesin visited the United States and reiterated his estimate that China's stockpile is likely "between 1,600 to 1,800 nuclear warheads and bombs," of which about 850 are operationally deployed.²⁶⁷

What does all this suggest for the nuclear-conventional firebreak as viewed from Beijing? Second Artillery Corps' mixing of nuclear and conventional missiles may imply that Chinese leaders do not see a very clear break between conventional and nuclear operations. In 2001 a team of PLA experts at the Academy of Military Sciences produced an English version of *Science of Strategy*, which had been written under the editorial supervision of two PLA generals, Peng Guangqian and Yao Youzhi. While the book concentrated on the central role of the struggle for dominance between opposing information systems in local "high-tech" wars, it contained the following observation concerning nuclear electromagnetic pulse (EMP) weapons:

As information technology develops and it has more influence on the function of nuclear weapons, the discharge of nuclear energy will also be included into information control and applied in the struggle over the control of information rights (such as the electromagnetic pulse weapon being developed). Nuclear weapons may walk out of deterrence and be used in actual combat. But this kind of nuclear war is the nuclear war included in hi-tech local wars, and its essence is hi-tech local war.²⁶⁸

²⁶⁵ See Hui Zhang, "The Defensive Nature of China's 'Underground Great Wall,'" *Bulletin of the Atomic Scientists*, January 16, 2012, available at <http://thebulletin.org/print/web-edition/features/the-defensive-nature-of-chinas-underground-great-wall>, accessed on December 15, 2012.

²⁶⁶ Hans M. Kristensen, "STRATCOM Commander Rejects High Estimates for Chinese Nuclear Arsenal," *Federation of American Scientists*, August 22, 2012, available at <http://www.fas.org/blog/ssp/2012/08/china-nukes.php>, accessed on December 20, 2012.

²⁶⁷ Bill Getz, "Number the Nukes: Ex-Russian Strategic Commander Says New Chinese Missiles Threaten the 1987 U.S.-Soviet Arms Treaty," *The Washington Free Beacon*, December 14, 2012, available at <http://freebeacon.com/number-the-nukes/>, accessed on December 20, 2012.

²⁶⁸ Peng Guangqian and Yao Youzhi (eds.), *Science of Strategy* (Beijing: Military Science Press, 2001), p. 361. China's Military Science Publishing House published an English translation of this book in 2005.

With some rewording this intriguing passage was retained in Peng and Yao's 2005 *The Science of Military Strategy*.²⁶⁹

It is difficult to decide what to make of these passages. Elsewhere *Science of Strategy* and *The Science of Military Strategy* observe that electronic computer, precision guidance, remote attack, space and laser technologies have given high-tech conventional forces the ability to achieve strategic effects similar to those of nuclear weapons "while avoiding the huge risk of stepping over the nuclear threshold."²⁷⁰ Perhaps this seeming inconsistency simply reflects the fact that these books had over thirty authors. Nevertheless, the cited passages about nuclear use in high-tech local wars under "informationalized" conditions does suggest that in certain circumstances China might consider using nuclear EMP weapons against enemy sensor, communications, and targeting networks.

If so, the PRC's nuclear-conventional firebreak may not be as wide as Western readings of China's minimal-deterrence posture and no-first-use of nuclear weapons doctrine are usually taken to indicate.²⁷¹ Moreover, U.S. conventional forces and information systems are increasingly dependent on commercial-off-the-shelf microelectronics that lack hardening against EMP effects.²⁷² Whether PRC awareness of this U.S. vulnerability may lead over time to a narrowing of the nuclear-conventional firebreak from China's perspective is anyone's guess. But it is certainly a possibility.

North Korea and Iran

Since North Korea's initial nuclear test in 2006, Pyongyang has been viewed as having a primitive atomic capability, and the Iranian nuclear program is thought to be proceeding apace toward a similar end. However, compared to even second-tier nuclear powers such as the United Kingdom and France, North Korean and Iranian nuclear capabilities are likely to be modest at best for years to come in terms of deployed launch systems and nuclear firepower. Both the United Kingdom and France maintain four SSBNs, which are enough to maintain at least one SSBN deployed at sea at all times. The newest French SSBN, *Le Terrible*, carries

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²⁶⁹ In the 2005 version, this passage reads: "With the further development of information technology, and its influence on the role of nuclear weapon[s], the discharge of nuclear energy will be controlled by information and be employed to seek information dominance. For instance, the electromagnetic pulse weapon still in [the] laboratory stage is a kind of nuclear weapon. It is possible for nuclear weapons to move from deterrence into warfighting." Peng Guangqian and Yao Youzhi (eds.), *The Science of Military Strategy* (Beijing: Military Science Publishing House, 2005), p. 404.

²⁷⁰ Peng and Yao (eds.), *Science of Strategy*, p. 21. For the comparable 2005 version of this passage, see Peng and Yao (eds.), *The Science of Military Strategy*, p. 17.

²⁷¹ For China's official no-first-use-of-nuclear-weapon policy, see Peng and Yao (eds.), *The Science of Military Strategy*, pp. 23-24.

²⁷² John and Braddock, "The Nuclear Weapons Effects National Enterprise," pp. vii, 14, 66.

sixteen M51 SLBMs, each capable of delivering six to ten independently targetable T75 thermonuclear warheads. The large disparity between a single French or British SSBN and North Korea's primitive nuclear capability, or that which Iran may eventually field, suggests that they will be, at best, marginal nuclear powers for the foreseeable future. Both are small, rogue states and the anxieties of their rulers over regime preservation indicate that they share some motivations for having nuclear forces.

In 1965 North Korea's government under Kim Il Sung reached an agreement with Moscow for the construction of a five-megawatt nuclear reactor. This reactor went operational in 1967 and was later modified by the North Koreans. In the 1980s, presumably with some help from China, signs of weapons development appeared, including a fifty-megawatt reactor at Yongbyon, which went critical in 1986, and construction of a secret reprocessing facility that began in 1987.²⁷³ In the spring of 1994, after Kim Il Sung was succeeded by Kim Jong Il, the U.S. Defense Department planned an air strike on Yongbyon to collapse the reactor and entomb the plutonium, but did not execute the mission. The reason was concern about Pyongyang's response. An all-out artillery and missile barrage aimed at Seoul might have caused 100,000 casualties.²⁷⁴

The eventual outcome of the failure to find a low-risk military solution to Pyongyang's nuclear program was that in October 2006 North Korea joined the nuclear club by conducting an underground nuclear test near P'unggye. The test probably used a plutonium-based derivative of the CHIC-4/A.Q. Khan design first tested by China in 1966.²⁷⁵ The device only achieved a yield of about 500 tons, well below the expected 12 kilotons and probably fizzled out due to differences in the neutronics of plutonium compared to highly enriched uranium.

North Korea conducted a second underground nuclear test in May 2009 after Kim Jong Il had suffered a stroke and Kim Jong Un was announced as the successor. Again the roughly four-kiloton yield was less than would be expected from a Hiroshima-like device, and Western analysis suggested that the device has not functioned correctly.²⁷⁶ Nonetheless, the 2009 test was followed by ballistic missile tests ostensibly aimed at orbiting a satellite. Not until December 2012 did Pyongyang finally manage to put a small, 200-pound satellite into earth orbit, and even then Kwangmyŏngsŏng-3 appeared to be tumbling.²⁷⁷

²⁷³ Reed and Stillman, *The Nuclear Express*, p. 260-261.

²⁷⁴ *Ibid.*, p. 261.

²⁷⁵ *Ibid.*, p. 262.

²⁷⁶ Jeffrey Park, "The North Korean Nuclear Test: What the Seismic Data Says," *Bulletin of the Atomic Scientists*, May 28, 2009, available at <http://thebulletin.org/web-edition/features/the-north-korean-nuclear-test-what-the-seismic-data-says>, accessed on December 20, 2012.

²⁷⁷ "North Korea Satellite 'Tumbling in Space'," *BBC*, December 18, 2012, available at <http://www.bbc.co.uk/news/world-asia-20769324>, accessed on December 21, 2012.

Given the difficulties the North Koreans have encountered in their first two nuclear tests and attempts to master long-range ballistic missile technology, it is unclear how much of a nuclear capability should be attributed to Kim Jong Un's regime. Most observers credit North Korea with less than ten nuclear weapons. As for long-range ballistic missiles, North Korea's Taepodong-2 uses the same liquid-fuel engines as the Unha-3 launch vehicle that orbited Pyongyang's first satellite in December 2012. The North Korean engines in these missiles utilize a highly corrosive, highly toxic oxidizer, which means readying a Taepodong-2 for launch takes days or longer.²⁷⁸ There is also uncertainty as to whether the North Koreans have been able to produce nuclear warheads light enough for the Taepodong-2 to reach the west coast of the United States. Despite the recent success in getting all three stages of the Unha-3 launch vehicle to work, it is questionable whether Pyongyang has achieved a reliable capability to strike the United States with a nuclear missile without lengthy, visible preparations. Thus, the North Koreans currently do not appear to have mastered either fission weapon technology or long-range ballistic missiles. But Kim Jong Un's regime is continuing to work on both, and Pyongyang's third nuclear test in February 2013 was probably more successful than the first two judging by the preliminary yield estimates of 6-7 kilotons.²⁷⁹

The likely motivations behind North Korea's ongoing efforts to develop nuclear weapons and long-range missiles against the objections of the United States, South Korea, Japan and other nations remain somewhat opaque. At the most basic level, preserving the regime in the face of the perceived threats to its existence from the United States and South Korea have undoubtedly weighed heavily on the minds of North Korea's rulers since the 1953 armistice that ended the fighting on the Korean Peninsula. It is worth recalling that in 1994 the Pentagon actually developed plans to strike the North Korean reactor at Yongbyon but elected not to do so for fear of triggering a conventional war in Korea.

A nuclear-armed North Korea, then, is a nation that South Korea, Japan, the United States, and even its protector, China, cannot ignore. This fact has enabled North Korea to blackmail political concessions and economic aid from its adversaries. For instance, between 1995 and 2008, the United States provided North Korea with over \$1.3 billion in food aid and energy assistance in the hope

A nuclear-armed North Korea, then, is a nation that South Korea, Japan, the United States, and even its protector, China, cannot ignore.

²⁷⁸ Charles P. Vick, "Taep'o-dong 2 (TD-2), NKS-X-2," November 5, 2012, available at <http://www.globalsecurity.org/wmd/world/dprk/td-2.htm>, accessed on December 24, 2012. The oxidizer believed to be used in the first two stages of the Taepodong-2 and Unja-3 rockets is AK27I: a mixture of 73% nitric acid (HNO³) and 27% dinitrogen tetroxide (N₂O₄) with an iodine inhibitor. Second-generation Soviet ICBMs also used toxic, hypergolic fuels. Both the Soviets' UR-100 (SS-11) and R-36 (SS-9) used unsymmetrical dimethylhydrazine (UDMH) as fuel.

²⁷⁹ Larry Greenemeier, "What Does North Korea's Latest Nuclear Test Tell Us about Its Atomic Ambitions?" *Scientific American*, February 12, 2013, available at <http://www.scientificamerican.com/article.cfm?id=north-korea-third-nuclear-test>, accessed February 28, 2013.

Recall the observation that India's former defense minister made in the wake of the 1991 Persian Gulf War. The lesson of Desert Storm was: "Don't fight the United States without a nuclear weapon."

of persuading Pyongyang to abandon its nuclear weapons program.²⁸⁰ In addition, Pyongyang's willingness to sell nuclear and missile technology to other countries has also been a source of hard currency for an economically bankrupt regime. In 2000, for example, Libya paid North Korea \$600 million for fifty No-Dong IRBMs.²⁸¹ Unquestionably the Kims have continued to pursue nuclear weapons despite the efforts of the United States and others to stop Pyongyang's pursuit of nuclear arms. Nevertheless, in the wake of North Korea's latest nuclear test on February 12, 2013, it remains unclear whether Pyongyang's primary incentive is national security, extracting economic aid to prop up the regime, or self-reliance.

What conclusion, if any, can be drawn about the nuclear-conventional fire-break as seen in Pyongyang? The North Korean regime's desire for self-preservation is strong. But so is the regime's inclination to take unprovoked military risks. In March 2010, a North Korean torpedo fired from a midget submarine sank the South Korean corvette *Cheonan* killing forty-nine sailors. In November 2010, in response to a South Korean live-fire exercise, North Korean artillery fired around 170 shells and rockets at Yeonpyeong Island, killing four South Koreans and injuring nineteen others. Yet, despite these provocative actions, it may well be that the nuclear threshold remains high from Pyongyang's perspective. After all, actually using a nuclear weapon against the United States or South Korea would almost certainly result in the North Korean regime's prompt destruction, and it is unlikely that this likelihood escapes the decision-makers in Pyongyang. Perhaps the one contingency that might provoke them to lash out with a nuclear weapon would be if the regime itself began to collapse.

Iran, of course, has yet to achieve a nuclear weapon capability, although its purportedly peaceful nuclear program continues apace. Nevertheless, it is not difficult to appreciate why the Iranians might seek nuclear weapons given their xenophobia and strident nationalism. In 2003, the Iranian ayatollahs witnessed the United States use its conventional superiority to overthrow Saddam Hussein's regime in Iraq in the space of three weeks. From Tehran's perspective, one obvious way of precluding regime change in Iran at the hands of the Great Satan would be to acquire nuclear arms. Recall the observation that India's former defense minister made in the wake of the 1991 Persian Gulf War. The lesson of Desert Storm was: "Don't fight the United States without a nuclear weapon."²⁸² So the foremost reason for the Iranians to seek nuclear weapons is to preclude the possibility of regime change by far superior American conventional forces: the goal is to develop nuclear weapons as a shield against outside intervention. At the same time, acquiring a nuclear capability would also enhance Tehran's

²⁸⁰ Mark E. Manyin and Mary Beth Nikitin "Foreign Assistance to North Korea," Congressional Research Service R40095, April 26, 2012, p. 3.

²⁸¹ Reed and Stillman, *The Nuclear Express*, p. 262.

²⁸² Samuel P. Huntington, "The Clash of Civilizations," *Foreign Affairs*, 72, No. 3, Summer 1993, p. 48.

regional influence and ensure that the ayatollahs could continue supporting terrorism against Israel through proxies such as Hamas and Hezbollah. These longer-term goals suggest that Iran's nuclear ambitions are more troubling than North Korea's. The Kims sought nuclear weapons to defend the regime and exercise blackmail. But as Israel's Moshe Ya'alon has observed, North Korea "has no aspiration to impose its regime and ideology globally" whereas the ayatollahs aspire to "defeat Western civilization."²⁸³

One hesitates even to guess how Iran's acquisition of nuclear weapons might affect the nuclear-conventional firebreak as seen from Tehran. But as discussed at the beginning of this chapter, Iran might be able to use its nuclear arms to undermine Israel's security without actually using a nuclear weapon. If Bracken is right, merely posturing for a nuclear exchange could suffice to begin moving the strategic balance in the Middle East more in Iran's favor. After all, even a primitive Iranian atomic warhead sufficiently miniaturized to be deliverable by an intermediate-range ballistic missile could pose an existential threat to Israel.

The potential of a nuclear Iran to alter the strategic balance of power between Israel and Iran, however, goes beyond the problems that Tehran's nuclear weapons may eventually pose for Israel and its American ally. There is also the longer-term possibility that a nuclear Iran would trigger a cascade of nuclear proliferation in the region. Saudi Arabia and Turkey are two countries that might feel compelled to go nuclear themselves if confronted with a nuclear Iran. Given the volatility of the Middle East, especially in the wake of the Arab Spring in 2011 and the ongoing civil war in Syria, one suspects that such a proliferation cascade would increase, perhaps substantially, the chances of the nuclear taboo being broken. As Henry Kissinger warned in 2005, the spread of nuclear weapons in regions of revolutionary upheaval "will produce a qualitatively different world whose perils will dwarf the worst nuclear nightmares of the Cold War."²⁸⁴

Iran might be able to use its nuclear arms to undermine Israel's security without actually using a nuclear weapon.

²⁸³ David Remnick, "The Vegetarian: A Veteran Spymaster Becomes a Dissident," *The New Yorker*, September 3, 2012, p. 27.

²⁸⁴ Henry A. Kissinger, "Iran: A Nuclear Test Case," *The Washington Post*, March 8, 2005, p. A15.

CHAPTER 5 > DETERRENCE, NUCLEAR-CONVENTIONAL FIREBREAKS, AND THE NUCLEAR TABOO

The United States government developed the atomic bomb during World War II and chose to use the new weapon. The dropping of atomic bombs on two Japanese cities ushered in the nuclear era. Today, for the noblest of reasons, the stated policy of the U.S. government is to withdraw from the nuclear enterprise. Unfortunately, the leaders of most of the other nations seeking or possessing nuclear weapons have seemingly compelling reasons for retaining nuclear arms. Short of fundamental transformation of the world political order, our nuclear future is more likely to be one of further proliferation rather than a long march toward nuclear abolition—unless, of course, a lot of minds can be changed in a number of foreign capitals.

Looking back at the Cold War, the emergence of U.S.-Soviet nuclear parity in the early 1970s simplified and stabilized the nuclear relationship between the United States and the Soviet Union. So long as each side could respond to the other's initial nuclear strike with devastating nuclear retaliation, the incentives in Washington and Moscow to avoid all-out nuclear war were strong. The leaders of both nations came to similar conclusions about the nuclear-conventional firebreak: it was wide and needed to be kept that way. Moreover, given the huge offensive nuclear forces the United States and the Soviet Union amassed over time, the small arsenals of the other nuclear powers had little effect on the fundamental deterrent relationship between the two superpowers. Yes, there were moments during the Cold War when the United States and the Soviet Union came close to the nuclear abyss. And more than one U.S. ally entertained doubts now and again about the reliability of American extended deterrence. Nevertheless, a secure retaliatory capability on both sides of the Iron Curtain was the bedrock of a relatively stable balance of terror during the final decades of the Cold War.

Today, however, there are nuclear competitions that do not appear to be nearly as stable as the U.S.-Soviet deterrent relationship eventually became. One hopes, for example, that a similarly stable deterrent relationship will come to dominate the standoff between India and Pakistan. But on India's side the country's Cold Start doctrine is troubling insofar as it presumes Indian leaders really understand Pakistan's nuclear "red lines." In this regard, the conclusion Indian leaders drew from the 1999 Kargil conflict is that Pakistan is a reckless, adventuristic, risk-acceptant, untrustworthy state.²⁸⁵ How this view might affect Indian decisions in the face of future Pakistani provocations is difficult to assess, but it is hardly indicative of a stable relationship between these two states. On Pakistan's side, the evident commitment to continue expanding the country's nuclear arsenal—to include developing low-yield warheads for tactical use—is also troubling. In the case of nuclear competition on the Indian subcontinent, it is far from clear that Cold War notions of mutual assured destruction can be counted upon to extend the nuclear taboo indefinitely.

Reflection on the diverse array of motivations and incentives that various nuclear states and aspirants have for possessing or acquiring nuclear arms has two main implications. First, Paul Bracken is right: nuclear weapons can and do affect strategic relationships between sovereign states even if they are not used. Ongoing attempts to reduce U.S. dependence on nuclear weapons, while laudable, risk ignoring this fact. The reality is that conventional weapons, however precise, do not have quite the psychological and strategic impact of nuclear weapons.

Second carrying Cold War assumptions and understandings about deterrence into the second decade of the 21st century is, at best, problematic. In 2009 Thomas Reed and Danny Stillman commented that "Finding a cure for the nuclear ambition disease is one of the defining challenges of our new millennium."²⁸⁶ Fair enough, but the incentives of interest, fear, and honor remain powerful motivators of behavior by national decision makers and polities alike, just as they were during the Peloponnesian wars. The panoply of reasons for possessing nuclear weapons detailed in the preceding chapter suggests that the world community is no closer to finding a cure for the nuclear disease than it is to transforming the international political order fundamentally enough to make the abolition of nuclear weapons an attainable goal. How then should we think about nuclear deterrence in the present era? In 2008, Keith Payne offered this sobering assessment:

Most of what we believed to be true about deterrence is of questionable value now because the stakes, the opponents, the contexts, and our deterrence goals differ so dramatically from those of the Cold War.²⁸⁷

The stated policy of the U.S. government is to withdraw from the nuclear enterprise. Unfortunately, the leaders of most of the other nations seeking or possessing nuclear weapons have seemingly compelling reasons for retaining nuclear arms.

²⁸⁵ Tellis, Fair, and Medby, "Limited Conflicts Under the Nuclear Umbrella," p. 6.

²⁸⁶ Reed and Stillman, *The Nuclear Express*, p. 146.

²⁸⁷ Keith B. Payne, *The Great American Gamble: Deterrence Theory and Practice from the Cold War to the Twenty-First Century* (Fairfax, VA: National Institute Press, 2008), pp. 12-13.

The evidence argues that the taboo against nuclear use is being threatened by the emergence of potential conflict situations between certain nations in which the nuclear-conventional firebreaks are growing increasingly narrow and at risk of being breached.

The verities derived from the Cold War balance of terror presumed a fundamentally two-sided competition in which the intentions and resources on both sides were far more comparable than, say, the competition between the United States and North Korea.²⁸⁸ Rather than a single bilateral nuclear competition that overshadows all others, there are now many nuclear competitions bearing on the ultimate fate of the nuclear taboo. Just to name a few, there is the United States versus Russia, China versus the United States and its Asian allies, and India versus Pakistan. Further, insofar as the PRC's rulers aspire for China to become the regional hegemon in East Asia, there are competitions between nuclear states as multi-faceted as China versus Russia to the north, China versus India to the south, and China versus the United States to the east. There also remains the possibility that a nuclear state could use nuclear weapons against a non-nuclear state, as happened in 1945.

If there are, in reality, many nuclear-conventional firebreaks, not one, what does this imply for Schelling's hope that the nuclear taboo will not be broken for at least another sixty years? Each of the various firebreaks discussed in the previous chapter depends on the calculations of the protagonists involved and a plethora of situation-dependent factors, including perceptions, judgments about the available options and strategic cultures. Some of these firebreaks appear to be quite wide and robust. In the case of the large-scale arsenal exchanges envisioned and endlessly analyzed in the United States and the USSR during the Cold War, the nuclear threshold appears to be quite high, especially from an American perspective. But in other cases, the nuclear-conventional firebreak appears to be much narrower or more fragile. How, for example, could Pakistan or Russia be deterred from using a few low-yield nuclear weapons in response to a conventional attack that seriously threatened either country's territorial integrity or national sovereignty? The disconcerting fact seems to be that the Russians in particular have identified conventional contingencies in which the use of a small number of very-low-yield nuclear weapons with tailored effects could avert a decisive defeat. While it may be very difficult for most Americans to imagine any contingency in which a U.S. president would judge nuclear use to be the least awful of the available options, Russian leaders appear to have a very different view about limited nuclear use in a theater context. Pakistan's leaders also appear to be entertaining similar thoughts, and the Chinese certainly have the technology to breach the nuclear threshold with EMP weapons.

As suggested in the introduction of this report, the evidence argues that the taboo against nuclear use is being threatened by the emergence of potential conflict situations between certain nations in which the nuclear-conventional firebreaks are growing increasingly narrow and at risk of being breached. These increasingly fragile nuclear-conventional firebreaks appear to be emerging irrespective of U.S.

²⁸⁸ Payne, *The Great American Gamble*, p. 336.

nuclear policies. The prospect that nuclear weapons will be used in the next ten or twenty years gives every indication of growing more, rather than less, likely. If nuclear weapons are used again, and if their use is perceived to have been strategically successful for the country that broke the nuclear taboo, the world will likely go in one of two directions. The first possibility is that international revulsion against breaking the nuclear taboo will be so strong and widespread that it will precipitate the necessary transformation of world politics to render nuclear abolition possible, regardless of Schelling's judgment that future conventional conflicts between major powers will not only occur but be "won" by the belligerent able to reconstitute a nuclear capability first. The second possibility is that limited use of low-yield nuclear weapons will become the new normal and give rise to a second nuclear age whose dangers and uncertainties will dwarf those of the first. Neither outcome is particularly attractive. But in the second nuclear age, the world may nevertheless be heading largely unnoticed toward one of them.



Center for Strategic and Budgetary Assessments

1667 K Street, NW, Suite 900

Washington, DC 20006

Tel. 202-331-7990 • Fax 202-331-8019

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