

U.S. Nuclear Force Levels:
Using QDR Goals to Maximize U.S. Security

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Summary

Nuclear weapons are the only current threat to the national existence of the United States. This threat exists from the potential for accidental or inadvertent nuclear war, theft and unauthorized use of nuclear weapons, and proliferation of nuclear weapons and weapon technologies.

The force level of the U.S. nuclear arsenal has an important role in attempting to mitigate these threats and helping to maximize U.S. security. Any decisions made regarding U.S. force levels must be carefully considered, however, to account for the political reality that U.S. nuclear policy decisions elicit reactions from countries around the world. These reactions, in turn, affect whether U.S. decisions result in net improvements of U.S. security.

The *2001 Quadrennial Defense Review* accounts for this global context, asserting that U.S. national security will be maximized when military capabilities can achieve all four of the *Review's* strategic goals: assure friends and allies of the United States, dissuade military competitors, deter coercion and aggression, and defeat adversaries when deterrence fails. A nuclear force of 1,100 total warheads should be mandated for this purpose. This nuclear force would consist of 1,000 operational strategic warheads and an additional 100 reserve strategic warheads to guarantee the reliability of the operational force. During the resulting reduction of the current U.S. arsenal, the tactical nuclear force would be eliminated as a discrete component force.

This nuclear force of 1,100 total warheads will improve U.S. security, both in the present and in the future, as it will help direct nuclear competition down a path of constructive de-escalation.

Introduction

Today's U.S. nuclear force levels are a legacy of the Cold War. After 1949, the United States was confronted with an ideological adversary in the Soviet Union armed with both nuclear weapons and a large conventional army. Both the United States and the Soviet Union calculated that the best way to deter a nuclear attack was to deploy nuclear forces capable of assuring the destruction of the enemy in a retaliatory strike. The result was nuclear force levels which peaked at approximately 32,500 warheads for the United States in 1966 and some 45,000 for the Soviet Union in 1986.¹

While the U.S.-Russian relationship has warmed considerably since the collapse of the Soviet Union in 1991, the nuclear force structures of both the United States and Russia have been left fundamentally unchanged. Nuclear arms treaties have successfully reduced the numbers of operational warheads on both sides and placed some of the remaining operational forces at lower levels of alert; however, these measures have accomplished little in terms of dramatically improving international security. This is because they have failed to fully account for the changed U.S.-Russian relationship and contemporary threats to the international community posed by dangers closely associated with Russia's economic and military deterioration, as well as nuclear proliferation in general.

Today, the United States maintains about 4,500 operational strategic warheads, approximately 780 operational tactical warheads, and some 5,000 reserve strategic and tactical warheads.² Russia continues to field about 3,800 operational strategic warheads, approximately

¹ Robert S. Norris and William M. Arkin, "Estimated U.S. and Soviet/Russian nuclear stockpiles, 1945-1994," *Bulletin of the Atomic Scientists* vol. 50, no. 6 (1994), p. 58-59.

² Robert S. Norris and Hans M. Kristensen, "NRDC: Nuclear Notebook, U.S. nuclear forces, 2005," *Bulletin of the Atomic Scientists* vol. 61, no. 01 (2005), p. 73-75.

3,400 operational tactical warheads, and as many as 9,000 reserve strategic and tactical warheads.³ Given this, Russian strategic nuclear forces remain the only present threat to the national existence of the United States.

With U.S.-Russian force levels still postured for the Cold War at the start of the 21st Century, the familiar threats associated with the Cold War legacy, of accidental or inadvertent nuclear war, are now coupled with increased threats from nuclear theft, proliferation, and unauthorized use. These additional threats have always existed, but since the break-up of the Soviet Union they have grown considerably in their relative importance. In the post-Cold War era, these threats have taken center stage while the traditional Cold War threat of accidental or inadvertent nuclear war remains looming in the wings.

To place the danger of the nuclear threat in perspective, the first nuclear weapon used in combat, on the Japanese city of Hiroshima in August 1945, had an explosive yield of approximately 13 kilotons (kt).⁴ This explosion destroyed almost all of the buildings within a 12 square-mile area and killed approximately 140,000 people in the first five months after the detonation.⁵ Less than a decade later, in March of 1954, nuclear weapon technology had already progressed to the point at which the United States was able to successfully detonate a 15 Mt weapon (15,000 kt), demonstrating the nearly limitless power of nuclear explosions. Today, the average yield of a weapon in the U.S. and Russian nuclear arsenals is more than an order of magnitude larger than the explosion at Hiroshima. Estimates suggest that even the use of a mere

³ Robert S. Norris and Hans M. Kristensen “NRDC: Nuclear Notebook, Russian nuclear forces, 2005,.” *Bulletin of the Atomic Scientists* vol. 61, no.02 (2005), p. 70-72.

⁴ Richard L. Garwin and Georges Charpak, *Megawatts and Megatons: The Future of Nuclear Power and Nuclear Weapons* (Chicago: Chicago Press, 2002), p. 59.

⁵ Stansfield Turner, *Caging the Nuclear Genie: An American Challenge for Global Security* (Boulder: Westview, 1997), p 9.

20 nuclear weapons against major cities in Russia would result in the deaths of 25 million people—one-sixth of the total population.⁶

Responsible control over this destructive power is now more difficult to guarantee than ever before. Russian economic and military deterioration creates the potential for inadvertent or accidental launches, theft or unauthorized use, and the proliferation of nuclear weapons, materials, and knowledge for profit. Furthermore, countries and non-state actors continue to seek to develop or acquire nuclear weapons for the security they hope the weapons will afford them, either absolutely or as bargaining chips. U.S. nuclear weapons policy, to include U.S. nuclear force levels, does have the power to influence the control of these weapons, however. Choices that the United States makes, as it determines the nuclear force levels that meet its security needs, are signals to which countries around the world react with their own nuclear policy decisions.

This paper intends to recommend nuclear force levels for the strategic, tactical, and reserve components of the U.S. nuclear arsenal that will maximize U.S. national security with regard to nuclear weapons in today's geopolitical context. To arrive at this recommendation, discrete force level options are judged on their ability to protect the United States and U.S. interests using a broad security perspective. The security perspective used is intended to appreciate the reality that U.S. policy decisions affect countries around the world that, in turn, react with policy decisions of their own, which may or not result in a net improvement of U.S. security. The interaction is therefore understood as a continuous series of policy actions and reactions that can either spiral towards a cessation of nuclear arms competition and proliferation or towards increased nuclear distrust and competition that fuels proliferation.

⁶ National Academy of Sciences, Committee on International Security and Arms Control, *The Future of U.S. Nuclear Weapons Policy* (Washington, DC: National Academy Press, 1997), p. 43.

Accounting for this policy interaction, the criteria used to evaluate the force level options are the strategic security goals of the *2001 Quadrennial Defense Review*: assure friends and allies of the United States, dissuade military competitors, deter aggression and coercion, and decisively defeat adversaries of the United States when deterrence fails. This paper assumes that the security of the United States is maximized with a total nuclear force level that is capable of achieving all four of these goals.

The research method used to reach conclusions about the topic was a review of articles, academic writings, and analytic pieces written by individuals and associations that specialize on the issues of nuclear policy and arms control. While all of the options for the nuclear arsenal relative to today's force levels are reductions, the recommendations of this analysis are not intended to be a roadmap for future reductions. The scope of the analysis is a determination based on how U.S. security can be maximized regarding nuclear weapons at *present*. This paper assumes that there are no scientific or technical barriers that would prevent implementation of the proposed force level options.

Background

Augmenting a military force with more planes, tanks, ships, and in this case nuclear weapons to improve the U.S. relative advantage in military affairs is not the only way to improve national security. Acting with responsible restraint within the military establishment is also an option for improving a nation's security. This philosophy is implicit in the U.S. *2001 Quadrennial Defense Review* (QDR), the document written to guide the military in its development of U.S. forces, capabilities, deployment, and use. The goals of the QDR are to

assure the allies and friends of the United States, dissuade its military competitors, deter aggression and coercion, and decisively defeat any adversary if deterrence fails.

These goals recognize that the security of the United States depends on more than just a relative advantage in terms of the number of military weapon systems the United States can field. They reveal that the security policy choices of the United States are capable of shaping U.S. security in a variety of ways. The specific policies relevant to U.S. nuclear capabilities are no different. More U.S. nuclear weapons do not necessarily mean improved national security for the United States relative to a smaller nuclear force.

For this reason, this paper will seek to answer three questions in an effort to determine what nuclear force level will maximize U.S. national security with regard to nuclear weapons. The three questions are: (1.) What are the possible roles for U.S. nuclear forces? (2.) How do these roles within the component nuclear forces promote or inhibit the achievement of the QDR goals? and (3.) What force level is capable of fulfilling all of the QDR goals to result in the greatest security for the United States?

Possible Roles of U.S. Nuclear Forces

Since their creation, nuclear weapons have played a variety of roles for policymakers. The roles of nuclear weapons have included: as a tool of coercion, as a deterrent, as a weapon of retaliation, as a weapon of preemption, and as a tactical weapon.

The United States has used its nuclear force for most of these purposes in the past; however, it is significant that the United States has not used its nuclear force in combat since the bombings of Hiroshima and Nagasaki in August of 1945. In this instance, the nuclear force was

used in a coercive role to force the Japanese surrender through means that did not require a U.S. invasion of Japan's main island.

Because of their amazing destructive power, nuclear weapons are also capable of coercion through only the threat of use. The massive destruction a nuclear weapon is capable of creating forces those without the power to neutralize the attack or retaliate in kind to acquiesce to the demands of a nuclear threat, if it is judged credible. It is difficult for the United States to reasonably use nuclear weapons as a tool of coercion today, because of the supremacy that the United States maintains in its conventional military forces. Any military coercion that the United States attempts is much more likely to come from the power projection of conventional military assets. The international community would no doubt strongly condemn any nuclear threat as bullying with an excessive threat of force.

An additional way in which nuclear weapons can be used as a tool of coercion is by using them to signal to adversaries. In this case, no explicit threat is made. The signal speaks for itself and may come in the form of a nuclear test or the announcement that a nuclear weapons program will start or resume.

The role of nuclear weapons as an emblem of national prestige has existed since the development of the first nuclear weapon and will continue to be relevant as long as countries have independent control over their nuclear stockpiles. The importance of power in politics is undeniable. In today's security environment, the possession of a nuclear weapon by a state or non-state entity demands at the very least concerned attention from the international community. Moreover, for the officially recognized nuclear states under the Nuclear Non-Proliferation Treaty (NPT), it means a powerful seat at the table when discussing international nuclear policy issues and many other security issues as well. This is clearly demonstrated by the fact that the only

permanent members of the United Nations Security Council happen to also be the only recognized nuclear states under the NPT.

The most enduring role of the U.S. nuclear arsenal, as seen by the current status of U.S. nuclear forces, has been the role of nuclear weapons as a deterrent. The large numbers of nuclear weapons that the United States and the Soviet Union possessed during the Cold War period emphasized the need to have a large deterrent force, which could survive a first strike and decisively retaliate after the enemy launched a preemptive strike. The geographic separation of the two powers made this strategy tenable by providing both sides with the time needed to detect an incoming nuclear attack and respond with massive retaliation. This reality led both sides to calculate that there was no way to launch and win a preemptive war, leaving the two adversaries in stalemate.

The deterrent role also extended beyond nuclear deterrence to that of deterrence of large-scale conventional war. In this role, nuclear weapons are credited with preventing a conventional military confrontation between the world's superpowers for four decades. The development of tactical nuclear weapons indicated both sides believed nuclear weapons could be employed in combination with conventional forces without escalation towards all-out nuclear war; however, neither side trusted this assumption enough to test the hypothesis and risk the alternative.

Today, the nuclear deterrent is also assigned the role of deterring chemical and biological warfare as well. Its application in this case holds that adversaries will not use chemical and biological weapons (CBW) in warfare with the United States, because they fear the consequences of a U.S. nuclear attack. The United States maintains a nuclear policy in which it

reserves the right to respond to any conflict as it deems necessary, including with the use of nuclear weapons.

An additional method for using nuclear weapons as a deterrent is in their use as a defensive weapon against nuclear attack. During the Cold War, the technology did not exist to intercept an incoming warhead with a conventional warhead, and even today this technology is expensive and inconsistent at best. Therefore, both the United States and the Soviet Union, and now Russia, chose to use the explosive power of nuclear weapons to make up for what it lacked in precision intercept technology to hit an incoming nuclear warhead with an anti-ballistic missile nuclear warhead. The United States used a system known as the Safeguard Anti-Ballistic Missile (ABM) System, which deployed nuclear warheads on Spartan and Sprint missile platforms. This role for nuclear weapons can be classified as a deterrent role, because the intent of the system was to protect approximately 150 Minuteman missiles armed with nuclear warheads so that they could survive a first strike and be capable of a retaliatory strike.⁷ This system, as well as the entire concept of using nuclear weapons for missile defense, was given up by the United States in 1976. Russia continues to use an anti-ballistic missile system known as A-135 around Moscow, which includes 100 underground interceptors designed to carry one nuclear warhead each.⁸

Under international law, countries are allowed to undertake preemptive action against an “imminent attack” in a recognized right to self-defense. Nuclear weapons can thus also be used as a preemptive weapon. In the Cold War context, this principle was thought of largely as a way to destroy an opponent’s ability to use its nuclear forces. This thinking was prevalent in the early

⁷ Stephen I. Schwartz, “Missiles Defenses Have a Long History,” *The Bulletin of the Atomic Scientists* (January/February 1997) <<http://www.brook.edu/FP/PROJECTS/NUCW/COST/bmd2.htm>>.

⁸ Robert S. Norris and Hans M. Kristensen, “Russian nuclear forces, 2004,” *Bulletin of the Atomic Scientists* vol. 60, no. 04 (2004), p. 72-74.

stages of the Cold War when a nuclear war was thought to be winnable. It was quickly replaced by deterrence theory and Mutually Assured Destruction. More recently, arguments have been made to suggest that the current administration is prepared to use nuclear weapons preemptively or preventatively to destroy an opponent's ability to strike with CBW as well.

Finally, during the Cold War, the United States focused its efforts at devising ways to employ nuclear weapons at the tactical level for their use in conjunction with conventional forces. Today, the thinking about the potential tactical uses of nuclear weapons has progressed beyond this to focus on the destruction of special targets that are protected by deeply buried and hardened facilities. In this role, the tremendous explosive yield of nuclear weapons would be employed on earth-penetrating missiles to destroy underground command centers or facilities that hold weapons of mass destruction.

Strategic Goals of the 2001 Quadrennial Defense Review

The Secretary of Defense is the principal defense policy advisor to the President. He is also responsible for the formulation of general defense policy and policy related to all matters of direct and primary concern to the Department of Defense. The Secretary's *2001 Quadrennial Defense Review* is the document designed to establish a new strategy for America's defense outlining four strategic goals "that will guide the development of U.S. forces and capabilities, their deployment and use."⁹ These goals include: assuring allies and friends of the United States, dissuading military competitors, deterring aggression and coercion, and decisively defeating any adversary if deterrence fails. As the Defense Secretary's overriding policy

⁹ *Quadrennial Defense Review Report*, Department of Defense, United States of America (30 September 2001), p. iii.

guidance for all Department of Defense assets, the development, capabilities, deployment, and use of the U.S. nuclear weapon force is also subject to it.

According to the QDR, the purpose of assuring allies and friends of the United States is to demonstrate resolve and steadfastness of purpose to maintain credibility in the eyes of the world. Within the scope of nuclear weapons policy, this assurance is given to U.S. friends and allies in the form of assuring them that the United States and its friends and allies will not be subject to coercion, even in the presence of weapons of mass destruction (WMD). This assurance is a direct result of the U.S. maintenance of a capable nuclear deterrent force.

Assurance also encompasses efforts to create favorable balances of military power in critical areas of the world to deter aggression and coercion. Regional examples relevant to this issue include East Asia and the Middle East. The United States will seek ways to ensure that adversaries cannot coerce allies such as Japan, South Korea, and Israel by maintaining capabilities and taking policy actions that assure our allies of U.S. support.

Assurance as relevant to nuclear policy also takes the form of demonstrating to U.S. friends and allies that those friendships and alliances are valued by supporting the NPT Regime and other non-proliferation efforts, as well as not enacting policies that place undue strain on those countries. A commitment to this latter form of assurance is a critical consideration for U.S. nuclear policy makers with respect to Russia, in an effort to avoid inadvertent or unauthorized nuclear weapons launches and nuclear arms proliferation.

The QDR also explains that the U.S. seeks to dissuade adversaries of the United States through influencing the nature of future military competitions, channeling threats in certain directions, and complicating military planning for potential adversaries. In the terms of nuclear policy, this can be done in several notable ways. First, the United States could sustain its forces

at such a level and capability that competing countries would not undertake technological endeavors to neutralize the force because such undertakings would be financially too costly. The United States could also adjust its nuclear force capabilities to attempt to discourage potential adversaries from deploying mobile or re-locatable forces or building hardened and deeply buried facilities.

Finally, dissuading adversaries could include relaxing current U.S. nuclear policy, or at least not pursuing any more aggressive nuclear policies than what are already in place, in order to avoid instigating competition from states such as China or Russia.

The goals of deterring and then defeating America's adversaries, if deterrence fails, are goals that have been relevant to the U.S. nuclear force since its conception in World War II. In support of the QDR goals, the nuclear force could act as a deterrent against large scale conventional forces, and/or attack with nuclear weapons or other weapons of mass destruction. The United States has intentionally left its policy for the use of nuclear weapons ambiguous so as to keep all U.S. military assets, to include nuclear weapons, as options in the event that the United States needs to deter any of the above threats.

The goal of defeating enemies if they cannot be deterred is relevant to nuclear policy, because it brings forth issues regarding first-use policy and sufficient nuclear force size to ensure destruction of the enemy. The goal of defeating enemies also implicitly includes the need to maintain a certain amount of nuclear force flexibility with which to confront future threats. The threats of the future could materialize from new hostile coalitions against the United States, a hostile regime takeover in a nuclear power state, the surprise unveiling of weapons of mass destruction in a hostile state, or the worsening of relations with major powers such as Russia and China.

Applying Force Level Options to QDR Goals

The Strategic Nuclear Force

The strategic force of the United States consists of approximately 4,500 nuclear warheads that can be delivered by intercontinental ballistic missiles, submarine launched ballistic missiles, or bombers. It represents the core component of the U.S. nuclear arsenal. Currently, under the Strategic Offensive Reductions Treaty (SORT), both the United States and Russia have agreed to reduce their strategic nuclear forces to between 2,200 and 1,700 warheads each by the year 2012. The lower bound of this target range represents one of the options that this paper will evaluate as an alternative force level for the U.S. strategic nuclear force. Additionally, the force levels of 1000, 300, and 0 will also be judged on their capabilities to fulfill the four strategic goals of the QDR.

~**Assure.** The QDR goal to assure U.S. friends and allies that they will not be the subject of coercion or aggression has three core subcomponents. The United States can assure its friends and allies by being capable of deterring coercion against them, using U.S. military power to maintain favorable regional balances of military power, and supporting Article VI of the Nuclear Non-Proliferation Treaty, which essentially states all members of the Treaty will strive for the elimination of nuclear weapons.

Preventing the coercion of U.S. friends and allies is essentially extending the U.S. nuclear deterrent to them. In order to deter a threat, the threat of retaliation must be real, clearly making it necessary for the United States to maintain some nuclear weapons in a world where nuclear weapons exist. However, large numbers of nuclear weapons for the purpose of preventing coercion and aggression are not necessarily required. The conventional military dominance of

the United States is likely even more critical to the assurance of U.S. friends and allies, and itself represents a significant deterrent that the United States can extend abroad. Even in regional hotspots where U.S. allies are threatened by hostile regimes such as South Korea, Japan, and Taiwan in East Asia and Israel in the Middle East, the assurance that these allies feel is likely tied more to the massive conventional forces, which the United States promises to bring to bare against aggressive adversaries, than its nuclear capabilities.

While this may in fact be the case, it is difficult to judge just how many nuclear weapons the United States must maintain to give all of its friends and allies confidence in the capability of the U.S. nuclear arsenal. A strategic force of 300 warheads would be enough to defeat even the largest potential U.S. adversary, but within today's context, this force level may not be politically enough to fully assure all U.S. friends and allies. A strategic force of only 300 warheads is smaller than the Chinese nuclear arsenal of approximately 400 warheads and would likely create concern in Taiwan, for example.¹⁰ This suggests that the force level options of 1700 or 1000 strategic warheads would be needed to achieve the subcomponent of the "Assure" goal that seeks to maintain favorable balances of military power.

For many U.S. allies, the U.S. strategic nuclear capabilities also assure them, because they allow these countries to restrain from developing their own nuclear weapons. This helps prevent further proliferation of nuclear weapons even to countries that are friendly to the United States. The NPT regime is the cornerstone of the effort to prevent proliferation. Besides providing an extended nuclear deterrent, the United States can also support the NPT regime by making concrete efforts to reduce its nuclear stockpile in the spirit of Article VI of the Treaty. These efforts help ensure that the NPT does not become an irrelevant agreement and bolster its

¹⁰ Robert S. Norris and Hans M. Kristensen, "NRDC: Nuclear Notebook, Chinese Nuclear Forces, 2003," *Bulletin of the Atomic Scientists* vol.59, no. 06 (2003), p.77-80.

legitimacy in the international effort to stop the proliferation of nuclear weapons, materials, and technical know-how. As all of the options given for the strategic force represent a reduction from current force levels, each would be capable in supporting this subcomponent of assurance.

~Dissuade. The QDR goal of “Dissuade” encompasses four key components: influencing military competition, channeling threats, complicating military planning, and supporting the NPT regime for the purpose of preventing proliferation. This goal relates to countries around the world that already possess nuclear weapons and to those which are aspiring to obtain them. It is important to point out that, more than the others, this QDR goal is critical to determining the future of nuclear weapons policy for the United States and the rest of the world, because it directly affects the direction nuclear competition takes—either escalation or de-escalation. In this way, U.S. nuclear force levels are particularly important relative to the nuclear policy reactions they elicit from both Russia and China. U.S. nuclear force levels should attempt to control military competition and encourage predictability from these two countries.

U.S. strategic nuclear force levels are critical to reassuring Russia that the United States welcomes improved relations and wants to move beyond viewing Russia in the light of the Cold War. Even with recent reductions, the current U.S. strategic force of 4,500 operational strategic warheads, with more in reserve status, forces Russia to commit money and resources it does not readily have to the maintenance of nuclear force parity with the United States. The deteriorating economic and military conditions in the country do not make this a beneficial security situation for the United States, as it results in the increased likelihood of accidental, illicit and inadvertent use, or the threat of theft of Russian nuclear weapons and fissile material.

During the mid-1980s, the Soviet Union invested an estimated \$250-\$300 billion into defense spending.¹¹ In 2000 this number had dropped to below \$6 billion as a result of a corresponding drop in total federal budget expenditures to just \$30 billion.¹² This steady economic decline in the post-Soviet era has left the Russian military, not to exclude its nuclear force, in a state of serious deterioration.

In its 2002 *Annual Report to Congress on the Safety and Security of Russian Nuclear Facilities and Military Forces*, the National Intelligence Council identified that Russia's economic crisis of the 1990s and consequent decline in military spending have "stressed" the country's nuclear security system.¹³ Russia's nuclear warhead security is plagued by two issues associated with a lack of funding—insufficient physical security of nuclear warheads and unreliable personnel.

It is true Russia has been successful in physically securing its nuclear arsenal in the post-Soviet era. To secure their weapons, the Russians employ a multi-layered approach that includes physical, procedural, and technical measures. However, the security system was designed in the Soviet era to protect weapons primarily against a threat from outside the country and may not be sufficient to meet today's challenge of a knowledgeable insider collaborating with a criminal or terrorist group.¹⁴ Even with security upgrades that have occurred since the Russians responded with improved security measures following September 11, 2001, significant upgrades need to be made to Russian nuclear warhead facilities to better meet today's challenges. Some key security upgrade programs currently taking place are: perimeter security upgrades around nuclear storage

¹¹ John R. Staples and Harold Otto, *Russian Defense Spending: Trends and Consequences*, Prepared for the International Security Research and Outreach Programme, International Security Bureau, Department of Foreign Affairs and International Trade, Canada (September 2000), p. 27.

¹² Staples and Otto, *Russian Defense Spending*, p. 27.

¹³ National Intelligence Officer for Strategic and Nuclear Programs, National Intelligence Council, *Annual Report to Congress on the Safety and Security of Russian Nuclear Facilities and Military Forces*, February 2002, <http://www.cia.gov/nic/special_russiannucfac.html#>.

¹⁴ NIC, *Safety and Security of Russian Nuclear Facilities*.

sites, including fences, sensors, and alarms; introduction of computers to automate the warhead inventory management system; transportation security upgrades to improve security during the shipment of warheads, and training and equipment for Emergency Response Teams for nuclear accidents.¹⁵ These types of upgrades are currently dependent on monetary assistance through U.S.-funded threat reduction programs, improving the security situation but making Russia dependent on foreign assistance.

The unreliability of the personnel working directly with the Russian nuclear force is a result of the poor wages and living conditions that they are forced to endure. In 1997, the Russian government was forced to close down a nuclear weapons facility because of a hunger strike at the site over low wages.¹⁶ It was not until 1999 that the Russian Ministry of Defense was able to pay out wages, to the personnel responsible for Russia's most destructive weapons, on a regular basis.¹⁷ These conditions make it tempting for poorly paid military and civilian personnel to seek opportunities to profit from the illicit sales of nuclear weapons materials. A scenario of this kind would represent a serious international security threat.

Also important in the discussion of the degradation of the Russian nuclear weapons force is the state of decay of the Russian early-warning command and control infrastructure. Russia's radars currently do not cover attack corridors from the North Atlantic and the Pacific where U.S. nuclear-armed submarines patrol.¹⁸ Furthermore, Russia is no longer able to maintain a constellation of satellites with sensors for the detection of missile launches that provides full

¹⁵ NIC, *Safety and Security of Russian Nuclear Facilities*.

¹⁶ NIC, *Safety and Security of Russian Nuclear Facilities*.

¹⁷ NIC, *Safety and Security of Russian Nuclear Facilities*.

¹⁸ Federation of American Scientists, Natural Resources Defense Council, Union of Concerned Scientists, *Towards True Security: A US Nuclear Posture for the Next Decade* (Cambridge: UCS Publications, 2001), p. 6.

coverage of the globe.¹⁹ This gives an incentive for Russia to place its nuclear arsenal in a posture to act very quickly, since they are vulnerable to an undetectable U.S. strike.

The lack of money available for Russian military spending on conventional forces has led it to rely more than ever on nuclear weapons in the event of a crisis. This combination of an increasing reliance on nuclear weapons and a need to be capable of a rapid launch due to early-warning vulnerabilities is a significant security concern. It greatly increases the potential for a mistaken launch. In 1995 this scenario in fact occurred when Russia's early warning system indicated a possible U.S. missile attack triggering Russia's emergency nuclear decision process. The early-warning system was not able to distinguish the launch of a Norwegian scientific research rocket from a U.S. nuclear attack. Luckily, eight minutes into the rocket launch, after the alarm had traveled all of the way up the chain of command to President Boris Yeltsin, Russia's warning radars were able to determine that the launch did not threaten Russia, canceling the alarm.²⁰

The judgment here regarding U.S. nuclear force levels is that reductions are beneficial to U.S. security, because they relieve pressure on the Russian military establishment from having to sustain nuclear forces in numbers roughly equal to U.S. levels. Important to keep in mind, however, is that nuclear weapons are also a primary source of national prestige for Russia. A dramatic reduction in strategic nuclear levels by the United States, to a level of 300 warheads for example, would not likely be matched by Russia at this time, potentially drawing scorn from the international community for delaying reductions. Currently, Russia uses its nuclear weapons capability to make up for its conventional military weakness—a tool of compensation that it is unlikely to readily give up.

¹⁹ *Towards True Security*, p. 6.

²⁰ *Towards True Security*, p. 7.

U.S. strategic nuclear force levels must also take care to properly channel Chinese nuclear competition and the threat it poses. Currently, China deploys only approximately 20 single-warhead liquid-fueled missiles with a range capable of reaching the United States.²¹ These missiles are kept in a very benign status with the warheads and fuel stored separately from the missile.²² This, coupled with the fact that the Chinese do not have an early warning system that could result in a false warning, greatly reduces the likelihood of an inadvertent, unauthorized, or mistaken launch. Current Chinese nuclear force modernizations are designed to make their force more survivable from attack with the development of solid-fueled, road-mobile missiles that will be deployed with their warheads.

While U.S. nuclear policy is unlikely to directly affect China's efforts to modernize its nuclear force, an indirect connection can be drawn. Using the logic that China understands its nuclear forces could not survive a U.S. first-strike, these modernizations are then necessarily designed to give China nuclear survivability against attacks from other Asian nuclear powers. U.S. nuclear force levels have the opportunity to influence these modernizations and channel the Chinese threat through strategic arms reductions that demonstrate support for the NPT regime. Conversely, if the United States ignores opportunities for reductions contrary to the spirit of the NPT, it is conceivable that non-nuclear weapons states may view the NPT regime as irrelevant and seek to develop nuclear weapons outside of the treaty regime or, in the case of the de facto nuclear weapons states not officially recognized by the NPT regime, continue to expand their nuclear weapons arsenals. These types of states on the Asian continent, namely India, are the threats which force China to continue to modernize its nuclear forces and will incidentally give China more capability and more power on the international political stage.

²¹ *Towards True Security*, p. 8.

²² *Towards True Security*, p. 8.

Also important to the “Dissuade” goal is how U.S. strategic nuclear force levels affect smaller nuclear powers or those aspiring towards increased nuclear status. Dramatic reductions in U.S. force levels could potentially have the effect of encouraging countries such as China, India, and Pakistan to actively work towards nuclear parity with the United States. With this in mind, the U.S. strategic nuclear force level should attempt to both assure China of the U.S. commitment to reductions, so that China does not continue to modernize, as well as stay numerically out of reach of China, so that China does not attempt to gain nuclear parity with the United States. This is a difficult force level balance to estimate and maintain.

~**Deter.** Four types of warfare that the United States could potentially become engaged in, and thus desires to deter from the outset with its strategic nuclear force, are nuclear war, war in which chemical and biological warfare agents are used, conventional war, and low-intensity conflict to include guerilla warfare and individual acts of terrorism.

History affirmatively answers the question of whether or not a large nuclear force can deter nuclear war with a peer nuclear competitor. When confronting nuclear powers in which the rationality of the country’s leader can be confidently assumed, the principles of deterrence will hold true. In the post-Cold War era, however, the number of nuclear weapons required to create a useful deterrent is much less than the thousands that the United States and Russia still maintain. It is very reasonable to believe that the U.S. point of self-deterrence, or the level of nuclear damage in retaliation that would deter a country from initiating nuclear war, is one nuclear detonation on U.S. territory or U.S. facilities abroad.²³ In other words, the United States has no policy objective today that is so threatened that it would employ nuclear weapons and accept the

²³ Stansfield Turner, *Caging the Nuclear Genie: An American Challenge for Global Security* (Boulder: Westview, 1997), p. 43.

risk of receiving even one nuclear detonation in retaliation.²⁴ To estimate that it only requires the threat of one nuclear detonation to push the United States past its point of self-deterrence but that it would require hundreds or thousands to push other states, even as large as Russia or China, past their point of self-deterrence is illogical.²⁵

When confronted with an irrational nuclear adversary, deterrence will likely become irrelevant and one can only hope that rational actors within the regime will affect restraint.²⁶ Here the size of the U.S. nuclear force has no bearing on the success of the force as a deterrent. If an irrational actor cannot be deterred by 1 or 100 nuclear weapons, a force of 300, 1000, or 1700 strategic weapons will not be a more effective deterrent.

Another challenge that the U.S. military confronts as a possibility in warfare is the military engagement of an enemy prepared to use chemical and biological warfare agents. The United States has traditionally never ruled out the possibility of using nuclear weapons specifically for the purpose of deterring this scenario. Those who favor this practice point to the success of the 1991 Persian Gulf War in which, on the eve of battle, President George H. Bush wrote a letter that was delivered to Iraqi President Saddam Hussein. The letter contained a veiled threat of nuclear retaliation, if Iraqi forces employed chemical or biological weapons. It is difficult to determine if this threat was in fact the deterrent which made the Iraqi leadership choose not to employ chemical and biological weapons, however. Upon delivery of the message, U.S. Secretary of State James Baker contributed a verbal threat to Iraqi Foreign Minister Tariq Aziz in which he pledged that the use of chemical or biological weapons would make the American objective not only the liberation of Kuwait but also the toppling of the Iraqi

²⁴ Turner, *Caging the Nuclear Genie*, p. 44.

²⁵ Turner, *Caging the Nuclear Genie*, p. 49.

²⁶ Turner, *Caging the Nuclear Genie*, p. 50.

regime.²⁷ It is likely this threat also played a factor in the Iraqi decision not to use chemical or biological weapons. Adding to the confusion, as to whether or not this case can be accepted as proof that nuclear weapons are useful in deterring chemical and biological weapons, is the fact that both the letter from Bush and the verbal threat from Baker also included destruction of Kuwait's oilfields as an Iraqi action that would result in Iraq "paying a terrible price" and precipitate an effort to topple the regime. The Iraqi military destroyed Kuwaiti oilfields on a large scale without the United States retaliating with nuclear weapons or toppling the regime. The lesson learned from this situation is ambiguous at best. In either case, the size of the nuclear force, when deciding between the options presented in this analysis that are greater than zero, seem to be of little consequence.

The third military challenge that the United States would like to deter is that of a traditional conventional conflict. Even though it is the U.S. custom to always leave all military options "on the table" when fighting wars, it is difficult to see a U.S. nuclear threat against an enemy that was fighting only with conventional means as credible. The United States could not use a nuclear weapon in a conventional war justifiably and without attracting very intense condemnation, or potentially even intervention with nuclear weapons, from the international community. Because of U.S. conventional military dominance, the United States can only justifiably fight an adversary without nuclear weapons with conventional forces alone. There is no other conventional military force in the world that even approaches the United States in its level of sophistication of both equipment and battlefield techniques nor is any force as well trained to fight and logistically prepared to do so.²⁸ In the case of deterring a conventional

²⁷ *Towards True Security*, p. 15.

²⁸ Turner, *Caging the Nuclear Genie*, p. 49.

threat, nuclear weapons seem to be an unreasonable alternative. The size of the nuclear force, whether 1700, 1000, or 300, is not relevant to this facet of deterrence.

The final threat that the U.S. strategic nuclear force must be prepared to confront with deterrence is that of low-intensity conflict. This category of threat, as previously stated, includes threats from guerilla fighters and terrorism. The character of those involved in this type of conflict is that they are nearly indistinguishable from non-combatant populations and operate using decentralized organizations. Any use of a nuclear weapon against these targets would be considered gross overkill. Here again, the use of nuclear forces for this deterrent mission seems unreasonable making the size of the nuclear force irrelevant.

The only deterrent mission which nuclear forces in general can be said to be unequivocally essential to is that of deterring nuclear war. A nuclear force of any size greater than zero would have some deterrent effect for this purpose. The deterrent value of nuclear weapons against the use of chemical and biological agents in war is more ambiguous, while using nuclear weapons to deter conventional war and guerilla or terrorist tactics seems unreasonable for the United States.

~Defeat. The final security goal of the QDR is to defeat enemies of the United States, if deterrence fails. When judging the strategic force level options in best meeting this goal, the issue of defining what the defeat of an enemy with nuclear weapons would look like must first be addressed. Using the arguments from the preceding section, the only scenario that will be evaluated is that of the defeat of a de facto nuclear state that has initiated nuclear war. In this case, the United States would be justified in responding with nuclear weapons to defeat its enemy. In a discussion of what “defeat” means, the idea of a country’s point of non-recovery is important. The point of non-recovery defines the maximum number of nuclear weapons that a

nation could usefully employ against another nation without going to excess.²⁹ This is to say that the United States could launch every nuclear weapon it has in its inventory in retaliation against an enemy that initiated nuclear war; however, the marginal impact of each additional warhead beyond that number associated with the enemy's point of non-recovery would be very small and essentially unnecessary.

If the U.S. nuclear force were targeted against an enemy's centers of gravity (COGs), the enemy's point of non-recovery could be minimized and probably require a total strike package of approximately 250 warheads, even for the largest potential adversary such as Russia or China. An MIT simulation conducted in 1987 concluded that the U.S. point of non-recovery, if a nuclear attack were targeted against the U.S. liquid fuel distribution network, would be only approximately 240 nuclear detonations.³⁰ This is because of the U.S. high dependence on liquid fuel, the destruction of which would cause many secondary effects that would destroy the U.S. economy and make it unable to recover gross national product to a level of 40% of the pre-attack level even after 6 years.³¹ It is reasonable to suggest that a similar attack against an adversary country's COGs would have similar results. A conservative estimate may require from 250 to 300 warheads for the largest potential adversaries but would certainly be substantially less for smaller countries, which have smaller landmass areas and thus much less dispersed economic networks.

The current U.S. nuclear targeting strategy is one of counter-force targeting. This type of targeting may require the use of slightly more nuclear warheads to push a country beyond its point of non-recovery, because it focuses on striking only military assets; however, because of

²⁹ Turner, *Caging the Nuclear Genie*, p. 37.

³⁰ Anjali M. Sastry, Joseph J. Romm, and Kosta Tsipis, *Nuclear Crash—The U.S. Economy After Small Nuclear Attack* (Cambridge: MIT, 1987), as cited in Turner, *Caging the Nuclear Genie* p. 36, Appendix B.

³¹ Sastry, Romm, and Tsipis, *Nuclear Crash*, as cited in Turner, *Caging the Nuclear Genie*, p. 35.

the incredible destructive force of nuclear weapons, attacks against military targets and targets in direct support of the military would inevitably reek havoc on transportation, communication, and industrial systems. Therefore, the end result would be no different.

Decisions about the strategic force level must also consider predicted effectiveness in meeting unknown challenges of the future. If a force of only 250 weapons is able to succeed in defeating even the largest adversary with nuclear weapons, it is reasonable to believe a force of this size is also capable of defeating any future enemy of the United States. New asymmetric threats will undoubtedly emerge in the future to which a nuclear force of this size will be ineffective in defeating, but this reality will be a result of the unsuitability of nuclear weapons for dealing with the threat and is independent of the nuclear force size.

The Tactical Nuclear Force

Of the approximately 700 tactical or non-strategic nuclear weapons that the U.S. maintains, 500 of these are B61 gravity bombs of three modifications and approximately 200 are Tomahawk land-attack cruise missiles.³² These weapons are intended to be used in battlefield and theater-level operations. The maintenance of a tactical force separate from the strategic force implies that there are certain nuclear missions which require capabilities that the strategic force cannot provide. A careful evaluation of the missions for which a tactical force potentially may be advantageous in achieving the QDR goals is necessary to determine if this is in fact the case. With this, two tactical force level options will be considered: a tactical force that maintains the current tactical to strategic warhead ratio of approximately 1 to 6 and the elimination of the discrete tactical force.

³² Robert S. Norris and Hans M. Kristensen, "NRDC: Nuclear Notebook, U.S. nuclear forces, 2005," *Bulletin of the Atomic Scientists* vol. 61, no. 01 (2005), p. 73-75.

Tactical nuclear weapons were originally devised as a means to stop massive enemy troop movements before they engaged friendly forces on the battlefield. However, the conditions for the effective use of tactical nuclear weapons in this mission role no longer exist. The Cold War scenario included the use of tactical nuclear weapons in the event the Soviet Union conducted a large-scale invasion of Western Europe. Today, neither the political circumstances nor a Russian capability for this exist, as U.S.-Russian relations have improved dramatically since the end of the Cold War and the Russian military has shrunk from 4 million to 1.2 million service members in the past 15 years.³³ All of this makes a massive Russian invasion of Europe highly improbable.

The contemporary tactical nuclear mission, which has attracted considerable attention of late and has garnered support for the maintenance of a tactical nuclear force and the development of new tactical weapons, is the threat of weapons of mass destruction hidden or stored in hardened and deeply buried bunker facilities. Those in favor of tactical nuclear weapons for the role of destroying these hardened and deeply buried targets (HDBTs) suggest that tactical nuclear warheads, with their high explosive yields and much higher fireball temperatures relative to conventional explosives, are needed to destroy chemical and biological agents within facilities protected by earth, rock, and concrete. Proponents of this role for tactical nuclear weapons also argue that collateral damage would be minimized by using one accurate and highly destructive nuclear strike versus a conventional strike that may result in the leaking of the chemical and biological agents to the surrounding area.

Scientific evidence suggests that this role for nuclear weapons is not advisable for four reasons, however. First, even a small, low-yield earth-penetrating nuclear weapon will create

³³ Eugene B. Rumer and Celeste A. Wallander, "Russia: Power in Weakness?" *The Washington Quarterly* vol. 27, no. 01 (2003), p. 61. Center for International and Security Studies.

enormous fallout. The explosion cannot be contained underground resulting in the throwing of tons of radioactive debris into the air that can drift for miles on the wind. The current U.S. bunker buster bomb, the B61-11, has a penetration depth of about 20 feet of frozen soil.³⁴ A one-kiloton nuclear warhead would need to be detonated between 200 and 300 feet underground to contain its radioactive fallout.³⁵ At the current capable depth of 20 feet, a one-kiloton warhead would eject one-million cubic feet of contaminated soil into the atmosphere.³⁶

Secondly, there is no guarantee that a nuclear blast will successfully destroy chemical or biological weapons stored in HDBTs. A nuclear blast is capable of the destruction of such agents if the explosion is sufficiently close to the agents.³⁷ However, due to the difficulty of obtaining accurate intelligence on the precise location of such deeply buried, hardened facilities, the only way to increase the probability of destroying such agents is to increase the yield of the weapon used, thus also increasing the corresponding fallout.³⁸

Related to the last difficulty of using tactical nuclear weapons against HDBTs is the reality that nuclear weapons could cause the spread of chemical and biological agents to the surrounding area. This could occur either as a result of undestroyed agents being spread into the resulting crater and the air from the explosion or from an inaccurate strike near the facilities. The latter scenario could cause the damaging of the storage facility and containers that could

³⁴ D. Wright and L. Gronlund, "Earth-penetrating Weapons," *Union of Concerned Scientists*, cited in "The Troubling Science of Bunker-Busting Nuclear Weapons," *Union of Concerned Scientists*, April 2003, <http://www.ucsusa.org/global_security/nuclear_weapons/page.cfm?pageID=777>.

³⁵ Wright and Gronlund, "Earth-penetrating Weapons" <http://www.ucsusa.org/global_security/nuclear_weapons/page.cfm?pageID=777>.

³⁶ R. Nelson, "Low-Yield Earth-Penetrating Weapons" *Science & Global Security* at <http://www.princeton.edu/~globsec/publications/pdf/10_1Nelson.pdf>

and S. Drell, R. Jeanloz, and B. Peurifoy, "A Strategic Choice: New Bunker Busters Versus Nonproliferation." *Arms Control Today* at <http://www.armscontrol.org/act/2003_03/drelletal_mar03.asp>; Cited in "The Troubling Science of Bunker-Busting Nuclear Weapons," *Union of Concerned Scientists*. April 2003.

³⁷ "The Troubling Science of Bunker-Busting Nuclear Weapons," *Union of Concerned Scientists*. April 2003.

³⁸ M. May and Z. Haldeman, "Effectiveness of Nuclear Weapons against Buried Biological Agents Targets" *Center for Security and International Cooperation*, <<http://cisac.stanford.edu/research/inprogress/mayhaldeman.html>>, Cited in "The Troubling Science of Bunker-Busting Nuclear Weapons," *Union of Concerned Scientists*. April 2003.

leak agents to the surface through fissures created by the nuclear explosion. A recent study predicts that anthrax spread in this fashion would cause even more casualties than the resulting nuclear fallout, which would also be severe.³⁹

Finally in the case against tactical nuclear weapons for the destruction of HDBTs, there are currently conventional weapons in the U.S. arsenal that are capable of neutralizing WMD threats protected underground. Conventional weapons can be used to cut off a bunker's communications, power, and air, effectively keeping the enemy weapons underground and unusable until US forces secure them.⁴⁰ This method is also limited by the accuracy and precision of intelligence regarding the location of these facilities, however.

A final mission, for which some argue a tactical nuclear arsenal is required, is flexible response to future threats. This assumes that there is an advantage in maintaining a discrete tactical force and that the strategic arsenal will not be capable of providing this flexible threat response should the need arise. Tactical weapons are sometimes cited as having low yields that make them more suitable to providing flexibility against future threats.

This also is not the case, however. The remaining U.S. tactical weapons provide no unique capabilities relative to the strategic force, and the thermonuclear weapons of the strategic force are capable of producing low yields similar to the yields produced by warhead designs within the tactical force and considered to be uniquely useful.⁴¹ U.S. thermonuclear weapons give the option for deriving three different yields from a single warhead using so-called “dial-a-yield” weapons. Each two-stage thermonuclear weapon consists of a boosted primary fission

³⁹ May and Haldeman, "Effectiveness of Nuclear Weapons against Buried Biological Agents Targets."

⁴⁰ M. Levi "Fire in the Hole: Nuclear and Non-nuclear Options for Counterproliferation" *Carnegie Endowment for International Peace* <<http://www.ceip.org/files/Publications/wp31.asp>>, Cited in “The Troubling Science of Bunker-Busting Nuclear Weapons.”

⁴¹ Bruce G. Blair, Jonathan Dean, Steve Fetter, James Goodby, et. al., *The Nuclear Turning Point: A Blueprint for Deep Cuts and De-Alerting of Nuclear Weapons* (Washington: Brookings Press, 1999), p. 161.

reaction and a secondary fusion reaction. A weapon of selectable yield could be derived from this type of weapon using optional features that would sever the secondary from the primary or prevent the boost gas from entering the pit containing the primary.⁴² The result would give the choice of three explosive yields—the full yield of the two stage weapon, the yield of the boosted primary, or the yield of the unboosted primary.⁴³ The option using only the unboosted primary would result in a yield on the order of a tactical nuclear weapon, maintaining a flexibility in yield that some policymakers may feel is necessary to support the QDR goal of defeating future enemies.

This evidence convincingly reveals the inadvisability of maintaining tactical nuclear weapons on technical grounds, which present the inability of tactical weapons to provide any additional capabilities to the U.S. nuclear force in support of the QDR goal to defeat adversaries when deterrence fails. The overall judgment regarding tactical nuclear weapons is even clearer, however, with respect to a tactical force's effect on achieving the QDR goal of dissuading nuclear competition. The maintenance of a tactical force would incite other countries to seek nuclear weapons as the answer to their security needs, given that the United States, even with its unmatched conventional military power, continues to find a utility in tactical nuclear weapons.

The Reserve Nuclear Force

The United States currently retains almost 5,000 nuclear warheads that are neither operational tactical or strategic warheads. These roughly 5,000 warheads make up the U.S. reserve nuclear force. The reserve force consists of two components: the operational stockpile and the inactive stockpile. The purpose of the operational reserve stockpile is to provide both

⁴² Garwin and Charpak, *Megawatts and Megatons*, p. 65.

⁴³ Garwin and Charpak, *Megawatts and Megatons*, p. 65.

deployed reserve spares for routine maintenance and a hedge stockpile. The hedge stockpile includes warheads that could be used to increase Minuteman and Trident warhead loadings.⁴⁴ The inactive stockpile contains strategic warheads that are placed in storage with their tritium removed and would only need to be re-supplied with tritium to return them to service. The principal justification for this reserve is to provide replacement warheads in case a warhead type were to develop reliability concerns.⁴⁵

Two options will be considered when determining the size of the reserve force that best supports the achievement of the QDR strategic goals. The first option is a reserve force that maintains the current reserve to strategic warhead ratio of approximately 1 to 1. The second option would be a reduction of the number of warheads held in the reserve force to a level that represents 10% of the operational strategic and tactical forces.

In evaluating how these two reserve force levels individually effect U.S. security with respect to the QDR goals, it is necessary to ask the questions “How many reserve warheads are necessary to ensure the reliability of the strategic and tactical forces?” and “Is there any value added to having more than the minimum necessary?” The answer to the first question requires an assessment as to whether or not ensuring the reliability of the operational forces is merely a numbers game, in which each operational strategic and tactical warhead must be guaranteed by one of the same in reserve. This is not the case. The best way to address concerns about the possible failure of one type of warhead is to deploy a mixture of warhead types so that the failure

⁴⁴ Bruce G. Blair, Jonathan Dean, Steve Fetter, James Goodby, et. al., *The Nuclear Turning Point: A Blueprint for Deep Cuts and De-Alerting of Nuclear Weapons* (Washington: Brookings Press, 1999), p. 168.

⁴⁵ Robert S. Norris and William M. Arkin, “NRDC Nuclear Notebook: U.S. Nuclear Stockpile, July 1997,” *Bulletin of the Atomic Scientists* vol. 53 (July-August 1997), p. 62-63 as footnoted in *The Nuclear Turning Point: A Blueprint for Deep Cuts and De-Alerting of Nuclear Weapons* (1999), p. 168.

of one type does not disable the entire force.⁴⁶ This is a practice that the United States has always used.

Using this methodology requires that much smaller portions of the force would need to be replaced in the event that one type of warhead becomes disabled. This could be done either by replacing the disabled warhead with a remanufactured version of the same warhead or with a version from the reserve stockpile that has not had failure concerns. Therefore, a stockpile of only about one-tenth the size of the deployed strategic and tactical forces would be necessary.⁴⁷ A reserve of this size would be sufficient for providing spares to substitute for warheads that are withdrawn for maintenance or remanufacture, or for replacing warheads or warhead components that are subjected to destructive testing during normal stockpile maintenance.⁴⁸

The maintenance of a reserve force at a level capable of replacing every operational warhead is unnecessary and would needlessly inflate stockpiles. This result would have direct and negative effects on the QDR goal of dissuading military competitors. It would force the Russian military to maintain nuclear forces beyond its means despite the dangers associated with this as previously described. It would also do nothing to convince aspiring nuclear powers that the United States was serious about adhering to its obligations under Article VI of the NPT and interested in diminishing its reliance on nuclear weapons to ensure its security.

The reserve force's relevance to the QDR goals of assuring, deterring, and defeating is more indirect. The operational strategic and tactical forces directly impact these goals, while the reserve force is significant in that it provides an insurance policy to help guarantee their accomplishment of the QDR goals. With this, either force level option for the reserve force

⁴⁶ Blair, Dean, Fetter, and Goodby, *The Nuclear Turning Point*, p. 169.

⁴⁷ Blair, Dean, Fetter, and Goodby, *The Nuclear Turning Point*, p. 168.

⁴⁸ Blair, Dean, Fetter, and Goodby, *The Nuclear Turning Point*, p. 169.

would be sufficient to assure U.S. friends and allies, deter coercion and aggression, and defeat adversaries of the United States.

Recommendation

In order to mitigate the threats of accidental or inadvertent nuclear war, nuclear proliferation, nuclear theft, or illegal use, U.S. force level considerations that appreciate a broad security perspective are critical. The goals of the QDR are useful in establishing this perspective while focusing all considerations on the single mission of securing the United States and U.S. interests. The force level that would best maximize U.S. security in today's geopolitical context, with respect to nuclear weapons, is a nuclear force of approximately 1,100 warheads. The United States should reduce to this force level immediately and unilaterally.

The force should consist of 1,000 operational strategic warheads and approximately 100 reserve strategic warheads. During reductions to this force level, the discrete tactical nuclear force should be eliminated. This is because a discrete tactical force provides no advantages over the current strategic force that could be applied to the more effective achievement of the QDR goals. In carrying out this elimination of the tactical force, the intentions and justifications for doing so should be carefully communicated to NATO allies, as many European leaders continue to judge the presence of U.S. tactical warheads in Europe as a stabilizing element.⁴⁹ In addition to the explanation regarding the removal of deployed tactical warheads from Europe, U.S. leaders should make it clear that the United States will continue to provide extended deterrence to U.S. friends and allies in Europe with its strategic force. The opportunity to coordinate the removal of U.S. weapons from Europe with a corresponding removal of Russian tactical

⁴⁹ Blair, Dean, Fetter, and Goodby, *The Nuclear Turning Point*, p. 161.

warheads from European Russia should be explored, but it should not be allowed to become a barrier to the immediate implementation of the recommended U.S. nuclear force level.

The strategic force of 1,000 warheads would be capable of achieving all of the QDR goals in today's context. It would properly assure friends and allies of the United States that they would not be subjected to coercion or aggression by providing a credible deterrent against aggressive countries, even countries which possess weapons of mass destruction. A reduction from the current force level to a level of 1,000 would reveal a U.S. commitment to Article VI of the Nuclear Non-Proliferation Treaty, without reducing to such dramatically low levels as to alarm our friends and allies that we may become unable to fulfill our commitments to them.

A strategic force of 1,000 warheads would also capably achieve the QDR goal to dissuade military competitors of the United States. A reduction to 1,000 warheads would appropriately relieve the pressure on the Russian military establishment, which it currently endures because it is forced to maintain a nuclear arsenal beyond its current economic means. This force level would not compel Russia to reduce its nuclear arsenal to a point that would strip Russia of its primary emblem of national prestige, however. In addition, this reduction would also demonstrate to China the U.S. commitment to nuclear reductions. This would help channel China as a military competitor in a direction favorable to the United States. The reassurance that a U.S. reduction would create may help dissuade China from continuing to modernize its nuclear force to enhance its survivability. Finally, a reduction to 1,000 warheads would achieve the desired balance between showing a commitment to the NPT while not encouraging smaller nuclear powers to establish nuclear parity with the United States.

The analysis of the types of conflicts that the U.S. nuclear force could potentially deter revealed that the capability to deter conflicts is related less to the number of nuclear weapons

which the United States possesses and more to the nature of the conflict. U.S. conventional military dominance makes it politically and morally unreasonable to use nuclear weapons to deter conventional war. Similarly, the U.S. nuclear arsenal is incapable of deterring low-intensity conflicts, because adversaries using guerilla and terrorist campaigns do not represent suitable targets for a nuclear strike. Because the value of nuclear weapons in deterring chemical and biological weapons use is difficult to determine, the only level of conflict that this nuclear force could be appropriately used to deter is nuclear war. A force of 1,000 operational nuclear warheads is a credible deterrent of nuclear war, because it provides more than enough destructive power to defeat even the largest U.S. adversary three times over. The force of 1,000 strategic warheads could achieve this type of defeat using the current counter-force targeting strategy—advantageously avoiding the need to overcome the resistance that would likely be mounted against a move towards a counter-value targeting strategy.

In support of this strategic force, the reserve force of 100 warheads would be sufficient to provide for the reliability, and indirectly the credibility, of the U.S. nuclear arsenal. An inventory of spare parts should be maintained in addition to the reserve stockpile, but this inventory should consist of components removed from dismantled nuclear warheads and not reserve fissile material.

An additional consideration that must accompany a force reduction of this magnitude concerns the force structure of this reduced nuclear arsenal. Considerations should be made to ensure the dispersal of the smaller strategic force amongst the nation's nuclear platforms—ICBMs, submarines, and bombers—adequately provides for its survivability. This new force structure would likely depend heavily upon submarines as the platform of choice because of their nearly perfect survivability.

The final result of this force level reduction will, in fact, be improved U.S. security. A nuclear force of approximately 1,100 warheads appropriately provides for the security of the United States and promotes a security environment, with respect to nuclear weapons, that accommodates the security concerns of other countries around the world. This will help foster a cycle of policy decisions that support a de-escalation of nuclear competition and promotion of the goals of the NPT. While this nuclear force reduction should be conducted unilaterally, subsequent reductions will require multilateral coordination. Policymakers should follow this reduction of U.S. nuclear force levels with multilateral negotiations, which incorporate all of the recognized nuclear powers, in an effort to orchestrate even deeper reductions in global nuclear inventories that will improve both U.S. and international security.

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Appendix: Strategic Force Decision Matrices

QDR Goal: Assure

	1700	1000	300	0
Prevent Coercion	Yes	Yes	Yes	Provides no credible deterrent
Maintain Favorable Balances of Military Power	Yes	Yes	Gives U.S. a strategic force less than that of China; would likely raise questions as to whether U.S. could provide extended deterrence to all of its allies	Provides no credible deterrent
Support U.S. Commitment to NPT, Article VI	Yes	Yes	Yes	Yes

Appendix: Strategic Force Decision Matrices continued

QDR Goal: Dissuade

	1700	1000	300	0
Influence Military Competition	Negative Influence; would relieve pressure on Russia in its maintenance of nuclear parity with U.S., this force level would not do enough to dissuade China from continuing to modernize its nuclear forces	Positive Influence; would relieve pressure on Russia in maintenance of nuclear parity	Negative Influence; while relieving pressure on Russia, this force level would make nuclear parity with U.S. seem attainable	Negative Influence; could result in proliferation to counter U.S. conventional military dominance
Channel Threats	Positively channel threats derived from both Russia and China	Positively channel threats derived from both Russia and China	Negatively channel threats by giving nuclear competitors an opportunity to gain or increase relative nuclear dominance over U.S.	Negatively channel threats by removing U.S. influence in global nuclear policy matters
Complicate Military Planning	Yes	Yes	Yes	No
Support NPT as a whole	Yes	Yes	No, would likely promote nuclear proliferation	No, would likely promote nuclear proliferation

Appendix: Strategic Force Decision Matrices conintued

QDR Goal: Deter

	1700	1000	300	0
Conventional War	Unusable deterrent capability	Unusable deterrent capability	Unusable deterrent capability	No deterrent capability
Use of Chem. & Bio Weapons	Unknown deterrent value	Unknown deterrent value	Unknown deterrent value	No deterrent capability
Low Intensity Conflict	No deterrent value	No deterrent value	No deterrent value	No deterrent capability
Nuclear War	Credible deterrent	Credible deterrent	Credible deterrent	No deterrent capability

Appendix: Strategic Force Decision Matrices continued

QDR Goal: Defeat

	1700	1000	300	0
Nuclear War with largest potential adversary	Capable to defeat	Capable to defeat	Capable to defeat	Incapable

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