

NAVAL WAR COLLEGE
Newport, R.I.

TO WHAT EXTENT DO U.S. NUCLEAR FORCES PROVIDE USEFUL OPTIONS
AGAINST ROGUE STATES WITH WEAPONS OF MASS DESTRUCTION?

By

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A paper submitted to the Faculty of the Naval War College in partial satisfaction of the requirements of the Department of Joint Military Operations.

The contents of this paper reflect my own personal views and are not necessarily endorsed by the Naval War College or Department of the Navy.

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20000623 039

8 February 2000

DTIC QUALITY INSPECTED 4

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REPORT DOCUMENTATION PAGE

1. Report Security Classification: UNCLASSIFIED			
2. Security Classification Authority:			
3. Declassification/Downgrading Schedule:			
4. Distribution/Availability of Report: DISTRIBUTION STATEMENT A: APPROVED FOR PUBLIC RELEASE; DISTRIBUTION IS UNLIMITED.			
5. Name of Performing Organization: JOINT MILITARY OPERATIONS DEPARTMENT			
6. Office Symbol: C		7. Address: NAVAL WAR COLLEGE 686 CUSHING ROAD NEWPORT, RI 02841-1207	
8. Title (Include Security Classification): TO WHAT EXTENT DO U.S. NUCLEAR FORCES PROVIDE USEFUL OPTIONS' AGAINST ROGUE STATES WITH WEAPONS OF MASS DESTRUCTION? (UNCLASSIFIED)			
9. Personal Authors: Fred B. Stoss III, Major, USAF			
10. Type of Report: FINAL		11. Date of Report: 8 February 2000	
12. Page Count: 24			
13. Supplementary Notation: A paper submitted to the Faculty of the NWC in partial satisfaction of the requirements of the JMO Department. The contents of this paper reflect my own personal views and are not necessarily endorsed by the NWC or the Department of the Navy.			
14. Ten key words that relate to your paper: Nuclear Weapons, Weapons of Mass Destruction, Nuclear Deterrence, U.S. WMD Deterrence Policy, Nuclear Weapon Employment, Joint Nuclear Doctrine, Joint Theater Nuclear Doctrine, Rogue States, Iraq, and Nuclear Targeting.			
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16. Distribution / Availability of Abstract:	Unclassified X	Same As Rpt	DTIC Users
17. Abstract Security Classification: UNCLASSIFIED			
18. Name of Responsible Individual: CHAIRMAN, JOINT MILITARY OPERATIONS DEPARTMENT			
19. Telephone: 841-6461		20. Office Symbol: C	

Abstract of

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With the proliferation of weapons of mass destruction (WMD) in Third World countries, the likelihood that the United States may get involved in regional wars against rogue states brandishing WMD increases as each year passes. This threat is apparent when considering examples of rogue states with WMD capabilities, such as Iraq, Iran, North Korea, and Libya.

The role of nuclear forces in the U.S. WMD policy is two-fold; deterrence, and if deterrence fails, employment. The WMD policy of the United States uses intentional ambiguity--a technique that has not always been successful when dealing with rogue leaders. As for employment, analysis indicates that in some situations, U.S. nuclear weapons have significant advantages over non-nuclear options.

Bottom line, current WMD deterrence policy requires more clarity to deter rogue leaders from using WMD. Nuclear forces of the United States are an asset for WMD deterrence, and if deterrence fails, for employment. But, nuclear options have significant distracters. Improved conventional capabilities can eliminate the need for nuclear options with one exception--an in kind response if it is desired by the NCA.

With many rogue states embracing weapons of mass destruction (WMD), deterring and fighting these adversaries is a daunting task for the National Command Authority (NCA) and geographic combatant commanders.¹ The role of nuclear forces in the U.S. WMD policy is two-fold; deterrence, and if deterrence fails, employment. This poses the question: to what extent do U.S. nuclear forces provide useful options against rogue states with WMD?²

With the end of the Cold War, the risk of a major nuclear exchange between the United States and Russia is greatly diminished. But the probability of theater war is not at all lessened. To the contrary, with the demise of the Soviet Union and the end of the bi-polar structure of the Cold War, the world has become a more volatile environment.³

Indeed, with the proliferation of WMD in Third World countries, the likelihood that the United States may get involved in regional wars against rogue states brandishing WMD increases as each year passes. This threat is apparent when considering examples of rogue states with WMD capabilities, such as Iraq, Iran, North Korea, and Libya. It is likely that the United States will be at odds with these rogue states; the United States already faced this possibility in the 1991 Persian Gulf War.

With the United States as the world's sole super-power, its military power may actually increase the probability of WMD use against U.S. military forces. Because of the superiority of U.S. conventional forces, rogue states in conflict with the United States may attempt to use their WMD capability to asymmetrically weaken U.S. strengths.⁴ To be certain, it is in the United States' best interest to find viable methods to deter the use of WMD, and if deterrence fails, to have options to effectively deal with the WMD threat.

This paper describes the concept of deterrence as it relates to the United States and rogue states with WMD capabilities. Then, it details the issues associated with employing

nuclear weapons against rogue states. Findings and counter-arguments are presented, followed by the author's recommendations.

First, it is important to get an understanding of the concept of deterrence. In short, deterrence is the threat of harm by a first party to a second party, if the second party does not conform to the standards of behavior suggested by the first party.⁵ The deterrence concept rests on two foundations: *capability* and *will*.⁶ Both elements are necessary for deterrence to be credible. The nuclear deterrence policy of the United States is no exception to these basic principles. For the first element, *capability*, the United States has the technical means to employ nuclear weapons.⁷ The *will* aspect of deterrence is more difficult to substantiate. While the United States is the only country that has used nuclear weapons in anger, it has refrained from using them in war since 1945.⁸ Therefore, is the U.S. deterrence policy still effective?

There is a continuing debate as to the effectiveness of nuclear deterrence. A vivid example is the nuclear standoff between the United States and the Soviet Union during the Cold War. Even in the post-Cold War era, the degree of effectiveness of nuclear deterrence during the Cold War is by no means settled. One fact is clear--the United States and Soviet Union did not employ nuclear weapons against the other. But the reasons why the two superpowers did not engage in war will perhaps always be under debate.⁹ While scholars and politicians cannot agree on the key reasons explaining the restraint of the United States and Soviet Union, most agree that nuclear deterrence was at least a factor.

Another example is the 1991 Persian Gulf War. In this case, Iraq had a significant WMD capability along with a history of using it against adversaries.¹⁰ Yet, Iraq did not employ WMD against the allied coalition despite facing overwhelming conventional forces--

a situation that seemed conducive to WMD use to asymmetrically weaken the strong conventional forces of the coalition. So why did Hussein decide not to employ WMD in the Gulf War?

Evidence indicates that a firm deterrence policy helped deter Saddam Hussein. In the months leading up to Desert Storm, key U.S. officials made several threatening statements to Iraq.¹¹ The United States made clear that it had the will to retaliate if Iraq employed WMD. Although the statements did not directly reveal to Hussein that the United States would respond with nuclear weapons if Iraq used WMD against coalition forces, they clearly implied that such a response was a possibility. Recently declassified documents by the Central Intelligence Agency (CIA) say that fear of U.S. nuclear retaliation was a key reason why Saddam Hussein did not employ WMD.¹² While the measure of effectiveness is debatable, as with the previous example of the United States and Soviet Union, the firm U.S. deterrence policy clearly influenced Hussein's decision not to use WMD.

But since 1991, the WMD deterrence policy of the United States has become more vague. This is apparent with the President's National Security Strategy (NSS) and the Chairman of the Joint Chiefs of Staff's National Military Strategy (NMS). In short, both documents state that the conventional and nuclear forces of the United States serve to deter aggression and coercion.¹³ The NSS goes on to state that if deterrence is unsuccessful, the United States reserves the right to use "*all means necessary*" to protect the United States and its allies.¹⁴ While this suggests that the United States may use any course of action, including possibly a nuclear response, it certainly is not as threatening as was the statements made by President Bush preceding Desert Storm.

The vagueness of WMD deterrence policy of the United States is no accident-- intentional ambiguity is a familiar practice of the United States. But it has not always been successful when dealing with rogue leaders. Dating back to 1950, the U.S. was vague on its commitment to the defense of South Korea in the hopes of containing North Korean aggression with minimal cost of U.S. overseas presence.¹⁵ Similarly, the United States did not clearly state its resolve to maintain Kuwait's security in the days leading up to Saddam Hussein's invasion of Kuwait in August 1990.¹⁶ Obviously, in both of these cases intentional ambiguity did not succeed. This does not imply that intentional ambiguity always fails, rather, that it does not always work when applied to leaders of rogue states.

The deterrence policy of the United States is just half of the puzzle for dealing with WMD-capable rogue states. The other half involves the courses of action in the event deterrence fails and WMD are used against the United States, its forces, or its allies. Employment options are the heart of the *capability* and *will* aspects of deterrence. Without realistic options, deterrence is a hollow threat.

If deterrence fails, there are many options for the NCA and geographic combatant commanders to consider. Since the WMD deterrence policy of the United States is ambiguous, the NCA has the latitude to employ almost any imaginable option or group of options; in fact, this is the key advantage of the vague U.S. WMD deterrence policy. Possibilities range from unconventional attacks by Special Operations Forces to overwhelming conventional force. With the vagueness of National policy, it is by no means certain that the U.S. would respond with nuclear attacks on the aggressor. But for the same reason, nuclear options cannot be ruled out.

Although geographic combatant commanders had nuclear options to consider since the invention of nuclear weapons, albeit with Presidential approval, there is little actual experience in using nuclear weapons in war. To date, only two of these weapons have been used in anger. The lack of experience in using nuclear weapons lends commanders, and for that matter, the NCA, few tried-and-true principles for their application. *Doctrine for Joint Nuclear Operations* (Joint Pub 3-12) and *Doctrine for Joint Theater Nuclear Operations* (Joint Pub 3-12.1) provides geographic combatant commanders guidance for planning and employing nuclear weapons and directs them to select targets, and develop supporting plans for nuclear weapon employment.¹⁷ One of the first tasks is to select targets for potential nuclear options.

Essentially, there are two schools of thought on targeting; counter-force and counter-value. The former focuses on directly attacking an enemy's military forces and the latter concentrates on the enemy's war supporting infrastructure and economy. For theater-level nuclear options, joint doctrine suggests examples that follow the counter-force philosophy.¹⁸ It is interesting that Joint Pub 3-12.1 only addresses counter-force targets as likely candidates for nuclear strikes. In doing so, the writers of joint doctrine seemingly took a limited perspective of employing nuclear weapons in a theater. But in order to understand the rationale behind counter-force and counter-value targeting, two concepts must be clarified: centers of gravity and the levels of war.

There are several definitions for the term "centers of gravity," but Dr. Milan Vego sums it up best saying that a center of gravity "is that source of strength--physical or moral, or a source of leverage--whose serious degradation, dislocation, neutralization, or destruction will have the most decisive impact on the enemy's or one's own ability to accomplish a given

military objective.”¹⁹ To further complicate the issue, different centers of gravity normally exist at each of the three levels of war.

Briefly, there are three levels of war: tactical, operational, and strategic. The tactical level of war is where battles are fought to accomplish military objectives. The operational level is where major operations and campaigns are planned to accomplish strategic objectives. Finally, the strategic level of war is where national-level decisions are made.²⁰

By combining the concept of centers of gravity with the three levels of war, a notional target list can be developed. For example, a center of gravity at the tactical level could be an individual enemy combat unit; at the operational level, the enemy’s army; and at the strategic level, the will of the decision-makers, or the will of the people that in-turn, influence the decision-makers. At the tactical and operational levels, the centers of gravity are usually physical in nature, thus tangible; while at the strategic level, the composition is normally non-physical, thus intangible.²¹

It would seem that the best method of targeting nuclear weapons is to strike at the strategic-level centers of gravity to quickly and decisively end the conflict. Indeed, the only wartime use of nuclear weapons vindicates this theory since the purpose of dropping nuclear devices on Hiroshima and Nagasaki was to break the will of the Japanese.²² The result of the attacks proved to be decisive at the strategic level.²³ But, strategic centers of gravity are difficult to influence by counter-value targeting. Case in point, in World War II, morale of the British and German peoples actually stiffened as a result of strategic bombing.²⁴ Counter-value targeting can pay huge dividends, as was the case with Japan in 1945, but at the same time such targeting is a risky endeavor because there is no certainty that it will be successful, and in fact, it can be counterproductive.

On the other hand, centers of gravity at the operational-level are usually physical and are therefore easier to influence; for example, the enemy's armed forces or an element thereof. When objectives are limited, a counter-force strategy can provide more immediate results at the operational level of war.²⁵ Also, perhaps a force-on-force targeting philosophy makes nuclear options more palatable.

Nuclear doctrine is brief, as is the nature of joint doctrine. To explain in more detail the strategic and operational-level issues facing the NCA and geographic combatant commanders, the author will elaborate on several principles in joint doctrine. This will be accomplished by comparing a notional target set against the nuclear suitability considerations from theater nuclear doctrine.²⁶ Doing so will show the suitability or unsuitability of nuclear options for a conflict against a rogue state. Since theater nuclear doctrines places emphasis on counter-force targeting, the author will use a rogue state's WMD capabilities as the notional target set.²⁷

There are several elements to a rogue state's WMD capabilities. The most critical aspect of a rogue state's WMD capability are the weapons themselves and associated delivery systems, such as ballistic missiles and aircraft capable of carrying WMD munitions. These delivery systems are usually located on or near the earth's surface and are usually located in hardened shelters.²⁸ Furthermore, for a rogue state to develop significant stocks of WMD, they require an infrastructure to produce the weapons. It is possible, and perhaps likely, that the production and storage areas of a rogue state are located in deeply buried facilities as an additional measure of protection from enemy attack.

The first suitability principle to be discussed is the *relative effectiveness* of nuclear weapons over non-nuclear munitions. The theory behind this aspect of nuclear suitability, is

that if conventional weapons can adequately accomplish the task, a nuclear weapon option would not be logical. This is because the use of nuclear weapons will have undesirable implications such as international backlash, so the employment of these weapons should have a significant advantage over conventional ones.²⁹

Intelligence targeteers can determine the effectiveness for nuclear and non-nuclear weapons using the damage expectancy (DE) model.³⁰ By comparing the capabilities of the weapon and the relative hardness of the target, a numerical value can represent the effectiveness of each weapon, be it a non-nuclear or nuclear weapon. Obviously, nuclear weapons are thousands to millions times more powerful than the largest conventional munitions.³¹ But pure explosive power is not the key to destroying a target. What really matters is where the detonation occurs and how much blast effect, or yield, is focused on the target; accuracy is more important than yield.

For surface targets (i.e., WMD delivery systems), it is questionable whether nuclear weapons have a significant degree of relative effectiveness over conventional munitions, especially when considering the lethality of precision guided munitions (PGMs). Because of the pinpoint accuracy of PGMs, the relative lower yield of conventional weapons can effectively destroy most targets because the PGM's explosive energy is focused on a small area. Also, by using several weapons on each target, damage can be compounded to further increase damage expectancy.

But, nuclear weapons may have *relative effectiveness* over conventional weapons in one aspect--destruction of deep underground targets. For targets such as hardened deep-underground WMD production and storage installations, for the time being, only nuclear weapons are capable of destroying them with a high degree of success.³²

In the future, perhaps conventional capabilities can mitigate the advantage of nuclear weapons in destroying underground facilities. One possibility is to use ballistic missiles armed with conventional warheads. A recent test conducted by the U.S. Air Force proved the ability of a conventional ICBM warhead to penetrate 44 feet of granite.³³ Another possible solution is a U.S. Navy proposal to mate conventional deep-penetrating weapons onto Tomahawk cruise missiles.³⁴

Limited capabilities of destroying underground targets with conventional weapons already exist. Reportedly in the recent air war against Serbian forces, the U.S. Air Force employed specialized conventional bombs against buried command and control centers.³⁵ But for the near-term, nuclear weapons have significantly more penetrating capability.

Closely linked to relative effectiveness of nuclear options, is the joint doctrine suitability principle of *planning*. The authors of joint doctrine recommend that planners consider the level of effort required for destruction of targets using conventional vice nuclear weapons.³⁶

The level of effort between nuclear and non-nuclear options is significantly different for one scenario. Take for example a situation where U.S. air power is poised to destroy a rogue state's WMD delivery vehicles. But because the enemy has a modern and dense air defense network, aircraft and cruise missiles have a low probability of reaching their target. A derivative of this situation is the incapacitation of U.S. air power by enemy WMD attacks on allied airfields.³⁷ Bottom line, for one reason or another, U.S. air power cannot deliver bombs on target. Although this seems to be an unlikely scenario because of U.S. air superiority and the military's ability to operate in WMD environments; nevertheless, it is a possibility.

In such a case, the United States has an alternate means of delivery--ballistic missiles. Ballistic missiles can easily penetrate strong air defenses and are immune to regional WMD attacks; ICBMs and SLBMs reenter the atmosphere too quickly for interception. An anti-ballistic defense system could provide some protection against U.S. ballistic missiles, but that technology is well beyond a rogue state's means. But the downsides of ICBMs and SLBMs are considerable. First, ICBM warheads, and perhaps SLBMs warheads depending on their operating area, will likely over-fly non-belligerent countries while transiting to the target area, probably creating unwanted international reactions.³⁸ For example, for ICBMs to strike Iraq, the warheads will travel over Russia. This could cause great concern for the Russians. Second, ICBMs and SLBMs are only armed with nuclear warheads.³⁹ So if a target can be easily destroyed with conventional weapons, using nuclear weapons merely because of their ease of penetrating enemy air defenses is overkill.

This brings to the fore, the suitability principle of *nuclear collateral damage*. Collateral damage certainly is not a unique aspect of nuclear weapons; even relatively low yield conventional munitions can cause unwanted collateral damage. But nuclear weapons cause almost unimaginable damage to the surrounding area. Beyond the considerable blast wave of nuclear weapons, there are additional effects unique to nuclear weapons, such as thermal radiation and nuclear radiation, the latter more commonly referred to as "fallout."⁴⁰

Using various tactics, planners can minimize collateral damage and nuclear fallout.⁴¹ An example is raising the height of burst to an altitude above the point where a significant amount of debris is pulled into the nuclear fireball and contaminated, thus, minimizing fallout.⁴² But with a deep underground facility, the weapon will likely be fused for a surface detonation and would probably require maximum yield.⁴³ The rationale is that if a nuclear

warhead is the weapon of choice because of the limitations of conventional explosive yields, (i.e., *relative effectiveness*), then to obtain the required explosive force on the target the nuclear device will need to be detonated on the surface. This causes the most collateral damage, since all three effects of nuclear detonations apply: blast overpressure, thermal radiation, and nuclear radiation.

The joint doctrine suitability principle of *execution planning* is linked with nuclear collateral damage. Nuclear detonations can adversely shape the battlefield. The spread of radiation and creation of obstacles could cause significant problems for friendly forces in a ground advance. Additionally, factors such as weather are variable and can unexpectedly impact friendly forces or non-belligerent countries by the spread of nuclear fallout.⁴⁴

It is obviously important to think about the suitability principle of *enemy response* after a nuclear strike by the United States; another joint doctrine consideration.⁴⁵ Essentially, there are three alternatives for the enemy after such a strike. Ideally, the adversary would submit, as was the case with Japan in August 1945. The second enemy course of action could be to continue fighting via non-WMD means. The third possibility is for the enemy to respond in kind. Since in this analysis, the rogue state possess WMD, a counter-strike using WMD is a logical enemy response. The author's of joint doctrine state the likely targets for an enemy's WMD attack include: allied airfields, naval facilities, ground forces, and civilian population centers.⁴⁶

The third enemy course of action, a WMD counter-strike, points out the importance of destroying enemy WMD capabilities as soon as possible in a conflict. The problem is the lack of certainty in destroying all of the rogue state's weapons. During the 1991 Persian Gulf War, only a fraction of Iraq's WMD capabilities were destroyed in the coalition's air war.

Furthermore, Iraqi Scud launches proved almost impossible to prevent.⁴⁷ So, if an adversary has mobile ballistic missile combined with WMD technology, it may be impossible to ensure that the enemy does not respond in kind if the United States employs WMD.

Even if U.S. intelligence sources are knowledgeable of the enemy's WMD delivery systems and their locations, for example, the fixed launch facilities for a WMD missile system, assured destruction of all enemy WMD is unlikely even with the use of nuclear weapons. Assuming an enemy has 10 launch facilities and that a strike by the United States can achieve a damage expectancy of 0.9 using either conventional or nuclear weapons, statistically, at least one of the enemy facilities will survive the strike. After the fog and friction of war, it is possible that even more facilities would survive the initial strike. In such a situation, the enemy has two choices. Either immediately launch its surviving assets before subsequent strikes by the United States can decimate their remaining forces, or not launch their surviving weapons in an effort to show their continued restraint and hope for a deterrent effect from their few surviving weapons. The latter possibility seems remote since the enemy has nothing to lose.

Therefore, a nuclear strike on a rogue state's WMD capabilities does not assure destruction of the enemy's WMD assets and may actually invite the adversary to respond in kind. While it is impossible to predict enemy actions if the rogue state's WMD capabilities were attacked exclusively by non-nuclear options, it seems logical that the enemy would be less likely to respond with WMD if the U.S. did not use nuclear weapons. Additionally, in the 1991 Persian Gulf War, air power was not the best method of destroying enemy WMD. Conventional ground forces proved to be the best method of neutralizing Iraq's WMD by physically capturing them.⁴⁸

Another principle from joint nuclear doctrine are the national and theater-level *constraints* posed by the implications of using nuclear weapons. Commanders should expect legal, political, and military restraints on the employment of nuclear weapons.⁴⁹

International law, be it customary or by convention, does not prohibit the use of nuclear weapons in armed conflict. The United States is party to international treaties that in some cases, prohibit the introduction of nuclear weapons.⁵⁰ But for rogue states, such legal considerations do not apply.

Politically, use of nuclear weapons by the United States could be a hot potato. First, some believe that since the United States no longer has an active inventory of chemical or biological weapons, that retaliation with nuclear weapons after a rogue state's first-use of chemical or biological weapons, unfairly raises the ante.⁵¹ Second, use of nuclear weapons by the United States legitimizes the use of WMD to resolve disputes.⁵² This could be counter-productive to efforts by the United States to condemn WMD ownership and use. The nuclear genie would be out of the bottle and may never be contained again. Third, the NCA and geographic combatant commanders must consider the impact that a nuclear weapon could have on the desired end-state, or the long-term goals of the United States for a particular region. In some cases, using nuclear weapons could be the best immediate option, but they could create long-term resentment with regional allies that may negate the benefits of nuclear options.⁵³

Military constraints could also apply, just as they do for non-nuclear options. Minimization of casualties is an example. On one hand, use of nuclear options can offer a method to strike at the enemy with minimal risk to friendly forces. But on the other hand, the NCA could be reluctant to have large numbers of enemy casualties, like that of the 1991

Persian Gulf War. During the final hours of Desert Storm, the NCA became sensitive even to casualties of the enemy military forces, as was seen during the "Highway of Death."⁵⁴

There is one case where the NCA may not be concerned about large numbers of enemy casualties--if the rogue leader used WMD on the soil of the United States, such as a major U.S. city. In that case, the NCA may adopt a counter-value targeting scheme for U.S. nuclear forces for "retaliation," a kinder term for revenge. But this is very situational and unpredictable. Suffice it to say that short of WMD use on the United States itself, the geographic combatant would likely have many restraints on the use of nuclear weapons in a theater.

In the above, the author analyzed U.S. WMD deterrence policy and the suitability of nuclear weapons against a rogue state's WMD capabilities. Several findings can be drawn from the analysis.

Overall, nuclear options are less than ideal for use against a rogue state's WMD capabilities. But, there are four aspects where nuclear weapons are advantageous.

First, U.S. nuclear forces likely have a deterrent effect on rogue states. The precise measure of effectiveness is impossible to substantiate, but nuclear deterrence was one reason why Hussein refrained from using WMD in the Gulf War. For nuclear deterrence to be effective, the will of the United States must be clearly communicated to rogue states.

Second, if a leader of a rogue state commits a grave error and uses WMD on the soil of the United States, a retaliatory attack using U.S. nuclear forces seems likely. Since the United States no longer has an active inventory of chemical or biological weapons, nuclear weapons are the only means for the United States to respond tit-for-tat.

A third advantage of nuclear weapons is their capability to destroy deep underground targets. If a geographic combatant commander determines that deep underground facilities require destruction before conventional or special operations forces can neutralize them, nuclear weapons provide the best means to destroy deeply buried targets. But, this situation seems an unlikely case to use a nuclear weapon because the gain of destroying the target probably does not counterbalance the disadvantages of using a nuclear option.

Lastly, if U.S. forces cannot penetrate enemy defenses to destroy a rogue state's WMD capabilities, nuclear ballistic missiles can penetrate such defenses with relative impunity. This too seems unlikely because of the dominance of U.S. air and conventional forces.

Although nuclear options provide some advantages, there are clearly significant problems with their employment. Nuclear collateral damage, high potential of continued enemy attacks with WMD, adverse international reactions, and the possibility of long-term damage to U.S. desired end-state goals strongly suggest that nuclear options should be the last option considered by the NCA and geographic combatant commanders. Conventional PGMs can destroy surface targets with almost the same degree of effectiveness as nuclear weapons and they do not have the excessive repercussions associated with nuclear options. As for the limited ability of conventional weapons to penetrate deep underground targets, perhaps in the future, conventional ballistic missiles can accomplish the task.

Also, attempting to influence a rogue state's strategic centers of gravity seems to be a risky undertaking with nuclear weapons. On one hand, the only wartime use of nuclear weapons succeeded in influencing the will of the enemy (i.e., Japan in 1945). But on the

other hand, it is only one data point, and other examples of strategic targeting did not meet with success.

Analysis also indicates that the current national policy for deterring rogue nations with WMD capabilities, albeit intentional, is dangerous. History indicates that when dealing with rogue states, vagueness can be perceived as indecisiveness and weakness. The North Korean 1950 invasion on South Korea and Iraqi invasion of Kuwait in 1990 stand out as examples of uncertainty over the resolve of the United States. Furthermore, if nuclear weapons provide realistic options, which this analysis suggests that they do in some situations, then the National policy should proclaim that U.S. nuclear forces are an option that the President may opt to employ.

The author has two recommendations. First, National WMD deterrence policy requires more clarity to deter leaders of rogue states. The author recommends the following statement: WMD attacks on the United States, its forces, or its allies, will be dealt with quickly and severely. The United States reserves the right to employ any option against a WMD aggressor, including the use of nuclear weapons.

Second, the United States must continue to pursue technology with conventional deep-penetrating warheads. For example, conventional ballistic missiles could penetrate enemy air defenses and destroy deep underground facilities, thus eliminating the need for nuclear options against rogue states with WMD for all but one situation--when a response in kind is desired. Like it or not, U.S. nuclear forces provide the only means for an in kind response.

Bottom line, current WMD deterrence policy requires more clarity to deter rogue leaders from using WMD. Nuclear forces of the United States are an asset for WMD

deterrence, and if deterrence fails, for employment. But, nuclear options have significant distracters. Improved conventional capabilities can eliminate the need for nuclear options with one exception--for an in kind response if it is desired by the NCA.

¹ Many weapons can constitute "weapons of mass destruction." The author defines WMD specifically as either chemical, biological, or nuclear weapons. This is similar to joint doctrine. Joint Chiefs of Staff, *Doctrine for Joint Nuclear Operations* (Joint Pub 3-12: 18 December 1995), Part II.

² The author's defines "rogue states" as those countries that either have or seek to obtain WMD capabilities, have hostile intent against the United States, and are regional aggressors.

³ Dale A. Blackburn et al., "A National Policy for Deterring the use of Weapons of Mass Destruction" (Unpublished Research Paper, Air Command and Staff College, Maxwell: April 1996), 1.

⁴ President, *A National Security Strategy for a New Century* (Washington D.C., The White House, October 1998), 22.

⁵ Steven P. Lee, *Morality, Prudence, and Nuclear Weapons* (Cambridge: Cambridge University Press, 1993), 93.

⁶ William F. McManaway. "Deterrence and Strategic Deterrence in the 21st Century," (Unpublished Research Paper, Army War College, Carlisle: 1993), 24.

⁷ U.S. nuclear forces include intercontinental ballistic missiles (ICBMs), submarine-launched ballistic missiles (SLBMs), bomber-delivered cruise missiles and gravity bombs, Tomahawk land attack missile-nuclear, and dual-capable fighter-bomber delivered gravity bombs. Joint Chiefs of Staff, *Doctrine for Joint Theater Nuclear Operations* (Joint Pub 3-12.1) (Washington D.C.: 9 February 1996), I-5.

⁸ The U.S. dropped two nuclear weapons on Japan in 1945; Hiroshima on 6 August 1945 and Nagasaki on 8 August 1945. In the last 50 years, Presidents faced several prospects for using nuclear weapons. Examples include: Berlin crisis of 1948, Korea in 1951, Vietnam in 1954 and 1967, Taiwan Strait crisis of 1959, and Cuban Missile Crisis of 1962. Department of Defense, National Defense University, *1998 Strategic Assessment* (Washington D.C.: 1998), 203.

⁹ The concept of nuclear deterrence is perhaps the most published topic in the second half of the 20th century. There are many monographs and articles that discuss the different arguments about nuclear deterrence. The author suggests two books in particular. Steven Lee (citation listed above) provides a detailed and analytical assessment on deterrence and Lawrence Freedman presents a short, but excellent history on nuclear deterrence. Peter Paret, ed., *Makers of Modern Strategy: from Machiavelli to the Nuclear Age*, by Lawrence Freedman (Princeton: Princeton University Press, 1986), Chap. 25.

¹⁰ Iraq employed chemical weapons (mustard and nerve gas) in the Iran-Iraq War. Hussein also used WMD against rebellious Iraqi Kurds. Colin Powell, *My American Journey* (New York: Ballantine, 1995), 455.

¹¹ Policy-makers made several comments warning Iraq not to use WMD. James Baker said on 29 October 1990: "[Saddam Hussein] must also realize that should he use chemical or biological weapons, there will be the most severe consequences." Thomas L. Friedman, "Bush and Baker Explicit in Threat to Use Force," *New York Times* (30 October 1990), A12. In addition, President Bush stated on 12 January 1990: "[T]he United States will not tolerate the use of chemical or biological weapons . . . You and your country will pay a terrible price if you order unconscionable actions of this sort." "Text of Letter From Bush to Hussein," *New York Times* (13 January 1990), I9.

¹² The CIA document states that other reasons for Iraq's non-use of WMD include poor weather conditions for chemical employment, the battle developed too quickly for Iraqi reaction, and allied air control restricted maneuverability of chemical-armed artillery units. Central Intelligence Agency. "Iraq's Non-use of Chemical Weapons" CIA Declassified Document. File Number: 071596_cia_75701_75701_01.txt. (Available at: <http://www.gulfink.osd.mil>), (3 December 1997).

¹³ *National Security Strategy*, 12; and Chairman, Joint Chiefs of Staff, *National Military Strategy of the United States of America* (Washington D.C.: 1997), 25.

¹⁴ Emphasis by author. *National Security Strategy*, 22.

¹⁵ Callum A. MacDonald, *Korea: The War Before Vietnam* (N.Y.: The Free Press, 1986), 16-7.

- ¹⁶ Michael R. Gordon and Bernard E. Trainor, *The Generals' War* (N.Y.: Little, Brown, and Company, 1995), 21-3.
- ¹⁷ More detailed and classified guidance comes to geographic combatant commanders via the nuclear supplement to the Joint Strategic Capabilities Plan (JSCP) and other forms of NCA direction. Joint Chiefs of Staff, *Doctrine for Joint Nuclear Operations* (Joint Pub 3-12), III-2.e.
- ¹⁸ They are: Enemy WMD capabilities and supporting units; ground combat and supporting units; air defense facilities and support; naval installations, vessels, and supporting facilities; non-state actors that have WMD capabilities; and underground facilities. *Doctrine for Joint Theater Nuclear Operations* (Joint Pub 3-12.1), III-4.b.
- ¹⁹ Milan Vego, Dr., *On Operational Art (4th Draft)* (Newport: Naval War College, 1999), 221.
- ²⁰ Joint Chiefs of Staff, *Doctrine for Planning Joint Operations* (Joint Pub 5-0: 13 April 1995), GL-10 – GL-12.
- ²¹ Vego, 223.
- ²² R.A.C Parker. *Struggle for Survival: The History of the Second World War*, (Oxford: Oxford University Press, 1989), 241.
- ²³ It can be argued that the use of the two nuclear weapons was not decisive and that the Japanese would have surrendered in short order without their use. The author concedes that other factors contributed to the Japanese surrender, but that the nuclear devices proved to be the final "push." Parker, 242.
- ²⁴ For a brief but outstanding discussion on the impact of strategic bombing in World War II, see Parker, Chap. 10.
- ²⁵ Air Force. *Nuclear Operations Air Force Doctrine Document 2-1.5* (AFDD 2-1.5). (Washington D.C.: 15 July 1998), 8-9.
- ²⁶ These considerations include relative effectiveness, nuclear collateral damage, enemy responses, advance planning, de-confliction, and "other considerations," namely, political and international constraints. *Doctrine for Joint Theater Nuclear Operations* (Joint Pub 3-12.1), III-2.a.
- ²⁷ The author concedes that other counter-force elements of the enemy could be targeted, especially the enemy's ground combat units. Indeed, during the Cold War, NATO defense plans included the use of nuclear weapons to destroy attacking Soviet/Warsaw Pact forces. But the author selected the WMD capabilities of rogue states vice ground combat units to illustrate the force-on-force aspect of nuclear targeting.
- ²⁸ "Hardened" or "hard" means that the facility has some form of artificial or natural barrier to resist the effects of enemy weapons. "Soft" facilities are highly vulnerable to weapons effects.
- ²⁹ *Doctrine for Joint Theater Nuclear Operations* (Joint Pub 3-12.1), III-2.a.
- ³⁰ In short, damage expectancy (DE) is comprised of the probability of damage (PD) times the probability of arrival (PA) of the weapon; or $DE=PD \times PA$. PD is the factor of target hardness, yield of the weapon, and accuracy of the weapon. PA is the probability of several factors, including the weapon system reliability and the probability to penetrate enemy air defenses.
- ³¹ Department of Defense and Department of Energy, *The Effects of Nuclear Weapons*, Samuel Glasstone and Phillip J. Dolan, ed. (Washington D.C.: 1977), 1.
- ³² Blackburn, 15.
- ³³ David C. Isby, "USAF Wants Proposals for Non-nuclear ICBM Warheads" *Janes*. Volume 3, Issue 3, (1 March 1999), n.p.
- ³⁴ Ibid. "Tactical Surface-to-Surface, Tactical Tomahawk Consumes TLAM Upgrade Funds," *Janes*. Volume 3, Issue 1, (1 January 1999), n.p.
- ³⁵ The degree of success of those attacks is not available via unclassified means. Ibid., "GBU-37 Used in Action." *Janes*. Volume 3, Issue 12, (1 December 1999), n.p.
- ³⁶ *Doctrine for Joint Theater Nuclear Operations* (Joint Pub 3-12.1), III-2d.
- ³⁷ Barry R. Schneider. *Future War and Counterproliferation*, (Westport: Praeger, 1999), 220.
- ³⁸ ICBMs can only launch from bases in the Mid-western United States. Submarines carrying SLBMs may or may not be in a launching position that can prevent over-flight of non-belligerent countries.
- ³⁹ *Doctrine for Joint Theater Nuclear Operations* (Joint Pub 3-12.1), I-5.d. and e.
- ⁴⁰ *The Effects of Nuclear Weapons*, 1-2.
- ⁴¹ *Doctrine for Joint Theater Nuclear Operations* (Joint Pub 3-12.1), III-2.b.
- ⁴² *The Effects of Nuclear Weapons*, 29-31.
- ⁴³ Some nuclear weapons have variable yields. *Doctrine for Joint Theater Nuclear Operations* (Joint Pub 3-12.1), I-5.a.
- ⁴⁴ See *The Effects of Nuclear Weapons*, Chapter IX for an in-depth description of nuclear fall-out patterns.

⁴⁵ *Doctrine for Joint Theater Nuclear Operations* (Joint Pub 3-12.1), III-2.c.

⁴⁶ *Ibid.*, Par. 6.

⁴⁷ Schneider, 154-5.

⁴⁸ *Ibid.*, 154.

⁴⁹ *Doctrine for Joint Theater Nuclear Operations* (Joint Pub 3-12.1), III-2.f.

⁵⁰ Navy. *The Commander's Handbook on the Law of Naval Operations* (NWP 1-14M) (n.p., October 1995), 10-1.

⁵¹ Some believe that there is a rank order of WMD. Nuclear weapons constitute the highest form, followed by biological and chemical weapons. Schneider, 70.

⁵² Michael T. Klemick, "Can Iraq Be Deterred from Using Weapons of Mass Destruction?" (MS Thesis, Naval Postgraduate School, Monterey: December 1997), 74.

⁵³ *Doctrine for Joint Theater Nuclear Operations* (Joint Pub 3-12.1) II.

⁵⁴ Charles Dunlap, "Technology: Recomplicating Moral Life for the Nation's Defenders." *Parameters* (Autumn 1999): 26-7.

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