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A thesis presented to the Faculty of the U.S. Army Command and General Staff College in partial fulfillment of the requirements for the degree

MASTER OF MILITARY ART AND SCIENCE

by

DENISE A. DELAWTER, MAJ, USA
B.S., United States Military Academy, West Point, NY, 10997

Fort Leavenworth, Kansas
1998

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The opinions and conclusions expressed herein are those of the student author and do not necessarily represent the views of the U.S. Army Command and General Staff College or any other governmental agency. (References to this study should include the foregoing statement.)

ABSTRACT

NUCLEAR WEAPONS, PROLIFERATION, AND TERRORISM: U.S. RESPONSE IN THE TWENTY-FIRST CENTURY, by MAJ Denise A. DeLawter, USA, 103 pages.

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This study describes the ease of obtaining the scientific knowledge, plans, and materials to enable a terrorist's construction of a nuclear device. It also analyzes motivation of terrorist groups, concluding that a nuclear weapon, capable of inflicting violence in the extreme, fulfills the terrorist's goal of violence in support of a political agenda or to inspire radical change.

Given the guidance from the national level, this study proposes a series of policy options available to the NCA for application in an aggressive counterproliferation policy. Finally, the U.S. must rapidly reorganize its counterproliferation structure and methods to streamline a more aggressive approach that is recognized and feared by potential nuclear terrorists--augment current political efforts with a clearly defined counterproliferation military mission and associated doctrine.

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LIST OF ABBREVIATIONS

CIA	Central Intelligence Agency
CINC	Commanders in Chief
CJCS	Chairman, Joint Chiefs of Staff
C2	Command and control
C3	Command, control, and communications
DCI	Defense Counterproliferation Initiative
DIA	Defense Intelligence Agency
DoD	Department of Defense
DOS	Department of State
EOD	Explosive Ordnance Disposal
FBI	Federal Bureau of Investigations
FSU	Former Soviet Union
HUMINT	Human intelligence
LSO	Limited Strike Option
MASINT	Measurement and signature intelligence
MIRV	Multiple, independently targetable reentry vehicles
NBC	Nuclear, biological, and chemical
NCA	National Command Authority
NEST	Nuclear Emergency Search Team

NMS	National Military Strategy
NPT	Nuclear Nonproliferation Treaty
NSS	National Security Strategy
OPSEC	Operations security
Pu-239	Plutonium
SLBM	Sea launched ballistic missiles
SIGINT	Signals intelligence
SDI	Strategic Defense Initiative
U-235	Uranium-235
U-238	Uranium-238
U.S.	United States
WMD	Weapons of mass destruction

CHAPTER 1

CURRENT SITUATION

Nuclear Weapons Proliferation

As the U.S. evolves in its role as the remaining superpower in the post-Cold War, multi-polar world, it needs to reevaluate its policy toward the growing destabilizing threat to U.S. national interests posed by the proliferation of weapons of mass destruction (WMD). The inevitable proliferation of these nuclear, biological, and chemical weapons by rogue nations, as well as transnational terrorist groups, requires a new rationale for the national security decision-making process and the national Intelligence Community's support to the decision-making process. The focus of this thesis is to evaluate the likelihood of a nuclear WMD getting into the hands of a terrorist group that would use it to threaten U.S. interests. The thesis will also propose a series of graduated policy options to address this threat.

The threat of WMD proliferation has become a top national security challenge to the U.S. and its interests abroad. Based on intelligence analyses of threats to these interests, U.S. policy-makers have developed several strategies from the 1950s to the present to address the various types of weapons of mass destruction. Initially, these weapons consisted solely of nuclear warheads, then quickly developed into chemical and biological threats. U.S. strategy has evolved from massive retaliation, through flexible response, assured destruction, limited strike options, and strategic defense initiative.[1]

The current policy includes the Rogue Doctrine, a phrase coined by the Intelligence Community and described in depth by author Michael Klare.[2] Each time the national decision-making process changed the policy, it did so based on the Intelligence Community's assessment of the threats to the U.S.

Current world politics are carried out in an increasingly unstable world. Without the stability the bipolar world provided, states today must establish their national security usually without the support of one of two superpowers. In some cases, this process includes upgrading their weapons to include WMD, specifically nuclear weapons. By the mid 1980s, the "nuclear two" (U.S. and USSR) became and remained the "nuclear five" (U.S., USSR, United Kingdom, China and France.)[3] However, this controlled proliferation occurred during the heart of the Cold War, and the bi-polar world structure lent itself to nuclear stability. One or both of the superpowers provided leadership to their surrogates in the nuclear arena and limited nuclear weapons proliferation.

However, in the last ten years, the number of nation-states who publicly admit to possessing nuclear weapons has grown from five to eight; Israel, Pakistan, and India having recently joined. These nations include the United States, Great Britain, France, China, Russia, Israel, Pakistan, and India.[4] With the end of the Cold War and its inherent bi-polar stability, there were reduced controls on existing nuclear weapons. As a result, the international community began developing nonproliferation measures--efforts focusing on preventing the spread of missiles and weapons of mass destruction via such

mechanisms as arms, technology, and export control.[5] In fact, after years of research and development India and Pakistan eventually developed their nuclear capability in response to perceived regional threats. Until they signed the Nuclear Nonproliferation Treaty (NPT), they took little or no nuclear guidance from any of the other nations possessing nuclear weapons.[6] If the Asia situation is only an indicator, U.S. analysts can predict continued nuclear proliferation coupled with inherent regional instability.

As the world reacts to the implosion of the former Soviet Union, we find an increased number of nations trying to become players in the international arena, to include "rogue" nations as well as terrorist groups vying for power in that arena. One powerful card that ensures entry in that arena would be the threat or actual deployment of a nuclear weapon. Rogue nations include: Iraq, Iran, Syria, Libya, and North Korea. A principal security problem associated with these nations is that most are anti-Western, and are involved in what has been characterized as "illicit proliferation activities"--activities that violate the Nuclear Nonproliferation Treaty and other nonproliferation agreements.[7] Such activities when combined with a policy of supporting terrorism, constitute a fundamental threat to U.S. interests, and earn for some countries the name Rogue State.

Consequently, nuclear weaponry in the hands of an adversary or in the hands of a terrorist group is a threat to the U.S. that demands an effective counter, and the National Command Authority (NCA) must decide how to counter this threat. William H. Lewis and Stuart E. Johnson, editors at the National Defense University, describe a scenario:

> . . . handful of weapons of mass destruction, especially nuclear weapons in the hands of the wrong country can change this situation [relatively little threat] overnight. The use of a few of these weapons, or even the threat of their use, changes the context in which our national command authority makes decisions about the terms under which we go to war or whether we go to war at all.[8]

The new nuclear proliferation environment puts immense pressure on the Intelligence Community, which continues to assess indicators, assumptions, and conclusions of locations and possession of nuclear weapons to the NCA. The NCA may consider the possibility of entering into a program of military measures centering on deterring or discouraging, as well as defending against, the possible use of WMDs--an aggressive counterproliferation situation.[9]

There are some important assumptions fundamental to organizing policy options for this problem. First, with the implosion of the USSR, a significant amount of the nuclear and non-nuclear materials intended for building and maintaining nuclear devices is no longer controlled by one centralized government. Another assumption is that the materials needed for a weapons grade nuclear reactor, if not a completed warhead with platform, will be available for terrorist organizations to obtain. Next, with ever-changing and rapidly advancing technology and computerization, the ability of these organizations to obtain or develop their own nuclear device will also increase. And finally, one may assume that the trend of terrorist activity may lead to the acquisition of a WMD. Based on these assumptions, the U.S. has little time to develop a collection effort designed to identify states or organizations with the potential to use nuclear weapons against U.S. interests.

Nuclear Terrorism

Imagine the following scenario--an anti-U.S. terrorist group decides to explode a nuclear device to devastate and humiliate the United States. Perhaps this group chooses an American Embassy in an obscure African country as their target to garner the attention of the world and threaten U.S. lives overseas. All it need do is obtain a nuclear warhead or radiological dispersion device and some kind of delivery system[10]. The delivery system could be as simple as a team of men, willing to give their lives to "the cause" and to God, driving a truck loaded with the nuclear device. With relatively uncomplicated technology and plans, the terrorist group obtains weapons grade uranium or plutonium and assembles its device, or simply steals the entire device. Considering the fact that with the proper amount of research and effort every security system is penetrable, the terrorist group could have already attacked and seized one of the shipments of weapons grade fissionable material traveling from Russia to the United States. The terrorist group then ships the material to a terrorist-supporting country such as Libya, builds the nuclear weapon, and delivers it to any U.S. embassy on the continent. Now, this scenario is somewhat simplistic but not outside the realm of possibility.

The United States focuses on the prevention of terrorism, specifically terrorism targeted against its domestic and foreign interests. The World Trade Center bombing in 1993, and the 1995 truck bombing of the federal office building in Oklahoma City only reinforced the American fear of terrorist incidents on U.S. soil. Recently, President

Clinton signed legislation that strengthened the authority of federal investigators and provided $1 billion over four years to help federal and state authorities fight terrorism.[11]

Technological Explosion

Nuclear technology is easy for a potential terrorist group to obtain. The blueprints and technical requirements to produce a nuclear weapon are available today from various open sources, to include electronic ones.[12] With some nations willing to sell certain nuclear-related technologies and equipment to the highest bidder and some nuclear scientists willing to make their services available, nuclear terrorism seems to be an increasingly dangerous problem of significant potential.

> . . . the success of Iraq in obtaining the materials, technology, and expertise for a nuclear weapons program--often with the collusion of foreign suppliers and the knowledge of their governments--exposed major deficiencies in existing national and international regulations on nuclear export control. In response, embarrassed governments, for example Germany, have strengthened their laws on exports, and there is now an international agreement for controlling the export of dual-use, as well as specifically nuclear, materials and technology.[13]

Despite various governments' and international regulations and attempts to control exports of nuclear technology and expertise, evidently both are leaking to rogue nations and possibly terrorist groups. As the remaining superpower, a strong U.S. threat of counterproliferation would deter and possibly stem the flow of technology necessary to build nuclear weapons.

NDU analyst William C. Martel believes that preventing nuclear proliferation through technological controls is unlikely to succeed and that it is nearly impossible for the U.S., or the UN, to bring it to heel.

> . . . the international mechanisms for controlling nuclear weapons technologies, principally export controls and nuclear regulatory regimes such as the NPT and IAEA [International Atomic Energy Agency], no longer are sufficient to prevent all nuclear proliferation. Iraq was developing nuclear weapons while it was under inspection by the IAEA as a signatory to the NPT. North Korea also pursued its weapons development program as a signatory to the NPT. Only recently the IAEA dismissed reports about a secret Iranian nuclear program after it conducted inspection of selected nuclear facilities in Iran.[14]

Clearly, the current screens and attempts to predict proliferation of nuclear weapons through technological tracking and inspections is not sufficient. In addition to this tracking system, the Intelligence Community needs to increase its collection through all its assets, but primarily human intelligence (HUMINT), signals intelligence (SIGINT), as well as measurement and signature intelligence (MASINT) to ensure the NCA has a complete picture of the threatening nation-state or terrorist organization to become a target of an aggressive U.S. counterproliferation plan.

Soviet Implosion

In retrospect, it is clear that the post-World War II world was characterized by stability. Indeed, many are now yearning for the stability engendered by the post World War II world. Adam Ulam characterized the whole of Cold War international relations as a struggle between "the rivals."[15] There were only two: the United States and the Soviet

Union. Most facets of international political discourse revolved around the east-west struggle. It was quite accurate to contend that the world had two centers or poles of power. By definition, bi-polarity fostered stability. The polar rivals viewed most nation-states and transnational political organizations as part of a camp, either sympathetic to the United States or the Soviet Union. This perception simplified international relations and the rules which governed international security affairs. Yet, today, states must establish their policies without the direction, influence, or interference of a superpower. As F. Scott Fitzgearld remarked at the end of World War I: "My calm, safe little world suddenly blew itself up."[16] In essence, this statement describes what happened to the world following the Soviet Union's implosion.

As the remnants of the former Soviet empire struggle to achieve democratic reforms and to build a free market economy, thousands of weapons scientists and technicians, including nuclear scientists, now face unemployment and look for new ways to earn salaries with which to feed their families. Military officers, who used to be treated as their country's elite, face economic hardships not previously experienced. Plant managers and workers at some of the most sensitive civilian research facilities labor under conditions that make it difficult for them to maintain an adequate standard of living. As a result, the challenge facing the Russians, and the rest of the world, is to ensure that the former Soviet Union does not become a vast supermarket for the most deadly instruments and technology known to man.[17]

United States Policy

Today, there is no greater threat to the United States, or to the world's security, than the spread of weapons of mass destruction, and specifically nuclear weapons. As already discussed, during the Cold War, the national security of both the U.S. and the Soviet Union was based upon a dangerous but well-understood balance of terror and well-traveled avenues of diplomacy. Both countries maintained formidable nuclear arsenals so that there was a high risk that conflict would result in certain and unacceptable losses no matter who the initial aggressor. If conflict appeared possible, diplomatic channels were available as a relief valve to avoid further escalation. Although living in a climate of high risk, the world enjoyed a high degree of stability.[18]

The collapse of Soviet Communism and the end of the Cold War eliminated what the U.S. considered to be the gravest threat to world security. Yet, today the concerns of the Cold War have been replaced with new and far different threats. We have moved from an era of high risk, but also high stability, to an era of much lower risk, coupled with much lower stability. Ethnic, religious, racial, and political conflicts have led to an increasing level of violence and terrorism around the globe. No place is immune--from the subways of Tokyo, to the buses of Jerusalem, or to the office buildings of New York and Oklahoma City. Zealotry in the name of a cause has led individuals, groups, and rogue nations to be increasingly willing to use devastating violence, often for no other reason than to cause destruction and terror.[19]

Unfortunately, this WMD threat is no longer merely theoretical. The leakage of nuclear materials from the former Soviet Union is now a fact. On several occasions already, Russian authorities have recovered weapons-usable nuclear material which had been diverted from civilian research institutes by individuals who intended to sell it. In four other cases, weapons-usable material, including highly enriched uranium and plutonium, made its way from the former Soviet Union into Europe before authorities finally seized it.[20]

Over four years ago, Senator Nunn directed the staff of the Permanent Subcommittee on Investigations to conduct an in-depth examination of this issue of illicit trafficking of nuclear materials to determine the likelihood of such diversion and trafficking events occurring. In May 1994, the subcommittee's efforts led to a hearing which brought together for the first time before Congress: the Director of the Federal Bureau of Investigation, the President of Germany's BKA (Germany's equivalent to our FBI), and the Head of Russia's Organized Crime Control Department. The combined testimony of these officials revealed the very real concern that the threat posed by organized crime in the former Soviet Union was significant for the potential proliferation of nuclear weapons. Specifically, the subcommittee posed the possibility that, under the right circumstances, organized crime could become involved in either facilitating or creating a nuclear black market. There was evidence that amateur "nuclear marketeers" are emerging in Russia and beginning to network throughout the world.[21]

In light of the importance of the situation, the current administration emphasized nonproliferation activities; however, the United States policy toward nuclear weapons is still tentative and ill-defined. President Clinton has defined the threat of weapons of mass destruction, as well as terrorism as threats to U.S. interests in his National Security Strategy. He goes on to identify WMD as the greatest potential threat to global security. As a nation, Clinton's strategy encourages us to continue to reduce the threat posed by proliferation of advanced technologies that places these weapons in the hands of parties hostile to the U.S. and global security interests. This strategy delineates nonproliferation initiatives and avers the right by the U.S. to strike at the bases and assets valued by terrorism.[22] Furthermore, he has declared improved U.S. dedication and efforts in the nonproliferation field and asked U.S. allies to do likewise. President Clinton has indicated that his preferred approach is the use of diplomacy and economic incentives to persuade the WMD proliferators to discontinue their objectionable behavior. He has let it be known, however, that Washington was prepared to use force--even extreme force-- to punish unacceptable proliferation behavior by "outlaw regimes."[23] Unfortunately, political posturing and saber rattling does little in the age of nuclear terrorism. Without an aggressive counterproliferation program that seeks out rogue nations or terrorist groups prone to use nuclear weapons and proposes military means to eliminate their nuclear capability, political posturing merely sets the global stage for their use.

Rather than develop an aggressive counterproliferation program, the U.S. has instead gone on a fact-finding mission to better develop its nonproliferation policy--to

prevent the spread of nuclear weapons. Following the Senate Subcommittee's hearing, its staff embarked on an inquiry which entailed hundreds of interviews with members of U.S. law enforcement, intelligence, and defense communities including: the Federal Bureau of Investigations (FBI), the Customs Service, the Central Intelligence Agency (CIA), the Defense Intelligence Agency (DIA), and various offices within the Departments of Defense, Energy, State, and Justice. The staff also met with dozens of academics and scholars throughout the United States. In 1995 it traveled to both Western and Eastern Europe to meet with law enforcement, intelligence, parliamentary, and regulatory officials in Germany, the Czech Republic, Ukraine, and Russia. The subcommittee concluded that the threat of nuclear diversion and trafficking is real, as evidenced by the documented seizures of weapons-usable uranium and plutonium in both Russia and Europe. It also found that there are confirmed cases of illicit smuggling of uranium and plutonium as well as the diversion of key system components from Russia to Iraq. Not surprisingly, the subcommittee found that the protection and control of Russian nuclear materials, and to some extent even nuclear weapons, is a continual challenge. Despite efforts by Russia, there is not yet an inventory for the hundreds of tons of nuclear materials that are spread out over more than 80 civilian facilities in the former Soviet Union.[24] The overall result of this and other WMD finding missions has been unremarkable in formulating current, applicable and effective U.S. policy.

The Senate subcommittee's staff obtained examples of various entities attempting to exploit unemployed Soviet scientists situation for money. The

investigation obtained a "solicitation letter" from a Hong Kong company, that was found in the Middle East. The letter states: ". . . we have detailed files of hundreds of former Soviet Union experts in the field of rocket, missile and nuclear weapon[s]. These weapon experts are willing to work in a country which needs their skills and can offer a reasonable pay."[25] The ramifications of the effect this "brain drain" can have on our national security are enormous. As economic conditions in the former Soviet Union continue to deteriorate, the likelihood of a theft of nuclear materials increases more rapidly than the Russian ability to ensure the security and protection of these lethal materials. Since experts agree that the wisest policy is to secure the materials at their source, the U.S. must redouble its commitment to assist the government of Russia to secure these weapons. Our expenditures in this regard are not foreign aid, but rather, they are expenditures in pursuit of our own national security. Despite U.S. commitment, the vast majority of work and resources must still come from within the nations of the former Soviet Union. Nevertheless, the U.S. can serve as an assistant and a catalyst in this effort. The U.S. must accept the notion that no other nation is equipped to lead this endeavor.[26]

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[1] P. Edward Haley, "The Fundamentals of Nuclear Strategy," in Nuclear Strategy, Arms Control, and the Future, eds. P. Edward Haley and Jack Merritt (Boulder, CO: Westview Press, Inc., 1988), 8-25.

[2] Michael Klare, Rogue States and Nuclear Outlaws (New York: Hill and Wang, 1995), 204-205.

[3] Patrick J. Garrity and Steven A. Maaranen, Nuclear Weapons in the Changing World, eds. Patrick J. Garrity and Steven A. Maaranen (New York: Plenum Press, 1995-1996), xvii.

[4] William C. Martel and William T. Pendley, "Rethinking US Proliferation Policy for the Future," in Weapons of Mass Destruction: New Perspectives on Counterproliferation, eds. William H. Lewis and Stuart E. Johnson (Washington, DC: NDU Press Publications, 1995), 209.

[5] U.S. Department of the Army, Field Manual (FM) 101-5-1, Operational Terms and Graphics (Washington, DC: Department of the Army, 30 September 1997), 1-110.

[6] Krishnaswami Sundarji, "Proliferation of WMD and the Security Dimensions in South Asia: An Indian View," in Weapons of Mass Destruction: New Perspectives on Counterproliferation, eds. William H. Lewis and Stuart E. Johnson (Washington, DC: NDU Press Publications, 1995), 55. Also, the editors in their preface indicate that India acquired a nuclear capability in response to China; Pakistan in response to India.

[7] Klare, 24.

[8] William H. Lewis and Stuart E. Johnson, "Introduction," in Weapons of Mass Destruction: New Perspectives on Counterproliferation, eds. William H. Lewis and Stuart E. Johnson (Washington, DC: NDU Press Publications, 1995), xi.

[9] FM 101-5-1, 1-40.

[10] A radiological dispersion device could consist of a warhead wrapped in C4, designed to scatter radiological materials in the area of the explosion. This type of device would not produce the yield of a nuclear explosion, but effectively exposes the environment and people with radiation.

[11] Laurence McQuillan, "Clinton to sign anti-terrorism bill," Reuters, Clinton-Terror Section, 20 April 1996 (EASI, 23 April 1996).

[12] Much of the material found in the definition chapter I downloaded from the INTERNET. Among this information were the blueprints for the US bombs dropped on Nagasaki and Hiroshima.

[13] Avner Cohen and Marvin Miller, "How to Think About--and Implement--Nuclear Arms Control in the Middle East," in Weapons Proliferation in the 1990s, ed. Brad Roberts (Boulder, CO: Westview Press, 1996), 362.

[14] Martel, 209.

[15] Ulam's primary thesis is that the post WW II world was characterized by the two remaining world powers engaged in a struggle for world preeminence. Adam B. Ulam, The Rivals (New York: St. Martin's Press, 1978.)

[16] F. Scott Fitzgerald's remark while applicable here was really intended to demonstrate that the First World War had forever and irrevocably altered "the precise relationship that existed between the classes."

[17] U.S. Congress, Senate, Permanent Subcommittee on Investigations, Global Proliferation of Weapons of Mass Destruction and Illicit Trafficking of Nuclear Materials, 13 March 1996, 2.

[18] U.S. Congress, 1.

[19] Ibid., 2.

[20] Ibid., 3.

[21] Ibid.

[22] William J. Clinton, "A National Security Strategy for a New Century," May 1977. Washington, DC, 1997, 5-10.

[23] Klare, 126.

[24] U.S. Congress, 4-5.

[25] Ibid.

[26] Ibid., 6.

CHAPTER 2

DEFINITION OF TERMS

In Tom Clancy's novel The Sum of All Fears, one of the terrorists involved in constructing a thermonuclear device remarks, "What was once the work of geniuses is now the work of tradesmen." Unfortunately, this statement is largely true. The scientific knowledge necessary for constructing a nuclear weapon is relatively straightforward and available from a variety of open sources. For instance, the information used in preparation of this section came from open source research. The Internet contains several "web sites" where one can access the necessary plans and schematics that would certainly assist in the conceptualization and possibly construction of a nuclear device. To understand the ease with which a terrorist group could construct a nuclear weapon, a basic understanding of nuclear weapons-related terminology and the scientific foundation underlying the atomic detonation process are crucial.

My intention in this chapter is to give the reader an appreciation for the complexity, not impossibility, of building a nuclear weapon. A terrorist group would need to obtain fissile material, bomb-building materials, and the scientific know-how to assemble, test, employ and maintain a nuclear weapon. Today, a terrorist group could meet these conditions.

Weaponization

Scientists have long realized that the energy released from atomic fission had implications for weaponization. On 2 August 1939, Albert Einstein wrote to then President Franklin Roosevelt. Einstein and several other scientists told Roosevelt of efforts in Nazi Germany to purify U-235 which might be used to construct an atomic bomb. It was shortly thereafter that the U.S. government began the serious undertaking known as the "Manhattan Project." Essentially, the U.S. committed itself to the Manhattan Project to expedient research and production that would produce a viable atomic explosive device.[1]

The Basics: Scientific Generalities

There are three basic terms that a terrorist group must understand before conceiving of building of an atomic detonation and weapons design. First, the weaponization process specializes in releasing the energy from splitting an atom(s). This topic will be explored later in this chapter. First, an atom is "composed of a nucleus of protons, neutrons, and a determined number of electrons orbiting the nucleus."[2] Second, fission is the explosive splitting of atoms. According to the definition, fission is "the splitting of the nucleus of a heavy atom (such as Highly Enriched Uranium or Plutonium) into two lighter nuclei. . . . It is accompanied by the release of energy."[3] In other words, fission is a nuclear reaction in which an atomic nucleus splits into fragments, usually two of comparable mass, with the production of approximately 100 million to several hundred

million volts of energy.[4] Third, once the builder initiates and contains the fission process in a device, it is generally referred to as a "bomb." Essentially, an atomic bomb is "an explosive device whose energy typically comes from the fissioning of uranium or plutonium."[5]

The Materials

It is impossible to construct an atomic device without uranium. Further, it is impossible to construct an atomic device from naturally occurring uranium. Unpurified or unenriched uranium will not produce a fission reaction. Uranium must be enriched through a variety of costly processes that require a substantial engineering effort on the part of the nation-state or terrorist group attempting to build the device.

All of the nuclear materials required to build a nuclear warhead derive from natural uranium. In its pure or unmodified state, uranium is a "radioactive element whose principal isotopes (atoms of the same chemical elements having different numbers of neutrons in their nucleus and further differentiated by their atomic weights) are Uranium-238 and Uranium-235."[6] U-235 is a subcomponent of natural uranium. Nuclear engineers must separate it from natural uranium for use in atomic weaponry. Natural uranium contains only 0.7 percent of U-235. U-238 comprises the remaining 99.3 percent of natural uranium. The challenge for the nuclear engineer is to separate the two isotopes. This separation requires an enrichment process to raise the low content of the

fissile isotope uranium to a very high level of concentration by displacing the U-238. Once separated, the U-235 can be used to produce a fission reaction.[7]

The Detonation Process: Specifics and Scientific Foundations

A fission nuclear bomb is in a race with itself--to successfully fission most of the material in the bomb before it blows itself apart.[8] In general, scientists must ensure the bomb meets two conditions before they can use fission to create atomic explosions: (1) they must keep the number of neutrons lost to fission (from non fission producing neutron captures, or escape from the fissionable mass) low; and (2) they must ensure the speed with which the chain reaction proceeds is very fast. The degree to which a bomb design succeeds in this race determines its efficiency. A poorly designed or malfunctioning bomb may "fizzle" and release only a tiny fraction of its potential energy.[9] To increase the yield of an atomic bomb, it is advantageous to boost the initial fissioning of the uranium or plutonium. This boost is achieved by introducing a squirt of neutrons to the fissile heart of the warhead, either with a small pea-sized source of radioactive polonium combined with beryllium, or by creating neutrons from fusing a few grams of radioactive tritium and deuterium.[10]

There are two types of atomic explosions that U-235 can facilitate: fission and fusion. As alluded to earlier, fission is a nuclear reaction in which an atomic nucleus splits into usually two fragments of comparable mass and releases energy. The atomic bomb expels this energy explosively and violently. The massive power behind the

reaction in an atomic bomb arises from the forces that hold the atom together. A fusion reaction (or hydrogen bomb) begins with a fission reaction. However, the fusion reaction derives its power from the resulting fusing of the nuclei of various hydrogen isotopes in the formation of helium. Since obtaining a fusion reaction (and, therefore, building a hydrogen bomb) is so much more than obtaining a fission reaction, I will restrict this discussion to fission bombs--the most likely terrorist nuclear weapons.[11]

Specifically, atoms consist of three sub-atomic particles. Protons and neutrons cluster together to form the nucleus (central mass) of the atom, while the electrons orbit the nucleus much like planets around a sun. These particles determine the stability of the atom. For all practical purposes, the one true element whose atoms can be split comparatively easily is the metal uranium. Uranium's atoms are unusually large. Consequently, it is hard for them to hold together firmly, and this attraction makes Uranium-235 an exceptional candidate for nuclear fission.[12]

Uranium is a heavy metal, heavier than gold. Not only does it have the largest atoms of any natural element, the atoms that comprise uranium have far more neutrons than protons. This composition does not enhance their capacity to split, but it does have an important bearing on their capacity to facilitate an explosion.

As mentioned earlier, there are two isotopes of uranium. Natural uranium consists mostly of isotope U-238, which has 92 protons and 146 neutrons (92+146=238). Mixed with this isotope, one will find a 0.7 percent accumulation of U-235, which has only 143 neutrons. This isotope, unlike U-238, has atoms that can be

split; thus it is termed "fissionable" and useful in making atomic bombs. Since U-238 is neutron-heavy, it reflects neutrons, rather than absorbing them like its brother isotope, U-235. (U-238 serves no function in an atomic reaction, but its properties provide an excellent shield for the U-235 in a constructed bomb as a neutron reflector. This helps prevent an accidental chain reaction between the larger U-235 mass and its `bullet' counterpart within the bomb.) Also, while U-238 cannot facilitate a chain-reaction, it can be neutron-saturated to produce plutonium (Pu-239). Plutonium is fissionable and can be used in place of U-235 (albeit, with a different model of detonator) in an atomic bomb.[13]

A U-235 atom is so unstable that a blow from a single neutron is enough to split it and trigger a chain reaction. This blow can occur even when a critical mass is present. When this chain reaction occurs, the Uranium atom splits into two smaller atoms of different elements, such as Barium and Krypton.

When a U-235 atom splits, it gives off energy in the form of heat and gamma radiation--the most powerful form of radioactivity and the most lethal. When this reaction occurs, the split atom will also give off two or three of its 'spare' neutrons. These spare neutrons fly out with sufficient force to split other atoms they come in contact with. In theory, it is only necessary to split one U-235 atom, and the neutrons from this will split other atoms, which in turn split other atoms, leading to a chain reaction. This progression does not take place arithmetically, but geometrically. All of this will happen within a millionth of a second.[14]

The minimum amount to start a chain reaction as described above is known as super-critical mass. The actual mass needed to facilitate this chain reaction depends upon the purity of the material, but for pure U-235, it is 110 pounds (50 kilograms). However, since no uranium is ever 100 percent pure, the builder will require critical mass.

Uranium is not the only material used for making atomic bombs. Another material is the element plutonium, in its isotope Pu-239. One cannot find plutonium naturally (except in minute traces), therefore, scientists always make it from uranium. The only way to produce plutonium from uranium is to process U-238 through a nuclear reactor. Plutonium will not start a fast chain reaction by itself, but to overcome this difficulty, one must have a neutron source--a highly radioactive material that gives off neutrons faster than the plutonium itself. In certain types of bombs, the scientist may use a mixture of the elements beryllium and polonium to bring about this reaction. Only a small piece is needed. The material is not fissionable in and of itself, but merely acts as a catalyst to the greater reaction.[15]

The Mechanism of the Bomb: Necessary Sub-Components

The following discussion demonstrates the ease with which a terrorist group could construct an atomic device.[16]

Detonating Head

The detonating head (or heads, depending on whether the builder desires a uranium or plutonium bomb model) that is seated in the conventional explosive charge(s) in a nuclear warhead is similar to the standard-issue blasting cap. It merely serves as a catalyst to bring about a greater explosion. It is essential that the scientist calibrate this device since too small a detonating head will only cause a colossal dud. (This situation is extremely dangerous since someone must disarm and re-fit the bomb with another detonating head. An added measure of discomfort comes from the knowledge that the conventional explosive may have detonated with insufficient force to weld the radioactive metals, resulting in a supercritical mass that could go off at any time.) The detonating head receives an electric charge from a coordinating detonator to initiate the nuclear reaction. Commercial chemical companies make and openly sell excellent blasting caps that can be easily modified to suit the required specifications.[17]

Explosive Charge(s)

The bomb uses an explosive charge to introduce (and weld) the lesser amount of uranium to the greater amount of uranium within the bomb's housing. Plastic explosives work best in this situation since they can be manipulated to enable both a uranium bomb and a plutonium bomb to detonate. One very good explosive is Urea Nitrate.[18]

Explosive Variants: Plutonium

While uranium is an ideally fissionable material, it is not the only one. Bomb builders can use plutonium in an atomic bomb as well. By leaving U-238 inside an atomic reactor for an extended period of time, the U-238 picks up extra particles (specifically neutrons) and gradually transforms into the element plutonium.[19]

Plutonium is fissionable, but not as easily fissionable as uranium. While uranium can be detonated by a simple 2-part gun-type device, plutonium must be detonated by a more complex 32-part implosion chamber along with a stronger conventional explosive, a greater striking velocity, and a simultaneous triggering mechanism for the conventional explosive packs. Along with all of these requirements is the additional task of introducing a fine mixture of beryllium and polonium to this metal while all of these actions are occurring.

Super-critical mass for Plutonium is defined as 35.2 lb. (16 kg). The amount needed for this super-critical mass can be reduced to a smaller quantity of 22 lb. (10 kg) by surrounding the plutonium with a U-238 casing.[20]

Being fundamentally different explosive devices, uranium and plutonium bombs require different detonators. Uranium uses a "gun-type" detonator, while plutonium requires an implosion detonator. The uranium detonator is comprised of two parts. The larger mass is spherical and concave, while the smaller mass fits precisely into the concave section of the larger mass. Upon detonation of a conventional explosive, the smaller mass is violently injected and welded to the larger mass, thereby causing a

supercritical mass. A chain reaction follows in one millionth of a second. The plutonium detonator is comprised of 32 individual 45-degree pie-shaped sections of Plutonium surrounding a Beryllium/Polonium mixture. These 32 sections together form a sphere. All of these sections must have the precisely equal mass (and shape) of the others. The shape of the detonator resembles a soccer ball. Upon detonation of conventional explosives, all 32 sections must merge with the B/P mixture within 1 ten-millionths of a second. The two detonators are schematically shown in figure 1:

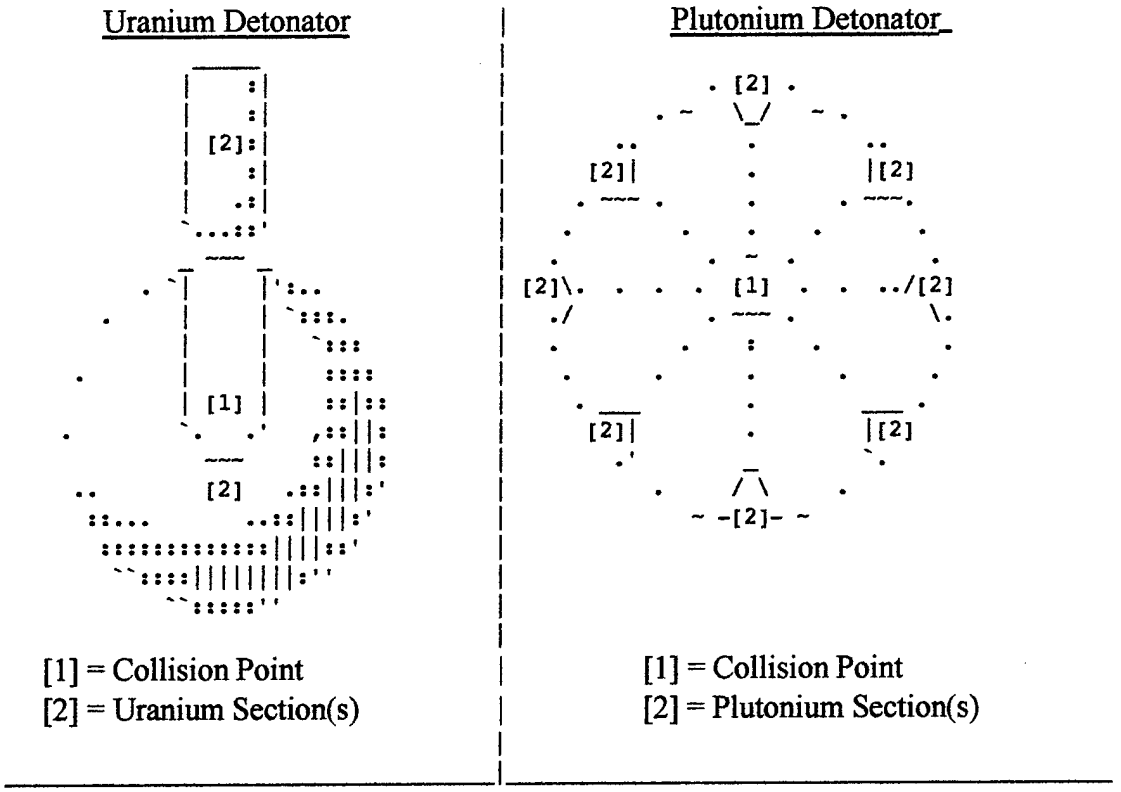

Figure 1. Schematic of Uranium and Plutonium Detonators. Source: J. D. Dyson, "Documentation and Diagrams of the Atomic Bomb," Prepared by Outlaw Labs, University of California-Berkeley, downloaded April 1996, 10.

Fuses

The bomb builder employs fuses as another safeguard to prevent an accidental detonation of both the conventional explosives and the nuclear payload. These fuses are set near the surface of the "nose" of the bomb so that they can be installed easily when the terrorist group is ready to detonate the bomb. The builders should install the fuses shortly before detonating the bomb. To affix them before this time could result in an accident of catastrophic proportions.

Weapons Design

Once enough of the fissile material is available, the bomb builder must engineer it into a weapons design. Scientists have used two general approaches for achieving nuclear fission in weapons design: Implosion Assembly and Gun Assembly. Schematics are provided below:

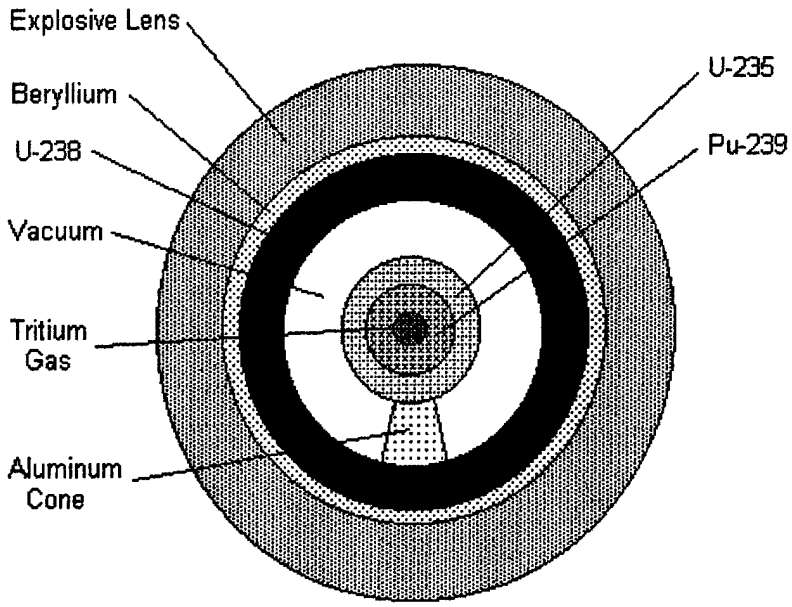

Figure 2. Implosion Design Assembly. Source: "Nuke Home Page," downloaded from the World Wide Web under the key word "nuclear weapons design," at the site http://www.pal.xgw.fi/hew/nuclear.html, April 1996, 6.

Implosion Design

An implosion assembly weapon is spherical in design and uses a chemical explosion to bring subcritical fissionable material to supercriticality. This chemical explosion rapidly reduces the volume of the subcritical mass, thus initiating the chain reaction.[21] While more complicated than the Gun Type Assembly, this design is certainly obtainable and relatively easy to produce by terrorists groups.

Gun Type Design

Creating a critical mass by firing one piece of fissionable material at another is an obvious idea and was the first approach developed for designing atomic bombs. Essentially, the device fires a piece of subcritical material down a gun barrel at another piece of subcritical material at a sufficient speed to trigger a fission process. The primary advantage of a gun type assembly (shown below) is its simplicity. It is as close to "fool proof" as modern ordnance technology permits. The design brings two pieces of fissile matter together at sufficient speed to create a chain reaction and fission. As explosive technology has evolved, this process is exceedingly simple and not subject to the same problems as developing an implosion weapon. As a matter of fact, the gun type assembly was the first design studied during the weaponization process of the Manhattan Project.

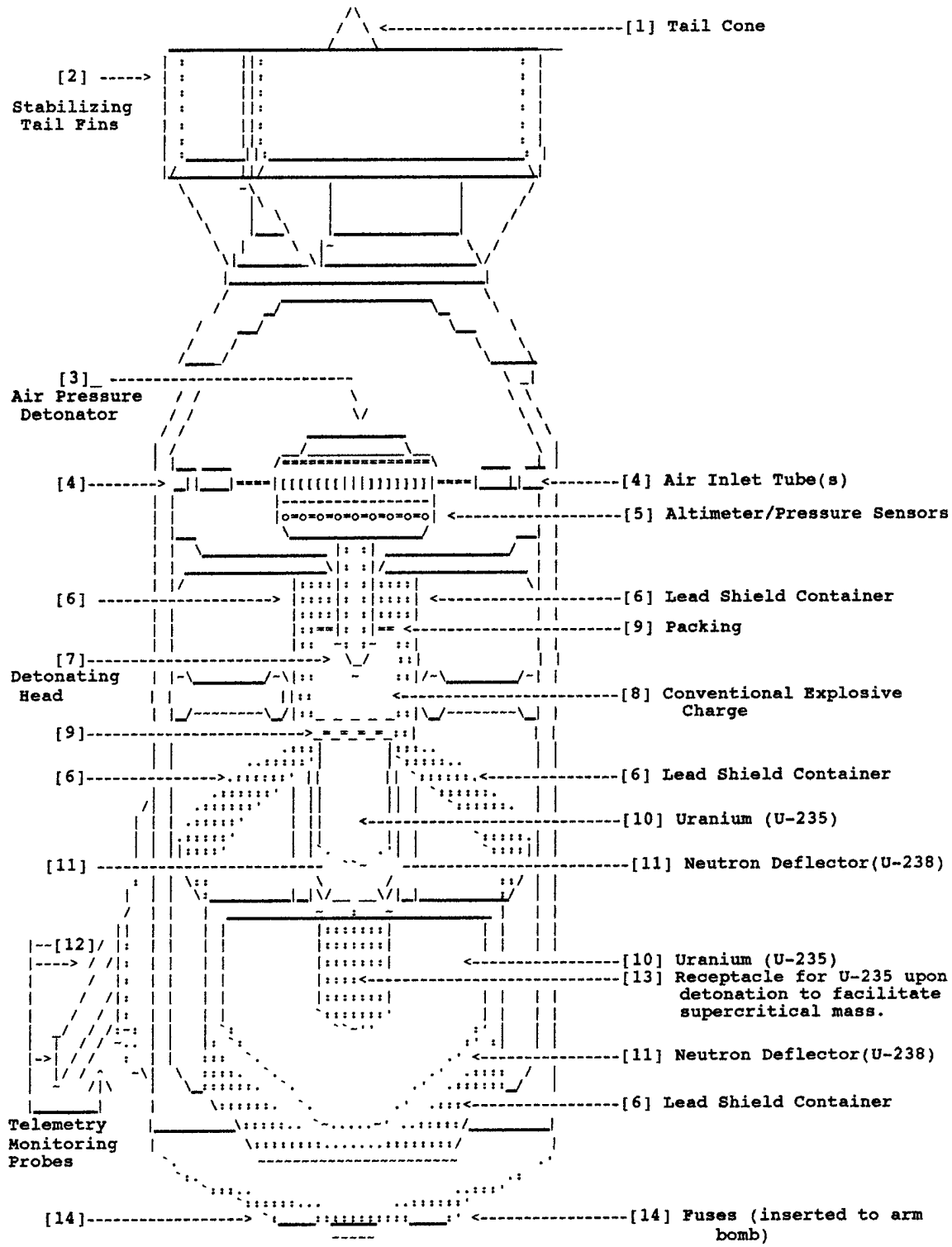

Figure 3. Gun Type Design Assembly. Source: "Todd's Atomic Home Page," downloaded from the World Wide Web under the key word "nuclear weapons design," at the site http:\\www.nuc.berkeley.edu/neutdronics/todd/ nuc.bomb.html#IV.A, February 98.

With an understanding of the basics as presented in this chapter, a terrorist group could obtain the materials and scientific expertise to assemble, test, maintain, and eventually employ a nuclear device. Again, this scientific knowledge is relatively easy to understand and readily available. If the group could obtain the uranium or plutonium, beryllium, testing facilities, and nuclear engineers, they could build their own nuclear bomb.

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[1] J. D. Dyson, "Documentation and Diagrams of the Atomic Bomb," Prepared by Outlaw Labs, University of California-Berkeley, downloaded April 1996, 1.

[2] U.S. Department of Energy, Office of Nonproliferation and National Security, Office of Nuclear Management, Nuclear Terms Handbook, USGPO, Washington DC, 1995, 19.

[3] Nuclear Terms Handbook, 36.

[4] Dyson, 5.

[5] Nuclear Terms Handbook, 19.

[6] Ibid, 47 and 78.

[7] Ibid, 79.

[8] Cary Sublette, "Nuclear Weapons Frequently Asked Questions: Introduction to Nuclear Weapons Physics and Design," downloaded from the World Wide Web under the key word "nuclear weapons," at the site http://www.pal.xgw.fi/hew/nfaq2.html, April 1996, 6.

[9] Sublette, 1.

[10] Dyson, 5.

[11] Ibid.

[12] Ibid., 6.

[13] Nuclear Terms Handbook, 79.

[14] Dyson, 6.

[15] Dyson, 8.

[16] I obtained this information through commercially accessible INTERNET sites.

[17] Dyson, 8-9.

[18] The directions on how to make Urea Nitrate were taken from open source documentation on the INTERNET and are as follows:

Ingredients

1 cup concentrated solution of uric acid (C5 H4 N4 O3)
1/3 cup of nitric acid
4 heat-resistant glass containers
4 filters (coffee filters will do)

Filter the concentrated solution of uric acid through a filter to remove impurities. Slowly add 1/3 cup of nitric acid to the solution and let the mixture stand for 1 hour. Filter again as before. This time the Urea Nitrate crystals will collect on the filter. Wash the crystals by pouring water over them while they are in the filter. Remove the crystals from the filter and allow 16 hours for them to dry. This explosive will need a blasting cap to detonate. It may be necessary to make a quantity larger than the aforementioned list calls for to bring about an explosion great enough to cause the Uranium (or Plutonium) sections to weld together on impact.
Taken from J. D. Dyson, 8-9.

[19] Dyson, 9.

[20] Ibid., 10.

[21] Ibid., 11.

CHAPTER 3

BACKGROUND--U.S. NUCLEAR WEAPONS POLICY LANDMARKS

Based on intelligence analysis of the threats to U.S. interests, U.S. policy makers have developed several strategies from the 1950s to the present to address the various stages of nuclear weapons.

Massive Retaliation

During the 1950s and into the 1960s, the U.S. downsized its general purpose military and upgraded its nuclear arsenal. Since the primary threat to U.S. interests was the Soviet threat of invasion in Europe, the U.S. developed its earliest nuclear policy--massive retaliation. Essentially, the U.S. proposed to use nuclear weapons against Soviet industrial centers if the Soviets attempted an invasion of the West. Since the Soviets could not respond in kind, the U.S. policy worked in deterring a potential Soviet threat to U.S. interests.[1]

Flexible Response

The U.S. nuclear advantage did not endure. By 1961, the Soviets had developed a substantial and growing nuclear arsenal. Based on intelligence analysis of the threat to U.S. interests (specifically, the Soviet ability to strike the continental U.S. with nuclear weapons as well as Soviet conventional capability), the U.S. revised its nuclear policy

under the strategy of flexible response. According to this policy option, the U.S. increased its conventional forces to make self-defense possible without resorting to a nuclear strike. However, it also attempted to make its weapons invulnerable by putting them in hardened silos and submarines.[2]

Assured Destruction

Flexible response was short-lived. The idea of ever increasing numbers of nuclear weapons would not deter the Soviet threat. From 1961 to the early 1970s, the U.S. declared its nuclear strategy of assured destruction. Under this policy, the U.S. would deter a Soviet nuclear attack by maintaining enough of a nuclear arsenal to destroy one third of the Soviet population, and two thirds of the Soviet industrial base. Essentially, the U.S. arsenal could inflict unacceptable damage to the Soviets and ultimately deterred a nuclear attack.[3]

Interestingly enough, the Soviets did not mirror the assured destruction policy with a similar policy. U.S. analysts were certain that the Soviets would welcome the potential to reduce their numbers of nuclear weapons, and tailor their forces along the same lines as the Americans. Author P. Edward Haley describes three reasons why the Soviets elected to maintain massive numbers of nuclear weapons instead.

> In the most fundamental sense, Assured Destruction leaves the survival of the Soviet regime in the hands of the U.S. government. . . the [Soviet] war-fighting approach holds out the promise, even if illusory, of victory. Second, Soviet military and political thought has developed along a more traditional military path than that of the United States, . . . and their entire approach to war is marked by

> traditional military thought. Last, . . . the Soviet leaders' preference for victory. . . is predicated on the superiority of communism and the historical inevitability of its triumph . . . In this ideological sense, the victory promised by the Soviet strategy for nuclear war-fighting is not only that gained on the battlefield, but the mastery of an inferior social system by a superior one.[4]

The fact that the Soviets did not follow the strategy U.S. analysts predicted is an important point that will apply to the current nuclear weapons situation. Some analysts have concluded that ideology and doctrine were the driving forces behind the Soviet continued nuclear weapons production in the 1970s.

One result of the Assured Destruction was the U.S. loss of superiority. The Soviets produced not only larger numbers of nuclear warheads, but much improved versions of them. In response to the U.S. deployment of multiple, independently targetable reentry vehicles (MIRVs), the Soviets developed their own MIRVs. This development forced the U.S. into its next phase of policy--the Limited Strike Option (LSO). During the 1970s and early 1980s, the U.S. planned to utilize more accurate missiles in the form of Air Launched Cruise Missiles (ALCMs), Missile Experimentals (MXs), and C4s (sea launched ballistic missiles (SLBM) launched from Trident submarines.)[5] By 1985, the Reagan administration had initiated systemic modernization of U.S. nuclear forces, including the production and deployment of the B-1 bomber, the M-X intercontinental ballistic missile, and the Trident-II (D5) Submarine-Launched Ballistic Missile.[6] These highly accurate missiles and systems would no longer hit Soviet population and industrial centers, but rather they could hit Soviet hard targets (missile silos and shelters for political and military planners).[7] This shift in thinking

demonstrates the adaptability the U.S. needed to use to meet the growing Soviet counterforce capability.

Strategic Defense Initiative

The increase of Soviet nuclear weapons capabilities, coupled with the gridlock of U.S. production and the destabilizing effect of increased U.S. nuclear weapons, all in the shadow of the SALT II talks, forced President Reagan to initiate the Strategic Defense Initiative (SDI). Quickly nicknamed "Star Wars," this policy centered around stopping Soviet missiles before they could strike U.S. targets. In President Reagan's words, "Would it not be better to save lives than to avenge them?"[8] Ultimately, Star Wars, coupled with world events, led to the implosion of the Soviet Union and an end to the nuclear threat.

Rogue Doctrine

The Soviet threat presented a viable and measurable threat for the U.S. military and public to focus its war-fighting efforts. When the Soviet Union fell along with the Berlin Wall, that focus disintegrated. The nuclear threat still existed, now compounded by the deadly threat of chemical and biological weapons. Additionally, the possibility existed that Third World countries or even terrorist groups, no longer influenced by the former Soviet superpower, possessed these weapons. The U.S. adjusted by developing

its current policy which author Michael Klare calls the Rogue Doctrine. Klare defines a rogue state:

> [T]he characterization of hostile (or seemingly hostile) Third World states with large military forces and nascent WMD capabilities as "rogue states" or "nuclear outlaws" bent on sabotaging the prevailing world order. Such regimes were said to harbor aggressive intentions vis-à-vis their less powerful neighbors, to oppose the "spread of democracy," and to be guilty of circumventing international norms against nuclear and chemical proliferation.[9]

The new U.S. policy would require the military to reconfigure its forces to conduct a continuing series of military engagements with rising Third World powers, the maintenance of a U.S. force about three-quarters the size of that maintained during the Cold War era, and the enhancement of America's "power projection" capability--the ability to bring U.S. military power to bear on remote and unfamiliar battlefields.[10]

Each time the national decision makers changed U.S. defense policy in the Cold War period, it did so based on the Intelligence Community's assessment of the Soviet threat to the U.S. Now, with the Soviet Union eliminated as a direct threat to the U.S. homeland and interests abroad, the U.S. has been required to address an increasingly unstable world. Through enhanced collection assets, the Intelligence Community must again assess the current nuclear weapons threat. Among a number of other concerns, the U.S. must now consider the possibility that a terrorist group--working alone or in collusion with a rogue nation--could become a primary player in the WMD arena. Unfortunately, potential threats include a host of nation-states and terrorist organizations where detection of nuclear weapons is extremely difficult.

[1] P. Edward Haley, "The Fundamentals of Nuclear Strategy," in Nuclear Strategy, Arms Control, and the Future, eds. P. Edward Haley and Jack Merritt (Boulder, CO: Westview Press, Inc., 1988), 8.

[2] Haley, 9-10.

[3] Haley, 13.

[4] Haley, 14-15.

[5] Haley, 18-19.

[6] Klare, 5.

[7] Haley, 18-21.

[8] Haley, 24.

[9] Klare, 26.

[10] Klare, 30.

CHAPTER 4

ROGUE NATIONS AND TERRORISTS: THEIR MOTIVATIONS AND NUCLEAR WEAPONS

Background

Three days after Hiroshima, in an address to the nation, President Truman declared, "The atomic bomb is too dangerous to be loose in a lawless world. . . .We must constitute ourselves trustees of this new force-to prevent its misuse and to turn it into channels for service to mankind." [1] From the inception of the atomic age, national governments realized that the "nuclear genie" harnessed such destructive power that it must be tightly controlled and monitored. Yet, the United States also realized that the technology which produced the Hiroshima and Nagasaki weapons would not and could not remain strictly within the U.S. domain. The technology and the awesome power of nuclear weaponry almost guaranteed that other nations, and possibly non-state groups, would actively pursue a nuclear capability. In fact in 1945, then Secretary of War Henry Stimson sent a memorandum to President Truman at the Potsdam Conference where the fate of the post World War II world was under discussion among the soon to be victorious allied powers. The first five sections of Stimson's memo are particularly relevant and state, in part:

> (1) Within four months we shall in all probability have completed the most terrible weapon ever known in human history, one bomb of which could destroy a whole city. . . .

(2) Although we have shared its development with the UK, physically the US is at present in the position of controlling the resources with which to reconstruct and use it and no other nation could reach this position for some years.

(3) Nevertheless, it is practically certain that we could not remain in this position indefinitely . . . . It is extremely probable that much easier and cheaper methods of production will be discovered by scientists in the future, together with the use of materials of much wider distribution.

(4) The future may see a time when such a weapon may be constructed in secret and used suddenly and effectively with devastating power . . . . With its aid even a very powerful unsuspecting nation might be conquered within a very few days by a very much smaller one.

(5) The world in its present state of moral advancement compared with its technical development would be eventually at the mercy of such a weapon. In other words, modern civilization might be completely destroyed.[2]

At the end of World War II, the world, and eventually nuclear weapons, were centered on two players; the United States and the Soviet Union. It was understood, although never publicly stated, that the Soviet Union would control access to nuclear weaponry in their sphere of influence while the United State would do the same. The world was a relatively simple place, it was East versus West, with spheres of influence that encompassed the world.

Today, bipolar structure is no longer present. The Soviet Union's demise, coupled with the explosion of nationalism, terrorism, and the end of the colonial world during the post-war period, has introduced a whole series of players to the international arena. Many of these players desperately want nuclear weaponry to secure their "legitimacy" as actors on the international stage.

Rogue Nations

A new term in the Intelligence Community has been coined to describe the former Soviet-influenced countries of North Korea, Libya, Syria, Iran, and Iraq. They are now commonly referred to as Rogue Nations. These seemingly hostile states with large military forces and nascent WMD capabilities appear bent on sabotaging the prevailing world order, harbor aggressive intentions vis-à-vis their less powerful neighbors, oppose the spread of democracy, and circumvent international norms against nuclear and chemical proliferation.[3]

The term rogue is intended to be particularly descriptive--U.S. policy makers who feel that these nations operate outside of the realm of recognized international discourse and, consequently, present a greater threat than those nations whose behavior can be influenced through traditional applications of diplomatic pressure, international sanctions, and economic embargos. Rogue states pursue criminal patterns of behavior and foreign policies independent of customary norms and values. They pursue their national interests without regard to international condemnation. Furthermore, they poster and support these interests and goals with terrorist groups. Quite simply rogue states represent a threat to the United States because they do not respond to the application of pressure that often influences those nations which operate in the mainstream of accepted international behavior.

The Effects of The Soviet "Meltdown"

Without the balance of power and relative stability of a bi-polar world, rogue nations and terrorist groups have no parameters to deter their development in the nuclear arena. The political, economic, and military meltdown of the former Soviet Union and the loss of command structures throughout Eastern Europe, has created scenarios which, even if anticipated, are unfathomable in their scope. Never before has an empire disintegrated while in possession of nuclear weapons and such vast quantities of other weapons of mass destruction. There are some 30,000 nuclear weapons, at least 40,000 tons of chemical weapons, significant biological weapons capability, tons of fissile materials, and tens of thousands of scientists and technicians who know how to makes these weapons, but have been deprived of the ability to make a living in a collapsed economy.

Of great importance is the leakage of fissile materials from the former Soviet Union, as well as the dissemination of the technical know-how and expertise by the 60,000 or so weapons scientists that were once part of the very substantial Soviet weapons program; scientists subject to the same economic dislocation that is effecting all the citizens of the former Soviet Union.[4] Collectively, these nuclear assets are potential acquisitions for a terrorist group to obtain a nuclear weapon.

The most obvious threat to the U.S. is the likelihood of either rogue nations purchasing for their use or for sale fissile material, scientific expertise, or actual nuclear weapons. Already operating outside international parameters, rogue states are not likely to adhere to any internationally imposed nonproliferation treaty or diplomatic pressures

to restrict proliferation. While rogue states are not easily coerced in the diplomatic arena to adhere to established international norms, they are nations with fixed borders and relatively fixed facilities. Intelligence activities designed to collect and assess rogue nation involvement in nuclear proliferation activities are restricted within the rogue nation's borders. However, rogue states that assist terrorist groups to further mutual anti-U.S. agendas present a greater threat.

President Reagan first introduced the idea of state-sponsored terrorism in a speech in 1985--that rogue states were training, financing, and either directly or indirectly controlling terrorist attacks against U.S. citizens abroad.[5] This link of rogue nation to terrorist group becomes a significant threat should the rogue state obtain and then transfer nuclear weapons of mass destruction.

Of greater concern to the U.S. are potentially nuclear-armed anti-U.S. terrorist groups. Terrorist groups possess far more limited resources than a rogue nation, and can operate in more than one nation. Due to their smaller numbers and more transient nature, it is difficult for the Intelligence Community to confirm their possession of nuclear weapons and intentions for use. However, given the past history of anti-U.S. sentiments, should any of these groups obtain a nuclear weapon to which the U.S. can confirm, the U.S. will have to be ready to confront the proliferator and react possibly with aggressive counterproliferation to deter possible use against U.S. targets or interests.

[1] Harry S. Truman as quoted in Michael Wheeler, Nuclear Weapons and the National Interest, (Fort Lesley McNair, Washington, DC: National Defense University Press, 1989), 25.

[2] Henry S. Stimson as quoted in Michael Wheeler, Nuclear Weapons and the National Interest, 26. Henry Stimson is regarded by some scholars as the "father of Nuclear Security." Many of the United States' preeminent nuclear strategists "studied" under Stimson during his tenure as Secretary of War. Most notably George Kennan, the author of the famous "Mr. X" article that served as the basis for US Nuclear policy during the Eisenhower administration.

[3] Klare, 27.

[4] U. S. Congress, 2.

[5] Klare, 26.

CHAPTER 5

TRANSNATIONAL TERRORISM: MOTIVATIONS AND RATIONALES FOR VIOLENCE

Overview

The first step in the critical examination of national security policy issues is the definition of terrorist terms and concepts. To devise effective policies and strategies (as well as explain, justify, and accumulate political support), governments and researchers must label or classify what they are trying to affect. Stated simply, governments can affect only that which they profess to understand. Complex problems such as political terrorism demand precision in the selection and usage of associated labels. While there is seldom universal agreement on a particular definition's correctness, the definitions I have elected to use here offer the clearest picture of the issues and concepts critical to this thesis.

Terrorism: Definitions

Exactly what constitutes terrorism is a subject of considerable debate both inside and outside of government, even between hemispheres.

> After every major onslaught [terrorism] it is customary for the United States, echoed by its allies, to announce "we have declared war on terrorism." Such statements reveal a misconception about this never-ending, shadowy form of conflict, for it is impossible to declare war on war. Western democracies find terror difficult to comprehend and are therefore ill equipped politically and intellectually to fight it. It is a clash between two alien worlds in which language and ideas easily become deformed.[1]

There is no universally accepted definition of exactly what is meant by the term terrorism. Dr. Martha Crenshaw, noted terrorism analyst, includes the following attributes in her definition of terrorism: Small conspiratorial groups that use systematic, unorthodox, political violence to manipulate political attitudes, rather than physically defeat an enemy.[2] What appears universal in most United States government's publications is the emphasis on terrorism as a mechanism to cause radical and fundamental political change in the status quo.[3] For this study, I will use the definition used by both the Central Intelligence Agency (CIA) and the United States Department of State (DOS). The DOS definition declares, "The term terrorism means premeditated, politically motivated violence perpetrated against non-combatant targets by subnational or clandestine agents, usually intended to influence an audience."[4] In more succinct terms, Charles Kegley, noted author on international terrorism, defines terrorism as the calculated use of violence in pursuit of political objectives.[5] Both definitions point out that the terrorist uses violence in support of a political agenda.

Violence and Political Change

Violence is the terrorist's mechanism for change. The terrorist uses violence in support of a political agenda to cause or inspire radical change. One cannot appreciate the terrorist's use of violence without understanding what this violence is intended to accomplish. In most cases, terrorists desire to fundamentally and radically alter the

political and societal status quo to conform to their particular ideological ideal.[6] One analyst argues that the goals of terrorism "usually involve attempts to change the nature of the social system in the presumed interest of a broader group."[7] The key concept is that the terrorist uses violence in service of a political agenda or ideology to foster or cause fundamental change in the political or societal status quo.

If one accepts that a terrorist uses violence to foster political and societal change, then the next logical step is to determine what level of violence the terrorist is willing to employ. Limiting the application of violence is difficult for governments, let alone for radicals seeking fundamental change. As Theodore Hanley in his thesis argued:

> In the field of U.S. Counterterrorism, the natural progression of increasing shock value and destructive severity of attacks is known as the 'ramping up effect.' As one method of attack grows mundane and fails to avert or disrupt a process, shock an audience, or draw attention from the media, the terrorists will increase their level of violence.[8]

Conventional wisdom holds that terrorists will use any and all weaponry at their disposal to foster the change their ideology dictates. When an individual or group resorts to violence, one can assume some control of the type of violence employed. This concept is crucial to the discussion of motivation and goals.

Motivation and Goals

What motivates individuals and groups to use terrorism to achieve a particular goal is a matter of considerable debate in both academia and the United States government. Part of the problem and reason for the debate results from a reluctance on

the part of academics and government officials to define exactly what they mean by the term motivation. Essentially, motivation is "the force that drives people and groups to achieve specific goals."[9] Achieving goals are the products of motivations, and are what an individual or group hopes to achieve.[10]

The definitions offered above are intended to highlight three crucial points. First, the terrorist uses violence in support of a political agenda to cause radical change in the status quo. Second, motivation defines why terrorist organizations utilize violence to achieve their particular goals. Third, once a group has decided to use violence, they will use progressively more violent means to shock or garner attention. They operate with no international or governmental restraint or control. It is likely that a terrorist group will use all practical means at its disposal to include nuclear weapons.

Terrorist Motivational Theory: Rationales For Violence

Effective U.S. policy development requires a fundamental understanding of an opponent's goals, ambitions, and actual raison d'être. It is essential to understand what motivates conventional political terrorists to use violence. Like the various definitions about what constitutes terrorism, there are an equal number of explanations about what motivates terrorists to use violence.

General Categories: National-Separatist and Traditional

Most analysts classify terrorist groups into two main types based on their motivational theory. These two types are the nationalist-separatist group and the traditional, politically-motivated terrorist group. The nationalist-separatist group broadly comprises those members of a nation, national minority, radical or ethnic group fighting for freedom from what they consider oppressive foreign domination.[11] Their rationale for violence revolves around the terrorist group's perception of national or ethnic rights, and justifies its actions against its enemy--foreign rule. An example of this type of group is the Irish Republican Army of Northern Ireland, fighting against the English dominance of the region.

The next group is the more complicated traditional group, motivated by political ideology. This broad group consists of organizations from both the political left and right, as well as religion-based. The hard left terrorist group typically advocates some form of socialism to end "evil and oppression;" however, their world view is usually contempt for authority and a strong leaning toward anarchism. A good example of a leftist terrorist group is the Peru-based Sendero Luminoso. Meanwhile, the hard right terrorist group rationalizes its use of violence to overthrow democratic governments in favor of ultranationalistic states. An example of a rightist terrorist group is Italy's Black Order. A subcategory in the politically motivated group is the terrorist group that is religion-based and usually fundamentalist in nature.[12] All three groups in this category represent organizations who are politically or religiously motivated to use extreme

violence to accomplish their goals, and constitute a significant threat to democratically elected nation states.

Some of the best work done on terrorist motivation is by Dr. Martha Crenshaw. Her synthesis of the literature on terrorist motivation offers logical and comprehensive criteria for analyzing the motivations of terrorist organizations. Although Crenshaw does not explicitly claim that her theories of terrorist motivation apply to explaining the motivations of all extra-legal organizations and actors, I feel that her theories have a great deal of validity for explaining the motivations of most extra-legal, clandestine organizations. These motivations include the use of premeditated and purposeful violence in a psychological and methodical way, employed in a struggle for political power rather than for material gain.[13] Crenshaw's explanations look not only at an organization's ideological claims and justifications for violence, but go one step further and look at the unique pressures faced by the organization itself. Therefore, as a framework for explaining political terrorist motivation, this study utilizes Crenshaw's theories of the Instrumental and Organizationalist perspectives.

The Instrumental Explanation and Perspective

Crenshaw argues that the instrumental explanation or approach assumes that terrorism is a means to a political end. Consequently, terrorists conduct terrorist acts as tools or mechanisms to affect political and societal change. A particular terrorist

organization, functioning as a relatively cohesive unit, acts to achieve collective value. Generally, these values are radical changes in political structure and societal conditions.[14] Crenshaw states:

> The non-state organization using terrorism is assumed to act on the basis of speculation of the benefit or value to be gained from an action, the costs of this attempt and of its failure, the consequences of inaction, or the probability of success. Terrorist actions may occur for several reasons: the value sought is overwhelmingly important; the costs of trying are low; the status quo is intolerable; or the probability of succeeding (even at high cost) is high.[15]

The instrumental approach regards terrorist action as a medium or weapon used by rational, calculating individuals or groups to achieve a desired political end. The notion that terrorists are essentially rational, calculating individuals lies at the heart of the instrumentalist perspective; a key distinction between instrumentalists and proponents of the organizational process theory approach. The instrumentalist approach assumes the terrorist group conducts a very western notion of a cost-risk analysis before embarking on attacks that serve to further their particular ideological agenda.

As to the question about terrorism's utility as a mechanism for fundamental societal and political change, Crenshaw argues that success and failure is measured by the terrorist organization's ability to attain its stated political ends. Since few, if any, terrorist organizations ever realize their long term "strategic" or stated ideological goals, the instrumentalist explanation contends that terrorism persists because it allows extremist organizations to achieve their "tactical" goals of publicity and recognition.[16] Obtaining, threatening to use, or actually employing a nuclear weapon by an

instrumentalist terrorist group gains international recognition and the associated level of fear or terror. Certainly, a nuclear weapon serves the instrumentalist as a means to the group's political ends.

The Organizational Process Theory

In contrast, what Crenshaw terms the Organizational Process Theory (sometimes referred to as the Group Dynamics approach) focuses on the internal dynamics and peculiar politics of particular terrorist organization. The organizationalists are terrorists who regard examining an organization's stated ideology as both a misleading and relatively unimportant mechanism to explain why individuals and groups utilize terrorism. Organizationalists argue that, over time, the terrorist organization's inner dynamics and political workings of the underground movement subsumes or supplants its particular ideology (whether it be leftist or rightist). In concrete terms, the inner dynamics between members of terrorist organization and their leaders demand that the organization constantly endorse, plan for, and conduct violent attacks. Individuals gravitate toward terrorist organizations because they want to affect fundamental political and societal change. Once in the underground, their desire magnifies itself. The priority becomes "action over talk." The organization's membership places enormous pressure on the movement's leadership to act. Should the organization's leaders exhibit a reluctance to continue with violence, members may elect to join another radical organization or form a splinter organization that can satisfy their hunger for action. The organizationalists do

not regard terrorist attacks as the result of any rational cost-risk analysis, but rather as the logical outcome of the underground organization's peculiar political dynamics and culture. It suggests that terrorism can become self-sustaining, regardless of its political consequences or ideology.[17]

The organizational theory is more thorough than the instrumental explanation because it offers an explanation for why terrorism continues regardless of practical political results. It assumes that the fundamental purpose of any political organization is to maintain itself, and that terrorist attacks are not part of any strategic or master plan.[18] In many ways, violence is a pressure valve to relieve strain within the organization. Violence allows the organization and its membership to at least perceive that they are attempting to foment change. Essentially, the group uses violence to demonstrate its continuing commitment to the cause of the organization. A nuclear weapon presents to the group an opportunity to use violence at the extreme level. Crenshaw points out that the organization's leaders in particular "wish to enhance and promote the organization" because "their personal ambitions are tied to the organization's viability and political position."[19] The organizationalists contend that the perpetuation and continuance of the organization as a viable entity often precipitates violent action. In more concrete terms, once formed and embarked on a campaign of violence, the terrorist organization's primary goal is survival.

In accordance with this theory, the only way to survive both internal and external pressures is to undertake violent attacks. External pressures are relatively easy to

understand. They derive from government or international community's attempts to eliminate the terrorist movement. Internal pressures derive from the organization's peculiar political dynamics. In general terms, the terrorist needs action in order to rationalize their existence. Walter Laqueur, a noted analyst on terrorism, argues that over time, terrorism and the terrorist organization becomes "the principal defining force in members' lives."[20] Consequently, the organization's membership demands that the organization continually plan for, and frequently conduct attacks. The organization's survival becomes paramount. Ideology and the political agenda become secondary considerations.

The organizationalists contend that once an organization is formed and operating, the only way to eliminate it is through extermination. Crenshaw contends that once underground, individuals generally remain underground despite government inducements to surrender. Because of the organization's desire for survival, the internal and external pressures, and the development of a culture or tradition for violence, terrorist organizations do not voluntarily "go out of business." [21] Once in existence, a group or factions of a group will continue terrorist attacks. The organizationalists contend that terrorism is a self-perpetuating, ongoing, and vicious cycle of violence. Obtaining the materials to construct a nuclear weapon, the scientific expertise, and actually developing it is the fodder within this cycle that perpetuates the organizationalist terrorist group. A fully developed and employable nuclear weapon presents a significant peak in this cycle and would meet their aims.

Political Terrorists and Nuclear Weapons: Instrumentalists Vs. Organizationalists

Understanding what motivates a political terrorist leads to the conclusion that transnational terrorist groups have and will probably consider using nuclear weapons. The inescapable conclusion is that one day, a political terrorist could view a nuclear weapon as a worthy weapon to change the status quo.

The instrumentalist approach argues that the terrorist group will pursue the nuclear weapons in a calculated manner, conducting a detailed cost-risk analysis that specifies the exact gain to be enjoyed from detonation of a nuclear weapon, and how this act would serve its ideological agenda. Ideological agendas take many forms. In general terms, most terrorist groups profess to fight on the behalf of an oppressed minority (nationalist-separatist theory.) They present themselves to the world as the oppressed peoples' arm of action to right a series of wrongs. The individual terrorist group would contend that they are the legitimate voice of the oppressed. Conversely, most of the world community refuses to view the terrorist group as legitimate, and generally regards them as little better than common criminals.

All terrorist groups crave recognition. They fight and die merely to be taken seriously by the legitimate world community. By their very existence, possession of nuclear weapons would inject the group into the international community as a force with which to be reckoned, thereby furthering its agenda and particular desires. From the instrumentalist perspective, the acquisition of nuclear weapons would certainly be a worthy goal.

The organizationalists contend that possession of nuclear weapons is the obvious continuation of the group's isolation. In other words, possession and use of nuclear weapons is the logical continuation of group's inner dynamics and pursuit of violence. Essentially, the group operating with little or no outside control could view the use of a nuclear weapons as a logical progression in their particular chain of violence. A key point to remember is that the ideology or particular goal becomes irrelevant. The pursuit of violence becomes preeminent. Any of the academic arguments that the terrorist will not use nuclear weapons because they do not want to offend their particular support structures are irrelevant.[22] Violence carried to its logical conclusion dictates that the terrorist, regardless if he is an instrumentalist or organizationalist, will seek to develop, steal, and use the most violent of weapons--the nuclear bomb.

This chapter has provided pertinent definitions of terrorism, goals and motivations of a terrorist group, and several theories describing terrorist's rationale for conducting attacks that support his political agenda or ideological ideal. The underlying theme here is that violence is the terrorist's mechanism for change. Whether motivated by the more objective, politically motivated instrumentalist theory or the sustaining, pursuit of violence associated with the organizationalist theory, a nuclear weapon capable of inflicting violence in the extreme, fits nicely into the arsenals of both types of terrorists groups. Assuming that the U.S. or one of its allies is on the receiving end of that violence is what motivates U.S. policymakers to develop a plan to deal with this almost inevitable event.

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[1] Christopher Dobson and Ronald Payne The Never-Ending War, (New York: Facts On File, Inc., 1987), 283.

[2] Dr. Martha Crenshaw, Terrorism, Legitimacy, and Power; The Consequences of Political Violence, ed. Martha Crenshaw (Middletown, CN: Wesleyan University Press, 1983), 2.

[3] The Department of Defense, in particular, emphasizes that terrorism is a weapon for political change. US Army Regulation 190-52 contends that terrorism is "The calculated use of violence by or the threat of violence to attain goals that are political, religious, or ideological in nature." The Intelligence and Threat Analysis Center defines terrorism as the "...use of violence by persons to cause political change." These definitions come from a handout distributed by the then Defense Intelligence College for use in its Counterterrorism Analysis Course, 1990.

[4] United States Department of State, Patterns of Global Terrorism (Washington, DC: GPO, 1 April 1991), Department of State Publication 9862, iv.

[5] Charles W. Kegley, Jr., ed. International Terrorism: Characteristics, Causes, and Control (New York, NY: St. Martin's Press, 1990). 45.

[6] Walter Laqueur, The Age of Terrorism (Boston, MA: Little, Brown, and Company, 1987), 116.

[7]Grant Wardlaw, "Linkages Between Illegal Drug Trafficking and Terrorism," Conflict Quarterly, Summer 1985, 12.

[8] Theodore R. Hanley, "Hammas: Will a Nuclear Weapon be in its Arsenal," Thesis, Joint Military Intelligence College, Bolling AFB, MD, August 1995, 15.

[9] CPT Todd D. Frady, The Goals and Motivations of Narcoterorrism and Political Terrorism: How Do They Differ? Bolling AFB: Defense Intelligence College, December 1990, 2.

[10] Frady, 12.

[11] COL Frank L. Goldstein, "International Terrorism in the Twenty-First Century," in Global Security Concerns; Anticipating the Twenty-First Century, ed. Dr. Karl P. Magyar (Washington, DC: USGPO, 1996), 293.

[12]Ibid.

[13] Crenshaw, 2.

[14] Dr. Martha Crenshaw has written extensively on the motivations for terrorism. This study will use the arguments detailed in her article "Theories of Terrorism" Inside Terrorist Organizations in ed. David Rappaport, (New York, NY: Columbia University Press, 1988), 13.

[15] Ibid., 14.

[16] Ibid., 15.

[17] Ibid., 19-22.

[18] Ibid., 19.

[19] Ibid., 19.

[20] Laqueur, 89.

[21] Crenshaw, Inside Terrorist Organizations, 22.

[22] Department of Defense, Office of the Secretary of Defense, "Department of Defense Response," in Proliferation: Threat and Response (Washington, DC: GPO, April 1996), ISBN 0-16-048591-6, 45.

CHAPTER 6

U.S. POLICY OPTIONS TO COUNTER NUCLEAR TERRORIST THREATS

> Danger exists from outlaw states opposed to regional and global security efforts and transnational actors, such as terrorists or international crime organizations, potentially employing nuclear, chemical or biological weapons against unprotected peoples and governments.[1]
>
> William J. Clinton, May 1997
> President, United States of America

Background

National Security Strategy

The current U.S. administration emphasizes nonproliferation activities without a well-defined counterproliferation policy. In his National Security Strategy (NSS), President Clinton defined the threats of weapons of mass destruction and terrorism as threats to U.S. interests, and to global security. This strategy focused on nonproliferation initiatives, to include the Nuclear Non-Proliferation Treaty (NPT), coupled with diplomatic and economic incentives to persuade the WMD proliferators to discontinue their objectionable behavior.[2] In addition to these diplomatic and economic tools, Clinton merely threatened the use of the military to combat these threats by striking bases and assets valued by terrorism,[3] as well as the use of extreme force to punish unacceptable proliferation behavior by "outlaw regimes."[4] Despite these threats, without an aggressive counterproliferation program that seeks out terrorist groups or

rogue nations prone to use nuclear weapons, and also proposes military means to eliminate their nuclear capability, political posturing merely sets the global stage for the use of WMD.

National Military Strategy

The National Security Strategy provides the framework for the Chairman, Joint Chiefs of Staff (CJCS) to define the 1997 National Military Strategy (NMS). This document conveys both his advice, and that of the Joint Chiefs of Staff on the strategic direction of the U.S. Armed Forces in implementing President Clinton's guidance. The CJCS succinctly states the threat in his opening statements: "While we no longer face the threat of a rival superpower, there are states and other actors who can challenge us and our allies conventionally and by asymmetric means such as terrorism and weapons of mass destruction." [5] He further proposes the concepts of strategic agility, overseas presence, power projection, and decisive force to counter these threats. All these concepts revolve around the rapid deployment of sufficient military power to overwhelm an adversary, establish new military conditions, and achieve a political resolution favorable to U.S. national interests.[6]

One imperative of the strategy is the concept of engagement, drawn directly from the NSS. It enhances U.S. security through integrated approaches that allow the nation to shape the international environment, respond to the full spectrum of crises, and prepare for an uncertain future. Among the instruments cited as available to the U.S. is its

"unparalleled military capabilities."[7] Simply put, this U.S. capability to engage threats in the global arena makes the world safer for the nation, its citizens, its interests, and its values. Applied to the threat of nuclear terrorism, this strategy would use U.S. forces to engage and eliminate the nuclear capability of terrorists that threaten U.S. interests with a nuclear device, thereby making the making the world a safer place.

The Chairman further labels WMD and terrorism as asymmetrical means for both state and nonstate actors to use against the U.S., and specifically, the U.S. military. He goes on to describe transnational dangers, specifically the complicating situation of terrorist groups that transcend national borders and threaten our national interests. His greatest concern in this area is the failure to deal with these security concerns early in their development. A tenuous event that would consequently require a more substantial response to a more dangerous problem in the future.

> While asymmetric challenges and transnational dangers are serious in themselves, a particularly grave "wild card" is the combination of several such threats. Acting in collusion with other hostile entities, for example, an adversary might attempt to combine multiple asymmetric means with the seizure of a strategic objective before we could respond.[8]

He also infers the extensive use of military resources to address the use or possession of WMD, the development of associated WMD technology, and the control and transfer of fissionable materiel as extremely important to enhancing U.S. security.[9] Given the threats to the U.S. and its military, so clearly defined by both the president and the CJCS, it is imperative that the resulting policy and doctrine provide detailed guidance on how to

determine the best method to decisively engage and eliminate such a severe threat to the U.S.

An aggressive counterproliferation policy would require certain parameters from the CJCS. The CJCS provides these parameters in the NMS in the form of limited strikes to deter aggression, justifying swift action by military forces as sometimes the best way to prevent, contain, or resolve conflict, thereby precluding greater effort and increased risk later.[10] Without showing his hand, the CJCS provides the focus to the Department of Defense to develop an appropriate response to these threats.

Department of Defense Response

In 1996, the Department of Defense (DoD) produced its own response to the proliferation of weapons of mass destruction, and later expanded it in 1997. In this response, the DoD echoed the assessments of both the president and the CJCS that the proliferation of nuclear weapons in the hands of terrorists as threatening the U.S. interests of regional stability in the international arena. Looking toward the approach of the new millennium, Secretary of Defense, William S. Cohen, described the threat the United States faces of a heightened prospect that regional aggressors, third-rate armies, terrorists cells, and even religious cults wielding disproportionate power by using--or even threatening to use--nuclear, biological, or chemical weapons.[11] To counter this threat, the primary approach remains diplomatic. As the only superpower, the U.S. sets the example in developing and sustaining international policy and cooperation to stem the

proliferation of WMD. Cohen states, "The United States is actively engaged in dialogues with several states in regions around the world to persuade them not to acquire these capabilities or to eliminate capabilities they might have already developed."[12]

Part of the U.S. policy involves protection by convincing potential and actual proliferants that all WMD will have no value. Simply put, both the U.S. and its coalition partners in counterproliferation will attempt to deny and limit the political and military utility of WMD, as well as threaten to inflict damage to proliferants in a response that will far outweigh any potential benefits of use.[13] However, without strong military policy, strategy, and actions to back up this threat, terrorists who operate outside the arena of economic sanctions and diplomatic posturing are not greatly affected.

1996 Defense Counterproliferation Initiative

Based on the current post-Cold War global environment, as well as lessons learned from the Gulf War against Iraq, the DoD has developed the Defense Counterproliferation Initiative (DCI). Through this initiative, the Secretary of Defense has directed both the Joint Chiefs of Staff and the operational Commanders in Chief (CINCs) to plan and conduct military operations aimed at counterproliferation.[14] Specific DCI objectives are:

1. Prevent the acquisition of NBC weapons and their delivery systems,
2. Roll back proliferation where it has occurred,
3. Deter the use of NBC weapons and their delivery systems, and

4. Adapt U.S. military forces and planning to respond to regional contingencies in which U.S., allied, and coalition forces face NBC threats.[15]

While broad in scope, this initiative gives operational CINCs the authority to develop operational plans, collection plans, and training exercises. It also gives them the basis to conduct actual deployments or operations to identify and eliminate anti-U.S. terrorist groups or rogue nations developing nuclear weapons employment means. Currently, the mission to counter the proliferation of WMD is assigned to combatant CINCs most directly responsible for carrying out the defense of U.S. national interest overseas where proliferation occurs--namely, the operational CINCs.[16]

The DoD response focuses programs and investments in four areas to counter proliferation--passive defense; active defense; counterforce; and measures to counter paramilitary, cover, and terrorist WMD threats.[17] Unfortunately, these areas encompass all three categories of WMD and do not differentiate between programs for each of the NBC threats. Regardless of the general nature of this policy, for the scope of this thesis the last two areas pertain most closely to the stated thesis problem, and are explained in depth in the 1996 DoD response.

Counterforce

Counterforce involves the development of military capabilities to target, plan attacks, seize, disable, destroy, disrupt, interdict, neutralize, or deny the use of WMD and their supporting command, control, and communications (C3); logistics structure; and

reconnaissance, surveillance, and target acquisition platforms while minimizing collateral effects. The key to counterforce is to defeat the WMD threat before it can be used against the U.S. interest or ally. To this end, CINCs and their staffs are focusing on improving capabilities for battlefield surveillance, target characterization, and munitions defeat.[18]

Measures to Counter Paramilitary, Covert, and Terrorist Threats

Measures in this category include those that primarily protect military and civilian personnel, facilities, and logistical and mobilization nodes from WMD threats, both in the U.S. and overseas. Of particular interest are covertly emplaced WMD. DoD is actively pursuing several programs to counter covert delivery and terrorist NBC threats, as well as to protect military facilities, and logistical and mobilization nodes against these threats. Activities include supporting, training, and equipping Joint Special Operations Forces, Explosive Ordnance Disposal (EOD) teams, and NBC weapon response teams to detect, neutralize, and render safe WMD devices here and overseas. Significant resources and advanced technologies are provided to these units, as well as coordination with other programs such as the Department of Energy's Nuclear Emergency Search Team (NEST).[19]

The latest DoD guidance on nuclear terrorism focuses on the transnational threat; particularly terrorism and security of nuclear materials from the Former Soviet Union (FSU). The 1997 guidance describes the availability of weapons grade nuclear materials,

and the potential fissile smuggling threat from organized criminal groups. It also depicts American military superiority as a paradox in the post Cold War environment--our overwhelming military strength increases the threat of nuclear attacks by creating incentives for adversaries to challenge us asymmetrically. However, despite the availability of the materials, technical expertise, and growing anti-U.S. sentiment, this new guidance downplays the likelihood of nuclear terrorism, almost dismissing this threat, and instead focuses primarily on chemical and biological threats. Cohen significantly downplays all NBC threats, "The likelihood of a state sponsor providing such a weapon [NBC] to a terrorist group is believed to be low. . . . Most terrorist organizations have shown little proclivity to develop and use NBC weapons."[20] Despite this downplay of the threat, DoD has designated several committees to review doctrine and budget for the counterproliferation effort in DoD.[21] However, the overall response focuses on chemical and biological weapons responses.[22] Clearly, the focus is directed at the chemical and biological threats, rather than the likely nuclear threat.

Despite the other-than-nuclear focus of the 1997 DoD response, the policy did include some positive moves toward integrating counterproliferation guidance. Based on the Quadrennial Defense Review of May 1997, the DoD has turned its focus to institutionalizing counterproliferation as an organizing principle in every facet of the military, as well as internationalizing these efforts to encourage allies and coalition partners to train, equip, and prepare their forces to operate under WMD conditions.[23] This focus combined with increased counterproliferation spending, and the requirement

for DoD to develop a rapid and proactive response to a terrorist-based WMD threat, places significant emphasis on continued development of a strategy to eliminate it. The 1997 guidance reiterates the Department of State (DOS) as the lead agency for crisis management in overseas incidents, during which DoD would play a key role. Specific DoD assets would include response forces employed either under the operational control of the Joint Special Operations Task Force assigned to the appropriate Unified Combatant Commander.[24] For the U.S. to develop an effective national response, it must continue to develop policy initiatives; adapt military planning and operations; and acquire new capabilities, Intelligence Community programs, and improved international cooperation.[25] The key for the CINCs to conduct the planning and execution of attacking a terrorist group lies in rapid and accurate intelligence collection, analysis, and dissemination.

Implications for the Intelligence Community

The post-Cold War period has forced the Intelligence Community to readjust its intelligence priorities to the primary threats to U.S. interests--WMD and international terrorism. Of critical importance to the U.S. is the covert and transient nature of terrorist organizations. The Intelligence Community provides critical information on how nations and groups acquire technologies and materials through the use of complicated covert procurement networks.[26] Without information identifying anti-U.S. terrorist groups obtaining nuclear materials, technical expertise, and delivery systems, the U.S. will be

forced to react to an actual deployment instead of pro-actively eliminating the threat. Working in conjunction with export control activities and the international community, the Intelligence Community can track these materials and expertise. Additionally, the Intelligence Community provides critical, focused information concerning possible targets and timetables for possible deployments of nuclear weapons that threaten our interests. "Tailored relationships between the CINCs and US. Intelligence Community and other government agencies that will improve U.S. forces' ability to operate and prevail against an NBC-armed adversary."[27]

In 1996, the Commission on the Roles and Capabilities of the United States Intelligence Community validated the various activities of the Intelligence Community.[28] According to the commission, the top two activities that threaten the security of the United States are WMD and terrorism. It found the continued need for the Intelligence Community to collect information on these and seventeen other threats using various agencies listed (see note 26). During a crisis, such as responding to nuclear terrorism, the entire Intelligence Community would theoretically come together to provide support to U.S. combat forces under the control of a Joint Task Force commander. Since there is no permanent organization with the Community dedicated to the provision of crisis support, this concept has yet to be proven effective.[29]

Inherent in the intelligence collection against terrorist groups in the post-Cold War period is the increase in intrastate tensions and the fluid nature of the enemy. The current environment presents a situation that drives both rogue nations and terrorist groups to

compete for WMDs; a race no longer held in check by a superpower struggle. Concurrently, various terrorist groups and any associated rogue nations vie for attention in the world arena.[30] These two situations force the Intelligence Community to apply flexibility and technical superiority to collect and analyze the threat in sufficient time to respond to the nuclear terrorist threat.

To best support an aggressive counterproliferation policy, the U.S. must employ collection systems that target nuclear fissile materials (uranium, plutonium), technical expertise (nuclear scientists), potential delivery system (missiles), and testing facilities. In addition to these materials and personnel, collection must also seek to identify terrorist intentions and anti-U.S. rhetoric. Analyzing potential terrorist targets provides critical planning and rehearsal time for U.S. attack targets. The Intelligence Community can best track weapons grade fissile materials and delivery systems through continued coordination with export controls and signatories of the Nonproliferation Treaty. Additionally, the Community needs to couple this tracking system with collection assets, to include: human intelligence (HUMINT), signals intelligence (SIGINT), as well as measurement and signature intelligence (MASINT) to ensure the national command authority (NCA) has a complete picture of the threatening nation-state or terrorist organization to become a target of an aggressive U.S. counterproliferation plan.

U.S. Response Options

In the course of researching this thesis, this author discovered three problems as they pertain to the U.S. response to nuclear terrorism. First, there is a great deal of information relating to the political or diplomatic options and actions the U.S. is applying to convince nation-states to prevent WMD proliferation. In his thesis on counterproliferation issues, Major Scott C. Cottrell attributes this problem to a counterproliferation command and control (C2) organization and structure designed to counter negotiations between nation states used to functioning in Cold War global strategies.[31] Furthermore, there is little evidence of an effort by the NCA or its subordinate organizations or agencies to address WMD proliferation by non-state actors. Second, there is no lead counterproliferation organization or agency, especially as it relates to terrorism. Given the highest threat rating by the President, Secretary of Defense, CJCS, and elements of the Intelligence Community, there is no direct chain-of-command for this national security threat. A variety of agencies and organizations collect and analyze counterproliferation and terrorism threats; however, there is no one director or agency that assimilates the information for a concise report of threat intentions. Given the time critical nature of nuclear terrorism, as well as the redundant efforts for this analysis, the result is a disjointed effort. And finally, DoD has yet to produce policies that focus the services' doctrine development efforts at all levels in the Joint arena.

Given the guidance from the President of the United States, the Chairman of the Joint Chiefs of Staff, the Department of Defense, and the available Intelligence

Community assets, this author has devised a series of policy options available to the NCA for application in an aggressive counterproliferation policy. To set the stage for these policy options, the U.S. must first expand its counterproliferation policy beyond the diplomatic and economic means, tremendously amplify the information tool (especially in the intelligence arena), and fully incorporate the military tools. Additionally, there needs to be a clear chain of command that provides distinct leadership for counterproliferation and terrorism starting at the national level.

Assuming that the Intelligence Community identifies a nuclear terrorist target, that the U.S. is coordinating with the international community (to include the United Nations) and possibly a combined task force to conduct counterproliferation operations, there are essentially three policy options available:

1. Continue to politically posture against an enemy that neither recognizes nor yields to international political or economic pressure;

2. Conduct a massive strike against an enemy that is transnational and may call several nation-states "home"; and

3. Conduct a "surgical" application of military force.

Clearly, the first option is not palatable since the threat is globally significant, unpredictable, and therefore enormously destabilizing. The second option on the surface appears too harsh and may cause unacceptable collateral damage to noncombatants. The third option is most probably the basis for current plans, however nascent.

A surgical application of force could assume several forms. This attack could defuse or disarm a nuclear weapon just prior to detonation, eliminate the device by destruction, or conduct a preemptive strike on the development facilities. An attempt to disarm or defuse a nuclear weapon en route to its target requires an intimate knowledge of the timetables of the terrorist group, as well as little margin for error should the device explode prematurely. This option also requires transportation of the weapon to a "weapons safe" area for examination and analysis. Likewise, the destruction of a nuclear weapon requires extremely accurate intelligence on the terrorist group's timetables to insert either a team or weapon that could destroy the device prior to detonation on or near its intended target. However, detonation of a nuclear device is not feasible because of the fallout caused by the explosion throwing radioactive material into the air and affecting the surrounding areas. Both these options afford the decision makers more time to try to reverse the terrorist intention to conduct a nuclear attack via other means; however, once accomplished approach the more reactive rather than proactive method of eliminating the threat.

The third surgical application of force involves extremely accurate intelligence and military finesse that disable the nuclear device in the development or testing phases. Given the types of materials needed by the terrorist group, this kind of attack could eliminate the potential for the terrorist organization ever regaining a nuclear advantage. Therefore, the solution to this national threat rests in an attack to eliminate the device before it becomes a fully developed and deployable nuclear bomb.

This strike could be either a close attack using a special forces team, or a stand-off attack using "smart" weapons. The purpose of such an attack would be to eliminate the terrorist's capability to complete the development of the nuclear weapon by targeting necessary components. Either application of military force would require intelligence analysis of the nuclear terrorist location and environment, type of weapon and development stage, and security or hardening of the development facility. Other considerations would be possible collateral damage in the aftermath of the attack. Certainly, the effects of exploding radioactive material produces its own radiological dispersion device that would contaminate the area.

Operations security (OPSEC) would become a primary concern. The U.S. necessarily coordinates with other nations for effective counterproliferation measures; however, there is always the possibility of conflicting vital interests. Ensured success of an early surgical would be dependent on strict OPSEC measures by the U.S. and any nations possibly involved. Consequently, this type of operation would be almost exclusively a U.S. mission, unless coordinated and rehearsed well in advance.

The use of U.S. military assets to destroy a terrorist's nuclear development facility sends an unmistakable message--the U.S. will not tolerate the proliferation of nuclear weapons by non-state actors in a world that is trying to proliferate peace and stability.

In the final analysis, the U.S. must rapidly reorganize its counterproliferation structure and methods to streamline and create a more aggressive approach that is

recognized and feared by potential nuclear terrorists. It should augment current political efforts with a clearly defined counterproliferation military mission and associated doctrine. The unclassified publication of such a policy and associated doctrine would send a clear signal to U.S. allies, potential nuclear terrorist threats, and their rogue state sponsors that the U.S. counterproliferation policy is coherent and incorporated at all levels.

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[1] William J. Clinton, "A National Security Strategy for a New Century," May 1977. Washington, DC, 1997, 6.

[2] Ibid., 5-10.

[3] Ibid., 10.

[4] Klare, 126.

[5] John M. Shalikashvili, "National Military Strategy; Shape, Respond, Prepare Now--A Military Strategy for a New Era," 1997, downloaded from the World Wide Web under the key words "national military strategy," at the site http://www.dtic.mil/jcs/nms/, 26 February 98.

[6] Ibid.

[7] Ibid.

[8] Ibid.

[9] Ibid.

[10] Ibid.

[11] William S. Cohen, U.S. Department of Defense, Office of the Secretary of Defense, "Proliferation: Threat and Response" 1997. Report from Secretary of Defense,

downloaded from the World Wide Web under the key word "proliferation," at the site http://www.denfenselink.mil/ pubs/prolif97/meassage.html, 1 March 98.

[12] William J. Perry, U.S. Department of Defense, Office of the Secretary of Defense, "Proliferation: Threat and Response" 1996. Report by Secretary of Defense, downloaded from the World Wide Web under the key word "proliferation," at the site http://www.denfenselink.mil/ pubs/prolif/response.html, 1 February 98.

[13] DoD Response, Perry.

[14] Again, nonproliferation is the focus on preventing the spread of missiles and WMD via such means as arms, technology, and export controls. Whereas counterproliferation are military measures centered on deterring or discouraging, as well as defending against the possible use of WMD. Defined from U.S. Department of the Army, Field Manual (FM) 101-5-1, Operational Terms and Graphics (Washington, DC: Department of the Army, 30 September 1997), 1-40 and 1-110.

[15] DoD Response, Perry.

[16] Ibid.

[17] DoD Response, Cohen.

[18] DoD Response, Perry.

[19] Ibid.

[20] DoD Response, Cohen.

[21] These committees include: the Chairman of the Joint Chiefs of Staff (CJCS) Missions and Functions Study that produced the CJCS Counterproliferation Charter (strategic-level policy and guidance for the employment of U.S. forces to counter proliferation of NBC weapons) and the CJCS Counterproliferation Concept Plan (tasking CINCs to prepare and develop plans for counterproliferation operations); the Counterproliferation Council (CPC) to monitor DoD-wide efforts to train, exercise, and equip U.S. forces for the counterproliferation mission; and the Counterproliferation Program Review Committee (CPRC) to review and coordinate R&D and acquisition efforts within DoD, Department of Energy, and the Intelligence Community. Source: DoD Response, Cohen.

[22] DoD Response, Cohen. These responses include: CW/BW response teams, the U.S. Army Chemical and Biological Defense Command (CBDCOM) to include the U.S. Army Technical Escort Unit, the U.S. Army Medical Research and Material Command to include the U.S. Army Medical Research Institute of Infectious Diseases (USAMRIID), the Naval Medical Research Institute, the Marine Corps' Chemical Biological Incident Response Force (CBIRF), and an Air Force Protection Plan

[23] DoD Response, Cohen.

[24] Ibid.

[25] Ibid.

[26] Ibid.

[27] DoD Response, Perry.

[28] The Intelligence Community, defined first in 1992 as an amendment to the National Security Act of 1947, include: the Office of the Director of Central Intelligence (DCI), the Central Intelligence Agency (CIA), the National Security Agency (NSA), the Defense Intelligence Agency (DIA), the National Reconnaissance Office (NRO), the Central Imagery Office (CIO), the intelligence elements of the Army, Navy, Air Force, and Marine Corps; other offices in the DoD for the collection of intelligence through special reconnaissance programs; the intelligence elements of the Federal Bureau of Investigation (FBI), the Department of Treasury, and the Department of Energy; and the Bureau of Intelligence and Research of the DOS. Source: Federation of American Scientists, "Commission on the Roles and Capabilities of the United States Intelligence Community, Final Report," Washington, DC, 1 March 1996. Downloaded from the World Wide Web under the key words "intelligence community," at the site http://www.fas.org/irp/ commission/workplan.html, 1 March 98.

[29] Ibid.

[30] Ibid.

[31]Scott C. Cottrell, "Identifying the Roles of the Separate Governmental Agencies in Countering the Proliferation of Weapons of Mass Destruction Among Non-State Actors Throughout the Counterproliferation Continuum," Master of Military Art and Science thesis, U.S. Army Command and General Staff College, Ft. Leavenworth, KS, 1997, 107.

CHAPTER 7

CONCLUSION--A VIABLE THREAT

> Almost any kind of nuclear explosion in a populated area, except perhaps one deep under the surface, would be accompanied by a large number of deaths and injuries in a short interval of time . . . .[1]
>
> Samuel Glasstone and Philip J. Dolan, March 1977
> DA Pam 50-3, "The Effects of Nuclear Weapons"

An Historical Example

We are limited to only two incidents of a nuclear bomb's effects on civilians and military personnel, as well as the associated infrastructures: Hiroshima and Nagasaki. The immediate and long term effects of these weapons of mass destruction are sobering. The physical damage caused by the atomic bomb in Hiroshima ranged from injuries due to the severe heat rays and blast, to personnel cellular destruction from radiation. The effects of this weapon continued to develop over a long period, with total numbers of deaths relating to it numbering 140,00 by 1945 (when the deaths from acute radiation subsided.)[2]

We can read in detail about the devastation in the city of Hiroshima at the time of impact. According to Japanese analysis of the atomic bomb in Hiroshima, "At the moment of the explosion a fireball was generated with a center which reached a temperature of several million degrees Celsius."[3] Within the first three seconds, the heat rays released in all directions spontaneously combusted laundry drying in the sun (1.8-

2.0 kilometers (km) from hypocenter), ignited thatched roofs, spontaneously combusted trees in the park, burning some from the inside out (2.5 km from hypocenter). After about 10 seconds, a shock wave followed the heat waves, traveling approximately 3.7 km from the hypocenter. This shock wave created maximum pressures of 35 tons per square meter with associated wind speeds of 440 meters per second, diminishing to 1.3 tons per square meter and 30 meters per second winds at three km from the hypocenter. After the initial blast that emanated from the hypocenter subsided, a vacuum of air and pressure developed at the center. The result was a wind that reversed direction and began blowing with equal intensity toward the center.[4]

In the aftermath of such an unimaginable blast, the destruction was high. The result of this WMD included the completely burned condition of everything within two kilometers of the hypocenter; most ruins were melted together like lava due to the intense heat. The view in all directions was like a scorched plain. The initial and residual radiation had extreme effects on the human body--swelling and abnormal growth of scar tissue, leukemia, cancer, birth defects, and genetic effects. Additionally, the radiation continued to spread throughout the area by "black rain" (radioactive soot and dust in the form of fallout).[5] Notwithstanding the shocking physical damage, the social damage in the aftermath must have been frightening for the Japanese as they realized the magnitude of their loss--extreme terror.

The huge losses of Japanese life, equipment, and infrastructure pale in comparison to the potential of that bomb. The results could have been much worse.

> The energy released from the Hiroshima A-bomb was originally thought to be equivalent to the destructive power of 20,000 tons of TNT. Later estimates, however, put the energy equivalent to approximately 15,000 tons of TNT, based on damage done to buildings and research on the bomb's composition. Despite the release of such enormous energy, it is believed that less than one kilogram of the 10 to 30 kilograms of uranium 235 housed in the bomb achieved fission.[6]

Given the fact that this nuclear bomb was the first exploded as an offensive weapon in the history of the world, it is not surprising that there were some inefficiencies. Had this WMD been more efficient, the increase in damage and loss of life and infrastructure would have been much greater.

One can only imagine the effects of such a weapon on, not an enemy of the U.S., but on one of our allies or even U.S. citizens abroad; exploded by a politically motivated terrorist group. A motivated terrorist group could obtain and deploy an equally inefficient nuclear device against U.S. interest abroad with devastating results.

Summation

This thesis has presented some sobering facts that point to the conclusion that it is well within the capability and motivation of a terrorist group to obtain and use a nuclear device against U.S. interests abroad. First, the global stage is set--the increasingly unstable, post-Cold War world provides global conditions that are ripe for terrorist groups (either working alone or through the support of rogue nations) to attempt to establish themselves as viable players by obtaining a nuclear weapon. The stability of one or both superpowers providing leadership to their surrogates in the nuclear arena is

gone, resulting in escalating nuclear weapons proliferation. Furthermore, control is nonexistent. The international community has not been able to enforce counterproliferation guidelines, and this is unlikely to deter terrorist actors from obtaining WMDs.

The role of the U.S. in this counterproliferation arena is one of a world leader. As the only remaining superpower, we need to reevaluate our policy toward the growing destabilizing threat to U.S. national interests caused by the proliferation of WMD. The potential, and perhaps inevitable migration of WMD to the possession of transnational terrorist groups establishes a new focus for the National Security decision-making process and the national Intelligence Community's support to the decision-making process. Without the impetus from the U.S. to generate aggressive counterproliferation, the international community may well become observers to the horrors of terrorism at the extreme level.

The focus of this thesis has been to evaluate the likelihood of a nuclear WMD getting into the hands of a terrorist group that would use it to threaten U.S. interests, and to propose a series of graduated policy options to address this threat. I have demonstrated the ease of obtaining the conceptual guidance needed to build a nuclear device, using sources primarily from electronic sources. The breakdown of the infrastructure and probable security of nuclear development facilities in the wake of the implosion of the FSU has provided the market with nuclear scientists eager to work, as well as potential sites where a terrorist group could obtain fissile materials. With the

availability of plans and instructions, technical expertise, and sources of fissile materials needed to construct a nuclear weapon readily available, the likelihood of a group obtaining a nuclear weapon and employing it is extremely high.

The next phase in this thesis was to analyze the motivations of terrorist groups to determine the probability of their going to the lengths necessary to employ a WMD. Using primarily Dr. Crenshaw's instrumentalist/organizationalist theory, the underlying theme for terrorist motivations is violence as the terrorist's mechanism for change. The instrumentalist approach argues that the terrorist group will pursue the nuclear weapons in a calculated manner, analyzing the group's benefit from the detonation of a nuclear weapon, and how this act would serve its ideological agenda. Since all terrorist groups crave recognition, possession of nuclear weapons would inject the group into the international community as a force with which to be reckoned, thereby furthering its agenda and particular desires. Whereas, the organizationalists contend that possession and use of nuclear weapons is the obvious continuation of the group's isolation, therefore, it is a logical continuation of group's inner dynamics and pursuit of violence. In either case, the pursuit of violence becomes preeminent. Violence carried to its extreme conclusion dictates that the terrorist, regardless if he acts from instrumentalist or organizationalist motives, will seek to develop, steal, and use the most violent of weapons--the nuclear bomb. Assuming that the U.S. or one of its allies will be on the receiving end of that violence should motivate U.S. policymakers to develop an

aggressive, proactive counterproliferation policy to deal with this event--one that promises to be inevitable should the measures discussed above come to fruition.

The preceding chapter described how National Security decision-makers and Intelligence Community see the greatest threats to the U.S. to be WMD and terrorism. The most current NSS, NMS, Intelligence Community, and Department of Defense response to this guidance do not provide a well-defined counterproliferation policy. The current U.S. counterproliferation position revolves around a great deal of political and diplomatic posturing, a lack of attention to nuclear terrorism, and a nonexistent national counterproliferation chain-of-command to focus collection efforts or direct potential counterproliferation operations.

Given the gravity of this threat, as well as guidance from the NCA and availability of Intelligence Community assets, I have proposed the following policy options available to the NCA for application in an aggressive counterproliferation policy. First, the U.S. must expand its existing nonproliferation efforts to incorporate counterproliferation means. Currently, the U.S. employs both diplomatic and economic tools to effect nonproliferation policy. The U.S. must now increase the use of its intelligence collection assets and incorporate fully its military tools. To best focus this effort, the U.S. must establish a chain-of-command to provide leadership for counterproliferation and terrorism, empowered to conduct overseas military attacks at clear threats to U.S. security.

It is imperative that the Intelligence Community collect on and identify distinct nuclear terrorist targets. The U.S. must continue to work with the international community and the United Nations to coordinate counterproliferation operations. And finally, the U.S. must be prepared to conduct specific and focused strikes against identified nuclear terrorists, even while it supports a rigorous diplomatic effort to counter terrorism.

An extremely focused application of military force could defuse or disarm a nuclear weapon, eliminate the device by destruction, or conduct an early strike to destroy terrorists nuclear development facilities. The solution to the nuclear terrorist threat rests in an early attack to eliminate it.

Such a strike could be either a close attack using a special forces team, or a stand off attack using "smart" weapons, designed to eliminate the terrorist's capability to complete the development of the nuclear weapon. Either method would require accurate intelligence of the terrorist target and its environment to ensure success with minimal collateral damage. Inherent in this type of military operation would be strict operations security (OPSEC) measures. Consequently, any use of U.S. military assets to destroy a terrorist's nuclear development facility would send an unmistakable message--the U.S. will not tolerate the proliferation of nuclear weapons by terrorists.

In the final analysis, the U.S. must set the example by taking a more aggressive approach to countering nuclear terrorism that is recognized and feared by potential nuclear terrorists. In the wake of the Cold War, in an environment of proliferation of

WMD in the hands of terrorist groups eager and motivated to achieve political goals at the expense of human lives, the U.S. has the capability to eliminate this threat. The world does not need to see the effects of death and destruction of the ultimate terrorist's weapon--a nuclear bomb. Political posturing about nonproliferation measures only buys time for non-state actors or even rogue nations to finalize their development of a nuclear device. It is time for the U.S. to take the lead and develop, equip, train, publish, and implement an aggressive counterproliferation policy, thereby sending a clear message to the nuclear terrorist--to cease work. The U.S. should exercise rigorous counterproliferation policy to ensure the security of the U.S., its interests, and those of its allies throughout the world.

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[1] Samuel Glasstone and Philip J. Dolan, U.S. Department of the Army Pamphlet 50-3, "The Effects of Nuclear Weapons." Washington, DC, March 1977, 543.

[2] "Outline of Atomic Bomb Damage in Hiroshima." Hiroshima Home Page, downloaded from the World Wide Web under the key word "Hiroshima," at the site www.city.hiroshima.jp/C/city/ABombDamage/99.html, March 1998.

[3] Ibid.

[4] Ibid.

[5] Ibid.

[6] Ibid.

APPENDIX A

REVIEW OF LITERATURE

Throughout my research, I discovered numerous books, articles and periodicals describing weapons of mass destruction (WMD), nonproliferation, and terrorism. It seems in vogue to discuss and analyze these three categories; however, rarely has the analysis combined them into one category, and never linking them with counterproliferation.

Even more interesting is the ongoing National Command Authority (NCA) claim that WMD and terrorism are the greatest threats to the U.S. However, little to no information is available that addresses the governmental response to these threats, especially in a possible combined threat of nuclear terrorism. Simply put, there is no evidence of a published U.S. counterproliferation policy, nor literature detailing the generation of such policy and associated doctrine.

I began my research on this topic in 1995 and conducted initial research in various publications concerning this topic. There were multiple articles in open source publications that discuss various aspects of nuclear terrorism. Also, I perused several books that underscored the terrorist mindset and motivations, as well as the motivation behind emerging rogue nations. My initial research revealed the ease of obtaining nuclear weapons designs off the Internet. In the later stages of my research, I focused on the U.S. nuclear policy development as a basis for the current U.S. position on

counterproliferation.

This appendix will provide a literature review in four areas: weapons of mass destruction, terrorists, weaponization, and policy; nonproliferation and counterproliferation.

Weapons of Mass Destruction

Several writings on the proliferation of WMD are available and include various assessments of the its effects on the U.S., as well as other states. The National Defense University's Institute for National Strategic Studies' *Weapons of Mass Destruction: New Perspectives on Counterproliferation* proved invaluable. Not only do its authors present their views on WMD proliferation, but they come from various countries that currently possess WMD. Each perspective is unique, and the authors provide interesting and varied motivations for the effects and control of WMD proliferation. Naturally, authors from potential rivals present conflicting views. For example, various Indian and Pakistani authors counter each other with their country's motivation for obtaining WMD, as well as nonproliferation and counterproliferation strategies. This book provides a basis for why nation states and potentially terrorist organizations may decided to obtain a WMD.[1]

I have downloaded from Internet a multitude of articles, primarily from Reuters, on the current conditions affecting WMD. These articles focus on the North Korean attempts to proliferate its nuclear capabilities, the Russian sale of plutonium into Germany, the Iranian bid to become nuclear, and the Chinese potential transfers of

nuclear technology. These articles provide the latest information of potential nuclear technology and development various countries around the world, and allow me to track the current situation.

Terrorists

Probably the book that provides the most insight and applicability to my thesis is Michael Klare's Rogue States and Nuclear Outlaws. Published in 1995, it delves into the current administration's attempt to develop a strategy to address WMD. Although his perspective is somewhat negatively biased in the original method the U.S. decision-makers arrived at the conclusion that they must focus on WMD, his predictions are thought-provoking.[2]

Equally helpful were three graduate theses that analyzed counterproliferation and terrorism. MAJ Scott Cottrell's thesis, *Identifying the Roles of the Separate Governmental Agencies in Countering the Proliferation of Weapons of Mass Destruction Among Non-State Actors Throughout the Counterproliferation Continuum*, delved into the terrorist threat, its motivation, and its propensity to continue to use WMD (all forms.)[3] CPT Todd D. Frady's thesis, *The Goals and Motivations of Narcoterrorism and Political Terrorism: How Do They Differ?* provided interesting insight into the motivations of terrorists.[4] Probably the most applicable thesis was Mr. Theodore R. Hanley's Hammas: *Will a Nuclear Weapon be in its Arsenal?*[5] This work provided valuable motivational theories as they apply to nuclear terrorism, as well as the likelihood of a

terrorist group actually using a nuclear weapon.

I chose to extensively use the ideas and theories of Dr. Martha Crenshaw as they apply to motivations of terrorism. Her books, *Terrorism, Legitimacy, and Power; The Consequences of Political Violence*[6], and *Inside Terrorist Organizations* provided a simple two prong description of terrorist groups.[7] Unlike the more complex definitions Christopher Dobson and Ronald Payne's, *The Never-Ending War*, Crenshaw's model presented a more clear cut model of terrorist motivation that allows the reader grasp base desires and goals of terrorist groups.[8]

Weaponization

The primary source for information on the weaponization of nuclear devices was the Internet. While the information is somewhat perishable, major web sites remain active for years and provide data and diagrams that clearly provide the basics for developing and building a nuclear device. User friendly web pages such as *Todd's Atomic Homepage* allow the Internet user to conduct research in a myriad of areas to include weapons, radiation, testing, materials, photographs, and history.[9] Another excellent source for diagrams of a nuclear weapon was J. D. Dyson's article, "Documentation and Diagrams of the Atomic Bomb." Both Todd and Dyson are students in the nuclear engineering program at University of California in Berkeley.

A primary source for information concerning nuclear terms describing the scientific components and their roles in the construction of a nuclear weapon was the

Nuclear Terms Handbook.[10] This handbook, along with Cary Sublette's article entitled, "Nuclear Weapons Frequently Asked Questions: Introduction to Nuclear Weapons Physics and Design"[11] and Todd's weapons diagrams completed a detailed packet of information needed to construct a nuclear weapon. Still another somewhat dated but still very useful source was the Department of the Army Pamphlet No 50-3, *The Effects of Nuclear War.* This second manual provided scientific data on the destructive effects of nuclear weapons, to include explosion, blast, burst, radiation (both thermal and nuclear), radio and radar, electromagnetic pulse, and biological effects.[12]

Technology Review, Management Science, and Chemical & Engineering News provided information and views on the transfer of nuclear technology and their effects on world stability.[13]

Policy: Nonproliferation and Counterproliferation

Several discussions in *Nuclear Strategy, Arms Control, and the Future* provide the historical perspective to the development of U.S. nuclear strategy and policies. This book provides insight into the escalation of nuclear weapons, the mind set behind the various U.S. strategies, and the resulting policies. It provides a historical analysis of the U.S. motivations for developing and maintaining WMD. Although it is somewhat dated, these motivations can be applied in part to current states and organizations attempting to obtain WMD.[14]

MAJ Scott Cottrell's thesis, "Identifying the Roles of the Separate Governmental Agencies in Countering the Proliferation of Weapons of Mass Destruction Among Non-State Actors Throughout the Counterproliferation Continuum," provided amazing insight into the current administration and other governmental agencies limited input into developing counterproliferation policy. He describes, in detail, the goals and responsibilities of the Department of State (DOS), DoD, Central Intelligence Agency (CIA), and Federal Bureau of Investigation (FBI) as they pertain to counterproliferation and terrorism.[15]

Naturally, the most important documents on policy for this thesis were the most recent publications of the *National Security Strategy* (NSS),[16] *National Military Strategy* (NMS), and DoD responses to these guidelines. Available in both hard copy and on the Internet, they provided the most current guidance to policymakers as they wrestle with a U.S. counterproliferation policy.

Also available on the Internet were a myriad of documents and articles on nonproliferation and counterproliferation. These government and civilian sources provided insight on the development of the current U.S. position on both nonproliferation and counterproliferation; highlighted by the collapse of the Soviet Union and its control of nuclear related materials and weapons.

Foreign Broadcast Information Service (FBIS) reports provide a wide range of opinions on not only the Nuclear Nonproliferation Treaty and the May 1995 meeting for its extension, but also on rogue nations and terrorists' interests in WMD.

In an attempt to get into the minds of decision-makers, I looked into the various autobiographies of previous presidents and policy makers. These authors include former President Reagan, Casper Weinberger, James Baker, and Colin Powell. These books provide selections that permit me to attempt to discover how the Intelligence Community has influenced them in their WMD policy making.

Specific periodical searches include *FBIS* reports that provided various regional reviews of the NPT and isolated views on several rogue nations obtaining NWMD. *The Economist*, *Brookings Review*, and *Vital Speeches of the Day* provide insightful views on the effects of WMD proliferation and the effectiveness of the NPT in current world politics.

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[1] William H. Lewis and Stuart E. Johnson, Weapons of Mass Destruction: New Perspectives on Counterproliferation. Eds. William H. Lewis and Stuart E. Johnson, Washington, DC: NDU Press Publications, 1995.

[2] Michael Klare, Rogue States and Nuclear Outlaws. New York: Hill and Wang, 1995.

[3] Scott C. Cottrell, "Identifying the Roles of the Separate Governmental Agencies in Countering the Proliferation of Weapons of Mass Destruction Among Non-State Actors Throughout the Counterproliferation Continuum." MMAS Thesis, Ft. Leavenworth, KS: U.S. Army Command and General Staff College, 1997.

[4] CPT Todd D. Frady, The Goals and Motivations of Narcoterrorism and Political Terrorism: How Do They Differ? MSSI Thesis, Washington, DC: Defense Intelligence College, December 1990.

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[10] U.S. Department of Energy, Office of Nonproliferation and National Security, Office of Nuclear Management, Nuclear Terms Handbook, USGPO, 1995.

[11] Cary Sublette, "Nuclear Weapons Frequently Asked Question: Introduction to Nuclear Weapons Physics and Design" downloaded from the World Wide Web under the key word "nuclear weapons," at the site http:\\www.pal.xgw.fi/hew/nfaq2.html, April 1996.

[12] Samuel Glasstone and Philip J. Dolan, U.S. Department of the Army Pamphlet No. 50-3, The Effects of Nuclear Weapons. Washington, DC, March 1977.

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[16] William J. Clinton, "A National Security Strategy for a New Century," May 1977 Washington, DC, 1997.

APPENDIX B

RESEARCH METHODOLOGY

The nature of this topic required extensive reading and research concerning the design and development of a nuclear weapon, terrorist motivations, and the developing U.S. counterproliferation policy. The greatest problem during this research was focusing on the development and evolution of current U.S. counterproliferation policy. Apparently, this policy is still being developed, perhaps at the classified level, and was generally unavailable for perusal.

In addition to background reading, this author was fortunate to attend two lectures in the Washington, DC area that provided some perspective of former decision-makers. Former USSR president Mikhail Gorbachev and former U.S. president George Bush lectured on forms of global leadership and the importance of nonproliferation.

My final research method included limited interview of analysts and the Central Intelligence Agency (CIA) early in the process. Although classified and not used in this thesis, these interviews validated the need to study this problem and suggest solutions.

The basic research methodology used in preparing this thesis was to research the proposed question and subordinate questions by conducting background readings, attending lectures, and conducting limited interviews. Researching the subordinate questions provided the answer to the proposed question. The specific methodology for each question follows.

Proposed Research Question: Will various nation-states and terrorist organizations seek to obtain nuclear weapons of mass destruction to threaten U.S. interests?

To answer this question, this author researched and attempted to answer the following subordinate questions:

1. What U.S. interests are likely to be threatened by a WMD?

2. What motivates nation-states/terrorist groups to obtain a WMD?

3. What is the likelihood of the use of a WMD against U.S. interests?

4. How can the U.S. identify states/organizations developing a WMD?

5. What steps can the U.S. take to prevent the aggressive use of a WMD?

6. Should the U.S. act unilaterally or with the United Nations/other allied countries in dealing with the aggressive use of WMD?

7. What policy options are available to the U.S. once it detects the development of WMD in other countries? How does the U.S. respond?

8. What are the implications for the Intelligence Community?

This author discovered answers to these questions in the background reading from various sources. The single greatest source of information on the subject was the Internet. I was able to access government documents and research labs that provided the basis for my analysis. It also had the most up to date government documents as they were loaded onto the Internet and available quickly for perusal. The Internet also provided a starting point for subsequent sources on the subject.

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