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IMPLICATIONS AND EFFECTS OF ADVANCED BIOLOGICAL AND
BIOLOGICAL/CHEMICAL WEAPONS AT THE OPERATIONAL PLANNING LEVEL

by

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

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

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Abstract of

**Implications and Effects of Advanced Biological and
Biological/Chemical Weapons at the Operational Planning Level**

Recent advances and potential proliferation of biological weapons could have profound implications on operational planning for the United States. In general, biological weapons development has the potential to revolutionize warfare planning. This paper analyzes recent research and advances in biological and biological/chemical technology. It examines the imposing threat and significance to the Biological Weapons Convention of 1972. It then discusses how biological and biological/chemical weapons effects the operational level and operational planning. The paper offers projections, opinions on deficiencies/risk, and suggests alternatives. Finally, conclusions are presented offering challenges and concerns.

PREFACE

The details on biological and biological/chemical technology presented in this paper are unclassified. Sufficient information is available, that once analyzed, shows an emerging threat world-wide. This paper uses information from Congressional testimony, official publications of the Department of Defense, trade journals, and other publications. The information from these sources, together with the analysis in this paper can serve as a point of departure for debate. The public's interest may pertain to the value of biological/chemical technology and it's application to deterrence and war. In addition, the military may also want to address biological/chemical technology effects at the operational level and corresponding implications to operational planning. Such debate is critical to ensure that United States' policy reflects the national will and serves the nation's security.

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CHAPTER I

INTRODUCTION

The Problem. As we think of threats to the United States, what usually comes to the mind of politicians, the military, and the public is the Soviet Union with its nuclear and conventional war making capabilities. Other threats that may come to mind include chemical warfare, the drug war, or even possible economic trade wars. Low on everyone's threat list appears to be the present and emerging field of biological warfare. Compared to nuclear or chemical warfare, little has been published on the subject. The trend has always been to push the topic aside as 'unthinkable' hoping it might go away. The public has shied away from the topic in forums and scientific symposia. Finally, the Congress agreed to a treaty that stated 'Thou shalt not dabble in biological warfare.'

In a perfect world order, the United States might not have to consider 'unthinkable' warfare. However, major scientific advances in molecular biology and biochemistry (biochem) lead to the so-called biotechnology in the 1980s. The key technique that ushered in the new threat was gene splicing or, more formally, recombinant DNA. The potential for biological weapons has increased so greatly that prior concepts of use, effectiveness and defense are woefully inadequate. Douglass states:

Potencies, probably a better descriptor to use than toxicity, have increased by four to ten orders-of-magnitude. Even the professionals who plan for nuclear war shake their

heads and go away mumbling when asked about the possibilities of . . . biological warfare.

The thesis offered in this paper is that recent advances and potential proliferation of biological weapons could have profound implications on operational planning for the United States. In general, biological weapons development has the potential to revolutionize warfare planning. This paper discusses recent research and advances in biological warfare. Analysis is provided for consideration to operational planners at various command levels. Finally, concluding thoughts are offered for future action and research.

This paper applies to naval, air, and ground forces alike. According to Douglass:

One of the objectives of Soviet biological warfare research identified by defectors has been the development of diseases and viruses that act quickly, in less than 24 hours, so that they could be used in tactical applications, such as neutralizing air bases.

The implications to the Commanders-In-Chief (CINCs) and their respective planning staffs are ominous: Biological scenarios do effect deliberate/contingency planning cycles and maybe even more importantly, crisis action procedures (CAP) now and in the future.

The scariest aspect of the revolution in biotechnology is the fact that it appears to fit with the Soviet doctrine for covert war, sabotage, subversion, and subjugation. Unfortunately, these subjects are also unacceptable because they are inconsistent with the governing policies of detente and the notion of a kinder and gentler Soviet Union. It is evident that

the United States is unprepared to deal with the problems of biochem warfare, independent of how or from which quarter they might arise.³

United States' Policy. The United States is a signatory to the Biological Weapons Convention of 1972 that outlaws biological and toxin weapons. In 1986, the United States was one of 67 nations who met in Geneva to try to correct shortcomings in the Biological Weapons Convention of 1972. The Final Declaration, adopted and signed by all participants, made progress in the areas of increasing openness and establishing forums for complaint resolution.⁴ The United States continues biological defense research but all biological weapons were destroyed long ago. The biological defense research program is conducted in full compliance with the biological weapons convention and with the Centers for Disease Control-National Institutes of Health guidelines, Biosafety in Microbiological and Biomedical Laboratories.⁵

It is evident that the United States desires to exclude the possibility of biological warfare as an option. As with any threat, the United States must analyze the threat potential and determine if would be enemies could or would use biological weapons in tactical operations. Finally, the United States may need to reconsider it's measures of deterrence for biological warfare.

CHAPTER II

ADVANCED BIOLOGICAL ENVIRONMENT

Threat.

Foreign Student's Higher Education. The United States is training foreigners at record levels in its universities. Foreign students in the United States reached a record 386,000 of which 37,330 are from the Middle East alone.⁶ Over the past year, enrollment has increased in Computer & information sciences, Engineering, Life sciences and Physical sciences. These four categories account for 34% of foreign studies or 132,540 majors. Wilson figured that:

About 72 per cent of the foreign scholars focused on research, while 13 percent spent most of their time teaching and 15 percent took part in some combination of the two. Roughly 60 percent were employed in the sciences.

Considering only Middle East countries with at least 1,000 students at U. S. universities, there are 24,700 students from Iran, Lebanon, Saudi Arabia, Israel, Egypt, Syria, United Arab Emirates, and Morocco (in order of magnitude).⁸

One of the effects of the biotechnology revolution is the proliferation of scientific knowledge. What is accomplished at the post-doctoral level this year, is taught at the graduate level the following year, and the undergraduate level the year after. . . . nor is there any shortage of equipment in the regions of the world that are especially troublesome.⁹ Basically, visiting students from foreign countries can acquire

the knowledge and acquire the equipment for basic biotechnology research.

It is clear from the above statistics that foreign students are opting for high technology educations in the United States. The disciplines numerated above provide the foundations for biological and delivery systems technology. This leads one to the simple conclusion that Middle East countries, as well as other areas, are increasing the numbers of U. S. trained scientists that potentially could develop biological weapons and delivery systems.

Biological Developments. For the sake of discussion, biological pathogens are defined by Compton as:

. . . living organisms that attack the human body, disrupting its processes and endangering its health and well being.¹⁰

Waging biological warfare includes pathogens that endanger humans, animals and plants. These three areas are supported by four categories of pathogens: (1) Bacterial; (2) Fungal; (3) Rickettsia; and (4) Viral.¹¹ Nature has waged biological warfare on humanity since the beginning of time. Likewise, man has used this natural process to gain military advantage in war, such as the smallpox epidemics that spread throughout the American Indian population in the 18th and 19th centuries. What has changed in the past two decades is the ability of man to change the natural process.

Deoxyribonucleic acid (DNA) is the chemical substance of genes, serving the dual function of hereditary transmission and

of programming the cell to perform it's biological functions. DNA is read sequentially, with certain portions serving as start and stop signals for the cellular process. Using bacteria with a single chromosome (restriction enzyme), it is possible to cut out strands of the DNA chain. Another enzyme is then added, which re-attaches the matching ends, reestablishing chemical continuity.¹² This simple process is the basis of recombinant DNA, or gene-splicing technology. In a similar process, plasmids are used instead of enzymes to insert new DNA segments producing a hybrid plasmid. The clone is then returned to the bacterial cell where it will multiply based upon its cloned DNA segment.

Genetic engineering techniques could be used to alter physical characteristics, increasing or decreasing a biological agent's ability to survive in a given environment. A second method of genetic engineering introduces toxin genes into non-toxigenic bacteria. The first two methods have warfare potential. However, there are two additional techniques that fringe on the unthinkable. These include modification of immunological properties and developing a pathogenic organism that is specific for a particular racial type, referred to as an ethnic weapon.¹³

Finally, biological agents could be developed, using gene-splicing techniques, that begin manufacturing the desired toxic agent "on command". Environmental factors, such as heat and humidity, could act as trigger mechanisms of agents already in place by some delivery system. For the operational commander

having sufficient laboratory equipment in theater, tailored biological weapons could be manufactured to support the campaign effort.

Biological/Chemical (Biochem) Advances. Since the signing of the Biological Warfare Convention of 1972, a gray area of interpretation has emerged. First, gene-splicing technology evolved such that artificial toxins became a possibility. And second, the demarcation line between biological and chemical weapons is disappearing.

At present, no known toxins rival the military effectiveness of the chemical nerve gases. However, most toxins cannot penetrate the skin, tend to be unstable in air, and nonvolatile, so they cannot be disseminated in a wind-borne vapor. Gene-splicing could be employed to engineer modified toxins that are more stable and that are also volatile, capable of penetrating the skin, or tailored to react with specific receptors in the body.¹⁴ Based upon these facts, there is an unanswered question. Is this resulting toxin a biological weapon or a chemical weapon? Furthermore, which treaty or convention does it pertain to? Or, is it the loophole that could allow the United States to develop biochem weapons? Thus far, there have been no answers to the questions in the literature: Maybe, the United States isn't looking for one.

Delivery Systems. Traditional delivery systems remain the mainstay for biological weapons. These include, but are not limited to, combinations of anthropoids, bombs, missiles,

aerosols, or water contamination.¹⁶ In Operation Desert Storm, pilotless-remote controlled mini-aircraft circled enemy camps with a video camera onboard to gather intelligence and direct artillery missions. Aerosols, strapped to such aircraft, offer cheap and virtually undetectable delivery systems in an tactical environment.

Another method of delivery, developed by the Soviet-bloc, was targeted for 1985. Although there is no confirmation, the process was to isolate and mass-produce rare, sophisticated toxins. Toxicity was further increased by extracting the active portion of the toxic molecule. The resultant new molecule was reproduced and "packaged" for delivery in existing weapons, or microencapsulated for special delivery techniques. In other techniques, a gene that manufactures a desired molecule was coded. The gene was then spliced into a genetic micro-organism. The result was a miniaturized biochem agent manufacturing plant intended to be surreptitiously introduced into the targeted individual or population. The micro-organism was then selected or designed for a specific delivery technique, such as, water supplies, air, food and drink, even clothing, or as drugs.¹⁸

Finally, biochem agents need not be mass-produced far in advance of their use. Once the desired parent cells are produced, cultures can be stored for activation when needed. The activation can be effected remote from the site of initial manufacture.¹⁷ Cell cultures, as delivery systems, can be

covertly carried to target countries and subsequently manufactured there.

The United States is faced with trying to find the 'needle in the hay stack.' Biochem stockpiles are not required and can use conventional delivery systems. Therefore, intelligence plays an even more important role in the identification and tracking of potential biochem agents and delivery systems.

Biological and Chemical Experiences. As the American forces breached the Iraqi defenses in Kuwait during Operation Desert Storm, just the threat of anthrax (biological) or chemical munitions caused attacking forces to wear protective clothing. It is questionable the same assault could have taken place in the hot summer months due to the physical stress on the soldiers.

During the early phases of the war in Afghanistan, the Soviets appeared to have experimented with incapacitant to support tactical operations. It is believed the Soviets used a novel chemical incapacitant that immobilized soldiers so rapidly that they were 'frozen' in position before they knew what was happening.¹⁸ A similar report from Afghanistan detailed the Soviet use of an instant incapacitant that put their victims to sleep from two to four hours without their awareness that they had ever had been under attack.¹⁹ Biochem incapacitant with timers could physically or mentally render soldiers unfit for combat, and without the combatant commander necessarily realizing what has happened or why.

In the Iran/Iraq war, surface to surface missiles (SSMs) did

not end or decide the war. However, they certainly had an influence. In all, over 875 SSMs were fired almost all of which were aimed at cities. The news media carried the descriptor 'Terror Weapons' and referred to them as the 'War of The Cities.'²⁰ Iranian SSMs constituted an acute challenge to the Iraqi leadership, which was extremely sensitive to such morale-impairing attacks; Likewise, Iraqi SSMs attacks so shocked the Iranian leadership that they appealed to various international forums.²¹ Over the course of the SSM war, Iran suffered between 6,000-15,000 casualties.²² The SSMs armed with biochem weapons would have the potential to increase the casualty rate from four to ten fold in a similar situation.

Biological Weapons at The Operational Level.

Deterrence. The United States and it's allies have successfully deterred conventional, nuclear, and chemical warfare of would be enemies by countering their force and weapons with force, weapons and superior technology. NATO has been, and still is, a shining example of the United States' determination to deter aggression. However, biological deterrence is another matter to contend with.

The United States is a signatory nation of the Biological Weapons Convention of 1972 as is most of the civilized world. The Biological Weapons Convention of 1972 is inadequate today as it does not cover biochem and newly related technologies. The U.S. Congress has met regularly to tighten control of these emerging biotechnologies. On 25 January 1989, a bill was

introduced by the Senate:

To amend the Arms Export Control Act to impose sanctions against firms involved in the transfer of chemical and biological agents or their related production equipment or technical assistance to Iran, Iraq, Syria, and Libya, and for other purposes . . . other wise known as the Chemical and Biological Warfare Prevention Act of 1989.²³

The House proposed a similar Act called the Biological Weapons Anti-Terrorism Act of 1989. The purpose of this Act was to:

- (1) Implement the Biological Weapons Convention, an international agreement unanimously ratified by the United States in 1974 and signed by more than 100 other nations, including the Soviet Union; and
- (2) Protect the United States against the threat of biological terrorism.²⁴

It is interesting to note that an Act was required in 1989 for the United States to implement the Biological Weapons Convention of 1972 and ratified in 1974.

Genetic engineering offers the ability to create new variations of toxins within days. Therefore, it is impossible to develop a deterrence on a toxin yet unknown. Congressional Quarterly recently reported that:

. . . most experts agree there is no real technical constraints on the use of . . . biological weapons. The only effective constraints are psychological. It's more the human mind that you have to effect than hardware.²⁵

Finally, Joseph D. Douglass, Jr. offers a warning valid to operational planners. He states:

The Department of Defense does not have an adequate grasp of the biological threat and has not been giving it sufficient attention. With respect to nuclear warfare, however, the nation at least forged the means of deterrence. In the face of vastly expanding threat of chemical and biological warfare, we stand today in virtual helplessness.²⁶

Analysis shows that deterrence is allusive at best considering biological warfare. The United States is in the dilemma of not wanting to officially develop such weapons, but also realizes that biological weapons could be used against its armed forces and population.

Defense. The United States' military posture is offensive by design but defensive by nature. The defense posture is necessary in peacetime to protect the homeland and our freedom of the seas. In war, the defense is used to consolidate gains, deny the enemy use of terrain, as well as a host of other tactical considerations.

While in the defense, tactical units must consider all types of warfare: conventional, nuclear, biological, and chemical (NBC). The Soviets have more than 30,000 dedicated personnel specializing in reconnaissance and decontamination operations and more than 30,000 special vehicles for NBC operations.²⁷ It is conceivable that sooner or later, United States' forces will face this threat either directly or through surrogate nations.

Since 1960, the Soviets have placed chemical and biological weapons prominently in tactical battlefield applications. However, they have assigned greater weight for use in Spetsnaz (Soviet Special Forces) or special force operations waged on the eve of war against high-value military targets such as command, control and communications facilities.²⁸ In 1975, mock Soviet exercises called for the Danish capital of Copenhagen to be blanketed with an incapacitating agent that immobilized the

population while Warsaw Pact troops seized the port facilities.²⁹

Tactical commanders, in the defense, would face unprecedented conditions in a biochem environment. The Pentagon foresees the following possible ways an adversary might use 'designer' bugs and drugs:

1. Organisms could be given novel immune characteristics to evade the protection of vaccines or the human immune system;
2. Potent toxins, effective in minute quantities, could be produced;
3. Plant or fungal toxins could be mass produced for warfare directed against agricultural crops; and
4. Physiologically active peptides could be designed to produce bizarre behavior.³⁰

Considering nation building and care for refugees that normally accompany a forward deployed defensive position, the implications could literally make the defensive force ineffective.

In order to counter the biochem threat, United States' forces in the early to mid-1990s, will receive upgraded equipment. The equipment includes new detectors and alarms, decontamination systems and material (like the soldier integrated protective ensemble and collective protection) for the heavy force modernization. Treatments include a new toxin antidote, a broad spectrum anti-viral drug for treatment of hemorrhagic fevers and new vaccines for protection against infectious biological agents.³¹

Offense. Should the United States develop offensive biochem weapons for deterrence? Rose offered two factors to amplify the impact of biochem weapons on the military:

First, the new biochemical processes are relatively cheap, easy to master, and accessible to all. Second, the new technology favors offense over defense.⁵²

Biochem weapons can be specifically tailored for offensive action with a desired result and produced within hours, while antidotes may take years. With gene splicing's ability to combine bits of known organisms in a almost limitless array, vaccines and distribution are not practical. If the United States draws upon nuclear deterrence as a precedence, it seems logical that the United States should develop a biochem capability for tactical use.

In order to use biochem weapons, the military and the government must re-educate the populace on the horrors of war. Most Americans strongly detest the use of nuclear weapons based upon fallout experiences with Three Mile Island and Chyernobol. Likewise, the citizens have seen pictures of the effects of mustard gas in Afghanistan. Recently, the world looked upon Operation Desert Storm as the way to fight future wars. But from the trenches of the common Iraqi soldier or civilian near the front, the war was an apocalypse. It is estimated that over 150,000 military and civilians perished. The world may judge United States' action as inhumane in the years to come. Offensively, it is possible to develop biochem weapons that could

put a potential enemy to sleep or incapacitate the force for a given period of time while friendly forces seize the objective.

If indeed, military operations are an extension of politics, might it not be more humane to take an objective with no loss of life or limb on either side? Such offensive actions and capability might deter would be aggressors, but even of greater importance, revolutionize tactical operations. At a minimum, biochem weapons would be a force multiplier. At best, pursuit of military objectives supported by biochem weapons might be taken with only a token force compared to one armed with conventional weapons. Furthermore, world opinion might be more supportive of military operations knowing in advance that loss of life would be minimum.

Terrorism. Thus far, there have been no known uses of biochem warfare by terrorists. However, this is not to say the terrorists haven't been seriously considering biochem as an option. It is known that terrorists not only have undergone chemical and biological warfare training, but have actually been involved in the manufacture of toxic chemicals and toxins.³³ In 1989, the Department of State issued a bulletin stating:

We are especially concerned about the spread of biological weapons in unstable areas and about the prospects of biological and toxin weapons falling into the hands of terrorists. Today a number of countries are estimated to be working to achieve a biological weapons capability based on information of extremely sensitive intelligence sources and methods. To date we have no evidence that any known terrorist organization has the capability to employ such weapons.³⁴

Many terrorist acts are intended to accomplish specific political

goals in both the long and short term. A credible threat to kill 100,000 people in a city to get a terrorist colleague out of prison could serve a short term goal. However, public revulsion engendered may make establishment of the new political order impossible, especially if mass casualties occur. Recent history has shown that terrorist groups are already showing little aversion to inflicting large number of casualties using conventional weapons. Terrorist groups could move to mass casualty terrorism to attract attention. Since the world community has shown little outrage over the Iraq/Iran war, perhaps the use of biochem warfare's psychological barrier has already been broken for terrorists.

The Department of State established a NBC Working Group that examines the United States Government's capacity to respond to nuclear threats. The group is expanding it's work to exercise developed programs to test the government's response capability to biochem threats. Various exercises have involved the Federal Government alone, the Federal Government coordinating with State and local governments, and the Federal Government acting with other countries.³⁵

Projections. There appears to be growing interest by potential enemies of the United States to develop the capability to wage biological or biochem warfare. Due to the difficulty in acquiring nuclear fuel and other nuclear technology, biochem weapons have potential to become the poor man's nuclear bomb. After all, biological weapons are cheap, easy to make, hard to

detect, and don't require stockpiling. Clearly, the weapons of choice for Middle East countries are based upon chemical and missile technology to counter superior conventional forces or potential nuclear capabilities. Since the 1925 Geneva Protocol and United Nations sanctions have not been observed in the Middle East, we can expect continued NBC, SSM, and biological capabilities will be developed there and else where in the world. Furthermore, one should not rule out the biological weapons threat by terrorists. The analysis shows the likelihood of biochem threats. These threats exist for United States military forces world-wide, not only in the future but also as this paper is being read.

Threat Counter View. Scientists and governments around the world tend to look upon biological warfare as a real danger to all of humanity. They cite that existing agents are slow-acting, unreliable, indiscriminate, unpredictable in their dispersal and effectiveness, capable of backfiring on the attacker, and likely to cause more damage to nearby civilian populations than to enemy forces, which would presumably be equipped with protective gear.³⁶ Recent editorials on Operation Desert Storm cite the precise bombing capabilities the United States and it's coalition partners and argue chemical and biological weapons are simply not needed for future wars. Finally, Bernstein reminds us of the lessons from World War II when he wrote:

American experience during World War II warns that weapons conceived for deterrence or retaliation may become attractive and may seem morally justifiable for offensive strikes. Once the war machine gears up for

action, scientists may not be able to constrain use of the technology they have created, particularly in a conflict that is deemed a 'just' war.³⁷

I do not agree with such arguments against the development of biochem weapons for deterrence or offensive action. First of all they don't consider who the potential enemy is and their biochem capabilities. Second, biochem technology could develop stable, usable weapons for tactical employment. Third, one could argue that taking an objective using biochem weapons is more humane than using conventional means. Finally, the United States' nuclear deterrence against Soviet strategic weapons would be very questionable if it only had defensive weapons. Our strategic triad is the foundation for deterrence yet it remains fundamentally offensive.

Thus far, this paper has presented analyses of the biological and biochem warfare threat and how it effects deterrence, defense, offense, and terrorism. Chapter IV uses the knowledge discussed from Chapter III and applies it to considerations for operational planning.

CHAPTER III

BIOLOGICAL WARFARE EFFECTS ON OPERATIONAL PLANNING

Commander-in-Chief (CINC). CINCs prepare for war in their assigned area of responsibility. As such, they consider short and long range estimates, and develop war plans based upon guidance. Biological and biochem warfare complicate the planning process. There are only sketchy outlines of short and long range biological warfare capabilities. This is disturbing since the analysis has shown the potential that such weapons can be tailor made within days. Therefore, intelligence plays a greater role as the threat increases. The CINC must also rely more on his Department of State's Representative as a source of intelligence due to the Department's constant monitoring by it's various working groups.

The CINC's Commander's Estimate should include Enemy Capabilities (ECs), if appropriate, for biological and biochem warfare and counter them against his Own Courses of Action (OCAs). Consideration must be given to Measures of Effectiveness and Combat Ratios. I submit that we could factor in tactical nuclear artillery, but how to factor in a potential enemy biochem threat is another matter. Needless to say, the topic deserves much thought by the intelligence and operations staff.

The CINC needs to exercise his staff to the potential threat. Scenarios should be developed for war gaming by the staff. War gaming provides the experience the staff officers

need in order to modify deliberate planning procedures for the development of operational orders and contingency plans. It is quite possible that biological warfare planning will ripple throughout the planning process to include review of the Time Phased Force Deployment Data (TPFDD).

Crisis Action Procedures (CAP) needs to be expanded to adequately address the potential threat of biological and biochem warfare in Phase III. In this phase, the CINC develops courses of action (COAs) after assessing existing plans and intelligence. At the end of the CAP process, the CINC produces and forwards the recommended COA to the Chairman, Joint Chief of Staff for approval.

CINCs may have to consider the use of Special Operation Forces to monitor the biological environment prior to initiation of operations. Surveillance and monitoring devices simply would not suffice in deploying forces in a high risk area.

Theater. Using operation art, the CINC (Unified or Specified Commanders) develop the Campaign Plans. However, a biological warfare threat complicates the planning process in phasing, time-space relationships, and combat power generation. More equipment and protective clothing is required putting additional stress on the logistical system. Finally, adequate command, control and communications (C3) is essential for the integration of land, maritime, and air forces into a theater or subtheater campaign plan.

The United States usually wages war with coalition partners

within a given theater. Prior knowledge of coalition forces' NBC defense is critical in mission assignment. Their effectiveness and placement within the theater depends upon their capability to prosecute war in the potential biochem threat environment.

Rear area security is particular vulnerable. The Soviets stress using Spetsnaz to paralyze C3 centers prior to an initial attack. There is no safe haven in the rear even if United States forces follow the tactic of defense in depth. Biochem weapons could possible breach air, land and sea defensive systems with a host of delivery systems.

Combatant Commander. Soviet doctrine lends the use of chemical and biological (CB) warfare on the crucial element of surprise. Military utility of CB weapons depends upon a number of variable such as target acquisition capabilities, training standards, terrain, climatic conditions, weapons delivery characteristics, stockpiles of agents and specialist logistic support, all linked to required casualty ratio or degree of degradation to be imposed upon the enemy. Finally, Soviet tactics comprise combat operations at the lower level, aimed at achieving operational gains.³⁸

Similar to the CINC, the Combatant Commander will need to train his staff in planning and executing war plans in a biochem environment. At this level, more emphasis will be placed on tactical application.

Based upon the United States' Biological Defense Research Program, the armed forces will field new equipment, protection

suits and antidotes during the 1990s. Besides the evident logistical problem of shelf life and sustainment, the combatant commander requires more time to outfit and train his units for sustained operations in a biological threat area of operation.

Deficiencies/Risk. Considering the potential biochem threat or terrorists activity, current doctrine, deliberate and crisis action procedures, training, and equipment are non-existent or minimum at best. For example, training exercises require using the M-17 Gas Mask and Mission Oriented Protective Posture (MOPP) protective suits. Until Operation Desert Storm, little attention was given to evacuation and unit decontamination. This should be of no surprise as USCINCOG's Operational Concept only makes scant reference to an NBC environment.

The United States is at risk if war were to be waged in a biochem environment: The armed forces simply do not have the training or surge capacity for sustained operations. Few staff officers have the training or knowledge of how to operate in a biochem environment in either the defense or offense. Simply stated, biochem expertise is not in the vogue.

Basically, we are ill-prepared to deal with a substantial biochem threat. The United States does have a deterrence in the form of tactical nuclear weapons. However, that is not much of a deterrence to terrorists. Considering the United States total military capability, I'm sure we would manage to prevail but at what cost?

Alternatives. The alternatives presented below maybe somewhat controversial as they contradict official United States policy on biological warfare. However, technological advances in the past have changed policy and warfare. Biotechnology advances could again be the instrument to change fundamental policy.

1. The United States can continue to seek enhancements to the Biological Warfare Convention of 1972 as biotechnology capabilities are identified as threats.

2. The United States can openly debate the advances of biotechnologies and their application to war. Advanced biochem weapons, with restrictions, should be able to replace more lethal forms of warfare.

3. The United States has the technology to develop biochem weapons for deterrence. The policy would be similar to that of nuclear deterrence.

4. The Biological Research Defense Program could surge development of defensive methods for protection and detection. This effort would apply to the general public as well as the armed force.

5. The United States Joint Chiefs of Staff needs to take the lead in realistic assessment and provide subordinate commands with doctrine and guidance for prosecution of war in a biochem environment.

CHAPTER IV

CONCLUSIONS

This paper examined how recent advances and potential proliferation of biological weapons could have profound implications on operational planning for the armed forces of the United States. United States policy on biological warfare revealed the longstanding goal to preclude the use of any such related weapon through the Biological Weapons Convention of 1972. As the analyses proceeded in the paper, it was determined that a grey area exists in the development of biological chemical (biochem) technology due to the fact that there is no treaty or convention covering developments. Next, potential biochem weapons capability was reviewed in conjunction at the operational levels of war considering deterrence, defence, offense, and terrorism. Potential problem areas were identified as they pertained to the CINC, Theater, and Combatant Commanders. Recommendations were offered for operational planners on countering effects of biochem warfare and terrorist activity. Finally, alternatives were presented on countering the growing biochem warfare and terrorist threat. Some of the alternatives are certainly open for debate as they counter official United States policy on biological warfare.

In conclusion, the biochem warfare and terrorist threats are real and growing. They have the potential to rival nuclear weapons as a matter of concern for the United States.

NOTES

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