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SUMMARY REPORT:
CHEMICAL WARFARE IN THE THIRD WORLD

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Burdeshaw Associates, Ltd.
4701 Sangamore Road
Bethesda, Maryland 20816

Performed Under Subcontract for
INSTITUTE FOR DEFENSE ANALYSES.

April 1987

Prepared for
Office of the Assistant to the Secretary of Defense (Atomic Energy)



INSTITUTE FOR DEFENSE ANALYSES
1801 N. Beauregard Street, Alexandria, Virginia 22311

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INSTITUTE FOR DEFENSE ANALYSES

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PREFACE

This study was conducted by the Burdeshaw Associates, Ltd. under subcontract from the Institute for Defense Analyses. IDA supported this research effort because it provides a view of chemical warfare -- the analysis of chemical warfare issues and operations in the Third World as seen from the military commander's point of view -- that complements in a unique manner, the research being done by IDA in chemical warfare operations for both the OSD and the OJCS.

This report contributes significantly to the understanding and awareness of the issues and problems that can arise from the proliferation of chemical munitions and delivery systems among Third World nations.

This study was conducted in response to DoD Task Order MDA 903 84C 0031: T-V6-381.

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EXECUTIVE SUMMARY

This report is an unclassified condensation of the report "Chemical Warfare in the Third World", (IDA Paper P-2014), prepared by Burdeshaw Associates, Ltd. for the Institute for Defense Analyses in March 1987. These two reports are sequel to the report "Analysis of Chemical Warfare Operations", (IDA Paper P-1812), published in January 1985. The purpose of this report is:

- to identify the potential threat of chemical warfare (CW) in Third World areas and by Third World nations;
- to assess the capabilities of U.S. military forces to cope with such potential use;
- to explore the possibility that terrorists may employ chemical munitions in support of their activities and the implications of that use for American military and diplomatic personnel serving abroad.

The report presents an assessment of the threat posed by the proliferation of chemical munitions and delivery systems among Third World nations, then portrays five plausible employment scenarios in which U.S. military forces are attacked in some fashion with chemical weapons. In a separate chapter the potential for terrorist use of chemicals is examined.

Five conclusions regarding the threat are derived.

- The full extent of the chemical warfare threat worldwide is not known; therefore, a continuing comprehensive intelligence effort is required to track its development.
- Chemical munitions are easy to acquire, either through local production of relatively simple compounds or from friendly states which have a production capability. The number of countries having a CW capability has grown and will continue to grow
- Chemical warfare, despite the Geneva Protocol, is seen as acceptable and legitimate by a number of nations, certainly at least by those that have employed chemical agents in the last three decades.
- The advantages of CW, particularly for forces faced by an unprepared opponent or for forces facing a more sophisticated, better-equipped enemy, are sufficient to make chemical use attractive.
- The threat of the use of CW against U.S. forces and other U.S. governmental activities and interests is growing, both from hostile armed forces and from terrorists.

The issues, and the conclusions and recommendations regarding them, address primarily the doctrine, equipment, organization, and training of U.S. armed forces operating in a chemical environment. Several important policy matters are identified as significant concerns. The following paragraphs cover the wide range of findings that relate to these broad categories.

- The nature of chemical warfare in the Third World differs from its role in Western Europe. The relationships between chemical and nuclear warfare, so distinct in the European study, play almost no role in the Third World. The effects of weather and terrain are far more severe in the Third World. Except for Korea, there are no major U.S. forces stationed in the Third World, and deployment plays a key role in the development of U.S. CW capabilities in such areas.
- There is a threat. The Iran-Iraq War proves the capability and willingness of at least one nation to employ chemicals, and there are strong indications that other nations are contemplating such use.
- There are sound tactical reasons for employing chemicals, but the normal advantages and disadvantages of chemical warfare are skewed by another consideration. In any instance in which modern, well-equipped U.S. forces, face a less sophisticated enemy force, the search by those enemy forces for an "equalizer" may well lead to the use of chemical weapons. They are cheap and very effective, and therefore very attractive.
- The vulnerability of naval forces to chemical attack from shore-based chemical delivery systems is highlighted in this study. Alarms and protected air filtration systems are needed on any naval vessel operating in close proximity to a shoreline.
- A chemical retaliatory capability, identified as the principal weakness of U.S. forces in previous studies, was assumed to be available, and binary artillery rounds and the BIGEYE bomb were employed in the various scenarios of this study. The BIGEYE plays an important role as an instrument of deterrence and retaliation. The binary artillery round, however, will not be available to U.S. light forces and many potential allies because rounds are not being produced for the light artillery and other weapons with which they are equipped. This is true for U.S. light forces and for many potential allies for whom the 105mm howitzer and mortars are the basic artillery weapons.
- There are many problems associated with the employment of chemical weapons on foreign soil and in conjunction with U.S. allies. The U.S.'s "no first use" policy complicates planning for the best distribution of these munitions and reduces the deterrent value of stocks which must remain in the hands of U.S. forces. These problems are further complicated when an ally has its own chemical delivery means but is serving under a U.S. commander in a coalition command.

- International terrorists, who are now supported by the intelligence networks and other infrastructure of certain nations, have a potentially devastating tool for creating the kind of havoc which serves their purposes. In attempting to cope with this potential, deterrence becomes a matter of defense means, measures and readiness because retaliation is almost impossible.
- U.S. overseas installations, both military and civilian, are vulnerable to chemical attack. They are ill-prepared physically and psychologically, intelligence is scant, warning is unlikely, and the resources to cope with such an attack are inadequate.

The principal conclusion to be drawn from this study is that the threat of chemical warfare is pervasive, greater than has been recognized or acknowledged by our defense programs, and we are not adequately prepared to meet the challenge.

I. INTRODUCTION

In January 1985, the report "Analysis of Chemical Warfare Operations" (IDA Paper P-1812) was published by the Institute for Defense Analyses. Prepared by Burdeshaw Associates, Ltd. the report dealt with the CW threat posed by the Soviet Union and the Warsaw Pact in Western Europe. A sequel, "Chemical Warfare in the Third World", (IDA Paper P-2014) published in March 1987, addressed the threat and potential impact on U.S. military forces and government installations of the employment of chemical warfare by a Third World nation, by Soviet forces in a Third World area, or by the terrorist elements which have become prominent on the international scene. This volume is an unclassified condensation of the second report.

A team of retired military officers representing all Services and the U.S. intelligence community prepared this study. They were charged with the following tasks:

- Review current intelligence information and evaluate the capabilities of non-Warsaw Pact countries to employ chemical weapons against U.S. forces deployed in contingency operations. Include an evaluation of weapons, delivery systems, doctrine, etc.
- Assess the capability of the intelligence community to provide adequate warning of non-Warsaw Pact countries' plans to employ chemical weapons against U.S./combined forces.
- Identify measures U.S./combined forces need to take to deter, and failing that, to minimize the effects of a CW attack.
- Develop feasible attack options against U.S. forces and allies and possible U.S. or combined military responses.
- Develop a warfighting scenario based on the above options that describes how chemical weapons might be used and how U.S. commanders would respond, based on current capabilities.
- Describe terrorist attack concepts which might be employed against U.S. installations overseas, such as military facilities and embassies.
- Develop response options which could deter, mitigate, or counter these attacks.
- Evaluate the feasibility of response options and identify changes in policy, equipment, organization, doctrine, and training which would reduce the impact of such attacks.

This condensed, unclassified assessment of the chemical threat in the Third World presents:

- Summaries of four contrasting scenarios which identify the major issues associated with the potential value and effects of chemical weapons if they are used against U.S. forces, installations, or other interests abroad.
 - A Southwest Asia confrontation between Soviet and U.S. forces in a Third World nation. Chemicals are used in support of conventional military operations.
 - A Sixth Fleet operation in the Mediterranean. Examines the vulnerability of naval forces operating within range of shore-based missiles and air forces armed with chemical weapons.
 - An intra-regional confrontation in the Persian Gulf area. Involves U.S. forces deployed on an international security mission; U.S. retaliatory chemical strikes are conducted with BIGEYE bombs by the U.S. Navy.
 - A U.S. amphibious operation opposed by the armed forces of a Third World nation on a hostile shore in Southwest Asia. Examines the vulnerability of the operation and the inadvisability of chemical retaliation in certain cases.
- A discussion of international terrorism and the potential for terrorist use of chemical weapons. A series of incidents that depict plausible uses of chemical munitions by terrorists is described. The incidents provide a study of the vulnerability of military and other government installations to such attack and the implications for U.S. policy and installation security.
- A summary discussion of issues and observations pertinent to protective reactions against the threat, and of policies and actions that will ensure continuity of operations and mission accomplishment under chemical attack.

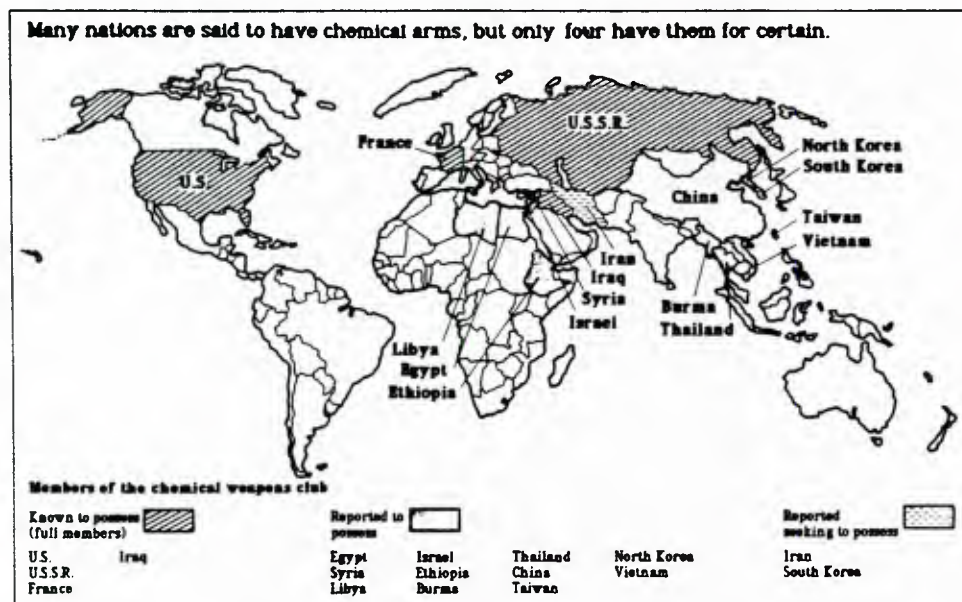
The report reflects the knowledge and experience of its military authors. They were guided by official intelligence estimates, known and proposed Department of Defense programs related to chemical warfare, and their appraisal of current events.

II. THE CHEMICAL THREAT

A. GENERAL

World reaction to the introduction of chemical warfare to the battlefields of World War I led to the Geneva Protocol of 1925, the first serious effort to ban these weapons. Despite the "no first use" provisions of the protocol, many nations developed chemical arsenals--the most expansive and comprehensive of which is that of the Soviet Union. The Soviets enjoy a very significant superiority of chemical warfare capability (which is described in the 1985 analysis, IDA P-1812, "Analysis of Chemical Warfare Operations").

Further, Soviet munitions and delivery systems may well be available to client states and surrogates engaged in the various trouble spots of the world. In addition, a number of states are believed to be developing their own chemical production capability. A current "proliferation report" is provided in Figure 2-1.



Source: *Chemical and Engineering News*, April 14, 1986.

Figure 2-1. PROLIFERATION OF CHEMICAL WEAPONS

Figure 2-1 reflects a significant expansion of the chemical warfare community. In the past 25 years the number of nations believed to have chemical arsenals has increased by at least 10, probably more; estimates run as high as 24 nations.¹ However, the ease with which these agents can be manufactured in industrial plants involved in insecticide and other chemical production makes the list of nations almost irrelevant. Any nation determined to equip its armed forces with a chemical attack capability can obtain the means to do so. The problem is to know which of them have done so if U.S. forces are to be employed in their proximity.

The attractiveness of chemical weapons for Third World countries is significant. They promise devastating effect, especially against an unwarned and unprepared enemy, at little cost. The fact that most instances of chemical use in the past 25 years have not fulfilled such promise does not detract from their potential. Inept employment and a lack of coordinated operations are the principal reasons why they have not had greater impact when they have been employed.

Compunction about the use of chemicals has been of little importance in recent years when nations have considered the advantages which seem to be offered, particularly when an opponent has no capability to defend or retaliate. The following instances of chemical employment reflect a willingness and a capability among a growing number of nations to employ these weapons. All of these examples have been confirmed by the U.S. government; some are questioned by other agencies.

- Yemen (1963-67): Egypt is confirmed to have used chemical bombs (mustard) against Yemenese tribesmen.²
- Laos (1975-83): The Vietnamese use of Soviet chemical and toxin weapons killed and drove out the rebellious Hmong tribe, killing 700-1000 persons. Mycotoxins or "yellow rain" came to the attention of the world when the U.S. State Department released reports of findings of these toxins in samples taken

¹ *Nuclear, Biological, and Chemical Defense and Technology International*, Vol. I, No. 1, April 1986, p. 14.

² *Soviet Chemical Weapons Threat*, Defense Intelligence Agency, 1985, p. 21.

in Laos and Cambodia. The U.S. government's major conclusion and contention was that a variety of agents and weapons were used there.³

- Cambodia (1978-83): The use of chemical weapons by the Vietnamese against Cambodian resistance forces has been confirmed by the U.S. government.⁴
- Afghanistan (1979-83): The Soviets and the Afghan army have used chemical weapons of a variety of types against Mujahedin guerrillas. In one case, death was so rapid for three guerrillas that their hands were still gripping their rifles when they were found in their firing position.⁵
- Iraq/Iran (1982-86): Iraq has developed production facilities for chemical agents and has repeatedly used chemical bombs in its war with Iran. The Iraqi chemical bombings in late January and early February of 1986 resulted in the treatment of approximately 8500 persons at medical facilities, 2500 of whom were hospitalized. Most of these were suffering from sulfur mustard, but nerve (tabun) and blood (cyanide) agents appear to have been used as well. Following one attack with suspected nerve agents, over 1000 persons were admitted to one hospital alone. U.N. teams have verified the use of chemical weapons in 1984, 1985, and 1986.^{6, 7}
- Other incidents: The Defense Intelligence Agency report, Soviet Chemical Weapons Threat, 1985, states: "There have also been allegations of chemical weapons use in the Ethiopian-Eritrean conflict and during the brief war between the People's Republic of China and North Vietnam. There are now eleven nations outside NATO and the Warsaw Pact that have chemical weapons in their arsenals and two more that are attempting to acquire them. More countries now have a chemical weapons capability than at any time in the past. Our forces as well as those of our allies must be alert to the fact of chemical weapons acquisition by such nations. Both military and security forces must also be alert to the possible use of these weapons by terrorist groups and clandestine forces."

³ Bay, Charles H., "An Update on the Other Gas Crisis," *Parameters*, U.S. Army War College, December 1979, pp. 27-35.

⁴ *NBC Defense and Technology International*, Vol. 1, No. 4, September 86, p. 6.

⁵ Douglas, Joseph D., Jr., Chemical Weapons, An Imbalance of Terror, *Strategic Review*, Summer 82, pp. 43, 47.

⁶ "UN Team Says Chemical Agents Used in Gulf War," *Washington Post*, March 27, 1984, pp. 1.

⁷ "The Chemical War: Iran Revisted-1986," *NBC Defense and Technology International*, Vol. I, No. 3, June 1986, pp. 32-39.

B. CHEMICAL AGENTS AND DELIVERY SYSTEMS

For the most part, a discussion of the chemical agents and delivery systems available in the Third World is a discussion of capabilities that might be available to these nations. Table 2-1 lists commonly known agents.

Table 2-1. TYPICAL CHEMICAL AGENTS

Name	Symptoms	Time From Exposure to First Symptoms	Country to Origin and Date	Remarks
Phosgene	Lethal; coughing, retching, asphyxia	Several hours	Germany, 1915	Extensive use in World War I; stockpiled not used, World War II
Mustard gas	Symptoms like phosgene, also vesicant	Several hours	Germany, 1917	Lingering contaminant. Incapacitating blistering agent. Also stocked not used, World War II
Tabun (GA)	Rapidly increasing loss of muscular control	1 to 30 minutes	Germany, 1937	Nerve gas. Closely allied chemically to organophosphate insecticides. Medical treatment the same
Sarin (GB)	Ultimate asphyxia		Germany, 1938	
Soman (GD)	Attacks central nervous system		Germany, 1944	
Hydrogen cyanide (AC)	Lethal; asphyxiation from paralysis of central nervous system	Seconds to a few minutes	France, 1916	Used in World War I; stockpiled in World War II; believed present in Soviet arsenal

Sources: National Defense, June 1980. Effectiveness of Chemical Weapons in WWI, 1959.

Tables 2-2 and 2-3 identify the Soviet chemical delivery systems for which chemical warheads are known to exist. Since these systems are found in the armies of many of the nations identified in Figure 2-1, it is likely that the associated chemical munitions also are available. Whether or not the warheads are stockpiled in those nations is important, but their absence does not preclude their availability in a time of crisis.

In addition to the systems shown in Tables 2-2 and 2-3, Soviet mortar shells, aerial bombs, spray tanks, and mines also are available as means for delivering chemical agents known to be in the hands of the North Koreans. Table 2-4 lists the delivery means and the quantities of munitions reportedly available to the North Korean armed forces. Because the

Table 2-2. CHEMICAL WARFARE DELIVERY SYSTEMS - SOVIET ARTILLERY/GROUND FORCES

Weapon	Max. Range	Weight of Projectile or Warhead	Unit Deploying	No. of Weapons in Unit
122mm*	12 km	25.8 kg	Regiment	6
130mm	27 km	33.5 kg	Army	36
152mm	17 km	43.6 kg	Division	18
BM-21	15 km	45.9 kg	Division	18
FROG-7	60 km	Est. 450 kg	Division	4
SCUD A**	80 km	Est. 680 kg	Army	3
SCUD B	280 km	Est. 770-860 kg	Army	3

*36 in motorized rifle division; 60 in tank division.

**Kenneth W. Gatland gives a range of 80-180 km for the SCUD A.

Sources: The Urgent Need for Chemical Weapons, AUSA.

Table 2-3. SOVIET-WARSAW PACT MULTIPLE ROCKET LAUNCHERS USED FOR CHEMICAL DELIVERY

MRL	Country	Caliber	No. of Tubes	Range
RM-71*	East Germany	122mm	40 (x2)	20.5 km
	Czechoslovakia			
WP-8	Poland	140mm	8	9.8 km
RPU-14	USSR	140mm	16	9.8 km
BM-14-17	USSR	140mm	17	9.8 km
BM-14-16	USSR	140mm	16	9.8 km
M-51	Czechoslovakia	130mm	32	8.2 km

*Each system has automatic reload for one salvo.

Source: U.S. Army Foreign Science and Technology Center, Chemical Warfare Capabilities - Warsaw Pact Countries, 31 Oct 79.

Table 2-4. NORTH KOREAN DELIVERY SYSTEMS

TYPE	QUANTITY	CALIBER
Artillery	4750 incl:	122mm 130mm 152mm
Med Rocket Launchers	2100 incl:	122mm - BM 21 130mm - Type 63 140mm - RPU 14, BM 14-16 200mm - BMD - 20 240mm - BM - 24
Rockets/Missiles	15 54	SCUD B FROG 5/7
Mortars	UNK	120mm 160mm 240mm
Aircraft	854	SU-7 MIG 15/17 MIG 19 MIG 21 AN-2 Helicopters

Source: The Military Balance, 1986-1987.

South Koreans lack retaliatory means and U.S. capabilities are not present, the likelihood of North Korean use of these weapons, if they ever do attack southward, must be extremely high.

C. CHEMICAL PRODUCTION

The full extent of the chemical threat in the world is not known because production is simple, possession is not easily detected, and latent capabilities exist almost everywhere. Many of the precursor chemicals and most of the processing equipment required for agent production have numerous legitimate industrial applications.

D. IMPLICATIONS FOR TERRORIST USE

The ease with which chemical agents and simple delivery means can be obtained or produced, coupled with the dramatic and devastating effect which can be promised by only an incidental use of such weapons, makes them ideal weapons for terrorists. Barring the capture and use of a nuclear device by a terrorist organization, there is no weapon system that can promise the havoc, the guaranteed worldwide attention, and the overall impact of a few nerve gas grenades in a crowded public facility or an inadequately guarded national security installation. The potential for such action cannot be ignored in any intelligence information survey of chemical warfare capabilities.

III. CHEMICAL WARFARE OPERATIONS

A. SOUTHWEST ASIA

The Southwest Asia scenario presents a situation in which a Soviet effort to extend suzerainty westward from Afghanistan is countered by deployment of U.S. forces. It carries the reader from decision-making at high-level planning headquarters to the battle scene at an infantry rifle company position, and considers the issues surrounding a Soviet decision to employ chemicals in support of their attack, and the resulting influence on the course of battle. Specific attention is paid to the effects of climate and terrain on the employment of the munitions.

For the most part, the lessons from this analysis proved to be of the same tactical significance as those of the NATO-Warsaw Pact study completed in 1985, but certain problems surfaced which were not apparent in the European study. Two vignettes serve to identify these problems.

* * * * *

AT TVD HEADQUARTERS

Dimitri Aronov, the Air Deputy to the TVD Commander, hung up the phone and turned to his aide. "Get my airplane ready. I have to go to a senior meeting on strategy. I'm sure Comrade Nicolai wants the Air Force to come up with some innovative act of military genius to bail him out of this miserable situation we've gotten ourselves into. As if Afghanistan wasn't bad enough, the targets here are few and the lines of communication could get awfully long if we're successful in moving south."

At the meeting, the TVD Commander Nicolai Borschkopf was his usual stern self. "Dimitri," he said, "you have seen our plans for taking over the key cities and moving south to gain control of the Gulf. Now the Americans have established defensive positions in the south and seem able to push the necessary logistics ashore to support them. They are a long way from home, but our lines of communication will also be long and difficult. We must pin down their air effort if we are to succeed, or we will pay dearly for every mile we advance. I have recommended to our superiors that we take advantage of our CW capability immediately to degrade that air capability and force the Americans to operate continuously in a chemical environment. We've trained for it, but they certainly aren't used to it, especially in this desert heat. I know from the reports that pilots and crews complain bitterly about the equipment even when the weather is mild. Your FENCERS and BACKFIRES supported by our SS-20s could really keep them guessing, plus make it damn hard for them to maintain an aggressive air campaign against our forces."

* * *

On 8 July at 0600 hours, coinciding with the breakfast break, shift changes in the towers, and expansion of ground crew activity that came with daylight, Soviet missiles began exploding on U.S. air bases established in the theater. Other airfields and field locations of the A10 squadrons were also attacked as the Soviets sought to exploit maximum surprise with their first use of chemical warfare. All attacks comprised both chemical and high explosive warheads, mixing the chemical agents with an effort to damage or destroy the chemical defensive tools of the forces attacked. Punching holes in masks, suits, and sealed enclosures was an effective way to add to the lethality of chemical munitions. Nevertheless, the chemical attack was principally with persistent agents, both nerve and mustard, because the primary purpose was disruption of operations, not mass casualties, although the bonus effect of casualties was recognized as a major contribution to disruption.

By 0630 the strikes were over. Casualties were high at two bases where missiles had hit in an ideal pattern. It was apparent to the survivors that many hours would pass before any normal operations could be resumed. At other bases, damage ranged from none to moderate. One base had been missed altogether and at other locations missiles had landed off-target or in less than effective patterns. Later, when assessing the impact of the raid, CINCCENT learned that he had lost about 25% of his sortie generation capability for almost six hours.

At 1000 the first of a follow-on quantity of missiles struck. Soviet intent was to continue an unending harassment of every locatable air installation to ensure that all personnel would be forced to wear their chemical gear at all times. They were quite aware that this requirement alone would affect drastically the U.S. ability to mount sorties, receive and transship supplies and reinforcing forces, and generally continue normal activities. Soviet missile supply guaranteed the continuance of such a tactic for a few weeks into the future.

* * *

The chemical attacks on the U.S. air bases were not totally unexpected. Mike Donovan, the air component commander of CENTCOM, had warned CINCCENT that his people might have to operate under the limitations imposed by a chemical environment. The missiles, however, were a particularly annoying threat to deal with. Their arrival was not as predictable as the enemy air attacks and he was forced to keep his airmen in a high state of CWD readiness pretty much around the clock.

The decision to retaliate came that afternoon. The next day's frag order included attacks on troop and logistics concentrations with the limited BIGEYE weapons available. Operations on the flight line had slowed dramatically since the Soviet CW attacks had begun. There had been only a few casualties, but in the heat, maintenance, servicing, and bomb loading moved very slowly. The Air Wing had learned to rotate its support teams

and forced them to take frequent breaks to avoid heat prostration, but sortie generation suffered and turn-around times increased, especially in mid-day. More and more of the effort was concentrated at first light and early evening, and the A-10s were dispersed to small strips so that they presented unproductive targets and could turn at the rates demanded by the Army for close air support.

The supply of BIGEYES was limited and Donovan had been told to make them count. He had tasked his intelligence people and reconnaissance assets to identify some high-value targets where large concentrations of troops could be found in the open. Second echelon forces in assembly areas could provide lucrative targets, the attack of which could seriously impair the Soviet momentum. It wasn't easy to hide in the desert, and the Soviets had chosen several routes on which to move south. Intelligence from host nation units had been useful in confirming aerial reports of lines of movement. Donovan and CENTCOM agreed that night attacks coupled with the regular daytime strikes would force the Soviets to remain in their protective equipment virtually around the clock, and an urgent request was forwarded to JCS to increase the supply of BIGEYE munitions.

For Donovan, it was simply another challenge and he was glad not to have the problems the Soviets had in trying to move a large force a great distance over tough terrain in excessive heat with U.S. air pounding them night and day. He prepared his air campaign daily with due consideration for the competing demands for air superiority, close air support, and interdiction. His F-15s along with Navy F-14s were committed to the first and his A-10s to the last of these missions. Thus, the F-16s and F-111s could focus on optimizing the interdiction of the Soviet ground forces. The BIGEYE had eased and increased the safety of loading and handling CW munitions immensely; his people were able to accomplish the load mission in full suits although at about half the rate of sortie generation he would have expected in a more temperate and non-chemical environment. The F-15s used the tankers to stay airborne longer and were able to operate from the rear bases south and west of the Persian Gulf. With the A-10s dispersed to sites closer to the Army, they were flying at a much higher sortie rate, but considerably less than Donovan and the Army would have liked. Previous exercise deployments had taught the Air Force that pushing the maintenance people too hard in the suits, especially in high temperatures, was counter-productive. The Air Force had learned through training to rotate people frequently, provide adequate rest, and compromise some protection to provide a more practical suit for hot climates.

* * *

A RIFLE COMPANY DELAYING POSITION

Captain Bill Olear peered down the road that ran into his reinforced rifle company's position. He and the leader of his fire support team (FIST) lay prone in a rocky outcropping discussing their mission and the best way

to accomplish it. Very simply, their job was to prevent any Soviet passage to the south.

Olear had been sent forward with his company to find and occupy this delay position and to prepare to hold it for as long as possible. He was not part of his division's final defense line, but he had been reinforced with additional TOW systems and two sections of ground-mounted HELLFIRE missiles. If his position could be held he was not to contemplate withdrawal; instead, he was to serve as an anchor which would allow a forward displacement of the defense line.

He had chosen his position well. Above and beyond he could discern his troops digging positions, emplacing their anti-tank weapons, and making preparations to defend the narrow passage to their front. They all had excellent observation over the long valley which stretched before them and had good command of the ridges upon which they were located. Olear realized that any vehicular enemy force would be taken under long-range, devastating anti-armor fires. Any infantry force, even one advancing in darkness, would be uncovered and extremely vulnerable if it tried to advance on the ridge lines and subject to massacre if it attempted to assault the ridges from the road. Olear's main concerns were his ammunition supply, water, and medical evacuation of the casualties he might sustain.

* * *

Three miles to the north, LTC Boris Medvedich was contemplating the same situation, but his job was to continue to advance to the south. He had arrived about three hours earlier with his motorized infantry battalion, a unit that had suffered harassment and delay from U.S. fighter aircraft which had dogged his route, but a unit still determinedly capable. Medvedich was confident of his unit's combat effectiveness, but right now he was hoping for help.

At his current location he had come upon a small outpost of Soviet airborne troops, a remnant of the brigade force that had previously failed to seize control of the area. They had told him of the American position to his south, and their account plus his own reconnaissance had confirmed that he had a severe task ahead of him and he did not relish the thought of the punishment that an assault on that position would exact. In preparing his plan he was aware that Soviet rocket forces were already delivering chemicals on American air bases, so he decided that a heavy concentration of chemicals, specifically of non-persistent nerve and blood gases, might sow enough chaos and confusion in the American position to permit him a lightning thrust up the road and a quick assault to overrun any personnel not incapacitated by the gas attack. He would use non-persistent munitions so that at the proper time his troops could move freely in the area without the encumbrance of their chemical clothing.

Colonel Medvedich was awaiting authority to employ his chemical munitions. The artillery and mortar preparatory fires were already planned,

and his assault elements were ready to move within fifteen minutes. He realized they would have to go whether or not his request was granted.

* * *

In the early morning hours with shadows and some mist still impairing long-range observation, Captain Olear was alerted by the sounds of moving armor. His observation teams simultaneously informed him of enemy activity to the north and he began immediately to inform his platoon leaders that something was happening. Suddenly the unmistakable sound of incoming artillery and mortar shells engulfed him and he dove for cover in his rocky hole in the ground. Within seconds he heard the strident tones of a gas alarm. Fighting a slight clutch of panic while wondering if everyone else had heard and recognized the alarm, he grabbed for his mask and slipped it on, thankful that he had obeyed his own orders about fitting, testing, and inspecting it regularly. His next thought was to contact his platoon leaders; he was relieved to get them all and to hear reassuring reports that they were alert to the gas attack and thought they had things under control. Olear was proud and confident of the discipline of his unit and believed in his officers and NCOs, but they had not suffered a real chemical attack before.

There was one thing he had not considered. The climate of the Gulf area, overheated days and cold nights, complicated Olear's decisions concerning chemical clothing. His men could not wear it during the heat of the day, and consequently some were not wearing it when the attack came. Now, despite their discipline, they were confused about what to do -- don their clothing or search for targets and fire their weapons. Some tried to do both, others did one or the other and a few did neither. The result was a temporary reduction of their effectiveness, but as the Soviet forces closed on their position, despite the insistence of the chemical alarm that gas shells were still falling, they gave all their attention to firing their weapons.

Olear's next reaction was recognition of a demand to retaliate -- his men had to know that their enemy would suffer the same panic, the same inhuman threat that they were enduring. When he spoke to his FIST leader and asked him to call in such retaliatory strikes he was informed that it would be hours before he could expect to reply in kind. The close support artillery battalion was equipped with 105s. Neither they nor the infantry's mortars had any chemical munitions, since the new binary rounds were not made for those weapons. The division's 155 battery and its MLRS units were not within range of the company's position, so Olear would have to do without.

* * *

Seventy-five minutes later Colonel Medvedich, contemplating the carnage through which he was retreating, realized that he had been right about needing help. He just hadn't gotten enough. The chemicals he had employed had not been a trump card. The Americans had been quick to defend themselves and the non-persistent munitions he had used had

evaporated so rapidly that he could not obtain a lethal concentration on the entire position and could not sustain it where it had developed. He knew his battalion was now ineffective and would be replaced by another. He would do his best to tell the next commander that some new concepts were needed to improve the effectiveness of their chemical weapons.

Captain Olear, observing the same ruins, had other thoughts. He was elated about his company's success, but he was distressed about his losses. He, too, had been reduced almost to ineffectiveness, having lost up to 30% of his men, too many, to the gas attack. Despite their discipline, some men had laid aside their masks and did not recover them in time, some had failed to keep them in good condition, and others had had their masks penetrated by bullets or shell fragments which rendered them useless. They had held their position, but they couldn't withstand another attack the next day. Olear had to have a relief company or he had to be allowed to withdraw from his position. Either alternative would be costly for his division commander.

* * * * *

The special issues and observations which derive from this scenario are listed below. In general the advantages and disadvantages of employing chemicals are little different than they would be in a NATO-Warsaw Pact confrontation; however, the weather, terrain, dispersion of forces, and the vast distances to be covered by military operations add significant complications.

- The desert conditions of Southwest Asia both enhance and challenge the effectiveness of chemical weapons.
 - The debilitating effects of protective clothing are increased significantly by the higher temperatures of desert lands. Tactics requiring an enemy to wear such clothing have a more profound impact on operational effectiveness.
 - The degradation of the persistency of chemical agents caused by high temperatures requires greater and more frequent dosages to achieve desired effects.
- The tactical advantages of chemical employment favor the offensive force which can choose the time, location, and persistency of its attack.
- The importance of finely honed defensive training and the acclimatization of troops is greater in the more demanding terrain and weather found in Southwest Asia.
- Chemical weapons support for light infantry forces is severely restrained if currently planned binary munitions are not manufactured for the smaller caliber weapons found with these forces or if unitary stocks in sufficient quantities are not retained in serviceable condition.
- Ease of handling, expanded transport capabilities, and improved safety are all advantages of the BIGEYE binary bomb, which is most essential for U.S.

retaliatory missions because of the limited ground delivery means available to forces most likely to be employed in this area.

B. MEDITERRANEAN SEA

The list of countries identified in Figure 2-1 includes at least two in the Mediterranean littoral who have expressed overt hostility to the U.S. and support for international terrorists. The presence of both chemical delivery means and munitions in these countries must be assumed likely.

Presuming the above to be true, the Mediterranean scenario of this study addresses the implications of a chemical attack on the U.S. Navy's Sixth Fleet. Questions of the feasibility, practicality, and anticipated results are examined from the standpoint of the attacker. The vulnerability of Sixth Fleet ships and the potential consequences of such attacks are addressed.

For the study, a hypothetical political crisis results in the determination by the U.S. to launch a military strike of the type employed against Libya. The operation entails the movement of a Surface Action Group (SAG) headed by the battleship IOWA to conduct a bombardment of a terrorist training facility and known shore defenses.

The enemy leader, warned by Russian surveillance means of the approach of the SAG and convinced that an invasion is imminent, decides to employ his surface-to-surface SCUD missiles in a last-ditch effort to cause the cancellation of U.S. plans. The study expresses doubt about the possibility of striking a naval task force moving rapidly at sea, but when desperate measures are deemed necessary by a national leader, this kind of strike cannot be ruled out.

The following extract from the full report describes, in anecdotal fashion, what might happen if such an attack were launched and by some stroke of luck at least one missile struck in the target area.

* * * * *

A CHEMICAL ATTACK AT SEA

The guided missile frigate REUBEN JAMES was at flank speed to maintain station two miles ahead of IOWA, while the guided missile destroyer KIDD patrolled the starboard flank. Fifty miles ahead was the city of Tripoli. The crews had been ordered to battle stations. The ships

steamed in total emission silence, EMCON ALFA, and would remain that way until ready to begin the shore bombardment or when detected by a threat system. Somewhere in the night sky behind them an E2C was providing the SAG with the radar picture via data link.

In the battleship IOWA's main engine control, Commander Rod Karp, the engineering officer, was concerned about his steam propulsion plant. In Karp's view the order for general quarters had caused a problem. With six of the eight boilers operating at near maximum capacity, the four firerooms were so hot that relief crews would be needed to continue operating the World War II-vintage M-type boilers over the next three or four hours. He ordered all extra boiler watch personnel and the crews of the one boiler under repair into the after mess deck and instructed Master Chief Boiler Technician Bronson to prepare a rotation schedule.

The chief grumbled something about "the men don't want others to operate 'their' machinery. All this heat stress hooey should be dropped when we fight our ship."

As he secured the watertight door behind him and entered the after mess deck, Bronson recalled that, according to ship's policy, the men's chemical protective equipment was stored in the firerooms. He noticed that only about half of the standby crews had brought their equipment; Bronson himself had left his in Main Control. He sent three runners to bring the spares from the B-Division storeroom.

On the bridge Captain Jim Cowley searched the horizon ahead, knowing they were now in range of enemy radars. No ships were in sight, nor was there any air activity reported by the E2C. An F-14 overhead reported seeing probable missile launches from the shore. A few minutes later he saw a series of flashes ahead of IOWA.

"Looks like air-bursts over the JAMES," exclaimed the Officer of the Deck, "maybe illumination rounds!"

"Combat, activate radars, get a fix on those bursts, plot their drift. Get a report from the JAMES, ASAP!," Cowley shouted into the intercom.

"Captain, JAMES reports chemical alarms, they are setting Circle William but are already in a cloud of nerve gas!," came the response from Combat moments later. "We estimate the cloud will be on us in two minutes with this closure speed. Recommend reversing course."

Cowley immediately shouted the orders they had practiced often the past month. "Sound the chemical alarm; set Circle William -- no exceptions, all ventilation off; activate the water washdown; left full rudder!" He picked up the IMC microphone and addressed the crew.

"Men, we are about to enter a cloud of nerve gas; it cannot be avoided. Our gas-tight envelope may not be fully effective, so I want all hands to don your protective masks now. Keep them on until we are clear

of the cloud and the decontamination teams have verified your spaces are clean."

As ventilation motors ran down throughout the ship and electronic gear was shut down to keep it from overheating, IOWA was engulfed in the aerosol cloud.

Within minutes the temperature on the upper level of Fireroom #3 passed 150°F, and the water gauge watch on 3B boiler, struggling to get into his protective equipment, failed to notice the water level disappear off the bottom of the gauge. The men on the lower level were unable to respond quickly to the subsequent alarm and the boiler failed. Fuel was cut off to both #3 boilers and the fireroom was evacuated except for the upper level watch who, unable to see out of his mask, slipped and fell from the narrow ladder and remained unconscious on the deck.

The #3 shaft slowed as steam pressure to its engine dropped. #4 main engine also slowed since it had been receiving cross-connected steam from #3 Fireroom. Commander Karp was concentrating on maintaining steam to the remaining engines when the report came from #2 Fireroom that the crew had been forced to remove their masks to function and were showing symptoms of nerve gas. Karp called for Master Chief Bronson to get a relief team to Fireroom #2. The man on the phone informed him that the chief was sick; lots of men were sick. Karp could barely make out what the talker had shouted through his mask. He ordered #2 Fireroom shut down and evacuated. Most of the firemen were unable to climb the vertical ladder because of the combined effects of gas, heat exhaustion and the encumbrance of the protective equipment, and were rescued later by a Damage Control Party.

Ten minutes after the attack, IOWA limped clear of the aerosol cloud at bare steerage speed.

* * *

REUBEN JAMES had been directly downwind of the SCUD airbursts. The chemical warning system had worked as advertised, but there was insufficient time to shut down ventilation before the gas had spread throughout the ship. Many of the crew were affected before they could don protective equipment. At this time there were 38 known fatalities and a very high percentage of the crew incapacitated. Those in air-conditioned spaces, mainly control stations, had time to mask properly and were able to maintain control of the ship. They were not able to man weapons stations nor had they sufficient manpower to decontaminate the ship and care for casualties. Emergency assistance was requested.

KIDD evaded the gas cloud and was proceeding alongside JAMES to render assistance.

IOWA, with her two escorts, was steaming north at eight knots on two screws, three boilers on the line. Precautionary decontamination was in

casualties, at least sixteen from the gas, the rest mainly from heat exhaustion. At the time of the report there were three fatalities but a number of others were critical. Because the majority of casualties were in the Engineering Department, it was unknown when IOWA could make more than eight knots. Her 16" guns could not be manned because of heat exhaustion to the turret crews. Medical assistance was requested.

* * * * *

This vignette exemplifies the major issues introduced by the current potential for the use of chemical warfare against ships at sea. As with other portions of this study, some are common problems, but some are unique to the Navy.

In this portrayal, the enemy leader took drastic action in response to his perceived notion of a threat. He was rewarded with a lucky success which caused the American commander to abandon his mission, at least temporarily. The probability of these occurrences is not high, but it is not zero. The vulnerabilities of the fleet which are revealed in the anecdotal treatment of the incident are real and require serious attention. Warning systems, individual protection which ensures survivability, collective protection which guarantees continued functioning, training and doctrine all require attention.

It must be assumed that potential Third World adversaries will be willing to employ chemical weapons against U.S. forces. Accurate intelligence regarding such capabilities and ship and force readiness to cope with the eventuality are required. Both are promised by existing programs, but not with the urgency or thoroughness which the situation demands.

C. GROUND FORCE INVASION

Deployment of U.S. forces in a security role in the third world is both reasonable and plausible. In such a role, it is likely that these forces will be more modern, i.e., equipped with a battlefield capability superior to that of a potential enemy force. In such a case, an enemy will search for an "equalizer," that is, some means of overcoming superior, more sophisticated fire power. At present, nothing, perhaps not even nuclear weapons, can promise greater disruption and degradation of combat effectiveness than might be achieved by judiciously employed chemical weapons.

The scenario depicts an American airborne unit committed to this role exposed to an attack even though its purpose was to prevent open hostilities. The situation is unique in this series for it is an operation involving U.S. forces with both friendly and enemy Third World armies. It also addresses the value of a chemical retaliatory capability aboard naval ships deployed in support of a contingency operation.

Ground combat is similar to that described in earlier vignettes. Tactical variations are present and the effects of higher temperatures are significant, but little is unique about the impact of a chemical attack on a small U.S. force.

Air combat, however, provides an opportunity to consider the value and practicality of delivering chemical retaliatory strikes from an aircraft carrier. Given almost no ground delivery capability by U.S. light forces, an air strike is the only means for launching such action. The value of a consignment of BIGEYE weapons aboard an aircraft carrier, immediately available for use in a remote area, is apparent when the situation depicted in this section of the report is considered.

* * * * *

BIGEYE STRIKE PLAN

The aircrews gathered in the Strike Planning Room sensed this was to be an unusual mission. Not that anything had been ordinary since two days ago when they had started supporting the Army in the operational area with air superiority and then close air support missions. They had found it a long trip up the Gulf, almost two hours one way from the USS THEODORE ROOSEVELT's previous position. It required plenty of aerial refueling for all but the A6s just to get there and back. Conversation varied from SAM evasion tactics they had used to the hardness of ejection seat packs after four-plus hours.

The Air Wing Commander, Zeke Carter, CAG to the aircrews, ducked through the door into the room, lit a cigar and began to brief.

"Gents, the 82nd is in trouble and we are going to help them out of it. This afternoon the enemy hit our troops with nerve gas. CINCCENT has requested permission from Washington to retaliate in kind, and right now this Battle Group has the only chemical strike capability available in theater. The Army has only light forces in the fight and they don't have a delivery system with them. But we have forty BIGEYE bombs ready for loading on five TRAM-capable A6Es, and more available if we need them.

"At 0500 tomorrow morning, if we receive authorization from the President, we are going to drop them on an enemy storage area. I've picked you guys to fly with me because you're top crews and you're familiar with the area. The Strike Group will consist of four A6s plus an airborne spare loaded with eight BIGEYES each, two EA6B jammers, two F-14 TARCAP, and two more F-14s stationed halfway up the Gulf. The Air Force will support us with an AWACS and a tanker. We will launch three KA6 tankers to support the fighters. Now, Johnny here will brief the target."

Lieutenant John Baylor, the Wing Air Intelligence Officer, unveiled a map and distributed photographs. "Before we get into details of the target," he said, "CAG wants me to lay out the rules used to select this target. They won't make your mission easier, but will acquaint you with the care we have given to the peculiar problems associated with chemical weapons."

"The first rule was to select a target of high military value. As you can see from the photos, the enemy has built up a large storage and staging area just north of the airfield. Our weaponeers have calculated that it would take the wing two days at maximum effort to effectively neutralize this large area, given the long transit time to the target and the limited number of tankers available. Your attack, in addition to deterring further use of chemicals by the enemy, will make the area useless immediately and keep it that way over an extended period. Moreover, we believe the enemy has stockpiled chemical artillery rounds within this area. Your attack should deny them the use of those weapons against our troops."

"Second, the target was selected to minimize the danger to the neighboring friendly forces. The prevailing winds this time of the year are from the southeast. Time on target is at 0500 when the wind should be light. Looking at the map, you can see the city twelve miles northeast of the target. Also note the village to the east of the airfield. Your attack must be planned to avoid dropping on these populated areas."

"This brings us to a third criterion, navigation and target identification. Note the oil field to the south of the airfield and particularly the pipeline running southwest to northeast and pointed directly at the target. This pipeline and the airfield itself should give excellent radar return and show up beautifully on FLIR as well. Each A6 will be assigned discrete aim points for your strings of bombs to get full coverage of the target with a lethal dose. Your weapons computers should have the new BIGEYE program inserted, which will allow you to deliver the optimum spray pattern. After this briefing, we will get together with the A6 crews for more detailed planning. Now I --"

"Now for procedures at the target to meet these criteria," interrupted CAG Carter. "During my run-in, I will determine the true wind at planned burst height. If it creates a threat to the friendly forces, I will call a mission abort. We will clear the area to the southwest, rendezvous with the KC-135 which should be in orbit here to the southwest. After refueling, we will

proceed to the ship with our bombs. If you have a system malfunction with the TRAM or the BIGEYE program such that you can't deliver with assured accuracy, abort and return to the ship. If you get into a situation where you must jettison bombs, do so on safe, over water.

"Johnny will brief the order of battle in just a minute," CAG continued, "but first I want to talk about en route tactics. We will fly the same route we have used the last two days and let down toward the battle area. Once low, we will skirt the oil fields and set up on the pipeline. The F-14 escorts will proceed to a position to the east, just outside the SAM envelope. The EA6s will establish orbits to the south of the target and west of the battle area. This will position our forces to appear as if we were preparing to attack enemy ground forces while establishing an effective disposition for the attack on the real target. My fourth criterion for this attack is surprise to get us in, on, and off the target without opposition."

After Baylor completed the briefings on Order of Battle and SAR procedures, CAG Carter again addressed the Strike Group. "Still no word from Washington on release of the weapons, so we will need to plan an alternate strike using conventional bombs and area coverage munitions -- max load. CINCCENT and our admiral are determined to hit this target ASAP, with or without BIGEYE. Johnny, show us where you think those chemical rounds are stored. Maybe we can give them their own gas!"

* * * * *

The final scenario, presented here without a vignette, addresses the problems associated with the assault by a Marine amphibious task force on a hostile shore. The reasons for a Third World nation to employ chemicals against this force and the vulnerabilities of the force, both afloat and ashore, parallel those of other scenarios. Variations are found in the various phases of an amphibious operation, and degrees of vulnerability differ as the mobile task force is gradually immobilized as it proceeds ashore and is supported by ships which must hover within naval gunfire range.

The unique element of this particular study is the presentation of a situation in which, despite having been attacked with chemical munitions, a commander is led to conclude that chemical retaliation is not in the best interest of his force or of the United States. Earlier conclusions regarding the development of an asymmetry of forces, which was so critical to operational capabilities in the European scenario, were found to be less of a factor under circumstances which might occur in certain Third World crises.

IV. TERRORISM AND CHEMICAL WEAPONS

A. OVERVIEW

Terrorism is not a new phenomenon. Modern terrorism in the Middle East, for instance, is merely an extension of an ancient tradition dating back to the Crusades. The English word "assassin" evolved during this period, when drug-taking "hashishin" launched suicidal attacks against the "infidel" intruders. Since the eleventh century the Moslem world has produced fierce and determined zealots willing to undertake desperate acts in pursuit of martyrdom and the will of Allah.

Around the individual terrorist, however, there has grown an infrastructure that produces a far more dangerous specter -- the international terrorist. In loose federations such as the PLO, and in groups with a "cause" such as the Red Brigades, the individual zealot has been assimilated into an organized body of terrorism. Infrastructure has been added and it introduces at least three new characteristics to terrorist activities:

- State-supported terrorism as an instrument of foreign policy. The use of terrorism has become not an incidental activity of governments but an element of state policy and an instrument for use against domestic and foreign enemies.
- Operative groups with sophisticated intelligence resources or support routed through embassies, consulates and business fronts, using diplomatic pouches and secure communications channels to provide intelligence information.
- Groups with access to sophisticated technologies, such as plastic explosives, weapons not detectable by standard airport security systems, and electronic triggering devices.

This view of modern international terrorism, as contrasted with the internal terrorism of the Viet Cong, for example, has a number of characteristic fingerprints worthy of note.

- Modern international terrorism is war by proxy. It is the strategy of terrorist groups to engage in aggression while avoiding retaliation.
- Internal terrorism, e.g., the Viet Cong, as a substitute for or precursor to more conventional armed conflict, is rationalized on the grounds of military necessity. Retaliation is a clear possibility. Modern international terrorism, on the other hand, perpetrates violent acts in the absence of any military confrontations. The objective appears to be to harass, demoralize, and create a forum for publicizing demands or political messages.
- Either form of modern terrorism relies on violence as the instrument of choice. Violence provides easy access to worldwide information media, which in turn

produces a confused world attitude. People have begun to think of acts of terrorism in relation to foreign policy rather than in relation to the heinous nature of the crime. The presence of an armed Yasser Arafat on the dais of the UN General Assembly is ample evidence of the moral confusion that has been cultivated around inhumane violence.

Through the vehicle of vignettes describing incidents that might occur at an embassy, an Air Force base, a naval air facility, and an Army installation in Europe, the basic report "*Chemical Warfare in the Third World*" (IDA P-2014) describes the threat of chemical weapons in the hands of terrorists. These incidents establish a plausible role for chemical weapons in the terrorist war on society. Chemicals are, in fact, an almost ideal weapon -- insidious, terrifying, utterly effective, reasonably simple to acquire, and a tool which guarantees headlines.

B. AN ASSESSMENT OF THE "BATTLEFIELD"

Embassies and military facilities worldwide can be subjected to small or mid-scale chemical warfare attacks. This is not to suggest that large casualty situations cannot be created -- but it does suggest that small or mid-scale objectives are more likely.

It is reasonable to project that these potential targets are not prepared, psychologically or physically, to cope with such an attack. Intelligence is scant, warning is non-existent, and a capability to cope with the resulting casualties is limited by a lack of both facilities and appropriate training.

Military and embassy facilities throughout the world are prime targets for terrorist attacks. Recent history, which records attacks at Beirut, and Rhein-Main and Ramstein air bases in Germany, proves the point. At each location personnel generally are in the same state of readiness, pursuing daily duties, and subject to the same surprises. At all such installations casualties will occur. There are steps that can be taken to minimize the effects, of which the following are most important:

- Personnel must be made aware of the potential threat.
- Security preparations at all locations must include consideration of a chemical attack, to include alarms, protective equipment, and protected facilities.
- Intelligence systems have to target the chemical threat.
- Medical facilities and treatment and medical preventatives and antidotes must be available at all locations. Proper indoctrination and training for chemical casualties will also be essential.

Terrorist attacks and incidents have produced a wide range of casualty results, reflecting both the primitive approaches employed by the terrorist and the effects of security measures employed around the world. The chemical weapon offers the terrorist another alternative.

Again it must be emphasized that the substance of the argument--that a chemical threat exists--is enhanced by the knowledge that international terrorism benefits from a state-supported intelligence and logistics infrastructure.

Finally, such use poses a significant policy question for the United States: What constraints are appropriate regarding retaliation in such a scenario?

V. ISSUES AND ANSWERS

A number of issues, and the conclusions and recommendations regarding them, are presented in this appraisal of the potential for chemical warfare in the Third World. The doctrine, equipment, organization and training of the armed forces are the principal focus of the findings, but several important policy questions, both military and governmental, are of equal significance.

There are differences in the nature of chemical warfare in the Third World and in Western Europe. The relationships between chemical and nuclear warfare, so distinct in the European study, play almost no role in this study. Resort to nuclear weapons, despite recognized opportunities for their employment, was not a factor in any of the scenarios. The effects of weather and terrain were found to be far more severe in Third World areas. Except for Korea, the study deals with areas where no major U.S. forces or equipment and supply stockpiles are present, hence deployment plays a key role and seriously affects U.S. chemical employment capabilities in these areas.

There is a threat. The Iran-Iraq War proves the capability and willingness of at least one nation to employ chemicals. Other instances in Asia and Africa offer strong indications that other nations find them useful and usable.

The tactical reasons for employing chemicals remain as they were described in the European study, with the advantages and disadvantages remaining about constant. There is, however, an additional reason for employment by a Third World nation. In an instance in which U.S. forces, modernized and equipped with more sophisticated means, face forces of a less developed country, the search by those enemy forces for an "equalizer" may well lead to consideration of chemical weapons. The potential havoc and impact promised by these weapons at relatively minor cost and risk make them very attractive in many cases. Each of the scenarios described in this report provides a plausible employment option for or in a Third World country.

U.S. forces remain vulnerable to chemicals. The normal initial defensive role of U.S. troops makes them known targets subject to surprise attack. Torrid climates exacerbate the problems and pose another: a requirement for a built-in water supply for troops who must wear chemical clothing for an extended period.

The vulnerability of naval forces operating within range of shore-based delivery systems was not highlighted in earlier studies. Until adequate alarms and protected air filtration systems are provided aboard all naval vessels, any modern task force is subject to major degradation if chemical warheads can be detonated in its vicinity.

In this study a chemical retaliatory capability was assumed to be available and binary artillery rounds and BIGEYE bombs were on hand. As a consequence the asymmetries of force effectiveness caused by the one-sided employment of chemicals played a lesser role.

The BIGEYE plays a very important role as an instrument of deterrence and retaliation in the Third World, particularly since it can be carried aboard U.S. naval ships. In many cases, especially early in a deployment cycle or when only light Army or Marine forces are employed, air delivery of the BIGEYE by naval aircraft may be the only retaliatory means available.

The whole problem of the employment of chemical weapons with, by, and in the land of an ally has not been addressed. The European study, relying upon NATO agreements and procedures and presuming enemy use before any distribution of chemical munitions, did not address the questions which are highlighted in this study. Our "no first use" policy complicates any plans to make the best distribution of these munitions to the fighting forces and reduces the deterrent value of stocks located and controlled at major depots. The scenarios addressed in this study highlight the need for policies addressing these issues.

A related issue is one which requires policy regarding the commitment of U.S. forces in cooperation with allies who might already have a chemical capability of their own, where U.S. forces could be drawn onto a chemical battlefield not of their own making. Carrying that question one more step: What U.S. reaction is appropriate if an ally now being supported overtly by the U.S., but in whose country the U.S. has no forces stationed, is attacked with chemical warfare? Considering the current threat in the Third World, the need for chemical defense equipment by such forces is apparent.

The potential for terrorist use of chemical agents and weapons compounds the problems of our forces overseas and extends the threat to embassies, consulates, and other government installations. Deterrence becomes a matter of defense means, measures, and

readiness, for the option of retaliation is almost non-existent. Terrorists do not provide targets for retaliation unless their training and supply bases can be located.

Specific recognition must be given to the fact that international terrorism differs from the actions of an individual terrorist with a personal vendetta. International terrorist groups, with their state-supported infrastructure, have access to the resources with which to wage chemical terrorism. Protective systems and intelligence systems must be put in place to counter this threat.

The vulnerability of a U.S. overseas installation to a terrorist attack is obvious and serious, and chemical weapons offer an attractive alternative to defeat the physical security barriers now being used. A great majority of such targets, both military and civilian, are ill-prepared psychologically or physically for such an attack. Intelligence is scant, warning is unlikely, and resources to cope with casualties are ill-prepared and inadequate.

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