STRATEGY RESEARCH PROJECT

CHEMICAL WARFARE, TERRORISM, AND NATIONAL DEFENSE

BY

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ABSTRACT

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The United States must improve its ability to defend its citizens and property against potential terrorist or "rogue state" attack with chemical weapons. As a military weapon, gas has been effective at causing casualties but has never been a "war winner." History shows that chemical weapons are most effective when used against an unprepared enemy that cannot retaliate in kind. The 1995 nerve agent attack in Tokyo was a "wake up call" for the United States to come to grips with the serious asymmetric threat from either rogue states or terrorists who could launch a devastating chemical attack on our homeland. This paper will trace the military history of chemical weapons and assess programs necessary to prevent, protect, and respond to a chemical WMD attack on the United States of America.

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CHEMICAL WARFARE, TERRORISM, AND NATIONAL DEFENSE

> In no future war will the military be able to ignore poison gas. It is a higher form of killing.
>
> —Professor Fritz Haber, pioneer of gas warfare, on receiving the Nobel Prize for Chemistry in 1919.

In 1995, the Aum Shinrikyo Sect launched a carefully planned and coordinated attack using a diluted form of nerve gas called sarin, a poison weapon for mass killing developed by the Nazis. The sarin was placed simultaneously in five Tokyo subway cars on three lines during morning rush hour. Police and other first responders quickly acted by taking thousands to hospitals where doctors administered atropine, a sarin antidote.[1] The damage was already done...ten people killed, thousands sickened, and millions of Japanese left feeling confused, vulnerable, and frightened.

The Tokyo attack established the precedent for terrorist use of chemical weapons of mass destruction (WMD) and our future has become more dangerous. The United States must improve its ability to defend its citizens and property against potential terrorist or "rogue state" attack with chemical weapons. The 1995 nerve agent attack in Tokyo was a "wake up call" for the United States to come to grips with the serious asymmetric threat from either rogue states or terrorists who could launch a devastating chemical attack on our homeland. This paper will trace the military history of chemical weapons and assess programs necessary to prevent, protect, and respond to a chemical WMD attack on the United States of America.

CHEMICAL WARFARE – WEAPONS AND TACTICS

As a military weapon, gas has been effective at causing casualties but has never been a "war winner." History shows that chemicals have seldom been decisive on the battlefield especially when weapons and defensive capabilities were similar on both sides. They have worked best when used against an unprepared enemy or one that cannot retaliate in kind.

Chemical agents range in effect and persistency. Edward M. Spiers, a Defense Lecturer at the University of Leeds, provides a good short description of their military potential:

> Theoretically toxic chemicals, which are extremely versatile, may be used to accomplish a wide variety of military missions. Some are lethal while others are merely incapacitating...Some are transient in their effects; others can contaminate over periods of hours, days or many weeks. Capable of inflicting casualties over large areas, chemical weapons can envelop formations...or small targets whose precise location is unknown. They are also "search weapons," able to penetrate shelters, buildings, trenches, and other types of fortification.

> Persistent agents...may be employed as weapons of area denial, contaminating large tracts of territory, foreclosing avenues of movement and resupply...Chemicals offer the prospect of killing or incapacitating an enemy without damaging vital economic or military objectives, such as bridges, factories, ports, railways and airfields. Above all, chemical weapons inspire more fear than conventional munitions; they could terrorise civilian populations and demoralise ill-trained or poorly protected combat units.[2]

Characterized as weapons of mass destruction (WMD), chemical agents have been used most effectively against unprepared armies and defenseless populations. In other words, toxic chemicals are potentially decisive when used in an asymmetric attack. Chemicals are most effective whenever the degree of dissimilarity of weapons, technology, or forces creates exploitable advantages and these engagements can be extremely lethal if the target is not ready to defend itself.[3]

CHEMICAL OPERATIONS IN THE GREAT WAR, 1915-1918

Conventional weapons and tactics failed to end deadlock on the Western Front during four bloody years of fighting. In an effort to break the deadlock of trench warfare and return to maneuver warfare, the belligerents turned to new weapons such as the tank, airplane, and poison gas. Gas did not change the course of battle though it accounted for over one million casualties including nearly 100,000 killed.[4]

During the war, chemists investigated thousands of chemical substances to be used as weapons. Of these, about thirty were actually used, and only about a dozen proved militarily effective.[5] War gases used during the 1915-1918 period were classified according to physiological effects or action on the human body.

> One category, lachrymators, was composed of tear gases such as xylyl bromide, an agent that primarily affected the eyes but in large concentrations could also damage the respiratory system. Asphyxiators, such as phosgene, chloropicrin, and chlorine, were in another category. These gases caused fluid to enter the lungs, thereby preventing oxygen from reaching the blood. Toxic gases, yet another category, passed through the lungs to the blood, preventing the circulation and release of oxygen throughout the body. Hydrogen cyanide ("Vincennite" to the French) was one of the least effective toxic agents. Sternutators, such as diphenylchlorarsine, were a type of respiratory irritant composed of a very fine dust that caused sneezing, nausea, and vomiting. Some sternutators were systemic poisons that had a delayed toxic effect on the body. The fina category held the greatest casualty producer – a vesicant or blister agent that, because of its peculiar odor, the British and later the Americans commonly referred to as "mustard gas."[6]

In late 1914, the German General Staff asked the Kaiser Wilhelm Institute for Physical Chemistry and Electrochemistry in Berlin to find a weapons grade chemical agent for battlefield use. The result was a special shell called the T-shell in honor of its inventor, Professor von Tappan. This was a standard 15-cm howitzer round containing seven pounds of xylyl bromide.

On 31 January 1915, the Germans fired over 18,000 T-shells at the Russian positions at Bolimov. The German attack was repulsed with heavy casualties. The Russians were not much affected by the chemical attack since cold temperatures inhibited the vaporization of the xylyl bromide.[7]

The work to find a more effective chemical weapon continued. The Germans enjoyed a huge advantage over the allies in chemical production capacity. The eight giant chemical companies located together in the Ruhr valley known as the Interessen Gemeinschaft (IG) practically held a world monopoly in production of dyestuffs. This was very significant in that many potential lethal gases could be produced in bulk with the processes and machines used in making dye. The existence of such a potentially lucrative business opportunity was not lost on the German chemical cartel. The head of the IG, Carl Duisberg, aggressively lobbied the German High Command for the introduction of chemical warfare and took a personal interest in the toxicity of various potential chemical weapons.[8]

The head of the Kaiser Wilhelm Institute, Professor Fritz Haber, and Germany's most brilliant chemists feverishly worked to find a truly practical, lethal chemical weapon. By early 1915, Haber had a new weapon to offer the Army. Rather than filling explosive shells with chemicals, he proposed to release it from pressurized cylinders that would be activated near enemy fortifications.[9]

Haber formed a special gas unit, the 35th Pioneer Regiment (Pioneerkommando), under command of Major von Zingler. Pioneerkommando was staffed with many of Germany's most skilled chemists including Hahn, Westphal, Madelung, James Frank, and Gustav Hartz—the last two along with Haber became future Nobel Prize winners.[10]

The chemical Haber used was chlorine, a powerful asphyxiating gas which was easily stored in cylinders as a liquid but when released into the air would evaporate into a low hovering cloud of heavier-than air fumes. Of course, wind conditions had to be just right for the weapon to be effective but it offered the hope of penetrating the strongest fortifications and breaking the deadlock in the trenches. If it proved effective, the Germans were in a good position since they already had enormous stocks of chlorine on hand and the capacity to produce much more. Before the war, daily German production of chlorine was forty tons; Britain could produce less than one tenth as much of the gas.[11]

Weather conditions caused the Germans to choose the Ypres salient in Belgium for the first chlorine attack. Pioneerkommando emplaced 5730 gas cylinders by 11 April. They then had to wait 11 more days to ensure a favorable wind.[12] Finally, late in the afternoon of 22 April the chemists of Pioneerkommando released the chlorine along a front of six to seven kilometers opposite Allied positions at Langmarck, on the northern arc of the Ypres salient. The gas cloud drifted over the French defenses manned by the 45th Division (Algerian) and the 87th Division (Territorial). The effect was immediate and devastating as both units broke and retreated leaving a gap four and a half miles wide. The Germans advanced carefully behind the cloud, capturing Langemarck and Pilkem along with some 2000 prisoners and over 50 British and French guns. They did not continue the pursuit but instead decided to dig in that night which gave the Allies time to reorganize and launch a counter-attack the next day[13]

In total, the Germans used 500 tons of chlorine at Ypres between 22 April and 24 May. Pioneerkommando emplaced and discharged more than 20,000 cylinders of gas.[14] Apparently unprepared for the success of the gas, the Germans failed to follow through with the powerful offensive that was needed to take advantage of the new weapon. The Germans did not have the necessary ammunition and reserves to continue the offensive or respond forcefully to Canadian and French counter-attacks. The Canadians improvised masks from towels and handkerchiefs soaked with water or urine and though some men succumbed they held their line and stopped the German advance. Allied artillery also managed to keep firing throughout the battle. The Ypres salient remained in Allied hands.[15]

The Germans continued their battlefield experimentation with gas cloud attacks on the Eastern Front during the remainder of 1915. Russian soldiers lacked protection and often became casualties yet the Germans gained few advantages. The Russians learned to man their front lines lightly, temporarily evacuate target areas, and light giant fires to deflect the direction of drifting gas clouds. In addition, the Germans had great difficulty coordinating large scale infantry attacks in conjunction with gas because winds were mostly unpredictable.[16]

The Allies had seen the potential of gas as a weapon of shock. They began to reduce their casualties by the issue of respirators and chemically impregnated cloth helmets named "hypo helmets." They also saw the necessity for training soldiers to take individual protective measures against gas attack. As an example, the men had to be reminded to rewet their respirators in water during extended attacks or the masks stopped working. The Allies claimed outrage and denounced gas as inhumane. A real fear was that the Germans would inflict severe and lasting damage on Allied troop morale if they did not retaliate with chemical weapons of their own.[17]

The British recruited a group of 21 chemistry graduates in 1915 for the Special Service Party to advise the Army on chemical defense. These chemists lectured soldiers on gas weaponry and defensive countermeasures. They also worked to organize the offensive chemical capability needed to retaliate in kind.[18] Retaliation was going to be an uphill climb considering the relatively weak state of the British chemical industry. The British had but one firm, the Castner-Kellner Alkali Company, which could produce bulk supplies of liquid chlorine.[19]

Major Charles Foulkes, Royal Engineers, was appointed "Gas Advisor" in late 1915. He was initially authorized to form two Special Companies, giving him a total of 670 men. Eventually this force evolved into the Special Brigade which numbered 6000. The rank of pioneer in the engineers was equivalent to that of private in the infantry. In order to attract the class of men he needed, Foulkes convinced the Army Council to approve an entering rank of corporal and to ease age and physical standards on the expectation that chemists would not see strenuous duty. The Specials were armed with revolvers rather than rifles to reinforce the authority of their noncommissioned officer rank when giving orders to the infantry soldiers and because side arms were more convenient for working in trenches.[20]

The British finally retaliated with a chlorine attack at Loos, Belgium in late September 1915. The main thrust of the battle of Loos was on a seven-mile front on level ground marked with rock quarries, slag heaps, and brick works. The flatness made it suitable for a gas discharge but not good ground at all for advancing infantry. German machine gunners had excellent fields of fire from the abandoned slag heaps. Under these circumstances, the British counted on their gas attack to clear the way for the assault.[21]

The gas attack at Loos was a disaster. Winds were almost calm and direction did not remain favorable. Almost from the start, gas drifted back into British lines killing their own men. The gas cylinders were supposed to completely discharge in under two minutes but the release pressure made the nuts so cold that they would not fit onto a new cylinder. Spanners for unscrewing the cocks were misfits causing the gas-corporals to go looking for adjustable spanners. The gas attack fell off its timetable due to these problems. The Specials were so frustrated that some of them carried their cylinders forward and tried to burst them with small arms fire.[22]

The Germans responded to the gas attack with an intense artillery bombardment that shattered pipes, connectors, and the chlorine cylinders. The Germans had expected the gas and assumed a defensive posture which included wearing new gas helmets of a superior design. They also burned bundles of cotton waste prepared by soaking with oil to divert the gas and keep it from settling in their trenches. The British suffered 60,000 casualties in the assault

on what the German gunners called Lechenfeld von Loos (corpse field of Loos). British gas casualties from mishaps were also very high – 2639 including 22 gas specialists killed.[23]

Both sides developed new weapons and made improvements to protective gear. Troops, cavalry horses, and even mules began to regularly be outfitted with gas masks. By late 1915, the Germans were using phosgene gas which was nearly invisible and caused victims to choke and die of suffocation. Phosgene smelled like newly mowed hay but was ten times deadlier than chlorine. The British were capable of retaliating with their own phosgene weapons in a matter of just a few months.[24]

Poison gas discharges from cylinders remained the primary means of delivery. Artillery shells had not been used much because it was technically challenging to design a shell which could safely house highly corrosive chemicals under pressure and shells could contain only a relatively small quantity of gas and this would be widely dispersed on detonation. This explains why both sides relied primarily on cylinders to deliver gas cloud attacks over the trench lines. On the other hand, the cylinders had serious drawbacks because they were cumbersome to move and emplace and a successful attack always depended on favorable wind direction.[25]

Experimentation with artillery delivery of gas continued and by 1917 both sides fired gas shells as the primary means of chemical attack. The gas shell war began with lachrymatory shells (tear gas) and was quickly superceded by a lethal shell period (phosgene) from early 1916 to July 1917. The French were first to employ an innovative non-explosive phosgene shell at Verdun in February 1916. By using only enough charge to open the shell, the French were able to increase gas capacity, increase surprise effect, and achieve improved concentrations by reducing dispersal. Even if casualty-producing concentrations were difficult to achieve using artillery shells, they at least forced the enemy to wear respirators that were fatiguing and impeded effective artillery counter-fires. Within just three months the Germans came out with their own lethal artillery ammunition—the Green Cross Shell which contained diphosgene.[26] Artillery delivery of gas allowed the German Army to take advantage of the prevailing winds in Europe which move from west to east. They could rely on gas filled shells fired beyond Allied lines since the gas cloud would drift back over their trenches. This meant the Germans no longer had to wait for the wind to change to a westerly direction as they had to with cylinder weapons and artillery launched gas included an element of surprise not present with cloud attacks.[27]

The British developed some effective new delivery systems. They first used the 4-inch Stokes mortar as a means to project gas in 1916. The Stokes bomb held six pounds of agent compared to three pounds for the British 4.5 inch heavy howitzer shell and had a range of 1000

yards at a rate of 15 rounds per minute, a rate faster than possible with the howitzer. The high rate of fire helped attain higher concentrations of gas in the impact area. Still, it was a relatively close range weapon with limited accuracy.[28]

Captain William H. Livens, commander of the flame projector company, discovered that he could make a giant mortar from a large steel drum buried in the ground to deliver giant toxic bombs. The Livens projector could shoot a thin-cased bomb containing 30 pounds of chemical agent for a distance of nearly a mile. Range could be adjusted by altering the propellant charge and aiming was accomplished by setting the angle of the weapon when buried in the ground. It was not capable of much accuracy but fired in batteries they could deliver high gas concentrations at long range. The Livens projectors created a near instantaneous toxic cloud over the enemy that enabled the British to obtain a degree of surprise that produced more casualties. The Germans did not have as much time to put on respirators and take other defensive measures as they had during cylinder borne gas cloud attacks.[29]

The Livens projector proved effective in its first combat use during the battle of Arras in April 1917. Three thousand projectors fired nearly 50 tons of phosgene and were complemented by 48 Stokes mortars that fired a new gas, chloropicrin. Chloropicrin is a lethal gas which due to its lightness and instability could penetrate the German protective masks. The attack at Arras prompted the Germans to develop their own version of the gas projector which was hurried into production in time to be used on the Italian front in October of the same year.[30]

The gas war continued through the first half of 1917 without a breakthrough by either side until the Germans introduced dichloroethyl sulfide, better known as mustard gas.[31] Mustard gas (also called "Yellow Cross" from German shell markings) is an extremely persistent vesicant (blister agent) and it is effective even in very low concentrations. It irritates the eyes and throat and intensifies to extreme eye pain, with blisters forming on skin that has been exposed to it even through several layers of clothing. Mortality rates for mustard were much lower than for other gases, only one or two percent, but recovery was very slow and many victims suffered life-long disability.[32] Due to its persistency, exposure to even minute amounts over a long period of time caused severe injury. The mask alone was insufficient protection.

Mustard is a very stable compound and has a long storage life. The Germans found that it could be loaded in high explosive shells without being destroyed or dispersed beyond usefulness by the shock of explosion on impact. All other gas shells were recognized by a relatively soft burst due to their smaller explosive charges and soldiers were trained to recognize that characteristic and immediately put on their respirators. The heavy explosive charge in Yellow Cross shells caused casualties from concussion and shrapnel and since they

sounded like normal artillery rounds, soldiers were slow to recognize a gas attack and take protective measures.[33]

Yellow Cross caused allied casualties to soar. Standard box respirators protected the lungs against mustard but did nothing to protect the body. Mustard accounted for ninety percent of all gas casualties, 160,000 British alone. Even if mortality rates were low the nearly continuous evacuation of large numbers of incapacitated men from the front caused tremendous tactical and logistical problems. The persistency of mustard was found most valuable in the defense to keep areas clear of the enemy. The Germans exploited mustard in a defensive role with the introduction of the Double Yellow Cross shell during the summer of 1918. This shell opened with a heavy high explosive charge forcing mustard upwards, which saturated terrain over a very wide area to deny its use by the enemy.[34]

The allies were very impressed with mustard gas but struggled to retaliate in kind until very late in the war because of production difficulties. In a 1919 report to the Chief of General Staff, Brigadier Foulkes suggested that mustard may have had a much more decisive impact except thankfully the German supply was not too plentiful. If the Germans had more mustard, they might have stored it at battery positions where it would have been instantly available and used with maximum effect.[35]

Both sides continued to search for new gases and particularly a gas that would defeat the enemy respirators (mask breakers). The allied use of chloropicrin, a respiratory and vomiting agent, had been somewhat successful but the Germans produced a new mask in April 1918 that rendered it ineffective. The Germans brought out their new Blue Cross shell which used chlorarsine particulate, not gas, in the hope of defeating allied respirators. It didn't work. By early 1918, the allies had developed new chlorarsine compounds, Adamasite and Clarke, which were capable of passing through existing German gas masks but the Armistice prevented their use.[36]

The United States Army entered the war in April 1917 but did not have a Chemical Warfare Service until May 1918. The American gas program, including both defensive and offensive capabilities came under the Interior Department's Bureau of Mines rather than the War Department. The bureau's work had great applicability to chemical warfare since it had experience investigating poison gases found in mines and had been conducting research to develop breathing devices and medical treatment for miners injured by gas.[37] A large research facility was established at Edgewood Arsenal in Maryland and production plants for phosgene, chloropicrin, chlorine, and mustard were started. The arsenal shipped these chemicals to the Allies in fifty-five gallon drums though they also had the capability of filling artillery shells. The

production of chemicals peaked one month prior to the Armistice and due to insufficient time and lack of shells, not a single gas shell manufactured at Edgewood ever made it to an American artillery piece in France.[38] The Americans did manage to develop a new arsenic compound with the properties of mustard but quicker acting. This chemical, named Lewisite after the officer who discovered it was to be produced in quantity. The first 150 tons of Lewisite was shipped on its way to Europe but like Adamsite and Clarke, the Armistice prevented its use.[39]

Gas weapons in World War I were effective enough to cause many casualties but did not result in a major breakthrough or win any battles. Chemicals were not weapons of mobility. Even mustard, the most effective gas used in the war, could only be used away from the main line of advance because of its persistency. Certainly, mustard proved effective as a weapon of area denial in the defense but that did not qualify it as a "war winner." Both sides developed similar capabilities to wage chemical warfare and defensive techniques were upgraded as soon as new weapons were introduced. The gas war ended in stalemate.

CHEMICAL WEAPONS USE BETWEEN THE WORLD WARS

The inter-war years marked a good try by the League of Nations to achieve an effective international ban on the offensive use of chemical weapons. It was also a time when chemical weapons were employed by modern powers against enemies that possessed no capability to retaliate in kind and even lacked the training and defensive equipment to resist its effects. This period was also notable for the use of gas as a terror weapon against helpless civilian populations and the development of new aerial delivery techniques. In these circumstances the chemical weapon proved to be a more effective means of waging war.

As soon as 1919, the British General Staff, urged on by Brigadier Foulkes and with strong support of Winston Churchill considered using poison gas against Afghan tribesmen. Edwin Montagu, the Secretary of State for India, along with the Viceroy, Lord Chelmsford, and the Commander in Chief in India, Sir Charles Monro all disapproved of the idea for serious political and moral reasons. The critics of gas warfare held that it was in conflict with the traditional chivalry of frontier fighting, encumbered logistics for combat operations, and it was not really needed since the army had just won the Third Afghan War (April – May 1919) with conventional weapons. Montagu gained support for his position among several members of the cabinet including Lord Fisher, President of the Board of Trade who wrote that the initial negative response to the idea of using gas in Afghanistan was correct: "the British public thought that poison gas was a low game and they think so still."[40]

The gas advocates could not stand up to such vigorous political opposition so the idea was set aside...at least officially. Although records were never kept and we can find no operational accounts in British archives, it is thought that Foulkes prevailed and chemicals were used after all. The Royal Air Force is alleged to have used gas bombs against the Afghans. Stocks of phosgene and mustard were sent. The Chemical Advisor to the British Army in India, Major Salt, wrote that 'after the usual talk about "clean hands" and "low-down tricks against poor ignorant tribesmen"...the Government have decided they will adopt a policy of using gas on the frontier.' Gas was effective against poorly equipped colonial rebels, and agents like mustard when used defensively could deny the enemy their favorite ambush sites for weeks. Aerial employment of tear gas and smoke could flush rebels into the open where they were more easily engaged with conventional firepower. By the mid 1920s, both Spain and France were using poison gas for the same reasons in Morrocco. Gas began to be seen as a great weapon to "police" colonial insurgents.[41]

At the conclusion of the First World War, the chemical services came under pressure to restrict their studies of gas. Many politicians in America and Europe wished to see gas warfare abandoned or abolished altogether. Efforts were made to eliminate gas weapons. The treaty of Versailles in 1919 banned the importation and manufacture of chemical weapons in Germany, completely. The new League of Nations held a conference on the international arms business at Geneva in May 1925. The nations labored for a month and put together a treaty banning these weapons. They went further looking toward the future by also banning bacteriological weapons, back then only a subject for science fiction.[42] The approved protocol stated:

> The use in war of asphyxiating, poisonous or other gases, and of all analogous liquids, materials or devices, has been justly condemned by the general opinion of the civilized world; and...the prohibition of such use...shall be universally accepted as part of International Law, binding alike the conscience and practice of nations.[43]

The United States, France, Germany, Poland, Italy, Japan and the British Empire were among the forty-one powers whose delegates signed the Geneva Protocol.[44] The treaty still had to be ratified by those nations. France, Italy, Germany, and Britain all ratified the treaty between 1926 and 1930. The USSR declared itself to be bound by the treaty in 1928. France, Great Britain, and the USSR added reservations to the effect that the agreement would not apply to war with non-signatories and if they were attacked with chemical or biological weapons, they reserved the right to retaliate in kind. The Protocol did not include sanctions for noncompliance. The Protocol did not prohibit research and development or building a stockpile of chemical weapons. In reality then, the Protocol merely outlawed the first use of chemical or

biological weapons and even then it lacked teeth. The treaty ran into opposition in the Senate and the United States did not ratify it even though their delegation took much of the lead in putting the agreement together in the first place. Likewise, Japan refused to ratify (they finally did in 1970). The Geneva Protocol of 1925 was finally approved by the United States fifty years later...it was resubmitted by President Nixon in 1970 and finally ratified in 1975.[45] Today, over 130 nations, including Iraq, have agreed to be bound by this accord.[46]

Chemical weapons began to proliferate to other countries during the 1920s and 1930s, often aided by scientists from the former Central Powers or Allied belligerents. Germany transferred chemical technology to several countries including Spain, the USSR, Brazil, and Yugoslavia. The Germans and Russians supplied Turkey with mass quantities of mustard and other lethal gases. Of course, this German activity was a violation of the disarmament provisions of the Versailles Treaty but that did not stop them. On the other side, a French military mission was working with Greek officers on the use of gas in combat. Japan was much more self reliant and steadily continued development of her own chemical weapons capability.[47]

The shortcomings of the Geneva Protocol became obvious during the massive use of chemical weapons by Italy during the Italo-Abyssynnian War of 1935-1936. Italian airplanes sprayed large amounts of phosgene, tear, and mustard gases over Ethiopia. Both countries were signatories of the Geneva Protocol but Italy claimed justification in using poison gas on the basis that the Ethiopians had violated other rules of the law of war. Italy's representatives in the League of Nations cited these crimes; torture and decapitation of Italian prisoners of war, mutilations on the bodies of dead and wounded soldiers, wrongful use of the Red Cross symbol, and use of illegal tumbling (dum dum) rifle bullets. The Ethiopian atrocities were factual and the enraged Italians used them to justify their reprisals with chemical weapons, but it did not make it legal. The 1925 Protocol had clearly been violated, as such reprisals were not allowed in the absence of an enemy's first use.[48]

The Italian Army had been planning for gas warfare and made good tactical use of chemicals to support their combat operation. The climate that included gusty winds, high heat, and occasional heavy rain made non-persistent agents like chlorine, phosgene, and chloropicrin much less effective. Likewise, aerial bombardment and artillery shelling failed to produce high enough concentrations of agent in the impact area for the same reasons. The weapon of choice became the highly persistent blister agent, mustard, principally delivered by air attack. Various types of bombs were used which gave good coverage around the ground bursts but the Ethiopian warriors quickly learned to circumvent these areas. After a time, aerial spraying of

mustard became the primary means of delivery since it was more accurate and could ensure a very even and thorough application of agent over large areas.[49]

The Italian tactics included the use of mustard to guard their flanks as they moved through the mountains. The barefooted Abyssynian warriors could not enter these protected zones without being burned. The gas was also used very effectively to disrupt enemy logistics and supply movement. These attacks killed many cattle and pack animals as well as instilling terror on civilian camp followers traveling alongside these supply columns. Finally, gas was used in the offense to help win battles. While machine guns held off the Abyssinians, the Italians would gas their rear area and likely lines of retreat. This would be followed by high explosive artillery and aerial attack that was designed to force the Abyssinians to withdraw into contaminated areas and where they would panic and the retreat turned into a rout.[50]

Abyssinian Emperor Haile Selassie spoke out at the League of Nations describing mustard gas as "death dealing rain" which had caused tens of thousands of casualties. The true value of gas in the war was its effect on terrorizing the enemy and civilian population. It helped the Italians win the war but was not a "war-winner" since they would have clearly won without it. Continual spraying of mustard gas on the Abyssinian warriors eventually caused mass desertions due to exhaustion and "because they said they could not fight against gas."[51] The Italian success with gas came about because the Abyssinians could not protect themselves and had no means to retaliate.

The Italians were not threatened with intervention by any other nation on behalf of Ethiopia and the League of Nations posed no real threat. The League tried to enforce economic sanctions against Italy but these were half-hearted measures and failed to stop the aggression. They could not come to any agreement to close the Suez Canal to Italian military transport or shut down oil supplies. Military action in support of sanctions was never seriously contemplated.[52]

The Japanese embarked on an extensive chemical warfare development program in the late 1920s. They developed a variety of novel gas weapons including gas rockets, special mustard spray bombs which discharged while floating to the ground suspended by parachutes, remote controlled gas trailers which dispensed mustard in 7 meter wide strips, and even a man-portable anti-tank weapon which shot a kilogram of hydrogen cyanide. Starting in 1937, the Japanese used poison gas in the war against the Chinese. During the war, Chinese reports claimed over 1000 gas attacks were launched against them by the Japanese. Many types of lethal gas were used including lewisite, mustard, phosgene, chloropicrin, and hydrogen cyanide. Japanese production of lethal gas was probably insufficient to maintain a prolonged all out gas

campaign in a country as vast as China. This may explain why Japan used lethal gas only against specially chosen targets and in mostly small-scale actions.[53]

The Japanese offensive gas units appear to have used China and Manchuria as a laboratory for testing weapons and conducting research. British military intelligence studied 17 gas attacks in North China during 1942 in which a total of 772 shells were fired killing 245 and wounding 927. They concluded that the firing of so few shells into villages could have had no real military purpose and must have been experimental. The British appeared to conserve their gas stocks for only those situations "when they are up against it either in attack or retirement."[54]

The Japanese tactical use of non-lethal irritant gases or "special smokes" was very widespread and quite successful. These were generated by means of firing candles, flame pots, and artillery shells at the enemy. These irritant agents and tear gases were called "red candles" and "red shells" due to their distinctive red markings. They worked well as a surprise weapon which could panic and confuse the unprepared Chinese. The red candles were also very successfully used to drive the Chinese out from fortresses, caves, and villages and into the open where they could be destroyed by Japanese forces. The irritant gases were effective at degrading Chinese morale and the temporary incapacitation of Chinese soldiers by red candles could be decisive in some battles. Chinese General Tang En-po observed that "it lays our men out long enough to enable the enemy to come and bayonet them as they lie gasping for breath."[55]

The League of Nations had enough information coming out of China to safely conclude that the Japanese were using poison gas but could do nothing to stop it. Japan never ratified the Geneva Protocol of 1925 (though China had done so) and the fact that Italy was bound by the agreement had not deterred Mussolini from using gas in Ethiopia. Other world events including German aggression in Europe took center stage and Japanese use of poison gas in China became a "back burner" issue for the time being.

The well known use of chemical weapons by Italy against the Abyssinians clearly showed the inadequacy of the 1925 Geneva Protocol and the weakness of the League of Nations to effectively respond. The numerous reports of chemical weapons attacks by the Japanese in China reinforced interest in poison gas warfare especially considering the tension caused by Nazi German aggressions in Europe. As a result, the late 1930s began a period of chemical rearmament throughout Europe which lasted through the end of World War II.

THE SECOND WORLD WAR

From the start of World War II, the belligerents held a common belief that chemical weapons would be used on a very large scale. The fact that this did not occur is remarkable considering that both Allied and Axis armed forces were in possession of vast chemical weapons arsenals and had effective means to deliver them. Chemical warfare officers in the United States and Great Britain who had forecast that gas would quickly become a major weapon in the war were surprised that no indications of gas were apparent during Germany's attack on Poland. Even so, the British government began to issue gas masks to both military and civilians alike prior to announcing its declaration of war against Germany. On that day, 3 September 1939, Great Britain attempted to obtain promises from the belligerents that they would abide by the 1925 Geneva Protocol prohibiting the use of gas and bacteriological weapons. Germany, Italy, Japan, Finland, Bulgaria, and Rumania all replied affirmatively. Japan did not use gas during the attack at Pearl Harbor and the President announced that the United States would use gas only in retaliation to the use of chemical weapons by Germany or Japan.[56] At the first commencement of hostilities, both Britain and France communicated through the Swiss government that they would likewise be bound by the Geneva Protocol. Hitler then announced a "no first use" policy in a speech to the Reichstag in which he said: "whoever fights with poison gas will be fought with poison gas. Whoever departs from the rules of humane warfare can only expect that we will do the same."[57]

The early successes of both Germany and Japan with conventional arms made their potential use of gas both unnecessary and disadvantageous. The tactics of "blitzkrieg" demanded surprise, speed, and shock of aerial and armored formations which would have been slowed by offensive gas operations of their own or retaliatory gas attacks by the defending enemy. Britain was acutely concerned with the prospect of another gas war with Germany and undertook a program to develop large quantities of phosgene and mustard bombs and spray containers which would be delivered by the Royal Air Force's Bomber Command in retaliation in the event of German first use.[58] Likewise, the quick strike attack by the Japanese against United States forces in Hawaii did not rely on gas for success.

The promise of restraint was borne by fear of retaliation on both sides. What was not known until very late in the war was that Germany had a class of powerful new toxics called nerve agents which had not been matched by the Allied chemical armaments developers. These nerve agents were derived from experiments to create effective insecticides in the late 1930s. Dr Gerhard Shrader noticed that one of his insecticides had a very powerful effect on humans even when exposed to very minute quantities. This new chemical was Tabun and its potential as a war gas was clear. It was colorless and nearly odorless, and quickly poisoned by

inhalation or absorption through the skin. Its action caused complete loss of muscular control and death by asphyxiation.[59]

The nerve agent Tabun works by interfering with enzymes causing muscular contraction and relaxation. Muscles contract by electrical impulse when the enzyme acetylcholine is released from the nerve fibers which connect the muscles. The muscles remain contracted until another enzyme called acetylcholinesterase is released by the nerve fibers to break down the acetylcholine which then allows muscles to relax. Tabun is an irreversible acetylcholinesterase inhibitor and causes convulsions and death due to complete disruption of the nervous system. It is fatal to humans exposed to a dose even smaller than a pinhead.[60]

Development of nerve agents continued and just one year later Schrader came up with a compound that was much like tabun but ten times more toxic. This one was named "sarin" after the scientists who developed it (*S*chrader, *A*mbros, *R*udiger and van der *Linde*). By 1944, they developed a third compound that was still similar but quite a bit more lethal and called it "soman."[61] German development and stockpiling of these highly lethal weapons in large quantities remained a well kept secret during the war and had it not been for German fear that the allies had developed nerve agents of their own they might have been used.

The gas war never came. Both sides prepared to respond to the others first use of chemical weapons by developing both defensive and offensive capabilities. German experimentation included the poisoning of human subjects in the concentration camps. They certainly knew the effectiveness of their newer weapons. Why were they not used? First, German intelligence greatly overestimated enemy capabilities and even reported that the Allies had developed nerve gases. It was also well known that Hitler had an aversion to using gas probably because he had been temporarily blinded by gas at Ypres during his World War I service. The best account of this came from Hitler's surgeon, Karl Brandt. During interrogation after the war, Brandt emphasized that Hitler never even visited the chemical warfare range at Raubkammer and consistently opposed the use of gas unless in retaliation against the Allies. Finally, during 1943 and afterwards the Allies had established air superiority in Europe. This made the prospect of a chemical weapons contest with the Allies a near guaranteed disaster for the German homeland and citizens.[62]

The United States which was the dominant Allied power in the Far Eastern Theater never seriously contemplated the first use of gas. Roosevelt's statement that the United States would be prepared to retaliate in kind but would not initiate first use became a policy of minimum deterrence. The Japanese were accused of using poison gas against the Chinese but Japanese leaders denied this. General Tojo and Field Marshal Shunroku Hatu admitted that

Japanese forces had used tear gas and sneezing agents insisting that these were permitted under international law. Tojo took Roosevelt at his word and overruled others in the Army High Command who advocated employment of chemical munitions during fighting over the Mariannas. Tojo claimed that Japan did not use these weapons, not only out of her obligations under international law, but, because Japan's production capacity for a chemical war could never equal the United States and Japan was extremely vulnerable to chemical attack as a densely populated island nation.[63] The bottom line for Japan was that they did not use chemicals because they were in a technically inferior position and feared retaliation since they would suffer much more than they would gain. Finally, American development and deployment of atomic weapons against Japan caused an abrupt end to the war altogether.

Edward M. Spiers offered this explanation for non-use of chemical weapons during the war:

> For all belligerents, save the United States, the threat of counter-city retaliation was the most powerful deterrent to gas warfare. It reflected a peculiar combination of fears and assumptions – misperceptions about enemy gas potential, inferences about possible enemy intentions derived from capabilities, and a conviction that any enemy, if attacked with gas, would retaliate in kind and on a massive scale. Compounding these forebodings was the dread of escalation – an assumption that gas once used, would become accepted as a legitimate weapon and so employed in all theatres of war.[64]

THE COLD WAR AND THIRD WORLD

After 1945 poison gas has been used or reported to have been used in several conflicts. Unsubstantiated charges were made in May 1951 that the United States, which still had not ratified the 1925 Geneva Protocol, launched B-29s against Nampo, North Korea causing a thousand casualties of which half died of suffocation. Further attacks against Won San and Hwanghai were subsequently reported. The United States denied all of this and was successful in blocking Soviet and Red Chinese efforts to have the United Nations mount an impartial investigation.[65]

The Egyptians were accused of using poison gas against the royalist forces (those supported by Saudi Arabia) to help the republicans during the 1963-1967 civil war in Yemen. The claimed attack occurred on 5 January 1967 and was credited with killing both people and animals in Kitaf, Northern Yemen. A British military advisor to the royalists claimed to have witnesses and photographed "hideous sores and eruptions on the skin of children and animals who had been exposed to the gas."[66] Egypt denied it and invited a UN investigation of the matter. In spite of credible reports by the Red Cross that confirmed Egypt's use of toxic gas,

the United Nations took no action because tensions in the Middle East made it impractical to get the consensus necessary to act and the war in Yemen immediately preceded the Arab Israeli War. The best guess was that the Egyptians employed mustard gas that had been discarded by the British who buried it in the desert during the 1940s. These old stocks of mustard were thought to have been unearthed and then put to use by the Egyptian Army.[67]

The United States made massive use of chemical riot gases and defoliants during the war in Vietnam but claimed these were not prohibited under international law. The most common tear gas used was CS that was effective at forcing enemy soldiers from sanctuaries like bunkers and underground tunnels. In a confined space CS is lethal but it was employed as an irritant or harassing agent and not thought of as a lethal gas. In the offense, CS was dropped in 55 gallon drums from helicopters to force the enemy out into the open where they could be engaged by United States air and ground forces. The chemical defoliation program, called OPERATION RANCH HAND, was intended to destroy crops and defoliate trees. The program was effective at denying concealment of many enemy ambush sites and infiltration routes by stripping trees and shrubs in nearly six million acres of South Vietnamese forests and a wide swath of neighboring Laos. The United States was heavily criticized both at home and abroad for its use of CS and herbicides in Vietnam. In 1969, the United Nations passed a resolution prohibiting "any chemical agents of warfare...which might be employed because of their direct toxic effects on humans, animals, or *plants*." The resolution was certainly meant to address the US use of herbicides. The United States steadfastly claimed herbicides and CS were not lethal weapons and would continue to be used in Vietnam. Having said that, in light of both domestic and international protests particularly concerning OPERATION RANCH HAND, the use of these chemicals in Vietnam was quietly shut down.[68]

Starting in 1978, Laotian refugees in Thailand claimed their villages had been attacked with poison gas by communist Laotian and Vietnamese aircraft. Similar reports of so called "yellow rain" attacks came out of Kampuchea at the time. Mujahideen rebel forces in Afghanistan also claimed that Soviet troops used chemical weapons. These reports were of great interest to the United States in light of cold war tensions and their impact on East-West relations. The Reagan administration went on the warpath in attempting to sway world opinion against the Soviet Union over these allegations. In 1981 Secretary of State Alexander Haig claimed that the United States had physical evidence that the Soviet Union and its allies were employing highly toxic poisons in Southeast Asia. In 1982, after looking at the "yellow rain" evidence in Kampuchea, the State Department stated, "the conclusion is inescapable that the toxins and other chemical warfare agents were developed by the Soviet Union." Some experts

counterclaimed that the "yellow rain" was no more than showers of honeybee feces mostly composed of the outer shells of pollen grains. These bee experts advised that in the tropics, honeybees excrete waste as a way to cool off so as to keep the temperature in their colonies low enough for larvae to develop normally. The physical evidence of chemical weapons use in Southeast Asia and Afghanistan was open to question. The United States officials did not reveal their claimed proof. These reports of poison gas use remain unsubstantiated, today.[69]

In September of 1980, Iraq invaded Iran, to begin their war that lasted for eight long years. This war included attacks with lethal chemical weapons as early as November 1980. Iran complained to the United Nations in 1983 and the UN sent an investigative team that surveyed and inspected Iranian hospitals to observe victims. The UN team found enough bomb fragments and unexploded ordnance on the battlefield to prove Iraqi use of both mustard and tabun nerve gas. This marked the first battlefield use of nerve agent in history. In spite of United States and United Nations condemnation, Iraq flagrantly continued to press its attacks with lethal chemicals through the first part of 1988. The Iraqis were outnumbered and faced with fanatical "human wave" assaults by the Iranians. The gas, especially mustard, was used mostly for defensive purposes to contaminate the battlefield to their front in order to create a barrier through which the Iranians would fear to cross. The Iran-Iraq war ended in August 1988 with the Iranians claiming 50,000 gas casualties including several thousand killed by poison gas.[70]

Iraq was not punished for using illegal weapons because the United States and many other countries did not side with the radical Islamic state that Iran became after the overthrow of the Shah and the rise of Ayatollah Khomeini. In fact, the United States while claiming to be neutral looked at Iraq and Saddam Hussein as a counterweight against too much influence by Iran in Southwest Asia and the Middle East. Consequently, no economic sanctions were ever imposed against Iraq during the war though the United States and some other countries banned export of certain chemicals to Iraq that could be useful in making weapons. This did very little. In March 1988, Iraq used mustard and nerve gas on its own citizens to put down a Kurdish rebellion in Halabja, northern Iraq. It worked...5,000 died as a result.[71]

THE PERSIAN GULF WAR – OPERATION DESERT STORM

Given the Iraqi Army's recent history in the war with Iran and operations against Kurdish insurrectionists in Northern Iraq, allied coalition forces had a realistic expectation that they would face Iraqi offensive chemical weapons. After all, Iraq was known to have an extensive arsenal of chemical weapons including mustard gas and at least two nerve agents, tabun and

sarin. At least before the war began, they had a formidable means to deliver these weapons by air, artillery, rocket artillery, specialized land mines, and even long range SCUD missiles. The threatened use of these weapons was exploited by Iraq as a political and psychological threat against the coalition and was hoped to be an effective deterrent from attack. Saddam Hussein may have hoped that the US leadership and people were sufficiently "casualty adverse" that the threat of chemical warfare would cause us to back away from using armed force to evict his army from Kuwait. He certainly communicated the threat in the clear. In the first week after the invasion of Kuwait, the Iraqi ambassador to Greece warned "Bagdad will use chemical weapons if it is attacked by the United States or Israel."[72]

In the end, the Iraqis refrained from using their chemical weapons during the Gulf War. There are several probable reasons to explain Iraqi non-use of lethal chemicals. The best explanation is that Saddam Hussein and many other Iraqi leaders must have feared the kind of retaliation that could be inflicted on Iraq by the United States and its allies. The United States never publicly committed to retaliation with chemical or nuclear weapons if Iraq used chemical weapons against coalition forces or civilians. President Bush was directly asked this question during a televised news conference on 5 February 1991 and said

> Well, I think it's better never to say what option you may be considering or may or may not do...[H]e [i.e., Saddam] ought to think very carefully about doing that – very, very carefully. And I will leave that up to a very fuzzy interpretation because I would like to have every possible chance that he decided not to do this.[73]

The purposeful ambiguity of the President's statement did not dissuade many expert media consultants from speculating on probable US resolve to retaliate on a massive scale with chemical or nuclear weapons. In addition, many Arab leaders in the coalition openly commented on what they viewed as a certainty in the event of Iraqi first use of chemical weapons. Lieutenant General Khalid bin Sultan, the Saudi Arabian military commander, warned that "we also know – and he [Saddam] knows it full well – that should he use them [CWs] that would cause the total destruction of Iraq." [74]

By the time the war was underway, Iraq quickly lost a majority of its ability to deliver chemical weapons, anyway. They lost many aircraft on the ground, a large number of their best high performance jets and helicopters fled to Iran where they were impounded. Their airfields and aircraft bunkers were all heavily damaged. Besides, allied air forces established total domination of the skies over the Kuwait theater of operations (KTO). Likewise, artillery formations and rocket artillery units were high priority targets during the air campaign and were destroyed in large numbers. Iraqi lines of communication were so heavily attacked that delivery

of chemical weapons, which require special handling, to the front line units would have been very difficult. They still had SCUD missiles but these were limited in terms of accuracy and payload. Iraqi SCUDs had been modified for extended range by reducing warhead capacity. Considering that US and coalition forces had effective chemical protection and defensive equipment, the use of chemical SCUDs could only have been effective as a terror weapon. As for the Iraqi Army, chemical protection was unevenly distributed and much of the frontline infantry which were lower priority units lacked protective equipment. Chemical weapons strikes against assaulting coalition forces would have wreaked havoc on the Iraqis since prevailing winds from the southeast would cause "blow back" on Iraqi positions. Saddam Hussein was rational enough to see the cost versus benefit equation did not work out in favor of using chemical weapons. He may also have felt Iraq's use of chemical weapons would ruin his ability to negotiate a settlement for terminating the war in a way which would allow him to claim a "political victory" and remain in power.[75]

CHEMICAL WEAPONS TERRORISM – TODAY'S ASSYMETRIC THREAT

> The Canaries went first. Policemen in protective suits, ridiculous-looking things with gas detectors hanging out in front, bore the cages before them...those who didn't wear protective suits watched the canaries closely. If the compound doors opened and the birds died, they would flee for their lives...they emerged with ton after ton of chemicals—sodium cyanide, sodium flouride, phosphorus trichloride, isopropyl alcohol, acetonitrile—some benign, but others deadly, and still others that if mixed together might create something deadlier still. Enough to kill 4.2 million people, guessed one newspaper; another topped it with an estimate of 10 million. Japanese television viewers watched, mesmerized, as the police stormed the redoubts of the sect, looking for evidence...[76]

The Aum Shinrikyo terrorists employed the highly lethal nerve poison sarin for their 1995 Tokyo subway attack. A raid on 25 branches of the cult found enough gas to kill more than four million people.[77] Sadly, Aum Shinrikyo is but one of many terror organizations operating in the world with the means to gain access to chemical weapons. Highly toxic chemical agents are available on commercial markets in nearly every country on earth. Some highly lethal insecticides, which could be used as weapons of annihilation, only require an exterminator's license to be purchased in the United States and are virtually unregulated in some countries.[78] Hopefully, the military chemical weapons such as mustard and sarin are under government control in most places but the possibility of even military weapons passing into terrorist hands cannot be discounted. Interdiction of chemical weapons is a difficult challenge and detection of chemical weapons before they are uncorked is equally problematic. Protection against a terrorist chemical attack is highly dependent on warning, preparedness to take defensive

protective measures, and the ability of medical and other emergency personnel to manage the consequences after an attack.

UNITED STATES SECURITY STRATEGY FOR COUNTERTERRORISM

The national security strategy for counterterrorism is working to reduce the threat of terrorist attacks on our citizens, our armed forces, and US property both in America and abroad. It clearly articulates the "ends" or objectives and effectively employs all the elements of national power to implement effective counterterrorism programs.

Current policy on US strategy for counterterrorism is defined in the President's, ***A National Security Strategy for a new Century (NSS)*** which articulates our objective to deter and punish terrorists and outlines broad policy and tactics for combating terrorism:

> The United States...remains determined to apprehend and bring to justice those who terrorize American citizens. We make no concessions to terrorists...we seek to eliminate terrorist sanctuaries overseas, counter state support for terrorism, and help other governments improve their capabilities to combat terrorism...As long as terrorists continue to target American citizens, we reserve the right to act in self-defense by striking at their bases and those who sponsor, assist or actively support them...no country can be a safe haven for terrorists.[79]

The NSS also addresses terrorism under the section concerning "Defending the Homeland." The United States is committed to deter or prevent the use of unconventional terrorist tools such as weapons of mass destruction (WMD). In response to any such attack, the United States will be prepared to limit the damage and respond effectively against those responsible.

The United States Armed Forces play a key role in the counterterrorism effort. The Chairman, Joint Chiefs of Staff's, ***National Military Strategy (NMS)*** contemplates a security environment that encompasses threats to our country and interests that are not "war" but may still call for the use of military force:

> Some state or nonstate actors may resort to asymmetric means to counter the US military. Such means include unconventional or inexpensive approaches that circumvent our strengths, exploit our vulnerabilities, or confront us in ways we cannot match in kind...Of special concern are terrorism, the use or threatened use of WMD, and information warfare. These three risks in particular have the potential to threaten the US homeland and population directly and to deny us access to critical overseas infrastructure...Hostile actors may use such means by themselves or in conjunction with conventional military force. Such asymmetric challenges are legitimate military concerns. We must increase our capabilities to counter these threats and adapt our military doctrine, training, and equipment to ensure a rapid and effective joint and interagency response.[80]

The clearest statement on our intent to isolate and punish terrorists and any state that provides them with support or a safe haven is found **in Presidential Decision Directive (PDD) 39, *U.S. Policy on Counterterrorism***:

> The United States regards all such terrorism as a potential threat to national security as well as a criminal act and will apply all appropriate means to combat it...the United States shall seek to identify groups or states that sponsor or support such terrorists, isolate them and extract a heavy price for their actions...The United States shall seek to deter terrorism through a clear public position that our policies will not be affected by terrorist acts...When terrorists wanted for violation of U.S. Law are at large overseas, their return for prosecution shall be a matter of the highest priority and shall be a continuing central issue in bilateral relations with any state that harbors or assists them. If we do not receive adequate cooperation from a state that harbors a terrorist whose extradition we are seeking, we shall take appropriate measures to induce cooperation. The United States shall give the highest priority to the developing of effective capabilities to detect, prevent, defeat and manage the consequences of nuclear, biological or chemical (NBC) materials or weapons use by terrorists.[81]

Taken together, the NSS, NMS, and PDD 39 form a solid, well articulated strategy for combating terrorism and the asymmetric threat posed by chemical weapons in the hands of terrorists or rogue states.

US ARMED FORCES AND THE FIGHT AGAINST TERRORISTS

Military force continues to be an important component of our counterterrorist strategy. The armed forces enable us to exact retribution and retaliation against terrorists and their state sponsors. On April 15, 1986, President Reagan launched a large-scale aerial bombardment against installations in Libya to punish them for support to the terrorists who attacked a Berlin nightclub which killed two OUS soldiers. In 1993, President Clinton initiated a massive cruise missile attack on the headquarters of the Iraqi Intelligence Service in Baghdad in retaliation for their unsuccessful plot to assassinate former President Bush during his visit to Kuwait earlier that year.[82] The President again showed our willingness to retaliate against terrorists on 20 August 1998, when US Navy ships and submarines in the Arabian and Red seas fired more than 79 cruise missiles in a well coordinated simultaneous attack against terrorist targets in Afghanistan and Sudan. The missiles fired on Afghanistan targeted the Zhawar Kili Al-Badr terrorist training camp 160 kilometers southeast of Kabul, the Afghani capital. The Sudanese target was a chemical manufacturing plant suspected of producing precursor ingredients for highly toxic persistent nerve agent VX. The cruise missiles hit their targets. The US attacks were announced as our response to the bombings against US embassies in Tanzania and Kenya that were linked to Osama bin Laden.[83]

Future efforts to combat terrorism will include using armed force against both the terrorists and those states that sponsor or assist them. "Countries that persistently host terrorists have no right to be safe havens," said President Clinton during his announcement giving his reasons for ordering the cruise missile attacks on terrorist targets in Afghanistan and Sudan.[84] The military option will not be appropriate for every occasion but its use or threatened use remains a powerful deterrent and should give the United States a stronger hand in dealing with those countries that harbor terrorists within their borders.

MILITARY ASSISTANCE TO CIVIL AUTHORITIES

The United States government is working hard to respond to terrorist use of weapons of mass destruction (WMD) and the armed forces have been given a pivotal supporting role to responsible federal and state civilian agencies. The 1996 Defense Against Weapons of Mass Destruction Act requires DoD to reinforce local and state capabilities to respond to domestic terrorist attacks involving WMD.[85] The President followed this up in May 1998 **with Presidential Decision Directive 62, *COMBATING TERRORISM*.** The importance of PDD 62 is the attempt to achieve improved integration of federal response to a terrorist attack by clarifying roles and responsibilities for both crisis management and consequence management. This PDD created a National Coordinator for Security, Infrastructure Protection and Counterterrorism. The National Coordinator works within the National Security Council and provides advice for resourcing counter-terror programs and guidance for crisis response.[86]

The federal government has divided the threat into the categories of crisis response and consequence management. The Department of Justice with the Federal Bureau of Investigation (FBI) is responsible for crisis response. Crisis management response seeks to prevent or limit the threat, investigate, and prepare a criminal case for federal prosecution. The Emergency Management Agency (FEMA) is in charge of coordinating federal assistance to state and local governments. Consequence management includes efforts to reduce and alleviate the damage and suffering caused by emergencies. In addition, the federal response encompasses technical operations and in the case of a chemical weapons release, the lead federal agency for technical matters is designated to be the Environmental Protection Agency.[87]

The US armed forces have been given major responsibilities to assist federal, state, and local governments prepare for and respond to a WMD terrorist attack. The Department of Defense has established the Joint Task Force for Civil Support, headquartered at the United States Joint Forces Command, to plan and coordinate DoD actions in response to a WMD crisis in the continental United States (CONUS). United States Pacific Command and United States

Southern Command have the same responsibilities for military assistance to civil authorities in states, territories, and possessions outside CONUS.[88] The Department of Defense created ten WMD Civil Support Teams each composed of 22 well-trained and equipped full-time National Guard soldiers. One WMD Civil Support Team is assigned to each of the ten FEMA regions in CONUS with a mission to assist first responders to ascertain the exact nature of a chemical or biological attack, provide necessary expert medical and technical advice, and help coordinate the employment of follow-on military assets. In FY 2000, Congress directed the establishment of 17 additional WMD Civil Support Teams.[89] In addition, DoD is now required to train local leaders and emergency response personnel in 120 major U.S. cities to respond to a WMD incident. These cities were chosen as the most likely targets of a terrorist attack. The city training program will be backed up by annual exercises to assess federal, state, and local emergency responders.[90]

INTERNATIONAL COOPERATION AND INTELLIGENCE SHARING

The United States and most other nations have ratified the international Chemical Weapons Convention (CWC) which prohibits the manufacture, acquisition, accumulation, transfer, and use of chemical weapons, including riot control gases. The treaty requires that signatories destroy existing stocks of chemical weapons and quit production. Nations that have obligated themselves under this agreement have ten years to accomplish this beginning 29 April, 1997. The treaty allows signatory nations to inspect industrial plants suspected as having the ability to produce chemical weapons material commercial, on demand (24 hours notice). The treaty will reduce but not eliminate chemical weapons proliferation since several "nations of concern" including North Korea, Iraq, Libya and others have not signed the agreement and some terrorist organizations have the resources to purchase or produce chemical weapons.[91]

The United States has also been successful in developing international cooperation against terrorism in the United Nations. The five permanent members of the United Nations Security Council issued its Statement on Combating International Terrorism (23 September 1999) which urged all member states to implement a specific action plan which includes cooperation to suppress terrorist acts and bring perpetrators to justice, prevention of the preparation and financing of terrorists in their territories, denying terrorists safe haven or asylum, exchanging information and cooperating in judicial matters, and working to strengthen international legal mechanisms to combat terrorism.[92] This was followed by UN Security Council Resolution 1269 (19 October 1999) which stresses the role of the United nations in

strengthening international cooperation in combating terrorism and calls on member nations to "prevent and suppress terrorist acts...and bring to justice the perpetrators of such acts."[93]

The United States is supporting European Community (EC) initiatives to expand police and intelligence cooperation. The FBI is coordinating with INTERPOL to make known the arrest warrants we have out on terrorists so that "watch lists" we publish are placed in the hands of border police in many countries. This has greatly increased the risk that terrorists face when crossing international borders.[94]

Obtaining and sharing knowledge of terrorist operations, personnel, techniques, financial support arrangements, and communications will permit the United States and other countries to penetrate terrorist organizations and bring more of these criminals to justice. The clearest example of such a team effort was the high degree of intelligence cooperation among the coalition allies to blunt Saddam Hussein's threat of a "holy terror" campaign during Desert Shield and Desert Storm.[95] High quality intelligence is crucial to any proactive counterterrorism program and the United States must work harder to achieve international cooperation in this regard.

CONCLUSION

The history of chemical weapons makes clear that this type of weapon is most effective as an asymmetric means of attack against a vulnerable, ill prepared enemy or population. The threat of chemical weapons being used by a terrorist organization against US forces overseas or to attack US citizens or property in CONUS is a serious concern.

The current national strategy for counterterrorism is adequate to guide our programs through the coming decade and beyond. Physical security of our bases and embassies overseas and likely civilian and federal facilities in CONUS must be improved. However, fortresses do not guarantee safety and we can't harden every potential terrorist target. The United States must continue to demonstrate the ability and willingness to use military force to punish terrorists and governments that support or harbor them.

We need to maintain our technical intelligence capability, strengthen human intelligence (HUMINT) sources, and work harder to develop international cooperation in shared anti-terrorist intelligence activities. Strong political and economic sanctions in cooperation with other nations to isolate state sponsors of international terrorism are useful and require long term commitment.

We have already demonstrated willingness to use military power such as air strikes to retaliate against terrorists and those countries that sponsor or provide them sanctuary. The United States should also be willing to launch preemptive strikes to destroy WMD development,

production, and storage facilities in countries that may threaten to use such weapons against the United States. The US ratification of the Chemical Weapons Convention eliminates our ability to "retaliate in kind" against an enemy that attacks US forces with chemical weapons. As a result, it is vitally important that the United States continue to invest in precision guided munitions and other high-tech weapons to give us a fearsome conventional retaliatory capability. In addition, the United States should let our adversaries know that we never rule out a nuclear response to punish an enemy that attacks us with chemical or biological weapons.

History points to chemical weapons being used most successfully against troops and civilians that lack the ability to protect themselves. United States forces have been provided the training and equipment to defend against chemical attack. This military capability must be maintained since neither the end of the Cold War nor international agreements like the CWC have eliminated the threat of chemical weapons to our forces. The US homeland and our citizens remain very vulnerable to chemical attack. Addressing this challenge will not be easy and there are no quick solutions. The massive federal program for dealing with WMD consequence management needs even more DoD involvement but is a good start. The recently established Joint Task Force for Civil Support, at FORSCOM and establishment of additional full-time National Guard WMD Civil Support Teams are visible proof of the ongoing DoD commitment and military support in this area should be expanded. These programs should be backed up by providing civilian emergency response agencies in our largest cities with modern chemical and biological agent detection and defense equipment in addition to training. Terrorism is not going to disappear. It is probably not a question of whether such an attack will occur but when it will happen. The current strategy will enable us to contain or reduce terrorism and the likelihood of a WMD incident on US soil but will require consistent effort and long-term DoD commitment to federal consequence management programs.

WORD COUNT = 11834

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