



# AUSA BACKGROUND BRIEF



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## BIOLOGICAL WARFARE DEFENSE: THE ARMY'S ROLE

### Biological Warfare: Legal Constraints

Ancient warfare was witness to many inhuman practices, not the least of which was the contamination of wells and the hurling of diseased human carcasses over the walls of cities under siege to spread diseases among the populace. Thus far, biological warfare (BW) has been little more than a dark shadow hovering in the background in most conflicts of the 20th century. Modern health sciences have advanced to such levels that the concept of deliberately employing some of the biological agents known to be available for warfare is abhorrent to all civilized states. The United States has enthusiastically supported global efforts to eliminate the possibility of BW in the future.

In 1925, the Geneva Protocol banned the first use of biological and chemical weapons, but it did not address the matter of their manufacture or possession. In 1972, the United States and more than 100 other countries signed the Biological and Toxin Weapons Convention prohibiting the development, production and stockpiling of biological weapons. The U.S. Senate ratified the international convention in 1974.

Fifteen years later, it became apparent that even this was insufficient legal protection because the U.S. government had never taken steps domestically to extend the provisions to private companies. Concern over the spread of applicable U.S. technologies to terrorist groups or to terrorist-supporting governments abroad stimulated the necessary action. A law extending the prohibition to private companies was signed into effect in May 1990. More recently, President Bush signed an executive order authorizing sanctions against companies that sell biological and chemical weapons-making technology to foreign countries.

### BW: An Overview

BW may be the least understood of the various methods of mass destruction. Fundamentally, it involves the use of one or more biological agents — defined as “micro-organisms which cause disease in man, plants, or animals or cause the deterioration of materiel” — in warfare to obtain a competitive advantage.

BW is not a discrete form of warfare; BW involves the use of one or more agents in a spectrum ranging from certain chemical agents, called toxins (organic poisonous chemicals generated by animal or vegetable matter), to living micro-organisms. Toxins are poisons that include such diseases as botulism, tetanus and diphtheria. The live agents may be either viruses (such as smallpox, encephalitis and yellow fever) or bacteria (such as bubonic plague, cholera and anthrax); they may occur naturally or they can be genetically engineered. The general term for all agents of potential use in BW is “agents of biological origin,” reflecting the range of types from which they may be chosen.

Means of delivery can include rockets, artillery shells, mines, air-dropped packets, aircraft sprayers, sabotage, and infected insects and rodents. Targets include rear-area objectives such as

food supplies, water sources, troop concentrations, convoys and population centers. BW can be used to disrupt and degrade mobilization plans and subsequent conduct of military operations. Finally, BW can be used as a terrorist weapon.

BW agents are not difficult to manufacture. Fundamentally, the process involves equipment similar to that used for wine fermentation and the production of many pharmaceuticals. The similarity of the processes to legitimate industrial work often masks the intent behind the effort.

Toxins retain their potency for many weeks and, in some cases, for many months. The toxins would be difficult to deliver on a battlefield, but they might be used to contaminate water supplies. One pound of toxin produced by salmonella bacteria (which cause typhoid) could lethally contaminate a 1.32 million-gallon reservoir of water.

Bacteria-caused diseases such as plague and cholera do not make convenient BW agents for the battlefield. Plague is fundamentally unstable and does not store well. Cholera can be spread only through food or water and can be countered by massive infusions of fluids. Anthrax, on the other hand, may be kept for a number of weeks and may be dispensed as either a liquid or dry aerosol. Anthrax is a well-known cattle disease which may be transmitted to humans (i.e., by ingestion of contaminated meat), but is not considered communicable from one human to another. Its stability, rapid multiplication of bacteria (from a single cell to more than a billion in ten hours), and lethality make it more attractive than most other diseases for BW application.

Anthrax is most dangerous when spores are inhaled in a dry form. The fatality rate of unprotected persons exposed in this manner may approach 90 percent. Whereas only about ten percent of wet anthrax spores may be aerosolized, virtually all may be distributed as a fine dust which is easily inhaled. The spores may also gain entry to the body through the skin. Either way, personal protection can be almost complete through timely warning and employment of protective clothing and masks. Once released into the environment, the agent does not survive for long and can be readily removed through standard decontamination measures.

Notably, the agent which was released so tragically from a BW research facility in Sverdlovsk in the USSR in April 1979 was anthrax. Some 22 pounds escaped in a bacterial aerosol, contaminating an area of almost eight square miles. Initial disinfection and decontamination measures were largely ineffective, and hundreds of citizens were reported to have died of pulmonary anthrax seven to ten days after the accident. Mass immunizations were undertaken too late to be fully effective.

#### Regional BW Capability: The Iraqi Example

Reports of Iraqi manufacture and stockpiling of biological weapons stirred great concern among allied nations with military contingents in Operation Desert Storm. Though Iraq is a signatory of the 1972 treaty outlawing the manufacture and possession of agents of biological origin, there is no evidence of an act of ratification. Iraq's arsenal of BW agents prior to Desert Storm operations was believed to include cholera, typhoid, bubonic plague, anthrax, tularemia and some biological toxins, but there could be others.

The Iraqis are believed to have manufactured large quantities of botulin toxin, but U.S. authorities discounted any capability for converting it to aerosol form for delivery on distant targets. Nevertheless, the Iraqi capability prompted a special effort for development of an experimental vaccine.

In light of Iraqi BW capabilities, U.S. troops in Saudi Arabia received inoculations against the most common strains of anthrax. Three shots are provided in a series, administered over 29 days. Immunity normally occurs between the second and third injections. The disease can also be treated

with antibiotics, but the vaccine, developed by Louis Pasteur late in the last century, is considered most effective. If the danger lasts for more than six months, troops receive a second series.

If Iraq had attempted to employ BW, it would not have been easy. The agents are dangerous to handle and highly sensitive to weather conditions. Iraqi troops would have found themselves at high risk from their own weapons. For the most part, coalition troops would have been well protected when using their normal NBC protective equipment, and even those caught by surprise in an unprotected posture would have been able to function for a considerable period before they would have been casualties.

### U.S. Army Responsibilities

According to the Army's senior biological analyst, the number of nations having or suspected of having offensive BW programs has increased from four to 10 since the signing of the 1972 Biological and Toxin Weapons Convention. A more recent report indicates the number may be closer to 12, with the group headed by the Soviet Union and regional military powers such as Iraq, Iran, Libya, North Korea and Vietnam.

The Soviets continue to improve the toxicity, stability, and military potential of their BW stocks. Soviet BW capabilities are probably reasonably well known by the U.S. intelligence community. However, the technological evolution of Third World military forces continues to include the potential for obtaining the capability to produce BW agents and the means to deliver them — be it artillery, missile, aircraft, or terrorist methods. It is this more volatile and unpredictable Third World threat that is most troublesome for the United States.

U.S. military forces must continue to counter the threat of BW, and be prepared for its possible use in trouble spots throughout the world. Medical countermeasures must be constantly updated to defend against emergent BW capabilities.

The Department of the Army, as the DOD executive agent for the development of medical defenses against BW threats, is charged with the responsibility to develop preventive vaccines, drugs, therapeutic measures, and patient treatment and management procedures. The Army's Fiscal Year 1991 budget request for biological defense research is \$66.3 million.

The U.S. Army Medical Research and Development Command is responsible for the research program. The command conducts research on biological agents identified as a threat, highly infectious by aerosol or other means, as well as those commonly endemic to the environment.

The Army has developed and is developing several biological vaccines and drugs for U.S. military forces who might encounter biological warfare. Since 1965, the Army has developed vaccines for several strains of encephalitis, tularemia, ribavirin, hemorrhagic fever and other biological agents. Currently, the Army is developing medical countermeasures for strains of botulism and anthrax, as well as additional strains of encephalitis and hemorrhagic fever. A rapid identification system for field use is also under development.

Though the United States has rejected any use of BW weapons, it remains an imperative for the U.S. Army to develop the necessary countermeasures to protect soldiers from other countries' use of BW on the battlefield.

### References:

Carus, W. Seth, *The Genie Unleashed: Iraq's Chemical and Biological Weapons Program*. Washington, D.C.: The Washington Institute for Near East Policy, 1989.

Department of Defense, *Soviet Military Power*, 1990. Washington, D.C.: U.S. Government Printing Office, 1990.

Geissler, Erhard (Ed.), *Biological and Toxin Weapons Today*. New York: Oxford University Press, 1986.

U.S. Army Command and General Staff College, *Nuclear, Biological and Chemical Operations*. Fort Leavenworth: USACGSC Subcourse 334/9, 1988.

U.S. General Accounting Office, *Biological Warfare: Better Controls in DOD's Research Could Prevent Unneeded Expenditures*. Washington, D.C.: GAO Report No. B-241869, 1990.

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