

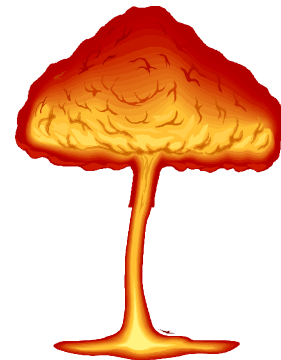
**THE WORLDWIDE
NUCLEAR, BIOLOGICAL, AND CHEMICAL
WARFARE THREAT**

Nuclear, biological, and chemical weapons programs proliferated through the third world in the 1960s. These programs reached maturity in the 1980s when chemical and toxin weapons were used on battlefields in North Africa, the Middle East, and Southeast Asia. In the 1990s, these programs are being expanded and refined.

Four third world states have nuclear weapons. Chemical warfare agents are being produced and stockpiled. Biological warfare programs are being established. Virtually all NBC weapons states have deep strike capabilities through ballistic missile programs. These factors increase the likelihood of NBC weapons use in conflicts between third world states. In most of these regions, US. and other Western interests are involved.

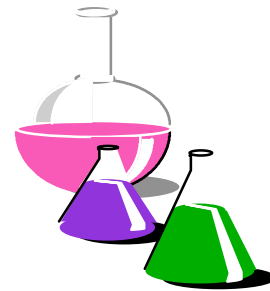
IS THERE STILL A THREAT?

The Nuclear Non-proliferation Treaty did not stop the spread of nuclear weapons technology to the third world. India, Israel, Pakistan, and possibly North Korea have nuclear weapons or could assemble them quickly. (1/5) South Africa had declared having developed nuclear weapons, though it has now dismantled its program. When U.N. inspections cease, Iraq's nuclear weapons program could resume. (2/18-20)



Practically all known BW states, such as Russia, China, Iran, Iraq, Libya, and North Korea have signed the BTWC; yet they continue offensive BW programs. (2/7,9,16,21,27,32)

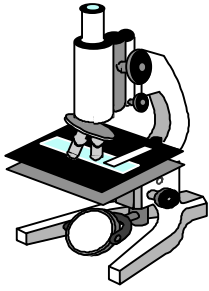
Over 160 states have signed the Chemical Weapons Convention, or CWC, but few of these actually have CW programs. The treaty will be effective only so far as CW threat states sign and adhere to it. Iran and Russia have signed the CW C, but will likely continue their CW programs, attempting to circumvent the convention. (2/16,32)



Other CW threat states, like Iraq, Libya, North Korea, and Syria have refused to join the convention. Serbia, not a member of the U.N., is not eligible to join. (2/7,27)

BIOLOGICAL WEAPONS

Biological warfare, or BW, is the use of pathogens or toxins as weapons. Pathogens include bacteria and viruses which cause diseases such as anthrax, cholera, and plague. Pathogens as weapons would be used against strategic targets such as food supplies, troops concentrations, and population centers to create panic and disrupt mobilization plans.



Toxins are poisons produced by pathogens, and by snakes, spiders, sea creatures and plants. BW researchers can now produce some toxins through chemical processes or through genetic engineering. Toxins are faster acting and more stable than live pathogens and could be used against tactical targets.

Biological warfare agents include anthrax, plague, cholera, smallpox, tularemia, Q fever, ricin, and botulinum toxin. (9/70)

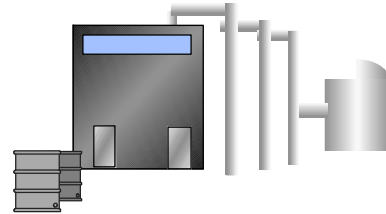
BW states hide their programs under the guise of legitimate medical research. There is little to distinguish a vaccine or pharmaceutical plant from a BW facility. BW production does not require specialized equipment, nor do threat states need to keep stockpiles of biological warfare agents. Through biotechnology, they can quickly produce the quantities of BW agent needed from small cultures. (2/A-3,4)

CHEMICAL WEAPONS

Chemical warfare agents can be classified by their effects on the body. These agents are blood, choking, blister, and nerve.

Blood agents interfere with the transfer of oxygen, suffocating the victim. Hydrogen cyanide is a blood agent which kills quickly and dissipates quickly.

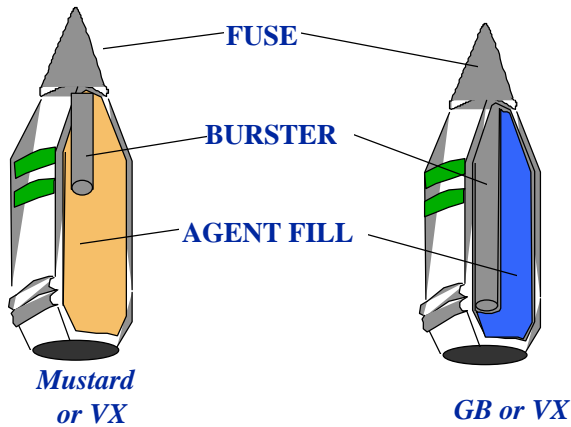
Choking agents damage the lungs. Blister agents cause painful blisters on the skin and are especially damaging when inhaled. Nerve agents attack the nervous system, causing difficulty in breathing, nausea, dim vision, convulsions, and death.



Chemical warfare agents can be persistent or non-persistent. The effects of persistent agents, such as mustard or VX, may last days or weeks. Hydrogen cyanide and sarin are non-persistent agents. For example, sarin evaporates at about the same rate as water.

Some industrial chemicals are also proven chemical warfare agents. These chemicals, like hydrogen cyanide and phosgene, are produced in industrial chemical plants throughout the world. (3/CHAP 2)

Practically any munition can be filled with CW agents. Chemical munitions are fitted with long or short bursters, according to the agent properties and the chemical strike planner's intended effect.



CHEMICAL MUNITIONS

A sarin filled munition with a long burster disseminates the agent as a vapor or fine aerosol, with some of the fragmentation effect of a conventional munition.

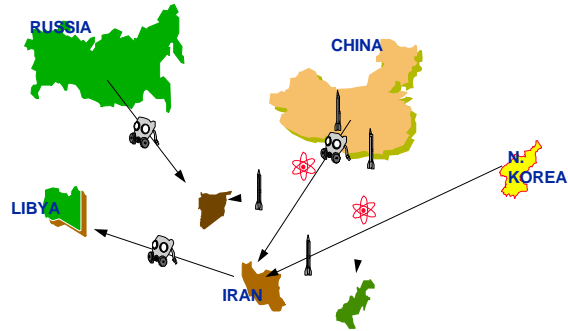
A blister or persistent nerve agent filled munition with a short burster is used to contaminate terrain or equipment. The short burster disperses the agent in droplets or as a coarse aerosol, so that it will evaporate more slowly, and its effects remain on target longer.

In the Iran-Iraq war, Iranian soldiers under aerial bombardment told of hearing only a muffled explosion followed by the smell of garlic, rather than the loud explosion of a high-explosive bomb. The short burster produced the muffled sound, and the garlic smell is typical of mustard. These soldiers were subsequently treated for blister agent wounds.

PROLIFERATION

Despite arms control regimes, transfer of NBC weapons technology and material continues among well established states, such as Russia and China, and third world NBC proliferants.

Russian President Yeltsin fired General Anatoly Kuntsevich, former Deputy Commander of the Soviet CBR Troops, in April 1994 from his position as Chairman, President's Committee on



Biological and Chemical Weapons. (4/10) The same month, charges were drawn up against Kuntsevich for attempting to transfer CW agent precursors to Syria. (4/fn 14)

North Korea has delivered hundreds of SCUD missiles and production technology to Iran and Syria. China sent M-11 missile related technology to Pakistan, and nuclear, CW and missile technology to Iran. (2/9,10,14) Iran supplied the CW agent to Libya, which Libya used against Chad in 1987. (2/26)

EUROPE

The world's most mature NBC weapons programs are found in Europe. While Russia maintains the most formidable NBC capability, other European states have developed chemical weapons.



The former Yugoslavia's CW program dates from the late 1950s. Yugoslavia produced mustard and sarin filled munitions at its CW plant at Mostar, now part of Bosnia. In 1992, as Yugoslavia was breaking up, the Serbs removed the CW

production equipment to Serbia. (5/-)

There have been threats and accusations of chemical weapons use in Bosnia. The riot control agent CS has been used. Serb forces have threatened to bomb the nuclear reactor in Slovenia. Muslim forces deliberately set canisters of chlorine from the Tuzla industrial chemical plant in front of their positions to deter Serb artillery attacks. (6/6-42,43,44)

The dissolution of the Soviet Union left Russia with some 25,000 tactical and strategic nuclear weapons. (9/43)

In November 1993, Russia renounced its no-first use policy, declaring it would use nuclear weapons if necessary to repel a conventional attack.

With Russia's economic and political instability, there is concern over "leakage" from Russia of technology and materials with WMD applications. Since 1991, there have been numerous incidents of criminal smuggling of nuclear material from Russia. (231,32,45)

Russia inherited the Soviet Union's biological warfare program, including the facilities to produce and weaponize BW agents and toxins. The Soviet Union developed a number of BW agents, and a BW testing ground was maintained on Vozrozhdeniya Island in the Aral Sea. In April 1979, at a BW plant in Sverdlosk, as much as 22 pounds of dry anthrax spores were accidentally released. Within two weeks, hundred of Soviet citizens had died of anthrax. (7/1,2,4)

Key components of the BW program remain intact and could support a future BW mobilization capability. Moreover, Russia may be continuing offensive research and development of BW agents. (9/46)

Russia has the largest and most advanced CW program in the world. This program, which began under the Soviets and continues in the Russian Republic, has produced nerve, blister, blood and choking agents. Russia has admitted to a stockpile of 40,000 tons of CW agent in weapons and in bulk storage. US intelligence believes Russia's CW stockpile is much larger. (9/44)

NOVICHOK

In the 1980S, the US intelligence community assessed that the Soviets were developing new CW agents, including binary agents that would defeat Western protection measures. (8/3)



According to Zil Mirzayanov, a former Soviet CW scientist, the Soviets actually began developing a new generation of binary CW agents in the mid-1970s. This project was codenamed “Novichok,” and reached the testing phase in the late 1980s. (4/5) These are nerve agents which are at least as toxic as VX, and include Substance 33, A-230, and A-232. A-232 can evade the CWC in two ways: first, its development was secret and it is not covered on the CWC list of prohibited chemicals; further, it can be covertly produced in commercial chemical plants that CWC inspectors would not suspect of CW agent production. (4/6)

THE MIDDLE EAST

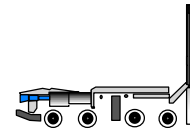
The Middle East and North Africa have the world’s highest concentration of NBC weapons and missile programs. Many of these states are seeking self-sufficiency in their programs, which will make them less vulnerable to outside pressure and will tempt them to transfer NBC technology and materials to other states. (9/23,24)



In 1987, Libya used chemical agent supplied by Iran against Chadian troops. The next year Libya's Rabta CW agent plant became operational. Rabta has produced at least 100 tons of blister and nerve agent. Libya has begun building a new underground CW plant at Tarhuna. Libya hoped this underground plant would mask its CW program and increase its survivability. Libya also has an offensive biological warfare program, which remains in the research and development stage. (2/26,27)

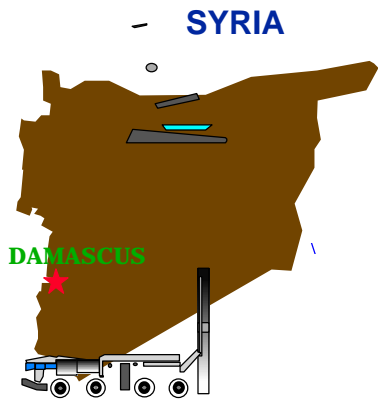
Iran's nuclear weapons program began under the Shah. The Islamic government has resumed this program and is seeking the technology for uranium enrichment and spent fuel processing. China and Russia are Iran's primary nuclear technology suppliers. (2/14)

IRAN



Iran has signed the CWC, but continues its chemical warfare program. Iran began its CW program in 1983 in response to Iraq's chemical weapons use. By 1987 Iran was using mustard and cyanide in artillery shells. Iran has produced several hundred tons of mustard, cyanide, and phosgene, and is researching nerve agents. (2/15,16) (9/27)

Iran's BW program also began during the war with Iraq. Iran is seeking complete biological production plants and may now have a small stock of BW agents. (2/16) (9/27)

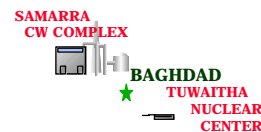


Syria has weaponized sarin in aerial bombs and SCUD missile warheads. Syria is researching advanced nerve agents, apparently with the help of Russian CW experts. (9/38) (4/fn 14)

Syria is pursuing BW weapons and has the biotechnical infrastructure to support a small BW program. (9/39)

Iraq's diverse and large scale nuclear weapons program began in the 1970s, with the acquisition of its Osirak and Isis reactors. Iraq investigated both plutonium production and uranium enrichment, and had established a crash program with the intent to produce a nuclear weapon by April, 1991. (2/18,19)

Iraq produced several thousand tons of blister and nerve agents, which were weaponized in mortar, tube artillery, and rocket shells, aerial bombs, spray tanks, and missile warheads. Iraq is well experienced in offensive CW use. During the war with Iran, Iraq



successfully integrated CW weapons into its offensive operations. Despite DESERT STORM damage, Iraq could revive its offensive CW capability within months of the UN inspectors' departure. (2/20,21)

Iraq produced anthrax, botulinum toxin, and aflatoxin which it weaponized in aerial bombs and missile warheads. Iraq also researched infectious viruses and mycotoxins. Iraq's BW facilities were targeted during DESERT STORM, but before Coalition strikes began, Iraq relocated virtually all of its BW agent production equipment. Iraq could easily resume its offensive BW program when UN inspections cease. (2/21) (9/32)



SOUTH ASIA

India's rivalries with China and Pakistan have been the driving forces behind NBC proliferation in South Asia. In May 1998, India and Pakistan both conducted nuclear tests. Both India and Pakistan could quickly assemble nuclear weapons. Both nations have ballistic missile programs for which nuclear warheads could be produced. (2/36-39)

With its ratification of the CWC, India declared its CW program. Pakistan also ratified the CWC, but has a CW research and development program which could transition to CW agent production. (9/16)

THE FAR EAST

Both China and North Korea have NBC weapons programs, and both continue to export dual-use equipment and technologies with NBC applications to third world countries.

(9/5)

China has been a nuclear weapons state since 1964 and has about 250 to 300 nuclear weapons deployed on medium, intermediate, and intercontinental range ballistic missiles.

China signed the BWC in 1984, but has likely continued its BW program, producing infectious agents and toxins. China's CW program includes a wide variety of agents and delivery systems. (11/70-71) (2/9)

China is also a significant supplier of nuclear, chemical, and missile related technology to the third world, particularly to Iran and Pakistan. (2/4,9,10,14,38,39)

North Korea began its BW program in the 1960s at the direction of Kim Il-song and can probably produce limited quantities of BW agents. North Korean BW agents likely include anthrax, plague, and yellow fever. (2/7)

(12/62)

North Korean's chemical warfare program expanded between 1990 and 1995, and is now believed to include a sizable stockpile of chemical weapons, including nerve, blister,



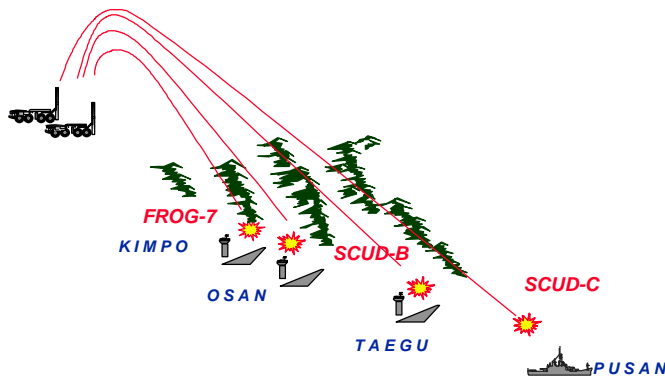
blood, and choking agents. North Korean troops train regularly for chemical warfare.

(9/6)

North Korea produces SCUD-B and -C ballistic missiles that can strike targets throughout the peninsula. The 1,000 kilometer range NO DONG can strike nearly all of Japan.

(2/5,7,8)

North Korea has produced enough plutonium for at least one nuclear weapon. (9/4,5)

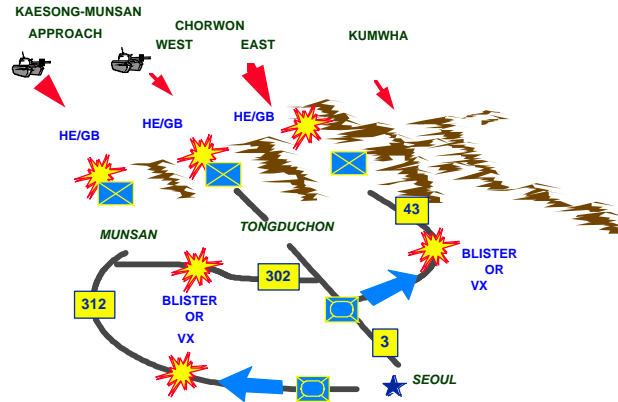


Should hostilities break out on the Korean peninsula, North Korea would quickly seek to suppress allied air operations. SCUD-B and -C missiles with persistent nerve agent in the

warheads would be launched against airbases such as Kimpo, Osan, and Taegu.

Command, control, and communications centers, and logistics depots are also likely chemical targets. (13/-)

In the artillery preparation, the North would attack ROK defenses in the corridors with a mix of conventional high-explosive and non-persistent chemical strikes. North Korean



122mm and 240mm multiple rocket launchers are effective delivery systems for hydrogen cyanide and sarin. South Korean defenders will be forced into protective gear, hindering weapons sighting, maneuver, and communications. But the contamination will dissipate by the time the North Korean forces reach the defenses.

As defenses in the corridors are breached, fires will shift to deeper targets. Long range artillery such as the 120mm gun and FROG-7 rocket could place persistent nerve or blister agents on C3, logistics, and reserves. Contamination of key points along lateral and rear area lines of communication will disrupt resupply and reinforcement. Persistent agents may also be employed to protect the flank of advancing North Korean forces. (13/-)

NBC TERRORISM

Military forces, as well as civilians, have always been subject to terrorist acts. However, the last few years have seen an increase in NBC terrorist incidents.

The March 1995 sarin attack on the Tokyo subway is a well-known example. Twelve persons were killed and over five thousand were treated for injuries. In November of that

year, Chechen rebels buried a packet of cesium-137 in a heavily visited Moscow park.

(9/51)

The groups most likely to use NBC weapons are non-state groups with select membership and non-mainstream ideologies. These groups, like the Aum Shinrikyo, often attract highly educated people with substantial incomes. The Aum acquired its chemical and biological weapons capability using its own personnel and financial resources..

SUMMARY

In closing, we have seen that nations divert technology for legitimate development to NBC weapons programs. Most of these programs are pursued in

...technology diversion.



...expanding WMD programs.

regions of the world where balances of power, as understood in the European sense, do not exist. When these weapons are used or threatened, regional conflicts quickly escalate to international concern and complicate efforts at crisis resolution.

...accidents, spills, sabotage.



...crisis escalation.



Military operations are made more difficult when an NBC capable enemy can deny the use of terrain and force our soldiers into protective gear. Movement, communications, and even the simplest soldier tasks become vastly difficult in an NBC environment. As new missions point our forces toward the world's trouble spots, our capability to fight and win on the NBC battlefield becomes increasingly important.

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References.

1. Les Aspin, Chairman HASC, From Deterrence to Denuking: Dealing with Proliferation in the 1990s, February 18, 1992.
2. OSD, Proliferation: Threat and Response, April 1996.
3. DA, FM 3-9 Potential Military Chemical/Biological Agents and Compounds, 12 December 1990.
4. Vil S. Mirzayanov et. al. "Chemical Weapons Disarmament in Russia: Problems and Prospects," The Henry L. Stimpson Center, Report No. 17, October 1995.
5. Kenneth Gerstner, DIA/TWP-4A, Letter Report on Former Yugoslavia CW Program, 1 October 1996.
6. USAITAC, FORMER YUGOSLAVIA, DoD-2600-6408-93, 23 April 1993.
7. DIA, Soviet Biological Warfare Threat, DST-1610f-86, 1986
8. DIA, Soviet Chemical Weapons Threat, DST-1620F-85, 1985
9. OSD, Proliferation: Threat and Response, 1997.
10. Lee Waters, Military Review, "Chemical Weapons Use in the Iran/Iraq War," October 1990.
11. DIA, Handbook of the Chinese People's Liberation Army, DDB-2680-32-84, November 1984.
12. DIA, North Korea The Foundations for Military Strength, October 1991.
13. Analysis by US Army Chemical School.