Soviet Chemical Weapons Threat

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SOVIET CHEMICAL WEAPONS THREAT

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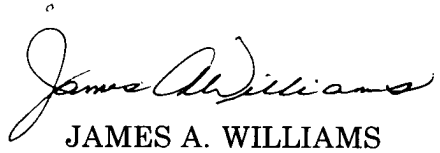
This is an updated version of a document issued as a Department of Defense publication in October 1983. It represents our continuing efforts to respond to requests from members of Congress, the press and the Armed Forces for unclassified information on the Soviet Union's chemical warfare capabilities. The illustrations in this document are derived from various U.S. sources; while not revealing of every detail, they are authentic.

There is no question that the Soviets have long held a policy and doctrine that acknowledge the military utility of chemical weapons in warfare. This view persists today. Indeed, the Soviets are exploiting state-of-the-art technology for new or improved chemical warfare agents, with the obvious intent of extending their advantage over the West.

With respect to world-wide developments related to chemical warfare, we note that over the past 20 years, nations outside the NATO/Warsaw Pact spheres have shown strong interest in acquiring chemical warfare capabilities. In view of this trend, we have included a brief discussion on chemical weapons use and proliferation.



JAMES A. WILLIAMS
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KEY JUDGMENTS

- Although the Soviets have claimed they are pursuing only a defense against chemical weapons, the size and scope of their activities demonstrate a formidable capability to carry out offensive chemical operations. Soviet policy and doctrine promote the need for these types of weapons and their value in warfare.
- The Soviets recently have used chemical warfare agents and toxins in Afghanistan and have supplied them for use by client forces in Laos and Cambodia-actions that demonstrate Soviet willingness to exploit the military utility of chemical and toxin weapons.
- They have a wide range of chemical warfare agents and associated delivery/dissemination systems. The calculations for the offensive employment of chemical weapons have been established.
- Research, development, and testing are continuing.
- They can produce very large quantities of chemical warfare agents.
- Storage depots within the USSR have undergone a significant increase in storage capacity since the late 1960's.
- We believe chemical weapons are collocated with conventional weapons in forward areas facing NATO.
- A large force of military specialists and equipment give the Soviets an unmatched capability to survive and operate on a contaminated battlefield. All Soviet forces (land, sea and air) receive extensive training in chemical protection.
- Any military force fighting Soviet forces will run a substantial risk that the Soviets will use chemical weapons.

HISTORY

The Soviet Union's chemical weapons activities can be traced to World War I. Of all the belligerents fighting in that war, the Russians probably were the least prepared to conduct chemical warfare. The Germans first used chemical weapons against the Russians in January 1915, three months before these weapons were first used on the Western Front. Russian industry lacked the capability to produce significant quantities of chemical agent, their delivery means were primitive, and the chemical protection training of the individual Russian soldier was poor. As a consequence, the Russians incurred more chemical warfare casualties and deaths than any other nation. Of the approximately one half million Russian chemical casualties, more than 50,000 were deaths.

Because of the high losses suffered during World War I, the Soviet leadership began to stress the importance of chemical warfare. During the 1920's and 1930's, their industry was modernized, chemical agent plants were constructed, and research and development was undertaken on chemical weapons. A chemical warfare organization and military chemical academies were established, and preparedness for chemical warfare was stressed throughout their forces.

By World War II, the Soviets had an extensive chemical organization and a significant stockpile of chemical weapons. At the end of the war, the Soviets captured and relocated to the Soviet Union two German nerve agent production plants and stocks of chemical agent. During the 1950's, Soviet chemical institutes developed other nerve agents for use in chemical weapons. Since World War II the Soviet chemical warfare program has continued unabated.

Historical Aspects

- Russia suffered almost half a million chemical warfare casualties during World War I.
- First military chemical academies established in the 1920's.
- At the end of World War II the Soviets captured and relocated two nerve agent plants to the Soviet Union.

CHEMICAL WARFARE AGENTS

Soviet research and development activities, usually headed by military chemists, continue to explore new chemical agents and combinations including ways to render the protective masks, suits and filtration systems of potential enemies ineffective.

A number of chemical agents, toxins, and combinations have been used by the Soviets in Afghanistan and by their client forces in Southeast Asia (Laos and Cambodia). One group of agents has been positively identified in the laboratory: toxic substances (known as mycotoxins) produced by molds. Other agents remain unidentified.

Soviet Chemical Warfare Agents

Lethal Agents

Nerve agents (including sarin, soman, and a V-series agent)
Blister agents (including mustard, lewisite, and a mixture of the two)
Blood agent (hydrogen cyanide)
Choking agent (phosgene)

Incapacitants

Not specifically identified, but an agent which causes unconsciousness for an hour or more has been widely reported as being used in Afghanistan.

Toxins

Research and development of a variety of toxins is continuing.

Notes

1. Protection from all of the above agents requires protective clothing and/or masks as well as rapid treatment for any exposed individuals.

2. Both non-persistent and persistent agents are available. Non-persistent agents will clear the target relatively quickly, while persistent agents will stay on target for hours to days, depending on weather conditions, unless removed by decontamination.

3. We believe the Soviets are investigating binary systems for chemical agent delivery because of the significantly improved safe handling and storage characteristics in this type of system.

4. This list of agents gives the Soviets an all-season capability for using these agents against an enemy.

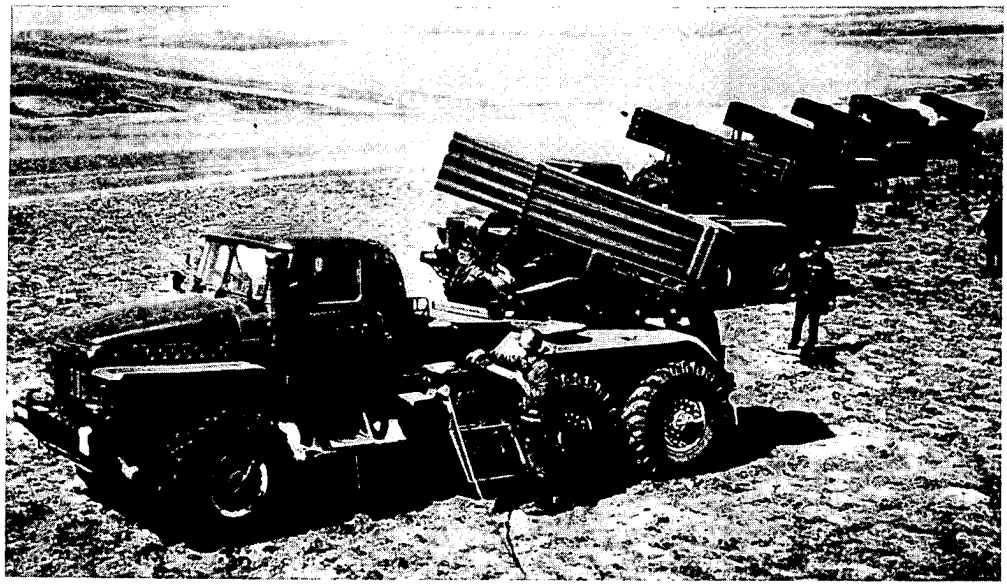
5. Production and possession of toxin weapons are banned by the Biological and Toxin Weapons Convention of 1972.

Delivery and Dissemination Systems

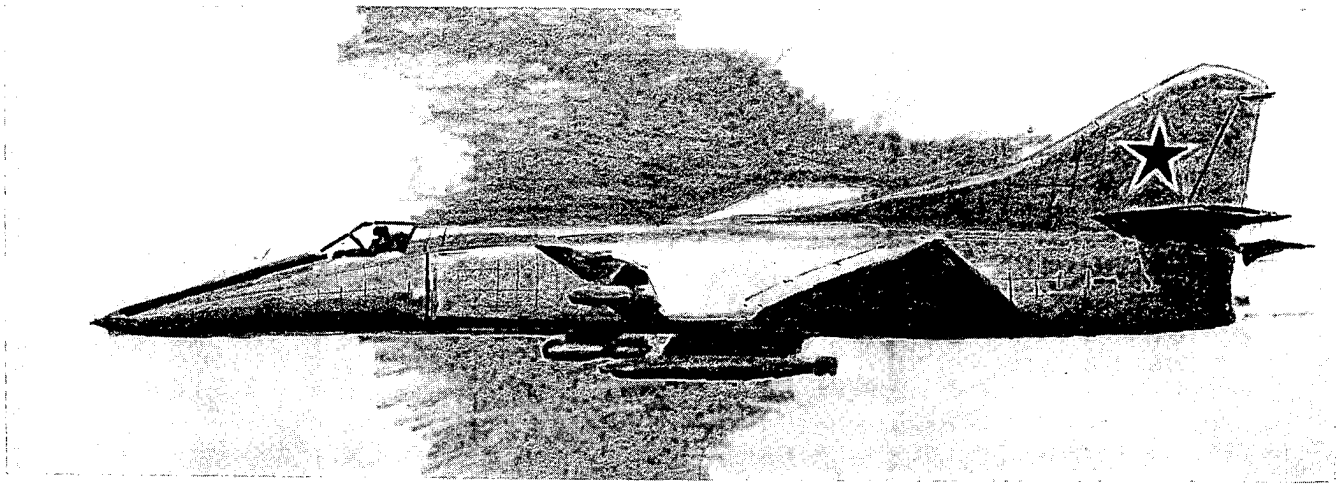
Almost all Soviet conventional weapon systems from mortars to long-range tactical missiles have compatible chemical ammunition or warheads, and are available to their land, air, and naval forces. The Soviets have developed the firing data required to use chemical weapons in battle situations. This includes the types and numbers of weapons required to attack various targets under a variety of weather and combat conditions. They continue to explore and test systems with improved dissemination, larger payload, increased range, and better accuracy. This gives them greater target flexibility and deeper strike capability. They have developed two types of chemical weapons for their tactical missiles — bulk agent and small bomblets which can be dispersed over the target.

SOVIET DELIVERY/DISSEMINATION SYSTEMS

- Missiles
- Artillery
- Mines
- Multiple rail and tube launched rockets
- Fighter-bombers and attack helicopters with aerial bombs, rockets, and spray tanks



Multiround rocket launcher, (BM-21), 122-mm.

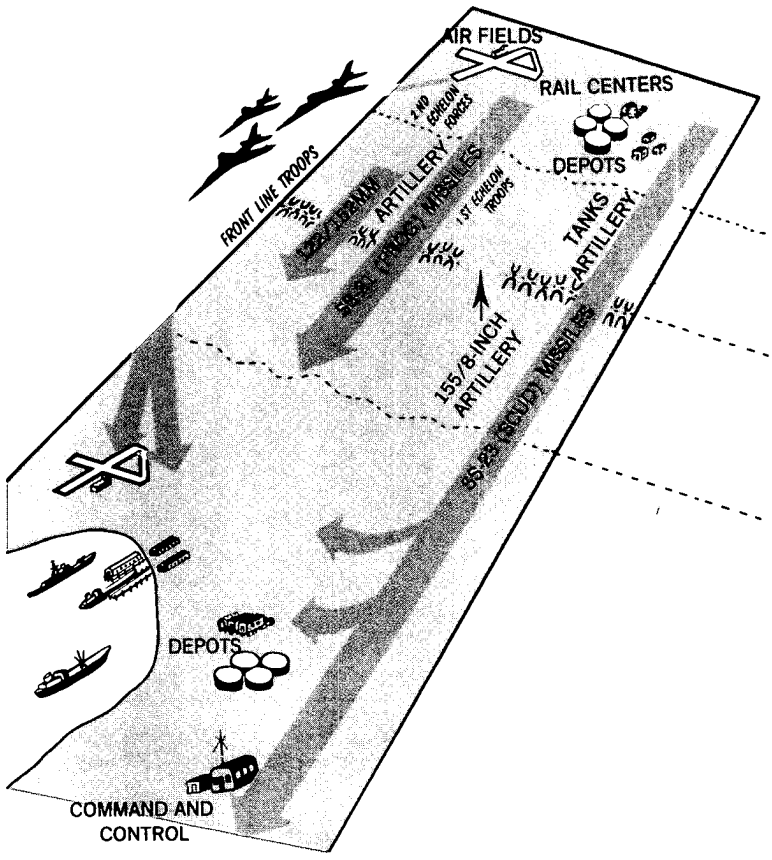


FLOGGER fighter bomber.

THE TARGETS FOR SOVIET CHEMICAL WEAPONS

The Soviets have developed the doctrine and plans for the use of chemical weapons including the targets to be attacked, and Soviet tacticians have standardized the procedures required. If a Soviet Commander determines that a particular battle situation is suited to the employment of chemical weapons, he can conduct strikes against any or all of the targets shown (once the approval to use chemical weapons has been given by the highest Soviet authority). He can select persistent agents or non-persistent agents as well as a variety of delivery systems. He will know the level of contamination he can place on the target. Should his own forces have to cross the contaminated areas, he will have specially trained troop support available for advice, reconnaissance, and decontamination. The scope and versatility of the Soviet chemical weapons arsenal provide the Commander the means to attack and contaminate a full range of targets. An example of the agent concentrations that can be placed on a target by a Soviet surface to surface missile is shown. At least 50% of exposed personnel will be affected. Also shown is the elliptical pattern superimposed on an airfield runway. Use of a persistent agent such as a V-agent would make it extremely difficult to fly operational missions from a contaminated airfield without proper decontamination. In addition to surface-to-surface missiles, fighter bombers play an important role in chemical bomb delivery. A FLOGGER aircraft operating from airfields in East Germany has a radius of operation that covers most of Western Europe.

The chemical strike capabilities of the Soviets in the immediate battle zones and against the rear areas are also shown.

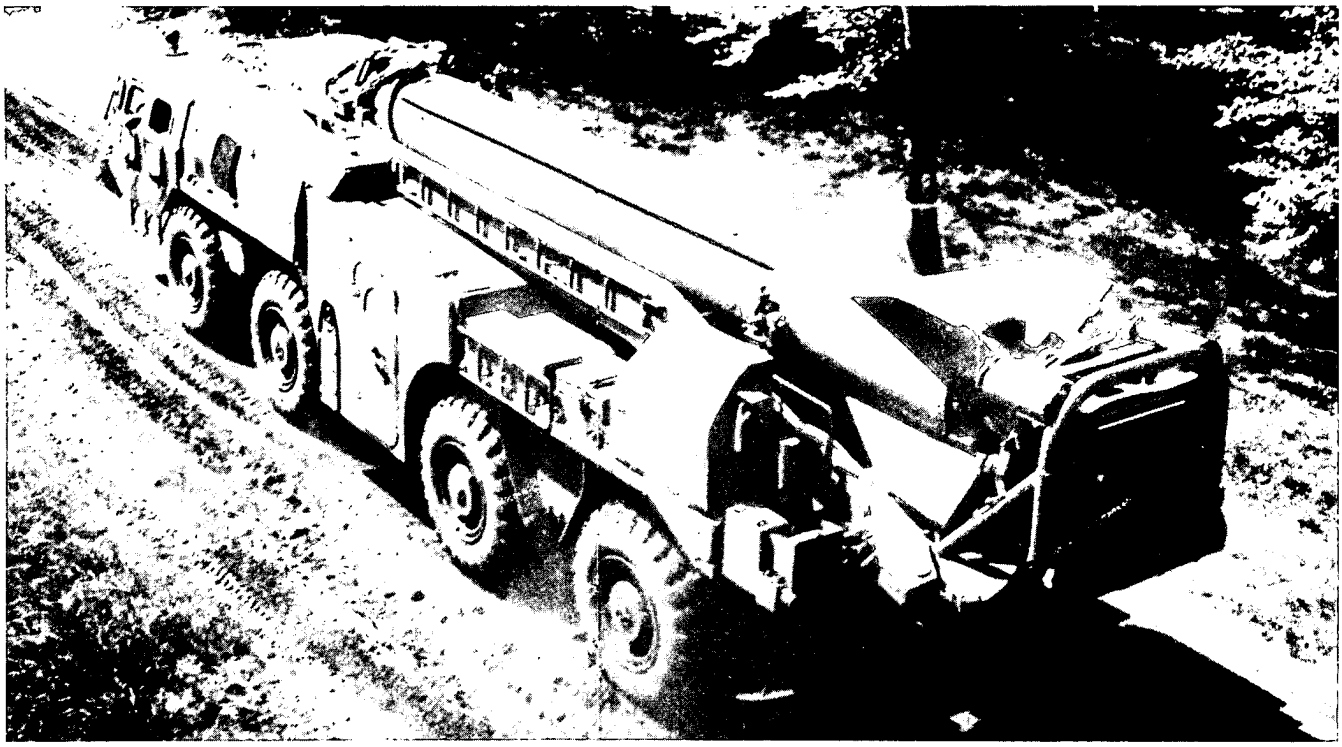


Soviet chemical delivery systems can strike in the front line or rear support areas.

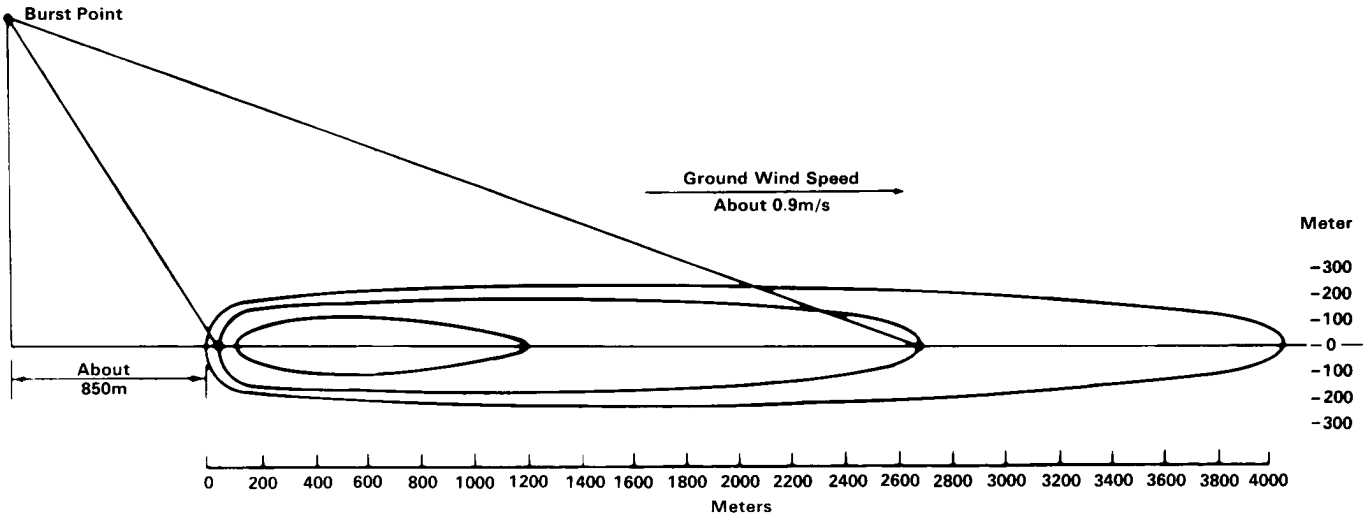
Radius of operation of the FLOGGER fighter-bomber operating from airfields in East Germany covers most of Western Europe. One of its assigned roles is the delivery of chemical bombs on selected targets.

TARGETS FOR SOVIET CHEMICAL WEAPONS

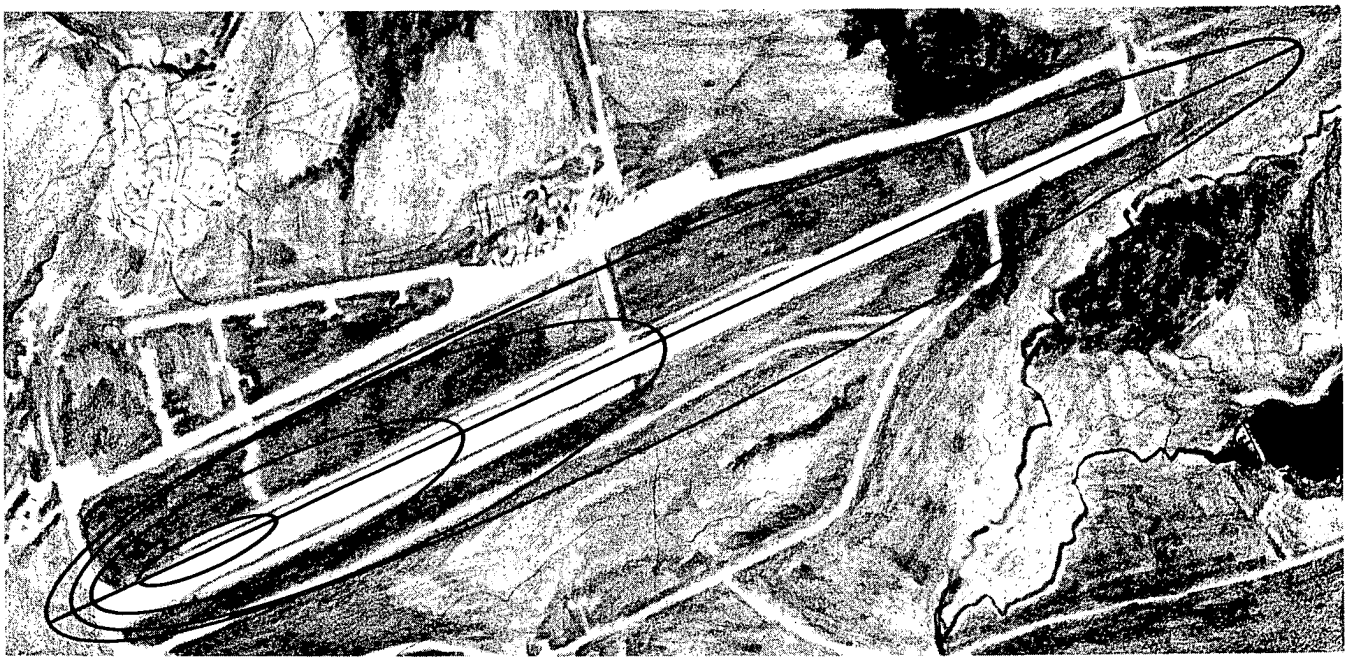
- Nuclear delivery means
- Airfields
- Naval bases and seaports
- Command and control facilities
- Storage depots
- Supply routes
- Troop concentrations
- Artillery and armor
- Amphibious/heliborne landing forces



The SCUD-B is a surface-to-surface tactical missile. It can deliver about 1,100 lbs of chemical warfare agent 180 miles from the launch point.



Typical ground contamination pattern created by a chemical warfare agent delivered by the SCUD missile. All unprotected personnel in the area will be casualties.



The SCUD-B ground contamination pattern superimposed on a military airbase runway. Operational flights from contaminated runways are extremely hazardous and difficult. The Soviets would attack a NATO airbase with many SCUD missiles to ensure coverage.

SOVIET CHEMICAL WEAPONS TESTING, PRODUCTION, AND STORAGE ACTIVITIES

Since the late 1960's the Soviets have continued to test, produce and stockpile chemical weapons. What we have observed over the past 15 years is not what we would expect of a nation that was maintaining a status quo.

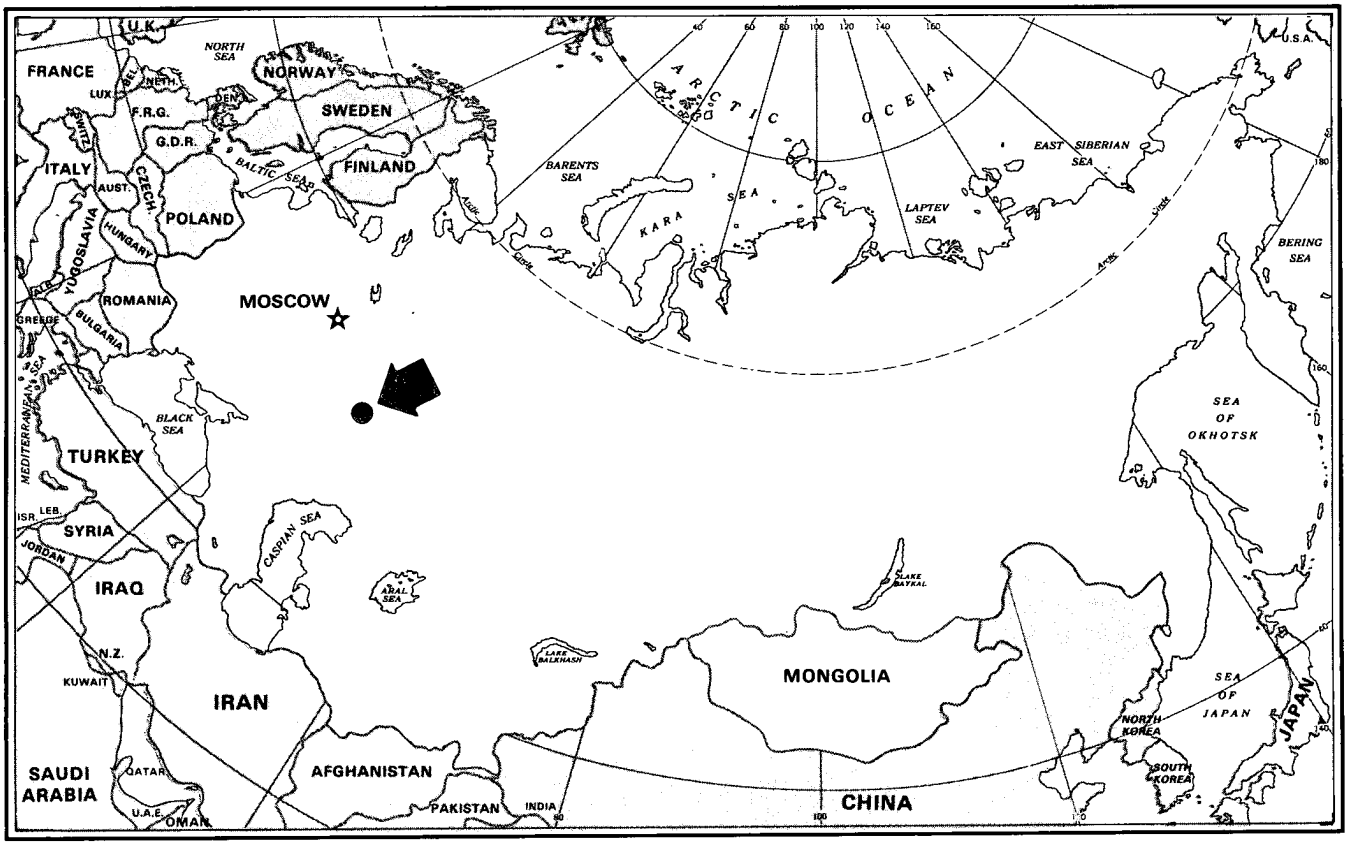
Soviet Chemical Weapons Testing

The Shikhany Chemical Warfare Proving Ground is one of the Soviets' primary chemical weapons test areas. It was established in the mid-1920's, and a number of chemical weapons tests were conducted in the late 1920's and 1930's. World War II reconnaissance photography confirmed that Shikhany was an active chemical weapons test facility. Since that time it has grown in size and sophistication and today continues to be a highly active chemical weapons testing facility.

Since the late 1970's, the Soviets have constructed several new chemical agent/weapon test facilities at Shikhany and construction is continuing. The sampling devices used to determine the efficiency of chemical weapons are arranged in grids which have a circular or rectangular pattern. These distinctive grids measure the agent concentration and how well it was dispersed. The shape of the grid and complexity of its pattern depend on the kind of weapon (bomb, artillery, rocket, etc.) and the type of agent being tested.

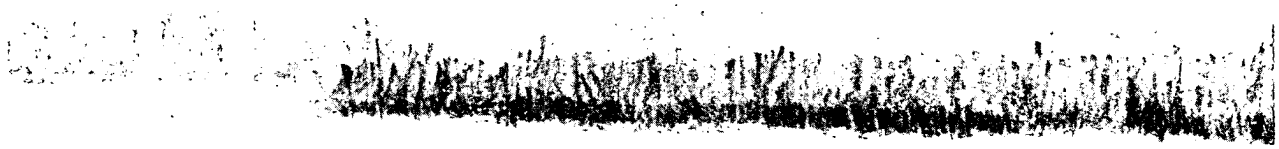
One of the new grids is a circular design. It is used to test the efficiency of a munition in dispersing effective concentrations of chemical agent.

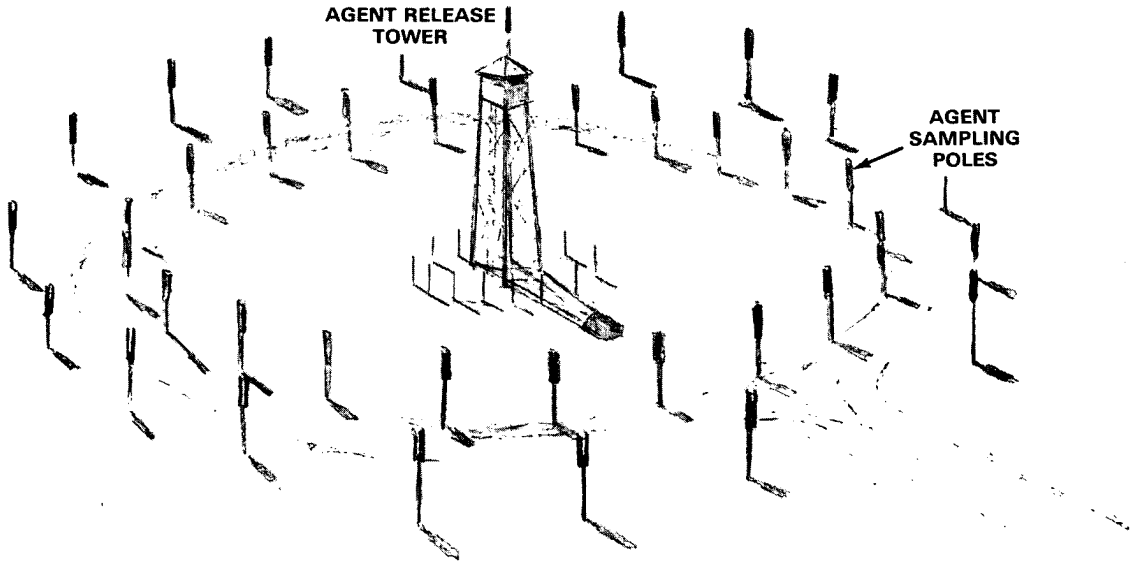
The rectangular grid also shows an example of a chemical weapons test at Shikhany. The impact craters were caused by exploding chemical munitions. The sampling devices are positioned downwind to measure concentration of the agent released. All testing of this kind is done under predetermined wind and temperature conditions. Tests similar to the one shown are continuing. Research, development and production facilities are also located at the Shikhany proving ground.

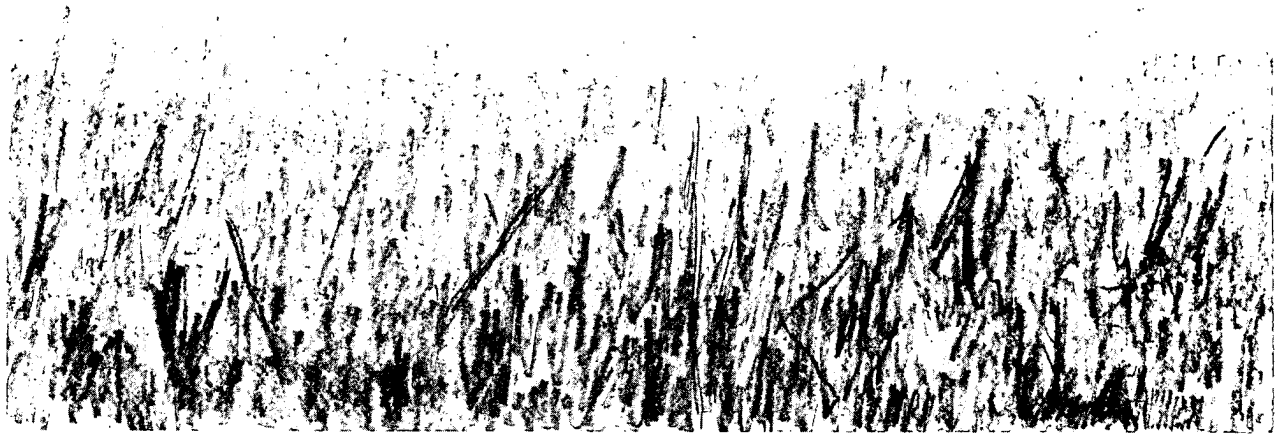


Shikhany chemical proving ground USSR.

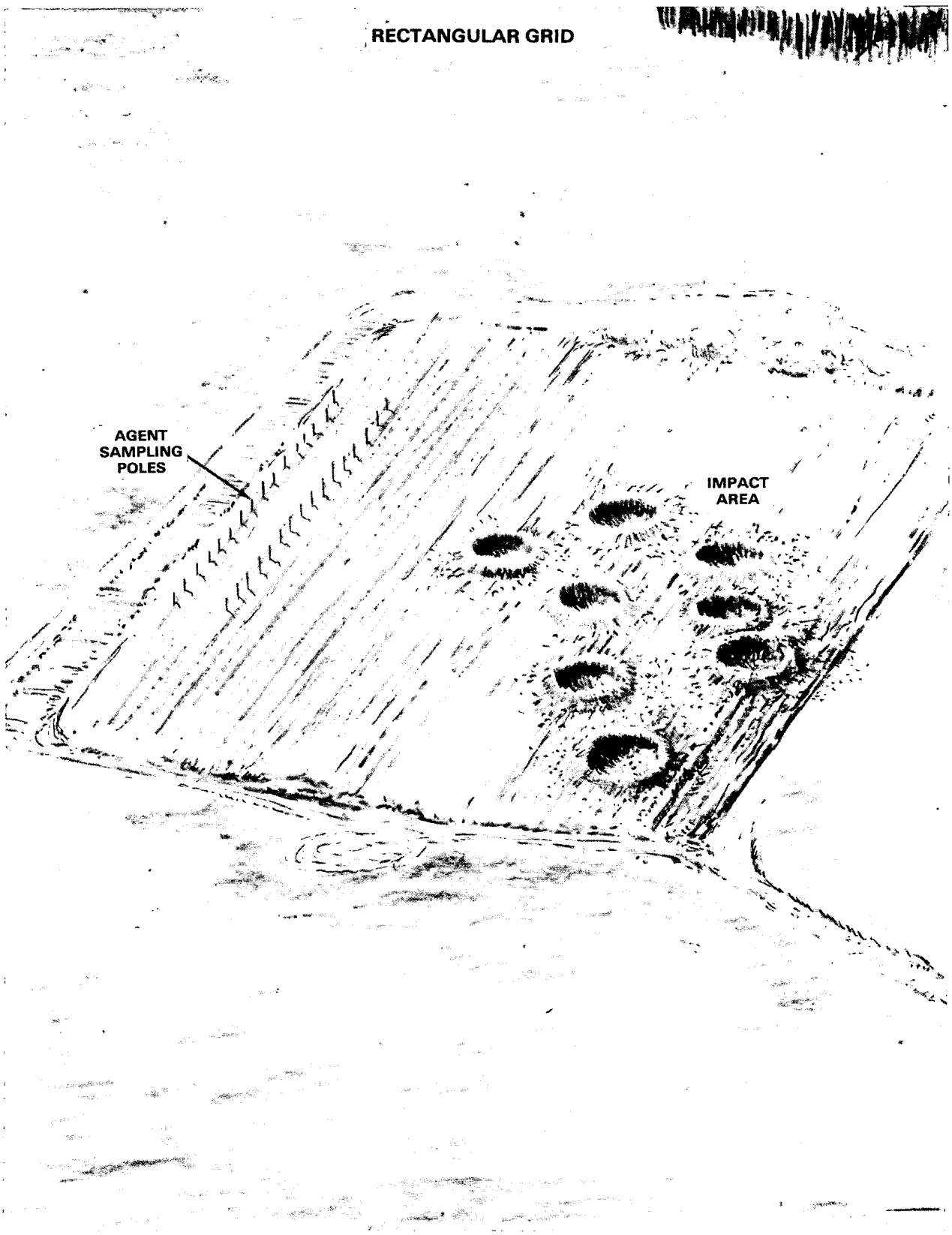
CIRCULAR GRID







Chemical agent weapon test grid.



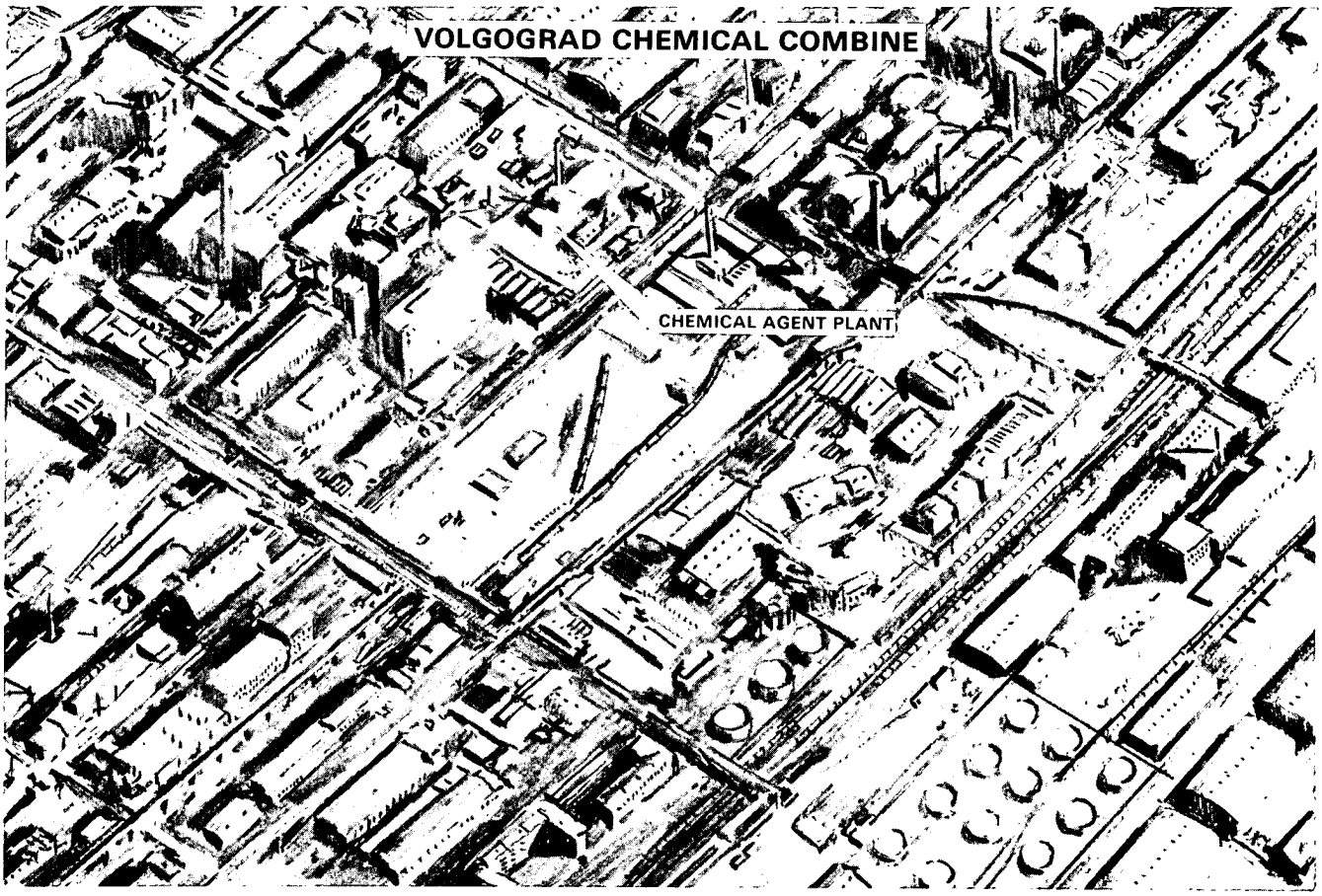
Chemical agent weapon test grid.

Chemical Warfare Agent Production

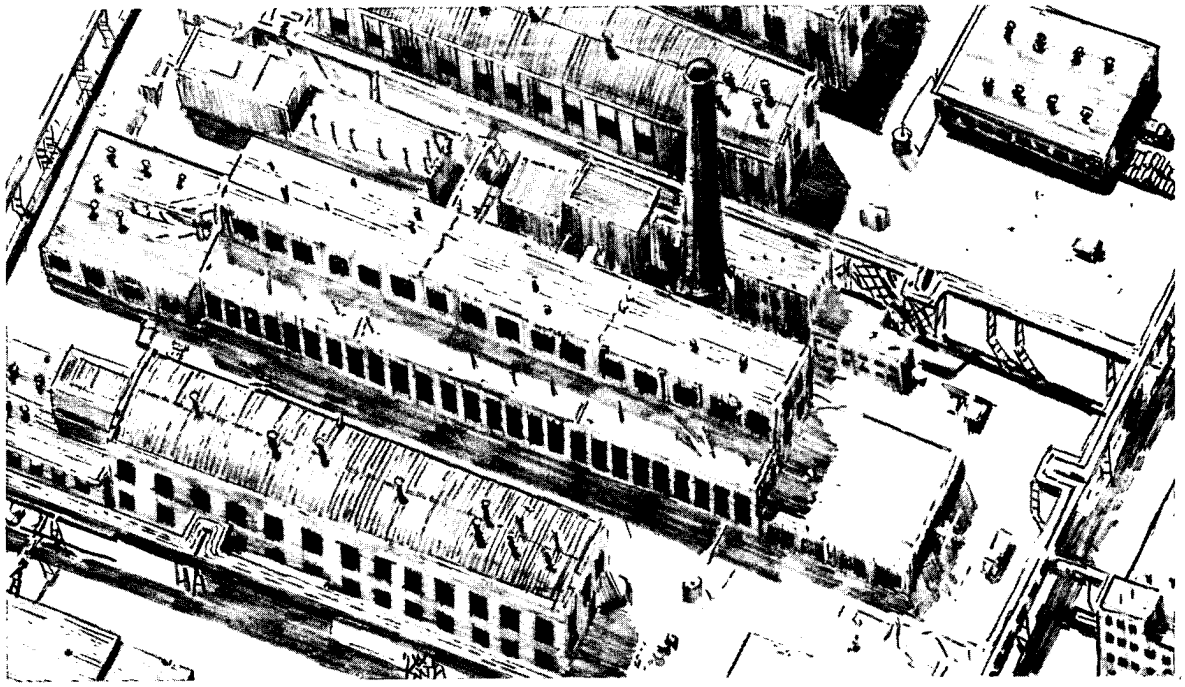
At the end of World War II, the Soviets captured from the Germans large stockpiles of chemical agents, as well as the technology and equipment to make the nerve agents tabun and sarin, and the German plans for production of soman. Two German nerve agent production plants were dismantled and removed to the Soviet Union where they were reassembled. The captured CW agent plant at Volgograd is depicted. The Soviets have continued to develop production capabilities based on this early design and have built agent manufacturing facilities in various locations around the Soviet Union.

Giving chemical warfare capabilities a high priority, the large modern Soviet chemical industry has the capability to produce toxic chemical warfare agents at manufacturing rates sufficient to meet military needs. The industry has had an agent production program since the late 1920's and today can supply a variety of chemical agents such as blister, choking, blood and nerve gases.

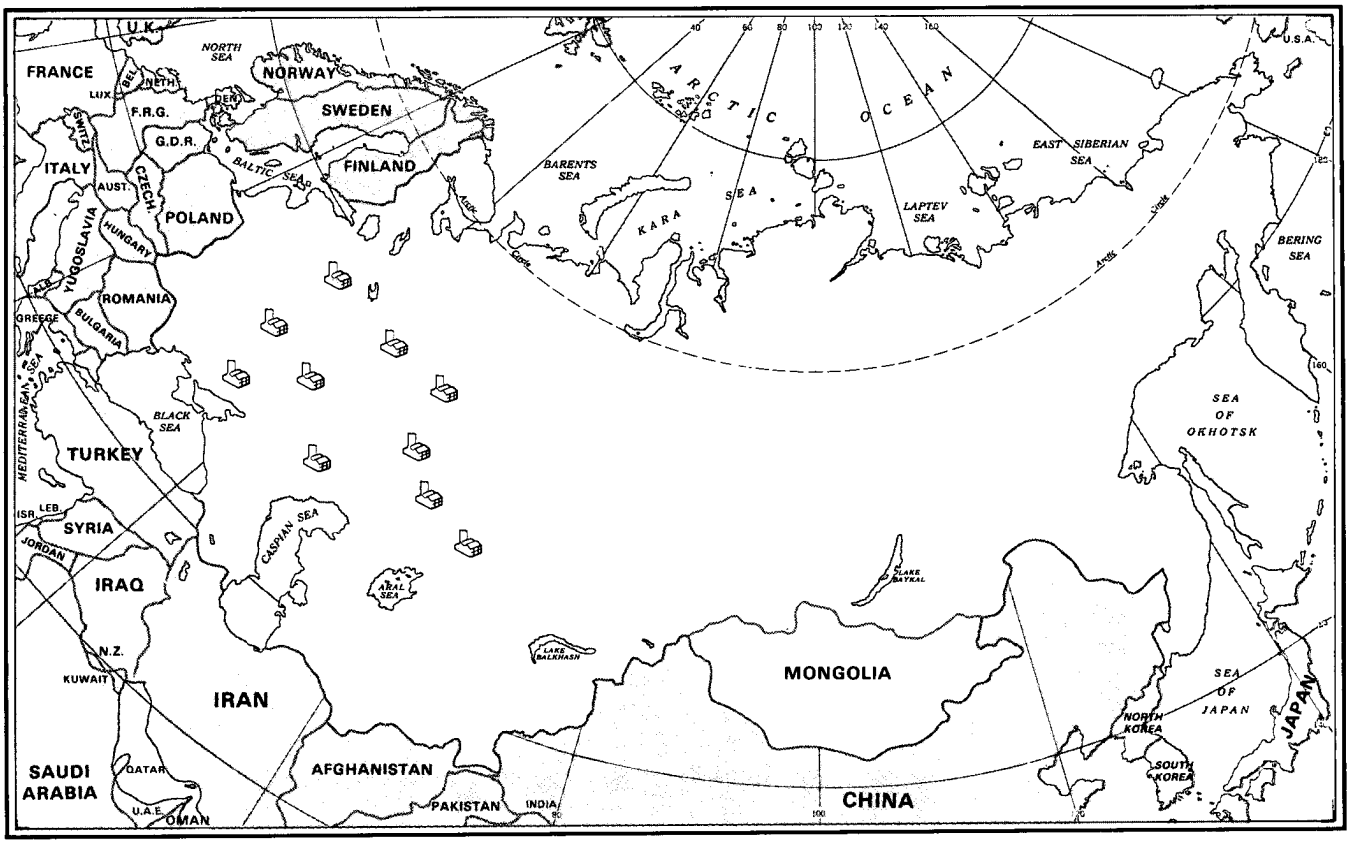
There are research institutes in the Soviet Union that are actively engaged in developing the theoretical foundations for producing chemical warfare agents of even greater lethality and designing the equipment necessary to make them.



Location of a nerve agent production plant captured by the Soviets during WWII.



The operational support complex (research, development, and production) at the Shikhany chemical proving ground.



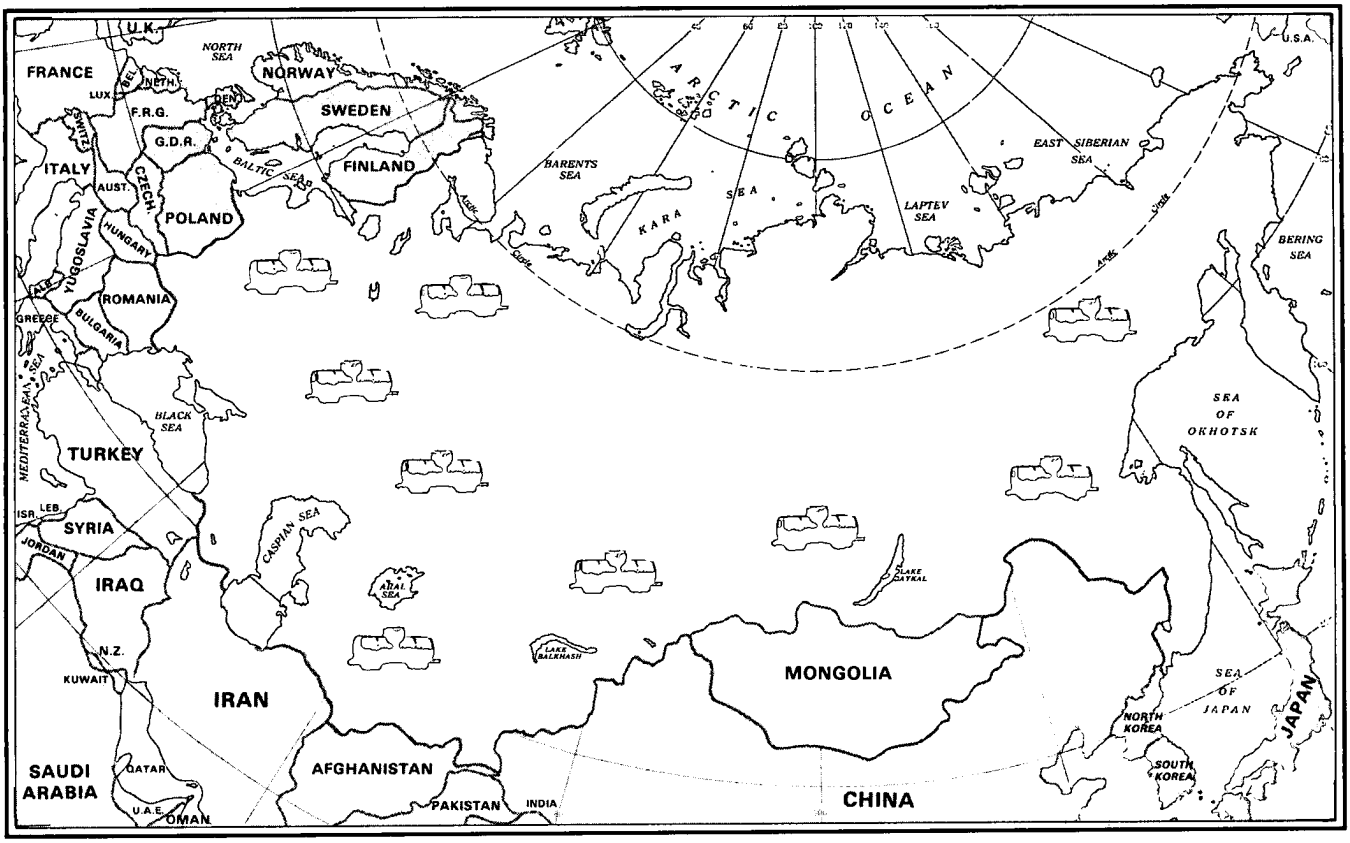
General location of chemical warfare agent production centers in the Soviet Union.

Soviet Chemical Weapons Depots

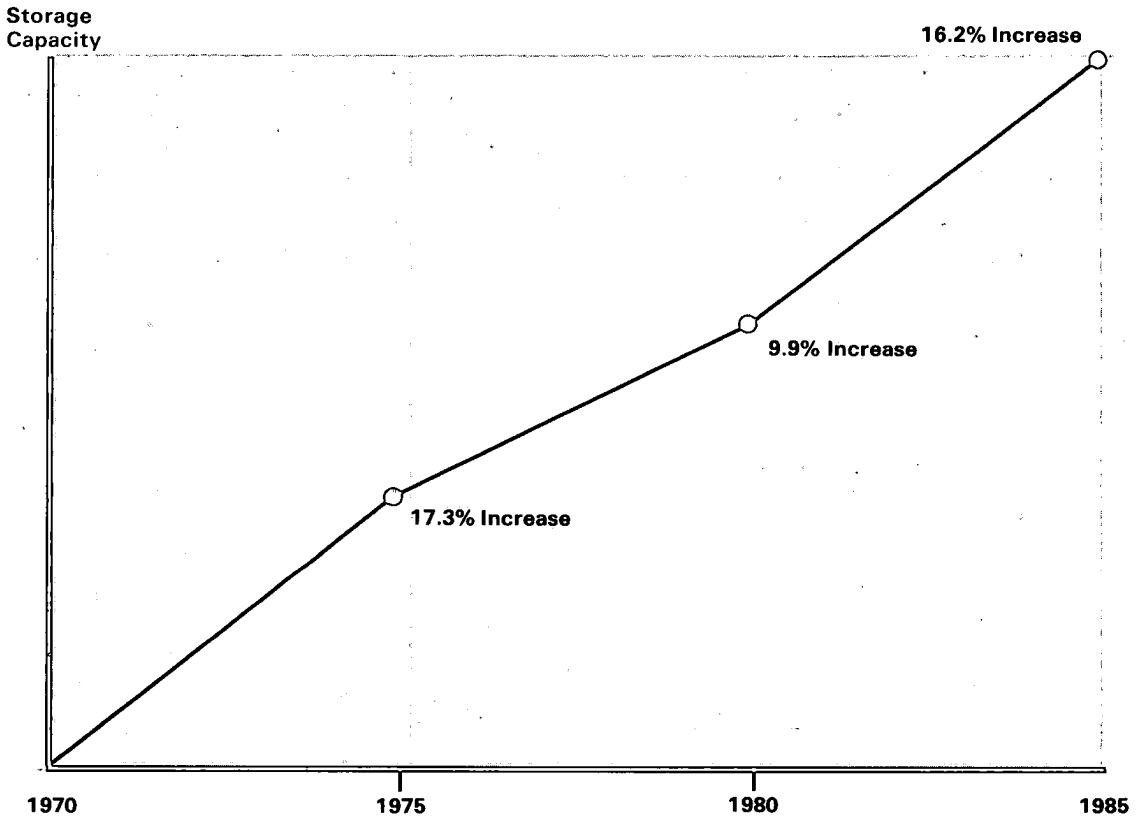
Chemical agents produced over the past five decades are stored in a network of military depots located across the Soviet Union. These depots contain agents in bulk containers and agent-filled munitions, as well as gas masks, protective suits, decontamination solutions, and decontamination vehicles. These depots support operational forces and report to the Headquarters of the Soviet Chemical Troops, in the Ministry of Defense.

Major Soviet chemical warfare storage depots are highly secure military installations. Many depots have rail lines allowing for the rapid mobilization of chemical warfare materials.

Since the late 1960's, the amount of agents, weapons, and material in storage at these depots has increased significantly, and this build up continues. A graphic representation of the increase characteristic of most of these areas is shown.

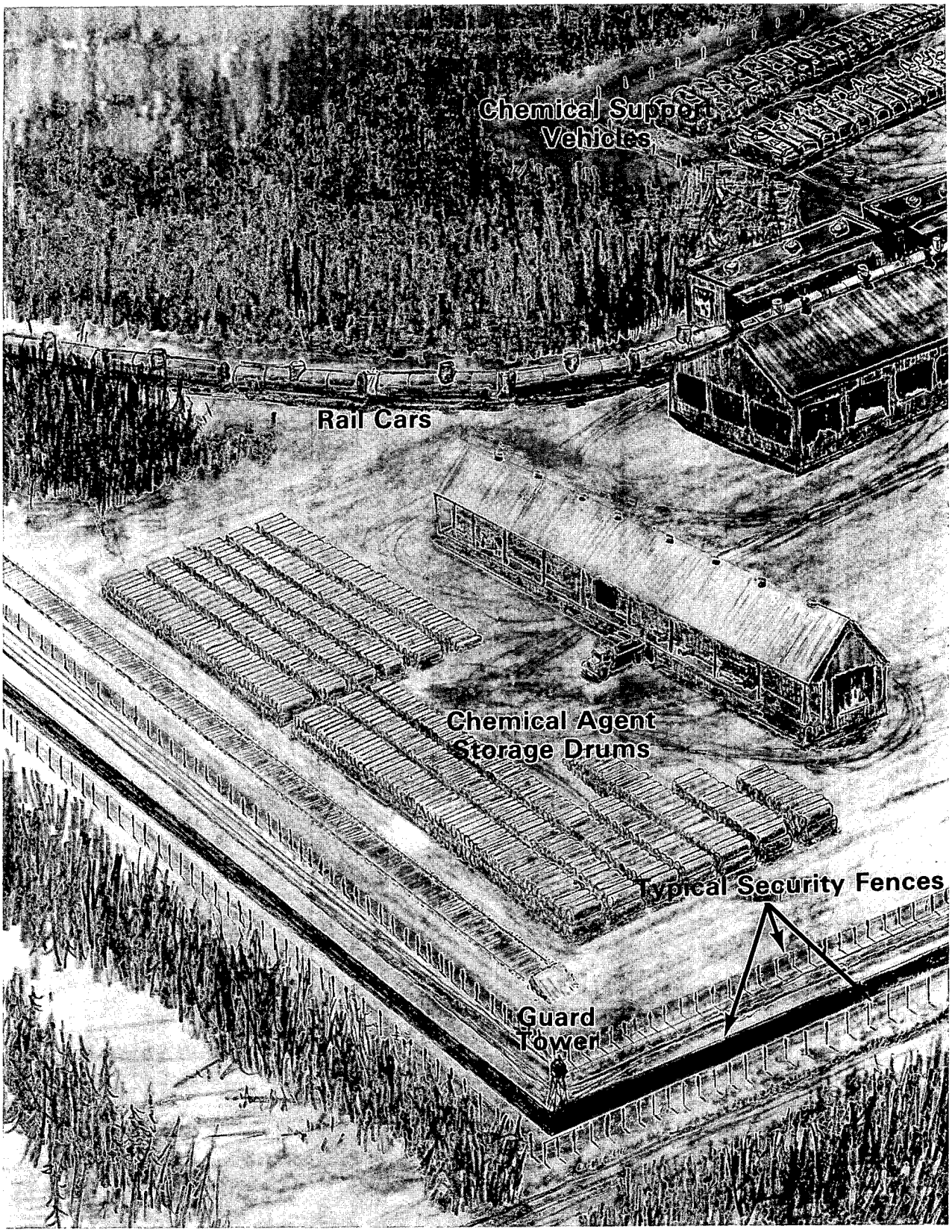


The extent of chemical weapons depots.



Expansion of storage capacity at Soviet chemical warfare depots has been significant.

Chemical munitions are reportedly stored in the forward areas as indicated.



Representative of Soviet chemical depots.

THE SOVIET CHEMICAL WARFARE ORGANIZATION

The continuing chemical weapons activities include a large well-trained chemical warfare organization directed by the Headquarters Chemical Troops in the Ministry of Defense. This chemical warfare organization is headed by a three-star General and numbers more than 45,000 officers and enlisted men in the ground forces alone. When staffed during a war, the size will double. Their primary responsibilities include the following:

- Technical advisors to the front commanders for chemical weapons and results of their use
- Research and development programs for weapons and protection
- Production and storage of chemical weapons and protective materiel testing and evaluation
- Training of all forces for chemical employment and survival on a contaminated battlefield
- Decontamination and reconnaissance
- Operating the chemical academies (college equivalent)

This corps of specialists also has about 30,000 special vehicles for decontamination and reconnaissance and has developed more than 200 areas for teaching and training all forces on how to protect themselves and clean up following combat where chemical weapons have been used. This training includes the use of actual chemical agents. Also, the Soviets have installed protective filtration systems in many combat and combat support vehicles and ships.

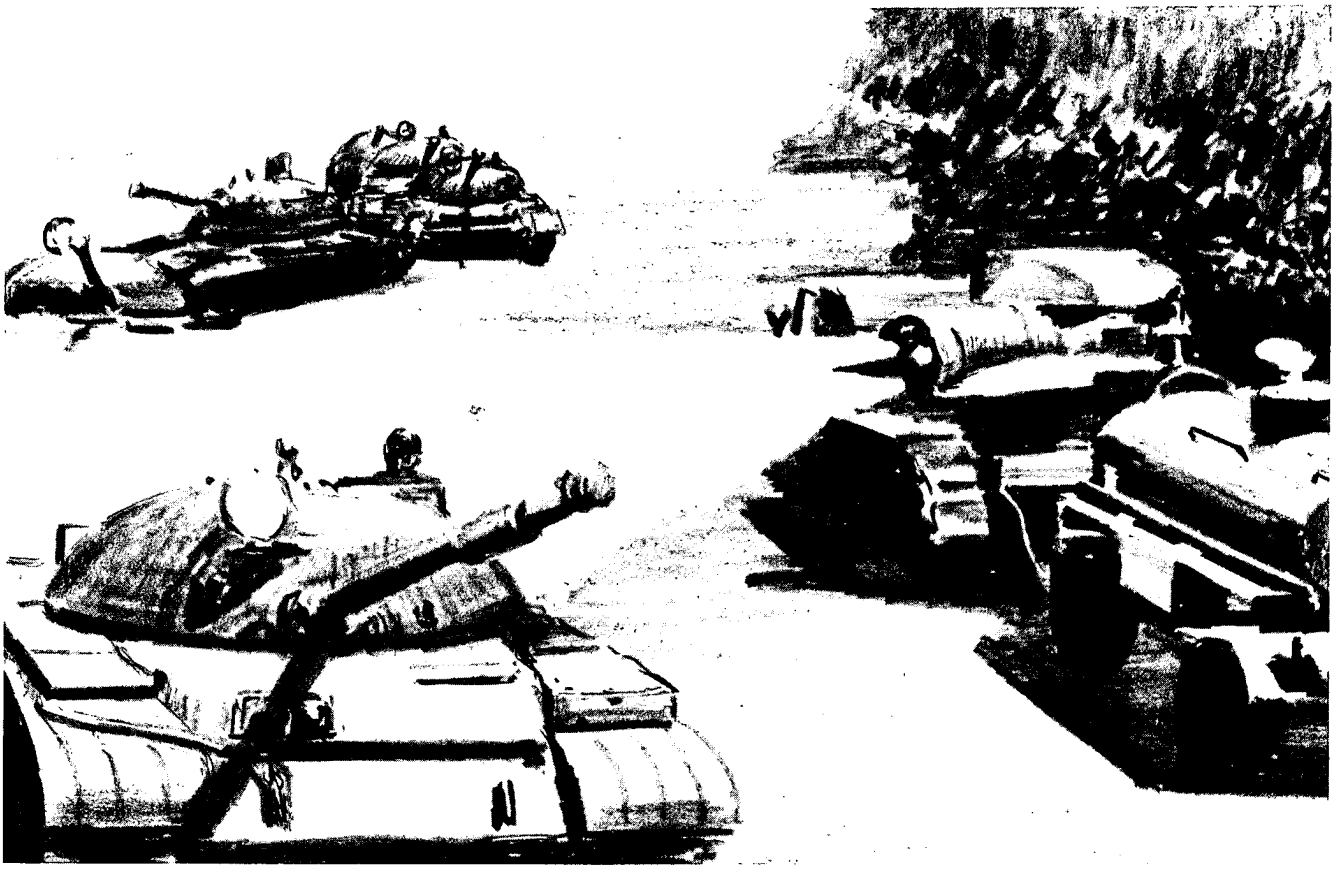
Continuing activities include the development, testing and evaluation of new chemical agents and weapon systems, protective antidotes against chemical agent poisoning, new suits and gas masks, decontaminating solutions and new vehicles with filtration systems.

A significant characteristic of protective equipment, including Soviet models, is the physical burden associated with prolonged wear, especially in warm temperatures. The equipment is bulky and uncomfortable. When worn for an extended period of time in hot weather soldiers become fatigued rather quickly and combat efficiency is lowered. In some cases heat prostration may result. Accordingly, the Soviets have devised norms stipulating desired maximum lengths of time for various temperature ranges for wearing protective suits.

Temperature (Centigrade/Farenheit)		Time Spent in Protective Suit
30°and above	86°and above	15–20 minutes
25°–29°	77°–84°	Up to 30 minutes
20°–24°	68°–75°	40–50 minutes
15°–19°	59°–66°	1.5–2 hours
BELOW 15°	BELOW 59°	More than 3 hours

Soviets use these norms as guidelines only because they realize that certain situations may require troops to wear protective suits beyond desired maximum times. The Soviets acknowledge that a 50% decrease in the work pace will occur after personnel have spent six continuous hours in full protective equipment, though this can be reduced by rests and spraying the protective suit with water to cool it. A Soviet example of the degrading effect on troop operations, when suits are worn for too long, describes a potentially disastrous mistake made by one of their artillery officers who had worn his protective suit for too long in temperatures above 30°C/86°F. Apparently unable to concentrate because of his impairment, he prepared firing data from the wrong firing tables. Recognizing this factor the Soviets basically call for more training in protective suits to improve physical and psychological conditioning.

The Soviet concept of maintaining the momentum of attack presupposes a capability to decontaminate armored fighting vehicles rapidly and return them to combat as fast as possible. A jet decontamination apparatus, the TMS-65, satisfies this requirement. It consists of an aircraft turbojet engine mounted on a URAL-375 truck chassis which sprays decontamination solution. An operator directs the jet engine's hot exhaust gases at contaminated vehicles. He may mix water or a decontamination solution intermittently into the exhaust. The TMS-65 normally is employed in pairs, positioned on both sides of a road. A contaminated vehicle passing between them can be decontaminated in less than a minute. Other equipment used to maintain the momentum of attack are the ARS-14 (equipment and terrain decontamination); AGV/DDA (personnel and clothing decontamination); and the DK for partial decontamination of combat crews.



The TMS-65 decontaminating tanks.

THE SPREAD OF CAPABILITIES AND USE

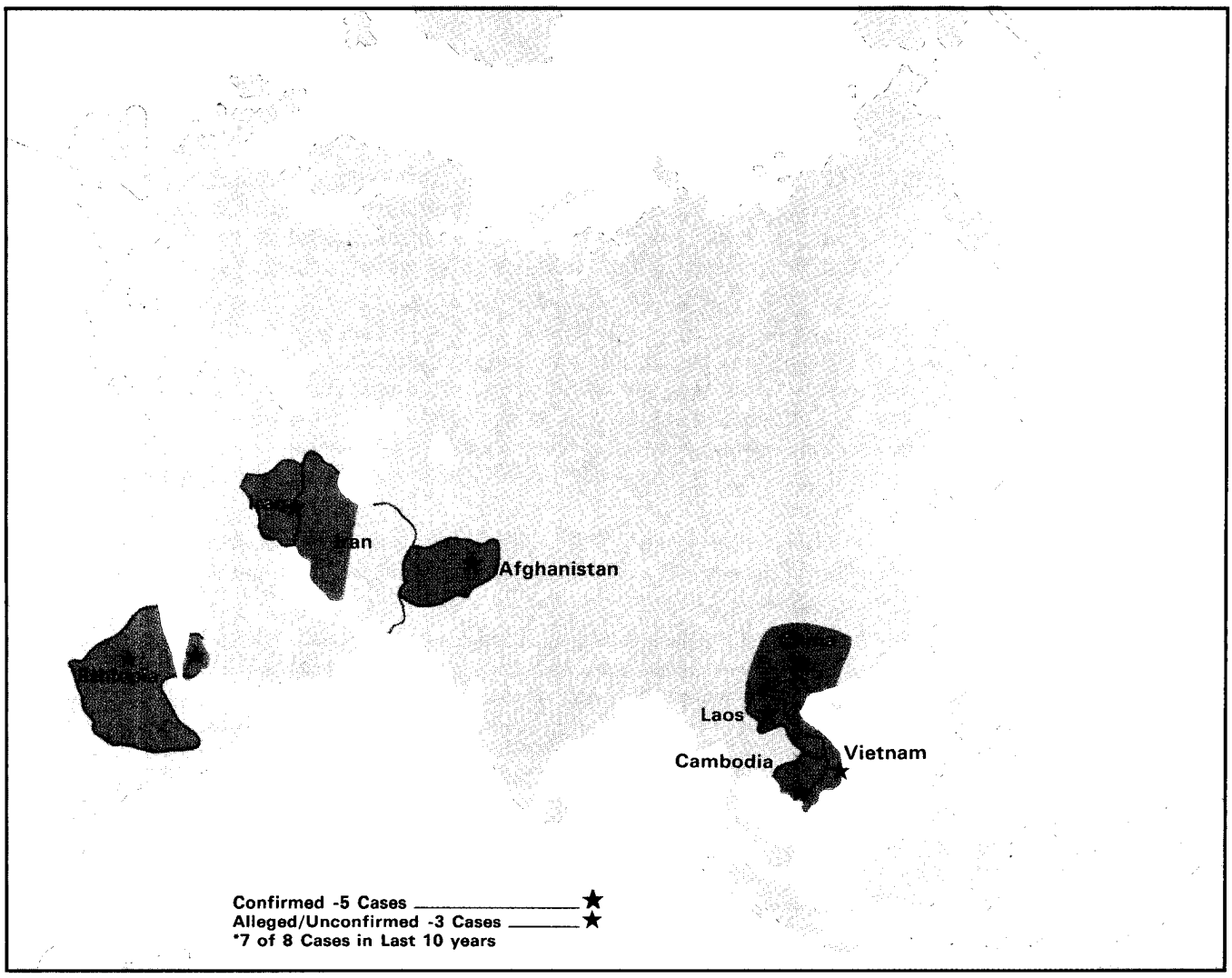
The Soviet Union continues to represent the major chemical weapons threat to the US. However, chemical weapons are spreading to nations outside the NATO/Warsaw Pact. US forces may face a chemical weapons threat in a significant number of other nations.

Chemical weapons have been used during the Egyptian-Yemeni war in the 1960's; in Southeast Asia and Afghanistan beginning in the mid-1970's and continuing into the early 1980's. There have also been allegations of chemical weapons use in the Ethiopian-Eritrean conflict and during the brief war between the Peoples Republic of China and North Vietnam. Most recently chemical weapons have been used in the Iraq-Iran war.

We have observed that as some nations have used these weapons, a number of others have developed a strong interest in acquiring them. Some are trying to find suppliers, others are making determined efforts to acquire the technology and equipment to produce chemical weapons independently in-country. None of these countries is capable of producing thousands of tons of chemical warfare agents at the present time. Over a period of time and as they improve their expertise and production capacities they will progress to production of larger tonnages of chemical warfare agents and will be developing delivery systems.

There are now 11 nations outside the NATO/Warsaw Pact that have chemical weapons in their arsenals and two more that are attempting to acquire them. More countries now have a chemical weapons capability than at any time in the past.

Our forces as well as those of our allies must be alert to the fact of chemical weapons acquisition by such nations. Both military and security forces must also be alert to the possible use of these weapons by terrorist groups and clandestine forces.



Where chemical weapons have been used since 1975.