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# *Continuing Development of Chemical Weapons Capabilities in the USSR*

*October 1983*



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APPLY

## PREFACE

The U.S. has intensified its efforts to achieve a complete and verifiable ban on chemical weapons and thus end the threat of chemical warfare. However, our goal is not yet attained; the threat remains.

This document was prepared in response to requests from members of Congress, the press, and the Armed Forces for unclassified information on the Soviet Union's chemical warfare capabilities. This report does not address the use of such weapons; evidence of Soviet involvement in the use of chemical and toxin weapons is provided in two State Department Special Reports, No. 98, "Chemical Warfare in Southeast Asia and Afghanistan," March 22, 1982; and No. 104, "Chemical Warfare in Southeast Asia and Afghanistan: An Update," November 1982 and in U.S. reports to the United Nations.

This report presents conclusions based on analyses of information collected over many years. The illustrations in this document are derived from various U.S. sources; while not revealing of every detail, they are authentic.

The USSR's armed forces have undergone extensive modernization and growth. Soviet chemical warfare capabilities have expanded significantly as part of that effort. This report focuses on the chemical weapons capabilities of the USSR and the continuing and expanding chemical weapons activities we have observed within the USSR from the late 1960s.


The Soviet Union continues to test, produce and stockpile chemical weapons. Moreover, the Soviets have put in place the doctrine, plans, personnel and equipment to support their use of chemical weapons. Many analysts believe that this expansion of chemical warfare capability could give the Soviets a significant military advantage if used in a conventional conflict. The continued testing of chemical weapons at expanding test facilities, enlarged storage capacity for chemical agents and weapons, and the existence of active production facilities are among the indicators of unabated Soviet chemical weapons activities. These factors, along with the evidence of the use of chemical and toxin weapons by the Soviet Union and its client forces in Afghanistan, Laos, and Kampuchea (Cambodia), reflect the Soviet drive to strengthen and improve their ability to wage chemical warfare.

The military value of chemical weapons includes the ability to contaminate areas, and thus restrict or deny the use of these areas to opposing forces. Chemical weapons can also be used to inflict casualties or force the defender to operate in protective gear and posture. Working or fighting in protective gear--the mask, hood, and special suit, gloves and boots--can be so debilitating that the protective posture can be as

damaging to military operations as direct casualties. The problems faced by an individual--heat stress and restriction of movement, dexterity, vision, and communication--are compounded when people must work or fight as a unit. Tasks which are tough under "normal" battlefield circumstances, such as repairing runways and other facilities, rescuing and treating casualties, flying aircraft and defending against armored attacks, become much more difficult in a chemically contaminated environment. Chemical weapon use against rear areas can seriously impair the defenders ability to support and resupply combat operations.

Because of these effects, one-sided use of chemical weapons could be decisive even if the defenders have extensive protective equipment. On the other hand, when used by both sides they probably would not be decisive and thus there should be little incentive to use these weapons if faced with the threat of retaliation.

Recognizing the effect that chemical weapons can have on military operations, it has been U.S. policy since World War I to maintain as a deterrent both protective capabilities and a stockpile of chemical weapons. The current stockpile was produced in the 1950s and 1960s. Further, it has long been U.S. policy never to initiate chemical warfare. Also, the U.S. does not and will not possess biological or toxin weapons.

  
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CONTENTS

I	History .....	1
II	Chemical Warfare Agents .....	2
III	Delivery and Dissemination Systems .....	3
IV	Targets .....	7
V	Chemical Weapons Testing, Production and Storage Activities.....	8
	Chemical Weapons Testing .....	8
	Chemical Warfare Agent Production .....	12
	Chemical Weapons Depots .....	12
VI	The Soviet Chemical Warfare Organization .....	17
VII	Conclusions.....	20

## 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. 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 casualties noted in Figure 1, 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 Soviets 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.

*Figure 1.*

## CHEMICAL WARFARE AGENTS

Some of the chemical warfare agents known to be in the Soviet arsenal are listed in Figure 2.

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

A number of chemical agents, toxins, and combinations are being used by the Soviets in Afghanistan and by their client forces in Southeast Asia (Laos and Kampuchea). 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

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

Mycotoxins (Have been identified as being used in Laos, Kampuchea and Afghanistan.)

#### 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.

*Figure 2.*

## DELIVERY AND DISSEMINATION SYSTEMS

Almost all Soviet conventional weapon systems from mortars to long-range tactical missiles have compatible chemical ammunition or warheads.

Figure 3 lists the systems they have available for 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 today 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.

Photos of three chemical weapons delivery systems are shown in Figures 4, 5, and 6. They have developed two types of chemical weapons for their tactical missiles--bulk agent and small bomb-lets which can be dispersed over the target.

## SOVIET DELIVERY/DISSEMINATION SYSTEMS

Missiles

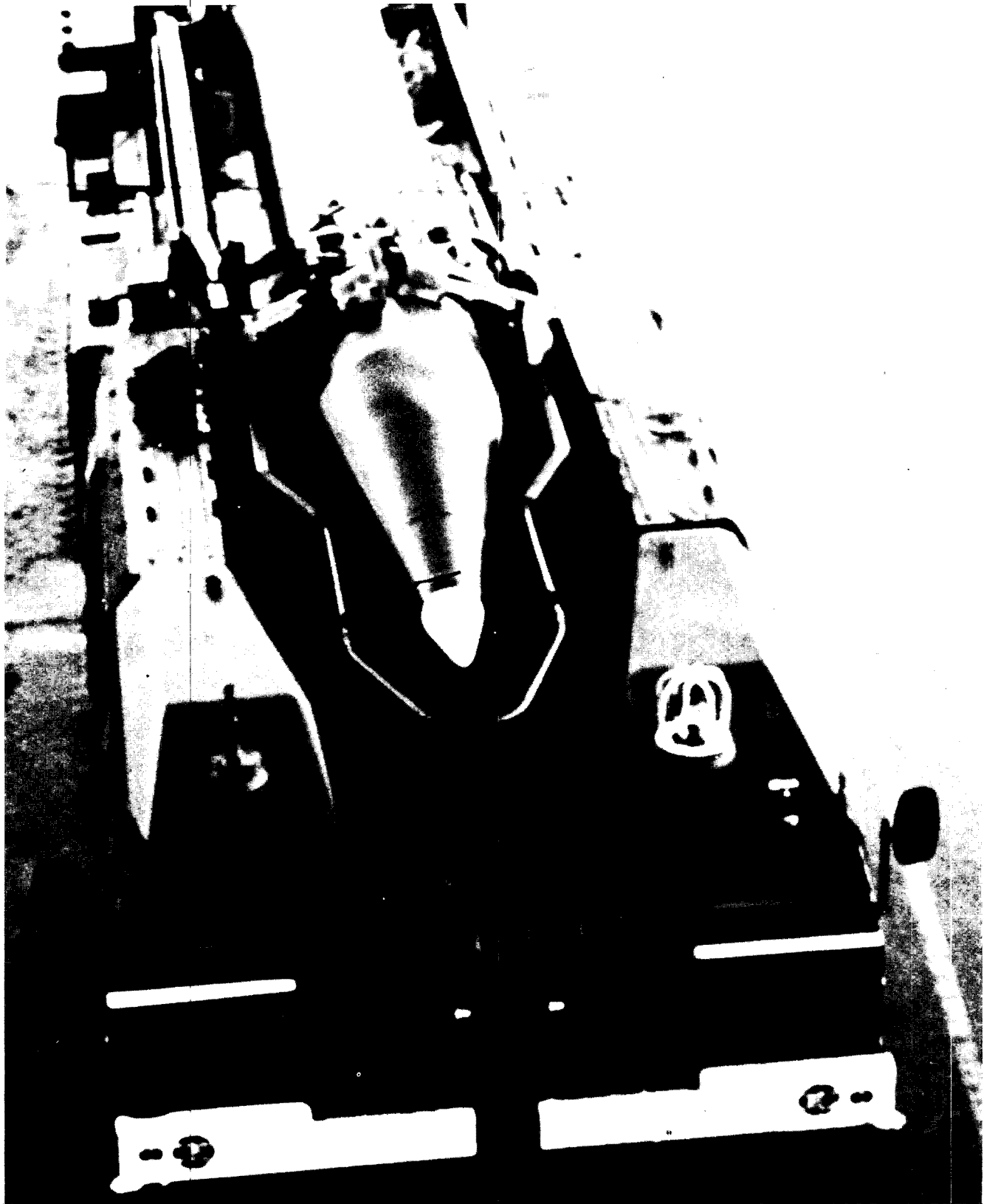
Artillery

Mines

Multiple rail and tube launched rockets

Fighter-bombers and attack helicopters with aerial bombs, rockets, and spray tanks

*Figure 3.*

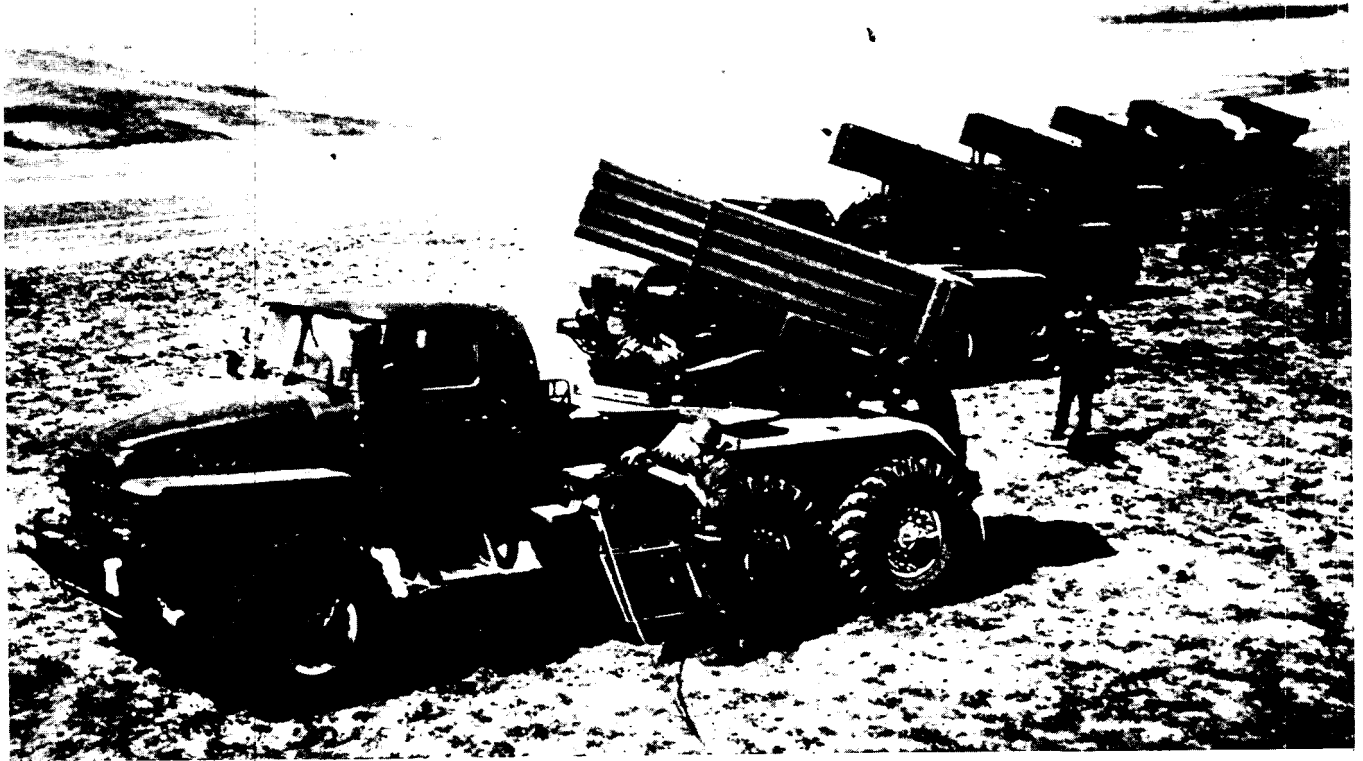


**Figure 4. This surface-to-surface tactical missile (Known as a SCUD B) can deliver a chemical warhead, of about 1,100 lbs, 180 miles.**





***Figure 5. M-8/HIP E Attack Helicopter – Can carry up to 1,650 lbs of chemical munitions on each wing.***



*Figure 6. Multiround rocket launcher, (BM-21), 122-mm.*

## 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 (Figure 7), 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.

### 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

Ships at sea

We have no evidence to suggest that the Soviets are concerned about civilian casualties resulting from their use of chemical weapons. Evidence from Southeast Asia and Afghanistan shows that civilians have been specific targets of chemical weapons.

*Figure 7.*

## 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. 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 CHEMICAL WEAPONS TESTING

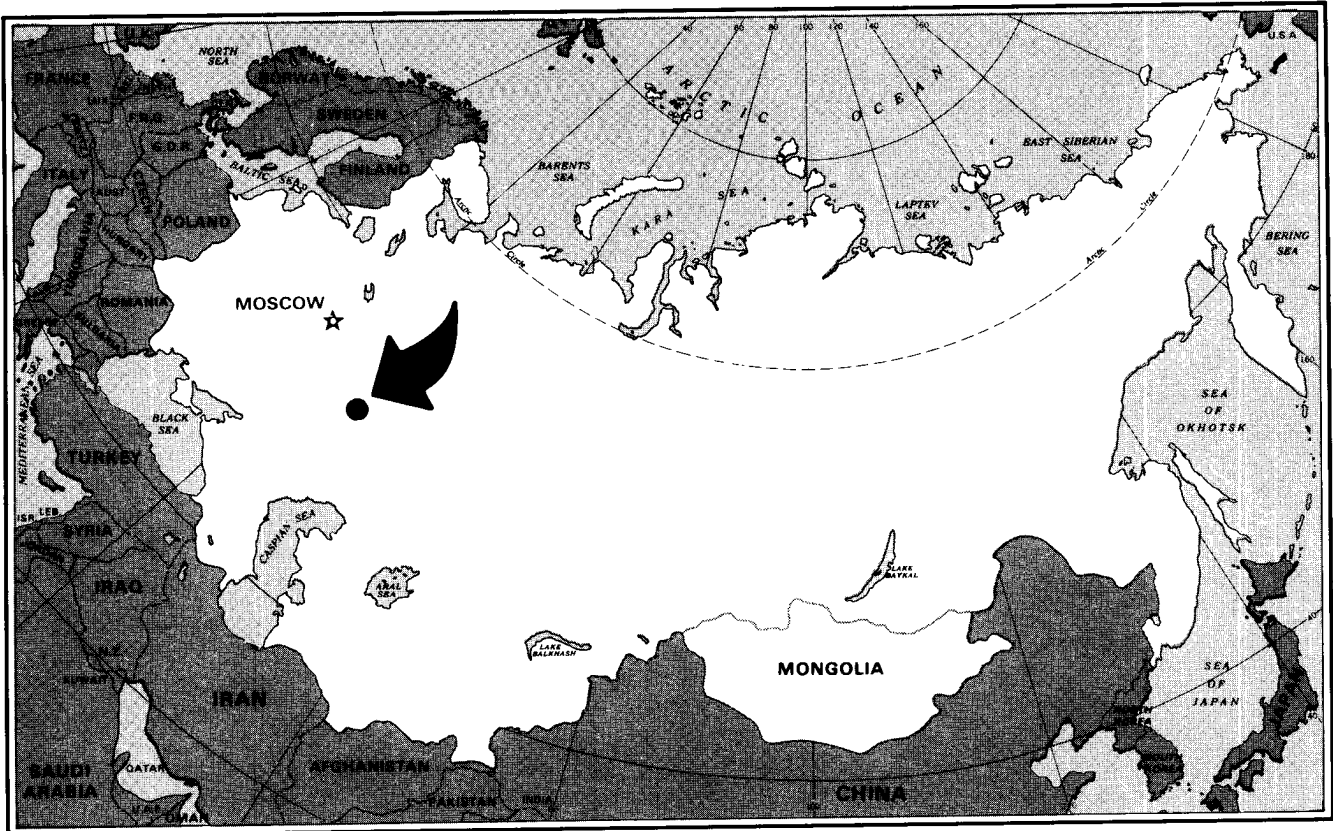
The Shikhany Chemical Warfare Proving Ground is one of the Soviets' primary chemical weapons test areas. It was established in the mid-1920's, and a number of chemical weapons tests were conducted in the late 1920's and 1930's. World War II reconnaissance photography confirmed that Shikhany was an active 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. Figure 8 indicates its location in the Soviet Union.

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 of a circular design and is shown in Figure 9. It is used to test the efficiency of a munition in dispersing effective concentrations of chemical agent.

Figure 10 shows an example of a chemical weapons test at Shikhany. The impact craters were caused by an exploding chemical munition. 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. A test similar to the one shown in Figure 10 was conducted at Shikhany in early 1980 shortly after the Soviets invaded Afghanistan and such tests are continuing.

**SHIKHANY CHEMICAL PROVING GROUND USSR**



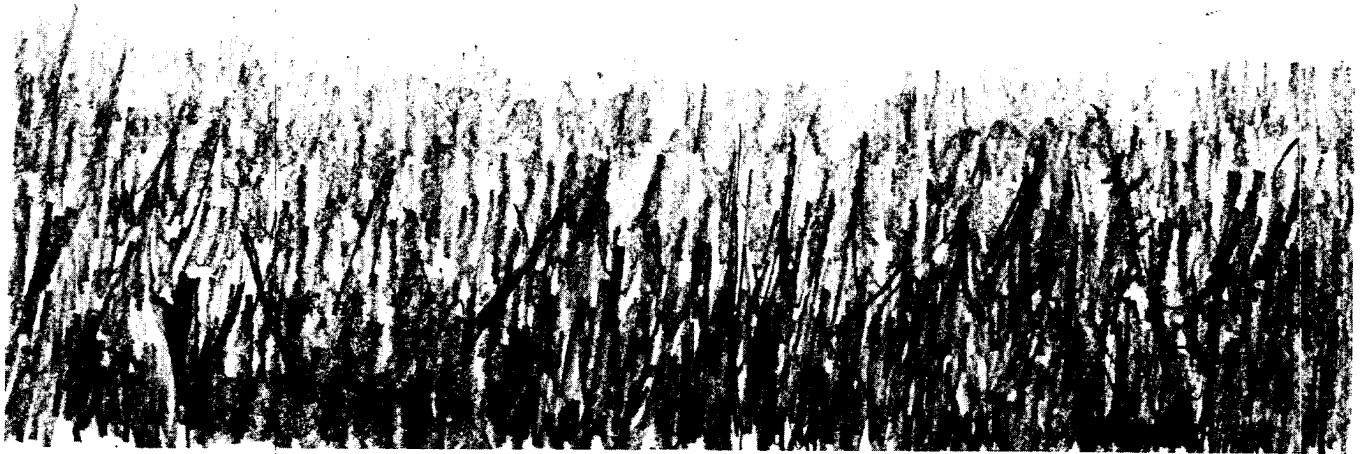
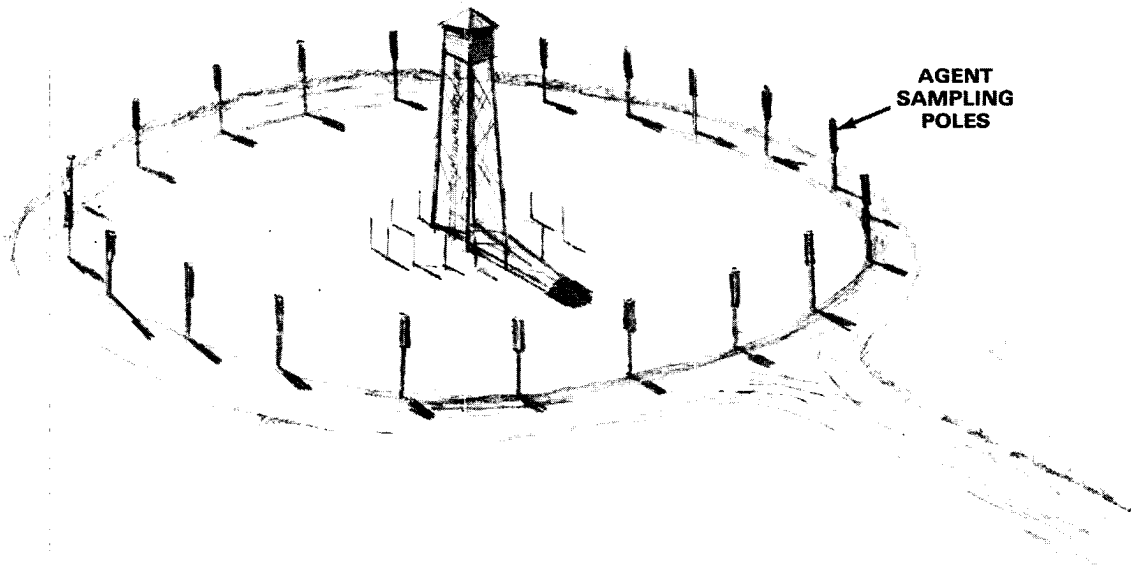
**Figure 8.**

**CIRCULAR GRID**



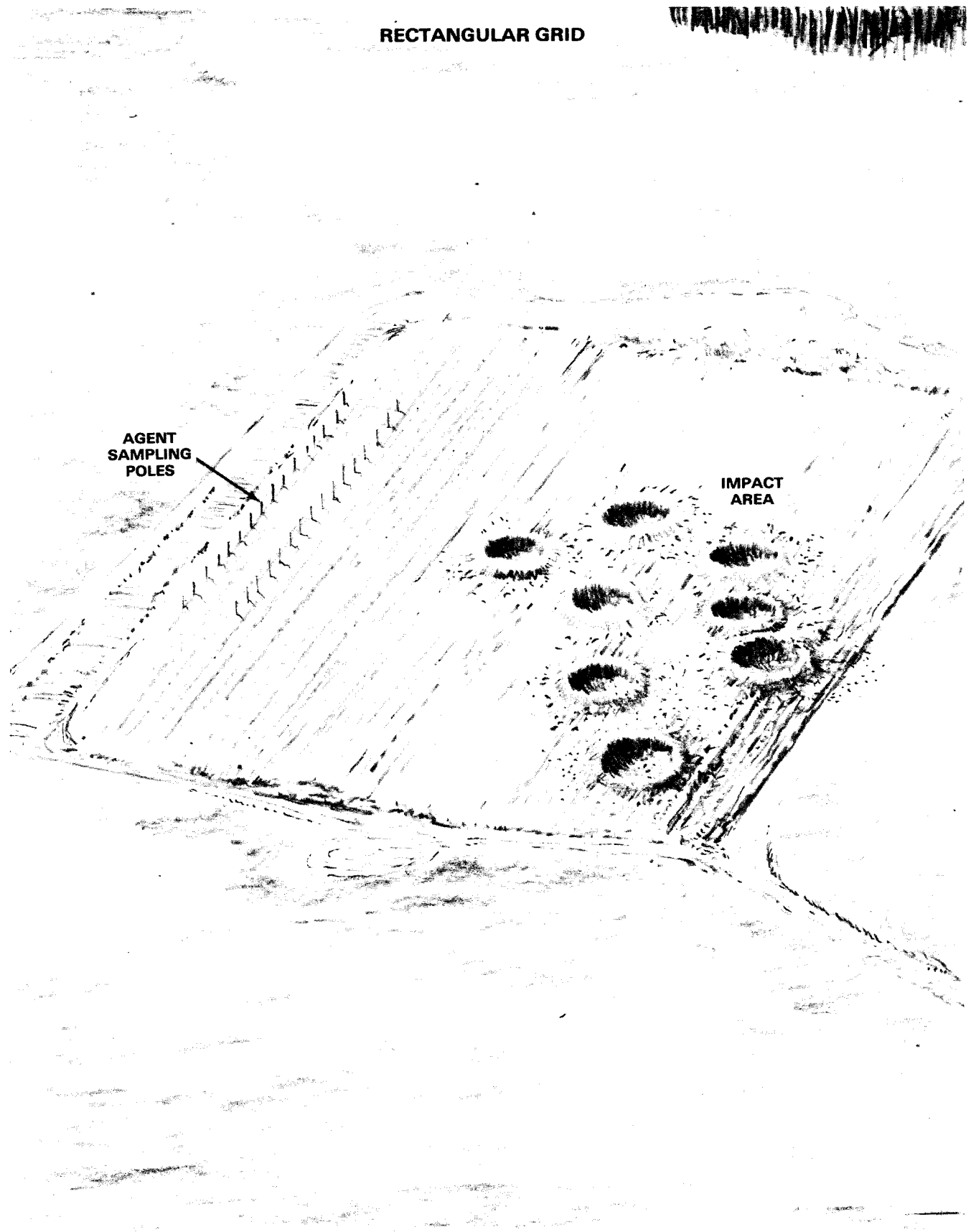
**AGENT RELEASE  
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**AGENT  
SAMPLING  
POLES**



**Figure 9. Chemical agent weapon test grid.**

**RECTANGULAR GRID**



**Figure 10. 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. 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 in Figure 11. 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.

Today 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.

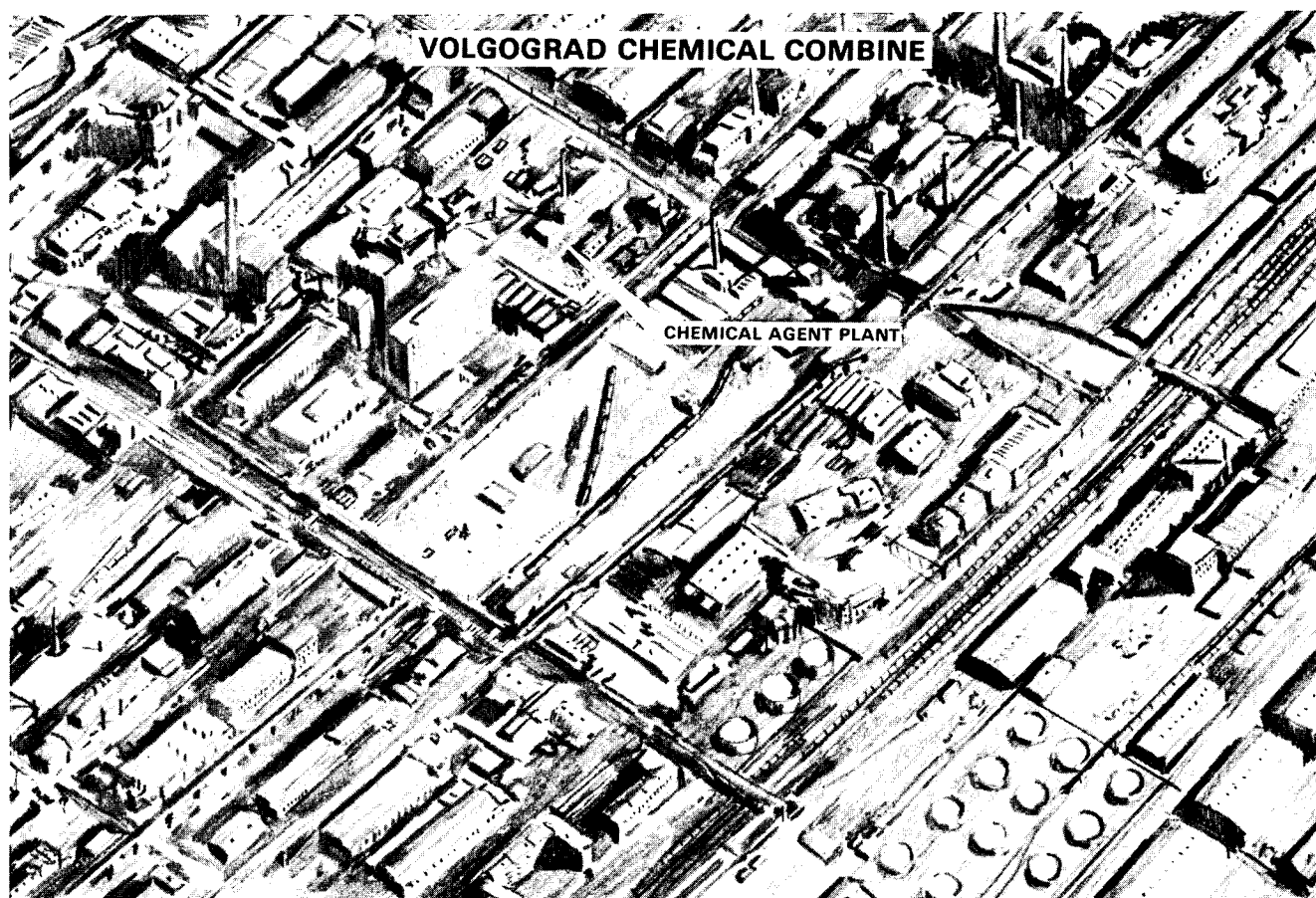
## SOVIET CHEMICAL WEAPONS DEPOTS

Chemical agents produced over the past five decades are stored in a network of military depots located across the Soviet Union (Figure 12). 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.

Figure 13 shows the typical configuration of a major Soviet chemical warfare storage depot. These 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 in Figure 14.





*Figure 11. Location of a nerve agent production plant captured by the Soviets during WW II.*

### CHEMICAL WEAPONS DEPOTS USSR

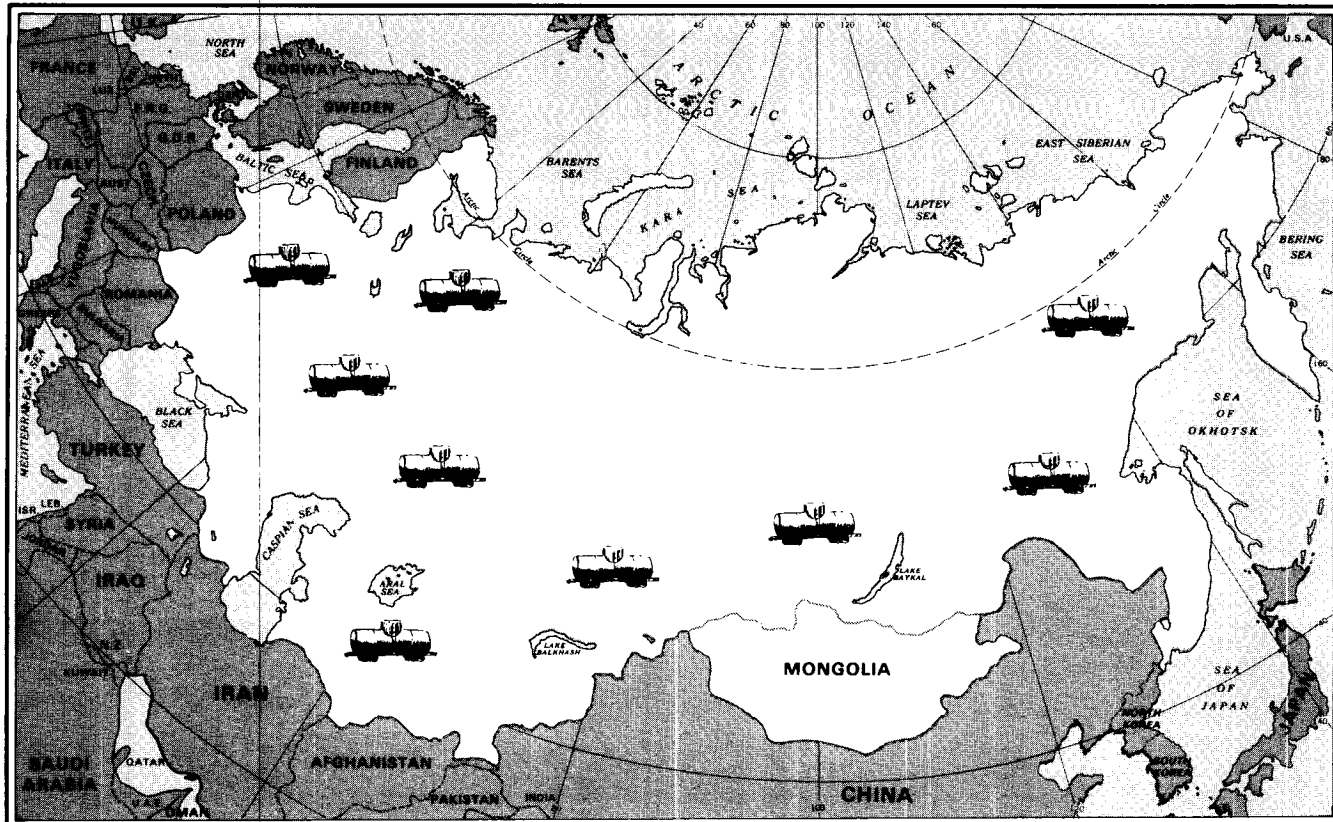
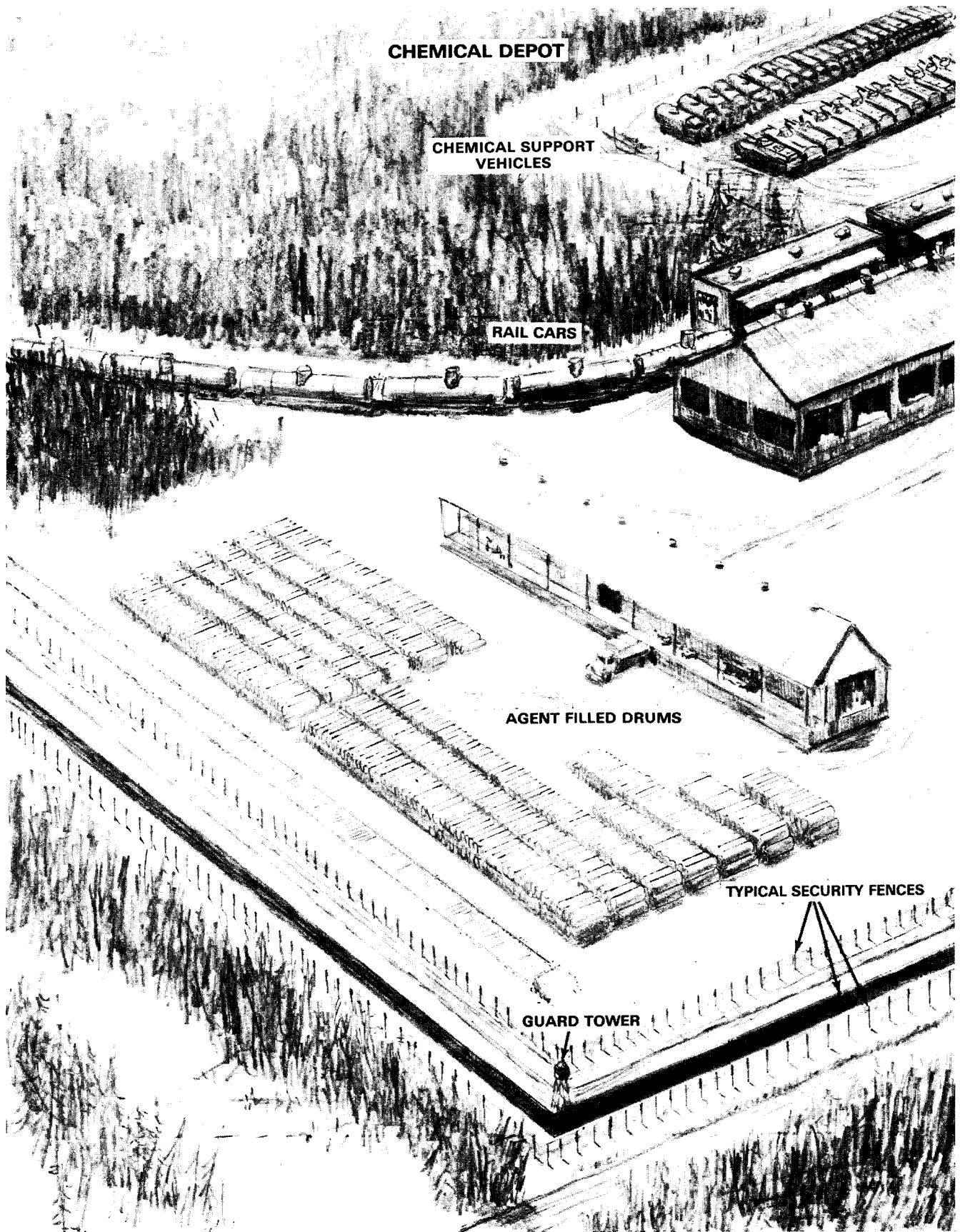
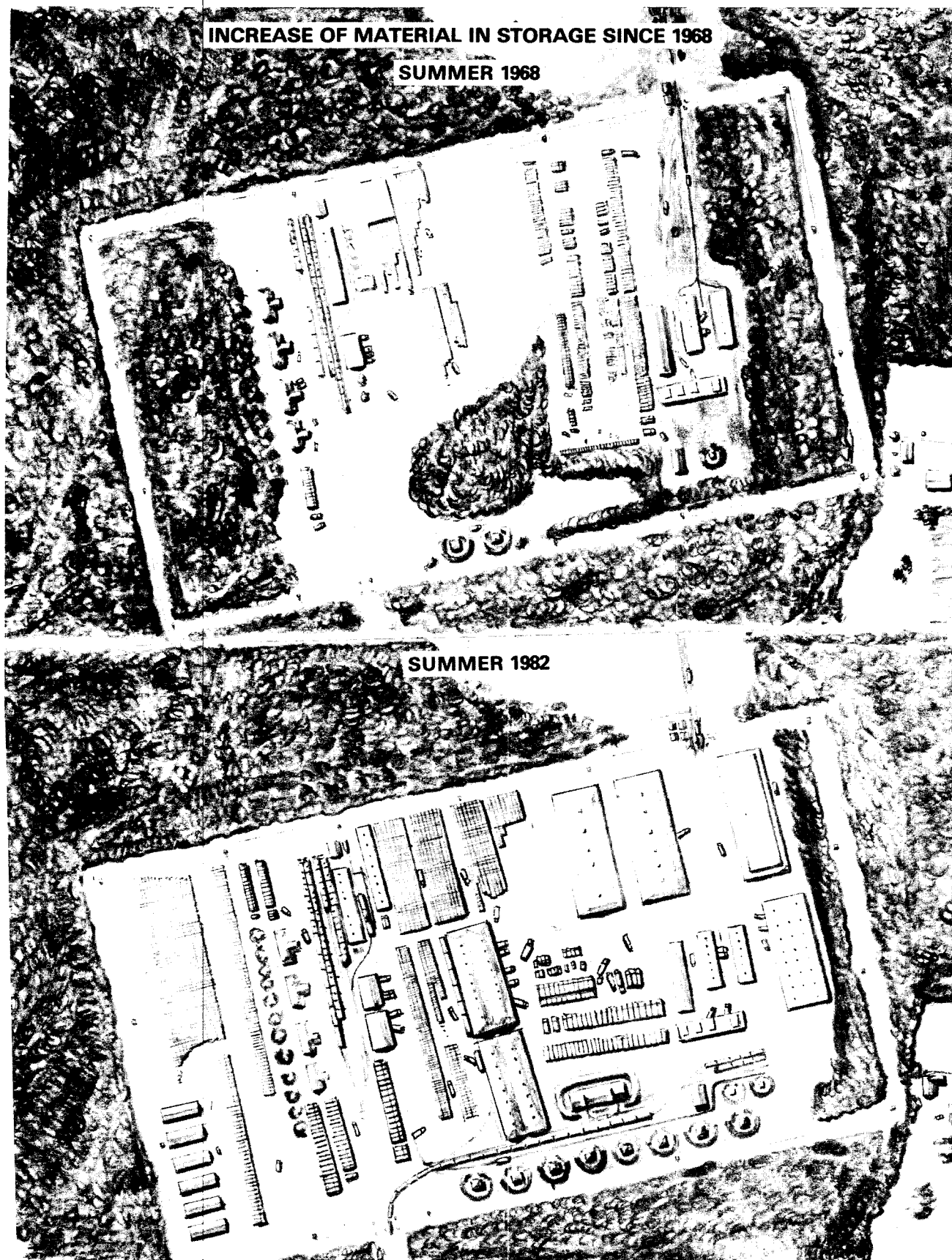


Figure 12. The extent of chemical weapons depots.



*Figure 13. Representative of Soviet chemical depots.*



**Figure 14. Typical expansion and increased storage capacity for chemical weapons since the late 1960s.**

## 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 80,000 officers and enlisted men. When staffed during a war, the size will double. Their primary responsibilities include the following:

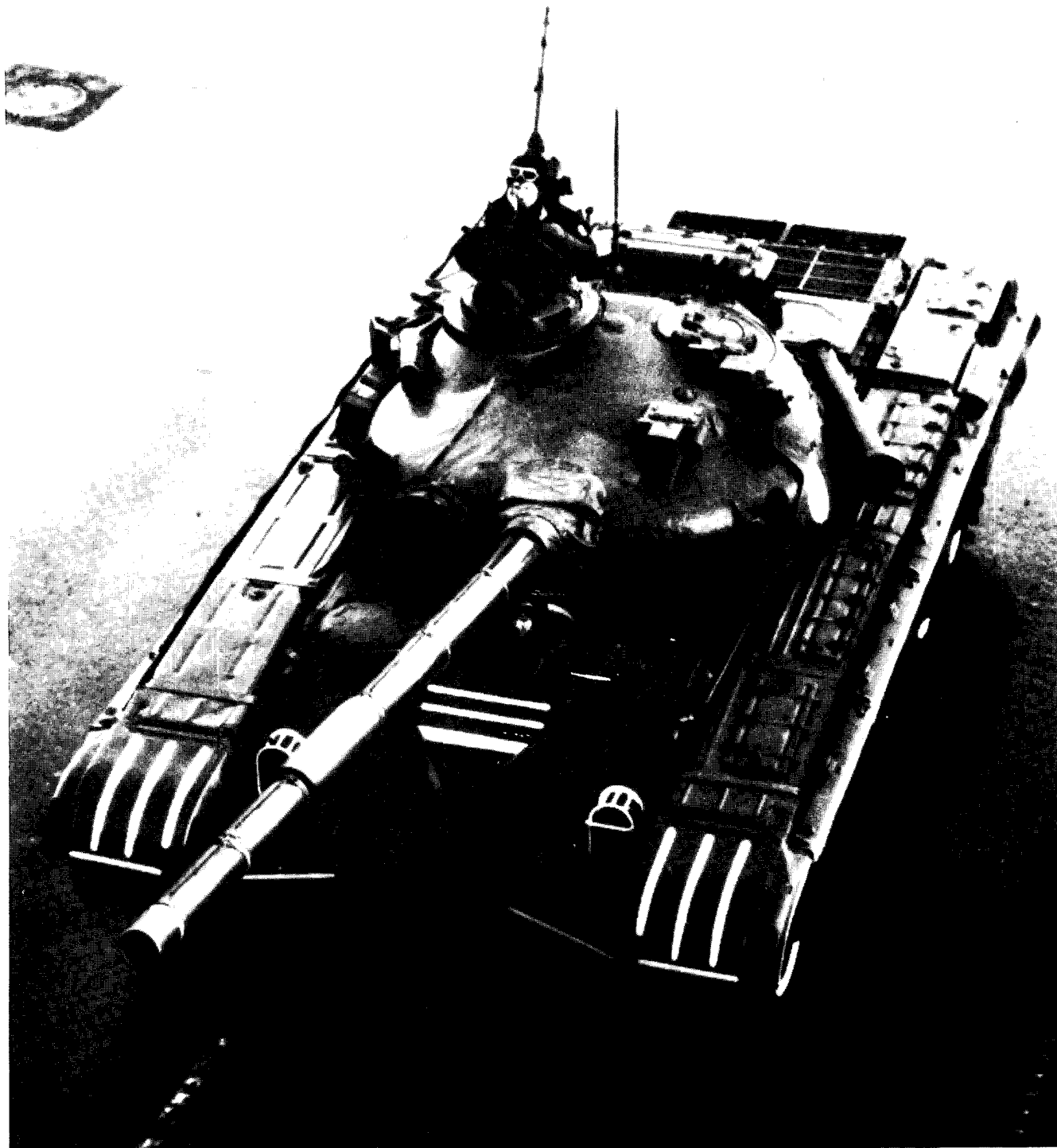
- Advisors to the front commanders for chemical weapons and tactics for their use
- Research and development programs for weapons and protection
- Production and storage of chemical weapons and protective materiel testing and evaluation
- Training of all forces for chemical employment and survival
- 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 (Figure 15). This training includes the use of actual chemical agents. Also, the Soviets installed protective filtration systems in combat and combat support vehicles and ships. Figure 16 shows a main battle tank known to have a filtration system.

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.



***Figure 15. T-72 Main Battle Tank – A Soviet decontamination training exercise.***



**Figure 16. T-80 Main Battle Tank — Is the most modern Soviet tank — Among it's features is a filtration system that protects the crew against the effects of chemical weapons.**



## CONCLUSIONS

Our conclusions based on reliable information are as follows:

- Chemical weapons-related activities continue unabated in 1983.
- The Soviet Union has a military doctrine that envisages the use of chemical warfare and acknowledges its value.
- The Soviet Union possesses a considerable variety of lethal and non-lethal agents, including nerve, blister, choking, and blood. Toxins are also part of their inventory.
- The Soviet Union possesses a variety of means to deliver chemical agents including bombs, spray tanks, tactical missiles, artillery and mortar projectiles, rockets, and mines.
- The Soviet Union can produce very large quantities of chemical agent for chemical weapons.
- The Soviet Union has large and well-trained chemical warfare forces.
- The Soviet Union has an active and still expanding chemical proving ground.
- The Soviet Union provides extensive chemical protection for their forces.
- The Soviet Union provides intensive chemical warfare training for their forces which includes the use of actual chemical agents.