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## CHEMICAL WEAPONS CONVENTION: MAJOR PROGRESS AND REMAINING PROBLEMS

Chemical warfare has been a threat since its massive employment in WWI. Huge stockpiles of chemical agents were accumulated, although not used, by the US and the European belligerents during WWII. Since then large stocks of nerve gas and other agents have been produced by the US and the USSR and lesser quantities have been made by France, Iraq and perhaps others. Although the military utility of chemical weapons in modern warfare is a matter of uncertainty and debate, the US maintains that its chemical capability is a deterrent against chemical attack by the Warsaw Pact. But the overwhelming threat of chemical weapons to unprotected civilian populations and the repugnance in which chemical weapons are generally held have singled them out for special efforts at prohibition. These efforts have recently been spurred by the proliferation of chemical weapons in the third world.

Chemical warfare re-emerged from potential to fact when Iraq resorted to the use of mustard and possibly nerve gas in its ongoing war with Iran. Other third world countries in the middle east and elsewhere are reported to be pursuing a chemical capability. With the advent of binary nerve gas munitions, soon to enter production in the US, and increased world-wide interest in chemical weapons, a chemical arms race and the assimilation of chemical warfare into military doctrine and actual combat becomes a serious possibility.

But a dramatic challenge to the threat is in sight. The Geneva negotiations on a Chemical Weapons Convention (CWC) have leaped forward during the past two years. General Secretary Gorbachev's willingness to agree to a verification regime that includes international onsite challenge inspection without right of refusal has brought the US to a surprising moment of truth. Many analysts had considered the US insistence on such inspections to be an unnegotiable position intended to preclude any agreement. Now, can we accept "yes" to our own proposal and then show the political will to complete the negotiation of the remaining details? Or will we backpedal?

The Convention is now complete in most major aspects. It provides for the complete elimination of all means of offensive chemical warfare — munitions, agents and key precursor stockpiles; production and testing facilities; and dedicated delivery systems — over a 10 year period. All parties must declare at the outset any such means that they presently possess or have transferred since WWII. These declarations will be verified by international onsite inspection teams within the first six months after the treaty enters into force and will be rechecked periodically. Relevant portions of the chemical industry will be monitored through information exchanges and inspection visits. Further, challenge inspections will be allowed within 48 hours of the request being made, without right of refusal, for any instances of suspected violations of the CWC, including alleged use. Chemical protective equipment and chemical protective training will be permitted. Chemical disarmament and chemical protection will replace chemical deterrence and the chemical arms race.

If achieved, the Convention will provide an unprecedented international regime for eliminating chemical warfare and for preventing the exploitation of chemical and medical technology for hostile purposes.

The possibility of a signed convention within a year or two is much greater than could have been expected

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## RECENT PROGRESS TOWARD CHEMICAL DISARMAMENT

*by Gordon Burck*

The Chemical Weapons Convention (CWC) now being negotiated in Geneva is intended to eradicate the means and threat of chemical warfare. Chemical arms control efforts predate the large-scale use of gas in WWI. Yet modern stockpiles are more deadly, and are spread more widely around the world, than ever before. And Iraq has repeatedly used chemical weapons in its war with Iran.

The urgent need for a verifiable ban fortuitously coincides with the vast change in Soviet openness to onsite verification. In fact, the onsite verification demands, which some Administration officials championed in full confidence that they would be refused by the Soviets, are now cornerstones of the Soviet position and are causing intense debate in the military and intelligence communities.

As discussed in a sidebar, the Conference on Disarmament (CD) has been negotiating the draft CWC since 1981. Contrary to expectations, the Soviets have agreed to all of the major provisions of the verification regime proposed by the US in 1984, although numerous important details of

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**even last Spring. And momentum continues to build — the Soviets made the last necessary major accommodation in August; the agreed draft text continues to grow; the Soviets have provided some data on their stockpile and have signaled a willingness to continue the process bilaterally with the US, subject to verification, even before signing of the Convention; and reciprocal international visits to Soviet and US chemical weapons facilities took place in October and November. Senior representatives of major chemical industries have indicated their support. The conclusion of an INF treaty will probably enhance the prospects of the CWC. The two agreements share many features of a reliable verification regime; and a treaty eliminating chemical weapons would remove an element that is counted as a Soviet advantage in NATO assessments of the conventional force balance in Europe.**

**Sustained progress is essential. Now that agreement has been reached on the most fundamental issues of verification, failure to achieve a Convention within a reasonable period risks provoking disillusionment and cynicism regarding the intentions of the major powers, and the momentum required for success might then be dissipated.**

**Nevertheless, there are significant problems yet to be dealt with, including:**

- **the perceived threat of the challenge inspection regime to military secrecy concerning intelligence and advanced weaponry;**
- **civil legal issues raised by the verification regime. Procedures must be worked out for inspection or other satisfactory assurance regarding facilities and activities not under the jurisdiction of national governments;**
- **the stated desire of France to maintain and even augment its stocks until the superpowers bring theirs down to near parity with the French;**
- **completion of the lists of prohibited and controlled chemicals (including toxins) and establishment of procedures for amending them as circumstances and technological change may require;**
- **persuading third world states involved in regional confrontations to join the Convention; and**
- **design of the International Authority and the procedures by which it would perform the necessary functions of the Convention.**

**The Chemical Weapons Convention negotiations are taking place in a window of opportunity and urgency. A century-long quest to eradicate chemical warfare is close to fruition. But important problems of implementation remain to be solved. FAS will make research on these problems and public education regarding the Chemical Weapons Convention a priority for the coming year.**



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procedure remain to be worked out. Following the successful reciprocal international visits to Soviet and US chemical weapons facilities in October (Shikhany) and November (Tooele, Utah), the normally scheduled December US-Soviet CW technical consultation and the January meeting of the Ad Hoc Committee on Chemical Weapons will next take place in Geneva. The full spring negotiating session begins in February. If the recent pace of agreement continues, we could have a signed Convention within a year or two, which could not have been expected even last spring.

This issue provides background for consideration of the draft Convention and of the military, legal, and political issues raised by it.

## SUMMARY OF THE DRAFT CHEMICAL WEAPONS CONVENTION

The following is a digest of the negotiating ("rolling") text of the Chemical Weapons Convention, as of the end of the 1987 summer session of the Conference on Disarmament. Many details are still being negotiated, but primarily the disagreements involving the US and USSR are highlighted in the text and sidebar (which also shows the record of Soviet concessions). Bracketed words or alternative clauses remain to be determined. Many of the terms peculiar to this treaty are further defined in the Glossary.

1. *SCOPE*

Prohibits

• development, production, acquisition, possession, transfer, or use of chemical weapons, or any preparations for use; and

• assistance, encouragement or inducement to anyone to violate Convention prohibitions.

Requires

• destruction of Chemical Weapons and [elimination] of CW production facilities in possession or under [jurisdiction] of each State Party.

2. *DEFINITIONS*

• Chemical Weapons or CW(s) are:

1) Specified toxic chemicals, including supertoxic lethal chemicals, other lethal and harmful chemicals, precursors including key precursors, key components of binary and/or multicomponent CW systems, and enhancement chemicals. Lists of chemicals of each type are attached.

2) Munitions/devices designed specifically to carry CW.

3) Any equipment designed specifically to deliver CW.

• "Chemical Weapons Production Facilities" are any building or equipment designed, constructed or used since 1 Jan 1946 to produce CW or for filling of CW.

3. *INITIAL DECLARATIONS*

Within 30 days of Convention obligation, each Party must declare:

• Existing Chemical Weapons, and CW production facilities which existed at any time since 1 Jan 1946, under its

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## THE CONFERENCE ON DISARMAMENT

**Since 1960, the world community's negotiating body for international arms control agreements has met in Geneva with a variety of names and compositions. The BWC was negotiated by the 25-member Conference of the Committee on Disarmament (CCD), starting in 1969. Since then, two name changes and two increases in membership (including the addition of France and China) resulted in the present 40-member Conference on Disarmament (CD). Item 4 on its agenda is the Ad Hoc Committee currently negotiating a ban on chemical weapons.**

## CHRONOLOGY OF CHEMICAL WEAPONS TREATY NEGOTIATIONS

**The effort to control chemical weapons is the longest running show in arms control. The existing international controls stem from the Hague conferences of 1899 and 1907, the Geneva Protocol of 1925, and the Biological Weapons Convention (BWC) of 1972.**

**Consideration of a multilateral ban on chemical and biological weaponry began in 1969, after completion of the Nonproliferation Treaty. A stand-alone biological weapons ban received a boost from the US unilateral renunciation, and the BWC was completed in 1972. Multilateral negotiations continued on a chemical ban for several years, but lacked superpower interest and sputtered.**

**Nixon and Brezhnev agreed at their 1974 summit to consider bringing forward a joint inititative on the prohibition on chemical weapons. This was affirmed at Vladivostok the same year, and technical consultations began in August, 1976.**

**Then, in 1977, the Vance trip to Moscow resulted in several bilateral working parties, *inter alia* on chemical weaponry. This US-Soviet effort achieved some progress on principles, which was reported to the CD, but it was allowed to lapse by the incoming Reagan administration.**

**A CD working group was established in 1980 to identify and discuss issues relating to a treaty. In late 1981 the UN reestablished, and in February 1983 the US agreed to participate in, the Ad Hoc Working Group of the CD, to work out a draft Chemical Weapons Convention. In April 1983 the US added a draft treaty to the 1982 Soviet statement of principles presented at the Second UN Special Session on Disarmament, and in April 1984 the US presented a more elaborate draft, featuring a plan for international on-site inspections without right of refusal. Also in 1984, the US and USSR began a series of consultations to work on specific technical issues. Finally in 1986-7 the USSR substantially accepted the US verification positions.**

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[jurisdiction] anywhere, or on its own territory under the [jurisdiction] of others;

• Precise location, nature and general scope of any laboratories, test and evaluation sites, or other facilities or establishments, on its territory or under its [jurisdiction] anywhere, designed, constructed or used since 1 Jan 1946 to develop Chemical Weapons; and

• Transferral/receipt by the Party of any Chemical Weapons, equipment [and relevant documentation] for CW production, or control over any such, since 1 Jan 1946.

4. *DETAILED DECLARATIONS—Chemical Weapons*

Within 30 days of Convention obligation, each Party must:

• Specify precise locations with aggregate quantities and detailed inventory of any declared Chemical Weapons under its [jurisdiction] (Feb 1987);

• Report other declared Chemical Weapons on its territory, to be removed within —— months;

• Specify declared transfers/receipts (1000 kg/year/chemical minimum); and

• Provide a general plan for destruction of CW. Declaration is subject (Feb 1987) to immediate verification by international onsite inspection, followed by continuous onsite instrument monitoring and systematic inspection of storage (Feb 1987) and destruction sites. Inspection of Chemical Weapons destruction sites is continuous during destruction activities (1984).

Destruction must begin within 1 year and end within 10. Detailed plans, including composition and location of Chemical Weapons to be destroyed in each annual destruction period (at a rate of at least 1/9 of stockpile taken cumulatively [accounting method and "Order of destruction" remain to be set]), are submitted [3-6] months prior to the period, and annual progress reports are made.

Chemicals on the several control lists requiring declarations may be shifted, removed, or added to the lists.

5. *DETAILED DECLARATIONS—CW Production Facilities*

In addition to detailed specification within 30 days of declared facilities and transfers, and immediate verification of the declaration,

• Production facilities shall immediately cease all production activity, and no other facilities may be built or modified; and

• Within 30 days, Parties must report specific actions to render inoperable and close plants, to be completed within 3 months, and general plans for [elimination] or temporary conversion.

After closure, declared facilities are subject to immediate inspection and verification, the same as for Chemical Weapons (1986). All production facilities must be [eliminated] within 10 years, with submission of plans in advance and annual progress reports. [Rate will probably be 1/9 of capacity per year.]

6. *ALLOWED FACILITIES AND ACTIVITIES*

Within 30 days and then annually, Parties must declare the amounts of chemicals used for "purposes not prohibited" and the facilities where they are produced. The latter are subject to systematic inspection and monitoring, and to the following limitations:

• All supertoxic lethal Chemical Weapons, and certain key components and key precursors specified in the Convention which are possessed for permitted purposes, may not exceed a stock of 1000 kg or an acquisition by any means of 1000 kg per year. Such chemicals may be produced by each Party at only one approved small-scale facility, with capacity not exceeding 1000 kg/yr. Verification is by [system-

## RELATIONSHIP OF CWC TO EXISTING CBW CONVENTIONS

**The Chemical Weapons Convention, being negotiated in Geneva by the Conference on Disarmament, will supplement two existing international treaties.**

**The Protocol for the Prohibition of the Use in War of Asphyxiating, Poisonous or Other Gases, and of Bacteriological Methods of Warfare (1925) is commonly known as the Geneva Protocol (GP). It was ratified by the US only in 1975 but now includes most nations and all major powers.**

**The Protocol is not a disarmament treaty; rather, it bans only the *use* of such substances in war, not production or stockpiling. Many countries have reserved the right of reprisal in kind if they or their allies are attacked with chemicals.**

**The Convention on the Prohibition of the Development, Production and Stockpiling of Bacteriological (Biological) and Toxin Weapons and on Their Destruction, known as the Biological Weapons Convention of 1972 (BWC), was ratified by the US and the USSR and came into force in 1975. The US had already renounced the development and possession of biological and toxin weapons under the Nixon administration.**

**Unlike the Geneva Protocol, the BWC explicitly prohibits development, production and possession. Its scope includes all means of biological warfare. This has allowed military research on potential biological agents in order to develop vaccines, detectors and protective equipment. Unlike the GP, the BWC provides for verification, by the UN Security Council. However, despite several serious allegations of biological warfare, this provision has never been employed.**

**The Chemical Weapons Convention will prohibit the existence and the use in any circumstances of the means of offensive chemical warfare, including a reiteration of the ban on toxins, and strictly limit production of these and all supertoxic chemicals by any means. The CWC also adds mandatory challenge inspection of alleged uses of chemical weapons. It will allow peaceful use of certain supertoxic and dual-use chemicals, including use for chemical warfare defense research, in strictly limited amounts and at restricted locations subject to onsite inspection.**

atic/permanent] inspection and continuous monitoring;
• [Other approved facilities may synthesize up to 100 g of each chemical and ——g in total per year for research or medical purposes. Verification is by annual reporting];
• For key precursors, Parties report initial and annual national and specific facility-wise data (above a cutoff to be set). Verification is by immediate and systematic inspection (1986);
• For large volume commercial chemicals with potential Chemical Weapons use, on the Convention list, Parties report national data and capacity and approximate production/consumption at each specific facility (above a threshold). Verification is by data reporting and analysis; and
• For other commercial toxic chemicals, with toxicity above a threshold and probably with production above 10 kg/chemical/facility (and a capacity consideration), Parties report similar data as for key precursors (but not for specific chemicals); and verification, above a higher production threshold, also is similar.

7. *CHALLENGE INSPECTION*

Specific short-notice inspection requests concerning doubts about compliance or ambiguous related matters will immediately be forwarded (probably without being filtered) by the International Authority. Compliance within [24/12 hours] will be mandatory in all cases (Feb, Aug 1987).

Parties may also request information from another Party directly or through the International Authority, which may set up a group of experts to study problems, convene special meetings including involved non-Party States, and implement fact-finding missions.

8. *ADMINISTRATION*

States are to enforce Convention prohibitions by a National Authority as well as appropriate domestic measures.

The International Authority will consist of a Consultative Committee with 1 representative of each State Party and an elected Executive Council [composition to be negotiated]. The Technical Secretariat will perform all analyses of plans, reports and inspections. It includes the Inspectorate, composed of international inspectors who are preassigned to each Party, subject to nonacceptance by the Party. (No Party will be inspected by any of its own nationals.) Repeated nonacceptance may be referred to the Executive Committee as impeding inspections.

The Inspectorate/Technical Secretariat may also trigger an immediate onsite inspection, if monitoring system irregularities cannot be explained, and may refer unsatisfactory results of routine inspections to the Executive Council.

## CONSEQUENCES AND IMPLICATIONS OF THE CONVENTION

The goal of the CWC is to eliminate and prevent the recreation of any means of offensive chemical warfare.

The treaty has two parallel purposes:
• to eliminate the military means for chemical warfare and to halt and reverse the assimilation of chemical weapons into military plans and doctrine; and

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## AREAS OF US-USSR AGREEMENT AND DISAGREEMENT ON CWC

**As of the Fall of 1987, the Soviet Union had agreed to the following provisions, listed chronologically:**

**• Teams of international inspectors selected and assigned to each Party at the outset of the treaty by the International Authority that administers the treaty may continuously witness and verify destruction of chemical weapon stocks (February 1984).**
**• Systematic onsite inspection by such teams will verify the elimination of chemical weapons facilities (January 1986).**
**• Systematic onsite inspection will verify compliance within the chemical industry (November 1986).**
**• Immediate declaration of locations and inventories of all chemical weapons stocks will be made at the commencement of the Convention (February 1987). These declarations will be verified by onsite international inspection.**
**• Short-notice challenge inspections, in all cases without right of refusal (August 1987).**

**Several areas of disagreement still remain:**

**• Challenge inspection details. Who can make a challenge, whether the warning time should be 12 or 24 hours, and whether the challenge request would be administered by the International Authority (adding 24 hours to the warning time).**
**• Elimination of Production Facilities. The USSR seeks the option of converting some facilities to peaceful uses, subject to approved, verifiable plans. The US prefers that facilities be completely dismantled and removed.**
**• Jurisdiction and control. The USSR seeks assurance that the operations of Western transnational corporations in other countries will be controlled. The issue will be settled by political acceptance of legal language.**
**• Order of destruction. The USSR wants 1/9 of each type of CW to be destroyed in each period, but no longer necessarily binaries first (1987). The US position remains that a cumulative n/9 of overall chemical (toxicity-equivalent) tonnage is to be destroyed by the end of the nth period.**

## THIS ISSUE

**This issue reflects renewed FAS involvement in issues of Chemical and Biological Warfare. FAS played important roles in the origin of the Biological Weapons Convention of 1972 and in gaining US ratification of the Geneva Protocol in 1975. We now are working for a Chemical Weapons Convention that will eliminate chemical warfare in a verifiable and secure way.**

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• to create public confidence in the treaty prohibitions and to avert international tension arising from unfounded suspicions and allegations.

A primary role of verification during the ten-year period projected by the CWC for eliminating the means of chemical warfare is to confirm that such elimination is actually taking place. This involves detailed initial declarations, routine inspections and periodic reporting during the destruction process. A further role is to make sure that the declarations submitted by states include all relevant stocks and facilities. Analysis of the declarations themselves and other collateral information will be useful for this purpose. Importantly, such information, generated by the CWC, will make national technical means (NTM) more informative. Finally, the option of challenge inspections should increase confidence in the initial and routine information and decrease reliance on ambiguous NTM.

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## THE SOVIET NEGOTIATING POSITION IN BRIEF

**The following statement of the current Soviet position on onsite challenge inspections was made by Nikita P. Smidovich, a member of the Soviet negotiating team at the Conference on Disarmament, at a conference held in Canada in October, 1987, just after the Shikhany inspection. The clarity and far-reaching specifics of the stand are far beyond even recent Western expectations.**

**To sum up our position on the challenge inspections I would like to identify the following points:**

**1. All States Parties to the CW Convention should have equal rights and obligations as regards to both submitting a request and accommodating it.**

**2. A request for inspection can be submitted in relation to any facility or location.**

**3. A request should contain the necessary basic data (what, where, when, how).**

**4. The period between the time of request and the arrival of the inspectors at the inspection site should not exceed 48 hours.**

**5. It is important to elaborate specific measures in order to prevent the use of challenge inspection for purposes uncompatible with the task of verifying compliance with the Convention.**

**6. The requested state may suggest alternative measures. Whether they are satisfactory shall be decided by the requesting state. The time for reaching agreement on the verification procedure should not exceed 48 hours (during that same period inspectors arrive at the inspection site).**

**7. But the most important—challenge inspections should be mandatory, without the right of a state to refuse such inspections and this should be legally binding in the CW Convention.**

## MODERN CHEMICAL WEAPONRY

**Modern chemical weapons originated in WWI and several agents used then — phosgene and mustard gas — were produced in vast amounts by many WWII belligerents, and mustard still remains in US and Soviet stockpiles. Tear gases and herbicides have also been used, especially in the Vietnam War (see box on p. 8). However, a chemical WWIII would probably be fought primarily with nerve gases, which originated in German organophosphate pesticide research in the late 1930s. Tabun (GA), sarin (GB) and soman (GD) were in various stages of development and production by the end of WWII, but they were never used. The US, USSR, France and the UK began production of these agents after the war; and the US added a persistent agent, VX (discovered in the UK), during the 1960s. The UK destroyed its stockpile in 1956, while France retained a small stockpile (similar in size to the US stockpile now in W. Germany). In 1969 the US ceased production of chemical weapons. Virtually no open information exists on the size of the Soviet inventory, except that it is probably at least as large as the US stockpile. After the Shikhany, USSR, CW test facility visit in October, substantial information is available on the composition of the Soviet stockpile, both agents and munitions. Notably, the Soviet Union possesses tactical rocket chemical warheads, which the US does not.**

**All of the stockpiled chemical weapons to date are "unitary"— that is, the active chemical itself is packaged in the munition. However, there are obvious production, storage and transportation risks, and research on binary weapons, with two components less toxic than nerve agents (see Glossary), began in 1949. During the post-Vietnam nadir of the Chemical Corps, plans for the first binary weapons plant were announced by the Army in September 1973, but Congress (FY 75,76), Ford (FY 78), and Carter (FY 79-81) repeatedly denied Pentagon funding requests.**

**However, in 1980 individual Representatives took the initiative. The first attempt achieved only token funding for plant site preparation, but Reagan's first Supplemental Appropriation added equipment money. As the result of continual budgetary battles, production of the first binary artillery shells is expected only on or after Dec 17, 1987. President Reagan has promised to withdraw the US European stockpile by 1992 and Congress has mandated the destruction of 90% of all US unitary agents by 1994. Plans also exist for the Bigeye binary bomb, a warhead for the multiple rocket launcher system, and possibly munitions for other weapons systems.**

**Interest in CW has grown elsewhere as well. Intelligence sources are said to estimate that as many as 16 countries possess militarily significant amounts of chemical weapons. In particular, Iraq has blatantly violated the Geneva Protocol. Iraq also joins the probable case of Egypt (in Yemen in the 1960s) of use by third world countries. Further, France has announced intentions to produce binary weaponry.**

## GLOSSARY: NUKESPEAK IS NOT ENOUGH

The Chemical Weapons Convention adds new chemical and verification terminology to prior arms control vocabularies. The following explanations will help clarify the references elsewhere. Cross references are *ed.

*BWC:* Biological Weapons Convention of 1972

*CBW:* Chemical and Biological Warfare

*CD:* Conference (formerly Committee) on Disarmament

*CWC:* Chemical Weapons Convention

*BINARY WEAPONS* differ from existing "unitary" chemical munitions in the pre-use packaging. The 155-mm binary artillery projectile scheduled to enter production this December has two chemical components carried in separate compartments, as with epoxy glue. The barrier between them is ruptured when the munition is fired, allowing the chemicals to react and form nerve agent GB, the same agent as in existing unitary 155-mm and 8-inch artillery projectiles. The main argument made for the binary projectile is improved safety. Arguments against it are that the existing unitaries are sufficiently safe and thoroughly field-tested while the binary has never been field tested with live agent.

*CHEMICAL WEAPONS* is a term with meanings of varying breadth. As used in this PIR, "chemical weapons" include only chemical agents and munitions. As defined in the CWC, however, they are of several types:
1) Specified toxic chemicals (whose properties can cause death or temporary or permanent harm to man or animals) of four principal categories:
• supertoxic lethal chemicals (nerve gas, mustard, lewisite),
• other lethal and harmful chemicals (phosgene [see dual use*], several phosphorus chemicals),
• precursors* including key precursors,
• key components* of binary and/or multicomponent chemical weapon systems;
• enhancement chemicals (such as thickeners and absorption aids)
2) Munitions/devices specifically designed to release such chemicals to cause harm or death; and
3) Any equipment specifically designed for direct use in the employment of such munitions/devices.

Civilian and nonwarfare uses of these chemical agents are monitored under the CWC. The use of riot control agents and herbicides for military purposes will be dealt with later.

But the latter substances are part of the wider definition of chemical weapons; as such, they are included in chemical warfare budgets and are involved in allegations of chemical warfare (see sidebar on Vietnam). However, such weapons as flame (napalm), smoke, white phosphorus, although included in CW budgets and the responsibility of the US Chemical Corps and the Soviet Chemical Troops personnel, are not strictly chemical weapons since their effects are not based on toxicity, and they are not treated by the CWC.

*DUAL-USE CHEMICALS* have both commercial and military uses. Specifically, a) toxic chemicals such as phosgene which have been, or could be, used in warfare, while having significant industrial use, and b) commercial chemicals used to produce military chemicals or which are the principal components of binary chemical weapons.

*INTERNATIONAL SYSTEMATIC INSPECTIONS* will be conducted by the technical branch of the International Authority established to administer the CWC. *International* means that an inspection team is formed from a list of trained, permanent employees of the authority. *Systematic* means that declared chemical weapon storage and deactivated production sites are periodically chosen at random for a visit on short notice. Some sites have a continuous presence of detection instruments and/or inspectors.

*KEY COMPONENTS* are the key precursors* packaged in a binary weapon.

*NERVE GASES* attack the transmission of information by the nervous system. They are colorless, odorless and enter the body by inhalation or by absorption through the skin. Symptoms include intense sweating, bronchial congestion and constriction, dimming of vision, uncontrollable vomiting and diarrhea, convulsions, and death through respiratory failure within minutes to hours, depending on the amount absorbed.

*PRECURSORS* are chemical substances changed by reaction into a chemical of interest, ie, a warfare toxic chemical. A KEY precursor is important for the chemical synthesis and/or toxic properties of a toxic chemical.

*PURPOSES NOT PROHIBITED* — examples, for some chemical weapons categories, are industrial, agricultural, research, medical, domestic riot control and law enforcement, or other peaceful purposes; and military purposes not connected with the use of chemical weapons.

### US DECLARED CHEMICAL WARFARE POLICY

**President Roosevelt made a public no-first-use declaration in 1943. Although this was never publicly withdrawn, in the 1950's it became clear that the Army did not consider the US bound by any restrictions, as stated in its 1956 Field Manual on the Law of Land Warfare. Roosevelt's policy was reinstated and reiterated by President Nixon in 1969, but the US did not formally ratify the Geneva Protocol until 1975.**

**At present, the US declares the dual policy of seeking the verifiable elimination of chemical weapons, and of maintaining deterrence of chemical warfare by means of a stockpile of chemical weapons, including the binary weapons entering production.**

## UNITED STATES CHEMICAL WARFARE IN VIETNAM

**Although the US did not use nerve agents or other lethal chemical agents in Vietnam, the US did employ massive amounts of riot control agents and defoliants in support of military operations (bunker/tunnel warfare; destruction of crops and forest cover in Operation Ranchhand).**

**The total quantities shipped to Southeast Asia were 13.7 million pounds of CS tear gas and 18.85 million gallons of herbicides, particularly Agent Orange (contaminated by as much as 300 pounds of a supertoxic impurity — dioxin), as well as Agents Blue and White. Half a million acres of cropland were sprayed in South Vietnam alone. The sprayers' slogan was "Only we can prevent forests."**

**The use of herbicides stopped at the end of 1970, after the US military commander and the US Ambassador in Vietnam reported them to be counter-productive, leaving 3 million gallons unused.**

**President Ford in 1974 issued an Executive Order, still in force, prohibiting the use of herbicides in war, except on US bases, and of riot control agents, except in rescue attempts.**

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### Military and Industrial Perspectives

From the military perspective, the threshold of danger is the minimum stock of chemicals that could reasonably change the course of a critical battle. Depending on meteorological and other factors, approximately a ton of agent is required to attack a square kilometer, forcing opposing troops into chemical protective posture. For artillery projectiles, this corresponds to at least 10 tons of munitions, or, for example, a few hundred 155-mm chemical artillery shells per square kilometer per attack. Scaling up to a 30 day war on the NATO central front, using a variety of chemical munitions and delivery systems in coordination with conventional munitions, Julian Perry Robinson, the eminent CW expert at the U. of Sussex, has estimated that an attacker might expend some 20-30,000 tons of chemical munitions.

An alternative case would be a one-time attack against 100 airbases, intended to reduce sortie generation rates for a day or so, which could require some 2,000 tons of munitions, primarily bombs.

According to French statements, a stock containing approximately 1000 tons of agent is the minimum militarily significant size. Detailed considerations of the likelihood of producing or hiding such quantities and of maintaining the necessary doctrine, training and other arrangements for their use have not been published. But it is clear that the potential violator under the CWC regime faces a substantial probability of detection.

## RECENT ALLEGATIONS

**Allegations of the use of chemical agents are endemic to warfare. However, several recent allegations are of particular importance for the environment of the CWC negotiations. When allegations are made irresponsibly, they may destroy the confidence necessary for negotiating such a treaty and obscure real evidence of proliferation which makes the treaty more urgent.**

**The most publicized cases of the past decade concern alleged Soviet biological and toxin warfare activities. Beyond their substance, in form they demonstrate the deficiences of current national and international verification mechanisms.**

***SOUTHEAST ASIA*** **Attacks by Vietnam on the Hmong people in Laos, starting in the mid-1970s, and subsequently against the resistence in Kampuchea, allegedly used a toxin-bearing yellow material that "fell like rain." The USSR was accused by the US of supplying the materials. Since the initial public charge by Secretary of State Alexander Haig in 1981, the yellow material has been proven to be bee feces; the presence of toxins beyond their natural locations has not been consistently or systematically proven; and refugee accounts of chemical attacks by alleged witnesses remain anecdotal and suspect, due to both content and collection methods, as recently underscored in declassified reports of US Government investigators. No munitions have been recovered. The UN investigatory team was not authorized by the Security Council under the terms of the BWC and was not allowed access to the areas of alleged attacks in Laos and Kampuchea.**

***SVERDLOVSK, USSR*** **The initial allegation, based on emigre sources, was that an explosion at a suspected**

Whether such attacks would be significantly more (or less) effective than efforts of similar magnitude using other weapons is of course highly relevant. Here is where the maintainance of an effective chemical protective capability, by degrading the utility of chemical weapons, reinforces the security provided by the Convention. Official public estimates of the utility of chemical weapons have tended to be anecdotal and self-serving. Openly published objective information and studies of the military usefulness of chemicals are needed.

The verification system which is outlined in the Convention causes certain concerns in the United States, as well as the USSR, W. Germany, Japan and other countries, for both commercial and military reasons.

To the extent that the declared chemical production facilities are in commercial chemical plants, and to the extent that challenge inspections open other plants to international view, there is concern about the loss of trade secrets. It seems likely, however, that the considerable Western experience with systems such as the US EPA's Confidential Business Information, the highly professional

## OF CHEMICAL WARFARE

**military biological research facility in April 1979 released a cloud of anthrax spores, which were inhaled by the population and killed up to 1000 people. Soviet literature before and after the outbreak, and special presentations (describing gross incompetence in Soviet meat processing) to the 1986 BWC review conference and to a team of foreign specialists, are consistent with substantial public evidence about the disease outbreak as a natural occurrence. However, no international investigation has been allowed in the area.**

***AFGHANISTAN*** **The physical evidence for allegations against the USSR since 1980 has been a single protective mask with trichothecene ("yellow rain" toxin) contamination said to be present on the surface, not in the filter, combined with anecdotal evidence. No other specific agent has been identified, although both biological and exotic chemical warfare have been alleged, and no shell fragment or other munition has been found despite a reward offer. The UN investigation team was not allowed entry.**

**The evidence for all of these allegations is weak or, in the case of the yellow rain, actually discredited. However, the US continues to reiterate its initial charges.**

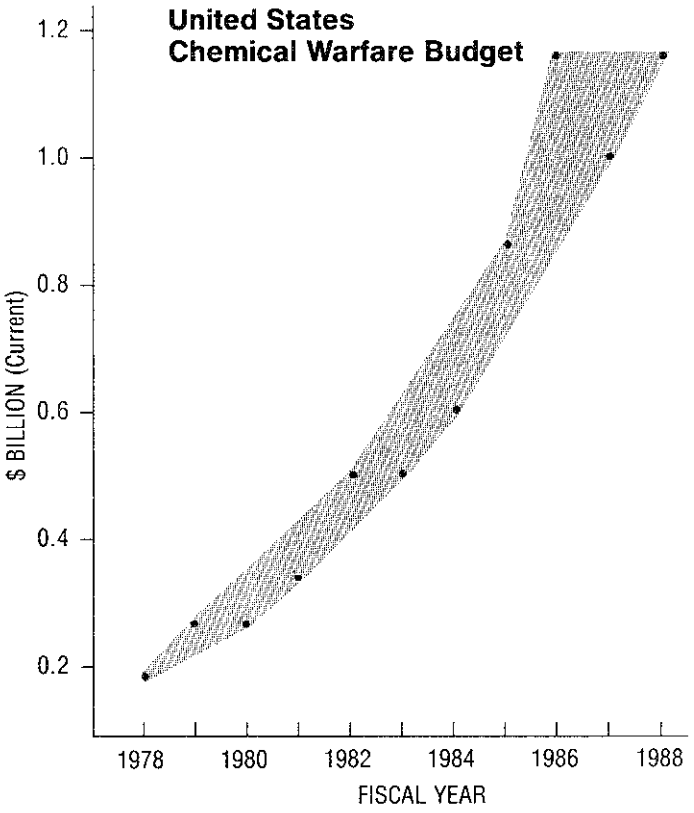
***IRAQ-IRAN WAR*** **This allegation, unlike the others, concerns specific chemical agents and has been confirmed by UN investigating teams. The use of toxic chemical agents — mustard and possibly tabun nerve gas — by Iraq has been confirmed from physical evidence by the UN investigation. Use by Iran is not confirmed. Both countries are parties to the Geneva Protocol.**

character of the Technical Inspectorate, and the possibility of distinguishing between the kinds of information needed for the CWC and the kinds that would be considered proprietary will assure the business communities. Recent comments from a number of industry spokesmen have tended to support this view.

Of further concern, particularly following the change in the US position on INF verification, are leaks of sensitive military information. Challenges could include frivolous requests to see sensitive installations not related to the CWC (though retaliation in kind seems a likely deterrent). The US and the USSR are currently discussing ways to deal with this matter.

### Other Negotiation Issues

Several issues have yet to be resolved in the negotiations. One of these concerns the "order of destruction," or constraints on the choice of weapons to be destroyed in each year of the destruction period. France, in isolation, has argued that it (and numerous other small possessors) be allowed to retain and even augment a stockpile until the




last year as assurance against use by non-signatories, abrogators or violators of the CWC. Verification would be made more difficult by the French proposal. Not only would this encourage short term proliferation but would destroy the advantages of verifying compliance with non-production. Unsupported by other states, the French position is likely to evolve as negotiations continue.

The CWC goal is particularly dependent on certain critical states becoming parties. One idea is to have a major international signing ceremony, with appropriate behind-the-scenes diplomatic activity by the major powers in order to focus maximum interest and priority on the Convention in other governments. In areas of tense local confrontation, such as the middle east, special diplomatic efforts and ingenuity will be needed to coordinate signing and ratification.

### Domestic Legal Implications

Despite the problems, it is apparent that an intrusive system is required, both to eliminate existing capabilities and to provide assurance that new ones do not come into existence. This will probably require domestic legislation to implement the CWC insofar as it applies to facilities not already under federal jurisdiction. Such legislation may need to address provisions such as:

- Mandatory challenges that involve search and certain types of sampling; and
- Specified amounts of destruction which must be carried out within defined 1-year intervals. This will not allow

*(Continued on page 10)*

*(Continued from page 9)*

lengthy judicial challenges based on environmental concerns. (A revised draft Environmental Impact Statement is nearly complete for the 90% demilitarization now mandated by the Congress to be accomplished by 1994.)

### Implications for US Binary Production

As shown in the graph, US spending on CBW has increased rapidly in the past decade. This escalation will increase because of the several billion dollars required for destruction of the existing stockpile, and possibly by a similar amount due to the production of new binary weapons, particularly if the program is compressed into a few years before a CWC is signed.

Pressure for production may increase from three directions. First, some officials believe the Soviets will negotiate sincerely only in response to such moves. Second, the proponents of deterrence will argue that there is a need to produce binary weapons so as to have a modernized deterrent during the 10-year period allowed for weapons destruction after the Convention's ban on further production comes into force. Third, there will also be bureaucratic pressure, stemming from the 40 year research program, 15 years of lobbying, and a just-completed plant for making binary artillery projectiles.

However, there are problems with the stick and deterrence arguments. A stick is likely irrelevant to the Soviet positions in Geneva, which are more probably linked to overall changes in Soviet policy regarding military doctrine and secrecy. Further, new production would a) be a poor example for stemming proliferation in the third world; b) be of little military utility, since there is a compelling case that the weapons ready for production are not appropriate to current US military doctrine; and c) exacerbate the European basing problem — what good are new artillery shells in the US for deterrence or immediate retaliation in Europe?

Is the replacement of the existing unitary nerve agent artillery munitions with binary ones worth incurring these liabilities? Unfortunately, France's position also threatens most of these outcomes. These dangers, and the negative effect on negotiations, make forbearance from new production worth reconsidering. ■


## ABOUT THE AUTHOR

**Gordon Burck, the FAS Staff Associate for Chemical and Biological Warfare, joined FAS after earning a Masters degree in International Affairs at Columbia University, where he specialized in Soviet and security studies. His earlier training was as a chemist and chemical engineer, with degrees from Pomona College and MIT. He has worked for engineering and consulting firms. In 1980 he served as a consultant on chemical weapons issues at the Center for Defense Information.**


## WORLD WAR I

**The modern use of lethal chemical weapons began with the surprise use of chlorine by the Germans at Ypres, Belgium, on April 22, 1915. As described by British military historian B.H. Liddell Hart, "It left a gap in the front over four miles wide, filled only by the dead and by those who lay suffocating in agony from chlorine gas-poisoning" (*History of the First World War*, Cassell, 1970). Unprepared to advance, however, the Germans gained nothing important from the attack. The use of chlorine gas was followed by other gasses, including phosgene and finally mustard, in an innovative race of offense and defense. Overall, it is estimated that approximately 200,000 tons of chemicals were produced during the war, and that gas caused more than half a million casualties and tens of thousands of deaths (L.F. Haber, *The Poisonous Cloud*, Oxford, 1986). For the year 1918, the efficiency of gas artillery in causing casualties to British troops was about the same, round for round, as that of conventional high explosive shells. For all the suffering and lasting illness caused by chemicals in WWI, chemical protective equipment and training kept gas from being a decisive weapon.**

## WORLD WAR II

**WWII was a case of stockpiled weapons that were not used. The reasons for non-use appear to have differed from country to country. Churchill was interested in exploiting the gas option against German buzz-bomb installations but his military advisors considered gas less effective than high explosives. Unlike the Allies, the Germans had discovered and stockpiled nerve gasses. Even so, Ochsner, commander of the German chemical troops stated after the war that gas was not contemplated because it would have been less effective than high explosive munitions and would have added to the burden of production and supply. He also cited Hitler's opposition to gas, attributed to Hitler himself having been gassed in WWI. And President Roosevelt was well known for his adamant opposition to gas, except as a deterrent to its use by the Axis.**

**Although the US had virtually no prewar stockpile, it produced more than 100,000 tons of chemical agents by the end of the war. The Soviet Union is estimated to have had a production capacity on the order of 100,000 tons of non-nerve agents per year by 1942. Germany had a prewar stockpile of 10,000 tons of mustard and a large production capacity. Some 200,000 tons of German chemical weapons were captured and destroyed by the US and UK alone after the war. But, unknown until after the war, Germany also had a prewar stock of some 2000 tons of tabun nerve agent and ended the war with two stockpiled nerve agents totalling as much as 25,000 tons that were captured by East and West. Overall as much as 500,000 tons of chemical agents were produced during the war. At no point in the war, however, were any of the belligerents operationally prepared to employ the stocks they possessed.**

## CHEMICAL WEAPONS CONVENTION STUDY GROUPS

The Convention's length, detail and jargon, against a background of vociferously alleged violations of prior treaties on chemical and biological weapons, will make the CWC ratification an intellectually trying experience for the Senate. But there will necessarily be two or three years of further negotiations and discussions before that time.

This intervening period will allow the scientific community to study the Convention's requirements and implications, and to make appropriate analytical studies. Many of the important issues are raised in this PIR. FAS is seeking to further such an effort by facilitating the formation of a national group of scientists, many with previous expertise on the issues, which would conduct research and prepare an interpretive guide to the Convention. A parallel group would look at the specific issues of domestic and international law. ■

## CONGRESSIONAL EXCHANGES AND HELSINKI COMMISSION

On November 17, FAS Director Jeremy J. Stone testified before the Commission on Security and Cooperation in Europe, chaired by Congressman Steny H. Hoyer (D-MD) and co-chaired by Senator Dennis DeConcini (D-AZ). The Commission is designed to support the Helsinki Accord and deals primarily with human rights. FAS testified on its effort to get Congressmen to travel to the Soviet Union and Soviet Parlimentarians to travel here. ■

## PLUTONIUM CHALLENGE FIRED OFF

On November 5, a coalition of eight organizations, including the Federation, released an open letter to President Reagan and Congress urging an immediate two-year moratorium on the further production of plutonium for nuclear weapons and a challenge to the US and the Soviet Union to negotiate a "bilateral, verifiable cutoff of the production of plutonium—as well as highly enriched uranium—for nuclear weapons."

FAS Research Chairman Frank von Hippel spoke at the press conference and distributed the September 1985 article in *Scientific American* he co-authored with FAS Senior Staff Scientist David H. Albright and FAS Council Member Barbara G. Levi "Stopping the Production of Fissile Materials for Weapons," as primary scientific documentation of the issues involved. Bonnie Ram, FAS's Bernard Schwartz Fellow in Energy and Environment, is also working with Albright and von Hippel on this issue.

The Plutonium Challenge has pulled together environmental and arms control support from around the country. A copy of the Challenge letter was sent to General-Secretary Gorbachev. ■

## FAS DEPLORES SPACE BASED KINETIC KILL SYSTEMS

FAS Associate Director for Strategic Weapons Policy Thomas K. Longstreth released a report on the questionable legality of testing the Space Based Interceptor (SBI), a key component of the Star Wars program, even under the Reagan Administration's broad interpretation of the ABM Treaty.

The report, entitled *Space Based Interceptors for Star Wars: Untestable Under any Interpretation of the ABM Treaty,* was distributed to Senators and Congressmen by Sen. Bennett Johnston (D-LA) and Rep. Vic Fazio (D-CA)—both leading opponents of the SBI. A Fazio amendment to delete funding for "development and deployment" of the SBI recently passed the House as part of 1988 Defense bill. A similar amendment is expected to be introduced to the Senate Appropriations bill. In an official response to the Longstreth report, the Secretary of State said that the legality of SBI testing is still being studied. ■

*Robert F. Mozley*

## MOZLEY IN RESIDENCE AT FAS

**Robert F. Mozley, emeritus professor of physics from the Stanford Linear Accelerator Center of Stanford University, has joined the FAS staff for the Winter of 1987-88 to work on various problems of physics and disarmament. In addition to his work on elementary particle physics, he has, of late, become a student of arms control problems.**

*Sagdeev, (right, in dark suit & glasses) at FAS with American working group on Joint Disarmament Project.*

## ACADEMICIAN ROALD SAGDEEV DEFENDS U.S.

In an unusual November event in Moscow, Soviet Space Institute Director Academician Roald Sagdeev and Professor Vitaly I. Goldansky defended the United States at a public press conference against charges in Moscow that the United States was deliberately trying to spread AIDS.

The Federation, which has close ties to the Soviet Scientists Committee for Peace and Against Nuclear War, of which Academician Sagdeev is deputy Chairman, telegraphed him on Nov. 5:

"On behalf of the Federation of American Scientists, please accept our thanks for defending our country against the false charges concerning AIDS."

The State Department spokesman Charles Redman, speaking in his official capacity, also commended the two Soviet scientists for their action.

Still later, on November 19, an FAS official, picking Sagdeev up at the Washington Madison Hotel, spotted Redman in the lobby and introduced Sagdeev. Redman said he was "happy to get that problem, at least, off the agenda."

Sagdeev has recently joined the Soviet Parliament as a representative from Odessa. On Nov. 24, he met at FAS with the FAS working group on the Joint Disarmament Project—a five year study underway jointly with his scientists' committee. ■

*John Conway, Director of the Kennedy Space Center's Payload Management and Operations, briefs the American Working Group on the Joint Disarmament Project.*

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