

The Chemical Weapons Convention

• Introduction

The entry into force of the 1993 Chemical Weapons Convention is unique in the history of arms control. This disarmament agreement both bans an entire class of weapons and simultaneously addresses chemical weapon proliferation concerns. This SIPRI Fact Sheet summarizes the process that led to conclusion of the convention.

The Chemical and Biological Warfare Project is one of SIPRI's longest-running research programmes. It focuses on developments in chemical and biological weapons, their actual or alleged use and acquisition, and efforts to obtain effective disarmament measures aiming at their total elimination. The entry into force of the Chemical Weapons Convention does not, of course, mark the end of concern about chemical warfare or the need for study of these questions.

From the beginning, SIPRI's aim was to provide a comprehensive survey of all aspects of chemical and biological warfare with the clear intention of getting rid of chemical and biological weapons. As part of its contribution to the disarmament process the SIPRI Chemical and Biological Warfare Project has produced many studies which have been useful to those engaged in arms control and disarmament negotiations. Many of the topics which it has covered were directly linked to key issues of the lengthy negotiations that ultimately resulted in the Chemical Weapons Convention.

Construction of the chemical weapon disarmament treaty regime has now entered a critical phase. The research agenda of the SIPRI Chemical and Biological Warfare Project now focuses on implementation and verification of the convention, the destruction of chemical weapons, old chemical weapons and toxic armament wastes, and countering proliferation.

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Adam Daniel Rotfeld
Director

• Banning a proven weapon

On 13 January 1993 the Convention on the Prohibition of the Development, Production, Stockpiling, and Use of Chemical Weapons and on their Destruction¹ was opened for signature in Paris. It is the most comprehensive disarmament treaty ever negotiated. The Chemical Weapons Convention (CWC) contains elaborate verification measures and lays down certain rules of interstate behaviour in both peace and war. It enters into force on 29 April 1997, almost 100 years after the first agreement restricting the use of projectiles with asphyxiating and harmful gases was signed. As of 15 April 1997, 162 states have signed the CWC and 74 have ratified it.

Fortunately, chemical weapons (CW) were used in only a small fraction of the many wars in this century. Chemical warfare as it is understood today—the military exploitation of the toxic properties of certain chemical compounds against people or the environment—began in April 1915 as a means to overcome the stalemate on the Western front in World War I. By the end of that war, in November 1918, the novel mode of warfare had caused over 1 million casualties, including more than 100 000 fatalities. The use of chemical weapons has since been confirmed in several colonial wars. Other major cases include employment of CW by Italy in Abyssinia in the 1930s, by Japan in China in the 1930s and early 1940s, by Egypt in The Yemen in the 1960s and by Iraq against Iran and its own Kurdish population in the 1980–88 Iraq–Iran War. The threat of CW use in the 1991 Persian Gulf War created fear of unconventional warfare in the post-cold war era. In March 1995 the first major terrorist incident involving CW occurred when the extremely toxic nerve agent sarin was released in the Tokyo underground.

Some states in unstable regions of the world remain interested in chemical weapons. While they are probably not the most effective battlefield weapons, chemical weapons can instil terror in entire populations and compel governments to strike preemptively against CW production and storage sites. The presumption of a CW capability in an adversary state can magnify an existing condition of crisis instability. The CWC offers the prospect that in the

¹ It is reproduced in *SIPRI Yearbook 1993: World Armaments and Disarmament* (Oxford University Press: Oxford, 1993), appendix 14A, pp. 735–56.

not too distant future an entire class of unconventional weaponry will be eliminated.

- **Chemical disarmament: a historical overview**

Attempts to ban chemical weapons progressed from early restrictions on their use to their total prohibition and elimination. Abhorrence against the use of poison in war can be found in some of the oldest literature of several cultures. In the 19th century the international community began to codify the conduct and customs of war, which resulted in the 1899 and 1907 Hague Regulations Respecting the Laws and Customs of War on Land. Poison and poisoned weapons were unconditionally outlawed: an expression of the fundamental principles that the means of injuring an enemy are not limitless and that warfare is subject to humanitarian law.

By the end of the 19th century discoveries in organic chemistry pushed industrial development in Europe and the United States forward. Fear of military exploitation of the toxic properties of some of the new compounds led to the adoption of the 1899 Hague Declaration (IV, 2) Concerning Asphyxiating Gases by which the contracting parties agreed 'to abstain from the use of projectiles the sole object of which is the diffusion of asphyxiating or deleterious gases'. The reference to projectiles, however, enabled Germany to claim that its first large-scale cylinder attack in April 1915 did not violate the laws of war as no shells were involved.

In hindsight, the 1899 Hague Declaration (IV, 2) raised some fundamental questions regarding the impact of emerging technology on warfare and the precise meaning of the principle of humanity in war. Technology was perceived as 'value neutral', and no compelling need was felt to restrain it. Moral judgement was reserved for its application in war. Consequently, the agreements of the time placed constraints on the *use* of certain types of weapon and not on the weapons themselves. Humanity in war also assumed a double meaning. The unnecessary suffering of the individual or non-combatant could be ameliorated by regulating certain modes of warfare or banning weapons that cause superfluous injuries or are perfidious. Nevertheless, modern technology also offered the possibility of making war so violent and destructive that fighting could only be of short duration, thereby causing fewer casualties. Humanity in war was thus transmuted into the statistic of dead, wounded and recoveries from injuries. Based on such arguments, the USA, for example, refused to accept the Hague Declaration (IV, 2) in 1899. The CWC ended most such debate by delegitimizing the entire class of weapons. However, the calls for non-lethal technologies, which include incapacitating chemicals, demonstrate that the discussion has shifted again.

After World War I, the major Allied powers attempted to translate the widespread revulsion against chemical warfare into an international prohibition on the use of such weapons. The 1922 Washington Treaty Relating to the Use of Submarines and Noxious Gases in Warfare, concluded between France, Italy, Japan, the United Kingdom and the

United States, never entered into force because France refused to ratify it for reasons unrelated to the chemical warfare article in the treaty. Feeling strongly about chemical warfare, in 1925 the USA submitted a proposal to prohibit trade in chemical munitions to the League of Nations Conference for the Supervision of the International Trade in Arms and in Implements of War. The subsequent discussions led to the adoption of the 1925 Geneva Protocol for the Prohibition of the Use in War of Asphyxiating, Poisonous or Other Gases, and of Bacteriological Methods of Warfare. Until the entry into force of the CWC, the Geneva Protocol remained the sole document constraining the employment of toxic chemicals in war. It has some major shortcomings. First, several major contracting parties attached reservations. They declared that the protocol binds them only as regards other states that have also signed, ratified or acceded to it. They also stated that the protocol will cease to be binding on them if they were first attacked with CW by another contracting party or any of its allies. Thus reduced to a no-first-use statement, the agreement did not remove the justification for chemical armament and preparations for chemical warfare. Second, the document did not contain any verification mechanisms if use was alleged, nor did it provide for sanctions in the case of a proven violation. The agreement none the less acquired great moral authority and constrained preparation for and resort to chemical warfare. From the mid-1960s onwards, as a consequence of massive US employment of lachrymatory and anti-plant agents in the 1961–73 Viet Nam War, the United Nations General Assembly adopted several resolutions interpreting the scope of the Geneva Protocol and inviting states to accede to it so as to make it as universal as possible. Currently, 132 states are parties to the Geneva Protocol. Several states have also withdrawn their reservations in recent years.

In the first half of the 1930s negotiations were conducted in the League of Nations to reduce the levels of armaments. Several proposals contained clauses to prohibit the development and production of chemical and biological weapons (CBW) in peacetime and to destroy existing stockpiles. A special committee was set up to deal with issues such as the definition of CBW, the verification of treaty compliance and the imposition of sanctions in the event of violations. In March 1933 Great Britain submitted a far-reaching draft treaty containing a definition of CW that included lachrymatory and incendiary agents. This new agreement would also have prohibited the use of CW against non-parties to the treaty. The right of retaliation was maintained. Resort to biological weapons, by contrast, would have been banned under all circumstances. The Disarmament Conference ceased its activities in January 1936 as a consequence of the worsening international climate in Europe and Asia. Italy resorted to CW in Abyssinia, and the international community failed to take coherent action. Military thinkers also began to theorize about the awesome potential of fleets of aircraft armed with chemical bombs against enemy cities, and some European powers instituted extensive civil defence

programmes. The 1930s ended with fear of massive employment of CW in the next war.

In World War II, apart from Japanese operations in China, chemical weapons were not used. After the defeat of the Axis powers the advent of the atomic bomb totally overshadowed CW-related issues. CW essentially disappeared from the disarmament scene until the late 1960s, when events in the Viet Nam War prompted the United Nations to prioritize chemical and biological disarmament. The discussions in the 1930s ended in failure, but the British draft had sown the seeds for the chemical and biological weapon disarmament treaties in the latter part of the 20th century. In particular, the British proposal heralded the shift from constraining the use of CBW in war to the total abolition of a particular class of arms in peacetime.

• Negotiating the CWC

Negotiations on the CWC began in 1968 in the framework of the UN Eighteen-Nation Committee on Disarmament.² An agreement on CBW almost immediately proved difficult to achieve, and instead a two-step approach was chosen which addressed the issue of biological disarmament first. Several countries felt that such a separate agreement was easier to achieve because of the widespread belief at the time that biological weapons (BW) had only limited military utility. In the cold war context, with the negotiating countries divided in the Western, Socialist, and Neutral and Non-Aligned blocs, the treaty-making process none the less remained complicated. The Convention on the Prohibition of the Development, Production and Stockpiling of Bacteriological (Biological) and Toxin Weapons and on their Destruction (BTWC) was signed at London, Moscow and Washington on 10 April 1972, and entered into force on 26 March 1975. The convention, however, lacks verification measures. Violations or allegations of BW use have proved difficult to follow up. Four review conferences have considered several confidence-building measures. In September 1994 an Ad Hoc Group of Governmental Experts (VEREX) reported to a Special Conference of States Parties that verification measures were possible. A new ad hoc group is now attempting to establish a supplementary Verification Protocol, which should be ready before the next review conference, which will be held no later than 2001. Negotiations have been complicated by rapid progress in biotechnology and genetic engineering, which offer the distinct possibility of designer agents and antidotes that would make biological warfare controllable.

The BTWC also committed states parties to further negotiations on CW disarmament. During the late 1970s the marked deterioration of East–West relations added to the complexities of banning a proven weapon. The positions on politically sensitive issues such as the nature and extent of verification measures

remained far apart. A series of bilateral negotiations between the USA and the USSR in the late 1970s and early 1980s also failed to achieve a breakthrough. Nevertheless, individual states or groups of states submitted a large number of working documents, including draft conventions. The slow progress of the negotiations led to the development of the idea of a CW-free zone in Europe. The North Atlantic Treaty Organization (NATO) rejected the proposal because it would have undermined its retaliatory option. (NATO would have been forced to transport chemical munitions across the Atlantic Ocean in the event of initiation of chemical warfare by the Warsaw Pact.) The idea died silently when East–West relations improved greatly in the latter half of the 1980s and a global ban on CW became a distinct possibility. The extensive use of CW in the Iraq–Iran War added urgency to the talks in Geneva.

In 1984 an important milestone was reached when the negotiators agreed on the basic structure of a preliminary draft treaty, based on a proposal submitted by the United States. A second series of bilateral talks between the Soviet Union and the USA between 1986 and 1991 gave impetus to the multilateral process. In particular, both parties began exchanging detailed information on their respective chemical weapon stockpiles and committed themselves to verified destruction. The USA also agreed to end the controversial programme for the production of binary chemical munitions, which it had begun in 1987. The experience of the threat of chemical warfare in the Gulf War enabled the negotiators at the Conference on Disarmament to reach final agreement in September 1992.

• Objectives of the CWC

The overall purpose of the CWC is to prevent the possibility of the use of chemical weapons and the destruction of existing CW. In contrast to the Geneva Protocol it does not allow for reservations. States parties can never under any circumstances engage in military preparations for offensive chemical warfare and therefore forgo the option of in-kind deterrence or retaliation. The CWC also prohibits the use of riot control or anti-plant agents as methods of warfare.

A key element in defining the CWC's scope is the so-called general purpose criterion. Not the objects themselves, but certain purposes to which they may be employed, are prohibited. The convention thus defines CW as any toxic chemical or its precursors intended for purposes other than those not prohibited by the CWC as well as munitions, devices or equipment specifically designed to be used with them. Permitted purposes include industrial, agricultural and medical applications, research and development of protection and defence against CW, and domestic law enforcement and riot control. Lachrymator agents or herbicides, for example, are not banned as long as their production and retention are consistent with the goals of the CWC. Some chemicals have essentially no purpose other than use in the manufacture of chemical warfare agents. They are consequently banned entirely except for small quantities

² Its name has changed several times. It was known as the Conference of the Committee on Disarmament in 1969–79, the Committee on Disarmament in 1979–84, and, the Conference on Disarmament from 1984 to the present.

for medical research or the development of protective equipment.

The general purpose criterion affords two major advantages. First, the CWC is not restricted to compounds which are explicitly listed in it. The discovery of a new potential chemical warfare agent thus will not undermine the CWC regime because such an agent will be automatically banned if it has no justifiable non-military purpose. Moreover, the research installation or production facility where the new CW agent was made can become the object of inspection under the CWC. Second, the general purpose criterion allows the international community to deal with dual-use commodities. Many of the chemicals covered by the convention have widespread civilian application. Because it is possible to distinguish between permitted and prohibited activities, it is not necessary to determine the intrinsic threat posed by a chemical compound.

One of the major objectives of the CWC is the verified destruction of all existing CW stockpiles and production and other CW-related facilities within 10 years after entry into force of the CWC. Not more than an extra 5 years may be granted in exceptional cases. Upon entry into force all activities at CW production facilities must cease immediately, and the installations must be closed within 90 days after entry into force. The destruction of these facilities is to begin within 1 year after entry into force; destruction of the CW themselves is to begin within 2 years. A state party is responsible for the destruction of all chemical weapons, production and other CW-related facilities on its territory or under its jurisdiction and control, as well as for any CW it may have abandoned after 1925 on the territory of another state party without the consent of the latter. The destruction time-frames are counted from the date of entry into force, and states which ratify later face progressively shorter deadlines. States which become parties after the 10-year period must destroy their CW and related installations as soon as possible, based on a schedule negotiated with the Organisation for the Prohibition of Chemical Weapons (OPCW), the international body based in The Hague that was set up by the CWC to organize and oversee implementation.

Each state party must declare all its CW and related facilities to the OPCW within 30 days after entry into force. It must specify their precise location and the quantities of chemicals involved and submit a general destruction plan. Declarations are also required for abandoned chemical weapons and old chemical weapons which were either produced before 1925 or between 1925 and 1946 but have deteriorated to such an extent that they are no longer usable. Based on these declarations, all locations where CW are stored or destroyed will be subject to verification through on-site inspection and monitoring with on-site instruments.

Destruction of the CW agents must be essentially irreversible so that the resulting chemical compounds are unsuitable for CW production. States parties cannot eliminate chemical weapons by dumping them in water or by means of land burial or open pit burning. They must assign the highest priority to ensuring the

protection of people and the environment during transport, storage and destruction of CW.

In addition to the verification of the destruction processes, the CWC also establishes a comprehensive verification regime to ensure that no illegal activities take place within states parties. The regime affects both the military sector and civilian chemical industry. It seeks to balance confidence in compliance with the protection of national security interests and industrial proprietary information. Verification consists essentially of regular reporting requirements, on-site inspections and, in the case of well-founded suspicions, challenge inspections. The OPCW is also charged with the organization and execution of the verification regime.

The activities of the chemical industry are monitored through declarations and on-site inspections. The nature of an industrial facility's obligations depends on the types and quantities of chemicals it produces, processes, transfers and consumes. The convention categorizes chemical compounds of particular concern in schedules depending on their relative importance for the production of CW agents or for legitimate civilian manufacturing processes. Each list has different reporting requirements. Schedule 1 contains compounds that can be used as CW or for the production of chemical agents (precursors) and that have few uses for permitted purposes. They are subject to the most stringent controls. Schedule 2 includes chemicals that are key precursors to chemical weapons but which generally have greater commercial application. Schedule 3 chemicals can and have been used to produce chemical weapons but are also used in large quantities for non-prohibited purposes. The convention also places reporting requirements on firms which produce specific quantities of discrete organic chemicals not on any of the schedules and special requirements on firms that manufacture more than a specified amount of unscheduled discrete organic chemicals with the elements phosphorus, sulphur or fluorine.

If non-compliance with the CWC is suspected, any state party has the right to request an on-site challenge inspection on the territory of another state party. The inspected state party may neither refuse an inspection nor improperly restrict the access of the inspection team. The challenge inspection is a politically delicate instrument and serves as a safety net should the routine system fail. It deters violations and can restore compliance.

While the CWC attempts to banish chemical warfare, states parties can none the less be faced with a chemical threat or the use of CW by another political entity. The CWC therefore provides for a range of remedial or preventive measures. For instance, it explicitly authorizes states parties to equip themselves with the most efficient protection against CW agents. Chemical agents affect their target through environmental mediation, and interposing a barrier will significantly reduce the military advantage an attacker might hope to gain from CW use and thus diminish their attraction. The CWC also stipulates that each state party has the right to request and receive assistance and protection against the use or threat of use of chemical weapons. The requests for

assistance and protection must be made through the OPCW, a guarantee for universal application.

The CWC also deals with the transfer of chemicals among states parties and between states parties and states that are not parties to the convention. In the past, the inability to distinguish unambiguously between chemicals used as warfare agents and those that have peaceful industrial purposes rendered any ban on their trade or transfer impractical because it was impossible to verify the end use in the recipient state. The general purpose criterion addresses this problem. Each state party is expressly forbidden to transfer chemical weapons, directly or indirectly, to other states parties, non-states parties or subnational entities under any circumstances. It further disallows any activity that would assist, encourage or induce anyone to engage in any undertaking that contravenes the convention. Specific legislation must be adopted by each state party to prevent any natural or legal person from undertaking any activity prohibited by the CWC or illegal activities on its territory.

In addition to their significance for verification and reporting routines, the three schedules of the CWC also form the basis of an export control regime among states parties and between states parties and non-states parties. The overriding criterion is that none of the transactions may contravene the basic purpose of the CWC. Schedule 1 chemicals can be transferred between any two states parties only for research, medicine, pharmaceutical use or protection and only in specified quantities. These chemicals cannot be retransferred to a third state. Such transactions are subject to detailed reporting requirements by both states parties. States parties will be allowed to transfer Schedule 2 chemicals only among themselves three years after the CWC's entry into force. These transactions, however, are not subject to stringent quantitative conditions or reporting requirements like those for Schedule 1 chemicals. During the preceding three years, states parties may continue to transfer such chemicals to non-states parties if they obtain an end-use certificate. The transfer of Schedule 3 chemicals is only discussed in relation to non-states parties: there are no quantitative limits. However, the exporting state party must ensure that the chemicals will not be used for purposes prohibited by the convention, and an end-use certificate is required which meets the minimum stipulations imposed by the convention. Five years after the CWC's entry into force all states parties will meet to consider other measures regarding the transfer of Schedule 3 chemicals to non-parties. End use is the object of routine reporting by a state party or, if the need arises, of verification inspection.

The CWC thus clearly distinguishes between states parties and other countries regarding trade relations. States parties are granted overall rights for permitted chemical activities and international cooperation among states parties. By implication, other countries cannot fully enjoy such rights. This may be seen as an incentive for states to join the CWC.

• Institutional aspects of the CWC

The CWC is the most elaborate disarmament treaty ever negotiated. This is reflected by the need to establish a special international body, the OPCW, to oversee its implementation. Although several arms limitation and disarmament agreements have entrusted international organs or organizations with implementation functions, the size and scope of the responsibilities of the OPCW are unprecedented.

A state party automatically becomes a member of the OPCW. Membership cannot be withdrawn although specific rights or privileges can be lost if the behaviour of the state party is not in keeping with convention requirements. States parties share in the costs incurred by the activities of the OPCW based on the United Nations Scale of Financial Assessments. The costs of verification activities related to the destruction of CW or CW production facilities, however, are borne by the possessor state.

The OPCW consists of three organs: the Conference of States Parties, the Executive Council and the Technical Secretariat. It is complemented by the National Authority in each of the states parties.

The Conference of States Parties

The highest decision-making body is the Conference of States Parties, in which all states parties have one representative and one vote. This reflects the underlying principle in the CWC that all states parties are treated in an equal and non-discriminatory manner. The convention is thus far the only global arms control agreement to do so.

The body's main responsibilities are to oversee implementation of and compliance with the CWC. It can consider any issue within the scope of the CWC, including the powers and functions of the Executive Council and the Technical Secretariat. It may make recommendations and decide on any question related to the CWC which is raised by a state party or brought to its attention by the Executive Council. Its responsibilities also extend to all relevant activities of the states parties.

The Conference of States Parties will meet in annual sessions to adopt the programme of work and approve the OPCW budget. Special sessions can be convened if the need arises. In order to evaluate the overall operation of the CWC and in particular the process of destruction of CW and related facilities, special review conferences will take place 5 and 10 years after entry into force of the CWC.

The first session of the Conference of States Parties will take place on 6 May 1997, one week after entry into force. It will elect the Executive Council and the Director-General of the Technical Secretariat and will consider and approve draft agreements, provisions and guidelines prepared by the Preparatory Commission (PrepCom) for the OPCW. The PrepCom was established after the CWC was opened for signature in 1993. It laid the foundation of the OPCW by setting up the necessary infrastructure and developing the procedures for the implementation of the CWC.

The Executive Council

The Executive Council is a representative organ. Its composition was a politically sensitive issue during negotiation of the CWC. A compromise resulted in a 41-member body in which the five regional groups (Africa, Asia, Eastern Europe, Latin America and the Caribbean, Western European and other States) are represented. Each state party has the right to serve on the Executive Council, and seats on it are based on the principle of rotation. There are also so-called industrial seats for those countries in each group with the most significant chemical industry. The Executive Council meets in regularly scheduled sessions and more often if required.

The Executive Council has the primary responsibility for supervising and directing the implementation of the CWC. This includes supervising the activities of the Technical Secretariat, cooperating with the National Authorities of the states parties, concluding agreements with states and international organizations on behalf of the OPCW and approving arrangements for the implementation of verification activities negotiated by the Technical Secretariat. The Executive Council will also review the draft programme and budget of the OPCW that is to be submitted to the Conference of States Parties. It has special responsibility as regards questions of non-compliance. If a claim of non-compliance with the CWC is made, it is the role of the Executive Council to inform and consult with the states parties involved and to request them to clarify and remedy the situation within a specified period. The Executive Council can act on its own initiative or on the request of a state party. It is required to bring claims of non-compliance to the attention of the Conference of States Parties and to recommend measures to deal with them. If the matter is urgent, the Executive Council can bring the issue before the UN General Assembly and Security Council. The Executive Council thus plays an important role in the peaceful settlement of disputes between states parties by providing a forum for consultation and cooperation.

The Executive Council is subordinate to the Conference of States Parties, but it will be highly influential in future because of its permanent nature and the political and professional experience of its members.

The Technical Secretariat

The Technical Secretariat and its Director-General are responsible for the practical work of the OPCW. Its role is to assist the Conference of States Parties and the Executive Council in their normal functions.

The main task of the Technical Secretariat is to organize and coordinate verification activities. These activities will be performed by its main component: the Inspectorate with its team of international inspectors. Only nationals of states parties may serve as inspectors or on staff. In view of the scope and intrusiveness of the verification regime, great emphasis has been put on the obligation of the OPCW to carry out verification in an unobtrusive manner and to safeguard confidential information received from the states parties. On behalf of the OPCW the Technical Secretariat will also negotiate agreements and

arrangements with states parties to implement the verification requirements. The Technical Secretariat is required to inform the Executive Council about its activities and any problems it encounters, especially those relating to compliance.

In order to meet the initial inspection requirements immediately after entry into force, the PrepCom conducted recruitment and training of prospective inspectors.

The National Authority

States parties are under a general obligation to undertake all measures necessary to implement the CWC and to render their national legislation consistent with the requirements of the convention. In comparison with other arms control agreements the CWC requires unprecedented national implementation measures. In particular, a state party must have a detailed and comprehensive legal and administrative structure in place to meet the verification requirements at the time it becomes legally bound by the CWC.

One such obligation is the establishment or designation of a National Authority to serve as liaison between a state party, the OPCW and the National Authorities of other states parties. The principal task of the National Authority is to collect all relevant information from civilian and military facilities whose activities fall within the scope of the CWC and to report the technical and other verification-related data to the Technical Secretariat. The National Authority also acts as a contact and host for the international inspection teams entering the country. Much of the effectiveness of the global verification system of the CWC will depend on the effectiveness of the national systems.

• Destruction of the Russian and US chemical weapon stockpiles

The Russian Federation and the United States possess the world's two largest CW stockpiles. They are also the only two declared possessors of chemical weapons. However, as of 15 April 1997 neither country had ratified the CWC, although the respective governments have repeatedly declared their commitment to the convention. Despite strong opposition the US Congress is likely to consider and vote on CWC ratification in April 1997, allowing the USA to become an original state party. By federal law the USA is committed to unilateral destruction of its chemical weapons by 2004. On 17 March 1997 Russian President Boris Yeltsin submitted the CWC to the State Duma for ratification. Domestic financial, social and technical obstacles have thus far prevented the destruction of Russian chemical weapons.

Russia

The Russian Federation possesses approximately 40 000 tonnes of CW agents stored at seven sites: Pohep, Bryansk oblast; Maradikovskiy, Kirov oblast; Leonidovka, Penza oblast; Shchuchye, Kurgan oblast; Gorny, Saratov oblast and Kizner and

Kambarka, Republic of Udmurtia. The arsenal consists of the nerve agents sarin, soman and V-gas, the vesicants lewisite and mustard, and the choking agent phosgene. Approximately 80 per cent of the stockpile consists of nerve agents.

As of 15 April Russia did not have a comprehensive destruction act. Although the State Duma unanimously passed such a bill on 27 December 1996, the Federation Council rejected it the following month. Nevertheless, plans for CW destruction continue to be developed. A comprehensive destruction act is needed to provide the legal basis for destruction, irrespective of Russia's ratification of the CWC.

Chemical weapon destruction efforts were hindered by a lack of funding, including a failure to allocate funds earmarked for CW destruction, and local and federal opposition to the draft destruction plan. Hearings on CW destruction held by the Duma Committee on the Environment on 21 May 1996 also demonstrated that a number of fundamental aspects of destruction, including the choice of destruction technologies, were either unfamiliar or objectionable to a significant number of those who spoke during the hearings.

Russian officials continue to stress the need for foreign financial assistance to enable destruction and have said that such assistance should amount to a minimum of 35–50 per cent of the total destruction cost, usually estimated at \$3.3–5 billion. Foreign assistance for destruction of Russian CW will probably depend in part on whether Russia ratifies the CWC. Four countries currently provide CW destruction assistance to Russia: Germany, the Netherlands, Sweden and the USA. Some other countries have stated their interest in providing assistance.

The most significant assistance thus far is the US funding for the construction of a pilot CW destruction facility at Shchuchye (an estimated \$600 million). US destruction aid is closely associated with a continuing joint evaluation of Russia's two-stage nerve agent destruction technology: the Russian-US Joint Evaluation Program. It is being conducted within the framework of the 1990 Bilateral Destruction Agreement and a 1994 Plan of Work addendum.³ The programme was initiated in part because the USA wished to learn more about a technology with which it was unfamiliar before allocating money to support it. The programme was also viewed as useful in promoting closer cooperation between Russia and the USA. The criteria for successful evaluation of the technology were to demonstrate the effectiveness of the technology in irreversibly destroying both Russian and US nerve agents and its safety and scientific credibility. All criteria were met or exceeded.

³ The BDA (Agreement between the United States of America and the Union of Soviet Socialist Republics on Destruction and Non-Production of Chemical Weapons and on the Measures to Facilitate the Multilateral Convention on Banning Chemical Weapons) was agreed by the USA and the USSR on 1 June 1990. The full text is reproduced in SIPRI, *SIPRI Yearbook 1991: World Armaments and Disarmament* (Oxford University Press: Oxford, 1991), appendix 14A, pp. 536–39.

The United States

The US stockpile consists of over 30 000 tonnes of unitary CW agent and approximately 700 tonnes of binary components. It includes the nerve agents sarin and VX and the vesicant mustard. They are stored at nine locations: Johnston Atoll in the Pacific Ocean; Edgewood, Maryland; Anniston, Alabama; Blue Grass, Kentucky; Newport, Indiana; Pine Bluff, Arkansas; Pueblo, Colorado; Tooele, Utah and Umatilla, Oregon. The cost of destroying the US stockpile is currently estimated at approximately \$12.4 billion. Large-scale destruction operations began at the Johnston Atoll Chemical Agent Disposal System (JACADS) in 1990. The second destruction facility at Tooele, Utah, began operation in August 1996.

Incineration continues to be the US Army's baseline destruction technology, but alternative destruction technologies are also being considered because of the opposition by some parties to incineration. The US Army is required by law to consider alternative destruction technologies for the destruction of bulk agent. Three proposals by private industry plus two developed by the Army have been evaluated by the National Academy of Sciences.

In addition, the research, development, test and evaluation inventory comprises approximately 4400 kg, and recovered munitions and similar 'non-stockpile' items amount to approximately 6100 kg. The programme for items which are not part of the US CW stockpile deals with recovered chemical munitions, chemical agent detector kits and miscellaneous chemical material stored at an estimated 65 sites. The destruction of non-stockpiled CW *matériel* will cost an estimated \$15.2 billion.

• Chemical weapon proliferation concerns

Chemical weapon proliferation is usually described as a lateral spread of precursor chemicals, dual-use high technology and expertise from developed to developing countries. The issue came to the fore in 1984 when it became clear that Iraq was systematically using chemical agents in its war against Iran. It was soon realized that companies from the developed world were knowingly or unknowingly involved in Iraq's CW programme. The governments of Western countries set up national export control policies and began to coordinate their efforts in the Australia Group in 1985. The Australia Group is an informal forum whose current objective is to limit the transfer of chemical precursors, equipment used in the production of chemical and biological weapons, and biological warfare agents and organisms. Sanitized intelligence information regarding proliferation threats is also shared. Currently, 30 states take part in the meetings, and the European Commission attends as an observer. The participants have agreed to apply the decisions of the group in their national export control systems. Initially, the non-proliferation poli-

cies were viewed as a temporary measure until entry into force of the CWC.

In January 1989, as the world's leaders met in Paris to restore the authority of the Geneva Protocol following the Iraq–Iran War, global attention focused on Libya's large CW factory at Rabta. West European companies, with the assistance of some firms in East Europe and Asia, were deeply involved in the construction of the plant despite the existence of export controls. These events, together with the chemical and biological warfare threat during the Gulf War, caused governments of the industrialized world to advocate a more permanent non-proliferation regime that supplements the CWC.

Non-proliferation policies have generally been directed at states. Although proliferation to terrorist or criminal organizations has been considered, it was not until the 20 March 1995 nerve agent attack in the Tokyo underground that the threat moved from the theoretical realm. The attack caused over 5500 casualties, including 12 fatalities. The extremist religious group Aum Shinrikyo had also released a nerve agent in a residential area of the town of Matsumoto on 27 June 1994, killing 7 and injuring over 200 people. The police investigations revealed the extent to which the group had been able to build up a sophisticated CW production capability. This demonstration of the relative ease with which lethal chemicals can be acquired, together with the emergence or return of domestic terrorist violence in the UK and the USA, has prompted security and emergency services to prepare for the use of chemical or biological agents against unsuspecting people. Governments of several countries have reacted to the events in the Tokyo underground by passing legislation against the manufacture and possession of CW agents. However, strategies for dealing with sub-state actors at the international level still need to be developed.

It is difficult to assess the global CW proliferation threat. New information about CW armament programmes in some countries and preoccupation with strengthening export controls nevertheless lead to the conclusion that only approximately 13 per cent of all nations are believed to have engaged in some form of CW armament—even if the worst intelligence estimates are accepted as fact. In World War I reliable evidence indicates that 17 per cent of all nations possessed chemical weapons. The figure for World War II was 19 per cent.

An estimate of 13 per cent is, however, higher than the estimates made for most of the period since 1945. Comparisons may be misleading because publicly available reports do not define CW capability. It is also not clear whether some of the alleged proliferators may in fact have chosen to refrain from acquiring an offensive CW arsenal. Despite the apparently rising number of proliferators, the mix of CW possessors may vary at different times. Assessments are further complicated by the indigenous acquisition of knowledge, expertise and technologies by developing countries as part of their legitimate industrialization programmes. World-wide access to relevant technologies as the result of globalization characterizes much of the proliferation process.

A well-functioning chemical industry is recognized as one of the pillars of sustained economic develop-

ment. Developing countries increasingly criticize export controls as unilateral discriminatory measures and demand their abolition after the CWC enters into force. They argue that the CWC commits states parties to remove barriers that restrict or impede trade for legitimate purposes with other states parties and to review their national regulations in the field of trade in chemicals in order to render them consistent with the object and purpose of the CWC. Many developed countries, including the members of the Australia Group, maintain that under the convention they cannot under any circumstances assist any state to acquire a CW capability. They argue that the non-proliferation regime supplements the CWC. The controversy has become heated and will dominate the early phases of the implementation of the convention.

• Conclusions

Chemical weapon disarmament has progressed far since the first attempts a century ago to outlaw the use of CW in war. The CWC is a new start. Only three states are publicly known to be holders of CW stockpiles. Apart from the United States and Russia, as successor state to the USSR, Iraq was the third major producer of chemical weapons, but the majority of these have been destroyed under the supervision of the United Nations Special Commission on Iraq (UNSCOM) following the Gulf War. Only when the states parties to the CWC begin to declare their stockpiles and past chemical warfare-related activities will the magnitude of the destruction problem become clear.

The CWC holds the best promise for reducing the threat of chemical warfare by building an environment of confidence and security. Some of its instruments are verification and inspections as well as aid and assistance in the area of chemical warfare defences in case of attack. In addition, the aim of the CWC to effectively ban all chemical weapons is complemented by the desire to promote the peaceful use of chemicals. Once all chemical munitions are destroyed and verification is routine, the promotion of trade and international cooperation in the field of chemical activities to enhance the economic and technological development of states parties may well become the convention's most important function.

• Select bibliography

Perry Robinson, J. P., Stock, T. and Sutherland, R. G., 'The Chemical Weapons Convention: the success of chemical disarmament negotiations', *SIPRI Yearbook 1993: Armaments, Disarmament and International Security* (Oxford University Press: Oxford, 1993), pp. 705–34.

Stockholm International Peace Research Institute, *The Problem of Chemical and Biological Warfare*, 6 vols (Almqvist & Wiksell: Stockholm, 1971–75).

Stock, T., Haug, M. and Radler, P., 'Chemical and biological weapon developments and arms control', *SIPRI Yearbook 1996: Armaments, Disarmament and International Security* (Oxford University Press: Oxford, 1996), chapter 15, pp. 661–708.

Zanders, J. P., 'Towards understanding chemical warfare weapons proliferation', *Contemporary Security Policy*, vol. 16, no. 1 (Apr. 1995), pp. 84–110.

Zanders, J. P., Eckstein, S. and Hart, J., 'Chemical and biological weapon developments and arms control', *SIPRI Yearbook 1997: Armaments, Disarmament and International Security* (Oxford University Press: Oxford, 1997), chapter 13 (forthcoming).

Countries which have signed and ratified the Chemical Weapons Convention, as of 15 April 1996

State	Date of signing	Date of ratification
Albania	14 Jan. 1993	11 May 1994
Algeria	13 Jan. 1993	14 Aug. 1995
Argentina	13 Jan. 1993	2 Oct. 1995
Armenia	19 Mar. 1993	27 Jan. 1995
Australia	13 Jan. 1993	6 May 1994
Austria	13 Jan. 1993	17 Aug. 1995
Belarus	14 Jan. 1993	11 July 1996
Belgium	13 Jan. 1993	27 Jan. 1997
Bosnia and Herzegovina	16 Jan. 1997	25 Feb. 1997
Brazil	13 Jan. 1993	13 Mar. 1996
Bulgaria	13 Jan. 1993	10 Aug. 1994
Cameroon	14 Jan. 1993	16 Sep. 1996
Canada	13 Jan. 1993	26 Sep. 1995
Chile	14 Jan. 1993	12 July 1996
Cook Islands	14 Jan. 1993	15 July 1994
Costa Rica	14 Jan. 1993	31 May 1996
Côte d'Ivoire	13 Jan. 1993	18 Dec. 1995
Croatia	13 Jan. 1993	23 May 1995
Czech Republic	14 Jan. 1993	6 Mar. 1996
Denmark	14 Jan. 1993	13 July 1995
Ecuador	14 Jan. 1993	6 Sep. 1995
El Salvador	14 Jan. 1993	30 Oct. 1995
Ethiopia	14 Jan. 1993	13 May 1996
Fiji	20 Jan. 1993	20 Jan. 1993
Finland	14 Jan. 1993	7 Feb. 1995
France	13 Jan. 1993	2 Mar. 1995
Georgia	14 Jan. 1993	27 Nov. 1995
Germany	13 Jan. 1993	12 Aug. 1994
Greece	13 Jan. 1993	22 Dec. 1994
Hungary	13 Jan. 1993	31 Oct. 1996
India	14 Jan. 1993	3 Sep. 1996
Ireland	14 Jan. 1993	24 June 1996
Italy	13 Jan. 1993	8 Dec. 1995
Japan	13 Jan. 1993	15 Sep. 1995
Lao People's Democratic Republic	12 May 1993	25 Feb. 1997
Latvia	06 May 1993	23 July 1996
Lesotho	7 Dec. 1994	7 Dec. 1994
Luxembourg	13 Jan. 1993	15 Apr. 1997
Maldives	1 Oct. 1993	31 May 1994
Mauritius	14 Jan. 1993	09 Feb. 1993
Mexico	13 Jan. 1993	29 Aug. 1994
Moldova	13 Jan. 1993	8 July 1996
Monaco	13 Jan. 1993	1 June 1995
Mongolia	14 Jan. 1993	17 Jan. 1995
Morocco	13 Jan. 1993	28 Dec. 1995
Namibia	13 Jan. 1993	27 Nov. 1995
Netherlands	13 Jan. 1993	30 June 1995
New Zealand	14 Jan. 1993	15 July 1996
Niger	14 Jan. 1993	9 Apr. 1997
Norway	13 Jan. 1993	7 Apr. 1994
Oman	2 Feb. 1993	8 Feb. 1995

Papua New Guinea	14 Jan. 1993	17 Apr. 1996
Paraguay	14 Jan. 1993	1 Dec. 1994
Peru	14 Jan. 1993	20 July 1995
Philippines	13 Jan. 1993	11 Dec. 1996
Poland	13 Jan. 1993	23 Aug. 1995
Portugal	13 Jan. 1993	10 Sep. 1996

State	Date of signing	Date of ratification
Romania	13 Jan. 1993	15 Feb. 1995
Saint Lucia	29 Mar. 1993	9 Apr. 1997
Saudi Arabia	20 Jan. 1993	9 Aug. 1996
Seychelles	15 Jan. 1993	7 Apr. 1993
Slovakia	14 Jan. 1993	27 Oct. 1995
South Africa	14 Jan. 1993	13 Sep. 1995
Spain	13 Jan. 1993	3 Aug. 1994
Sri Lanka	14 Jan. 1993	19 Aug. 1994
Swaziland	23 Sep. 1993	20 Nov. 1996
Sweden	13 Jan. 1993	17 June 1993
Switzerland	14 Jan. 1993	10 Mar. 1995
Tajikistan	14 Jan. 1993	11 Jan. 1995
Tunisia	13 Jan. 1993	15 Apr. 1997
Turkmenistan	12 Oct. 1993	29 Sep. 1994
United Kingdom	13 Jan. 1993	13 May 1996
Uruguay	15 Jan. 1993	10 Oct. 1994
Uzbekistan	24 Nov. 1995	23 July 1996

The states which have signed, but not ratified, are: Afghanistan, Azerbaijan, Bahamas, Bahrain, Bangladesh, Benin, Bolivia, Brunei Darussalam, Burkina Faso, Burundi, Cambodia, Cape Verde, Central African Republic, Chad, China, Colombia, Comoros, Congo, Cuba, Cyprus, Djibouti, Dominica, Dominican Republic, Equatorial Guinea, Estonia, Gabon, Gambia, Ghana, Grenada, Guatemala, Guinea, Guinea-Bissau, Guyana, Haiti, Holy See, Honduras, Iceland, Indonesia, Iran, Israel, Japan, Kazakhstan, Kenya, Korea, Republic of (South Korea), Kuwait, Kyrgyzstan, Liberia, Liechtenstein, Lithuania, Madagascar, Malaysia, Malawi, Mali, Malta, Marshall Islands, Mauritania, Micronesia, Myanmar (*Burma*), Nauru, Nepal, Nicaragua, Nigeria, Pakistan, Panama, Qatar, Russia, Rwanda, Saint Kitts (Christopher) and Nevis, Saint Vincent and the Grenadines, Samoa, Western, San Marino, Senegal, Sierra Leone, Singapore, Slovenia, Tanzania, Thailand, Togo, Turkey, Uganda, Ukraine, United Arab Emirates, USA, Venezuela, Viet Nam, Yemen, Zaire, Zambia and Zimbabwe.

The non-signatory states are: Angola, Andorra, Antigua and Barbuda, Barbados, Belize, Bhutan, Botswana, Egypt, Eritrea, Iraq, Jamaica, Jordan, Kiribati, Korea, Democratic People's Republic of (North Korea), Lebanon, Libya, Macedonia, Former Yugoslav Republic of (FYROM), Mozambique, Niue (for whose security and foreign relations New Zealand is responsible), Palau, Sao Tome and Principe, Solomon Islands, Somalia, Sudan, Suriname, Syria, Taiwan (not officially recognized as an independent state by the UN), Tonga, Trinidad and Tobago, Tuvalu and Vanuatu.

sipri

Stockholm International Peace Research Institute

Frösunda
S-169 70 SOLNA
Sweden

Telephone: +46 8 655 97 00
Telefax: +46 8 655 97 33
Electronic mail address: sipri@sipri.se
Internet: <http://www.sipri.se>
