

7. Chemical and biological weapon developments and arms control

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I. Introduction

The Chemical Weapons Convention (CWC) entered its fourth year of implementation in 2000, and several critical milestones were reached on 29 April: the list of chemicals that can no longer be transferred to non-states parties was expanded; another category of industrial plant sites was included in the inspection regime; and possessors of chemical weapons (CW) were required to have destroyed 1 per cent of their chemical munitions. All four declared possessor states—India, South Korea, Russia and the United States—are now in the process of destroying their CW.

The negotiations on a protocol to the 1972 Biological and Toxin Weapon Convention (BTWC) made slow progress on several technical issues. Monitoring compliance with the future regime and export licensing issues were the main stumbling blocks. The states participating in the negotiations have nevertheless begun the formal preparations to present a final document at the Fifth Review Conference of the BTWC, which will be held at the end of 2001.

Allegations of the proliferation or use of chemical and biological weapons (CBW) continued to be made in 2000. Those made by one party to the CWC against another may seriously diminish confidence in the convention's security regime. The inspection of Iraq's CBW did not resume in 2000 and enforcement of the sanctions imposed by the UN Security Council was further eroded. Concerns were also expressed about exposure to dangerous chemicals or toxins on the modern battlefield.

Section II of this chapter deals with the implementation of the CWC and focuses on the difficulties encountered in the destruction of CW in Russia and the USA. The negotiations to strengthen the BTWC disarmament regime are discussed in section III. Section IV addresses CBW proliferation concerns. Section V gives a brief overview of the status of CBW disarmament in Iraq, and section VI discusses the problems of determining the causes of the illnesses affecting veterans of the 1991 Persian Gulf War and the Balkan peace-keeping operations. Section VII presents the conclusions.

II. Chemical weapon disarmament

Implementing the CWC

The CWC entered into force on 29 April 1997. As of 1 January 2001, 141 states had ratified or acceded to the convention and a further 35 states had signed it.¹ Eighteen members of the United Nations have neither signed nor ratified the CWC.² According to an Egyptian academic, Egypt has resolved not to accede to the CWC unless Israel accedes to the 1968 Treaty on the Non-Proliferation of Nuclear Weapons (Non-Proliferation Treaty, NPT). Egypt also declared that it remains committed to the idea of a zone free of all non-conventional weapons in the Middle East.³ In contrast, Israel perceives that there is a growing regional CW threat. In addition to general scepticism about the ability of global arms control treaties to increase Israel's security, two factors are claimed to have diminished the prospects of Israeli ratification of the CWC: the collapse of the weapon inspections in Iraq in 1998, and the perception of an increased CBW threat posed by Iran (which is a party to both the CWC and the BTWC).⁴ Iraq, Libya and Syria also remain outside the CWC. In Africa, Mozambique acceded to the CWC in 2000, but Angola, the Democratic Republic of the Congo and Zambia have yet to ratify the convention.

By the time the Organisation for the Prohibition of Chemical Weapons (OPCW) held its Fifth Session of the Conference of States Parties (CSP), on 15–19 May 2000, the Technical Secretariat (TS) had received all outstanding initial declarations.⁵ Until April 2000 the USA had been in technical non-compliance with respect to its industry declaration, when it submitted the long-overdue industry declarations for facilities that produce chemicals listed in Schedules 1, 2 and 3 of the CWC. The TS was able to complete the first US industry inspection before the Fifth CSP.⁶ The Fifth CSP also decided on

¹ Azerbaijan, Colombia, Eritrea, Gabon, Jamaica, Kazakhstan, Kiribati, Malaysia, Mozambique, the United Arab Emirates, Yemen and the Federal Republic of Yugoslavia became parties in 2000. A brief summary of the convention and a list of parties are given in annexe A in this volume.

² They are Andorra, Angola, Antigua and Barbuda, Barbados, Belize, Egypt, Iraq, Korea (North), Lebanon, Libya, Palau, Sao Tome and Principe, Solomon Islands, Somalia, Syria, Tonga, Tuvalu and Vanuatu.

³ El Fayoumi, M., 'The CWC in the present Middle East environment: an Egyptian view', *OPCW Synthesis*, Nov. 2000, pp. 26–28.

⁴ Steinberg, G. M., 'Israeli policy on the CWC', *OPCW Synthesis*, Nov. 2000, pp. 29–31.

⁵ Organisation for the Prohibition of Chemical Weapons (OPCW), Report by the Director-General: status of submission of initial declarations and notifications as of 11 May 2000, Conference of States Parties Fifth Session document C-V/DG.8, 12 May 2000. According to Article II of the CWC, a state party must submit its initial declaration (on CW stockpiles, CW production facilities and CW programmes since 1946) not later than 30 days after the CWC enters into force for it. The Convention on the Prohibition of the Development, Production, Stockpiling and Use of Chemical Weapons and on their Destruction (corrected version), 8 Aug. 1994, is reproduced on the SIPRI Chemical and Biological Warfare Project Internet site at URL <<http://www.sipri.se/cbw/docs/cw-cwc-texts.html>>. The 31 Oct. 1999 amendment to Part VI of the Verification Annex of the CWC is reproduced at URL <<http://projects.sipri.se/cbw/docs/cw-cwc-verannex5bis.html>>.

⁶ Mahley, D. A., United States of America Statement to the Fifth Conference of the States Parties of the Organization for the Prohibition of Chemical Weapons, The Hague, 15 May 2000. The nature of an industrial facility's obligations depends on the types and quantities of chemicals it produces, processes,

guidelines for low concentrations of scheduled chemicals: parties need not declare mixtures containing less than 30 per cent of Schedule 2B and 3 chemicals. However, the issue of concentration limits for mixtures with Schedule 2A and 2A* chemicals was deferred to the sixth CSP, to be held in 2001, pending further consideration and advice from the Scientific Advisory Board.⁷

By the third anniversary of its entry into force, 29 April 2000, the CWC had reached some important milestones specified in the convention. CW possessors were required to have destroyed 1 per cent of their Category 1 CW.⁸ Plant sites producing unscheduled discrete organic chemicals (DOC) above certain thresholds were also included in the CWC inspection regime.⁹

The prohibition of the transfer of Schedule 2 chemicals to or the receipt of such chemicals from non-states parties took effect in 2000. This is the second step in a three-stage process of restricting the access of non-parties to certain chemicals.¹⁰ The Fifth CSP adopted the recommendation of the Executive Council that the transfer restrictions would not apply to products containing 1 per cent or less of a Schedule 2A or 2A* chemical, products containing 10 per cent or less of a Schedule 2B compound, and those products identified as consumer goods packaged for retail sale for personal or individual use. The packaging criterion was introduced in order to avoid unnecessary impact on sales of consumer goods and is justified by the assumption that the difficulty and cost associated with extracting the scheduled chemical would make such products unattractive to a proliferator. The Executive Council will be informed immediately of future security concerns resulting from the decision, and the first CWC Review Conference, in 2003, will review its application.¹¹ In 2000 some practical implementation problems were identified (e.g., discrepancies between reported exports and imports of scheduled chemicals). The TS will also have to create a mechanism to verify compliance with the trade bans as regards non-parties.¹²

transfers and consumes. The CWC categorizes chemical compounds of particular concern in schedules depending on their importance for the production of chemical warfare agents or for legitimate civilian manufacturing processes. Each list has different reporting requirements. Schedule 1 contains compounds that can be used as CW and that have few uses for permitted purposes. They are subject to the most stringent controls. Schedule 2 includes toxic chemicals and precursors to CW but which generally have greater commercial application. Schedule 3 chemicals can be used to produce CW but are also used in large quantities for non-prohibited purposes. The CWC also places reporting requirements on firms which produce discrete organic chemicals (DOC) that are not on any of the schedules and contains special requirements for firms that produce 'unscheduled' DOC with phosphorus, sulphur or fluorine.

⁷ OPCW, Conference of States Parties Fifth Session decision document C-V/DEC.19, 19 May 2000.

⁸ Category 1 chemical weapons are CW based on Schedule 1 chemicals and their parts and components. CWC, Verification Annex Part IV (A), para. 16. See the discussion below in the section 'Destruction of chemical weapons and related facilities'.

⁹ DOC are a class of chemical compounds consisting of all compounds of carbons, except for its oxides, sulphides and metal carbonates. The definition does not include long-chain polymers.

¹⁰ On entry into force Schedule 1 chemicals could no longer be transferred, and in 2002 the CSP will have to consider whether there should be transfer regulations for Schedule 3 chemicals in addition to the licensing requirements laid out in the CWC.

¹¹ OPCW, Conference of States Parties Fifth Session decision document C-V/DEC.16, 17 May 2000; and Feakes, D., 'Developments in the Organisation for the Prohibition of Chemical Weapons', *CBW Conventions Bulletin*, no. 48 (June 2000), p. 26.

¹² *OPCW Secretariat Brief*, no. 23 (16 Oct. 2000); and *OPCW Secretariat Brief*, no. 24 (21 Dec. 2000).

The issue of the transfer of the salts of Schedule 1 chemicals remained unresolved. The Scientific Advisory Board recommended that the CWC should not differentiate between the treatment of a free base and that of the corresponding salt. While the salts are chemically distinct from the parent compounds, there is a dynamic equilibrium between the base and the salt, which means that there is always a certain amount of the free base available. Furthermore, the equilibrium is reversible so that the salt can be retransferred into the base. It thus appears that the transfer to a non-party of a salt containing a Schedule 1 chemical, irrespective of the quantity or concentration, should be prohibited even if the salt is not included in any of the three CWC schedules. However, some states viewed such a decision as an amendment of the Annex on Chemicals (amendments must be made in accordance with the stipulations in Article XV of the CWC) or argued that because some salts are included in the schedules the drafters of the CWC deliberately excluded other salts from the schedules. Because of the lack of consensus, OPCW Director-General José Bustani recommended further study of the issue.¹³

The OPCW budget for 2001 remained at the 2000 level—60 million euros (c. \$59 million)—of which 29.5 million euros (c. \$29 million) are for verification. If additional overhead costs are included, verification costs would be 36 million euros (c. \$35 million). The budget provides for 240 inspection missions worldwide, including the continuous presence of inspectors during the operation of CW destruction facilities.¹⁴ However, in view of the expanded verification activities (US industry declarations, new parties and inspection of DOC plants) the budget allocation was deemed insufficient by the Director-General.¹⁵ In December Bustani informed the Executive Council that approval for a supplemental budget for 2001 will be sought from the CSP owing to unforeseen developments that have a significant budgetary impact and because of the exclusion of some budget items by the Fifth CSP. He also announced the need for budget increases for 2002 and 2003.¹⁶ The financial situation was exacerbated by the failure of many parties to submit their assessed contribution on time (in 2000 some parties had not yet submitted their 1998 and 1999 payments) and because of delays in the reimbursement of verification costs by some parties, in particular for costs of verification of destruction of CW.¹⁷

As of 1 December 2000 the OPCW had conducted 913 inspections; 269 industry inspections took place in 2000.¹⁸ In order to set up a credible verifica-

¹³ OPCW, Note by the Director-General: results of the Expert Meeting on the conclusions and recommendations submitted by the Scientific Advisory Board in 1999, 19th Session, Executive Council document EC-XIX/DG.4, 14 Mar. 2000.

¹⁴ *OPCW Secretariat Brief*, no. 22 (2 June 2000).

¹⁵ OPCW, 'Opening statement by the Director-General to the Conference of States Parties at its Fifth Session', Conference of States Parties Fifth Session document C-V/DG.11, 15 May 2000, para. 33.

¹⁶ *OPCW Secretariat Brief*, no. 24 (note 12).

¹⁷ *OPCW Secretariat Brief*, no. 24 (note 12).

¹⁸ The total comprises 14 inspections of abandoned CW sites, 195 inspections of CW destruction facilities, 201 inspections of CW production facilities, 122 inspections of CW storage facilities, 34 inspections of facilities containing old CW, 44 inspections of facilities producing DOC, 77 inspections of Schedule 1 facilities, 145 inspections of Schedule 2 facilities, and 65 inspections of Schedule 3 facilities. Information provided by the OPCW Media Branch, The Hague, 22 Dec. 2000.

tion regime within the budget, the Fifth CSP adopted a method based on broad geographic distribution to select which Schedule 3 plants to inspect.¹⁹ However, a random selection formula for DOC plants still needs to be approved.²⁰

In May Russian President Vladimir Putin submitted a federal bill to the State Duma to withdraw Russia's reservations to the 1925 Geneva Protocol in the light of the fact that Russia is a party to the BTWC and the CWC.²¹ On 15 January 2001 Russia informed the French Government, the depositary of the Geneva Protocol, that it had withdrawn its reservations.²²

Destruction of chemical weapons and related facilities

In 2000 the four declared CW possessors began or continued destroying their chemical weapons. India, South Korea and the USA met the Phase 1 destruction deadline of 1 per cent of Category 1 CW by 29 April 2000, but Russia failed to do so. As of 1 December, 5352 tonnes of chemical warfare agent (of a total of 69 863 tonnes for all declared CW) and 1 477 318 munitions and containers (of a declared total of 8 389 000) had been destroyed worldwide under OPCW supervision since the entry into force of the CWC.²³ The OPCW also issued destruction certificates for 25 of the 61 CW production facilities which are located in seven states that are parties to the CWC. In 2000 an additional 11 destruction plans for CW production facilities were submitted to the Technical Secretariat. The Executive Council approved 7 of the 8 plans which the TS had forwarded to it.²⁴

Former CW production facilities can also be converted for purposes not prohibited under the CWC. The Fifth CSP approved the conversion of four former CW production facilities in Russia and two in the United Kingdom.²⁵ The TS also received one request for temporary conversion of a former CW-related

¹⁹ Mathews, R. J., 'Intention of Article VI: an Australian drafter's perspective', *OPCW Synthesis* (Nov. 2000), p. 11.

²⁰ OPCW, Report of the Fifth Session of the Conference of States Parties, Conference of States Parties Fifth Session document C-V/6, 19 May 2000, para. 12.2(c).

²¹ ITAR-TASS (Moscow), 22 May 2000, in 'Putin wants to annul reservations in 1925 toxic gas bill', Foreign Broadcast Information Service, *Daily Report-Central Eurasia (FBIS-SOV)*, FBIS-SOV-2000-0522, 24 May 2000. A brief summary of the provisions of and the parties to the Geneva Protocol are given in annexe A in this volume.

²² Following approval by the State Duma on 27 Oct. 2000 and the Federation Council on 24 Nov. 2000, Federal Law no. 143-FZ, authorizing the withdrawal of reservations, was promulgated on 6 Dec. 2000. Letter of notification by the Embassy of France to the Swedish Ministry for Foreign Affairs, Stockholm, 13 Feb. 2001.

²³ Information provided by the OPCW Media Branch, The Hague, 22 Dec. 2000. The figures include the verified destruction of almost 1500 tonnes of agents and 440 000 munitions and containers in 2000. *OPCW Secretariat Brief*, no. 24 (note 12).

²⁴ Information provided by the OPCW Media Branch, The Hague, 17 Nov. 2000; and *OPCW Secretariat Brief*, no. 24 (note 12).

²⁵ Russian facilities were the mustard-agent production facilities in Berezniki and Chapayevsk, an installation for filling mustard-lewisite mixture into munitions in Chapayevsk, and the DF production facility 'Khimprom' in Volgograd. British facilities were ICI Valley, Rhydymwyn, North Wales, and ICI Randle, Runcorn, Cheshire. Conference of States Parties Fifth Session document C-V/6 (note 20).

facility. In December the completion of conversion was being certified at two Russian facilities.²⁶

Destruction of CW in the United States

The US CW destruction programme consists of two major components: stockpile items and non-stockpile chemical *matériel*.²⁷ Incineration is the so-called baseline destruction technology for stockpile items, but the US Department of Defense (DOD) is required by law to explore alternative destruction technologies because of the strong opposition to incineration. Destruction operations continued in 2000. By 29 April the USA had destroyed approximately 15 per cent of its Category 1 CW and thereby exceeded by a substantial margin the CWC Phase 1 requirement.²⁸ It achieved another milestone in November with the elimination of all CW at Johnston Atoll. Nevertheless, there is concern that the USA might fail to meet the CWC-imposed destruction deadline of 2007.

On 30 November the US Army announced that all CW at Johnston Atoll had been destroyed (412 532 munitions and 200 one-ton containers of bulk nerve and mustard agents, representing 6 per cent of the US stockpile).²⁹ The closure operation, which includes the disposal of secondary waste produced during the destruction of CW, will start in January 2001 and is estimated to last up to

²⁶ Information provided by the OPCW Media Branch, The Hague, 17 Nov. 2000; and *OPCW Secretariat Brief*, no. 24 (note 12).

²⁷ Stockpile items include bulk storage containers and fully or partially assembled munitions. They are stored at 9 locations: Edgewood Chemical Activity, Aberdeen Proving Ground, Md.; Anniston Chemical Activity, Anniston, Ala.; Blue Grass Chemical Activity, Richmond, Ky.; Newport Chemical Depot, Newport, Ind.; Pine Bluff Chemical Activity, Pine Bluff, Ark.; Pueblo Chemical Depot, Pueblo, Colo.; Deseret Chemical Depot, Tooele, Utah; Umatilla Chemical Depot, Hermiston, Ore.; and Johnston Atoll Chemical Activity, Johnston Atoll (south-west of Hawaii). In 1990, before destruction operations commenced on Johnston Atoll, the US CW stockpile was 31 496 tons.

The Non-Stockpile Chemical Materiel Project deals with 5 categories of chemical warfare *matériel*: (a) binary CW; (b) miscellaneous chemical warfare items, including unfilled munitions, support equipment and devices to be employed in conjunction with the use of CW; (c) recovered CW; (d) former production facilities; and (e) buried chemical warfare *matériel*. All non-stockpile chemical *matériel*, with the exception of buried items, must be destroyed according to the CWC-mandated time lines. They may be present at more than 100 sites in the USA. In 1999 Congress authorized the transport of non-stockpile *matériel* across state borders, which could make possible their destruction in existing and planned incinerators for CW. In June 2000 the US Army announced that it was studying this option. Henderson, R., 'Incineration facilities target of Army study', *Anniston Star*, 5 June 2000, URL <http://www.annistonstar.com/news/news_20000605_0141.html>. However, a provision inserted in the National Defense Authorization Act prevents Anniston, Ala., from receiving such shipments. Orndorff, M., 'Bill limits weapons burning at Anniston', *Birmingham News*, 11 Oct. 2000, URL <<http://www.al.com:80/?>>.

²⁸ For the USA, Category 1 CW comprise stockpile (e.g., certain filled munitions and bulk agent containers) and non-stockpile items (e.g., the unfilled shells designed for binary nerve agents). Army exceeds major Chemical Weapons Convention milestone', *Reach Newsletter*, Blue Grass, Ky., Aug. 2000, URL <<http://www-pmcd.apgea.army.mil/CSDP/SL/BGCA/reach/2000/August/convention.asp>>; and Program Manager for Chemical Demilitarization, 'Chemical weapons disposal facility helps United States surpass treaty's April deadline', Press Release, 29 Apr. 2000, URL <<http://www-pmcd.apgea.army.mil/CSDP/IP/PR/2000/200004/20000429/index.asp>>.

²⁹ Program Manager for Chemical Demilitarization, 'At a glance: total munitions processed at Johnston Atoll Chemical Agent Disposal Facility', Processing status as of 5 Nov. 2000, URL <http://www-pmcd.apgea.army.mil/aag_jacads.asp>; and Program Manager for Chemical Demilitarization, 'Chemical weapons disposal facility completes operations ahead of schedule', Press Release, 14 Mar. 2000, URL <<http://www-pmcd.apgea.army.mil/CSDP/IP/PR/2000/200003/20000314/index.asp>>. One US ton is equal to 0.907 metric tonne.

33 months.³⁰ By US law the Johnston Atoll Chemical Agent Disposal System (JACADS) must be destroyed and no part can be reused in existing or planned incinerators on the mainland.³¹

The only other operational CW incinerator in the USA is the Tooele Chemical Agent Disposal Facility (TOCDF) at the Deseret Chemical Depot. Between August 1996 and early November 2000 it destroyed 4809 tons of CW. The figure comprises 617 650 munitions and 4912 one-ton containers and represents 35.3 per cent of the stockpile (54.6 per cent of the munitions) stored at the site.³² The TOCDF is scheduled to conduct closure operations at the end of 2003. In January 2000 a former employee charged that data were being manipulated to conceal the incomplete destruction of the nerve agent and that misleading information had been presented in order to obtain the environmental permit.³³ On 8 May an accidental release of 18 milligrams of sarin as a consequence of an operator error closed down the incinerator. It did not resume full operation until the middle of September.³⁴ These and other publicized incidents had an impact on the political debate at other designated incineration sites and led to a number of worker walkouts.³⁵

Destruction operations have not begun at the other storage sites. Incineration systems are envisaged at Anniston, Umatilla and Pine Bluff. In June, following a legal challenge by two opposing groups, the Alabama Department of Environmental Management (ADEM) endorsed the permit originally issued on 19 June 1997 to build and eventually operate the Anniston Chemical Agent Disposal Facility (ANCDF).³⁶ In November the ANCDF was reported to be

³⁰ US Department of Defense, 'Chemical weapons destruction complete on Johnston Atoll', Press Release, 30 Nov. 2000, URL <http://www.defenselink.mil/news/Nov2000/b11302000_bt715-00.html>.

³¹ Ember, L. R., 'Johnston Atoll: end of a beginning', *Chemical & Engineering News*, vol. 78, no. 46 (13 Nov. 2000), p. 23. Only the shell of the main building will remain for nesting birds (Johnston Atoll was designated a National Wildlife Refuge in 1926), because the Army and the Air Force (whose property the atoll is) do not have the funds to remove it.

³² 'At a glance: total munitions processed at Tooele Chemical Agent Disposal Facility' (note 29); and Program Manager for Chemical Demilitarization, 'Halfway point reached', Press Release, 12 Oct. 2000, URL <<http://www-pmcd.apgea.army.mil/CSDP/IP/PR/2000/200010/20001012/index.asp>>.

³³ McIntyre, J., 'Pentagon probes charges of Army fraud at weapons incinerator', Cable News Network, 12 Jan. 2000, via CNN Online, URL <<http://www.cnn.com>>; and Associated Press, 'Ex-Tooele depot employee charges officials with falsifying reports', *Anniston Star*, 12 Jan. 2000, URL <http://www.annistonstar.com/news/news_0000112_8070.html>.

³⁴ Henderson, R., 'CDC report: Tooele leak result of bad choices', *Anniston Star*, 22 June 2000, URL <http://www.annistonstar.com/news/news_20000622_5794.html>; Program Manager for Chemical Demilitarization, 'Chemical weapons incinerator regulator authorizes limited restart of munitions destruction operations', Press Release, 28 July 2000, URL <<http://www-pmcd.apgea.army.mil/CSDP/IP/PR/2000/200007/20000728/index.asp>>; and Program Manager for Chemical Demilitarization, 'Utah state regulators authorize deactivation furnace restart at Tooele Chemical Agent Disposal Facility; plant restart now complete', Press Release, 19 Sep. 2000, URL <<http://www-pmcd.apgea.army.mil/CSDP/IP/PR/2000/200009/20000919/index.asp>>.

³⁵ Cockle, R., 'Umatilla chemical crew walks out', *The Oregonian*, 4 Jan. 2000, URL <<http://www.oregonlive.com/news/00/01/st10407.html>>; Hunsberger, B., 'Dispute has people near depot anxious about safety', *The Oregonian*, 9 Jan. 2000, URL <<http://www.oregonlive.com/news/00/01/st10901.html>>; and Henry L. Stimson Center, 'The US chemical weapons destruction program: progress amidst controversy', *CBW Chronicle*, vol. 3, no. 1 (Feb. 2000), pp. 6-8.

³⁶ Program Manager for Chemical Demilitarization, 'Alabama Department of Environmental Management Commission rules on ANCDF', Press Release, 20 June 2000, URL <<http://www-pmcd.apgea.army.mil/CSDP/IP/PR/2000/200006/20000620/index.asp>>; and Henderson, R., 'Incensed by the incinerator', *Anniston Star*, 21 June 2000, URL <http://www.annistonstar.com/news/news_20000621_1035.html>.

89 per cent complete, and it is expected to be finished in February 2001. Destruction operations are to start in early 2002 and will continue for nearly four years.³⁷ However, doubts about the safety of the incinerator were raised repeatedly following the incidents at the TOCDF.³⁸ In November, in a new court case brought by an opposition group, the judge ruled that ADEM had determined health-risk levels for the public without public hearings and thus had violated Alabama's Administrative Procedure Act. If the decision is upheld by the Alabama Supreme Court, the ruling may lead to a declaration that the incinerator permit is defective, which would halt its construction and operation.³⁹ The Umatilla Chemical Agent Disposal Facility was approximately 87 per cent complete in November 2000; it has the same CW destruction schedule as the ANCDF.⁴⁰ The incinerator complex at Pine Bluff was 32 per cent complete, and CW destruction will begin in 2003.⁴¹

Technologies other than incineration are being considered for the other US chemical weapon destruction sites.⁴² Only bulk agent is stored at the Aberdeen Proving Ground, Edgewood Chemical Activity (mustard) and at the Newport Chemical Depot (VX). A neutralization/biotreatment process is the preferred method for the destruction of the mustard agent. The process consists of hydrolysis followed by the addition of the hydrolysate to a mixture of sewage-treatment bacteria.⁴³ Pilot testing of the process has been under way since June 1999, and a final decision on the use of the technology is expected by the winter of 2003. Disposal of the mustard agent should then be completed within one year.⁴⁴ The VX at Newport will be destroyed using neutralization followed by supercritical water oxidation. The agent will be first hydrolysed with sodium hydroxide, and the resulting hydrolysate will be subsequently diluted with water and mixed with oxygen to produce non-toxic salt water, which will

³⁷ Ember (note 31); and Program Manager for Chemical Demilitarization (note 36).

³⁸ Associated Press, 'Reports of fraud at Utah incinerator bother state officials', *Anniston Star*, 13 Jan. 2000, URL <http://www.annistonstar.com/news/news_20000113_7529.html>; Henderson, R., 'Army fails to satisfy commissioners' concerns', *Anniston Star*, 15 June 2000, URL <http://www.annistonstar.com/news/news_20000615_4243.html>; and McCullars, J., 'Incinerator talks conclude; response issue still unresolved', *Anniston Star*, 30 Nov. 2000, URL <http://www.annistonstar.com/news/news_20001130_9044.html>.

³⁹ Corrade, M., 'Circuit court ruling puts incineration permit in jeopardy', *Anniston Star*, 30 Nov. 2000, URL <http://www.annistonstar.com/news/news_20001130_1361.html>.

⁴⁰ Ember (note 31). At Umatilla Chemical Agent Disposal Facility 3717 tons of CW (various types of munitions filled with sarin and VX and one-ton containers with mustard agent) await destruction.

⁴¹ Ember (note 31).

⁴² Additional information on the Alternative Technologies and Approaches Project (ATAP) and the Assembled Chemical Weapon Assessment Program (ACWA) is given in Zanders, J. P., French, E. M. and Pauwels, N., 'Chemical and biological weapon developments and arms control', *SIPRI Yearbook 1999: Armaments, Disarmament and International Security* (Oxford University Press: Oxford, 1999), p. 572; and Zanders, J. P. and Wahlberg, M., 'Chemical and biological weapon developments and arms control', *SIPRI Yearbook 2000: Armaments, Disarmament and International Security* (Oxford University Press: Oxford, 2000), p. 515–16.

⁴³ For an overview of the process, see ATAP, 'Neutralization/biotreatment of mustard agent: Aberdeen Chemical Agent Disposal Facility', Fact Sheet, URL <<http://www-pmcd.apgea.army.mil/ATAP/IP/FS/APG/neutbiotreat/index.asp>>.

⁴⁴ ATAP, 'Alternative technologies pilot facility process: Aberdeen Proving Ground', Fact Sheet, URL <<http://www-pmcd.apgea.army.mil/ATAP/IP/FS/APG/pilot/index.asp>>.

be transferred to an off-site commercial waste-water treatment plant.⁴⁵ In December 1999 the US Army obtained an environmental permit from the state of Illinois, and in April 2000 pilot testing of the process and preliminary construction work began. The project was in its final design stage at the end of the summer.⁴⁶ Construction is expected to be completed by the end of 2002 and, following a testing phase, the disposal of the VX should take place in 2004.⁴⁷ More than one-third of the equipment and buildings of the former chemical weapon production facility at the Newport Chemical Depot has now been demolished.⁴⁸

No destruction technology has been selected for the Blue Grass Chemical Activity or the Pueblo Chemical Depot. In 1997–98 the US Army had initially selected 6 of 12 proposed destruction technologies, but continued testing only 3 technologies because of budget constraints. In May 1998 it chose the neutralization/supercritical water oxidation and the neutralization/biotreatment processes. However, because the DOD still formally intended to test the 3 additional alternative technologies, Congress included \$40 million in the fiscal year (FY) 2000 National Defense Authorization Act for this purpose. The testing continued in 2000.⁴⁹ The Army also began the so-called ‘technology-neutral task’ of removing the energetics (propellants, explosives, fuses, bursters, and so on) from the 780 078 mustard-filled rounds stored at the Pueblo Chemical Depot in order to prepare them for future destruction.⁵⁰ The preparation of site-specific environmental impact statements began in the spring of 2000.⁵¹

Between October and November 2000, six 6-inch (c. 15 cm) bomblets, which are presumably filled with sarin, were recovered at the Rocky Mountain Arsenal near Denver (since 1992 it has been a wildlife refuge that attracts

⁴⁵ For an overview of the process, see ATAP ‘Neutralization/supercritical water oxidation of nerve agent VX’, Fact Sheet, URL <<http://www-pmcd.apgea.army.mil/ATAP/IP/FS/NECD/neutralVX/index.asp>>. The initial design envisaged the production of the salt for landfill disposal and the transfer of the effluent only to the waste-water treatment facility. Program Manager for Chemical Demilitarization, ‘Army making headway with VX disposal facility’, Press Release, 20 Sep. 2000, URL <<http://www-pmcd.apgea.army.mil/ATAP/IP/PR/2000/200009/20000920/index.asp>>.

⁴⁶ Program Manager for Chemical Demilitarization (note 45); US General Accounting Office (GAO), *Chemical Weapons Disposal: Improvements Needed in Program Accountability and Financial Management*, GAO/NSIAD-00-80, May 2000, p. 28; and Ember (note 31).

⁴⁷ ‘Newport Chemical Agent Disposal Facility nearing construction’, *Reach Newsletter*, Newport Chemical Depot, Ind., winter 2000, URL <<http://www-pmcd.apgea.army.mil/ATAP/SL/NECD/reach/2000/Winter/nearingconstruction.asp>>.

⁴⁸ ‘Newport former chemical agent production facility update’, *Reach Newsletter*, Newport Chemical Depot, Ind., winter 2000, URL <<http://www-pmcd.apgea.army.mil/ATAP/SL/NECD/reach/2000/Winter/formerchemical.asp>>.

⁴⁹ US General Accounting Office (note 46), p. 30.

⁵⁰ ‘Reconfiguration: an important step toward disposal of Pueblo’s chemical weapons’, *Reach Newsletter*, Pueblo Chemical Depot, fall 2000, URL <<http://www-pmcd.apgea.army.mil/CSDP/SL/PUCD/reach/2000/Fall/reconfig.asp>>. These tasks must be carried out irrespective of the destruction technology chosen by the Army.

⁵¹ ‘Steps taken toward chemical weapons disposal in Pueblo’, *Reach Newsletter*, Pueblo Chemical Depot, summer 2000, URL <<http://www-pmcd.apgea.army.mil/CSDP/SL/PUCD/reach/2000/Summer/steps.asp>>.

thousands of visitors annually).⁵² The bomblets are expected to be destroyed by detonation in a specially built structure in January 2001.⁵³

In May the US General Accounting Office (GAO) released a report estimating that the USA would not meet the final destruction deadline of 2007 for about 10 per cent of its CW stockpile because incineration is unacceptable to Colorado and Kentucky and because the proposed alternative technologies have not yet been proven safe and effective. As the US Army must also obtain approval for these alternative technologies from state and local communities, it is unlikely that the destruction operations can begin before 2007. Estimated completion dates for both sites range between May 2011 and December 2015.⁵⁴ (The CWC provides for a possible extension of the final destruction deadline by up to a maximum of five years, that is, until 2012.) The 2007 deadline would be missed even if the Army were to choose the proven incineration technology, for which it must also obtain environmental permits.⁵⁵ The demolition of sections of the former CW production facility at Newport could exceed the 2007 deadline if the destruction (which involves an alternative technology) of the CW that must be destroyed first does not remain on schedule.⁵⁶ The GAO also anticipates delays beyond the 2007 deadline for the destruction of some recovered chemical warfare *matériel* since the destruction methods have not yet been proven safe and effective or accepted by state and local authorities.⁵⁷

In addition, the GAO calculated that the US Army would exceed its current budget estimate of \$14.9 billion because the figure does not include the costs associated with the destruction delays in Colorado and Kentucky or the destruction of the non-stockpile *matériel*. The report also questioned whether the Army had adequately budgeted for the cost of closing the destruction facilities and cleaning up adjacent areas.⁵⁸

Destruction of CW in Russia

Russia's CW destruction programme continued to suffer from serious underfunding, and on 29 April 2000 Russia failed to meet the Phase 1 destruction

⁵² The submunitions were intended for the Honest John missile, which carried a cluster of 268 such bomblets. The USA manufactured sarin at the Rocky Mountain Arsenal in 1953–57. Guy, A., Jr, 'Chemicals to dissolve sarin-filled bomblet', *Denver Post*, 29 Oct. 2000, URL <<http://www.denverpost.com/news/news1029e.htm>>; Lane, G., 'Caustic to "digest" arsenal bomblet', *Denver Post*, 14 Nov. 2000, URL <<http://www.denverpost.com/news/news1114q.htm>>; Lane, G., '6th bomblet discovered at arsenal', *Denver Post*, 21 Nov. 2000, URL <<http://www.denverpost.com/news/news1121j.htm>>; Janofsky, M., 'Cleanup of "bomblets" in Colorado refuge expected soon', *New York Times* (Internet edn), 1 Dec. 2000, URL <<http://www.nytimes.com/2000/12/01/national/01BOMB.html>>; and SIPRI, *The Problem of Chemical and Biological Warfare*, vol. 2, *CB Weapons Today* (Almqvist & Wiksell: Stockholm, 1973), p. 232.

⁵³ Morson, B., 'Army unveils sarin-bomb destroyer', *Denver Rocky Mountain News*, 20 Dec. 2000, URL <<http://insidedenver.com/news/1220sari5.shtml>>.

⁵⁴ US General Accounting Office (note 46), p. 39.

⁵⁵ US General Accounting Office (note 46), p. 40. In order to meet the destruction deadline of 2007 the authorization for the baseline incineration process should have been granted by 20 June 1999.

⁵⁶ US General Accounting Office (note 46), pp. 44–45.

⁵⁷ US General Accounting Office (note 46), pp. 43–44.

⁵⁸ US General Accounting Office (note 46), p. 45–48.

deadline. Acting on the recommendation of the Executive Council, the Fifth CSP extended the 1 per cent destruction deadline for Category 1 CW by two years based on four understandings: Russia must destroy 1 per cent of its Category 1 CW before the Phase 2 deadline (29 April 2002); it must report to every second regular session of the Executive Council on the progress of its destruction plans; the OPCW Director-General must periodically submit a progress report on the destruction of CW to the Executive Council; and the Executive Council chairman must do likewise.⁵⁹ The decision effectively merges the Phase 1 and Phase 2 destruction requirements. Russia must now destroy 20 per cent of its Category 1 CW (8000 tonnes) by 29 April 2002. The CSP also called on all states parties to provide destruction assistance to Russia and urged Russia to take measures to facilitate such assistance.⁶⁰

The Russian federal budget for 2001 allocates 6036.4 million roubles (\$217.2 million) for 'arms disposal and liquidation within the framework of international treaties'. The figure is an increase from the 2070 million roubles (\$74.5 million) budgeted for 2000. The bulk of the increase is for implementation of the CWC, for which a total of 3085 million roubles (\$111 million) have been reserved.⁶¹ The sum includes 1500 million roubles (\$54 million) for the construction of a CW destruction facility in Gorny, Saratov region. Russian military sources nevertheless indicated that the proposed budget for CW destruction in 2001 falls well short of the 6400 million roubles (\$230 million) they estimate will be needed for 2001. With the continuing underfunding of the CW destruction programme it is unlikely that Russia will meet the next CWC-imposed destruction deadline of 29 April 2002.⁶² The conversion of former CW production sites is estimated to cost \$110 million, but Russian Government experts were quoted as saying that Russia could pay only one-tenth of that sum.⁶³ Realizing this danger, in July the State Duma urged Putin to prioritize the destruction programme and place the question on the agenda of the Russian Security Council.⁶⁴

Russia began its destruction operations with the elimination of Category 3 CW at Maradikovskiy, Kirov region, and Leonidovka, Penza region, in early 2000.⁶⁵ However, operations were suspended because Russia had not notified

⁵⁹ OPCW, Conference of States Parties Fifth Session decision document C-V/DEC.14, 17 May 2000.

⁶⁰ OPCW, Conference of States Parties Fifth Session decision document C-V/DEC.15, 17 May 2000.

⁶¹ Romashkin, P., Draft Federal Budget of 2001 and spending for implementing Strategic Arms Reduction treaties, Center for Arms Control, Energy and Environmental Studies, Moscow, 8 Sep. 2000, URL <<http://www.armscontrol.ru/start/exclusive/pbr0908.htm>>. The exchange rate was 27.8 roubles for 1 US dollar.

⁶² 'Chemical weapons liquidation in Russia to be financed sevenfold', *Military News Agency* (Moscow), 12 Oct. 2000, distributed via Green Cross Legacy Programme, Basel, Switzerland; and Komarov, V., 'Russia's chemical headache needs international cure', *Russia Today*, 20 Apr. 2000, URL, <<http://www.russiatoday.com/rusjournal/rusjournal.php3?id=153136>>.

⁶³ Reuters, 'Russia says lagging in chemical weapons destruction', 7 Feb. 2000, URL <<http://www.cnn.com>>; and 'Environmental extortion: Russia's new revenue stream', *Global Intelligence Update*, 5 Apr. 2000, URL <<http://www.stratfor.com/CIS/commentary/0004050052.htm>>.

⁶⁴ ITAR-TASS (Moscow), 7 July 2000, in 'Russia: Duma calls for financing chemical weapons elimination', FBIS-SOV-2000-0707, 13 July 2000.

⁶⁵ Category 3 CW are unfilled munitions and devices, and equipment specifically designed for use in connection with chemical warfare. The destruction of Category 3 CW must be completed not later than 5 years after entry into force of the CWC. CWC, Verification Annex, Part IV(A), para. 16.

the OPCW of these activities. Russia submitted draft destruction plans for the two sites, which the Executive Council approved in October, thus enabling the resumption of destruction activities.⁶⁶ On the basis of documentation supplied by Russia, OPCW inspectors were able to independently verify the destruction of approximately 40 000 items (fuses, powder and burster charges) at the two sites. The amount represents 8 per cent of Russia's declared Category 3 CW.⁶⁷

In November 2000 Russia submitted combined plans for the destruction and verification of the large VX production and filling facility at Novocheboksarsk; the Executive Council will consider the plans in 2001.⁶⁸ The Novocheboksarsk facility has been discussed in detail at several Executive Council meetings since the Fifth CSP, and Russia has expressed the view that certain delegations appear to be blocking resolutions instead of furthering the destruction of CW in Russia.⁶⁹

In December it was announced that the CW in the Penza region would be transported to Shchuchye for destruction.⁷⁰ If this decision is to be implemented, it will require a change in the federal law on CW destruction, which precludes such transport.

Russia has been receiving assistance from the European Union (EU), Finland, Germany, the Netherlands, Sweden and the USA for the destruction of its CW and CW-related facilities. The EU provided 7 million euros (c. \$6.81 million) through its Technical Assistance for the Commonwealth of Independent States (TACIS) programme, of which 4 million euros (c. \$3.9 million) are designated for decontamination of the lewisite production installations and the adjacent area in preparation for the destruction of the Kaprolaktam factory in Dzerzhinsk, Nizhni Novgorod region. The remaining funds are to be used to set up an environmental monitoring system at a CW destruction facility under construction near Gorny.⁷¹ The monitoring system will operate independently, and its data will be made public. Both programmes started on 16 January 2000 and will run for two years.⁷² Germany's contribution for 2000 was 7.3 million Deutschmarks (c. \$3.6 million) for the Gorny

⁶⁶ *OPCW Secretariat Brief*, no. 23 (note 12).

⁶⁷ Feakes, D., 'Developments in the Organisation for the Prohibition of Chemical Weapons', *CBW Conventions Bulletin*, no. 49 (Sep. 2000), p. 8. Twenty-two items were totally destroyed and could not be verified independently.

⁶⁸ *OPCW Secretariat Brief*, no. 24 (note 12).

⁶⁹ *OPCW Secretariat Brief*, no. 23 (note 12).

⁷⁰ 'Chemical weapons from Penza to be destroyed in Kurgan Region', *Military News Agency* (Moscow), 18 Dec. 2000, distributed via Green Cross Legacy Programme, Basel, Switzerland.

⁷¹ Reuters, 'Russia gets EU money to destroy chemical weapons', 2 Mar. 2000, URL <http://abcnews.go.com/wire/World/reuters20000203_1815.html>; and Interfax, 'EU gives EUR 7 mln for safe destruction of Russia's chemical weapons', 2 Mar. 2000, in 'Daily financial report for 02 Mar 00', FBIS-SOV-2000-0302, 3 Mar. 2000. Construction work has progressed farthest in Gorny; 1 building was completed in the first half of 2000. Talon, B., 'Dangerous arsenals go into salvage', 23 June 2000, in 'Construction of chemical weapons destruction facility in Saratov Oblast', FBIS-SOV-2000-0626, 29 June 2000.

⁷² Technical Assistance for the Commonwealth of Independent States (TACIS), 'Development of environmental monitoring system in connection with destruction of chemical weapons in the Saratov region', Press Release by Project Management SOFRECO, Moscow, Mar. 2000; TACIS, 'Preparation for decontamination', Press Release by Project Management SOFRECO, Moscow, Mar. 2000; and TACIS Chemical Weapons Destruction Environmental Monitoring Saratov oblast, 'Saratov oblast works begins', *Newsletter of the Saratov Oblast Environmental Monitoring Project*, no. 1 (Oct. 2000), p. 2.

facility.⁷³ Finland has allocated approximately \$1.2 million in assistance. According to an agreement signed in October 2000 it will donate equipment to Russia for the detection and analysis of toxic agents at the Kambarka site.⁷⁴

In January 2000 Italy joined the list of donor countries when it signed an assistance agreement with Russia under which it allocates \$8.3 million for 2000–2003 for the construction of infrastructure related to the CW disposal activities in Kizner, Udmurtia.⁷⁵ On 31 March, at a meeting on Russia hosted by the OPCW, Canada and Norway announced that they would make financial contributions to Russia's CW destruction programme. Canada will provide approximately \$70 000 through the US Cooperative Threat Reduction (CTR) programme; the amount of Norway's assistance was not disclosed.⁷⁶ On 31 May members of the French Parliament stated that France had also offered assistance to eliminate Russia's CBW, but no details were reported.⁷⁷ In the margin of the Group of Eight (G8) summit meeting in Okinawa, Japan, British Prime Minister Tony Blair offered £12 million (*c.* \$18 million) for the period 2001–2003 to assist in Russia's CW destruction.⁷⁸

The USA remains by far the largest provider of destruction assistance through the CTR programme. In April the Central Laboratory of Chemical Analytical Control of Chemical Disarmament and Environmental Monitoring opened in Moscow; US funds and analytical instruments were provided at a cost of \$18.5 million.⁷⁹

Concern was expressed that the USA may be required to continue to fund not only the programme implementation, but also the future operation and maintenance of the threat reduction projects.⁸⁰ The USA planned to contribute \$888 million over 10 years to the construction of the destruction facility in Shchuchye. However, the programme is behind schedule, and the US Congress withheld construction funds for FY 2000 and FY 2001 pending Russia's fulfilment of its obligations regarding the construction of infrastructure. Russia is committed, among other things, to the modernization of

⁷³ ITAR-TASS (Moscow), 20 July 2000, in 'Russia approves distribution of German funds for chemical weapons destruction', FBIS-SOV-2000-0720, 24 July 2000.

⁷⁴ Agence France-Presse, 'Finland signs accord to help Russia destroy chemical weapons', 27 Oct. 2000, URL <<http://www.cnn.com>>.

⁷⁵ ITAR-TASS (Moscow), 20 Jan. 2000, in 'Russia, Italy sign chemical weapons agreement', FBIS-SOV-2000-0120, 20 Jan. 2000 (in Russian). The Italian assistance consists of the design and construction of facilities for gas, water and power supply, the delivery of sanitary equipment, and environmental monitoring. ITAR-TASS (Moscow), 28 Jan. 2000, in 'Italy to help Russia destroy chemical weapons', British Broadcasting Corporation (BBC) Summary of World Broadcasts, 31 Jan. 2000.

⁷⁶ Brugger, S., 'Russia to miss CWC deadline', *Arms Control Today*, vol. 30, no. 4 (May 2000), p. 48.

⁷⁷ ITAR-TASS (Moscow), 31 May 2000, in 'France offers to help destroy Russian weapons', FBIS-SOV-2000-0531, 1 June 2000.

⁷⁸ ITAR-TASS (Moscow), 21 July 2000, in 'Putin, Blair agree to destroy chemical weapons, other dangerous material', FBIS-SOV-2000-0721, 24 July 2000; and London Press Association, 21 July 2000, in 'UK offers Russia 82 million toward weapons destruction, plutonium disposition', Foreign Broadcast Information Service, *Daily Report—West Europe (FBIS-WEU)*, FBIS-WEU-2000-0721, 24 July 2000. A list of the G8 members is given in the glossary in this volume.

⁷⁹ ITAR-TASS (Moscow), 4 Apr. 2000, in 'Chemical disarmament laboratory opens in Moscow', FBIS-SOV-2000-0404, 7 Apr. 2000; and Reuters, 'Russia unveils US-built chemical weapons lab', *Russia Today*, 6 Apr. 2000, URL <<http://www.russiatoday.com/news.php3?id=148917>>.

⁸⁰ US General Accounting Office, *Weapons of Mass Destruction: US Efforts to Reduce Threats from the Former Soviet Union*, GAO/T-NSIAD/RCED-00-119, 6 Mar. 2000, pp. 2, 5–6.

Shchuchye's infrastructure (which includes water and gas pipelines and new blocks of flats). However, only \$1.8 million of Russia's CW destruction budget of \$20.5 million was allocated for Shchuchye.⁸¹

Destruction of CW in India and South Korea

India was reported to have fully met the CWC 1 per cent destruction requirements. It is expected to use a successfully tested neutralization technology in its new CW destruction facility.⁸²

In May 2000 the first information about South Korea's CW became public. The South Korean press cited government and military sources which stated that in 1999 the South Korean Army had begun destroying CW at Youngdong, Chungbuk province. In December the OPCW noted that 'a State Party' had destroyed approximately 1.1 per cent of its declared Category 1 CW and all of its declared Category 3 CW. Following an interruption owing to technical difficulties, destruction activities are scheduled to recommence in April 2001.⁸³

The South Korean stockpile is reported to consist of nerve, blister and possibly some other categories of agent and to amount to several hundred tonnes, although it is not known whether the figure represents agent or munition weight. An official of the Ministry of Environment suggested that the nerve agents were binary agents when he stated that the CW posed no human risks 'because they remain divided in two separate materials that are not dangerous unless they are launched for attacks'.⁸⁴ The local authorities and population were apparently not informed of the destruction operations, safety procedures or the impact on the environment.⁸⁵ In July the Ministry of National Defence proposed creating a consultative body on the safety of the CW destruction plant, which would involve representatives of the government, the military, environmental organizations and concerned non-governmental organizations

⁸¹ Reuters (note 79); Filipov, D., 'Russian town wary of chemical weapons disposal', *Boston Globe*, 24 Apr. 2000, p. A01; and US State Department, 'Clinton signs the Defense Dept. Appropriations Act for FY-2001', 10 Aug. 2000, URL <<http://www.defense-aerospace.com/data/communiques/data/2000Aug3018/index.htm>>.

⁸² *OPCW Secretariat Brief*, no. 24 (note 12).

⁸³ *OPCW Secretariat Brief*, no. 24 (note 12). South Korea maintains that it possesses no non-conventional weapons and calls the plant a 'destruction facility for chemicals', not for CW. Ambassador Song Young-Shik's address to the fifth CSP contained no reference to the CW destruction activities. Song, Y., 'Statement to the Fifth Session of States Parties of the Organisation for the Prohibition of Chemical Weapons', The Hague, 15 May 2000. OPCW documents name all other CW possessors.

⁸⁴ Yonhap (Seoul), 9 May 2000, in 'Chemical weapons destruction sparks pollution controversy', Foreign Broadcast Information Service, *Daily Report-East Asia (FBIS-EAS)*, FBIS-EAS-2000-0509, 10 May 2000.

⁸⁵ 'Army secretly destroys chemical weapons', *Chosun Ilbo* (Seoul), 9 May 2000, URL <<http://www.chosun.com/w21data/html/news/200005/200005090043.html>>; 'Ministry reluctant over chemical plant details', *Chosun Ilbo*, 9 May 2000, URL <<http://www.chosun.com/w21data/html/news/200005/200005090298.html>>; Yonhap (Seoul), 9 May 2000, in 'ROK abides by CWC obligations to scrap chemical weapons', FBIS-EAS-2000-0509, 10 May 2000; and *Chosun Ilbo*, 9 May 2000, in 'ROK military efforts at destroying nerve, blister, blood, and choking agents revealed', FBIS-EAS-2000-0509, 10 May 2000.

(NGOs), in order to address public concerns.⁸⁶ Nonetheless, some local protests occurred.⁸⁷

Old, abandoned and sea-dumped chemical weapons

At the time of the Fifth CSP, May 2000, the parties had not agreed on usability guidelines for old CW (OCW) and abandoned CW (ACW) that were manufactured between 1925 and 1946.⁸⁸ Because the Technical Secretariat thus was unable to close the files on several OCW declarations and because parties must submit general and detailed destruction plans, the OPCW's Director-General announced that he would implement provisional criteria from 1 June 2000. In four OCW inspections carried out by early October none of the parties involved objected to the provisional criteria. Consequently, the Director-General urged the Executive Council to endorse those criteria.⁸⁹

The destruction of World War I CW in Belgium is experiencing considerable delays. The newly built CW dismantling facility in Poelkapelle is only able to process approximately seven projectiles per operating day. Currently, it barely manages to dismantle the approximately 1500 'problem' munitions recovered annually.⁹⁰ More than 27 000 other shells await processing. One reason for the delay is the unsatisfactory design of the specially built facility. In particular, the liquid agent filling of the German Blue Cross shells (a sternutator) is often contaminated with more than 1 per cent of explosives, which the operators of the commercial incinerator in Antwerp refuse to process.⁹¹ A study of the problem commissioned by the government recommended the construction of a new incinerator as the economically most viable option.⁹² A second reason for the delays is that, because the installation is operated by the inter-service bomb disposal unit of the Belgian Armed Forces, the few highly trained operators are sometimes involved in mine-clearing activities during

⁸⁶ *Korea Herald*, 18 July 2000, in 'ROKG to launch consultative body on safety of chemical destruction plant', FBIS-EAS-2000-0717, 19 July 2000.

⁸⁷ *Korea Herald*, 5 Aug. 2000, in 'Youngdong residents demand removal of chemical plant', FBIS-EAS-2000-0804, 7 Aug. 2000.

⁸⁸ For OCW manufactured between 1925 and 1946 the TS must determine their usability (based on guidelines accepted by the CSP). If the OCW are considered no longer usable they can be destroyed as toxic waste in accordance with the national legislation of the state party; otherwise they must be eliminated as CW subject to the provisions of the CWC. OCW manufactured before 1925 are to be treated as toxic waste; CW produced after 1945 must be destroyed according to the CWC obligations. The criteria for determining OCW also apply to ACW. CWC, Verification Annex, Part IV(B). The determination of the usability of OCW has important verification and financial implications.

⁸⁹ *OPCW Secretariat Brief*, no. 23 (note 12).

⁹⁰ Problem munitions include all recovered World War I projectiles which cannot be positively identified as non-toxic on the basis of their external characteristics. During the re-identification process munitions are X-rayed to determine their content.

⁹¹ B. W. P., 'Meer mankracht voor bommen' [More manpower for bombs], *De Standaard*, 29 Feb. 2000, p. 5. The most common fillings for Blue Cross shells were diphenylchloroarsine (DA or adamsite) and diphenylcyanoarsine (DC).

⁹² B. W. P., 'Leterme: "Militaire verbrandingsoven geen oplossing"' [Leterme: military incinerator no solution] *De Standaard*, 22 Apr. 2000, URL, <http://www.standaard.be/nieuws/binnenland/detail.asp?doctype=detail.asp&ArticleID=DST22042000_009>. The proposed incinerator would be able to destroy munitions containing no more than 1 kg of explosives, thus reducing the number of munitions to be dismantled to one-fourth the total. R. D., 'Verbrandingsoven van half miljard voor gifbommen' [Incinerator of half a billion for poison bombs], *Het Laatste Nieuws*, 22 Apr. 2000, p. 12.

peacekeeping missions or must return to their respective services in order to retain their chances for promotion.⁹³

Japan continued preparations for the elimination of the CW it abandoned in China during World War II. The number of munitions involved remained a point of dispute, and the two countries declared significantly different numbers to the OPCW. By early May OPCW inspectors had carried out at least nine inspections in order to determine the exact number of munitions.⁹⁴ In late February a new dump site containing over 17 600 CW was discovered in Nanjing, Jiangsu province.⁹⁵ In September, 75 Japanese and 150 Chinese specialists removed 897 mustard agent bombs and almost 2000 explosive devices in Bei'an, Heilongjiang province, and placed them in temporary storage in Qiqihar (300 kilometres from the recovery site) pending destruction.⁹⁶ Japan has not yet selected a destruction technology. According to head of Japan's Office for ACW Akio Suda the explosive charges in the weapons pose the greatest technological challenge. Because of the large number of munitions, manual dismantling of the CW (the method used in Europe) would be too slow. Japan aims to eliminate all ACW in China by 2007.⁹⁷

Russia plans to monitor the ecological impact of CW dump sites in the Baltic Sea. It expects that the effects of dumped German World War II munitions will increase in the near future; there is particular concern about arsenic levels. The Russian Ministry for Emergency Situations has noted that the location of only one-fifth of the CW dump sites in the Baltic may be known.⁹⁸

A report commissioned by the Italian Ministry for Environment stated that at least 20 000 (possibly as many as 200 000) devices containing 24 chemical substances are located off the coast of Bari in the lower Adriatic Sea. Among the chemicals detected were arsenic and mustard agent, and fear was expressed that they may cause damage to the marine ecosystem. Italy, the UK and the USA used the area as a CW dumping site after World War II and sea-

⁹³ R. D., '800 miljoen om 7 bommen per dag te ontmantelen' [800 million to dismantle 7 bombs per day], *Het Laatste Nieuws*, 2 Feb. 2000, p. 13; Dejaegher, P., 'Ontmanteling gifgranaten vormt veiligheidsrisico' [Dismantling poison poses security risk], *De Standaard*, 2 Feb. 2000, URL <http://www.standaard.be/nieuws/binnenland/detail.asp?doctype=detail.asp&ArticleID=DST02022000_001>; and Dejaegher, P., 'Gifgranaten geraken niet weggewerkt' [Poison shells do not get eliminated], *De Standaard*, 2 Feb. 2000, URL <http://www.standaard.be/nieuws/binnenland/detail.asp?doctype=detail.asp&ArticleID=DST02022000_002>. In Feb. the statutory rotation was cancelled for facility operators.

⁹⁴ Xinhua News Agency, 3 May 2000, in 'OPCW: Japan still responsible for chemical weapons in PRC', Foreign Broadcast Information Service, *Daily Report—China (FBIS-CHI)*, FBIS-CHI-2000-0503, 4 May 2000. Japan claims that c. 700 000 pieces must be removed; China estimates that there are more than 2 million abandoned CW. The reasons for the huge discrepancy include disagreement about whether or not certain munitions contain chemical warfare agent, Japan's rejection of claims that certain types of munition are of Japanese origin, and so on.

⁹⁵ Xinhua News Agency, 21 June 2000, in 'Chemical weapons left by Japan troops in 1937 found in Nanjing', FBIS-CHI-2000-0621, 22 June 2000.

⁹⁶ Associated Press, 'Japan, China begin excavating wartime poison gas cache', Cable Network News, 16 Sep. 2000, URL <<http://www.cnn.com/2000/SAIANOW/east/09/15/china.japan.poisongas.ap/index.html>>; and Xinhua News Agency, 1 Oct. 2000, in 'Japanese mission unearths abandoned chemical weapons in China', *Inside China Today*, 2 Oct. 2000, URL <<http://www.insidechina.com/news.php3?id=205163>>.

⁹⁷ Wehrfritz, G. and Takayama, H., 'Digging up a poisonous past', *Newsweek*, no. 38 (25 Sep. 2000), p. 82.

⁹⁸ ITAR-TASS, 'Russia to check ecological situation at sea dumping sites', 31 Jan. 2000, via CNN Online, URL <<http://www.cnn.com>>.

dumping reportedly continued until the beginning of the 1970s. A statement by Italian Vice-Minister for the Environment Valerio Calzolaio to a parliamentary hearing noted that five people, mostly local fishermen, had been killed and another 236 people injured between 1946 and 1997 as a consequence of these weapons. Environment Minister Edo Ranchi stated that the countries involved in the dumping will have to share in the clean-up costs.⁹⁹

III. Biological weapon disarmament

By mandate from a Special Conference in 1994, an Ad Hoc Group (AHG) of parties to the BTWC has convened in Geneva since January 1995 to develop a legally binding instrument, a protocol to strengthen the BTWC. The AHG met four times in 2000.¹⁰⁰ The intention is to complete the negotiation prior to the Fifth Review Conference, to be held on 19 November–7 December 2001. A preparatory committee meeting will be held on 25–27 April 2001.

The purpose of the future protocol is to strengthen the BTWC without amending the convention.¹⁰¹ The draft is contained in a Procedural Report (known as the rolling text), which consists of two parts. Part I represents the results of the AHG session, and Part II contains the proposals by the chairman and the designated Friends of the Chair (FoC), who assist on particular issues for future consideration. The draft protocol comprises 23 articles in addition to annexes and appendices.¹⁰²

The 25th anniversary of the entry into force of the BTWC was 26 March 2000, and 19 June 2000 marked the 75th anniversary of the Geneva Protocol. Both events garnered considerable political attention and provided forums to reaffirm the international commitment against biological warfare and to urge completion of the negotiations.

Frustration with the slow pace of the negotiations was voiced by several delegations. Delegates stressed the need to focus on practical enforcement contributing to BTWC compliance. The following areas received the most attention: investigations, compliance measures and objective criteria, transfers, cooperation, and issues related to the international organization to be created under the future protocol.¹⁰³ As in previous years, Chairman of the AHG Tibor Tóth was assisted by several FoC in his consultations and negotiations on special issues.¹⁰⁴ From the 20th session onwards Tóth held an increasing num-

⁹⁹ Xinhua News Agency, 'Italy says lower Adriatic was chemical weapons dump until '70s', 10 Feb. 2000, URL <<http://library.northernlight.com/FD20000210220000053.html?cb=0&dx=1006&sc=0>>; and Farrell, N., 'Britain to face bill for poison gas in the Adriatic', *Sunday Telegraph*, 20 Feb. 2000, p. 27.

¹⁰⁰ The sessions were held on the following dates: 18th session, 17 Jan.–4 Feb.; 19th session, 13–31 Mar.; 20th session, 10 July 4–Aug.; and 21st session, 20 Nov.–8 Dec.

¹⁰¹ Pearson, G. S. and Dando, M. R. (eds), *The BTWC Protocol: Proposed Complete Text for an Integrated Regime*, Evaluation Paper no. 17 (Department of Peace Studies, University of Bradford: Bradford, Mar. 2000), p. 3.

¹⁰² Ad Hoc Group document BWC/AD HOC GROUP/54, Parts I–III, 18 Dec. 2000.

¹⁰³ BWC/AD HOC GROUP/54 (note 102), Part I, pp. 2–3.

¹⁰⁴ BWC/AD HOC GROUP/54 (note 102), Part I, p. 2. At the 21st session 10 FoC dealt with the preamble, general provisions, definitions of terms and objective criteria, measures to promote compliance, investigations, confidentiality issues, legal issues, measures related to Article X (of the BTWC on cooperation), declaration formats, and the seat of the organization.

ber of informal consultations with representatives of participating states parties before and during the sessions. These often bilateral discussions focused on disputed issues in the rolling text in the hope that states with a strong view on a particular point might be willing to modify their positions.¹⁰⁵ Practical solutions were conceptually explored with due regard for traditional security assurances and the right to economic and technological development under the BTWC. Tóth orally reported the substantive outcomes of the meetings on a weekly basis to the AHG and presented a synopsis at the end of the session in order to maintain transparency.¹⁰⁶

In the latter half of 2000 it became increasingly clear that the negotiating approach of having the FoC focus on particular aspects of the rolling text had reached its useful limits and that the major outstanding issues were all interconnected. In 2001 the participating states will have to consider the draft protocol in its entirety.¹⁰⁷ To this end, Tóth requested the assistance of several facilitators, who will focus on harmonization of time lines for activities and measures in the protocol. They will also address structural issues, editorial matters, the establishment of a Preparatory Commission, the headquarters agreement with the host country and the legal aspects of the protocol.¹⁰⁸

The industrialized and developing countries hold significantly different views on the concrete measures to implement Article X of the BTWC. These are contained in Article VII, Scientific and technological exchange for peaceful purposes and technical cooperation, of the draft protocol. In 2000 there was a considerable reduction of square brackets, which indicate reservations or objections by one or more participating states. This enabled the further development of the proposed Cooperation Committee, which will review the implementation of measures and make recommendations with respect to scientific and technological exchanges.¹⁰⁹ It will also make recommendations to the Executive Council of the future organization regarding: (a) the cooperative relationship of the organization with other international organizations; (b) the programmes and activities of the TS; and (c) the use of voluntary fund and contributions, as well as funds from the regular budget, in activities related to international cooperation. The Executive Council can act on any of these recommendations as it deems appropriate.¹¹⁰ Whether the Coordination Committee will be able to develop a framework for activities promoting scientific and technological exchanges and technological cooperation remained uncertain.¹¹¹

While there was strong political insistence on completing the protocol before the Fifth Review Conference, the pharmaceutical industry in Europe,

¹⁰⁵ Ad Hoc Group document BWC/AD HOC GROUP/52, Part I, 16 Aug. 2000, p. 3.

¹⁰⁶ BWC/AD HOC GROUP/52 (note 105), Part I, p. 3; and BWC/AD HOC GROUP/54 (note 102), Part I, p. 3.

¹⁰⁷ Pearson, G. S., 'Strengthening the Biological and Toxin Weapons Convention', *CBW Conventions Bulletin*, no. 50 (Dec. 2000), p. 25.

¹⁰⁸ BWC/AD HOC GROUP/54 (note 102), Part I, p. 4.

¹⁰⁹ BWC/AD HOC GROUP/54 (note 102), 18 Dec. 2000, Article VII, (D) Institutional mechanisms for international cooperation and protocol implementation assistance, pp. 104–106.

¹¹⁰ BWC/AD HOC GROUP/54 (note 102), Article VII, (D), p. 105.

¹¹¹ BWC/AD HOC GROUP/54 (note 102), Article VII, (D), p. 105.

Japan and the USA remained reluctant to endorse the proposed compliance and verification measures, despite their continued pledge to uphold and support the objectives of the BTWC.¹¹² Furthermore, the divergent views on the scope of visits and investigations both between and among industrialized and developing countries intensified the stalemate on verification measures. The debate on verification measures is also linked to that on international cooperation. The Western Group accepts that incentives are required to persuade certain developing countries to ratify the protocol. However, the need to promote international cooperation and technological exchanges in the biological sciences cannot be at the expense of national security guarantees. Several non-aligned countries, particularly Cuba and Iran, voiced concern over what they perceive to be the discriminatory nature of export controls and export control regimes, which many industrialized states wish to maintain after the entry into force of the protocol.¹¹³ This view is countered by the assertion that export controls are consistent with Article III of the BTWC and that they complement the security provided for by the protocol regime, as long as they do not unjustly hamper economic development.¹¹⁴

The Netherlands and Switzerland submitted their proposals to host the future organization in The Hague and Geneva, respectively.¹¹⁵ At the 21st session of the AHG they outlined the basis of their bids.

In 2000 some progress was made in the negotiation of the protocol. However, there was no breakthrough on some of the issues which divide the industrialized and developing countries or which are disputed among them. Towards the end of the year few square brackets were being removed and, in the search for consensus, some of the original proposals for key verification and compliance assurance provisions were weakened. Among the supporters of a strong and meaningful protocol there is rising concern about the additional compromises that may be needed to finalize the negotiations. Perhaps more than any other factor, in 2001 the position of the USA as a major power and as the world leader in biotechnology will determine the outcome. However, the election of a US President whose administration is highly sceptical of arms control will not facilitate compromise, especially in the area of verification, unless the text is weakened beyond usefulness. There is a sense of urgency, dictated by the deadline of the Fifth Review Conference at the end of 2001, to conclude the protocol negotiations. The Fifth Review Conference may have to halt the negotiations without a protocol, renew the AHG mandate

¹¹² Pharmaceutical Research and Manufacturers of America (PhRMA), Scientific and Regulatory Affairs, Compliance Protocol to the Biological Weapons Convention: A Joint Position of European, United States and Japanese Industry, 30 July 2000, URL <<http://srpub.phrma.org/bwc/07.30.00.bwc.protocol.html>>.

¹¹³ Ad Hoc Group document BWC/AD HOC GROUP/WP.426, 2 Aug. 2000.

¹¹⁴ Ad Hoc Group document BWC/AD HOC GROUP/WP.424, 20 July 2000. This position is being strongly upheld by the UK. Emphasis is placed on the benefits of mutually reinforcing, overlapping arms control regimes, such as the protocol, in addition to national export controls. It is also stated that the rigorous application of export controls provides security benefits for all parties, not just Western countries, by reducing the chance that BW will be developed and used anywhere.

¹¹⁵ BWC/AD HOC GROUP/54 (note 102), Part I, pp. 4–5.

in the hope of achieving a protocol by the Sixth Review Conference, in 2006, or create a new mandate with a different approach.

IV. Allegations of CBW proliferation and use

In 2000 allegations of CBW proliferation and use were made by US agencies and officials as well as by other states. There is particular concern because some CWC parties were accused of developing or using CW by other parties. However, these accusations were not accompanied by requests for challenge inspections, investigations of alleged use or emergency assistance. Because of its confidentiality policy the OPCW is unable to shed light on such allegations, although in one instance related to Iran (discussed below) the OPCW Director-General issued a statement. The uncertainty resulting from unsubstantiated allegations is detrimental to the confidence that the CWC security regime should generate. The OPCW also received two reports from NGOs alleging the use of CW, but the Director-General stated that an investigation can only be launched at the request of a state party.¹¹⁶

In 2000 US sources continued to list approximately 20 states of CBW proliferation concern. The list includes states of primary proliferation concern—China, India, Iran, Iraq, Libya, North Korea, Pakistan and Syria—as well as Algeria, Cuba, Egypt, Ethiopia, Israel, Kazakhstan, Myanmar, Russia, Sudan, Taiwan, Ukraine, Uzbekistan and Viet Nam.¹¹⁷ In some cases the allegations merely reflect information supplied by parties under the BTWC and the CWC declaration mechanisms. The allegations include accusations that a particular country possesses the capability to produce CBW, has a rudimentary programme, is actually producing CBW or is stockpiling such weapons.

The CBW proliferation debate in 2000 was increasingly influenced by the emphasis on the dangers posed by asymmetric warfare (i.e., certain states might try to offset the conventional superiority of advanced powers with CBW and exploit the fact that parties to the BTWC and the CWC have denied themselves these weapons).¹¹⁸ Other concerns related to the future application of biotechnology to weapon development, the increasing self-sufficiency of BW programmes, the difficulty of detecting CBW programmes, the use of denial and deception techniques for hiding such activities, and advances in dissemination techniques.¹¹⁹

¹¹⁶ Bustani, J. M., 'Opening statement by the Director-General to the Eighteenth Session of the Executive Council', 15 Feb. 2000, para. 37.

¹¹⁷ US Central Intelligence Agency (CIA), Unclassified Report to Congress on the Acquisition of Technology Relating to Weapons of Mass Destruction and Advanced Conventional Munitions, 1 July Through 31 December 1999, URL <http://www.odci.gov/cia/publications/bian/bian_aug2000.htm>; US Department of Defense, Chemical and Biological Defense Program, Annual Report to Congress, Mar. 2000, URL <<http://www.defenselink.mil/pubs/chembio02012000.pdf>>; and Office of the Secretary of Defense, Proliferation: Threat and Response, Jan. 2001, URL <<http://www.defenselink.mil/pubs/ptr200101110.pdf>>.

¹¹⁸ O'Brien, K. and Nusbaum, J., 'Intelligence gathering on asymmetric threats: part one', *Jane's Intelligence Review*, vol. 12, no. 10 (Oct. 2000), pp. 50–55.

¹¹⁹ US Department of State, 'CIA Director Tenet outlines threats to national security', *Washington File*, 21 Mar. 2000, URL <<http://www.state.gov/>>.

Allegations of CBW programmes in Iran

Iran is a party to the BTWC and the CWC and has been an active participant in the implementation of the CWC and in the AHG that is negotiating a protocol to the BTWC. As a consequence of the large-scale Iraqi chemical attacks during the 1980–88 Iraq–Iran War and the lack of international response to Iraq’s violation of the Geneva Protocol, Iran wants to maximize the security guarantees under both disarmament treaties. Iran has also offered concrete assistance to the OPCW in the event of a CW attack on another state party. As a developing country, it seeks the widest possible access to technologies for legitimate purposes under the international cooperation provisions of the BTWC and the CWC.

Israel and the USA appear to be particularly doubtful of Iran’s commitment to the BTWC and the CWC. The US Central Intelligence Agency (CIA) has reported that Iran has stockpiled hundreds of tonnes of bulk and weaponized (i.e., prepared to deliver as weapons) blister, blood and choking agents in violation of the CWC and that it has attempted to obtain technology, training and precursor chemicals from China and Russia.¹²⁰ The USA has also accused China of violating the CWC by providing Iran with chemical precursors, production equipment and other technologies, and the China Nonproliferation Act was introduced in the US Congress in response to these allegations.¹²¹ The USA also claims that Iran has a BW programme in the late stages of research and development and that it already holds some stocks of agents and weapons.¹²² Furthermore, the USA claims that Iran possesses considerable expertise in biological agent production, and it has been suggested that research done at legitimate Iranian biomedical institutes could also support BW programmes.¹²³ The USA alleges that Iran is now concentrating on indigenous efforts to pursue its CBW objectives because of the limits that multilateral export controls have placed on its activities. It also fears that Iran might become a supplier of CBW-related materials to other states.¹²⁴

Some analysts disagree that Iran has stockpiled CBW but contend that it is building surge capabilities for their manufacture in an emergency, concealing the programmes as legitimate activities. It is claimed that Iraq, not the USA, is the main motivator for Iran’s acquisition programmes. Iraq poses an enormous

¹²⁰ US Central Intelligence Agency (note 117); and US Department of State, ‘Iran is still seeking WMD capabilities’, *Washington File*, 5 Oct. 2000, URL <<http://www.state.gov/>>.

¹²¹ The act, originally aimed at China, now targets all suppliers of ‘weapons of mass destruction’ as identified by the Director of the CIA, not just China. It was introduced in the House of Representatives on 12 July 2000. US Department of State, ‘Draft summary of China Nonproliferation Act, Thompson Amendment to PNTR bill’, *Washington File*, 11 Sep. 2000, URL <<http://www.state.gov/>>; and US Department of State, ‘Senator Thompson revises China Nonproliferation Act’, *Washington File*, 26 July 2000, URL <<http://www.state.gov/>>.

¹²² US Department of State (note 119).

¹²³ US Department of State, ‘US nonproliferation chief sees positive steps taken by Russia’, *Washington File*, 5 Oct. 2000, URL <<http://www.state.gov/>>.

¹²⁴ US Department of State (note 119).

security dilemma to Iran, which considers that the collapse of the UN inspection regime in Iraq has considerably worsened its security environment.¹²⁵

The USA has not requested a CWC challenge inspection in Iran but appears to be contemplating such an action. At the Fifth CSP the USA noted that through the bilateral consultations under Article IX of the CWC it was able to address some outstanding questions regarding the declarations which some parties had submitted to the OPCW. However, the US statement added that other parties had been less responsive to US inquiries. The USA therefore 'will continue to engage these States Parties bilaterally before contemplating other measures'.¹²⁶ During a February evaluation meeting of the mock challenge inspection in Brazil in October 1999 the Iranian representative highlighted the importance of the consultation procedure but added, in a possible reference to the nature of diplomatic interaction between Iran and the USA, that this 'procedure is especially valid and fruitful when [the] two states involved have appropriate channels for exchanging information'.¹²⁷

In autumn 2000 the *OPCW Synthesis* published a contribution by an Israeli analyst which stated that Israeli critics of the CWC claim that 'the verification regime will be ineffective and that signatories such as Iran will be able to violate the CWC'. He added that Israel perceives Iran's participation in the OPCW as less than credible.¹²⁸ The article drew a furious response from Iran, and as a result the OPCW Director-General issued a formal statement which, in addition to an apology regarding the editorial policy, reiterated that the TS 'has no reason whatsoever to question Iran's full compliance with the CWC and that the application of verification measures in Iran is strictly in accordance with the Convention'. He also noted that all verification activities in Iran had been conducted 'in an atmosphere of openness and transparency, and with the full cooperation of the Iranian Government'.¹²⁹

Pakistani allegations of Indian CW possession and use

Despite the fact that India and Pakistan are both parties to the CWC and adopted their respective national implementation legislation in 2000, there were unsubstantiated reports in the Pakistani press that India has stockpiled methyl isocyanate, phosgene, tabun, sarin, soman, and other respiratory and skin irritants. There were also allegations that India supplied phosgene to Iraq prior to the Persian Gulf War.¹³⁰ Pakistani news sources also accused India of

¹²⁵ Kay, D., 'Threat briefing and proliferation issues', Paper presented at the Jane's Conference on Weapons of Mass Destruction: Reaction in the Face of Uncertainty, Washington, DC, 2–3 Oct. 2000.

¹²⁶ USA, Statement to the Conference of States Parties at its Fifth Session on the status of the implementation of the convention, OPCW, Conference of States Parties Fifth Session document C-V/NAT.2, 18 May 2000, para. 4.

¹²⁷ 'Challenge inspection: the Iranian view', *OPCW Synthesis*, May 2000, p. 21.

¹²⁸ Steinberg, G. M., 'Israeli policy on the CWC', *OPCW Synthesis*, Nov. 2000, pp. 30–31.

¹²⁹ OPCW, 'Statement by Director-General of the OPCW', The Hague, Letter distributed to subscribers to *OPCW Synthesis*, 8 Dec. 2000.

¹³⁰ Sharif, M. A., 'Pak defence sources: India supplied "war gas" to Iraq', *The News* (Islamabad), FBIS-NES-2000-0120, 20 Jan. 2000. Phosgene (carbonyl dichloride) has widespread industrial application, a fact which was recognized by the inclusion of this World War 1 agent in Schedule 3 of the CWC.

using CW against Pakistani troops in the Lipa Valley and Siachen glacier along the Line of Control between India and Pakistan in Kashmir. In October the opposition leader in the Azad Kashmir Assembly claimed that India's use of CW in Kashmir had begun to contaminate the land.¹³¹ Pakistani newspapers urged the government to take the matter to the United Nations and to demand an investigation of India's alleged violation of its treaty commitments.¹³² The Pakistani Government did not request an investigation from the OPCW.

North Korea

For several years South Korea has claimed that North Korea possesses 2500–5000 tonnes of chemical weapons.¹³³ A US DOD report asserted that North Korea is self-sufficient in the production of first-generation chemical agents and has stockpiled munitions of as much as 5000 tonnes of nerve, blood and blister agents. It also claimed that North Korea has the capability to produce and weaponize biological agents such as anthrax and smallpox.¹³⁴ According to the CIA, the USA is probably more concerned about North Korea's involvement in the missile and alleged CBW programmes in other states, including Egypt, Iran, Iraq, Pakistan and Syria.¹³⁵

In order to protect against possible CBW use, the USA has established two biological–chemical warfare response teams in South Korea, ordered its troops in South Korea to take anthrax vaccinations and installed portal shields at major South Korean bases to detect biological warfare agents.¹³⁶

Relations between North and South Korea improved dramatically in 2000, and a summit meeting was held in Pyongyang in June. According to a subsequent statement by a South Korean Defence Ministry official, the South Korean Government is considering a proposal for North and South Korea to scrap or reduce their respective CW holdings.¹³⁷ North Korea also attempted to improve its relations with the USA. In October US Secretary of State Madeleine Albright met with North Korean President Kim Jong Il. However, talks with the USA focused on nuclear weapons and ballistic missiles and CBW did not appear to be prioritized.

¹³¹ 'Urdu daily claims CW employed by India in Kashmir', in *Rawalpindi Nawa-I-Waqt*, FBIS-NES-2000-1004, 3 Oct. 2000 (in Urdu); and SAP (Islamabad), 16 Oct. 2000, in 'India said using chemical weapons along line of control', FBIS-NES-2000-1016, 17 Oct. 2000 (in Urdu).

¹³² 'Urdu daily claims CW employed by India in Kashmir' (note 131).

¹³³ Yonhap (Seoul), 10 May 2000, in 'DPRK alleged to possess 2.5-5K tons of chemical weapons', FBIS-EAS-2000-0510, 10 May 2000.

¹³⁴ US Secretary of Defense, *2000 Report to Congress: Military Situation on the Korean Peninsula*, 12 Sep. 2000, available at URL <<http://www.defenselink.mil/newsSept2000/korea09122000.html>>.

¹³⁵ US Central Intelligence Agency (note 117).

¹³⁶ Yonhap (Seoul), 30 Mar. 2000, in 'USFK sets up 2 bio-chemical warfare companies in ROK', FBIS-EAS-2000-0330, 30 Mar. 2000.

¹³⁷ '10 June', *CBW Conventions Bulletin*, no. 49 (Sep. 2000), p. 36.

South Africa's CBW programme

The trial of Brigadier Wouter Basson, the key figure in South Africa's Project Coast CBW programme, continued in 2000. Most of the information that emerged from the court proceedings and the 1998 Truth and Reconciliation Commission hearings has been on the development and use of a variety of agents and delivery systems for assassination and the schemes to defraud that Basson set up in the late 1980s and early 1990s. Although one of the primary reasons for initiating the CBW programme in 1981 was a perceived chemical warfare threat following South Africa's intervention in the war in Angola from 1975, Project Coast apparently produced little 'classic' CBW.¹³⁸

The details of the weaponization of the crowd-control agent CR (dibenz (b,f)-1,4-oxazepine) emerged at the trial. CR is claimed to be more potent than the more common agent CS (ortho-chlorobenzylidene malononitrile). The powder was produced by Delta G Scientific and deliveries to the arms manufacturer Armscor peaked at 1 tonne per month. CR was weaponized by Swartklip Products at Phillippi between 1987 and 1994. The munitions that were filled with the agent included hand and rifle grenades, 8-mm mortar bombs and 1373, 155-mm artillery shells for the G5 gun, which has a range of up to 40 km. The mortar rounds to be filled with CR were delivered by Armscor. Swartklip used 155-mm shells that are normally loaded with a smoke agent.¹³⁹

The latter two types of munition, which were used by the South African National Defence Forces (SANDF), were developed in a Project Coast programme that focused on the development of crowd-control agents. Such agents were used for internal security as a consequence of riots and uprisings in the black townships (e.g., those which occurred in the aftermath of the shooting of students in Soweto in June 1976). Production ceased in 1994 following South Africa's signature of the CWC in January 1993. Floris Laubscher, a chemist at Swartklip Products, testified at the Basson trial that the CR in the 155-mm shells was replaced with a smoke agent and that the CR was subsequently destroyed.¹⁴⁰

South Africa did not declare this CW programme to the OPCW following the entry into force of the CWC. It reportedly destroyed approximately 1 tonne of the hallucinating agent BZ (3-quinuclidinyl benzilate) in 1993 because the agent is listed in the CWC schedules.¹⁴¹ However, chemicals that are not included in the schedules and their delivery systems are not considered CW under the CWC if they are used for domestic riot control provided that their

¹³⁸ For an overview of the various components of Project Coast, see Zanders, French and Pauwels (note 42), pp. 583–85; and Zanders and Wahlberg (note 42), pp. 530–31. Weekly reports of the Basson Trial are available from the Centre for Conflict Resolution, University of Capetown at URL <http://ccrweb.ccr.uct.ac.za/cbw/cbw_index.html>.

¹³⁹ Basson trial, week 24 report, 9 Jun. 2000, prepared and distributed by Chandré Gould and Marlene Burger, Centre for Conflict Resolution, University of Cape Town.

¹⁴⁰ Basson trial (note 138).

¹⁴¹ The researchers investigating the South African CBW programme have so far found no evidence documenting the CW destruction. Gould, C., Centre for Conflict Resolution, University of Cape Town, Private communication with Zanders, J. P., Jan. 2001.

type and quantity are consistent with such purposes. While CR is not listed in the CWC, mortar and artillery rounds are not used for riot-control purposes. No party to the CWC has declared a CW programme involving the military application of riot-control agents.¹⁴² The main reason to keep the CR programme secret was apparently to prevent the African National Congress (ANC) from acquiring data about the powerful crowd-control agent when it assumed control of the government after the 1994 elections. In that sense, the motivation for the decision was similar to the one regarding the termination of South Africa's nuclear weapon programme and the dismantlement of its nuclear devices in anticipation of the legalization of the ANC in 1990.¹⁴³

Anti-drug-crop biological agent development

There was controversy in 2000 about the legality under the BTWC and the ecological consequences of a US initiative to destroy narcotic crops with the biological agent *Fusarium oxysporum*. The US Department of Agriculture has been investigating the fungus since the 1980s. It is one of 30 commonly occurring varieties, and there are various strains of each type. The fungi cause diseases (including wilts, blights and root rots) in a wide variety of plants, but they also produce mycotoxins that may attack the cell membranes of hosts or protect them against encroaching organisms.¹⁴⁴

A proposed project to test the fungus against marijuana crops in Florida was cancelled in 1999 after objections were raised by local residents.¹⁴⁵ The USA subsequently sought to pursue these efforts in a multilateral framework. (It also continued initial bioherbicide work and quarantine testing at facilities in Florida and Maryland.¹⁴⁶) The UN Drug Control Programme (UNDCP), primarily with funding and urging from the USA, attempted to reach an agreement with Colombia to conduct a two-year test of a biological method of coca crop eradication. This process was to employ the EN-4 strain of *Fusarium*

¹⁴² OPCW official, Private communication with Zanders, J. P., Dec. 2000.

¹⁴³ Gould, C. and Folb, P., *SA Chemical and Biological Warfare Programme*, Interim draft report presented at a workshop, Pretoria, 29–31 Oct. 2000, and discussions at the workshop.

¹⁴⁴ Mycoherbicide.Net, 'Genera & species proposed for use as mycoherbicides against drug plants', URL <<http://www.mycoherbicide.net/MYCOLOGY/GENUS-SPECIES/genera-SPECIES.htm>>; and Mycoherbicide.Net, 'Mycotoxins in general', URL <<http://www.mycoherbicide.net/HEALTH/MYCOTOXINS/index.htm>>. The ecological concerns relate to the mutability of the (genetically engineered) fungus; the fear that in the future such a fungus might attack essential crops as it survives in the soil for many years without a host and variants of the fusarium fungus attack crops such as vegetables and grains; the possibility that the policy will introduce non-native strains of the agent into the local ecosystem with unknown environmental consequences; and the risk to human health, especially regarding people with weakened immune systems. Bartz, D., 'US presses Colombia to use herbicide on coca', 24 July 2000, URL <<http://www.tni.org/drugs/document/reu240700.htm>>; Golden, T., 'Fungus considered as a tool to kill coca in Colombia', *New York Times* (Internet edn), 6 July 2000, URL <www.nytimes.com/library/world/americas/070600colombia-drugs.html>; Kotler, J., 'Colombia against using fungus', 15 July 2000, URL <<http://www.tni.org/drugs/document/ap10700.htm>>; and Stevenson, S. and Bigwood, J., 'Drug control or biowarfare', *MoJo Wire*, 6 July 2000, URL <http://www.motherjones.com/news_wire/coca.html>.

¹⁴⁵ Kleiner, K., 'Operation Eradicate', *New Scientist*, 11 Sep. 1999, URL <<http://www.newscientist.com/ns/19990911/newsstory10.html>>.

¹⁴⁶ Burks, K., Bureau of Invasive Plant Management, Division of State Lands, Florida Department of Environmental Protection, Private communication with J. Simon, 25 Oct. 2000.

oxysporum (dubbed 'Agent Green' by opponents). In July 2000 Colombia refused to participate.¹⁴⁷ On 22 August US President Bill Clinton, reacting to suggestions that the fungus could be considered a BW, deleted the condition of 'aerial spraying of chemical herbicides; [and] tested, environmentally safe mycoherbicides' from the large 'drug war' aid package to Colombia.¹⁴⁸ Under pressure from the USA, the Colombian Government considered domestic development of similar agents, but ultimately rejected the plan.¹⁴⁹

The Andean Committee of Environmental Authorities rejected the use of the fungus in their states, and the Inter-American Drug Abuse Control Commission of the Organization of American States (OAS) stated that it does not support and is not involved in biological drug-crop eradication programmes.¹⁵⁰

The UNDCP reacted strongly to suggestions that the use of these mycoherbicides on Colombian coca crops constituted biological warfare.¹⁵¹ It argued that it had been looking into a potentially environment-friendly method of crop control. According to subsequent statements by UNDCP representatives, the agency is not currently planning or discussing a biological control programme in Colombia or any other Andean country.¹⁵² However, the UNDCP was forced to respond to similar allegations in 1998 with respect to a poppy fungus (*Pleospora papaveracea*) project that it was sponsoring at the Institute of Genetics in Tashkent, Uzbekistan.¹⁵³ The programme was launched in 1989, and following the collapse of the Soviet Union work continued with UNDCP assistance in institutes (including former weapon laboratories) in several former Soviet republics. A British Broadcasting Corporation (BBC) report in October 2000 suggested that the cash-strapped Institute of Genetics might sell the fungus to 'private parties' such as drug cartels if it did not receive additional funding from the UK and the USA.¹⁵⁴ However, experts have played down the threat potential suggesting that it would be difficult to adapt the fungus so that it would attack legitimate crops and that the use of the fungus against opium poppies has thus far been largely ineffective.¹⁵⁵

¹⁴⁷ Kotler (note 144).

¹⁴⁸ Presidential Determination no. 2000-28, Memorandum for the Secretary of State, Presidential Determination on Waiver of Certification Under Section 3201 'Conditions on assistance for Colombia', in Title III, chapter 2 of the Emergency Supplemental Act, FY 2000, as Enacted in Public Law 106-246 (White House, Office of the Press Secretary: Washington, DC, 2000).

¹⁴⁹ Sunshine Project, 'Colombia abandons research on biological agents for drug eradication', Press Release, 25 Jan. 2001, URL <<http://www.sunshine-project.org>>.

¹⁵⁰ Hammond, E., Sunshine Project, Private communication with J. Simon, 6 Nov. 2000; and Stevenson, S., 'Andean nations say no to coca-killing fungus', Mycoherbicide.Net, 7 Sep. 2000, URL <<http://www.mycoherbicide.net/caamartilesss.htm>>.

¹⁵¹ United Nations, UN: no plans for 'biological war' on coca, drug control programme head refutes report of proposal to test fungal herbicides in Colombia, UN document UNIS/NAR/694, 5 Sep. 2000.

¹⁵² Accion Adina, Sunshine Project, Transnational Institute, 'United Nations pulls out of plans to use anti-drug biological weapons in South America', Press Release, 9 Nov. 2000.

¹⁵³ United Nations, Poppy fungus project is not 'biological warfare', says UN, UN Document UNIS/NAR/643, 1 July 1998.

¹⁵⁴ 'Britain's secret war on drugs', BBC One, 2 Oct. 2000, 2200 BST; and 'West funds anti-opium fungus', BBC News, 1 Oct. 2000, URL <http://news.bbc.co.uk/hi/english/world/south_asia/newsid_951000/951082.stm>.

¹⁵⁵ Stone, R., 'Experts call fungus threat poppycock', *Science*, vol. 290 (13 Oct. 2000), p. 246.

While the development and use of biological crop control agents are legal under the BTWC, some questions have been raised about the legality of the programme in Colombia. Some US legal experts have argued that such use does not violate the BTWC as long as there is governmental approval from the state within which the fungicide is used, but in the Colombian case this position is questionable since the spraying of the fungus was one of the conditions of the US anti-drug aid package.¹⁵⁶ (In contrast, use without governmental consent is viewed as a violation of the BTWC.¹⁵⁷) However, since left-wing guerrillas in Colombia rely on the drug trade as an important source of income to sustain their armed struggle against the government, the use of the mycoherbicide against their crops can be viewed as part of the military campaign and thus may constitute a method of warfare (although the BTWC does not clarify the concept of 'hostile purposes'), which the BTWC prohibits under any circumstances. It is also conceivable that such use could lead to a request for an investigation of a suspicious outbreak of disease under the future protocol to the BTWC and that the proliferation of the technology contributes to its abuse for illegitimate purposes.

Additional reports of CBW proliferation and use

Chechnya

In 2000 Chechen and Russian troops accused each other of using CW in Grozny. In January Chechen rebels accused Russian troops of attacking them with toxic chlorine and ammonia bombs, a charge denied by the Russian authorities who, in turn, accused the Chechen rebels of setting off toxic bombs to manufacture false evidence.¹⁵⁸ There were unconfirmed claims in February that Russia was conducting experiments with chemical and biological agents on Chechen prisoners.¹⁵⁹ In response, Russia accused the Chechen rebels of using shells containing chlorine and ammonia.¹⁶⁰ In March Russian police reported the seizure of 10 tonnes of chlorine that had been stored in Grozny by Chechen rebels.¹⁶¹ In May an arms depot that allegedly contained a nerve agent was reported to have been discovered in the Chechen village Avtury.¹⁶²

¹⁵⁶ Golden, T., 'Fungus considered as a tool to kill coca in Colombia', *New York Times* (Internet edn), 6 July 2000, URL <www.nytimes.com/library/world/americas/070600colombia-drugs.html>.

¹⁵⁷ Rogers, P., Whitby, S. and Dando, M., 'Biological warfare against crops', *Scientific American*, June 1999, p. 67.

¹⁵⁸ Interfax (Moscow), 'Russian military refutes chemical weapons allegations', 5 Jan. 2000, FBIS-SOV-2000-0105, 5 Jan. 2000; and ITAR-TASS, 'Chechens say Russian troops using chemical weapons', 6 Jan. 2000, FBIS-SOV-2000-0106, 6 Jan. 2000.

¹⁵⁹ Kavkaz-Tsentr News Agency, 'Chechen intelligence boss says experiments being carried out in secret camp', 25 Feb. 2000, cited in *HSP Rolling Chronicle*, no. 48 (12 Sep. 2000), p. 26.

¹⁶⁰ BBC News, 'Russian soldiers admit Grozny losses', 5 Jan. 2000, URL <<http://news6.thdo.bbc.co.uk/hi/english/world/europe/newsid%5F591000/591928.stm>>; and Interfax (Moscow), 'Russian military refutes chemical weapons allegations', 5 Jan. 2000, FBIS-SOV-2000-0105, 5 Jan. 2000.

¹⁶¹ ITAR-TASS, 'Russians discover chlorine, arms caches in Grozny', 12 Mar. 2000, FBIS-SOV-2000-0312, 12 Mar. 2000 (in Russian).

¹⁶² ITAR-TASS, Sobetsky, Y., 'Nerve gas found in ammunition depot in Chechnya', 20 May 2000, FBIS-SOV-2000-0520, 20 May 2000.

Syria

There have been claims that Syria has an advanced CW programme which includes the stockpiling and weaponization of the nerve agent sarin and the toxin ricin. It is also alleged to be developing missiles with North Korean and Russian assistance, leading to speculation that it might be able to deliver sarin using Scud-D missiles.¹⁶³ According to US officials, the weaponization efforts have been primarily indigenous, although Syria remains dependent on foreign suppliers for precursor chemicals and other key equipment.¹⁶⁴

The Democratic Republic of the Congo

In the summer of 2000 President of the Democratic Republic of the Congo Laurent-Désiré Kabila accused Rwanda's armed forces of using CW in the Likasi area in Katanga province. Rwandan officials dismissed the accusations.¹⁶⁵

Angola

Elsewhere in Africa, the União Nacional Para a Independência Total de Angola (National Union for the Total Independence of Angola, UNITA) accused the Angolan Government of chemical warfare against its forces and civilians.¹⁶⁶ The Angolan Army countered with claims that it had discovered a UNITA chemical arms cache but declined to give details.¹⁶⁷

Initiatives to counter CBW proliferation*NATO Weapons of Mass Destruction Centre*

The NATO Weapons of Mass Destruction (WMD) Centre, which was created at NATO's 50th anniversary summit meeting in Washington in April 1999, was inaugurated in May 2000. The centre is in the early stages of development and expects to employ a staff of 8–12 people.¹⁶⁸ Planned functions include the maintenance of a database designed to facilitate information sharing on WMD withdrawal and dismantling in the former Soviet Union, to serve as a repository for information on WMD-related civil response programmes in

¹⁶³ US Central Intelligence Agency (note 120); 'Syria's missile program takes a step', Strategic Forecasting (Stratfor), 31 May 2000, URL <<http://www.stratfor.com/MEAF/commentary/0005310008.htm>>; and Fishman, A., 'Syria armed with especially fatal weapon', *Yedi'ot Aharonot*, 25 Jan. 2000, p. 11.

¹⁶⁴ Koch, A., 'USA, Israel say Syria continues with WMD', *Jane's Defence Weekly*, vol. 34, no. 5 (11 Oct. 2000), p. 32.

¹⁶⁵ Panafrican News Agency, 'Rwanda disputes use of chemical weapons in DRC', 2 Aug. 2000, URL <<http://www.africanews.org/PANA7news/20000802/feat10.html>>.

¹⁶⁶ South African Press Association–Agence France-Presse (Sapa-AFP), 'Angolan Army discovers big UNITA arms depot, claims 400 dead', 5 Jan. 2000, URL <<http://www.anc.org.za:80/ancdocs/briefing/new20000106/25.html>>; and *CBW Conventions Bulletin*, no. 49 (Sep. 2000), p. 29.

¹⁶⁷ BBC News, 'UN puts pressure on Angola rebels', 9 Jan. 2000, URL <<http://news6.thdo.bbc.co.uk/hi/english/world/africa/newsid%5F595000/595436.stm>>.

¹⁶⁸ Zadra, R., NATO WMD Centre, Private communication with J. Simon, 23 Aug. 2000.

NATO countries, to provide members with support in dealing with WMD issues and to develop documentation on WMD issues for the public.¹⁶⁹

Cooperative Defense Initiative

The USA emphasized its desire for security in the Middle East via the Cooperative Defense Initiative (CDI). The CDI will link friendly countries in the region to improve defences against CBW via measures such as an early-warning system. In discussions with Egypt, Kuwait, Qatar and Saudi Arabia in April 2000, US Secretary of Defense William Cohen emphasized the growing threat of attack with non-conventional weapons and CBW in particular. One component of the CDI would be a system to provide advance warning of missile attack in the Gulf region for the countries linked by the system.¹⁷⁰

Threat reduction efforts

Western states continued to fund programmes employing weapon designers, scientists and technicians in the former Soviet Union in order to prevent a so-called brain drain to states that may be interested in acquiring CBW and other non-conventional weaponry. The US Congress has authorized more than \$4.7 billion for programmes aimed at reducing the proliferation threat in Russia and the other newly independent states via programmes such as the DOD's CTR programme,¹⁷¹ the Department of Energy's Materials Protection, Control and Accountability Program, and the Department of State's International Science and Technology Center.¹⁷² These agencies have requested over \$880 million for FY 2001.¹⁷³ The Clinton Administration requested \$974 million for its Expanded Threat Reduction Initiative (ETRI) in 2001, an increase of \$85 million over the FY 2000 budget of \$888 million. ETRI programmes include funding science centres and other civilian research, enhanced border control and programmes to enhance regional security.¹⁷⁴ The

¹⁶⁹ Hain-Cole, C., 'The summit initiative on weapons of mass destruction: rationale and aims', *NATO Review* (Internet edn), vol. 47, no. 2 (summer 1999), pp. 33–34, URL <<http://www.nato.int/docu/review/1999/9902-08.htm>>.

¹⁷⁰ US Department of State, 'Secretary Cohen on Cooperative Defense Initiative following meeting with Mubarak in Cairo', *Washington File*, 4 Apr. 2000, URL <<http://www.state.gov/>>; US Department of State, 'Transcript: Cohen, Qatar Foreign Min. Al Thani discuss regional security', *Washington File*, 5 Apr. 2000, URL <<http://www.state.gov/>>; US Department of State, 'Transcript: press conference with Secretary of Defense Cohen in Kuwait', *Washington File*, 8 Apr. 2000, URL <<http://www.state.gov/>>; and US Department of State, 'Transcript: Cohen, Saudi Arabia's Prince Sultan media availability', *Washington File*, 9 Apr. 2000, URL <<http://www.state.gov/>>.

¹⁷¹ US General Accounting Office (note 80), p. 1. As of Mar. 2000 the DOD had expended c. \$1.7 billion of the \$3.2 billion that Congress has authorized for this programme. US General Accounting Office, *Cooperative Threat Reduction: DOD's 1997–98 Reports on Accounting Were Late and Incomplete*, GAO/NSIAD-00-40, Mar. 2000, p. 5.

¹⁷² US General Accounting Office (note 80), p. 3.

¹⁷³ US General Accounting Office (note 80), p. 4.

¹⁷⁴ US Department of State, 'Clinton says US must continue international engagement : FY 2001 budget to fund key foreign policy priorities', *Washington File*, 7 Feb. 2000, URL <<http://www.state.gov/>>.

British Government pledged to spend up to £100 million (c. \$147 million) in assistance through the EU to employ scientists in the TACIS programme.¹⁷⁵

In May, at a meeting in the once-secret CBW research complex at Obolensk, the USA announced \$1.6 million in additional funding from the EU, Japan and the USA.¹⁷⁶ In July the US Department of Energy (DOE) also announced a project of collaboration between US scientists and former Soviet weapon scientists on four non-military biological research projects as part of the effort to fight brain drain.¹⁷⁷ While such programmes continued to receive funding in 2000, there is increasing concern as to whether they are achieving their stated goals. The US GAO issued a report indicating that, despite the vast amount of money that has been spent, it is difficult to prove that there has been a positive impact. There are also concerns that the scientists sponsored by the programme could be accepting the money while assisting weapon development in other states.¹⁷⁸ However, thus far there appears to have been only a minimal dispersion of researchers from former Soviet CBW facilities to countries of proliferation concern.¹⁷⁹

Armenia concluded an agreement with the USA under which, on request, it will receive equipment, supplies and materials (provided that it does not transfer them without US approval and that the USA can examine their use on site) and technology, services and training. The USA will also be able to audit and examine all relevant documentation on 30-day written notice.¹⁸⁰ In addition, the USA signed agreements with Kyrgyzstan and Uzbekistan which provide each country with \$3 million in assistance for equipment and training in order to fight terrorism and illicit trafficking in nuclear, chemical and biological weapons.¹⁸¹ US funding for border export control and non-proliferation programmes in the region is included in the Security Assistance Act of 2000.¹⁸²

¹⁷⁵ Syal, R., 'Russia paid to stop weapons proliferation', *Electronic Telegraph*, issue 1717 (6 Feb. 2000), URL <<http://www.telegraph.co.uk>>.

¹⁷⁶ The majority of the additional funding comes from the DOD budget and is intended to be spent to upgrade security at Obolensk and lessen the risk of proliferation owing to theft or illegal diversion of materials. Thus far Obolensk has received \$3.4 million in US funding, but the scientists at Obolensk are still paid less than \$100 per month. Miller, J., 'Russia opens doors to lab that created deadly germs', *New York Times* (Internet edn), 24 May 2000, URL <<http://www.nytimes.com/library/world/europe/052400russia-science.html>>.

¹⁷⁷ US Department of State, 'US announces projects with former weapons Soviet weapons scientists', *Washington File*, 24 July 2000, URL <<http://www.state.gov/>>.

¹⁷⁸ US General Accounting Office (note 80), p. 2.

¹⁷⁹ Leitenberg, M., 'An assessment of the biological weapons threat to the United States', Paper presented at the Conference on Emerging Threats Assessment, Biological Terrorism, Institute for Security Technology Studies, Dartmouth College, 7–9 July 2000, p. 6.

¹⁸⁰ US Department of State, Agreement Between the Government of the United States of America and the Republic of Armenia Concerning Cooperation in the Area of Counterproliferation of Weapons of Mass Destruction, 24 July 2000, URL <http://www.defenselink.mil/news/Jul2000/20000724us_armenia.pdf>; and SNARK (Yerevan), 'US–Armenian non-proliferation of weapons treaty signed to negate Iranian threat', 10 Aug. 2000, FBIS-SOV-2000-0810, 8 Oct. 2000 (in Russian).

¹⁸¹ US Department of State, 'US border security assistance programs in Uzbekistan', *Washington File*, 18 Apr. 2000, URL <<http://www.state.gov/>>; and US Department of State, 'The United States border security assistance programs in Kyrgyzstan', *Washington File*, 17 Apr. 2000, URL <<http://www.state.gov/>>.

¹⁸² US Security Assistance Act of 2000, Public Law 106-280, 6 Oct. 2000.

Missile defence systems

One of the more controversial initiatives which the USA continued to pursue in 2000 to counter BW and CW proliferation was missile defence. Proponents have argued that missile defence systems would deter proliferants from developing or using missiles equipped with chemical or biological warheads.¹⁸³

V. CBW disarmament in Iraq

There was no progress towards the CBW disarmament of Iraq in 2000.¹⁸⁴ Iraq terminated all cooperation with the United Nations Special Commission on Iraq (UNSCOM) in 1998. The United Nations Monitoring, Verification and Inspection Commission (UNMOVIC) was created under UN Security Council Resolution 1284 in December 1999, but Iraq has refused to cooperate with UNMOVIC because it insists that it has already met all the disarmament requirements laid out in Resolution 687. However, significant amounts of Iraqi CBW and related materials remain unaccounted for.¹⁸⁵

In 2000 UNMOVIC was constituted by newly appointed Executive Chairman Hans Blix.¹⁸⁶ Resolution 1284 designates a College of Commissioners to review the implementation of relevant resolutions on Iraq and to provide the Executive Chairman with 'professional advice and guidance'.¹⁸⁷ On 10 March UN Secretary-General Kofi Annan appointed 16 commissioners.¹⁸⁸ Blix has indicated that his judgement will prevail over the College of Commissioners should there be disagreement.¹⁸⁹

In addition to the Office of the Executive Chairman, UNMOVIC has four divisions: the Division of Planning and Operations, which is responsible for

¹⁸³ See chapter 7 in this volume.

¹⁸⁴ UN Security Council Resolution 661 prohibited all exports and imports to and from Iraq. UN Security Council Resolution 661, 6 Aug. 1990. Resolution 687 (the so-called ceasefire resolution) made the lifting of the sanctions conditional on Iraq's compliance with the disarmament obligations and the return of Kuwaiti property and prisoners of war. An exemption to the sanctions was made for medicine, food and other humanitarian supplies. UN Security Council Resolution 687, 3 Apr. 1991. The oil-for-food programme, which was adopted by UN Security Council Resolution 986, permitted Iraq to sell a limited amount of oil to finance the purchase of medicine, food and other humanitarian supplies. UN Security Council Resolution 986, 14 Apr. 1995. Resolution 1284 stipulated that the sanctions could be lifted if Iraq cooperates with UNMOVIC, provided that there are mechanisms in place to ensure that Iraq does not acquire prohibited items. It also removed the limit on the amount of oil which Iraq may export under the oil-for-food deal. UN Security Council Resolution 1284, 17 Dec. 1999.

¹⁸⁵ The creation of UNMOVIC and the status of Iraq's disarmament is described in Wahlberg, M., Leitenberg, M. and Zanders, J. P., 'The future of chemical and biological weapon disarmament in Iraq: from UNSCOM to UNMOVIC', *SIPRI Yearbook 2000: Armaments, Disarmament and International Security* (Oxford University Press: Oxford, 2000), pp. 560–75.

¹⁸⁶ Blix assumed his post on 1 Mar. 2000. Secretary-General appoints Hans Blix of Sweden Executive Chairman of UN Monitoring, Verification and Inspection Commission, Press Release, UN document SG/A/721, 27 Jan. 2000; and United Nations, Press Briefing by Chairman of United Nations Monitoring, Verification and Inspection Commission, 1 Mar. 2000, URL <<http://www.un.org/News/briefings/docs/2000/20000301.blix.doc.html>>.

¹⁸⁷ UN Security Council Resolution 1284 (note 184), para. 5.

¹⁸⁸ The commissioners, who are of various nationalities, are diplomats or technical experts. Secretary-General appoints 16 commissioners for UN Monitoring, Verification and Inspection Commission, Press Release, UN document SG/A/724 IK/289, 10 Mar. 2000.

¹⁸⁹ United Nations (note 186).

planning and directing and performing monitoring, verification and inspection activities; the Division of Analysis and Assessment, which analyses and assesses information; the Division of Information, which maintains UNMOVIC's database and archives; and the Division of Technical Support and Training, which provides logistical and technical support and conducts technical and cultural training programmes for UNMOVIC inspectors. There is also an Administrative Service.¹⁹⁰ Resolution 1284 stipulates that the UNMOVIC staff are to be UN employees and drawn from the broadest possible geographical base.¹⁹¹ In August UNMOVIC reported that the recruitment of headquarters-based core staff was near completion. Only 12 to 15 staff members had been formerly employed by UNSCOM.¹⁹²

Resolution 1284 stresses that UNMOVIC should establish and operate a reinforced system of monitoring and verification that would integrate the UNSCOM inspection and verification tasks. In practice, this amounts to an approach that is similar to that taken by UNSCOM. UNMOVIC's organizational plan comprises on-site inspections (including no-notice inspections), interviews with officials, analysis of Iraqi documentation and sample analysis. UNMOVIC is to be equipped so that photographs can be taken from both the ground and the air and so that it can conduct its own aerial surveillance.¹⁹³ The introduction of the integrated monitoring and verification system means that there will be no organizational, work or staff divisions between the disarmament and the monitoring activities. UNMOVIC has begun to develop inspection procedures and to review the format for Iraq's monitoring declarations.¹⁹⁴ The College of Commissioners is reported to have discussed the procedures for field operations (in particular for 'sensitive sites'), inspector guidelines and standard operating and sampling procedures.¹⁹⁵

Iraq maintains that it will not allow new inspections unless the sanctions are lifted and the UK and the USA cease bombing.¹⁹⁶ As long as Iraq refuses to cooperate, the prospect of the resumption of inspections depends on the ability and willingness of the Security Council to pressure Iraq to accept the conditions of Resolution 1284. However, there is disagreement among the permanent members of the Security Council on how to deal with Iraq. China, France and Russia abstained during the vote on Resolution 1284 and expressed the view that the resolution does not offer Iraq a clear path to sanctions relief.¹⁹⁷ In

¹⁹⁰ Note by the Secretary-General, UN document S/2000/292, 6 Apr. 2000, pp. 7–10.

¹⁹¹ UNSCOM relied on staff seconded by UN member governments.

¹⁹² Note by the Secretary-General, UN document S/2000/835, 28 Aug. 2000; and Briefing on UNMOVIC by Hans Blix to the SIPRI Research Staff Collegium, 3 Oct. 2000.

¹⁹³ Note by the Secretary-General (note 190), p. 5.

¹⁹⁴ Note by the Secretary-General (note 192), 28 Aug. 2000, p. 4.

¹⁹⁵ Note by the Secretary-General (note 192), p. 2.

¹⁹⁶ 'No movement over UNMOVIC', *Disarmament Diplomacy*, no. 47 (June 2000), p. 63. In 1999 and 2000 British and US aircraft patrolling the no-fly zones in northern and southern Iraq regularly bombed military targets in Iraq when threatened by Iraqi air defence forces.

¹⁹⁷ Security Council establishes new monitoring commission for Iraq adopting Resolution 1284 (1999) by vote of 11–0–4, Press Release, UN document SC/6775, 17 Dec. 1999.

addition, the Clinton Administration ruled out the use of force to coerce Iraq to cooperate with UNMOVIC.¹⁹⁸

Iraq may be less inclined to cooperate with UNMOVIC since the international embargo appears to be collapsing and the international community seems less determined to keep Iraq isolated. Concern about the impact of the sanctions on the Iraqi population has been expressed by senior UN officials, humanitarian and human rights organizations, the European Parliament, a group of 77 US congressmen and a UN commission on human rights, among others.¹⁹⁹ Diplomatic contacts with Iraq increased in 2000, and trade delegations from a number of countries are reportedly competing for Iraqi contracts.²⁰⁰

VI. Delayed toxic effects of the modern battlefield

Almost a decade after the end of the Persian Gulf War there is still no satisfactory explanation for the collective health problems, known as the Gulf War illnesses (GWI), which afflict a large number of British and US veterans, as well as a smaller number of veterans from other Coalition states.²⁰¹ The British Ministry of Defence (MOD) now acknowledges that there is strong scientific evidence that Gulf War veterans suffer ill health up to three times more often than comparable groups.²⁰² The British and US governments have investigated several potential causes of GWI, including pretreatment with drugs to counter the effects of CBW, stress and exposure to chemical agents, oil-well fires and depleted uranium (DU).²⁰³ There appears to be a general understanding that the

¹⁹⁸ Crossette, B. and Myers, S. L., 'US forswears force over Iraq inspections', *New York Times* (Internet edn), 13 Sep. 2000, URL <<http://www.nytimes.com>>.

¹⁹⁹ United Nations Children's Fund (UNICEF), 'Iraq surveys show "humanitarian emergency"', URL <<http://www.unicef.org/newsline/99pr29.htm>>; 'No sign of UNMOVIC beginning work as spotlight remains on impact of sanctions in Iraq', *Disarmament Diplomacy*, no. 44 (Mar. 2000), pp. 52–53; European Parliament resolution on the situation in Iraq, B5-0342, 0365 and 0374/2000, PE 289.456, *European Parliament 2000–2001: Texts adopted at the sitting of Thursday, 13 Apr. 2000*, TA 10, 13 Apr. 2000, available at URL <<http://www.mede.be/en/index452.htm>>; United Nations, Subcommittee on the Promotion and Protection of Human Rights, Press Release, 18 Aug. 2000; and Pisik, B., 'Iraq trade doing fine despite sanctions', *Washington Times*, 25 Oct. 2000, URL <<http://www.washtimes.com/world/default-20001025221725.html>>.

²⁰⁰ Rusanova, Y., 'Warm welcome for Iraqi minister', *Moscow News*, no. 30 (2–8 Aug. 2000), p. 2; Knowlton, B., 'Venezuelan visits Iraq, angering Washington', *International Herald Tribune*, 11 Aug. 2000, p. 4; MacAskill, E., Whitaker, B. and Steele, J., 'Time erodes support for sanctions', *The Guardian*, 1 Aug. 2000, p. 6; Khalaf, R., 'The smiling face of Saddam Hussein', *Financial Times*, 20 Oct. 2000, p. 17; Khalaf, R., 'The smiling face of Saddam Hussein', *Financial Times*, 20 Oct. 2000, p. 17; BBC News Online, 'Egypt upgrades ties with Iraq', 7 Nov. 2000, URL <http://news.bbc.co.uk/low/english/world/middle_east/newsid_1012000/1012166.stm>; and 'UN sanctions collapsing in Iraq', *New York Times* (Internet edn), 1 Nov. 2000, URL <<http://www.nytimes.com/aponline/world/AP-Iraq-Sanctions.html>>.

²⁰¹ Zanders, J. P. and Hart, J., 'Chemical and biological weapon developments and arms control', *SIPRI Yearbook 1998: Armaments, Disarmament and International Security* (Oxford University Press: Oxford, 1998), pp. 486–88.

²⁰² House of Commons, Defence Committee, 'Gulf veterans' illnesses', Minutes of Evidence, 28 Apr. 1999, p. 3.

²⁰³ British Ministry of Defence, 'Gulf veterans' illnesses', URL <<http://www.mod.uk/policy/gulfwar/index.htm>>; and GulfLink, Office of the Special Assistant to the Deputy Secretary of Defense for Gulf War Illnesses, URL <<http://www.gulfink.osd.mil/>>. DU has a uranium-235 content that is less than that

Gulf War veterans are not suffering from a single syndrome and that there is no single cause of their ill health.

One of the potential causes of GWI is pyridostigmine bromide (PB), a pre-treatment against nerve agents.²⁰⁴ Despite the fact that the PB tablets required extensive human testing before their use was approved by the US Food and Drug Administration (FDA) an estimated 250 000–300 000 US soldiers were given them during the Gulf War. The investigation of the effect which this may have had on their health is hampered by the lack of reliable data correlating those who took PB with those experiencing adverse health effects.²⁰⁵ It was also revealed that 9000 French soldiers took PB during the Gulf War.²⁰⁶

Many Gulf War veterans believe that the Coalition's use of DU in armour-piercing munitions or tank armour protection was a major contributory factor in the development of GWI. It has been claimed that the toxic dust from the DU weapons used in the Gulf War may also explain the high incidence of cancer in southern Iraq.²⁰⁷ The US DOD has rejected these claims, arguing that veterans do not display the symptoms (in particular chronic kidney damage) generally associated with high levels of DU exposure.²⁰⁸ However, during 2000 there were increasing reports of illnesses (with symptoms not unlike those associated with GWI) and deaths among the members of European peacekeeping forces which had been posted in areas where NATO aircraft fired DU ordnance in the former Yugoslavia. In January 2001 the EU decided to launch an investigation into the matter and several European NATO members, including Belgium, France and Italy, plan to place the DU question on the NATO agenda.²⁰⁹ Also in January 2001 a survey by the UN Environment Programme (UNEP) of areas where such munitions had been used found that 8 of the 11 sites examined had considerably higher levels of radioactive contamination than normal. Traces of toxic dust and pieces of unexploded ordnance were also found. UNEP claims that the 11 sites are representative of the 112 areas where DU munitions were used that were indicated on the NATO

found in nature. DU contains <0.71% uranium-235. It is a by-product of the enrichment process used to make reactor- or weapon-grade uranium. DU contains fewer fissile atoms than natural uranium.

²⁰⁴ Golomb, B. A., *A Review of the Scientific Literature as it Pertains to Gulf War Illnesses*, vol. 2 *Pyridostigmine Bromide*, RAND/US Department of Defense, Office for the Special Assistant for Gulf War Illnesses, URL <http://www.gulflink.osd.mil/library/randrep/pb_paper/>.

²⁰⁵ Golomb (note 204).

²⁰⁶ Inciyan, E., 'Syndrome du Golfe: 9000 militaires français aurait pris un produit dangereux' [Gulf Syndrome: 900 French soldiers would have taken a dangerous product], *Le Monde*, 2 Nov. 2000, p. 10.

²⁰⁷ Associated Press, *Los Angeles Times* (Internet edn), 'Gulf War troops said exposed to uranium', 3 Mar. 1998, URL <<http://www.latimes.com/HOME/NEWS/NATION/t000020788.1.html>>; Fisk, R., 'The catastrophe Blair, Clinton and Saddam have in common', *The Independent*, 9 Mar. 1998, p. 17; and Struck, D., 'Iraq blames Gulf War for cancers', *International Herald Tribune*, 6 July 1998, p. 9.

²⁰⁸ US Department of Defense, Office for the Special Assistant for Gulf War Illnesses, *Environmental Exposure Report: Depleted Uranium in the Gulf*, 31 July 1998, URL <<http://www.gulflink.osd.mil/du/>>.

²⁰⁹ Beirlant, B. 'EU eist waarheid over Balkansyndroom' [EU demands truth about Balkan syndrome], *De Standard* (Brussels), 5 Jan. 2001, URL <http://www.standaard.be/nieuws/print.asp?articleID=DST05012001_26>; Smith, M. and Bishop, P., 'NATO inquiry on cancer deaths of Balkan veterans', *Electronic Telegraph*, 5 Jan. 2001, URL <<http://www.telegraph.co.uk/>>; and Crawshaw, S. and Castle, S., 'Balkan syndrome spurs governments to action', *The Independent* (Internet edn), 6 Jan. 2001, URL <<http://www.independent.co.uk/news/World/Europe/2000-01/balkan060101.shtml>>.

map which UNEP employed for the survey.²¹⁰ It has been reported that the British MOD admitted that it had known about the health risks posed by the use of DU munitions for 10 years.²¹¹ US officials, however, denied any link between the symptoms displayed by the soldiers and the use of DU.

Questions were raised about the US Anthrax Vaccine Immunization Program because of the uncertainty regarding the causes of GWI.²¹² US authorities assert that the anthrax vaccine is safe and claim that there is no link between it and GWI; reported cases of adverse reactions to the vaccine are claimed to be similar to the side-effects expected from other common vaccines.²¹³ Nevertheless, concern over the safety and the efficacy of the anthrax vaccine has caused unrest and resistance in the military. Many service members have faced disciplinary measures, including dismissal, for refusing vaccination.²¹⁴ Other soldiers have opted to leave the military rather than disobey the order to take the vaccine, and the US GAO has reported that many pilots and aircrew members have left or plan to leave the military because of the vaccination programme.²¹⁵

VII. Conclusions

The implementation of the CWC moved into a new phase as the first treaty-specified milestones were reached on 29 April 2000, the third anniversary of its entry into force. The verification regime now includes new categories of facilities to be inspected. The transfer restrictions on Schedule 2 chemicals took effect in 2000 and, consequently, the non-parties to the treaty are becoming increasingly isolated and excluded from economic transactions important to their economies. All four CW possessor states are now destroying chemical weapons. By 29 April 2000 they were required to have destroyed 1 per cent of their Category 1 CW. The dire economic and social conditions in Russia are the principal reasons for Russia's failure to meet the Phase 1 destruction deadline. Despite the growing number of states offering destruction assistance, the funds pledged or transferred remain insufficient.

²¹⁰ 'UNO: Nato vergiftet Kosovo' [UNO: NATO poisons Kosovo], *Die Tageszeitung*, 6 Jan. 2001, p. 1.

²¹¹ Smith, M. and Jennings, C., 'MoD knew of ammo risks for 10 years', *Electronic Telegraph*, 6 Jan. 2001, URL <<http://www.telegraph.co.uk/>>.

²¹² The programme began in 1998 and consists of a series of 6 vaccinations over an 18-month period followed by an annual booster to be given to all 2.4 million active and reserve military personnel. As of Oct. 2000, more than 1.95 million doses of anthrax vaccine had been administered to over 490 000 military personnel. Department of Defense, 'Information about the anthrax vaccine and the Anthrax Vaccine Immunization Program (AVIP)', Anthrax Vaccine Immunization Programme (AVIP) Agency, Office of the Army Surgeon General, Falls Church, VA, 15 Oct. 2000, URL <<http://www.anthrax.osd.mil/>>.

²¹³ Approximately 150 000 US soldiers were vaccinated against anthrax during the Gulf War. Department of Defense (note 208).

²¹⁴ Department of Defense, DefenseLINK, 'Anthrax vaccine contract briefing', 5 Aug. 1999, URL <http://www.defenselink.mil/news/Aug1999/x08051999_x0805ant.html>.

²¹⁵ US General Accounting Office, *Anthrax Vaccine: Preliminary Results of GAO's Survey of Guard/Reserve Pilots and Aircrew Members*, Testimony before the Committee on Government Reform, House of Representatives, GAO-01-92T, 11 Oct. 2000.

Destruction activities in South Korea, Russia and the USA are complicated by the environmental and safety concerns of local populations. The USA may miss the final destruction deadline of 2007 because of the need to find alternative technologies to incineration and the complicated bureaucratic process of obtaining the necessary safety certifications and plant operation permits.

Despite some unresolved technical and political issues the parties to the CWC are proving that the convention can offer collective security and operate in an atmosphere of cooperation. It is therefore particularly regrettable that sources in some states parties accuse other parties of material breaches, without the OPCW being in a position to refute or confirm such allegations. The danger exists that the continuation of such allegations may undermine confidence in the CWC.

The negotiation of a protocol to the BTWC reached a critical stage in 2000. The intention is still to complete the document before the Fifth Review Conference and preparations for a preparatory commission meeting in the spring are under way. The constructive participation of the chemical industry was crucial to the success of the CWC. However, the biotechnological and pharmaceutical industries have been less willing to suggest solutions that provide transparency while protecting their business interests. If negotiations on the protocol are concluded in 2001 the parties to the BTWC may be presented with a weak document for their signature. It is also possible that the AHG will be unable to agree on a final text. In that case, if the participants wish to pursue the negotiations, they might continue beyond the Fifth Review Conference, possibly for another five years until the Sixth Review Conference.

Although UNMOVIC became operational in 2000, Iraq continues to refuse any cooperation under UN Security Council Resolution 1284, arguing that it has met all its disarmament obligations. The prospect for the resolution of questions about Iraq's CBW programme remains bleak because the international sanctions regime to force Iraqi compliance is continuously being weakened.

On the eve of the 10th anniversary of the liberation of Kuwait, many questions remain about the causes of GWI. Claims that NATO's use of depleted uranium contributed to the deteriorating health of a number of European peacekeepers who served in the Balkans raised new questions about exposure to dangerous chemicals or toxins on the modern battlefield.

CBW proliferation remained a concern in 2000. Despite strengthened international norms against CBW and the new CWC-imposed transfer restrictions, some states appear determined to maintain major CBW armament programmes. Also of concern in 2000 was the possible application of advancements in biotechnology to the development of biological weapons.