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 peacekeeping 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.


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.


\(^12\) 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.\(^1\)

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.\(^1\) 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.\(^1\) 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.\(^1\) 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.\(^1\)

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

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2. OPCW Secretariat Brief, no. 22 (2 June 2000).
4. OPCW Secretariat Brief, no. 24 (note 12).
5. OPCW Secretariat Brief, no. 24 (note 12).
6. 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.\textsuperscript{19} However, a random selection formula for DOC plants still needs to be approved.\textsuperscript{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.\textsuperscript{21} On 15 January 2001 Russia informed the French Government, the depository of the Geneva Protocol, that it had withdrawn its reservations.\textsuperscript{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.\textsuperscript{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.\textsuperscript{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.\textsuperscript{25} The TS also received one request for temporary conversion of a former CW-related

\textsuperscript{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).
\textsuperscript{24} Information provided by the OPCW Media Branch, The Hague, 17 Nov. 2000; and *OPCW Secretariat Brief*, no. 24 (note 12).
\textsuperscript{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).
facilities. 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.
33 months. 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.

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. 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. 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. 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.

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). In November the ANCDF was reported to be

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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.

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

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\(^{37}\) Ember (note 31); and Program Manager for Chemical Demilitarization (note 36).


\(^{40}\) 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).


be transferred to an off-site commercial waste-water treatment plant.\textsuperscript{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.\textsuperscript{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.\textsuperscript{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.\textsuperscript{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.\textsuperscript{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.\textsuperscript{50} The preparation of site-specific environmental impact statements began in the spring of 2000.\textsuperscript{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


\textsuperscript{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).


\textsuperscript{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.

thousands of visitors annually). The bomblets are expected to be destroyed by detonation in a specially built structure in January 2001.

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. (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. 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. 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.

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.

**Destruction of CW in Russia**

Russia’s CW destruction programme continued to suffer from serious under-funding, and on 29 April 2000 Russia failed to meet the Phase 1 destruction...
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. 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.

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. 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. 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. 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.

Russia began its destruction operations with the elimination of Category 3 CW at Maradikovsky, Kirov region, and Leonidovka, Penza region, in early 2000. However, operations were suspended because Russia had not notified

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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.\textsuperscript{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.\textsuperscript{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.\textsuperscript{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.\textsuperscript{69}

In December it was announced that the CW in the Penza region would be transported to Shchuchye for destruction.\textsuperscript{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.\textsuperscript{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.\textsuperscript{72} Germany’s contribution for 2000 was 7.3 million Deutschmarks (c. \$3.6 million) for the Gorny

\textsuperscript{66} OPCW Secretariat Brief, no. 23 (note 12).
\textsuperscript{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.
\textsuperscript{68} OPCW Secretariat Brief, no. 24 (note 12).
\textsuperscript{69} OPCW Secretariat Brief, no. 23 (note 12).
\textsuperscript{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.
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.

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. 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. 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. 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.

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. 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. 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

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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.


82 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.


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. 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.

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. 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 stennutator) is often contaminated with more than 1 per cent of explosives, which the operators of the commercial incinerator in Antwerp refuse to process. A study of the problem commissioned by the government recommended the construction of a new incinerator as the economically most viable option. 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

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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 diphenylcyanarsine (DC).
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-

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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.
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-

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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.


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 pre-amble, 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. 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.

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. 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.

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. 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. Whether the Coordination Committee will be able to develop a framework for activities promoting scientific and technological exchanges and technological cooperation remained uncertain.

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

106 BWC/AD HOC GROUP/52 (note 105), Part I, p. 3; and BWC/AD HOC GROUP/54 (note 102), Part I, p. 3.
108 BWC/AD HOC GROUP/54 (note 102), Part I, p. 4.
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. 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. 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.

The Netherlands and Switzerland submitted their proposals to host the future organization in The Hague and Geneva, respectively. 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

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.
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

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. 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. 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. 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. 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.

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

122 US Department of State (note 119).
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.\textsuperscript{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’.\textsuperscript{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’.\textsuperscript{127}

In autumn 2000 the \textit{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.\textsuperscript{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’.\textsuperscript{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.\textsuperscript{130} Pakistani news sources also accused India of


\textsuperscript{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.


\textsuperscript{130} Sharif, M. A., ‘Pak defence sources: India supplied “war gas” to Iraq’, \textit{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.\textsuperscript{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.\textsuperscript{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.\textsuperscript{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.\textsuperscript{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.\textsuperscript{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.\textsuperscript{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.\textsuperscript{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.


\textsuperscript{132} ‘Urdu daily claims CW employed by India in Kashmir’ (note 131).

\textsuperscript{133} ‘Urdu daily claims CW employed by India in Kashmir’ (note 131).


\textsuperscript{135} US Central Intelligence Agency (note 117).

\textsuperscript{136} Yonhap (Seoul), 10 May 2000, in ‘DPRK alleged to possess 2.5-5K tons of chemical weapons’, FBIS-EAS-2000-0510, 10 May 2000.

\textsuperscript{137} US Central Intelligence Agency (note 117).


\textsuperscript{139} ‘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.

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.

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.

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. 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

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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>.
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. 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.

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.

A proposed project to test the fungus against marijuana crops in Florida was cancelled in 1999 after objections were raised by local residents. 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.) 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*.

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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 (\textit{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).
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.\textsuperscript{156} (In contrast, use without governmental consent is viewed as a violation of the BTWC.\textsuperscript{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

\textit{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.\textsuperscript{158} There were unconfirmed claims in February that Russia was conducting experiments with chemical and biological agents on Chechen prisoners.\textsuperscript{159} In response, Russia accused the Chechen rebels of using shells containing chlorine and ammonia.\textsuperscript{160} In March Russian police reported the seizure of 10 tonnes of chlorine that had been stored in Grozny by Chechen rebels.\textsuperscript{161} In May an arms depot that allegedly contained a nerve agent was reported to have been discovered in the Chechen village Avtury.\textsuperscript{162}

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. 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.

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.

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. The Angolan Army countered with claims that it had discovered a UNITA chemical arms cache but declined to give details.

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. 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

NATO countries, to provide members with support in dealing with WMD issues and to develop documentation on WMD issues for the public.\footnote{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>.
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**Cooperative Defense Initiative**

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**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,\footnote{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.
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the Department of Energy’s Materials Protection, Control and Accountability Program, and the Department of State’s International Science and Technology Center.\footnote{US General Accounting Office (note 80), p. 3.

These agencies have requested over $880 million for FY 2001.\footnote{US General Accounting Office (note 80), p. 4.
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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.\(^{182}\)

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\(^{176}\) 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/052400 russia-science.html>.


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

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\(^{183}\) 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.


\(^{187}\) 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. Resolution 1284 stipulates that the UNMOVIC staff are to be UN employees and drawn from the broadest possible geographical base. 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.

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. 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.

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.

Iraq maintains that it will not allow new inspections unless the sanctions are lifted and the UK and the USA cease bombing. 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.

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.
addition, the Clinton Administration ruled out the use of force to coerce Iraq to cooperate with UNMOVIC.\textsuperscript{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.\textsuperscript{199} Diplomatic contacts with Iraq increased in 2000, and trade delegations from a number of countries are reportedly competing for Iraqi contracts.\textsuperscript{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.\textsuperscript{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.\textsuperscript{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).\textsuperscript{203} There appears to be a general understanding that the


\textsuperscript{202} House of Commons, Defence Committee, ‘Gulf veterans’ illnesses’, Minutes of Evidence, 28 Apr. 1999, p. 3.

\textsuperscript{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.gulflink.osd.mil/>. DU has a uranium-235 content that is less than that
One of the potential causes of GWI is pyridostigmine bromide (PB), a pre-treatment against nerve agents. 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. It was also revealed that 9000 French soldiers took PB during the Gulf War.

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. 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. 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. 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
map which UNEP employed for the survey.\textsuperscript{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.\textsuperscript{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.\textsuperscript{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.\textsuperscript{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.\textsuperscript{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.\textsuperscript{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.

\textsuperscript{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>.
\textsuperscript{213} Approximately 150 000 US soldiers were vaccinated against anthrax during the Gulf War. Department of Defense (note 208).
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.
Terror armed with biological, chemical, or nuclear weapons. The unpredictability of terrorist efforts to acquire NBC weapons and a potentially higher probability of use pose a serious challenge to global stability and security. In particular, the Bush Administration has singled out state sponsors of terrorism with.

Technological developments (in NBC, computer, and production technology). Increasingly free flow of information, people and goods. See also Jayantha Dhanapala, Arms Control and Multilateralism: The Problem of Political Will. A presentation to Tenth Annual International Arms Control Conference. Conundrums in Arms Control: The New Millennium.

CIVIL defense decontamination Persian Gulf syndrome poisons toxins. Note: See also subdivisions Biological warfare and Chemical warfare under individual wars, e.g., "Persian Gulf War, 1991--Biological warfare;" and subdivisions such as "War use" under other subject headings, e.g., "Hazardous substances--War use," "Poisons--War use," "Toxins--War use," etc. Biological and toxin weapons: research, development, and use from the Middle Ages to 1945. Edited by Erhard Geissler and John Ellis van Courtland Moon.

The 2010 report claimed that "available information did not indicate Cuba's dual-use activities during the reporting period involved activities prohibited by the BWC."