Verification of the Biological Weapons Convention

Politics, science and industry

Since 1995 an Ad Hoc Group of States Parties to the 1972 Biological and Toxin Weapons Convention (BWC) has been negotiating a legally binding Protocol to strengthen the treaty's effectiveness and to improve its implementation. One important aspect of the discussions has been the attempt to devise measures to verify the Protocol. An interplay between politics, science and industry has been at the centre of work to shape the Protocol, which currently exists as an advanced 'Rolling Text'. These variables influence participating states' views both about how verifiable the Protocol can be, and how verifiable they want it to be. Differing perceptions on these issues have influenced the language of the draft text: instead of the word 'verification', the term 'compliance measures' is used in order to attract broader support.

The political context of the Ad Hoc Group is the most important component influencing the development of the Protocol, with the positions formed in the capitals of contributing countries constituting an important element. The most significant political preoccupations of the negotiating states include a wish to enhance national and/or international security, and a desire to preserve state sovereignty. Some of the other matters, which are translated into political issues, include: the need to protect military and commercial secrets; the desirability of different verification measures; the costs of verification; and the desire for treaty provisions that promote participation and confidence building in the regime, such as mechanisms to facilitate international scientific and technical co-operation. While all of these concerns are legitimate, they may be used by some states to slow down the talks in the hope of preventing the emergence of a strong Protocol or, indeed, any Protocol at all.

One political assessment that states have had to make is of the risk that biological weapons (BW) proliferation poses to national and international security, and the extent to which a BWC Protocol could minimise the danger. For example, the US sees possible BW proliferation as a major threat, but some elements in the country do not accept that a Protocol could greatly enhance American security, and, indeed, some observers believe that it may prove damaging. A number of other Western states also perceive a significant risk from BW proliferation, but, unlike the US, they feel that an adequately verified BWC Protocol could contribute to their security.

By contrast, some developing countries are simply not participating in the Ad Hoc Group. In part this is because they perceive other threats – economic and environmental, for example – to be more pressing than possible BW proliferation, and perhaps also because they are unsatisfied by their experience with other international arms control regimes. Of interest is the fact that African nations – with the exception of South Africa – are declining to play a role in the Ad Hoc Group, paralleling the paucity of ratifications by African states of the Chemical Weapons Convention.

Also in this issue ... Book Reviews, Verification Watch, Science and Technology Scan, plus details of the VERTIC–Wilton Park Conference on the Monitoring and Verification of Peace Agreements.

Trust & Verify

February 2000 • Issue Number 89 • ISSN 0966-9221

The Verification Research, Training and Information Centre (VERTIC)

Baird House
1517 St. Cross Street
London EC1N 8UW
United Kingdom

t +44 (0)20 7440 6960
f +44 (0)20 7242 3266
e info@vertic.org
w www.vertic.org

There is also a tendency for countries to favour verification proposals that do not have an undue impact on themselves. This would seem to indicate that some states believe that the security risks from BW proliferation are unlikely to originate in their own territories, contradicting evidence of recent activities by indigenous terrorist groups in several countries, as well as concerns in some states about bio-terrorism.

Ideally, verification regimes enhance both national and international security by giving states confidence that violations can be detected in time to take action to minimise the effects and to deter potential violators. But verification also involves costs: economic, and in terms of possible risks to a country's security provisions and other national activities. Some states, particularly the US, fear that verification mechanisms could compromise their bio-defence programmes or other defence research and development, including counter-terrorism, as well as their industrial profits. In the case of the US, the former concern is ironic given the level of openness about its defensive programmes. By contrast, other Ad Hoc Group participants and external observers believe that the additional danger of espionage from an international regime is minimal — if someone were intent on learning state secrets there would be far easier ways of doing so than through an international inspectorate. Furthermore, while the economic outlay for verification is real, it is not significant compared to the cost of other national security initiatives.

In addition, there are different political interpretations concerning the relative importance of verification measures in the Rolling Text. Many participating countries believe that a strong verification regime should be a vital element of the Protocol, but other aspects are also seen as important. A major aim, particularly for the developing countries, is to maximise measures promoting scientific and technical co-operation. Although verification and scientific co-operation are complementary, trade-offs are being made between them.

Science

Different assessments about the potential verifiability of the BWC Protocol are based, in part, on contrasting scientific analyses. There is a widespread perception in the Ad Hoc Group that verifying non-proliferation of biological weapons is more challenging than for other weapons because of two fundamental complications.

- First, BW agents are living micro-organisms, or, in the case of toxins, products of live processes. Consequently, they are of dual origin: they can occur in great quantities in nature; and they can be manufactured in laboratories.
- Second, like chemical weapons, BW agents and precursors, and the equipment needed to manufacture and to weaponise them, have both legitimate and illicit uses.

In view of these complications, verification sceptics feel that any verification regime must be capable of demonstrating intent to abuse dual-use and dual-origin materials. It is felt that it is insufficient to demonstrate the presence of suspicious matter in a laboratory, or a suspicious outbreak of disease. Rather, it is deemed necessary to ascertain that substances are being used, or are intended for use, in an illicit programme, or

The US clarifies its position on 'visits'

Oliver Meier

The US has added some details to its minimalist stance on the controversial question of 'visits' to relevant biological weapons (BW) facilities. In an informal paper – released on 2 February 2000 – Washington accepts the concept of 'transparency visits', which is the alternative to the 'randomly-selected visits' mentioned in the Rolling Text. But the US envisages only a limited role for such visits – to maintain the expertise of the Technical Secretariat – and believes that they should not be used to validate whether states' declarations about their BW-relevant facilities and materials are accurate and complete.

The visiting team would also be prohibited from drawing conclusions or generating findings. The mandate should be 'relatively simple and generic', and should be distinct from other on-site activities. Furthermore, the visits should be co-operative endeavours and should build confidence. Both the level of information and the degree of access granted to the team should be at the discretion of the visited state party.

Because such visits would be non-intrusive – essentially amounting to a guided tour of the facility – Washington sees no need for so-called managed-access procedures, under which certain sections of a plant might be screened off and other measures might be taken to avoid the loss of confidential data. The paper contains no information on the criteria that will be used to identify which facilities should be examined.

that an outbreak of disease results from the hostile use of micro-organisms or toxins.

Alongside such fundamental concerns are a host of logistical difficulties. For example, since BW facilities can be very small and can be cleaned up quickly, their detection poses significant tests. External commentators have noted, however, that there is a tendency to overstate this problem, given that small facilities will not produce militarily significant quantities.

Scepticism over the possibility of verifying a Protocol with an adequate degree of confidence is reinforced, in part, by misconceptions about the nature of verification. Sceptics often have a tacit belief that verification solutions should be in the form of particular technologies, and their understanding that the development of such technologies is extremely unlikely for BW verification can add to their doubt. Although technologies can facilitate verification, they do not constitute the entire process. In verification regimes political solutions, such as the level of access permitted during an on-site inspection, are at least as important as technical fixes.

A significant number of countries and commentators argue that a verification regime providing an adequate degree of confidence in the BWC Protocol is attainable. The basic elements include:

- mandatory declarations of activities and/or facilities;
- visits to ensure that these pronouncements are complete and accurate; and
- short notice investigations, which would be invoked by a challenge from a state party, to address concerns about possible non-compliance.

All of these options are in the Rolling Text, but there is no consensus on the purpose of visits as being to validate declarations — much less details regarding all three mechanisms.

Industry

To be effective a BWC Protocol verification regime should involve relevant industries. Since the bio-technological companies requiring dual-use materials are many and diverse – ranging from agriculture and food production to bio-remediation – it would be impractical for the verification regime to attempt to monitor them all. The task of defining which facilities should be declared is an area needing particular attention from the Ad Hoc Group. At this stage, the sector that has been deemed most likely to be affected is the pharmaceutical industry – although by no means all of it – because of its inherent production capability.

This global enterprise is lucrative and disproportionately represented in the West — particularly in the European Union (EU), Japan and the US (which has the largest share of pharmaceutical companies). Pharmaceutical products are research intensive, often taking years to develop and test, and many potential products fail to enter the market. Pharmaceuticals are also knowledge intensive: a small sample can contain a lot of information about its composition and manufacture. The emphasis on research and development – in some cases coupled with the lack of appropriate patenting protection – puts an even higher value on confidential business information than in other industries.

It is not surprising that talk of 'declarations', 'transparency', 'investigations' and 'visits' has caused anxiety about the impact of possible verification measures, both within industry and in those parts of government charged with promoting the sector. In the majority of countries that have significant pharmaceutical enterprises, interaction between industry and government has enabled the latter to develop positions that protect industrial interests. Such dialogue has also helped industries to understand and to accept measures proposed under the Protocol. However, critically, relations between the US government and the American pharmaceuticals industry are difficult.

One element that should reassure industry is that there will be two tiers of responsibility for implementing the Protocol: an international organisation overseeing implementation; and national authorities established by states parties to coordinate their obligations and to conduct a dialogue with the international organisation. Such a division of labour would enable national civil servants to be vigilant in protecting state secrets — either trade or military.

Conclusion

In constructing an effective regime to verify compliance with the Protocol, the Ad Hoc Group is dealing with a complex dynamic involving politics, science and industry. Different national perceptions about these three variables impose limitations on, open possibilities for, and, above all, complicate the work of, the Ad Hoc Group. This is especially apparent in its effort to devise effective verification, and the resulting regime will inevitably reflect compromises between the triad of politics, science and industry.

Henrietta Wilson
Consultant to VERTIC

Henrietta observed the seventeenth session of the Ad Hoc Group of the BWC in Geneva (22 November–10 December) on behalf of the Acronym Institute and VERTIC. She published analyses of its deliberations in *Disarmament Diplomacy*, Issues 40 (September–October 1999) and 42 (December 1999). A longer version of this article will be published as a VERTIC Research Report.

Approaching arms control and verification afresh

Following the US Senate's decision on 13 October 1999 not to approve ratification of the Comprehensive Nuclear Test Ban Treaty (CTBT), it is unnecessary to emphasise the need for an informed debate on the role of arms control in the post-Cold War era. Nancy Gallagher's collection of well-informed and thought provoking essays covers many of the issues and problems that surround the subject. The book is the product of a project conducted by the US-based Women in International Security group, which aims to increase communication between scholars and policymakers. Most of the authors have experience in both academia and government.

Rather than organising the book around specific arms control regimes, this volume adopts a fresh approach and looks at the problems that cut across different areas. Defining arms control broadly as 'co-operative measures to reduce the costs and risks associated with the acquisition, threat, and use of military force', all six authors try to bridge the gaps between theory and policy.

Verification Quotes

'Treaties are inherently slow and cumbersome. Their sole virtue is that they establish rigorous standards for verification.'

Former CIA Director (1977–81) Admiral Stansfield Turner (retired). See 'Clinton Can Cut Nuclear Arms Without a Treaty', *International Herald Tribune*, 2 November 1999, p. 8.

'In God We Trust. All Others We Monitor.'

Sign at the US Air Force seismic monitoring station, Alice Springs, Northern Territory, Australia. This was shown in a promotional film for the Comprehensive Nuclear-Test-Ban Treaty Organization.

'... a fissile material cut-off treaty is a central and indispensable element in any verification regime for a world free of nuclear weapons.

Australian Minister for Foreign Affairs and Trade, Alexander Downer, MP, at the commemoration of the century of the 1899 Hague Peace Conference, University of Melbourne, 18 February 1999. Quoted in *Foreign Affairs and Trade Record*, Department of Foreign Affairs and Trade, Canberra, vol. 3, no 1–2, July 1999, p. 11.

Gallagher's introduction maps 'current arguments about arms control policy onto old disputes about international relations theory' (p. 13). She contends that the old tools used for analysing arms control dilemmas are no longer sufficient. This argument lays the groundwork for an analysis of 'Arms Control in the Information Age' by Emily O. Goldman. She recommends 'bridging strategies' or 'flexible packages of asymmetrical measures that both regulate capabilities and influence rivals' motivations' to adapt arms control to the post-Cold War world and information age (p. 25).

Ann M. Florini describes 'A New Role for Transparency' in order to help solve many of the world's non-proliferation problems. In a chapter titled 'Beyond Defence, Deterrence, and Arms Control', Gloria Duffy argues for a US policy that attempts 'to reduce or prevent threats before they require military responses' (p. 75), especially non-traditional dangers.

Unlike the other authors who deal with non-conventional security issues, Rebecca Johnson is mainly concerned with the modification of existing institutions. In 'Nuclear Arms Control through Multilateral Negotiations', she uses the example of the CTBT talks to make specific reform proposals for the Conference on Disarmament and other multilateral fora. In 'The Impact of Governmental Context on Negotiation and Implementation: Constraints and Opportunities for Change', Amy Sands uses the effect of US domestic politics on the Chemical Weapons Convention talks to argue for a more 'holistic approach to arms control'.

Gallagher's closing chapter analysing the two-level dynamics of 'the politics of verification' could hardly be more timely in light of the Senate's decision on the CTBT. She urges verification analysts and practitioners to move away from a purely technical debate about the effectiveness of verification arrangements towards an acceptance that some 'verification paradoxes' are inevitable and unresolvable. With such an approach, even domestic debates, like the one about the verifiability of the CTBT, might be won.

Reviewed by Oliver Meier

Arms Control: New Approaches to Theory and Policy
Edited by Nancy W. Gallagher
(London/ Portland, Oregon: Frank Cass, 1998)
£16.50 (paperback)

Verification Watch

Life after non-ratification: the CTBTO carries on

The Preparatory Committee (PrepCom) for the Comprehensive Nuclear Test Ban Treaty Organization (CTBTO) met for its tenth session on 15–19 November 1999 — the first such gathering since the US Senate refused to agree to the ratification of the Comprehensive Nuclear Test Ban Treaty (CTBT) in October 1999. Safe in the knowledge that Senate opponents of the CTBT had failed to block Washington's financial contribution to the PrepCom, a budget of $79.9 million was approved to support the work of the Provisional Technical Secretariat (PTS) in 2000. This was $5.2m larger than the amount earmarked in 1999. The budget projection for 2001 is $94.9m, although some states have already indicated that an increase of $15m next year would be unacceptable.

The PTS aims to have the International Monitoring System (IMS) in place by 2003. The greatest obstacle to meeting this objective remains completion of the Operations Manual for On-Site Inspections. In addition, 31 IMS stations and one radionuclide laboratory 'require adjustments'. Site surveys revealed that the co-ordinates provided in Annex 2 of the CTBT Protocol for IMS station locations were in many cases unsuitable because of excessive background noise or because the bearings turned out to be at sea. Infrasound station 59 on Hawaii had to be relocated because of potential volcanic activity and because it was within the confines of a state prison. Fortunately, site surveyors were able to find an excellent low-noise area only 62 kilometres away.

The commissioning of primary seismic stations is making progress. In the near future, the US will hand over control of the Belbasi Seismic Monitoring Station (close to Ankara) to Turkey for upgrading and connection to the IMS. Pakistan has reconnected its Chakwal Seismic Monitoring Station, which was disengaged before its nuclear tests of May 1998. New Zealand and Fiji have been discussing the possibility of jointly building a monitoring station on the South Pacific island as part of the IMS.

Meanwhile, the Clinton administration has appointed the former head of the Joint Chiefs of Staff, General John Shalikashvili (retired), to lead a high-level CTBT task force. His mandate is 'to reach out to members of the Senate and to construct a path that will bridge any differences and ultimately obtain Senate advice and consent to the Treaty'.

Sources: CTBT/PC-10/1/Annex V '2000 Programme and Budget', Tenth Session, Vienna, 15–19 November 1999; CTBT/PC-10/1 'Report of the Tenth Session of the Preparatory Commission for the Comprehensive Nuclear-Test-Ban Treaty Organization', p. 3; CTBT/PC-10/1/Annex II, www.ctbto.org; *Xinhua*, Ankara, 8 February 2000; *Xinhua* & New Zealand Press Association, 25 January 2000; US Secretary of State Madeleine K. Albright, *Statement on the Comprehensive Test Ban Treaty*, Davos, Switzerland, 28 January 2000; *Jane's Defence Weekly*, 2 February 2000, p. 4.

Verified decommissioning fizzles in Northern Ireland

In December 1999 there was considerable hope that, as part of the Good Friday peace process, the Irish Republican Army (IRA) would at last begin to discuss disarmament with the Independent International Commission on Decommissioning. The IRA appointed an interlocutor to conduct talks with the Commission, which is headed by Canadian General John de Chastelain. On 31 January 2000, however, the Commission reported that, contrary to expectations, the IRA had neither provided information to General de Chastelain as to when decommissioning would start, nor (reading between the lines) had it discussed the modalities of the process, including verification, or provided data on its weapon holdings.

By contrast, the Loyalist Ulster Volunteer Force (UVF) has been discussing the modalities of decommissioning its arms with the Commission for some time. The independent body has warned that, given the quantity of paramilitary arms and their dispersed location, it will soon become logistically impossible to complete verified decommissioning by the Good Friday Agreement deadline of 22 May 2000. In response to the British Government's move to suspend the new Northern Ireland Executive – a decision that was implemented despite a last-minute IRA statement that it would 'consider how to put arms and explosives beyond use' – the IRA announced in February that it was ceasing contact with the Commission altogether.

Sources: Report of the Independent International Commission on Decommissioning, Belfast, 31 January 2000; Report of the Independent International Commission on Decommissioning, Belfast, 11 February 2000; *The Times*, 3 December 1999, p. 1.

OPANAL seeks new role

On 30 November–1 December 1999, members of the Agency for the Prohibition of Nuclear Weapons in Latin America and the Caribbean (OPANAL) met in Lima, Peru, for their sixteenth biannual General Conference. (OPANAL is responsible for overseeing implementation of the Latin American nuclear-weapon-free zone, which was established by the 1967 Treaty of Tlatelolco.) For the first time, non-governmental organisations (NGOs) were formally admitted to the event as observers — VERTIC was one of the 12 NGOs that were present.

Since membership of the nuclear-weapon-free zone is practically universal – Cuba has signed the Treaty of Tlatelolco, but remains the only state in the region yet to ratify it – the debate focused on whether the Agency should assume additional responsibilities. Secretary-General Enrique Roman-Morey was tasked with improving contacts with other nuclear-weapon-free-zone agencies and examining whether OPANAL should convene an international all-zone symposium.

Participants at the General Conference also emphasised the need to speed up the conclusion of safeguards accords with the International Atomic Energy Agency, which is charged with verifying compliance with the Treaty. All member states, with the exception of Guyana, have finalised such agreements, but only Cuba, Ecuador, Peru and Uruguay have signed additional protocols to strengthen their safeguards. No OPANAL member state has ratified a protocol.

The General Conference was followed by a two-day seminar on disarmament – also attended by VERTIC – that addressed issues as diverse as the role of different regional and global organisations in disarmament and arms control, the future of arms control and non-proliferation regimes, and the relationship between peace, security and development.

Sources: Conference document number CG/Res. 387, 30 November 1999. Documents and information about OPANAL and the disarmament seminar can be found at www.opanal.org

Son of UNSCOM

The UN Security Council authorised, on 17 December 1999, the establishment of a new arms inspection commission for Iraq, which is to be named the UN Monitoring, Verification and Inspections Commission (UNMOVIC). It succeeds the UN Special Commission (UNSCOM), whose inspections ceased in late 1998 prior to the bombing campaign by the US and the UK. However, four countries, including China, France, and Russia (all permanent members of the Security Council), abstained from the vote, revealing the fractured state of international support for Iraqi inspections and virtually inviting Iraq's rejection of the resolution on 19 December.

The resolution establishing UNMOVIC provides incentives for Baghdad's co-operation, including: lifting the limit on Iraqi oil sales for humanitarian purposes; loosening UN oversight of Iraqi imports; and the possible suspension of sanctions by the end of 2000.

Critics believe that these concessions could give Baghdad more flexibility to buy equipment needed to develop weapons of mass destruction. Unconfirmed US intelligence reports claim that, since the end of UNSCOM inspections, Iraq has begun to rebuild the facilities necessary for producing chemical, biological and nuclear weapons. Although the International Atomic Energy Agency (IAEA) inspected Iraq's nuclear material and one declared nuclear facility at Tuwaitha in late January 2000 – carried out under Iraq's safeguards agreement with the IAEA – these visits did not extend to suspect sites.

On 26 January, the members of the Security Council unanimously agreed that former Swedish IAEA Director-General Hans Blix should head UNMOVIC. Blix's appointment was acceptable to China, France and Russia, which had previously rejected the recommendation that the post should be given to the first UNSCOM Executive Chairman, Rolf Ekéus. Iraq claims that it will not co-operate with UNMOVIC, but the real test will come when Blix – backed by the Security Council – formally requests a visit to Baghdad.

Sources: Barbara Crossette, '4 Abstain as UN Votes To Inspect Iraqi Arms', *International Herald Tribune*, 18–19 December 1999, pp. 1, 5; Barbara Crossette, 'Iraq Rejects New Inspections but Leaves Opening', *International Herald Tribune*, 20 December 1999, p. 4; Barbara Crossette, 'Security Council Agrees on New Iraq Arms Inspector,' *International Herald Tribune*, 27 January 2000, p. 9; 'No Inspectors, Iraqi Official Says', *International Herald Tribune*, 11 February 2000, p. 4.

OSCE verifies radar dismantlement

The Organisation for Security and Co-operation in Europe (OSCE) has successfully concluded its path-breaking exercise of monitoring the dismantling by Russia of the Skrunda radar station in Latvia, which resulted from a June 1994 accord between the two countries.

An OSCE representative was appointed to the Joint Committee that was set up to monitor and to co-ordinate implementation of the agreement, and an OSCE Inspection Team was established to carry out biannual surveys of the radar site. The OSCE described the process as 'one of the unsung success stories of international diplomacy during the 1990s'.

Source: OSCE press release, number IS 03/99, *OSCE Newsletter*, October 1999, pp. 2–3.

Chemical weapon destruction blues

Both the US and Russia are facing difficulties in meeting their obligations to destroy chemical-weapons (CW) stocks by 2007, as stipulated under the 1993 Chemical Weapons Convention (CWC). A former employee at the only functioning CW incinerator on the US mainland has alleged that the facility is unsafe and poses health and environmental risks. Gary Harris, who was employed by EG&G Defence Material Inc. at the Tooele plant in Utah, believes that the US Army-run incinerator has design flaws, which resulted in some of the gelled chemical agents not being completely burned. Scrap metal that has been resold could allegedly have been contaminated with traces of CW agents like sarin.

These charges were publicised by the Chemical Weapons Working Group, which has filed a joint lawsuit with the National Sierra Club and the Vietnam Veterans of America Foundation against the US Government. If the allegations lead to a formal investigation, operations at the Tooele plant and the construction of similar facilities in Alabama, Arkansas, Colorado, Kentucky and Oregon could be suspended. This outcome could raise the costs of CW destruction considerably and delay US compliance with the CWC.

On 7 February 2000, Russia announced that, unless it finds external funding, it would not be able to meet the 2002 deadline for destroying 20% of its chemical weapons. Russia is also requesting that it be exempted from its obligation under the Convention to destroy all of its CW facilities. Instead, Moscow has proposed that 18 of the 24 plants be converted to peaceful activities. In seeking the exemption, Russia has, for the first time, publicly revealed details of, and plans for, its former CW factories, as well as the associated costs.

Sources: *Defense News*, 31 January 2000; Chemical Weapons Working Group website at www.cwwg.org/cwwg.html; *Deseret News*, 22 January 2000; *OPCW Synthesis*, number 5, November–December 1999, pp. 1, 13–15; Reuters, 'Russia Lagging in Chemical Weapon Destruction', 8 February 2000; Judith Miller, 'Undoing Chemical Arms', *International Herald Tribune*, 7 February 2000.

New positions available at VERTIC

On-Site Inspection Researcher

VERTIC seeks an expert familiar with on-site inspection theory and practice. The successful applicant will conduct an 18-month research project on the modalities, techniques and technology of on-site inspections, spanning the range of international agreements that are of interest to the organisation – principally arms control, disarmament, the environment, and peace accords. He/she will have direct experience of conducting on-site inspections or will have carried out considerable research into the subject. Proficiency in English is essential. The salary range is £22,000–32,000 for a senior researcher, and £15,000–24,000 for a researcher.

Information Officer/Networker

VERTIC seeks a unique individual to expand its contacts with the outside world – notably the global verification community, governments, the media, and other non-governmental organisations (NGOs) – and to develop further the organisation's role as a clearing-house for verification information. Ideally, the successful applicant will have experience of public relations, working with the media and/or outreach programmes. He/she will have an understanding of international politics, preferably in areas relevant to the work of VERTIC.

Duties will include maintaining and expanding VERTIC's verification network, organising conferences and workshops, managing the promotion and distribution of VERTIC's publications, and producing its annual *Verification Organisations Directory*. Proficiency in English and computer literacy are essential. A one-year contract is offered in the first instance, with the possibility of extension subject to funding. A part-time arrangement may also be considered. The salary range is £15,000–24,000.

Applicants should send a curriculum vitae and a cover letter addressing the selection criteria and providing the names and full contact details of three referees. For detailed job descriptions, see VERTIC's website at www.vertic.org or contact VERTIC's Administrator, Angela Woodward. The closing date for applications for both positions is 31 March 2000.

Great yearbook, shame about the verification

Once again the Norwegian-based Fridtjof Nansen Institute has produced a gem of a yearbook (see the July 1999 issue of *Trust & Verify* for a review of the 1998–99 version). The 1999–2000 volume comprises a balanced mixture of country profiles and reference material on international environmental agreements, and inter- and non-governmental organisations. This information is preceded by a set of short papers that analyse current issues and key themes, and provide a clear summary of where international environmental policymaking is succeeding and where further obstacles must be overcome.

The only paper that mentions verification is an overview of the international nuclear safety regime. Roland Timerbaev and Abram Iorysh describe how the regime has developed since the 1950s under the International Atomic Energy Agency, and they include summaries of the relevant conventions. The authors note that the April 1999 meeting of the contracting parties to the Nuclear Safety Convention resulted in a landmark international monitoring system for dealing with the nuclear safety status of participating countries.

Joyeeta Gupta provides an excellent evaluation of progress on the climate regime, taking into account the economic, political, legal, institutional, scientific, and environmental perspectives. She points out that, while great progress has been made, potential bottlenecks – resulting, for example, from deep divisions between the developing and developed states, and from government inaction due to fears of domestic opposition to emission reduction policies – could still stall the regime.

Kristin Rosendal also emphasises the need to overcome the North–South divide in her chapter on bio-diversity. She examines the problematic relationship between the Convention on Biological Diversity and the agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPs), which was concluded under the auspices of the World Trade Organisation (WTO).

Similarly, Beatrice Chaytor and James Cameron assess the WTO's treatment of environmental issues, and assert that procedural and substantive reform of the Organisation will be required in order to integrate sustainable development into its rules. These two papers demonstrate that there is still a long way to go before environmental and trade matters are seen as equally important.

Edgar Gold looks at the attempts to reduce ship-source marine pollution. He praises American efforts to improve international liability and compensation mechanisms, but pleads for more emphasis to be put on preventing accidents from occurring in the first place. Finally, Adil Najam highlights the growing participation of business in environmental policymaking – via the Geneva-based World Business Council for Sustainable Development – but questions whether this represents a true greening of the private sector or just a 'greenwash'.

> ... there is still a long way to go before environmental and trade matters are seen as equally important.

By making slightly fewer direct references to verification than in previous issues, this edition may leave the impression that verification and monitoring do not matter. This is unfortunate and something that should be rectified in future years. Nonetheless, the *Yearbook of International Co-operation on Environment and Development 1999/2000* remains a valuable source of both hard facts and thought provoking commentary, which should appeal not just to those involved in environmental policymaking, but also to anyone with an interest in international affairs.

Reviewed by Clare Tenner

Yearbook of International Co-operation on Environment and Development 1999/2000
Edited by Helge Ole Bergesen, Georg Parmann and Øystein B. Thommessen
(London: Earthscan Publications, 1999), £45 (hardback)

Readers are asked to note that the VERTIC website has moved from www.fhit.org/vertic to www.vertic.org

Science & Technology Scan

'Breakthrough' in landmine detection could dramatically reduce false alarms

A prototype detection system could help to eliminate the large number of false alarms involved in locating anti-personnel landmines. The US Defense Advanced Research Projects Agency (DARPA) recently tested a pilot system, which was developed by Quantum Magnetics, in areas around Tuzla, Bosnia-Herzegovina. The prototype reportedly located without any false alarms five anti-personnel-landmine-type targets loaded with the explosive RDX and one that was filled with metal, as well as two RDX anti-tank-landmine-like targets.

The system, which performed well in both heat and rain, does not suffer the same problems with false alarms as current devices because it can recognise explosives, rather than just a landmine's metal firing pin. It works by sending out radio-frequency energy that hits individual atoms in the explosive, which return a frequency recognised by the detector. The next step is to equip the system to detect TNT – the most common explosive used in landmines.

Source: Jeremy Singer, '"Breakthrough" In Mine Detection Could Dramatically Cut False Alarms', *Inside The Army*, 11 October 1999, p. 9.

'Sound gun' developed to help inspectors

A 'sound gun' built by the Los Alamos National Laboratory in New Mexico, US, could facilitate on-site inspections. The 'gun' is able to identify the contents of unmarked steel containers from a distance of three metres, allowing inspectors to distinguish between an ordinary fuel drum and, for example, a barrel of nerve agent.

The gun exploits the ability of ultrasound to make a container resonate. A laser beam measures the vibrational frequency of the drum, which, in turn, depends on what is stored inside. More than 100 different chemicals can be identified in about 30 seconds.

The sound gun has several advantages over existing technology, which is cumbersome and must be placed within one centimetre of the target. And users must be protected from the radioactive neutron source that the instrument uses.

Another alternative technique is to use a special drill bit that can extract a sample of the chemical and then reseal the container. But the drill cannot be used from a distance and leaking noxious substances could endanger the inspectors.

Source: *New Scientist*, 30 October 1999, p. 11.

Robots to refuel satellites ...

The US Department of Defense is developing a robot that can refuel and service satellites in orbit. The autonomous space transporter and robotic orbiter (ASTRO) will shuttle back and forth between satellites and fuel dumps that are stationed in holding orbits. ASTRO could extend a satellite's life many times over, since they would no longer drop out of orbit and burn up when their fuel supplies were exhausted.

Verification would be strengthened by the availability of continuous coverage and the enhancement of controllers' ability to manoeuvre satellites at will, making it more difficult for observers to predict their positions. This would help to ensure that states attempting to violate arms control and disarmament agreements could not time their illicit activities to avoid overhead passes by satellites, which India is believed to have done before its nuclear tests in 1998.

Source: *New Scientist*, 30 October 1999, p. 22.

... and robots that roll and hop

Information-gathering robots that roll and hop could be used for remote-controlled intelligence gathering. The robots, developed by the University of Minnesota, are described as roughly the size and shape of a roll of toilet paper. Each carries a tiny sensor: a video camera, vibration device or microphone. The 'robo-scouts' can be deployed in teams, with individuals staying in touch by radio. They are controlled from a mobile base, permitting a distance of more than 400 metres

to be maintained between the scouts and their operators.

The research team claims that the hopping action is their greatest accomplishment. This is achieved using a spring-loaded mechanism that winches in a leg and then suddenly releases it, making it possible for the robot to climb stairs and to overcome small barriers. Wheels at either end of the cylinder allow the robot to roll into position.

Source: *New Scientist*, 13 November 1999, p. 6.

Underground radar breakthrough

Bahktar Associates of California in the US recently unveiled a radar that can provide three-dimensional images of objects up to 45.7 metres below the surface of land and sea. Such a device would allow verifiers to identify underground weapons facilities, like those of concern in Libya, Iraq and North Korea. The underwater detection capability could also be used to verify treaties dealing with submarines and nuclear weapons positioned on the seabed.

Source: Bryan Bender, 'Radar Breakthrough Could Help DoD "See" underground', *Jane's Defence Weekly*, 22 December 1999, p. 8.

Live seismic data on the web

Near real-time seismograms are being broadcast on the internet – having been recently developed jointly by the US Geological Survey's Albuquerque Seismological Laboratory and the University of California at San Diego. The data, which can be used to detect underground nuclear tests, is available at www.liss.org, and includes information from 36 seismic stations around the world — soon to be expanded to more than 150.

Source: Charles R. Hutt and Harold Bolton, 'Live Seismograms from the Net,' *IRIS Newsletter*, vol. XVIII, no.1, spring/summer 1999, pp. 2–3.

Submarine-detecting plankton?

Four Ukrainian marine biologists have made significant progress in their research on bioluminescent plankton, which, when disturbed, can reveal the presence of large underwater objects, such as submarines. The research could also be used to verify future nuclear arms-control treaties that restrict or prohibit nuclear-armed submarines. In October, the Ukrainian security service accused the scientists of 'exporting state secrets'.

Source: Jon Copley and Duncan Graham-Rowe, 'The Cold War Resurfaces,' *New Scientist*, 20 November 1999, p. 4.

VERTIC News & Events

East Timor mission head to address VERTIC–Wilton Park conference

The head of the former UN Assistance Mission in East Timor (UNAMET), Ian Martin, will be the keynote speaker at the joint VERTIC–Wilton Park Conference on the Monitoring and Verification of Peace Agreements, which will be held on 24–26 March 2000. For further details, see the enclosed insert or contact Heather Ingrey at: Wilton Park Conferences, Wiston House, Steyning, West Sussex, BN44 3DZ, UK. Phone 01903 817764; E-mail: heather.ingrey@wiltonpark.org.uk; Fax 01903 814217.

Landmine Monitor project

VERTIC has submitted to Landmine Monitor the first draft of its report on the UN's role in assessing compliance with the Ottawa Convention. The document was prepared by Angela Woodward, and was considered at Landmine Monitor's meeting in Brussels on 31 January–2 February 2000. It will be one of the thematic papers that will be in the second annual Landmine Monitor report on state compliance with the Ottawa Convention, which will be presented to the Second Meeting of States Parties in Geneva in September.

VERTIC participates in UK Inquiry

VERTIC has made a written submission on issues of monitoring, verification and compliance to the UK House of Commons Foreign Affairs Committee's Inquiry into Weapons of Mass Destruction. Committee members have asked Trevor Findlay to appear before them in April 2000.

New interns

VERTIC has acquired two new interns until the end of April 2000. Douglas Dyer, who comes to the organisation through Educational Programs Abroad (EPA), is enrolled at The Evergreen State College in Olympia, Washington, US. He is a third-year student, majoring in political science. During his internship, Douglas is also taking classes at Birkbeck College, University of London. He is helping to update the *Verification Organisations Directory*, researching peacekeeping in East Timor, and analysing European Union mechanisms for monitoring member nations' compliance with environmental agreements.

Sasha Lezhnev comes to VERTIC with the assistance of the British Universities North American Club. He is a third-

year student at Georgetown University in Washington, DC, pursuing a degree in Comparative Studies, with a regional focus on Russia and Africa. As well as helping to update the *Verification Organisations Directory*, Sasha is assisting Tom Milne with surveying Russian verification research programmes for a chapter in VERTIC's *Verification Yearbook 2000*.

New grants for test ban research

VERTIC has received two new grants to continue its work on verification of the CTBT. The John Merck Fund in Chicago and the Ploughshares Fund in San Francisco awarded the organisation $40,000 and $30,000 respectively. Some of the money will be used to convene a high-level meeting of seismologists and other scientific and verification experts in order to assess the verifiability of the CTBT and the current and potential future performance of the International Monitoring System.

A founding VERTIC Board member retires

It is with regret that VERTIC announces the retirement of John Edmonds CMG CVO from its Board. Formerly a Royal Navy officer and a British diplomat, John was Ambassador and Leader of the UK delegation to the trilateral CTBT negotiations between 1978 and 1980. He was later Chairman and Vice-Chairman of the former Council for Arms Control and a Visiting Fellow at Reading University in the UK. John was a member of VERTIC's Oversight and Advisory Board (OAB) from the inception of the organisation in 1986, and became a VERTIC Director when the Board of Directors and the OAB merged in 1997. VERTIC thanks John for his dedicated service over the past 14 years and wishes him well with his continuing work in the arms-control and disarmament community.

Staff news

Trevor Findlay has been busy with fund-raising applications, preparing VERTIC's submission to the UK House of Commons Foreign Affairs Committee's Inquiry into Weapons of Mass Destruction, and organising and editing the initial contributions to VERTIC's *Verification Yearbook 2000*. On 30 November, Trevor and Clare Tenner met with John Ashton of the UK Foreign and Commonwealth Office (FCO) to discuss climate change issues. On 3 December, he attended a public meeting organised by Pugwash London on the BWC Protocol negotiations.

On 6 December, he met with Eleanor Krawutschke, head of Educational Programs Abroad (EPA), which provides VERTIC with most of its US interns. On 9 December, he went to a reception given by FCO Minister of State Peter Hain, MP. He presented a paper on proliferation of weapons of mass destruction at a symposium in Tokyo on 19–21 January. The title of the conference, which was organised by the UN University, was 'On the Threshold: The United Nations and Global Governance in the New Millennium'.

On 26 January, Trevor attended a seminar on India's nuclear weapons programme at King's College, London, given by Dr George Perkovitch of the W. Alton Jones Foundation. On 28 January, he heard the Chairman of the Australian Joint Chiefs of Staff, Admiral Chris Barrie, speak at the Royal United Services Institute for Defence Studies (RUSI) on peacekeeping in East Timor. On 4 February, Trevor and Oliver Meier went to an all-day non-proliferation seminar at the FCO, organised – in co-operation with the FCO – by the Mountbatten Centre for International Studies (MCIS) and the Programme for Promoting Nuclear Non-proliferation (PPNN).

At Chatham House on 7 February, Trevor and Oliver met the Chairman of the 2000 Nuclear Non-Proliferation Treaty Review Conference, Ambassador Abdallah Baali, to discuss institutional, procedural and substantive issues.

Oliver Meier gave a talk to the West Midlands Campaign for Nuclear Disarmament on 27 November about the future prospects for the CTBT. He travelled to Lima, Peru, to attend the General Conference of the Agency for the Prohibition of Nuclear Weapons in Latin America and the Caribbean (OPANAL) and a conference on 'Disarmament and Security: A New Latin America and Caribbean Agenda for the Next Millennium', which were held on 30 November–1 December and 1–3 December respectively. On 7–8 December, Oliver participated in the UK Atomic Energy Authority–British Nuclear Fuels Limited seminar on 'Safeguards in the New Millennium' in York, UK, where he presented a paper on 'Verification in International Treaties beyond 2000'. He also gave a talk on 'New Verification and Transparency Approaches: Trends for the Future: Solution or False Security?' at a Wilton Park non-proliferation conference on 13–17 December.

On 17 January, BBC World Radio Europe interviewed Oliver about progress in the BWC Protocol negotiations. On 18 January, he met with the Counsellor at the Chinese Embassy in London, Pan Weifang. Oliver represented VERTIC at the first meeting of the All Party Group on Global Security and Non-proliferation on 19 January, and, on 26 January, he attended a presentation by Dr George Perkovich entitled 'India's Nuclear Bomb: The Impact on Global Proliferation', both at the UK House of Commons.

Between 29 and 30 January, Oliver took part in a conference on 'Strengthening the BTWC: A Seminar on the Recruitment, Training and Operation of the Future Inspectorate' at the Clingendael Institute, Netherlands. On 4 February, he participated in a meeting of the MCIS–PPNN–FCO Nuclear Non-Proliferation Study Group. On 7 February, he contributed to a meeting at Chatham House, involving non-governmental organisations and the Chairman of the NPT Review Conference, Ambassador Baali.

Oliver has been working on a chapter examining

verification of a nuclear test ban for *Verification Yearbook 2000*, as well as on VERTIC's submission to the Foreign Affairs Select Committee's Inquiry into Weapons of Mass Destruction. He will have a letter published in the forthcoming *Bulletin of the Atomic Scientists* on US policy towards on-site inspections. Oliver's recent publications include pieces on the implications of US non-ratification of the CTBT and the crisis in nuclear arms control, which appeared in the December issue of the German policy journal, *Blätter für deutsche und internationale Politik*, and the December 1999–January 2000 issue of *Wissenschaft und Frieden* respectively.

Clare Tenner attended a presentation on International Environmental Policy, which was given by the German Environment Minister, Juergen Trittin, on 16 November at the London-based Royal Institute of International Affairs (RIIA). On 18 November, she was present at a pre-Seattle conference in London on the World Trade Organisation and Sustainable Development – arranged by UN Environment and Development-UK – and, on 30 November, she participated in a seminar at the Centre for Defence Studies, King's College, on the Environment and Security. Also on 30 November, Clare met with the head of the Environment, Science and Energy Department at the FCO, John Ashton, to discuss multilateral environmental agreements. This was followed up with a meeting on 13 January 2000 with Andrew Key of the FCO, to talk in more detail about the Climate Convention and its Kyoto Protocol.

On 16 December, Clare met with Pablo Kang of the Australian High Commission and Jake Werkesman of the Foundation for International Environmental Law and Development (FIELD) to discuss Australian policy on the Kyoto Protocol. On 7 January, she met with Christiaan Vrolijk of the Energy and Environment Programme at the RIIA to exchange information on their respective environment programmes. On 9 February, Clare attended a seminar at King's College, London, given by Bhupendra Jasani, and, on 17 February, she took part in one of a series of seminars on verification at the London School of Economics (LSE).

Clare spent much of December and January researching and writing two papers for the *Verification Yearbook 2000*. During February she has been working closely with colleagues at the Institute for European Environmental Research and FIELD on a joint research project proposal – which focuses on the European Union (EU)'s implementation of the Kyoto Protocol — under the EU Fifth Framework Programme.

Angela Woodward visited New York and Washington, DC, in January to conduct interviews and research at the UN and Human Rights Watch. This will help her to prepare VERTIC's report for Landmine Monitor on the UN's involvement in the implementation of the Ottawa Convention. She presented the draft report to Landmine Monitor in late January.

On a visit to New Zealand in February she met with staff at the Political Science Department, University of Canterbury, and visited Dr Kate Dewes and Royal Navy Commander Robert Green (retired) of the Disarmament and Security Centre, Christchurch, New Zealand. On 17 February, she attended a seminar on verification given by Nicholas Sims at the LSE.

VERTIC

Baird House
1517 St. Cross Street
London EC1N 8UW
United Kingdom

t +44 (0)20 7440 6960
f +44 (0)20 7242 3266
e info@vertic.org
w www.vertic.org

VERTIC is the Verification Research, Training and Information Centre, an independent, non-profit making, non-governmental organisation. Its mission is to promote effective and efficient verification as a means of ensuring confidence in the implementation of treaties or other agreements that have international or national security implications. VERTIC aims to achieve its mission through research, training, dissemination of information, and interaction with the relevant political, diplomatic, technical, scientific and non-governmental communities. A Board of Directors is responsible for general oversight of VERTIC's operations and an International Verification Consultants Network provides expert advice. VERTIC is funded primarily by grants from foundations and trusts.

Trust & Verify is published by VERTIC six times per year. Unless otherwise stated, views expressed herein are the responsibility of the author and do not necessarily reflect those of VERTIC and/or its staff. Material from Trust & Verify may be reproduced, although acknowledgement is requested where appropriate. Editor: Trevor Findlay. Sub-editing, design and production: Richard Jones. Copyright, VERTIC 2000.
Annual subscription rates: £20 (individual); £25 (organisation). To subscribe or to obtain a free e-mail copy of Trust & Verify, complete the coupon located on the back of the enclosed publications insert or on VERTIC's website at www.vertic.org
Current funders: Ford Foundation, John Merck Fund, Joseph Rowntree Charitable Trust, Rockefeller Family Philanthropic Offices, Ploughshares Fund, Landmine Monitor, W. Alton Jones Foundation and the John D. and Catherine T. MacArthur Foundation.