CTBT verifiable with high probability

The Independent Commission on the Verifiability of the Comprehensive Nuclear Test Ban Treaty (CTBT)—established by Vertic in August—met in London on 26–27 October 2000. Its *Final Report,* which was adopted by consensus, concludes that the treaty is verifiable with 'high probability'. Taking into account the system mandated by the treaty and additional verification means available to the international community, the Commission identified a complex and constantly changing 'verification gauntlet' that any potential violator would have to confront. These global verification capabilities will together constitute a powerful deterrent to any state contemplating an illicit nuclear test.

The Commission comprised 14 scientists and experts from 11 different countries, who were selected for their expertise in test ban verification technologies or techniques. Commissioners were drawn from government agencies, academia, non-governmental organisations, and the future Comprehensive Nuclear Test Ban Treaty Organization (CTBTO)'s Provisional Technical Secretariat in Vienna, Austria. Commissioners acted in their own personal capacities.

The Commission was tasked with assessing the verifiability of the CTBT both now, when the treaty's verification system is being established, and, in the future, once the system is complete. It was also enjoined to consider the totality of the verification resources available globally, whether inside or outside the treaty regime, and the likelihood of synergies between the various types of relevant data, whatever their origin. The aim was to produce a brief, eight-page report, which, while scientifically rigorous, would be accessible to the policymakers required to make decisions about whether or not their country should sign and/or ratify the CTBT.

The *Final Report* is a carefully balanced assessment of verifiability. In its opening paragraphs it makes clear that a verification system is always a product of politics, technology and finance. It does not claim that the CTBT is 100 percent verifiable—an impossible claim to make of any verification system. But it does make a strong case that any event that may be a possible clandestine nuclear test will be detected, located and identified with high probability.

The Commission was unwilling to attach a precise percentage figure to the probability that this could be achieved by the treaty's International Monitoring System (IMS), either in terms of the system as a whole, or in respect of the four technologies it employs: seismic; hydroacoustic; infrasound; and radionuclide.

Nonetheless, it expressed confidence that explosions as low as one kiloton (and, in some cases, much lower) in all environments would be detected with a high degree of confidence. Commissioners highlighted that even the partially completed IMS already has capabilities below one kiloton in some regions, especially in the strategically sensitive area of Central Eurasia. The *Final Report* describes progress made to date in establishing the IMS. In particular, it notes that key components of the Global Communications Infrastructure are in place and that the Vienna-based International Data Centre has demonstrated that it can receive and process information and distribute it in a timely manner to states parties.

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CTBT PrepCom approves record budget

The meeting of the Preparatory Commission (PrepCom) for the CTBTO, held in Vienna in November, conducted its business in record time and adjourned three days early. The PrepCom approved a 4.4 percent increase for its 2001 budget compared with its 2000 budget, including significant new resources for preparing for on-site inspections.

US Air Force to improve nuclear test detection

The US Air Force has contracted Science Applications International Corporation (SAIC) to upgrade its global seismic monitoring system. The deal, worth up to US$100 million, will result in the installation of new seismic monitoring stations and the improvement of existing ones.

The *Final Report* highlighted the impressive capabilities of two often-overlooked IMS technologies—hydroacoustic and infrasound—used to detect, respectively, explosions under the sea and in the atmosphere. Hydroacoustic technology was said to be so sensitive as to be able to detect any relevant event in any of the world's oceans once the system is fully established. Similarly, infrasound technology, which has been developed most vigorously by France, is said to have extraordinary long distance detection capabilities. Space shuttle launches in Florida, for instance, are routinely detected in Canada.

The *Final Report* underscores the synergies among the three 'wave form' technologies and between them and the radionuclide network, which will detect radioactive particles and gases from nuclear tests. In addition to detection, the location and identification of nuclear tests would likely involve using data from one or more of the other four IMS technologies—again exploiting their synergies. Radionuclide detection technology was, in fact, described as providing the 'smoking gun' for verifying non-compliance with the CTBT, particularly when obtained during an on-site inspection (OSI). This is because it can definitively distinguish a nuclear explosion from a conventional explosion in a way that the wave form technologies cannot. The Commissioners noted that a well-prepared OSI regime should serve as a deterrent to any potential violator as a result of the high probability of exposure.

Verification viewed holistically

One of the *Final Report's* innovations is its holistic approach to CTBT verification. Commissioners became aware during their deliberations that, in addition to the IMS and the treaty regime's other components, there are considerable verification resources on which the international community can draw to offer reassurance that the CTBT is being complied with. The treaty itself provides for information from national technical means (NTM) of verification—information-gathering capabilities owned and operated by governments, such as satellites—to be used by a treaty party in seeking clarification and consultation with regard to a suspicious event, or as the basis of a request for an OSI of another party. Of course, NTM are also used by states unilaterally to reassure themselves that fellow parties and other states are not conducting nuclear tests.

While the report acknowledges that some NTM capabilities are classified, it also points out that there are now thousands of openly accessible scientific and environmental monitoring resources that may provide evidence of a clandestine nuclear explosion. These include increasingly available and cheap commercial satellite imagery and scientific seismic networks with global coverage. In the coming decade the scientific networks are likely to encompass thousands of digital seismic stations worldwide that will be recording earth movements, including those caused by illicit nuclear tests (should any occur). Information derived from these sources could be used synergistically with IMS data.

Implausible evasion scenarios

The Commission spent time considering the likelihood that a country would attempt to cheat the verification system through some elaborate evasion scenario. Three were considered:

- decoupling;
- hiding a nuclear explosion in another event; and
- conducting an explosion in an area and in an environment where attribution could be problematic.

The latter two scenarios were dismissed on the grounds that no credible examples of how they might work could be identified. The most discussed option was so-called decoupling, in which an attempt is made to attenuate the seismic signals of an underground nuclear explosion by detonating it in an underground cavity, either an existing one or one constructed for the purpose. Commissioners agreed that such an undertaking faced numerous technical, financial and organisational obstacles and would expose the perpetrator to a complicated verification gauntlet. They concluded that even the sophisticated nuclear weapon states would have difficulty in executing such a scenario because of the complexities involved, not least ensuring secrecy and a foolproof means of deceiving all elements of the verification regime.

Conclusion

The *Final Report* ends by recommending that states provide the necessary political, financial and technical support to permit the CTBT regime to be established as soon as possible, that the international community support greater exchange of data between the IMS and non-IMS sources, and that research into the scientific and technical underpinnings of CTBT verification be nourished.

While acknowledging how much work remains to be done on the IMS, the Commission's report reveals the surprising capabilities of a system that is still being established. By examining the totality of the verification resources available to the international community it not only provides a truer picture of verifiability, but also draws attention to the fact that this compounds the uncertainty facing any potential treaty evader. A constantly evolving, technically advancing and multifaceted CTBT verification gauntlet is something that no state is ever likely to contemplate running.

Trevor Findlay, Chairman of the Independent Commission and Executive Director of VERTIC

For further information on the Independent Commission, including its *Final Report* and *Annex* containing the contributions of the Commissioners, see www.ctbtcommission.org. Printed copies are available, on request, from VERTIC.

Peace Missions Monitor

Northern Ireland: second inspection but still no verified decommissioning

Two respected international figures, former Finnish President Martii Ahtisaari and former African National Congress Secretary-General Cyril Ramaphosa, made a second inspection of Irish Republican Army (IRA) weapons dumps on 25 October. After the inspection Ramaphosa declared that, 'We are even more convinced about their intentions after going back for a re-inspection and finding that the arms dumps had not been tampered with'. While the modalities of the inspection process have not been revealed, it is assumed that some form of tamper-proof seals is being used.

Meanwhile, however, the IRA, despite previous undertakings, has not resumed talks with the Independent International Commission on Decommissioning, which is supposed to be overseeing the decommissioning of paramilitary arsenals of both sides. *Sinn Féin* warned in late November that the IRA was unlikely to allow a third inspection unless it got its way on reform of the Northern Ireland police force. Two and a half years after the signing of the 1998 Good Friday Agreement, none of the major paramilitaries have undertaken decommissioning.

Source *The Times*, 26 October 2000, p. 2, 3 November 2000, p. 10, and 23 November 2000, p. 15.

UN to verify Ethiopia–Eritrea ceasefire

The UN has announced that it will deploy 2–4,000 troops to monitor the 18 June 2000 ceasefire agreement between Ethiopia and Eritrea brokered by the Organization of African Unity (OAU). United Nations' peacekeepers will be stationed in a 25-kilometre buffer zone between the two states and will remain until the border delimitation/demarcation process has been completed. The UN Secretary-General, Kofi Annan, has appealed to member states to provide troops and equipment for the new UN force—both are expected to come mostly from African and Asian countries.

Source Thalif Deen, 'UN peacekeepers to monitor Ethiopia–Eritrea ceasefire', *Jane's Defence Weekly*, 28 June 2000, p. 17.

Israel rejects Palestinian call for monitors

Israel has rejected a Palestinian proposal for a 2,000-strong unarmed international observer mission for the West Bank and Gaza Strip to provide 'safety and security' for Palestinians and presumably to monitor compliance by both sides with their periodic attempts to end hostilities. Although the US has been quietly exploring the possibility in talks between the two sides, Israel has rejected the idea—without further explanation—as having the potential to make the situation worse. It is not clear, though, whether Israel would reject a US-led observer force, like the Multinational Force and Observers deployed since 1982 in the Sinai between Israel and Egypt. Nachman Shai, an Israeli spokesman, said 'we don't much trust the UN or any other international organizations. The Americans, yes'.

Source *International Herald Tribune*, 7 November 2000, p. 1, and 9 November 2000, p. 7.

Verifying CW destruction: a long, slow haul

EFFORTS TO DESTROY chemical weapons (CW) have intensified in recent years, largely due to the destruction requirements of the 1993 Chemical Weapons Convention (CWC). The Organization for the Prohibition of Chemical Weapons (OPCW), based in The Hague, Netherlands, oversees implementation of the CWC. The Convention, which entered into force on 29 April 1997, mandates the verified destruction of all CW stockpiles by 29 April 2007. Extensions of this deadline by up to five years are possible.

Four declared possessors

Four countries have declared CW stockpiles to the OPCW: India, Russia, South Korea and the US. The total amount of CW initially declared (excluding amounts destroyed) is approximately 70,000 agent tonnes (weight of chemical fill only).

Russia has approximately 40,000 agent tonnes stored at seven sites. Large-scale operations to destroy this stockpile, which will cost an estimated US$5–6 billion, have not yet begun, primarily because of financial constraints. Russia has already had one destruction deadline extended by the OPCW. Earlier this year it also emerged that approximately 40,000 fuses and burster charges were removed from CW munitions and destroyed at Russia's Leonidovka and Maradikovsky sites without prior notification being given to the OPCW. Operations at the sites were suspended, following discussions in the OPCW's Executive Council. Destruction of the items was subsequently verified (with the exception of 22 destroyed beyond recognition) by OPCW on-site inspectors from 17–25 April 2000. The Executive Council has since approved a Russian plan for destruction of such items in future.

As of September 2000, the US had destroyed approximately 21 percent of its original 31,000 agent tonne stockpile, which is stored at nine sites. Large-scale destruction operations are taking place at two of these sites. Construction of chemical weapons destruction facilities (CWDFs) is stalled at two other sites due to domestic concerns over the safety of the incineration technology. The total cost of destroying the American stockpile continues to rise and is now estimated at about US$15.3 billion.

India may have as many as eight CW sites, but the size of its stockpile is not publicly known. South Korea's CW is reportedly located in Yongdong Province in the centre of the country and consists of several hundred tonnes, apparently largely comprising unfilled munitions, devices, and 'specifically designed equipment' and little, if any, chemical fill. Destruction operations in India and South Korea have begun and both countries had, by the end of 1999, destroyed more than one percent of their respective stockpiles, as mandated by the CWC.

Verification by the OPCW

The OPCW's Verification Division, comprising 73 staff, is responsible for all of the Organization's verification activities, including receiving and evaluating declarations from states parties. These declarations form the basis for the planning, technical support, evaluation and finalisation of inspections. The actual inspections are carried out by the Inspectorate Division, which consists of 231 persons (203 of whom are inspectors).

CWDFs may be subject either to continuous or remote monitoring. If a facility operates continuously, there are inspectors at the site at all times. During night shifts inspectors are not generally present inside the facility itself, but each morning they verify the operations of the previous night by checking instrumentation, such as flow meters. The CWDFs that destroy chemical weapons intermittently, in either 'batch mode' or in 'destruction campaigns', are monitored only when such activities occur. Currently about 60 percent of all inspector days are spent at CWDFs, a figure that will probably increase as additional facilities become operational over the next two to three years. Efforts are underway to install cameras in tamper proof boxes for periods when inspectors are not present at a CWDF.

By contrast, chemical weapons storage facilities (CWSFs) are not subject either to continuous on-site or remote monitoring. They are inspected, on average, one and one half times per year. During each inspection seals are used; they are subsequently removed—in accordance with the CWC's verification annex—to allow for regular maintenance, checking for leaks, and movement of chemical weapons. These activities are documented and subject to record checks by the OPCW. Some CWSFs are completely inventoried by OPCW inspection teams, while others are checked through statistical sampling techniques. The process is repetitious and routine, but there are occasional unexpected developments that must be subsequently addressed.

The intensity of verification at both destruction and storage facilities depends on a number of factors, including the condition of the CW (munition body and/or chemical fill) and the ease with which diversion might occur. An efficient and transparent accounting system at a CWSF enhances confidence. The configuration of the CWSF also influences how easily items or groups of items may be inventoried. Munitions may be grouped

according to type and fill. If they have serial numbers and are stored sequentially, the possibility of diversion is reduced.

The level of verification imposed on a CWDF, usually located close to a CWSF, also depends to a great extent on how the facility is designed and operated. Again the possibility for diversion of CW as it is transported from the CWSF to the CWDF is assessed and monitored. OPCW inspectors should be able to check that the CWDF's output is consistent with its input. The CWDF's design features which reduce the possibility of diversion during destruction operations and which allow for sampling or observation at intermediate stages are also considered when determining the verification measures necessary. It is helpful, particularly in the case of munition bodies, if the final destroyed product is identifiable. Finally, some OPCW verification and monitoring measures may be scaled back or eliminated if similar activities in other (bilateral or multilateral) agreements are determined to be 'complementary'.

Over the long term the emphasis of activities under the CWC will increasingly shift from verification of destruction of weapons towards verification of non-production by some sectors of civilian industry, collection and analysis of declarations on trade in certain chemicals, and implementation of technical assistance and co-operation measures.

Mixed transparency benefits

One of the expectations after the Convention's entry into force was that there would be greater transparency regarding past and present CW activities by states parties. While this has occurred in some areas, the decision to reveal the contents of state party declarations essentially rests with that state party. Some information from classified declarations is included in data publicly available from the OPCW, but the name of the declaring state party is not identified. A lack of publicly available information relating to many state party declarations and international verification activities makes it difficult for those not directly involved to judge the overall effectiveness of the regime, including the verification of CW stockpile destruction. This issue is the subject of continuing discussion within the OPCW.

John Hart, On-Site Inspection Researcher, VERTIC

Verification Quotes

The optimal degree of verification is not 100%, given the steeply rising marginal costs when approaching this level. From the viewpoint of benefit–cost analysis, the optimum point is where the marginal benefits of added verification are matched by their marginal costs. This argument is similar to the one regarding the optimal degree of pollution—that is not zero given the very high incremental cost at low levels of pollution.

Michael D. Intriligator, University of California, Los Angeles, in presentation on 'Verifying a Nuclear Weapons Convention', United Nations, New York, 26 October 1999.

We will return, if you please, to *history*, to solid, believable, verifiable fact!

Professor Binns to his History of Magic class, in J.K. Rowling, Harry Potter and the Chamber of Secrets, *Bloomsbury, London, 1998, p. 115.*

You need to verify, verify and verify whatever we tell you. 'This is a cup of tea. Yes, it looks like a cup of tea, but we are going to verify it'. 'This is a spoon. Yes, it looks like a spoon, but we are going to verify it'.

Iraqi Foreign Minister Tariq Aziz parodying the UN Special Commission for Iraq, quoted by Richard Butler, former UNSCOM Executive Chairman in his book, Saddam Defiant: The Threat of Weapons of Mass Destruction, and the Crisis of Global Security, *Wiedenfeld & Nicolson, London, 2000, p. 184.*

What can I do in Equator province? It's 90 percent jungle! Look! All around! What can I do? Nothing! Nothing!

Colonel Ion Albu, frustrated Romanian military observer, member of the UN Mission to the Congo, which has been attempting to monitor a non-existent ceasefire between the multiple parties to the civil war in the Democratic Republic of the Congo, quoted in Karl Vick, 'UN Observes Local Life, But Little Else, in Congo', International Herald Tribune, *4 October 2000, p. 2.*

. . . we consider such declarations and visits to be non-threatening and manageable. The risks of losing confidential business information, genetic material, or proprietary cultures, including the constant threat of corporate espionage, are the day-to-day concerns of industry. The specialized problems associated with a BTWC compliance regime should be easily managed.

Lance C. Gordon and Thomas P. Monath, 'Strengthening the Biological Weapons Convention', Science, *20 November 1998, vol. 282, no. 5393, p. 1423.*

Verifying destruction of old and abandoned CW: a longer, slower haul

In addition to stockpiled chemical weapons, the CWC also requires that 'old chemical weapons' (OCW) and 'abandoned chemical weapons' (ACW) be declared and subject to verified destruction. It is believed that there are at least 700,000 ACW worldwide. In contrast, the total number of OCW is largely undetermined. Most have been removed from former First World War battlefields in Europe: each year approximately 3,500 tons of munitions from this period are recovered, 10–20 percent of which are chemical weapons.

At least six states parties—Belgium, France, Germany, Italy, Japan and the UK—have declared possession of OCW, while at least three states parties—China, Italy and Panama—have declared the existence of ACW on their territory. A state party must declare any OCW within 180 days of discovery. But since states parties have the option of insisting that their declarations to the Organization for the Prohibition of Chemical Weapons (OPCW) be kept classified, in part or in their entirety, some ambiguities regarding the content of these statements exist.

Old chemical weapons

There are two categories of OCW. One consists of CW produced before 1925—these are to be treated as 'toxic waste' and are subject to more relaxed international verification. The second category comprises CW produced between 1 January 1925 and 1 January 1946, which are determined to be 'unusable'. Any country that had a CW programme or on whose territory CW were produced, stored or used may uncover OCW.

During the Second World War, CW were positioned in all major theatres of operation. Approximately 45 tons of sulphur mustard manufactured in Batujajar, West Java, in 1940–41 by the Dutch colonial government, for example, was unearthed in Indonesia in 1979. It was subsequently destroyed. In the US, the army's Non Stockpile Chemical Materiel Program is responsible for, *inter alia*, destroying any OCW uncovered on American territory. The total estimated cost of the Program is more than US$15 billion and rising. Belgium, France and Germany have longstanding OCW destruction programmes.

Abandoned chemical weapons

Any chemical weapon abandoned since 1 January 1925 on the territory of another state party 'without the permission of the latter' is defined as an ACW. These weapons may also be OCW and *vice versa*. While both the Abandoning State Party (ASP) and the Territorial State Party (TSP) have responsibilities towards the destruction of these weapons, it is generally understood that the ASP has the primary responsibility and should meet the cost.

The Japanese Imperial Army left the largest number of ACW currently known to exist (no less than 700,000) on the territory of China during the Second World War. There have been bilateral contacts between the two governments over this issue since at least 1991. Most of the details of negotiations are not publicly known, although final agreement was complicated by:

- the need to identify and agree on destruction technologies (mainly American or European);
- overall Japanese responsibilities, such as liability and issuance of a formal apology; and
- mutual understanding on the scope of the problem (such as how much of the ACW, if any, might be of non-Japanese origin).

A memorandum of understanding was signed on 31 July 1999 in which both sides formally recognised that Japan had abandoned large numbers of CW on the territory of China. The scope of the problem was significantly clarified and Japan is now prepared to meet the cost of destruction, which will almost certainly exceed US$1 billion and take several years to complete. It is unclear, however, when destruction operations will begin.

With regard to Panama, the US conducted field tests of CW munitions during and following the Second World War, including on the island of San José. It seems unlikely that all munitions fired on test ranges in Panama have been accounted for and dealt with. If CW munitions are still extant, whether whole or in part, they are considered chemical weapons under the CWC and should, therefore, be declared to the OPCW.

Varying levels of verification

The level of international monitoring and verification applied to OCW and ACW is lower than that for stockpiled CW. This is reflected by the fact that OCW and ACW are not subject to continuous on-site monitoring. The frequency of inspections for such weapons is also lower than that for stockpiled CW. As of August 2000, a total of 11 ACW sites and 21 OCW sites had been declared and were subject to monitoring and verification by the OPCW.

The level of expenditure has been one of the principal considerations within the OPCW on OCW- and ACW-related issues, including, for example, whether the cost of inspection should be borne by the inspected state party or by the OPCW as a whole. This question of attribution has only been partially resolved.

A second outstanding issue with financial implications is the question of 'usability', since the cost of verification for 'unusable' weapons is usually less than the cost of verification for those determined to be usable. This matter raises two immediate problems. First, determining usability is to some extent subjective. Second, there is debate over whether the munition body and the chemical fill must both be deemed usable for a CW to be officially declared 'usable', or whether only one usable element will suffice. In general, the munition bodies of OCW and ACW tend to be in poor condition. By contrast, the fill is usually either completely hydrolysed (or has leaked out) or is in nearly the same condition as it was the day the munition was filled.

The original purpose for which a CW was manufactured also affects the level of international monitoring and verification. Hence the OPCW does not take into account theoretical scenarios, such as loading a pile of unstable old chemical weapons into a crate and pushing it from an aircraft.

Conclusion

Additional declarations of OCW/ACW are to be expected in the near-to-mid term. During the 1960s, for instance, CW were used on the territory of Yemen, which became a state party to the CWC on 1 November 2000. Consequently, the contents of its initial declaration—due within 30 days of the Convention entering into force for Yemen—might be revealing. In addition, OCW and ACW could be uncovered on territories formerly under other states' jurisdiction or control. Slovenia, for example, informed the OPCW in 1999 that it had destroyed a small number of First World War-era chemical munitions on an emergency basis, even though it had not been among the declared OCW possessors.

Technical and political debates about the verified destruction of old and abandoned chemical weapons are continuing and will not be definitively resolved for some time yet.

John Hart, On-Site Inspection Researcher, VERTIC

Science & Technology Scan

New climate change models underline verification uncertainty

Scientists from the UK's Hadley Centre have created the first climate model that includes continuous interaction between vegetation, the atmosphere and the oceans. The model shows that rising temperatures caused by climate change will result in greater production of carbon dioxide by micro-organisms in the soil, leading to further temperature increases. Plants will initially absorb more carbon dioxide, but at higher temperatures this effect will level out. By 2050 the biosphere is expected to switch from being a small 'sink' for carbon dioxide to a large source of the gas. Like other climate models, the results are subject to a significant degree of uncertainty. Such uncertainties have important implications for verification of the Kyoto Protocol, as some countries are planning to meet some of their greenhouse gas emissions targets through the use of biospheric 'sinks', such as the planting of forests. Given that the long-term stability of these 'sinks' is uncertain, they will need to be monitored indefinitely.

Source Nicola Jones, 'Green lungs feel the heat', *New Scientist*, 11 November 2000, p. 28; Jorge Sarmiento, 'That sinking feeling', *Nature*, vol. 408, 9 November 2000, p. 155.

Micro-craft aloft

Micro Craft, an aerospace development company in San Diego, US, has successfully tested a miniature flying vehicle that is only 23 centimetres across and weighs just 1.4 kilogrammes. It consists of little more than a fan that rotates inside a protective cylinder. A small two-stroke petrol engine drives the fan, which provides enough lift to get the small craft off the ground and allows it to hover and move from side to side. The craft can fly for about two hours on the 200 grams of fuel it carries. The test vehicle can also hold a small video camera that transmits images back to the ground. It was developed with financial help from the US Defense Advanced Research Projects Agency (DARPA) and has obvious implications for verification. It could be used to monitor ceasefire lines or to inspect manufacturing and research installations or even large buildings.

Source 'Backpack drone that peers behind enemy lines', *New Scientist*, 21 October 2000, p. 10.

Advanced walkthrough device for detecting weapon components?

A new security instrument, called the Sentinel, now makes it possible to screen individuals for a full range of illicit substances. Barringer Technologies Inc., of Warren, New Jersey, introduced its walkthrough portal, which can scan about seven people per minute for several different minute particles and vapours. The individual stands in the portal while airflow gently dislodges particles and vapours, which are collected and analysed in seconds by an IONSCAN detector. The portal will make it easier to detect weapons components, including those for chemical weapons.

Source 'Another Bad Day for Terrorists: No Explosives Undetected', *US Newswire* www.usnewswire.com, 15 September 2000.

Verification Watch

IAEA highlights verification

From 18–22 September 2000, the International Atomic Energy Agency (IAEA)'s 130 member states met in Vienna for their 44th General Conference (GC). The importance of strengthening nuclear safeguards and verification was highlighted in the opening statement of the Agency's Director General, Dr Mohamed ElBaradei. He noted that the number of states that have concluded an Additional Protocol with the IAEA to strengthen their nuclear safeguards falls short of expectations, even though nine have been concluded and eight have entered into force since the previous GC in 1999. To date 55 Additional Protocols have been approved, 53 have been signed, and 17 have entered into force. Japan called for a 'Plan of Action' to encourage more states to conclude an Additional Protocol by 2003. But the Conference agreed only that elements of the Plan be considered 'as appropriate and subject to available resources.'

The Director General reiterated that the IAEA wants to have a conceptual framework for Integrated Safeguards, outlining how traditional and new safeguard activities will be combined, in place by the end of 2001. The Agency described the development of Integrated Safeguards as the 'prime focus of current and future work'. The GC supported these efforts, urging the Secretariat to continue studying to what degree the implementation of Additional Protocols could lead to a reduction of traditional safeguard activities.

The GC approved the Agency's 2001 budget, which includes US$82.9 million for Nuclear Verification and Security of Material, US$1.4 million more than in 2000. Uniquely among UN agencies, the IAEA's budget has not grown in real terms for more than 10 years. It must again rely on voluntary contributions.

The IAEA welcomed three new members, Azerbaijan, the Central African Republic and Tajikistan, increasing the total to 133. The GC addressed a number of regional issues and asked ElBaradei to convene a forum in which 'participants from the Middle East and other interested parties could learn from the experience of other regions, including in the area of confidence building relevant to the establishment of a nuclear weapon free zone'.

On the first day of the GC, ElBaradei met with Evgueny Adamov, Russian Minister for Atomic Energy, and General John Gordon, head of the US National Nuclear Security Administration, established earlier this year. They reviewed progress on the Trilateral Initiative, under which nuclear material withdrawn from the two countries' military programmes will be put under IAEA safeguards. In June, Russia and the US each declared 34 tonnes of weapon-grade plutonium excess to their defence requirements. The participants noted 'substantial progress' towards a Model Verification Agreement. They agreed to work on specialised verification and monitoring systems and the development of inspection procedures and basic technical measures. The three sides (Russia, the US and the IAEA) also agreed to meet again in September 2001 to plan implementation of the Initiative.

Source *PPNN Newsbrief*, no. 51, third quarter 2000; IAEA Press Releases, Vienna, 19 and 24 September 2000; IAEA News Briefs, vol. 15, no. 4, October–November 2000; 'Strengthening the Effectiveness and Improving the Efficiency of the Safeguards System and Application of the Model Protocol', GC(44)/12, 16 August 2000; 'Statement to the Forty-fourth Regular Session of the IAEA General Conference 2000 by Director General Mohamed El-Baradei', Vienna, 18 September 2000. This and other statements, as well as resolutions and documents, can be found on the IAEA website at www.iaea.org.

OSCE opens Operations Centre

The Organisation for Security and Co-operation in Europe (OSCE) has set up an Operations Centre at its Vienna-based Conflict Prevention Centre to serve as a planning cell for future missions and field operations and to identify potential crisis areas. The ill-fated 1998 Kosovo Verification Mission (see November 1998 issue of *Trust & Verify*) starkly highlighted the need for such an Operations Centre.

The Operations Centre will have a small core staff with relevant expertise (military and non-military) for all kinds of OSCE missions. Operational planners will define objectives, timelines, best practice, and resource requirements. A second key function of the Centre will be to liaise with the OSCE's international partner organisations.

The Centre will have two modes of operation. In 'routine mode' it will undertake preparations for future missions. In 'surge mode' it will deal with the transition to an operation, with its personnel serving as a core team during mission build-up and perhaps even accompanying a new head of mission in the initial stages of deployment. Once an operation has finished, the Centre will systematically review the work carried out and draw lessons for future missions.

Source Eva Zieschank, 'Operations Centre due to open in September', *OSCE newsletter*, vol. 7, no. 9, September 2000, pp. 6–7.

Permanent Monitoring Panel for Missile Proliferation

The World Federation of Scientists (WFS) launched a Permanent Monitoring Panel for Missile Proliferation (PMP) in 1997. The Panel attempts to monitor the extent and rate of missile prolif-

eration, current anti-missile programmes, implications for the Anti-Ballistic Missile Treaty, and current nonproliferation agreements. The PMP also provides an informal channel for experts to exchange views and to make recommendations regarding international co-operation on theatre missile defence. The WFS was founded in Erice, Sicily, in 1973 by a group of eminent scientists, led by Isidor Isaac Rabi and Antonino Zichichi. The WFS has grown to include more than 10,000 scientists from 110 countries.

Source WFS website at www.federationofscientists.org.

Assessing the World Bank Inspection Panel: modified rapture

In 1993 the World Bank responded to environmental and human rights critics by establishing a public accountability mechanism known as the World Bank Inspection Panel. Composed of distinguished development experts, the Panel enables citizens of developing countries to make known directly their grievances regarding the environmental and social costs of the Bank's projects. Anyone negatively affected can thus acquire some degree of standing, potential allies, media access, and even the possibility of redress.

According to a study by Jonathan Fox, professor of social sciences at the University of California, the Inspection Panel's impact so far has been relatively intangible. Its greatest benefit appears to have been its willingness to listen to claimants, although it has also increased transparency and raised the international profile and legitimacy of the Bank's broader package of 'minimum safeguard' policies. Fox concludes, however, that the Panel has not led to more targeted or institutionalised accountability reforms, such as credible sanctions for non-compliant managers or staff. Nor has it produced many solutions in the field. The Panel, he says, is 'a paradigm case both of the influence of transnational advocacy networks over international norms and policies and of their limited leverage over institutional behavior in practice'.

Source Jonathan A. Fox, 'The World Bank Inspection Panel: Lessons from the First Five Years', *Global Governance,* vol. 6, no. 3, July–September 2000, pp. 279–319.

Next target for Landmines Convention compliance: rebel groups

A booklet has been published on the issue of how non-state actors (NSAs), such as rebel groups locked in armed combat with government forces, might be encouraged to comply with the 1997 Landmines Convention and how their compliance might be monitored. Unlike the 1977 Additional Protocol I to the 1949 Geneva Convention, which applies to certain NSAs, such as armed rebel forces, the Landmines Convention, banning the use, production, stockpiling and transfer of anti-personnel landmines, applies only to states.

A March 2000 workshop hosted by the Swiss Campaign to Ban Landmines recommended encouraging NSAs to submit reports on their compliance, similar to those required of states parties under Article 7 of the Convention. NSAs might also be encouraged to allow external monitoring of their activities, a measure beyond the scope of the Convention. Opening dialogue, building trust and creating support for the ban among NSAs were, however, considered to be as important as drawing them into a formal regulatory framework.

Source 'Engaging Non-State Actors in a landmine ban' workshop summary proceedings, 24–25 March 2000, Geneva. The Non-State Actor Working Group of the International Campaign to Ban Landmines is continuing work on this issue (see www.icbl.org).

UN advances international multilateral environmental agreements

Verification of multilateral environmental agreements was high on the agenda of the United Nations General Assembly (UNGA) in October. The focus of the Second Committee—Economic and Financial—was on preparations for a conference to conduct a ten-year review of progress in implementing Agenda 21, the plan of action adopted at the 1992 UN Conference on Environment and Development (UNCED) in Rio de Janeiro, Brazil. There is support for convening the review meeting at the highest political level in order to mobilise political will effectively. Indonesia and South Africa have offered to host the meeting. Several states noted that Agenda 21 had failed to meet expectations: developing countries emphasised the failure of developed states to provide the anticipated financial resources and technologies.

On 18 October, meanwhile, the UN Economic and Social Council (ECOSOC) adopted a resolution establishing a Forum on Forests. This will implement the Forest Principles agreed at UNCED (see the last edition of *Trust & Verify* for details). The Forum has been tasked with promoting international co-operation towards forest-related issues, implementing the proposals of the former Intergovernmental Panel on Forests/ Intergovernmental Forum on Forests, and monitoring and assessing progress. Within five years the Forum will consider the prospects for developing a legal framework for regulating the use and conservation of all types of forests.

Finally, between 26 and 30 October, the UNGA considered matters relating to oceans and the Law of the Sea Convention. It adopted a resolution calling for, *inter alia,* capacity building to help implement the Law of the Sea Convention and action on illegal, unreported and unregulated fishing and degradation of the marine environment.

Source Malena Sell, 'Briefing note on UNGA Second Committee consideration of Environment and sustainable development agenda items', *Earth Negotiations Bulletin,* 25 October 2000; 'UNGA consideration of oceans and the law of the Sea', *Linkages Journal,* vol. 5, no. 10, 1 November 2000, p. 5; 'New UN Forum on Forests Established', *Linkages Journal,* vol. 5, no. 10, 1 November 2000, p.10.

VERTIC News & Events

VERTIC receives three new grants

The W. Alton Jones Foundation has awarded VERTIC a new two-year grant of US$200,000 to continue its work on the verification of the UN Framework Convention on Climate Change (UNFCCC) and the Kyoto Protocol.

VERTIC has also received a grant from the European Commission to hold a conference in 2001 on policies and measures undertaken by European Union member states to implement the UNFCCC and the Kyoto Protocol. The latter will be carried out in partnership with two other London-based non-governmental organisations—the Foundation for International Environmental Law and Development (FIELD) and the Institute for European Environmental Policy (IEEP).

And the Ford Foundation recently approved a three-year grant of US$390,000 for VERTIC's arms control and disarmament verification programme.

Independent Commission and associated events

In addition to hosting and acting as the Secretariat for the meeting of the Independent Commission on the Verifiability of the CTBT on 26–27 October, VERTIC undertook several associated events in October and November to promote the *Final Report*. On the morning of 30 October a press release was disseminated and a press briefing held at the organisation's headquarters. In the evening VERTIC hosted a public seminar at the British Academy in London to launch formally the *Final Report*. On 7 November Commission Chairman Trevor Findlay gave a presentation on the Commission's report at the International Institute of Strategic Studies (IISS).

On the morning of 21 November, Oliver Meier gave a press briefing to journalists in Vienna, following the weekly UN press conference. In the evening the Commission's report was presented at a seminar at the United Nations in Vienna, hosted by the missions of Australia and Japan, and attended by delegations to the CTBT PrepCom and staff of the CTBTO's Provisional Technical Secretariat. The *Final Report* and its *Annex* have been widely distributed to governments, international organisations and non-governmental organisations.

New intern joins VERTIC

John Russell, who has a Masters degree in international politics and strategic studies from the University of Wales, Aberystwyth, will be researching the verification of nuclear disarmament and a nuclear weapon-free world. He will commence work at VERTIC on 28 November for three months.

New VERTIC publications

The *Verification Yearbook 2000* will be launched on 8 December. The contents and authors are as follows:

- *Preface,* Richard Butler
- *Introduction: the salience and future of verification* Trevor Findlay
- *Nuclear test ban verification: work in progress* Oliver Meier
- *Nuclear safeguards: evolution and future* David Fischer
- *Verifying nuclear arms control and disarmament* Annette Schaper
- *Chemical disarmament: advent and performance of the OPCW* Robert J. Mathews
- *Verifying biological disarmament: towards a protocol and organisation,* Nicholas Sims
- *Verification of conventional arms control* Pál Dunay
- *Verification under duress: the case of UNSCOM* Stephen Black
- *Multilateral environmental agreements: trends in verification* Clare Tenner
- *Verification and compliance systems in the climate change regime* Clare Tenner
- *Monitoring and verifying the military aspects of peace accords* Jane Boulden
- *Evolution of police monitoring in peace operations* J. Matthew Vaccaro
- *Remote monitoring from space: the resolution revolution* Bhupendra Jasani
- *The information revolution and verification* Andrew Rathmell
- *Compliance mechanisms for disarmament treaties* A. Walter Dorn and Douglas S. Scott
- *Intelligence in arms control and disarmament* Tim McCarthy
- *Societal verification: wave of the future?* Dieter Deiseroth

The printed version of the *Yearbook* will be available from VERTIC (see insert in this edition of *Trust & Verify*); individual chapters will also be downloadable free and as PDF files from VERTIC's website at www.vertic.org from 8 December.

VERTIC has also published three new *Briefing Papers*: Clare Tenner, 'Monitoring Implementation of the Kyoto Protocol', *Briefing Paper* 00/3, June 2000; Clare Tenner, 'The Kyoto Proto-

col: Pulling Verification Together', *Briefing Paper* 00/4, September 2000; and William Walker, 'Defence Plutonium Inventories and International Safeguards in the UK', *Briefing Paper* 00/5, October 2000.

Staff news

CHARLES ARTZ has been assisting Oliver Meier with research on the future verification requirements of a Fissile Material Treaty. He also helped with preparations for the Independent Commission meeting, drafted items for *Trust & Verify* and assisted with formatting and compiling the *Annex* to the Commission's *Final Report.*

TREVOR FINDLAY, along with Angela Woodward and VERTIC Board members Lee Chadwick and Owen Greene, attended a course on Legal Responsibilities of Voluntary Organisations on 3 October. On 10 October he met with Australian chemical weapons expert Robert Mathews and on 16 October with Hilary Palmer, VERTIC's fundraising advisor. On 18 October he gave a presentation on the Independent Commission to the biannual Nuclear Non-Proliferation Study Group at the UK Foreign and Commonwealth Office (FCO). On 19 October he met with Helen Hughes of the UN Association of the UK and the following day attended a seminar at Chatham House on Enforcing Multilateral Agreements.

From 26–27 October he hosted social events for, and chaired the meeting of, the Independent Commission. On 31 October he met with David Morgan of Educational Programs Abroad and on 1 November, together with Oliver Meier, met with Michael Kraig of the Stanley Foundation. In Geneva from 15–17 November he attended the Geneva Centre for Security Policy's fourth International Security Forum and was on the panel for the Arms Control Cluster session on 17 November. On 20 November he attended the Climate Change Conference in The Hague, Netherlands.

Trevor's publications during the period included: 'Verifiability of the CTBT: The Report of the Independent Commission', *Disarmament Diplomacy*, no. 51, October 2000. He completed editing VERTIC's *Verification Yearbook 2000* and edited the Independent Commission's *Final Report* and *Annex.* Trevor also drafted an article on the Commission with Oliver Meier for a forthcoming edition of the *Bulletin of the Atomic Scientists* and a Strategic Pointer for the IISS website.

JOHN HART attended the conference 'Eliminating chemical and biological weapons in the 21st Century: What needs to be done?' at Wilton Park from 29 September to 1 October. On 1 November he was present at a briefing at Westminster given by Dr Alexander Pikayev, a Scholar-in-Residence at the Carnegie Endowment for International Peace (Moscow), entitled 'Russian perceptions of European security'. He circulated his paper on on-site verification of industry under the Chemical Weapons Convention to various readers and began preparations for his project's workshop on on-site inspections in March 2001.

OLIVER MEIER visited Vienna from 9–10 October to meet with staff of the Provisional Technical Secretariat (PTS) of the CTBTO and members of national missions. On 18 October, along with Angela Woodward, he attended the Nuclear Non-Proliferation Study Group at the FCO. On 19 October he met with Helen Hughes of the United Nations Association to discuss priorities for the arms control and disarmament agenda. On 24 October, along with Trevor Findlay, Oliver attended a meeting with John Holum, US Under-Secretary of State for Arms Control and International Security, at the IISS. On 26–27 October he acted as Secretary at the Independent Commission's meeting, and on 30 October chaired VERTIC's public seminar at the British Academy. During the period Oliver assisted in preparing the Independent Commission's *Final Report* and *Annex.*

From 13–16 November in Tokyo, Oliver participated in the third Workshop on Science and Modern Technology for Safeguards organised by the Institute of Nuclear Materials Management and the European Safeguards Research and Development Association. He gave a presentation on 'The Use of Open Source Information in Multilateral Arms Control and Disarmament Regimes', which will be published in the workshop's proceedings. On 16 November he visited the office of the Tokyo Peace Depot to discuss the outcome of the Independent Commission.

On 18–19 November Oliver attended the 14th Workshop of the Pugwash Study Group on the Implementation of the Chemical and Biological Weapons Conventions in Geneva. He presented a discussion paper on 'Aerial imagery and the verification protocol for the Biological Weapons Convention' (BWC). On 20 November, he made a presentation on the use of open source information and novel verification technologies under the future BWC verification protocol at a joint briefing of non-governmental organisations and European Union delegations at the Palais des Nations in Geneva. While there, he attended the opening session of the 21st meeting of the Ad Hoc Group of States Parties to the BWC. On 22 November he met with delegations to the CTBT PrepCom and PTS staff in Vienna. On 23 November, Oliver's translation of the Independent Commission's *Final Report* was published in the German daily, *Frankfurter Rundschau.*

ELLEN PEACOCK has been promoting and distributing the Independent Commission's *Final Report* and *Annex,* as well as various VERTIC publications. She established and maintained

the Commission's website, drafted press releases, helped to organise the Commission's meeting and arranged the press briefing and public seminar to announce the findings of the *Final Report.* Ellen also organised the launch of the *Verification Yearbook 2000,* and continues to maintain the VERTIC library and its website.

CLARE TENNER spent most of the period preparing for the Sixth Conference of the Parties (COP6) to the United Nations Framework Convention on Climate Change, held on 12–24 November in The Hague. She co-ordinated work on position papers for Climate Action Network on the Compliance System for the Kyoto Protocol, Article 3.2 of the Protocol, 'demonstrable progress', and on national reporting requirements for forestry and other land-use change activities. In addition, she wrote a VERTIC *Briefing Paper* for COP6, and had an article on assessing 'demonstrable progress' under the Kyoto Protocol published in *Hotspot.* On 12–13 October Clare attended a strategy meeting of Climate Action Network Europe on COP6, held in Brussels. On 20 October she went to a meeting at the Royal Institute of International Affairs (RIIA) on compliance systems in Multilateral Environmental Agreements and on 1 November met with the Co-ordinator of Climate Action Network UK, Paul McConnel.

ANGELA WOODWARD, in addition to managing the organisation's administration, provided administrative support for the meeting of the Independent Commission. Angela represented VERTIC at a reception at the FCO marking the establishment of its new Environment Policy Department on 8 November and attended a meeting of Landmine Action on 9 November.

VERTIC would like to take this opportunity to wish everyone a merry christmas and a happy new year.

VERTIC

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 international agreements and intra-national agreements with international involvement. 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.

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