

Testing times on the Korean Peninsula

Over the past two decades, North Korea's foreign policy has been a thorn in the side of the nuclear non-proliferation regime. Under Soviet pressure, the country reluctantly joined, in 1985, the 1968 Nuclear Non-Proliferation Treaty (NPT). Once on the inside, though, it stalled on obligatory negotiation and entry into force of its comprehensive safeguards agreement (CSA) with the International Atomic Energy Agency (IAEA). While its CSA should have entered into force in 1986, it only became legally binding on 10 April 1992. By that time, the IAEA, building on its experiences with Iraq, was implementing a new approach to nuclear safeguards. Under the old system, the IAEA employed a method of 'material accountancy', merely checking if state declarations of their nuclear material inventories were correct. By 1992, however, it also assessed the completeness of states' declarations.

The IAEA quickly identified discrepancies in North Korea's declaration. The country soon started to deny access to vital facilities, which could be the site of non-declared activities. Agency insistence on full access contributed to North Korea's decision of 12 March 1993 to withdraw from the NPT. The announcement effectively suspended IAEA verification of its nuclear activities. A series of bilateral meetings with the United States culminated in North Korea's 'suspension' of its NPT withdrawal on 11 June 1993.

One year later, the parties adopted the 1994 Agreed Framework, which halted North Korean nuclear activities and allowed the IAEA to verify the freeze. In return, North Korea was assured that the West would engage in a degree of nuclear cooperation with the country and that it would receive deliveries of heavy oil to compensate for the loss of electricity production.

The situation on the Korean Peninsula remained in a state of suspended animation throughout the late 1990s and at the start of the twenty-first century. In 2002, though, US pronouncements that North Korea possessed an undeclared uranium enrichment programme led North Korea to expel IAEA inspectors and, on 10 January 2003, to effectuate its withdrawal from the NPT. Two years later, on 10 February 2005, North Korea publicly stated that that it had a nuclear arsenal.

A conservative estimate of North Korea's plutonium stockpile is that it is sufficient to produce five weapons. While all types of plutonium may be used in nuclear weapons, its isotopic composition has consequences for weapon design. Since it is technically unfeasible to use most compositions of plutonium in a simple shotgun design, an implosion device is likely to be required. Construction of an implosion device necessitates the presence of advanced machining and manufacturing capabilities and precisely designed, applied and timed high explosives. Even if the North Koreans have the necessary tools and expertise, only testing of the weapon can provide assurance that it will function properly and generate the desired yield.

In this issue . . .

Andreas Persbo assesses the North Korean nuclear problem, while Duncan Brack examines the European Union (EU)'s Forest Law Enforcement, Governance and Trade (FLEGT) Action Plan. Plus all of the usual features: Verification Watch, Science and Technology Scan, Peace Missions Monitor, Verification Quotes and VERTIC News and Events.

Trust & Verify

May-June 2005 • Issue Number 120 • ISSN 0966-9221

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Miniaturization also entails advanced weapons engineering. The first US nuclear bombs weighed 4.0 and 4.6 tonnes respectively. A weapon of that size is unlikely to be delivered using a missile. However, delivery may be of lesser importance if North Korea's objective is merely to demonstrate a technical and military capability.

On 6 May 2005, the US announced that satellite surveillance had detected possible preparations for a nuclear test. North Korea presently denies such an assertion. Its rebuff may mean nothing, since the country is likely engaging in its long-time policy of strategic deception aimed at misleading, confusing or interfering with any type of data collection related to the plans, objectives, strengths and weaknesses of the country.

Of course, the North Korean statement that it possesses a nuclear arsenal should be viewed against the same strategic backdrop. Speculatively, North Korea's decision whether to test a nuclear weapon would depend on its political goals for the test. It may be seeking to secure food or energy aid, obtain monetary compensation or 'just' to receive security guarantees. Its aim may also be to test a fully deployable weapons design.

Given the gaps, limitations and uncertainties in the evidence at hand regarding North Korea's intentions and capabilities, it is possible to come up with diametrically opposed interpretations of its present course. North Korea's engagement in routine deception underpins the need for verification, both of test preparations and of the prospective test itself. Traditionally, effective verification is, among other things, aimed at verifying compliance with a treaty that the state is party to. But, in this case, effective verification would be the only way to call the bluff of a state that is party to none of the major nuclear arms control and disarmament accords. Bluff or no bluff, a North Korean test pronouncement would have widespread and serious consequences for international peace and security.

Identifying test site preparation

There are few optimal nuclear test sites in North Korea. A surface test would result in fallout over densely populated areas, while an underground test would be hazardous, causing radioactive materials to seep into the country's purportedly shallow water table.

An underground test is the most feasible option. It would be easy to conceal, as the North Koreans already deploy the majority of their military assets underground. South Korean intelligence estimates that North Korea has constructed some 8,200 tunnels, spanning more than 500 kilometres in total.

Generic indicators that a site is being prepared for underground nuclear testing include the construction of tunnels, movement of equipment to the site and the building of support

structures, such as command and control bunkers and instrumentation facilities near the test location. All of these may be detected using imagery intelligence (IMINT) collected by aerial or space-based platforms. Commercially available imagery may also facilitate detection of unconcealed preparations. However, support structures will likely be camouflaged (as Pakistani structures were) and work is likely to cease during known satellite overpasses. Given North Korea's preference for tunnelling, pinpointing the site among the maze of existing tunnels and those under construction will be like finding the proverbial needle in a haystack.

If press reports are accurate, US estimates of North Korean test preparations seem to be based largely on IMINT. In view of the fact that it is relatively easy for the North Koreans to conceal activities from IMINT assets, reliance on this collection method alone is not wise.

Preparations for nuclear testing would also generate communications traffic, which might prove useful in identifying the exact test site. Nonetheless, the capabilities of signal intelligence (SIGINT) should not be overstated. Test site technicians are likely to use encrypted electronic communications and telecommunications warfare units may be able to confuse SIGINT collectors by producing amounts of false or misleading traffic or by using jamming technology.

Human intelligence (HUMINT) would be the only way to confirm, refute or augment information received through remote monitoring. The availability of HUMINT is restricted by factors like access to suspected facilities and the ability to transmit acquired information in a timely and comprehensive manner. However, as clearly shown by verification experience in Iraq, HUMINT is susceptible to disinformation and should be evaluated alongside information from other sources if a complete picture is to be painted (see Jones, Brian, 'Intelligence, verification and Iraq's WMD', *Verification Yearbook 2004*, VERTIC, London, December 2004, pp. 195–211, www.vertic.org).

There clearly would be uncertainties about the validity of information obtained from intelligence gathered solely through national technical means. On-site inspections, therefore, are necessary to determine conclusively whether a nuclear test site is being prepared. Inspections of this kind are not unheard of in North Korea. In 1999, for example, US inspectors gained access to an underground complex near Kumchang-ni, which satellite surveillance had flagged as a potential enrichment site. In that case, no evidence of nuclear activity was found.

International inspectors would be preferable, since they would be able to provide similar assurance to the international community. This may not be feasible in this context, though, as North Korea deeply mistrusts the IAEA (see *Trust & Verify*,

No. 106). Consequently, it is probably necessary to think along the lines of ad hoc bilateral verification missions.

Verifying a nuclear test: fallout forensics

The ability of the International Monitoring System (IMS) of the Comprehensive Nuclear Test Ban Treaty Organization (CTBTO) to detect underground nuclear explosions is constantly improving. Presently, seismic data collected by the IMS is automatically transmitted to subscribing signatory states to the 1996 Comprehensive Nuclear Test Ban Treaty (CTBT). Nuclear tests with a yield of over one kiloton are very likely to be picked up by IMS seismic stations. However, low yield tests are more difficult to detect through seismic means, with detection capabilities dropping off for explosions below one kiloton. Seismic stations located close to the nuclear test site are more likely to detect and locate the event. India's nuclear test in 1998 was identified in this way (by a station located in Pakistan). Pakistan switched off data transmission from its seismic station before it tested its own nuclear device.

A North Korean atmospheric test may be picked up by IMS infrasound stations and the release of nuclear particles would be detected by one or more radionuclide monitoring stations. Until the CTBT enters into force, the CTBTO is not permitted to use the system or any information gathered to determine whether a nuclear test has occurred.

Some individual states are likely to identify an atmospheric test using their own verification toolbox. The US has maintained national technical means to monitor atmospheric nuclear tests since the late 1940s. It successfully detected the first Soviet nuclear test in August 1949 through routine radionuclide sampling over the Pacific Ocean. During the 1950s, the US developed a system for air debris sampling and infrasound detection. By 1960, an initial network of seismic stations had been established to monitor underground testing. The first satellite capable of detecting nuclear tests was launched in 1963. Today, the US Nuclear Detonation System (NDS) consists of 24 satellites covering most, if not all, of the planet's surface.

Many governmental, non-governmental and academic institutions routinely obtain and analyze seismic data for purposes other than treaty monitoring, although it may be useful in classifying nuclear tests. The Korea Seismological Institute in South Korea, for instance, has monitored and classified seismic events in the north since the 1980s. Such entities are able to detect and disseminate information on nuclear testing. In 1993, for example, VERTIC broke the news of a Chinese test within three hours of it taking place, distributing details on the time, exact location and estimated yield of the test (see *Trust & Verify*, No. 41).

The murky road ahead

The failure of the United Nations Security Council and indeed the world to deal successfully with the Indian and Pakistani nuclear tests of 1998 and the later implicit recognition of these countries as nuclear weapons states has created a dangerous situation. Without doubt, other nations considering the nuclear weapons option are carefully monitoring the situation in North Korea. The nuclear non-proliferation regime is in bad shape, as evidenced by the failure of the 2005 NPT Review Conference to produce meaningful results. North Korea's announcement of its nuclear weapons holding was itself dangerously destabilizing, but irrefutable proof of a nuclear capability achieved through testing would engender further crisis for the non-proliferation regime and, in the worst-case scenario, could trigger a wave of nuclear proliferation.

Future efforts to solve the North Korean problem must focus on bringing its fissile materials under international safeguards. Attempts must also be made to identify and to dismantle verifiably and irreversibly its alleged nuclear arsenal. As a multi-lateral framework does not seem to be favoured on the Korean Peninsula, what would it take to bring the North Koreans back into an effective verification system? One can say with confidence that the task of verifying a nuclear weapons-free Korean Peninsula is becoming increasingly complex. It seems unlikely today that North Korea will suddenly rejoin the NPT and sign the CTBT, although it may be amenable to joining an ad hoc arrangement that trades economic and national security benefits for verified dismantlement, perhaps modelled on the 1994 Agreed Framework. While press reports indicate that the Agreed Framework itself is abandoned, Pyongyang is known for rapidly changing its position.

Any attempt to verify the eventual dismantlement of nuclear weapons facilities will require full transparency and the deployment of inspectors who are knowledgeable of different aspects of nuclear weapons production. Given North Korea's policy of ambiguity with respect to its nuclear weapons holdings, it is difficult to see how it can provide full assurances of any nuclear weapon dismantlement it may carry out. Only on-site inspection by an international inspectorate, accorded access to all locations suspected of involvement in a nuclear weapons programme, could provide such a guarantee. Sadly, without a significant shift in North Korea's attitude towards bilateral or multilateral on-site inspections, effective verification of its nuclear weapons is not achievable. In the long term, only renewed and comprehensive diplomatic efforts, addressing the security concerns of all involved parties, are likely to solve the crisis.

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A licensing system for legal timber: the EU's FLEGT initiative

Illegal logging and the international trade in illegally logged timber are major problems for many timber-producing countries in the developing world. Together, these activities cause environmental damage, cost governments billions of US dollars in lost revenue, promote corruption, undermine the rule of law and good governance and finance armed conflict. They retard sustainable development in some of the poorest countries on the planet.

Consumer nations contribute to these problems by importing timber products without ensuring that they are legally sourced. In recent years, however, producer and consumer countries alike have paid increasing attention to illegal logging and the trade in illegal timber. It was one of the two main issues on the agenda of the G8 Environment and Development ministerial meeting in Derby, UK, on 17–18 March 2005.

Probably the most important international initiative to prevent illegal logging is the European Union (EU)'s Forest Law Enforcement, Governance and Trade (FLEGT) Action Plan. This article examines the proposal for a licensing system for legal timber, which is at the heart of the FLEGT initiative.

The FLEGT initiative

The G8 Action Programme on Forests of 1998–2002 helped to stimulate a range of national and international responses to reduce illegal logging, including a series of Forest Law Enforcement and Governance (FLEG) conferences. Coordinated by the World Bank, these regional events brought together representatives of government, industry and non-governmental organizations (NGOs) from producer and consumer countries. The first one took place in East Asia (Bali, Indonesia) in 2001; the second in Africa (Yaoundé, Cameroon) in 2003; and the third, covering the Europe and North Asia region, will take place in St Petersburg, Russia, in November 2005.

Spurred by the discussions at the East Asia FLEG conference, the European Commission hosted a workshop in Brussels, Belgium, in April 2002 to identify options for the EU to help control illegal logging in general and the import of illegally logged timber in to the EU in particular. The EU, as a whole, is a major global importer of timber products, and several countries from which EU member states import these goods suffer from extensive illegal activities. After long drawn-out discussions following the workshop, the Commission finally published its FLEGT Action Plan in May 2003, which the Council

approved in October. The European Parliament adopted a motion on the topic in February 2004.

The Action Plan includes a series of proposals. The main ones are:

- to negotiate FLEGT voluntary partnership agreements with producer countries;
- to adopt a licensing system to identify legal products in partner states and certify them for import in to the EU; unlicensed products will be denied entry;
- to examine member states' existing legislation (on money laundering, for example) that might help to prevent imports of illegal products;
- to consider additional national measures that might be necessary to prohibit the import of illegal timber, especially of products originating in countries not participating in partnership agreements and thus not covered by the licensing scheme;
- to provide capacity-building assistance to partner nations to help them establish the licensing scheme, reform their laws and regulations (if necessary) and improve enforcement;
- to put pressure on financial institutions to scrutinize investments in the forestry industry; and
- to encourage industry and governments to buy only from legal sources.

The first two proposals are the subject of the remainder of this article.

A licensing system to exclude illegal timber

The major problem with developing measures to exclude illegal timber from EU markets is that there is currently no means of distinguishing legal from illegal products at its borders. A variety of certification schemes—of which the Forest Stewardship Council (FSC) system is probably the best known—exist to identify timber products generated in a sustainable manner. These schemes may imply legality of production as well (depending on the extent to which they require monitoring of the chain of custody), but their market share, although growing rapidly, is still very small.

The EU's solution is a new timber licensing system, designed to identify legality of production. This focus on trade is at the root of the FLEGT Action Plan, accounting for the addition of the letter 'T' to the FLEG acronym. The system is similar in principle to mechanisms already in place in a number of

international agreements, such as the 1973 Convention on International Trade in Endangered Species (CITES), the Kimberley Process on conflict diamonds, and the catch document scheme of the 1980 Convention on the Conservation of Antarctic Marine Living Resources (CCAMLR). All of these agreements feature license or permit systems, and tracking mechanisms, designed to exclude particular categories of products—highly endangered species of wildlife, conflict diamonds and illegally caught Patagonian toothfish, respectively—from international markets.

The major difference in the case of the FLEGT initiative is that no international agreement exists to provide a framework for the new timber licensing scheme. The EU is therefore aiming to construct one through a string of bilateral agreements with major timber-producing and timber-exporting countries. The European Commission and EU member states are currently holding exploratory talks with potential partner countries: likely early candidates include Cameroon, Ghana, Indonesia and Malaysia; other producer nations are expressing interest.

The system will require that an export permit, or legality license, accompany exports from FLEGT partner states to any part of the EU; products without such a license will be refused entry, and possibly confiscated by EU customs authorities. The Commission's initial proposal was to restrict coverage of the scheme to a limited range of solid wood products (roundwood and rough sawnwood) due to the difficulties of ascertaining the origin of processed timber goods (which are sometimes produced and processed in more than one nation). Many developing country producers, however, are increasingly processing wood products before export, in order to add value. Analyses (by Chatham House and the Commission) of the likely impacts of the scheme suggested that this limitation would compromise its effectiveness, so it was extended to include plywood. Further extensions to encompass other product categories are expected to follow.

As a new requirement for imports in to the EU, the timber licensing scheme requires new EU legislation, in the form of a regulation. A draft regulation was published in July 2004 and is currently being discussed by the Council Forestry Working Group. When member states finally agree on it (probably by late 2005), it may be sent to the European Parliament for further discussion, depending on which Article of the treaty the regulation is based on (itself a matter for negotiation).

For the scheme to function properly, licenses granted under it need to guarantee that products have been manufactured and processed legally right along their chain of custody, and that harvesting and processing, transport and export have not breached the laws of the country of origin, including with regard to payment of taxes, charges and export duties. There

is no shortage of model systems available. In several countries, governments have retained private surveillance and certification companies to carry out functions such as collecting export duties or monitoring production, and many of their systems can be easily adapted to verifying legality of production. Questions about the potential role of independent monitors in acting as an external check on the validity of the system (similar to the activities of Global Witness in Cameroon, for example) or about a possible 'whistle-blowing' function for NGOs and local communities remain to be resolved. Many of these factors will be set out in the voluntary partnership agreements to be negotiated between the EU and each participating country; the Commission has produced a negotiating mandate for the agreements, but it is not publicly available. Given the lack of enforcement capacity and the extent of corruption in many producer countries, the principle of independent verification of the licensing system is an important one. Many EU NGOs have expressed concern that there is no explicit reference to it in the draft regulation (which, unlike the negotiating mandate, is publicly available).

Clearly, the establishment of the licensing system will entail costs. Experiences with similar systems suggest, however, that they are not likely to be very high: in the region of €1–3 per cubic metre for a third-party control system, compared to export prices for tropical logs and sawnwood of US\$150–250 and US\$450–600 per cubic metre. Financial assistance for the new system is expected to be a feature of the partnership agreements. In any case, their running costs may well be met through improvements in tax collection. There will also be some costs to the EU, in terms of additional resources for customs agencies, but again these are unlikely to be very high. European customs authorities are well used to operating licensing systems, and the main ports through which timber from likely partner states enters are relatively few in number.

There are of course a large number of developing country timber-producing and timber-exporting countries, implying the need for a large number of partnership agreements, and accompanying investment of diplomatic and technical

Illegal logging website

www.illegal-logging.info

The Sustainable Development Programme at Chatham House (the Royal Institute of International Affairs), UK, maintains the website www.illegal-logging.info, which provides a central point of information about efforts to stem illegal forest practices and the associated trade in forest products.

resources. It is hoped that it will be possible to negotiate regional agreements, which should also help to tackle the problem of evasion.

Will the licensing system work?

The obvious weakness of the proposed licensing system is that some producer countries may choose not to enter into partnership agreements, in which case no controls will be applied to their exports to the EU. This in turn may provide a relatively straightforward means of trans-shipping illegal products from partner nations through non-partner countries, effectively 'laundering' them into legitimate markets.

One must remember, though, that the licensing system is not intended to operate in isolation. Other components of the FLEGT initiative should reinforce it. In particular:

- government procurement policy should be used to source legal timber, from whatever origin (five EU member states, including three major importers (France, Germany and the UK) are currently operating or developing such schemes);
- additional national or EU legislation should be adopted to allow more effective action to be taken against imports of illegal timber (Germany has published draft national

legislation, and the EU will consider possible options in late 2005); and

- voluntary industry initiatives (currently under way in several EU member states) should be encouraged.

The EU FLEGT initiative represents a bold attempt to tackle a growing and urgent problem that has not seemed susceptible to any other combination of policies and measures. It developed partly out of frustration with the failure of initiatives aimed purely at producer countries, which ignored the important role played by demand in consumer nations in creating incentives to log and export illegally. In choosing to focus primarily on a licensing system for legal timber, it drew on lessons from similar schemes in other areas, such as the Kimberley Process, designed to exclude undesirable products from international markets. If it manages to attract a significant number of producer nations, it stands a good chance of success.

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Peace Missions Monitor

UN verifies Syrian withdrawal

Syria has maintained troops in Lebanon since 1976. The 1989 Taif Accords made the Syrian Army a guarantor of the 'security, independence and unity of Lebanon'. In response to a Syrian-backed move to amend the Lebanese constitution in order to facilitate the re-election of Emile Lahoud, the United Nations Security Council (UNSC), on 2 September 2004, adopted resolution 1559. While declaring its support for a free and fair presidential election in Lebanon, the UNSC took the opportunity to call on all foreign forces to pull out of the country. In a show of defiance, the Lebanese National Assembly extended the president's term by three years the following day.

The deadlock was broken with the 14 February 2005 assassination of former Prime Minister Rafik Hariri. Syrian involvement in the blast was suspected and the popular demonstrations that followed forced Damascus to re-examine its role in Lebanon. On 3 April 2005, the Syrian government declared that it would withdraw all of its troops, military assets and intelligence apparatus from Lebanon.

The UN quickly dispatched a three-person verification team to monitor the withdrawal. The process has reportedly gone smoothly and there have been few incidents. One exception came when the verification team attracted the attention of an armed militia, which fired warning shots and thereafter denied the team access to a paramilitary camp in the Bekaa Valley. On 24 May, UN Secretary-General Kofi Annan announced that verification was complete and that the mission had submitted a positive report. According to the UN, the entire border area is free of Syrian troops. Some uncertainty remains regarding a Syrian position near Deir Al-Aashayer. Established prior to 1976, the position lies on a strip of land that Damascus considers to be Syrian territory.

Sources UN Security Council resolution 1559, 2 September 2004, www.un.org/Docs/sc/; 'Identical Letters from the Governments of Lebanon and the Syrian Arab Republic submitted to the President of the Security Council', A/58/879 and A/58/883, 30 August 2004, www.un.org/Docs/sc/; Nayla Assaf and Nada Raad, 'Lebanese cabinet faces fierce criticism ahead of vote', *Daily Star*, 5 November 2004, www.dailystar.com.lb/; 'Syrian forces have verifiably been withdrawn from Lebanon, Annan says', UN News Service, 23 May 2005, www.un.org/news/; Nicholas Blanford, 'Whose map is right? Syrian colonel insists his base is not in Lebanon', *Daily Star*, 5 May 2005, www.dailystar.com.lb/.



UK study on verifying nuclear disarmament

The UK presented the final report of its five-year study on verifying nuclear disarmament at the 2005 NPT Review Conference held from 2–27 May 2005 at UN headquarters in New York. Conducted by the UK Atomic Weapons Establishment (AWE), the study draws attention to the following:

- The primary barriers to verifying nuclear disarmament, particularly the handling of sensitive information related to national security and nuclear weapon technologies.
- That facility and environmental monitoring would benefit from the utilization of other remote monitoring techniques. Authentication of nuclear warheads is considered the most technically challenging aspect, as only techniques that do not compromise national security or facilitate nuclear proliferation can be employed.
- That effective verification is more likely if routine and challenge inspections supplement monitoring. Forms of managed access could be used to allow personnel without security clearance to gain entrance to sensitive nuclear warhead facilities to perform verification tasks.
- Considerable technology exists to support verification of a disarmament programme, although much work still needs to be done to develop and prove these technologies.
- The need for a more focused future study, which identifies other problems associated with verifying a nuclear weapon-free world and possible solutions. Encouragingly, the report hints at possible collaboration (with unnamed partners) in carrying out further verification research.

At a difficult and uncertain time for nuclear disarmament, this study's outcome constitutes a useful starting point for further discussion and perhaps the construction of a viable, robust verification regime for nuclear weapons disarmament, if not globally, at least in Europe.

Sources 'Verification of nuclear disarmament: final report on studies into the verification of nuclear warheads and their construction', submitted by the UK, NPT/CONF.2005/WP.I, 18 April 2005, www.un.org/events/npt2005/.

Restrictions emerge for POPs

From 2–6 May, the first Conference of Parties to the 2001 Stockholm Convention on Persistent Organic Pollutants (POPs), which entered into force on 17 May 2004, took place in Punta del Este, Uruguay. The conference made good progress

in implementing arrangements for monitoring and verifying compliance with the treaty. For instance, a decision was taken to establish a reporting schedule: states parties must submit their first report by the end of 2006, and further reports every four years thereafter. The reporting format covers exports of chemicals listed in the 'elimination' and 'restriction' annexes of the convention and destruction of waste containing POPs. Processes were established for evaluating the convention's effectiveness, including with regard to monitoring data on the presence of POPs.

The conference also called for the preparation of a scoping paper on a global monitoring plan. This procedure will build on existing health and environmental monitoring programmes and databases. The first effectiveness evaluation should occur no more than four years after entry into force of the convention (May 2008).

A decision was taken to establish a working group to consider compliance matters. The group will consider states parties' views and the compliance mechanisms of other multilateral environmental agreements.

The conference also produced terms of reference for the POPs Review Committee, which assesses nominations for new chemicals to be added to treaty control schedules. Committee members will be drawn from countries across the five UN regions. The committee will be open to observers and up to 30 experts. Russia and the US have yet to ratify the convention.

... and other pollutants, too

A new protocol to the 1979 Convention on Long-Range Transboundary Air Pollution (CLRTAP) of the United Nations Economic Commission for Europe (UNECE) entered into force on 17 May 2005. The 1999 Gothenburg Protocol to Abate Acidification, Eutrophication and Ground-level Ozone sets new emission targets for sulphur dioxide, nitrogen oxides and volatile organic compounds, as well as calling for controls on ammonia in the 55 states in the UNECE region. The protocol contains reporting procedures, while the treaty's Implementation Committee—which was established by the Executive Body of the CLRTAP—will carry out reviews to determine states parties' compliance. The adequacy of parties' obligations and progress towards the protocol's goals will also be assessed in sessions of the Executive Body.

Greener shipping

International rules to control harmful emissions from ships' exhausts entered into force on 19 May 2005. The Regulations for the Prevention of Air Pollution from Ships are contained in an annex to the 1973 International Convention for the Prevention of Pollution from Ships (itself modified by a 1978 protocol and known as MARPOL 73/78). The annex was adopted in a 1997 protocol to MARPOL 73/78. The regulations place limits on the discharge of sulphur dioxide and nitrogen oxide by ships. They also contain rules regarding the sulphur content of fuel, the release of ozone depleting substances and the incineration of certain products. In November 2003, the International Maritime Organization (IMO), which oversees treaty implementation, adopted a resolution on greenhouse gases. It is currently preparing guidelines for the emission of greenhouse gases. Meanwhile, on 5 April, a revised schedule bringing forward the phasing out of single-hulled oil tankers and introducing a new regulation banning the carriage of heavy grade oil in single-hulled tankers entered into force. The new measures were adopted in December 2003 as amendments to Annex I of MARPOL 73/78. This followed the sinking of the oil tanker *Prestige* off the coast of Spain in November 2002.

Sources 'Summary of the First Conference of the Parties to the Stockholm Convention', *Earth Negotiations Bulletin*, Vol. 15, No. 117, 9 May 2005, www.iisd.ca; 'Parties to POPs treaty keep up the pressure', *ENDS Environment Daily*, Issue 1,874, 9 May 2005, www.environmentdaily.com; 'New air pollution protocol to take effect on 17 May 2005', UNECE Press Release, 1 March 2005, www.unece.org; 'International air pollution rules take effect', *ENDS Environment Daily*, Issue 1,881, 19 May 2005, www.environmentdaily.com; 'New rules to reduce emissions from ships to enter into force', IMO Press Briefing, 18 May 2005, www.imo.org/newsroom.

IAEA considers scrapping the small quantities protocol

By agreeing a Small Quantities Protocol (SQP) to their Comprehensive Safeguards Agreement with the IAEA, states effectively suspend most of their rights and obligations under nuclear safeguards. The protocols have reduced the verification burden for the IAEA but have also created considerable gaps in the nuclear verification system.

Under the protocol, states are required to provide the agency with design information on their existing nuclear facilities. They are not required to report on stockpiles of nuclear materials, however, provided that they are less than what is otherwise exempted from safeguards (for example, under one kilogram of plutonium or high enriched uranium). Where states intend to acquire materials in excess of these limits, they must notify the agency 'sufficiently in advance' or six months before nuclear material is to be introduced into a facility, such as a uranium

enrichment plant. At the time of writing, 86 states have a SQP in force with the IAEA.

Following concerns that states could simply neglect to inform the agency about the acquisition of materials, the IAEA Secretariat has reportedly prepared and circulated a paper recommending that the Board of Governors does not approve any further SQPs. The paper also suggests that those states with an SQP in force renounce it. The Board of Governors is expected to discuss the future of the SQP at its next meeting on 13 June. Scrapping the SQP would have a positive impact on the comprehensiveness of nuclear safeguards, as it will allow for more inspections. The ramifications for the safeguards budget, though, are still to be determined, since scrapping the SQP would lead to more inspections in states thus exempted.

Sources 'Status with regard to conclusion of safeguards agreements and additional protocols', IAEA web page, 17 May 2005, www.iaea.org; 'IAEA reconsiders small quantities protocol', Global Security Newswire, 27 April 2005, www.nti.org.

UN adopts treaty on suppression of acts of nuclear terrorism

On 13 April 2005, the UN General Assembly (UNGA) adopted the International Convention for the Suppression of Acts of Nuclear Terrorism (CSANT). The treaty obliges states parties to establish offences in their national law for activities related to nuclear terrorism. It also provides a framework for international cooperation on the investigation and prosecution of these crimes and for extradition of offenders. Russia introduced the first draft nuclear terrorism accord in 1997, but subsequent negotiations revealed disagreement among states on several key issues, including the definition of 'terrorism'. The CSANT text was skilfully crafted to avoid this problem, by instead defining acts of 'nuclear terrorism'. Even though the UNGA adopted the convention by consensus, some delegations were concerned about its scope (some wanted the treaty to cover actions by states).

The convention demands that states notify the UN Secretary-General when they sign the treaty of what measures they have taken to implement the treaty's jurisdictional requirements. It also calls for states to provide each other with legal assistance to facilitate appropriate national implementation. Nuclear or radiological materials seized are then subject to verification under IAEA safeguards, and should be handled with regard to the IAEA's health, safety and physical protection standards. The convention opens for signature on 14 September 2005 and will enter into force 30 days after at least 22 states sign and ratify it.

Source UN General Assembly resolution 59/290, 13 April 2005, www.un.org/Depts/dhl/resguide/r59.htm.



High-flying blimps show surveillance promise

Researchers at Purdue University in West Lafayette, Indiana, US, are developing a high-altitude, helium-filled blimp powered by solar panels. Solar power allows the geostationary ship to float anywhere across the globe at an altitude of 18,500 metres for up to a year. This means that the blimp can function at the same operational altitude as the retired SR-71 *Blackbird* and the US *Global Hawk* unmanned aerial vehicle (UAV). The blimp is aerodynamic, and comes equipped with a control system that will keep it stationary in high winds. Given its relative proximity to the ground, such a craft has a greater capacity to monitor terrestrial locations and activities than a surveillance satellite. Moreover, blimps such as this can be manufactured at low cost. Competitor JP Aerospace produces high-altitude craft with a price tag of US\$500,000 per blimp, modest in comparison to both satellites and aircraft.

Research is continuing to enable blimps to fly even higher. Presently, the US Air Force is looking to develop airships with the capacity to reach a near-space altitude of 30,500 metres. This would place the blimp well beyond the reach of most surface-to-air missile systems.

Moreover, since state sovereignty in near space is largely undefined, it is unclear whether high-altitude blimps would require overflight permission. It is reasonable to assume, however, that this particular question will attract more attention in future.

Low-cost, high-altitude blimps have significant monitoring applications. For instance, they could be used to verify compliance with arms control and disarmament treaties and with environmental accords. International verification bodies could also use them as an autonomous remote monitoring platform. International verification bodies could also use them as an autonomous remote monitoring platform carrying cameras, radar and environmental detection equipment.

Sources 'Solar-powered blimp could fly for a year', United Press International, 21 March 2005, www.spacewar.com; Álvaro Fabricio dos Santos, 'Sovereignty and space traffic management', *Revista da SBDA, Direito Aeronáutico e Direito Espacial*, February 2004, www.sbda.org.br/revista/revista.htm; see also the JP Aerospace website at www.jp-aerospace.com.

Detecting biological warfare agents

Robert Lipert, Associate Scientist at the Institute for Combinatorial Discovery at Iowa State University, US, and his research

team have created a technology that can identify biological warfare agents in quantities as low as a single spore or bacterium. In a joint project with Concurrent Analytical Inc. of Waimanalo, Hawaii, US, the team conducted trials on simulated anthrax and plague using the 'surface enhanced Raman scattering' technique. A spectrometer looked for signs of these agents by analyzing how laser beam light particles disperse on a given object.

The technology was specifically developed to monitor contamination of water supplies, but it could also be used to detect biological agents and bacteria in cases of suspected biological weapons use. The research team has also noted its potential in medical diagnostics, such as identifying human cancers or viruses.

Sources 'Researchers prepare bioagent detection system', Global Security Newswire, 11 May 2005, www.nti.org; 'Iowa State researchers developing technology to detect weapons of mass destruction', 11 May 2005, www.iastate.edu/~nscentral/releases/2005/may/wmd.shtml.

New nuclear material detection device

Researchers at the Los Alamos National Laboratory (LANL) in New Mexico, US, have developed a technique to detect nuclear contraband in trucks or ocean-going containers using cosmic ray particles called muons. Muons are extremely good at spotting nuclear material through lead or gold shielding, for instance. If the consignment is not shielded, it could be distinguished by geiger counters and gamma-rays, which should be used along with the muon detector.

Muon radiography can identify large amounts of dense material, including nuclear substances, by examining how the muons pass through the matter and at what angles they scatter. The new device takes around 20 seconds to conduct a reading and has a three per cent margin of error. Unlike current x-ray and gamma-ray detectors, muon radiography presents no radiation risks.

The new device also paints a more complete detection picture than current methods and requires less expert analysis of results. It could be used by border control and customs officials as part of initiatives to prevent illegal movement of weapons of mass destruction (WMD) and related materials, as required by UNSC resolution 1540.

Sources 'Los Alamos muon detector could thwart nuclear smugglers', *Los Alamos National Laboratory News*, 19 February 2005, www.lanl.gov/news/index.php?fuseaction=home.story&story_id=2324; 'Cosmic rays reveal past and present secrets', MSNBC, 23 February 2005, www.msnbc.msn.com/id/7017833/.

New VERTIC Executive Director

Michael Crowley will take up his duties as VERTIC's new Executive Director on 27 June. The VERTIC staff and Board look forward to working with him during what promises to be a very interesting time for verification.

Eminent physicist joins VERTIC Board

VERTIC is pleased to welcome Dr David Wolfe, Director of the Oppenheimer Institute for Science and Cooperation, US, to the Board. His work with the Oppenheimer Institute includes developing public-private partnerships to promote the commercialization of technology in Russia to transfer weapons-related capacities to the civilian sector, as well as policy research and scholarly exchanges related to the non-proliferation of WMD in general. Dr Wolfe is also Emeritus Professor of Physics at the University of New Mexico in Albuquerque, US, where he taught for 30 years. He joined the Board in late April.

VERTIC report on states' WMD laws

VERTIC submitted its final report to the Weapons of Mass Destruction Commission (WMDC) in May 2005. The study, entitled 'National measures to implement WMD treaties and norms: the need for international standards and technical assistance', examines international obligations to implement national measures governing nuclear, biological and chemical weapons, related materials and delivery systems. It outlines the status of best practice guidance for the adoption and enforcement of national measures and considers difficulties in assessing the present state of implementation and enforcement and the availability of technical assistance. It concludes by offering some thoughts on means to improve national implementation and compliance with WMD obligations. The study, written by Andreas Persbo and Angela Woodward, is available at www.vertic.org.

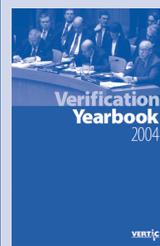
Joint VERTIC/CCTC report

On 10 May 2005, Dr Trevor Findlay, Director of the Canadian Centre for Treaty Compliance (CCTC), presented an interim report on 'A standing United Nations WMD verification body: necessary and feasible' to NGO representatives and delegates at the NPT Review Conference in New York. The study examines options for establishing a standing UN monitoring, verification and inspection body to deal with WMD issues.

Originally commissioned from VERTIC by the WMDC, the study became a cooperative project between VERTIC and the CCTC following Dr Findlay's departure from VERTIC in February to head the CCTC at Carleton University in Ottawa, Canada. The final report will be submitted to the WMDC in June 2005. The interim report is available at www.vertic.org.

New interns

VERTIC welcomed two new interns at the start of June. Janel Blanchard, currently an international studies major and Spanish minor at the University of North Carolina at Chapel Hill, US, came through the Educational Program Abroad (EPA). She will spend two months at VERTIC, while Sean West, who will graduate from the University of California at



Verification Yearbook 2004

'An important tool'

Wolfgang Hoffmann, Executive Secretary Comprehensive Nuclear Test Ban Treaty Organization, Vienna

The *Verification Yearbook 2004* continues VERTIC's wide-ranging annual coverage of verification developments and trends in arms control and disarmament, the environment and other fields. With a preface by Rogelio Pfirter, Director General of the Organisation for the Prohibition of Chemical Weapons, this year's *Yearbook* contains 11 chapters.

Introduction: the state of play of verification Trevor Findlay
Effective CTBT verification: the evidence accumulates

David Hafemeister

Improving CWC implementation: the OPCW Action Plan

Lisa Tabassi and Scott Spence

The lessons of UNSCOM and UNMOVIC Trevor Findlay

Verifying Libya's nuclear disarmament Jack Boureston and Yana Feldman

Iran and nuclear safeguards: establishing the facts and seeking compliance Wyn Q. Bowen

Small arms: monitoring the UN action programme

Helen Hughes

Monitoring greenhouse gases Larry MacFaul

International systems for monitoring and verifying fisheries agreements Judith Swan

Intelligence, verification and Iraq's WMD Brian Jones

Monitoring human rights treaties Patricia Watt

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Berkeley, US, with a Master of Public Policy in May 2006 will be at VERTIC until August 2005. He presently holds a BS (Hons) from the School of Foreign Service at Georgetown University, Washington, DC.

Janel and Sean are researching states' national laws to implement treaties relating to biological and nuclear weapons as well as UN Security Council resolution 1540. They are also researching state' attitudes towards early entry into force of the CTBT and its verification system. Janel will focus on states in East and North-East Asia, while Sean will consider states in South and South-East Asia. In addition, Sean will help to maintain VERTIC's watching brief on states of concern in the Middle East.

Staff news

ANGELA WOODWARD attended a discussion meeting at Chatham House on 'Prospects for the Nuclear Non-proliferation Treaty (NPT) Review Conference' with Andreas Persbo on 1 April. They also participated in the joint Centre for Strategic and International Studies (CSIS)/International Institute for Strategic Studies (IISS) workshop on proliferation trends, held at the IISS in London on 19 April. Angela hosted a meeting on the *BioWeapons Monitor* initiative of the BioWeapons Prevention Project (BWPP) at VERTIC on 17 May. She gave a presentation on national implementing measures for the 1972 Biological Weapons Convention at a meeting of the Advisory Service on International Humanitarian Law of the International Committee of the Red Cross, held in Versoix, Switzerland, on 26 May. She and Andreas continued their research on national implementation measures to implement WMD treaties and norms. They co-wrote 'National measures to implement WMD treaties and norms: the need for international standards and technical assistance', a study commissioned by the WMD. Angela also oversaw the next phase of grant applications to prospective funders and edited several VERTIC papers as well as *Trust & Verify*.

JANE AWFORD met with Rick Furno, Local Employment Advisor at the US Embassy in London, on 6 April to discuss employment and volunteering opportunities for the partners, spouses and children of embassy employees during their postings to the UK. She went to the Directory of Social Change (DSC) Charityfair 2005 at the Excel conference centre in London on 12 April, where she attended seminars on influencing the media and on the UK Charity Commission's new mission and strategies for 2005–08. On 27 April she represented VERTIC at a seminar on 'Buried Treasure: making the most of your intellectual property', held by solicitors Bircham Dyson Bell. Jane edited VERTIC's submission to the United Nations

Verification Quotes

'In the last decade, the US authorities seem to have come to the position: don't trust and don't verify—at least not through international inspections. I submit that the experiences from Iraq should lead to some second thoughts. International inspectors have legal access to installations, facilities, which may not be accessible to intelligence, and they may bring information that intelligence cannot produce'

Former United Nations Monitoring, Verification and Inspection Commission (UNMOVIC) Executive Chairman and former IAEA Director General, Hans Blix, in a speech at the India International Centre. Maxims News, 16 March 2005, www.maximsnews.com.

'The North Koreans have learned how to use irrationality as a bargaining tool. We can't tell what they are doing'

A senior US official on the US assertion that North Korea is making preparations for nuclear testing, quoted in 'US cites signs of Korean preparations for nuclear test', *New York Times*, 6 May 2005, <http://nytimes.com>.

'While there remains a lack of solid evidence that the Saudis "have been playing around, we can never be sure"'

A Vienna-based diplomat ponders Saudi Arabia's negotiation of a Small Quantities Protocol with the IAEA, quoted in 'Saudi Arabia begins talks to ease IAEA oversight', *Global Security Newswire*, 20 April 2005, www.nti.org.

'The problem is the Americans say: Well we would be in favour of a treaty but we don't want any verification system. Well, if you don't have any verification system, it runs the risk of making the treaty a bit meaningless'

Australian Foreign Minister Alexander Downer on the difference in opinion between Australia and the US in verifying a future Fissile Material Cut-off Treaty, quoted in 'Australia, US at odds over fissile material treaty', *Global Security Newswire*, 14 April 2005, www.nti.org.

Institute for Disarmament Research (UNIDIR) on 'Verifying European Arms Embargoes' for the VERTIC website and helped to edit VERTIC's paper on national implementation measures for WMD treaties. She is currently helping to edit two VERTIC Briefs on verification of the proposed Fissile Material Cut-off Treaty (FMCT) and the verifiability of a potential Israeli-Palestinian peace accord. Jane coordinated the launch of the Verification Organizations Directory (VOD) to embassies and high commissions in London, and continues to update VOD entries as new information becomes available.

BEN HANDLEY continued to manage the administration of VERTIC's office. He also upgraded the centre's computer systems and maintained its website. He made logistical arrangements for a meeting of the VERTIC Board of Directors in May and prepared financial statements for the meeting and for reports for funders. On 4 May, Ben represented VERTIC at the Development House tenants' meeting to discuss common issues and priorities for future activities.

LARRY MACFAUL participated in the European Safeguards Research and Development Association (ESARDA) Working Group on Verification Technologies and Methodologies in London on 9 May. He attended a meeting at the UK Department for Environment, Food and Rural Affairs (DEFRA) on 13 May to discuss the Seminar of Governmental Experts and the Twenty-Second Sessions of the Subsidiary Bodies to the UNFCCC, held in Bonn, Germany, from 16–27 May. Along with Andreas Persbo and Angela Woodward, on 27 May, he met with Dr David Brown of the Overseas Development Institute (ODI) to discuss verification issues relating to forestry. Larry continues to work on papers on verification matters and the climate change regime for the International Institute of Applied Systems Analysis (IIASA) and ESARDA.

ANDREAS PERSBO represented VERTIC at the 15 April WMD Awareness Programme Steering Group Meeting at University College London. On 27 April, he met with Keith Barnham and David Lowry at Imperial College to discuss Professor

Barnham's theoretical model to calculate historical plutonium production in UK Magnox reactors. On 28 April, he accompanied them to their presentation of the model to Glenn Hawkins, Head of the UK Safeguards Office at the UK Department of Trade and Industry (DTI). Andreas attended the first week (2–9 May) of the 2005 NPT Review Conference in New York. While there, he met with UN staff and delegates from fellow NGOs as well as officials from NPT states parties. On 12 May, he attended the final day of the 2005 ESARDA symposium on Safeguards and Nuclear Material Management in London. Andreas met with Professor Ove Bring of the Swedish National Defence College on 13 May to discuss VERTIC's nuclear research programme. Andreas also assisted Angela Woodward in developing future research priorities for VERTIC's arms control and disarmament verification programme. He reviewed a forthcoming VERTIC Brief on the verifiability of a potential Israeli-Palestinian peace accord and maintained a watching brief on verification developments in states of concern.

building trust through verification

VERTIC is the Verification Research, Training and Information Centre, an independent, non-profit making, non-governmental organization. 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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CURRENT FUNDERS Weapons of Mass Destruction Commission, Esmée Fairbairn Foundation, Foreign Affairs Canada, Global Opportunities Fund of the UK Foreign and Commonwealth Office, John D. and Catherine T. MacArthur Foundation, Joseph Rowntree Charitable Trust, Ploughshares Fund, Polden-Puckham Charitable Trust, United Nations Institute for Disarmament Research (UNIDIR)

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