

# The 2010 NPT Review: Prospects for verification

As the cornerstone of efforts to prevent the spread of nuclear weapons, and the legal basis for the promotion of nuclear disarmament, the 1968 Treaty on the Non-Proliferation of Nuclear Weapons (NPT) is arguably the most important treaty in this field. 'Considering the devastation that would be visited upon all mankind by a nuclear war', to borrow from its preamble, its importance is beyond doubt. As Soviet Premier Nikita Khrushchev remarked in 1963: 'The survivors would envy the dead.'

This year, as every fifth, the NPT comes up for review. Between May 3rd and 28th, representatives of the treaty's 189 states parties are to meet in New York to assess its performance over the last five years and produce a consensus final document with recommendations for the future. Fifteen years have now passed since conference participants in 1995 decided on the treaty's indefinite extension. Ten years have passed since parties agreed on 13 'practical steps' toward disarmament and five years have passed since the last gathering broke up in disarray. How this review conference will turn out is hard to predict.

Ahead of the conference, this article explores a number of verification issues and priorities that its participants could profitably address—and possibly act on. This article begins by looking at the current state of the NPT and explaining the significant changes to the treaty's verification regime that have taken place over the last 20 years.

The treaty has, on balance, been a remarkable success. Four decades on from the NPT's March 1970 entry into force, nearly all countries are now members and nuclear weapons remain in the hands of the relative few. The world of several dozen nuclear-armed states foreseen by John F. Kennedy and others in the early 1960s has been averted. Today, nine states are known to have nuclear arms, up from five when the NPT came into effect. Though other factors—such as the extended American nuclear 'umbrella', and the technical challenges associated with nuclear bomb-making—have played their own parts in slowing the rate of spread, the role of the NPT, in terms of both normative force and verification procedures, has been critical.

But for some time, the treaty has been under severe strain—not least due to the perennial tension between its nuclear- and non-nuclear-weapon states parties over

## In this issue ...

David Cliff raises issues for consideration in the 2010 NPT Review Conference, Angela Woodward discusses biological and chemical terrorism and Joy Hyvarinen looks beyond the Copenhagen Climate Change Conference. Plus the usual features.

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Trust & Verify

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the rate of disarmament. Under the NPT, the latter (i.e. all except the pre-NPT weapon states of Britain, China, France, Russia and the US) undertake not to build or otherwise acquire nuclear weapons (Article II), while the former agree to pursue negotiations on nuclear disarmament (Article VI). Such is the grand ‘bargain’ around which the treaty revolves. Warhead numbers have fallen significantly since their Cold War peak in the mid-1980s, and look set to continue to drop, but many non-nuclear states contend that the decrease has not been sufficient, nor fast enough. The weapon states, they say, are not living up to their side of the deal.

Disarmament aside, it is the ongoing crises over North Korea and Iran that are the most familiar causes for concern. North Korea announced withdrawal from the treaty in 2003 and in the last five years has tested two nuclear explosive devices. It is thought to have enough bomb-ready plutonium for five or six more (though it is not yet thought to be capable of integrating them into a reliable weapons delivery system).

With regard to Iran, circumstantial evidence is mounting which suggests that the country is seeking nuclear weapons capability under cover of its ostensibly civilian nuclear power programme. As Michael Clarke—director of the Royal United Services Institute—has observed, Iran ‘points the way to a new dynamic of proliferation, where civil power programmes put a country near enough the nuclear threshold to be tempted to cross it at short notice.’

Given the anticipated rise in the number of countries with nuclear power programmes, fears of this kind are well grounded. Article IV of the NPT recognises the ‘inalienable right’ of non-nuclear-weapon states to produce nuclear energy, so long as they abide by their commitment not to also produce bombs. But nuclear power programmes entail inherent proliferation and security risks, especially where uranium enrichment and/or reprocessing facilities are involved. The worrying possibility is that an array of NPT parties in full compliance with Article IV could also be-

come ‘virtual’ nuclear powers, by virtue of acquiring sufficient quantities of fissile material—the biggest hurdle for potential proliferators—through civilian programmes. Designing and building an actual bomb, particularly a crude 1940s version, is comparatively straightforward.

### **A brief look at safeguards**

Verification of non-nuclear-weapon states’ obligations under the treaty is entrusted to the International Atomic Energy Agency (IAEA), which predates the NPT by over a decade. To protect against the diversion of nuclear energy from peaceful to non-peaceful uses, Article III of the treaty requires each non-nuclear-weapon state to accept IAEA safeguards on all their nuclear material, and to conclude a safeguards agreement with the agency—in accordance with its ‘safeguards system’ and statute—for this purpose. Each so-called comprehensive safeguards agreement is individual, but all follow the form and content of a standard text, INFCIRC/153 (agreed by the IAEA Board of Governors in 1971), which obliges states to record and declare all nuclear material and facilities, and allow agency inspectors to verify that information. Twenty-two states parties have yet to bring such an agreement into force, albeit none of particular proliferation concern.

For its part, the IAEA has a ‘right and obligation’ under comprehensive safeguards agreements to ensure that safeguards are applied on all nuclear material used by non-nuclear-weapon states—whether properly declared or not. But in the 20 years that followed the introduction of INFCIRC/153, IAEA inspectors focused on verifying only what was presented to them. The possibility of unseen, undeclared nuclear material (and/or activities) was largely overlooked. As the 2009 report of the International Commission on Nuclear Non-Proliferation and Disarmament (ICNND) explains: ‘It was assumed that the development of [nuclear] fuel cycle capabilities independent of declared facilities would be beyond the resources of most states, and in any event would be readily detectable, and therefore if proliferation did

occur, it was likely to involve diversion from declared facilities.’

The discovery, in the wake of the 1991 Gulf War with Iraq, that Saddam Hussein had been pursuing a secret nuclear weapons programme (much of it under the noses of IAEA inspectors) exposed the error of those assumptions. In response, the agency—in collaboration with member states—began looking at ways to strengthen the system. The objective became to develop the means to effectively verify not only the correctness of states’ declarations but also their completeness, in line with the IAEA’s responsibility to apply safeguards on nuclear material.

By 1995, a list of strengthening measures had been drawn up, some of which were able to be brought in under the existing legal authority of INFCIRC/153, (for instance, environmental sampling). For others, however, further authority was deemed necessary, a requirement that set the stage for the development of a new legal instrument: the model Additional Protocol (INFCIRC/540), a voluntary supplement approved by the IAEA Board in May 1997.

The strengthening measures under an Additional Protocol relate principally to information and access. INFCIRC/540 requires states to provide the IAEA with a far broader range of information than is called for in the text of INFCIRC/153, and grants inspectors greatly enhanced rights of access (including to all parts of a nuclear site—not just isolated ‘strategic points’ as before—with just two hours notice). As a result, in a state with an Additional Protocol, the IAEA has a far clearer picture of the nuclear activities taking place there. And its ability to provide a credible assurance of completeness is considerably improved, although such an assurance can never be definitive.

Additional Protocols are open to all states, not just NPT members. Overall, 128 states have now signed up to one, including the five NPT-recognised weapon states—and India). As figure one shows, 94 have them in force. Of the 64 non-nuclear-weapon states parties to the NPT with significant nuclear

activities, 48 currently have an INFCIRC/540 agreement in force, while a further 11 have either signed or had one approved by the IAEA Board. The remaining five—Argentina, Brazil, Egypt, Syria and Venezuela—have not signed. Iran was applying an Additional Protocol on a ‘provisional’ basis from 2003, but suspended implementation of it in 2005. Israel, North Korea and Pakistan have not signed an Additional Protocol.

### Setting a new standard

In light of the widely recognised usefulness of the Additional Protocol, it is now often said that the combination of an INFCIRC/153-type agreement and an INFCIRC/540 represents the ‘contemporary standard’ for NPT safeguards. It is, therefore, important that any substantive final document to result from the upcoming review conference reiterates the appeal to all states parties to conclude and bring an Additional Protocol into force ‘as soon as possible,’ as called for in the final document of the 2000 conference. The chance of securing universal adoption of the Additional Protocol among NPT parties is admittedly slim (the half-dozen most important hold-outs are the hard cases), but this appeal should be made, nonetheless.

One argument is that Additional Protocols should not be voluntary anyway. The text of INFCIRC/540 is silent on this, but as John Carlson—director of the Australian Safeguards and Non-Proliferation Office—has pointed out, non-nuclear-weapon states have agreed to accept the agency’s ‘safeguards system’, not specifically the measures set out in an INFCIRC/153 (which had not even been negotiated when the NPT came into force). As the contemporary safeguards standard, a joint INFCIRC/153-INFCIRC/540 arrangement can thus be plausibly argued to represent the current embodiment of the ‘safeguards system’ referred to in the treaty.

That the system continues to be assessed and improved upon—in proactive ways, ideally—is essential. With this in mind, one aspect of safeguards worth of review conference consideration is that of the

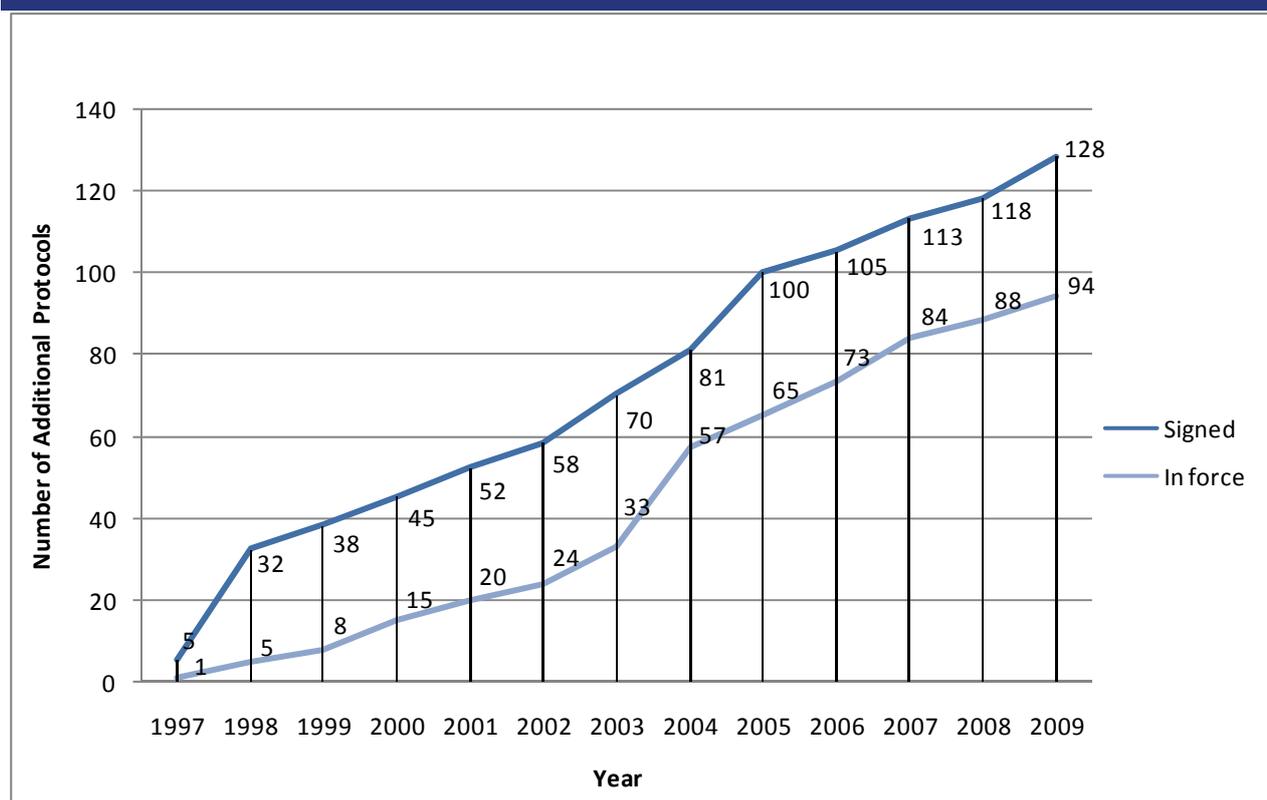
agency's right to verify the absence of clandestine weapons research and development in non-nuclear-weapon states. At present, there is some debate over the extent to which the IAEA's existing powers extend into the field of weaponization, with former IAEA Director-General Mohammed ElBaradei, for one, noting during his tenure that 'the agency's legal authority to investigate possible parallel weaponization activity is limited, absent some nexus to nuclear material being present.'

Mr Carlson disagrees, arguing that while INFCIRC/153 is written in terms of nuclear material, 'weaponization is not only a breach of NPT commitments but indicates diversion or intended diversion of nuclear material so is clearly encompassed by the IAEA's responsibility to provide timely warning of diversion.' In any case, since the manufacture of a nuclear weapon will at some stage, however distant, necessarily involve nuclear material, is there not always a linkage between the two? As the Zedillo Commission on the future of the IAEA recommended in 2008: 'The IAEA's existing authorities should be interpreted to give the agency the responsi-

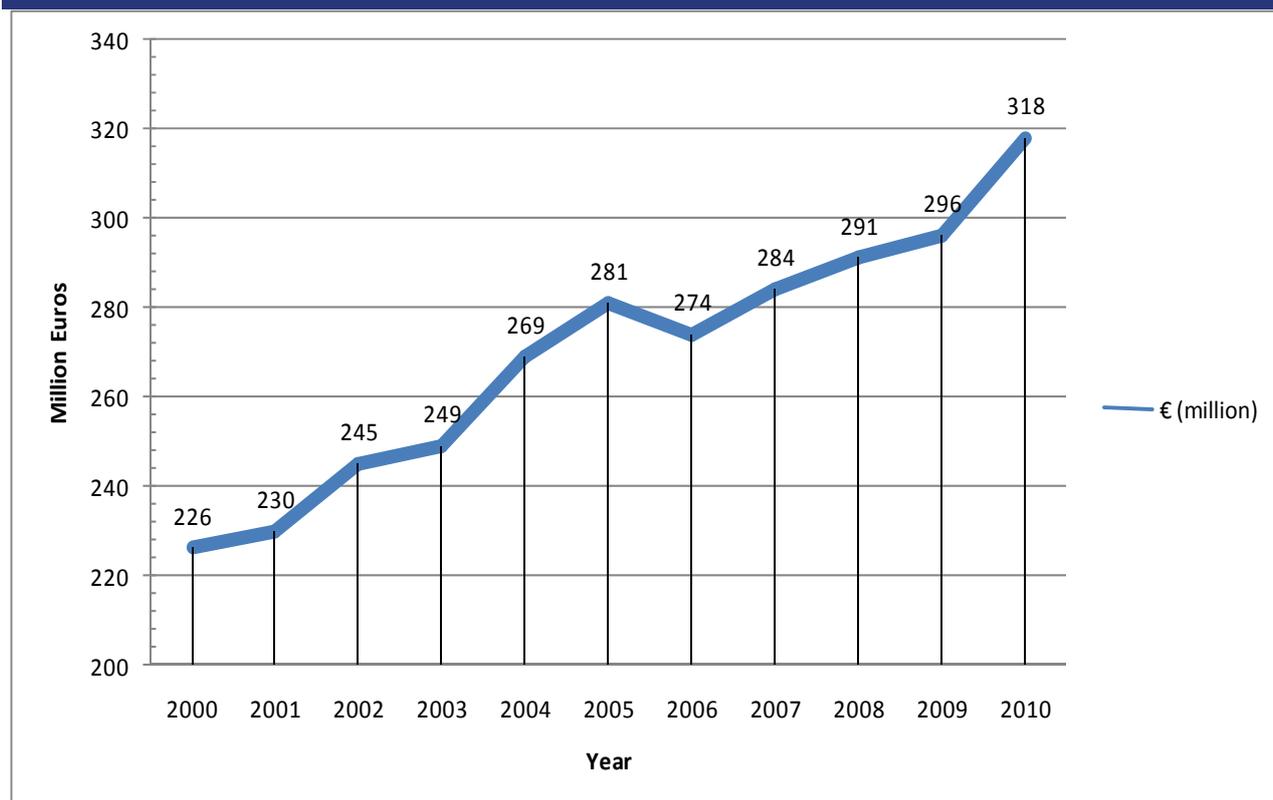
bility to inspect for indicators of weaponization. The agency should establish a team of qualified inspectors for this purpose.'

If the agency is to find undeclared nuclear activities, and possibly evidence of weaponization, it cannot be expected to do without the assistance of its member states, and the resources at their disposal. To quote Hans Blix, the former Director-General of the agency, IAEA inspectors 'cannot be expected to comb through every inch of a state's territory blindly searching for nuclear material and installations.' Political considerations notwithstanding, the sharing of information with the agency—including relevant intelligence—is therefore essential. If weaponization does become part of the agency's formal remit, this need will become greater still. Though perhaps somewhat self-evident, language recognising and stressing the importance of information-sharing between states and the IAEA, with regard to the effectiveness of the safeguards system, would be a valuable addition to a final document. Two more needs—and quite pressing ones at that—relate to the financial and human resources of the IAEA. Financially, if the agency is to

### Steady progress: Additional protocols signed and in force, 1997-2009



## Budget picture: Unadjusted evolution of the IAEA Budget



live up to the increased expectations of the international community, it must have a budget up to the task. For years, though, IAEA funding (which is provided by contributions from member states) has been limited by zero real growth constraints tying budgetary increases to inflation. In a welcome intervention, Barack Obama made a campaign promise in 2008 to work toward a doubling of the IAEA budget within four years. Last August, US pressure secured IAEA Board approval of a rare real budgetary increase—of 2.7 per cent, on top of a 2.7 per cent rise in line with inflation—to bring total IAEA funds for 2010 to €318m (see figure two). But this 5.4 per cent rise was only half the 11 percentage point increase called for by Mr ElBaradei prior to the Board's decision.

With respect to staffing, as the ICNND report notes, much of the IAEA's workforce of nuclear scientists, engineers and managers are approaching retirement, 'and for nearly thirty years the career entry channels have nowhere kept up with replacement requirements.' Two years ago, the Zedillo Commission warned that half of the top managers and senior inspectors at the agency were expected to retire within

the next five.

But the Zedillo Commission makes some good recommendations also, in both of these areas. To address funding needs, it calls on the IAEA Board to approve a one-time budgetary increase of €80m, followed by consistent annual increases (of around €50m each, it suggests) above inflation. To tackle the 'incipient crisis' in staffing, it recommends that the agency embark on a 'substantial campaign to recruit, train and retain the highly qualified personnel needed to carry out its safeguards responsibilities.' In turn, it says, member states should launch their own initiatives to 'attract and educate the next generation of specialists in safeguards-related technologies', and provide incentives to pursue a career at the IAEA.

### Clarifying the relationship with the treaty

Then again, outfitting the IAEA is only half the story. The objective of safeguards, as set out in INFCIRC/153, is both to detect the diversion of nuclear material to nuclear weapons, and to deter actions of this sort through the risk of getting caught. To a considerable extent, however, the deterrent

power of safeguards rests on the (highly politicised) consequences of non-compliance with them—matters for the UN Security Council to decide, upon referral by the IAEA Board. Consequences of safeguards violations is a further issue that could be usefully addressed at the review conference, particularly with reference to, as James Acton of the Carnegie Endowment for International Peace advocates, the degree to which non-compliance with safeguards agreements equates to non-compliance with the NPT.

The issue of compliance is not always clear, especially as most safeguards violations are seen to be relatively minor affairs and not proliferation concerns. With a hint of optimism, Mr Acton suggests that NPT parties should use the conference to ‘clarify and emphasise’ that any future non-compliance with safeguards will automatically amount to a violation of Article III. Moreover, he argues, they should agree that ‘the most serious cases of deliberate safeguards non-compliance’ will, in the future, be assumed to represent non-compliance with Article II—the prohibition article—as well. Related to this is the subtle, but significant, modification to the NPT included in the final document from 2000. Article IV of the treaty makes a state’s right to produce nuclear energy conditional on conformity with Articles I and II. Ten years ago the review conference’s final document made that right conditional on compliance with Article III also. According to this language, a state in non-compliance with its safeguards thus forfeits the right to produce nuclear energy. If agreement is reached on a final document at this year’s conference, this point ought to again be part of it.

### **Reviewing disarmament progress**

Preventing proliferation through safeguards is more than an end in itself. Rather, as was recognised in 2000, safeguards ‘help to create an environment conducive to nuclear disarmament’ and cooperation. With disarmament having moved firmly back into the spotlight since the election of President Obama, who last year described the NPT as a ‘centrepiece’ of

his foreign policy, there is more optimism today than in nearly two decades that meaningful progress in this area can be achieved.

Making progress will, first and foremost, depend on US and Russian actions. While this article was being prepared, the two countries were still negotiating their way toward a replacement for the bilateral 1991 Strategic Arms Reduction Treaty (or START, which expired in December), after Mr Obama and his Russian counterpart, Dmitry Medvedev, agreed last July to limit their respective strategic warhead numbers to between 1,500 and 1,675 (see editor’s note below). Together, the Cold War rivals hold over 90 per cent of the 23,000 warheads currently in existence. No multilateral disarmament treaty encompassing a range of nuclear powers, if not the full complement, has a chance of becoming reality for as long as this situation endures.

A new START treaty would be certainly a step in the right direction, but alone it is insufficient. If disarmament momentum is to be sustained, deeper cuts are needed, and broader ones too, involving not just strategic arms but shorter-range tactical weapons, and warheads kept in reserve—neither of which have ever been limited by treaty. A fuller explanation of the issues involved here (missile defences, Cold War mindsets and the conventional forces imbalance, for instance) is beyond the scope of this discussion. Suffice to say that it will not be easy. Nor is it likely to be quick. Nor will it amount to anything if a multilateral disarmament treaty cannot be effectively verified. There are four elements to this, says Barry Blechman, in a report on disarmament for Washington’s Stimson Centre: declarations; inspections of declared and undeclared facilities alike; technical safeguards; and the verifiable destruction of all declared items, according to an agreed schedule. Considerable work in these areas has already been undertaken, including the recent partnership between the UK and Norway, with VERTIC participation, on ‘information-barrier’ technologies (designed to protect classified warhead information without sacrific-

ing verification transparency), and managed inspector access to warhead dismantlement facilities. As part of this initiative, a joint dismantlement exercise was held in Norway last June, on which VERTIC will report in due course.

Preparatory studies such as the UK-Norway Initiative are vital in laying the groundwork for a world without nuclear weapons, and should rightfully be seen as part of an ongoing process of confidence-building. Worth repeating, then, the call from the 2000 Review Conference for ‘the further development of the verification capabilities that will be required to provide assurances of compliance with nuclear disarmament agreements for the achievement and maintenance of a nuclear-weapon-free world.’ That recommendation remains as apt today as it was then.

### Concluding thoughts

The 2010 NPT review conference provides a timely opportunity for all parties, including both nuclear and non-nuclear weapons states, to renew their commitment to the treaty and reaffirm its indispensability. After the failure of the 2005 conference to reach agreement on anything whatsoever (except an agenda, after three weeks), the bar is set low. However, there are some hopes that the conference will result in significant movement forward on both the non-proliferation and disarmament fronts, though that is far from assured. This article has identified eight issues and priorities relevant to the verification of treaty obligations that could be addressed by review conference participants in May: universalization (of the Additional Protocol); weaponization; information; funding; staffing; non-compliance with Article III; Article III's link to Article IV; and the development of disarmament verification capabilities. Ensuring the soundness of NPT verification—taking into account the expected rise in the number of states developing nuclear power—is incumbent upon all parties in good standing.

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#### Editor's note:

Agreement of the replacement treaty was announced on 26 March. This successor pact will restrict the number of strategic warheads deployed on either side to 1,550 each, as well as imposing delivery vehicle limits. It now awaits signature and ratification by the Russian Federation and the United States

# Biological and chemical terrorism: assessing the threat in Asia

## Introduction

The global threat of biological and chemical terrorism is undoubtedly real, although the problem of how to accurately assess this threat has vexed analysts and policymakers for decades. Many are agreed on the individual elements that ought to be considered—for example, motivations for selecting biological or chemical means of attack, access to pathogens and chemical agents, and the capability to effectively weaponize them—but without a structured framework for considering their respective importance, certain factors are overemphasised, and resulting assessments are unbalanced and speculative. This hampers collective efforts to develop appropriate policy solutions to the current and future problem of chemical and biological terrorism. As there have been, thankfully, relatively few terrorist incidents involving biological or chemical weapons to date, attempts to develop predictive models from precedent has proven difficult.

This article considers the prospects of biological and chemical terrorism, particularly in the Asian region, looking ahead to 2030. Yet biological and chemical terrorism is not a problem which impacts only a handful of states, or a particular region. Any terrorist event involving biological weapons (BW) or chemical weapons (CW) would evidence a failure in one or more state's counter-proliferation and counter-terrorism policies and in the global 'web of prevention' which could have serious repercussions for many other countries. As a lawyer who works with states around the world to strengthen their domestic regulatory framework in order to prohibit and prevent these weapons, I know the challenges that many states encounter in trying to shore up this 'web'.

Few could have foreseen how the rapid advances in biology and chemistry over the last ten, or even five, years could impact on the terrorist threat, with 'dual-

use' materials, equipment and technologies now more readily accessible. Thus attempts to extrapolate what the situation might be like in 30 years time are extremely difficult.

This paper seeks to explain the nature of biological and chemical ('bio-chem') terrorism; propose a methodology for bio-chem terrorism threat assessment; highlight certain trends impacting on this threat in the Asian region; and endeavour to make some policy recommendations in order to reduce these threats in the years ahead.

## Biological and chemical terrorism

So what is biological and chemical terrorism? Definitions of these terms differ, both in precision and scope. Generally speaking, biological terrorism involves the use of pathogens and toxins by non-state actors to inflict harm against humans, animals and plants (agro-terrorism). Such harm can include attempts to cause mass death or illness among human or animal populations, either directly or through contaminated food supply, as well as efforts to destroy crops and sabotage agricultural production. Importantly, it also includes the psychological and economic harm to populations through the panic associated with overt or covert biological attacks. For example, the 2001 anthrax letters attack in the United States led to a disproportionate economic and psychological harm compared with the actual number of deaths. It must be remembered that biological terrorism is at the far end of the spectrum of biological risks which range from natural disease outbreak, unintended consequences, accidents, negligence, vandalism/sabotage and the deliberate use of BW. Risk assessment across this spectrum is prudent, given that many of these other risks pose a more immediate problem to states. Chemical terrorism similarly seeks to inflict such harm, but through the use of chemical agents or toxins.

## Assessing the threat of biological and chemical terrorism

Analysts at the Center for Nonproliferation Studies at the Monterey Institute of International Studies developed a helpful methodology for conducting bioterrorism risk assessment for consideration by The Weapons of Mass Destruction Commission ('Blix Commission') in 2004 (Ackerman and Moran). While they consider that bioterrorism is a 'distinct' issue from chemical, nuclear and radiological terrorism, with its own highly specialized problems deserving of 'bio' focussed responses, arguably the similarities in the problems of biological weapons (BW) and chemical weapons (CW) control (especially when compared with nuclear or radiological weapons) as well as the growing convergence between the two fields of science and their respective treaty regimes supports the application of this methodology to chemical terrorism threat assessment.

The Ackerman/Moran model postulates that bioterrorist threat assessment is based on the interaction between the consequences and the likelihood of an attack. When chemical terrorism threat assessment is included, the model specifies that:

- Biological or chemical terrorist threat = consequences of attack \* likelihood of attack

Ackerman and Moran break this down into sub-elements as follows:

- Consequences of an attack = value of asset being defended \* hazard posed by [biological or chemical] agent(s) \* vulnerability of asset being defended
- Likelihood of attack = motivation \* capability of attacker(s)

This structured threat assessment, they argue, requires the examination of factors traditionally excluded from bioterrorism threat assessment (for example, non-physical effects of a biological attack) and makes the process more objective (notwithstanding the subjective elements involved in assessing terrorists' motivations). They also point out

that there is a tendency to infer terrorists' intention from a potential or actual capability, and vice versa, which is misguided. For example, while Islamic extremist groups Jemaah Islamiyah and Abu Sayyaf are known to possess manuals on the production of biological and chemical weapons, this alone does not mean they had the intent or the capability to successfully do so.

### Consequences of an attack

Applying the Ackerman/Moran model, the following factors are relevant to a threat assessment of the consequences of a biological (and chemical) attack.

#### Value of asset to defender

The 'assets' that may be targeted by terrorists include human lives, and animal and crop production (economic assets): it is the terrorists' perception of their value to the defender that should guide assessment of this element. While policymakers should always seek to protect human life, they inevitably have to make choices about resource allocation and will likely need to carry out a 'cost-benefit' analysis to determine the monetary value of economic assets and how much they are willing to spend to prevent their harm, versus replacement value.

#### Harm potential of agent

There are infinite permutations and combinations of the harm potential of these agents. It is necessary to carry out assessments of each biological (or chemical) agent that might realistically be used by terrorists. The factors that terrorists will take into account in selecting a biological agent for a terrorist attack form the basis for this threat assessment: for example, how likely it is to kill its intended victim (pathogenicity); the degree to which it is contagious or infectious; its resistance to protective or prophylactic countermeasures; and the degree of risk to the terrorist in handling it.

The biological agents often cited as being of potential interest to terrorists include: bacterial organisms (e.g. anthrax and plague); viruses (e.g. ebola, haemorrhagic fevers and even smallpox); toxins (e.g. botulinum

toxin, ricin and saxitoxin); and certain rickettsiae and fungi. The trade in certain precursor chemical agents is also subject to national controls to help prevent their diversion to chemical weapons programmes or access to them by terrorists, although the developing world views these counter-proliferation measures as restricting their peaceful development.

### Vulnerability to biological or chemical weapons

Certain factors make populations around the world more susceptible to the deliberate spread of disease through bioterrorism and reduce their ability to respond with protective and prophylactic measures after a biological or chemical weapons attack. The globalized economy has increased the routes and speed of disease transmission: for example, the SARS outbreak in 2002-2003 was spread from mainland China to Hong Kong, Canada and beyond by infected air travellers within hours. Global public health programmes have eradicated certain diseases (in the case of smallpox) and significantly reduced the incidence of other naturally occurring diseases, but this has indirectly facilitated a reduced natural immunity around the world to certain diseases. However, having a high standard of public health globally is, on balance, vital in reducing populations' vulnerability to disease, including deliberate disease through bioterrorism. The ability of health systems to respond to medical emergencies is also a factor in chemical terrorism, where large numbers of victims will need simultaneous treatment. It must also be remembered that certain countries or regions may be more vulnerable to particular diseases, or may have limited capacity to respond to bio-chem attacks.

### Likelihood of an attack

Ackerman and Moran also highlight the relevance of terrorists' capability and motivations in conducting a biological attack when carrying out a threat assessment: both capability and motivation must be present for there to be terrorist attack. These factors are also examined in great detail by other analysts. This section will outline some of the relevant issues and examine their relevance to the prospect of bio-chem

terrorism to the Asian region.

## Terrorists' capability to attack

### State sponsorship

Despite the complete prohibition on biological and chemical weapons in international law, some states are still believed to harbour ambitions of possessing a CBW capability. Should these states have CBW capability, perhaps hiding it within a permissible BW or CW defence programme, and the desire to provide terrorists with financial, logistical, technical or other assistance, then this significantly reduces a terrorist group's lead time to acquire this capability. Countries providing a 'safe haven' for terrorists (through negligence, ineffectual law enforcement or because they do not have complete control of their territory), inadvertently provide support for bio-chem terrorist objectives.

### Organization and resources

A terrorist group motivated to acquire a CBW capability does require certain attributes, whether or not it has garnered state-sponsorship. To maintain the discipline to secretly develop such a capability, the group would need to be 'vertically organized, highly integrated and ideologically uniform'. Without state sponsorship, terrorist groups would also need fairly substantial capital to fund an organized, large-scale attack involving a weaponized agent.

### Acquisition of materials and equipment

It is a relatively inexpensive process to purchase or steal relevant biological agents, acquire samples from the natural environment or infected animals or crops, or create pathogens through synthetic biology techniques. Many chemical agents of interest to terrorists may be purchased in large quantities off-the-shelf, such as fertilizers or chlorine. Studies have also shown that dual-use equipment for the production and weaponization of biological and chemical agents is available for sale on the internet. Alarming, state surpluses have also been offered for sale in this way.

### Acquisition of knowledge and skills

Possessing the raw materials for a biological or chemical weapon is one thing, but delivering it to a target population effectively is another. Terrorists may try to develop the necessary knowledge and skills 'in-house', or they may bring in outside expertise. It is widely thought that the logistical and technical hurdles to develop a BW programme capable of producing a viable weapon and dissemination device capable of inflicting mass casualties is beyond most terrorist groups. The Aum Shinrikyo cult in Japan, which released sarin gas into the Tokyo subway on 20 March 1995 killing 12 people and seriously injuring at least 50 more, had previously made many unsuccessful attempts to weaponize biological agents. Its vast wealth was insufficient to guarantee success.

### Terrorists' motivations for conducting biological or chemical terrorism

The likelihood of a terrorist attack involving biological and chemical weapons requires capability and motivation. There are particular reasons why terrorist groups might choose to use these weapons over others that might be more accessible and likely to achieve significant casualties, psychological harm, societal chaos and economic disruption (e.g. conventional explosives or even firearms). However, terrorists may consider that using these weapons over others has certain advantages, as described below.

### Desire to inflict significant casualties and/or mass panic

There are different methods for predicting the casualty rates for biological and chemical terrorism scenarios, although the variability of certain factors (particularly relating to effective delivery) makes it extremely difficult to calculate with accuracy. There is certainly the potential for a bioterrorism event to result in thousands of casualties. A terrorist's cost-benefit analysis could show that bioterrorism results in more deaths than conventional weapons and at less cost than efforts to acquire a radiological weapon capability, for example. At the very least, a suspected biological attack, a hoax, or even an attack with rela-

tively few deaths can result in mass panic.

### Willingness to break the global taboo against CBW use to achieve their goals

The taboo against the use of biological and chemical weapons, by State or non-State actors, remains extremely strong... but there have been exceptions. The Aum Shinrikyo cult worked on sarin, VX gas, anthrax, botulinum toxin, ebola and hydrogen cyanide with clear evidence of their intention to use these on human populations. The perpetrator of the 2001 anthrax mailings also showed a total disregard for human life, using the postal system as a delivery mechanism, thereby contaminating mail intended for millions of recipients.

### Relatively easy to carry out and difficult to detect

A biological or chemical terrorism attack involving the successful delivery of a large quantity of material and resulting in significant casualty rates may be relatively difficult to achieve. However analysts have recently been determining the ease with which terrorists might execute attacks by contaminating food supplies, or by manipulating life science technologies for harm. The issue of food contamination is particularly worrisome, as food production processes might actually facilitate the delivery of tainted products to the consumer, by which time it is extremely difficult to determine when and where the deliberate contamination occurred, or who caused it. Meanwhile, a disease outbreak might not even be traced to a covert bioterrorism attack. This all points to the need for effective public health surveillance and response systems in order to mitigate the effects of such an attack, but the issue of the public health sector's involvement in law enforcement to identify the location and cause of an attack, let alone the perpetrator, once a deliberate attack is suspected, is fraught with sensitivities.

### Prospects for bio-chem terrorism: trends in the Asian region

States in Asia face threats involving terrorists located and operating within Asia; located in Asia and operating outside the region; and from terrorists located else-

where and targeting Asia. The burgeoning biotech industry across Asia has significantly increased the region's vulnerabilities to bioterrorism and has focused global attention on Asian efforts to mitigate these risks while also pursuing its right to peaceful development.

I do not purport to be an expert in terrorism in general, nor in the particular groups that are located or operate in the Asian region. But what I am familiar with is the extent to which states around the world have prohibited biological and chemical terrorist activity in their territory and have taken steps to prevent the proliferation of CBW, including to terrorists and other non-State actors. Most examples are drawn from the BW area, as VERTIC's legislative assistance programme, which cooperates and shares information with states to develop new laws to prohibit and prevent nuclear, biological and chemical weapons, heavily focuses on BW-related legislative support. By sharing my thoughts on the status of prohibition and prevention in the Asian region, I aim to identify some trends in Asian states' vulnerability to bio-chem terrorist attacks and their ability to prevent such attacks occurring within their territory or in other states.

Across Asia, the status of states' legislative preparedness to prevent and respond to bio-chem terrorism is patchy although some states, such as India, have tackled this task comprehensively. It must be said, however, that no state in the world has a 'gold standard' regulatory framework in this area.

### South Asia

India and Pakistan have relatively comprehensive national legislation in this area (with Pakistan currently finalizing a new BWC Act), while the other states (Bangladesh, Bhutan, Maldives, Nepal and Sri Lanka) have very few relevant legislative measures in force and do not appear to be making attempts to improve the situation. These states are at an increased risk of being 'safe havens' for terrorist activities involving biological and chemical weapons, without the means to effectively investigate and prosecute those

engaging in such activities.

Critically, these states lack:

- Legislative provisions punishing activities involving biological weapons (development, production, acquisition, stockpiling or use; attempts; financing etc) despite being members of the relevant treaties to facilitate the detection and punishment of attempted or actual use of BW;
- Control lists for biological agents and toxins, dual-use equipment and technology to license imports and exports, regulate domestic transfers, and license facilities and personnel to handle controlled agents;
- Preventive measures to account for, secure and physically protect dangerous biological agents and toxins to prevent terrorist access to CBW materials stored in facilities or in transit;
- Preventative measures to control transfers of dangerous biological agents and toxins to reduce vulnerability through theft or loss of terrorist relevant materials; and
- National biosecurity oversight mechanisms to implement biosecurity laws; monitor their effectiveness and issue updated subsidiary regulations; report to Parliament on biosecurity effectiveness; and liaise with other states and intergovernmental bodies on this issue.

### Central Asia

Certain states in this region formerly housed Soviet 'anti-plague' stations and other elements of the large Soviet offensive biological weapons programme, and so have a history of legislative measures to protect their personnel and the environment. While certain states have comprehensive legislation in some areas, particularly those explicitly required under WMD treaties or the UN Counter-Terrorism Conventions, they lack specific regulation required under UNSCR 1540 (such as preventive measures to account for, secure and physically protect dangerous biological

agents and toxins). Other states have prohibited BW and CW in law, yet lack effective preventive measures. Encouragingly, many states are progressively strengthening their regulatory frameworks to prohibit bio-chem terrorism, alongside activities to enhance physical security of terrorist-relevant materials.

### East Asia

Perhaps unsurprisingly, China, Japan and South Korea lead the field in this region. Japan was in the unfortunate position of having to develop legislation reactively, in light of their experience prosecuting Aum Shinrikyo cult leader Shoko Asahara for the sarin gas attack (the case took eight years to conclude).

### South-East Asia

Worryingly, certain states in this region which have a growing biotechnology industry and harbour radical Islamic terrorist groups lack even the most basic measures prohibiting biological weapons and comprehensive regulations preventing terrorist acquisition (for example, they lack control lists and preventive measures to account for, secure and physically protect dangerous biological agents and toxins). There is some evidence that they are attempting to ameliorate these deficiencies, with new legislative bills under preparation. Inter-regional cooperation will be crucial to effective enforcement of these laws.

### West Asia

Certain states in this region are widely considered to harbour active offensive biological and chemical weapons programmes or, in the case of Iraq, used to possess such programmes. Combined with the presence of radical Islamic terrorist groups in the region, the potential for state sponsorship of biological and chemical terrorism in this region deserves more attention by the international security community. While there is some movement in certain states towards a more robust biosecurity regulatory environment (principally certain states in North Africa and the Gulf Cooperation Council), the progress is slow and uneven. Regional geopolitics also mean many

states in this region remain outside the BWC and CWC regimes and lack sensitivity to CBW proliferation issues.

### Policy recommendations

Analysts and policymakers around the world need to pay more attention to the chemical, but particularly biological, terrorist threat. The respective treaty regimes should be strengthened, particularly compliance monitoring and enforcement of the 1972 Biological Weapons Convention, starting with the existing confidence-building measure arrangements. Intra- and inter-regional cooperation on biosecurity and (bioterrorism prevention) and chemical security (chemical terrorism prevention) is absolutely essential to developing a more effective web of prevention, as terrorist activities transcend borders. All states face common challenges in this area and aside from facilitating helpful communication, such cooperation could develop regional initiatives at tackling them.

Angela Woodward

Programme Director, VERTIC

This article is drawn from the author's paper on 'Chemical and Biological Terrorism: trends in Asia', presented at the 12th Asian Security Conference, hosted by the Institute for Defense Studies and Analysis, New Dehli, India, during 11-13 February 2010.

# Looking beyond Copenhagen

The Foundation for International Environmental Law and Development (FIELD) looks with some trepidation towards the Sixteenth Conference of the Parties to the UN Framework Convention on Climate Change (UNFCCC COP 16)/Sixth Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol (CMP6), to be held in Mexico at the end of this year. The failure of the UN Copenhagen Climate Change Conference has left the international negotiating process in disarray.

In FIELD's view negotiators need to look forward now, rather than dwell on why things went wrong in Copenhagen. What role the Copenhagen Accord, a political agreement reached outside the UNFCCC process, will play is an open question. While the Accord may come to have positive consequences, for example through its funding pledges, it may also have negative consequences: for example, the linking of adaptation and the impacts of response measures (the latter is an issue of particular concern to oil producing countries) is likely to slow negotiations on adaptation, which is an increasingly urgent issue.

The focus should be on the continuing negotiations under the Ad Hoc Working Group on Long-term Cooperative Action under the Convention (AWG-LCA) and the Ad Hoc Working Group on Further Commitments for Annex I Parties under the Kyoto Protocol (AWG-KP). Many issues remain to be resolved, a key question being if developed countries will show leadership by taking on strong emissions reduction commitments, rather than focusing on China, India and other countries with rapidly growing emissions. Developed countries have a historical responsibility and the UNFCCC is clear that they should take the lead in combating climate change.

At the time of writing it is not clear how many preparatory negotiating sessions will take place before

COP 16 and CMP6 meet from 29 November – 10 December in Mexico. In any case, time is short for finding agreement on complicated issues such as: nationally appropriate mitigation actions (NAMAs) for developing countries; measuring, reporting and verification (MRV); financing; technology transfer; and emissions reduction targets for developed countries, including questions such as to what extent developed countries will be able to rely on land use, land use change and forestry (LULUCF) and potentially REDD-plus to reach their targets.

In addition, there is a need to overcome the failure at Copenhagen and the divisive effects of the Copenhagen Accord, which some countries objected to and many other countries are suspicious of. It is not clear if and how elements of the Copenhagen Accord could be brought into the UNFCCC framework.

Some have pointed to decision making by consensus as the biggest block to progress in the international climate change negotiations and other UN negotiations. It is far from ideal, but the lack of trust evident at Copenhagen is likely to be the biggest challenge facing negotiators over the coming months.

## About FIELD's work

FIELD's work includes advocacy, advice and capacity building, and research, with climate change as a major focus area. FIELD will continue to provide assistance to developing countries, in particular vulnerable ones, and to indigenous peoples and civil society organisations and other groups involved in the international climate change negotiations.

At Copenhagen and during the preparatory negotiations in 2009, FIELD was engaged in a wide range of activities. For example, FIELD and its partners in the European Capacity Building Initiative ([www.eurocapacity.org](http://www.eurocapacity.org)) organised a preparatory workshop for negotiators from Least Developed

Countries (LDCs) prior to the Copenhagen conference. FIELD assisted the Alliance of Small Island States (AOSIS) with adaptation issues, a very high priority for small islands. FIELD also provided briefing papers and advice about 'REDD-plus' (reducing emissions from deforestation and forest degradation and related activities) to negotiators from developing countries (this project was funded by the Gordon and Betty Moore Foundation).

Joy Hyvarinen  
Director, FIELD.

This article will also be published in *ELFlite*, the newsletter of the Environmental Law Foundation, in April 2010.

## New style: New VERTIC flyer

### What is VERTIC?

The Verification Research, Training and Information Centre (VERTIC) is an independent, non-profit making, charitable organization. Established in 1986, VERTIC supports the development, implementation and verification of international agreements as well as initiatives in related areas.

VERTIC provides this support through research and analysis, assistance and training, dissemination of information, and interaction with the governmental, diplomatic, technical, scientific and non-governmental communities.

VERTIC's work focuses on the development and application of monitoring, reporting, review, verification and compliance mechanisms, and on national implementation measures.

### What are VERTIC's priority areas?

#### Arms control and disarmament

- National implementation measures for treaties prohibiting and preventing nuclear, biological and chemical weapons as well as for United Nations (UN) Security Council Resolution 1540 (2004).
- Verification of a future fissile material treaty.
- Verification of nuclear disarmament.
- 1996 Comprehensive Nuclear Test Ban Treaty (CTBT).
- 1968 Nuclear Non-Proliferation Treaty (NPT) and International Atomic Energy Agency (IAEA) safeguards.
- 1972 Biological Weapons Convention (BWC).
- 1993 Chemical Weapons Convention (CWC).
- Conventional arms agreements.

#### Environment

- 1992 United Nations Framework Convention on Climate Change (UNFCCC), the 1997 Kyoto Protocol and future action on climate change.
- Forests and climate change.
- Illegal logging and related trade.
- Agreements on the atmosphere, fishing, wildlife and other areas.

*"Non-governmental actors, such as VERTIC, have played—and will continue to play—a significant role in the field of verification research and training, as well as in disseminating information about the importance of verification in arms control and other agreements".*

—Dr Mohamed ElBaradei, Director General, IAEA, 1997–2009

### How does VERTIC operate?

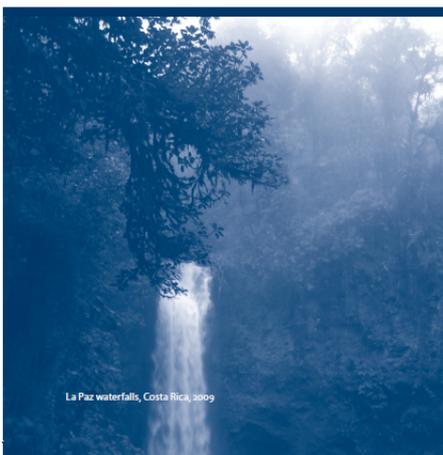
VERTIC is based in central London, governed by a Board of Directors and advised by an International Verification Consultants Network. It is funded by philanthropic foundations, governments and other organizations and is regulated by the Charity Commission for England and Wales.

### What are VERTIC's activities?

VERTIC conducts research and analysis and offers both expert advice and consultancy on verification matters. In addition, it supplies technical legislative assistance to states incorporating nuclear, biological and chemical weapons treaty obligations into national law, and initiates confidence-building activities.

VERTIC staff members liaise with governments, UN agencies and other international organizations, universities, research institutes, and other members of civil society. VERTIC personnel organize and participate in seminars, workshops and conferences. The organization also provides the general and specialist media with analysis of verification issues and runs internship and volunteer programmes.

VERTIC holds observer status at the IAEA General Conference and has consultative (roster) status with the UN's Economic and Social Council.



La Paz waterfalls, Costa Rica, 2009



United Nations Headquarters, New York, 2009



## Verification Watch

### IAEA report casts doubts on Iran's nuclear behaviour ...

The International Atomic Energy Agency released a report in February which surveys Iran's nuclear activity. In it, the Agency criticises the level of cooperation it has received from Tehran and raises concerns over nuclear activities that may be underway in the Middle Eastern state. The Agency states that it continues to verify the non-diversion of declared nuclear material in Iran, but adds that the state 'has not provided the necessary cooperation to permit the Agency to confirm that all nuclear material is in peaceful activities.' Commentators have remarked on the clear and critical tone of the report, which has been the first to be produced under the IAEA's new Director-General, Yukiya Amano.

The report surveyed the broad sweep of the Agency's knowledge of Iranian nuclear activities, detailing the various concerns that have been raised over a wide range of areas. The report includes observations on topics such as Iran's conversion, enrichment and re-processing activities, and considers military dimensions to the Iranian programme. The Agency remarks that Tehran's actions have raised 'concerns about the possible existence in Iran of past or current undisclosed activities related to the development of a nuclear payload for a missile.'

The release of the report led to condemnation of Tehran by some states. Iran's Supreme Leader responded that its conclusions were 'baseless.'

### Syria's nuclear activities

A recent report, issued by Yukiya Amano, the Director General IAEA, has increased pressure on Syria to cooperate with the Agency in verifying the country's nuclear activities. Syria, a signatory to the Treaty on the Non-Proliferation of Nuclear Weapons (NPT) since 1969 and a proponent of a Nuclear-Weapon-Free-Zone (NWFZ) in the Middle East has been

generally reluctant to allow access to what remains of the Dair Alzour facility, which was bombed by Israel in September 2007, and has continued to insist that the bombed installation was a non-nuclear military facility. The IAEA has other evidence that appears to contradict this claim, including information that indicates that the facility was a nuclear reactor built with the help of the Democratic People's Republic of Korea (DPRK), an accusation that Syria denies.

In October 2007, the IAEA obtained satellite images that showed that the site had been cleared. On 23 June 2008, IAEA inspectors were given access to Dair Alzour where they discovered traces of 'anthropogenic natural uranium' which Syria had not declared. Damascus insisted that the uranium had come from Israel's missiles. The Agency considers that there is a low probability that this is the case, but is unable to discount it entirely because of Israel's reluctance to provide the information required to verify it.

According to the report, the IAEA sent the Syrian government a letter on 7 January 2010, requesting that Syria cooperates fully with the Agency's investigation. The letter asked for more information on the destroyed site, such as technical details regarding its design, increased openness about Syria's procurement efforts, access to the debris of the Dair Alzour facility, and further access to Dair Alzour itself, as well as three other areas that might be connected to Syria's alleged nuclear programme. Syria has refused to cooperate, claiming that because the site has been cleared it is unable to to the Agency's demands.

During the Agency's limited investigations, anthropogenic natural uranium particles were also discovered at the Miniature Neutron Source Reactor (MNSR) in Damascus. According to the IAEA report, 'Syria's initial explanations for the presence of the particles were that they had originated either from standard reference materials used in neutron

activation analysis or from a shielded transport container.’

The Agency’s own findings did not support this explanation, prompting Syria to suggest “that the particles may have originated from other materials present at the MNSR, specifically quantities of yellowcake produced at a pilot phosphoric acid purification plant at Homs, previously undeclared uranyl nitrate compounds derived from the yellowcake and/or small quantities of previously undeclared imported uranyl nitrate materials.’

It is unclear whether there is a link between the uranium discovered at the MNSR and the Dair Alzour site, but it is something that the report stresses needs to be investigated. There is also concern that there may be a link between the uranium particles discovered at the MNSR and the other locations that need to be investigated. And whether there was a connection between nuclear material found at the MNSR and the yellowcake from the Homs phosphoric acid purification pilot plant (where, in July 2004, inspectors had noted hundreds of kilograms of yellowcake).

The report concludes by urging Syria to cooperate more fully with the IAEA, and requests that the government in Damascus sign an Additional Protocol, which would allow the Agency to more fully verify Syria’s nuclear activities .

- Tim Collins and Bill Eichler, London

## **IUCN report on REDD and national implementation**

In December 2009, the International Union for Conservation of Nature (IUCN) published what the MEA Bulletin describes as a ‘comprehensive’ report on ‘national legal frameworks for reducing emissions from deforestation and forest degradation in developing countries (REDD).’ Focusing on four case studies – Brazil, Cameroon, Guyana and Papua New Guinea – the study ‘identifies main themes for ensuring successful REDD legal regimes and elaborates relevant legal and policy considerations with regard to each.’

Since the UN Climate Change Conference in Bali, Indonesia (2007), it has been generally accepted that any climate change regime must include a mechanism for tackling the issues of deforestation and forest degradation. Certain initiatives have emerged in this area including the United Nations Collaborative Programme on Reducing Emissions from Deforestation and Forest Degradation in Developing Countries (UN-REDD) which assists developing countries in preparing themselves for participation in a future REDD mechanism, and the World Bank Forest Carbon Partnership Facility (FCPF) which builds REDD capacity in developing countries.

The IUCN report analyses the issues that arise at the national level with regards to the legal frameworks that are needed for REDD-related activities. According to John Costenbader, the author of the reports introduction, ‘Once a future global REDD regime is established, it is essential that it operates within national legal frameworks that are customized to the specific needs of each country, but which strive to achieve the ‘three e’ REDD goals of equity, efficiency, and effectiveness, as well as clarity.’

The report elaborates on four main themes that it identifies as crucial for ensuring the formulation of national legal frameworks for REDD initiatives. The first is ‘Land, Forest and Carbon Ownership.’ Rights to land and forest resources need to be made clear in national legislation, while also being granted to those who are skilled at managing forests for carbon se-

questration (the capturing and long-term storing of carbon dioxide). The second theme is 'Participation'. National legislation will need to ensure that 'REDD stakeholders' are involved in the development of REDD initiatives. The more inclusive a REDD project, the more likely its effective implementation will be. The third theme is closely related to the second: 'Benefit Sharing'. REDD national legislation needs to sufficiently incentivise forest owners to ensure that 'keeping trees standing is an attractive alternative to deforestation'. If forest owners do not benefit from REDD initiatives then they are likely to block implementation out of fear that they will have a detrimental impact on their livelihoods. The fourth, and final, theme encompasses three interrelated issues: 'Additionality, Permanence and Baselines'. Additionality states that a REDD project must achieve emission reductions that would not have happened otherwise. If this was not the case then it would simply be a waste of resources. In order to effectively evaluate additionality, it must be measured against baselines that are set according to either past levels, or future projections, of deforestation. Finally, any reductions made as a result of a REDD initiative must be permanent. ([http://cmsdata.iucn.org/downloads/eplp\\_77.pdf](http://cmsdata.iucn.org/downloads/eplp_77.pdf)).

While the report recognises that countries' circumstances vary widely, the authors are clear that, according to their extensive research, the four themes that they identify have a universal relevance.

-Bill Eichler, London

## **Non-governmental CWC coalition formed, includes VERTIC**

In an alliance involving VERTIC, dozens of non-governmental organisations from around the world are forming a partnership, known as the Chemical Weapons Convention Coalition, to promote the elimination of chemical weapons and prevent their use by terrorists. The coalition's mission statement declares that the work of the alliance is to support the ban on chemical weapons through 'focused civil society action aimed at achieving full membership of the CWC' in addition to three other goals: the 'safe and timely elimination' of chemical weapons; the prevention of their misuse for 'hostile purposes'; and the promotion of their use for peaceful ends. The coalition hopes to attract around 100 groups by the end of this year. 'The CWC is often considered to be the most successful of the WMD treaties, and that is arguably the case,' writes VERTIC's Angela Woodward in a January 2010 *Global Security Newswire* article. 'But there remain certain significant problems with the convention which states parties have utterly failed to deal with, such as non-compliance issues (like 'non-lethal weapons') or instigating the on-site inspection mechanism. When states parties, and the membership organisation they created for the convention, cannot deal with these problems, it is civil society's responsibility to air these problems and constructively work towards finding solutions to them.' The CWC, which came into force in 1997, currently has 188 member states.

- David Cliff, London

## In Memoriam: Mr Boris Kvok, a staunch but anonymous supporter of the test ban

Boris Kvok, the director of the CTBTO's on-site inspection division, passed away on 12 February 2010, only 50 years old. He leaves a wife and two children behind, as well as an organization grateful for his work.

After graduating from the Moscow State Institute of International Relations in 1976 at the young age of 22, Mr Kvok joined the Soviet Foreign Service. He was immediately thrown into hot assignments, serving as a diplomat with the Soviet Embassy in Pakistan between 1978 and 1983. He later took up position in Moscow, continuing to work on South Asian issues.

In 1993, Mr Kvok took up a post with the Permanent Mission of the Russian Federation to the Conference on Disarmament in Geneva. Here, he helped frame, and later bring into force, some quite remarkable arms control agreements: first the Chemical Weapons Convention and later the Comprehensive Nuclear Test Ban Treaty. He returned to Moscow in 1998 to take the job of Deputy Director of the Disarmament and Security Affairs Department. In 2001, he was assigned the post of Deputy Permanent Representative of the Russian Federation to the International Organizations in Vienna. As such, he became a familiar, and friendly, face in the hallways and meeting rooms of the Vienna International Centre.

And so, in 2004, Mr Kvok arrived at the CTBTO On-Site Inspection Division. He quickly became highly respected by those who worked for him thanks to his extensive experience with test-ban issues. And it was his considerable experience as a diplomat that brought additional impetus to the work of the Division. Under his directorship, work on the on-site inspection manual sped up dramatically. He lobbied for, and saw through, several on-site inspection exercises, which culminated with the first integrated on-site inspection exercise in Kazakhstan in late 2008. But he was also known for his considerate and generous personality and his honest and straightforward attitude.

Perhaps surprisingly given his experience, he was less

known outside the CTBTO. However, Mr Kvok also wrote several articles, and contributed to several books. His works include 'On the Nuclear Tests in India and Pakistan' (*International Affairs*, No. 5, Vol.44, 1998) and 'On the Conference on Disarmament' (*International Affairs*, No. 9, Vol. 41, 1995).

- Andreas Persbo, London and Vienna

## Verification Quotes

*"As (of) tomorrow, the steps will start in fact under the full scope, safeguards, and the supervision of the (IAEA) inspectors."* - Iranian Ambassador Ali Ansgar Soltanieh announces his country's decision to enrich uranium to near weapons grade (CNN, 9 February 2010).

*"Arms control, verification, compliance and non-proliferation will no longer be starved for resources ... Quite the contrary, these missions, along with our political-military efforts, will be adequately resourced and well staffed with first-rate professionals."* - Undersecretary Ellen Tauscher delivers some welcome news to State Department staffers in February 2010.

*"Autonomous efforts must not be subject to MRV [Measurement, Reporting and Verification]"* - Ambassador Xie Zhenhua of China lends support to India opposing any international scrutiny of voluntary actions to reduce greenhouse gas emissions (The Hindu, 12 March 2010).

*"The 100 billion dollars has to start flowing soon. Poor countries desperately need this money to cope with a changing climate and reduce their emissions, and rich countries need to show that they can be trusted to deliver on their promises of climate action"* - Oxfam Advisor Robert Bailey asks about funds promised in Copenhagen.



## *Science & Technology Scan*

### **Ultra-sensitive chemical/biological detector under development**

Researchers at the Oak Ridge National Laboratory in Tennessee announced in February the development of a chemical and biological sensor with an apparently unprecedented level of sensitivity. According to information released by the laboratory, this new 'sniffer' device has 'implications that could be significant for anyone whose job is to detect explosives, biological agents and narcotics.' The device consists of a digital camera, a laser, imaging optics, a signal generator, digital signal processing and various other components that can together detect tiny amounts of substances in the air. Mr Lavrik noted that the research team hoped to have a device 'capable of detecting incredibly small amounts of explosives compared to today's chemical sensors.'

As reported by the laboratory, the underlying concept of the sniffer is based on micro-scale resonators similar to the microcantilever probes used in atomic force microscopy that measure changes in resonance frequency according to changes in mass. To date, however, the difficulty of measuring and analysing tiny oscillation amplitudes—about the size of a hydrogen atom—has impeded the widespread application of such systems. Oak Ridge's device works, according to its press release, by 'deliberately hitting the microcantilevers with relatively large amounts of energy associated with a range of frequencies, forcing them into wide oscillation.'

Previously, as Panos Daktos from the laboratory explained, scientists wanted to avoid such high amplitude 'because of the high distortion associated with that type of response.' The sniffer, however, turns that difficulty into an advantage, 'by tuning the system to a very specific frequency that is associated with the specific chemical or compound we want to detect.' The research team envision this technology being miniaturised and incorporated into a handheld instrument that could be used by transport security screeners, police forces, and the military. With adequate levels of funding, Mr Daktos believes that a prototype could be developed within 6 to 18 months.

David Cliff, London

## Peace Missions Monitor

### UN Withdrawal from the Congo looms

Soon, the United Nations may face the drawdown of its biggest peacekeeping operation to date, the United Nations Organization Mission in the Democratic Republic of the Congo ('MUNOC').

The government of the Democratic Republic of Congo has asked that the first peacekeepers start to leave the country in June 2010. The first batch of troops would leave positions taken up in the peaceful western part of the vast country, whereas withdrawals from the unstable east would not be completed until June 2011 at the earliest. It is widely believed that the request was motivated by Congolese President Joseph Kabila wanting to shore up his position before the 2011 presidential election.

MUNOC was established by UN Security Resolution 1279 (1999) to observe the so-called Lusaka Ceasefire Agreement. This accord nominally ended the bloody Second Congo War. The force mandate expires at end of May.

- Andreas Persbo, London

### MUNOC in numbers

20,509 total uniformed personnel, of which:

- 18,646 are troops;
- 705 are military observers; and
- 1,158 are police.

1,005 international civilian personnel, of which

- 2,613 are local civilian staff; and
- 648 are United Nations Volunteers.

### Security Council discusses exit strategies

On 12 February 2010, the members of the UN Security Council sat down for a day-long discussion on exit strategies for peace keeping missions. This discussion had been called by the French presidency, which had circulated a 'concept paper' outlining some of the issues two weeks before the meeting.

The French concept paper remarked that peacekeeping missions are now at a 'all-time high' with more than 96,000 men and women in uniform, costing member states about US\$7.8bn annually. The paper stopped short of claiming that this was too expensive, but did refer to a need to 'make the best possible use of available resources' in this time of 'global financial crisis'. According to the French, the present situation in peacekeeping is 'far from ideal'. Amongst many other things, the paper pointed to 'certain long-standing operations which have existed for almost 50 years without any significant progress in the peace process'.

The presidential statement that followed was relatively modest. The Council stressed, that 'the overarching objective should be to achieve success through creating the conditions for sustainable peace on the ground, thereby allowing for reconfiguration or withdrawal of the United Nations peacekeeping mission'.

But it also pledged to improve its own performance by, for instance, 'to include in peacekeeping mandates a desired outcome of the implementation of mandated tasks and a clear prioritization of tasks to achieve it'. It called for the use of strategic plans for peacekeeping missions, and emphasised the use of measurable objectives in all operations.

- Andreas Persbo, London

### **Arms Control and Disarmament Programme**

In January, the Arms Control and Disarmament programme participated in a meeting in Norway under the UK-Norway initiative on verifying warhead dismantlement. The meeting discussed future plans for the initiative including drafting a working paper for the coming NPT review conference in May. In the same month, Andreas Persbo lectured to the 23rd ISODARCO winter disarmament course on the current state and future prospects for CTBT. The ISODARCO winter course is organized in association with the Pugwash Conferences on Science and World Affairs and hosted a long list of international experts on disarmament issues.

In February, the programme participated in the Fourth Annual Workshop on Reducing the Risks from Radioactive and Nuclear Materials. The workshop was organized by the Institute of Nuclear Materials Management. Andreas Persbo gave a presentation on nuclear disarmament and the cooperation of nuclear and non-nuclear weapon states.

Also in February, the programme took part in a roundtable consultation at the French embassy. The exchange was meant to build links between the London based non-governmental research community and French government.

In March, Andreas and Meena attended the 2010 Moscow Nonproliferation Conference, organized by the Center for Energy and Security Studies in Moscow, Russia. Andreas Persbo delivered a presentation on the fissile material cut-off treaty.

At the end of March, Andreas presented on verifying missile accords to a Wilton Park conference.

- Andreas Persbo, Hassan ElBahtimy, Meena Singelee, Jasper Pandza

### **National Implementation Measures (NIM) programme**

During the first quarter of the year, NIM staff participated in several events to raise awareness about the need to adopt national legislation to implement the BWC.

Scott Spence participated in the UNSCR 1540 Committee awareness-raising workshop on Biosafety and Biosecurity held in Kenya in February (for the African region); while Angela Woodward participated in the International Humanitarian Law workshop “From law to action: IHL implementing legislation” hosted by the International Committee of the Red Cross (ICRC) in Bangladesh from 14 to 17 February (for the South Asia region). Several countries approached VERTIC staff during these workshops to discuss approaches and further co-operation on strengthening their legislation for the implementation of the BWC and Resolution 1540.

Additionally, Rocio Escauriaza participated in the Ukrainian workshop “Biosafety and Biosecurity: Implementing the Recommendations of the States Parties Meetings of the Biological Weapons Convention”, held from 15 to 17 February in Kiev and organized by the National Academy of Sciences; and in the workshop ‘Europe and the Global Challenge of Biological Controls’ hosted by the University of Bath on 15 and 16 January.

Rocio has continued to carry out legislative survey work, while Scott has drafted six regional reports on biosecurity regulatory frameworks. Scott and Rocio are finalizing preparations for a drafting workshop that will take place at the end of March in London.

VERTIC is pleased to announce that its National Implementation Kit for the BWC is now complete and available on VERTIC’s NIM website ([www.vertic.org/NIM](http://www.vertic.org/NIM)) in Arabic, English, French, Russian and Spanish. It includes a Sample Act and

Regulatory Guidelines for the BWC and biological weapons-related provisions of UNSCR 1540, along with fact sheets on the BWC, CWC, and establishing a BWC National Authority.

Angela Woodward participated in a workshop on "Building a sustainable capacity in dual-use bioethics" held at the Australian National University (ANU) in Canberra, Australia from 28-29 January. This workshop is part of a collaborative project on dual-use bioethics involving the universities of Bath, Bradford and Exeter in the United Kingdom and the ANU, which is funded by the Wellcome Trust. Angela is an Advisory Board member of this project. Angela presented a paper on chemical and biological terrorism at the Indian Institute for Defence Studies and Analyses (IDSA) "12th Asian Security Conference" held from 11-13 February in New Delhi, and met with New Zealand Ministry of Foreign Affairs officials to discuss topical arms control and disarmament issues in Wellington on 15 March. Angela also worked with fellow board members of the BioWeapons Prevention Project (BWPP) on fundraising activities during this quarter.

The NIM team thank Hassan Elbahtimy for translating the *Regulatory Guidelines* into Arabic.

- Angela Woodward, Scott Spence and Rocío Escarriaza Leal

## Environment Programme

Since January, the environment programme has been engaged in preparing the final report of the full phase of the Chatham House project on measuring progress on tackling illegal logging, across the 12 countries studied. Larry MacFaul and Sam Lawson presented the initial results of the full phase illegal logging project at the 15th Illegal Logging Update and Stakeholder Consultation, Chatham House, London, 20th -21st January. Larry and Sam spoke in front of some 150-200 participants.

The meeting was opened by Hilary Benn, UK Secretary of State for Environment, Food and Rural Affairs.

Larry also participated in the Chatham House-RRI Dialogue on Forests, Governance and Climate Change No. 3, on 22 January 2010.

In March, Larry travelled to Nigeria with FIELD to assist with a two day capacity building workshop for government officials on the climate change negotiations. Larry delivered a presentation on climate change mitigation focusing on MRV issues, and helped with other workshop sessions including exploring climate change priorities for Nigeria and a negotiation simulation exercise. The workshop involved the High Commission, UNDP, ECBI and was funded by DFID's Policy and Knowledge Programme (PAK). It received very positive feedback from the participants. This workshop was preceded by a similar exercise for Masters students at SOAS, London.

VERTIC has been collaborating closely with FIELD on climate change and REDD work as well on funding proposals focusing on the climate change regime and other environmental areas. VERTIC now has a consultancy arrangement with FIELD for continuing work on environment issues. VERTIC has also been liaising with several other international organizations and institutes on activities focusing on the ongoing climate negotiations.

- Larry MacFaul

## Grants and Administration

In the first quarter of 2010, VERTIC secured grants and contracts totalling £571,721, making this a particularly successful fundraising period. The Joseph Rowntree Charitable Trust approved VERTIC's application for £99,770 over 36 months in support of our core activities. Canada Global Partnership Programme has provided £384,830 in support of VERTIC's NIM Programme over two years. In addition, Sandia National Laboratories supplied USD\$64k in support of our work. Carnegie Corporation of New York awarded VERTIC US \$48,597 in support of a report on the UK-Norway Initiative.

FIELD sub-contracted VERTIC's participation in a capacity building workshop in Nigeria on the climate change regime, for £2,800. FIELD has also provided £10,000 for VERTIC's collaboration on a range of environment activities.

The Board of Trustees confirmed Andreas Persbo as VERTIC Executive Director on 22 February 2010. Two interns joined us in March, Martin Groarke and Bill Eichler. Bill has recently completed his MA Middle Eastern Studies from University of Nottingham and Martin is a graduate of Dublin City University and holds a BA International Relations. They will be with us for a period of two months. David Cliff's internship period ended in February, after a very successful 3 month period. David was an outstanding intern and we are grateful for all his hard work.

- Unini Tobun

building trust through verification

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Andreas Persbo & Larry MacFaul

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