

## **52nd Pugwash Conference on Science and World Affairs**

*Science <—> Sustainability <—> Security*

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### **Report of Working Group 3**

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Working Group 3 discussed the strengthening of chemical and biological arms control treaties, as well as chemical, biological, and nuclear terrorism.

The group decided that the best way to discuss these topics in the sessions allotted was to hold five largely separate discussions on the following issues:

- [Strengthening the Chemical Weapons Convention \(CWC\)](#)
- [Strengthening the Biological and Toxin Weapons Convention \(BTWC\)](#)
- [Preventing chemical terrorism](#)
- [Preventing biological terrorism](#)
- [Preventing nuclear terrorism](#).

### **Strengthening the Chemical Weapons Convention**

The discussion began with a presentation on the implementation problems under the Chemical Weapons Convention (CWC), which just had its fifth anniversary. Currently, 174 states have signed the treaty, and 145 have ratified it, testifying to the popularity of complete chemical disarmament. The treaty is a watershed in disarmament verification, especially in terms of its on-site inspection provisions administered by the Organization for the Prohibition of Chemical Weapons (OPCW). However, States Parties must solve a range of implementation challenges if the treaty is to function effectively at prohibiting chemical weapons.

One working group presentation identified three far-reaching implementation problems that have arisen since the treaty's entry into force: noncompliance of certain states with the treaty's verification provisions, the predicted failure of certain states to meet an ambitious April 2007 deadline to destroy their CW

stockpiles, and atrophy of various treaty provisions because individual States Parties have not used them.

Several states have not complied fully with the CWC's provisions. The United States, for example, was cited as ratifying the CWC with significant conditions. This sets a poor example and precedent that other states may follow or exploit politically. Many states have yet to create a National Authority for domestic implementation of the treaty. Such noncompliance undermines the treaty.

It was noted that neglect of certain provisions has weakened the treaty regime. Challenge inspections have not occurred, yet were to have provided teeth to the CWC's verification regime. They serve as a contractual obligation that requires states to operate inside the treaty's institutions to pursue evidence of accused programs. Similarly, the General Purpose Criterion (GPC), a catchall for control of agents not scheduled under the convention, has not been applied vigorously in treaty interpretation.

The GPC was central to one point of concern raised about research on so-called non-lethal weapons (NLWs), including sedatives, retching agents, and psychoactive substances. While the treaty does allow for use of riot-control agents in non-combat and law-enforcement situations, the US appears to give itself the benefit of the doubt when interpreting the treaty, potentially allowing for the use of such agents in operations other than war. Some group members were aghast at such developments, saying they undermine treaties and that the "non-lethal" label is scientifically unsound in any case. Others were more open to NLWs, noting their potential practicality in peacekeeping and other military operations where armed individuals could be hiding in crowded areas or using hostages as human shields.

A range of proposed remedies arose from this discussion. While no particular proposal received a stamp of approval from the group, participants repeated three major points. First, the treaty's near-term responsibility is to ensure destruction of declared stockpiles, and to make every effort to do as much as possible before 2007, especially in Russia. Second, participants said that emphasis should be shifted from routine inspections, many of which could be carried out with automatic monitoring equipment such as that employed by UNSCOM. It was observed that this would free resources for challenge inspections and more direct challenges to treaty violators. Third, on a range of issues participants encouraged States Parties to adopt a more scrupulous interpretation of treaty provisions ranging from the General Purpose Criterion to the loophole provided for "riot control agents."

It was observed that at least one positive development has emerged from the CWC: the chemical industry's support for the treaty regime. This support persists, and appears critical to the success of any treaty where dual-use dilemmas may emerge.

## **Strengthening the Biological and Toxin Weapons Convention (BTWC)**

Discussion on strengthening the BTWC focused not only on the need for such a regime, but also on new biotechnology developments that, if left unfettered, could imperil the BTWC altogether. As with the CWC, less-than-scrupulous interpretation of treaty loopholes by States Parties was cited as a problem that could be a “treaty breaker.”

This discussion seemed based on the assumption that little progress will occur when the Fifth BTWC Review Conference resumes in November. The United States’ rejection of the Draft Protocol and its attempt to terminate the Ad Hoc Group’s mandate have left a leadership vacuum in Geneva. Given this, few new measures are expected besides limited biosafety and biocriminality measures of the type backed by the US and the UK. It was argued that these proposals, which are limited in scope, will be a useful basis for moving forward, but do not constitute an adequate protocol in themselves.

The group focused a great deal on emerging concerns. Among these was the threat from new biochemical techniques that could create a host of new weaponizable toxins. Using combinatorial techniques, industry is now screening 3 million chemicals per year; 50,000 of which are found to have highly toxic properties. Such techniques also yield “non-lethal” agents that could be weaponized. Unfortunately, the technology’s potential use for toxin synthesis presents another major challenge to both CWC and BTWC verification. Another group member raised concerns about recombinant DNA experiments, citing a research study in which a recombinant mouse poxvirus designed to serve as a delivery vehicle for contraceptive gene therapy for rodent control was inadvertently converted into a fatal pathogen. Abuse of genomics research is also a concern.

In light of the potential misuse of this new technology, it was proposed that these activities be regulated under existing treaties. Under the CWC, the OPCW could focus inspections on the discrete organic chemical (DOC) plants that employ biotechnology to produce toxic chemicals. A BTWC monitoring protocol could also take the risks of new developments into account.

Confronted with these thorny issues, participants noted that certain false dichotomies muddle efforts to bring substances under treaty control. One is the “lethal weapon” versus “non-lethal weapon” dichotomy. A group member noted that no chemical agent could be called non-lethal, since lethality is ultimately a function of the dose administered. Others questioned this dichotomy on the grounds that non-lethal substances not only would be indistinguishable from lethal agents in real time, but also would almost certainly be employed in tandem with lethal weapons, a clear violation of humanitarian principles. Another problematic dichotomy is the provision in the treaty distinguishing between offensive and

defensive purposes for possessing biological agents. Under the treaty, States Parties are able to conduct activities that are indistinguishable from offensive research and development but for the stated intent. US biodefense activities are particularly troubling in this regard.

Group members suggested a few steps to get BTWC verification back on track. One proposed measure was to use the British Green Paper on BTWC verification, which summarizes a number of politically viable options, as a basis for moving forward. The Ad Hoc Group remains a suitable forum for discussing a protocol. Even more critically, supporters of a strong BTWC protocol must elicit support of industries that would be affected, especially by winning support of such groups as the Pharmaceutical Researchers and Manufacturers of America. Such support may require compromises, but it was offered that useful provisions, including green-light challenge inspections and disease outbreak investigations, might be accepted by industry. Inconsistencies in inspection requirements would still have to be worked out—sectors from brewing to pharmaceuticals to education would likely be affected by BTWC inspections.

A widespread feeling prevailed that little progress will take place without increased US involvement. Many group members dismissed the idea of attempting an Ottawa-type process in lieu of US leadership.

### **Chemical and Biological Terrorism**

The group was uncomfortable with the word “terrorism,” believing that it requires careful definition. Group members did acknowledge that “terrorism” does usually encompass a manifestation of politically or ideologically driven violence. It was generally also used as a term of reference for the use of weapons against a population outside of a recognized combat situation. Rather than debating definitions, the group deliberated on the motivations for chemical and biological weapons use and the effects of such weapons.

Shying from the term “terrorism,” an analytical framework of armed violence was introduced as the basis for discussion. This framework was meant to serve as a model to identify the chain of events that would contribute to a chemical or biological attack, or, for that matter, any violent act and measure its effects. Four key determinants are at play in this framework:

- The potential of the weapon to cause the desired effect
- The number of potential users armed
- The vulnerability of the victim(s)
- The psychological potential for violence.

Each of these determinants is to some degree a function of the others. Two simple concepts make this framework useful. First, if any of these factors is measured at

zero, there will be no violent effect. Secondly, the psychological potential for violence is shaped by an individual's perception of the other three determinants. This framework was presented as a useful way, for example, to assess the sending of anthrax letters in the US last fall. Participants took this model as a point of departure to address the likelihood of use and the likely effects of biological or chemical weapons.

The question of the effects of CBW use, and their resulting attractiveness to non-state actors, was discussed. Participants agreed that chemical and biological weapons have a spectrum of effects, most of which could not be termed "mass destruction." Even the term "mass destruction," it was said, creates problems. How does one compare the effects of deliberately released smallpox, which could kill millions, and the more intense local effect of a nuclear explosion? These are but two manifestations of unconventional weapons use. The group questioned the value of labeling weapons types according to the damage caused.

Nor can effects simply be measured in terms of physical damage. Terror thrives on ignorance and sensationalism, both of which were served in heaping portions following September 11. Thus, an effect of anthrax letters was not only the people killed and the buildings quarantined, but also the widespread fear that any letter among billions could contain anthrax spores. Another noted consequence of the media feeding frenzy over the anthrax scare was an erosion of the norm against BW use.

Working group members agreed that several "bioterror" scenarios are cause for grave concern. For example, it was accepted that the deliberate release of smallpox or any other highly contagious and fatal disease would be a crime against humanity potentially leading to hundreds of thousands, if not millions of deaths. The deliberate release of a vaccine-resistant contagion is also worrying. At the same time, participants noted that no use of BW would be able to destroy human civilization, although it is feasible that some pathogens could cause 90 percent fatality rates, leading to a crisis unprecedented in human history.

Non-state use of chemical weapons prompted less discussion. While they would cause significant localized damage, they were not treated as a "megaterrorism" threat, to quote one participant. Participants said that CW remained a threat, particularly because they can be targeted more easily than biological agents, and their effects will not differ as significantly from one victim to another. Also, some chemical agents, such as chlorine and cyanide, are more manageable and more accessible than BW.

Some proposals to address the terror threat did come out of the working group. One was for states to prepare for attacks by strengthening public health and educating public in order to mitigate psychological effects of terror attacks. This

would entail expanded epidemiological research and monitoring as well. Another measure is for states to sign on to treaties establishing stiff penalties for biological weapons possession and use and maintaining tight control over pathogens. Participants also agreed on a treaty requiring states to establish stiff criminal penalties for possession and use of illicit biological agents.

## **Nuclear Terrorism**

Nuclear terrorism presents a range of unique problems that the group determined would be worth longer discussion. Nuclear terrorism encompasses the range of threats involving nuclear materials. Roughly in order of increase threat level, these are:

- Radioactive dispersion devices
- Attacks on nuclear power installations
- Acquisition or use of nuclear materials suitable for use in functioning nuclear explosive devices
- Acquisition or use of intact nuclear weapons.

The problem with the current response, especially from the United States, to this four-fold threat is that it is not the product of an effort to consider or compare the full range of nuclear terrorist threats. Participants argued that we must decide which threats will be a priority.

For example, the first threat, radioactive dispersal devices (RDDs), is more psychological than physical. The second, sabotage of nuclear power installations, is not a hypothetical threat, given cases of sabotage in the former Soviet Union. In one instance, a nuclear facility was subject to blackmail, in another, a plant security system was faced a planned computer virus attack. This threat is most acute where reactors are in urban areas. Russian blueprints for a maritime mobile power reactor based on highly enriched uranium (HEU) naval reactors are also problematic. The safety of facilities in Pakistan and India also prompted concern.

The third category, theft of fissile material, was also raised as a real concern, given its usefulness in fashioning a working nuclear device. In fact, it is a key choke point in nuclear weapons production. HEU can be easily incorporated into a crude gun-type nuclear device. However, programs to downblend HEU to a sub-weapons-grade level are moving slowly.

Fourth and finally, acquisition of functional nuclear weapons is a grave concern. Thousands of tactical nuclear weapons are in storage and not well protected, especially in Russia. Yet these weapons, which pose the greatest proliferation threat, are not subject to any legally binding transparency or verification mechanism that could ensure their security.

## **Recommendations for comprehensive action against nuclear terrorism**

The first two threats listed—radiological attacks and nuclear sabotage—merit attention, but could be addressed primarily by immediate safety measures and a public information campaign. In the short-term, screening of personnel could begin immediately at the world's nuclear facilities. In the intermediate term, fissile material controls should be enacted, as should controls on other radiological materials. One such proposal suggested that an international agency could be assigned to control of radioactive materials, especially in the nuclear fuel cycle.

Tactical nuclear weapons (TNWs) are vulnerable to theft. One participant said that more cooperative threat reduction funds, both from the US Nunn-Lugar program and foreign governments, should go to TNW dismantling. In fact, the US and Russia should adhere to their 1991 and 1992 agreements to take such weapons out of deployment.

The Nunn-Lugar programs received universal acclaim for their role in addressing the nuclear terrorism threat in the former Soviet Union and as a model for international initiatives against the global nuclear terrorism threat. The group lauded the US political commitment at the G8 to move forward with funding for CTR for at least another decade. However, this commitment to funding is marred by tricky accounting where funds already committed to CTR are being counted as “new commitments” to nonproliferation over the next ten years. The moneys under the G8 commitment could also occur through debt reduction linked to Russian nonproliferation support. Participants noted that the EU also deserved strong criticism for its failure to fund CTR efforts in the former Soviet Union. It was strongly urged that more money should go to accelerating HEU downblending.

On the international legal level, a draft convention against nuclear terrorism has been tabled by Russia. Other conventions apply to nuclear safety, each of which could be a part of the comprehensive plan of action.

## **Openness in Science**

To conclude discussion, participants questioned whether the technical feasibility of chemical, nuclear, or biological attacks should be explained in public fora. Participants agreed that responsible and realistic communication with the public is crucial before and after predictable unconventional weapons events. When properly informed, people will be less likely to panic over small threats. And if such an event happens to be severe, then the public still benefits from access to scientific knowledge by knowing how to respond.

The group generally concluded that the full spectrum of threats from nuclear, chemical, and biological weapons demands a domestic commitment from governments and a shared international response.