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SCIENTIFIC OPENNESS AND NATIONAL SECURITY AFTER 9-11

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The events of 11 September 2001 and the anthrax letters have reignited the longstanding debate over scientific openness and national security. And for the first time, the life sciences community is the focus of concern. Recent proposals for self-governance are unlikely to provide sufficient reassurance that information, in the words of the Corson Report, "not directly and significantly connected with technology critical to national security" is not disclosed. A more formalized system for considering the security implications of biodefence and other dual-use research, including specific criteria for making decisions on dissemination restrictions or classification, is needed in order to maintain support for the very endeavours on which both public health and national security depend.

Fear of bioterrorism has emerged as a priority concern of American security policy as a result of the anthrax letters of 2001. That event resonating with the September 11 terrorist attacks crystallized a much more urgent sense of threat than had previously been perceived. It is now commonly assumed that malicious organizations will attempt to exploit the destructive potential of biotechnology, and it is also implicitly conceded that a dedicated effort is likely to succeed.[1]

In response to this surge of fear, the American political system has sharply increased investment in biodefence research intended to provide protection against deliberate biological attack. Nowhere is this more true than at the National Institutes of Health (NIH), which has seen its funding for biodefence grow by over 3,200%, from $53 million in fiscal year 2001 to a record $1.8 billion (requested) in fiscal year 2006.[2] These funds have resulted in a 1,500% increase in the number of grants for research on anthrax, plague and other top biological warfare agents, from 33 between 1996-2000, to almost 500 between 2001 and January 2005.[3] This research is dedicated to determining the character and magnitude of potential threat in order to develop better methods of protection. But at least some of this effort will assuredly identify more advanced methods of attack as well.

That unavoidable fact poses a sharp dilemma and a fundamental problem of policy. By its very nature, biodefence research generates information that the global medical community has strong reason and arguably an inherent right to know. Unrestricted dissemination of that information, however, might inform those dedicated to destruction. Moreover, as in other areas of technology, it is likely that offensive applications of biotechnology will prove to be substantially easier than defensive ones and could therefore emerge more rapidly in open competition.

In principle, the dilemma might be substantially mitigated by a new oversight system under which sensitive information vital to public health protection is restricted to those professionally qualified and explicitly authorized to have it and those individuals are in turn monitored to document responsible use. Such an arrangement does not exist within any country or internationally, however, and is not as yet even being officially discussed. But for such an arrangement to be effective at any level, there is a need to devise principles to guide decisions on whether to restrict or classify information. Fortunately, there are useful precedents in that regard.

Evolving Practice

In the past, all NIH-funded research has been unclassified. But in October 2001, President Bush signed an Executive Order extending classification authority to the Department of Health and Human Services, which includes NIH. Anthony Fauci, who heads the NIH institute responsible for biodefence research, later said that although most NIH-funded research would remain unclassified, some limitations on access could not be ruled out. "As we move into more research on counter-bioterrorism," Fauci said, "we should examine this issue on a case-by-case basis".[4]

By the spring of 2002, it was clear that the Bush Administration was seriously considering the possibility of restrictions on the dissemination of scientific findings that could have national security implications — what has been called "sensitive but unclassified" information. In a memorandum to federal agencies in March, White House

Chief of Staff Andrew Card raised the need to protect sensitive but unclassified information.[5] At the same time, the US Department of Defense (DOD) circulated a draft directive containing proposals for new categories of controlled information and for prepublication review of certain DOD-funded research, even if it was unclassified.[6] Because of strong criticism from the scientific community, the Pentagon draft was withdrawn. However reports continued to emerge about White House plans to develop rules for the dissemination of information that could have national security implications.

US scientific organizations moved quickly to minimize the possibility of government-mandated restrictions on fundamental research, offering governance by scientists themselves as an alternative. In August 2002, the American Society for Microbiology (ASM), which publishes eleven leading US peer-reviewed scientific journals, adopted guidelines for handling manuscripts dealing with sensitive microbiological issues. As part of the traditional peer-review process, all reviewers were now required to inform the Editor of any manuscript that contained information on methods or materials "that might be misused or might pose a threat to public health safety". Any manuscript thus identified would be held until a decision concerning its disposition had been rendered by the Editor-in-Chief in consultation with the ASM Publication Board.[7] As Board Chairman Samuel Kaplan later described it, the goal was to establish a practice for trying to prevent the publication of information that could be a "clear and imminent danger to the public".[8] A few months later, the *Proceedings of the National Academy of Sciences* (PNAS) quietly adopted a similar review process for biological agents that had been identified by the Centers for Disease Control and Prevention as posing the highest security risk.[9]

By October 2002, the Presidents of the National Academies of Science were weighing in, declaring in a formal statement that a balance was needed between the restrictions necessary to safeguard "strategic secrets" and the openness required to accelerate the progress of technical knowledge. The NAS Presidents called upon scientists and policymakers to work together to develop clear criteria for determining what information needed to be restricted or classified and how best to accomplish that task.[10]

In January 2003, in response to a request from ASM, the National Academy of Sciences hosted a day-long meeting of scientists and security experts to begin to explore how to balance openness and national security. Scientific journal editors were generally dismissive of the idea that any research should be publicly withheld. But others cautioned that unless scientists took the lead in defining what was sensitive and proposing how it could be protected, the government would act. If scientists do not take these security concerns seriously, former Deputy Secretary of Defense John Hamre warned, politicians with little understanding of science will step in with "blanket restrictions" that would have "devastating effects on the conduct of science".[11]

The following day, thirty journal editors and scientists agreed in a signed statement to support the development of new processes for considering the security implications of proposed manuscripts and, where necessary, to modify or refrain from publishing papers whose potential harm outweighed their potential benefits. In an editorial accompanying release of the statement, the PNAS elaborated upon the thinking behind the effort. No one would publish a "cookbook recipe" for a weapon, which would in any event not pass scientific muster. But it is nearly impossible, the editorial said, to determine in advance exactly what type of manuscript should not be published, as any work of value to terrorists would also be of value in countering terrorism. For this reason, the journal editors had focused on developing a common set of publication policies.[12] But as Stanford Professor Stanley Falkow later pointed out, the journal editors had failed to provide guidance not only on who exactly would make these publication decisions but also what information constituted a potential threat.[13]

Precedents and Possible Guidelines

The need to balance scientific openness and national security is not a new issue. As former ASM president Ron Atlas has noted, since the beginning of modern science in the 1600s, scientists have confronted questions of secrecy and science. In an essay in 1626, Sir Francis Bacon observed: "And this we do also; we have consultations, which of the inventions and experiences which we have discovered shall be published, and which not; and take all an oath of secrecy for the concealing of those which we think fit to keep secret…"[14]

During the Cold War, concerns that the Soviet Union had benefited militarily from access to US scientific and technical information, especially in computer science and other areas of the physical sciences, prompted discussions not unlike today's about possible restrictions on scientific communication, including prepublication review by the Pentagon of research in certain areas relevant to national security. In response, the National Academy of Sciences convened an expert panel under the chairmanship of former Cornell University President Dale Corson to examine how to balance scientific communication and national security. The Corson Report, which was published in 1982, concluded that the national welfare, including national security, is best served by allowing the free flow of all scientific and technical information "not directly and significantly connected with technology critical to national security". Accordingly, the report recommended that most fundamental research at universities should be unclassified; that a limited amount might require classification; and that a small grey area could require limited restrictions short of classification.[15]

The Reagan Administration accepted the Corson Report recommendations, embodying them in National Security Decision Directive189, which stated: "to the maximum extent possible, the products of fundamental research [shall] remain unrestricted.... No restrictions may be placed upon the conduct or reporting of federally-funded fundamental research that has not received national security classification, except as provided in applicable US Statutes". NSDD189 defined fundamental research as "basic and applied research in science and engineering, the results of which ordinarily are published and shared broadly within the scientific community…"[16]

Following the controversy over the Card memo, the President's Science Advisor, John Marburger, publicly reaffirmed the Bush Administration's commitment to NSDD 189,[17] referring to an earlier letter from National Security Advisor Condoleezza Rice. "The key to maintaining US technological preeminence is to encourage open and collaborative basic research," Rice wrote in November 2001. "[T]he policy on the transfer of scientific, technical, and engineering information set forth in National Security Decision Directive 189 shall remain in effect, and we will ensure that this policy is followed."[18]

In addition to upholding the principle of scientific openness, the Corson Report also outlined criteria for making classification decisions in fundamental research, criteria that could serve as a model for classification decisions in the life sciences, including biodefence research, today. Admittedly, the context is very different: the Soviet Union as compared to a much more diffuse set of national and possibly subnational actors; the physical sciences as compared to the life sciences. But no US adversary, much less terrorist group, that exists today is better capable than the Soviet Union was of adapting fundamental research results for military purposes. If these criteria were deemed by the NAS as appropriate to deal with the Soviet military threat, they should be at least as effective against the much less sophisticated adversaries we currently face.

Drawing on the Corson Report, one could establish the principle that no basic or applied research, including biodefence research, at university, industry or government labs should be restricted or classified unless the following criteria are met:

1. the technology is developing rapidly and time from basic science to application is short;
2. the technology has identifiable direct military applications; or it is dual-use and involves process or production related technologies;
3. the transfer of technology would give a BW proliferator (e.g. a nation-state or subnational group) a significant near-term military benefit;
4. the US is the only source of information about the technology, or other nations that could also be the source have control systems as secure as those in the US; and,
5. the duration and nature of the proposed restrictions would not seriously compromise existing public health practice.

There are two main differences between these criteria and those outlined in the Corson Report: the term "Soviet Union" has been replaced by "BW proliferator;" and a fifth criterion has been added to take account of the public health implications of any proposed restrictions.

Whether it is possible to identify a more specific list of fundamental research for which restrictions or classification is warranted is unclear. One proposal, in 2003, included the following examples: alterations in virulence that defeat vaccine; alterations that greatly accelerate disease course or delay diagnosis; engineering drug resistance; and, delivery systems.[19] But this and other proposals like it are far too broad, and would capture a wide swath of fundamental research critical to future medical, agricultural and other peaceful applications.

Interestingly, a much more limited approach to the classification of biodefence information has been promulgated by the US Army. In Army regulation 380-86, dated 1 February 2005, only one area of research is proposed for classification: the results of medical research revealing operational deficiencies or vulnerabilities in biological defence. By comparison, the identity of microorganisms and toxins being studied, their characteristics, and the consequences of their administration to appropriate hosts is considered unclassified information, as is general medical research and procedures for protecting personnel against biological agents.[20]

There are sound scientific reasons for avoiding dissemination restrictions or classification in the life sciences, including in the area of biodefence research. As the NAS has noted, none of the research that has been the focus of recent attention has pointed the way toward the production of biological weapons in any specific way. Many additional experimental steps are required in order to translate basic research results into a useable biological warfare agent, much less an actual weapon.[21] In addition, as the rapid response to SARS showed, scientific progress depends upon open communication and the ability to replicate research and validate results. Restrictions on the flow of scientific information will undermine not only efforts to develop defences against biological weapons but also to protect the public against the threat from naturally occurring disease. New restrictions could also have a chilling effect on the willingness of scientists to work in areas in which there are limits on their ability to communicate with other scientists and to publish their research results.[22]

There are also compelling security reasons for avoiding restrictions or classification, especially in the area of biodefence research. As Mark Wheelis has pointed out, secrecy about the nature and scope of US biodefence efforts makes it more difficult for Congress to exercise its oversight responsibilities and limits opportunities for expert or public input into the policymaking process. The result could be policies that fail to address the real threats facing the United States. Limits on the dissemination of information about US biodefence research activities could also raise suspicions about US intentions to comply with the Biological Weapons Convention (BWC), thus leading others to pursue the very illicit activities the US programme is designed to counter. Lack of openness on the part of the US could also serve as a justification for others to be more secretive about their own purported biodefence activities, thereby complicating US efforts to detect genuine violations of the BWC. Finally, limits on the dissemination of biodefence information denies the US the deterrent value that comes from an adversary being aware of the robust nature of US biodefence preparations.[23]

Many of these arguments are similar to those made in the 1980s by US officials concerned about secrecy at Soviet biological institutes, including the possibility that Moscow was using recombinant DNA technology for offensive BW purposes. At a 1988 roundtable, ACDA official Robert Mikulak stated that there was "no justification" for secret biological research labs or classified research. He also argued that openness could help reduce suspicions of noncompliance with the Biological Weapons Convention. At the same meeting, DOD official Thomas Dashiell argued that by making DOD biodefence efforts "visible," the programme could act as a deterrent to potential adversaries.[24]

Both Mikulak and Dashiell also disavowed the need for classified research involving recombinant DNA technology. "There is no justification for classified military research on recombinant DNA … anywhere," Mikulak declared. Dashiell agreed, noting that classification was unnecessary because the relevant work involved "basic science areas" and the possible application was a number of years away.[25]

Classification and Oversight Mechanisms

If certain types of fundamental research in the life sciences are to be reviewed for possible dissemination restrictions or classification, however limited in scope, how might this best be pursued?

One possibility would be to rely upon scientific journals to review manuscripts, as proposed in the February 2003 statement by journal editors and scientists. This is also the

approach recommended in October 2003 by an expert panel convened by the National Research Council under the chairmanship of MIT professor Gerald Fink. In their report, *Biotechnology Research in an Age of Terrorism*, the Fink Committee argued that "imposing mandatory information controls on research in the life sciences, if attempted, [would] be difficult and expensive with little likely gain in genuine security". As a consequence, the Committee recommended self-governance by scientists and scientific journals to review publications for their potential security risks.[26]

The Fink Committee recognized, however, that scientists have available to them many other opportunities for sharing the results of their research efforts short of publication. This includes presentations at scientific meetings, Internet postings, and normal e-mail and other exchanges between scientists working in similar areas. For this and other reasons, the Committee called for a concerted effort to educate scientists about the dual-use nature of biotechnology research. They also recommended adding seven so-called "experiments of concern" to the NIH Guidelines, the oversight process which is to be followed by all academic and other institutions that receive funding from NIH for recombinant DNA research. In the view of the Committee, this layered system of self-governance, involving individual scientists, the local and national committees responsible for implementing the NIH Guidelines (known respectively as Institutional Biosafety Committees and the Recombinant DNA Advisory Committee), and journal publishers, would provide an effective oversight arrangement. In March 2004, the Bush Administration announced plans to create a National Science Advisory Board for Biosecurity to develop guidelines for implementing these recommendations. But the Board, which has yet to be named or to hold its first meeting, is strictly advisory and both industry and classified research are formally outside its jurisdiction.[27]

Another possibility would be to rely upon a more formalized process for considering potential dissemination restrictions or classification requirements before funding has been approved and the research begun. This is the approach enshrined in NSDD 189, which states: "Each federal government agency is responsible for … determining whether classification is appropriate prior to the award of a research grant, contract, or cooperative agreement".[28] It is also reflected in the broader oversight proposal we have been developing at the Center for International and Security Studies at Maryland aimed at preventing advanced research in the life sciences from being applied, either inadvertently or deliberately, for destructive purposes.[29]

Under our proposed oversight system, all proposals in certain clearly defined research areas would go through a peer review process in which the potential scientific, medical, or other benefits are weighed against the potential security risks. Consideration would be given not only to whether and under what conditions the proposed research should proceed but also the possible need for restrictions on the dissemination of the research results, including through classification. This peer review process would be applied comprehensively to all relevant institutions, whether government, industry or academic. This is in contrast to the Fink Committee approach, which formally would apply only to academic or other institutions that are subject to the NIH Guidelines. Thus, neither industry nor government biodefence programs, which the Fink Committee singled out as raising particular dual-use concerns, would be required to adhere to its proposed rules.

To encourage compliance with our oversight system and adequate funding for its implementation, the obligations would be mandatory, unlike the Fink Committee approach, which relies on the voluntary compliance of scientists with the NIH Guidelines. And consistent with the globally distributed nature of the research itself, our system would seek to establish uniform procedures and rules among all participating countries. The Fink Committee recommendations, by comparison, apply only to the United States, although the Committee acknowledged in its report that only internationally harmonized standards would minimize the risk of misuse of dual-use research.

Like the NIH Guidelines, our oversight system would be tiered, with the level of risk of the proposed research determining the nature and extent of the oversight requirements. At the foundation would be a local review body, responsible for overseeing and approving what we call potentially dangerous research activities, particularly those that increase the potential for otherwise benign pathogens to be used for destructive purposes. This local oversight body would be similar to the existing Institutional Biosafety Committees, though better resourced, both financially and in terms of dedicated personnel.[30] The vast majority of research would fall into this category or not be affected at all.

At the next level there would be a national review body, which would be responsible for overseeing and approving what we call moderately dangerous research activities, particularly those that would enhance the weaponization potential of pathogens or toxins that already have been identified as posing a security threat. This national oversight body would be similar to the Recombinant DNA Advisory Committee.

At the top would be a global implementing body, which would be responsible for overseeing and approving the most dangerous research activities, especially research that involves or could result in the creation of pathogens significantly more dangerous than those that currently exist. The closest precedent for this would be the WHO Advisory Committee on Variola Virus Research, which oversees and approves all smallpox virus research conducted in the USA and Russia, the only countries authorized to retain the virus following its successful eradication in nature.

If the relevant peer review body determined that the results of a particular research project needed to be restricted, every effort would be made to share the restricted information with other scientists with a legitimate need-to-know. One model for this is the process that was used by the NAS to allow limited access to certain portions of its 2002 study on agricultural bioterrorism. In response to security concerns from the Department of Agriculture, which funded the study, NAS officials developed guidelines for the types of individuals who could be given access to the controlled information. Anyone interested had to submit a written request and be interviewed by NAS staff before being provided a copy of the controlled information.[31] It might also be possible to use a secure, password-controlled website to make controlled information available to those who have been vetted and found to have a legitimate need for access to the information.[32]

Clearly, the success of an oversight system like that described above depends very heavily on the willingness of the scientific community to help develop and implement the procedures and rules that are at the heart of the system. But security experts will also be critical to the peer review process, especially at the national level, where most biodefence research proposals likely would be vetted. Security clearances

may be necessary for some or all of the individuals that serve on the national oversight body. Nondisclosure agreements, with appropriate penalties for violations, could also be used to help prevent unauthorized disclosures of sensitive information. And at every level, independent scientists and security experts, without a vested interest in the outcome of the review process, would be required to help ensure the integrity of the overall system.

Notes

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[2] In addition to basic research, these figures also cover construction of new biosafety laboratories and development of medical countermeasures. Prepared Testimony of Anthony Fauci, Director, National Institute of Allergies and Infectious Diseases, Senate Committee on Health, Education, Labor & Pensions, 8 February 2005, available at http://help.senate.gov/testimony/t184_tes.html

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[9] Nicholas R Cozzarelli, "PNAS policy on publication of sensitive material in the life sciences", *Proceedings of the National Academy of Sciences*, 18 February 2003, available at http://www.pnas.org/cgi/content/full/100/4/1463?etoc

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[16] "National Policy on the Transfer of Scientific, Technical and Engineering Information", (NSDD 189), 21 September 1985, available at http://www.fas.org/irp/offdocs/nsdd/nsdd-189.htm

[17] Remarks by John Marburger at Scientific Openness and National Security Workshop, National Academy of Sciences, Washington, DC, 9 January 2004.

[18] Condoleezza Rice Letter to Dr Harold Brown, co-Chairman, Center for Strategic and International Studies, 1 November 2001, available at http://www.aau.edu/research/Rice11.1.01.html

[19] Stephen S Morse, "Bioterror R&D: Assessing the Threat", powerpoint presentation at Scientific Openness and National Security Workshop, National Academy of Sciences, Washington, DC, 9 January 2004.

[20] US Department of the Army, "Classification of Former Chemical Warfare, Chemical and Biological Defense, and Nuclear, Biological, and Chemical Contamination Survivability Information" (Army Regulation 380-86), 1 February 2005, available at http://www.fas.org/irp/doddir/army/ar380-86.pdf

[21] Cozzarelli, "PNAS policy on publication of sensitive material in the life sciences", 18 February 2003; and US National Academies of Science, "Background Paper on Science and Security in an Age of Terrorism", 18 October 2002, available at http://www4.nationalacademies.org/news.nsf/isbn/s10182002?OpenDocument.

[22] At least one of the Principal Investigators for the most contentious experiments – mousepox, smallpox protein, and poliovirus – has left the field because of the controversy surrounding publication of the work. Private communication, 3 March 2005.

[23] Mark Wheelis, "Transparency and Biodefense", unpublished powerpoint presentation, 5 December 2003. See also, Jeanne Guillemin, "National Security and Biodefense: Is There a Case for Full Transparency?" 21st Workshop of the Pugwash Study Group on the Implementation of the Chemical and Biological Weapons Conventions, Geneva, 4-5 December 2004.

[24] "Biological Warfare Issues Weighed", *ASM News*, vol 54 no 7, 1988.

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[26] National Research Council, *Biotechnology Research in an Age of Terrorism*, (Washington, DC: National Academies Press), Oct. 2003, available at http://www.nap.edu/books/0309089778/html/

[27] Information on the NSABB, including its charter, is available at http://www.biosecurityboard.gov/index.htm

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[29] John Steinbruner and Stacy Okutani, "The Protective Oversight of Biotechnology", *Biosecurity and Bioterrorism: Biodefense Strategy, Practice, and Science*, vol 2 no 2, 2004, available at http://www.liebertonline.com/doi/pdf/10.1089/bsp.2004.2.273; and John D Steinbruner and Elisa D Harris, "Controlling Dangerous Pathogens", *Issues in Science and Technology*, vol 19 no 3 (Spring 2003), available at http://www.issues.org/19.3/steinbruner.htm

[30] The limitations of the current Institutional Biosafety Committees has been documented in Sunshine Project, "Mandate for Failure: The State of Institutional Biosafety Committees in an Age of Biological Weapons Research", 4 October 2004, available at http://www.sunshine-project.org/

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Progress in The Hague *Quarterly Review no 49*

Developments in the Organization for the Prohibition of Chemical Weapons

The major event during the period under review was the thirty-ninth session of the Executive Council, which met for only one day, 14 December 2004. Libya's combined plan for conversion and verification of the chemical weapons production facilities (CWPFs) Rabta Pharmaceutical Factories 1 and 2 (phase II) was approved, along with several facility agreements for on-site inspections at the Category 2 Al-Jufra chemical weapons destruction facility (CWDF), Ruwagha chemical weapons storage facility (CWSF), CWPF Tripoli STO-001 and for the Rabta Pharmaceutical Factories. In addition, it was reported on 31 January that a change to Part V of the Verification Annex to the Chemical Weapons Convention (the Convention or CWC) had been adopted. This change, further to a request by Libya, removes a procedural block in order to permit states parties joining the Convention after 29 April 2003 to convert former CWPFs for purposes not prohibited under the Convention.

Implementation of the Article VII action plan has become one of the Organisation's overriding concerns this year and the pace of activity will continue to gain speed in advance of the tenth session of the Conference of the States Parties where further steps will be taken on this matter, if necessary.

Thirty-ninth Session of the Executive Council

The Executive Council met for its thirty-ninth session on 14 December and was chaired by José Antonio Arróspide of Peru.

The Vice-Chairmen and coordinators for clusters of issues reported to the Council on informal consultations during the intersessional period as follows: Benchaâ Dani of Algeria, on chemical weapons issues; Mustafa Kamal Kazi of Pakistan on chemical industry and other Article VI issues; Marc Th. Vogelaar of the Netherlands on administrative and financial issues; and Kirill Gevorgian of Russia on legal, organisational, and other issues. The Chairman reported on his activities on behalf of the Council during the intersessional period.

The Director-General began his opening statement to the last regular session of the Council for 2004 by expressing gratitude and satisfaction with the work of the OPCW and its the programme and budget for 2005. Mr Pfirter noted that the Council's relevant recommendations and suggestions regarding the budget will guide the Secretariat's work on the one for 2006.

Turning to verification, the Director-General observed that several decisions were before the Council including ones deferred from the previous session as well as decisions relating to facility agreements with Libya and a CWDF in India. Mr Pfirter discussed Libya's preparations for the destruction of its Category 1 weapons and noted that destruction of its Category 2 weapons would begin in December. It was noted by the Director-General that nearly three times as much lewisite is being destroyed now at Unit 1 of the Gorny CWDF due to a technical modification in the destruction process. Mr Pfirter also remarked that 48 per cent of the stockpile of a state party of withheld identity has now been destroyed. In respect of optimisation, Mr Pfirter observed that, in the United States, optimisation of verification is underway at the Anniston Chemical Agent Disposal Facility, including the successful completion of its first round of munitions destruction under an optimisation trial. He added that optimisation at a CWDF in India is being discussed and that talks are also underway with Russia, including discussions on the possible optimisation of verification activities at the future CWDFs in Kambarka and Maradikovsky.

With regard to international cooperation, the Director-General noted that recent events were held in Argentina, Bangladesh, Kenya, Singapore, and Uruguay under the OPCW's Conference Support Programme. Particular attention was drawn to the Fourth Singapore International Symposium on Protection against Toxic Substances, which Mr Pfirter attended, held in Singapore during 6-10 December. The Director-General also observed that 15 projects were sponsored in 2004 in several states parties with developing economies under the Programme for Support of Research Projects. In respect of assistance and protection, Mr Pfirter expressed his satisfaction with the adoption of a decision by the Conference on the format for submission of information about national protection programmes. Brief mention was also made of the upcoming ASSISTEX 2 to be held in Ukraine. National capacity-building was discussed by the Director-General, including thirteen courses for first responders in as