

**NOTE BY THE DIRECTOR-GENERAL****RESPONSE BY THE DIRECTOR-GENERAL  
TO THE REPORT OF THE SCIENTIFIC ADVISORY BOARD  
ON DEVELOPMENTS IN SCIENCE AND TECHNOLOGY  
FOR THE THIRD SPECIAL SESSION OF THE CONFERENCE OF  
THE STATES PARTIES TO REVIEW THE OPERATION  
OF THE CHEMICAL WEAPONS CONVENTION****INTRODUCTION**

1. Following the practice adopted by the First and Second Special Sessions of the Conference of the States Parties to Review the Operation of the Chemical Weapons Convention (hereinafter “the First Review Conference” and “the Second Review Conference”),<sup>1</sup> the Director-General has asked the Scientific Advisory Board (SAB) to prepare a report on relevant developments in science and technology that States Parties to the Chemical Weapons Convention (hereinafter “the Convention”) may wish to take into account in their review of the operation of the Convention, as provided for in paragraph 22 of Article VIII. In order that States Parties received the views of the SAB as soon as possible, the Director-General has already forwarded the report of the SAB to the States Parties (see RC-3/DG.1, dated 29 October 2012).
2. With a view to assisting States Parties in their review of the Convention, particularly with regard to any changes of policy that might be necessary on the basis of scientific and technological developments, the Director-General, again following established practice, provides his assessment in this Note.
3. The Director-General wishes to use this opportunity to express his gratitude to the SAB for its valuable and thoughtful contribution to preparations for the Third Special Session of the Conference of the States Parties to Review the Operation of the Chemical Weapons Convention (hereinafter “the Third Review Conference”). The Director-General notes that this report was the result of extensive deliberations within the SAB, which made use of a wide range of inputs from the global scientific community.
4. The SAB has organised its findings into three main sections: Part A: “Issues that may impact the scope of the implementation of the Convention”; Part B: “Issues related to the Technical Secretariat”; and Part C: “Analysis of developments in science and technology relevant to the Chemical Weapons Convention”. This Note by the

<sup>1</sup> See RC-1/DG.2, dated 23 April 2003, and RC-2/DG.1, dated 28 February 2008 and Corr.1, dated 5 March 2008.



Director-General focuses on the main findings of the SAB contained in Parts A and B of its report, but also draws upon the substantive analysis by the SAB contained in Part C.

## **ISSUES THAT MAY IMPACT THE SCOPE OF THE IMPLEMENTATION OF THE CONVENTION**

### **The convergence of chemistry and biology**

5. The Director-General agrees with the SAB that the growing convergence of chemistry and biology, and indeed of other sciences, may affect the future implementation of the Convention and that this is an important area to keep under review. These advances in the convergence of the sciences promise major benefits, including increased protection against chemical weapons, improved medical and health care, more efficient food production, the development of renewable energy resources, and enhanced pollution management. However, there is also the potential that such developments could be misused for the production of toxic chemicals (including toxins and bioregulators) for use as chemical weapons.
6. The convergence of chemistry and biology has also been noted by the States Parties to the Biological Weapons Convention (BWC) at their Seventh Review Conference in December 2011.<sup>2</sup> While the two treaties are and will remain separate legal regimes, many scientific advances affect both treaties in a similar manner.
7. The Director-General wishes to submit the following recommendations to the Third Review Conference, which
  - (a) may wish to acknowledge that, based on the work of the SAB and its temporary working group (TWG), the convergence of chemistry and biology and other sciences is a development that will likely pose both challenges and opportunities for the Convention;
  - (b) could note that this is a field of rapid advances and therefore requires systematic monitoring by the Secretariat and by the SAB. The Third Review Conference could also encourage States Parties to submit their own assessments of the convergence of the sciences; and
  - (c) may wish to recommend increased interaction between technical experts in chemistry and biology.

### **Nanotechnology**

8. The SAB identified nanotechnology as an important emerging technology that potentially might have an impact on the Convention. As with the convergence of chemistry and biology, nanotechnology will first and foremost bring many benefits to States Parties, including in terms of improved counter-measures against chemical weapons. However, concerns have been raised that advances in nanotechnology, perhaps especially in combination with other developments, could pose a risk to the object and purpose of the Convention. While it would appear that the Third Review

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<sup>2</sup>

Paragraph 49 of Part II of BWC/CONF.VII/7, dated 13 January 2012

Conference need not take any specific action on this topic, the Director-General suggests that this conference might wish to recognise that nanotechnology be kept under review.

### **Schedules of chemicals and related advice**

9. In its report, the SAB once again stressed the importance of the comprehensive nature of the prohibitions enshrined in the Convention (the “General Purpose Criterion”) and the fact that all potential candidate chemicals fall within its scope. The Director-General concurs and believes that it is particularly important in the context of preventing the future re-emergence of chemical weapons and the misuse of toxic chemicals. The Secretariat will continue to monitor developments relating to unscheduled and novel toxic chemicals and will explore ways in which to augment its technical capabilities in this area.
10. The Third Review Conference might, therefore, wish to reaffirm the comprehensive nature of the Convention’s prohibitions and their application to any toxic chemical, except where such a chemical is intended for purposes not prohibited by the Convention, and as long as the types and quantities involved are consistent with such purposes.
11. The SAB’s report recalled the recommendations from the Fifteenth Session of the SAB regarding exemptions from the current 30-day notification period for transfers of certain Schedule 1 chemicals. As expressed in his response to the SAB’s report from that session (see paragraph 12 of EC-61/DG.6\*, dated 25 May 2010), the Director-General believes that further analysis from the legal and technical point of view would be required on this matter. The Secretariat intends to undertake such further analysis, on the basis of which States Parties could subsequently discuss policy options.

### **Implementation of Part IX of the Verification Annex**

12. The Director-General would like to draw the attention of States Parties to the SAB’s view that “any process designed for the formation of a chemical substance should be covered by the term ‘produced by synthesis’”,<sup>3</sup> a term that is used in Part IX of the Verification Annex to the Convention (hereinafter “the Verification Annex”). This view reaffirms the SAB’s 1999 recommendation that the term “produced by synthesis”, should include biologically mediated processes.<sup>4</sup> The SAB noted that, since 1999, there has been an increasing trend towards the commercial production of bulk chemicals by means of biological processes. Today, declaration practices vary greatly among States Parties.
13. The Secretariat will analyse this situation further to assess the relevance of facilities producing bulk chemicals by means of biological processes to the object and purpose of the Convention and will propose policy options that ensure consistency between States Parties.

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<sup>3</sup> Paragraph 10 of RC-3/DG.1

<sup>4</sup> See paragraph 2.3 of SAB-II/1, dated 23 April 1999.

14. The Third Review Conference may wish to consider this issue and recommend further steps. Complementary studies by States Parties or relevant organisations could also prove useful.

#### **Incapacitating chemical agents**

15. Since the Second Review Conference, the SAB has conducted a thorough review of the issue of incapacitating chemical agents (ICAs). The Director-General would like to draw the attention of States Parties' to the SAB's assessment that the technical discussion on the potential use of toxic chemicals for law-enforcement purposes has been exhaustive. Regarding the SAB's recommendation that the Secretariat "start preparations for verification activities",<sup>5</sup> the Secretariat will pursue efforts to enhance its chemical-analysis capabilities and will work with designated laboratories on this issue.
16. On the margins of the Seventeenth Session of the Conference of the States Parties, several presentations were given by various entities on the subject of ICAs. Given the SAB's assessment of the technical discussion, States Parties might consider using the Third Review Conference as an opportunity to further discuss the broader implications of the use of toxic chemicals for law-enforcement purposes.

#### **Captive use of Schedule 1 chemicals**

17. The Director-General is grateful to the SAB for the study which it undertook on the subject of the captive use of Schedule 1 chemicals. The Director-General believes that this is an important issue about which the chemical industry needs to be informed through the National Authorities.
18. The Third Review Conference may wish to request States Parties to share the relevant information with their chemical industry and to report other examples of captive use of Schedule 1 chemicals to the Secretariat.

#### **Formation of Schedule 1 chemicals as by-products/impurities**

19. The Director-General agrees with the SAB's assessment that it is technically feasible that some Schedule 1 chemicals could be formed through impurities in low concentrations during industrial production.
20. The Third Review Conference may wish to encourage States Parties to assess if some Schedule 1 chemicals could occur in certain types of their industries.
21. The Director-General in this regard wishes to recall that the production of any Schedule 1 chemical, irrespective of its concentration, shall be subject to the restrictions, declarations, and inspections set forth in Article VI and in Part VI of the Verification Annex. The Director-General acknowledges the SAB's assessment that it is impractical to isolate Schedule 1 by-products in low concentrations and that they therefore pose no threat to the object and purpose of the Convention. However, as the SAB notes, such by-products may have to be taken into consideration from a regulatory perspective. One way in which this could be done is through the

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<sup>5</sup> Paragraph 13 of RC-3/DG.1

establishment of a low-concentration limit for Schedule 1 chemicals (as already implemented by some States Parties), which could be achieved through various mechanisms.

22. The Director-General suggests that the Third Review Conference may wish to encourage States Parties to further discuss this regulatory aspect.

#### **On-site and off-site analysis**

23. The Director-General notes with satisfaction the SAB's view that significant progress has been made since the Second Review Conference in the OPCW's ability to verify the presence or absence of toxic chemicals through on-site and off-site analysis. The Director-General would like to express his gratitude to the SAB, particularly to its TWG on sampling and analysis (S&A), for its important contribution to progress in this area.
24. Progress has been most notable in the areas of analysis criteria for saxitoxin and ricin, of analysis criteria for trace analysis, and of methods for analysis of biomedical samples. The Secretariat is already implementing many of the recommendations of the SAB in these areas, and others will be implemented in the near future. For example, the Secretariat has been conducting confidence-building exercises for the analysis of biomedical samples and, as the SAB has recommended, future such exercises will progress towards the more difficult analysis of longer-lived biomarkers of exposure, such as protein adducts.
25. The Third Review Conference may wish to note the importance of continuing to improve on-site and off-site analysis.

#### **OPCW proficiency-testing programme**

26. The Director-General agrees that the proficiency-testing programme has played a key role in establishing the network of designated laboratories for the off-site analysis of authentic samples. He notes the SAB's recommendation that a review of the proficiency-testing programme be undertaken.
27. The Third Review Conference may wish to also note this recommendation and consider how it should be taken forward.

#### **Education and outreach in science and technology**

28. The Director-General agrees with the SAB that education and outreach is a critical element in the prevention of the re-emergence of chemical weapons and the misuse of toxic chemicals. The TWG on education and outreach has made a number of proposals at its first two meetings, some of which are already being implemented. States Parties may wish to refer to the TWG's reports in their review of this topic. The Director-General wishes to submit the following recommendations to the Third Review Conference, which:
  - (a) could recommend that increased efforts be made nationally, regionally, and internationally to ensure that all those engaged in chemistry are aware of the Convention and its prohibitions and obligations;

- (b) may wish to encourage States Parties to include information on the Convention in medical, scientific, and military educational materials and programmes;
- (c) could encourage States Parties to promote the development of training and education programmes for individuals who have been granted access to toxic chemicals, in order to raise awareness of the risks, as well as of the obligations of States Parties under the Convention; and
- (d) could call upon States Parties to support and encourage the development, promulgation, and adoption of codes of conduct and other voluntary measures by the relevant stakeholders.

## **ISSUES RELATED TO THE TECHNICAL SECRETARIAT**

### **Strengthening Secretariat efforts to stay abreast of developments affecting industry**

- 29. The Secretariat is augmenting its capabilities to monitor developments in science and technology and to provide advice to the Director-General. The Secretariat will seek advice from the SAB on the feasibility of establishing a systemic approach to tracking and evaluating advances in science and technology, given the pace at which these advances are occurring.

### **On-site and off-site analysis**

- 30. The Director-General agrees with the SAB that it is important to regularly practise the entire process of off-site analysis. Although no off-site analysis has yet been undertaken in a designated laboratory, the ability to do so is an important element of the Convention's verification regime, and is particularly significant in the context of challenge inspections and investigations of alleged use.
- 31. Due to the significant costs involved in conducting such exercises, the Director-General suggests that the Third Review Conference consider recommending that resources be made available to enable regular exercises of the entire off-site analysis process to be conducted in conjunction with OPCW field exercises.
- 32. The Director-General notes the SAB's views on the OPCW Central Analytical Database and, as he did in his responses to the previous SAB reports to the First and Second Review Conferences, agrees that the Secretariat needs to have analytical data on relevant unscheduled chemicals. For example, S&A is also relevant in identifying the chemicals contained in old and abandoned chemical weapons.

### **Inspection equipment and training**

- 33. The Director-General appreciates the efforts of the SAB in reviewing the list of approved inspection equipment, as requested by the Second Review Conference, and is grateful for the SAB's willingness to inform the Secretariat about new technologies and to continue to offer advice, upon request.

34. The Director-General believes that a well-equipped and well-trained Inspectorate will contribute to the effective, efficient, and consistent application of the Convention's verification regime.

#### **Assistance and protection**

35. The Director-General shares the SAB's view that advances in science and technology provide opportunities for better assistance and protection against chemical weapons. Many of these advances are detailed in the SAB's report. Regarding a mechanism to share best practices among States Parties, the Director-General would like to note that the Secretariat has established a Protection Network and maintains a data bank on protection. Furthermore, the Secretariat is providing training with the support of States Parties with established chemical-emergency mechanisms, and is also developing a "train-the-trainers" course.

#### **Destruction of chemical weapons**

36. In its report, the SAB recalled its earlier assessment that "the technologies and processes for the destruction of declared chemical weapons stockpiles had matured".<sup>6</sup> The SAB also noted that destruction processes for old chemical weapons and abandoned chemical weapons have been further developed since 2008. The Director-General agrees with the SAB that the expertise to monitor and verify destruction of chemical weapons stockpiles is an important technical capability that should be maintained.
37. The Third Review Conference may wish to request the Secretariat to maintain the necessary technical expertise and knowledge to assist States Parties in the destruction of chemical weapons and to request the SAB to keep a watching brief on the development of new destruction technologies.

#### **Other issues**

38. The Director-General believes that it is essential to maintain a robust verification regime that keeps pace with developments in science and technology, and with other external factors and developments in the OPCW. To this end, he has asked the SAB to establish a new TWG on verification. The Secretariat will, in the future, implement many of the additional recommendations that have been made by the SAB.

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<sup>6</sup> Paragraph 116 of RC-3/DG.1