

**NOTE BY THE DIRECTOR-GENERAL****RESPONSE TO THE REPORT OF THE TWENTY-FOURTH SESSION OF THE  
SCIENTIFIC ADVISORY BOARD**

1. This Note sets out the Director-General's comments on the report of the Twenty-Fourth Session of the Scientific Advisory Board (SAB) (SAB-24/1, dated 28 October 2016) and the ongoing work of the SAB.
2. An understanding of developments in science and technology is crucial to the full and effective implementation of the Chemical Weapons Convention (hereinafter "the Convention"), as scientific and technological underpinnings are found throughout its articles. The rapid pace of scientific advances, alongside increased diffusion and globalisation of scientific knowledge, demands scientific literacy and the ability to bring practical scientific advice to policymakers.
3. With the preparation of the SAB's recommendations to the Fourth Special Session of the Conference of the States Parties to Review the Operation of the Chemical Weapons Convention (hereinafter "the Fourth Review Conference"), the activities of the SAB have seen a significant increase, as illustrated by the six substantive reports produced in 2016.<sup>1</sup> The Director-General encourages States Parties to carefully consider his call for voluntary contributions (S/1450/2017, dated 16 January 2017) to support the work of the SAB. In this regard, the Director-General wishes to thank the Government of New Zealand for its 2016 contribution.
4. The Director-General wishes to inform States Parties that seven members of the SAB will be leaving the Board in 2017 and a formal call for nominations has been issued (S/1452/2017, dated 18 January 2017). States Parties wishing to submit nominations to the SAB must do so by 28 July 2017.

**RESPONSE TO THE REPORT OF THE TWENTY-FOURTH SESSION OF  
THE SCIENTIFIC ADVISORY BOARD**

5. The SAB met in The Hague, the Netherlands, for its Twenty-Fourth Session from 25 to 28 October 2016. The session was chaired by Dr Christopher Timperley, with Mr Cheng Tang as the Vice-Chairperson. The report of the session was issued as SAB-24/1.

---

<sup>1</sup> Reports of the SAB are available at: [www.opcw.org/about-opcw/subsidiary-bodies/scientific-advisory-board/documents/reports/](http://www.opcw.org/about-opcw/subsidiary-bodies/scientific-advisory-board/documents/reports/)



6. Opening remarks were presented by the Deputy Director-General (paragraphs 5.1 to 5.4 of SAB-24/1), who thanked the Chairperson, Vice-Chairperson, and the members of the Board for their continued engagement with States Parties through formal briefings and “Science for Diplomats” side events. Meeting with the Board later in the session (paragraphs 12.1 to 12.4 of SAB-24/1), the Director-General reemphasised the importance of engagement with States Parties and of providing practical advice on technical issues. In 2016, the SAB briefed States Parties during its Twenty-Third Session (21 April),<sup>2</sup> its Twenty-Fourth Session (28 October),<sup>3</sup> and the Twenty-First Session of the Conference of the States Parties (hereinafter “the Conference”) (1 December).<sup>4,5</sup> The SAB intends to continue this practice in 2017.
7. After a careful study of the report of the Twenty-Fourth Session of the SAB, the Director-General is pleased to submit to the Executive Council the comments below.

#### **Recommendations to the Director-General (paragraph 1.2 of SAB-24/1)**

8. The Director-General thanks the SAB for its recommendations from the 2016 workshop on chemical forensics endorsed by the Board at its Twenty-Fourth Session (paragraphs 8.12 to 8.17 of SAB-24/1, and paragraph 18 below). He notes the relevance of this advice to the verification regime, especially for sampling and analysis, and collection and validation of information in support of contingency operations such as deployments of the OPCW Fact-Finding Mission in Syria. The recommendations supporting adoption of fit-for-purpose tools and methods would also be relevant to initiatives such as the Rapid Response and Assistance Mission.
9. In accordance with paragraph 9 of the SAB’s terms of reference (C-II/DEC.10/Rev.1, dated 2 December 2004), the Director-General requests that the SAB establish a new temporary working group (TWG) and appoint a Chairperson for it. This TWG will address questions relating to science and technology relevant in investigative work, and will undertake further consideration of topics described in paragraph 8 above, other recommendations from the chemical forensics workshop, and in particular questions falling under subparagraphs 2(e) and (g) of the SAB’s terms of reference relevant to investigative methods in contingency operations. The Director-General will in the near future prepare a mandate for the TWG, which should hold its first meeting before the end of the first quarter of 2018.

#### **Follow-up to the Scientific Advisory Board’s recommendations (paragraphs 6.3 to 6.7 of SAB-24/1)**

10. The Director-General appreciates the SAB’s continued availability to provide technical advice to the Technical Secretariat (hereinafter “the Secretariat”) for taking

---

<sup>2</sup> The presentation from this briefing is available at:  
[www.opcw.org/fileadmin/OPCW/SAB/en/21\\_April\\_SAB\\_Briefing\\_to\\_States\\_Parties-for\\_print.pdf](http://www.opcw.org/fileadmin/OPCW/SAB/en/21_April_SAB_Briefing_to_States_Parties-for_print.pdf)

<sup>3</sup> The presentation from this briefing is available at:  
[www.opcw.org/fileadmin/OPCW/SAB/en/SAB-24\\_Chair\\_Briefing\\_to\\_States\\_Parties\\_1\\_.pdf](http://www.opcw.org/fileadmin/OPCW/SAB/en/SAB-24_Chair_Briefing_to_States_Parties_1_.pdf)

<sup>4</sup> The statement from this briefing is available at:  
[www.opcw.org/fileadmin/OPCW/SAB/en/SAB\\_Chair\\_Briefing\\_to\\_CSP21-statement.pdf](http://www.opcw.org/fileadmin/OPCW/SAB/en/SAB_Chair_Briefing_to_CSP21-statement.pdf)

<sup>5</sup> Slides from this briefing are available at:  
[www.opcw.org/fileadmin/OPCW/SAB/en/SAB\\_Chair\\_Briefing\\_to\\_CSP21-slides.pdf](http://www.opcw.org/fileadmin/OPCW/SAB/en/SAB_Chair_Briefing_to_CSP21-slides.pdf)

SAB recommendations forward; this has been especially valuable with regard to the meaning of “production by synthesis”. As States Parties are currently responding to a survey and providing their own views on biomediated processes and production by synthesis (S/1436/2016, dated 14 November 2016), the Director-General asks that the SAB be prepared to consider questions that may arise as the Secretariat compiles the responses.

11. The Director-General notes that, of the 18 original recommendations from the final report of the TWG on verification,<sup>6,7</sup> three require further development, as indicated below.
  - (a) Recommendation 1: “The Secretariat should consider adopting a comprehensive, more analytical approach to verification utilising all available and verifiable information.”
  - (b) Recommendation 6: “The Secretariat should visit the National Authorities to obtain assurance on the accuracy and completeness of declarations. The outcome of such visits may impact on the inspection frequency.”
  - (c) Recommendation 10: “The verification thresholds for OCPFs<sup>8</sup> producing highly relevant chemicals, and the possibility of revision of the product group codes, should be addressed by the SAB as well as the industry cluster.”
12. In regard to recommendation 10, this issue, if warranted, could usefully be considered in relation to outcomes from ongoing discussions on SAB recommendations related to the verification of OCPFs. Recommendations 1 and 6 require further consideration in respect of any potential implications for the verification regime; discussions in the Open-Ended Working Group on the Future Priorities of the OPCW (OEWG-FP) could be useful.

**Developments in science and technology (paragraphs 7.1 to 7.3 and 7.7 to 7.14 of SAB-24/1)**

13. The SAB has produced a substantial body of information from its meetings and workshops, which includes its considerations of new and emerging technologies, industrial chemistry, and the increasing convergence across scientific disciplines. The Director-General appreciates the efforts made by the Board to research information and to identify and engage experts across broad ranges of scientific disciplines.
14. The science and technology review has highlighted trends in technologies with increasingly sophisticated capabilities to integrate measurements with complementary

---

<sup>6</sup> Verification: Report of the Scientific Advisory Board's Temporary Working Group (SAB/REP/1/15, dated June 2015). Available at: [www.opcw.org/fileadmin/OPCW/SAB/en/Final\\_Report\\_of\\_SAB\\_TWG\\_on\\_Verification\\_-\\_as\\_presented\\_to\\_SAB.pdf](http://www.opcw.org/fileadmin/OPCW/SAB/en/Final_Report_of_SAB_TWG_on_Verification_-_as_presented_to_SAB.pdf)

<sup>7</sup> The Impact of Developments in Science and Technology in the Context of the Chemical Weapons Convention (EC-80/DG.7, dated 28 August 2015). Available at: [www.opcw.org/fileadmin/OPCW/SAB/en/ec80dg07\\_e\\_.pdf](http://www.opcw.org/fileadmin/OPCW/SAB/en/ec80dg07_e_.pdf)

<sup>8</sup> OCPF = other chemical production facility.

data streams and data sets. Measurements augmented in this way provide opportunities for real-time recognition of unexpected chemical and/or biological signatures with applications in remote sensing, stand-off detection, and investigations. The Director-General looks forward to the report from the forthcoming SAB workshop on emerging technology, which will further assess potential relevance of these technologies to the Convention.

**Scientific and technological elements of verification technologies, emerging technologies, and new equipment (paragraphs 7.4 to 7.6 and 8.1 to 8.17 of SAB-24/1)**

15. Engaging experts in technologies with applicability for verification and/or compliance monitoring provides valuable insight for maintaining a verification regime that is fit for purpose. In this regard, the Director-General was pleased to see the presentations by Hamburg University and the French Alternative Energies and Atomic Energy Commission. The former presentation is of relevance to SAB recommendations on the use of data analysis and the latter is of relevance to practical uses of the integration of large complex data sets with biochemical measurements. The Director-General encourages the SAB to continue engaging experts from other disarmament communities, in order to learn from their experiences.
16. Actionable scientific advice requires that the SAB have insight into the work of the Secretariat. The Director-General continues to make his staff available to provide the Board with briefings and to discuss where additional scientific guidance is most beneficial in their work. This practice ensures that the Organisation can access advice relevant for the effective implementation of the Convention, including for non-routine situations.
17. The Director-General notes the SAB's views on the OPCW Central Analytical Database and agrees that on-site sampling and analysis capabilities would benefit from the inclusion of analytical data on relevant unscheduled chemicals, as proposed by the OPCW Laboratory. In response to the SAB's suggestion to engage States Parties on the issue, the Director-General notes that briefings have been held during Industry Cluster meetings (October 2016) and at a side event during the Twenty-First Session of the Conference (December 2016).
18. The report of the SAB's workshop on chemical forensics, held in Helsinki, Finland, from 20 to 22 June 2016, has been issued as a working paper (SAB-24/WP.1, dated 14 July 2016). The Director-General wishes to thank VERIFIN<sup>9</sup> as co-organiser and the European Union for providing funding to hold the event. Chemical forensics represents one of a number of capabilities that would be used to produce information that can be integrated with and cross-referenced to other information collected during an investigation. The workshop brought together an impressive panel of experts from a range of scientific fields, many facing similar challenges in developing methodologies for the "fingerprinting" of a variety of classes of chemicals. The workshop provided valuable inputs on how chemical forensic methods can be used in an investigative capacity and how methods are being developed and challenges

---

<sup>9</sup> VERIFIN = Finnish Institute for Verification of the Chemical Weapons Convention.

addressed across a range of applications. The Director-General notes the SAB's recommendations (see also paragraphs 8 and 9 above) and appreciates the Board's identifying topical areas that could usefully be considered for inspector training. The Director-General feels that a briefing provided to the SAB by the Inspectorate Division on the training programme would generate informative discussion of these recommendations. Additionally, the Director-General would like to thank the SAB for the side event briefing provided to States Parties on the aforementioned workshop at the Twenty-First Session of the Conference.<sup>10</sup>

#### **Legacy chemical weapons (paragraphs 9.1 to 9.9 of SAB-24/1)**

19. The Director-General appreciates the SAB's watching brief on science and technology relevant to legacy chemical weapons. The Director-General notes that a wealth of information relevant to investigations, sampling and analysis, disposal, and the environmental fate of chemical agents has been produced from studying legacy weapons. Staying abreast of developments in this area strengthens technical expertise and knowledge available for the implementation of the Convention.

#### **Medical countermeasures and response to chemical agents (paragraphs 10.1 to 10.6 of SAB-24/1)**

20. The report of the SAB's workshop on chemical warfare agent toxicity, emergency response and medical countermeasures, held in Paris, France on 26 and 27 September 2016 has been issued as a working paper (SAB-24/WP.2, dated 14 October 2016). The Director-General wishes to thank the Secrétariat Général de la Défense et de la Sécurité Nationale of France as co-organiser and the European Union for providing additional funding to hold the event. The workshop provided a valuable update on medical countermeasures and emergency response procedures for incidents involving chemical agents. The Director-General notes the SAB's recommendations in regard to best practices for response and the need for tools to enable more rapid recognition of exposure. In this regard, the outcome documents and presentations have been shared with relevant units in the Secretariat. The Director-General notes that the SAB's watching brief on emerging technologies is highly relevant for identifying technologies that have applicability for the detection of real-time exposure. The Director-General would like to thank the SAB for the side event briefing provided to States Parties on this workshop at the Twenty-First Session of the Conference.<sup>11</sup>
21. The Director-General appreciates the SAB's continuing review of and reporting on the long-term effects and treatment of chemical agent exposure. Ongoing studies of victims are producing a wealth of data that scientists may be able to use to produce better understanding of the mechanisms of action of the agents, and develop improved countermeasures and therapeutics.

---

<sup>10</sup> The presentation from this side event is available at:  
[www.opcw.org/fileadmin/OPCW/Science\\_Technology/Diplomats\\_Programme/20161130-S\\_T\\_Diplomats-Chemical\\_Forensics.pdf](http://www.opcw.org/fileadmin/OPCW/Science_Technology/Diplomats_Programme/20161130-S_T_Diplomats-Chemical_Forensics.pdf)

<sup>11</sup> The presentation from this side event is available at:  
[www.opcw.org/fileadmin/OPCW/Science\\_Technology/Diplomats\\_Programme/20161130-S\\_T\\_Diplomats-CWA\\_Toxicity.pdf](http://www.opcw.org/fileadmin/OPCW/Science_Technology/Diplomats_Programme/20161130-S_T_Diplomats-CWA_Toxicity.pdf)

**Scientific advisory mechanisms and engagement with other advisory boards (paragraphs 6.8 to 6.10 and 11.1 to 11.8 of SAB-24/1)**

22. The Director-General is pleased to see interest in the OPCW SAB coming from other scientific advisory mechanisms. The sharing of experiences between boards is beneficial to ensuring that actionable advice can be brought forward for policymakers. In this regard, the Director-General notes that best practices and lessons learned from science advice at the OPCW were shared in a side event at the Eighth Review Conference of the Biological and Toxin Weapons Convention (BTWC) in November 2016.<sup>12</sup> He further encourages the SAB to engage with scientific advisers from States Parties in order to share experiences in facilitating productive discourse between scientists and policymakers.
23. The Director-General notes that the convergence of the sciences lends itself to finding commonalities with other international scientific advisory mechanisms. For example, technologies developed for biomediated chemical production processes that have raised questions with regard to OCPF verification are also of interest to the United Nations Scientific Advisory Board for their relevance in support of the United Nations' Sustainable Development Goals (SDGs). This year, the 2017 science and technology event of the Preparatory Commission for the Comprehensive Nuclear-Test-Ban Treaty Organization (CTBTO)<sup>13</sup> will include the exploration of potential synergies with the SDGs in the monitoring of international disarmament and non-proliferation treaties, reflecting a potential security dimension in which convergence plays a role. In this regard, engagement with other advisory boards provides additional insight into the assessment of developments in science and technology.
24. The Director-General was pleased to see the Chairperson of the Advisory Board on Education and Outreach (ABEO) briefing the SAB. Engagement and the sharing of experiences present opportunities for the boards to continually improve the effectiveness of their advisory roles. In his discussion with the SAB, the Director-General expressed his concern and condemnation that chlorine had again been used as a weapon, requesting SAB members to encourage others in their respective fields to also condemn the use of chlorine as a weapon and to spread the message for upholding the norms of the Convention. Furthermore, he encouraged the SAB members to support the twentieth anniversary of the OPCW through organising events in their home countries in 2017. In regard to these requests, the Director-General encourages members of the two boards to consider areas in which they might collaborate.

---

12

The presentation from this side event is available at:  
[http://www.unog.ch/80256EDD006B8954/\(httpAssets\)/CAB209422758487FC125808300496853/\\$file/OPCW1\\_Science\\_Advice\\_Policy-Maker\\_Engagement\\_in\\_CWC.pdf](http://www.unog.ch/80256EDD006B8954/(httpAssets)/CAB209422758487FC125808300496853/$file/OPCW1_Science_Advice_Policy-Maker_Engagement_in_CWC.pdf). Additional presentations from SAB members at the BTWC Review Conference can be found in the 10 November 2016 side events section at:  
[http://www.unog.ch/80256EE600585943/\(httpPages\)/57A6E253EDFB1111C1257F39003CA243?OpenDocument](http://www.unog.ch/80256EE600585943/(httpPages)/57A6E253EDFB1111C1257F39003CA243?OpenDocument)

13

More information on the 2017 CTBTO science and technology event can be found at:  
<https://www.ctbto.org/specials/snt2017/>

**FUTURE WORK AND OTHER BUSINESS OF THE SCIENTIFIC  
ADVISORY BOARD**

25. In 2017 the SAB will hold its Twenty-Fifth and Twenty-Sixth Sessions, from 27 to 31 March and from 16 to 20 October respectively; both sessions will include briefings to States Parties. The Secretariat will organise SAB workshops on emerging technologies (July 2017) and on trends in industrial chemical production (September 2017) for informing the report of the SAB to the Fourth Review Conference. Funding for these workshops is to be made available in particular through the European Union Joint Action on support for OPCW activities. The development of the report to the Fourth Review Conference is taking place intersessionally, and will be included in the agenda of the Twenty-Sixth Session; the report is intended to be adopted at the Twenty-Seventh Session of the SAB (in 2018) and released prior to the Fourth Review Conference.
26. Assessing developments in science and technology must be forward looking and cross disciplinary (“convergent”), and to be effective requires consideration of driving forces for innovation. These include technological, economic, socio-political, and regulatory insights. In this regard, the Director-General supports the SAB’s view that in addition to reviewing the developments in science and technology in the five-year period between the Third and the Fourth Review Conferences, the SAB could usefully provide guidance for relevant trends and issues to address in the five-year period between the Fourth and Fifth Review Conferences.
27. In addition to reviewing publications and patents, and the use of online scientific resources and communities, SAB members are encouraged to participate in relevant scientific conferences. This engagement within the scientific community augments the SAB’s monitoring activities; the Secretariat will provide administrative support for SAB members in this regard.
28. Given the important role of science and technology in the work of the OPCW, the Director-General has requested that the SAB Chairperson and Vice-Chairperson brief the OEWG-FP on current and future issues in science and technology relevant to implementation of the Convention. The SAB’s engagement with the OEWG-FP will begin in the first quarter of 2017.