



OPCW

Scientific Advisory Board

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**REPORT OF THE SECOND MEETING OF THE SCIENTIFIC ADVISORY BOARD
TEMPORARY WORKING GROUP ON VERIFICATION**

1. The Report of the Second Meeting of the Scientific Advisory Board (SAB) Temporary Working Group on Verification is hereby circulated to States Parties. The meeting was held in The Hague from 23 to 25 September 2013.
2. The Chairman of the SAB and the Director-General have agreed that this report can be circulated to States Parties in advance of the Twenty-First Session of the SAB.
3. In accordance with the Rules of Procedure of the SAB, this report will be reviewed in detail by the SAB at its Twenty-First Session.

Annex: Report of the Second Meeting of the SAB Temporary Working Group on Verification



Annex

**REPORT OF THE SECOND MEETING
OF THE SAB TEMPORARY WORKING GROUP ON VERIFICATION**

- 1. AGENDA ITEM ONE – Opening of the meeting and adoption of the agenda**
- 1.1 The Scientific Advisory Board Temporary Working Group (TWG) on Verification held its second meeting from 23 to 25 September 2013 at OPCW Headquarters in The Hague.
- 1.2 The meeting was chaired by Roberto Martinez-Alvarez on behalf of the SAB.
- 1.3 The meeting began with welcome and introduction of two new members, Alejandra Graciela Suárez (SAB Chairperson) and Augustin Baulig. The TWG was also informed that Julius Kozma was unable to continue his participation due to other obligations. The list of TWG members attending this meeting is given in the Appendix to this Annex.
- 1.4 The following agenda was adopted:
 - (a) Opening of the meeting and adoption of the agenda
 - (b) Experiences of other international organisations
 - (c) What are the technologies/methodologies used for verification purposes in other international treaties that could benefit the CWC verification regime?
 - (d) Which methodologies (whether existing or new) could assist States Parties in ensuring that all declarable plant sites are identified for declaration?
 - (e) How can sampling and analysis most effectively be utilised for verification purposes?
 - (f) What are the key technical components of a consistent approach to declaring complex mixtures of discrete organic chemicals?
 - (g) Which new or emerging technologies may add value to existing capabilities for verification purposes (such as data analysis/data mining, statistical analysis, and/or attribution analysis)?
 - (h) Which methodologies might be helpful for the Secretariat to keep abreast of developments in science and technology of relevance to the CWC verification regime?
 - (i) Any other business
 - (j) Conclusions, recommendations, plan of action for intersessional period, elaboration of the TWG report and date of the next meeting
 - (k) Closure of the meeting

2. AGENDA ITEM TWO – Experiences of other international organisations

- 2.1 Catherine Smallwood from the World Health Organisation (WHO) informed the TWG on verification activities of the WHO. WHO conducts its disease surveillance and response activities under the legal framework of the 2005 International Health Regulations. The Regulations mandate adapted responses for all public health risks of potential international concern, using an all-hazards approach and containment of public health risks at source. Early detection, verification and risk assessment are central to implementation of the International Health Regulations (IHR) because if identified and responded to early, adverse health, social, economic, environmental and political impacts may be prevented or more readily mitigated.
- 2.2 WHO has established a single, reproducible process for the management of acute public health risks centred around information derived from global event-based and indicator-based surveillance. In terms of event-based data, WHO collects, triangulates, verifies, assesses information derived from official and unofficial sources for public health action. This process is made more efficient through the use of a number of electronic tools. These tools enable data collection, sharing, and analysis as well as communication between WHO's global distributed network of offices, WHO's 193 Member States, other UN agencies, technical institutions, non-governmental organisations, WHO Collaborating Centres and the private sector. In this regard, WHO with its Member States is the largest global network collecting information on health.
- 2.3 In discussion, the following points were raised:
- (a) The presentation demonstrated the utility of data management tools. These include tools for collecting information in the field and conducting epidemiological analyses, online search tools for event-based surveillance, and information management systems tailored to the needs of a decentralised organisation.
 - (b) WHO is one of a number of organisations that have published information on treatment for exposure to chemical weapons. This information is complementary to questions being addressed by the SAB (e.g. in the context of medical countermeasures and treatments). Efforts to ensure consistency between the OPCW and the WHO should be undertaken.
- 2.4 Christopher Eldridge from the International Atomic Energy Agency (IAEA) provided an overview of the Agency's use of open-source information in support of IAEA Safeguards. The presentation explained that open source information is a component of the safeguards-relevant information utilised by the IAEA to support the drawing of independent and objective Safeguards conclusions. The IAEA Department of Safeguards finds open-source information to be extremely useful in carrying out its mission to verify the correctness and completeness of Member States' declarations. However, its effective use requires a dedicated, professional staff with the appropriate range of expertise, as well as appropriate investment in information technology, data sources, and staff training. If the IAEA receives credible indications about possible undeclared activities from open sources, clarification is sought from the State

concerned. But any conclusions the IAEA draws are based on the IAEA own findings. The presentation emphasised the following points:

- (a) The types of information sources the Department of Safeguards uses can be divided into three categories: State-supplied information such as declarations, information from safeguards activities conducted by the IAEA, and other information, including open sources.
- (b) Open source information contributes to the enhancement of the Department's knowledge regarding a State's nuclear programmes, related research and development, nuclear infrastructure, imports and exports. Open-source information also provides context to a State's declarations and on transnational activities.

2.5 In discussion, the following points were raised:

- (a) Both presentations demonstrated the benefits of efficient and effective use of open source information.
- (b) Open source information cannot be used on its own for decision making; information credibility needs formal assessment by open source specialists, through a look at multiple reports and views of a subject to identify biases and to provide complementary views of the information.
- (c) Information overload is another challenge. Here the expertise is required to help effectively synthesise the data with other information streams, ensuring that it is used in the proper context and given appropriate weight.
- (d) Effective use and analysis of open source information requires adequate resources including specialised staff and tools.
- (e) The largest challenge to open source information is credibility; to address this IAEA and WHO have established methodologies for the validation of such information before it is taken further for any use.
- (f) While open sources are a component of the information utilised by organisations, any conclusions the organisation draws must be based on the organisation's own findings.

3. AGENDA ITEM THREE – What are the technologies/methodologies used for verification purposes in other international treaties that could benefit the CWC verification regime?

3.1 Per Runn summarised the intersessional work. This included a report for the TWG that delved into the need for the OPCW to move into a more holistic approach when evaluating verification information, the possible use of open source information, the sharing of critical information amongst staff involved in the verification process and the extended use of secure electronic communication.

3.2 In discussion the following points were raised:

- (a) Electronic tools are at the core of verification in other international organisations.
- (b) The TWG will continue to explore the use of open source information in support of implementation of the CWC.

4. AGENDA ITEM FOUR – Which methodologies (whether existing or new) could assist States Parties in ensuring that all declarable plant sites are identified for declaration?

4.1 Pilar Vita from the Technical Secretariat briefed the TWG on the declaration process, describing each step of the evaluation process and the measures taken to ensure timeliness, completeness and accuracy of the information received. These measures include relevant data analysis and evaluation tasks based on information both within current year and historical declarations for a State Party (e.g. a Schedule 2 chemicals mass balance across a 5-year period) and relevant information provided in declarations of other States Parties (e.g. in the identification of transfer discrepancies). Difficulties commonly encountered include: declaration of non-declarable sites; States Parties having different interpretations of plant site definition, calculations of quantity, and use of different low concentration limits; inconsistent use of plant sites codes; and discrepancies in the declarations of import/export data concerning trade between the two States Parties. Ms Vita noted how tailor-made assistance from the Technical Secretariat to States Parties can be helpful in reducing occurrences of these issues. The TWG was encouraged to provide further suggestions.

4.2 Bimal Mehta summarised the intersessional work. Mr Mehta noted that methodologies that could be used to assist States Parties were identified in the previous meeting of the TWG. He noted that reviewing currently used methodologies and identifying shortcomings could be used to identify new methods that could be applied.

4.3 In discussion the following points were raised:

- (a) Recommendations to address the non-declaration of declarable activities will be the primary focus of work.
- (b) The path forward would be to evaluate the effectiveness of methodologies used by National Authorities, identify any short comings, and initiate follow-up by suggesting tools and/or training.
- (c) Industry and National Authorities should both be engaged to ensure the effective implementation of the CWC declaration regime. Guidelines can be made available to industry through industry associations and National Authorities. Trade fairs should be considered as an opportunity for industry engagement. There is a need to find innovative ways to simultaneously engage both industry and the National Authorities; this could involve more efforts at the country level with guidelines and informative materials produced in local languages.

- (d) Demonstrating how using open source information, taking into account the consideration discussed under agenda items 2 and 3, to support States Parties in identifying declarable activities is critical.
- (e) Promotion of the use of the Electronic Declarations Tool for National Authorities (EDNA), or other compatible tools, by all States Parties could support the process of reducing inconsistencies and errors in declarations.
- (f) Economic indicators can be used to follow the appearance and disappearance of industrial sites to inform assessments of declarations; the Technical Secretariat demonstrated how this could work in a Note (S/862/2010/Rev.1, dated 31 August 2010).

5. AGENDA ITEM FIVE – How can sampling and analysis most effectively be utilised for verification purposes?

5.1 Paula Vanninen briefed the TWG on the EQuATox (Establishment of Quality Assurances for the Detection of Biological Toxins of Potential Bioterrorism Risk) project (www.equatox.org/), presenting the results from proficiency tests involving ricin and saxitoxin. The features of biological toxins such as ricin, botulinum toxins, staphylococcal enterotoxins and saxitoxin place them at the interface of classical biological and chemical agents. While different technologies for toxin detection have been established, very few universally agreed “gold standards” are available. Within EQuATox a network of expert laboratories was established integrating expertise from security, verification, health and the food sector. Professor Vanninen emphasised that proficiency tests, certified reference materials and validated methods are needed.

5.2 The following points were raised:

- (a) Methods for analysis of ricin and saxitoxin were evaluated in conjunction with the TWG on Sampling and Analysis. The methods endorsed by that TWG are still valid.
- (b) Not all States Parties or designated laboratories have capabilities for the identification of toxins. Laboratories that undertake toxin analysis need to document criteria for identification, and the Secretariat needs to consider how results should be reported, e.g. for immunoassays. The availability of methodology in a larger number of laboratories is hindered by a lack of certified reference materials for some toxins.
- (c) Sample preparation methods for difficult matrices need further development to achieve lower limits of detection. Several laboratories participating in the EQuATox exercise had problems with the detection of low concentrations of ricin.
- (d) Analysis of saxitoxin and other PSP toxins (paralytic shellfish poisons) is complicated by poor selectivity of immunological assays. Unequivocal identification of ricin is complicated by co-occurrence with a structurally related agglutinin. For both saxitoxin and ricin, combined immunological and

MS-based approaches are recommended. For ricin, some laboratories consider a cytotoxicity or other assay which measures biological activity desirable.

5.3 Robin Black summarised the intersessional work on sampling and analysis (S&A): both strategic and more focused aspects of S&A had been discussed. Current analytical capabilities and how these should evolve to meet today's and future challenges were discussed. The major current capability gap is associated with trace analysis if required in an investigation of alleged use (IAU). The series of confidence building exercises on biomedical sample analysis, organised by the OPCW Laboratory, is partly addressing this gap, but trace analysis of environmental samples has yet to be addressed by the Technical Secretariat. The identification of non-scheduled compounds, whose spectra are not in the OPCW Central Analytical Database (OCAD), may also be important in an IAU. In its review of S&A for the Third Review Conference, the SAB recommended a review of verification activities, including the current balance of resource allocation, for example with regard to proficiency tests, trace analysis (where analytes are present at parts per billion rather than parts per million as exercised in proficiency tests) and toxin analysis. The group also discussed possible technological advances that might reduce the logistic burden and analysis time for on-site analysis, and improve and expand capabilities for off-site analysis. The TWG on S&A provided a thorough evaluation of these topics. The TWG on Verification should continue this work by providing strategic direction and guidance on adoption of emerging methodologies and technologies.

5.4 In the discussion the following points were raised:

- (a) To be prepared for an IAU, capabilities for the analysis of biomedical and environmental samples are essential. Robust standard operating procedures (SOPs) can be slow to develop and adopt; identification criteria and reporting requirements need to be agreed and documented in a concise format. A requirement for what may be expensive accreditation for trace analytical methods requires further discussion between expert laboratories and the Secretariat.
- (b) Chemical attribution (forensics) would enhance IAU capabilities, for example by identifying the origin and/or production methods of chemicals identified in IAU. Databases and/or an appropriate reference sample are critical for an attribution capability, and inter-laboratory collaboration is essential. The TWG will summarise the current state of attribution analysis in a chemical weapons context. This topic raises the question as to whether non-scheduled minor degradation products or additives such as agent stabilisers should be included in the OCAD.
- (c) The most important development in mass spectrometry (MS) in the past 10 years is high resolution mass spectrometry (HRMS). The TWG should further explore how current analytical capabilities can be enhanced by this technique.

- (d) Involvement of the Technical Secretariat, specifically the OPCW Laboratory, is important for the TWG in considering S&A issues. Valuable lessons may be learned from the recent activities regarding Syria.

6. AGENDA ITEM SIX – What are the key technical components of a consistent approach to declaring complex mixtures of discrete organic chemicals?

6.1 Mehran Rouzbahani summarised the intersessional work. He reminded the TWG that declarations of facilities producing mixtures containing discrete organic chemicals (DOCs) vary amongst the States Parties, resulting in some other chemical production facilities (OCPF) sites not being declared. There is variance in application of declarable concentration thresholds for mixtures containing DOCs by States Parties, and the SAB has not previously advised on this issue. A discussion paper was distributed within the TWG.

6.2 In discussion the following points were raised:

- (a) There is need for further elaboration of the issue from a technical perspective. To this end, the TWG might consider the key components of what defines DOC in technical and scientific terms.
- (b) Regarding declarability of facilities producing mixtures containing DOCs, it would be important to provide a technical rationale.
- (c) Other international conventions have similar issues with mixtures of chemicals (e.g. the conventions on persistent organic pollutants and on psychotropic drugs). The TWG will seek further information.
- (d) Other stakeholders' views and opinions (e.g. chemical industry, academia, etc.) are necessary to help inform considerations of the mixture issue.

7. AGENDA ITEM SEVEN – Which new or emerging technologies may add value to existing capabilities for verification purposes (such as data analysis/data mining, statistical analysis, and/or attribution analysis)?

7.1 Murat Gulay of the Technical Secretariat briefed the TWG on the Secretariat's Verification Information System (VIS). The presentation focused on each of the components of the VIS with an update on the current status as well as areas that need to be addressed in the future (including improved and better integrated business processes, a contemporary document management system with record management capabilities, and increased analytical capabilities). Related projects such as EDNA and Secure Information Exchange (SIX) were also covered.

7.2 In discussion, the following points were raised:

- (a) The TWG could assist in identifying initiatives to support and encourage States Parties to adopt electronic declaration tools.
- (b) The establishment of a mechanism for the secure exchange of information between States Parties and the Secretariat is expected to increase the overall

efficiency, not only of the submission of Article VI declarations but also the exchange of other information. The TWG could highlight other potential use cases for such a mechanism (similar systems of data transmission are used in other international organisations).

7.3 Bimal Mehta briefed the TWG on possibility for using eXtensible Business Reporting Language (XBRL) as a tool for data capture, analysis, and retrieval. XBRL is an open source standard, based on XML (the markup language widely used on websites and various software platforms). Recognising that the OPCW receives and handles huge amounts of information related to various aspects of CWC implementation like declarations, inspection reports etc., the process of information collection, compilation and retrieval should efficiently provide required information quickly and accurately at a minimum cost. Additionally, in order to effectively share information between different software applications, it will be helpful if the information is collected and stored in a standardised system that can be used everywhere by anyone. XBRL uses a common taxonomy (dictionary) and tags to identify and understand each element of data; since the dictionary is available and accessible to everyone, any computer can store, read and interpret the data in the same manner as any other computer. The Global Reporting Initiative (GRI) has adopted XBRL as a means to communicate and share information both within and outside their organisation.

7.4 In discussion the following points were raised:

- (a) The VIS and EDNA already use XML in conjunction with tagging libraries that have been specifically developed for the processing of declaration data. This OPCW standard is available to all States Parties and has been used by some for the development of their own declaration software.
- (b) Consideration might be given to the use of a standard such as XBRL for other types of information than declaration data.

7.5 Per Runn summarised the intersessional work:

- (a) A gap-analysis to identify points in the verification cycle where new technologies could be beneficial will be performed.
- (b) The focus of the future work will be to consider tools for the compilation and analysis of data collected from the different stages of the verification process.
- (c) The need for more efficient preparation of inspection reports and their uploading into VIS had been discussed.
- (d) The verification process would benefit from a more holistic approach in analysis of data, not treating individual data as unique, but combining data from many sources in order to present a complete set of information for making verification more effective.

8. AGENDA ITEM EIGHT – Which methodologies might be helpful for the Secretariat to keep abreast of developments in science and technology of relevance to the CWC verification regime?

8.1 Jonathan Forman provided an overview of science and technology monitoring, describing it as a type of data analysis which requires that the right questions are asked in order to obtain actionable results. In the context of verification, science and technology monitoring can provide information on technologies that can benefit the verification regime. Technology monitoring is different from scanning the horizon for scientific developments as the latter activity is a case of looking for what you do not know that you do not know, rather than monitoring developments in known scientific fields (see paragraphs 7.10 to 7.14 of SAB-20/1, dated 14 June 2013).

8.2 In discussion the following points were raised:

- (a) The TWG recognised the importance of technology monitoring for the Organisation.
- (b) Changes in the chemical industry can be anticipated by following trends in research focus and funding, as well as patent applications and grants.
- (c) Social media is helpful for monitoring science and technology developments.

9. AGENDA ITEM NINE – Any other business

Stefan Mogl informed the TWG that the SAB had come to the understanding that any process designed for the formation of a chemical substance should be covered by the term “produced by synthesis” in subparagraph 1(a) of Part IX of the Convention (SAB-19/1 and RC-3/DG.1). He emphasised that the SAB should provide technical guidance for the identification of relevant facilities that are employing biological and biologically mediated processes and suggested that members of the TWG on Verification should contribute to this discussion. The members agreed that following the completion of the work of the TWG on Convergence in Chemistry and Biology in November 2013, they would take up the issue at their next meeting. The TWG on Verification should discuss, in particular, questions related to declaration requirements, exemptions as well as verification thresholds.

10. AGENDA ITEM TEN – Conclusions, recommendations, plan of action for intersessional period, elaboration of the TWG report and date of the next meeting

The third meeting of the TWG was tentatively scheduled for 7 to 9 April 2014.

11. AGENDA ITEM ELEVEN – Closure of the meeting

The Chairperson closed the meeting at 13:00 on 25 September 2013.

Appendix: List of Participants in the Second Meeting of the Temporary Working Group on Verification

Appendix

LIST OF PARTICIPANTS IN THE SECOND MEETING OF THE SAB TEMPORARY WORKING GROUP ON VERIFICATION THE HAGUE, THE NETHERLANDS¹ 23 – 25 SEPTEMBER 2013

Participant	Institution
Professor Roberto Martinez-Alvarez ²	Universidad Complutense de Madrid
Dr Augustin Baulig	Secrétariat général de la défense et de la sécurité nationale, Paris
Dr Robin Black	Defence Science and Technology Laboratory (DSTL), Porton Down
Mr Hermann (Alex) Lampalzer	Preparatory Commission for the Comprehensive Nuclear-Test-Ban Treaty Organization (CTBTO)
Mr Bimal Mehta	Transpek Industry Ltd., Vadodora
Mr Stefan Mogl	SPIEZ Laboratory, Spiez
Dr Daan Noort	Netherlands Organisation for Applied Scientific Research (TNO)
Mr Eric Pujol	International Atomic Energy Agency (IAEA)
Mr Mehran Rouzbahani	Consultant
Dr Per Runn	Consultant
Professor Alejandra Graciela Suárez	Universidad Nacional de Rosario. Consejo Nacional de Investigaciones Científicas y Técnicas
Professor Paula Vanninen	Finnish Institute for Verification of the Chemical Weapons Convention, University of Helsinki
Mr Francois Mauritz van Straten	South African Nuclear Energy Corporation SOC Ltd, Pretoria
Dr Rob Visser	Consultant
Mr Michael Walls	American Chemistry Council
Mr Christopher Eldridge (guest speaker)	International Atomic Energy Agency (IAEA)
Dr Catherine Smallwood (guest speaker)	World Health Organisation (WHO)

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¹ Mui Tiang Sng (DSO Laboratories, Singapore) and Nicai Maria Fusaro Mouro (ABIQIUM) could not attend the second meeting of the TWG.

² Chairperson of the TWG on Verification.