



The OPCW Plant Biomarker Challenge

How can plants help keep humans safe from chemical threats?

As vegetation is part of our lives, plants are good candidates to use as sensors of toxic chemicals. We need to improve our understanding of the physical and chemical modifications that occur due to exposure to toxic chemicals. It is essential that these changes are defined and characterised, and methods established and validated, to achieve new modalities of detection. Unequivocal verification of exposure will in turn strengthen the verification regime of the Chemical Weapons Convention (CWC).

The OPCW's Scientific Advisory Board (SAB) encourages scientists from all OPCW Member States to participate in the challenge and submit their proposals. Be practical, innovative, and engaged! By pushing the boundaries of science and technology you are helping to make this world a safer place.

The Challenge

The OPCW, through this crowd-sourcing challenge, is seeking proposals from scientists across its Member States that describe a method or system by which a specific type of vegetation could act as an indicator of exposure to chemicals that are toxic to humans and/or animals. As vegetation (whether natural, introduced or invasive) is always present in areas of human habitation, plants are well suited as potential sentinel species.

With a view toward prevention of the re-emergence of chemical weapons and strengthening efforts to keep humans safe and secure from chemical threats, the OPCW is interested in learning from the world's scientific community about innovative, yet practical, capabilities that enable the recognition of biochemical signatures of chemical exposure.

Example Indicators



The deadline for the Phase 1 proposal submission is **14 January 2021**



Changes in colour



Changes in leaf or stem morphology



Other observable indicators of chemical exposure

Capabilities of Interest

Capabilities of interest would include the ability to recognise chemical exposure at the earliest possible occurrence for protection and response purposes, and/or to aid in the retrospective analysis of an incident involving chemical exposure. In the latter case, especially for highly reactive chemicals or chemicals exposed to a decontamination process, effects that arise due to chemicals generated through metabolic pathways, and/or environmental fate and transport processes potentially play an important role.

Proposals should look at plants which can present an “on-site” observable change (using visual, spectral and/or other non-destructive sensing methods), and link this change to any indicative biomarker(s) that could be confidently identified in an “off-site” laboratory with suitable molecular detection methods (such as mass spectrometry).

Submissions from scientists from all of the five regional groups of OPCW Member States (<https://www.opcw.org/about-us/member-states>) are highly encouraged.



Early exposure indication

The ability to recognise chemical exposure at the earliest possible occurrence for protection and response purposes



Retrospective analysis of chemical exposure

The capability to retrospectively analyse chemical incidents, especially those involving highly reactive chemicals or chemicals exposed to a decontamination process, effects that arise due to chemicals generated through metabolic pathways, and/or environmental fate and transport processes potentially play an important role.

Awards and Publication

Monetary awards are to be given for the most innovative proposals, to allow the initiation of a proof-of-concept study. Furthermore, the Secretariat would like to take the collective submissions and produce a scientific review article to be published in peer-reviewed literature and authored by all submitting scientists as a means to exchange scientific knowledge across international borders.

Requirements for Submitted Proposals

Entering the challenge requires only a written proposal. This proposal should provide a detailed description with relevant scientific literature references and citations. Submissions do not require experimental demonstration. All submissions must provide a proposal for experimentally demonstrating a proof-of-concept. As described under the introduction to the challenge, proposals

should describe how a given type of plant might present an “on-site” observable change and link this change to any indicative biomarker(s) that could be confirmed with “off-site” (laboratory-based) molecular detection methods.

Submissions from collaborating scientists and research groups are encouraged. The submission should indicate the corresponding author and the institution to which the award money would be awarded. Please note that each award can only be provided to a single institution (see section that follows **modalities**).

As there are countless examples of chemicals that can cause harm to vegetation and also can concentrate in plant tissue once released in the environment, preference for an awarded proposal will be given to effects that are induced by a chemical action on a life (metabolic) process. This is intended to be a chemical effect that manifests itself through the interaction of biomarkers and/or adduct formation. The chemicals of interest should be relevant to chemical security concerns due to toxic effects on humans and animals. Proposals that look at commonly used and available herbicides will not be considered.

What is expected in the proposal document:

- List of authors, associations and contact information
- Executive summary of idea
- Main body of proposal to include methodology, approach and implementation plan
- Relevant references cited in text
- Brief description of relevant expertise of proposal team; CVs of key personnel

The following should be considered while developing a proposal:

- The OPCW Designated Laboratory Network (/designated-laboratories) has developed sound and robust methods for analysis of chemical warfare agents (CWAs) in environmental samples, making traditional CWAs of lesser interest for submitted proposals (CWAs also require specific handling and safety considerations which make them poorly suited to proof-of-concept experiments outside expert laboratories). If a proposal does address an innovative idea involving CWAs, it would be considered on its merits, and a proof-of-concept study using CWA simulants would be acceptable.
- Proposals are encouraged to include consideration of toxic industrial chemicals (TICs). Easily accessible TICs (many of which are far less toxic than CWAs) are commonly discussed in reference to chemical threats, and proposals that expand the knowledge of how to recognise environmental exposure are of interest.
- Some types of agricultural chemicals, including pesticides but excluding herbicides, may also be of relevance.

- Another commonly discussed category of chemicals that pose security concerns are the so-called central nervous system (CNS)-acting chemicals (see example (<https://www.opcw.org/sites/default/files/documents/2019/08/CNS%20Acting%20Chemicals.pdf>) these chemicals are thought of for their effect on animal and human nervous systems, there are molecules within vegetation that may be of relevance to biochemical interactions (for example, plant species that express acetylcholinesterase are known).
- The observable effect should be distinct enough to suggest that a certain chemical or type of chemical might have been present (this could be also the result of degradation and/or reaction products that form metabolically after exposure or through environmental fate and transport processes). The observable change of interest is one that is intended to serve as an indicator of need for further characterisation. If an observable change in vegetation can be induced by a variety of chemicals, the proposal should be clear on which types of chemicals these might be (noting that from an early warning perspective, the ability to generate a response from a variety of possible toxic chemicals is advantageous).
- For whichever chemicals and/or classes of chemicals are considered in the proposal, the submission should include an explanation of why these chemicals have relevance to chemical security.

The underlying biochemistry of exposure for the type of vegetation and the chemicals considered must be described in detail. This would include relevant biomarkers and metabolic processes, as well as environmental fate and transport processes.

The proposal for experimentally demonstrating a proof-of-concept should include a detailed description of how the observable change would be recognised through a non-destructive on-site measurement method. This should include the type of equipment required and a means of creating an alert. Proposals that include the use of mobile devices, computer vision, apps, remote and/or automated data collection tools, and sensors are encouraged.

For the off-site proof-of-concept aspects of the proposal, suitable methods should be identified that could be used to experimentally confirm the presence of indicative markers. Proposals that employ OMICS and systems biology-based approaches are encouraged.

Submissions must follow the requirements outlined in the submission instructions and the statement of work (<https://www.ungm.org/Public/Notice/119024>) to be considered.



Download instruction documents

Download the detailed submission documents from the United Nations Global Marketplace Tender Notice (<https://www.ungm.org/Public/Notice/119024>)



There are no restrictions on what types of vegetation might be considered. However, preference for granting of an award will be given to proposals describing vegetation that is commonly found (even considered ubiquitous) across multiple geographic regions. A focus on a single type of plant is acceptable, but not required, for the submission.

Modalities

The Challenge will be run in three phases.

Phase 1

In Phase 1, proposals as described above will be evaluated by a technical evaluation team made up of members of the OPCW Technical Secretariat and the OPCW SAB. The corresponding authors (principal investigators) from up to 10 submissions (at least one from a State within each regional group that provides submissions) will be invited to deliver a presentation to the Plant Biomarker Challenge proposal evaluation team to “pitch” their proof-of-concept proposals to the scientific review committee.

Based on the presentations of the principal investigators, up to five of the submissions will be awarded a fixed-price contract of up to €40,000 to allow the proof-of-concept project to be performed as Phase 2 of the project. Should travel be necessary, The OPCW will provide travel, accommodation and entry visa (if needed) support for all invited principal investigators.

The grant will be paid out in a schedule that includes an initial payout with two staggered smaller payouts after receipt of a mid-term and final report of the project, respectively. Upon awarding of a grant, terms and conditions will be reviewed with the principal investigators receiving the award.

Individual awards can only be given to a single institution, where the money can be used by an individual principal investigator or collectively by collaborating scientists within that institution; if this is the desired outcome, it should be made clear in the submission. Proposals that are intended to be collaborative with multiple institutions represented are also possible (and encouraged); for this situation each institution should work together to draft one proposal that incorporates the entire body of work to be done. The submission should indicate the corresponding author and the institution to which the contract would be awarded. Please note that each award can only be provided to a single institution. The lead institution will then work with its collaborators to further disseminate the funding as necessary.



Proposals will be evaluated, and the authors of up to 10 submissions will be invited to pitch their proposals. Up to five of these submissions will be awarded a grant.

Phase 2

In Phase 2, the principal investigators receiving the grants will be given one year to demonstrate the proof-of-concept that was proposed. Within the year time frame, at least one progress report will be requested (at the 6 month mark), and opportunities will be provided to engage with the technical evaluation team.



Grant recipients have one year to demonstrate their concept and produce a progress report

Phase 3

Phase 3 will take place no later than three months after the end of Phase 2. All the principal investigators who received grants will be invited to present the results of their research to the technical evaluation committee. The OPCW will provide travel, accommodation and entry visa (if needed) support for all invited principal investigators.

A final report, that takes into account the questions and comments of the review committee, will be the final deliverable for the principal investigators. This is due within two months after the aforementioned final presentation.



Principal investigators present their final deliverables and produce a final report of their research.

To Enter

The deadline for the Phase 1 proposal submission is **23:59 CET on 14 January 2021**.

Late submissions and submissions that do not meet the requirements outlined in the submission instructions and the statement of work will not be considered.

Download the detailed submission documents from the United Nations Global Marketplace Tender Notice (<https://www.ungm.org/Public/Notice/119024>)

All submissions, including those not receiving an award, will be considered for inclusion in a scientific review of chemical exposure effects on vegetation. This review would be published in the peer-reviewed scientific literature. The review is intended to capture the knowledge produced by the challenge on underlying biochemistry of security-relevant toxic chemical exposure on vegetation. This would focus on vegetation-based biomarkers and metabolic processes, as well as environmental fate and transport processes that may serve as indicators for exposure and/or presence of a chemical which is toxic to humans and animals.

All principal investigators will be asked to give their consent for the information they provide to be included in the publication. In exchange, all consenting principal investigators whose proposals contribute to the review article will be included as authors and given opportunity to review and edit the manuscript. The scientific review committee will facilitate and coordinate the drafting and journal submission of the paper. This review article will be an open access publication to promote international exchange of scientific knowledge.

Contact

For more information, contact OPCW Procurement (https://www.opcw.org/contact-form?enquiry_type=Procurement).

Do not contact anyone else in the Technical Secretariat about the challenge as this may disqualify your proposal.

About the Scientific Advisory Board

The OPCW Scientific Advisory Board (<http://www.opcw.org/about-us/subsidiary-bodies/scientific-advisory-board>) is comprised of 25 independent experts from OPCW Member States. The role of the SAB is to assess and report to the Director-General developments in scientific and technological fields that are relevant to the Convention. On request, the SAB provides advice on technical matters related to the implementation of the Convention, including on co-operation and assistance to the Technical Secretariat.



REQUEST FOR QUOTATION (RFQ)

Plant Biomarkers Challenge Research Grants

RFQ Reference: OSP-P20-001	Date: 03 December 2020
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SECTION 1: REQUEST FOR QUOTATION (RFQ)

The OPCW kindly requests your quotation for the provision of goods, works and/or services as detailed in Annex B of this RFQ.

This Request for Quotation comprises the following documents:

Section 1: This request letter

Section 2: RFQ Instructions and Data

Annex A: General Conditions of Contract

Annex B: Schedule of Requirements (Statement of Work)

Annex C: Technical and Financial Offer

Annex D: Quotation Submission Form

When preparing your quotation, please be guided by the RFQ Instructions and Data. Please note that quotations must be submitted using Annex D: Quotation Submission Form and Annex C Technical and Financial Offer, by the method and by the date and time indicated. It is your responsibility to ensure that your quotation is submitted on or before the deadline. Quotations received after the submission deadline, for whatever reason, will not be considered for evaluation.

Thank you and we look forward to receiving your quotations.

Issued by:

Name: Eموke Ficز

Title: Procurement Officer

Date: 3 December 2020

SECTION 2: RFQ INSTRUCTIONS AND DATA

Deadline for the Submission of Quotation	14 January 2021
Method of Submission	Quotations must be submitted by email. Bid submission address: procurement@opcw.org ▪ File Format: PDF. ▪ File names must be maximum 60 characters long and must not contain any letter or special character other than from Latin alphabet/keyboard. ▪ All files must be free of viruses and not corrupted. ▪ Max. File Size per transmission: 5 MB. ▪ Mandatory subject of email: OSP-P20-001 ▪ Multiple emails must be clearly identified by indicating in the subject line "email no. X of Y", and the final "email no. Y of Y". ▪ It is recommended that the entire Quotation be consolidated into as few attachments as possible. ▪ The proposer should receive an email acknowledging email receipt.
Supplier Code of Conduct	All prospective suppliers must read the United Nations Supplier Code of Conduct and acknowledge that it provides the minimum standards expected of suppliers to the UN and OPCW. The Code of Conduct, which includes principles on labour, human rights, environment and ethical conduct may be found at: https://www.un.org/Depts/ptd/about-us/un-supplier-code-conduct.
Conflict of Interest	The OPCW encourages every prospective Supplier to avoid and prevent conflicts of interest, by disclosing to the OPCW if you, or any of your affiliates or personnel, were involved in the preparation of the requirements, design, specifications, cost estimates, and other information used in this RFQ.
General Conditions of Contract	Any Purchase Order or contract that will be issued as a result of this RFQ shall be subject to the General Conditions of Contract attached as Annex A.
Eligibility	Bidders shall have the legal capacity to enter into a binding contract with the OPCW and to deliver in the Netherlands, or through an authorized representative.
Currency of Quotation	Quotations shall be quoted in Euro. Where quoted in different currencies, for the purposes of comparison of all quotations, the OPCW will convert the currency quoted into Euro, in accordance with the prevailing UN Operational Rate of Exchange on the closing date.
Duties and taxes	Article II, Section 7, of the Convention on the Privileges and Immunities provides, inter alia, that the OPCW is exempt from all direct taxes, except charges for public utility services, and is exempt from customs restrictions, duties, and charges of a similar nature in respect of articles imported or exported for its official use. All quotes shall be submitted net of any direct taxes and any other taxes and duties, unless otherwise specified in Section 3: Data Sheet.
Documents to be submitted	Bidders shall include the following documents in their quotation: ☒ Annex D: Quotation Submission Form duly completed and signed ☒ Annex C: Technical and Financial Offer duly completed and signed and in accordance with the Schedule of Requirements (Specifications) in Annex B ☒ Other: Documents listed in Annex C.
Quotation validity period	Quotations shall remain valid for 60 days from the deadline for the Submission of Quotation.
Price variation	No price variation due to escalation, inflation, fluctuation in exchange rates, or any other market factors shall be accepted at any time during the validity of the quotation after the quotation has been received.

Partial Quotes	☒ Not permitted ☐ Permitted Insert conditions for partial quotes and ensure that the requirements are properly listed in lots to allow partial quotes
Alternative Quotes	☒ Not permitted ☐ Permitted If permitted, an alternative quote may be submitted only if a conforming quote to the RFQ requirements is submitted. Where the conditions for its acceptance are met, or justifications are clearly established, the OPCW reserves the right to award a contract based on an alternative quote. If multiple/alternative quotes are being submitted, they must be clearly marked as “Main Quote” and “Alternative Quote”
Payment Terms	☐ 100% within 30 days after receipt of goods, works and/or services and submission of payment documentation. ☒ Other: The award will be paid out in a schedule that includes an initial payment with two staggered smaller payments after receipt of a progress and final report of the project, respectively.
Contact Person for correspondence, notifications and clarifications	Focal Person: Eموك فicz E-mail address: procurement@opcw.org
Clarifications	Requests for clarification from bidders will not be accepted any later than 7 days before the submission deadline. Responses to request for clarification will be communicated by email.
Evaluation method	☐ The contract will be awarded to the lowest price substantially compliant offer ☒ Other: Proposals will be evaluated by a Technical Evaluation Team. Up to 10 submissions (at least one from a State within each regional group that provides submissions) will be invited to “pitch” their proof-of-concept proposals to the Technical Evaluation Team. Based on the presentations, up to five of the submissions) will be awarded a fixed price contract of up to €40,000. Should travel be necessary, the OPCW will provide travel, accommodation and entry visa (if needed) support.
Evaluation criteria	☒ Full compliance with all requirements as specified in Annex B ☒ Full acceptance of the General Conditions of Contract ☐ Comprehensiveness of after-sales services ☐ Earliest Delivery /shortest lead time ☐ Others Click or tap here to enter text.
Right not to accept any quotation	The OPCW is not bound to accept any quotation, nor award a contract or Purchase Order
Right to vary requirement at time of award	N/A
Type of Contract to be awarded	A Purchase Order (PO), the OPCW General Terms and Conditions (GTC) for the Purchase of Services (Annex A), the Statement of Work (Annex B) and the Supplier’s Technical and Financial Offer (Annex C) shall form the Contract. In cases where a bidder does not accept the type of Contract and the OPCW GTC, the OPCW reserves the right to reject the quotation.
Expected date for contract award.	01 March 2021

ANNEX A: GENERAL CONDITIONS OF CONTRACT

[General Terms and Conditions for Services](#)

ANNEX B: SCHEDULE OF REQUIREMENTS (SPECIFICATIONS)

The Schedule of Requirements is defined in the attached Annex B (Statement of Work).

ANNEX C: TECHNICAL AND FINANCIAL OFFER - SERVICES

Bidders are requested to complete this form, sign it and return it as part of their quotation along with Annex D Quotation Submission Form. The Bidder shall fill in this form in accordance with the instructions indicated. No alterations to its format shall be permitted and no substitutions shall be accepted.

Name of Bidder:	Click or tap here to enter text.	
RFQ reference:	OSP-P20-001	Date: Click or tap to enter a date.

Technical Offer

Provide the following:

- submissions do not require experimental demonstration. All submissions must provide a proposal for experimentally demonstrating a proof-of-concept. Proposals should describe how a given type of plant might present an “on-site” observable change and link this change to any indicative biomarker(s) that could be confirmed with “off-site” (laboratory-based) molecular detection methods. For more details please consult Annex B Statement of Work;
- a description of your qualification, capacity and expertise that is relevant to the Statement of Work;
- a methodology, approach and implementation plan;
- team composition and CVs of key personnel.

Financial Offer

Provide a lump sum for the provision of the services stated in your technical offer. The lump sum should include all costs of preparing and delivering the Services. All daily rates shall be based on an eight-hour working day.

Up to five of the submissions will be awarded a fixed price contract of up to €40,000. Should travel be necessary, the OPCW will provide travel, accommodation and entry visa (if needed) support.

Currency of Quotation: Click or tap here to enter text.

Ref	Description of Deliverables	Price
Total Price		

Compliance with Requirements

	You Responses		
	Yes, we will comply	No, we cannot comply	If you cannot comply, pls. indicate counter proposal
Delivery Lead Time	☐	☐	Click or tap here to enter text.
Validity of Quotation	☐	☐	Click or tap here to enter text.
Payment terms	☐	☐	Click or tap here to enter text.

I, the undersigned, certify that I am duly authorized to sign this quotation and bind the company below in event that the quotation is accepted.

Exact name and address of company

Company Name: Click or tap here to enter text.

Address: Click or tap here to enter text.

Click or tap here to enter text.

Phone No.: Click or tap here to enter text.

Email Address: Click or tap here to enter text.

Authorized Signature:

Date: Click or tap here to enter text.

Name: Click or tap here to enter text.

Functional Title of Authorised

Signatory: Click or tap here to enter text.

Email Address: Click or tap here to enter text.

ANNEX D: QUOTATION SUBMISSION FORM

Bidders are requested to complete this form, including the Company Profile and Bidder's Declaration, sign it and return it as part of their quotation along with Annex C: Technical and Financial Offer. The Bidder shall fill in this form in accordance with the instructions indicated. No alterations to its format shall be permitted and no substitutions shall be accepted.

Name of Bidder:	Click or tap here to enter text.	
RFQ reference:	OSP-P20-001	Date: Click or tap to enter a date.

Company Profile

Item Description	Detail			
Legal name of bidder	Click or tap here to enter text.			
Legal Address, City, Country	Click or tap here to enter text.			
Website	Click or tap here to enter text.			
Year of Registration	Click or tap here to enter text.			
Legal structure	Choose an item.			
Are you a UNGM registered vendor?	☐ Yes ☐ No If yes, insert UNGM Vendor Number			
Bank Information	Bank Name: Click or tap here to enter text. Bank Address: Click or tap here to enter text. IBAN: Click or tap here to enter text. SWIFT/BIC: Click or tap here to enter text. Account Currency: Click or tap here to enter text. Bank Account Number: Click or tap here to enter text.			
Previous relevant experience: 3 contracts				
Name of previous contracts	Client & Reference Contact Details	Contract Value	Period of activity	Types of activities undertaken

Bidder's Declaration

Yes	No	
☐	☐	Requirements and Terms and Conditions: I/We have read and fully understand the RFQ, including the RFQ Information and Data, Schedule of Requirements, the General Conditions of Contract and any Special Conditions of Contract. I/we confirm that the Bidder agrees to be bound by them.
☐	☐	I/We confirm that the Bidder has the necessary capacity, capability and necessary licenses to fully meet or exceed the Requirements and will be available to deliver throughout the relevant Contract

Yes	No	
		period.
☐	☐	Ethics: In submitting this Quote I/we warrant that the bidder: has not entered into any improper, illegal, collusive or anti-competitive arrangements with any Competitor; has not directly or indirectly approached any representative of the Buyer (other than the Point of Contact) to lobby or solicit information in relation to the RFQ; has not attempted to influence, or provide any form of personal inducement, reward or benefit to any representative of the Buyer.
☐	☐	I/We confirm to undertake not to engage in proscribed practices, or any other unethical practice, with the OPCW or the UN or any other party, and to conduct business in a manner that averts any financial, operational, reputational or other undue risk to the OPCW or the UN and we have read the United Nations Supplier Code of Conduct : https://www.un.org/Depts/ptd/about-us/un-supplier-code-conduct and acknowledge that it provides the minimum standards expected of suppliers to the UN and the OPCW.
☐	☐	Conflict of interest: I/We warrant that the bidder has no actual, potential or perceived Conflict of Interest in submitting this Quote, or entering into a Contract to deliver the Requirements. Where a Conflict of Interest arises during the RFQ process the bidder will report it immediately to the Procuring Organisation's Point of Contact.
☐	☐	Prohibitions, Sanctions: I/We hereby declare that our firm, its affiliates or subsidiaries or employees, including any subcontractors or suppliers for any part of the contract is not under procurement prohibition by an intergovernmental or United Nations Organisation, including but not limited to prohibitions derived from the Compendium of United Nations Security Council Sanctions Lists and have not been suspended, debarred, sanctioned or otherwise identified as ineligible by any UN Organization, including any organisation within the World Bank Group or any multi-lateral development bank, or by the institutions and bodies of economic integration organisations (e.g., the EU).
☐	☐	Bankruptcy: I/We have not declared bankruptcy, are not involved in bankruptcy or receivership proceedings, and there is no judgment or pending legal action against them that could impair their operations in the foreseeable future.
☐	☐	Offer Validity Period: I/We confirm that this Quote, including the price, remains open for acceptance for the Offer Validity.
☐	☐	I/We understand and recognize that you are not bound to accept any Quotation you receive and we certify that the goods offered in our Quotation are new and unused.
☐	☐	By signing this declaration the signatory below represents, warrants and agrees that he/she has been authorised by the Organization/s to make this declaration on its/their behalf.

Signature: _____

Name: Click or tap here to enter text.

Title: Click or tap here to enter text.

Date: Click or tap to enter a date.



Annex B STATEMENT OF WORK Plant Biomarker Challenge

1. Scope

This Statement of Work (SOW) describes the requirements for the OPCW's Plant Biomarker Challenge. The OPCW is seeking proposals from scientists across its Member States that describe a specific type of vegetation and its potential to act as an indicator of exposure to chemicals that are toxic to humans and animals as part of the Plant Biomarker Challenge.

With a view towards prevention of the re-emergence of chemical weapons and strengthening efforts to keep humans safe and secure from chemical threats, the OPCW Technical Secretariat is interested in learning from the world's scientific community about innovative, yet practical, capabilities that enable the recognition of biochemical signatures of chemical exposure. For example, observable changes in colour, leaf and/or stem morphology and/or any other observable health indicator of vegetation that can be shown to have correlation to indicative chemical exposure biomarkers in the exposed plant. As vegetation (whether natural, introduced or invasive) is always present in areas of human habitation, plants are well suited as potential sentinel species.

Capabilities of interest would include the ability to recognise chemical exposure at the earliest possible occurrence for protection and response purposes, and/or to aid in the retrospective analysis of an incident involving chemical exposure. In the latter case, especially for highly reactive chemicals or chemicals exposed to a decontamination process, effects that arise due to chemicals generated through metabolic pathways, and/or environmental fate and transport processes potentially play an important role.

Fixed price contracts will be awarded for the most innovative proposals, to allow initiation for a proof-of-concept study. Furthermore, the Secretariat intends to take the relevant collective submissions and produce a scientific review article to be published in peer-reviewed literature and authored by all submitting scientists as a means to exchange scientific knowledge across international borders.

Submissions from scientists from all of the five regional groups of OPCW Member States are highly encouraged.

Proposals as described above will be evaluated by a Technical Evaluation Team. Up to 10 submissions (at least one from a State within each regional group that provides submissions) will be invited to "pitch" their proof-of-concept proposals to the Technical Evaluation Team. Based on the presentations, up to five of the submissions will be awarded a fixed price contract of up to €40,000. Should travel be necessary, the OPCW will provide travel, accommodation and entry visa (if needed) support.

Contract awards can only be given to a single institution, where the money can be used by an individual principal investigator or collectively by



collaborating scientists within that institution; if this is the desired outcome, it should be made clear in the submission. Proposals that are intended to be collaborative with multiple institutions represented are also possible (and encouraged); for this situation each institution should draft separate proposals (specific to the work to be done at each institution) and submit the proposals together (as a package) with a lead institution identified for the collaborating groups. The lead institution will receive the award, should the collective proposal be selected by the Technical Evaluation Team.

All submissions, including those not receiving an award, will be considered for inclusion in a scientific review of chemical exposure effects on vegetation. This review would be published in the peer-reviewed scientific literature.

All principal investigators will be asked to give their consent for the information they provide to be included in the publication. In exchange, all consenting principal investigators whose proposals contribute to the review article will be included as authors and given opportunity to review and edit the manuscript. A scientific review committee will facilitate and coordinate the drafting and journal submission of the paper. This review article will be an open access publication to promote international exchange of scientific knowledge.

2. Definitions, Acronyms, and Abbreviations

The following definitions, acronyms, and abbreviations shall apply throughout this SOW unless defined otherwise hereinafter:

CWA – chemical warfare agent

TIC – toxic industrial chemical

SAB – Scientific Advisory Board

OMICS - various disciplines in biology whose names end in the suffix -omics, such as genomics, proteomics, etc.

3. Requirements

Submissions do not require experimental demonstration. All submissions must provide a proposal for experimentally demonstrating a proof-of-concept. Proposals should describe how a given type of plant might present an “on-site” observable change and link this change to any indicative biomarker(s) that could be confirmed with “off-site” (laboratory-based) molecular detection methods.

Submissions from collaborating scientists and research groups are encouraged. The submission should indicate the corresponding author and the institution to which the contract would be awarded. Please note that each award can only be provided to a single institution.



There are no restrictions on what types of vegetation might be considered. However, preference will be given to proposals describing vegetation that is commonly found (even considered ubiquitous) across multiple geographic regions. A focus on a single type of plant is acceptable, but not required, for the submission.

As there are countless examples of chemicals that can cause harm to vegetation and also can concentrate in plant tissue once released in the environment, preference for an awarded proposal will be given to effects that are induced by a chemical action on a life (metabolic) process. This is intended to be a chemical effect that manifests itself through the interaction of biomarkers and/or adduct formation. The chemicals of interest should be relevant to chemical security concerns due to toxic effects on humans and animals. Proposals that look at commonly used and available herbicides will not be considered.

The underlying biochemistry of exposure for the type of vegetation and the chemicals considered must be described in detail. This would include relevant biomarkers and metabolic processes, as well as environmental fate and transport processes.

The proposal for experimentally demonstrating a proof-of-concept should include a detailed description of how the observable change would be recognised through a non-destructive on-site measurement method. This should include the type of equipment required and a means of creating an alert. Proposals that include the use of mobile devices, computer vision, apps, remote and/or automated data collection tools, and sensors are encouraged.

For the off-site proof-of-concept aspects of the proposal, suitable methods should be identified that could be used to experimentally confirm the presence of indicative markers. Proposals that employ OMICS and systems biology-based approaches are encouraged.

The following should also be considered while developing a proposal:

- The OPCW Designated Laboratory Network has developed sound and robust methods for analysis of CWAs in environmental samples, making traditional CWAs of lesser interest for submitted proposals (CWAs also require specific handling and safety considerations which make them poorly suited to proof-of-concept experiments outside expert laboratories). If a proposal does address an innovative idea involving CWAs, it would be considered on its merits, and a proof-of-concept study using CWA simulants would be acceptable.
- Proposals are encouraged to include consideration of TICs. Easily accessible TIC (many of which are far less toxic than CWAs) pose the risk of being used as chemical threats, and proposals that expand the knowledge of how to recognise environmental exposure are of interest.
- Some types of agricultural chemicals, including pesticides but excluding herbicides, may also be of relevance.
- Another commonly discussed category of chemicals that pose security concerns are the so-called central nervous system (CNS)-acting



chemicals. While these chemicals are thought of for their effect on animal and human nervous systems, there are molecules within vegetation that may be of relevance to biochemical interactions (for example, plant species that express acetylcholinesterase are known).

- The observable effect should be distinct enough to suggest that a certain chemical or type of chemical might have been present (this could be also the result of degradation and/or reaction products that form metabolically after exposure or through environmental fate and transport processes). The observable change of interest is one that is intended to serve as an indicator of need for further characterization. If an observable change in vegetation can be induced by a variety of chemicals, the proposal should be clear on which types of chemicals these might be (noting that from an early warning perspective, the ability to generate a response from a variety of possible toxic chemicals is advantageous).
- For whichever chemicals and/or classes of chemicals are considered in the proposal, the submission should include an explanation of why these chemicals have relevance to chemical security.

The Technical Evaluation Team will determine, inter alia, whether:

- the proposed research meets the objectives of the Plant Biomarker Challenge;
- the project has sufficient scientific merit;
- the existing resources, infrastructures and expertise, as declared, are adequate for implementation of the project; and
- the resources and related funding requested are justified and commensurate with the planned tasks and expenditures.

The Technical Evaluation Team will apply the aforementioned review criteria for both the written proposal submissions as well as the oral presentations by selected applicants.

4. Deliverable Data Items

The Contractor shall deliver the following data items (in English and delivered electronically, unless otherwise specified):

1. Progress report
 - a. To be delivered within 6 months (electronic submission in Microsoft Word and Adobe PDF format) after the award.
2. Presentation
 - a. To be delivered in person or virtually (electronic submission in Microsoft PowerPoint or Adobe PDF) within 12-15 months after award.
3. Final report
 - a. To be delivered within two months after the Presentation (electronic submission in Microsoft Word or Adobe PDF)



GENERAL TERMS AND CONDITIONS OF CONTRACT

CONTRACTS FOR THE PROVISION OF SERVICES

The Contract shall be governed by the following General Terms and Conditions of Contract - Contracts for the Provision of Services (hereinafter referred to as “General Terms and Conditions”), together with its incorporated attachments or annexes, if any. Any departure from these General Terms and Conditions shall only be valid if mutually agreed between the Parties in writing.

1. DEFINITIONS

“**OPCW**” or “**Organisation**” means the Organisation for the Prohibition of Chemical Weapons represented by the Director-General or his/her duly authorised representative.

“**Contractor**” means the supplier of the Services named in the Contract, represented by an individual duly authorised to undertake contractual obligations on behalf of the supplier.

“**Contract**” means the written agreement (including a Purchase Order) relating to the purchase of Services between the Organisation and the Contractor and includes these General Terms and Conditions.

“**Parties**” means the Contractor and the Organisation, collectively, and “**Party**” means either one of them.

“**Services**” means any Services provided, or to be provided, to the Organisation by the Contractor, or any of the Contractor's subcontractors, including any product from such Services, pursuant to or in connection with the Contract.

2. LEGAL STATUS OF THE PARTIES

The Organisation and the Contractor have the following legal status:

2.1 Pursuant to paragraph 48 of Article VIII of the Chemical Weapons Convention (hereinafter referred to as the “Convention”), the Agreement between the Organisation for the Prohibition of Chemical Weapons and the Kingdom of the Netherlands concerning the Headquarters of the OPCW (hereinafter referred to as the “Headquarters Agreement”), any other agreement to which the Organisation is a Party concerning its privileges and immunities, and the relevant legislation of a Member State of the OPCW, as applicable, the Organisation has full legal personality and enjoys such privileges and immunities as are necessary for the independent fulfilment of its functions.

2.2 The Contractor shall have the legal status of an independent Contractor *vis-à-vis* the Organisation, and nothing contained in or relating to the Contract shall be construed as establishing or creating between the Parties the relationship of employer and employee or of principal and agent. The officials, representatives, employees, or subcontractors of each of the Parties shall not be considered in any respect as being the employees or agents of the other Party and each Party shall be solely responsible for all claims arising out of or relating to its engagement of such persons or entities.

3. RESPONSIBILITY FOR PERSONNEL

To the extent that the Contract involves the provision of any Services to the OPCW by the Contractor's officials, employees, agents, servants, subcontractors and other representatives (hereinafter referred to collectively as the “Contractor's personnel”), the following provisions shall apply:

3.1 The Contractor shall be responsible for the professional and technical competence of the personnel it assigns to perform work under the Contract and will select reliable and competent individuals who will be able to effectively perform the obligations under the Contract and who, while doing so, will respect the local laws and customs and conform to a high standard of moral and ethical conduct.

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- 3.2 The Contractor's personnel shall be professionally qualified, and, if required to work with officials or staff of the Organisation, shall be able to do so effectively. The qualifications of any personnel whom the Contractor may assign or may propose to assign to perform any obligations under the Contract shall be substantially the same, or better, as the qualifications of any personnel originally proposed by the Contractor.
- 3.3 At the option of and in the sole discretion of the Organisation:
- 3.3.1 the qualifications of personnel proposed by the Contractor (*e.g.*, a *curriculum vitae*) may be reviewed by the Organisation prior to such personnel's performing any obligations under the Contract;
 - 3.3.2 any personnel proposed by the Contractor to perform obligations under the Contract may be interviewed by qualified staff or officials of the Organisation prior to such personnel performing any obligations under the Contract; and,
 - 3.3.3 in cases in which the Organisation has reviewed the qualifications of such Contractor's personnel, the Organisation may reasonably refuse to accept any such personnel.
- 3.4 Requirements specified in the Contract regarding the number and qualifications of the Contractor's personnel may change during the course of the performance of the Contract. Any such change shall be made only following written notice of such proposed change and upon written agreement between the Parties regarding such change, subject to the following:
- 3.4.1 The Organisation may, at any time, request, in writing, the withdrawal and replacement of any of the Contractor's personnel, and such request shall not be unreasonably refused by the Contractor.
 - 3.4.2 Any of the Contractor's personnel assigned to perform obligations under the Contract shall not be withdrawn or replaced without the prior written consent of the Organisation, which shall not be unreasonably withheld.
 - 3.4.3 The withdrawal or replacement of the Contractor's personnel shall be carried out as quickly as possible in a manner that will not adversely affect the performance of obligations under the Contract.
 - 3.4.4 All expenses related to the withdrawal or replacement of the Contractor's personnel shall, in all cases, be borne exclusively by the Contractor.
 - 3.4.5 Any request related to the withdrawal or replacement of the Contractor's personnel shall not be considered to be a termination, in whole or in part, of the Contract, and the Organisation shall not bear any liability in respect of such withdrawn or replaced personnel.
 - 3.4.6 If a request for the withdrawal or replacement of the Contractor's personnel is *not* based upon a default or failure on the part of the Contractor to perform its obligations in accordance with the Contract, the misconduct of the personnel, or the inability of such personnel to reasonably work together with the Organisation's officials and staff, then the Contractor shall not be liable by reason of any such request for the withdrawal or replacement of the Contractor's personnel for any delay in the performance of the Contractor of its obligations under the Contract that is substantially the result of such personnel being withdrawn or replaced.
- 3.5 Nothing in these General Terms and Conditions shall be construed to create any obligations on the part of the Organisation with respect to the Contractor's personnel assigned to perform the work under the Contract, and such personnel shall remain the sole responsibility of the Contractor.
- 3.6 The Contractor shall be responsible for requiring that all personnel assigned by it to perform any obligations under the Contract and who may have access to any premises or other property of the Organisation shall:
- 3.6.1 undergo or comply with security screening requirements made known to the Contractor by the Organisation, including but not limited to, where deemed necessary by the Organisation, a review of any criminal history;
 - 3.6.2 when within the Organisation's premises or on the Organisation's property, display such identification as may be approved and furnished by the Organisation's security officials, and that upon the withdrawal or replacement of any such personnel or upon termination or completion of the Contract, such personnel shall immediately return any such identification to the Organisation for cancellation.

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- 3.7 Within one working day after learning that one of the Contractor's personnel, who have access to any of the Organisation's premises, have been charged by law enforcement authorities with an offense other than a minor traffic offense, the Contractor shall provide written notice to inform the Organisation about the particulars of the charges then known and shall continue to inform the Organisation concerning all substantial developments regarding the disposition of such charges.
- 3.8 All operations of the Contractor, including without limitation, storage of equipment, materials, supplies and parts, within the Organisation's premises or on the Organisation's property shall be confined to areas authorised or approved by the Organisation. The Contractor's personnel shall not enter or pass through and shall not store or dispose of any of its equipment or materials in any areas within the Organisation's premises or on the Organisation's property without appropriate authorisation from the Organisation.

4. ASSIGNMENT

- 4.1 Except as provided in Article 4.2, below, the Contractor shall not, assign, transfer, pledge or make any disposition of the Contract, of any part thereof, or of any of the rights, claims or obligations under the Contract without the prior written authorisation of the Organisation. Any such unauthorised assignment, transfer, pledge or other disposition, or any attempt to do so, shall not be binding on the Organisation. Except as permitted with respect to any approved subcontractors, the Contractor shall not delegate any of its obligations under the Contract, except with the prior written consent of the Organisation. Any such unauthorised delegation, or attempt to do so, shall not be binding on the Organisation.
- 4.2 The Contractor may assign or otherwise transfer the Contract to the surviving entity resulting from a reorganization of the Contractor's operations, provided that:
- 4.2.1 such reorganization is not the result of any bankruptcy, receivership or other similar proceedings; and
 - 4.2.2 such reorganization arises from sale, merger, or acquisition of all or substantially all of the Contractor's assets or ownership interests; and
 - 4.2.3 the Contractor promptly notifies the Organisation about such assignment or transfer at the earliest opportunity; and
 - 4.2.4 the assignee or transferee agrees in writing to be bound by all of the terms and conditions of the Contract, and such writing is promptly provided to the OPCW following the assignment or transfer.

5. SUBCONTRACTING

- 5.1 In the event that the Contractor requires the services of any subcontractor to perform any obligations under the Contract, the Contractor shall obtain the prior written approval of the Organisation of the selected subcontractor. The Organisation shall be entitled, in its sole discretion, to review the qualifications of any subcontractors and to reject any proposed subcontractor that the Organisation reasonably considers not qualified to perform the obligations under the Contract.
- 5.2 The Organisation shall have the right to require any subcontractor's removal from the Organisation's premises without having to give any justification thereof. Any such rejection or request for removal shall not, in and of itself, entitle the Contractor to claim any delays in the performance, or to assert any excuses for the non-performance, of any of its obligations under the Contract, and the Contractor shall be solely responsible for all services and obligations performed by its subcontractors.
- 5.3 The terms of any subcontract shall be subject to, and shall be construed in a manner that is fully in accordance with, all of the terms and conditions of the Contract.
- 5.4 Except with the prior written authorisation of the Organisation, the Contractor shall ensure that its subcontractor(s) do not subcontract, assign, transfer, pledge or make any other disposition of the Contract, of any part of the Contract, or of any of the rights, claims or obligations under the Contract.

6. OBLIGATIONS OF THE CONTRACTOR

- 6.1 The Contractor shall:
- 6.1.1 perform its obligations under the Contract in accordance with applicable laws, norms, standards and regulations; and

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- 6.1.2 perform its obligations in good faith and comply with both the express requirements of the Organisation, as defined in the Contract, and all obligations arising from the nature and purpose of the Contract; and
 - 6.1.3 procure tools, materials and personnel as necessary for the proper performance of the Contract; and
 - 6.1.4 obtain and maintain all permits, licenses and/or authorizations as required by applicable laws and regulations and as necessary for the performance of its obligations under the Contract.
- 6.2 In the event of failure to obtain permits, licenses and/or authorizations required under this Article within a reasonable time after signature of the Contract, depending on the nature and the scope of the Contract, the Organisation may declare the Contract void or terminate the Contract for the part not performed.

7. DELIVERY

The Contractor shall deliver the Services at the place of delivery specified in the Contract and within the delivery period stipulated in the Contract.

8. WARRANTIES

- 8.1 The Contractor warrants and represents that:
- 8.1.1 any Services to be provided under the Contract, including any equipment used for such Services, shall be free from any right or claim of a third party, including rights or claims based on copyright, patent or other industrial or intellectual property rights; and
 - 8.1.2 all materials, equipment and workmanship utilised in performing the Services under the Contract shall be of the respective kind(s) described in the Contract and free from defects.

9. EXAMINATION AND ACCEPTANCE

- 9.1 The Organisation reserves the right to examine at its expense the equipment, materials and supplies and/or to assess the Services provided under the Contract prior to effecting the payment due under the Contract. The Contractor shall provide, when possible, all facilities for any such examination without any additional charge.
- 9.2 In case of rejection by the Organisation of the equipment, materials, supplies and/or Services provided, a new examination may be carried out by representatives of both Parties, if promptly requested by the Contractor, and before the Organisation exercises any legal remedies. The Contractor shall bear the expenses of such a new examination.
- 9.3 All examinations shall be carried out in good faith.
- 9.4 If the Contract specifically requires the Contractor to procure equipment, material or supplies on behalf of the Organisation in connection with the performance of the Services, such procurement shall be of new equipment, materials or supplies, unless procurement of used equipment, materials or supplies is approved in advance by the Organisation.

10. TITLE

Unless the Contract stipulates otherwise, title to any goods which are provided in connection with the Services, including the product of such Services, shall pass from the Contractor to the Organisation upon their delivery and acceptance by the Organisation in accordance with the terms of the Contract.

11. PRICE AND PAYMENT

- 11.1 The price and the currency specified in the Contractor's offer, as accepted by the Organisation, are firm and not subject to revision pending duration of the Contract. The Organisation's financial liability under the Contract is restricted to the price and currency indicated in the Contract. The price specified in the Contract shall not be increased except with the prior written agreement of the Organisation.
- 11.2 Unless expressly stipulated otherwise in the Contract, the Organisation shall effect payment within thirty (30) days of receiving the invoice and any other documents specified in the Contract or full provision of the Services, whichever is later.

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- 11.3** In no event will complete or partial payment by the Organisation, in and of itself, constitute acceptance of the Services.
- 11.4** The Organisation shall not pay any charge for late payment unless this has been expressly agreed to in writing.
- 11.5** Advance payment shall only be authorised by the Organisation where normal commercial practice or the interests of the Organisation so require.

12. INDEMNIFICATION

- 12.1** The Contractor shall indemnify, hold and save harmless and defend, at its own expense, the Organisation, its officials, agents and employees, and any of its Member States, from and against all suits, proceedings, claims, demands, losses and liability of any kind or nature, including their costs and expenses, arising out of:
- 12.1.1** negligence, acts or omissions of the Contractor or its personnel and subcontractors in the performance of the Contract, including claims and liability in the nature of workers' compensation; and
 - 12.1.2** claims arising out of the unauthorised use of patented inventions or devices, copyrighted material or other intellectual property provided by the Contractor under the Contract.
- 12.2** The responsibility of the Contractor under this Article shall not be limited by or subject to any terms of existing Contractor's insurances.

13. INSURANCE AND LIABILITY

- 13.1** The Contractor shall pay the Organisation promptly for all loss, destruction, or damage to the property of the Organisation caused by the Contractor's personnel or by any of its subcontractors or anyone else directly or indirectly employed by the Contractor or its subcontractors in the performance of the Contract.
- 13.2** Unless otherwise provided in the Contract, prior to the commencement of the performance of any other obligations under the Contract, and subject to any limits which may be set forth in the Contract, the Contractor shall take out and shall maintain for the entire term of the Contract, for any extension thereof, and for a period following any termination of the Contract reasonably adequate to deal with losses:
- 13.2.1** insurance against all risks in respect of its property and any equipment used for the performance of the Contract;
 - 13.2.2** workers' compensation insurance, or its equivalent, or employer's liability insurance, or its equivalent, with respect to the Contractor's personnel sufficient to cover all claims for injury, death and disability, or any other benefits required to be paid by law, in connection with the performance of the Contract;
 - 13.2.3** liability insurance in an adequate amount to cover third party claims for death and bodily injury, products and completed operations liability, and loss or damage to property, arising from or in connection with the Contractor's performance under the Contract, including but not limited to, liability arising out or in connection with the acts or omissions of the Contractor, its personnel, agents, or invitees, or the use, during the performance of the Contract, of any vehicles, boats, airplanes or other transportation vehicles, and equipment, whether or not owned by the Contractor; and
 - 13.2.4** such other insurance as may be agreed upon in writing between the Contractor and the Organisation.
- 13.3** The Contractor's insurance policies shall also cover subcontractors and all defense costs and shall contain a standard "cross liability" clause.
- 13.4** The Contractor acknowledges and agrees that the Organisation accepts no responsibility for providing life, health, accident, travel or any other insurance coverage for any Contractor's personnel performing services in connection with the Contract.
- 13.5** The Contractor shall, upon request, provide the Organisation with satisfactory evidence of the insurances required under this Article.
- 13.6** The Organisation reserves the right to request the Contractor to increase the liability coverage defined in the above insurance policies, as appropriate, depending on the value and purposes of the Contract. Any amounts not insured, not recovered or not claimed by the Contractor shall be borne by the Contractor.

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13.7 Except for the workers' compensation insurance, the insurance policies taken by the Contractor shall include a waiver of subrogation of the Contractor's rights to the insurance carrier against the OPCW, and, at the request of the Organisation:

13.7.1 name the OPCW as an additional insured under the liability policies, including, if required, as a separate endorsement under the policy; and

13.7.2 provide that the OPCW shall receive thirty (30) days written notice from the Contractor's insurance carrier prior to any cancellation or material change of coverage.

13.8 The Contractor shall be responsible to fund all amounts within any policy deductible or retention.

13.9 The Contractor acknowledges and agrees that neither the requirement for taking out and maintaining insurance as set forth in the Contract nor the amount of any such insurance, including but not limited to, any deductible or retention relating thereto, shall in any way be construed as limiting the Contractor's liability arising under or relating to the Contract.

14. ENCUMBRANCES AND LIENS

The Contractor shall not cause or permit any lien, attachment or other encumbrance by any person to be placed on file or to remain on file in any public office or on file with the Organisation against any monies due to the Contractor or that may become due for any work done or against any goods supplied or materials furnished under the Contract, or by reason of any other claim or demand against the Contractor or the Organisation.

15. EQUIPMENT FURNISHED BY THE ORGANISATION

Title to any equipment and supplies that may be furnished by the Organisation to the Contractor for the performance of any obligations under the Contract shall rest with the Organisation, and any such equipment shall be returned to the Organisation at the conclusion of the Contract. Such equipment, when returned to the Organisation, shall be in the same condition as when delivered to the Contractor, subject to normal wear and tear, and the Contractor shall be liable to compensate the Organisation for the actual costs of any loss, damage to, or degradation of the equipment that is beyond normal wear and tear.

16. COPYRIGHT, PATENTS AND OTHER PROPRIETARY RIGHTS

16.1 Except as is otherwise expressly provided in writing in the Contract, the Organisation shall be entitled to all intellectual property and other proprietary rights including, but not limited to, patents, copyrights, and trademarks, with regard to products, processes, inventions, ideas, know-how, or documents and other materials which the Contractor has developed for the Organisation under the Contract and which bear a direct relation to or are produced or prepared or collected in consequence of, or during the course of, the performance of the Contract. The Contractor acknowledges and agrees that such products, documents and other materials constitute works made for hire for the Organisation.

16.2 To the extent that any such intellectual property or other proprietary rights consist of any intellectual property or other proprietary rights of the Contractor:

16.2.1 that pre-existed the performance by the Contractor of its obligations under the Contract; or

16.2.2 that the Contractor may develop or acquire, or may have developed or acquired, independently of the performance of its obligations under the Contract,

the Organisation does not and shall not claim any ownership interest thereto, and the Contractor grants to the Organisation a perpetual and royalty-free license to use such intellectual property or other proprietary right.

16.3 At the request of the Organisation, the Contractor shall take all necessary steps, execute all necessary documents, and generally assist in securing such proprietary rights and transferring or licensing them to the Organisation in compliance with the requirements of the applicable law and the Contract.

16.4 Subject to the foregoing provisions, all maps, drawings, photographs, mosaics, plans, reports, estimates, recommendations, documents, and all other data compiled by or received by the Contractor under the Contract shall be the property of the Organisation, shall be made available for use or inspection by the Organisation at reasonable times and in reasonable places, shall be treated as confidential, and shall be delivered only to the Organisation's authorised officials on completion of the work under the Contract.

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17. PUBLICITY AND USE OF THE NAME, EMBLEM OR OFFICIAL SEAL OF THE ORGANISATION

- 17.1 Unless specifically authorised in writing by the Organisation, the Contractor shall neither disclose the terms of the Contract nor advertise or otherwise make public the fact that it has a contractual relationship with the Organisation.
- 17.2 The Contractor shall not use in any manner whatsoever the name, emblem, or official seal of the Organisation, or any abbreviation of the name of the Organisation, in connection with the Contractor's business or otherwise, unless authorised in writing by the Organisation.

18. CONFIDENTIALITY

- 18.1 The Contractor and its personnel shall not use any information acquired or developed in the course of this Contract for any purpose without the prior authorisation in writing of the Organisation.
- 18.2 The Contractor is required to exercise the utmost discretion during the performance of the Contract. Except with the prior written authorisation of the Organisation, the Contractor may not communicate to any other person, government or authority external to the Organisation any information known to it by reason of its Contract with the Organisation which has not previously been made public, nor shall the Contractor at any time use such information to private advantage. In case the Contractor is requested by law or judicial order or by any national authority to disclose information received from the Organisation, the Contractor, before any such disclosure is made, shall give the Organisation immediate notice of such a request in order to allow the Organisation to take protective measures or such other action that it deems appropriate.
- 18.3 The Organisation reserves the right to disclose information about the Contract to the extent required pursuant to the Chemical Weapons Convention, decisions of the Organisation's policy-making organs, or internal rules promulgated thereunder.
- 18.4 If the Organisation specifically so requires, a duly authorised representative of the Contractor shall sign a secrecy agreement with the Organisation on behalf of the Contractor based on a template to be provided by the Organisation at the same time of signature of the Contract.
- 18.5 The obligations under this Article shall not lapse upon expiration, termination, cancellation, or non-renewal of the Contract.
- 18.6 The Contractor shall be liable for any breach of confidentiality by it or its personnel, agents, subcontractors or anyone directly or indirectly employed by them. The extent of any such liability shall be directly proportional to the extent of the damage caused.

19. FORCE MAJEURE; OTHER CHANGES IN CONDITION

- 19.1 In the event and as soon as possible after the occurrence of any cause constituting *force majeure*, the affected Party shall give notice and full particulars in writing to the other Party of such occurrence or cause, if the affected Party is thereby rendered unable, wholly or in part, to perform its obligations and meet its responsibilities under the Contract. The affected Party shall also notify the other Party of any other changes in condition or the occurrence of any event which interferes or threatens to interfere with its performance of the Contract. Not more than fifteen (15) days following the provision of such notice of *force majeure* or other changes in condition or occurrence, the affected Party shall also submit a statement to the other Party of estimated expenditures that will likely be incurred for the duration of the change in condition or the event of *force majeure*. On receipt of the notice or notices required hereunder, the Party not affected by the occurrence of a cause constituting *force majeure* shall take such action as it reasonably considers to be appropriate or necessary in the circumstances, including the granting to the affected Party of a reasonable extension of time in which to perform any obligations under the Contract.
- 19.2 If the Contractor is rendered unable, wholly or in part, by reason of *force majeure* to perform its obligations and meet its responsibilities under the Contract, the Organisation shall have the right to suspend or terminate the Contract on the same terms and conditions as are provided for in Article 20 ("Termination of the Contract"), except that the period of notice shall be seven (7) days instead of thirty (30) days. In any case, the Organisation shall be entitled to consider the Contractor permanently unable to perform its obligations under the Contract in case the Contractor is unable to perform its obligations, wholly or in part, by reason of *force majeure* for any period in excess of sixty (60) days from the date of receipt by the Organisation of the relevant notice or of the Organisation becoming aware, by other means, of the Contractor's inability.

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19.3 *force majeure*, as used herein, means any unforeseeable and irresistible act of nature, any act of war (whether declared or not), invasion, revolution, insurrection, terrorism, or any other acts of similar nature or force, provided that such acts arise from causes beyond the control and without the fault or negligence of the Contractor.

20. TERMINATION OF THE CONTRACT

20.1 Either Party may terminate the Contract for cause, in whole or in part, upon thirty (30) days written notice, in writing, to the other Party. The Organisation may terminate the Contract at any time, in whole or in part, in any case in which the mandate of the Organisation applicable to the performance of the Contract or the funding of the Organisation applicable to the Contract is curtailed or terminated, whether in whole or in part.

20.2 In addition, unless otherwise provided in the Contract, upon sixty (60) days advance written notice to the Contractor, the Organisation may terminate the Contract without having to provide any justification therefor.

20.3 In the event of any termination of the Contract, upon receipt of notice of termination by the Organisation, the Contractor shall, except as may be directed by the Organisation in the notice of termination or otherwise in writing:

20.3.1 take immediate steps to bring the performance of any obligation under the Contract to a close in a prompt and orderly manner and reduce expenses to a minimum;

20.3.2 refrain from undertaking any further or additional commitments under the Contract as of and following the date of receipt of such notice;

20.3.3 place no further subcontracts or orders for materials, services, or facilities, except as the Organisation and the Contractor agree in writing are necessary to complete any portion of the Contract that is not terminated;

20.3.4 terminate all subcontracts or orders to the extent they relate to the portion of the Contract terminated;

20.3.5 transfer title and deliver to the Organisation, the fabricated and unfabricated parts, work in progress, completed work, supplies, and other material produced or acquired for the portion of the Contract terminated;

20.3.6 deliver all completed or partially completed plans, drawings, information, and other property that, if the Contract had been completed, would be required to be furnished to the Organisation hereunder;

20.3.7 complete performance of the work not terminated; and

20.3.8 take any other action that may be necessary, or that the Organisation may direct in writing, for the minimisation of losses and for the protection and preservation of any property, whether tangible or intangible, related to the Contract that is in possession of the Contractor and in which the Organisation has or may be reasonably expected to acquire an interest.

20.4 In the event of any termination, the Organisation shall be entitled to obtain reasonable written accountings from the Contractor concerning all obligations performed or pending in accordance with the Contract.

20.5 On termination, the Organisation shall not be liable to pay the Contractor, except for those goods delivered and Services provided to the Organisation in accordance with the requirements of the Contract prior to the Contractor's receipt of notice of termination from the Organisation or to the Organisation's receipt of notice of termination from the Contractor.

20.6 In no event will the Organisation be liable to pay the Contractor an amount greater than the agreed Contract price.

20.7 The Organisation may, without prejudice to any other right or remedy available to it, terminate the Contract immediately by giving the Contractor written notice in the event that:

20.7.1 the Contractor commits a breach to the terms of the Contract and fails to remedy the situation within a reasonable time upon the Organisation's written request; in the event of a breach of Article 5 ("Subcontracting"), or any of the essential terms of the Contract listed in Article 30 below ("Essential Terms"), the right to termination under this paragraph shall also apply with respect to any subcontractor for the part of work related to such subcontractor;

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- 20.7.2** the Contractor is adjudged bankrupt, or made a general assignment for the benefit of its creditors, or a receiver is appointed on account of the Contractor's insolvency; or
- 20.7.3** the Organisation reasonably determines that the Contractor has become subject to a materially adverse change in its financial condition that threatens to substantially affect the ability of the Contractor to perform any of its obligations under the Contract.
- 20.8** Except as prohibited by law, the Contractor shall be bound to compensate the Organisation for all damages, costs and losses of interest as a result of any of the events specified in paragraphs 20.7.1 and 20.7.2 above and resulting from or relating to a termination of the Contract, even if the Contractor is adjudged bankrupt, or is granted a moratorium or stay or is declared insolvent. The Contractor shall immediately inform the Organisation of the occurrence of any of the events in paragraphs 20.7.1 and 20.7.2 above and shall provide the Organisation with any information pertinent thereto.
- 20.9** In case of immediate termination by the Organisation under paragraph 20.7 above, the Organisation has the right, at its own option, to:
- 20.9.1** have the work performed or Services provided under its direct responsibility, in which case the Contractor shall be obliged to pay all additional costs arising for the Organisation; and
- 20.9.2** have the work performed or Services provided by a third party, in which case the Contractor shall be obliged to pay all additional costs arising for the Organisation;
- 20.10** The provisions of this Article are without prejudice to any other rights or remedies of the Organisation under the Contract or under the law, including its right to submit claims for damages and losses, impose liquidated damages, demand payment or compensation for damages, or for cancellation of the Contract.
- 20.11** The initiation of conciliation or arbitral proceedings in accordance with Article 23 ("Settlement of Disputes"), below, shall not be deemed to be in itself termination of the Contract.

21. NON-WAIVER OF RIGHTS

The failure by either Party to exercise any rights available to it, whether under the Contract or otherwise, shall not be deemed to constitute a waiver by the other Party of any such right or remedy associated therewith, and shall not relieve the Parties of any of their obligations under the Contract.

22. NON-EXCLUSIVITY

Unless otherwise specified in the Contract, the Organisation shall have no obligation to purchase any minimum quantities of goods or Services from the Contractor, and the Organisation shall have no limitation on its right to obtain goods or Services of the same kind, quality and quantity described in the Contract from any other source at any time.

23. SETTLEMENT OF DISPUTES

- 23.1** The Parties shall use their best efforts to amicably settle any dispute, controversy, or claim arising out of the Contract or the breach, termination, or invalidity thereof. Without prejudice to the privileges and immunities of the Organisation, where the Parties wish to seek such an amicable settlement through conciliation, the conciliation shall take place in accordance with the Conciliation Rules of the United Nations Commission on International Trade Law ("UNCITRAL"), then in effect, or according to such other procedure as may be agreed between the Parties in writing.
- 23.2** Any dispute, controversy or claim between the Parties arising out of the Contract or the breach, termination, or invalidity thereof that remains unresolved within sixty (60) days after receipt by one Party of the other Party's request for amicable settlement shall, at the request of either Party, be referred to arbitration in accordance with the UNCITRAL Arbitration Rules then in effect. The number of arbitrators shall be one. The place of arbitration shall be the Permanent Court of Arbitration, The Hague, the Netherlands. The language of the arbitration shall be English. The decisions of the arbitrator shall be based on general principles of international commercial law. The arbitrator shall be empowered to order the return or destruction of goods or any property, whether tangible or intangible, or of any confidential information provided under the Contract, order the termination of the Contract, or order that any protective measures be taken with respect to the goods, the Services or any other property or any confidential information provided under the Contract, as appropriate, in accordance with the relevant UNCITRAL Arbitration Rules. The arbitrator shall have no authority to award punitive damages. Unless otherwise expressly provided in the Contract, the arbitrator shall have no authority to award interest in

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excess of the London Inter-Bank Offered Rate (“LIBOR”) then prevailing, and any such interest shall be simple interest only. The Parties shall be bound by any arbitration award rendered as a result of such arbitration as the final adjudication of any such dispute, controversy or claim.

24. PRIVILEGES AND IMMUNITIES

- 24.1 Nothing contained in the Contract shall be deemed a waiver, express or implied, of any privilege or immunity that the Organisation may enjoy pursuant to the Headquarters Agreement or which it otherwise enjoys.
- 24.2 Nothing contained in the Contract shall be deemed as conferring any privileges and immunities of the Organisation to the Contractor or its personnel.

25. TAX EXEMPTIONS

- 25.1 The Organisation is exempted from all direct taxes, except charges for certain utility Services, as well as from customs restrictions, duties, and charges of a similar nature in respect of articles imported or exported for its official use, in accordance with the provisions of the Headquarters Agreement, the privileges and immunities agreements to which the Organisation is a Party, or the relevant legislation of a Member State of the OPCW, as applicable.
- 25.2 The Contractor shall not invoice or charge the Organisation for any taxes, fees or duties, unless required to do so by the relevant national authorities after consideration of the privileges and immunities accorded to the Organisation by its Member States. Any such requirement shall be in writing and submitted to the Organisation. The Contractor shall collaborate with the Organisation on a best efforts basis in order to achieve tax exemption in the relevant country. If it is determined that any exempt taxes have nevertheless been included in the price, the Organisation may deduct the exempt amount at the time of payment. Payment of such reduced amount shall constitute full payment by the Organisation.
- 25.3 The Contractor authorises the Organisation to deduct from the Contractor’s invoices any amount representing such taxes, duties or charges, unless the Contractor has consulted with the Organisation before the payment thereof, and the Organisation, has in each instance, specifically authorised the Contractor to pay such taxes, duties or charges in writing. In that event, the Contractor shall provide the Organisation with written evidence that payment of such taxes, duties or charges has been made and appropriately authorised, and the Organisation shall reimburse the Contractor of any such taxes, duties or charges so authorised by the Organisation and paid by the Contractor.
- 25.4 The Organisation is additionally exempted from Value Added Tax (hereinafter referred to as “VAT”) in the territory of the European Union (hereinafter referred to as “EU”) in accordance with EU Directive 2006/112/EC – Article 151(b) as amended by EU Council Directive 2009/162/EU. Contractors located in EU countries shall not include VAT in the invoices to the Organisation. VAT will not be paid by the Organisation to EU Contractors. Only Contractors located in The Netherlands will be paid the net amount plus VAT, provided that the total amount of the invoice is not higher than Euro thirty-five thousand (35,000).
- 25.5 All Contractors should refer in the invoice to the above EU Directive or the relevant VAT law applicable in the Contractor’s country. The Organisation will provide a certificate of exemption only upon request.

26. MODIFICATIONS

- 26.1 No modification or change of the terms and conditions of the Contract shall be valid and enforceable against the Organisation, unless agreed by means of a valid written amendment to the Contract signed by the duly authorised representatives of each Party.
- 26.2 Should the Contract be extended for additional periods in accordance with the terms and conditions of the Contract, the terms and conditions applicable to any such extended term of the Contract shall be the same terms and conditions as set forth in the Contract, unless the Parties shall have agreed otherwise pursuant to a valid amendment concluded in accordance with this Article.
- 26.3 The terms or conditions of any supplemental undertakings, licenses, or other forms of agreement concerning any goods or Services provided under the Contract shall not be valid and enforceable against the Organisation nor in any way shall constitute an agreement by the Organisation thereto, unless any such undertakings, licenses or other forms are the subject of a valid amendment concluded in accordance with this Article.

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27. AUDITS AND INVESTIGATIONS

- 27.1 Each invoice paid by the Organisation shall be subject to a post-payment audit by auditors, whether internal or external, of the Organisation or by other authorised or qualified agents of the Organisation at any time during the term of the Contract and for a period of five (5) years following the expiration or termination of the Contract. The Organisation shall be entitled to a refund from the Contractor for any amount shown by such audits to have been paid by the Organisation other than in accordance with the terms and conditions of the Contract.
- 27.2 The Organisation may conduct investigations relating to any aspect of the Contract or the award thereof, the obligations performed under the Contract, and the operations of the Contractor generally relating to the performance of the Contract at any time during the term of the Contract and for a period of five (5) years following the expiration or termination of the Contract.
- 27.3 The Contractor shall provide its full and timely cooperation with any such inspections, post-payment audits or investigations. Such cooperation shall include, but shall not be limited to, the Contractor's obligation to make available its personnel and any relevant documentation for such purposes at reasonable times and on reasonable conditions and to grant the Organisation access to the Contractor's premises at reasonable times and on reasonable conditions in connection with such access to the Contractor's personnel and relevant documentation. The Contractor shall require its agents, including but not limited to, the Contractor's attorneys, accountants or other advisers, to reasonably cooperate with any inspections, post-payment audits or investigations carried out by the Organisation hereunder.

28. LIMITATION ON ACTIONS

- 28.1 Except with respect to any indemnification obligations in Article 12 ("Indemnification") above, or as otherwise set forth in the Contract, any arbitral proceedings in accordance with Article 23 ("Settlement of Disputes") above, arising out of the Contract must be commenced within three (3) years after the cause of action has accrued.
- 28.2 The Parties further acknowledge and agree that, for these purposes, a cause of action shall accrue when the breach actually occurs, or, in the case of latent defects, when the injured Party knew or should have known all of the essential elements of the cause of action, or in the case of a breach of a warranty, when tender of delivery is made, except that, if a warranty extends to future performance of the goods or any process or system is ready to perform in accordance with the requirements of the Contract, the cause of action accrues when such time of future performance actually begins.

29. SEVERABILITY

If any provisions of the Contract will be declared or become invalid, illegal, unenforceable, or in conflict with the law of any jurisdiction, the remaining provisions will remain valid and enforceable. Depending on the nature of the affected provisions, the Parties may agree to modify or replace such provisions as necessary to reflect the Parties' original intentions with regard to their respective rights and obligations.

30. ESSENTIAL TERMS

The Contractor acknowledges and agrees that each of the provisions in Article 18 ("Confidentiality"), Article 31 ("Source of Instructions"), Article 32 ("Officials Not to Benefit"), Article 33 ("Observance of the Law"), Article 34 ("Child Labour"), Article 35 ("Terrorism"), Article 36 ("Mines"), Article 37 ("Sexual Exploitation"), Article 38 ("Disclosure of Sanctions or Temporary Suspension") and Article 39 ("Collaboration with Certain Countries") hereof constitutes an essential term of the Contract and that any breach of any of these provisions shall entitle the Organisation to terminate the Contract or any other contract with the Organisation immediately upon notice to the Contractor, without any liability for termination charges or any other liability of any kind.

31. SOURCE OF INSTRUCTIONS

The Contractor shall neither seek nor accept instructions from any authority external to the Organisation in connection with the performance of its obligations under the Contract. Should any authority external to the Organisation seek to impose any instructions concerning or restrictions on the Contractor's performance under the Contract, the Contractor shall promptly notify the Organisation and provide all reasonable assistance required by the Organisation. The Contractor shall not take any action in respect of the performance of its obligations under the Contract that may adversely affect the interests of the Organisation, and the Contractor shall perform its obligations under the Contract with the fullest regard to the interests of the Organisation.

32. OFFICIALS NOT TO BENEFIT

The Contractor warrants that it has not and shall not offer to any representative, official, employee or other agent of the Organisation any direct or indirect benefit arising from or related to the performance of the Contract or of any other contract with the Organisation or the award thereof or for any other purpose intended to gain an advantage for the Contractor.

33. OBSERVANCE OF THE LAW

The Contractor shall comply with all laws, ordinances, rules, and regulations bearing upon the performance of its obligations under the Contract. In addition, the Contractor shall maintain compliance with all obligations relating to its registration as a qualified vendor of Goods or Services to the Organisation as such obligations are set forth in the Organisation's vendor registration procedures.

34. CHILD LABOUR

The Contractor represents and warrants that neither it, its parent entities (if any), nor any of the Contractor's subsidiary or affiliated entities (if any) is engaged in any practice inconsistent with the rights set forth in the Convention on the Rights of the Child, including Article 32 thereof, which, *inter alia*, requires that a child shall be protected from performing any work that is likely to be hazardous or to interfere with the child's education, or to be harmful to the child's health or physical, mental, spiritual, moral, or social development.

35. TERRORISM

The Contractor agrees to undertake all reasonable effort to ensure that none of the funds received from the Organisation under this Contract are used, directly or indirectly, to provide support to individuals or entities subject to sanctions or other measures promulgated by the United Nations Security Council and appearing in the Consolidated United Nations Security Council Sanctions List. This provision shall be included in all sub-contracts or sub-agreements entered into under the Contract.

36. MINES

The Contractor represents and warrants that neither it, its parent entities (if any), nor any of the Contractor's subsidiaries or affiliated entities (if any) is engaged in the sale or manufacture of anti-personnel mines or components utilized in the manufacture of anti-personnel mines.

37. SEXUAL EXPLOITATION

37.1 The Contractor shall take appropriate measures to prevent sexual exploitation or abuse of anyone by its employees or any other persons engaged and controlled by the Contractor to perform any services under the Contract. For these purposes, sexual activity with any person less than eighteen years of age, regardless of any laws relating to consent, shall constitute the sexual exploitation and abuse of such person.

37.2 In addition, the Contractor shall refrain from, and shall take all reasonable and appropriate measures to prohibit its employees or other persons engaged and controlled by it from exchanging money, goods, services, or other things of value, for sexual favours or activities, or from engaging in any sexual activities that are exploitive or degrading to any person.

37.3 The Organisation shall not apply the foregoing standard relating to age in any case in which the Contractor's personnel or any other person who may be engaged by the Contractor to perform any Services under the Contract is married to the person less than the age of eighteen years with whom sexual activity has occurred and in which such marriage is recognized as valid under the laws of the country of citizenship of such Contractor's personnel or such other person who may be engaged by the Contractor to perform any services under the Contract.

38. DISCLOSURE OF SANCTIONS OR TEMPORARY SUSPENSION

38.1 The Contractor warrants that it is not suspended, debarred, or otherwise identified as ineligible by an intergovernmental or United Nations organisation, including any organisation within the World Bank Group or any multi-lateral development bank, or by the institutions and bodies of economic integration organisations (*e.g.*, the EU).

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38.2 The Contractor is required to disclose to the Organisation whether itself, or any of its affiliates, subcontractors or agents, is subject to any sanction or temporary suspension imposed by any such organisation at any time during the three (3) years prior to the conclusion of the Contract and at any time throughout the execution of the Contract. The Contractor recognises that a breach of this provision will entitle the Organisation to terminate immediately the Contract, and that a material misrepresentation on its status constitutes a fraudulent practice.

39. COLLABORATION WITH CERTAIN COUNTRIES

The Organisation reserves the right to communicate in writing to the Contractor countries from which no goods or Services shall be purchased directly or indirectly for purposes of delivery, distribution, installation, or use under the Contract. These communications shall be deemed a condition of the Contract and be incorporated by the Contractor in any contracts with authorised subcontractors.

40. NOTICES

Official notices related to the Contract shall be in English and shall be valid if sent by registered mail, or any standard recognised form of electronic communication (such as E-mail, certified electronic mail or any future standard commercial communication method) to the address of the recipient Party defined in the Contract.

41. SURVIVAL

The obligations set forth in Article 12 (“Indemnification”), Article 17 (“Publicity and Use of the Name, Emblem or Official Seal of the OPCW”), Article 18 (“Confidentiality”), Article 23 (“Settlement of Disputes”), Article 24 (“Privileges and Immunities”), Article 27 (“Audits and Investigations”) and Article 32 (“Officials Not to Benefit”), of these General Terms and Conditions shall not cease upon completion, expiration or termination of the Contract.

42. COMPLETION OF CONTRACT

The Contract shall be considered complete when all terms and conditions have been complied with by the Parties and the Parties have discharged all reciprocal obligations. If the Contract is valid for a limited period of time, the expiration of the period of validity in itself shall not relieve any Party of completing obligations still pending at the date of expiration.
