



**ORGANISATION FOR THE PROHIBITION OF CHEMICAL WEAPONS**

**Uncovering the Use of Chemical Weapons: the Role of Science and  
the OPCW Designated Laboratories**

**Ahmet Üzümcü, Director-General OPCW**

**University of Helsinki**

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*REMARKS AS DELIVERED*

Chancellor Thomas Wilhelmsson,  
Faculty members,  
Dear students,  
Ladies and gentlemen,

It is a great honour for me to speak at the Department of Chemistry of the University of Helsinki. The OPCW enjoys a long and rich history of collaboration with this University. Since the inception of the Chemical Weapons Research Project in 1973, to its evolution into VERIFIN, a world-leading institution, has played a crucial role in supporting chemical disarmament. The contribution of Finland to the OPCW work was not limited to this, it supported the elimination of Chemical Weapons (CWs) in Syria and Libya. Ekokém Waste Disposal Facility destroyed nearly 5.500 metric tonnes of DF effluents from Syria.

Today, VERIFIN serves as a model for how science can make a direct and practical contribution to improving peace and security – a model, worthy of emulation.

Its research arm has pioneered new methods for screening and identification of chemical warfare agents, their degradation products and starting materials, covering thousands of chemicals.

The methods developed by VERIFIN have been put into practice in laboratories around the world. They have in effect become the international standard for helping to achieve our shared objective of a world free of chemical weapons.

At the same time, VERIFIN has actively participated in creating and updating the OPCW Central Analytical Database, training OPCW analytical inspectors, evaluating the results of OPCW proficiency tests, and arranging workshops.

Additionally, VERIFIN has made a valuable contribution to applied training for chemists from developing countries to assist them in implementing the Chemical Weapons Convention, and develop their potential to use chemistry for peaceful purposes.

I would like here to acknowledge the valuable contribution made by VERIFIN's Director, Professor Vanninen, as a member of the OPCW Scientific Advisory Board, as well as that of her predecessors and colleagues.

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Science and technology, and chemistry in particular, have a transforming and positive influence on our world.

Advancements in chemical science have contributed immensely to raising the quality of life and explaining the deep mysteries of our existence. Its scope for bringing sustainable progress and prosperity remains unbounded.

Nonetheless scientific progress has advanced in tandem with the dark potential for its misuse. As history demonstrates, the ability of science to invent ever more destructive weapons and technologies poses grave dangers.

Disarmament, especially, as it concerns weapons of mass destruction has long been on the international agenda. It was the subject of the very first resolution adopted by the United Nations General Assembly in January 1946; reflecting the aspirations of the UN's founding nations.

Since that time, there have been a series of international agreements and treaties that seek to deal with the threats posed by WMDs. None, however, is as far reaching and as stringent in its application as the Chemical Weapons Convention (CWC).

The Convention is recognised as a major disarmament treaty. But it really evolved in response to a deeply felt humanitarian imperative; the unquestionable need to eliminate a barbaric and reviled tool of warfare.

This realisation came at a great cost. Chemical weapons were used on a massive scale during the First World War. In all 1.3 million casualties resulted with nearly 100,000 dead. Never before had the world seen carnage of this nature and on this scale.

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Against the long and tragic history of chemical warfare, the conclusion of the CWC and its entry into force in 1997 marked a watershed. The international community's long-standing efforts to comprehensively ban chemical weapons had finally become a reality.

This year, we mark the twentieth anniversary of the Convention and founding of the Organisation for the Prohibition of Chemical Weapons.

Much has been accomplished in these short twenty years. One-hundred-and-ninety-two nations are now signatories to the Convention, and 98% of world's population live under its protection.

This important landmark offers a good opportunity to reflect on the Organisation's progress made towards its original goals, and to prepare for what the future might hold.

The Convention is the first multilateral treaty that bans an entire class of weapons of mass destruction. It establishes rights and obligations of far-reaching scope. The Convention is comprehensive and non-discriminatory. It prohibits the development, production, stockpiling, transfer, retention and use of chemical weapons by States Parties, under conditions of strict international verification.

The Convention makes no exceptions in prohibiting the possession of chemical weapons. All States Parties have equal rights and obligations, and those who possess chemical weapons must destroy their stockpiles. States Parties are also required to ensure that, within their jurisdiction, chemistry is only used for peaceful purposes.

In order to achieve lasting disarmament in a cooperative framework and spirit, the Convention creates obligations but also rights. . In this way, it was developed as a wide reaching and comprehensive regime; a regime that spans four mutually supportive pillars. These relate to destroying chemical weapons; preventing new weapons from emerging; the right to seek assistance and protection against chemical attacks; and promoting international cooperation on peaceful uses of chemistry.

Since the Convention came into force, 95% of 72 000 tons of declared chemical warfare agents have been destroyed under verification by the OPCW.

This is an historic achievement and a contribution recognised by the Nobel Peace Prize Committee, which awarded the prize to the OPCW in 2013.

The two largest possessor States, namely Russia and the United States, are both progressing steadily towards the end goal of complete destruction of their stockpiles. This is expected to be completed by the year 2023.

As we approach the goal of completing the destruction of declared chemical weapons, the OPCW and the global community are shifting focus from destruction, to preventing re-emergence. Science and technology have an especially important role to play in this regard.

In the first instance, this means maintaining an ability to detect the presence of chemical warfare agents through effective sample collection and analytical methods. The cornerstone of this capability is the OPCW Laboratory and our network of designated labs.

OPCW-Designated Laboratories are a lynchpin of the Organisation's verification regime and its capacity to investigate possible violations of the Convention.

These laboratories perform off-site analysis of chemical samples collected by OPCW inspectors. This practice applies to our routine verification activities in which case a site could be a chemical production facility, a storage depot or another relevant installation. On the other hand, in such instances as investigations of alleged use of chemical weapons sampling and analysis is used in order to provide the forensic evidence for the case being investigated.

These laboratories offer the necessary assurance to our States Parties that the chemical analyses needed to make determinations, or to clarify issues occurring during OPCW inspections are carried out competently and with unambiguous results.

As far back as 1996, the OPCW Laboratory began conducting Official Proficiency Tests to assure that designated laboratories meet the highest standards of chemical sampling and analysis capabilities. Twenty three laboratories currently meet these rigorous standards and are now part of the network of OPCW-Designated Laboratories.

VERIFIN's laboratory has an especially impressive pedigree with the OPCW. Not only was it among the first to be designated by the OPCW for its verification activities, it has consistently earned straight 'A's in OPCW proficiency tests.

Equally important, VERIFIN has been a valued partner in the OPCW's work to build laboratory capabilities in States Parties. We have been working together to enhance laboratory capability programmes focusing on Quantitative Mass Spectrometry, Laboratory Quality Management, Nuclear Magnetic Resonance and Liquid Chromatography-Mass Spectrometry.

Our capabilities and the skills of our designated laboratories were put to the test in Syria. In 2013 allegations of the use of chemical weapons in Syria were investigated by the UN supported by the OPCW. It was an investigation initiated by the UN Secretary General as Syria was not a party to the CWC. Four laboratories were selected to analyse the initial samples collected on-site. The indisputable finding of these investigations confirmed the use of chemical weapons. Syria acceded to the Convention in September 2013. What followed was an unprecedented chemical demilitarisation mission that quickly destroyed the capability in Syria to produce chemical weapons followed by the removal of chemical weapons which were destroyed outside its territory. Unfortunately, the removal and destruction of Syria's chemical weapons that followed did not conclude our work in that country.

In the face of continuing allegations of the use of chemical weapons, we have deployed nineteen Fact-Finding Missions to investigate those allegations that seemed justified to be looked into.

There are several methods and procedures used by the FFM to gather information, data, and evidence.

It conducts interviews of carefully selected individuals who may be affectees or otherwise witnesses, treating physicians or first responders. It collects all pertinent information, and where applicable secures biomedical and environmental samples.

The samples gathered in the course of these investigations are transported to the OPCW Laboratory in Rijswijk, Netherlands, and then further distributed to our designated labs for sampling and analysis. Since 2013, these laboratories have collectively conducted over 1000 analyses.

Through the independent analysis by designated laboratories around the world, our network provides confidence that the results are valid, and indisputable.

The OPCW's Fact-Finding missions are tasked with determining if chemical weapons have been used. Critically, the work of these missions informs the OPCW-UN Joint Investigative Mechanism

(JIM), which was established by the UN Security Council to identify the perpetrators of chemical weapon attacks in Syria – and hopefully, to bring them to justice.

The OPCW FFM is investigating the most recent allegations of use of chemical weapons in Syria in Khan Shaykhun.

A parallel on-going undertaking in Syria which also involves highly specialised technical and scientific skills as well as reference to designated laboratories relates to the question of clarifying certain elements of Syria's declaration covering its chemical weapons programme. A Declaration Assessment Team (DAT) has been engaged with Syria since 2014 in an effort to clarify several outstanding issues. The purpose of this exercise is to arrive at a declaration that will be regarded by our States Parties as complete and accurate.

This multi-disciplinary team of technical experts has conducted extensive technical consultations with the Syrian authorities, which have been complemented with high-level discussions at OPCW Headquarters in The Hague. In the course of its work, the DAT has conducted site visits to examine facilities, collect samples, and conduct interviews.

Throughout this process, the Syrian authorities have provided new information to supplement its declaration; however this regrettably does not resolve all outstanding issues. There are still gaps and inconsistencies.

This precludes closure which would otherwise be facilitated through the provision of scientifically and technically plausible explanations on the unresolved questions as well as access to individuals with an overarching knowledge of the Syrian chemical weapons programme.

The Deputy Foreign Minister of the Syrian Arab Republic and his delegation will be invited to resume high-level consultations to address the remaining issues related to Syria's declaration.

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Looking beyond the horizon, a more complex set of objectives are building capabilities to meet new and emerging challenges that include new types of chemicals and technologies, as well as other relevant scientific advances.

Scientists and policy-makers are working together – notably, through the OPCW Scientific Advisory Board – to keep abreast of these developments, and to understand their impacts on the implementation of the Convention.

We cannot, of course, hope to control every new chemical – nor should we try to. Accordingly, it is imperative that our work strikes as informed a balance as possible – between prevention and promotion in relation to applications that have malevolent and beneficial uses.

The work of institutions like VERIFIN reaffirms the important nexus between science and security. Because the history of modern warfare has all too often recorded instances of scientific advances being turned to nefarious purposes, our scientific community must remain vigilant to detect, and defend against, such misuse.

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As we shift focus away from destroying chemical weapons to preventing their re-emergence, maintaining the expertise and integrity of the OPCW Laboratory and our network will remain paramount.

The OPCW Laboratory must be positioned to fully address the demands of the future not just in terms of its investigative function but also as a source contributing to capacity development and keeping fully abreast with the science and the technology for protective purposes.

We will work with States Parties to ensure that the Laboratory remains fit-for-purpose and in fact plays a bigger part in our efforts to make the Organisation a repository of skills and knowledge in the context of chemical disarmament.

We are launching an initiative to upgrade the laboratory to a Center for Chemistry and Technology in order to enhance its scientific and technical capabilities and to serve as a global centre of excellence. A fundamental goal is to ensure that the Center not only stays fully informed about the latest developments in science and technology but is also able to make a contribution in improving diagnostic methods and protection capabilities. We will no doubt look once again to our most dependable partner – VERIFIN - for its assistance.

In closing, I would like to reiterate that scientists provide the backbone of multilateral disarmament efforts. Through their work, we are made aware of emerging trends and threats. When breaches of the norm occur in ways unexpected, we seek to benefit from their insights. In short, their participation and contribution is indispensable to our endeavours to promote global peace and security through the implementation of the Convention. The OPCW truly values its relationships with scientists and their representative bodies.

Allow me also to express my hope that the close and productive collaboration that we at the OPCW have enjoyed with the University of Helsinki may continue to flourish and work to protect future generations against the scourge of chemical weapons.

I thank you for your attention.