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DESTRUCTION ACCORDING TO THE CHEMICAL WEAPONS CONVENTION AND ITS APPLICATION IN SYRIA



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# DESTRUCTION ACCORDING TO THE CHEMICAL WEAPONS CONVENTION AND ITS APPLICATION IN SYRIA

## Abstract:

This paper analyses the complex process of chemical weapons destruction. It starts with sea dumping, the most simple and used method, now prohibited, continuing with conventional methods like hydrolisis and incineration, which have been used since the fifties. Finally, new technologies with specific applications are reviewed, like the use of explosives, biodegradation and supercritical water oxidation. Also, we discuss issues related to categories and deadlines for chemical weapons destruction in the Chemical Weapons Convention and possible modifications based on the need to complete Syria´s chemical´s stockpiles destruction before mid-2014.

## Keywords:

Syria, chemical weapons, Chemical Weapons Convention, chemical weapons destruction, incineration, hydrolisis.

## INTRODUCTION: DESTRUCTION BEFORE THE ENTRY INTO FORCE OF THE CHEMICAL WEAPONS CONVENTION

Throughout the First World War the use of toxic chemicals as a warfare method was widespread. After the war, and also during and after the Second World War, large quantities of chemical weapons were produced and stored, which were subsequently removed or destroyed by methods that, although at the time were acceptable, in modern times they are not. For example, some volatile chemicals or gases, such as phosgene were simply released to the atmosphere, and many chemical agents were destroyed, in large quantities, by open burning processes.

Another method used was the discharge into the sea by a ship load of chemical weapons that had to be removed and sunk into a marine trench. This method is currently banned. In fact, it was already prohibited by the International Convention for the Prevention of Marine Pollution by Dumping from Ships and Aircraft (Oslo Convention), which entered into force in 1974. That same year, the Convention for the Prevention of Marine Pollution from Land-based Sources (Paris Convention) was signed, which entered into force in 1978. In 1992 both Conventions were merged into the new Convention for the Protection of the Marine Environment of the North East Atlantic (Oslo-Paris Convention and OSPAR Convention), which entered into force in 19981.

In 1974 the first Convention on the Protection of the Marine Environment of the Baltic Sea Area (Helsinki Convention) was signed, which was revised and signed in 1992 by all countries bordering the Baltic Sea and the European Economic Community. This new Convention entered into force in 2000, governed by an international organization called Helsinki Commission (HELCOM)2.

Since the 1950s a major change in terms of the destruction of chemical weapons began. Some countries started to destroy their chemical arsenals using more environmentally friendly techniques. At that time, the developed techniques that allowed safe and efficient destruction of chemical weapons, and that were economically feasible were incineration and hydrolysis, resulting as the best options hydrolysis followed by incineration. Therefore, for example, between 1958 and 1993, over fourteen thousand tonnes of nerve agents (tabun, GA; sarin, GB, soman, GD; Cyclosarin, GF; mixtures of GB and GF, VX; and VR or Russian VX) and blister (yperita, H; lewisite, L; and mixtures of the two, HL) in Germany, Canada, United States, Iraq, UK and Russia3, were destroyed with these techniques.

[1] For more information on the OSPAR Convention see: http://www.magrama.gob.es/es/costas/temas/proteccion-del-medio-marino/convenios-internacionales/convenio_ospar.aspx. Date consulted: 11.02.2013.
[2] See http://helcom.fi. Date consulted: 11.02.2013.
[3] PITA, René, *Armas químicas: la ciencia en manos del mal*, Madrid, Plaza y Valdés, 2008.

A different method used in the past, but that currently cannot be used is burying, in other words, digging a trench in the field and burying the chemical weapons in it. Still today, throughout excavation works, buried chemical weapons are unexpectedly found, usually in a deplorable and dangerous condition.

However, in the negotiations in the Conference of Disarmament (CD) at Geneva in what would become the Chemical Weapons Convention (CWC), the problem of old and abandoned weapons, and the evident need they have to be destroyed was submitted4. The CWC negotiation solved these problems by establishing cutoff dates in the final text, reached in 1993, of the Convention that would come into force on April 29, 1997:

- In article II, paragraphs 5 and 6, the CWC defines the terms "old chemical weapons" and "abandoned chemical weapons" defines the terms: The former as "chemical weapons which were produced before 1925, or produced in the period between 1925 and 1946 that have deteriorated to such an extent that they can no longer be used as chemical weapons", and the second as "chemical weapons, including old chemical weapons, abandoned by a State after 1 January 1925 in the territory of another State without the consent of the latter".
- In article III, paragraph 2, two important exceptions are established: "The provisions of this Article and the relevant provisions of Part IV of the Verification Annex shall not, at the discretion of a State Party, apply to chemical weapons buried on its territory before 1 January 1977 and which remain buried, or which had been dumped into the sea before 1 January 1985".

Accordingly, the States Parties to the CWC which buried chemical weapons before 1 January 1977, or which dumped chemical weapons into the sea before 1985 are not required to retrieve and destroy them.

**CHEMICAL WEAPONS DESTRUCTION IN IRAQ BEFORE ITS ACCESS TO THE CWC**

The adoption of resolution 687 of the UN Security Council of 3 April 1991 established the terms and conditions for formal ceasefire between Iraq and the coalition of States cooperating with Kuwait, ending the Gulf War in 1991.

Iraqi chemical weapons were scattered in numerous air bases and storage depots throughout the country. When the time came to take stock of the Iraqi chemical arsenal, the work seemed endless. However, in early 1993, UNSCOM inspectors5 had verified the

[4] The text of the Convention is available at: http://www.opcw.org/index.php?eID=dam_frontend_push&docID=6354. Date consulted: 11.02.2013.

[5] On April 19, 1991, the Security Council established the UN Special Comission (UNSCOM) for chemical and biological weapons, together with the International Atomic Energy Agency (IAEA) in the field of nuclear weapons; it was responsible for ensuring compliance with the provisions of Resolution 687. This commission had two missions: to inspect and supervise the destruction or elimination of non-conventional weapons,

existence of about 140,000 empty and loaded chemical munitions, about 590 tonnes of bulk agents and 3,500 tonnes of precursors.

Given this situation, it appeared that the quick and safe destruction of Iraqi chemical weapons would be a difficult and complex task. UNSCOM sought support from a small group of countries with experience in chemical weapons destruction to seek a safe and effective solution. Five countries, Canada, USA, France, UK and Russia agreed to provide an expert in this field, together with a representative of the World Health Organization (WHO) and an expert in combustion engineering from the Institute of Technology in New Jersey, formed an advisory committee for the chemical weapons destruction (Destruction Advisory Panel, DAP). After several meetings between experts from UNSCOM and Iraqi counterparts they agreed that Iraq could build the facilities required for the destruction of its chemical weapons, and operate under UNSCOM direction and supervision.

The two techniques available at that time for the destruction of nerve agents were direct incineration and chemical neutralization. However, no method had been used previously for the destruction of GF (cyclosarin) or GB/GF mixtures (sarin/cyclosarin). A further complication came from the fact that this Iraqi mixture also contained up to 40% dichloromethane as organic solvent. After many discussions it was decided to opt for chemical neutralization, since Iraq had no experience in the construction and operation of the incinerator type needed to address the direct incineration of nerve agents. The two alternatives tested were neutralization with 2-aminoetanol followed by incineration of the resulting products, and hydrolysis with an aqueous caustic soda (sodium hydroxide) solution, followed by removal of the dry residue into a secure landfill. One disadvantage of caustic soda hydrolysis is the vast amount of waste generated, which can be up to five to six times the amount of agent destruction. Although the toxicity of these residues is relatively low, they cannot be simply released to the environment due to its high fluorine content. Moreover, as in Iraq it was not easy to have 2-aminoedthanol but caustic soda was available, it was decided to evaluate the neutralization with the latter6.

The plant basic design was agreed at a meeting between Iraqi and UNSCOM experts in late November 1991. After evaluating the results of the pilot plant studies, it was agreed in April 1992 the final plant design, which was started-up by Iraqi personnel under UNSCOM supervision in September 1992.

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missiles with a range over 150 km, as well as production and storage facilities, and, in addition, to control by a verification and monitoring program, that Iraq was trying to rebuild its unconventional capability.

[6] MANLEY, Ron G., "UNSCOM's experience with chemical warfare agents and munitions in Iraq", en STOCK, Thomas y LOHS, Karlherinz (eds.), *The Challenge of old chemical munitions and toxic armament wastes, SIPRI Chemical & Biological Warfare Studies, no. 16*, Oxford, Oxford University Press, 1997, 241-262.

The yperite or mustard gas can be destroyed by chemical oxidation or by neutralization, but its variable purity may lead to unpredictable results, and at that time none of the two processes had been used regularly on an industrial scale. However, the yperite elimination by direct incineration was a well known process, used successfully by many countries, such as Canada, U.S. and UK. Therefore, it was decided to opt for incineration as the means of destroying the Iraqi yperite arsenal. In the absence of an appropriate facility in Iraq, it became necessary to design and build a facility specifically for this purpose. The final design was agreed at a series of meetings between Iraqi and UNSCOM experts in late November 1991, and construction began in Al Muthanna in January 1992. The construction was carried out throughout the year with the UNSCOM advice and assistance. The plant was operational in November 1992 by Iraqi personnel working under the UNSCOM experts' direction. It is important to note the work and the effort undertaken by Iraq for the construction and setting up of this plant in little more than nine months.

**CHEMICAL WEAPONS DESTRUCTION AFTER THE ENTRY INTO FORCE OF THE CWC**

According to the CWC, chemical weapons destruction is a process by which chemicals are converted in an essentially irreversible way to a form unsuitable for production of chemical weapons, and which in an irreversible manner renders munitions and other devices unusable as such.

The CWC indicates exhaustively in Part IV (A) of the Verification Annex on "Destruction of chemical weapons and its verification pursuant to Article IV", in paragraph 13: "Each State Party shall determine how it shall destroy of chemical weapons, except that the following processes may not be used: dumping in any body of water, land burial or open-pit burning. It shall destroy chemical weapons only at specifically designated and appropriately designed and equipped facilities". That means that it is forbidden to destroy chemical weapons by dumping them into rivers, seas and oceans, burying them, and its open-air burning. Moreover, it is important to clarify that it is the State Party which determines the procedure to be followed for the chemical weapons destruction.

Then, what procedures exist and which one is the most appropriate? The answer is not easy, because we have to take into account many factors: the type of chemical to destroy and if it is in containers or in munitions, the presence or absence of explosive charge in the munitions and the conservation status of the chemical and the munitions, among many others.

Time limitations imposed by the CWC, namely, the need to start destroying chemical weapons stockpiles no later than two years after the entry into force of the Convention for a State Party, and the obligation to complete its destruction no later than 29 April 2007, it involved the use of only a few destruction technologies that were developed at that time

and that had already been effective for the destruction of chemical warfare agents. In this sense, the two most frequently used technologies for chemical weapons destruction in accordance with the CWC requirements were at that time (and still are) incineration (destruction at high temperature) and hydrolysis or "neutralization", followed by a further processing of waste (destruction at low temperature).

**METHODS FOR DESTRUCTION OF CHEMICAL WEAPONS**

In the case of old and abandoned chemical weapons, they are composed of two parts which are very difficult to separate: one part toxic, the toxic chemical or chemical warfare agent; and an explosive part, component of the dispersion system. This combination, together with corrosion, degradation and lack of information, makes its handling difficult and dangerous.

The basic principle for handling explosive materials is **no confinement**. The explosives can only be handled safely in open areas without people in the vicinity and to avoid the effects of the shock wave and fragmentation, with side protections, without roof or a very light roof.

The basic principle for handling toxic materials, particularly liquids and gases, is the **total confinement**. For this, different barriers are used, such as filters, bubblers (scrubbers), locks and airtight containers, among others, trying to avoid contact and inhalation (through the use of gloves and mask) and reducing operator's exposure time.

The explosive charge of chemical munitions requires its handling in an unconfined area and the handling of the chemical agent that is incorporated in it requires a confined area, therefore it is not possible to do both safety requirements simultaneously. It is necessary, firstly, to make sure there is no risk of explosion, and then destroy the chemical agent. Then, once the chemical munitions are dismantled, the scrap has to be decontaminated and properly inactivate the toxic load.

Due to this matter, the destruction of chemical weapons is usually done in several phases. First, if their conservation status and safety permit, munitions, with or without bursting charge will be brought to a dismantling facility or to a storage facility nearby. In a second phase, they are inspected to analyze or classify its content, and separate the explosive part from the toxic one, and separate both of them from the metal part or scrap. In a third phase, the explosive and the toxic part are destroyed with the most appropriate method and scrap is decontaminated.

It might happen that for various reasons, whether due to security , the poor condition of the munitions, or for technical reasons (for example, because the agent has been damaged, polymerized and therefore it is not possible to remove it from its container), it would not be possible to separate the various parts. In these cases, techniques of destruction by explosive

are used, where these problematic chemical weapons are conveniently exploded in a chamber, thus avoiding both the explosive hazard as well as toxic hazard, and then the waste is treated to permit its subsequent discharge.

**Agents, precursors, classical munition and binary munition**

Chemical warfare agents cause in living things, pathophysiological and psychological effects ranging from temporary disability to severe illness or death. Classification of chemical warfare agents according to their pathophysiological effects is mainly based on toxicological mechanisms of action as well as characteristic clinical signs and symptoms that the agent produces in the organism. They are classified into:

a) Nerve agents
b) Vesicants or Blister agents
c) Pneumotoxic or suffocating agents
d) Cyanidic, cyanogenic, hematoxic or blood agents; and
e) Incapacitating agents.

In conventional chemical munitions the chemical warfare agent is usually found as such, stored or not in glass recipients to prevent corrosion of the muniton that contains them. However, for some chemical warfare agents there are the so-called binary systems, where the precursors (the so-called key component and a second component) are in compartments separated by a membrane which breaks by the inertia of the shot, so that the precursors mix and react to form the chemical agent.

For the destruction of binary chemical weapons the CWC states:

- For the purposes of the order of destruction, a declared quantity (in tonnes) of the key component intended for a specific toxic end-product shall be considered equivalent to the quantity (in tonnes) of this toxic end-product calculated on a stoichiometric basis assuming 100 per cent yield.
- A requirement to destroy a given quantity of the key component shall entail a requirement to destroy a corresponding quantity of the other component, calculated from the actual weight ratio of the components in the relevant type of binary chemical munition/device; and
- If more of the other component is declared than is needed, based on the actual weight ratio between components, the excess shall be destroyed over the first two years after destruction operations begin.

This means that, for example, if a State Party has declared possession of sarin (Schedule 1A)7, not only all the sarin must be destroyed, but also all the methylphosphonyldifluoride

[7] For purposes of implementing the CWC, toxic chemicals for which it is planned to implement verification measures listed on three lists, each of them with agents (A) and precursors (B). These lists are included in the

(DF) declared would have to be destroyed, a key component of sarin (Schedule 1B) as well as the stoichiometric ratio of isopropyl alcohol (not listed substance), as they are both components of a binary system of sarin.

**Destruction techniques using explosives**

Explosive destruction technologies destroy chemical weapons by the use of explosives or heat. These techniques do not require dismantling munitions and differ greatly from the incineration or combustion (explosion) in open-pit, the latter prohibited by the CWC. It could be set up three groups of chemical weapons destruction technologies using explosives:

- The explosives detonation technology, which destroys almost completely the chemical and the explosive charge of the ammunition, when detonating a high explosive surrounding the ammunition. The detonation gases residues are subsequently processed to complete its destruction. Examples of this technology are blasting Transportable Detonation Chamber (TDC) and the DANVICH system (Detonation of Ammunition in a Vaccum-integrates Chamber). The DANVICH system has been used for the destruction of more than 43,000 chemical weapons in Belgium, China and Japan.
- The technology called “neutralization” (not to be confused with the “neutralization” by hydrolysis) uses small explosive shaped charges to open the ammunition and dismantle the fire chain from it. The agent is subsequently destroyed by neutralization (hydrolysis). The U.S. Army’s EDS system (Explosive Destruction System) is an example of this technology. The EDS is an autonomous, transportable system, which has a containment vessel of thick walled stainless steel, to withstand the explosion, and that once the ammunition is destroyed, hydrolysis is then made to the content. The waste is stored in 208 liter drums for further processing.
- Thermal Destruction (TD) uses the heat generated by electric heating in a containment vessel for burning or detonating the ammunition, and to destroy the chemical agent and the explosive charge. The resulting gases are treated by a special gas treatment system. The Static Detonation Chamber (SDC) is an example of thermal destruction technology.

**Conventional destruction**

Since the fifties, burial and dumping into the sea that had been regularly used began to be considered environmentally inadequate, and the destruction of chemical weapons with environmentally acceptable techniques such as incineration and hydrolysis was initiated.

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“Annex on chemicals”. Schedule 1 contains chemicals and precursors that have been developed, produced, stockpiled or used as a chemical weapon as defined in Article II of the Convention.

Some data published in 1997 for the destruction of chemical weapons in the period between 1958 and 1993, indicate that about 66% (about 9,600 tonnes) were destroyed by incineration, 27% (about 3,900 tonnes) by hydrolysis or neutralization and the remaining 7% (about 1,000 tonnes) by hydrolysis and incineration8.

*Incineration*

Incineration is an inherently attractive method for organic compounds destruction because these contain carbon and hydrogen, and its combustion with the air oxygen produce carbon dioxide and water. In the case of chemical warfare agents, due to the presence of other atoms such as fluorine, chlorine, sulfur, phosphorus, nitrogen and arsenic, other gases are released, such as hydrogen chloride, sulfur dioxide (both in the yperite's case), phosphorus pentoxide (in the case of nerve agents), hydrogen fluoride (in some nerve agents such as sarin and soman) and nitrogen oxides (in some neurotoxic agents such as tabun, VX and VR).

This does not limited chemical warfare agents to be considered fuels and, therefore, susceptible to be destroyed by incineration. The resulting products of incineration are much less toxic than the initial products and, in addition, in the incineration plants, the waste gases are conveniently filtered and purified before being released into the atmosphere. In the case of arsenic-containing compounds there are further problems due to the intrinsic toxicity of arsenic itself, so it is usually necessary to fix it as part of a concrete block, or as part of a vitreous material.

*Hydrolysis (neutralization)*

Hydrolysis or neutralization involves the reaction of the chemical warfare agent with hydroxyl ions from an alkaline substance such as sodium hydroxide. Alkaline hydrolysis of most nerve agents leads the sodium salts of alkylphosphonic acids, except tabun alkaline hydrolysis, which leads the sodium salts of phosphoric acid. Yperite can also be neutralized by reaction with hot water.

The major disadvantage of alkaline hydrolysis is that it requires a large volume of hydrolysis reagent and that it produces a large volume of hydrolyzed end product waste, which may involve more than five times the initial volume of a hydrolyzing agent.

In all cases, the resulting hydrolysate requires an additional treatment to meet the current spillage into the environment requirements. This additional treatment may be an incineration process, or the use of new technologies such as biodegradation or oxidation with water in supercritical conditions.

[8] PEARSON, Graham S. y MAGEE, Richard S., "Critical evaluation of proven chemical weapon destruction technologies (IUPAC Technical Report)", *Pure and Applied Chemistry*, 2002, vol. 74, núm. 2, 187-316.

*Biodegradation*

In some cases the hydrolyzate may undergo biological treatment similar to the one used in the Waste Water Treatment Plants of large cities.

The hydrolyzate from, for example, yperite hydrolysis with a sodium hydroxide solution is neutralized to obtain a neutral pH and thus allow bacterial digestion. In large tanks containing spoilage microorganisms, the hydrolyzate is digested in a process which takes several days. Finally the purified water is recycled and the waste constituted by salts and bio-sludge is conveniently treated to allow its discharge.

*Supercritical water oxidation*

Among the new technologies developed for the destruction of chemical weapons there is Supercritical Water Oxidation (SCWO), which employs high temperatures and pressures, to use the special properties that water has in supercritical state for the destruction of the organics.

In supercritical conditions for water, 374ºC and 221 bar (218 atm), the transformation of carbon into carbon dioxide, hydrogen into water, chlorine into chloride, nitrogen into nitrate, sulfur into sulfate and phosphor into phosphate is achieved.

Supercritical water has unique and very different properties from the ambient water. Salts and other polar compounds which are normally soluble in wáter, under supercritical conditions, their solubility drastically decrease and they precipitate. In addition, nonpolar organic compounds that are usually immiscible with water are completely solubilized in water in a supercritical state, so that it greatly facilitates the oxidation by air's oxygen.

The pilot plant for destruction of chemical weapons at Blue Grass in the U.S. employs a two-stage process for the destruction of chemical weapons stored there. The first step is a hydrolysis process to neutralize the chemical agent. Once the ammunition is dismantled and once the chemical is separated from the explosive charge, the latter are treated separately with water or with a sodium hydroxide solution to achieve its hydrolysis. The temporary storage hydrolyzate is then subjected to a second treatment for "water oxidation in supercritical state." Here, the hydrolyzate is mixed with water and air in a sealed container and subjected to high pressure and temperature, so that the destruction is achieved thanks to the special properties of water in supercritical state.

## CHEMICAL WEAPONS DESTRUCTION IN SYRIA

Article I of the CWC on "General obligations" clearly states: "Each State Party to this Convention undertakes, never under any circumstances, to develop, produce, otherwise acquire, stockpile or retain chemical weapons, or transfer directly or indirectly, chemical

weapons to anyone". That means **whatever the circumstances are, chemical weapons cannot be transferred, directly or indirectly, to anyone**, even for its destruction on the territory of another State Party. If we consider the text of the Convention, the possibility of taking them to a port for shipment to any destination outside the State Party territory should be, in principle, completely ruled out.

Furthermore, Part IV (A) of the Annex on implementation and verification of the Convention, which deals with the "Destruction of chemical weapons and its verification pursuant to Article IV" also has other constraints to respect when carrying out the destruction, such as the presentation of the general plan for destruction of chemical weapons the order of destruction and modification of its intermediate deadlines.

**Presentation of the general plan for the destruction of chemical weapons: order and destruction deadlines**

Paragraph 6 of Part IV (A) of the Convention Annex states: "The general plan for destruction of chemical weapons […] shall provide an overview of the entire national chemical weapons destruction programme of the State Party and information on the efforts of the State Party to fulfil the destruction requirements contained in this Convention. The plan shall specify:

a) A general schedule for destruction, giving types and approximate quantities of chemical weapons planned to be destroyed in each annual destruction period for each existing chemical weapons destruction facility and, if possible, for each planned chemical weapons destruction facility;
b) The number of chemical weapons destruction facilities existing or planned to be operated over the destruction period;
c) For each existing or planned chemical weapons destruction facility:
    i) Name and location; and
    ii) The types and approximate quantities of chemical weapons, and the type (for example, nerve agent or blister agent) and approximate quantity of chemical fill, to be destroyed;
d) The plans and programmes for training personnel for the operation of destruction facilities;
e) The national standards for safety and emissions that the destruction facilities must satisfy;
f) Information on the development of new methods for destruction of chemical weapons and on the improvement of existing methods;
g) The cost estimates for destroying the chemical weapons; and
h) Any issues which could adversely impact on the national destruction programme".

In paragraph 15 states that: "The order of destruction of chemical weapons is based on the obligations specified in Article I and the other Articles, including obligations regarding systematic on-site verification. It takes into account interests of States Parties for undiminished security during the destruction period; confidence-building in the early part of the destruction stage; gradual acquisition of experience in the course of destroying chemical weapons; and applicability irrespective of the actual composition of the stockpiles and the methods chosen for the destruction of the chemical weapons. The order of destruction is based on the principle of leveling out".

Furthermore, paragraph 16 indicates: "For the purpose of destruction, chemical weapons declared by each State Party shall be divided into three categories:

> Category 1: Chemical weapons on the basis of Schedule 1 chemicals and their parts and components;
>
> Category 2: Chemical weapons on the basis of all other chemicals and their parts and components;
>
> Category 3: Unfilled munitions and devices, and equipment specifically designed for use directly in connection with employment of chemical weapons".

It is also relevant what is stated in paragraph 20: "The Executive Council shall review the general plans for destruction of chemical weapons, submitted pursuant to Article III, paragraph 1 (a) (v), and in accordance with paragraph 6, inter alia, to assess their conformity with the order of destruction set forth in paragraphs 15 to 19. The Executive Council shall consult with any State Party whose plan does not conform, with the objective of bringing the plan into conformity".

**Current situation**

The destruction of Syrian chemical weapons of Category 3 already started during the inspection of the declared facilities. Inspectors used their visit to verify these facilities and at the same time monitor and verify the destruction of munitions and devices loaded. It is important to clarify that the inspectors of the Organization for the Prohibition of Chemical Weapons (OPCW)9 did not perform any destructive activity, as indicated in some reports in the media, but they verified that Syrian staff responsible for carrying out the destruction, carried it out as stipulated in the CWC. This destruction involves neither technically difficult nor heavy workload, as is the use of hammers, drills, grinders and shovels, among others, to

[9] The OPCW is the organization, based in The Hague, is responsible for enforcing the provisions of the CWC.

destroy pipes, control systems or containers production facilities, blending and filling, closing it off this way10.

The OPCW-UN Joint Mission confirmed on Thursday 31 October that the Syrian government had completed the functional destruction of critical equipment for all facilities declared chemical weapons production and mixing and filling plants, making them inoperable11. That was the deadline set by the Executive Council of the OPCW to complete "as soon as possible and in any case no later than 1 November 2013, the destruction of chemical weapons production and mixing/filling equipment"12.

Moreover, the OPCW-UN Joint Mission has inspected 21 of the 23 sites declared by Syria and 39 of the 41 facilities located on those sites. The two remaining sites were not visited for security reasons. Syria said those sites are abandoned and all its contents had been transferred to other sites declared and inspected. These 41 facilities declared by Syria include 18 production (which, in turn, include filling facilities), 12 storage facilities, 8 mobile facilities filled and 3 chemical weapons-related facilities.

While production, filling and mixing systems present in these 41 facilities have been disabled, the ultimate destruction, probably by controlled blasting, is still pending and will have to be done by the Syrian government also under verification of OPCW inspectors.

The next milestone in the process of destruction of chemical weapons in Syria must occur before 15 November when the Executive Council of the OPCW approves the detailed plan of destruction presented by Syria on Thursday, 24 October to eliminate its chemical weapons stockpile13. The Special Coordinator leading the OPCW-UN Joint Mission in Syria, Sigrid Kaag is currently consulting with the Syrian authorities, the OPCW and the UN, in order to establish a detailed list of requirements to help both the Syrian government and the Joint Mission itself necessary to carry out the destruction under OPCW verification of all Syria's chemical weapons before the first half of 2014.

[10] Nations Security Council, S/2013/629, Letter dated 28 October 2013 from the Secretary-General addressed to the President of the Security Council.
[11] The OPCW-UN Joint Mission was established by the Director General of the OPCW and the UN Secretary General on October 16. The Mission is led by Special Coordinator, Sigrid Kaag.
[12] Decision EC-M-33/DEC.1 OPCW Executive Council is available at: http://www.opcw.org/fileadmin/OPCW/EC/M-33/ecm33dec01_e_.pdf. Date consulted: 11.02.2013.
[13] OPCW, "Syria submits its initial declaration and a general plan of destruction of its chemical weapons programme", 27 de octubre de 2013, disponible en http://www.opcw.org/news/article/syria-submits-its-initial-declaration-and-a-general-plan-of-destruction-of-its-chemical-weapons-pro/. Date consulted: 11.02.2013.

**CONCLUDING REMARKS: THE UNIVERSALITY OF THE CWC**

The OPCW, awarded the 2013 Nobel Peace Prize, is getting closer to a chemical weapons free world, since it is closer to achieving its "universality". There are still missing six countries to access to the CWC: Angola, North Korea, Egypt, Israel, Myanmar and South Sudan. However, for this chemical weapons free world, the CWC text should apply to all States Party alike, since access to the Convention also requires all States Party alike.

With respect to the total destruction of chemical of chemical weapons in the States Party, it should have ended ten years after the entry into force of the Convention on 29 April 2007. But this deadline has not been met. Moreover, the CWC allows an extension of 5 years until April 29, 2012, but the deadline has expired and destruction has not been finalized yet.

Russia, until 31 May 2013 had destroyed more than 73.77% of its chemical weapons and expected to complete the destruction of more than 10,483 tonnes in December 2015, while the U.S., on the same date, had destroyed the 89.75% and expected to complete in September 2023 the destruction of more than 2,845 tonnes that still have to be destroyed.14

Lybia, which acceded to the CWC, in January 2004, declared more than 26 tonnes of sulfur mustards, along with other precursors, munitions and components, as well as three production plants. It has destroyed, to date 31 May 2013, 84.63% of the chemical agents and two of the three production plants, but it does not expect to complete destruction operations until December 2016.

When Iraq acceded to the CWC in February 2009, it declared two bunkers with chemical munitions filled and unfilled, some precursors, as well as five production facilities of chemical weapons. At that time, no plans were announced for destruction, although they stressed that the bunkers were damaged because of the war in 2003 and the inspection thereof should be carefully planned. Most Iraqi chemical weapons were destroyed under a UN program after the 1991 Gulf War. Since the CWC does not allow destruction by burial, currently it is working on how to conduct an examination of the inside of the bunkers to study the security and then proceed to plan inventory and destruction.

While the use of chemical weapons in the Syrian conflict urges a rapid elimination of chemical capacity present in Syria, this destruction process should not pose at any time an "a la carte" CWC modification for this new State party. Carrying out "forced" interpretations of the Convention's provisions may weaken this international treaty, considered one of the main tools of non-proliferation and disarmament. It is also important to note that the

[14] Note by the Director-General, Overall progress with respect to the destruction of the remaining chemical weapons stockpiles, EC-73/DG.8, July 3, 2013.

current activities carried out in Syria could set precedents for the near future, especially considering that there are still six outstanding countries pending to accede to the Convention, some of them possibly possessing chemical weapons.

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