20th Chemical Weapons Demilitarisation Conference
(CWD 2017)
London, UK
24 - 26 May 2017
Make your world a safer place
“Dynasafe Mobile Destruction Solution for new discovered non-stockpile Chemical Weapons”

Dr Thomas Stock (Director Business Development, Dynasafe Environmental Systems GmbH - Office Langenselbold, Am Weiher 8, 63505 Langenselbold, Germany) and Holger Weigel (CSO/CTO Dynasafe, Dynasafe International AB, Kista Science Tower, SE- 165 41 Kista, Stockholm, Sweden)
CWC Facts Reminder 20th Anniversary

- CWC open for signature 13 January 1993
- entered into force 27 April 1997
- Today 192 States Parties (ratified or acceded), 98% of the global population, have joined the OPCW
- 94% of the world's declared stockpile of 72,304 metric tones of chemical agent have been destroyed
- 4 States Parties declared ACW
- 16 States Parties declared OCW

(as of May 2017)
20th Anniversary of EIF of CWC- are new CW declarations possible?

- New State Party with CW acceding to CWC (non member states: Egypt, North Korea, Palestine, South Sudan, Israel (signed but not ratified))
- New discoveries of Old Chemical Weapons (OCW)
- New discoveries of Abandoned Chemical Weapons (ACW)
Destruction Obligations from CWC
– most likely scenarios -

(1) New CW Possessor States
Based upon the CWC obligations any new possessor State has to destroy it’s own CW stockpile - CWDF, however, alteration are possible, e.g. Libya, Albania

(2) New OCW States
Every new OCW recovery has to be disposed of, based upon date of production and ”usability” assessment

(3) New ACW States
If really happen, ACW procedures regarding declaration, verification and Destruction will strictly be applied
20th Anniversary of the CWC – What is left in terms of destruction activities?

Achievements:

(1) Two Possessor States still have to finalize their CW stockpile destruction
(2) The main ACW project is on-going
(3) The States Parties with major OCW have their own destruction capabilities set-up

Prospects:

(1) States no Parties to CWC with CW stockpiles?
(2) New discoveries of OCW?
(3) New ACW discoveries?
(4) Recoveries of former sea-dumped CW?
Destruction Technologies applied for stockpiled CW

The CW destruction technologies have been developed over the last 30 years to destroy assembled unitary chemical weapons (artillery projectiles, mortars, air bombs, mines, rockets, rocket warheads, spray tanks, etc.) as well CW agents stored in bulk, binary munitions and recovered CW munitions.

These mature large-scale CW destruction technologies are divided in two main groups:

• high temperature destruction technologies like incineration,
• low-temperature destruction technologies like hydrolysis, neutralization, followed by post-treatment of the generated reaction masses
The OCW “Dilemma” - State Party with new OCW discoveries - but not having destruction capabilities

State Party discovers OCW, however, lacks capacity and capabilities to destroy these old chemical weapons, because of:

- Missing CW destruction plant
- Missing experience, expertise and knowledge
- Missing information about the OCW with respect to filling and configuration
- Too large numbers of OCW
- OCW are in dangerous conditions – unstable and not to be long-term stored
What is technologically required to cope with the remaining prospects?

• No need for stationary large scale destruction solutions?
  o Exception: New State Party with CW stockpile

• Requirements for mobile destruction solution(s)?
  o Newly discovered OCW
  o Newly discovered ACW
Dynasafe - CW Destruction Systems

(1) Stationary System
  • SDC 2000 plus OGT

(2) Semi-stationary/re-locatable System
  • SDC 1200 CM plus OGT

(3) Moveable System
  • SDC 1000 CM 1 plus OGT

(4) Fully Mobile System
  • SDC 1000 CM 2 plus OGT
Dynasafe CW Destruction Systems
Dynasafe Fully Mobile System  
SDC 1000 CM 2 plus OGT

General Provisions

- Proven technology
- Applicable also for fused munitions
- Flexible Off-Gas Treatment/waste water free
- Reliable capacity
- Built-in safety margin
- Compact design
- Additional capability for dunnage material disposal
- Rapid deployment/field deployment
- Analytical plant/process support as add-on
- Easy decontamination
- Easy to operate
SDC 1000 CM2 – Basis - Libya Design
• Notice to proceed: 2 February 2013
• OGT in Workshop in Sweden: 1 August 2013
• SDC in Workshop in Sweden: 15 August 2013
• Complete plant tested and packed for shipment: 20 September 2013
• Plant ready commissioned in Wadam/Libya: 20 October 2013
• Finished destruction declared category 1 – 24 January 2014
• Continued destruction canister material until May 2014

Dynasafe managed having a plant from scratch on site in Libya ready to receive the first chemical weapon in less than 8 months.
Libya Destruction Campaign

- Plant built in less than 8 months
- Camp in the desert near Wadam
- 100% autonomous operation

Disposal

- 130 mm HD
- 250 kg bombs
- missile inserts
- HD “heels” canisters
- Total more than 3,000 objects
Design Criteria for mobile SDC 1000 CM 2 System

- Complete plant in container or racks
- Plant is proven with HD and HD heels
- 24/7 field operations proven
- CBU for waste feed and clean burning of all waste
- No waste water – 100% waste water free
- All dunnage material can be processed as well
- No organic waste leaving the facility
SDC 1000 CM 2 – Plant Layout
OGT Layout

CWD 2017

Waste
Water
Evaporator

HEPA/
ACF

THO

CBU
OGT – waste water free
SDC 1000 CM2 – Capacity Evaluation

- 1 feed/h
- max 3 kg NEQ
- max 5 kg yellow mixture
- max 250 mm diameter x 600 mm length
- larger items side feed into cold SDC
- at least 7 hours per day
- 4 days a week – one day is reserved for waste disposal and unforeseen
- 45 to 60 minutes processing times per feed
- experience in Libya – capacity proven
- built in safety margin
Dynasafe Experience

a) 100% of the ammunitions in Belgium are fused ammunitions

b) A huge amount of the material disposed in Munster was/is fused ammunitions

c) In ANCDF fused ammunitions has been destroyed

d) In conventional Dynasafe Demil plants thousands of tons of fused ammunitions have been destroyed!
Clean burning of:
- Dunnage material
- Organic waste
- Activated Carbon Filters
- Liquid waste
- Soil
- Concrete

- 100% of the waste generated on-site can be processed – no additional incineration capacities required
SDC 1000 CM2 – Possible Layout
Complete Complex set-up
Complete Complex set-up - Framework

- less than 800 m²
- no special safety distance due to NO donor charges necessary
- storage of feed munitions in Dynasafe EOD chambers possible (optional)
- complete system consisting of strictly separated green and red area
- SDC, OGT, CBU, (optional shell cutting line)
- analytics, decontamination,
- tent with sluices for main plant units and with filter system
- utilities, control room
- social rooms/containers
Operation – Staffing Training

Very Strict Training Procedure

• Proper Pre-selection of staff
• Classroom Training
• CWA related training in GEKA/HCG
• Plant training in ANCDF and Munster
• OJT training directly on the plant
• Certification of operators
• US CWA based training procedure
• Zero tolerance in safety, environmental and quality
• Professional US Navy Nuclear Power Trainers
Dynasafe SDC 1000 CM 2 - the flexible solution for:

(1) States Parties with new discoveries of OCW
(2) States Parties with new ACW discoveries
(3) States Parties with OCW already recovered, but not having destruction capabilities
(4) States Parties with recoveries of former sea-dumped CW
State Party with recently discovered OCW - but not having destruction capabilities

Two possible ways out:

(1) so-called “Transfer for Destruction” approach under strict OPCW oversight and verification - “Austria Approach”

(1) “Emergency Assistant Program” application - provide technical capacity/assistance to a State Party under the strict OPCW oversight and verification
Thank you for listening!

www.dynasafe.com
thomas.stock@dynasafe.com
holger.weigel@dynasafe.com