

After any mission that could involve exposure to toxic chemicals, the protective equipment used has to be decontaminated and carefully inspected.

Furthermore, special first-aid medical support and transportation with ambulances must be ensured at any time while demil operations are being carried out.

#### 4. Destruction of chemical agents

The German OCW disposal concept includes as a decisive step the incineration of the chemical agent fillings at high temperatures, which results in the complete mineralization of the chemicals. The combustion flue gases are scrubbed and stack emissions continuously monitored in a way as to ensure that stringent German environmental standards are met.

Prior to incineration, chemical agents and demil wastes as well as empty shells are intermediately stored in polyethylene (PE) containers.

The incineration plant near Munster is designed for a destruction capacity of approximately 70 agent tonnes per year.

An additional plant is currently being planned for the disposal of both soil contaminated with arsenicals and explosives mixed with toxic chemicals.

##### 4.1 Incineration of chemical agents

The Munster incineration plant, after approximately 5 years of planning and construction, began full operation in 1980. It includes a batch-type double chamber furnace with unique features primarily designed for the destruction of viscous sulphur mustard. In two overlapping shifts or a 14 hour working day, up to 350 kg of sulphur mustard can be incinerated.

(Further technical and other data on the plant, including costs of construction and operation, are specified in Annex 1; the functional diagramme of the plant is shown in Annex 2).

Prior to incineration the chemicals are analyzed for the presence of arsenicals. Based on analytical results, batches are put together and the conditions for the most effective waste and effluent air treatment adjusted accordingly.

The re-opened PE storage containers are loaded on a heat resistant charging wagon which is then moved through a gas lock into the evaporation chamber. There, at 300°C and in an inert atmosphere ( $N_2+CO_2+H_2O$ ), the chemicals are vapourized within 10 to 12 hours and the vapours introduced through an insulated duct into the main incineration chamber.

In this chamber, sulphur mustard is oxidized at temperatures between 1000°C to 1200°C, and within a reaction time of 2 seconds converted into sulphur dioxide ( $SO_2$ ), hydrogen chloride (HCl), carbon dioxide and water.