G Agents (methylphosphonofluoridates)

Some containers of sarin are known to have been dumped at sea. G agents are hydrolyzed by sea water with a half life of a few hours so that leaks from shells or containers should not pose a prolonged hazard especially in deep water, however public concern now precludes the further dumping of G agents at sea. G agents may be incinerated in contained systems but extensive safety precautions would be required. They are easily destroyed by alkaline hydrolysis. Organic solvents such as alcohol or acetone will promote the reaction through solubilization. Hydrolysis with aqueous sodium hydroxide is the method utilized for sarin disposal in the United States CAMDS system.

V Agents

These materials are also hydrolized by sea water, however some phosphonic acids produced are themselves toxic and are sufficiently resistant to further hydrolysis that this is not a practical disposal method. V agents may be detoxified by alkaline hydrolysis although an organic solvent to increase solubilization is usually required. V agents may also be oxidized with bleach or chlorine and this is the basis of decontamination techniques in the field. Acid chlorinolysis is the process used in the United States CAMDS system. As with the G agents, extreme safety precautions must be incorporated into any disposal plant in order to protect both the workers and the surrounding ecosystems.

DDT

While this and related insecticides are not CW agents, they are now banned in many countries and their disposal is typical of the problems encountered with many toxic industrial chemicals and wastes. In the environment, DDT decomposes very slowly and may be accumulated within some plants, animals, birds or fish. The complete disposal of DDT requires contained incineration at very high temperatures (1700°F). Effluents must be scrubbed to remove acids.

In order to overcome environmental and safety concerns, extreme and highly expensive methods are often required to destroy stocks of chemical warfare agents. A preliminary description of the disposal of mustard at Suffield was presented in CCD 434 on 16 July 1974. The destruction was completed in 1976, and disposal of the hydrolysate products has been continuing at a slow rate since that time. The following is an updated version of the process.

MUSTARD DISPOSAL IN CANADA

During World War II Canada, like many other nations, acquired supplies of chemical warfare agents in the event that gas warfare was used. Early in the war some mustard was obtained from the United States and the United Kingdom. Canadian mustard was produced by the thiodiglycol process in a special plant set up at Cornwall, Ontario in 1941. The plant ceased operation in 1945 and was dismantled in 1946. Mustard was not manufactured at Suffield, but because of its primary role as a Commonwealth CW Test Centre, a large storage capacity was created and Canadian stocks were stored there in bulk. Some of this material was used for wartime tests and experiments on the range. At the end of the war, the bulk mustard remaining at Suffield was stored in four large lead-lined concrete vats. As it would have been difficult to package this material for disposal elsewhere, it was left in situ to be used for experimentation. With the discovery of nerve agents, experimental interests shifted and little of the mustard was used.