(4) Sulphur Mustards:

2-chloroethylchloromethylsulphide	2625-76-5
Mustard Gas (H): Bis(2-chloroethyl)sulphide	505-60-2
Bis(2-chloroethylthio)methane	63869-13-6
Sesqui Mustard (Q):	
1,2-Bis(2-chloroethylthio)ethane	3563-36-8
1,3-Bis(2-chloroethylthio)-n-propane	63905-10-2
1,4-Bis(2-chloroethylthio)-n-butane	
1,5-Bis(2-chloroethylthio)-n-pentane	
Bis(2-chloroethylthiomethyl)ether	63918-90-1
O-Mustard (T):	
Bis(2-chloroethylthioethyl)ether	63918-89-8

Mustard Gas: $C_4H_8Cl_2S$
CAS NO. 505-60-2
HS NO. 29.30.90
Merck 6225

Synonyms: 1,1'-Thiobis[2-chloroethane]; bis-(2-chloroethyl) sulphide; b.b'-dichloroethyl sulphide; 2,2'-dichlorodiethyl sulphide, sulphur mustard, yellow cross liquid; kampfstoff "lost", yperite.

Physical properties: MW: 159.1; mp: 14°C; bp: 217°C; d. 1.274; $nO(^2D)^0$ 1.5313; slightly soluble in water (0.68 g/litre) soluble in most organic solvents; a colourless oily liquid with a garlic odour.

Synthesis: There are two major routes; the simplest involves the reaction of thiodiglycol with any chlorinating agent such as HCl or thionyl chloride while the original Levenstein process involved the reaction of ethylene with sulphur monochloride or sulphur dichloride. Vinyl chloride is also reported to react photochemically with hydrogen sulphide.

Toxicology: Causes conjunctivitis and blindness. Its effects are usually delayed (1-12 hr) and can cause edema, ulceration and necrosis of skin and respiratory tract; LD_{50} is 0.42 mg/liter/2m respiratory (rat) and median lethal dose (inhalation) is 1500 gm/min/m^3.

Key precursors: Thiodiglycol (CAS No. 111-48-8), hydrogen sulphide (CAS No.7783-06-4).

Precursors: Ethylene oxide (CAS No. 75-21-8), 2-chloroethanol (CAS No. 107-07-3), sodium sulphide (CAS No.1313-82-2), sulphur monochloride (CAS No. 10025-67-9), sulphur dichloride (CAS No. 10545-99-0).