SIDS INITIAL ASSESSMENT PROFILE

CAS No.	127-18-4
Chemical Name	Tetrachloroethylene
Structural Formula	$Cl_2C=CCl_2$

CONCLUSIONS AND RECOMMENDATIONS

The chemical is a candidate for further work.

SHORT SUMMARY WHICH SUPPORTS THE REASONS FOR THE CONCLUSIONS AND RECOMMENDATIONS

The major uses of tetrachloroethylene are as a dry cleaning solvent and a chemical intermediate. It is also used in metal degreasing and extraction processes. Some minor uses have been reported, which include use as a textile scouring solvent, fumigant, stain remover, paint remover and heat transfer media ingredient.

Tetrachloroethylene is distributed between environmental compartments by a number of different process. These include volatilisation, precipitation and adsorption, the processes responsible being dependent upon the nature of the release. Based upon its environmental chemistry, computer models predict that the atmosphere will be the major sink for tetrachloroethylene.

For the environment, various PNEC values were derived from test results (51 µg/l for water, 100 mg/l for microorganisms in WWTP, 632 µg/kg for sediment, 0.1 mg/kg for terrestrial organisms). Most of PEC/PNEC ratios are lower than 1, however, in the worst case scenario prediction for the aquatic compartment a PEC/PNEC ratio higher than 1 is obtained. As this calculated PEC uses worst case assumptions it is likely that actual concentrations are lower than this. If the water quality objective of 10 µg/l is applied for tetrachloroethylene releases, future concentrations of tetrachloroethylene in surface water should not exceed 10 µg/l, at this level the PEC/PNEC ratio is less than 1. In the terrestrial compartment a $PEC:PNEC_{local}$ >3 is achieved, however, tetrachloroethylene is very volatile and if applied to soil would be expected to evaporate rapidly from the soil surface. A low K_{oc} indicates the bioaccumulation and biomagnification potential of tetrachloroethylene is low. (This is supported by reported data.)

Studies in experimental animals and humans have shown that tetrachloroethylene is rapidly and extensively absorbed following inhalation and oral exposure; the rate of skin penetration appears to be lower than for some other solvents. The main toxic effect associated with acute inhalation exposure is CNS depression, and accidental exposure to very high concentrations has led to narcosis, unconsciousness and even death. Human experience and/or animal data indicate that tetrachloroethylene is irritating to the skin and to the respiratory tract.

Tetrachloroethylene is clearly carcinogenic in standard animal studies, producing liver tumours in mice and kidney tumours in rats. However, consideration of the mechanisms underlying the appearance of these tumours indicates that they are highly unlikely to be of any significance in relation to human health. There is no convincing evidence for any increased risk of cancer in humans resulting from exposure to tetrachloroethylene.

The majority of measurements of worker exposure to airborne tetrachloroethylene in manufacturing were low, with significant excursions which would be controlled by the use of respiratory protective equipment. Inhalation exposures for recycling and use as a chemical feedstock were similarly low, although based on very little

information. Inhalation exposures in dry-cleaning and metal degreasing were somewhat higher. Under certain circumstances there may be additional exposure via the dermal route, although this may be readily controlled with appropriate protective clothing.

Consumer exposure to tetrachloroethylene is restricted to contact following dry-cleaning of clothes and other articles. Exposure falls into two distinct categories; those from contact with professionally dry-cleaned items and those arising from the use of coin-operated dry-cleaning machines. Whilst the former category does not give grounds of concern in relation to human health, the use (and foreseeable misuse) of coin operated machines has resulted in evidence of central nervous system depression, including one reported fatality.

NATURE OF FURTHER WORK RECOMMENDED

A retrospective epidemiological study on the risk of spontaneous abortion in dry-cleaning workers is needed (currently being carried out).

There is a need for limiting the risks for consumers on the use (and foreseeable misuse) of coin-operated dry-cleaning machines