SIDS INITIAL ASSESSMENT PROFILE

CAS No.	79-01-6
Chemical Name	Trichloroethylene
Structural Formula	CCl_2=CHCl

CONCLUSIONS AND RECOMMENDATIONS

The chemical is an animal carcinogen but there was no agreement as to whether this was due to a genotoxic mechanism.

SHORT SUMMARY WHICH SUPPORTS THE REASONS FOR THE CONCLUSIONS AND RECOMMENDATIONS

Trichloroethylene (TRI) is mostly used for metal degreasing. TRI is also used in adhesives, for consumer uses and for other uses (extraction, leather preparation, pharmaceuticals etc.).

The worst case PEC/PNEC ratios suggest that TRI is not likely to cause adverse effects in the aquatic environment. The highest $PEC_{effluent}$ (427 µg/l) is due to production of TRI, giving a PEC/PNEC ratio of 3.3 which suggests that TRI may cause adverse effects on microorganisms in a WWTP.

Within the terrestrial compartment the PEC/PNEC ratio for production is 0.48, for handling 0.5, for metal degreasing is 0.14 and for use as an intermediate is 0.12 which suggests adverse effects are unlikely to occur in soil.

TRI is likely to have little effect on stratospheric ozone and will not make significant contribution to photochemical ozone formation. However, the breakdown product, dichloroacetyl chloride may have an adverse effect upon stratospheric ozone. More information is required on the lifetime and reactions of dichloroacetyl chloride.

The main toxic effect associated with acute inhalation exposure is CNS depression. Exposure to very high concentrations causes narcosis; extensive experience in the use of TRI as an anaesthetic at concentration of 5000 to 10000 ppm has demonstrated that recovery from narcosis is usually complete. Studies in human volunteers have shown that the NOAEL for CNS depression is in the region of 300 ppm, for exposures of up to eight hours.

There are indications from human experience and studies in animals that both single and repeated dermal exposure to TRI can be irritating to the skin, as is to be expected given the defatting properties of the substance, and that it should therefore be classified as a skin irritant. Also, from the limited data which are available, it is apparent that TRI should be classified as an eye irritant.

Overall, in animals, kidney toxicity appears to be the most sensitive endpoint for both long-term repeated inhalation and oral exposure. NOAELs of 100 ppm and 50 mg/kg/day were identified in rodents for inhalation and oral exposure, respectively.

The genotoxicity of TRI has been extensively investigated in experimental test systems. TRI tested positive in a bacterial (Ames) test and a mouse lymphoma gene mutation assay, demonstrating that TRI is an *in vitro* mutagen. However, there is strong evidence that this mutagenic activity is not expressed *in vivo*.

From animal data, increased incidence of kidney and lung cancer at 100 ppm and 50 mg/kg/day were observed for inhalation and oral routes respectively. Accordingly NOAELs can be derived, although other lung changes (vacuolation of Clara cells) have been seen in mice at concentrations below 100 ppm. Since TRI does not appear to express mutagenic activity *in vivo*, it is likely that any carcinogenicity would be mediated by non-genotoxic mechanisms.

The risk of cancer under contemporary exposure condition is uncertain and therefore the exposures experienced in the workplace, in particular those encountered in poorly controlled metal cleaning operations, are of concern for human health. There are additional concerns for workers relating to repeated dose toxicity; a NOAEL for kidney of 100 ppm by inhalation having been identified from animal data.

NATURE OF FURTHER WORK RECOMMENDED

Risk management activities related to occupational exposure in the metal cleaning industry should be considered.

International consumer exposure data to be gathered.