

MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY

INTEROFFICE COMMUNICATION

November 21, 2003

TO: 1,1-diphenylethane file (CAS # 612-00-0)

FROM: Gary Butterfield



SUBJECT: Screening level for 1,1-diphenylethane

1,1-Diphenylethane is also commonly known as 1,1-ethyldienebisbenzene. It is a liquid with a molecular weight of 182.26 g/mol.

The following references or databases were searched to identify data to determine the screening level: U.S. Environmental Protection Agency (EPA) Integrated Risk Information System (IRIS), National Institute for Occupational Safety and Health (NIOSH) Registry for Toxic Effects of Chemical Substances (RTECS), American Conference of Governmental and Industrial Hygienists (ACGIH) Threshold Limit Values (TLVs), Michigan Department of Environmental Quality (DEQ) library, International Agency for Research on Cancer (IARC) Monographs, Chemical Abstract Service (CAS) Online (1968 - May 2003), National Library of Medicine (NLM) - Toxline, and National Toxicology Program (NTP) Status Report.

The CAS and NLM on-line literature searches were conducted on May 5, 2003. No toxicity study that could be used to set a screening level were located during the literature search. Dow Chemical submitted summaries of some unpublished acute toxicity data from their files for the purpose of having an ITSL set, Dow/Lockwood (1984).

In an acute oral study, groups of 4 male F344 rats, weighing 190 to 212 grams, were administered a single gavage dose of 250, 500, 1000 or 2000 mg/kg of 1,1-diphenylethane dissolved in corn oil. All rats survived the 14 day observation period. The LD50 was determined to be greater than 2000 mg/kg.

In an acute inhalation study, two groups of four male F344 rats were exposed for 1-hour to either 1.6 or 1.5 mg/L, nominal concentration. There were no deaths observed during the 2 week observation period.

For the purpose of calculating an ITSL, it is generally more acceptable to use an inhalation study over an oral study. However, as no deaths occurred in either of the above acute studies (oral or inhalation), it is not known how much greater the exposures could be before reaching the LD50 or LC50. For a comparison of potential screening levels between oral versus inhalation based on the available data, an ITSL can be calculated from both routes of exposure as follows.

From the inhalation study, the 1.5 mg/L dose level will be used as a surrogate LC50 in the equation from R232(1)(g) as follows.

$$\text{ITSL} = \frac{1.5 \text{ mg/L}}{500 \times 100 \times 40} = 0.8 \text{ ug/m}^3 \text{ annual average}$$

From the oral study, 2000 mg/kg will be used as a surrogate LD50 in the equation from R232(1)(h) as follows.

$$\text{ITSL} = \frac{2000 \text{ mg/kg}}{500 \times 40 \times 100 \times 0.167} \times \frac{1 \text{ kg}}{0.9 \text{ m}^3} = 7 \text{ ug/m}^3 \text{ annual average}$$

Due to the fact that no deaths occurred, it is considered appropriate to set the screening level to the higher of the above two potential screening levels. Thus, from the oral study, the ITSL is being set at 7 ug/m³ with annual averaging.

References:

Dow/Lockwood. 1984. 1,1-diphenylethane: acute toxicological properties. Lab report number K-000667-001. Summary submitted by Dow Chemical to DEQ Air Quality Div.