

MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY

INTEROFFICE COMMUNICATION

August 7, 1998

TO: File for methyldiethanolamine (CAS #105-59-9)
FROM: Marco Bianchi, Toxics Unit, Air Quality Division
SUBJECT: Initial Threshold Screening Level

The updated initial threshold screening level (ITSL) for methyldiethanolamine is $6 \mu\text{g}/\text{m}^3$ based on an annual averaging time. A previous chemical review dated July 1, 1998 determined an ITSL for methyldiethanolamine at $15 \mu\text{g}/\text{m}^3$ annual averaging. Since that time, additional information has become available for review of this compound and has resulted in a lowering of the screening level to $6 \mu\text{g}/\text{m}^3$ based on an annual averaging time.

Originally, only one study was available for review. In an acute range-finding toxicity study by Smyth et al. (1954), groups of 5 male or female Carworth-Wistar rats were given a single dose of methyldiethanolamine in a logarithmic series by gastric intubation. The animals were observed for 14 days, and the LD_{50} value was estimated by the method of Thompson to be $4.78\text{g}/\text{kg}$ ($4780\text{mg}/\text{kg}$).

In the newly obtained study by Ballantyne (1996), 5 male and 5 female Sprague-Dawley rats were given a single dose of methyldiethanolamine in a dose-series by gavage. After dosing, rats were examined daily for signs of toxicity over a 2-week period. Toxic effects included sluggishness, lacrimation, chromodacryorrhea, diarrhea, kyphosis, and prostration. At necropsy, animals that died revealed distended stomachs containing blood and having dark red or purple discoloration of the glandular portion. Intestines contained blood and had variable degrees of congestion. Lungs in general showed dark red mottling. Survivors had no gross pathology at necropsy. The LD_{50} was determined to be $1945 \text{mg}/\text{kg}$ with confidence limits of 1310-2870 mg/kg . This LD_{50} will be used to derive a revised ITSL.

The ITSL was derived as follows:

$$\text{LD}_{50} = 1945\text{mg}/\text{kg}$$

$$\text{ITSL} = \frac{1}{500} \times \frac{1}{40} \times \frac{1}{100} \times \frac{1945}{0.167 \times 0.931} = 0.0063\text{mg}/\text{m}^3$$

$$0.006 \text{mg}/\text{m}^3 \times 1000 = 6 \mu\text{g}/\text{m}^3 \text{ based on annual averaging.}$$

The ITSL for methyldiethanolamine = 6 ug/m³ based on annual averaging.

References:

Ballantyne, B. 1996. Acute toxicity and primary irritancy of alkylalkanolamines. *Veterinary and Human Toxicology*. 38(6):422-426.

Smyth, HF. et. al., 1954. Range-Finding Toxicity Data List V. *Journal of Industrial Hygiene and Toxicology*. 10:61-68.

MB:SLB

cc: Mary Lee Hultin, AQD