

MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY

INTEROFFICE COMMUNICATION

JULY 24, 1998

TO: File for diethylamine (CAS#109-89-7)

FROM: Marco Bianchi

SUBJECT: Initial Threshold Screening Level

The initial threshold screening level (ITSL) for diethylamine is  $150 \mu\text{g}/\text{m}^3$  based on an 8 hour averaging time. The following references or databases were searched to identify data to determine the ITSL: IRIS, HEAST, NTP Management Status Report, RTECS, EPB-CCD, EPB library, CAS-online, NLM-online, IARC, NIOSH Pocket Guide, and ACGIH Guide.

A complete reference check was conducted for diethylamine disclosing various toxicological studies for review. According to the ACGIH (1996, supplement), the reported oral  $\text{LD}_{50}$  values for diethylamine are 108 mg/kg for rats and 130 mg/kg for mice. By contrast, RTECS listed an  $\text{LD}_{50}$  in rats and mice of 540 mg/kg and 500 mg/kg, respectively. Regardless of the  $\text{LD}_{50}$  values, all of these acute studies have shown that animals exposed to concentrated vapors of diethylamine exhibited strong irritation and corrosion to mucous membranes of the eyes, nose, and respiratory tract. Both the ACGIH and RTECS agreed that a 4-hour rat inhalation  $\text{LC}_{50}$  was observed at 4000 ppm ( $12,000 \text{ mg}/\text{m}^3$ ).

In a subchronic inhalation study by Lynch et al., (1986), 200 Fischer-344 rats were placed in three exposure chambers (100/sex/container) and exposed to 0, 25 or 250 ppm of diethylamine vapor for 6.5 hrs/day, 5 days/wk for 6 months. Results revealed no overt toxicity at 25 ppm, but at 250 ppm, both sexes exhibited sneezing, and tearing eyes. At necropsy, no gross lesions were related to exposure. Histologic changes thought to be related to diethylamine exposure were confined to the respiratory tract. Both male and females exposed to 250 ppm showed significantly increased frequencies of squamous metaplasia, lymphoid hyperplasia and suppurative rhinitis of the nares, compared to controls. Nares of rats in the 25 ppm group were not examined. In comparison, Tkachev (1969) showed chronic interstitial pneumonia along with hardening of the argyrophilous framework of the alveoli and the accumulation of acidic mucopolysaccharides in rats exposed to 1.4 ppm continuously for 3 months. This raises doubts about not finding any effects in the Lynch study at the 25 ppm exposure level. Therefore, the subchronic study by Lynch will not be used to derive an RfC for an ITSL. Instead, the ACGIH Threshold Limit Value (TLV) of 5 ppm ( $15 \text{ mg}/\text{m}^3$ ) will be used to derive an ITSL, based on severe irritation to the eyes and skin of laboratory animals and of humans. Irritation was seen in humans exposed to 12 and 25 ppm.

*The ITSL was determined as follows:*

ACGIH TLV = 15 mg/m<sup>3</sup>

15 mg/m<sup>3</sup> ÷ 100 = 0.15 mg/m<sup>3</sup>

0.15 mg/m<sup>3</sup> x  $\frac{1000 \text{ ug/m}^3}{1 \text{ mg/m}^3}$  = 150 ug/m<sup>3</sup>

**The ITSL for diethylamine = 150 ug/m<sup>3</sup> based on 8 hr. averaging.**

**References:**

1. Documentation of Threshold Limit Values and Biological Exposure Indices. 1996 (supplement). Diethylamine. American Conference of Governmental Industrial Hygienists (ACGIH), 6th Edition.
2. Lynch, DW et al., 1986. Subchronic inhalation of diethylamine vapors in Fischer-344 rats: organ system toxicity. Fund. App. Toxicol. 6(3):559-565.

MB:SLB

cc: Mary Lee Hultin, AQD