MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY

INTEROFFICE COMMUNICATION

August 7,1998

TO: File for Dimethylamino-2-propanol (CAS #108-16-7)

FROM: Marco Bianchi, Toxics Unit, Air Quality Division

SUBJECT: Initial Threshold Screening Level

The initial threshold screening level (ITSL) for dimethylamino-2-propanol is 4 $\mu g/m^3$ based on an annual 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 dimethylamino-2-propanol but only four rodent LD_{50} studies were available for review. In the first study (Smyth et al. 1954), groups of five male or female rats were given a single dose of dimethylamino-2-propanol 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. The LD_{50} for dimethylamino-2-propanol was determined to be 1890 mg/kg.

In a toxicity report obtained through the EPA library, Eastman Kodak Co. presented acute oral toxicity data in tabular format, providing only approximate LD_{50}s for rats and mice. For rats, an LD_{50} range was listed at 800-1600 mg/kg, and for mice, an approximate LD_{50} was listed at 1600 mg/kg.

In a study by Ballantyne (1996), 5 male Sprague-Dawley rats were given a single dose of dimethylamino-2-propanol in a dose-series by gavage. Rats were examined 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 1739 mg/kg.

Finally, a comparative acute toxicity study of various classes of amines by Myers et al. (1997) resulted in an LD_{50} of 1070 mg/kg for dimethylamino-2-propanol. In this study, 5 male Wistar albino rats were dosed in a graded series by gavage, and observed immediately after dosing and 14-days post-dosing. Animals displayed lethargy, labored breathing, and prostration. At necropsy, rats that died had injected stomachs and intestines (frequently with hemorrhage),

congestion of the kidneys and adrenal glands, and lung petechiae. Survivors showed no remarkable gross lesions. The LD_{50} was calculated by the moving average method of Thompson and the tables of Weil.

It was determined that each of the above studies had similar LD_{50} toxicities ranging from 1070-1890 mg/kg (or calculated ITSLs ranging from 3.5 to 6 ug/m^3). Utilizing criteria from the guidelines for minimum data reporting requirements for acute toxicity testing resulted in selecting the Myers' study (1997). This study seemed the most comprehensive, and would provide the greatest level of protection to sensitive populations.

The ITSL was derived as follows:

LD_{50} = 1070 mg/kg

$$\text{ITSL} = \frac{1}{500} \times \frac{1}{40} \times \frac{1}{100} \times \frac{1070}{0.167 \times 0.919} = 0.0035 \text{ mg/m}^3$$

0.004 mg/m^3 x 1000 = 4 ug/m^3 based on annual averaging.

The ITSL for dimethylamino-2-propanol = 4 ug/m^3 based on annual averaging.

References:

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

Myers, RC. Et al., 1997. Comparative acute toxicity and primary irritancy of various classes of amines. Toxic Substance Mechanisms. 16:151-193.

Smyth, HF. el. al., 1954. Range-Finding Toxicity Data: List V. Archives of Industrial Hygiene and Occupational Medicine. 10:61-68.

TSCA 8(e) submittal. 1992. 88-920008929. [Eastman Kodak Co. Initial submission: Letter from Eastman Kodak Co to USEPA regarding toxicity studies with 1-(dimethylamino)-2-propanol with cover letter dated 091092.]

MB:SLB
cc: Mary Lee Hultin, AQD