MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY

INTEROFFICE COMMUNICATION

August 20, 1998

TO: File for Diisopropylamine (CAS #108-18-9)

FROM: Marco Bianchi, Toxics Unit, Air Quality Division

SUBJECT: Initial Threshold Screening Level (ITSL)

The Initial Threshold Risk Screening Level (IRSL) for diisopropylamine is 200 $\mu g/m^3$ based on an 8 hr. averaging time. This compound was initially evaluated by AQD staff in 1995 and approved with a PAI of 0.0139 ug/m^3 (8 hr. averaging time). In an effort to set a final screening level, the following references or databases were searched to identify data to determine the ITSL/IRSL: IRIS, HEAST, NTP Management Status Report, RTECS, EPB-CCD, EPB library, CAS-online, NLM-online, IARC, NIOSH Pocket Guide, and ACGIH Guide.

According to ACGIH, diisopropylamine vapor is a severe, primary, pulmonary irritant in both acute and chronic exposures, producing excessive fluid and cloudy swelling of the corneal epithelium at vapor concentrations of 600 ppm and above in several species of laboratory animals. Groups of guinea pigs, rabbits, cats, and rats were exposed to varying concentrations of diisopropylamine. Test animals exposed to 2200 ppm died in less than 3 hours, but all survived at an exposure of 777 ppm for 7 hours. Smyth et al., found that the acute inhalation toxicity of diisopropylamine is considerably greater than that of diethylamine, isopropylamine, or ethylamine; the concentrations causing death to animals in 4 hours being approximately 1000, 4000, 6000, and 8000, respectively. Smyth et al., also reported an oral LD_{50} of diisopropylamine in rats at 770 mg/kg.

Monsanto conducted a one-month rat inhalation study by exposing 15 male and 15 female Charles River CD (SD) BR rats to 0, 0.1, 0.6 and 2.0 mg/liter diisopropylamine vapor for 6 hrs/day, 5 days/week for 4 weeks. Exposure of rats to 2.0 mg/l resulted in 3 deaths, substantial body weight reductions, and several pathological changes and lesions. Slight to moderate toxicity, as evidenced by decreased body weight gains, decreased lymphocyte counts, increased erythrocyte parameters, ocular corneal lesions, and microscopic lesions of the nasal turbinates, was noted at the 0.6 mg/l exposure level. The only effects noted at the 0.1 mg/l exposure level were low incidences of nasal and ocular corneal lesions and moderately reduced lymphocyte counts. A No-Observable-Effect-Level (NOEL) was not determined in this study.

In a subchronic inhalation study by Treon et al. (1949), groups of guinea pigs, rabbits, cats, and rats were exposed 7 hr/day over an eight week period. All rabbits died by the

20th exposure day, as well as one-half of the guinea pigs, but all other test animals survived the 40 exposures at 600 ppm. No changes were seen in the cellular elements of the blood in any of the exposed animals; however, cloudiness of the cornea with partial or total loss of vision occurred. Treon also cited reports of disturbances in vision, nausea, and headache in workers where concentrations averaged between 25 and 50 ppm. Based upon limited data, the ACGIH recommended a threshold limit value (TLV) of 5 ppm (21 mg/m^3) to protect against disturbance of vision and irritation of respiratory passages. NIOSH confirmed this value by also establishing a recommended exposure level (REL) of 5 ppm, but because of rounding differences, converted the REL to 20 mg/m^3. This value will be used to derive the ITSL for diisopropylamine.

The ITSL was determined as follows:

NIOSH REL = 20 mg/m^3

20 mg/m^3 ÷ 100 = 0.20 mg/m^3

$$0.20\ mg/m^3 \times \frac{1000\ ug/m^3}{1\ mg/m^3} = 200\ ug/m^3$$

The ITSL for diisopropylamine = 200 $\mu g/m^3$ based on 8 hr. averaging.

References:

1. Documentation of Threshold Limit Values and Biological Exposure Indices. 1991. Diisopropylamine. American Conference of Governmental Industrial Hygienists (ACGIH), 6th Edition.

MB:SLB
cc: Mary Lee Hultin, AQD