MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY

INTEROFFICE COMMUNICATION

July 22,1998

TO: File for Ethylamine (CAS #75-04-7)

FROM: Marco Bianchi, Toxics Unit, Air Quality Division

SUBJECT: Initial Threshold Screening Level

The Initial Risk Screening Level (IRSL) for ethylamine is 92 $\mu g/m^3$ based on an 8 hour averaging time. The clinical effects in animals were reported to be eye and skin irritation.

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.

A complete reference check for ethylamine produced a number of toxicologic studies for evaluation. RTECS listed an oral rat LD_{50} of 400 mg/kg obtained from a Smyth study (1954). In this same study, Smyth also exposed rats to a concentration of 8000 ppm (14,757 mg/m^3). This exposure concentration killed 2 out of 6 rats in 4 hours suggesting that ethylamine is moderately toxic by oral administration, but low in acute inhalation toxicity. An Air Products and Chemicals sponsored study confirmed the low acute inhalation toxicity of ethylamine, but with a slightly lower LC_{50} concentration of 5540 ppm (10,219 mg/m^3) using 5 rats/sex.

In a study by Bio-dynamics for Pennwalt Corporation (1986), five Sprague-Dawley rats/sex were exposed to ethylamine for 4 hours at a concentration of 2580 ppm (4759 mg/m^3). Observations noted during exposure included increased secretory response, respiratory distress, hunched appearance, closed eyes, matted coat and reduced activity. All animals survived through the 14-day post-exposure period. Gross postmortem observations were considered unremarkable.

Lynch et al., (1988) exposed 30 male and 30 female F-344 rats to 0, 10, 100, or 500 ppm ethylamine vapor, 6 hrs/day, 5 days/wk for 24 weeks. Examination of the nasal cavity of rats exposed at 500 ppm for 120 days disclosed moderate to marked atrophic rhinitis in 16/16 males and 17/17 female rats. The lesion involved principally the anterior half of the nasal cavity and was characterized by purulent exudate in the nasal meatuses; chronic, active inflammation that was often ulcerative; necrosis and loss of the cartilaginous nasal septum; loss of bony turbinates; and squamous metaplasia of nasal epithelium. No lesions were detected in the nasal cavities of the controls, 10, or 100 ppm exposed rats for the same time period. Body weight gain in

rats of both sexes exposed to 500 ppm was statistically reduced compared to the controls throughout the 24 weeks of exposure. No treatment-related effects on hematology, clinical chemistry, or ECG indices were observed, and no evidence of cardiotoxicity was seen in rats exposed to ethylamine for up to 120 days. Although the NOAEL from this study is 100 ppm, it will not be used to derive a reference concentration (RfC) because a subchronic rabbit inhalation study resulted in lung and eye irritation at 50 ppm (ACGIH, 1991). Instead, the ITSL will be based on the Threshold Limit Value (TLV) of 9.2 mg/m^3. This number was recommended by the ACGIH to minimize the potential risk of irritation produced by repeated, low-level exposures to ethylamine.

The ITSL was determined as follows:

ACGIH TLV = 9.2 mg/m^3

9.2 mg/m^3 ÷ 100 = 0.092 mg/m^3

$$0.092\ mg/m^3 \times \frac{1000\ ug/m^3}{1\ mg/m^3} = 92\ ug/m^3$$

The ITSL for ethylamine = 92 µg/m^3 based on 8 hour averaging.

REFERENCES:

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

2. EPA Library Microfiche. 1986. An acute inhalation toxicity study of ethylamine in the rat. Biodyamics Inc. for Pennwalt Corporation. OTS0513609.

3. EPA Library Microfiche. 1993. Acute inhalation toxicity evaluation on monoethylamine in rats. International Research and Development Corp. for Air Products and Chemicals. OTS0538173.

4. Lynch D.W. et al., 1988. Subchronic inhalation toxicity of ethylamine vapor in F-344 rats. The 27th Society of Toxicology Meeting Poster Session; Dallas, Texas 2/15/88.

MB:SLB
cc: Mary Lee Hultin, AQD