

MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY

INTEROFFICE COMMUNICATION

January 21, 1997

TO: File for 2,6-Dimethyl Morpholine (CAS# 141-91-3)

FROM: Michael Depa, Toxics Unit, Air Quality Division

SUBJECT: Screening Level Determination

The initial threshold screening level (ITSL) for 2,6-dimethyl morpholine is 377 $\mu\text{g}/\text{m}^3$ based on an annual averaging time.

The following references or databases were searched to identify data to determine the IRSL: IRIS, RTECS, ACGIH Threshold Limit Values, NIOSH Pocket Guide to Hazardous Chemicals, Environmental Protection Bureau Library, IARC Monographs, CAS Online (1967 - November 26, 1996) National Library of Medicine, Health Effects Assessment Summary Tables, and NTP Status Report. Review of these sources found that EPA has not established an RfC or RfD for 2,6-dimethyl morpholine. The ACGIH and NIOSH have not established occupational exposure limits (OELs). An LD50 of 2830 mg/kg was referenced on the RTECS printout (Union Carbide, 1961); however, this reference was unavailable. A telephone conversation with Union Carbide Corporation prompted Union Carbide to send a confidential summary of several toxicity studies, including one that describes an LD50 of 2830 mg/kg and an acute inhalation study. These studies are summarized below.

Groups of Carworth-Wistar rats (sex and number not specified) were dosed with single oral doses of dimethyl morpholine (10% solution) differing by a factor of 2.0 in a geometric series. The rats were observed for 14 days. The authors stated that dimethyl morpholine produced gastrointestinal hemorrhage, congestion of the adrenals and spleens, mottling of livers (both pale and congested areas), and pale kidneys with internal congestion. The authors reported that the LD50 for rats is 2.83 g/kg with no range calculable because at the dosage levels selected, mortalities were either 0 or 100%. The LD50 reported is not an accurate value because of the mortality of either all or none of the rats. Furthermore, since the dose levels were not provided it could not be determined at what dose 0% mortality occurred (this dose could have been used as a conservative estimate of the LD50). An ITSL could not be derived from this study.

In an acute inhalation study provided by Union Carbide, the authors reported that substantially saturated vapor (about 4000 ppm or 18,847 mg/m^3) caused 100% mortality

among 6 male rats exposed for 8 hours. A second group exposed to 4000 ppm for 4 hours survived the usual 14 -day observation period. The authors concluded the under these conditions dimethyl morpholine would be classed as moderately hazardous. This concentration was determined to be adequate to use as a 4 hour LC50. The 18,847 mg/m³ dose level then was used in Rule 232(1)(f) to develop the ITSL as follows.

$$\text{ITSL} = \text{LC50}/(500 \times 100)$$

$$\text{ITSL} = (18,847 \text{ mg/m}^3)/(50,000)$$

$$\text{ITSL} = 0.3769 \text{ mg/m}^3$$

$$\text{ITSL} = 377 \text{ } \mu\text{g/m}^3 \text{ (based on an annual averaging time)}$$

The ITSL for 2,6-dimethyl morpholine is 377 $\mu\text{g/m}^3$ based on an annual averaging time.

REFERENCES

Union Carbide data Sheet. 1961. Volume 11, page 13.

MD:slb