

MICHIGAN DEPARTMENT OF NATURAL RESOURCES

INTEROFFICE COMMUNICATION

June 10, 1994

TO: File for Piperidine (110-89-4)  
FROM: Marco Bianchi  
SUBJECT: Initial Threshold Screening Level

The initial threshold screening level (ITSL) for piperidine is 140  $\mu\text{g}/\text{m}^3$  based on an annual averaging time.

The following references or databases were searched to identify data to determine the 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 piperidine, but only limited information was available. Two studies were available which calculated an oral rat  $\text{LD}_{50}$ . Van den Heuvel et al., (1990) calculated rat  $\text{LD}_{50}$ s of 405 and 448 mg/kg for male and female Sprague-Dawley rats, respectively. Smyth et al., (1962) had comparable results when calculating a  $\text{LD}_{50}$  of 0.52 ml/kg (equivalent to 448 mg/kg) after dosing groups of 5 non-fasted Carsworth-Wistar male rats.

In addition to the  $\text{LD}_{50}$  study, Smyth et al., (1962) also conducted a  $\text{LC}_{50}$  inhalation study using groups of six male or female albino rats exposed to 2000 ppm (7000  $\text{mg}/\text{m}^3$ ) for 4 hours by metered vapor concentrations. Inhalation of metered vapor concentrations by rats was conducted with flowing streams of vapor prepared by various styles of proportioning pumps. Concentrations were logarithmic in series with a factor of two. The results showed that 0 out of 6 rats died within 14 days, while 4000 ppm (14,000  $\text{mg}/\text{m}^3$ ) for the same time period killed all six rats. Although a  $\text{LC}_{50}$  was not determined for this study, it is rigorous enough to use 2000 ppm as a  $\text{LC}_{50}$  surrogate value for an ITSL derivation.

The ITSL was derived as follows:

$$LC_{50} = 2000 \text{ ppm} = 7000 \text{ mg/m}^3$$

$$ITSL = \frac{LC50}{500 \times 100}$$

$$ITSL = \frac{7000}{500 \times 100} = 0.14 \text{ mg/m}^3$$

$0.14 \text{ mg/m}^3 \times 1000 = 140 \text{ } \mu\text{g/m}^3$  based on annual averaging.

The ITSL for piperidine =  $140 \text{ } \mu\text{g/m}^3$  based on annual averaging.

References:

van den Heuvel, M.J. et al., 1990. The international validation of a fixed-dose procedure as an alternative to the classical  $LD_{50}$  test. Food Chem. Toxicol. 28(7):469-482.

Smyth, F. et al., 1962. Range-Finding Toxicity Data: List VI. Am. ind. Hyg. Assoc. J. 23:95-107.

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