

MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY

INTEROFFICE COMMUNICATION

July 27, 1998

TO: File for Dibutylamine (CAS #111-92-2)

FROM: Marco Bianchi, Toxics Unit, Air Quality Division

SUBJECT: Initial Threshold Screening Level

The Initial Risk Screening Level (IRSL) for dibutylamine is $23 \mu\text{g}/\text{m}^3$ based on an annual averaging time. Adverse effects in rats due to acute exposure were reported to be mucous membrane irritation and abnormal respiration. 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 dibutylamine produced a number of acute oral and inhalation studies for evaluation. RTECS listed a Romanian oral rat LD_{50} of 189 mg/kg, and a Russian oral mouse LD_{50} of 290 mg/kg. In two acute inhalation studies by Smyth (1954), all study rats survived a 4-hour 250 ppm concentration, but all rats died when exposed to a 4-hour 500 ppm concentration.

The following three acute inhalation studies were obtained through the EPA-OTS library. In a 1-hour LC_{50} study sponsored by Air Products and Chemicals Inc., a group of 10 male, albino rats were exposed to $2100 \text{ mg}/\text{m}^3$ dibutylamine for 1-hour. The only exposure-related outcome mentioned was that rats huddled together during the exposure period. There were no deaths at any time during the 14-day observation period. In a similar 1-hour LC_{50} study sponsored by Pennwalt Corporation, Sprague-Dawley rats (number unknown) were exposed to $3028 \text{ mg}/\text{m}^3$ of dibutylamine. During exposure, adverse effects included partial closing of eyes, reduced respiratory rate, exaggerated respiratory movements, and hunched body posture. All rats recovered after 4-5 days during the 14-day post-exposure period. Macroscopic pathology revealed no abnormalities. Finally, in a 4-hour LC_{50} companion study sponsored by Pennwalt Corporation, male and female Sprague-Dawley rats (5 rats/sex/group) were exposed to a series of dibutylamine concentrations for 4-hours. Signs of irritant effects during exposure included abnormal respiration, closing or partial closing of eyes, adoption of an abnormal body posture, excessive salivation, lacrimation, gasping, and convulsions. During the 14-day observation period, clinical signs included abnormal breathing, rales, staining in the urogenital area and sneezing. Macroscopic pathology revealed lung congestion in decedents. The estimated 4-hour LC_{50} for dibutylamine was $1150 \text{ mg}/\text{m}^3$.

Standard error of the estimate was 95 mg/m³. The ITSL will be derived using the 4-hour LC₅₀ of 1150 mg/m³.

The ITSL was determined as follows:

$$LC_{50} = 1150 \text{ mg/m}^3$$

$$ITSL = \frac{1150 \text{ mg/m}^3}{500 \times 100} = 0.023 \text{ mg/m}^3$$

0.023 mg/m³ x 1000 = 23 ug/m³ based on annual averaging.

The ITSL for dibutylamine = 23 µg/m³ based on annual averaging.

References:

EPA Library Microfiche. 1951. Toxicity data on ten chemicals. Mellon Institute of Industrial Research for Union Carbide. OTS0515575.

EPA Library Microfiche. 1976. Acute inhalation toxicity of n-butyl-1-butanamine in rats. Biosearch Inc. for Air Products and Chemicals Inc. OTS0515655.

EPA Library Microfiche. 1987. Acute inhalation toxicity study in rats using dibutylamine: one hour exposure. Huntington Research Centre for Pennwalt Corporation. OTS0513617.

EPA Library Microfiche. 1987. Acute inhalation toxicity study in rats using dibutylamine: four hour exposure. Huntington Research Centre for Pennwalt Corporation. OTS0513618.

MB:SLB

cc: Mary Lee Hultin, AQD