

MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY

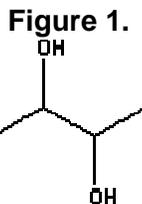
INTEROFFICE COMMUNICATION

August 31, 2007

TO: File for 2,3-Butanediol (CAS #513-85-9)
FROM: Michael Depa, Air Quality Division, Toxics Unit
SUBJECT: Screening Level Determination

The Initial Threshold Screening Level for 2,3 butanediol (CAS No. 513-85-9) is 15 µg/m³ (annual averaging time).

The following references or databases were searched to identify data to determine the screening level: U.S. EPA Integrated Risk Information System (IRIS), Registry for Toxic Effects of Chemical Substances (RTECS), American Conference of Governmental and Industrial Hygienists (ACGIH) Threshold Limit Values (TLVs), National Institute for Occupational Safety and Health (NIOSH) Pocket Guide to Hazardous Chemicals, Environmental Protection Bureau Library, International Agency for Research on Cancer (IARC) Monographs, Chemical Abstract Service (CAS) Online (1967- April, 2006), National Library of Medicine (NLM), Health Effects Assessment Summary Tables (HEAST), and National Toxicology Program (NTP) Status Report. The EPA has not established a reference dose (RfD) or a reference concentration (RfC) 2,3 butanediol. There are no occupational exposure limits (e.g., ACGIH TLV or NIOSH REL). The molecular weight of 2,3 butanediol is 80.2g. The molecular formula is C₄H₁₀O₂. The molecular structure for 2,3 butanediol is shown in Figure 1.



Appearance: viscous colorless liquid, or colorless to white solid
Melting point: 25 C
Boiling point: 183 - 184 C
Density (g cm⁻³): 0.995
Flash point: 85 C

A Lethal Dose 50% (LD50) study was provided by the permit applicant (Michigan Ethanol, AQD Permit Number 210-01C) which found no lethality at a dose of 5000 mg/kg (MB Research Laboratories, 2006). The highest dose tested was used as a surrogate LD50 to derive the screening level using Rule 232(h). Using the body weight from the female Wistar rats as presented in the LD50 report, and the formula to calculate inhalation rate (EPA, 1988), the ITSL was calculated as follows:

$$\text{ITSL} = 1/500 \times 1/100 \times 1/40 \times \text{LD50}/0.167 \times W_a/I_a$$

Where, LD50 = lethal dose 50%, W_a = weight of animal and I_a = inhalation rate of animal.

$$\text{ITSL} = 1/500 \times 1/100 \times 1/40 \times (5000\text{mg/kg})/0.167 \times 0.262\text{kg}/0.2539\text{m}^3$$

$$\text{ITSL} = 0.015 \text{ mg/m}^3$$

$$\text{ITSL} = 15 \text{ }\mu\text{g/m}^3$$

References

MB Research Laboratories, 2006. Unpublished report by Albert C., Gilotti, Ph.D., Study Director. Acute Oral Toxicity – Up and Down Procedure, 2,3-butanediol (CAS# 513-85-9), MB Research Laboratories, 1765 Wentz Road, PO Box 178, Spinnerstown, PA 18968, August 11, 2006. Project #: MB 06-14579.01

U.S. EPA. 1988. Recommendations for and documentation of biological values for use in risk assessment. National Technical Information Service PB 88-179874.