MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY

INTEROFFICE COMMUNICATION

MARCH 23, 2014

TO: File for Triethylene Glycol Monobutyl Ether (CAS No. 143-22-6)

FROM: Michael Depa, Toxics Unit, Air Quality Division

SUBJECT: Development of the Screening Level

The initial threshold screening level (ITSL) for triethylene glycol monobutyl ether (synonym: butoxytriethylene glycol) is 18 µg/m³ (annual averaging time).

The following references or databases were searched to identify data to determine the screening level: Environmental Protection Agency's (EPA's) Integrated Risk Information System (IRIS), the Registry of Toxic Effects of Chemical Substances (RTECS), the American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Values (TLV), National Institute of 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- May 2014), 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 concentration (RfC) or reference dose (RfD) for triethylene glycol monobutyl ether. The ACGIH and NIOSH have not established Occupational Exposure Limits (OELs). The molecular weight is 206.28 g, and the molecular formula is C10-H22-O4. The molecular structure is pictured in Figure 1. Physical properties are listed in Table 1. Triethylene glycol monobutyl ether is water soluble.

Figure 1. Molecular Structure of Triethylene Glycol Monobutyl Ether

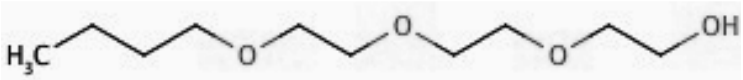

Table 1. Physical Properties of Triethylene Glycol Monobutyl Ether

Physical Property	Value	Units	Temp (deg C)	Source
Melting Point	-30	deg C		EXP
Boiling Point	278	deg C		EXP
log P (octanol-water)	0.020	(none)		EST
Water Solubility	1.00E+06	mg/L	25	EXP
Vapor Pressure	0.0025	mm Hg	25	EXP
Henry's Law Constant	9.50E-14	atm-m3/mole	25	EST
Atmospheric OH Rate Constant	5.15E-11	cm3/molecule-sec	25	EST

From: http://toxnet.nlm.nih.gov/cgi-bin/sis/search: 143-22-6

The ITSL was derived using LD50 data from a study obtained from the "Screening Information Data Set" (SIDS) program operated under the auspices of the Organization for Economic Cooperation and Development (OECD). The LD50 was published as 5300 mg/kg (McClintock ML and Gollapudi B, 1990).

Then, the ITSL is calculated using and equation pursuant to Rule 232(1)(h),:

$$\text{ITSL} = \frac{1}{500} \times \frac{1}{40} \times \frac{1}{100} \times \frac{\text{LD50 (mg/kg)}}{0.167} \times \frac{W_a}{I_a}$$

Where the default weight and inhalation rate of male wistar rat is 0. 5 g and 0.45 m³, respectively (EPA, 1988).

$$\text{ITSL} = \frac{1}{500} \times \frac{1}{40} \times \frac{1}{100} \times \frac{5300\ (\text{mg/kg})}{0.167} \times \frac{0.5\text{kg}}{0.45\text{m}^3}$$

$$\text{ITSL} = 0.0176\ \text{mg/m}^3 \times \frac{1000\ \mu\text{g}}{1\ \text{mg}}$$

$$\text{ITSL} = 18\ \mu\text{g/m}^3$$

Pursuant to Rule 232(2)(c) the ITSL is given annual averaging time. Therefore, the ITSL for triethylene glycol monobutyl ether is 18 µg/m³ with annual averaging time.

References:

EPA. 1988. Recommendation for and documentation of biological value for use in risk assessment. PB 88-179874

McClintock ML and Gollapudi B. 1990. Evaluation of triethylene glycol monomethyl ether in the mouse bone marrow micronucleus test. Dow Chemical Company Study ID TXT:K-005610-007, Dated March 7, 1990. OECD SIDS Initial Assessment Report for SIAM 15: High Boiling Ethylene Glycol Ethers, Boston, Massachusetts, 22-25 October, 2002, UNEP Publications (http://www.inchem.org/documents/sids/sids/eges.rev.pdf)