

MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY

INTEROFFICE COMMUNICATION

December 10, 2002

TO: File for Propylene Glycol Monoethyl Ether (CAS #52125-53-8)

FROM: Gary Butterfield, Air Unit, Environmental Science and Services Division

SUBJECT: Screening Level for Propylene Glycol Monoethyl Ether

Propylene glycol monoethyl ether is also known as PGEE or ethoxypropanol. The Chemical Abstract Service number (CAS #) 52125-53-8 is for a commercial mixture of two specific ethoxypropanol isomers. The first isomer is 1-ethoxy-2-propanol or PGEE-beta isomer with a CAS # of 1569-02-4. The other isomer is 2-ethoxy-1-propanol or PGEE-alpha isomer with a CAS # of 19089-47-5. The ratio of the two specific isomers in the commercial mixture is unknown, although the major component is the beta isomer.

The following references or databases were searched to identify data to determine the Initial Threshold Screening Level (ITSL): The United States Environmental Protection Agency, Integrated Risk Information System, National Institute for Occupational Safety and Health, Registry for Toxic Effects of Chemical Substances, American Conference of Governmental and Industrial Hygienists, Threshold Limit Values, Department of Environmental Quality library, International Agency for Research on Cancer Monographs, CAS Online (1968 - August 2002), National Library of Medicine (NLM) - Toxline, and National Toxicology Program Status Report.

The CAS and NLM literature searches were conducted on August 1, 2002. There was no toxicity information available for the commercial mixture of epoxypropanol under CAS #52125-53-8.

A very limited number of toxicity studies have been published for each of the isomer components of the commercial mixture. The beta isomer has the most toxicity data available, including results of a 30-day oral toxicity study being reported in addition to a couple of LD50 studies. The alpha isomer has a more limited set of toxicity data published with only one LD50 study available.

The ITSL for the beta isomer was set previously at 240 ug/m<sup>3</sup> with annual averaging based on the NOEL from the 30-day oral toxicity study by Smyth and Carpenter (1948).

It is possible to set an ITSL for the PGEE-alpha isomer based on the LD50 reported in Smyth et al (1941). In Smyth et al (1941), the rat oral LD50's for each isomer were determined. Both isomers were found to have similar LD50 values calculated from this study. The alpha isomer LD50 was reported to be 7.1 g/kg while the beta isomer LD50 was 7.0 g/kg.

Under R 232(1)(h) and the LD50 value from Smyth et al (1941), it is possible to calculate the screening level for the PGEE-alpha isomer as follows:

$$\text{ITSL} = \frac{(7.1 \text{ g/kg})}{500 \times 40 \times 100 \times 0.167 \times 0.9} = 23 \text{ ug/m}^3 \text{ annual average}^*$$

\* The default rat inhalation rate of 0.9 m<sup>3</sup>/kg was used in the above equation.

Knowing the ITSLs for each of the two individual isomers, does allow some room for making assumptions of the PGEE-mixture toxicity. Generally, it can be assumed that the toxicity of the PGEE-mixture should not be greater than the most toxic component of the mixture, and by using the lowest ITSL of the isomers that make up the mixture for the ITSL, the intent of R 225 through R 232 for protecting health concerns can be met. **Therefore, the ITSL for the PGEE mixture is being set at 23 ug/m<sup>3</sup> with annual averaging.** It is expected that an ITSL based on toxicity data for the mixture would not be lower than this value. If data becomes available that is specific for the PGEE mixture, this ITSL should be re-evaluated.

#### Screening levels for PGEE:

beta-isomer - 240 ug/m<sup>3</sup> annual averaging  
alpha-isomer - 23 ug/m<sup>3</sup> annual averaging  
mixture - 23 ug/m<sup>3</sup> annual averaging

#### References:

Smyth et al., 1941. The single dose toxicity of some glycols and derivatives. J. Ind. Hyg. Toxicol. 23: 259-268.

Smyth and Carpenter. 1948. Further experience with the range finding test in the industrial toxicology laboratory. J. Ind. Hyg. Toxicol. 30: 63-68.

gb:dp

cc: Cathy Simon, ESSD