MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY

INTEROFFICE COMMUNICATION

February 7, 1996

TO: Ethylene glycol monophenyl ether (CAS # 122-99-6)

FROM: Gary Butterfield

SUBJECT: Screening level for ethylene glycol monophenyl ether

The typical secondary references (RTECS, TLV, NIOSH, NTP, IRIS, IARC) were reviewed to find if toxicity data is available for ethylene glycol phenyl ether (EGPE). A Dec. 11, 1995 CAS and NLM on-line literature search was conducted. The literature search was able to find that no inhalation toxicity data is available for calculation of the screening level.

Of the available oral studies, rabbits have been identified as being more sensitive than rats to EGPE, Breslin (1986). While, rats can be considered to be more sensitive than mice. The rat LD50 is on the order of 1 to 2 g/kg, Smyth et al (1941). While in a two generation mouse study, the high dose level mice survived doses of 4 to 5 g/kg, Heindel et al (1990). It is not known how sensitive humans are to EGPE, but there is some evidence of neurotoxicity in humans following unknown doses from dermal exposure having occurred, Morton (1990).

Because there is evidence of rabbits being the more sensitive laboratory species of the species that have been tested, it would be consistent with protecting human health to use the rabbit data as the basis for setting a screening level. Even though the rabbit study was only a 10 day study while other species have been tested for longer periods, one rat feeding study was for 13 weeks, and there is also a mouse multigeneration study that has been conducted. However, the longer term studies in rats and mice were conducted at much higher doses than the doses that showed effects in the rabbit study. Therefore, the screening level will be based on the rabbit data form Breslin et al (1991) and (1986).

Breslin et al (1991) and (1986) conducted 10 day gavage study in female New Zealand white rabbits. Adverse effects (decreased body weights, hemolytic changes, microscopic changes in the hematopietic system) were observed at the lowest dose tested, 100 mg/kg, as well as more severe effects, including death, being observed at the higher dose levels. For purposes of calculating the screening level, the 100 mg/kg dose level is considered to be the lowest observed adverse effect level (LOAEL). The short duration of this study most closely fits the conditions of the equation in R232(1)(e), which can determine a screening level from a seven day study. The LOAEL of 100 mg/kg can be used in the equation of R232(1)(e) to calculate the screening level as follows.

$$\text{ITSL} = \frac{(100\ \text{mg/kg})/10}{35 \times 100} \times \frac{1}{0.36} = 8\ \text{ug/m3}$$ with annual averaging

where:
- 0.36 m3/kg is the default inhalation rate for New Zealand rabbits.
- the NOAEL is estimated by dividing the LOAEL by a factor of 10.

References:

Breslin et al. 1991. Hemolytic activity of ethylene glycol phenyl ether (EGPE) in rabbits. Fund Appl Toxicol 17:466-481.

Breslin et al. 1986. 2-Phenoxyethanol: hemolytic investigation in rabbits and rats. Unpublished report from Dow Chemical, obtained from the US EPA -report number OTS 0510215.

Heindel et al. 1990. Assessment of ethylene glycol monobutyl and monophenyl ether reproductive toxicity using a continuous breeding protocol in Swiss CD-1 mice. Fund Appl Toxicol 15:683-696.

Morton. 1990. Occupational phenoxyethanol neurotoxicity: a report of three cases. J Occup Med 32:42-45.

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