MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY

INTEROFFICE COMMUNICATION

TO: Phenyl glycidyl ether file (CAS # 122-60-1)

FROM: Gary Butterfield

SUBJECT: Screening level for Phenyl glycidyl ether

DATE: May 8, 2008

Phenyl glycidyl ether is also known as 1,2-epoxy-3-phenoxy propane. It is a colorless liquid. The melting point is 3.5C. The boiling point is 243C. The vapor pressure is 0.01 mmHg at 25C. The molecular formula is $C_9H_{10}O_2$. The molecular weight is 150.1 g/mol.

The following references or databases were searched to identify data to determine the screening level: U.S. Environmental Protection Agency (EPA) Integrated Risk Information System (IRIS), National Institute for Occupational Safety and Health (NIOSH) Registry for Toxic Effects of Chemical Substances (RTECS), American Conference of Governmental and Industrial Hygienists (ACGIH) Threshold Limit Values (TLVs), Michigan Department of Environmental Quality (DEQ) library, International Agency for Research on Cancer (IARC) Monographs, Chemical Abstract Service (CAS) Online (1968 - April 2008), National Library of Medicine (NLM) - Toxline, and National Toxicology Program (NTP) Status Report.

The CAS and NLM on-line literature searches were conducted on April 22, 2008. There is an ACGIH TLV and a NIOSH REL for phenyl glycidyl ether. Both of these OELs identify phenyl glycidyl ether as being carcinogenic and a skin sensitizer/irritant.

There are several published articles reporting results in animals from 90 days of exposure (Terrill et al (1977), Lee et al (1977), and Terrill et al (1982)). However, those studies are conducted at relatively low levels, and did not find significant adverse effects. They do report hair loss (alopecia) occurring in rats, which may be supportive of the OEL skin sensitization/ irritation classification. This adverse effect was considered to be insufficient to be used as a basis for setting a screening level.

The original rat inhalation exposure carcinogenicity study was conducted at the DuPont Haskell Laboratory and is unpublished with select parts of the final report available from EPA ToSCA document 8EHQ-0279-0274. This study is also available in a published journal article from Lee et al (1983). In the chronic inhalation study reported by Lee et al (1983), groups of 100 male and 100 female Sprague-Dawley rats were exposed 6 hour/day, 5 day/ week for 24 months to 0, 1 or 12 ppm phenyl glycidyl ether. Dosages can be converted to 0, 6.14 and 73.7 mg/m^3 with the life time averaged doses being 0, 1.1 and 13.2 mg/m^3 by adjusting with 6/24 and 5/7. There was an interim sacrifice of 10 male and 10 females from

each group after one year of exposure. Survivors were examined at the end of two years of exposure. Nasal tumors, keratinized epidermoid carcinomas, were observed during the second year of exposure with an incidence rate of 1/89, 0/83, 9/85 in males and 0/87, 0/88, 4/89 in females, in the control, low and high dose groups respectively. These tumors are considered to be significant and were used to derive an IRSL and SRSL for phenyl glycidyl ether by use of the BMDS multistage cancer model. The cancer potency was found to be $1.0358x10^{-5}$ $(ug/m^3)^{-1}$ which results in an IRSL of 0.1 ug/m^3 and SRSL of 1 ug/m^3 both with annual averaging.

References:

Lee et al. 1977. Alopecia Induced by Inhalation Exposure to Phenyl Glycidyl Ether. Journal of Toxicology and Environmental Health 3(5-6):859-869

Lee et al. 1983. Morphologic expression of glandular differentiation in the epidemiod nasal carcinomas induced by phenyl glycidyl ether inhalation. Am J Pathol 111:140-148.

Terrill et al. 1977. The inhalation toxicity of phenylglycidyl ether: I. 90-day inhalation study. TOXICOL APPL PHARMACOL 42(2):263-270

Terrill et al. 1982. Inhalation toxicity of phenylglycidyl ether: Reproduction, mutagenic, teratogenic and cytogenetic studies. TOXICOL APPL PHARMACOL 64(2):204-212.

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