MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY

INTEROFFICE COMMUNICATION

TO: Guaifenesin file (CAS # 93-14-1)

FROM: Gary Butterfield

SUBJECT: Screening level for Guaifenesin

DATE: May 22, 2007

Guaifenesin is a common cold medicine that is an ingredient in Robitussin and known by many other manufacturer names. One of the common chemical names is glyceryl guaiacolate. The molecular weight is approximately 198 g/mol. The melting point of is 78.5C. The vapor pressure is $1.5x10^{-6}$ mmHg. The water solubility is $5x10^{4}$ mg/L.

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 2007), 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 23, 2007.

There is surprisingly little toxicity data for this commonly-used cough medicine ingredient. In most of the longer term or multiple dose toxicity data, guaifenesin was only one component of a complex medicine mixture that was administered. Therefore it is difficult to attribute any adverse effects observed to only one of the components of a complex mixture.

In the Escudero and Boyd (1969) article, the oral LD50 in male Wistar rats was reported to be 1.5 g/kg. Groups of 16 to 20 young male rats, weighing approximately 190 g, were administered guaifenesin via gavage after being dissolved in distilled water. The LD50 was calculated by the linear regression method.

The acute rat oral LD50 of 1.5 g/kg was used to determine the ITSL using R232(1)(h) as follows.

$$\text{ITSL} = \frac{1500\ \text{mg/kg}}{500x40x100x0.167} \times \frac{1\ \text{kg}}{0.9\ \text{m3}} = 5\ \text{ug/m3 annual average}$$

This screening level based on the LD50 is currently the best available until more substantial toxicity data can be obtained.

References:

Escudero and Boyd. 1969. Maximal tolerated doses of glyceryl guaiacolate expectorant. Pharmacol Res Comm 1: 413-422.