MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY

INTEROFFICE COMMUNICATION

TO: File for Monoethanolamine (CAS #141-43-5)

FROM: Doreen Lehner, Toxics Unit, Air Quality Division

DATE: June 4, 2013

SUBJECT: Screening Level for Monoethanolamine (CAS# 141-43-5)

The initial threshold screening level (ITSL) for monoethanolamine (CAS #141-43-5) is 80 $\mu g/m^3$ with an 8-hour averaging time.

Monoethanolamine (MEA) also known as ethanolamine, 2-aminoethanol, and 1-amino-2-hydroxyethane has a molecular weight of 61.0831. MEA is a toxic, flammable, corrosive, colorless, viscous, hygroscopic, amino alcohol with a fishy, ammoniacal odor. An air odor threshold concentration at 2.6 ppm in air has been reported. It is widely distributed in biological tissue and is a component of lecithin. It is used: as a surfactant; in the production of nonionic detergents, emulsifiers, paper, glues, polishes, acetate rayon dyes, pharmaceuticals, corrosion inhibitors, and chemical intermediates; to enhance strength and reduce drying time in cement; as an accelerator in rubber vulcanization; to neutralize acid components in lubricants, as a pH regulator in cosmetics and printing inks; in dry cleaning as an aid to clean and scour textiles; as a fluorimetric reagent; and to remove CO_2 and H_2S from natural gas, and other mixed gas streams (EPA, 2013; Wikipedia, 2013).

Figure 1. Structure of monoethanolamine

A literature review was conducted to determine an initial threshold screening level (ITSL) for MEA. The following references and databases were searched to derive the above screening levels: CCD, United States Environmental Protection Agency (US EPA) Integrated Risk Information System (IRIS), National Institute for Occupational Safety and Health (NIOSH), American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Values and Biological Exposure Indices (TLV/BEI) 2012 guide, National Toxicology Program

(NTP) Study Database, International Agency for Research on Cancer (IARC), Acute Database, Chemical Abstract Service (CAS) Online (searched 2/11/13), National Library of Medicine (NLM)-online, EPA Aggregated Computational Toxicology Resource (ACToR) Database, US EPA TSCATS database, and Hazardous Substances Data Bank (HSDB).

The literature review found very limited toxicological information for screening level derivation. The best available basis for ITSL derivation is the occupational exposure level. The ACGIH has established a threshold limit value – time weighted average (TLV-TWA) at 3 ppm (8 mg/m^3) for monoethanolamine for worker exposure to minimize the potential for eye and skin irritation reported in animals. Rule 232(1)(c) allows for the use of occupational exposure levels in determining an ITSL using the following equation:

$$ITSL = \frac{OEL}{100} = \frac{8\ {}^{mg}/_{m^3}}{100} = 0.08\ {}^{mg}/_{m^3} = 80\ {}^{\mu g}/_{m^3}$$

According to Rule 232(2)(a), the averaging time is 8 hours. Therefore, the initial threshold screening level (ITSL) for monoethanolamine (CAS #141-43-5) is 80 µg/m^3 with an 8-hour averaging time.

References:

ACGIH. 2008. Ethanolamine. Documentation of the TLVs and BEIs. ACGIH Worldwide Signature Publications.

APCR. 2013. Air Pollution Control Rules, Promulgated pursuant to Part 55, Air Pollution Control, of the Natural Resources and Environmental Protection Act, Michigan Department of Environmental Quality. 1994, Act 451, as amended (NREPA).

EPA. 2013. Aggregated Computational Toxicology Resource. Chemical Summary: Ethanolamine (141-43-5) Retrieved data on 2/8/2013. Available at: http://actor.epa.gov/actor/GenericChemical?casrn=141-43-5

Wikipedia. 2013. Ethanolamine. Retrieved data on 2/8/2013. Available at: http://en.wikipedia.org/wiki/Ethanolamine

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