MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY

INTEROFFICE COMMUNICATION

December 15, 1999

TO: 3,3,3-Trifluoropropene file (CAS #677-21-4)

FROM: Gary Butterfield, Toxics Unit, Air Quality Division

SUBJECT: Initial Threshold Screening Level (ITSL) for trifluoropropene

An October 21, 1999, the Chemical Abstract Service (CAS) on-line literature search did not find any published toxicity studies having been conducted with this material. The October 21, 1999, National Library of Medicine (NLM) on-line literature search found a few unpublished studies that have been submitted to the U.S. Environmental Protection Agency (EPA) under the Toxic Substances Control Act by various industries. The unpublished studies relevant to development of the screening level were either cited in the Registry of Toxic Effect of Chemical Substances (RTECS) or provided by Dow Corning Company as discussed below.

The Dow Corning Company also provided three toxicity studies to support establishment of a screening level for trifluoropropene. These studies included a mutagenicity study submitted to EPA by DuPont, as well as, Dow Corning's own 4-hour acute and a 14-day rat inhalation studies. The acute study and the mutagenicity study were cited in the October 21, 1999, NLM literature search mentioned above.

Based on the information obtained from Dow Corning Company and the Air Quality Division's literature search, the available toxicity data base for trifluoropropene includes: a one hour LC50 in mice of 1.75 grams per liter (g/L) (NIOSH 1999); a mutagenicity assay using Salmonella typhimium; and two studies provided by Dow Corning - a 14-day and a 4-hour acute study. The mutagenicity assay showed positive responses in TA 1538, 98 and 100 strains, but not TA 1537 strain (DuPont 1979). In the 4-hour acute inhalation study, three groups of male and female rats (5/sex) were exposed to 0, 1.05, 2 or 4 g/L. This exposure resulted in no mortality in any of the animals (Dow Corning 1986).

There is a general preference for use of longer term exposure studies for deriving potential screening levels for the protection of health effects from long term exposure. Therefore, the 14-day study can provide a better basis for the screening level than the acute study.

The 14-day rat inhalation study had no effects produced at the study's single exposure level of 987 parts per million (ppm). There were no changes ¡n body weight, organ weight or any pathological changos observed in this study. Therefore, the 987 ppm level is 3,3,3-considered to be a no-observed-effect-level (NOEL) dose level. This data can be used in the equation from R232(d) to obtain a screening level, as follows:

Convert ppm to µg/m³: 987 ppm x (3930 µg/m³/ppm) = 3.88×10^6 µg/m³

ITSL = $(3.88 \times 10^6)/(35 \times 100)$ x 6/24 = 280 µg/m³ with annual average

Reference:

Dow Corning Corp. 1992. A 14-day repeated dose inhalation toxicity study with Dow Corning 1-2211 Intermediate (also known as trifluoropropene) in albino rats. Dow Corning Report No. 1992-10000-37720.

Dow Corning Corp. 1986. Acute inhalation toxicity of trifluoropropene in albino rats. File # 1033-2. The 4-hour study.

Dow Corning Corp. 1988. Acute vapor inhalation toxicity of TX-52. EPA Office of Toxics Substances (OTS) doc # 878220507, The 1-hour study as cited in RTECS.

DuPont. 1979. Mutagenic activity in the Salmonella microsome assay. EPA OIS doc # 878220602.

National Institute for Occupational Safety and Health (NIOSH). 1999. RTECS.

GB:SLB
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