MICHIGAN DEPARTMENT OF NATURAL RESOURCES

INTEROFFICE COMMUNICATION

January 6, 1993

TO: FILE

FROM: Cathy Simon

SUBJECT: Hexamethyldisiloxane (Cas No. 107-46-0)

The ITSL for hexamethyldisiloxane is 240 $\mu g/m^3$ based on an annual averaging time for dispersion modeling.

The following databases or references were searched for information on hexamethyldisiloxane: IRIS, HEAST, EPB library (Nutshell), RTECS, and CAS Online. From these references or databases, only one study (Rowe, et al 1948) was identified which could be used to calculate an ITSL. In this study, a group of 10 rats and 8 guinea pigs were exposed repeatedly to a concentration of 4400 ppm hexamethyldisiloxane. The rats received 15 seven-hour exposures in 18 days, and the guinea pigs received 20 seven-hour exposures in 26 days. A similar number of control animals received no exposures. Effects noted in the guinea pigs included a slight depression in the rate of growth. In the exposed rats there was a very slight increase in the liver and kidney weight. No histopathological effects were noted in the lungs, hearts, livers, kidneys, spleens, and adrenals of any exposed animals, although only about half of each group received this examination.

The study by Rowe et al (1948) has several shortcomings including inadequate number of dose groups, inadequate number of animals per dose group, no statistical analysis, etc. Despite these shortcomings, an ITSL was determined from this study using the algorithm in Rule 232(1)(d), with an additional 10-fold safety factor for the observed effects.

$$\text{ITSL} = 4400 \text{ ppm} \times \frac{7 \text{ hrs}}{24 \text{ hrs}} \times \frac{1}{35 \times 100 \times 10} = 0.037 \text{ ppm}$$

$$\text{ITSL} = 0.037 \text{ ppm} \times \frac{162.2}{0.0245} = 240 \ \mu g/m^3$$

Where 162.2 is the molecular weight for hexamethyldisiloxane.

Although the duration of the study by Rowe et al is slightly longer than the 7 days called for in Rule 232(1)(d), the safety factors in this algorithm seemed appropriate given that there were some effects observed, and the study was of low quality. Rowe et al (1948) also conducted acute oral toxicity studies in guinea pigs, however, the inhalation toxicity studies were considered more appropriate for determining the ITSL.

Hexamethyldisiloxane gave negative results in several in vitro genotoxicity assays (Isquith et al, 1988a) including microbial assays measuring reverse mutation, mitotic recombination, and DNA damage; gene mutation in mouse lymphoma cells (L5178y); sister chromated exchanges; and DNA alkaline elution. A significant number of chromosomal aberrations were observed, however in mouse lymphoma cells tested without a metabolic activation system, although this effect was observed only in a single dose in the middle of the dose range. Chromosomal aberrations were not observed in Sprague-Dawley rats administered hexamethyldisiloxane by intraperitoneal injection (Isquith, et al 1988b).

REFERENCES

Isquith, A. et al. 1988a. Genotoxicity studies on selected organosilicon compounds: in vitro assays. Food & Chemical Toxicology 26:255-261.

Isquith, A. et al. 1988b. Genotoxicity studies on selected organosilicon compounds: in vivo assays. Food & Chemical Toxicology 26:263-266.

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Rowe, V.K., H.C. Spencer, S.L. Brass. 1948. Toxicological studies on certain commercial silicones. Journal of Industrial Hygiene 30:332-352.

CAS:ma