MICHIGAN DEPARTMENT OF NATURAL RESOURCES

INTEROFFICE COMMUNICATION

DECEMBER 5, 1994

TO: File for Trichlorosilane (CAS# 10025-78-2)

FROM: Michael Depa, Toxics Unit

SUBJECT: Screening Level Determination

An initial threshold screening level (ITSL) for trichlorosilane is 8 $\mu g/m^3$ based on an annual averaging time.

The following references or databases were searched to identify data to determine the ITSL: IRIS, RTECS, ACGIH Threshold Limit Values, NIOSH Pocket Guide to Hazardous Chemicals, Environmental Protection Bureau Library, IARC Monographs, CAS Online (1967-October 15, 1994), National Library of Medicine, Health Effects Assessment Summary Tables, and NTP Status Report. Review of these sources found that EPA has not established an RfC or RfD for trichlorosilane. Occupational exposure limits were not available. There was no data meeting the minimum criteria for establishing an RfC or RfD. A 1-hour LC5O experiment was available from Dow Corning (1987).

Groups of 10 Sprague-Dawley rats (5 male and 5 female) were exposed to 0, 1687, 2287, 2683, and 3770 ppm trichlorosilane for 1 hour. Table 1 shows the mortality data.

Table 1. Mortality Data from 1 Hour Inhalation Study using Trichlorosilane

Exposure Concentration (ppm)	Number Dead/Number of Female Rats	Number Dead/Number of Male Rats
Uncontaminated Air	0/5	0/5
1687	0/5	1/5
2287	0/5	2/5
2683	4/5	0/5
3770	4/5	5/5

Corneal opacity and respiratory difficulty were the main clinical signs observed following exposure. Necropsy of the animals that died showed gas extended G.I. tracts and apparent hemorrhaging in the lungs. It was reported that the 1 hour LC5O was 2,767 ppm. This was converted to mg/m^3 in the following way:

$$\frac{mg}{m^3} = \frac{ppm\ x\ molecular\ weight}{24.45}$$

$$\frac{mg}{m^3} = \frac{2{,}767\ ppm\ x\ 135 \frac{grams}{mole}}{24.45}$$

$$\frac{mg}{m^3} = 15{,}278 \frac{mg}{m^3}$$

This value was used to calculate the ITSL according to Rule 232 (1) (g) as follows:

$$ITSL = \frac{LC50}{500\ x\ 100\ x\ 40}$$

$$ITSL = \frac{15,278 \frac{mg}{m^3}}{500\ x\ 100\ x\ 40}$$

$$ITSL = 0.00764 \frac{mg}{m^3}$$

$$ITSL = 8 \frac{\mu g}{m^3}$$

The ITSL for trichlorosilane is 8 µg/m^3 based on annual averaging time.

REFERENCES

Dow Corning. 1987. A comparison of acute inhalation toxicity of a series of chlorosilanes with hydrogen chloride in rats. September 21, 1987.