

MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY

INTEROFFICE COMMUNICATION

TO: File for 1,1,1,2-Trichloroethane (CAS # 630-20-6)
FROM: Mike Depa, AQD Toxics Unit
SUBJECT: Screening levels for 1,1,1,2-Trichloroethane
DATE: October 23, 2015

The initial risk screening levels and secondary risk screening levels (IRSL and SRSL) for 1,1,1,2-Trichloroethane (1,1,1,2-TCE) are: IRSL = 0.1 $\mu\text{g}/\text{m}^3$, and SRSL = 1.0 $\mu\text{g}/\text{m}^3$, both with annual averaging time.

The basis for these screening levels is the U.S. Environmental Protection Agency (EPA, 1988) assessment. EPA carcinogenicity classification for 1,1,1,2-TCE is "C"; possible human carcinogen. This is based on increased incidence of combined hepatocellular adenomas and carcinomas in female mice; inadequate evidence from human studies.

Table 1. Tumor Incidence in Female Mice after Gavage with 1,1,1,2-TCE

Administered Dose (mg/kg)/day	Human Equivalent Dose (mg/kg)/day	Tumor Incidence
0	0	5/49
250	14.8	13/46
500	27.6	30/48

Tumor Type: hepatocellular adenoma or carcinoma. In: mouse/B6C3F1, female. Route: gavage. Reference: NTP, 1983

EPA (1988) calculated an Oral Slope Factor (OSF) for 1,1,1,2-TCE of 2.6E-2 per mg/kg/day. EPA calculated an Inhalation Unit Risk (IUR) based on the OSF as follows:

$$\begin{aligned} \text{IUR} &= \text{OSF} \times (\text{adult inhalation rate per day}) / (\text{adult default body weight}) \times 1\text{mg}/1000\mu\text{g} \\ \text{IUR} &= 2.6\text{E-}2 / (\text{mg}/\text{kg}/\text{day}) \times 20\text{m}^3/70\text{kg} \times 1\text{mg}/1000\mu\text{g} \\ \text{IUR} &= 7.4\text{E-}6 \text{ per } \mu\text{g}/\text{m}^3 \end{aligned}$$

Based on this Inhalation Unit Risk (IUR) of 7.4E-6 per $\mu\text{g}/\text{m}^3$, the IRSL and SRSL are derived:

$$\text{IRSL} = \frac{1\text{E-}6 \text{ risk}}{7.4\text{E-}6 (\mu\text{g}/\text{m}^3)^{-1}} = 0.1 \mu\text{g}/\text{m}^3 \text{ (annual AT)}$$

$$\text{SRSL} = \frac{1\text{E-}5 \text{ risk}}{7.4\text{E-}6 (\mu\text{g}/\text{m}^3)^{-1}} = 1 \mu\text{g}/\text{m}^3 \text{ (annual AT)}$$

EPA, 1988. Integrated Risk Information System (IRIS). Chemical Assessment Summary for 1,1,1,2-Tetrachloroethane; CASRN 630-20-6. Accessed 10-23-2015.

http://cfpub.epa.gov/ncea/iris/iris_documents/documents/subst/0265_summary.pdf

NTP, 1983. National Toxicology Program. Carcinogenesis Studies of 1,1,1,2-Tetrachloroethane (CAS No. 630-20-6) in F344/N Rats and B6C3F1 Mice (Gavage Studies) NTP TR-237. May 1983. U.S. Department of Health and Human Services.