

MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY

INTEROFFICE COMMUNICATION

TO: File for Vinyl chloride (CAS # 75-01-4)
FROM: Robert Sills, AQD Toxics Unit Supervisor
SUBJECT: Screening levels for Vinyl chloride
DATE: August 19, 2015

The screening levels for vinyl chloride (VC) are as follows:

ITSL = 100 ug/m³, annual averaging time (AT)

IRSL = 0.11 ug/m³, annual AT;

SRSL = 1.1 ug/m³, annual AT.

The basis for these SLs is the EPA (2000; IRIS) assessment, which included an inhalation RfC = 100 ug/m³. This RfC was based on a rat chronic (lifetime) feeding study which provided a NOAEL = 0.13 mg/kg-d, a NOAEL(HEC) = 2.5 mg/m³, and a LOAEL of 1.3 mg/kg-d (LOAEL(HEC) = 25.3 mg/m³ (EPA, 2000). The critical effect was liver cell polymorphism. EPA (2000) applied a total UF of 30, consisting of UF_H = 10 and UF_A = 3 for toxicodynamic differences (coupled with PBPK modeling). When the ITSL was first established based on this RfC on 8/7/2000, a default AT of 24 hours was applied. At this time the AT is being set at annual as appropriate considering that the key studies involved lifetime exposure. Therefore, the ITSL is set equal to the RfC at 100 ug/m³, with annual AT.

The IRSL and SRSL were initially established by AQD on 8/7/2000. EPA (2000) concluded that vinyl chloride is classified as, "A", known human carcinogen by the inhalation route of exposure, based on human epidemiology data. Strong evidence exists for a causal relationship between exposure to VC in humans and a significantly excessive risk of liver angiosarcoma. EPA (2000) provided an inhalation unit risk for continuous lifetime exposure from birth = 8.8E-6 per ug/m³. Based on this unit risk estimate (URE), the IRSL and SRSL are derived as follows:

$$\text{IRSL} = \frac{1\text{E-6 risk}}{8.8\text{E-6 (ug/m}^3\text{)}^{-1}} = 0.11 \text{ ug/m}^3 \text{ (annual AT)}$$

$$\text{SRSL} = \frac{1\text{E-5 risk}}{8.8\text{E-6 (ug/m}^3\text{)}^{-1}} = 1.1 \text{ ug/m}^3 \text{ (annual AT)}$$

References

EPA. 2000. IRIS database. Chemical entry for vinyl chloride. Inhalation RfC and Carcinogenicity assessment. Last revised 8/7/2000. Still current as of 8/19/15.