

MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY

---

INTEROFFICE COMMUNICATION

---

August 2, 2002

TO: Valeraldehyde file (CAS # 110-62-3)

FROM: Gary Butterfield

SUBJECT: Screening level for valeraldehyde

Valeraldehyde is also known as n-valeraldehyde, amyl aldehyde, and n-pentanal. Physical properties found that valeraldehyde is a colorless liquid with a density of 0.818 g/cm<sup>3</sup>, a molecular weight of 86.13, a melting point of -91 degrees C, and a boiling point of 102 degrees C. The vapor pressure is reported to be 26 mmHg at 20 degrees C.

The following references or databases were searched to identify data to determine the screening level: U.S. Environmental Protection Agency (EPA) Integrated Risk Information System (IRIS), National Institute for Occupational Safety and Health (NIOSH) Registry for Toxic Effects of Chemical Substances (RTECS), American Conference of Governmental and Industrial Hygienists (ACGIH) Threshold Limit Values (TLVs), Michigan Department of Environmental Quality (DEQ) library, International Agency for Research on Cancer (IARC) Monographs, Chemical Abstract Service (CAS) Online (1993- March 2002), National Library of Medicine (NLM) - Toxline, and National Toxicology Program (NTP) Status Report.

The ACGIH has a TLV for valeraldehyde of 50 ppm (or 176 mg/m<sup>3</sup>). This TLV is not based on toxicity information specific for valeraldehyde, but is adopted because valeraldehyde is expected to be less toxic (in this case irritating) than is acetaldehyde. The TLV of 50 ppm for valeraldehyde was adopted because it is twice the acetaldehyde ceiling level of 25 ppm.

The CAS and NLM on-line literature searches were conducted on April 10, 2002. There is very little toxicity data on this chemical available. The literature searches did find some acute toxicity studies (oral and inhalation) that have been published. However, only one of those acute studies is of adequate quality upon which to potentially determine an ITSL. That study is the oral LD<sub>50</sub> reported by Smyth et al (1969). Groups of Carworth rats were administered, via gavage, undiluted valeraldehyde and observed for 14 days. The LD<sub>50</sub> was calculated using the moving averages method. The rat oral LD<sub>50</sub> of 4.58 g/kg was reported in this article.

In evaluating the available data to determine the ITSL for valeraldehyde, the use of the TLV was considered more appropriate than using an oral rat LD<sub>50</sub>. While the TLV is not based on chemical specific toxicity data for valeraldehyde, presumably there is some worker experience associated with use of the TLV. The TLV of 50 ppm was established in 1978 and has been in use since this time. Currently, there is no indication from ACGIH that the TLV is being revised or under consideration for revision. However, the lack of toxicity data on which the TLV is based, adds uncertainty to the ITSL derived from this value.

Considering the information above, the screening level is being set on 1% of the TLV value of 50 ppm (or 176 mg/m<sup>3</sup>), as follows using the equation from R232(1)(c).

$$\text{ITSL} = \frac{(176 \text{ mg/m}^3)}{100} = 1760 \text{ ug/m}^3 \text{ with 8 hour averaging}$$

It should be noted that valeraldehyde is a high production volume chemical in EPA's HPV program, for which additional toxicity testing will be conducted in the future to fill data gaps. Further review of this screening level should be done when this new data is available; unfortunately, no schedule is currently available for when this testing will be done.

#### References

ACGIH. 1992. Documentation of the TLV and BEI for valeraldehyde.

Smyth et al. 1969. Range - finding toxicity data: list vii. AIHAJ 30:470-6.