

MICHIGAN DEPARTMENT OF NATURAL RESOURCES

INTEROFFICE COMMUNICATION

FEBRUARY 2, 1995

TO: File for Isoamyl Alcohol (123-51-3)

FROM: Marco Bianchi

SUBJECT: Initial Threshold Screening Level

The initial threshold screening level (ITSL) for isoamyl alcohol is $360 \mu\text{g}/\text{m}^3$ based on an 8 hr. averaging time.

The following references or databases were searched to identify data to determine the ITSL: IRIS, HEAST, NTP Management Status Report, RTECS, EPB-CCD, EPB library, CAS-online, NLM-online, IARC, NIOSH Pocket Guide, and ACGIH Guide.

A number of acute studies have shown that isoamyl alcohol has a low order of acute toxicity. The acute oral LD_{50} in rats has been reported to be $5.77 \text{ g}/\text{kg}$ (Smyth et al., 1969) and 1.3 to $4.0 \text{ g}/\text{kg}$ (Opdyke 1978). RTECS listed an oral rat LD_{50} of $1300 \text{ mg}/\text{kg}$; clinical signs included fatty degeneration of liver, and changes of the blood, kidney, bladder, and ureter.

Human studies obtained from ACGIH documentation have shown isoamyl alcohol to be irritating to the nose and throat at 100 ppm and to the eyes at 150 ppm within 3 to 5 minutes to test subjects (Nelson, 1943). But this compound did not produce skin irritation nor was a skin sensitizer in human volunteers. Similar exposure related effects to n-butyl alcohol, but at 25 ppm , caused the ACGIH to conclude that isoamyl alcohol is less irritating than n-butyl alcohol. Additionally, ACGIH documentation and *Patty's* listed two German carcinogenicity studies for isoamyl alcohol. These studies revealed myeloid leukemia, liver, spleen, and antestomach carcinomas after Wistar rats were dosed orally or subcutaneously for approximately 2 years. Only benign tumors were observed in the control rats of each study. These studies were considered inadequate for cancer risk assessment by the *Patty's* reviewer.

The ACGIH TLV Committee recommended a level of 100 ppm ($360 \text{ mg}/\text{m}^3$) for isoamyl alcohol based on human throat irritation at 100 ppm , and by analogy comparing irritation data to n-butyl alcohol. This committee is also reviewing evidence for the carcinogenicity of this compound.

Normally, the TLV would be used as presented to derive an ITSL for isoamyl alcohol. But because of the uncertainty of this compound being carcinogenic, and the TLV being set at a level that causes health effects, it seems appropriate to include an additional 10-fold safety factor for ITSL derivation.

The ITSL was derived as follows:

$$\text{ACGIH TLV} = 360 \text{ mg}/\text{m}^3$$

$$360 \text{ mg}/\text{m}^3 \times 1000 \text{ ug}/\text{mg} = 360,000 \text{ ug}/\text{m}^3$$

$$\frac{360,000 \text{ ug/m}^3}{10 \text{ (safety factor)}} = 36,000$$

ITSL = 1% of the ACGIH

$$36,000 \text{ ug/m}^3 \times 0.01$$

The ITSL for isoamyl alcohol = $360 \mu\text{g/m}^3$ based on 8 hr. averaging.

References:

ACGIH. 1994. Documentation of the TLV's and BEI's.

Patty's Industrial Hygiene and Toxicology; Volume II, Part D. 1994. Alcohols. Chapter 30; pp. 2585-2760.

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