

MICHIGAN DEPARTMENT OF NATURAL RESOURCES

INTEROFFICE COMMUNICATION

JANUARY 30, 1995

TO: File for 2,3-Dimethylbutane (79-29-8)

FROM: Marco Bianchi

SUBJECT: Initial Threshold Screening Level

The initial threshold screening level (ITSL) for 2,3-dimethylbutane is $3,500 \mu\text{g}/\text{m}^3$ 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.

Little information was available on individual isomers of hexane such as 2,3-dimethylbutane. The ACGIH listed a TLV of 500 ppm ($1760 \text{ mg}/\text{m}^3$) for "hexane isomers other than n-hexane", while NIOSH listed a REL of 100 ppm ($350 \text{ mg}/\text{m}^3$). NIOSH and ACGIH disagree on how to classify hexane isomers with regards to them being potential neuropathic agents. According to the ACGIH, the NIOSH criteria document on alkanes concluded that all C_5 - C_8 alkanes are potential neuropathic agents and should have the same PEL as established for n-hexane. Conversely, the ACGIH believes it is inconsistent to base exposure limits for the isomers of hexane on their unproven neurotoxicity. It considers it unlikely that all the hexanes would follow the same metabolic route in the body, in view of the known patterns of xenobiotic biotransformation in animals and humans identified with the marked variation in structure of the various hexane molecules. This viewpoint, coupled with an absence of adverse effects from exposure to concentrations at 500 ppm reported by both Nelson et al., (1943) and Elkins (1959), provided enough justification for the ACGIH to set the TLV at 500 ppm. However, the ACGIH clarifies their position by stating that this TLV is based on isomers of hexane, and mixtures of hexanes containing essentially no n-hexane (<5%).

The ACGIH presents a valid argument for staff to consider deriving an ITSL based on an OEL of 500 ppm. However, Rule 232(1)(c) states that (in the absence of chemical specific data), an ITSL will be based on the lowest occupational exposure level (OEL) of either the NIOSH recommended exposure level listed in the NIOSH pocket Guide to Chemical Hazards (September 1985), or the time-weighted average or ceiling TLV listed in the 1988-1989 ACGIH TLV booklet. Since, the NIOSH value of 100 ppm ($350 \text{ mg}/\text{m}^3$) is the lower of the two, this number will be used to derive the ITSL.

The ITSL was derived as follows:

$$\text{NIOSH REL} = 350 \text{ mg/m}^3$$

$$350 \text{ mg/m}^3 \div 100 = 3.5 \text{ mg/m}^3$$

$$3.5 \text{ mg/m}^3 \times \frac{1000 \text{ ug/m}^3}{1 \text{ mg/m}^3} = 3500 \text{ ug/m}^3$$

The ITSL for 2,3-dimethylbutane = 3,500 $\mu\text{g/m}^3$ based on 8 hr. averaging.

References:

ACGIH. 1994. Documentation of the TLVs and BEIs.

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