

MICHIGAN DEPARTMENT OF NATURAL RESOURCES

INTEROFFICE COMMUNICATION

JANUARY 31, 1995

TO: File for 2,3-Dimethylpentane (565-59-3)

FROM: Marco Bianchi

SUBJECT: Initial Threshold Screening Level

The initial threshold screening level (ITSL) for 2,3-dimethylpentane 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 heptane such as 2,3-dimethylpentane. The ACGIH listed a TLV of 400 ppm (1640 mg/m^3) for n-heptane and heptane isomers, while NIOSH listed a REL of 85 ppm (350 mg/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 class of compounds on their unproven neurotoxicity. The ACGIH believes that the peripheral neuropathies noted following exposures to mixtures of pentane, hexane, heptane, and octane are predominantly, if not entirely, due to the hexane present in such mixtures. Although the possibility that chronic exposure to high concentrations of pentane, heptane, and/or octane may lead to polyneuropathy cannot be ruled out altogether, the existing toxicological and metabolic fate data do not support the role of aliphatic hydrocarbons other than n-hexane and its neurotoxic metabolites as etiologic agents of polyneuropathy. This viewpoint, coupled with studies that showed heptane to be slightly more acutely toxic than n-hexane in producing narcosis and respiratory irritation, led the ACGIH to recommend a TLV of 400 ppm.

The ACGIH present a valid argument for staff to consider deriving an ITSL based on an OEL of 400 ppm. However, Rule 232(1)(c) states that (in the absence of chemical specific data), an ITSL is 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 85 ppm (350 mg/m^3) is the lower of the two, this number will be used to derive the ITSL.

The ITSL was derived as follows:

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

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

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

The ITSL for 2,3-dimethylpentane = 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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