

**MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY**

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**INTEROFFICE COMMUNICATION**

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June 12, 1996

TO: 1,5-Hexadiene (592-42-7)

FROM: Marco Bianchi, Toxics Unit, Air Quality Division

SUBJECT: Initial Threshold Screening Level

The initial threshold screening level (ITSL) for 1,5-hexadiene is 264  $\mu\text{g}/\text{m}^3$  based on an annual averaging time.

This chemical is being re-evaluated due to new information provided by Dow Corning Corp. Dow Corning forwarded a four-hour acute whole body rat inhalation study, a 14 day rat inhalation range finding study, and a 90-day subchronic rat inhalation study for 1,5-hexadiene. 1,5-Hexadiene was initially reviewed by AQD staff in May 1996, but due to a paucity of data, the ITSL was set at 0.04  $\mu\text{g}/\text{m}^3$ , based on an annual averaging.

In the four-hour acute study, five male and five female Sprague-Dawley rats were exposed to 0 and 5  $\text{mg}/\text{m}^3$  of 1,5-hexadiene. No apparent abnormalities related to the test material were observed during the exposure or observation periods. No deaths were observed in either the control or test group animals. Necropsies of the test animals revealed no apparent abnormalities in any major tissues or organs.

A 14-day range-finding vapor inhalation toxicity study was conducted in rats to determine exposure levels of 1,5-hexadiene for the 90-day subchronic inhalation study. Four groups of five male and five female Sprague-Dawley rats were exposed to target concentrations of 0, 100, 500, and 1,000 ppm 1,5-hexadiene for six hrs./day, five days/wk for two weeks. No mortality was observed in any of the groups and no clinical signs of toxicity were noted which were considered treatment-related. There were no statistically significant differences in body weight gains or food consumption between animals exposed to 1,5-hexadiene and control animals. Gross pathology did not reveal any treatment-related effects. Other than an increase in absolute brain weights in males exposed to 1,000 ppm, 1,5-hexadiene (data considered equivocal) no other statistically significant differences were observed.

Based on the 14-day range-finding study, a 90-day subchronic rat inhalation study was conducted to investigate the subchronic toxicity of 1,5-hexadiene. Four groups of 10 male and 10 female Sprague-Dawley rats each were exposed to 0, 31, 315, and 1000 ppm of 1,5-hexadiene vapors for six hrs/day, five days/wk for 13 weeks. These

concentrations are equal to 0, 104, 1055, and 3350 mg/m<sup>3</sup>. A control and a test group were also exposed concurrently, to 0 and 1000 ppm for 13 weeks and were observed for 28 days for reversibility, persistence, or delayed occurrence of toxic effects. Animals were observed for treatment-related signs of toxicity, growth, food consumption and mortality. After 13 weeks of exposure, rats were sacrificed and examined for changes in blood, serum chemistry, urine, organ weights, and histopathology. No mortality was observed in any of the test groups. Nasal discharge and facial soiling were the principal clinical signs observed during the study. No statistical significant differences were noted in either mean body weights, food consumption or clinical pathology data between test and control groups.

There were no significant differences in organ weights or gross pathologic changes among groups. Microscopic changes in organ systems was limited to tracheal mucosa in the 1,000 ppm exposed females. This effect had completely resolved by the recovery sacrifice. Based upon this data, the lowest, no observable effect level (NOEL) of 1,5-hexadiene occurred in females at 315 ppm (1055 mg/m<sup>3</sup>). An ITSL will be derived from this NOEL.

The ITSL was derived as follows:

$$\text{ITSL} = \text{NOAEL}/(10 \times 100) \times \text{hours exposed per day per 24 hour day}$$

$$\text{ITSL} = (1055 \text{ mg/m}^3)/(10 \times 100) \text{ 6hrs/24 hours per day}$$

$$\text{ITSL} = 0.264 \text{ mg/m}^3 \times 1000 \mu\text{g/mg} = 264 \mu\text{g/m}^3$$

The ITSL for 1,5-hexadiene = 264  $\mu\text{g}/\text{m}^3$  based on annual averaging.

MB:slb