MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY

INTEROFFICE COMMUNICATION

April 7, 2016

TO: Dimethyl Methyl Phosphonate file (CAS # 756-79-6)

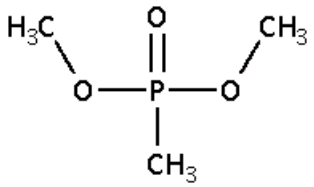
FROM: Mike Depa, Air Quality Division, Toxics Unit

SUBJECT: ITSL Derivation

Previously, the averaging time (AT) assigned to was 24 hours, as per the default methodology (Rule 232(2)(b))(see attached memo from Gary Butterfield dated 2/2/1995). The current file review concludes that the AT may appropriately be set at annual, based on the nature and duration of the key study and the initial threshold screening level (ITSL) value derivation, as allowed under Rule 229(2)(b). Therefore, the AT is set to annual.

The ITSL for dimethyl methyl phosphonate is 700 µg/m³ based on an annual averaging time.

Molecular Structure of
Dimethyl Methyl Phosphonate



MICHIGAN DEPARTMENT OF NATURAL RESOURCES

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INTEROFFICE COMMUNICATION

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February 2, 1995

TO: Dimethyl methyl phosphonate file (CAS # 756-79-6)

FROM: Gary Butterfield

SUBJECT: ITSL for Dimethyl methyl phosphonate

The following sources were checked for toxicity information on dimethyl methyl phosphonate: EPA'S IRIS database, EPA's BEAST, the IARC monographs, NTP bioassays, the EPB library (PUBLIB) and RTECS. There are no occupational exposure levels set by ACGIH, OSHA or NIOSH for this material.

EPA has not listed an RfC or RfD in the IRIS database for dimethyl methyl phosphonate. IRIS currently indicates the RfD and carcinogenic assessment are under review. However, a draft RfD of 0.2 mg/kg is listed in EPA (1992).

An on-line literature search, of CAS and NLM, was conducted on Nov. 21, 1994 to look for any published toxicity studies evaluating dimethyl methyl phosphonate. The NTP (1987) bioassay found increased incidences of male rat renal cancers, consisting of tubular cell hyperplasia, tubular cell adenocarcinomas, hyperplasia of the transitional cell epithelium, and transitional cell papillomas. There was no evidence of carcinogenic activity in female rats, or in male and female mice. It is possible to conclude that these male rat kidney lesions are not relevant to other species, including humans, due to the kidney lesions being associated with male rat specific, alpha-2u-globulin.

The majority of the toxicity studies evaluating dimethyl methyl phosphonate have been conducted by the oral route of exposure. There are a few published inhalation studies, Mattie et al (1987) reported finding male rat testicular effects following a 90 day inhalation exposure. The effects on reproductive ability have also been observed following oral exposure. The similar effects observed following exposure by oral, as well as, the inhalation routes of exposure make it possible to conclude that data from studies by the oral route of exposure is acceptable for use in calculation of the ITSL. Durinick et al (1984) also reported some reproductive effects observed in male rats following a 90 day oral exposure. On day 84 of the study male rats were mated with untreated females to evaluate the reproductive effects of exposure. There was a-2- February 2, 1995 dose related decrease in sperm count, sperm motility, and fertility index. There was an increased number of resorptions with increasing dose. Histologic abnormalities of the

testes were only observed in the high dose males. The mating trial was the most sensitive index of male reproductive effects, the low dose (250 mg/kg) had a fertility index comparable to the control rats, the next higher dose (500 mg/kg) had significantly decreased number of fetuses per litter and increased number of resorptions. A NOAEL of 250 mg/kg can be identified in this study.

From this NOAEL, an RfD can be calculated by following the RfD methodology of EPA, and results in a draft RfD similar to the one listed in EPA (1992), as follows.

draft RfD = (250 x (5/7))/UF = 0.2 mg/kg

where the UF of 1000 based on factors of 10 for each of the following: subchronic to chronic duration, rat to human, and sensitive individuals. Once an RfD has been calculated, the screening level for dimethyl methyl phosphonate can be calculated by the equation listed under R232(1)(b).

The ITSL was determined as follows.

ITSL = (RfD) x ($70kg/20m^3$) = 700 $\mu g/m^3$ with a 24 hr average.

References:

Dunnick et al. 1984. Reproductive toxicity of dimethyl methyl phosphonate in the male Fischer 344 rat. Toxicol Appi Pharmacol 72:379-387.

EPA. 1992. Health advisory for dimethyl methyl phosphonate. EPA Office of the Assistant Administrator of Water. NTIS if PB 93-117018.

Mattie et al. 1987. Toxic effects of inhaled dimethyl methyiphosphonate on the testes of Fischer-344 rats. Toxicol 47:231-232. (Abstract only)

NTP. 1987. Toxicology and carcinogenesis of dimethyl methylphosphonate in F344/N rats and B6C3F1 mice. NTP-TR-323.