

MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY

INTEROFFICE COMMUNICATION

TO: File for Alpha-Methyl Styrene (CAS # 98-83-9)

FROM: Robert Sills, AQD Toxics Unit Supervisor

SUBJECT: Alpha-Methyl Styrene ITSL change in the averaging time from 24 hrs to annual

DATE: December 28, 2016

The current ITSL for Alpha-Methyl Styrene is 230 ug/m³, with annual averaging time (AT).

Previously, the ITSL was established on November 10, 1994 at 230 ug/m³ with 24 hr averaging time (attached). The averaging time (AT) assigned to the ITSL at that time was 24 hours, as per the default methodology at that time (Rule 232(2)(b)). The ITSL was based on subchronic inhalation bioassay and RfC calculation approach (attached). The ITSL derivation utilized a total uncertainty factor (UF) = 1000 to the NOAEL; the total UF consisted of a UF = 10 for each interspecies extrapolation and intraspecies variability, and UF = 10 for subchronic-to-chronic conversion. The current file review concludes that the AT for the ITSL may appropriately be set at annual, based on the nature and duration of the key study and the ITSL value derivation, as allowed under Rule 229(2)(b).

MICHIGAN DEPARTMENT OF NATURAL RESOURCES

INTEROFFICE COMMUNICATION

November 10, 1994

TO: alpha-Methyl styrene file (CAS # 98-83-9)
FROM: Gary Butterfield
SUBJECT: Screening level for alpha-methyl styrene

The ACGIH and NIOSH have OELs for alpha-methyl styrene of 50 ppm or 242 mg/m³. These OELs are based on the TLV or REL for styrene. EPA does not have an RfC or RfD listed in IRIS. There is an entry in EPA's HEAST table with an inhalation RfD of 70 ug/kg (converts to 240 ug/m³). This value is based on study reported by Wolf et al (1956). In an attempt to identify any newer data a Nov 1, 1994 CAS and NLM on-line search was conducted. No more recent data utilizable for calculation of the ITSL was found. The type of recent studies include in vitro mutagenicity assays. In the study reported by Wolf et al (1956), rats, guinea pigs, rabbits and monkeys were exposed to vapors of alpha-methyl styrene at concentrations of 200, 600, 800 or 3000 ppm for 7 to 8 hours a day, 5 days per week for up to 152 exposures. The authors reported the 'no effect' level of 200 ppm identified from this study.

The screening level can be calculated from the Wolf et al no effect level using the RfC methodology described in EPA (1990) as follows.

NOAEL(adj) = 200 ppm x [(4.83 mg/m³)/ppm] x 8/24 x 5/7 = 230 mg/m³
NOAEL(hec) = NOAEL(adj) x (1a/1h) = 230 mg/m³ assumed default 1a/1h = 1
RfC = NOAEL(hec)/UF = (230 mg/m³)/(10x10x10) = 230 ug/m³ for 24 hours
where UF consists of a factor of 10 for each of the following:
animal to human; sensitive individuals; and, subchronic to chronic.

The ITSL is equivalent to the above calculated RfC, and is being established at 230 ug/m³ with 24 hour averaging.

References:

ACGIH. 1994. Threshold Limit Values for chemical substances and physical agents and biological exposure indices.

EPA. 1990. Interim methods for development of inhalation reference concentrations - review draft. EPA/600/8-90/066A.

EPA. 1994. Health Effects Assessment Summary Tables. Table 2.

EPA. 1994. IRIS database

NIOSH. 1990. Pocket guide to chemical hazards.

Wolf et al. 1956. Toxicological studies of certain alkylated benzenes and benzene. AMA Arch Indust Health 14:387-398.