

MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY

INTEROFFICE COMMUNICATION

TO: File for Acenaphthene (CAS # 83-32-9)

FROM: Robert Sills, AQD Toxics Unit Supervisor

SUBJECT: Acenaphthene ITSL change in the averaging time from 24 hrs to annual

DATE: December 27, 2016

The current ITSL for Acenaphthene is 210 ug/m³, with annual averaging time (AT).

Previously, the ITSL was established on July 19, 1993 at 210 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 an EPA (1990) Reference Dose (RfD) of 0.06 mg/kg-d, which EPA derived from a subchronic (90 day) mouse gavage bioassay. The critical effects were liver weight changes accompanied by microscopic alterations (cellular hypertrophy), and increases in cholesterol levels. EPA (1990) applied a total uncertainty factor (UF) = 3000, which consisted of a UF = 10 for each interspecies extrapolation, intraspecies variability, and subchronic-to-chronic conversion, and, UF_{db} = 3 for lack of adequate data in a second species and reproductive/developmental data. The current review notes that in utilizing this oral study for ITSL derivation, AQD also has route-to-route (oral to inhalation) conversion uncertainty which is also addressed with this UF_{db}. 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).

References:

EPA. 1990. Integrated Risk Information System (IRIS database). Chemical file for Acenaphthene. Oral RfD assessment last revised 11/1/90. Retrieved on 12/27/16.

MICHIGAN DEPARTMENT OF NATURAL RESOURCES

INTEROFFICE COMMUNICATION

July 19, 1993

TO: File for Acenaphthene (CAS #83-32-9)

FROM: Robert Sills, Surface Water Quality Division

SUBJECT: Screening Level Development

A review of the available literature indicates a lack of an occupational exposure level or an EPA inhalation RfC. Also, the available literature through June, 1993 contains insufficient human and animal inhalation data for ITSL derivation. The most appropriate data for ITSL derivation for acenaphthene is the key study selected by EPA (1993) for the oral RfD derivation. In an unpublished Study (Wolfe, 1989), four groups of CD-1 mice (20/sex/group) were gavaged daily with 0, 175, 350 or 700 mg/kg/day acenaphthene for 90 days. The toxicological evaluations of this study included body weight changes, food consumption, mortality, clinical pathological evaluations (including hematology and clinical chemistry), organ weights and histopathological evaluations of target organs. The results of this study indicated no treatment-related effects on survival, clinical signs, body weight changes, total food intake, and ophthalmological alterations. Liver weight changes accompanied by microscopic alterations (cellular hypertrophy) were noted in both mid- and high-dose animals and seemed to be dose-dependent. Additionally, high-dose males and mid- and high-dose females showed significant increases in cholesterol levels. Although increased liver weights, without accompanying microscopic alterations or increased cholesterol levels, were also observed at the low dose, this change was considered to be adaptive and was not considered adverse. The LOAEL is 350 mg/kg/day based on hepatotoxicity; the NOAEL is 175 mg/kg/day. EPA (1993) applied a composite UF of 3000 to this NOAEL to derive the RfD of 0.06 mg/kg/day. The UF is composed of: 10 for each inter- and intraspecies variability, 10 for the use of a subchronic study, and 3 for the lack of adequate data in a second species and reproductive/developmental data. EPA (1993) assigned 'low' confidence ratings to the key study, the database, and the RfD.

Data are not available to indicate that oral route to inhalation route extrapolation is inappropriate, nor to indicate the relative absorption rates for these two routes. The ITSL is thus derived as:

$$\text{ITSL} = \text{oral RfD} \times 70\text{kg}/20\text{m}^3 = 0.06 \text{ mg/kg-day} \times 70\text{kg}/20\text{m}^3 = 0.21 \text{ mg/m}^3;$$

averaging time is 24 hours.

REFERENCES

- EPA. 1993. IRIS database. Chemical file for Acenaphthene (CASRN 83-32-9). Last revised 5/1/93.
- Wolfe, G.W. 1989. Subchronic toxicity study in mice with acenaphthene. Hazleton Laboratories America, Inc. Sponsored by Dynamac Corp. HLA Study No. 2399-127. (Cited by EPA (1993) as U.S. EPA, 1989).

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