MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY

INTEROFFICE COMMUNICATION

TO: File for Butyl Benzyl Phthalate (CAS # 85-68-7)

FROM: Robert Sills, AQD Toxics Unit Supervisor

SUBJECT: Butyl Benzyl Phthalate ITSL change in the averaging time from 24 hrs to annual

DATE: December 27, 2016

The current ITSL for butyl benzyl phthalate is 700 ug/m^3, with annual averaging time (AT).

Previously, the ITSL (which was previously referred to as the Acceptable Ambient Concentration, or AAC) was established on February 10, 1992 at 700 ug/m^3 with 24 hr averaging time (see attached). The averaging time (AT) assigned to the ITSL previously was 24 hours, as per the default methodology at that time (Rule 232(2)(b)). The ITSL was based on an EPA (1989) Reference Dose (RfD) of 0.2 mg/kg-d, which EPA derived from a subchronic (6 month) rat oral feeding bioassay. The critical effects were significantly increased liver-to-body weight and liver-to-brain weight ratios. EPA (1989) applied a total uncertainty factor (UF) = 1000, which consisted of a UF = 10 for each interspecies extrapolation, intraspecies variability, and 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).

References:

EPA. 1989. Integrated Risk Information System (IRIS database). Chemical file for Butyl Benzyl Phthalate. Oral RfD assessment last revised 9/1/89. Retrieved on 12/27/16.

Michigan Department of Natural Resources

Interoffice Communication

2/10/92

To : Butyl Benzyl Phthalate File

From : Gary Butterfield

Subject : AAC for Butyl Benzyl Phthalate (CAS # 85-68-7)

Carcinogenesis of butyl benzyl phthalate was evaluated in a study conducted by NTP (1982). In that study, female rats were found to have an increased incidence of mononuclear cell leukemia and lymphoma. No increased tumor incidence were observed in male rats or either sex of mice. The evidence of that study is now considered equivocal evidence of butyl benzyl phthalate being carcinogenic. Of the few other long term animal studies that have been conducted, none have produced compelling evidence of a carcinogenic effect.

The majority of mutagenicity assays also have been negative.

IARC (1982) also reviewed the NTP data, concluding there was insufficient evidence to classify butyl benzyl phthalate as a carcinogen. In 8/87 an EPA work group verified, see IRIS, the conclusion that there is only limited evidence of butyl benzyl phthalate being carcinogenic and the qualitative weakness of the NTP data is inadequate for quantitative evaluation.

Due to the lack of convincing and quantifiable carcinogenic effects an AAC will be based on non-carcinogenic effects. No animal inhalation toxicity data is available on butyl benzyl phthalate. Limited number of reports of human inhalation exposures to butyl benzyl phthalate have been reported. Usually those reports found butyl benzyl phthalate exposure occurred with simultaneous exposure to other chemicals. Thus, the human exposure studies for calculation of the AAC are of little value. In order to calculate an AAC, it is necessary to rely on use of oral, animal data. The use of oral data is deemed appropriate as there is limited data with phthalates (other than butyl benzyl phthalate) indicating, as a group, they are rapidly and completely absorbed from the GI tract, as well as, lungs. Therefore, a conversion from oral to inhalation can be substantiated in calculation of an AAC.

In 6/89, EPA verified an RfD of 0.2 mg/kg on IRIS, based on data from an unpublished NTP (1985) study where increased liver weights were observed in a six month rat study. A NOAEL of 159 mg/kg was identified.

In recent studies supporting use of a NOAEL of 159 mg/kg, Robinson (1991) reported neurological symptoms and reduced body weight gains in rats following butyl benzyl phthalate in diets at doses of 1500

or 3000 mg/kg for 6 weeks, but not at 500 mg/kg. Few details of pathological examination, other than the neurological effects. Therefore confidence in the 159 mg/kg is higher. Ema et al (1990) administered butyl benzyl phthalate in the diet to pregnant rats to determine teratogenic potential. A NOAEL dose of 654 mg/kg for maternal and embryo lethal effects. This study and NOAEL is also consistent with the above studies.

The AAC can be calculated as follows :

AAC = (0.2 mg/kg) x (70 kg/20 m3) x (1000 ug/mg) = 700 ug/m3

with 24 averaging time, based on non-carcinogenic effects, and converted from the RfD (0.2 mg/kg/d) as reported in IRIS.

References :

Ema, M., T. Murai, T. Itami, et al. 1990. Evaluation of the teratogenic potential of the plasticizer butyl benzyl phthalate in rats. J Appl Toxicol 10:339-343.

EPA. 1987. Health effects assessment for selected phthalatic acid esters. Final draft. EPA, Environmental Criteria and Assessment Office, Cincinnati, OH. ECAO-CIN-H066.

EPA. 1992. IRIS.

IARC. 1982. 29:194.

NTP. 1982. Carcinogenesis bioassay of butyl benzyl phthalate (85-68-7) in F344 rats and B6C3F1 mice (feed study). NTP TR # 213.

NTP. 1985. Twenty-six week subchronic study and modified mating trial in F344 rats. Butyl benzyl phthalate. Hazelton Laboratories America Inc,. Project # 12307-02, -03 Unpublished, as cited in IRIS.

Robinson, E.C. 1991. Lack of neuropathological changes in rats after exposure to butyl benzyl phthalate. J Toxicol Environ Health 32:345-347.