MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY

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INTEROFFICE COMMUNICATION

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TO: File for p-toluenesulfonic acid (CAS# 104-15-4)

FROM: Keisha Williams, Air Quality Division (AQD)

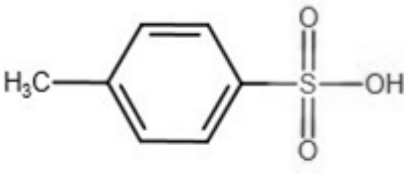
DATE: November 4, 2016

SUBJECT: Screening level update for p-toluenesulfonic acid

The initial threshold screening levels (ITSLs) for p-toluenesulfonic acid are 1.8 µg/m^3, annual averaging time and 210 µg/m^3, 1 hour averaging time.

There is a lack of information regarding the inhalation toxicity of p-toluenesulfonic acid (Figure 1). However, High Production Volume (HPV) Assessment Reports on p-toluenesulfonic acid and the similar compound, benzenesulphonic acid, noted that portal of entry (POE) effects are suspected as "both substances are sulphonic acids , which are very acidic (comparable to sulphuric acid) and therefore expected to show local effects in the gastrointestinal tract" (NOTOX, 2004; NOTOX, 2007). Since POE effects are expected, it is not appropriate to use toxicity information from oral studies to derive an ITSL. Although there is a lack of inhalation toxicity information, sulfuric acid toxicity data will be used to derive ITSLs in an effort to be health protective.

Figure 1. p-toluene sulfonic acid



In the AQD Toxic Air Contaminant list, sulfuric acid has two ITSLs: 1 µg/m^3, annual averaging time based on a monkey study where bronchial epithelial hyperplasia and bronchiolar wall thickening were seen in a dose-dependent fashion after 78 weeks of inhalation exposure and 120 µg/m^3, 1 hour averaging time based on a human, clinical study where changes in airway function was seen in asthmatics in a dose-dependent fashion (MDEQ, 2015).

With molecular weight adjustment considerations, as shown in Equation 1, the resulting ITSLs for p-toluenesulfonic acid are 1.8 µg/m^3, annual averaging time and 210 µg/m^3, 1 hour averaging time.

Equation 1.

$$\frac{ITSL_{sulfuric\ acid}}{molecular\ weight_{sulfuric\ acid}} = \frac{ITSL_{p-toluenesulfonic\ acid}}{molecular\ weight_{p-toluenesulfonic\ acid}}$$

where molecular weight for sulfuric acid is 98.1 g/mol

molecular weight for p-toluenesulfonic acid is 172.198 g/mol

ITSLs for sulfuric acid are 1 µg/m^3, annual averaging time and 120 µg/m^3, 1 hour averaging time

$$ITSL_{p-toluenesulfonic\ acid} = \frac{1\frac{\mu g}{m^3}}{98.1\ g/mol}\ x\ 172.198\frac{g}{mol} \approx 1.8\ \frac{\mu g}{m^3}, annual\ averaging\ time$$

$$ITSL_{p-toluenesulfonic\ acid} = \frac{120\frac{\mu g}{m^3}}{98.1\ g/mol}\ x\ 172.198\frac{g}{mol} = 210.64\frac{\mu g}{m^3}$$
$$\approx 210\ \frac{\mu g}{m^3}, 1\ hour\ averaging\ time$$

References

Act 451 of 1994, Natural Resources and Environmental Protection Act and Air Pollution Control Rules, Michigan Department of Environmental Quality.

MDEQ. 2015. *Memo from Michael Depa to Files for Sulfur Trioxide (SO3) [CAS# 7446-11-9], Sulfuric Acid (H2SO4) [CAS# 7664-93-9], and Oleum [CAS# 8014-95-7].* January 7, 2015. Michigan Department of Environmental Quality, Air Quality Division.

NOTOX. 2004. High Production Volume (HPV) Challenge Program: HPV Assessment Report on Benzenesulphonic acid (CAS# 98-11-3).

NOTOX. 2007. High Production Volume (HPV) Challenge Program: HPV Assessment Report on p-Toluenesulphonic acid (CAS# 104-15-4). Accessed July 21, 2016. https://iaspub.epa.gov/oppthpv/document_api.download?FILE=c16597rs.pdf