

MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY

INTEROFFICE COMMUNICATION

TO: File for 2-Naphthylamine (CAS # 91-59-8)  
FROM: Doreen Lehner  
SUBJECT: Screening level for 2-Naphthylamine (CAS # 91-59-8)  
DATE: April 10, 2014

The Initial Risk Screening Level (IRSL) for 2-naphthylamine (CAS # 91-59-8) is  $0.00013 \mu\text{g}/\text{m}^3$  based on an annual averaging time. The IRSL was established on 8/04/1982 and is based on a study by Conzelman et al. (1972) in which groups of 2-7 male and 2-5 female beagle dogs (age 8-10 months) were given 2-naphthylamine by mouth in a capsule at doses of 0, 6.25, 12.5, 25, or 50 mg/kg body weight per day for 6 days a week for 2 to 26 months. Total dose per dog ranged from 12 g to 204 g. The incidence of urinary bladder carcinomas for males were 0/2, 4/6, 2/5, 6/7, and 1/2 and the incidence for females were 0/2, 0/3, 2/5, 2/3, and 3/3 for 2-naphthylamine doses of 0, 6.25, 12.5, 25, or 50 mg/kg-d respectively. An oral slope factor was calculated by staff using Global 79 statistical software, resulting in a human carcinogenic potency value,  $q_1^*$  of  $27 (\text{mg}/\text{kg}/\text{day})^{-1}$ . Rule 231(1) was used to develop an IRSL for 2-naphthylamine. The equation is below:

$$IRSL = \frac{1 \times 10^{-6}}{\text{Unit Risk}}$$

The carcinogenic potency value ( $q_1^*$ ) of  $27 (\text{mg}/\text{kg}/\text{day})^{-1}$  is converted to an inhalation unit risk factor using the equation in Rule 231(3)(f) below:

$$q_1^* (\mu\text{g}/\text{m}^3)^{-1} = q_1^* (\text{mg}/\text{kg}/\text{day})^{-1} \times \frac{20 \text{ m}^3}{70 \text{ kg}} \times \frac{1 \text{ mg}}{1000 \mu\text{g}} \times \frac{a}{b}$$
$$q_1^* (\mu\text{g}/\text{m}^3)^{-1} = 27 \text{ mg}/\text{kg}/\text{day} \times \frac{20 \text{ m}^3}{70 \text{ kg}} \times \frac{1 \text{ mg}}{1000 \mu\text{g}} \times \frac{1}{1} = 0.007714286 (\mu\text{g}/\text{m}^3)^{-1}$$

Using the human inhalation risk ( $q_1^*$ ) of  $0.007714286 (\mu\text{g}/\text{m}^3)^{-1}$  gives:

$$IRSL = \frac{1 \times 10^{-6}}{0.007714286} = 0.00012963 \mu\text{g}/\text{m}^3$$

The IRSL for 2-naphthylamine is  $0.00013 \mu\text{g}/\text{m}^3$  based on an annual averaging time and the SRSL is  $0.0013 \mu\text{g}/\text{m}^3$  based on an annual averaging time.

**References:**

APCR, 1994. Air Pollution Control Rules, Promulgated pursuant to Part 55, Air Pollution Control of the Natural Resources and Environmental Protection Act, Michigan Department of Environmental Quality. 1994. Act 451, as amended (NREPA).

Conzelman, GM Jr. and Moulton, JE. 1972. Dose-response relationships of the bladder tumorigen 2-naphthylamine: a study in beagle dogs. *J Natl Cancer Inst*, 49:193-205.

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