MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY

INTEROFFICE COMMUNICATION

TO: File for 1-Chloro-2-nitrobenzene (CAS # 88-73-3)

FROM: Doreen Lehner

SUBJECT: Screening level for 1-Chloro-2-nitrobenzene (CAS # 88-73-3)

DATE: April 7, 2014

The Initial Risk Screening Level (IRSL) for 1-chloro-2-nitrobenzene (CAS# 88-73-3) is 0.21 µg/m^3 based on an annual averaging time. The IRSL was established on 2/8/1982 and is based on a Water Resources Division (WRD) literature review and derivation of a human oral carcinogenicity slope factor of 0.017 (mg/kg/d)$^{-1}$. This oral carcinogenicity slope factor is based on an increased incidence of liver tumors in female albino CD mice exposed via the diet for 18 months, followed by a three-month observation period (Weisburger et al., 1978).

Rule 231(1) was used to develop an IRSL for 1-chloro-2-nitrobenzene. The equation is below:

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

The WRD human oral cancer value of 0.017 (mg/kg/day)-1 found in the worksheet in Appendix A, attached, is converted to an inhalation cancer value using the equation in Rule 231(3)(f) below:

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

$$q_1^* \left({}^{\mu g}/_{m^3}\right)^{-1} = 0.017 \left({}^{mg}/_{kg/day}\right)^{-1} \times \frac{20\ m^3}{70\ kg} \times \frac{1\ mg}{1000\ \mu g} \times \frac{1}{1} = 0.000004857 \left({}^{\mu g}/_{m^3}\right)^{-1}$$

Using this value for the unit risk gives:

$$IRSL = \frac{1 \times 10^{-6}}{0.000004857 \left({}^{\mu g}/_{m^3}\right)^{-1}} = 0.205888408\ {}^{\mu g}/_{m^3} = 0.21\ {}^{\mu g}/_{m^3}$$

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).

Weisburger EK, Russfield AB, Homburger F, Weisburger JH, Boger E, Van Dongen CG, and Chu KC. 1978. Testing of twenty-one environmental aromatic amines or derivatives for long-term toxicity or carcinogenicity. J Environ Pathol Toxicol. Nov-Dec 2 (2):325-356.

Appendix A

See attached.

TERRESTRIAL TOXICITY and AESTHETICS CRITERIA

C.A.S. # 87-73-3 Date: 2/82

Chemical Name: 1-chloro-2-nitro benzene Initials: BV

Human Health Criteria:

Cancer risk assessment:

$$q_1^* = \frac{0.161278 \times 10^{-1}}{0.14749 \times 10^{2}} = 1.094 \times 10^{-3} \text{ (mg/kg/d)}^{-1}$$

70 / 10.03 = 13.26

$$q_1^* = q \times 13.26 = 1.45 \times 10^{-2} \times 1.167^{*} = 1.69 \times 10^{-2} \text{ (mg/kg/d)}^{-1}$$

* since the rodents were not adjusted for lifetime exposure prior to fitting to the multistg. model, there is an additional factor of $\frac{Le}{le} = \frac{21 \text{ months}}{18 \text{ months}} = 1.167$ which must be multiplied by the q_1^* in order to properly adjust the potency for the lifetime dose.

$$10^{-6} \text{ dose} = \frac{1 \times 10^{-6}}{q_1^*} = 5.9 \times 10^{-5} \text{ mg/kg/d}$$

$$\frac{5.9 \times 10^{-5} \times 70 \text{ kg}}{2 \text{ l/d}} = 2.1 \times 10^{-3} \text{ mg/l}$$

$$= 2.1 \text{ µg/l}$$