

MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY

INTEROFFICE COMMUNICATION

TO: File for Benzidine (CAS # 92-87-5)

FROM: Doreen Lehner

SUBJECT: Historical screening level review for Benzidine (CAS # 92-87-5)

DATE: April 11, 2014

The Initial Risk Screening Level (IRSL) for benzidine (CAS# 92-87-5) is 0.00002 $\mu\text{g}/\text{m}^3$ based on an annual averaging time. The IRSL was established on 10/15/1992 based on an inhalation unit risk (IUR) of $6.7\text{E}-2 (\mu\text{g}/\text{m}^3)^{-1}$ developed by EPA on 7/1/1991 (EPA, 1991). The EPA based their IUR determination on an epidemiologic study by Zvon (1973) where 11 cases of bladder cancer were observed, "in 25 workers exposed to levels of benzidine 0.005 to 17.6 mg/m^3 for a mean period of 11.46 years. A mean total accumulated dose of 130 mg/kg was estimated from urinary benzidine levels" (EPA, 1991).

Benzidine (CAS# 92-87-5) also known as 4,4'-diaminobiphenyl and di-phenylamine is an aromatic amine. It is a grayish-yellow, reddish-gray, or white crystalline powder with a molecular weight of 184.24 g/mol . Benzidine was used historically as a test component for cyanide and is still used in the production of dyes (Wikipedia, 2014).

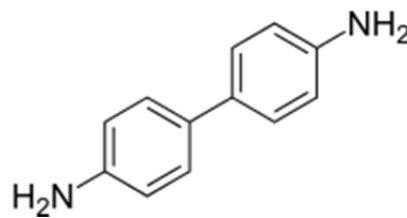


Figure 1. Structure of benzidine.

Rule 231(1) was used to develop the IRSL using the unit risk value derived by EPA for benzidine. The equation is below:

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

Using the EPA IUR of 6.7E-2 for the unit risk gives:

$$IRSL = \frac{1 \times 10^{-6}}{6.7 \times 10^{-2}} = 0.000014925 \mu g / m^3$$

The staff person that developed the Initial Risk Screening Level (IRSL) for benzidine (CAS # 92-87-5) in 1992 rounded this value to 0.00002 $\mu g/m^3$ and the SRSL was derived as 0.0002 $\mu g/m^3$ 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).

EPA. 1991. Integrated Risk Information System. Benzidine (CASRN 92-87-5). Retrieved data on 4/11/2014. Carcinogenicity assessment last revised 7/01/1991. Available online at: <http://www.epa.gov/iris/subst/0135.htm>

Wikipedia. 2014. Benzidine. Available online at: <http://en.wikipedia.org/wiki/Benzidine>

Zavon MR. 1973. Benzidine exposure as a cause of bladder tumors. Arch. Environ. Health. 27:1-7.

DL:lh