

MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY

INTEROFFICE COMMUNICATION

September 29, 2003

TO: 3,4-dichlorobenzonitrile file (CAS # 6574-99-8)
FROM: Gary Butterfield, Toxics Unit, Air Quality Evaluation Section
Air Quality Division
SUBJECT: Screening level for 3,4-dichlorobenzonitrile

3,4-Dichlorobenzonitrile is also known as 3,4-DCBN. This material is a white solid, with a molecular weight of 172 g/mol.

The following references or databases were searched to identify data to determine the screening level: U.S. Environmental Protection Agency (EPA) Integrated Risk Information System (IRIS), National Institute for Occupational Safety and Health (NIOSH) Registry for Toxic Effects of Chemical Substances (RTECS), American Conference of Governmental and Industrial Hygienists (ACGIH) Threshold Limit Values (TLVs), Michigan Department of Environmental Quality (DEQ) library, International Agency for Research on Cancer (IARC) Monographs, Chemical Abstract Service (CAS) Online (1968 - May 2003), National Library of Medicine (NLM) - Toxline, and National Toxicology Program (NTP) Status Report.

The CAS and NLM on-line literature searches were conducted on May 5, 2003. No toxicity studies were located during the literature searches. Dow Chemical was able to provide a summary of some unpublished acute studies for use by the DEQ to set screening levels, Dow/Stebbins (1996).

In an acute oral study, groups of three male F344 rats were administered via gavage doses of 500, 1,000 or 2,000 mg/kg. All of the rats given 2,000 mg/kg died. One of three rats died at the 1,000 mg/kg dose level. There were no deaths at the 500 mg/kg dose level.

The highest dose level that caused no deaths could be used as a surrogate LD50, because no statistically valid LD50 was determined from the above study and the number of animals per dose group, three, is a small number of animals. A screening level can be set using this surrogate LD50 of 500 mg/kg in the equation from R232(1)(h) to calculate an ITSL as follows.

$$\text{ITSL} = \frac{500 \text{ mg/kg}}{500 \times 40 \times 100 \times .167} \times \frac{1 \text{ kg}}{0.9 \text{ m}^3} = 2 \text{ ug/m}^3 \text{ annual average}$$

The default rat inhalation rate of 0.9 m³/kg was used in the above calculation.

As a solid at ambient temperatures, 3,4-DCBN would therefore be expected to be emitted to ambient air as a particulate. The contribution of airborne 3,4-DCBN concentrations to ambient particulate levels should be considered when evaluating compliance with any of the NAAQS for particulate matter.

References:

Dow/Stebbins. 1996. 3,4-dichlorobenzonitrile: acute toxicological properties. HERL file number DR-0200-0900-002. Submitted by Dow Chemical to the DEQ Air Quality Division.