

**MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY**

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**INTEROFFICE COMMUNICATION**

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AUGUST 6, 1999

TO: File for Phthalocyanine Blue (CAS No. 147-14-8)

FROM: Michael Depa

SUBJECT: Screening Level Determination

The initial threshold screening level (ITSL) for phthalocyanine blue is 21 µg/m<sup>3</sup> (annual average).

The following references or databases were searched to identify data to determine the screening level: Environmental Protection Agency's (EPA's) Integrated Risk Information System (IRIS), the Registry of Toxic Effects of Chemical Substances (RTECS), the American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Values (TLV), National Institute of Occupational Safety and Health (NIOSH) Pocket Guide to Hazardous Chemicals, Environmental Protection Bureau Library, International Agency for Research on Cancer (IARC) Monographs, Chemical Abstract Service (CAS) Online (1967- August 29, 1998), National Library of Medicine (NLM), Health Effects Assessment Summary Tables (HEAST), and National Toxicology Program (NTP) Status Report. EPA has not established a reference concentration (RfC) or reference dose (RfD) for phthalocyanine blue. There are no occupational exposure limits for phthalocyanine blue.

**Background Information**

The ITSL for phthalocyanine blue was initially set at 0.04 µg/m<sup>3</sup> (annual) according to Rule 232(1)(I) [see memos to the file dated April 5, 1994 and March 9, 1994]. A review of the literature was performed that included all available toxicity data on phthalocyanine blue. No pertinent toxicity data was discovered in this search. The Color Pigments Manufacturers Association (CPMA) provided the Toxics Unit with 8 documents from EPA Docket # 400085 "Copper Monochlorophthalocyanine Pigment Toxic Chemical Release Reporting." These documents were reviewed for toxicity data relevant to phthalocyanine blue.

Phthalocyanine blue is also known as Copper Phthalocyanine Blue, C. I. (Color Index) Pigment Blue 15 and many other names. The molecular weight of phthalocyanine blue is 575.5 g. Phthalocyanine blue is a pigment (as opposed to a dye) and as such is chemically inert and not soluble in water, alcohol, hydrocarbons and lipids. The diameter of phthalocyanine blue particles range from 0.02 to 0.125 µm. The U.S. Environmental Protection Agency, Office of Pesticides and Toxics Substances evaluated phthalocyanine blue and in 1995 delisted "Copper Phthalocyanine Compounds" from the reporting requirements under section 313 of the Emergency Planning and Community Right-To-

Know Act of 1986 (EPCRA). The rationale for delisting copper phthalocyanine compounds from these reporting requirements was printed in the Federal Register Tuesday, April 11, 1995 on pages 18362-18363. EPA stated, "Therefore, these copper phthalocyanine compounds cannot reasonably be anticipated to cause '...significant adverse acute human health effects at concentration levels that are reasonably likely to exist beyond facility site boundaries as a result of continuous, or frequently recurring releases.'" Furthermore, EPA stated that, "...these copper phthalocyanine compounds cannot reasonably be anticipated to cause cancer, developmental toxicity, reproductive toxicity, neurotoxicity, gene mutations, or chronic toxicity."

## Animal Studies

An LD50 study was provided to the MDEQ-Air Quality Division by J. Lawrence Robinson of the Color Pigments Manufactures Association, Inc. (CPMA). Groups of 5 male and female Sprague-Dawley rats were given a single dose by gavage of 200, 1600, 3200, 6400 mg/kg copper phthalocyanine blue (CAS No. 147-14-8) and observed for 14 days (BASF, 1997). No deaths occurred during the dosing or the 14 day observation period. Clinical signs of toxicity included dyspnea, apathy and blue-colored feces. At necropsy there were no gross pathological findings. The authors concluded that the LD50 is greater than 6400 mg/kg. This surrogate LD50 was used to develop the ITSL for Phthalocyanine blue according to Rule 232(1)(h) as follows:

$$\text{ITSL} = \text{LD50} / (500 \times 40 \times 100) \times 1 / (0.167) \times W_a / I_a$$

$$\text{ITSL} = (6400 \text{ mg/kg}) / (2000000) \times 1 / (0.167) \times (0.431 \text{ kg}) / (0.401 \text{ m}^3)$$

$$\text{ITSL} = 0.0032 \text{ mg/kg} \times 6.436 \text{ kg/m}^3$$

$$\text{ITSL} = 0.0206 \text{ mg/m}^3$$

$$\text{ITSL} = 21 \text{ } \mu\text{g/m}^3 \text{ (with a 24-hour averaging time).}$$

It appears that the toxicity of this pigment is due to the copper content. The ITSL for copper phthalocyanine blue was compared to the ITSL for copper. The molecular weight of copper is 63.5 g and that for copper phthalocyanine blue is 576 g. Copper is 11% by weight of the copper phthalocyanine blue compound. So 11% of the ITSL for phthalocyanine, or  $21 \text{ } \mu\text{g/m}^3$ , is  $2.31 \text{ } \mu\text{g/m}^3$ . This is roughly the same as the ITSL for copper,  $2 \text{ } \mu\text{g/m}^3$ . Therefore, the ITSL for copper phthalocyanine blue would also be protective of the effects of copper.

## References

BASF. 1997. Report on the study of the acute oral toxicity of "Heliogenblau 7040" in the rat (Translation from German).

MD:ST