MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY

INTEROFFICE COMMUNICATION

February 12, 1996

TO: File for Colophony (CAS # 8050-09-7)

FROM: Michael Depa, Toxics Unit

SUBJECT: Screening Level Determination

The initial threshold screening level (ITSL) for colophony is 1 µg/m^3 based on a 1-hour averaging time.

The following references or databases were searched to identify data to determine the ITSL: IRIS, RTECS, ACGIH Threshold Limit Values, NIOSH Pocket Guide to Hazardous Chemicals, Environmental Protection Bureau Library, IARC Monographs, CAS Online (1967-November 25, 1995), National Library of Medicine, Health Effects Assessment Summary Tables, and NTP Status Report. Review of these sources found that EPA has not established an RfC or RfD for colophony. There was no data meeting the minimum criteria for establishing an RfC or RfD.

An acute animal inhalation study was identified. Groups of 8 male Wistar rats (180 - 200g) were exposed to 0 or 220 mg/m^3 (S.D. ± 80) rosin fumes (Zitting, 1980). The exposure scenario consisted of pumping heated (360°C) colophony through the exposure chamber for 15 minutes. Then the pump was turned off for 20 minutes. Thereafter the chamber was flushed with fresh air for 10 minutes and the procedure repeated. Four doses were given during one day. The rats were exposed for 2 weeks, 5 days a week. Only lung and liver glutathione and enzyme levels were reported. Glutathione was significantly decreased ($p<0.001$) in the liver but not in the lung. O-deethylase was increased in both the lung and liver ($p<0.005$). Because of the limited pathology analysis, this study was deemed to be inadequate for a determination of an ITSL.

The compound “Rosin core solder thermal decomposition products” (also known as colophony) is listed in the ACGIH TLV booklet. A TLV is not provided. Instead, a notice is provided that states, “Sensitizer; reduce exposure to as low as possible.” A copy of the ACGIH (1994) draft documentation for colophony was obtained from the ACGIH via FAX. This draft documentation for colophony was analyzed to determine the reason for the statement “reduce exposure to as low as possible,” The ACGIH states:

> Studies of workers exposed to thermal decomposition products of rosin core solder (colophony) showed short-term reversible airways obstruction. Other exposed workers were symptom-free for an average of 6 years, after which they developed permanent asthma.

The ACGIH reasoned that, “Such an approach should minimize the potential for skin irritation and/or the development of temporary and permanent asthma among exposed workers.”

The NIOSH REL Ceiling for rosin core solder, pyrolysis products (as formaldehyde) is 0.1 mg/m^3. There was no information that indicated that an ITSL developed from the REL would be inappropriate. According to Rule 232 hierarchy, the ITSL was developed as follows.

ITSL = OEL/100

where, OEL (occupational exposure limit) is either the NIOSH REL or the ACGIH TLV.

ITSL = (0.1 mg/m^3) / 100

ITSL = 0.001 mg/m^3

ITSL = 1 $\mu g/m^3$

The averaging time was determined according to Rule 232(2) (a) to be 1 hour. The ITSL for colophony is 1 $\mu g/m^3$ based on a 1-hour averaging time.

References

ACGIH. 1994. Draft documentation for Rosin Core Solder Thermal Decomposition Products. Obtained by FAX from the American Conference of Governmental Hygienists, Cincinnati, OH.

Zitting, A. 1980. The effects of the fumes from heated rosin (colophony) on tissue glutathione and xenobiotic metabolism in rat lung and liver. Research Communications in Chemical Pathology and Pharmacology. Vol 27(3) 563-569.

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