MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY

INTEROFFICE COMMUNICATION

TO: File for Iodine (CAS No. 7553-56-2)

FROM: Cathy Simon, Air Quality Division

SUBJECT: Screening Level Update - Iodine

DATE: December 3, 2012

The initial threshold screening level (ITSL) for iodine has been changed from 10 µg/m^3 (1-hour averaging time) to 1 µg/m^3 (8-hour averaging time). This change is being made as part of a project to update ITSLs that are derived from outdated occupational exposure limits. The evaluation of data being done as part of this project is limited to identifying the most recent occupational exposure limit, and does not include a review of all the available scientific literature.

The original ITSL for iodine was set in 1994 and was derived from the American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Value (TLV) – Ceiling limit of 0.1 ppm (1.0 mg/m^3) (MDNR, 1994). This TLV of 0.1 ppm was first adopted by the ACGIH in 1963. The new ITSL is based upon the most recent TLV (time weighted average value) of 0.01 ppm (0.1 mg/m^3), which was adopted by the ACGIH in 2008, and represents the most up to date and scientifically based TLV available from the ACGIH. The new ITSL was derived as follows:

$$ITSL = \frac{TLV}{100} = \frac{0.1\ mg/m^3}{100} = 0.001\ mg/m^3 = 1\ \mu g/m^3$$

The above ITSL of 1 µg/m^3 (8-hour averaging time) was derived pursuant to Rule 229(2)(b) of the Michigan Air Pollution Control Rules, and is consistent with the methodology of Rule 232(1)(c).

References

MDNR. 1994. *Memo from Marco Bianchi to File for Iodine (7553-56-2). Subject: Interim Initial Threshold Screening Level.* April 27, 1994. Michigan Department of Natural Resources, Air Quality Division.

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MICHIGAN DEPARTMENT OF NATURAL RESOURCES

INTEROFFICE COMMUNICATION

April 27, 1994

TO: File for Iodine (7553-56-2)

FROM: Marco Bianchi

SUBJECT: Interim Initial Threshold Screening Level

The interim initial threshold screening level (ITSL) for iodine is 10 µg/m^3 based on an 1 hour averaging time.

The following references or databases were searched to identify data to determine the ITSL: IRIS, BEAST, NTP Management Status Report, RTECS, EPB-CCD, EPB library, IARC, NIOSH Pocket Guide, and ACGIH Guide.

A limited database search was conducted for iodine because the ACGIH provided information to set an ITSL. According to the ACGIH, the OEL for this compound is a ceiling limit of 1 mg/kg (0.1 ppm) meaning, this concentration is not to be exceeded during any part of the working exposure. Because of this ceiling limit, the averaging time for the derived ITSL will be 1 hour instead of 8 hours.

Iodine sublimes to a violet gas with a characteristic irritating odor at ordinary temperatures. This gas is intensely irritating to mucous membranes and adversely affects both the upper and lower portions of the pulmonary tract. Interestingly, the concentration-response relationship of iodine gas-induced irritation is exceedingly steep. Researchers have reported that humans can work undisturbed at concentrations of 0.1 ppm, but difficult between 0.15 to 0.2 ppm, and impossible at 0.3 ppm. Based on the reported no-effect level concentrations in humans for ocular and upper respiratory tract irritation, the ACGIH recommends a 0.1 ppm (1 mg/kg) ceiling limit for iodine.

The Interim ITSL based on the ACGIH value of 1 mg/m^3 for iodine was determined as shown below:

$$ACGIH\ TLV = 1\frac{mg}{m^3}; or\ 1{,}000\frac{\mu g}{m^3}$$

$$ITSL = 1\%\ of\ the\ ACGIH$$

$$1{,}000\frac{\mu g}{m^3}\ x\ 0.01 = 10\frac{\mu g}{m^3}$$

The interim ITSL for iodine = 10 µg/m^3 based on 1 hr averaging.

References:

ACGIH, Threshold Limit Values and Biological Exposure Indices for 1993-1994.

ACGIH, Documentation of Threshold Limit Values and Biological Exposure Indices, 6th edition, Volume I, 1991.

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