

MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY

INTEROFFICE COMMUNICATION

TO: File for Arsenic and inorganic arsenic compounds (CAS No. 7440-38-2)  
FROM: Keisha Williams, Air Quality Division  
DATE: May 8, 2015  
SUBJECT: Updates for Initial Risk Screening Level File

The initial risk screening level (IRSL) for arsenic and inorganic arsenic compounds is 0.0002  $\mu\text{g}/\text{m}^3$  (annual averaging time) based on the Environmental Protection Agency's (EPA's) inhalation unit risk, 0.0043 per  $\mu\text{g}/\text{m}^3$  (EPA 1998). The IRSL and secondary risk screening level (SRSL) were established by the Air Quality Division on January 13, 1988 based on the inhalation unit risk value last updated by EPA in 1998.

EPA used a compilation of epidemiological studies on occupational exposures to arsenic and associated increased incidence of lung cancer ([Brown and Chu 1983a,b,c; Lee-Feldstein 1983; Higgins 1982; Enterline and Marsh 1982] found in EPA 1998). The IRSL and SRSL are calculated as shown in Equations 1 and 2.

Equation 1.

$$IRSL = \frac{1 \times 10^{-6}}{\text{unit risk estimate}} = \frac{1 \times 10^{-6}}{\frac{0.0043}{\frac{\mu\text{g}}{\text{m}^3}}} = 0.00023 \frac{\mu\text{g}}{\text{m}^3} \approx 0.0002 \frac{\mu\text{g}}{\text{m}^3}$$

Equation 2.

$$SRSL = \frac{1 \times 10^{-5}}{\text{unit risk estimate}} = \frac{1 \times 10^{-5}}{\frac{0.0043}{\frac{\mu\text{g}}{\text{m}^3}}} = 0.0023 \frac{\mu\text{g}}{\text{m}^3} \approx 0.002 \frac{\mu\text{g}}{\text{m}^3}$$

**References**

EPA. 1998. IRIS Summary for Arsenic, inorganic (CASRN 7440-38-2). Integrated Risk Information System, US Environmental Protection Agency, Accessed on May 1, 2015. <http://www.epa.gov/iris/subst/0278.htm>

(References: Brown, C.C. and K.C. Chu. 1983a. Approaches to epidemiologic analysis of prospective and retrospective studies: Example of lung cancer and exposure to

arsenic. In: Risk Assessment Proc. SIMS Conf. on Environ. Epidemiol. June 28-July 2, 1982, Alta, VT. SIAM Publications.

Brown, C.C. and K.C. Chu. 1983b. Implications of the multistage theory of carcinogenesis applied to occupational arsenic exposure. *J. Natl. Cancer Inst.* 70(3): 455-463.

Brown, C.C. and K.C. Chu. 1983c. A new method for the analysis of cohort studies: Implications of the multistage theory of carcinogenesis applied to occupational arsenic exposure. *Environ. Health Perspect.* 50: 293-308.

Enterline, P.E. and G.M. Marsh. 1982. Cancer among workers exposed to arsenic and other substances in a copper smelter. *Am. J. Epidemiol.* 116(6): 895-911.

Higgins, I. 1982. Arsenic and respiratory cancer among a sample of Anaconda smelter workers. Report submitted to the Occupational Safety and Health Administration in the comments of the Kennecott Minerals Company on the inorganic arsenic rulemaking. (Exhibit 203-5)

Lee-Feldstein, A. 1983. Arsenic and respiratory cancer in man: Follow-up of an occupational study. In: *Arsenic: Industrial, Biomedical, and Environmental Perspectives*, W. Lederer and R. Fensterheim, Ed. Van Nostrand Reinhold, New York.)

**MICHIGAN DEPARTMENT OF NATURAL RESOURCES**

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**INTEROFFICE COMMUNICATION**

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June 4, 1992

TO: Arsenic file (CAS# 7440-38-2)

FROM: Gary Butterfield

SUBJECT: Update of the IRSL

Due to the IRSL being based on epidemiology data (a procedure not normally done by DNR), and the fact that the potency was calculated by EPA, it has been decided that it is inappropriate for the Toxics unit to alter the IRSL from the current value of 0.00023  $\mu\text{g}/\text{m}^3$  and a SRSL of 0.0023  $\mu\text{g}/\text{m}^3$  both with annual averaging.

A review of data published since the last review (1/13/88), in order to determine if any significant new data is available, should be conducted. This review should occur at the earliest convenient date.