Chemical Name: Beryllium (soluble salts) Developed by: Bob Heitzman, John Estenik
CAS # 7440-41-7 IRIS Data Retrieval Date: 2-10-98
Internal Code # 17 Fact Sheet Preparation Date: 2-12-98

CRITERIA SUMMARY

Lake Erie Basin			
Tier I HNC (μg/l)		Tier I HCC (μg/l)	
Drinking	Nondrinking	Drinking	Nondrinking
130	1,000	17	130

EXPOSURE AND TOXICITY DATA

Human health trophic level 3 bioaccumulation factor ($BAFHH_{TL3}$) = 19 l/kg (MDEQ)
Human health trophic level 4 bioaccumulation factor ($BAFHH_{TL4}$) = 19 l/kg (MDEQ)
Acceptable daily exposure (ADE) = 5.4E-3 mg/kg/day (IRIS RfD, last revised 02/01/93)
Carcinogen assessment: Class B2; probable human carcinogen (IRIS, last revised 09/01/92)
Cancer slope factor (q_1*) = 4.3 per mg/kg/day (IRIS, last revised 09/01/92)
Body weight of average human (BW) = 70 kg (OAC 3745-1-38)
Relative source contribution factor (RSC) = 0.8 (OAC 3745-1-38)
Per capita water consumption (WC) = 2.0 l/day for drinking water criteria (OAC 3745-1-38)
= 0.01 l/day for nondrinking water criteria (OAC 3745-1-38)
Mean consumption of trophic level three fish (FC_{TL3}) = 0.0036 kg/day (OAC 3745-1-38)
Mean consumption of trophic level four fish (FC_{TL4}) = 0.0114 kg/day (OAC 3745-1-38)

The q_1* was not used to calculate the risk associated dose (RAD) below because it is being re-evaluated. The U.S. EPA human health ambient water quality criteria for beryllium have been withdrawn. Therefore, the RAD was calculated by dividing the ADE by 10 to account for carcinogen potential as was done by U.S. EPA in the calculation of the maximum contaminant level (MCL) for beryllium (57 FR 31776).

Risk associated dose (RAD) = ADE ÷ 10
= 5.4E-3 mg/kg/day ÷ 10
= 5.4E-4 mg/kg/day

REFERENCES

Integrated Risk Information System. USEPA Office of Research and Development, National Center for Environmental Assessment.

Michigan Department of Environmental Quality, Surface Water Quality Division. 1997. Bioaccumulation Factor Worksheet for Beryllium. Verification Date: 4/7/97.

Ohio Administrative Code rule 3745-1-38: Methodologies for Development of Human Health Criteria and Values for the Lake Erie Drainage Basin. Effective 10/31/97.

CALCULATION OF HUMAN NONCARCINOGENIC CRITERION (HNC) [a]

$$HNC = \frac{ADE \times BW \times RSC}{WC + [(FC_{TL3} \times BAFHH_{TL3}) + (FC_{TL4} \times BAFHH_{TL4})]}$$

$$\text{Drinking Water HNC} = \frac{5.4E\text{-}3 \text{ mg/kg/day} \times 70 \text{ kg} \times 0.8}{2.0 \text{ l/day} + [(0.0036 \text{ kg/day} \times 19 \text{ l/kg}) + (0.0114 \text{ kg/day} \times 19 \text{ l/kg})]}$$

$$= 0.13 \text{ mg/l} = 130 \text{ } \mu\text{g/l}$$

$$\text{Nondrinking Water HNC} = \frac{5.4E\text{-}3 \text{ mg/kg/day} \times 70 \text{ kg} \times 0.8}{0.01 \text{ l/day} + [(0.0036 \text{ kg/day} \times 19 \text{ l/kg}) + (0.0114 \text{ kg/day} \times 19 \text{ l/kg})]}$$

$$= 1.0 \text{ mg/l} = 1{,}000 \text{ } \mu\text{g/l}$$

CALCULATION OF HUMAN CARCINOGENIC CRITERION (HCC) [a]

$$HCC = \frac{RAD \times BW}{WC + [(FC_{TL3} \times BAFHH_{TL3}) + (FC_{TL4} \times BAFHH_{TL4})]}$$

$$\text{Drinking Water HCC} = \frac{5.4E\text{-}4 \text{ mg/kg/day} \times 70 \text{ kg}}{2.0 \text{ l/day} + [(0.0036 \text{ kg/day} \times 19 \text{ l/kg}) + (0.0114 \text{ kg/day} \times 19 \text{ l/kg})]}$$

$$= 1.7E\text{-}2 \text{ mg/l} = 17 \text{ } \mu\text{g/l}$$

$$\text{Nondrinking Water HCC} = \frac{5.4E\text{-}4 \text{ mg/kg/day} \times 70 \text{ kg}}{0.01 \text{ l/day} + [(0.0036 \text{ kg/day} \times 19 \text{ l/kg}) + (0.0114 \text{ kg/day} \times 19 \text{ l/kg})]}$$

$$= 1.3E\text{-}1 \text{ mg/l} = 130 \text{ } \mu\text{g/l}$$

[a] See Ohio Administrative Code 3745-1-38 effective October 31, 1997.