MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY
WATER RESOURCES DIVISION
HUMAN & WILDLIFE TOXICITY SUMMARY

Chemical Name:	1,1,1-Trichloroethane	CAS No.:	71-55-6
Derived By:	D. Bush	Literature Review Date:	7/18/12
Reviewed By:	Shannon Briggs	Verification Date:	8/9/2012

	Drinking Water	Nondrinking Water
Surface Water		
HNV (Tier 1)	62,000 ug/L	1,300,000 ug/L
HCV (Tier 1)	NA	NA
Screening Level		
Ground Water		
GW Noncancer		
GW Cancer		

HUMAN HEALTH INTERMEDIATE VALUES:

ADE (RfD)	2.295 mg/kg/d
POTENCY	
HH-BAF-TL_3	4.1 L/kg
HH-BAF-TL_4	6.2 L/kg

WV	NA
WV-BAF-TL_3	
WV-BAF-TL_4	

Comments:

MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY
WATER RESOURCES DIVISION
HUMAN NONCANCER VALUE WORKSHEET

Chemical Name:	1,1,1-Trichloroethane	CAS No.:	71-55-6
Developed By:	D. Bush	Literature Search Date:	7/18/2012
Reviewed By:	Shannon Brijz	Verification Date:	8/9/2012

Key Study: NTP (2000) exposed male and female mice to 1,1,1-trichloroethane via the diet for 90 days. A NOAEL and LOAEL (> 10% body weight decrease) occurred in male and female mice exposed to dietary concentrations of 10,000 ppm and 20,000 ppm, respectively. NTP (2000) calculated NOAEL doses of 1,770 mg/kg and 2,820 mg/kg for male and female mice, respectively. Since it could not be determined if one sex was more sensitive than the other, the arithmetic mean of 1,770 mg/kg and 2,820 mg/kg was used to derive the ADE.

ADE = 2.295 mg/kg/d

$$ADE = \frac{2{,}295\ mg/kg/d}{1{,}000}$$

Where UF = 10x for each intraspecies and interspecies extrapolation. An additional 10x was used to account for subchronic-to-chronic extrapolation and concern for neurological effects.

drinking water

$$HNV = \frac{(2.295\ mg/kg/d) \times (70\ kg) \times (0.8)}{(2\ L/d) + (0.0036\ kg/d \times 4.1\ L/kg) + (0.0114\ kg/d \times 6.2\ L/kg)} = 61{,}627.28\ ug/L$$

HNV for drinking water = 62,000 ug/L

non-drinking water

$$HNV = \frac{(2.295\ mg/kg/d) \times (70\ kg) \times (0.8)}{(0.01\ L/d) + (0.0036\ kg/d \times 4.1\ L/kg) + (0.0114\ kg/d \times 6.2\ L/kg)} = 1{,}346{,}605.1970\ ug/L$$

HNV for non-drinking water = 1,300,000 ug/L

MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY
WATER RESOURCES DIVISION
BIOACCUMULATION FACTOR WORKSHEET

Chemical Name: 1,1,1-Trichloroethane
CAS No. 71-55-6
BAF Derived By: D. Bush
Literature Review Date: 7/18/2012
BAF Reviewed By: Shannon Briggs
Verification Date: 8/9/2012

HH-BAF-TL.3: 4.1 L/kg
WL-BAF-TL.3:
HH-BAF-TL.4: 6.2 L/kg
WL-BAF-TL.4:

I. FIELD BAFs, BSAFs, or LABORATORY BCFs

Ref #	BAF, BSAF, or BCF	Value	Species	Exposure Duration (days)	Tissue Type	Tissue Lipid (%)	Steady State Tissue Conc. ng/g	Water or Sed. (BSAF) Conc. µg/L
1.)	BCF	9	bluegill sunfish	28	whole body	4.8%	N/A	73.4

Final BAF Justification: Even though the BCF is based on a measure of radioactivity, it is used in this assessment because it is the only measured BCF available.

II. LOG Kow VALUES

Ref #	Meas./Calc. Log Kow	Method	Value	Meas./Calc. Log Kow	Method	Value
2.)	Measured	Shake-flask	2.47			
3.)	Measured	Shake-flask	2.49			
4.)	Calculated	CLOGP	2.48			

Final Log Kow: 2.48
Justification: The final Log Kow is the geometric mean of the two measured values.

Food Chain Multipliers
FCM-TL.3: 1.0098
FCM-TL.4: 1.0019

MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY
WATER RESOURCES DIVISION
BIOACCUMULATION FACTOR CALCULATIONS

Assessment/Calculations:

Baseline BAF = (FCM)[(BCF/F_{fd}) -1](1/F_l)

Baseline BAFTL3 = 1.0098[(9/1) - 1](1/0.048) = 168.30
Baseline BAFTL4 = 1.00192[(9/1)-1](1/0.048) = 166.99

Note: F_{fd} = 1 because Log Kow < 4.00

f_{fd} ambient = $1/[1 + (2.4x10^{-7})(10^{logKow})]$
f_{fd} ambient = $1/[1 + (2.4x10^{-7})(10^{2.48})]$
f_{fd} ambiei 0.9999275

HH BAF_{TL3} = [(Baseline BAF_{TL3})(0.0182) +1]($f_{fd\ ambient}$)
HH BAF_{TL3} = [(168.30)(0.0182) +1] (0.9999275)
HH BAF_{TL3} = 4.1

HH BAF_{TL4} = [(Baseline BAF_{TL4})(0.031) + 1](f_{fd} ambient)
HH BAF_{TL4} = [(166.99)(0.0310) +1](0.9999275)
HH BAF_{TL4} = 6.2

References:

1.) Barrows, M.E., S.R. Petrocelli, K.J. Macek, and J.J. Carroll. 1980. Bioconcentration and elimination of selected water pollutants by bluegill sunfish (*Lepomis macrochirus*). In: Dynamics, Exposure, and Hazard Assessment of Toxic Chemicals. R. Haque, ed. Ann Arbor, MI: Ann Arbor Science. 379-92.

2.) Banerjee, S., S.H. Yalkowsky, and S.C. Valvani. 1980. Water solubility and octanol/water partition coefficients of organics: limitations of the solubility-partition coefficient correlation. Environ. Sci. Technol. 14(10):1227-1229.

3.) Hansch, C. and A. Leo. 1979. Substituent Constants for Correlation Analysis in Chemistry and Biology. John Wiley and Sons, N.Y.

4.) USEPA. 1997. ASTER Ecotoxicity Profile, ERL-Duluth.