Rule 57 Aquatic Values Data Sheet

Chemical name: MTBE
CAS #: 1634-04-4

Developed by: D. Bush
Approved by: VER
Approval date: 8/1/08
Literature search date 5/5/2008

FAV: 420,000 ug/L *(Tier 1)*
AMV: 210,000 ug/L *(Tier 1)*
FCV: 32,000 ug/L *(Tier 2)*
Acute CF: ---- *Chronic CF:* ----

ACUTE DATA

Species	Test type (EC or LC50)	Duration (hours)	Test conditions (FT,M, etc.)	Hardness mg/L	Chemical	LC50/EC50 ug/L	SMAV ug/L	GMAV ug/L	Rank	Reference
Water flea	EC50	48	FT,M	127		472,000	472,000	472,000	1	1
(*Daphnia magna*)	EC50	48	S,M	156		170,000*				2
Amphipod (*Hyallela azteca*)	EC50	96	FT,M	20-30		473,000	473,000	473,000	2	1
Snail	EC50	96	FT,M	20-30		559,000	559,000	559,000	3	1
(*Physa gyrina*)	LC50	96	FT,M	20-30		1,036,000**				1
Mayfly (*Hexagenia limbata*)	EC50	96	FT,M	20-30		581,000	581,000	581,000	4	1
Fathead minnow	LC50	96	FT,M			706,000	688,790	688,790	5	3
(*Pimephales promelas*)	LC50	96	FT,M	47.7		672,000				4
Rainbow trout (*Oncorhynchus mykiss*)	LC50	96	S,M	168.3		773,000	773,000	773,000	6	5
Bluegill sunfish	LC50	96	FT,M	20-30		1,054,000	1,054,000	1,054,000	7	1
(*Lepomis macrochirus*)	EC50	96	FT,M	20-30		1,054,000				1
Midge (*Chironomus tentans*)	EC50	48	FT,M	20-30		1,742,000	1,742,000	1,742,000	8	1

* Value not used to derive the SMAV because a FT,M test is a higher priority than a S,M test.
** Value not used to derive an SMAV because an EC50 is a higher priority than an LC50 from the same test.

CHRONIC DATA

Species	Test type (ELS, etc.)	Duration (days)	Study Conditions (FT,M etc.)	Hardness mg/L	NOEC/LOEC ug/L	MATC ug/L	SMCV ug/L	GMCV ug/L	Rank	Reference
Water flea (*Daphnia magna*)	LC	21	FT,M	127	51,000/100,000	71,000	71,000	71,000	1	1
Fathead minnow (*Pimephales promelas*)	ELS	31	FT,M	20-30	299,000/450,000	367,000	367,000	367,000	2	1

References:

1. Wong, D.C.L., W.R. Arnold, G.A. Rausina, et al. 2001. Development of a freshwater aquatic toxicity database for ambient water quality criteria for methyl tertiary-butyl ether. Environ. Toxicol. Chem. 20:1125-1132.

2. ASI Analytical Services Division. 1990. 48-hour Static Acute Toxicity Test for MTBE Using *Daphnia magna*. Prepared for AMOCO Corporation.

3. Veith, G.D., D.J. Call, and L.T. Brooke. 1983. Structure-toxicity relationships for fathead minnow, *Pimephales promelas*: Narcotic industrial chemicals. Can. J. Fish. Aquat. Sci. 40(6):743-748.

4. Geiger, D.L., D.J. Call, and L.T. Brooke.1988. Acute Toxicities of Organic Chemicals to Fathead Minnows (*Pimephales promelas*). Volume IV. Bull. Environ. Contam. Toxicol. 55(4):618-620.

5. Naddafi, K., R. Nabizadeh, and A. Baiggi. 2008. Bioassay of methyl tertiary-butyl ether (MTBE) toxicity on rainbow trout fish. J. Haz. Mat. 154:403-406.

Studies of suitable duration but not used:

Gupta, G. and Y.J. Lin. 1995. Toxicity of methyl tertiary butyl ether to *Daphnia magna* and *Photobacterium phosphoreu* m. Bull. Environ. Contam.

Toxicol. 55:618-620. (Insufficient details of study design, vehicle control? Water quality parameters? Unmeasured test)

Werner, I., C.S., Koger, L.A. Deanovic, and D.E. Hinton. 2001. Toxicity of methyl-*tert*- butyl ether to freshwater organisms. Environ. Poll. 111:83-88. (Secondary reference)

Min. data req. met	Acute Factor
2	13
3	8
4	7
5	6.1
6	5.2
7	4.3

Rule 57 Aquatic Values Work Sheet

Chemical Name: MTBE
C.A.S. #: 1634-04-4

AQUATIC MAXIMUM VALUE CALCULATIONS

A. Minimum 8 species requirement is **not** met. Minimum requirements met = ___
Minimum requirements missing for Tier I =
Acute factor = ____

1. Toxicity **is not** dependent on a water characteristic

   a. FAV calculation

2. Toxicity **is** dependent on a water characteristic

   a. Slope = (Table ___)

   b. FAV equation:

3. Go to C.

B. Minimum 8 species requirement **is** met (Tier I)

1. Toxicity **is not** dependent on a water characteristic

   a. FAV calculation: Att. ___ FAV = 416,526 ug/L = 420,000 ug/L

2. Toxicity **is** dependent on a water characteristic

   a. Slope = (Table ___)

   b. Ranked genus mean acute intercepts: Table

   c. Final acute intercept = (Att. ___)

   ln of final acute intercept =

   d. FAV equation =

C. Aquatic Maximum Value (AMV) calculation:

AMV = 416,526 ug/L ÷ 2 = 208,263 ug/L

AMV = 210,000 ug/L

FINAL CHRONIC VALUE CALCULATIONS

A. Minimum 8 species requirement is **not** met (Tier II). Minimum requirements met = 2
Minimum requirements missing for Tier I = 6

1. Acute to chronic ratio

   a. Number ACRs meeting minimum data requirements = 1 (Table 1)

   b. Acute to chronic ratio = $\sqrt[3]{18 \times 18 \times 6.6479} = 12.9145$

2. Toxicity **is not** dependent on a water characteristic

   FCV = 416,526 ug/L ÷ 12,9145 = 32,253 ug/L

3. Toxicity **is** dependent on a water characteristic = 32,000 ug/L

   a. Slope = (Table _)

   b. Aquatic chronic intercept = (Table _)

   ln of aquatic chronic intercept =

   c. FCV equation =

B. Minimum 8 species requirement **is** met (Tier I)

1. Toxicity **is not** dependent on a water characteristic

   a. FCV = ___ (Att. ___)

2. Toxicity **is** dependent on a water characteristic

   a. Slope = (Table _)

   b. Ranked genus mean chronic intercepts: Table ___

   c. Final chronic intercept = ____ (Att. ___); ln of final chronic intercept =

   d. FCV equation =

Table I. ACR for MTBE

A. Species	B. 48-hour EC50	C. 21-day MATC	B/C ACR
D. magna	472,000 ug/L	71,000 ug/L	6.6479