Rule 57 Aquatic Values Data Sheet

9/18/2006

Chemical or product name: 4-Nitrophenol
Manufacturer (WTAs): -----
C.A.S #: 100-02-7

Developed by: Christopher Hull *FAV*: 1,900 ug/l* *(Tier: II)*
Approved by: D. Bush *AMV*: 940 ug/l* *(Tier: II)*
Approval date: 6/30/08 *FCV*: 200 ug/l* *(Tier: II)*
CAS, AQUIRE: 7/17-18/06 *Acute CF: ----* *Chronic CF: ----*
Clearinghouse search date: 6/20/96

ACUTE DATA

Species	Endpoint (EC or LC50)	Duration (hours)	Test Type (FT,M, etc.)	Hardness mg/L	Test pH (s.u.)	LC50/EC50 ug/L	SMAV ug/L	GMAV ug/L	Rank	Reference
Channel Catfish (*Ictalurus punctatus*)	LC50	96	FT,M	44.9	6.9-7.7	15,000	15,000	15,000	1	1
Water Flea (*Daphnia magna*)	LC50	48	S,U	173.0	7.4-9.4	22,000	22,000	22,000	2	2
Sheepshead Minnow	LC50	96	FT,M	-----	-----	32,000	29,394	29,394	ACR only	3
(*Cyprinodon variegatus*)	LC50	96	FT,M	-----	-----	27,000				4
Fathead Minnow	LC50	96	FT,M	47.8	7.66	58,600	44,338	44,338	3	5
(*Pimephales promelas*)	LC50	96	FT,M	43.2	7.32	41,000				1,5
	LC50	96	FT,M	45.1	7.56	37,300				5
	LC50	96	FT,M	43.3-48.5	-----	59,000				6
	LC50	96	FT,M	43.3-48.5	-----	62,000				6
	LC50	96	FT,M	45	7.8	30,400				7
	LC50	96	FT,M	45	7.8	33,800				7

CHRONIC DATA

Species	Test type (ELS, etc.)	Duration (days)	Study Conditions (FT,M etc.)	Hardness mg/L	Test pH (s.u.)	MATC ug/L	SMCV ug/L	GMCV ug/L	Rank	Reference
Water Flea [1]	LC	21	FT,M	128.4	8.1-8.9	6,299	6,299	6,299	1	8
(*Daphnia magna*)	LC	21	SR,M	128.4	7.7-8.8	7,340 [2]				8
Sheepshead Minnow [3] (*Cyprinodon variegatus*)	ELS	28	FT,M	-----	-----	13,115	13,115	13,115	2	3

*Value rounded to 2 significant figures.

[1] For MATC and ACR calculations, see Table 1.

[2] Value not used to calculate SMCV, because a value derived from a FT,M test is preferred over values from other test types (Rule 57(2)(i)(i)(C)).

[3] For MATC and ACR calculations, see Table 2.

Table 1. MATC & ACR calculations for Daphnia magna tested with 4-Nitrophenol (Ref. # 8), 9/06.

Acute = 48-hr. EC50 = 25,500 ug/l (unsubstantiated).

Chronic:

- FT, M test = 21-day NOEC (reprodn) = 4,350 ug/l; LOEC = 9,120 ug/l; MATC = $\bar{X}_g$ = 6,299 ug/l.
- SR, M test = 21-day NOEC (reprodn) = 5,150 ug/l; LOEC = 10,460 ug/l; MATC = $\bar{X}_g$ = 7,340 ug/l.

ACR: No valid acute value, so no ACR possible.

Table 2. MATC & ACR calculations for Sheepshead Minnow tested with 4-Nitrophenol (Ref. # 3).

Acute: 96-hr. LC50 (FT, M) = 32,000 ug/l.

Chronic: 28-day NOEC (growth, hatchability) = 10,300 ug/l; LOEC = 16,700 ug/l; MATC = $\bar{X}_g$ = 13,115.258 ug/l.

ACR = $\frac{\text{96-hr. LC50, Ref. \#3}}{\text{28-day MATC (Ref. \#3)}} = \frac{32,000 \text{ ug/l}}{13,115.258 \text{ ug/l}} = 2.4399063$.

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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: 4-Nitrophenol
C.A.S. #: 100-02-7

AQUATIC MAXIMUM VALUE CALCULATIONS, 9/06

A. Minimum 8 species requirement is **not** met (Tier II). Minimum requirements met = 3
Minimum requirements missing for Tier I = 5 (i, v, vi, vii, viii).
Acute factor = 8

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

   a. FAV calculation $FAV = \frac{\text{lowest GMAV}}{\text{Acute Factor}} = \frac{15{,}000 \text{ ug/L}}{8} = 1{,}875 \text{ ug/L}$

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. ___

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: $AMV = \frac{FAV}{2} = \frac{1{,}875 \text{ ug/L}}{2} = 937.5 \text{ ug/L}$

4-NITROPHENOL =

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FINAL CHRONIC VALUE CALCULATIONS, 9/06

A. Minimum 8 species requirement is **not** met (Tier II). Minimum requirements met = 0 (GMCV route); 1 (ACR route).
Minimum requirements missing for Tier I = GMCV route: 8; ACR route: 2.

1. Acute to chronic ratio

   a. Number ACRs meeting minimum data requirements = 1 (Table 2)

   b. Acute to chronic ratio = $\bar{X}_g$(SHM ACR, 18, 18) = $\bar{X}_g$(2.4399063, 18, 18) = 9.2464009

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

   FCV = FAV / ACR = 1,875 ug/L / 9.2464009 = 202.7816 ug/L

3. ~~Toxicity is dependent~~ on a water characteristic

   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 =

4-NITROPHENOL REFERENCES, 9/06

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*For abbreviations used, see Appendix.

APPENDIX: REFERENCE ABBREVIATIONS USED, 7/06

AMD = ambient monitoring data.
BCF = bioconcentration factor.
D = data (as a suffix to other abbreviations listed here).
DO = data only (as a suffix to other abbreviations listed here)..
EF = environmental fate.
GWD = groundwater data.
IITM/C = insufficient information on test methods / conditions.
ISD = *in situ* data.
LD = leachate data.
LSER = Linear Solvation Energy Relationship.
MCD = microcosm data.
MIX = mixture (not chemical-specific) test data.
MED = model ecosystem data.
MET = metabolism
MOD = model (theoretical) data / analysis.
NA = not available at this time.
ND = no data (on this chemical).
NIL = not in (MDEQ) Library.
NR = not reviewed.
NUE = no useable endpoint.
O = only (as a suffix to other abbreviations listed here).
PD = phytotoxicity data.
QSAR = Quantitative Structure-Activity Relationship.
RWD = receiving water data.
SD = secondary data.
SED = sediment data or testing.
SW = saltwater.
TATO = test animals too old.
TDI = test duration inappropriate.
TM/CU = test methods / conditions unacceptable.
TONNA = test organisms not North American.
TONS = test organisms not suitable.
UD or UP = uptake data.
WET = whole-effluent testing.