

MINNESOTA POLLUTION CONTROL AGENCY
AQUATIC LIFE CRITERIA

Page 1 SUMMARY

A.	Chemical: PFOS (Lake Calhoun)	CAS# 1763-23-1	Date Aug. 3, 2007
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B. Minnesota Criterion: ug/l (unless noted otherwise)					
Water Class	Use	CC	MC	FAV	Basis ¹
1,2A	DW, Salmonid	12 ng/l	85 ug/l	170 ug/l	PCA Hs
1,2Bd	DW, NonSalmonid	12 ng/l	85 ug/l	170 ug/l	PCA Hs
2B, 2C, 2D	NonSalmonid	12 ng/l	85 ug/l	170 ug/l	PCA Hs
	Other				

Toxicity related to water quality?: no
 If yes, above criteria values determined for:
 Slope: Acute:
 Chronic:

Formulas:	MPCA	EPA
CC:		
MC:		
FAV:		

Notes:

C.	EPA Criterion: ug/l	CCC: none	Basis:
	Date:	MC: none	Basis:
		FAV: none	Basis:

D.	Other Criteria ug/l	Source

E. Notes: The PFOS site-specific criterion for Lake Calhoun is based on BAF information from Lake Calhoun. Lake Calhoun is a class 2B water. The PFOS site-specific criterion for the Mississippi River is based on BAF information collected at pool 3 on the Mississippi River.

¹ Criteria basis codes for part B:
 EPA = From EPA criterion
 PCA = Criterion developed by Minnesota Pollution Control Agency staff
 T1 = Direct aquatic life toxicity, EPA national criteria procedures used
 T2 = Direct aquatic life toxicity, EPA advisory procedures used
 Hs = Human health systemic effects
 Hc = Human health carcinogenic effects
 R = Tissue residue (bioaccumulation)
 W = Wildlife effects
 O = Organoleptic (taste and odor)
 Other = Criterion based on other end point

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Page 2 DIRECT AQUATIC LIFE TOXICITY - EPA Criterion Available

A.	Chemical: PFOS (Lake Calhoun)	CAS# 1763-23-1	Date Aug. 3, 2007
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B.	EPA Criterion: ug/l	CCC: none	Basis:
	Date:	MC: none	Basis:
		FAV: none	Basis:

1.	Related to water quality?:		
2.	Toxicity:	FAV:	N:
	ug/l	Chronic value:	N:
3.	Residue		
	FDA action level:		
	BCF Final:	N total:	N used:
	geo mean at 1% lipid:		
	% lipid:		
	geo man unadjusted for lipid:		

C. MPCA Evaluation of EPA Criterion

1. Four lowest GMAVs:
2. Commercially or recreationally important species:
3. Plant data:
4. Extrapolation of water quality effects:
5. Chronic data No. of values:
 No. below criterion:

Notes:

6. ACRS	ACR used by EPA: none	N:
	Geo. mean, all ACRs: none	N:
	ACR used by MPCA: 9.12	N: 3

Notes: EPA has no surface water criterion for PFOS

D. Separate Cool/Warm Water Criterion, ug/l

No. of Salmonids deleted from lowest 4 GMAVs:
N(nonsal): FAV: MC: CC:
Adjustments to FAV:

Notes:

E. Summary of changes made to EPA criterion:

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Page 3 DIRECT AQUATIC LIFE TOXICITY
No EPA criterion available

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B. EPA National Method			
1. Data requirements:	Salmonid (2A water only):	Oncorhynchus mykiss	
	Osteichthyes (fish):	Pimephales promelas	
	Chordata (fish, amphibian):	Pseudacris crucifer	
	Planktonic crustacean:	Daphnia magna	
	Benthic crustacean:	Hyalella azteca	
	Aquatic insect:		
	Phylum other than Arthropoda or Chordata:	Unio complamatus	
	Second insect or phylum not already rep.:	Lumbriculus variegatus	
2. GMAVs	Lowest 4(2A): See tier II method	Lowest 4(2B,2C, 2D): See tier II method	
ug/l			
	N:	N:	
3. FAV:	2A:	2B, 2C, 2D:	
4. Adjustments to FAVs:			
5. Chronic data:	See table 2a	No.	Species:
mean values			
ug/l			
6. ACR Measured:	Acute value	Chronic value	ACR
	9100	410	22.19
Generic: 18	67,200	35,500	1.90
	Generic		18
Final: 9.12			
7. Final Plant Value: NOEC = 300 ug/l, northern milfoil			
8. Chronic Criterion (FAV/ACR) See tier II method below			

C. EPA Advisory Method			
1. Data requirements:	Fish:	Pimephales promelas	
	Crustacean:	Daphnia magna	
No. SMAVs: 8	Third animal:	Lumbriculus variegatus	
No. GMAVs: 7	Plant for herbicide:		
Factor: 4.3	Insect for pesticide:		
2. Lowest GMAV: 5600 ug/l		Species: Lumbriculus variegatus	
3. FAV: 5600 ug/l/ 4.3, reduced to 170 ug/l		MC: 85	
4. Chronic data: See B.5.			
5. ACR: 9.12 See B.6.			
6. CC: 18.6 ug/l = 19 ug/l			
7. Citation for lowest GMAV: STS-334			

D. Notes: EAO staff lowered the tier II FAV of 1302 ug/l to the project EC50 of 170 ug/l to protect Chironomus tentans. the original Chironomus tentans study only tested up to 150 ug/l PFOS. Thus the EC50 for this study was reported as greater than 150 ug/l. STS consulting extrapolated an estimated EC50 of 170 ug/l

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Page 4 HUMAN HEALTH

A.	Chemical: PFOS (Lake Calhoun)	CAS# 1763-23-1	Date Aug. 3, 2007
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B.	EPA Human Health Criterion: ug/l	DW and fish: none	fish only: none	DW only: none
ADI/Ref.dose: mg/kg/day		Cancer Potency Slope: (mg/kg-d) ⁻¹		
Final BCF:		%lipid:		
RSC:				

C. Minnesota Human Health Criterion				
1. Ref.dose: 0.000075 mg/kg/day		Source: MDH		
RSC: 0.2		Source: MDH		
2. Cancer Potency Slope: (mg/kg-d) ⁻¹		Source:		
3. Measured BAFs: Species/Tissue		BAF	%lipid	Norm BAF
1. Bluegill (fillet)		2802	not applicable	2802
2. White Sucker (fillet)		29	not applicable	29
3.				
4.				
Geo mean: 2854*				
4. Measured BCFs: Species/Tissue		BCF	%lipid	Norm. BCF
1. See table 5a				
2.				
3.				
4.				
5.				
6.				
Geo mean:				
5. Edible portion BAF or BCF		BAF		BCF
Cold water: 6.0 % lipid				
Warm water: 1.5 % lipid				
6. Geo mean unadjusted for lipid:				
7. log Kow: not applicable adjust. for % lipid: not applicable		meas.	QSAR:	Est. BCF:
8. Parachor: not applicable				
9. Food Chain Multiplier: not applicable				
10. Final BAF: 2A: 2802		2B,2C, 2D: 2802		
11. Criteria: ug/l	2A: 12.2 ng/l**	2Bd: 12.2 ng/l **	2B/2C, 2D: 12.4 ng/l #	HRL/HBV: 0.3 ug/l

D.	Organoleptic: ug/l	Source:
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- E. Notes: * EAO staff decided to only use the the bluegill BAF data. The use of the white sucker BAF would have significantly lowered the final BAF.
- F. ** Criterion developed using the default 2L/day water intake and 70 kg body wt as specified in Minn R. ch.7050.
- G. # Criterion developed using 0.01 ml/day incidental ingestion and 70 kg body wt as specified in Minn. R. ch. 7050.