APPENDIX 7B.9

COMPARISON OF SAMPLE STATION CONCENTRATIONS TO TOXICITY BENCHMARKS

TABLE 1
COMPARISON OF SAMPLE STATION CONCENTRATIONS TO TOXICITY BENCHMARKS
AREA AR
INDUSTRI-PLEX SUPERFUND SITE

	Toxicity Benchmarks[1,2]					Sample Location Concentrations[3,4]					
COPCs	SLERA Value	Type	SELs	TECs	PECs	AR01	AR02	AR03	AR04	AR05	AR06
VOCs (mg/kg)											
1,1-Dichloroethane	0.25	SCV	na	na	na						
Benzene	0.53	SQB	na	na	na						
Carbon Disulfide	0.008	SCV	na	na	na						
Xylene, m/p-	0.23	SQB	na	na	na						
Xylene, o-	1.50	SCV	na	na	na						
SVOCs (mg/kg)											
Acenaphthylene	0.41	ERL	na	na	na						
Anthracene	2.06	LEL	34.63	0.54	7.91						
Benzo(a)anthracene	2.99	LEL	138.52	1.01	9.83						
Benzo(a)pyrene	4.02	ERL	134.77	1.40	13.57						
Benzo(b)fluoranthene	2.25	LEL	na	na	na						
Benzo(g,h,i)perylene	1.59	LEL	29.95	na	na						
Benzo(k)fluoranthene	2.25	LEL	125.41	na	na						
Carbazole	na	na	na	na	na						
Chrysene	3.18	LEL	43.05	1.55	12.07						
Dibenz(a,h)anthracene	0.56	LEL	12.17	0.31	na						
Fluoranthene	27.14	SQC	95.46	3.96	20.87						
Fluorene	5.05	SQB	14.97	0.72	5.02						
Indeno(1,2,3-cd)pyrene	1.87	LEL	29.95	na	na						
N-Nitrosodiphenylamine	na	na	na	na	na						
Phenanthrene	7.96	SQC	88.91	1.91	10.95						
Phenol	na	na	na	na	na						
Pyrene	6.18	ERL	79.55	1.83	14.23						
Total PAHs	na	na	935.92	15.07	213.39						
Pesticides (mg/kg)											
4,4'-DDD	0.07	LEL	0.56	0.04	0.26						
4,4'-DDE	0.05	LEL	1.78	0.03	0.29						
4,4'-DDT	0.01	ERL	6.65	0.04	0.59						
alpha-Chlordane	0.07	LEL	0.56	0.03	0.16						
gamma-Chlordane	0.005	ERL	0.56	0.03	0.16						
Inorganics (mg/kg)											
Antimony	2.00	ERL	na	na	na	1.4	1.9	2.0	**20**	1.8	0.55
Arsenic	8.20	ERL	33	9.79	33	**324**	**546**	**296**	**889**	**110**	**16**
Barium	na	na	na	na	na	24	45	26	74	59	29
Beryllium	na	na	na	na	na	1.8	0.54	0.57	1.2	0.63	0.34
Cadmium	1.20	ERL	10	0.99	4.98	**9.1**	**3.1**	**3.0**	**12**	**2.7**	0.68
Chromium	81	ERL	110	43.4	111	18	**188**	**283**	**1,120**	**129**	30
Cobalt	50	LEL	na	na	na	14	6.0	11	20	7.1	5.2
Copper	34	ERL	110	31.6	149	**61**	**232**	**285**	**1,570**	**186**	**67**
Iron	20,000	LEL	40,000	na	na	16,000	**36,800**	18,600	**29,800**	**23,200**	10,600
Lead	47	ERL	250	35.8	128	7.3	**111**	**120**	**558**	**140**	**45**
Manganese	460	LEL	1,110	na	na	309	281	138	402	238	152
Mercury	0.15	ERL	2	0.18	1.06	0.065	**1.8**	**2.8**	**2.4**	**1.3**	0.025
Nickel	21	ERL	75	22.7	49	18	14	15	**26**	**22**	21
Selenium	na	na	na	na	na	5.0	3.9	3.8	20	3.1	1.045
Silver	0.50	LEL	na	na	na	0.21	**7.4**	**4.2**	**4.2**	**19**	**14**
Thallium	na	na	na	na	na	2.0	3.6	2.3	3.5	2.0	1.55
Zinc	150	ERL	820	121	459	**1,850**	**503**	**665**	**1,300**	**391**	**156**
Chromium VI	na	na	na	na	na	0.19	2.0	3.0	12	1.4	0.33

1. Benchmarks for organic COPCs have been adjusted to a site specific TOC concentration of 9.4%.
2. Total PAHs were calculated as the sum of individual concentrations of the listed SVOCs except carbazole, N-nitrosodiphenylamine, and phenol.
3. A blank cell indicates that the COPC was not analyzed.
4. A bolded value indicates that a concentration exceeds the SLERA value or TEC. A shaded and bolded value indicates that a concentration exceeds the SEL or PEC.

COPC - Chemical of Potential Concern
SLERA - Screening Level Ecological Risk Assessment
LEL - Low Effects Limits (OMOE, 1993; OMOE, 1996)
SEL - Severe Effects Limits (OMOE, 1993)
TEC - Threshold Effects Concentrations (MacDonald *et al.,* 2000)
PEC - Probable Effects Concentrations (MacDonald *et al* ., 2000)
ERL - Effects Range Low (Long *et al.,* 1995)
SQC - Sediment Quality Criteria (USEPA, 1996)
SQB - Sediment Quality Benchmark (USEPA, 1996)
SCV - Secondary Chronic Value (Jones *et al.* , 1997)
na - Toxicity benchmark not available

TABLE 2
COMPARISON OF SAMPLE STATION CONCENTRATIONS TO TOXICITY BENCHMARKS
AREA AR DOWNSTREAM
INDUSTRI-PLEX SUPERFUND SITE

	Toxicity Benchmarks[1,2]					Sample Location Concentrations[3,4]
COPCs	SLERA Value	Type	SELs	TECs	PECs	SD-MC-13
VOCs (mg/kg)						
1,1-Dichloroethane	0.38	SCV	na	na	na	0.003
Benzene	0.80	SQB	na	na	na	0.003
Carbon Disulfide	0.012	SCV	na	na	na	0.003
Xylene, m/p-	0.35	SQB	na	na	na	0.006
Xylene, o-	2.24	SCV	na	na	na	0.003
SVOCs (mg/kg)						
Acenaphthylene	0.62	ERL	na	na	na	0.11
Anthracene	3.08	LEL	51.80	0.80	11.83	0.33
Benzo(a)anthracene	4.48	LEL	207.20	1.51	14.70	**1.7**
Benzo(a)pyrene	6.02	ERL	201.60	2.10	20.30	**2.6**
Benzo(b)fluoranthene	3.36	LEL	na	na	na	**3.8**
Benzo(g,h,i)perylene	2.38	LEL	44.80	na	na	1.5
Benzo(k)fluoranthene	3.36	LEL	187.60	na	na	2.3
Carbazole	na	na	na	na	na	0.32
Chrysene	4.76	LEL	64.40	2.32	18.06	**3.0**
Dibenz(a,h)anthracene	0.84	LEL	18.20	0.46	na	**0.53**
Fluoranthene	40.60	SQC	142.80	5.92	31.22	4.7
Fluorene	7.56	SQB	22.40	1.08	7.50	0.12
Indeno(1,2,3-cd)pyrene	2.80	LEL	44.80	na	na	2.2
N-Nitrosodiphenylamine	na	na	na	na	na	0.17
Phenanthrene	11.90	SQC	133.00	2.86	16.38	2.0
Phenol	na	na	na	na	na	0.17
Pyrene	9.24	ERL	119.00	2.73	21.28	**4.1**
Total PAHs	na	na	1400.00	22.54	319.20	**29**
Pesticides (mg/kg)						
4,4'-DDD	0.11	LEL	0.84	0.07	0.39	0.02
4,4'-DDE	0.07	LEL	2.66	0.04	0.43	0.02
4,4'-DDT	0.02	ERL	9.94	0.06	0.88	0.01
alpha-Chlordane	0.10	LEL	0.84	0.04	0.25	0.0004
gamma-Chlordane	0.007	ERL	0.84	0.04	0.25	0.0004
Inorganics (mg/kg)						
Antimony	2.00	ERL	na	na	na	**2.8**
Arsenic	8.20	ERL	33	9.79	33	**339**
Barium	na	na	na	na	na	71
Beryllium	na	na	na	na	na	1.1
Cadmium	1.20	ERL	10	0.99	4.98	**5.3**
Chromium	81	ERL	110	43.4	111	**956**
Cobalt	50	LEL	na	na	na	21
Copper	34	ERL	110	31.6	149	**486**
Iron	20,000	LEL	40,000	na	na	**55,000**
Lead	47	ERL	250	35.8	128	**647**
Manganese	460	LEL	1,110	na	na	**1,150**
Mercury	0.15	ERL	2	0.18	1.06	**3.4**
Nickel	21	ERL	75	22.7	49	**30.6**
Selenium	na	na	na	na	na	2.1
Silver	0.50	LEL	na	na	na	**1.0**
Thallium	na	na	na	na	na	0.26
Zinc	150	ERL	820	121	459	**1,200**
Chromium VI	na	na	na	na	na	10

1. Benchmarks for organic COPCs have been adjusted to a site specific TOC concentration of 14.0%.
2. Total PAHs were calculated as the sum of individual concentrations of the listed SVOCs except carbazole, N-nitrosodiphenylamine, and phenol.
3. A blank cell indicates that the COPC was not analyzed.
4. A bolded value indicates that a concentration exceeds the SLERA value or TEC. A shaded and bolded value indicates that a concentration exceeds the SEL or PEC.

COPC - Chemical of Potential Concern
SLERA - Screening Level Ecological Risk Assessment
LEL - Low Effects Limits (OMOE, 1993; OMOE, 1996)
SEL - Severe Effects Limits (OMOE, 1993)
TEC - Threshold Effects Concentrations (MacDonald *et al.,* 2000)
PEC - Probable Effects Concentrations (MacDonald *et al*., 2000)
ERL - Effects Range Low (Long *et al.,* 1995)
SQC - Sediment Quality Criteria (USEPA, 1996)
SQB - Sediment Quality Benchmark (USEPA, 1996)
SCV - Secondary Chronic Value (Jones *et al.*, 1997)
na - Toxicity benchmark not available

TABLE 3
COMPARISON OF SAMPLE STATION CONCENTRATIONS TO TOXICITY BENCHMARKS
AREA BE-1
INDUSTRI-PLEX SUPERFUND SITE

	Toxicity Benchmarks[1,2]					Sample Location Concentrations[3,4]	
COPCs	SLERA Value	Type	SELs	TECs	PECs	BE01	BE02
VOCs (mg/kg)							
1,1-Dichloroethane	0.43	SCV	na	na	na		
Benzene	0.92	SQB	na	na	na		
Carbon Disulfide	0.014	SCV	na	na	na		
Xylene, m/p-	0.40	SQB	na	na	na		
Xylene, o-	2.57	SCV	na	na	na		
SVOCs (mg/kg)							
Acenaphthylene	0.71	ERL	na	na	na		
Anthracene	3.53	LEL	59.44	0.92	13.57		
Benzo(a)anthracene	5.14	LEL	237.76	1.74	16.87		
Benzo(a)pyrene	6.91	ERL	231.34	2.41	23.29		
Benzo(b)fluoranthene	3.86	LEL	na	na	na		
Benzo(g,h,i)perylene	2.73	LEL	51.41	na	na		
Benzo(k)fluoranthene	3.86	LEL	215.27	na	na		
Carbazole	na	na	na	na	na		
Chrysene	5.46	LEL	73.90	2.67	20.72		
Dibenz(a,h)anthracene	0.96	LEL	20.88	0.53	na		
Fluoranthene	46.59	SQC	163.86	6.80	35.82		
Fluorene	8.68	SQB	25.70	1.24	8.61		
Indeno(1,2,3-cd)pyrene	3.21	LEL	51.41	na	na		
N-Nitrosodiphenylamine	na	na	na	na	na		
Phenanthrene	13.66	SQC	152.62	3.28	18.80		
Phenol	na	na	na	na	na		
Pyrene	10.60	ERL	136.55	3.13	24.42		
Total PAHs	na	na	1606.50	25.86	366.28		
Pesticides (mg/kg)							
4,4'-DDD	0.13	LEL	0.96	0.08	0.45		
4,4'-DDE	0.08	LEL	3.05	0.05	0.50		
4,4'-DDT	0.03	ERL	11.41	0.07	1.01		
alpha-Chlordane	0.11	LEL	0.96	0.05	0.28		
gamma-Chlordane	0.008	ERL	0.96	0.05	0.28		
Inorganics (mg/kg)							
Antimony	2.00	ERL	na	na	na	0.90	1.1
Arsenic	8.20	ERL	33	9.79	33	**13**	**29**
Barium	na	na	na	na	na	43	64
Beryllium	na	na	na	na	na	0.38	0.42
Cadmium	1.20	ERL	10	0.99	4.98	**1.9**	**1.8**
Chromium	81	ERL	110	43.4	111	26	35
Cobalt	50	LEL	na	na	na	6.8	6.9
Copper	34	ERL	110	31.6	149	**60**	**89**
Iron	20,000	LEL	40,000	na	na	10,500	10,300
Lead	47	ERL	250	35.8	128	**143**	**83**
Manganese	460	LEL	1,110	na	na	174	161
Mercury	0.15	ERL	2	0.18	1.06	**0.19**	0.06
Nickel	21	ERL	75	22.7	49	13	18
Selenium	na	na	na	na	na	2.8	2.4
Silver	0.50	LEL	na	na	na	**1.3**	**5.2**
Thallium	na	na	na	na	na	0.90	1.1
Zinc	150	ERL	820	121	459	**489**	**340**
Chromium VI	na	na	na	na	na	0.28	0.37

1. Benchmarks for organic COPCs have been adjusted to a site specific TOC concentration of 16.1%.
2. Total PAHs were calculated as the sum of individual concentrations of the listed SVOCs except carbazole, N-nitrosodiphenylamine, and phenol.
3. A blank cell indicates that the COPC was not analyzed.
4. A bolded value indicates that a concentration exceeds the SLERA value or TEC. A shaded and bolded value indicates that a concentration exceeds the SEL or PEC.

COPC - Chemical of Potential Concern
SLERA - Screening Level Ecological Risk Assessment
LEL - Low Effects Limits (OMOE, 1993; OMOE, 1996)
SEL - Severe Effects Limits (OMOE, 1993)
TEC - Threshold Effects Concentrations (MacDonald *et al.*, 2000)
PEC - Probable Effects Concentrations (MacDonald *et al*., 2000)
ERL - Effects Range Low (Long *et al.*, 1995)
SQC - Sediment Quality Criteria (USEPA, 1996)
SQB - Sediment Quality Benchmark (USEPA, 1996)
SCV - Secondary Chronic Value (Jones *et al.*, 1997)
na - Toxicity benchmark not available

TABLE 4
COMPARISON OF SAMPLE STATION CONCENTRATIONS TO TOXICITY BENCHMARKS
AREA BE-3
INDUSTRI-PLEX SUPERFUND SITE

	Toxicity Benchmarks[1,2]					Sample Location Concentrations[3,4]
COPCs	SLERA Value	Type	SELs	TECs	PECs	BE03
VOCs (mg/kg)						
1,1-Dichloroethane	0.42	SCV	na	na	na	
Benzene	0.89	SQB	na	na	na	
Carbon Disulfide	0.013	SCV	na	na	na	
Xylene, m/p-	0.39	SQB	na	na	na	
Xylene, o-	2.50	SCV	na	na	na	
SVOCs (mg/kg)						
Acenaphthylene	0.69	ERL	na	na	na	
Anthracene	3.43	LEL	57.72	0.89	13.18	
Benzo(a)anthracene	4.99	LEL	230.88	1.68	16.38	
Benzo(a)pyrene	6.71	ERL	224.64	2.34	22.62	
Benzo(b)fluoranthene	3.74	LEL	na	na	na	
Benzo(g,h,i)perylene	2.65	LEL	49.92	na	na	
Benzo(k)fluoranthene	3.74	LEL	209.04	na	na	
Carbazole	na	na	na	na	na	
Chrysene	5.30	LEL	71.76	2.59	20.12	
Dibenz(a,h)anthracene	0.94	LEL	20.28	0.51	na	
Fluoranthene	45.24	SQC	159.12	6.60	34.79	
Fluorene	8.42	SQB	24.96	1.21	8.36	
Indeno(1,2,3-cd)pyrene	3.12	LEL	49.92	na	na	
N-Nitrosodiphenylamine	na	na	na	na	na	
Phenanthrene	13.26	SQC	148.20	3.18	18.25	
Phenol	na	na	na	na	na	
Pyrene	10.30	ERL	132.60	3.04	23.71	
Total PAHs	na	na	1560.00	25.12	355.68	
Pesticides (mg/kg)						
4,4'-DDD	0.12	LEL	0.94	0.07	0.44	
4,4'-DDE	0.08	LEL	2.96	0.05	0.48	
4,4'-DDT	0.02	ERL	11.08	0.06	0.98	
alpha-Chlordane	0.11	LEL	0.94	0.05	0.27	
gamma-Chlordane	0.008	ERL	0.94	0.05	0.27	
Inorganics (mg/kg)						
Antimony	2.00	ERL	na	na	na	1.5
Arsenic	8.20	ERL	33	9.79	33	**88.3**
Barium	na	na	na	na	na	67
Beryllium	na	na	na	na	na	0.62
Cadmium	1.20	ERL	10	0.99	4.98	**3.1**
Chromium	81	ERL	110	43.4	111	**46**
Cobalt	50	LEL	na	na	na	17
Copper	34	ERL	110	31.6	149	**84**
Iron	20,000	LEL	40,000	na	na	**22,500**
Lead	47	ERL	250	35.8	128	**162**
Manganese	460	LEL	1,110	na	na	359
Mercury	0.15	ERL	2	0.18	1.06	**0.40**
Nickel	21	ERL	75	22.7	49	**26**
Selenium	na	na	na	na	na	1.8
Silver	0.50	LEL	na	na	na	**1.3**
Thallium	na	na	na	na	na	1.5
Zinc	150	ERL	820	121	459	**609**
Chromium VI	na	na	na	na	na	0.49

1. Benchmarks for organic COPCs have been adjusted to a site specific TOC concentration of 15.6%.
2. Total PAHs were calculated as the sum of individual concentrations of the listed SVOCs except carbazole, N-nitrosodiphenylamine, and phenol.
3. A blank cell indicates that the COPC was not analyzed.
4. A bolded value indicates that a concentration exceeds the SLERA value or TEC. A shaded and bolded value indicates that a concentration exceeds the SEL or PEC.

COPC - Chemical of Potential Concern
SLERA - Screening Level Ecological Risk Assessment
LEL - Low Effects Limits (OMOE, 1993; OMOE, 1996)
SEL - Severe Effects Limits (OMOE, 1993)
TEC - Threshold Effects Concentrations (MacDonald *et al.,* 2000)
PEC - Probable Effects Concentrations (MacDonald *et al*., 2000)
ERL - Effects Range Low (Long *et al.,* 1995)
SQC - Sediment Quality Criteria (USEPA, 1996)
SQB - Sediment Quality Benchmark (USEPA, 1996)
SCV - Secondary Chronic Value (Jones *et al.*, 1997)
na - Toxicity benchmark not available

TABLE 5
COMPARISON OF SAMPLE STATION CONCENTRATIONS TO TOXICITY BENCHMARKS
AREA BE-2
INDUSTRI-PLEX SUPERFUND SITE

	Toxicity Benchmarks[1,2]					Sample Location Concentrations[3,4]			
COPCs	SLERA Value	Type	SELs	TECs	PECs	BE08	BE09	BE10	BE11
VOCs (mg/kg)									
1,1-Dichloroethane	0.25	SCV	na	na	na				
Benzene	0.53	SQB	na	na	na				
Carbon Disulfide	0.008	SCV	na	na	na				
Xylene, m/p-	0.23	SQB	na	na	na				
Xylene, o-	1.49	SCV	na	na	na				
SVOCs (mg/kg)									
Acenaphthylene	0.41	ERL	na	na	na				
Anthracene	2.05	LEL	34.50	0.53	7.88				
Benzo(a)anthracene	2.98	LEL	138.01	1.01	9.79				
Benzo(a)pyrene	4.01	ERL	134.28	1.40	13.52				
Benzo(b)fluoranthene	2.24	LEL	na	na	na				
Benzo(g,h,i)perylene	1.59	LEL	29.84	na	na				
Benzo(k)fluoranthene	2.24	LEL	124.96	na	na				
Carbazole	na	na	na	na	na				
Chrysene	3.17	LEL	42.90	1.55	12.03				
Dibenz(a,h)anthracene	0.56	LEL	12.12	0.31	na				
Fluoranthene	27.04	SQC	95.12	3.94	20.79				
Fluorene	5.04	SQB	14.92	0.72	5.00				
Indeno(1,2,3-cd)pyrene	1.87	LEL	29.84	na	na				
N-Nitrosodiphenylamine	na	na	na	na	na				
Phenanthrene	7.93	SQC	88.59	1.90	10.91				
Phenol	na	na	na	na	na				
Pyrene	6.15	ERL	79.26	1.82	14.17				
Total PAHs	na	na	932.50	15.01	212.61				
Pesticides (mg/kg)									
4,4'-DDD	0.07	LEL	0.56	0.04	0.26				
4,4'-DDE	0.05	LEL	1.77	0.03	0.29				
4,4'-DDT	0.01	ERL	6.62	0.04	0.59				
alpha-Chlordane	0.07	LEL	0.56	0.03	0.16				
gamma-Chlordane	0.005	ERL	0.56	0.03	0.16				
Inorganics (mg/kg)									
Antimony	2.00	ERL	na	na	na	**2.3**	**3.1**	**2.7**	1.8
Arsenic	8.20	ERL	33	9.79	33	**122**	**375**	**235**	**143**
Barium	na	na	na	na	na	56	79	53	23
Beryllium	na	na	na	na	na	0.86	0.77	0.71	0.65
Cadmium	1.20	ERL	10	0.99	4.98	**5.0**	**3.5**	**2.6**	**3.0**
Chromium	81	ERL	110	43.4	111	**62**	**75**	**50**	**53**
Cobalt	50	LEL	na	na	na	12	15	23	29
Copper	34	ERL	110	31.6	149	**206**	**168**	**134**	**141**
Iron	20,000	LEL	40,000	na	na	**29,900**	**55,600**	**41,700**	13,100
Lead	47	ERL	250	35.8	128	**149**	**181**	**147**	**199**
Manganese	460	LEL	1,110	na	na	290	405	**652**	124
Mercury	0.15	ERL	2	0.18	1.06	**0.16**	**0.17**	**0.19**	0.38
Nickel	21	ERL	75	22.7	49	**25**	**29**	**25**	18
Selenium	na	na	na	na	na	2.4	4.0	2.6	1.9
Silver	0.50	LEL	na	na	na	**1.1**	**1.4**	**0.81**	0.36
Thallium	na	na	na	na	na	1.3	2.7	2.2	0.295
Zinc	150	ERL	820	121	459	**654**	**700**	**596**	**3,200**
Chromium VI	na	na	na	na	na	0.66	0.80	0.53	0.57

1. Benchmarks for organic COPCs have been adjusted to a site specific TOC concentration of 9.3%.
2. Total PAHs were calculated as the sum of individual concentrations of the listed SVOCs except carbazole, N-nitrosodiphenylamine, and phenol.
3. A blank cell indicates that the COPC was not analyzed.
4. A bolded value indicates that a concentration exceeds the SLERA value or TEC. A shaded and bolded value indicates that a concentration exceeds the SEL or PEC.

COPC - Chemical of Potential Concern
SLERA - Screening Level Ecological Risk Assessment
LEL - Low Effects Limits (OMOE, 1993; OMOE, 1996)
SEL - Severe Effects Limits (OMOE, 1993)
TEC - Threshold Effects Concentrations (MacDonald *et al.*, 2000)
PEC - Probable Effects Concentrations (MacDonald *et al.*, 2000)
ERL - Effects Range Low (Long *et al.*, 1995)
SQC - Sediment Quality Criteria (USEPA, 1996)
SQB - Sediment Quality Benchmark (USEPA, 1996)
SCV - Secondary Chronic Value (Jones *et al.*, 1997)
na - Toxicity benchmark not available

TABLE 6
COMPARISON OF SAMPLE STATION CONCENTRATIONS TO TOXICITY BENCHMARKS
AREA HB01 (SHALLOW)
INDUSTRI-PLEX SUPERFUND SITE

	Toxicity Benchmarks[1,2]					Sample Location Concentrations[3,4]					
COPCs	SLERA Value	Type	SELs	TECs	PECs	HB01-01	HB01-02	HB01-03	HB01-04	HB01-05	HB01-06
VOCs (mg/kg)											
1,1-Dichloroethane	0.29	SCV	na	na	na						
Benzene	0.62	SQB	na	na	na						
Carbon Disulfide	0.009	SCV	na	na	na						
Xylene, m/p-	0.27	SQB	na	na	na						
Xylene, o-	1.73	SCV	na	na	na						
SVOCs (mg/kg)											
Acenaphthylene	0.48	ERL	na	na	na						
Anthracene	2.38	LEL	39.96	0.62	9.13						
Benzo(a)anthracene	3.46	LEL	159.84	1.17	11.34						
Benzo(a)pyrene	4.64	ERL	155.52	1.62	15.66						
Benzo(b)fluoranthene	2.59	LEL	na	na	na						
Benzo(g,h,i)perylene	1.84	LEL	34.56	na	na						
Benzo(k)fluoranthene	2.59	LEL	144.72	na	na						
Carbazole	na	na	na	na	na						
Chrysene	3.67	LEL	49.68	1.79	13.93						
Dibenz(a,h)anthracene	0.65	LEL	14.04	0.36	na						
Fluoranthene	31.32	SQC	110.16	4.57	24.08						
Fluorene	5.83	SQB	17.28	0.84	5.79						
Indeno(1,2,3-cd)pyrene	2.16	LEL	34.56	na	na						
N-Nitrosodiphenylamine	na	na	na	na	na						
Phenanthrene	9.18	SQC	102.60	2.20	12.64						
Phenol	na	na	na	na	na						
Pyrene	7.13	ERL	91.80	2.11	16.42						
Total PAHs	na	na	1080.00	17.39	246.24						
Pesticides (mg/kg)											
4,4'-DDD	0.09	LEL	0.65	0.05	0.30						
4,4'-DDE	0.05	LEL	2.05	0.03	0.33						
4,4'-DDT	0.02	ERL	7.67	0.04	0.68						
alpha-Chlordane	0.08	LEL	0.65	0.03	0.19						
gamma-Chlordane	0.005	ERL	0.65	0.03	0.19						
Inorganics (mg/kg)											
Antimony	2.00	ERL	na	na	na	**3.5**	0.46	1.3	**12**	**3.0**	**6.1**
Arsenic	8.20	ERL	33	9.79	33	**271**	**9.9**	**185**	**300**	**53**	**324**
Barium	na	na	na	na	na	29	11	55	134	39	35
Beryllium	na	na	na	na	na	0.22	0.23	0.22	0.22	0.23	0.57
Cadmium	1.20	ERL	10	0.99	4.98	**4.2**	0.23	**12**	**24**	**8.2**	**14**
Chromium	81	ERL	110	43.4	111	**146**	10	**88**	**157**	**208**	**430**
Cobalt	50	LEL	na	na	na	17	3.3	4.8	6.2	4.0	13
Copper	34	ERL	110	31.6	149	**376**	23	**1,370**	**1,840**	**2000**	**646**
Iron	20,000	LEL	40,000	na	na	**23,200**	9,700	11,500	**27,100**	13,900	**41,350**
Lead	47	ERL	250	35.8	128	**220**	11	**60**	**672**	**283**	**292**
Manganese	460	LEL	1,110	na	na	244	80	94	174	117	264
Mercury	0.15	ERL	2	0.18	1.06	**1.1**		**0.62**	**2.7**	**1.1**	**0.68**
Nickel	21	ERL	75	22.7	49	13	5.8	15	10	8.6	17
Selenium	na	na	na	na	na	0.63	0.23	8.4	2.1	1.4	1.6
Silver	0.50	LEL	na	na	na	**0.51**	0.23	0.22	**1.5**	**0.73**	**1.2**
Thallium	na	na	na	na	na	0.43	0.46	0.43	6.5	0.46	0.42
Zinc	150	ERL	820	121	459	**1,050**	84	**3,990**	**1,480**	**267**	**2,350**
Chromium VI	na	na	na	na	na	1.6	0.56	0.95	1.7	2.2	4.6

1. Benchmarks for organic COPCs have been adjusted to a site specific TOC concentration of 10.8%.
2. Total PAHs were calculated as the sum of individual concentrations of the listed SVOCs except carbazole, N-nitrosodiphenylamine, and phenol.
3. A blank cell indicates that the COPC was not analyzed.
4. A bolded value indicates that a concentration exceeds the SLERA value or TEC. A shaded and bolded value indicates that a concentration exceeds the SEL or PEC.

COPC - Chemical of Potential Concern
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LEL - Low Effects Limits (OMOE, 1993; OMOE, 1996)
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SQB - Sediment Quality Benchmark (USEPA, 1996)
SCV - Secondary Chronic Value (Jones *et al.*, 1997)
na - Toxicity benchmark not available

TABLE 6 (Continued)
COMPARISON OF SAMPLE STATION CONCENTRATIONS TO TOXICITY BENCHMARKS
AREA HB01 (SHALLOW)
INDUSTRI-PLEX SUPERFUND SITE

	Toxicity Benchmarks[1,2]					Sample Location Concentrations[3,4]				
COPCs	SLERA Value	Type	SELs	TECs	PECs	HB01-07	HB01-08	HB01-09	HB01-10	SD-MC-06
VOCs (mg/kg)										
1,1-Dichloroethane	0.29	SCV	na	na	na					0.027
Benzene	0.62	SQB	na	na	na					0.003
Carbon Disulfide	0.009	SCV	na	na	na					**0.017**
Xylene, m/p-	0.27	SQB	na	na	na					0.0065
Xylene, o-	1.73	SCV	na	na	na					0.003
SVOCs (mg/kg)										
Acenaphthylene	0.48	ERL	na	na	na					0.08
Anthracene	2.38	LEL	39.96	0.62	9.13					0.26
Benzo(a)anthracene	3.46	LEL	159.84	1.17	11.34					**1.3**
Benzo(a)pyrene	4.64	ERL	155.52	1.62	15.66					1.4
Benzo(b)fluoranthene	2.59	LEL	na	na	na					2.1
Benzo(g,h,i)perylene	1.84	LEL	34.56	na	na					0.76
Benzo(k)fluoranthene	2.59	LEL	144.72	na	na					1.7
Carbazole	na	na	na	na	na					0.16
Chrysene	3.67	LEL	49.68	1.8	13.93					1.8
Dibenz(a,h)anthracene	0.65	LEL	14.04	0.36	na					0.21
Fluoranthene	31.32	SQC	110.16	4.57	24.08					3.4
Fluorene	5.83	SQB	17.28	0.84	5.79					0.15
Indeno(1,2,3-cd)pyrene	2.16	LEL	34.56	na	na					0.94
N-Nitrosodiphenylamine	na	na	na	na	na					0.15
Phenanthrene	9.18	SQC	102.60	2.20	12.64					1.0
Phenol	na	na	na	na	na					0.15
Pyrene	7.13	ERL	91.80	2.11	16.42					**2.6**
Total PAHs	na	na	1080.00	17.39	246.24					**18**
Pesticides (mg/kg)										
4,4'-DDD	0.09	LEL	0.65	0.05	0.30					0.02
4,4'-DDE	0.05	LEL	2.05	0.03	0.33					0.004
4,4'-DDT	0.02	ERL	7.67	0.04	0.68					0.004
alpha-Chlordane	0.08	LEL	0.65	0.03	0.19					**0.09**
gamma-Chlordane	0.005	ERL	0.65	0.03	0.19					**0.09**
Inorganics (mg/kg)										
Antimony	2.00	ERL	na	na	na	0.50	**18**	1.3	0.45	**9.6**
Arsenic	8.20	ERL	33	9.79	33	7.4	**651**	**115**	**47.9**	**273**
Barium	na	na	na	na	na	6.2	118	13	13	49
Beryllium	na	na	na	na	na	0.25	1.1	0.21	0.225	1.0
Cadmium	1.20	ERL	10	0.99	4.98	**1.9**	**35**	**3.0**	**3.0**	**15**
Chromium	81	ERL	110	43.4	111	15	**457**	**54**	34	**790**
Cobalt	50	LEL	na	na	na	2.0	**54**	10	8.5	28
Copper	34	ERL	110	31.6	149	**60**	**917**	**92**	**43**	**824**
Iron	20,000	LEL	40,000	na	na	3,740	**54,600**	**20,100**	11,200	**39,600**
Lead	47	ERL	250	35.8	128	12	**605**	**51**	23	**567**
Manganese	460	LEL	1,110	na	na	34	162	197	186	358
Mercury	0.15	ERL	2	0.18	1.06		**1.7**	0.13	0.06	**2.4**
Nickel	21	ERL	75	22.7	49	4.6	**43**	8.6	6.8	**28**
Selenium	na	na	na	na	na	0.25	5.2	0.45	0.23	2.4
Silver	0.50	LEL	na	na	na	0.25	**1.6**	0.21	0.23	**2.0**
Thallium	na	na	na	na	na	0.50	9.1	0.43	0.45	2.0
Zinc	150	ERL	820	121	459	115	**12,900**	**1,050**	**874**	**3,710**
Chromium VI	na	na	na	na	na	0.16	0.80	0.57	0.36	8.5

1. Benchmarks for organic COPCs have been adjusted to a site specific TOC concentration of 10.8%.
2. Total PAHs were calculated as the sum of individual concentrations of the listed SVOCs except carbazole, N-nitrosodiphenylamine, and phenol.
3. A blank cell indicates that the COPC was not analyzed.
4. A bolded value indicates that a concentration exceeds the SLERA value or TEC. A shaded and bolded value indicates that a concentration exceeds the SEL or PEC.

COPC - Chemical of Potential Concern
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SQC - Sediment Quality Criteria (USEPA, 1996)
SQB - Sediment Quality Benchmark (USEPA, 1996)
SCV - Secondary Chronic Value (Jones *et al.* , 1997)
na - Toxicity benchmark not available

TABLE 7
COMPARISON OF SAMPLE STATION CONCENTRATIONS TO TOXICITY BENCHMARKS
AREA HBHA WETLAND HB02-1
INDUSTRI-PLEX SUPERFUND SITE

	Toxicity Benchmarks[1,2]					Sample Location Concentrations[3,4]					
COPCs	SLERA Value	Type	SELs	TECs	PECs	HB02-01	HB02-02	HB02-03	HB02-04	HB02-05	HB02-06
VOCs (mg/kg)											
1,1-Dichloroethane	0.24	SCV	na	na	na						
Benzene	0.50	SQB	na	na	na						
Carbon Disulfide	0.007	SCV	na	na	na						
Xylene, m/p-	0.22	SQB	na	na	na						
Xylene, o-	1.40	SCV	na	na	na						
SVOCs (mg/kg)											
Acenaphthylene	0.39	ERL	na	na	na						
Anthracene	1.93	LEL	32.38	0.50	7.39						
Benzo(a)anthracene	2.80	LEL	129.50	0.95	9.19						
Benzo(a)pyrene	3.76	ERL	126.00	1.31	12.69						
Benzo(b)fluoranthene	2.10	LEL	na	na	na						
Benzo(g,h,i)perylene	1.49	LEL	28.00	na	na						
Benzo(k)fluoranthene	2.10	LEL	117.25	na	na						
Carbazole	na	na	na	na	na						
Chrysene	2.98	LEL	40.25	1.45	11.29						
Dibenz(a,h)anthracene	0.53	LEL	11.38	0.29	na						
Fluoranthene	25.38	SQC	89.25	3.70	19.51						
Fluorene	4.73	SQB	14.00	0.68	4.69						
Indeno(1,2,3-cd)pyrene	1.75	LEL	28.00	na	na						
N-Nitrosodiphenylamine	na	na	na	na	na						
Phenanthrene	7.44	SQC	83.13	1.79	10.24						
Phenol	na	na	na	na	na						
Pyrene	5.78	ERL	74.38	1.71	13.30						
Total PAHs	na	na	875.00	14.09	199.50						
Pesticides (mg/kg)											
4,4'-DDD	0.07	LEL	0.53	0.04	0.25						
4,4'-DDE	0.04	LEL	1.66	0.03	0.27						
4,4'-DDT	0.01	ERL	6.21	0.04	0.55						
alpha-Chlordane	0.06	LEL	0.53	0.03	0.15						
gamma-Chlordane	0.004	ERL	0.53	0.03	0.15						
Inorganics (mg/kg)											
Antimony	2.00	ERL	na	na	na	**2.8**	**4.2**	**7.4**			
Arsenic	8.20	ERL	33	9.79	33	**550**	**737**	**860**	**641**	**109**	**126**
Barium	na	na	na	na	na	74.9	165	110	76	23	25
Beryllium	na	na	na	na	na	0.82	1.3	2.0	1.5	0.22	0.22
Cadmium	1.20	ERL	10	0.99	4.98	**18**	**29**	**35**	**27**	**3.3**	**5.8**
Chromium	81	ERL	110	43.4	111	**271**	**384**	**566**	**510**	**72**	**87**
Cobalt	50	LEL	na	na	na	31	**55**	**136**	**91**	19	19
Copper	34	ERL	110	31.6	149	**402**	**511**	**1,020**	**809**	**139**	**150**
Iron	20,000	LEL	40,000	na	na	**85,300**	**217,000**	**191,000**	**108,500**	**20,300**	**27,600**
Lead	47	ERL	250	35.8	128	**169**	**264**	**526**	**356**	**69**	**68**
Manganese	460	LEL	1,110	na	na	**1,410**	**3,010**	**3,460**	**1,315**	145	354
Mercury	0.15	ERL	2	0.18	1.06	**0.82**	**0.72**	**1.1**	**1.6**	**0.39**	**0.23**
Nickel	21	ERL	75	22.7	49	**22**	**36**	**55**	**47**	15	13
Selenium	na	na	na	na	na	2.3	3.3	2.4	3.9	1.2	1.1
Silver	0.50	LEL	na	na	na	**0.65**	**1.3**	**1.9**	**1.0**	0.22	0.22
Thallium	na	na	na	na	na	0.45	0.41	0.47			
Zinc	150	ERL	820	121	459	**4,160**	**6,970**	**8,720**	**7,325**	**973**	**1,520**
Chromium VI	na	na	na	na	na	2.9	4.1	0.61	5.5	0.77	0.94

1. Benchmarks for organic COPCs have been adjusted to a site specific TOC concentration of 8.8%.
2. Total PAHs were calculated as the sum of individual concentrations of the listed SVOCs except carbazole, N-nitrosodiphenylamine, and phenol.
3. A blank cell indicates that the COPC was not analyzed.
4. A bolded value indicates that a concentration exceeds the SLERA value or TEC. A shaded and bolded value indicates that a concentration exceeds the SEL or PEC.

COPC - Chemical of Potential Concern
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LEL - Low Effects Limits (OMOE, 1993; OMOE, 1996)
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SCV - Secondary Chronic Value (Jones *et al.*, 1997)
na - Toxicity benchmark not available

TABLE 7 (Continued)
COMPARISON OF SAMPLE STATION CONCENTRATIONS TO TOXICITY BENCHMARKS
AREA HBHA WETLAND HB02-1
INDUSTRI-PLEX SUPERFUND SITE

	Toxicity Benchmarks[1,2]					Sample Location Concentrations[3,4]				
COPCs	SLERA Value	Type	SELs	TECs	PECs	HB02-07	HB02-08	HB02-09	HB02-10	SD-MC-08
VOCs (mg/kg)										
1,1-Dichloroethane	0.24	SCV	na	na	na					0.01
Benzene	0.50	SQB	na	na	na					0.01
Carbon Disulfide	0.007	SCV	na	na	na					**0.013**
Xylene, m/p-	0.22	SQB	na	na	na					0.02
Xylene, o-	1.40	SCV	na	na	na					0.01
SVOCs (mg/kg)										
Acenaphthylene	0.39	ERL	na	na	na					0.17
Anthracene	1.93	LEL	32.38	0.50	7.39					0.22
Benzo(a)anthracene	2.80	LEL	129.50	0.95	9.19					**1.1**
Benzo(a)pyrene	3.76	ERL	126.00	1.31	12.69					**1.4**
Benzo(b)fluoranthene	2.10	LEL	na	na	na					**2.2**
Benzo(g,h,i)perylene	1.49	LEL	28.00	na	na					0.94
Benzo(k)fluoranthene	2.10	LEL	117.25	na	na					1.8
Carbazole	na	na	na	na	na					0.4
Chrysene	2.98	LEL	40.25	1.45	11.29					**2.2**
Dibenz(a,h)anthracene	0.53	LEL	11.38	0.29	na					0.22
Fluoranthene	25.38	SQC	89.25	3.70	19.51					**3.9**
Fluorene	4.73	SQB	14.00	0.68	4.69					0.24
Indeno(1,2,3-cd)pyrene	1.75	LEL	28.00	na	na					1.2
N-Nitrosodiphenylamine	na	na	na	na	na					0.17
Phenanthrene	7.44	SQC	83.13	1.79	10.24					**2.0**
Phenol	na	na	na	na	na					0.12
Pyrene	5.78	ERL	74.38	1.71	13.30					**3.0**
Total PAHs	na	na	875.00	14.09	199.50					**21**
Pesticides (mg/kg)										
4,4'-DDD	0.07	LEL	0.53	0.04	0.25					0.0004
4,4'-DDE	0.04	LEL	1.66	0.03	0.27					0.0004
4,4'-DDT	0.01	ERL	6.21	0.04	0.55					0.0004
alpha-Chlordane	0.06	LEL	0.53	0.03	0.15					0.0004
gamma-Chlordane	0.004	ERL	0.53	0.03	0.15					0.0004
Inorganics (mg/kg)										
Antimony	2.00	ERL	na	na	na					1.8
Arsenic	8.20	ERL	33	9.79	33	**331**	**982**	**1,190**	**1,040**	**594**
Barium	na	na	na	na	na	50	158	160	117	76
Beryllium	na	na	na	na	na	0.66	1.6	1.4	1.8	0.93
Cadmium	1.20	ERL	10	0.99	4.98	**12**	**35**	**30**	**45**	**25**
Chromium	81	ERL	110	43.4	111	**218**	**511**	**406**	**592**	**244**
Cobalt	50	LEL	na	na	na	27	**60**	**82**	**88**	42
Copper	34	ERL	110	31.6	149	**327**	**765**	**605**	**995**	**333**
Iron	20,000	LEL	40,000	na	na	**50,900**	**166,000**	**182,000**	**142,000**	**110,000**
Lead	47	ERL	250	35.8	128	**144**	**335**	**261**	**384**	**129**
Manganese	460	LEL	1,110	na	na	413	**2,170**	**1,570**	**1,610**	**1,580**
Mercury	0.15	ERL	2	0.18	1.06	**0.95**	**1.0**	**0.74**	**1.4**	**0.78**
Nickel	21	ERL	75	22.7	49	20	**39**	**42**	**49**	20
Selenium	na	na	na	na	na	2.4	2.4	2.8	3.5	2.1
Silver	0.50	LEL	na	na	na	0.48	**1.5**	**1.2**	**1.5**	0.41
Thallium	na	na	na	na	na					1
Zinc	150	ERL	820	121	459	**2,580**	**6,660**	**6,030**	**9,980**	**6,340**
Chromium VI	na	na	na	na	na	0.61	5.5	4.4	6.4	2.6

1. Benchmarks for organic COPCs have been adjusted to a site specific TOC concentration of 8.8%.
2. Total PAHs were calculated as the sum of individual concentrations of the listed SVOCs except carbazole, N-nitrosodiphenylamine, and phenol.
3. A blank cell indicates that the COPC was not analyzed.
4. A bolded value indicates that a concentration exceeds the SLERA value or TEC. A shaded and bolded value indicates that a concentration exceeds the SEL or PEC.

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SQC - Sediment Quality Criteria (USEPA, 1996)
SQB - Sediment Quality Benchmark (USEPA, 1996)
SCV - Secondary Chronic Value (Jones *et al.* , 1997)
na - Toxicity benchmark not available

TABLE 8
COMPARISON OF SAMPLE STATION CONCENTRATIONS TO TOXICITY BENCHMARKS
AREA HBHA WETLAND HB02-2
INDUSTRI-PLEX SUPERFUND SITE

	Toxicity Benchmarks[1,2]					Sample Location Concentrations[3,4]						
COPCs	SLERA Value	Type	SELs	TECs	PECs	HB02-11	HB02-12	HB02-13	HB02-14	HB02-15	HB02-16	HB02-17
VOCs (mg/kg)												
1,1-Dichloroethane	0.38	SCV	na	na	na							
Benzene	0.81	SQB	na	na	na							
Carbon Disulfide	0.012	SCV	na	na	na							
Xylene, m/p-	0.36	SQB	na	na	na							
Xylene, o-	2.28	SCV	na	na	na							
SVOCs (mg/kg)												
Acenaphthylene	0.63	ERL	na	na	na							
Anthracene	3.13	LEL	52.63	0.81	12.02							
Benzo(a)anthracene	4.55	LEL	210.52	1.54	14.94							
Benzo(a)pyrene	6.12	ERL	204.83	2.13	20.63							
Benzo(b)fluoranthene	3.41	LEL	na	na	na							
Benzo(g,h,i)perylene	2.42	LEL	45.52	na	na							
Benzo(k)fluoranthene	3.41	LEL	190.61	na	na							
Carbazole	na	na	na	na	na							
Chrysene	4.84	LEL	65.43	2.36	18.35							
Dibenz(a,h)anthracene	0.85	LEL	18.49	0.47	na							
Fluoranthene	41.25	SQC	145.09	6.02	31.72							
Fluorene	7.68	SQB	22.76	1.10	7.62							
Indeno(1,2,3-cd)pyrene	2.84	LEL	45.52	na	na							
N-Nitrosodiphenylamine	na	na	na	na	na							
Phenanthrene	12.09	SQC	135.13	2.90	16.64							
Phenol	na	na	na	na	na							
Pyrene	9.39	ERL	120.91	2.77	21.62							
Total PAHs	na	na	1422.43	22.90	324.31							
Pesticides (mg/kg)												
4,4'-DDD	0.11	LEL	0.85	0.07	0.40							
4,4'-DDE	0.07	LEL	2.70	0.04	0.44							
4,4'-DDT	0.02	ERL	10.10	0.06	0.90							
alpha-Chlordane	0.10	LEL	0.85	0.04	0.25							
gamma-Chlordane	0.007	ERL	0.85	0.04	0.25							
Inorganics (mg/kg)												
Antimony	2.00	ERL	na	na	na	**7.9**	**6.8**	**8.2**	**11**	**8.3**	0.99	**4.9**
Arsenic	8.20	ERL	33	9.79	33	**1,200**	**1,220**	**447**	**1,100**	**492**	**23**	**214**
Barium	na	na	na	na	na	220	227	96	94	61	12	63
Beryllium	na	na	na	na	na	1.3	1.5	1.4	1.5	1.7	0.13	0.93
Cadmium	1.20	ERL	10	0.99	4.98	**15**	**19**	**30**	**8.5**	**13**	0.63	**4.8**
Chromium	81	ERL	110	43.4	111	**253**	**282**	**407**	**356**	**346**	20.8	**129**
Cobalt	50	LEL	na	na	na	**69**	44	**65**	19	16	4.0	11
Copper	34	ERL	110	31.6	149	**285**	**384**	**621**	**368**	**540**	28	**217**
Iron	20,000	LEL	40,000	na	na	**233,000**	**190,000**	**79,200**	**188,000**	**94,600**	9,100	**57,200**
Lead	47	ERL	250	35.8	128	**167**	**200**	**290**	**261**	**339**	31	**426**
Manganese	460	LEL	1,110	na	na	**3,900**	**789**	433	**713**	410	101	287
Mercury	0.15	ERL	2	0.18	1.06	**0.31**	**0.48**	**0.54**	**1.3**	**0.73**	0.07	**1.1**
Nickel	21	ERL	75	22.7	49	**47**	**32**	**48**	**43**	**26**	6.6	**34**
Selenium	na	na	na	na	na	8.7	7.5	5.9	8.7	8.2	1.7	4.3
Silver	0.50	LEL	na	na	na	**1.4**	**1.1**	**1.2**	**0.83**	**0.97**	0.13	**1.4**
Thallium	na	na	na	na	na	18	17	7.7	15	8.6	0.38	4.3
Zinc	150	ERL	820	121	459	**2,330**	**2,580**	**6,040**	**1,180**	**1,740**	**126**	**493**
Chromium VI	na	na	na	na	na	2.7	3.0	4.4	3.8	3.7	0.22	1.4

1. Benchmarks for organic COPCs have been adjusted to a site specific TOC concentration of 14.2%.
2. Total PAHs were calculated as the sum of individual concentrations of the listed SVOCs except carbazole, N-nitrosodiphenylamine, and phenol.
3. A blank cell indicates that the COPC was not analyzed.
4. A bolded value indicates that a concentration exceeds the SLERA value or TEC. A shaded and bolded value indicates that a concentration exceeds the SEL or PEC.

COPC - Chemical of Potential Concern
SLERA - Screening Level Ecological Risk Assessment
LEL - Low Effects Limits (OMOE, 1993; OMOE, 1996)
SEL - Severe Effects Limits (OMOE, 1993)
TEC - Threshold Effects Concentrations (MacDonald *et al.,* 2000)
PEC - Probable Effects Concentrations (MacDonald *et al*., 2000)
ERL - Effects Range Low (Long *et al.,* 1995)
SQC - Sediment Quality Criteria (USEPA, 1996)
SQB - Sediment Quality Benchmark (USEPA, 1996)
SCV - Secondary Chronic Value (Jones *et al.*, 1997)
na - Toxicity benchmark not available

TABLE 9
COMPARISON OF SAMPLE STATION CONCENTRATIONS TO TOXICITY BENCHMARKS
AREA HBHA WETLAND HB03-1
INDUSTRI-PLEX SUPERFUND SITE

	Toxicity Benchmarks[1,2]					Sample Location Concentrations[3,4]				
COPCs	SLERA Value	Type	SELs	TECs	PECs	HB03-01	HB03-02	HB03-03	HB03-05	SD-MC-10
VOCs (mg/kg)										
1,1-Dichloroethane	0.20	SCV	na	na	na					0.01
Benzene	0.42	SQB	na	na	na					0.01
Carbon Disulfide	0.006	SCV	na	na	na					0.005
Xylene, m/p-	0.18	SQB	na	na	na					0.01
Xylene, o-	1.18	SCV	na	na	na					0.01
SVOCs (mg/kg)										
Acenaphthylene	0.32	ERL	na	na	na					0.17
Anthracene	1.62	LEL	27.20	0.42	6.21					0.17
Benzo(a)anthracene	2.35	LEL	108.78	0.79	7.72					0.46
Benzo(a)pyrene	3.16	ERL	105.84	1.10	10.66					0.69
Benzo(b)fluoranthene	1.76	LEL	na	na	na					1.1
Benzo(g,h,i)perylene	1.25	LEL	23.52	na	na					0.48
Benzo(k)fluoranthene	1.76	LEL	98.49	na	na					0.91
Carbazole	na	na	na	na	na					0.17
Chrysene	2.50	LEL	33.81	1.22	9.48					0.96
Dibenz(a,h)anthracene	0.44	LEL	9.56	0.24	na					0.11
Fluoranthene	21.32	SQC	74.97	3.11	16.39					1.5
Fluorene	3.97	SQB	11.76	0.57	3.94					0.17
Indeno(1,2,3-cd)pyrene	1.47	LEL	23.52	na	na					0.56
N-Nitrosodiphenylamine	na	na	na	na	na					0.10
Phenanthrene	6.25	SQC	69.83	1.50	8.60					0.53
Phenol	na	na	na	na	na					0.17
Pyrene	4.85	ERL	62.48	1.43	11.17					1.3
Total PAHs	na	na	735.00	11.83	167.58					9.1
Pesticides (mg/kg)										
4,4'-DDD	0.06	LEL	0.44	0.04	0.21					0.003
4,4'-DDE	0.04	LEL	1.40	0.02	0.23					0.003
4,4'-DDT	0.01	ERL	5.22	0.03	0.46					0.0004
alpha-Chlordane	0.05	LEL	0.44	0.02	0.13					0.0004
gamma-Chlordane	0.004	ERL	0.44	0.02	0.13					0.0004
Inorganics (mg/kg)										
Antimony	2.00	ERL	na	na	na					**2.3**
Arsenic	8.20	ERL	33	9.79	33	**426**	**111**	**265**	**229**	**639**
Barium	na	na	na	na	na	89	22	30	29	74
Beryllium	na	na	na	na	na	0.62	0.21	0.23	0.84	0.90
Cadmium	1.20	ERL	10	0.99	4.98	**11**	**3.0**	**2.8**	**5.6**	**14**
Chromium	81	ERL	110	43.4	111	**207**	**60**	**85**	**424**	**361**
Cobalt	50	LEL	na	na	na	**54**	12	19	17	43
Copper	34	ERL	110	31.6	149	**246**	**86**	**136**	**424**	**356**
Iron	20,000	LEL	40,000	na	na	**65,400**	15,800	**30,100**	**20,900**	**94,800**
Lead	47	ERL	250	35.8	128	**83**	34	**52**	**115**	**116**
Manganese	460	LEL	1,110	na	na	**3,770**	274	**760**	379	**2,300**
Mercury	0.15	ERL	2	0.18	1.06	**1.5**	**0.25**	**0.32**	**1.9**	**1.8**
Nickel	21	ERL	75	22.7	49	20	9.6	13	17	21
Selenium	na	na	na	na	na	1.1	0.85	0.65	3.2	2.5
Silver	0.50	LEL	na	na	na	0.49	0.21	0.23	0.21	0.32
Thallium	na	na	na	na	na					0.21
Zinc	150	ERL	820	121	459	**2,850**	**702**	**545**	**1,320**	**4,040**
Chromium VI	na	na	na	na	na	0.47	0.64	0.91	0.60	3.87

1. Benchmarks for organic COPCs have been adjusted to a site specific TOC concentration of 7.4%.
2. Total PAHs were calculated as the sum of individual concentrations of the listed SVOCs except carbazole, N-nitrosodiphenylamine, and phenol.
3. A blank cell indicates that the COPC was not analyzed.
4. A bolded value indicates that a concentration exceeds the SLERA value or TEC. A shaded and bolded value indicates that a concentration exceeds the SEL or PEC.

COPC - Chemical of Potential Concern
SLERA - Screening Level Ecological Risk Assessment
LEL - Low Effects Limits (OMOE, 1993; OMOE, 1996)
SEL - Severe Effects Limits (OMOE, 1993)
TEC - Threshold Effects Concentrations (MacDonald *et al.,* 2000)
PEC - Probable Effects Concentrations (MacDonald *et al*., 2000)
ERL - Effects Range Low (Long *et al.,* 1995)
SQC - Sediment Quality Criteria (USEPA, 1996)
SQB - Sediment Quality Benchmark (USEPA, 1996)
SCV - Secondary Chronic Value (Jones *et al.*, 1997)
na - Toxicity benchmark not available

TABLE 10
COMPARISON OF SAMPLE STATION CONCENTRATIONS TO TOXICITY BENCHMARKS
AREA HBHA WETLAND HB03-2
INDUSTRI-PLEX SUPERFUND SITE

	Toxicity Benchmarks[1,2]					Sample Location Concentrations[3,4]					
COPCs	SLERA Value	Type	SELs	TECs	PECs	HB03-06	HB03-07	HB03-08	HB03-09	HB03-10	SD-MC-11
VOCs (mg/kg)											
1,1-Dichloroethane	0.29	SCV	na	na	na						0.01
Benzene	0.62	SQB	na	na	na						0.01
Carbon Disulfide	0.009	SCV	na	na	na						0.007
Xylene, m/p-	0.27	SQB	na	na	na						0.01
Xylene, o-	1.74	SCV	na	na	na						0.01
SVOCs (mg/kg)											
Acenaphthylene	0.48	ERL	na	na	na						0.10
Anthracene	2.39	LEL	40.15	0.62	9.17						0.59
Benzo(a)anthracene	3.47	LEL	160.58	1.17	11.39						**4.0**
Benzo(a)pyrene	4.67	ERL	156.24	1.63	15.73						**7.2**
Benzo(b)fluoranthene	2.60	LEL	na	na	na						**10**
Benzo(g,h,i)perylene	1.84	LEL	34.72	na	na						**3.7**
Benzo(k)fluoranthene	2.60	LEL	145.39	na	na						**5.9**
Carbazole	na	na	na	na	na						0.97
Chrysene	3.69	LEL	49.91	1.80	14.00						**9.9**
Dibenz(a,h)anthracene	0.65	LEL	14.11	0.36	na						**1.2**
Fluoranthene	31.47	SQC	110.67	4.59	24.20						**16**
Fluorene	5.86	SQB	17.36	0.84	5.82						0.37
Indeno(1,2,3-cd)pyrene	2.17	LEL	34.72	na	na						**4.9**
N-Nitrosodiphenylamine	na	na	na	na	na						0.17
Phenanthrene	9.22	SQC	103.08	2.21	12.69						**7.0**
Phenol	na	na	na	na	na						0.165
Pyrene	7.16	ERL	92.23	2.12	16.49						**14**
Total PAHs	na	na	1085.00	17.47	247.38						**85**
Pesticides (mg/kg)											
4,4'-DDD	0.09	LEL	0.65	0.05	0.30						0.0004
4,4'-DDE	0.05	LEL	2.06	0.03	0.34						0.0004
4,4'-DDT	0.02	ERL	7.70	0.04	0.68						0.0004
alpha-Chlordane	0.08	LEL	0.65	0.03	0.19						0.0004
gamma-Chlordane	0.005	ERL	0.65	0.03	0.19						0.0004
Inorganics (mg/kg)											
Antimony	2.00	ERL	na	na	na						**3.6**
Arsenic	8.20	ERL	33	9.79	33	**157**	**400**	**499**	**266**	**333**	**1,200**
Barium	na	na	na	na	na	42	109	97.2	96	72.4	129
Beryllium	na	na	na	na	na	0.22	0.85	0.89	0.63	0.46	1.1
Cadmium	1.20	ERL	10	0.99	4.98	**3.5**	**19**	**22**	**15**	**11**	**21**
Chromium	81	ERL	110	43.4	111	**69**	**430**	**621**	**293**	**197**	**477**
Cobalt	50	LEL	na	na	na	11	39	45	35	24	27
Copper	34	ERL	110	31.6	149	**167**	**653**	**917**	**444**	**276**	**527**
Iron	20,000	LEL	40,000	na	na	**20,300**	**73,900**	**52,200**	**44,700**	**53,000**	**138,000**
Lead	47	ERL	250	35.8	128	**178**	**282**	**306**	**209**	**98**	**200**
Manganese	460	LEL	1,110	na	na	298	**1,980**	**1,980**	**2,780**	**1,260**	**1,280**
Mercury	0.15	ERL	2	0.18	1.06	**0.28**	**2.1**	**3.7**	**1.5**		**3.6**
Nickel	21	ERL	75	22.7	49	**25**	**32**	**34**	**27**	20	20
Selenium	na	na	na	na	na	1.9	4.5	4.7	2.9	1.9	3.6
Silver	0.50	LEL	na	na	na	**0.56**	**0.81**	**0.76**	**0.56**	0.21	**0.69**
Thallium	na	na	na	na	na						0.21
Zinc	150	ERL	820	121	459	**741**	**5,020**	**5,300**	**3,520**	**2,520**	**4,900**
Chromium VI	na	na	na	na	na	0.74	4.6	6.7	3.1	2.1	5.1

1. Benchmarks for organic COPCs have been adjusted to a site specific TOC concentration of 10.9%.
2. Total PAHs were calculated as the sum of individual concentrations of the listed SVOCs except carbazole, N-nitrosodiphenylamine, and phenol.
3. A blank cell indicates that the COPC was not analyzed.
4. A bolded value indicates that a concentration exceeds the SLERA value or TEC. A shaded and bolded value indicates that a concentration exceeds the SEL or PEC.

COPC - Chemical of Potential Concern
SLERA - Screening Level Ecological Risk Assessment
LEL - Low Effects Limits (OMOE, 1993; OMOE, 1996)
SEL - Severe Effects Limits (OMOE, 1993)
TEC - Threshold Effects Concentrations (MacDonald *et al.,* 2000)
PEC - Probable Effects Concentrations (MacDonald *et al*., 2000)
ERL - Effects Range Low (Long *et al.,* 1995)
SQC - Sediment Quality Criteria (USEPA, 1996)
SQB - Sediment Quality Benchmark (USEPA, 1996)
SCV - Secondary Chronic Value (Jones *et al.*, 1997)
na - Toxicity benchmark not available

TABLE 11
COMPARISON OF SAMPLE STATION CONCENTRATIONS TO TOXICITY BENCHMARKS
AREA HBHA WETLAND HB03-3
INDUSTRI-PLEX SUPERFUND SITE

	Toxicity Benchmarks[1,2]					Sample Location Concentrations[3,4]							
COPCs	SLERA Value	Type	SELs	TECs	PECs	HB03-04	HB03-11	HB03-12	HB03-13	HB03-14	HB03-15	HB03-16	HB03-17
VOCs (mg/kg)													
1,1-Dichloroethane	0.40	SCV	na	na	na								
Benzene	0.85	SQB	na	na	na								
Carbon Disulfide	0.013	SCV	na	na	na								
Xylene, m/p-	0.37	SQB	na	na	na								
Xylene, o-	2.38	SCV	na	na	na								
SVOCs (mg/kg)													
Acenaphthylene	0.66	ERL	na	na	na								
Anthracene	3.28	LEL	55.13	0.85	12.59								
Benzo(a)anthracene	4.77	LEL	220.51	1.61	15.64								
Benzo(a)pyrene	6.41	ERL	214.55	2.23	21.60								
Benzo(b)fluoranthene	3.58	LEL	na	na	na								
Benzo(g,h,i)perylene	2.53	LEL	47.68	na	na								
Benzo(k)fluoranthene	3.58	LEL	199.65	na	na								
Carbazole	na	na	na	na	na								
Chrysene	5.07	LEL	68.54	2.47	19.22								
Dibenz(a,h)anthracene	0.89	LEL	19.37	0.49	na								
Fluoranthene	43.21	SQC	151.97	6.30	33.23								
Fluorene	8.05	SQB	23.84	1.15	7.99								
Indeno(1,2,3-cd)pyrene	2.98	LEL	47.68	na	na								
N-Nitrosodiphenylamine	na	na	na	na	na								
Phenanthrene	12.66	SQC	141.54	3.04	17.43								
Phenol	na	na	na	na	na								
Pyrene	9.83	ERL	126.64	2.91	22.65								
Total PAHs	na	na	1489.93	23.99	339.70								
Pesticides (mg/kg)													
4,4'-DDD	0.12	LEL	0.89	0.07	0.42								
4,4'-DDE	0.07	LEL	2.83	0.05	0.46								
4,4'-DDT	0.02	ERL	10.58	0.06	0.94								
alpha-Chlordane	0.10	LEL	0.89	0.04	0.26								
gamma-Chlordane	0.007	ERL	0.89	0.04	0.26								
Inorganics (mg/kg)													
Antimony	2.00	ERL	na	na	na		2.0	**7.5**	**6.3**	1.7	**4.7**	**5.8**	**8.1**
Arsenic	8.20	ERL	33	9.79	33	**80**	**236**	**154**	**161**	**40**	**306**	**533**	**340**
Barium	na	na	na	na	na	46	36	88	74	76	112	171	113
Beryllium	na	na	na	na	na	0.23	0.61	0.69	0.86	1.7	0.76	0.99	0.63
Cadmium	1.20	ERL	10	0.99	4.98	**4.1**	**6.7**	**8.5**	**5.2**	**3.2**	**8.7**	**11**	**16**
Chromium	81	ERL	110	43.4	111	**58**	**96**	**288**	**294**	**45**	**128**	**210**	**118**
Cobalt	50	LEL	na	na	na	32	19	22	8.4	5.7	11	**55**	21
Copper	34	ERL	110	31.6	149	**133**	**154.5**	**586**	**374**	**97**	**209**	**286**	**182**
Iron	20,000	LEL	40,000	na	na	15,200	**33,750**	**22,400**	**33,300**	10,200	**35,400**	**100,000**	**78,200**
Lead	47	ERL	250	35.8	128	**66**	**107**	**239**	**300**	**129**	**204**	**212**	**161**
Manganese	460	LEL	1,110	na	na	162	149	**1,100**	329	109	134	**2,580**	**1,480**
Mercury	0.15	ERL	2	0.18	1.06	**0.19**	**0.48**	**1.7**	**1.3**	0.12	**0.18**	**0.45**	**0.30**
Nickel	21	ERL	75	22.7	49	**24**	**23**	**33**	**28**	14.4	**23**	**33**	20
Selenium	na	na	na	na	na	1.0	2.8	4.9	4.6	2.1	4.5	4.4	3.3
Silver	0.50	LEL	na	na	na	**0.67**	0.42	**0.85**	**0.98**	**0.54**	**13.6**	**1.1**	**0.75**
Thallium	na	na	na	na	na		3.0	1.8	1.2	0.30	2.2	6.5	3.6
Zinc	150	ERL	820	121	459	**1,340**	**1,750**	**1,040**	**639**	**200**	**1,340**	**1,930**	**1,420**
Chromium VI	na	na	na	na	na	0.62	1.0	3.1	3.2	0.48	1.4	2.3	1.3

1. Benchmarks for organic COPCs have been adjusted to a site specific TOC concentration of 14.9%.
2. Total PAHs were calculated as the sum of individual concentrations of the listed SVOCs except carbazole, N-nitrosodiphenylamine, and phenol.
3. A blank cell indicates that the COPC was not analyzed.
4. A bolded value indicates that a concentration exceeds the SLERA value or TEC. A shaded and bolded value indicates that a concentration exceeds the SEL or PEC.

COPC - Chemical of Potential Concern
SLERA - Screening Level Ecological Risk Assessment
LEL - Low Effects Limits (OMOE, 1993; OMOE, 1996)
SEL - Severe Effects Limits (OMOE, 1993)
TEC - Threshold Effects Concentrations (MacDonald *et al.,* 2000)
PEC - Probable Effects Concentrations (MacDonald *et al* ., 2000)
ERL - Effects Range Low (Long *et al.,* 1995)
SQC - Sediment Quality Criteria (USEPA, 1996)
SQB - Sediment Quality Benchmark (USEPA, 1996)
SCV - Secondary Chronic Value (Jones *et al.* , 1997)
na - Toxicity benchmark not available

TABLE 12
COMPARISON OF SAMPLE STATION CONCENTRATIONS TO TOXICITY BENCHMARKS
AREA HBHA WETLAND MC-09
INDUSTRI-PLEX SUPERFUND SITE

	Toxicity Benchmarks[1,2]					Sample Location Concentrations[3,4]
COPCs	SLERA Value	Type	SELs	TECs	PECs	SD-MC-09
VOCs (mg/kg)						
1,1-Dichloroethane	0.47	SCV	na	na	na	0.01
Benzene	1.00	SQB	na	na	na	0.04
Carbon Disulfide	0.015	SCV	na	na	na	0.012
Xylene, m/p-	0.44	SQB	na	na	na	0.02
Xylene, o-	2.80	SCV	na	na	na	0.01
SVOCs (mg/kg)						
Acenaphthylene	0.77	ERL	na	na	na	0.32
Anthracene	3.85	LEL	64.75	1.00	14.79	0.32
Benzo(a)anthracene	5.60	LEL	259.00	1.89	18.38	0.75
Benzo(a)pyrene	7.53	ERL	252.00	2.63	25.38	1.1
Benzo(b)fluoranthene	4.20	LEL	na	na	na	1.5
Benzo(g,h,i)perylene	2.98	LEL	56.00	na	na	0.72
Benzo(k)fluoranthene	4.20	LEL	234.50	na	na	1.5
Carbazole	na	na	na	na	na	0.32
Chrysene	5.95	LEL	80.50	2.91	22.58	1.5
Dibenz(a,h)anthracene	1.05	LEL	22.75	0.58	na	0.18
Fluoranthene	50.75	SQC	178.50	7.40	39.03	2.3
Fluorene	9.45	SQB	28.00	1.35	9.38	0.32
Indeno(1,2,3-cd)pyrene	3.50	LEL	56.00	na	na	0.85
N-Nitrosodiphenylamine	na	na	na	na	na	0.32
Phenanthrene	14.88	SQC	166.25	3.57	20.48	0.76
Phenol	na	na	na	na	na	0.32
Pyrene	11.55	ERL	148.75	3.41	26.60	1.9
Total PAHs	na	na	1750.00	28.18	399.00	14.0
Pesticides (mg/kg)						
4,4'-DDD	0.14	LEL	1.05	0.08	0.49	0.001
4,4'-DDE	0.09	LEL	3.33	0.05	0.54	0.001
4,4'-DDT	0.03	ERL	12.43	0.07	1.10	0.001
alpha-Chlordane	0.12	LEL	1.05	0.05	0.31	0.001
gamma-Chlordane	0.009	ERL	1.05	0.05	0.31	0.001
Inorganics (mg/kg)						
Antimony	2.00	ERL	na	na	na	**7.3**
Arsenic	8.20	ERL	33	9.79	33	**802**
Barium	na	na	na	na	na	97
Beryllium	na	na	na	na	na	1.9
Cadmium	1.20	ERL	10	0.99	4.98	**30**
Chromium	81	ERL	110	43.4	111	**641**
Cobalt	50	LEL	na	na	na	**75**
Copper	34	ERL	110	31.6	149	**1,110**
Iron	20,000	LEL	40,000	na	na	**111,000**
Lead	47	ERL	250	35.8	128	**397**
Manganese	460	LEL	1,110	na	na	**2,090**
Mercury	0.15	ERL	2	0.18	1.06	**3.8**
Nickel	21	ERL	75	22.7	49	**44**
Selenium	na	na	na	na	na	5.5
Silver	0.50	LEL	na	na	na	**1.1**
Thallium	na	na	na	na	na	2.1
Zinc	150	ERL	820	121	459	**7,420**
Chromium VI	na	na	na	na	na	6.9

1. Benchmarks for organic COPCs have been adjusted to a site specific TOC concentration of 17.5%.
2. Total PAHs were calculated as the sum of individual concentrations of the listed SVOCs except carbazole, N-nitrosodiphenylamine, and phenol.
3. A blank cell indicates that the COPC was not analyzed.
4. A bolded value indicates that a concentration exceeds the SLERA value or TEC. A shaded and bolded value indicates that a concentration exceeds the SEL or PEC.

COPC - Chemical of Potential Concern
SLERA - Screening Level Ecological Risk Assessment
LEL - Low Effects Limits (OMOE, 1993; OMOE, 1996)
SEL - Severe Effects Limits (OMOE, 1993)
TEC - Threshold Effects Concentrations (MacDonald *et al.,* 2000)
PEC - Probable Effects Concentrations (MacDonald *et al*., 2000)
ERL - Effects Range Low (Long *et al.,* 1995)
SQC - Sediment Quality Criteria (USEPA, 1996)
SQB - Sediment Quality Benchmark (USEPA, 1996)
SCV - Secondary Chronic Value (Jones *et al.*, 1997)
na - Toxicity benchmark not available

TABLE 13
COMPARISON OF SAMPLE STATION CONCENTRATIONS TO TOXICITY BENCHMARKS
HBHA POND DEEP SD-05
INDUSTRI-PLEX SUPERFUND SITE

	Toxicity Benchmarks[1,2]					Sample Location Concentrations[3,4]
COPCs	SLERA Value	Type	SELs	TECs	PECs	SD-MC-05
VOCs (mg/kg)						
1,1-Dichloroethane	0.37	SCV	na	na	na	0.01
Benzene	0.78	SQB	na	na	na	**46**
Carbon Disulfide	0.012	SCV	na	na	na	**0.06**
Vinyl Chloride	na	na	na	na	na	0.01
Xylene, m/p-	0.34	SQB	na	na	na	**2.4**
Xylene, o-	2.20	SCV	na	na	na	0.30
SVOCs (mg/kg)						
2-Methylphenol	0.17	SCV	na	na	na	**0.38**
Acenaphthene	8.53	SQC	na	na	na	0.80
Acenaphthylene	0.61	ERL	na	na	na	0.41
Anthracene	3.03	LEL	50.88	0.79	11.62	**1.2**
Benzo(a)anthracene	4.40	LEL	203.50	1.49	14.44	**4.9**
Benzo(a)pyrene	5.91	ERL	198.00	2.06	19.94	**6.5**
Benzo(b)fluoranthene	3.30	LEL	na	na	na	**10**
Benzo(g,h,i)perylene	2.34	LEL	44.00	na	na	**4.1**
Benzo(k)fluoranthene	3.30	LEL	184.25	na	na	**8.3**
Carbazole	na	na	na	na	na	2.1
Chrysene	4.68	LEL	63.25	2.28	17.74	**10**
Dibenz(a,h)anthracene	0.83	LEL	17.88	0.45	na	**1.1**
Fluoranthene	39.88	SQC	140.25	5.82	30.66	**19**
Fluorene	7.43	SQB	22.00	1.06	7.37	**1.3**
Indeno(1,2,3-cd)pyrene	2.75	LEL	44.00	na	na	**5.2**
Naphthalene	6.60	SQB	na	2.42	7.71	0.83
N-Nitrosodiphenylamine	na	na	na	na	na	0.41
Phenanthrene	11.69	SQC	130.63	2.81	16.09	**10**
Phenol	na	na	na	na	na	0.55
Pyrene	9.08	ERL	116.88	2.68	20.90	**13**
Total PAHs	na	na	1375.00	22.14	313.50	**98**
Pesticides (mg/kg)						
4,4'-DDD	0.11	LEL	0.83	0.07	0.39	0.001
4,4'-DDE	0.07	LEL	2.61	0.04	0.43	0.001
4,4'-DDT	0.02	ERL	9.76	0.06	0.87	0.001
alpha-Chlordane	0.10	LEL	0.83	0.04	0.24	0.001
gamma-Chlordane	0.007	ERL	0.83	0.04	0.24	0.001
Inorganics (mg/kg)						
Antimony	2.00	ERL	na	na	na	**6.3**
Arsenic	8.20	ERL	33	9.79	33	**1,103**
Barium	na	na	na	na	na	149
Beryllium	na	na	na	na	na	1.8
Cadmium	1.20	ERL	10	0.99	4.98	**26**
Chromium	81	ERL	110	43.4	111	**423**
Cobalt	50	LEL	na	na	na	14
Copper	34	ERL	110	31.6	149	**790**
Iron	20,000	LEL	40,000	na	na	**71,500**
Lead	47	ERL	250	35.8	128	**417**
Manganese	460	LEL	1,110	na	na	**719**
Mercury	0.15	ERL	2	0.18	1.06	**1.9**
Nickel	21	ERL	75	22.7	49	**27**
Selenium	na	na	na	na	na	2.2
Silver	0.50	LEL	na	na	na	**1.3**
Thallium	na	na	na	na	na	0.95
Zinc	150	ERL	820	121	459	**3,380**
Chromium VI	na	na	na	na	na	4.5

1. Benchmarks for organic COPCs have been adjusted to a site specific TOC concentration of 13.8%.
2. Total PAHs were calculated as the sum of individual concentrations of the listed SVOCs except carbazole, N-nitrosodiphenylamine, and phenol.
3. A blank cell indicates that the COPC was not analyzed.
4. A bolded value indicates that a concentration exceeds the SLERA value or TEC. A shaded and bolded value indicates that a concentration exceeds the SEL or PEC.

COPC - Chemical of Potential Concern
SLERA - Screening Level Ecological Risk Assessment
LEL - Low Effects Limits (OMOE, 1993; OMOE, 1996)
SEL - Severe Effects Limits (OMOE, 1993)
TEC - Threshold Effects Concentrations (MacDonald *et al.,* 2000)
PEC - Probable Effects Concentrations (MacDonald *et al*., 2000)
ERL - Effects Range Low (Long *et al.,* 1995)
SQC - Sediment Quality Criteria (USEPA, 1996)
SQB - Sediment Quality Benchmark (USEPA, 1996)
SCV - Secondary Chronic Value (Jones *et al.*, 1997)
na - Toxicity benchmark not available

TABLE 14
COMPARISON OF SAMPLE STATION CONCENTRATIONS TO TOXICITY BENCHMARKS
AREA HBHA POND DEEP SD-07
INDUSTRI-PLEX SUPERFUND SITE

COPCs	Toxicity Benchmarks[1,2]					Sample Location Concentrations[3,4]
	SLERA Value	Type	SELs	TECs	PECs	SD-MC-07
VOCs (mg/kg)						
1,1-Dichloroethane	0.30	SCV	na	na	na	0.05
Benzene	0.62	SQB	na	na	na	0.01
Carbon Disulfide	0.009	SCV	na	na	na	**0.02**
Vinyl Chloride	na	na	na	na	na	0.01
Xylene, m/p-	0.27	SQB	na	na	na	0.02
Xylene, o-	1.75	SCV	na	na	na	0.01
SVOCs (mg/kg)						
2-Methylphenol	0.13	SCV	na	na	na	**0.22**
Acenaphthene	6.79	SQC	na	na	na	0.15
Acenaphthylene	0.48	ERL	na	na	na	0.22
Anthracene	2.41	LEL	40.52	0.63	9.25	0.41
Benzo(a)anthracene	3.50	LEL	162.06	1.18	11.50	**2.2**
Benzo(a)pyrene	4.71	ERL	157.68	1.64	15.88	**3.0**
Benzo(b)fluoranthene	2.63	LEL	na	na	na	**5.5**
Benzo(g,h,i)perylene	1.86	LEL	35.04	na	na	1.7
Benzo(k)fluoranthene	2.63	LEL	146.73	na	na	**3.4**
Carbazole	na	na	na	na	na	0.67
Chrysene	3.72	LEL	50.37	1.82	14.13	**4.9**
Dibenz(a,h)anthracene	0.66	LEL	14.24	0.36	na	**0.47**
Fluoranthene	31.76	SQC	111.69	4.63	24.42	**8.3**
Fluorene	5.91	SQB	17.52	0.85	5.87	0.33
Indeno(1,2,3-cd)pyrene	2.19	LEL	35.04	na	na	**2.4**
Naphthalene	5.26	SQB	na	1.93	6.14	0.22
N-Nitrosodiphenylamine	na	na	na	na	na	0.15
Phenanthrene	9.31	SQC	104.03	2.23	12.81	**4.1**
Phenol	na	na	na	na	na	0.22
Pyrene	7.23	ERL	93.08	2.14	16.64	**6.5**
Total PAHs	na	na	1095.00	17.63	249.66	**44**
Pesticides (mg/kg)						
4,4'-DDD	0.09	LEL	0.66	0.05	0.31	0.001
4,4'-DDE	0.05	LEL	2.08	0.03	0.34	0.001
4,4'-DDT	0.02	ERL	7.77	0.04	0.69	0.001
alpha-Chlordane	0.08	LEL	0.66	0.03	0.19	0.001
gamma-Chlordane	0.005	ERL	0.66	0.03	0.19	0.001
Inorganics (mg/kg)						
Antimony	2.00	ERL	na	na	na	**3.6**
Arsenic	8.20	ERL	33	9.79	33	**2,390**
Barium	na	na	na	na	na	119
Beryllium	na	na	na	na	na	1.4
Cadmium	1.20	ERL	10	0.99	4.98	**20.9**
Chromium	81	ERL	110	43.4	111	**476**
Cobalt	50	LEL	na	na	na	20
Copper	34	ERL	110	31.6	149	**571**
Iron	20,000	LEL	40,000	na	na	**116,000**
Lead	47	ERL	250	35.8	128	**421**
Manganese	460	LEL	1,110	na	na	**891**
Mercury	0.15	ERL	2	0.18	1.06	**1.4**
Nickel	21	ERL	75	22.7	49	**30**
Selenium	na	na	na	na	na	2.5
Silver	0.50	LEL	na	na	na	**1.2**
Thallium	na	na	na	na	na	0.82
Zinc	150	ERL	820	121	459	**3,310**
Chromium VI	na	na	na	na	na	5.1

1. Benchmarks for organic COPCs have been adjusted to a site specific TOC concentration of 11.0%.
2. Total PAHs were calculated as the sum of individual concentrations of the listed SVOCs except carbazole, N-nitrosodiphenylamine, and phenol.
3. A blank cell indicates that the COPC was not analyzed.
4. A bolded value indicates that a concentration exceeds the SLERA value or TEC. A shaded and bolded value indicates that a concentration exceeds the SEL or PEC.

COPC - Chemical of Potential Concern
SLERA - Screening Level Ecological Risk Assessment
LEL - Low Effects Limits (OMOE, 1993; OMOE, 1996)
SEL - Severe Effects Limits (OMOE, 1993)
TEC - Threshold Effects Concentrations (MacDonald *et al.,* 2000)
PEC - Probable Effects Concentrations (MacDonald *et al*., 2000)
ERL - Effects Range Low (Long *et al.,* 1995)
SQC - Sediment Quality Criteria (USEPA, 1996)
SQB - Sediment Quality Benchmark (USEPA, 1996)
SCV - Secondary Chronic Value (Jones *et al.*, 1997)
na - Toxicity benchmark not available

TABLE 15
COMPARISON OF SAMPLE STATION CONCENTRATIONS TO TOXICITY BENCHMARKS
REFERENCE RIVER
INDUSTRI-PLEX SUPERFUND SITE

	Toxicity Benchmarks[1,2]					Sample Location Concentrations[3,4]					
COPCs	SLERA Value	Type	SELs	TECs	PECs	SD-01-00-IP	SD-01-00-IP-TR	SD-04-00-IP	SD-04-00-IP-TR	SD-12-00-IP	SD-23-01-FW
VOCs (mg/kg)											
1,1-Dichloroethane	0.27	SCV	na	na	na	0.01		0.01	0.02	0.01	0.01
Benzene	0.58	SQB	na	na	na	0.01		0.01	0.02	0.01	0.01
Carbon Disulfide	0.009	SCV	na	na	na	0.005		0.007	**0.016**	0.009	0.009
Xylene, m/p-	0.25	SQB	na	na	na	0.01		0.01	0.02	0.02	
Xylene, o-	1.63	SCV	na	na	na	0.01		0.01	0.02	0.01	
SVOCs (mg/kg)											
Acenaphthylene	0.45	ERL	na	na	na	0.15	0.19	0.20	0.22	0.19	0.30
Anthracene	2.23	LEL	37.58	0.58	8.58	0.15	0.19	0.32	0.22	0.38	0.30
Benzo(a)anthracene	3.25	LEL	150.34	1.10	10.67	0.64	0.21	**1.5**	0.22	**1.4**	0.30
Benzo(a)pyrene	4.37	ERL	146.27	1.52	14.73	0.81	0.25	**2.1**	0.22	**1.9**	0.30
Benzo(b)fluoranthene	2.44	LEL	na	na	na	0.92	0.31	**3.0**	0.21	2.1	0.30
Benzo(g,h,i)perylene	1.73	LEL	32.51	na	na	0.50	0.19	1.4	0.22	1.1	0.30
Benzo(k)fluoranthene	2.44	LEL	136.12	na	na	0.84	0.19	2.2	0.22	2.0	0.30
Carbazole	na	na	na	na	na	0.15	0.19	0.22	0.22	0.17	0.30
Chrysene	3.45	LEL	46.73	1.69	13.10	1.1	0.25	**2.6**	0.22	**2.1**	0.30
Dibenz(a,h)anthracene	0.61	LEL	13.21	0.34	na	0.11	0.19	**0.35**	0.22	0.32	0.30
Fluoranthene	29.46	SQC	103.61	4.30	22.65	1.5	0.40	3.7	0.23	3.1	0.07
Fluorene	5.49	SQB	16.25	0.79	5.44	0.15	0.19	0.16	0.22	0.19	0.30
Indeno(1,2,3-cd)pyrene	2.03	LEL	32.51	na	na	0.53	0.19	1.8	0.22	1.4	0.30
N-Nitrosodiphenylamine	na	na	na	na	na	0.15	0.19	0.2	0.22	0.16	0.30
Phenanthrene	8.63	SQC	96.50	2.07	11.88	0.85	0.22	1.6	0.22	1.5	0.30
Phenol	na	na	na	na	na	0.15	0.19	0.20	0.22	0.16	0.30
Pyrene	6.70	ERL	86.34	1.98	15.44	1.7	0.44	**3.4**	0.22	**2.9**	0.08
Total PAHs	na	na	1015.79	16.35	231.60	10	3.4	**24**	3.2	**21**	4.1
Pesticides (mg/kg)											
4,4'-DDD	0.08	LEL	0.61	0.05	0.28	**0.20**	0.01	0.03	0.002	0.01	**0.06**
4,4'-DDE	0.05	LEL	1.93	0.03	0.31	**0.47**	0.01	0.0005	0.002	0.0004	0.01
4,4'-DDT	0.02	ERL	7.21	0.04	0.64	**0.18**	0.003	0.0005	0.002	0.0004	0.003
alpha-Chlordane	0.07	LEL	0.61	0.03	0.18	0.0004	0.001	0.0005	0.001	0.0004	0.002
gamma-Chlordane	0.005	ERL	0.61	0.03	0.18	0.0004	0.001	0.0005	0.001	0.0004	0.002
Inorganics (mg/kg)											
Antimony	2.00	ERL	na	na	na	0.81	1.4	1.2	**5.6**	0.71	0.74
Arsenic	8.20	ERL	33	9.79	33	**12**	**28**	**33**	**45**	**23**	5.2
Barium	na	na	na	na	na	59	96	108	173	71	5.7
Beryllium	na	na	na	na	na	0.39	0.71	0.71	0.87	0.52	0.10
Cadmium	1.20	ERL	10	0.99	4.98	0.50	**2.2**	**6.1**	**5.2**	**1.2**	0.09
Chromium	81	ERL	110	43.4	111	12	28	**311**	**512**	**198**	29
Cobalt	50	LEL	na	na	na	6.4	8.3	21	22	9.2	0.76
Copper	34	ERL	110	31.6	149	**32**	**71**	**290**	**344**	**36**	1.9
Iron	20,000	LEL	40,000	na	na	11,700	19,400	**36,400**	**51,600**	17,800	2,040
Lead	47	ERL	250	35.8	128	**188**	**252**	**49**	**369**	**153**	6.5
Manganese	460	LEL	1,110	na	na	396	225	**1,520**	**1,980**	**1,180**	13
Mercury	0.15	ERL	2	0.18	1.06	**0.31**	0.03	**0.60**	0.08	**0.42**	0.07
Nickel	21	ERL	75	22.7	49	9.2	17	**26**	**26**	11	1.1
Selenium	na	na	na	na	na	0.94	0.50	1.5	0.50	1.2	0.45
Silver	0.50	LEL	na	na	na	0.09	0.50	**0.75**	0.50	0.20	0.22
Thallium	na	na	na	na	na	0.18	0.55	0.31	0.55	0.25	0.5
Zinc	150	ERL	820	121	459	**131**	**282**	**590**	**611**	**234**	12
Chromium VI	na	na	na	na	na	0.13	0.30	3.3		2.1	0.31

1. Benchmarks for organic COPCs have been adjusted to a site specific TOC concentration of 10.2%.
2. Total PAHs were calculated as the sum of individual concentrations of the listed SVOCs except carbazole, N-nitrosodiphenylamine, and phenol.
3. A blank cell indicates that the COPC was not analyzed.
4. A bolded value indicates that a concentration exceeds the SLERA value or TEC. A shaded and bolded value indicates that a concentration exceeds the SEL or PEC.

COPC - Chemical of Potential Concern
SLERA - Screening Level Ecological Risk Assessment
LEL - Low Effects Limits (OMOE, 1993; OMOE, 1996)
SEL - Severe Effects Limits (OMOE, 1993)
TEC - Threshold Effects Concentrations (MacDonald *et al.,* 2000)
PEC - Probable Effects Concentrations (MacDonald *et al*., 2000)
ERL - Effects Range Low (Long *et al.,* 1995)
SQC - Sediment Quality Criteria (USEPA, 1996)
SQB - Sediment Quality Benchmark (USEPA, 1996)
SCV - Secondary Chronic Value (Jones *et al.*, 1997)
na - Toxicity benchmark not available

TABLE 15 (Continued)
COMPARISON OF SAMPLE STATION CONCENTRATIONS TO TOXICITY BENCHMARKS
REFERENCE RIVER
INDUSTRI-PLEX SUPERFUND SITE

	Toxicity Benchmarks[1,2]					Sample Location Concentrations[3,4]				
COPCs	SLERA Value	Type	SELs	TECs	PECs	SD-23-02-FW	SD-23-03-FW	SD-27-01-FW	SD-27-02-FW	SD-27-03-FW
VOCs (mg/kg)										
1,1-Dichloroethane	0.27	SCV	na	na	na	0.01		0.01	0.01	0.01
Benzene	0.58	SQB	na	na	na	0.01		0.01	0.01	0.01
Carbon Disulfide	0.009	SCV	na	na	na	0.007		0.007	0.007	0.003
Xylene, m/p-	0.25	SQB	na	na	na					
Xylene, o-	1.63	SCV	na	na	na					
SVOCs (mg/kg)										
Acenaphthylene	0.45	ERL	na	na	na	0.45		0.24	0.35	0.22
Anthracene	2.23	LEL	37.58	0.58	8.58	0.53		**0.99**	0.30	0.22
Benzo(a)anthracene	3.25	LEL	150.34	1.10	10.67	**1.8**		**2.4**	**1.5**	0.52
Benzo(a)pyrene	4.37	ERL	146.27	1.52	14.73	**1.7**		0.93	0.83	0.31
Benzo(b)fluoranthene	2.44	LEL	na	na	na	2.3		1.5	0.95	0.37
Benzo(g,h,i)perylene	1.73	LEL	32.51	na	na	0.23		0.24	0.21	0.22
Benzo(k)fluoranthene	2.44	LEL	136.12	na	na	2.1		1.5	1.4	0.54
Carbazole	na	na	na	na	na	0.23		0.52	0.13	0.22
Chrysene	3.45	LEL	46.73	1.69	13.10	**2.0**		**2.0**	1.4	0.51
Dibenz(a,h)anthracene	0.61	LEL	13.21	0.34	na	0.23		0.21	0.21	0.22
Fluoranthene	29.46	SQC	103.61	4.30	22.65	3.1		**5.5**	3.4	1.3
Fluorene	5.49	SQB	16.25	0.79	5.44	0.34		0.62	0.18	0.22
Indeno(1,2,3-cd)pyrene	2.03	LEL	32.51	na	na	0.23		0.45	0.50	0.16
N-Nitrosodiphenylamine	na	na	na	na	na	0.23		0.24	0.21	0.22
Phenanthrene	8.63	SQC	96.50	2.07	11.88	**3.0**		**4.5**	1.5	0.73
Phenol	na	na	na	na	na	0.23		0.24	0.21	0.22
Pyrene	6.70	ERL	86.34	1.98	15.44	**3.6**		**3.4**	**2.4**	0.45
Total PAHs	na	na	1015.79	16.35	231.60	**22**		25	15	6.2
4,4'-DDD	0.08	LEL	0.61	0.05	0.28	**0.08**		0.01	0.01	0.01
4,4'-DDE	0.05	LEL	1.93	0.03	0.31	0.02		0.006	0.004	0.005
4,4'-DDT	0.02	ERL	7.21	0.04	0.64	0.02		0.015	0.01	0.006
alpha-Chlordane	0.07	LEL	0.61	0.03	0.18	0.002		0.006	0.01	0.006
gamma-Chlordane	0.005	ERL	0.61	0.03	0.18	0.0003		**0.006**	**0.006**	**0.006**
Inorganics (mg/kg)										
Antimony	2.00	ERL	na	na	na	0.23	1.7	0.32	0.22	0.56
Arsenic	8.20	ERL	33	9.79	33	**18**	**15**	6.8	5.1	4.1
Barium	na	na	na	na	na	21	26	31	17	21.8
Beryllium	na	na	na	na	na	0.31	1.0	0.21	0.20	0.15
Cadmium	1.20	ERL	10	0.99	4.98	0.10	0.90	0.40	0.03	0.08
Chromium	81	ERL	110	43.4	111	22	14	9.0	13	15
Cobalt	50	LEL	na	na	na	3.2	1.9	5.8	3.5	4.9
Copper	34	ERL	110	31.6	149	9.5	9.0	8.1	7.1	6.8
Iron	20,000	LEL	40,000	na	na	9,220	3,500	7,640	7,990	7,710
Lead	47	ERL	250	35.8	128	20	5.6	18	28	21
Manganese	460	LEL	1,110	na	na	91	133	297	247	183
Mercury	0.15	ERL	2	0.18	1.06	0.07		0.01	0.005	0.01
Nickel	21	ERL	75	22.7	49	8.3	3.6	6.6	8.8	10
Selenium	na	na	na	na	na	0.28	3.0	0.40	0.27	0.29
Silver	0.50	LEL	na	na	na	0.14		0.20	0.14	0.15
Thallium	na	na	na	na	na	0.33		0.47	0.31	0.34
Zinc	150	ERL	820	121	459	31	10	60	33	112
Chromium VI	na	na	na	na	na	0.24	0.15	0.10	0.14	0.16

1. Benchmarks for organic COPCs have been adjusted to a site specific TOC concentration of 10.2%.
2. Total PAHs were calculated as the sum of individual concentrations of the listed SVOCs except carbazole, N-nitrosodiphenylamine, and phenol.
3. A blank cell indicates that the COPC was not analyzed.
4. A bolded value indicates that a concentration exceeds the SLERA value or TEC. A shaded and bolded value indicates that a concentration exceeds the SEL or PEC.

COPC - Chemical of Potential Concern
SLERA - Screening Level Ecological Risk Assessment
LEL - Low Effects Limits (OMOE, 1993; OMOE, 1996)
SEL - Severe Effects Limits (OMOE, 1993)
TEC - Threshold Effects Concentrations (MacDonald *et al.,* 2000)
PEC - Probable Effects Concentrations (MacDonald *et al* ., 2000)
ERL - Effects Range Low (Long *et al.,* 1995)
SQC - Sediment Quality Criteria (USEPA, 1996)
SQB - Sediment Quality Benchmark (USEPA, 1996)
SCV - Secondary Chronic Value (Jones *et al.* , 1997)
na - Toxicity benchmark not available

TABLE 16
COMPARISON OF SAMPLE STATION CONCENTRATIONS TO TOXICITY BENCHMARKS
REFERENCE WETLAND
INDUSTRI-PLEX SUPERFUND SITE

	Toxicity Benchmarks[1,2]					Sample Location Concentrations[3,4]					
COPCs	SLERA Value	Type	SELs	TECs	PECs	SD-24-01-FW	SD-24-02-FW	SD-24-03-FW	SD-24-03-ME	SD-HB-00-TR	SD-SA-01-TR
VOCs (mg/kg)											
1,1-Dichloroethane	0.57	SCV	na	na	na	0.01	0.01	0.01	0.03	0.02	0.01
Benzene	1.20	SQB	na	na	na	0.01	0.01	0.01	0.005	0.02	0.01
Carbon Disulfide	0.018	SCV	na	na	na	0.007	0.007	0.007		0.015	0.008
Xylene, m/p-	0.53	SQB	na	na	na				0.01	0.02	0.01
Xylene, o-	3.36	SCV	na	na	na				0.01	0.02	0.01
SVOCs (mg/kg)											
Acenaphthylene	0.92	ERL	na	na	na	0.06	0.8	0.21	0.04	0.23	0.12
Anthracene	4.62	LEL	77.70	1.20	17.75	0.10	**1.9**	0.05	0.25	0.23	0.12
Benzo(a)anthracene	6.72	LEL	310.80	2.27	22.05	0.44	**5.9**	0.52	0.96	0.23	0.11
Benzo(a)pyrene	9.03	ERL	302.40	3.15	30.45	0.4	**5.5**	0.35	0.79	0.23	0.13
Benzo(b)fluoranthene	5.04	LEL	na	na	na	0.74	**10**	1.1	0.88	0.23	0.18
Benzo(g,h,i)perylene	3.57	LEL	67.20	na	na	0.23	0.92	0.21	0.55	0.23	0.12
Benzo(k)fluoranthene	5.04	LEL	281.40	na	na	0.69	**9.6**	1.1	0.40	0.23	0.12
Carbazole	na	na	na	na	na	0.23	0.99	0.05		0.23	0.12
Chrysene	7.14	LEL	96.60	3.49	27.09	0.55	**7.3**	0.52	0.92	0.23	0.14
Dibenz(a,h)anthracene	1.26	LEL	27.30	0.69	na	0.23	0.5	0.21	0.12	0.23	0.12
Fluoranthene	60.90	SQC	214.20	8.88	46.83	0.88	**15**	0.84	2.6	0.23	0.21
Fluorene	11.34	SQB	33.60	1.63	11.26	0.09	**2.8**	0.04	0.13	0.23	0.12
Indeno(1,2,3-cd)pyrene	4.20	LEL	67.20	na	na	0.23	1.7	0.21	0.62	0.23	0.12
N-Nitrosodiphenylamine	na	na	na	na	na	0.23	1.05	0.21		0.23	0.12
Phenanthrene	17.85	SQC	199.50	4.28	24.57	0.46	**12**	0.29	1.3	0.23	0.17
Phenol	na	na	na	na	na	0.23	1.1	0.21		0.23	0.12
Pyrene	13.86	ERL	178.50	4.10	31.92	0.68	**11**	0.87	2.4	0.23	0.28
Total PAHs	na	na	2100.00	33.81	478.80	6.0	**85**	6.7	12	3.5	2.1
Pesticides (mg/kg)											
4,4'-DDD	0.17	LEL	1.26	0.10	0.59	0.04	0.10	0.04	**0.39**	0.002	0.005
4,4'-DDE	0.11	LEL	3.99	0.07	0.65	0.01	0.01	0.02	0.04	0.002	0.004
4,4'-DDT	0.03	ERL	14.91	0.09	1.32	0.02	**0.13**	0.03	0.02	0.002	0.002
alpha-Chlordane	0.15	LEL	1.26	0.06	0.37	0.001	0.001	0.01	0.002	0.001	0.0005
gamma-Chlordane	0.011	ERL	1.26	0.06	0.37	0.001	0.002	0.005	0.004	0.001	0.0005
Inorganics (mg/kg)											
Antimony	2.00	ERL	na	na	na	0.24	0.50	0.70	1.2	0.77	1.1
Arsenic	8.20	ERL	33	9.79	33	3.8	4.8	**41**	**31**	**16**	**27**
Barium	na	na	na	na	na	13	16	67	44	59	88
Beryllium	na	na	na	na	na	0.10	0.11	1.2	0.80	0.73	1.0
Cadmium	1.20	ERL	10	0.99	4.98	0.24	0.22	0.96	**2.0**	**2.9**	**1.5**
Chromium	81	ERL	110	43.4	111	10	17	**277**	**410**	18	42
Cobalt	50	LEL	na	na	na	1.9	2.6	8.2	12	12	13
Copper	34	ERL	110	31.6	149	20	12	**85**	**130**	**38**	**58**
Iron	20,000	LEL	40,000	na	na	4,790	6,720	**20,900**	13,200	**23,300**	**24,200**
Lead	47	ERL	250	35.8	128	**81**	**74**	**581**	**566**	**233**	**456**
Manganese	460	LEL	1,110	na	na	50	68	230	131	58	263
Mercury	0.15	ERL	2	0.18	1.06	0.03	0.02	**0.70**	**0.71**	0.01	**0.20**
Nickel	21	ERL	75	22.7	49	6.0	7.2	**26**	**24**	**27**	**23**
Selenium	na	na	na	na	na	0.30	0.24	2.1	0.91	0.50	0.50
Silver	0.50	LEL	na	na	na	0.15	0.12	**2.9**	**2.5**	0.50	0.50
Thallium	na	na	na	na	na	0.35	0.28	1.0	0.06	0.55	0.55
Zinc	150	ERL	820	121	459	48	47	**129**	**251**	**207**	**246**
Chromium VI	na	na	na	na	na	0.11	0.18	3.0	4.4	0.20	0.45

1. Benchmarks for organic COPCs have been adjusted to a site specific TOC concentration of 21.0%.
2. Total PAHs were calculated as the sum of individual concentrations of the listed SVOCs except carbazole, N-nitrosodiphenylamine, and phenol.
3. A blank cell indicates that the COPC was not analyzed.
4. A bolded value indicates that a concentration exceeds the SLERA value or TEC. A shaded and bolded value indicates that a concentration exceeds the SEL or PEC.

COPC - Chemical of Potential Concern
SLERA - Screening Level Ecological Risk Assessment
LEL - Low Effects Limits (OMOE, 1993; OMOE, 1996)
SEL - Severe Effects Limits (OMOE, 1993)
TEC - Threshold Effects Concentrations (MacDonald *et al.,* 2000)
PEC - Probable Effects Concentrations (MacDonald *et al*., 2000)
ERL - Effects Range Low (Long *et al.,* 1995)
SQC - Sediment Quality Criteria (USEPA, 1996)
SQB - Sediment Quality Benchmark (USEPA, 1996)
SCV - Secondary Chronic Value (Jones *et al.*, 1997)
na - Toxicity benchmark not available

TABLE 17
COMPARISON OF SAMPLE STATION CONCENTRATIONS TO TOXICITY BENCHMARKS
REFERENCE POND
INDUSTRI-PLEX SUPERFUND SITE

	Toxicity Benchmarks[1,2]					Sample Location Concentrations[3,4]				
COPCs	SLERA Value	Type	SELs	TECs	PECs	SD-02-00-IP	SD-03-00-IP	SD-03-00-IP-TR	SD-25-01-FW	SD-25-02-FW
VOCs (mg/kg)										
1,1-Dichloroethane	0.23	SCV	na	na	na	0.01	0.004		0.01	0.01
Benzene	0.49	SQB	na	na	na	0.01	0.004		0.01	0.01
Carbon Disulfide	0.007	SCV	na	na	na	0.01	0.004		**0.009**	**0.010**
Vinyl Chloride	na	na	na	na	na	0.01	0.004		0.01	0.01
Xylene, m/p-	0.22	SQB	na	na	na	0.03	0.01			
Xylene, o-	1.38	SCV	na	na	na	0.01	0.004			
SVOCs (mg/kg)										
2-Methylphenol	0.10	SCV	na	na	na	**0.50**	**0.17**	**0.19**	**0.30**	**1.6**
Acenaphthene	5.33	SQC	na	na	na	0.50	0.11	0.19	0.30	1.55
Acenaphthylene	0.38	ERL	na	na	na	**0.50**	**0.39**	0.19	0.30	**1.6**
Anthracene	1.89	LEL	31.83	0.49	7.27	**0.50**	0.44	0.19	0.30	**1.6**
Benzo(a)anthracene	2.75	LEL	127.33	0.93	9.03	0.50	**2.1**	0.19	0.51	**4.9**
Benzo(a)pyrene	3.70	ERL	123.89	1.29	12.48	0.50	**3.3**	0.19	0.41	**5.1**
Benzo(b)fluoranthene	2.06	LEL	na	na	na	0.50	**4.9**	0.18	0.48	**5.8**
Benzo(g,h,i)perylene	1.46	LEL	27.53	na	na	0.50	**1.7**	0.19	0.19	**2.2**
Benzo(k)fluoranthene	2.06	LEL	115.29	na	na	0.50	**3.2**	0.19	0.63	**6.7**
Carbazole	na	na	na	na	na	0.50	0.37	0.19	0.30	1.6
Chrysene	2.93	LEL	39.58	1.43	11.10	0.50	**4.4**	0.19	0.50	**5.4**
Dibenz(a,h)anthracene	0.52	LEL	11.18	0.28	na	**0.50**	**0.53**	0.19	**0.30**	**1.1**
Fluoranthene	24.95	SQC	87.76	3.64	19.19	0.50	**6.4**	0.22	1.0	**11**
Fluorene	4.65	SQB	13.77	0.67	4.61	0.50	0.21	0.19	0.30	**1.6**
Indeno(1,2,3-cd)pyrene	1.72	LEL	27.53	na	na	0.50	**2.4**	0.19	0.27	**3.7**
Naphthalene	4.13	SQB	na	1.51	4.83	0.50	0.16	0.19	0.30	**1.6**
N-Nitrosodiphenylamine	na	na	na	na	na	0.50	0.17	0.19	0.30	1.55
Phenanthrene	7.31	SQC	81.73	1.76	10.07	0.50	**3.3**	0.19	0.45	**3.1**
Phenol	na	na	na	na	na	0.50	0.17	0.19	0.30	1.6
Pyrene	5.68	ERL	73.13	1.68	13.08	0.50	**6.1**	0.23	0.38	**8.1**
Total PAHs	na	na	860.36	13.85	196.16	8.0	**40**	3.0	6.6	**65**
Pesticides (mg/kg)										
4,4'-DDD	0.069	LEL	0.52	0.04	0.24	0.03	**0.10**	0.001	0.02	0.02
4,4'-DDE	0.043	LEL	1.63	0.03	0.27	0.01	**0.04**	0.002	0.02	0.02
4,4'-DDT	0.014	ERL	6.11	0.04	0.54	0.001	**0.03**	0.001	**0.02**	0.006
alpha-Chlordane	0.060	LEL	0.52	0.03	0.15	0.001	0.0004	0.001	0.01	0.0084
gamma-Chlordane	0.004	ERL	0.52	0.03	0.15	0.001	0.0004	0.001	**0.01**	**0.01**
Inorganics (mg/kg)										
Antimony	2.00	ERL	na	na	na	1.4	0.93	1.50	0.42	1.7
Arsenic	8.20	ERL	33	9.79	33	**30**	**21**	**34**	6.0	**16**
Barium	na	na	na	na	na	81	90	155	27	51
Beryllium	na	na	na	na	na	1.1	0.95	1.3	0.35	0.52
Cadmium	1.20	ERL	10	0.99	4.98	**2.9**	**2.8**	**4.1**	0.04	0.8
Chromium	81	ERL	110	43.4	111	**155**	**46**	**71**	23	**61**
Cobalt	50	LEL	na	na	na	12	13	19	7.6	9.9
Copper	34	ERL	110	31.6	149	**66**	**75**	**125**	**35**	**94**
Iron	20,000	LEL	40,000	na	na	**25,500**	**20,300**	**27,700**	16,400	19,000
Lead	47	ERL	250	35.8	128	**197**	**153**	**259**	**328**	**755**
Manganese	460	LEL	1,110	na	na	**837**	383	423	115	175
Mercury	0.15	ERL	2	0.18	1.06	**0.35**	**0.26**	0.09	**0.20**	**0.55**
Nickel	21	ERL	75	22.7	49	20	**24**	**32**	13	17
Selenium	na	na	na	na	na	1.2	0.88	0.50	0.55	3.2
Silver	0.50	LEL	na	na	na	0.47	**0.90**	0.50	0.27	0.34
Thallium	na	na	na	na	na	0.23	0.28	0.55	0.60	2.2
Zinc	150	ERL	820	121	459	**377**	**457**	**645**	63	**307**
Chromium VI	na	na	na	na	na	1.7	0.50	0.76	0.24	0.65

1. Benchmarks for organic COPCs have been adjusted to a site specific TOC concentration of 8.6%.
2. Total PAHs were calculated as the sum of individual concentrations of the listed SVOCs except carbazole, N-nitrosodiphenylamine, and phenol.
3. A blank cell indicates that the COPC was not analyzed.
4. A bolded value indicates that a concentration exceeds the SLERA value or TEC. A shaded and bolded value indicates that a concentration exceeds the SEL or PEC.

COPC - Chemical of Potential Concern
SLERA - Screening Level Ecological Risk Assessment
LEL - Low Effects Limits (OMOE, 1993; OMOE, 1996)
SEL - Severe Effects Limits (OMOE, 1993)
TEC - Threshold Effects Concentrations (MacDonald *et al.,* 2000)
PEC - Probable Effects Concentrations (MacDonald *et al*., 2000)
ERL - Effects Range Low (Long *et al.,* 1995)
SQC - Sediment Quality Criteria (USEPA, 1996)
SQB - Sediment Quality Benchmark (USEPA, 1996)
SCV - Secondary Chronic Value (Jones *et al.* , 1997)
na - Toxicity benchmark not available

TABLE 17 (Continued)
COMPARISON OF SAMPLE STATION CONCENTRATIONS TO TOXICITY BENCHMARKS
REFERENCE POND
INDUSTRI-PLEX SUPERFUND SITE

	Toxicity Benchmarks[1,2]					Sample Location Concentrations[3,4]				
COPCs	SLERA Value	Type	SELs	TECs	PECs	SD-25-02-ME	SD-25-03-FW	SD-26-01-FW	SD-26-02-FW	SD-26-03-FW
VOCs (mg/kg)										
1,1-Dichloroethane	0.23	SCV	na	na	na	0.02	0.01	0.01	0.01	0.01
Benzene	0.49	SQB	na	na	na	0.004	0.01	0.01	0.01	0.01
Carbon Disulfide	0.007	SCV	na	na	na		0.01	**0.009**	0.003	**0.009**
Vinyl Chloride	na	na	na	na	na	0.02	0.01	0.01	0.01	0.01
Xylene, m/p-	0.22	SQB	na	na	na	0.01				
Xylene, o-	1.38	SCV	na	na	na	0.01				
SVOCs (mg/kg)										
2-Methylphenol	0.10	SCV	na	na	na		**0.21**	**0.28**	**0.22**	**0.30**
Acenaphthene	5.33	SQC	na	na	na	0.07	0.21	0.28	0.22	0.30
Acenaphthylene	0.38	ERL	na	na	na	0.02	0.21	0.28	0.22	0.30
Anthracene	1.89	LEL	31.83	0.49	7.27	0.33	0.22	0.28	0.22	0.30
Benzo(a)anthracene	2.75	LEL	127.33	0.93	9.03	**1.3**	**0.99**	0.28	0.22	0.30
Benzo(a)pyrene	3.70	ERL	123.89	1.29	12.48	**1.3**	0.71	0.28	0.22	0.30
Benzo(b)fluoranthene	2.06	LEL	na	na	na	1.5	0.92	0.19	0.15	0.18
Benzo(g,h,i)perylene	1.46	LEL	27.53	na	na	0.65	0.21	0.28	0.22	0.30
Benzo(k)fluoranthene	2.06	LEL	115.29	na	na	0.74	0.75	0.28	0.22	0.30
Carbazole	na	na	na	na	na		0.20	0.28	0.22	0.30
Chrysene	2.93	LEL	39.58	1.43	11.10	1.40	0.80	0.28	0.22	0.30
Dibenz(a,h)anthracene	0.52	LEL	11.18	0.28	na	0.22	0.13	0.28	0.22	**0.30**
Fluoranthene	24.95	SQC	87.76	3.64	19.19	2.5	1.9	0.25	0.19	0.21
Fluorene	4.65	SQB	13.77	0.67	4.61	0.12	0.21	0.28	0.22	0.30
Indeno(1,2,3-cd)pyrene	1.72	LEL	27.53	na	na	0.67	0.41	0.28	0.22	0.30
Naphthalene	4.13	SQB	na	1.51	4.83	0.03	0.21	0.28	0.22	0.30
N-Nitrosodiphenylamine	na	na	na	na	na		0.21	0.28	0.22	0.30
Phenanthrene	7.31	SQC	81.73	1.76	10.07	1.6	1.10	0.28	0.22	0.30
Phenol	na	na	na	na	na		0.21	0.28	0.22	0.30
Pyrene	5.68	ERL	73.13	1.68	13.08	**2.3**	1.3	0.28	0.22	0.30
Total PAHs	na	na	860.36	13.85	196.16	**15**	9.6	4.4	3.4	4.5
Pesticides (mg/kg)										
4,4'-DDD	0.069	LEL	0.52	0.04	0.24	0.01	0.01	0.06	0.02	0.02
4,4'-DDE	0.043	LEL	1.63	0.03	0.27	0.004	0.01	**0.05**	0.01	0.01
4,4'-DDT	0.014	ERL	6.11	0.04	0.54	0.002	0.011	**0.03**	**0.018**	**0.015**
alpha-Chlordane	0.060	LEL	0.52	0.03	0.15	0.001	0.01	0.01	0.01	0.01
gamma-Chlordane	0.004	ERL	0.52	0.03	0.15	0.001	**0.006**	**0.007**	0.001	**0.01**
Inorganics (mg/kg)										
Antimony	2.00	ERL	na	na	na	0.64	0.84	0.40	0.81	0.70
Arsenic	8.20	ERL	33	9.79	33	5.4	2.5	**9.4**	4.8	5.0
Barium	na	na	na	na	na	49	18	73	44	36
Beryllium	na	na	na	na	na	0.37	0.23	0.51	0.26	0.33
Cadmium	1.20	ERL	10	0.99	4.98	0.78	0.02	0.12	0.02	0.04
Chromium	81	ERL	110	43.4	111	26	13	33	21	8.9
Cobalt	50	LEL	na	na	na	8.1	6.1	8.0	6.0	3.7
Copper	34	ERL	110	31.6	149	**53**	18	**43**	17	10
Iron	20,000	LEL	40,000	na	na	14,700	11,200	17,100	12,500	8,810
Lead	47	ERL	250	35.8	128	**210**	**55**	**103**	**25**	**43**
Manganese	460	LEL	1,110	na	na	190	87	315	224	134
Mercury	0.15	ERL	2	0.18	1.06	0.10	0.08	0.01	0.01	0.04
Nickel	21	ERL	75	22.7	49	15	8.7	19	13	5.9
Selenium	na	na	na	na	na	0.24	0.30	0.50	0.30	0.40
Silver	0.50	LEL	na	na	na	0.20	0.12	0.25	0.15	0.20
Thallium	na	na	na	na	na	0.07	1.0	0.60	0.45	0.47
Zinc	150	ERL	820	121	459	**178**	35	83	44	45
Chromium VI	na	na	na	na	na	0.28	0.14	0.35	0.22	0.10

1. Benchmarks for organic COPCs have been adjusted to a site specific TOC concentration of 8.6%.
2. Total PAHs were calculated as the sum of individual concentrations of the listed SVOCs except carbazole, N-nitrosodiphenylamine, and phenol.
3. A blank cell indicates that the COPC was not analyzed.
4. A bolded value indicates that a concentration exceeds the SLERA value or TEC. A shaded and bolded value indicates that a concentration exceeds the SEL or PEC.

COPC - Chemical of Potential Concern
SLERA - Screening Level Ecological Risk Assessment
LEL - Low Effects Limits (OMOE, 1993; OMOE, 1996)
SEL - Severe Effects Limits (OMOE, 1993)
TEC - Threshold Effects Concentrations (MacDonald *et al.,* 2000)
PEC - Probable Effects Concentrations (MacDonald *et al*., 2000)
ERL - Effects Range Low (Long *et al.,* 1995)
SQC - Sediment Quality Criteria (USEPA, 1996)
SQB - Sediment Quality Benchmark (USEPA, 1996)
SCV - Secondary Chronic Value (Jones *et al.* , 1997)
na - Toxicity benchmark not available

TABLE 18. PEC QUOTIENTS

Station:	PEC	MC-01	MC-02	MC-03	MC-04	MC-12	MC-05	MC-06	MC-07	MC-08	MC-09	MC-10	MC-11	MC-13
	Concentration (mg/kg)													
As	33	28	30	34	45	23	1103	273	2390	594	802	639	1200	339
Cd	5	2.2	2.9	4.1	6.1	1.2	26	15	20.9	25	30	14	21	5.3
Cr	111	28	155	71	512	198	423	790	476	244	641	361	477	956
Cu	149	71	66	125	344	36	790	824	571	333	1110	356	527	486
Pb	128	252	197	259	369	153	417	567	421	129	397	116	200	647
Hg	1.06	0.31	0.35	0.26	0.6	0.42	1.9	2.4	1.4	0.78	3.8	1.8	3.6	3.4
Ni	17	17	20	32	26	11	27	28	30	20	44	21	20	30.6
Zn	439	282	377	645	611	234	3380	3710	3310	6340	7420	4040	4900	1200

Station:		MC-01	MC-02	MC-03	MC-04	MC-12	MC-05	MC-06	MC-07	MC-08	MC-09	MC-10	MC-11	MC-13
		Quotients												
As		1	1	1	1	1	33	8	72	18	24	19	36	10
Cd		0	1	1	1	0	5	3	4	5	6	3	4	1
Cr		0	1	1	5	2	4	7	4	2	6	3	4	9
Cu		0	0	1	2	0	5	6	4	2	7	2	4	3
Pb		2	2	2	3	1	3	4	3	1	3	1	2	5
Hg		0	0	0	1	0	2	2	1	1	4	2	3	3
Zn		1	1	1	1	1	8	8	8	14	17	9	11	3
Total		5	6	7	14	5	60	39	97	44	67	40	65	34
Mean PEC Quotient		0.7	0.9	1.0	2.0	0.7	8.6	5.6	13.8	6.2	9.6	5.7	9.2	4.9

Notes:

PEC - Probable Effects Concentration (MacDonald et al., 2000)

Quotients = (Sediment concentration)/(PEC)

APPENDIX 7B.10

HYALELLA AZTECA, 10-DAY ACUTE TOXICITY TESTS

Aquatec Biological Sciences

Ecology | Environmental Toxicology | Natural Resource Assessments | Microbiology

SEP - 1

August 25, 1999

Charles Menzie, Ph.D.
Menzie-Cura & Associates, Inc.
1 Courthouse Lane, Suite 2
Chelmsford, Massachusetts 01824

Dear Dr. Menzie:

Enclosed please find one unbound copy of the report of *Hyalella azteca* 10-day survival and growth tests completed on samples received for the Industriplex project.

If you have any questions regarding the report, please contact me or Dr. Philip C. Downey.

Sincerely,

John Williams
Manager, Environmental Toxicology
clbtr3152.doc

75 Green Mountain Drive, South Burlington, Vt. 05403 Tel: 802.860.1638 Fax: 802.658.3189

Results of *Hyalella azteca* Survival and Growth Toxicity Tests

Reference BTRs 3152, 3153, 3169, 3189, 3196

Prepared for:
Menzie-Cura & Associates
1 Courthouse Lane, Suite 2
Chelmsford, MA 01824

August 1999

Aquatec Biological Sciences

Ecology | Environmental Toxicology | Natural Resource Assessments | Microbiology

BTRS 3152, 3153, 3169, 3189, 3196

PROJECT: 99026

I have reviewed this data package, which was completed under my supervision. This data package is complete, and to the best of my ability, accurately reflects the conditions and the results of the reported tests.

John W. Williams
Toxicity Laboratory Manager

8/25/99
Date

I have reviewed and discussed this data package with the responsible laboratory manager. Based on this review, the data package was, to the best of my knowledge and belief, conducted in accordance with established company quality assurance procedures.

Philip C. Downey, Ph.D.
Director

8/25/99
Date

75 Green Mountain Drive, South Burlington, Vt. 05403 Tel: 802.860.1638 Fax: 802.658.3189

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EXECUTIVE SUMMARY

Results of Toxicity Tests
Conducted June 20-July 6, 1999
for Menzie-Cura & Associates
Industriplex Site

Laboratory Sample ID	Client Sample ID	Species	Mean Survival (%)	Mean Dry Weight (mg)
10219	SD-04 Hall's Brook	*Hyalella azteca*	98	0.077
10220	SD-12 Hall's Brook	*Hyalella azteca*	94	0.078
10221	SD-13 Aberjona River	*Hyalella azteca*	96	0.077
10223	Laboratory Control	*Hyalella azteca*	98	0.063
10224	SD-03 Phillips Pond	*Hyalella azteca*	95	0.088
10341	SD-01 Aberjona S. Branch	*Hyalella azteca*	98	0.138
10342	SD-02 South Pond	*Hyalella azteca*	99	0.129
10343	SD-10 HBHA Creek	*Hyalella azteca*	95	0.132
10344	SD-11 HBHA Pond	*Hyalella azteca*	95	0.137
10345	Laboratory Control	*Hyalella azteca*	99	0.087
10446	SD-06 HBHA	*Hyalella azteca*	94	0.040
10447	SD-07 HBHA	*Hyalella azteca*	36 **	0.020
10448	Laboratory Control	*Hyalella azteca*	69	0.020
10472	SD-8	*Hyalella azteca*	94	0.057
10473	SD-9	*Hyalella azteca*	90	0.056
10474	SD-5	*Hyalella azteca*	0 *	0 *
10475	SD-5DUP	*Hyalella azteca*	0 *	0 *

* Statistically significantly different from the laboratory control sediment ($p \leq 0.05$)
** Although not statistically different from the Laboratoy Control, this sample met the project-specific criterion for acute toxicity (>50% mortality).

INTRODUCTION:

Samples were received for toxicity testing at Aquatec Biological Sciences of 75 Green Mountain Drive, South Burlington, Vermont. Tests were conducted at Aquatec Biological Sciences. The results of the following tests are reported:

Client:	Menzie-Cura & Associates
Facility/Location:	Industriplex Site
Initial Sampling Date:	June 17, 1999
Testing Date:	June 20-July 6, 1999
Tests Conducted:	Amphipod, *Hyalella azteca* , 10-day Survival and Growth

METHODS:

The procedures followed in conducting these toxicity tests were based on methods described by the USEPA (EPA 600/R-94/024). Test conditions for *Hyalella azteca* are listed in Table 1. Testing was completed in three separate groupings based upon chronological sequencing from the time of sediment collection. The objective for the test groupings was to complete the 10-day acute tests prior to expiration of a 14-day sediment storage time so that subsequent chronic toxicity tests could be started within a 14-day time frame. The first testing group was initiated on June 20, 1999. The second testing group was initiated on June 24, 1999. The third testing group was initiated on June 26, 1999. A laboratory control (artificial sediment) was included with each testing group.

Statistical comparisons were performed against the concurrent laboratory control. In some cases, where the laboratory control response was visually less than the responses in the test samples, statistics were not performed. If complete mortality was observed in any sample, the response was considered to be significant.

PROTOCOL DEVIATIONS:

Within the third testing group, Sample 10446 (SD-06 HBHA), Replicate A had an organism average dry weight which appeared to be an outlier. We believe that either the initial (pan weight) or final weight (pan weight plus dried organisms) may have been incorrectly recorded.

Organism survival for the Laboratory Control associated with the third testing group did not meet the control survival acceptabiltiy criterion outlined in the method.

RESULTS:

Summary result tabulations for the *Hyalella azteca* whole sediment toxicity tests are located in Appendix A.

Group 1 Test Results: This group included samples 10219 (SD-04 Hall's Brook), 10220 (SD-12 Hall's Brook), 10221 (SD-13 Aberjona River), and 10224 (SD-03 Phillips Pond). None of the samples in this testing group had survival or gowth responses that were significantly less than the Laboratory Conrtol sample (10222). All of the samples within this testing group were scheduled for chronic toxicity testing.

Group 2 Test Results: This group included samples 10341 (SD-01 Aberjona S. Branch), 10342 (SD-02 South Pond), 10343 (SD-10 HBHA Creek), and 10344 (SD-11 HBHA Pond). None of the samples in this testing group had survival or growth responses that were significantly less than the Laboratory Control sample (10345). All of the samples within this testing group were scheduled for chronic toxicity testing.

Group 3 Test Results: This group included samples 10446 (SD-06 HBHA), 10447 (SD-07 HBHA), 10472 (SD-8), 10473 (SD-9), 10474 (SD-5), and 10475 (SD-5DUP). The responses observed in Samples 10474 and 10475 were assumed to be significant (no organisms survived). The survival or growth responses in the remaining samples in this testing group were not significantly less than the Labortaory Control sample (10345), however, this

comparison should be viewed as being provisional because the Laboratory Control organisms did not meet the survival acceptability criterion.

Inspection of the data associated with Group 3 reveals one sample that demonstrates probable acute toxicity, but was not detected statistically. Sample 10447 (SD-07 HBHA) had a mean suvival of 36 percent and mean growth of 0.02 mg. These results were numerically less than 50 percent of the survival and growth responses observed in site samples 10446 (SD-06 HBHA), 10472 (SD-8), and 10473 (SD-9) which had 90-94 percent survival. Samples 10446 (SD-06 HBHA), 10472 (SD-8), and 10473 (SD-9) were scheduled for chronic toxicity testing. Samples 10447 (SD-07 HBHA), 10474 (SD-5), and 10475 (SD-5DUP) exhibited acute toxicity (defined as <50% survival and/or statistically lower than the control) and were not scheduled for chronic toxicity testing.

Total Ammonia and Sulfide: Porewater and overlying water ammonia concentrations for samples 10474 (SD-5) and 10475 (SD-5DUP) were measured as approximately 2000 and 200 mg/L, respectively. The presence of high ammonia concentrations in the porewater of these samples was communicated to Dr. Menzie of Menzie-Cura Associates during testing. Total sulfide was less than 0.5 in porewater for all samples, therefore, testing fo sulfide in overlying water was not conducted.

QUALITY ASSURANCE:

A standard reference toxicant SRT test was conducted concurrently with each batch of *Hyalella azteca* for each testing group. The resulting LC50 value fell within control chart limits and was viewed as being acceptable.

Table 1. Test Conditions for the Amphipod (*Hyalella azteca*) 10-day Whole Sediment Survival and Growth Toxicity Test.

ASSOCIATED PROTOCOL: EPA, 1994. *Methods for Measuring the Toxicity and Bioaccummulation of Sediment-associated Contaminants with Freshwater Invertebrates Method 100.1 (EPA/600/R-94/024).*

1. Test type:	Whole-sediment toxicity (static renewal)
2. Test temperature:	23 ± 1°C
3. Light quality:	Wide-spectrum fluorescent lights
4. Light illuminance:	500 to 1000 lux
5. Photoperiod:	16 hr. light, 8 hr. dark
6. Test chamber size:	300 mL beaker
7. Sediment volume:	100 mL (distributed to test chambers on the day prior to administration of test organisms
8. Overlying water volume:	175 mL
9. Renewal of overlying water :	At least twice daily
10. Age of test organisms:	7-14 days old at the start of the test
11. Number of organisms / test chamber:	10
12. Number of replicate test chambers / treatment:	8
13. Feeding regime:	1.5 mL YCT daily
14. Aeration:	None, unless dissoved oxygen in overlying water drops below 40% saturation or demonstrates a declining trend during daily monitoring. If required, aeration will be sufficiently gentle to prevent resuspension of sediments to the overlying water. Additional water renewals may be used in lieu of aeration.
15. Overlying water:	Reconstituted water (EPA/600/R-94/024)

Table 2. Test Conditions for the Amphipod (*Hyalella azteca*) 10-Day Whole Sediment Survival and Growth Toxicity Test (continued).

16. Control sediment:	Formulated sediment (EPA/600/R-94/024, section 7.2.3.2)
17. Test chamber cleaning:	None
18. Monitoring:	
Overlying water	
Temperature	Daily
Dissolved oxygen	Daily
pH	Daily
Conductivity	Beginning and end of test
Alkalinity	Beginning and end of test
Hardness	Beginning and end of test
Ammonia	Beginning and end of test
Organism behavior	Within 2 hours to remove "floaters' Daily
19. Test duration:	10 days
20. End points:	Survival and growth (dry weight to 0.01 mg, 60°C overnight), by replicate
21. Reference toxicant:	96-h acute, water only (KCl)
22. Test acceptability:	Minimum mean control survival of 80% and performance-based criteria outlined in EPA/600/R-94/024, Table 11.3
23. Statistical analysis and data interpretation:	Arc-sine (square-root) transformation of survival data. Homogeneity and normality tests followed by hypothesis testing versus the negative control responses. If responses in a test sample were greater than the control responses, the sample responses were viewed as being not significant by direct observation (statistical analysis not performed).

APPENDIX: A

Amphipod (*Hyalella azteca*) Sediment Toxicity Test Results

TR Number: 3152/3153 Project Number: 99026 Test Start Date: 6/20/99
pecies: *Hyalella azteca* Test End Date: 6/30/99
Aquatec Biological Sciences
roject Description: Industriplex

Sample Number	Replicate	Start Count	Total No. Surviving	*Proportion Surviving*	*Mean Proportion Surviving*	Initial Boat Weight (mg)	Total Dry Weight (mg)	No. of Organisms Weighed	*Mean Weight Within Replicate (mg)*	*Mean Weight Over All Replicates (mg)*
10219	A	10	10	1.00		28.72	29.61	10	0.089	
	B	10	10	1.00		25.39	26.04	10	0.065	
	C	10	10	1.00		24.74	25.53	10	0.079	
	D	10	9	0.90		23.32	23.94	9	0.069	
	E	10	9	0.90		28.85	29.61	9	0.084	
	F	10	10	1.00		29.84	30.59	10	0.075	
	G	10	10	1.00		31.92	32.71	10	0.079	
	H	10	10	1.00	0.98	28.57	29.35	10	0.078	0.077
10220	A	10	10	1.00		31.29	32.12	10	0.083	
	B	10	10	1.00		27.21	27.99	10	0.078	
	C	10	8	0.80		26.36	27.11	8	0.094	
	D	10	10	1.00		29.99	30.72	10	0.073	
	E	10	10	1.00		24.54	25.23	10	0.069	
	F	10	9	0.90		23.84	24.39	9	0.061	
	G	10	8	0.80		26.69	27.33	8	0.080	
	H	10	10	1.00	0.94	28.18	29.08	10	0.090	0.078
10221	A	10	10	1.00		33.12	34.15	10	0.103	
	B	10	10	1.00		25.52	26.25	10	0.073	
	C	10	9	0.90		27.37	27.84	9	0.052	
	D	10	9	0.90		26.37	27.25	9	0.098	
	E	10	9	0.90		27.11	27.67	9	0.062	
	F	10	10	1.00		22.13	22.83	10	0.070	
	G	10	10	1.00		20.16	21.02	10	0.086	
	H	10	10	1.00	0.96	21.91	22.63	10	0.072	0.077
10222	A	10	10	1.00		26.72	27.46	10	0.074	
	B	10	9	0.90		23.91	24.50	9	0.066	
	C	10	10	1.00		24.88	25.49	10	0.061	
	D	10	10	1.00		25.96	26.69	10	0.073	
	E	10	10	1.00		23.40	24.00	10	0.060	
	F	10	9	0.90		22.38	22.93	9	0.061	
	G	10	10	1.00		24.09	24.62	10	0.053	
	H	10	10	1.00	0.98	22.71	23.26	10	0.055	0.063
10224	A	10	9	0.90		24.83	25.67	9	0.093	
	B	10	9	0.90		26.12	26.73	8	0.076	
	C	10	10	1.00		26.16	26.88	10	0.072	
	D	10	10	1.00		21.57	22.60	10	0.103	
	E	10	10	1.00		20.45	21.24	10	0.079	
	F	10	9	0.90		22.95	23.90	9	0.106	
	G	10	9	0.90		22.75	23.59	9	0.093	
	H	10	10	1.00	0.95	20.69	21.47	10	0.078	0.088

Amphipod (*Hyalella azteca*) Sediment Toxicity Test Results

BTR Number: 3169 Project Number: 99026 Test Start Date: 6/24/99
Species: *Hyalella azteca* Test End Date: 7/4/99
Aquatec Biological Sciences
Project Description: Industriplex

Sample Number	Replicate	Start Count	Total No. Surviving	*Proportion Surviving*	*Mean Proportion Surviving*	Initial Boat Weight (mg)	Total Dry Weight (mg)	No. of Organisms Weighed	*Mean Weight Within Replicate (mg)*	*Mean Weight Over All Replicates (mg)*
10341	A	10	9	0.90		27.78	29.24	9	0.162	
	B	10	9	0.90		28.00	29.20	9	0.133	
	C	10	10	1.00		26.25	27.43	10	0.118	
	D	10	10	1.00		36.63	38.22	10	0.159	
	E	10	10	1.00		25.76	27.13	10	0.137	
	F	12	12	1.00		31.91	33.13	12	0.102	
	G	10	10	1.00		36.86	38.51	10	0.165	
	H	11	11	1.00	0.98	36.63	38.00	11	0.125	0.138
10342	A	10	10	1.00		36.70	38.13	10	0.143	
	B	10	10	1.00		34.47	36.50	10	0.203	
	C	10	10	1.00		28.20	29.80	10	0.160	
	D	10	10	1.00		24.83	25.67	10	0.084	
	E	10	10	1.00		28.99	29.85	10	0.086	
	F	10	10	1.00		25.71	26.62	10	0.091	
	G	10	9	0.90		25.38	26.36	9	0.109	
	H	10	10	1.00	0.99	31.97	33.55	10	0.158	0.129
10343	A	10	9	0.90		24.90	26.39	9	0.166	
	B	10	10	1.00		26.60	28.12	10	0.152	
	C	10	10	1.00		31.52	32.73	10	0.121	
	D	10	10	1.00		23.24	24.62	10	0.138	
	E	10	10	1.00		25.77	26.92	10	0.115	
	F	10	8	0.80		25.35	26.27	8	0.115	
	G	10	10	1.00		24.39	25.58	10	0.119	
	H	10	9	0.90	0.95	22.32	23.51	9	0.132	0.132
10344	A	10	10	1.00		29.90	31.35	10	0.145	
	B	10	10	1.00		27.64	28.85	10	0.101	
	C	10	9	0.90		30.80	32.10	9	0.144	
	D	10	10	1.00		27.93	29.24	10	0.131	
	E	10	9	0.90		25.68	27.40	9	0.191	
	F	10	9	0.90		25.69	26.93	9	0.138	
	G	10	9	0.90		31.21	32.30	9	0.121	
	H	10	10	1.00	0.95	31.14	32.42	10	0.128	0.137
10345	A	10	10	1.00		27.35	28.02	10	0.067	
	B	10	9	0.90		28.10	29.20	9	0.122	
	C	10	10	1.00		25.45	26.58	10	0.113	
	D	10	10	1.00		24.50	25.45	10	0.095	
	E	10	10	1.00		25.77	26.62	10	0.085	
	F	10	10	1.00		25.49	26.10	10	0.061	
	G	10	10	1.00		27.71	28.52	10	0.081	
	H	10	10	1.00	0.99	31.28	31.98	10	0.070	0.087

Amphipod (*Hyalella azteca*) Sediment Toxicity Test Results

BTR Number: 3189/3196 Project Number: 99026 Test Start Date: 6/26/99
Species: *Hyalella azteca* Test End Date: 7/6/99
Aquatec Biological Sciences
Project Description: Industriplex

Sample Number	Replicate	Start Count	Total No. Surviving	Proportion Surviving	Mean Proportion Surviving	Initial Boat Weight (mg)	Total Dry Weight (mg)	No. of Organisms Weighed	Mean Weight Within Replicate (mg)	Mean Weight Over All Replicates (mg)
10446	A	10	10	1.00		22.99	25.43	10	0.344	
	B	10	10	1.00		24.66	25.16	10	0.050	
	C	10	10	1.00		26.96	27.20	10	0.024	
	D	10	10	1.00		28.86	29.23	10	0.037	
	E	10	10	1.00		28.03	28.37	10	0.034	
	F	10	6	0.60		25.35	25.55	5	0.040	
	G	10	10	1.00		26.10	26.64	10	0.054	
	H	10	9	0.90	0.94	28.13	28.48	9	0.039	0.040
10447	A	10	3	0.30		26.01	26.08	3	0.023	
	B	10	7	0.70		27.16	27.38	7	0.031	
	C	10	2	0.20		31.31	31.36	2	0.025	
	D	10	0	0.00		32.74	32.74	0	0.000	
	E	10	0	0.00		33.06	33.06	0	0.000	
	F	10	8	0.80		26.91	27.10	8	0.024	
	G	10	5	0.50		27.35	27.48	5	0.026	
	H	10	4	0.40	0.38	27.16	27.27	4	0.027	0.020
10446	A	10	10	1.00		35.23	35.25	2	0.010	
	B	10	5	0.50		32.55	32.72	5	0.034	
	C	10	7	0.70		33.76	33.85	7	0.013	
	D	10	9	0.90		31.14	31.44	9	0.033	
	E	10	7	0.70		31.16	31.25	7	0.014	
	F	10	2	0.20		33.44	33.47	2	0.015	
	G	10	9	0.90		32.12	32.34	8	0.028	
	H	10	6	0.60	0.69	31.99	32.07	6	0.013	0.020
10472	A	10	9	0.90		30.69	31.05	9	0.040	
	B	10	10	1.00		28.18	28.69	10	0.051	
	C	10	8	0.80		29.82	30.15	8	0.066	
	D	10	10	1.00		27.22	27.69	10	0.047	
	E	10	10	1.00		28.30	28.89	10	0.059	
	F	10	10	1.00		28.46	29.15	10	0.066	
	G	10	9	0.90		25.73	26.23	8	0.063	
	H	10	9	0.90	0.94	25.79	26.38	9	0.063	0.057
10473	A	10	10	1.00		31.44	31.98	10	0.054	
	B	10	10	1.00		26.12	26.81	10	0.069	
	C	10	9	0.90		25.65	26.16	9	0.056	
	D	10	4	0.40		27.03	27.23	4	0.050	
	E	10	10	1.00		33.29	33.77	10	0.048	
	F	10	10	1.00		26.11	26.64	10	0.053	
	G	10	10	1.00		25.96	26.41	10	0.045	
	H	10	9	0.90	0.90	26.24	26.89	9	0.072	0.056
10474	A	10	0	0.00						
	B	10	0	0.00						
	C	10	0	0.00						
	D	10	0	0.00						
	E	10	0	0.00						
	F	10	0	0.00						
	G	10	0	0.00						
	H	10	0	0.00	0.00					
10475	A	10	0	0.00						
	B	10	0	0.00						
	C	10	0	0.00						
	D	10	0	0.00						
	E	10	0	0.00						
	F	10	0	0.00						
	G	10	0	0.00						
	H	10	0	0.00	0.00					

Sample 10446 Replicate A was excluded from the average weight determination
A weighing error may have occurred

8/25/99

APPENDIX: B

Industri-Plex Site
CHAIN OF CUSTODY RECORD

Project No.: 578
Project Name: Industriplex
Project Location: Woburn, MA

DATE: 6/17/99
SAMPLERS: CAM/PK

MENZIE-CURA & ASSOCIATES, INC.
1 COURTHOUSE LANE, SUITE 2
CHELMSFORD, MA 01824
TEL: 978/453-4300 FAX: 978/453-7260

SAMPLE ID	Date	Comp.	Grab	Station Locations	No. of Containers	Acute Chironomy	Acute Hyalella	Chronic Chironomy	Chronic Hyalella		NOTES
SD-04	6/17		✓	Hells Brook	1	X	X	X	X		
SD-12	6/17		✓	Hells Brook	1	X	X	X	X		
SD-13	6/17		✓	Aberjona Riv	1	X	X	X	X		
											Internal Cooler Temp 0.6°C on delivery

Relinquished By: (Signature)	Date	Time	Received By: (Signature)	Date	Time
[signature]	6/17/99	1800	[signature]	6/18/99	1000
Relinquished By: (Signature)	Date	Time	Received By: (Signature)	Date	Time
Relinquished By: (Signature)	Date	Time	Received By: (Signature)	Date	Time

Laboratory:
Phone:
Contact Person:

Remarks: Hells Brook are reference areas. SD-13 is possibly contaminated with arsenic.

CHAIN OF CUSTODY RECORD

Project No.	Project Name:	Project Location:
578	Industriplex	

DATE: 6/18/99

SAMPLERS: C. AM

MENZIE-CURA & ASSOCIATES, INC.
1 COURTHOUSE LANE, SUITE 2
CHELMSFORD, MA 01824
TEL: 978/453-4300 FAX: 978/453-7260

Analyses Required

SAMPLE ID	Date	Comp.	Grab	Station Locations	No. of Containers	Metals Analysis	Chemical Analysis	Metals Analysis	Chemical Analysis	
2A SD-03	6/18	✓		Phillips Pond	11	X	X	X	X	

NOTES

Relinquished By: (Signature)	Date	Time	Received By: (Signature)	Date	Time
[signature]	6/18/99	1600			
Relinquished By: (Signature)	Date	Time	Received By: (Signature)	Date	Time
	6/19/99	10:30	[signature]		
Relinquished By: (Signature)	Date	Time	Received By: (Signature)	Date	Time

Remarks:

Laboratory:

Phone:

Contact Person:

Coolers Temp. 7.9 C

CHAIN OF CUSTODY RECORD

Project No.: 5-78

Project Name: Industriplex

Project Location: Woburn

DATE: 6/21/99

SAMPLERS: MA, CM, KC

MENZIE-CURA & ASSOCIATES, INC.
1 COURTHOUSE LANE, SUITE 2
CHELMSFORD, MA 01824
TEL: 978/453-4300 FAX: 978/453-7260

SAMPLE ID	Date	Comp.	Grab	Station Locations	No. of Containers	Acute Ceriodaphnia	Chronic Ceriodaphnia	Acute Chironomus	Chronic Chironomus		NOTES
SD-01	6/21	✓		Aberjona S. Branch	1	X	X	X	X		
SD-02	"	✓		South Pond	1	X	X	X	X		
SD-10	"	✓		HBHA Creek	1	X	X	X	X		
SD-11	"	✓		HBHA Pond 3	1	X	X	X	X		

Relinquished By: (Signature)	Date	Time	Received By: (Signature)	Date	Time
[signature]	6/21/99	1800			
Relinquished By: (Signature)	Date	Time	Received By: (Signature)	Date	Time
	6/22/99	11:00	[signature]		
Relinquished By: (Signature)	Date	Time	Received By: (Signature)	Date	Time

Laboratory:

Phone:

Contact Person:

Remarks:

Cooler Temp. = 10.3°C

CHAIN OF CUSTODY RECORD

Project No.	Project Name:	Project Location:
578	Industri-plex	Woburn

DATE: 6/22/99

SAMPLERS: C. Menzie

MENZIE-CURA & ASSOCIATES, INC.
1 COURTHOUSE LANE, SUITE 2
CHELMSFORD, MA 01824
TEL: 978/453-4300 FAX: 978/453-7260

SAMPLE ID	Date	Comp.	Grab	Station Locations	No. of Containers	Bioassay					NOTES
SD-8	6/22/99	✓			1	✓					
SD-9	6/22/99	✓			1	✓					
SD-5	6/22/99	✓			1	✓					
SD-5 (dup)	6/22/99	✓			1	✓					

Relinquished By: (Signature)	Date	Time	Received By: (Signature)	Date	Time
[signature]	6/22/99	5:13pm	Karen Bruney	6/23/99	10:00
Relinquished By: (Signature)	Date	Time	Received By: (Signature)	Date	Time
Relinquished By: (Signature)	Date	Time	Received By: (Signature)	Date	Time

Remarks:

Laboratory: Aquatech Biological Sciences

Phone: 802-860-1638

Contact Person: John Williams

Cooler Temp = 5.5°C

CHAIN OF CUSTODY RECORD

Project No.	Project Name:	Project Location:
578	Industriplex	Woburn

DATE: 6-23-99

SAMPLERS

MENZIE-CURA & ASSOCIATES, INC.
1 COURTHOUSE LANE, SUITE 2
CHELMSFORD, MA 01824
TEL: 978/453-4300 FAX: 978/453-7260

Analyses Required

SAMPLE ID	Date	Comp.	Grab	Station Locations	No. of Containers	Bioassay C. Dubia + H. azteca	Acute + Chronic				NOTES
SD-6	6-23-99		✓	SD-06 HBHA	1	✓	✓				
SD-07	6-23-99		✓	SD-07 HBHA	1	✓	✓				

Relinquished By: (Signature)	Date	Time	Received By: (Signature)	Date	Time
Bruce Hutchins	6-23-99	1220	[illegible]	6/24/99	10:00
Relinquished By: (Signature)	Date	Time	Received By: (Signature)	Date	Time
Relinquished By: (Signature)	Date	Time	Received By: (Signature)	Date	Time

Laboratory:

Phone:

Contact Person:

Remarks:
Final 2 Samples for Industriplex Bioassays

Cooler Temp. 9.3°C

APPENDIX: C

Title: Hyalella azteca survival vs. Lab Control (10223)
File: 10222s Transform: ARC SINE(SQUARE ROOT(Y))
Number of Groups: 5

GRP	IDENTIFICATION	REP	VALUE	TRANS VALUE
1	10222	1	1.0000	1.4120
1	10222	2	0.9000	1.2490
1	10222	3	1.0000	1.4120
1	10222	4	1.0000	1.4120
1	10222	5	1.0000	1.4120
1	10222	6	0.9000	1.2490
1	10222	7	1.0000	1.4120
1	10222	8	1.0000	1.4120
2	10219	1	1.0000	1.4120
2	10219	2	1.0000	1.4120
2	10219	3	1.0000	1.4120
2	10219	4	0.9000	1.2490
2	10219	5	0.9000	1.2490
2	10219	6	1.0000	1.4120
2	10219	7	1.0000	1.4120
2	10219	8	1.0000	1.4120
3	10220	1	1.0000	1.4120
3	10220	2	1.0000	1.4120
3	10220	3	0.8000	1.1071
3	10220	4	1.0000	1.4120
3	10220	5	1.0000	1.4120
3	10220	6	0.9000	1.2490
3	10220	7	0.8000	1.1071
3	10220	8	1.0000	1.4120
4	10221	1	1.0000	1.4120
4	10221	2	1.0000	1.4120
4	10221	3	0.9000	1.2490
4	10221	4	0.9000	1.2490
4	10221	5	0.9000	1.2490
4	10221	6	1.0000	1.4120
4	10221	7	1.0000	1.4120
4	10221	8	1.0000	1.4120
5	10224	1	0.9000	1.2490
5	10224	2	0.9000	1.2490
5	10224	3	1.0000	1.4120
5	10224	4	1.0000	1.4120
5	10224	5	1.0000	1.4120
5	10224	6	0.9000	1.2490
5	10224	7	0.9000	1.2490
5	10224	8	1.0000	1.4120

8/25/99

Title: Hyalella azteca survival vs. Lab Control (10223)
File: 10222s Transform: ARC SINE(SQUARE ROOT(Y))

Summary Statistics on Transformed Data TABLE 1 of 2

GRP	IDENTIFICATION	N	MIN	MAX	MEAN
1	10222	8	1.2490	1.4120	1.3713
2	10219	8	1.2490	1.4120	1.3713
3	10220	8	1.1071	1.4120	1.3154
4	10221	8	1.2490	1.4120	1.3509
5	10224	8	1.2490	1.4120	1.3305

Title: Hyalella azteca survival vs. Lab Control (10223)
File: 10222s Transform: ARC SINE(SQUARE ROOT(Y))

Summary Statistics on Transformed Data TABLE 2 of 2

GRP	IDENTIFICATION	VARIANCE	SD	SEM	C.V. %
1	10222	0.0057	0.0754	0.0267	5.5016
2	10219	0.0057	0.0754	0.0267	5.5016
3	10220	0.0197	0.1403	0.0496	10.6668
4	10221	0.0071	0.0843	0.0298	6.2437
5	10224	0.0076	0.0871	0.0308	6.5472

Title: Hyalella azteca survival vs. Lab Control (10223)
File: 10222s Transform: ARC SINE(SQUARE ROOT(Y))

Steel's Many-One Rank Test - Ho: Control<Treatment

GROUP	IDENTIFICATION	TRANSFORMED MEAN	RANK SUM	CRIT. VALUE	DF	SIG 0.05
1	10222	1.3713				
2	10219	1.3713	68.00	47.00	8.00	
3	10220	1.3154	62.00	47.00	8.00	
4	10221	1.3509	64.00	47.00	8.00	
5	10224	1.3305	60.00	47.00	8.00	

Critical values are 1 tailed (k = 4)

Title: Hyalella azteca survival vs. Lab Control (10223)
File: 10222s Transform: ARC SINE(SQUARE ROOT(Y))

Shapiro - Wilk's Test for Normality

D = 0.3204
W = 0.8272

Critical W = 0.9190 (alpha = 0.01 , N = 40)
W = 0.9400 (alpha = 0.05 , N = 40)

Data FAIL normality test (alpha = 0.01). Try another transformation.

Warning - The first three homogeneity tests are sensitive to non-normality and should not be performed with this data as is.

Title: Hyalella azteca survival vs. Lab Control (10223)
File: 10222s Transform: ARC SINE(SQUARE ROOT(Y))

Bartlett's Test for Homogeneity of Variance

Calculated B1 statistic = 4.1363 (p-value = 0.3879)

Data PASS B1 homogeneity test at 0.01 level. Continue analysis.

Critical B = 13.2767 (alpha = 0.01, df = 4)
= 9.4877 (alpha = 0.05, df = 4)

Amphipod (*Hyalella azteca*) Day 10 Survival and Dry Weight Data

Client: Menzie-Cura & Assoc.	Project: 99026 Industriplex	BTR: 3152 / 3153
	Test Start: June 20, 1999	Test End: June 30, 1999

Sample	Rept.	# Alive	Init.	Repick #	Repick Init.	Total Surv	# Weighed	Init Pan Wt.	Total Dry Wt.
10219	A③	10	σ	—	—	10	10	28.72	29.61
	B	10	σ	—	—	10	10	25.39	26.04
	C	10	JJG	—	—	10	10	24.74	25.53
	D	9	SR	—	—	9	9	23.32	23.94
	E	9	σ	—	—	9	9	28.85	29.61
	F	16 ~~9~~ 10	JJG	—	—	10	10	29.84	30.59
	G	10	JJG	—	—	10	10	31.92	32.71
	H	10	σ	—	—	10	10	28.57	29.35
10220	A	10	JJG	—	—	10	10	31.29	32.12
	B	10	σ	—	—	10	10	27.21	27.99
	C	8	σ	0	σ 6/10	8	8	26.36	27.11
	D	① ~~8~~ 10	σ	—	—	10	10	29.99	30.72
	E	10	SR	—	—	10	10	24.54	25.23
	F	9	JJG	—	—	9	9	23.84	24.39
	G	~~6~~ 7	SR	1 6/30	σ 6/30	8	8	26.69	27.33
	H	10	JJG	—	—	10	10	28.18	29.08
10221	A	10	σ	—	—	10	10	33.12	34.15
	B	10	JJG	—	—	10	10	25.52	26.25
	C	7	SR	2	σ 6/30	9	9	27.37	27.84
	D②	9	σ	—	—	9	9	26.37	27.05
	E	9	JJG	—	—	9	9	27.11	27.67
	F	10	SR	—	—	10	10	22.13	22.83
	G	10	SR	—	—	10	10	20.16	21.02
	H	10	SR	—	—	10	10	21.91	22.63
10222	A	10	σ	—	—	10	10	26.72	27.46
	B	9	σ	—	—	9	9	23.91	24.50
	C	10	σ	—	—	10	10	24.88	25.49
	D	10	σ	—	—	10	10	25.96	26.69
	E	10	σ	—	—	10	10	23.40	24.03
	F	9	JJG	—	—	9	9	22.38	22.93
	G	10	SR	—	—	10	10	24.09	24.62
	H	10	σ	—	—	10	10	22.71	23.26

Balance QC: Initial (20 mg = 19.97 mg) Final (20 mg = 19.97 mg) Balance Asset #:

Date/time In Temp(°C) Init. Date/time out 7/1 1050 Temp(°C) 19°C Init. SR

Comments: ① Correction σ 6/30/99

② One Chironomus larva ② One indigenous Chironomus larva σ

Reviewer: σ Date: 8/19/99 Balance QC Initial = 19.99 mg Final = 20.00 hasurwt.doc

Laboratory: Aquatec Biological Sciences, South Burlington, Vermont 7/1/99

Amphipod (*Hyalella azteca*) Day 10 Survival and Dry Weight Data

Client: Menzie-Cura & Assoc.	Project: 99026 Industriplex	BTR: 3152 / 3153
	Test Start: June 20, 1999	Test End: June 30, 1999

Sample	Repl.	# Alive	Init.	Repick #	Repick Init.	Total Surv	# Weighed	Init Pan Wt.	Total Dry Wt.
10224	A	9	SL	—	—	9	9	24.83	25.67
	B	(1) 9	SL	—	—	9	9 ~~8~~	26.12	26.73
	C	10	SL	—	—	10	10	26.16	26.88
	D	10	SL	—	—	10	10	21.57	22.00
	E	10	JJG	—	—	10	10	20.45	21.24
	F	~~10~~ 9	SL	—	—	9	9	22.95	23.90
	G	9	SL	—	—	9	9	22.75	23.59
	H	8	SL	2	JG 6/30	10	10	20.69	21.47
	A								
	B								
	C								
	D								
	E								
	F								
	G								
	H								
	A								
	B								
	C								
	D								
	E								
	F								
	G								
	H								
	A								
	B								
	C								
	D								
	E								
	F								
	G								
	H								

Balance QC: Initial (20 mg =)	Final (20 mg =)	Balance Asset #:	
Date/time In	Temp(°C)	Init.	Date/time out 7/1 Temp(°C) 19.2 Init. SL

Comments: (1) Lost one, 8 available for dry wt. SL

Balance QC 7/1 I = 19.99 mg F = 20.00 mg

Reviewer: _____ Date: 8/19/99

Laboratory: Aquatic Biological Sciences, South Burlington, Vermont

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Amphipod (*Hyalella azteca*) Overlying Water Environmental Monitoring

Project: Menzie-Cura & Associates	Project: 99026 Industriplex	BTR: 3152 / 3153

Sample	Parameter	Day of Analysis 0	1	2	3	4	5	6	7	8	9	10
10219	T (°C)	23.0	23.5	23.2	23.1	23.5	22.8	23.4	23.0	23.7	24.0	23.0
	pH	7.3	7.4	7.3	7.4	7.4	7.3	7.4	7.4	7.4	7.4	7.4
	DO (mg/L)	6.7	7.1	6.8	7.2	6.6	6.1	5.3	5.6	5.8	5.5	6.9
	Conductivity	310	X	X	X	X	310	X	X	X	X	270
	Ammonia, alk/hardness	✓	X	X	X	X	X	X	X	X	X	✓
10220	T (°C)	22.9	23.5	23.2	23.2	23.6	23.1	23.6	23.0	23.7	24.1	23.0
	pH	7.4	7.5	7.4	7.8	7.5	7.7	7.6	7.5	7.5	7.5	7.6
	DO (mg/L)	6.8	7.3	7.3	7.5	6.2	7.0	6.4	6.1	5.8	5.8	6.8
	Conductivity	330	X	X	X	X	330	X	X	X	X	330
	Ammonia, alk/hardness	✓	X	X	X	X	X	X	X	X	X	✓
10221	T (°C)	22.9	23.5	23.3	23.2	23.7	22.9	23.4	22.8	23.7	24.0	23.0
	pH	7.4	7.5	7.3	7.8	7.3	7.4	7.4	7.3	7.52 JG	7.3	7.3
	DO (mg/L)	6.8	7.0	7.1	7.3	5.6	5.9	5.0	5.0	4.3	4.5	4.8
	Conductivity	380	X	X	X	X	320	X	X	X	X	310
	Ammonia, alk/hardness	✓	X	X	X	X	X	X	X	X	X	✓
	Init./Date: 1999	6/20 JG	6/21 CC	6/22 JG	6/23 [illegible]	6/24 JG	6/25 BR	6/26 ST	6/27 JG	6/28 JG	6/29 JG	6/30 CC

Comments: H. azteca added to beakers 15:30 6/20/99 JJG

Review: [illegible] Date: 8/19/99

Laboratory: Aquatec Biological Sciences, South Burlington, Vermont

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Amphipod (*Hyalella azteca*) Overlying Water Environmental Monitoring

Project: Menzie-Cura & Associates	Project: 99026 Industriplex	BTR: 3152 / 3153

Sample	Parameter	Day of Analysis 0	1	2	3	4	5	6	7	8	9	10
~~10222~~ ~~[illegible]~~ 10222 cc	T (°C)	22.9	23.6	23.0	23.1	23.6	23.1	23.5	23.0	23.7	24.1	23.0
	pH	7.8	7.8	7.7	8.0	7.7	8.0	7.8	7.7	7.8	7.7	7.7
	DO (mg/L)	~~7.8~~ 8.0	7.5	7.8	7.6	6.5	7.9	7.0	6.4	6.4	6.4	6.5
	Conductivity	340	X	X	X	X	340	X	X	X	X	340
	Ammonia, alk/hardness	✓	X	X	X	X	X	X	X	X	X	✓
10224	T (°C)	22.8	23.8	23.1	23.0	23.6	23.1	23.5	23.1	23.8	24.1	22.7
	pH	7.4	7.5	7.5	7.9	7.5	7.7	7.6	7.5	7.6	7.4	7.6
	DO (mg/L)	6.9	7.1	7.3	7.5	6.1	7.1	6.1	5.8	5.8	5.2	5.5
	Conductivity	390	X	X	X	X	380	X	X	X	X	350
	Ammonia, alk/hardness	✓	X	X	X	X	X	X	X	X	X	✓
~~10225~~	T (°C)											
	pH											
	DO (mg/L)											
	Conductivity		X	X	X	X		X	X	X	X	
	Ammonia, alk/hardness		X	X	X	X	X	X	X	X	X	
	Init./Date: 1999	6/20 JG	6/21 CC	6/22 [illegible]	6/23 [illegible]	6/24 [illegible]	St 6/25	St 6/26	JG 6/27	6/28 JG	6/29 JG	6/30 CC

Comments:

Review: [illegible] Date: 8/19/99

Laboratory: Aquatec Biological Sciences, South Burlington, Vermont

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ALKALINITY & HARDNESS WORKSHEET

BTR Number: Several Project #: 99026 Analyst: CC / ST

Species: *Chironomus tentans* and *Hyalella azteca* Analysis

Test Facility: Aquatec Biological Sciences, South Burlington, Vermont Dates: 7/16/99 7/23/99

Project: Menzie-Cura Industriplex Acute Tests 7/22/99 8/20/99

		ALKALINITY				HARDNESS			
Date	Sample Type	Sample ml	Initial ml	Final ml	Alkalinity (mg/L)	Sample ml	Initial ml	Final ml	Hardness (mg/L)
06/20/99	10219 Day 0	50	3.8	5.0	24.0	50	0.0	4.0	80.0
06/20/99	10220 Day 0	50	5.0	6.1	22.0	50	4.0	8.4	88.0
06/20/99	10221 Day 0	50	6.1	7.2	22.0	50	8.4	12.6	84.0
06/20/99	10222/3 Day 0	50	7.2	8.7	30.0	50	12.6	18.1	110.0
06/20/99	10224 Day 0	50	20.9	21.8	18.0	50	18.1	21.9	76.0
06/30/99	10219 Day 10 HA	50	0.0	1.3	26.0	50	23.6	28.5	98.0
06/30/99	10220 Day 10 HA	50	1.3	2.9	32.0	50	28.5	33.7	104.0
06/30/99	10221 Day 10 HA	50	2.9	4.1	24.0	50	33.7	38.8	102.0
06/30/99	10222 Day 10 HA	50	4.1	5.7	32.0	50	0.0	6.1	122.0
06/30/99	10224 Day 10 HA	50	6.9	8.5	32.0	50	6.1	11.1	100.0
06/30/99	10219 Day 10 CT	50	8.5	10.0	30.0	50	11.1	15.6	90.0
06/30/99	10220 Day 10 CT	50	10.0	11.4	28.0	50	15.6	20.7	102.0
06/30/99	10221 Day 10 CT	50	11.4	12.9	30.0	50	20.7	25.7	100.0
06/30/99	10223 Day 10 CT	50	12.9	14.4	30.0	50	25.7	31.6	118.0
06/30/99	10224 Day 10 CT	50	14.4	15.8	28.0	50	31.6	35.9	86.0

Alkalinity and Hardness Analysis

Client: MENZIE-CURA	Project: INDUSTRIPLEX	BTR: SEVERAL
Sample Description: Overlying Water, H. azteca, C tentans		DAY 0: 6/20 DAY 10: 6/30

ACUTE TEST

			ALKALINITY				HARDNESS				
Sample ID	Sample Date		Sample Vol.	Titrant Init. Vol.	Titrant Final Vol.	Analyst Date/ Init.	Sample Vol.	Titrant Init. Vol.	Titrant Final Vol.	Analyst Date/ Init.	Data entered Init.
10219	6/20/99		50	3.8	5.0	7/16 CC	50	0	4.0	7/16/CC	JM
10220	6/20/99		50	5.0	6.1		50	4.0	8.4		JM
10221	6/20/99		50	6.1	7.2		50	8.4	12.6		JM
	10222/3	ctl.	50	7.2	8.7		50	12.6	18.1		JM
10224	6/20/99		50	20.9	21.8		50	18.1	21.9		JM
10219	6/30/99	azteca	50	0	1.3	7/22CC	50	28.6	28.5	8/20SAT	JM
10220	6/30/99		50	1.3	2.9	7/22CC	50	28.5	33.7	8/20SAT	JM
10221	6/30/99		50	2.9	4.1	7/22CC	50	33.7	38.8	8/20SAT	JM
10222	6/30/99	ctl.	50	4.1	5.7	7/22CC	50	0	6.1	8/20SAT	JM
10224	6/30/99		50	6.9	8.5	7/23CC	50	6.1	11.1	8/20SAT	JM
10219	6/30/99	entrans	50	8.5	10.0	7/23CC	50	11.1	15.6	8/20SAT	JM
10220	6/30/99		50	10.0	11.4	7/23CC	50	15.6	20.7	8/20SAT	JM
10221	6/30/99		50	11.4	12.9	7/23CC	50	20.7	25.7	8/20SAT	JM
10223	6/30/99	ctl.	50	12.9	14.4	7/23CC	50	25.7	31.6	8/20SAT	JM
10224	6/30/99		50	14.4	15.8	7/23CC	50	31.6	35.9	8/20SAT	JM

ACUTE 1

Hyalella azteca Initial Dry Wt.

Client: Menzie-Cura & Assoc.	Project: 99026	BTR: 3152 / 3153
Culture ID: HA61699	Age: 11 days	

Replicate	Number of Organisms weighed	Initial Pan Weight (mg)	Final Pan Weight (mg)	Avg. Dry Wt.
1	10	25.31	25.53	0.022
2	10	24.14	24.31	0.017
3	10	25.83	26.00	0.017
4	10	22.37	22.57	0.02
5	10	23.77	23.96	0.019
6	10	23.92	24.05	0.013
7	10	25.36	25.58	0.022
8	10	23.81	23.95	0.014
Initials: JJG				
Date: 6/21/99				

Balance QC: Initial (20 mg = 19.98)	Final (20 mg = 19.98)	Balance	
Asset #: 6/22 = 20.01	6/22 = 20.01		
Date/time In 6/21/99	Temp(°C) ~~19~~ 80°	Init. JJG	Date/time out 6/22/99 14:30
Temp(°C) ~~19~~ 77	Init. JJG		
Comments:			

Reviewer: [signature] Date: 8/19/99

Laboratory: Aquatec Biological Sciences, South Burlington, Vermont

Organism Holding and Acclimation

Species: *Hyalella azteca*	Date Received: 6/16/99 No. Rec. 800
Supplier: EC & T	Hatch Date: 6/9/99
Apparent Conditon: Excellent	Culture ID: HA5-1199 ~~6-6-99~~ HA 6/16/99

Acclimation / Holding Procedures: Transfer to holding culture boxes, add laboratory reconstituted water. Acclimate to water to be used for testing: EPA/600/R-94/024 moderately hard reconstituted water (sediment overlying water formulation). Aerate lightly. Water change once (50%) weekly.
Daily Feeding: 1:1 mix of *Selenastrum* / YCT, 1-3 mL (maintain hint of green algal coloration on culture box bottom). Do not allow excess food/fungus to accumulate.
Monitoring: Examine over a light box daily, record apparent condition. Temperature daily; pH, D.O, on Mon., Weds., Fri., (miniumum); A&H, conductivity weekly.
Test starts: record date, time, initials for sediment test and SRT test starts.

1999 Date	Fed	Temp	pH	D.O.	Cond uct.			Water Chg.	Condition *	Init.
6/16	YCT/Sel	22.7	7.0	7.4	240			Added mix (Sel recv)	ok/N	JG
6/17	YCT/Sel time	22.7	—	—	—			Added Accord	N	JG
6/18	YCT/Sel	22.7	7.9	8.2	300			Added Sel recon water	normal	JG
6/19	YCT/Sel	22.5							Normal	JG
6/20	YCT/Sel	22.5	7.9	8.1	270	TEST STARTS md 9602c			Age = 11 d	
6/21	Sel/YCT	20.7	—	—	—	SRT START			Age = 12 d	
6/22	YCT/Sel								Age = 13 d	JG
6/23									Age = 14 d	

Age = 14

* N = normal, appear healthy. Record # dead if any observed.

Sediment test start (Date/time/Init.) 6/20/99 SRT test start (Date/time/init.) 6/21/99

Environmental Consulting & Testing
1423 N. 8th St. Suite 118 • Superior, WI 54880

SHIPPING DATE: 06-15-99

FROM: ECT SUPERIOR, WI.

TO: AQUATEC
75 GREEN MT. DR.
SOUTH BURLINGTON, VT 05403
802-860-1638

SPECIES: SCUD (H. azteca)
DATE OF Hatch: 06-09-99

NUMBER: 800 +

TEMP. AT SHIPPING: 23.4 C

P.O.#: 597 VERBAL J. WILLIAMS

SHIPPED BY: Fed. Ex. 1706-1491-7

WATER CHEMISTRY RECORDS

TEMPERATURE	22 to 24	AS Co
CONDUCTIVITY	100 to 200	AS UMHOS/CM
T.HARDNESS	60 to 90	AS CACO3
T.ALKALINITY	40 to 60	AS CACO3
pH	7.3 to 7.8	

Originally obtained from culture at EPA Duluth, MN
Fed Algae and YTC
NaCl Reference 96 hr LC50
Mean = 3.48 s.d.= 0.85
Range 2x s.d. = 1.78 to 5.18
n=10

Rec 6/16/99

Temp 22.7 °C
Conductivity 240
pH 7.0
D.O 7.9

Sediment Characterization

Client: Menzie-Cura & Assoc.	Project: 99026	BTR: 3152 / 3153

Date sediments distributed to test chambers (100 mL homogenized sediment):

- *H. azteca* acute test: 6/~~20~~19/99
- *C. tentans* acute test: 6/~~20~~19/99
- *H. azteca* chronic test: 7/1/99 } entire sample used with exception of aliquot reserved
- *C. tentans* chronic test: 7/1/99 } for *C. tentans* 2 auxillary male measurements.

7/11/99 - Sediments into beakers on Day 9 for aux. males.

Sample Number	porew pH	porew H2S	porew Amm	Sediment Visual Characterization
10219	215 mL 6.7	extracted	6/21/99 1.7	black mud, watery, Chironomids (several) present removed
				black, watery mud, few Chironomids removed
10220	213 mL 7.1	extracted	6/21/99 1.86	
10221	240 mL 7.3	extracted	6/21/99 13.5	brownish, black watery mud few Chironomids removed.
~~10222~~				
10224	128 mL 6.7	extracted	3.62	very black, watery mud. 128 mL extracted 6/21/99
	Pore water	extraction	6/21/99	. 250 g / centrifuge bottle
Number ~~10225~~ not used	15 m	7640 RPM.		
~~10226~~ Number not used				
~~10227~~ Number not used				
10222 / 23 LCS	/	/	/	EPA artificial control sediment (77% med. and fine sand; 17% kaolinite clay; 5% 0.5 mm-sieved peat; 1% $CaCO_3$). Stored dry, then hydrated prior to addition to test chambers.

S = sample collected / preserved.

Extract porewater, measure and record pH, decant and preserve sulfide and ammonia samples.

Entered by: _____ Date: 6/20 7/1/99

Sediments distributed to beakers 6/19/99 13:00 JJG/~~S~~ (for acute tests)

Reviewer: _____ Date: 8/19/99

Laboratory: Aquatec Biological Sciences, South Burlington, Vermont

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H. azteca added to beakers 6/20/99 15:30 JJG

Title: Hyalella azteca survival vs. Laboratory Control (10345)
File: 10345s Transform: ARC SINE(SQUARE ROOT(Y))
Number of Groups: 5

GRP	IDENTIFICATION	REP	VALUE	TRANS VALUE
1	10345	1	1.0000	1.4120
1	10345	2	0.9000	1.2490
1	10345	3	1.0000	1.4120
1	10345	4	1.0000	1.4120
1	10345	5	1.0000	1.4120
1	10345	6	1.0000	1.4120
1	10345	7	1.0000	1.4120
1	10345	8	1.0000	1.4120
2	10341	1	0.9000	1.2490
2	10341	2	0.9000	1.2490
2	10341	3	1.0000	1.4120
2	10341	4	1.0000	1.4120
2	10341	5	1.0000	1.4120
2	10341	6	1.0000	1.4120
2	10341	7	1.0000	1.4120
2	10341	8	1.0000	1.4120
3	10342	1	1.0000	1.4120
3	10342	2	1.0000	1.4120
3	10342	3	1.0000	1.4120
3	10342	4	1.0000	1.4120
3	10342	5	1.0000	1.4120
3	10342	6	1.0000	1.4120
3	10342	7	0.9000	1.2490
3	10342	8	1.0000	1.4120
4	10343	1	0.9000	1.2490
4	10343	2	1.0000	1.4120
4	10343	3	1.0000	1.4120
4	10343	4	1.0000	1.4120
4	10343	5	1.0000	1.4120
4	10343	6	0.8000	1.1071
4	10343	7	1.0000	1.4120
4	10343	8	0.9000	1.2490
5	10344	1	1.0000	1.4120
5	10344	2	1.0000	1.4120
5	10344	3	0.9000	1.2490
5	10344	4	1.0000	1.4120
5	10344	5	0.9000	1.2490
5	10344	6	0.9000	1.2490
5	10344	7	0.9000	1.2490
5	10344	8	1.0000	1.4120

J 8/25/99

Title: Hyalella azteca survival vs. Laboratory Control (10345)
File: 10345s Transform: ARC SINE(SQUARE ROOT(Y))

Shapiro - Wilk's Test for Normality

D = 0.2358
W = 0.8304

Critical W = 0.9190 (alpha = 0.01 , N = 40)
W = 0.9400 (alpha = 0.05 , N = 40)

Data FAIL normality test (alpha = 0.01). Try another transformation.

Warning - The first three homogeneity tests are sensitive to non-normality and should not be performed with this data as is.

Title: Hyalella azteca survival vs. Laboratory Control (10345)
File: 10345s Transform: ARC SINE(SQUARE ROOT(Y))

Bartlett's Test for Homogeneity of Variance

Calculated B1 statistic = 4.9667 (p-value = 0.2907)

Data PASS B1 homogeneity test at 0.01 level. Continue analysis.

Critical B = 13.2767 (alpha = 0.01, df = 4)
= 9.4877 (alpha = 0.05, df = 4)

Title: Hyalella azteca survival vs. Laboratory Control (10345)
File: 10345s Transform: ARC SINE(SQUARE ROOT(Y))

Steel's Many-One Rank Test - Ho: Control<Treatment

GROUP	IDENTIFICATION	TRANSFORMED MEAN	RANK SUM	CRIT. VALUE	DF	SIG 0.05
1	10345	1.3916				
2	10341	1.3713	64.00	47.00	8.00	
3	10342	1.3916	68.00	47.00	8.00	
4	10343	1.3332	59.50	47.00	8.00	
5	10344	1.3305	56.00	47.00	8.00	

Critical values are 1 tailed (k = 4)

Amphipod (*Hyalella azteca*) Day 10 Survival and Dry Weight Data

Client: Menzie-Cura & Assoc.	Project: 99026	BTR: 3169
	Test Start: June 24, 1999	Test End: July 4, 1999

Sample	Repl.	# Alive	Init.	Repick #	Repick Init.	Total Surv	# Weighed	Init Pan Wt.	Total Dry Wt.
10341	A	9	σ	—	—	9	9	27.78	29.34
	B	9	σ	0	σ 7/4	9	9	28.00	29.20
	C	10	σ	—	—	10	10	26.25	27.43
	D	10	σ	—	—	10	10	36.63	38.22
	E	10	σ	—	—	10	10	25.76	27.13
	F	12	σ	—	—	12	12	31.91	33.13
	G	10	JJG	—	—	10	10	36.86	38.51
	H	11	σ	—	—	11	11	36.03	38.00
10342	A	10	σ	—	—	10	10	36.70	38.13
	B	10	σ	—	—	10	10	34.47	36.50
	C	10	σ	—	—	10	10	28.20	29.80
	D	10	σ	—	—	10	10	24.83	25.67
	E	10	σ	—	—	10	10	28.99	29.85
	F	10	σ	—	—	10	10	25.71	26.62
	G	9	PW	0	σ 7/4	9	9	25.38	26.36
	H	10	σ	—	—	10	10	31.97	33.55
10343	A	9	σ	0	σ 7/4	9	9	24.90	26.39
	B	10	PW	—	—	10	10	26.60	28.17
	C	10	σ	—	—	10	10	31.52	32.73
	D	10	σ	—	—	10	10	23.29	24.62
	E	10	PW	—	—	10	10	25.77	26.92
	F	8	JJG	0	σ 7/4	8	8	25.35	26.27
	G	10	JJG	—	—	10	10	24.39	25.58
	H	9	PW	0	σ 7/4	9	9	22.32	23.51
10344	A	10	JJG	—	—	10	10	29.90	31.35
	B	10	JJG	—	—	10	10	27.84	28.85
	C	9	σ	0	σ 7/4	9	9	30.80	32.10
	D	10	JJG	—	—	10	10	27.93	29.24
	E	9	JJG	0	σ 7/4	9	9	25.68	27.40
	F	9	σ	0	σ	9	9	25.69	26.93
	G	9	σ	0	σ	9	9	31.21	32.30
	H	10	JJG	—	—	10	10	31.14	32.42

Balance QC: Initial (20 mg = 19.99) Final (20 mg = 19.99) Balance Asset #:

Date/time In Temp(°C) 87°C Init. JJG Date/time out 7/5/99 11:30 Temp(°C) 89°C Init. JJG

Comments: Hyalella preserved in EtOH 7/4/99 JJG

7/5 Initial 20mg = 20.02 Final 20mg = 20.04 JJG

Reviewer: [signature] Date: 8/19/99

Laboratory: Aquatec Biological Sciences, South Burlington, Vermont

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Amphipod (*Hyalella azteca*) Day 10 Survival and Dry Weight Data

Client: Menzie-Cura & Assoc.	Project: 99026	BTR: 3169
	Test Start: June 24, 1999	Test End: July 4, 1999

Sample	Repl.	# Alive	Init.	Repick #	Repick Init.	Total Surv	# Weighed	Init Pan Wt.	Total Dry Wt.
10450	A	10	JJG	—	—	10	10	27.35	28.02
10345	B	9	JJG	1dead	JJG 7/4	9	9	28.10	29.10
	C	10	JJG	—	—	10	10	25.45	26.58
	D	10	JJG	—	—	10	10	24.50	25.45
	E	10	JJG	—	—	10	10	25.77	26.62
	F	10	JJG	—	—	10	10	25.49	26.10
	G	10	JJG	—	—	10	10	27.71	28.52
	H	10	JJG	—	—	10	10	31.28	31.98

	A								
	B								
	C								
	D								
	E								
	F								
	G								
	H								

	A								
	B								
	C								
	D								
	E								
	F								
	G								
	H								

	A								
	B								
	C								
	D								
	E								
	F								
	G								
	H								

Balance QC: Initial (20 mg =)		Final (20 mg =)		Balance Asset #:	
Date/time In	Temp(°C)	Init.	Date/time out	Temp(°C)	Init.
Comments:					

Reviewer: [signature] Date: 8/19/99

Laboratory: Aquatec Biological Sciences, South Burlington, Vermont

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Amphipod (*Hyalella azteca*) Overlying Water Environmental Monitoring

Project: Menzie-Cura & Associates	Project: 99026 Industriplex	BTR: 3169

Sample	Parameter	Day of Analysis 0	1	2	3	4	5	6	7	8	9	10
10341	T (°C)	23.8	22.5	23.7	22.9	23.6	24.1	22.8	22.5	23.0	21.8	22.7
	pH	7.0	7.5	7.2	7.3	7.3	7.3	7.3	7.3	7.3	7.5	7.3
	DO (mg/L)	4.6	7.1	6.0	6.2	6.1	5.3	5.3	5.3	5.5	7.2	~~5.4~~ 6.7 JG
	Conductivity	310	X	X	X	X	~~300~~ 310	X	X	X	X	300
	Ammonia, alk/hardness Sulfide	✓	X	X	X	X	X	X	X	X	X	✓
10342	T (°C)	23.6	23.0	23.6	23.1	23.7	24.1	22.9	22.8	23.1	22.1	22.2
	pH	7.2	7.4	7.3	7.4	7.5	7.1	7.5	7.5	7.3	7.6	7.2
	DO (mg/L)	6.2	6.9	6.2	6.5	6.0	5.0	5.9	6.5	5.2	7.3	~~5.5~~ 6.8 JG
	Conductivity	330	X	X	X	X	310	X	X	X	X	300
	Ammonia, alk/hardness Sulfide	✓	X	X	X	X	X	X	X	X	X	✓
10343	T (°C)	23.5	23.2	23.6	23.4	23.9	24.1	23.0	22.8	23.2	22.1	22.1
	pH	7.1	7.5	7.3	7.4	7.3	7.3	7.4	7.5	7.3	7.5	7.2
	DO (mg/L)	5.6	7.4	6.1	6.2	5.0	5.2	5.8	6.8	5.3	6.8	~~5.3~~ 6.7 JG
	Conductivity	330	X	X	X	X	310	X	X	X	X	300
	Ammonia, alk/hardness Sulfide	✓	X	X	X	X	X	X	X	X	X	✓
	Init./Date: 1999	JG 6/24	St 6/25	St 6/26	JG 6/27	JG 6/28	6/29 JG	6/30 JG/ec	7/1 SR	7/2 JG/ec	7/3 JG	7/4 JG

Comments: Test Start 6/24/99 1830 JG

Review: _____ Date: 8/19/99

Laboratory: Aquatec Biological Sciences, South Burlington, Vermont

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Amphipod (*Hyalella azteca*) Overlying Water Environmental Monitoring

Project: Menzie-Cura & Associates	Project: 99026 Industriplex	BTR: 3169

Sample	Parameter	Day of Analysis 0	1	2	3	4	5	6	7	8	9	10
10344	T (°C)	23.5	23.1	23.8	23.3	23.9	24.2	23.0	22.9	23.2	22.2	22.4
	pH	7.3	7.6	7.5	7.5	7.5	7.5	7.9	7.5	7.4	7.6	7.4
	DO (mg/L)	5.6	6.7	5.8	5.8	5.4	4.8	4.7	5.6	5.2	6.8	~~5.4~~ 6.7 JG
	Conductivity	390	X	X	X	X	330	X	X	X	X	290
	Ammonia, alk/hardness Sulfide	✓	X	X	X	X	X	X	X	X	X	✓
10345	T (°C)	23.4	22.9	23.7	23.2	23.9	24.2	23.0	23.0	23.2	22.1	22.2
	pH	7.4	7.9	7.7	~~7.78~~ JG	7.7	7.7	7.8	7.8	7.7	7.7	7.7
	DO (mg/L)	7.6	8.0	7.5	6.4	6.7	6.3	6.4	7.1	6.4	6.8	6.8
	Conductivity	450	X	X	X	X	350	X	X	X	X	340
	Ammonia, alk/hardness Sulfide	✓	X	X	X	X	X	X	X	X	X	✓
	T (°C)											
	pH											
	DO (mg/L)											
	Conductivity		X	X	X	X		X	X	X	X	
	Ammonia, alk/hardness Sulfide		X	X	X	X	X	X	X	X	X	
	Init./Date: JGG	JG 6/24	SK 6/25	SK 6/26	6/27 JG	6/28 JG	6/29 JG	6/30 JG	7/1 SK	7/2 JG/CC	7/3 SK	7/4 JG

Comments: Test start 6/24/99 1830 JG

Review: _____ Date: 8/19/99

Laboratory: Aquatec Biological Sciences, South Burlington, Vermont

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ALKALINITY & HARDNESS WORKSHEET

BTR Number: Several Project #: 99026 Analyst: CC / ST

Species: *Chironomus tentans* and *Hyalella azteca* Analysis

Test Facility: Aquatec Biological Sciences, South Burlington, Vermont Dates: 6/23/99 8/23/99

Project: Menzie-Cura Industriplex Acute Tests 8/22/99

		ALKALINITY				HARDNESS			
Date	Sample Type	Sample ml	Initial ml	Final ml	Alkalinity (mg/L)	Sample ml	Initial ml	Final ml	Hardness (mg/L)
06/24/99	10341 Day 0	50	15.8	16.5	14.0	50	18.2	21.8	72.0
06/24/99	10342 Day 0	50	16.5	17.6	22.0	25	21.8	23.9	84.0
06/24/99	10343 Day 0	50	11.0	11.8	16.0	50	23.9	28.8	98.0
06/24/99	10344 Day 0	50	11.8	12.9	22.0	50	28.8	34.5	114.0
06/24/99	10345/6 Day 0	50	12.9	15.0	42.0	50	34.5	42.1	152.0
07/04/99	10341 Day 10 HA	50	15.0	16.3	26.0	50	0.0	5.0	100.0
07/04/99	10342 Day 10 HA	50	16.3	17.5	24.0	50	5.0	9.7	94.0
07/04/99	10343 Day 10 HA	50	17.5	18.8	26.0	50	9.7	14.9	104.0
07/04/99	10344 Day 10 HA	50	18.8	20.1	26.0	50	14.9	20.1	104.0
07/04/99	10345 Day 10 HA	50	20.1	21.5	28.0	50	20.1	25.7	112.0
07/04/99	10341 Day 10 CT	50	21.5	22.6	22.0	50	25.7	30.1	88.0
07/04/99	10342 Day 10 CT	50	22.6	23.3	14.0	50	30.1	34.4	86.0
07/04/99	10343 Day 10 CT	50	23.3	24.4	22.0	50	34.4	39.2	96.0
07/04/99	10344 Day 10 CT	50	24.4	25.7	26.0	50	39.2	44.5	106.0
07/04/99	10346 Day 10 CT	50	25.7	27.3	32.0	50	44.5	50.4	118.0

Alkalinity and Hardness Analysis

Client: MENZIE · CUEA	Project: INDUSTRIPLEX	BTR: SEVERAL
Sample Description: Overlying Water, H. azteca, C. tentans (Day 0: 6/29) (Day 10: 7/4)		

	Sample ID	Sample Date	ALKALINITY Sample Vol.	Titrant Init. Vol.	Titrant Final Vol.	Analyst Date/ Init.	HARDNESS Sample Vol.	Titrant Init. Vol.	Titrant Final Vol.	Analyst Date/ Init.	Data entered Init.
	10341	6/24/99	50	15.8	16.5	6/23CC	50	18.2	21.8	8/22SAT	JM
	10342		50	16.5	17.6	6/23CC	25	21.8	23.9		JM
	10343		50	11.0	11.8	8/22SAT	50	23.9	28.8		JM
	10344		50	11.8	12.9	8/22SAT	50	28.8	34.5		JM
ctl.	10345		50	12.9	15.0	8/22SAT	50	34.5	42.1		JM
azteca	10341	7/4/99	50	15.0	16.3	8/22SAT	50	0	5.0	8/22SAT	JM
	10342		50	16.3	17.5	8/22SAT	50	5.0	9.7		
	10343		50	17.5	18.8	8/22SAT	50	9.7	14.9		JM
	10344		50	18.8	20.1	8/22SAT	50	14.9	20.1		JM
ctl.	10345		50	20.1	21.5	8/22SAT	50	20.1	25.7		JM
tentans	10341	7/4/99	50	21.5	22.6	8/22SAT	50	25.7	30.1	8/23SAT	JM
	10342		50	22.6	23.3		50	30.1	34.4		JM
	10343		50	23.3	24.4		50	34.4	39.2		JM
	10344		50	24.4	25.7		50	39.2	44.5		JM
ctl.	10346		50	25.7	27.3		50	44.5	50.4		JM

ACUTEZ

Hyalella azteca Initial Dry Wt.

Client: Menzie-Cura & Assoc.	Project: 99026	BTR: 3169
Culture ID: 6/18/99	Age: 13 days	

Replicate	Number of Organisms weighed	Initial Pan Weight (mg)	Final Pan Weight (mg)	Avg. Dry WT.
1	10	25.74	25.94	0.020
2	10	24.40	24.57	0.017
3	10	26.04	26.28	0.024
4	10	33.13	33.29	0.016
5	10	30.58	30.70	0.012
6	10	25.15	25.52	0.034
7	10	34.53	34.85	0.034
8	10	27.73	28.00	0.027
Initials:	SP		JJG	
Date:	6/25		6/26/99	

Balance QC: Initial (20 mg = 20.01) Asset #:	6/26 20.01	Final (20 mg = 20.01) 6/26 20.02	Balance
Date/time In 6/25 1900 Temp(°C) 16 Temp(°C) 86 °C Init. JJG		Init. SP	Date/time out 6/26/99 16:30
Comments:			

Reviewer: J Date: 8/19/99

Laboratory: Aquatec Biological Sciences, South Burlington, Vermont

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Organism Holding and Acclimation

Species: *Hyalella azteca*	Date Received: 6/18/99 No. Rec. 800
Supplier: EC & T	Hatch Date:. 6/11/99
Apparent Conditon: Excellent	Culture ID: HA61899

Acclimation / Holding Procedures: Transfer to holding culture boxes, add laboratory reconstituted water. Acclimate to water to be used for testing: EPA/600/R-94/024 moderately hard reconstituted water (sediment overlying water formulation). Aerate lightly. Water change once (50%) weekly.
Daily Feeding: 1:1 mix of *Selenastrum* / YCT, 1-3 mL (maintain hint of green algal coloration on culture box bottom). Do not allow excess food/fungus to accumulate.
Monitoring: Examine over a light box daily, record apparent condition. Temperature daily; pH, D.O, on Mon., Weds., Fri., (miniumum); A&H, conductivity weekly.
Test starts: record date, time, initials for sediment test and SRT test starts.

1999 Date	Fed	Temp	pH	D.O.	Cond uct.			Water Chg.	Condition *	Init.
6/18	Sel/YCT	22.1	7.2	7.6	360			✓	N	JJG
6/19	Sel/YCT								Normal	JJG
6/20	YCT/Sel	22.4							N	JJG
6/21	Sel/YCT	22.6	7.7	7.4	330			✓	Age = 10 d	JJG
6/22	YCT	22.4	8.0	6.3	330				Age = 11 d	JJG
6/23	YCT/Sel	22.6	—	—	—				Age = 12 d	
6/24	YCT/Sel	23.3	7.7	7.7	330			✓	Age = 13 d	JJG
6/25	YCT/Sel								Age = 14 d	JJG

* N = normal, appear healthy. Record # dead if any observed.

Sediment test start (Date/time/init.) 6/24/99 1830 SRT test start: (Date/time/init.) 6/25/99

Environmental Consulting & Testing
1423 N. 8th St. Suite 118 • Superior, WI 54880

SHIPPING DATE: 06-17-99

FROM: ECT SUPERIOR, WI.

TO: AQUATEC
75 GREEN MT. DR.
SOUTH BURLINGTON, VT 05403
802-860-1638

SPECIES: SCUD (H. azteca)
DATE OF Hatch: 06-11-99

NUMBER: 800 +

TEMP. AT SHIPPING: 23.2 C

P.O.#: 600 VERBAL J. WILLIAMS

SHIPPED BY: Fed. Ex. 1706-1491-7

WATER CHEMISTRY RECORDS

TEMPERATURE	22 to 24	AS Co
CONDUCTIVITY	100 to 200	AS UMHOS/CM
T.HARDNESS	60 to 90	AS CACO3
T.ALKALINITY	40 to 60	AS CACO3
pH	7.3 to 7.8	

Originally obtained from culture at EPA Duluth, MN
Fed Algae and YTC
NaCl Reference 96 hr LC50
Mean = 3.48 s.d.= 0.85
Range 2x s.d. = 1.78 to 5.18
n=10

RoC 6/18/99
Temp 22.1
pH 7.2
D.O. 7.6
Cond. 360

Sediment Characterization

Client: Menzie-Cura & Assoc.	Project: 99026	BTR: 3169

Date sediments distributed to test chambers (100 mL homogenized sediment):

- *H. azteca* acute test: > 6/23/99
- *C. tentans* acute test:
- *H. azteca* chronic test:
- *C. tentans* chronic test: > 7/5/99 For Auxiliary mates on 7/15/99

Sample Number	porew pH	porew H2S	porew Amm	Sediment Visual Characterization
10341	6.4			Brown/black liquid/mud. Some vegetation
10342	6.6			Sovey black ~~brown~~ sediment
10343	6.4			Sovey black sediment / Detritus
10344	6.8			Very liquid black fine mud.
				Sediments distributed to test
				beakers, overlying water added
				6/23/99 1800
10345 / 46 LCS	/	/	/	EPA artificial control sediment (77% med. and fine sand; 17% kaolinite clay; 5% 0.5 mm-sieved peat; 1% CaCO3). Stored dry, then hydrated prior to addition to test chambers.

Extract porewater, measure and record pH, decant and preserve sulfide and ammonia samples.

Entered by: [signature] Date: 6/23/99

Reviewer: [signature] Date: 8/19/99.

Laboratory: Aquatec Biological Sciences, South Burlington, Vermont

Title: Hyalella azteca survival vs. Lab. Control (10448)
File: 10448s Transform: ARC SINE(SQUARE ROOT(Y))
Number of Groups: 5

GRP	IDENTIFICATION	REP	VALUE	TRANS VALUE
1	10448	1	1.0000	1.4120
1	10448	2	0.5000	0.7854
1	10448	3	0.7000	0.9912
1	10448	4	0.9000	1.2490
1	10448	5	0.7000	0.9912
1	10448	6	0.2000	0.4636
1	10448	7	0.9000	1.2490
1	10448	8	0.6000	0.8861
2	10446	1	1.0000	1.4120
2	10446	2	1.0000	1.4120
2	10446	3	1.0000	1.4120
2	10446	4	1.0000	1.4120
2	10446	5	1.0000	1.4120
2	10446	6	0.6000	0.8861
2	10446	7	1.0000	1.4120
2	10446	8	0.9000	1.2490
3	10447	1	0.3000	0.5796
3	10447	2	0.7000	0.9912
3	10447	3	0.2000	0.4636
3	10447	4	0.0000	0.1588
3	10447	5	0.0000	0.1588
3	10447	6	0.8000	1.1071
3	10447	7	0.5000	0.7854
3	10447	8	0.4000	0.6847
4	10472	1	0.9000	1.2490
4	10472	2	1.0000	1.4120
4	10472	3	0.8000	1.1071
4	10472	4	1.0000	1.4120
4	10472	5	1.0000	1.4120
4	10472	6	1.0000	1.4120
4	10472	7	0.9000	1.2490
4	10472	8	0.9000	1.2490
5	10473	1	1.0000	1.4120
5	10473	2	1.0000	1.4120
5	10473	3	0.9000	1.2490
5	10473	4	0.4000	0.6847
5	10473	5	1.0000	1.4120
5	10473	6	1.0000	1.4120
5	10473	7	1.0000	1.4120
5	10473	8	0.9000	1.2490

8/25/95

Title: Hyalella azteca survival vs. Lab. Control (10448)
File: 10448s Transform: ARC SINE(SQUARE ROOT(Y))

Shapiro - Wilk's Test for Normality

D = 2.2797
W = 0.9180

Critical W = 0.9190 (alpha = 0.01 , N = 40)
W = 0.9400 (alpha = 0.05 , N = 40)

Data FAIL normality test (alpha = 0.01). Try another transformation.

Warning - The first three homogeneity tests are sensitive to non-normality and should not be performed with this data as is.

Title: Hyalella azteca survival vs. Lab. Control (10448)
File: 10448s Transform: ARC SINE(SQUARE ROOT(Y))

Bartlett's Test for Homogeneity of Variance

Calculated B1 statistic = 8.3562 (p-value = 0.0794)

Data PASS B1 homogeneity test at 0.01 level. Continue analysis.

Critical B = 13.2767 (alpha = 0.01, df = 4)
= 9.4877 (alpha = 0.05, df = 4)

Title: Hyalella azteca survival vs. Lab. Control (10448)
File: 10448s Transform: ARC SINE(SQUARE ROOT(Y))

Summary Statistics on Transformed Data TABLE 1 of 2

GRP	IDENTIFICATION	N	MIN	MAX	MEAN
1	10448	8	0.4636	1.4120	1.0034
2	10446	8	0.8861	1.4120	1.3259
3	10447	8	0.1588	1.1071	0.6162
4	10472	8	1.1071	1.4120	1.3128
5	10473	8	0.6847	1.4120	1.2804

Title: Hyalella azteca survival vs. Lab. Control (10448)
File: 10448s Transform: ARC SINE(SQUARE ROOT(Y))

Summary Statistics on Transformed Data TABLE 2 of 2

GRP	IDENTIFICATION	VARIANCE	SD	SEM	C.V. %
1	10448	0.0915	0.3025	0.1070	30.1469
2	10446	0.0348	0.1866	0.0660	14.0767
3	10447	0.1226	0.3501	0.1238	56.8208
4	10472	0.0134	0.1158	0.0409	8.8207
5	10473	0.0633	0.2517	0.0890	19.6574

Title: Hyalella azteca survival vs. Lab. Control (10448)
File: 10448s Transform: ARC SINE(SQUARE ROOT(Y))

Steel's Many-One Rank Test - Ho: Control<Treatment

GROUP	IDENTIFICATION	TRANSFORMED MEAN	RANK SUM	CRIT. VALUE	DF	SIG 0.05
1	10448	1.0034				
2	10446	1.3259	89.50	47.00	8.00	
3	10447	0.6162	49.00	47.00	8.00	
4	10472	1.3128	89.00	47.00	8.00	
5	10473	1.2804	86.50	47.00	8.00	

Critical values are 1 tailed (k = 4)

Amphipod (*Hyalella azteca*) Day 10 Survival and Dry Weight Data

Client: Menzie-Cura & Assoc.	Project: 99026 Industriplex	BTR: 3189 / 3196
	Test Start: June 26, 1999	Test End: July 6, 1999

Sample	Repl.	# Alive	Init.	Repick #	Repick Init.	Total Surv	# Weighed	Init Pan Wt.	Total Dry Wt.
10446	A	8	SS	2	JT	10	10	22.99	24.43
	B	10	CC	—	—	10	10	24.66	25.16
	C	9	JJG	1	JT	10	10	26.96	27.20
	D	10	CC	—	—	10	10	28.86	29.23
	E	10	JJG	—	—	10	10	28.03	28.37
	F	5	St	1	CM	6	5	25.35	25.55
	G	10	JJG	—	—	10	10	26.10	26.64
	H	8	St	1	JT 7/6	9	9	28.13	28.48
10447	A	3	St	—	—	3	3	26.01	26.08
	B	7	JJG	—	—	7	7	27.16	27.38
	C	2	SS	—	—	2	2	31.31	31.36
	D	0	SS	—	—	~~2~~ 0	0	32.74	~~27.18~~
	E	0	SS	—	—	~~2~~ 0	0	33.06	—
	F	~~2~~ 7	CC	1	JT 7/6	8	8	26.91	27.16
	G	5	St	—	—	5	5	~~33.~~ 27.35	27.48
	H	4	St	—	—	4	4	27.16	27.27
10448	A	9	JT	1	JT 7/6	10	2 (1)	~~30.69~~ CC	~~35.23~~ init pan wt. / total dry wt. 35.28
	B	5	JJG	0	CM	5	5	~~28.18~~	~~32.55~~ 32.72
	C	7	JJG	0	CM	7	7	~~29.62~~	~~33.76~~ 33.85
	D	9	JJG	0	CM	9	9	~~27.22~~	~~31.14~~ 31.44
	E	7	JT	0	CM	7	7	~~28.30~~	~~31.16~~ 31.26
	F	2	St	0	CM	2	2	~~28.49~~	~~33.44~~ 33.47
	G	8	CC	1	CM	9	8	~~25.73~~	~~32.12~~ 32.34
	H	4	St	2	JT 7/6	6	6	~~26.79~~	~~32.31.99~~ CC 32.07
10472	A	8	SS	1	JT 7/6	9	9	30.69	31.05
	B	10	St	—	—	10	10	28.18	28.69
	C	8	JJG	0	CM	8	8	29.62	30.15
	D	9	SS	1	JT 7/6	10	10	27.22	27.69
	E	10	SS	—	—	10	10	28.30	28.89
	F	8	SS	2	JT 7/6	10	10	28.49	29.15
	G	8	CC	1	CM	9	9	25.73	26.25
	H	9	CC	—	—	9	9	25.79	26.36

Balance QC: Initial (20 mg = 20.02 g) Final (20 mg = 20.04 g) Balance Asset #:
Date/time In 7/7 1100 Temp(°C) 86 Init. St Date/time out 7/7 1130 Temp(°C) 87 Init. SS
Comments: (1) Cup spilled, lost 1 amphipods. JT 7/6/99
(2) Sample 10447, when sieved very little of the sample was left for repick. 7/6/99 JJG

Reviewer: [illegible] Date: 8/18/99
Laboratory: Aquatec Biological Sciences, South Burlington, Vermont

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Amphipod (*Hyalella azteca*) Day 10 Survival and Dry Weight Data

Client: Menzie-Cura & Assoc.	Project: 99026 Industriplex	BTR: 3189 / 3196
	Test Start: June 26, 1999	Test End: July 6, 1999

Sample	Repl.	# Alive	Init.	Repick #	Repick Init.	Total Surv	# Weighed	Init Pan Wt.	Total Dry Wt.
10473	A	10	JJG	—	—	10	10	31.44	31.98
	B	10	SJ	—	—	10	10	26.12	26.81
	C	7	CC	2	J 7/6	9	9	25.66	26.16
	D	4	JJG	0	CM	4	4	27.03	27.23
	E	0 ~~9~~	CC	1	J 7/6	0 ~~9~~ 10	10	33.29	33.77
	F	10	JJG	—	—	10	10	26.11	26.64
	G	10	SJ	—	—	10	10	25.96	26.41
	H	9	JJG	—	—	9	9	26.24	26.89
10474	A	0	JJG	—	—	0	0	34.04	
	B	0	JJG	—	—	0	0	34.74	
	C	0	JJG	—	—	0	0	24.58	
	D	0	JJG	—	—	0	0	27.21	
	E	0	JJG	—	—	0	0	27.55	
	F	0	JJG	—	—	0	0	33.15	
	G	0	SJ	—	—	0	0	33.56	
	H	0	JJG	—	—	0	0	33.31	
10475	A	0	JJG	—	—	0	0	32.82	
	B	0	JJG	—	—	0	0	35.17	
	C	0	JJG	—	—	0	0	30.89	
	D	0	JJG	—	—	0	0	39.57	
	E	0	JJG	—	—	0	0	30.32	
	F	0	JJG	—	—	0	0	31.21	
	G	0	JJG	—	—	0	0	35.59	
	H	0	JJG	—	—	0	0	32.84	
	A								
	B								
	C								
	D								
	E								
	F								
	G								
	H								

Balance QC: Initial (20 mg = 20.02g)	Final (20 mg = 20.09g)	Balance Asset #:
Date/time in 7/7 1100 Temp(°C) 86 Init. SJ	Date/time out 7/7 1140 Temp(°C) 87	Init. SJ
Comments:		

Reviewer: [illegible] Date: 8/4/99

Laboratory: Aquatec Biological Sciences, South Burlington, Vermont

Amphipod (*Hyalella azteca*) Overlying Water Environmental Monitoring

Project: Menzie-Cura & Associates	Project: 99026 Industriplex	BTR: 3189 / 3196 Test Starts 6/26/99

Sample	Parameter	Day of Analysis 0	1	2	3	4	5	6	7	8	9	10
10446	T (°C)	24.0	23.0	23.8	24.0	23.0	22.8 ~~23.7~~	23.5	22.2	22.5	22.8	22.9
	pH	7.5	7.5	7.5	7.5	7.4	7.5	7.5	7.6	7.5	7.5	7.5
	DO (mg/L)	7.4	7.3	7.4	7.3	6.5	7.3	6.4	7.5	6.8	6.9	6.8
	Conductivity	340	X	X	X	X	340	X	X	X	X	300
	Ammonia, alk/hardness Sulfide	✓	X	X	X	X	X	X	X	X	X	✓
10447	T (°C)	23.8	22.9	24.0	24.0	22.8	23.4 ~~23.7~~	23.4	21.9	22.6	23.0	22.7
	pH	7.6	7.7	7.7	7.9	~~7.6~~ 7.7[a]	7.6	7.6	7.6	7.7	7.5	7.5
	DO (mg/L)	6.6	7.4	7.2	7.5	~~7.9~~ 7.2[a]	6.7	6.6	7.3	7.2	6.5	6.8
	Conductivity	410	X	X	X	X	350	X	X	X	X	320
	Ammonia, alk/hardness Sulfide	✓	X	X	X	X	X	X	X	X	X	✓
10472	T (°C)	23.8	22.8	23.8	23.9	23.0	23.3	23.2	22.7	22.5	22.7	22.7
	pH	7.5	7.6	7.7	7.8	~~7.7~~ 7.6[a]	7.5	~~7.7~~ 7.5[a]	7.5	7.5	7.4	7.5
	DO (mg/L)	7.0	7.2	7.3	7.6	~~7.2~~ 7.3[a]	6.4	6.7	7.5	6.3	6.0	6.5
	Conductivity	330	X	X	X	X	340	X	X	X	X	310
	Ammonia, alk/hardness Sulfide	✓	X	X	X	X	X	X	X	X	X	✓
	Init./Date:	6/26 JG	JG 6/27	6/28 JG	6/29 JG	6/30 JG CC	7/1 JG	7/2 JG CC	7/3 JG	7/4 JG	7/5 JG	7/6 CC

Comments: Test start 6/26/99 17:00

Review: _____ Date: 8/19/99

Laboratory: Aquatec Biological Sciences, South Burlington, Vermont

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Amphipod (*Hyalella azteca*) Overlying Water Environmental Monitoring

Project: Menzie-Cura & Associates	Project: 99026 Industriplex	BTR: 3189 / 3196 Test Starts 6/26/99

Sample	Parameter	Day of Analysis 0	1	2	3	4	5	6	7	8	9	10
10473	T (°C)	23.7	23.0	22.7	23.9	22.8	23.1	23.7	22.1	22.4	22.6	22.7
	pH	7.5	7.6	7.6	7.7	7.6	7.5	7.5	7.5	7.7	7.5	7.5
	DO (mg/L)	7.6	7.2	6.9	7.3	6.5	6.7	6.3	7.8	7.4	6.2	6.7
	Conductivity	340	X	X	X	X	340	X	X	X	X	320
	Ammonia, alk/hardness Sulfide	✓	X	X	X	X	X	X	X	X	X	✓
10474	T (°C)	23.7	22.9	23.8	24.0	22.9	23.0	23.1	22.3	22.3	22.6	22.5
	pH	7.6	8.1	7.6	8.0	8.0	8.0	8.0	8.0	8.0	7.8	7.8
	DO (mg/L)	6.6	7.0	6.8	7.6	6.9	7.1	7.0	7.8	7.4	6.7	6.8
	Conductivity	410	X	X	X	X	600	X	X	X	X	400
	Ammonia, alk/hardness Sulfide	✓	X	X	X	X	X	X	X	X	X	✓
10475	T (°C)	23.6	22.8	23.8	24.0	22.9	23.2	23.1	22.3	22.3	22.8	22.6
	pH	7.5	7.9	7.9	8.1	8.0	8.0	8.0	7.9	7.9	7.8	7.9
	DO (mg/L)	7.6	6.7	6.8	7.6	7.2	7.9	7.2	6.9	6.5	6.7	6.8
	Conductivity	330	X	X	X	X	600	X	X	X	X	410
	Ammonia, alk/hardness Sulfide	✓	X	X	X	X	X	X	X	X	X	✓
	Init./Date:	6/26	6/27 JG	6/28 JG	6/29	6/30 JG CL	7/1	7/2 JG CL	7/3	7/4 JG KD	7/5 JG	7/6 CL

Comments: Test start 6/26/99 17:00

Review: _____ Date: 8/19/99

Laboratory: Aqualec Biological Sciences, South Burlington, Vermont

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Amphipod (*Hyalella azteca*) Overlying Water Environmental Monitoring

Project: Menzie-Cura & Associates	Project: 99026 Industriplex	BTR: 3189 / 3196 Test Starts 6/26/99

Sample	Parameter	Day of Analysis 0	1	2	3	4	5	6	7	8	9	10
10448	T (°C)	23.6	22.9	23.9	24.1	23.0	22.9	23.4	22.5	22.4	22.7	22.6
	pH	7.9	7.7	7.7	7.9	7.8	7.7	7.7	7.8	7.8	7.8	7.8
	DO (mg/L)	8.5	7.6	7.5	7.7	7.5	7.7	7.1	7.6	7.3	7.1	7.3
	Conductivity	3.2	X	X	X	X	370	X	X	X	X	380
	Ammonia, alk/hardness Sulfide	✓	X	X	X	X	X	X	X	X	X	✓
	T (°C)											
	pH											
	DO (mg/L)											
	Conductivity		X	X	X	X		X	X	X	X	
	Ammonia, alk/hardness Sulfide	✓	X	X	X	X	X	X	X	X	X	
	T (°C)											
	pH											
	DO (mg/L)											
	Conductivity		X	X	X	X		X	X	X	X	
	Ammonia, alk/hardness Sulfide	✓	X	X	X	X	X	X	X	X	X	
	Init./Date:	6/26 JG	6/27 JG	6/28 JG	6/29 JG	6/30 JG CC	7/1	7/2 JG/CC	7/3	7/4 JG	7/5 JG	7/6

Comments: Test Start 6/26/99 17:00

Review: _____ Date: 8/19/99

Laboratory: Aquatec Biological Sciences, South Burlington, Vermont

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ALKALINITY & HARDNESS WORKSHEET

BTR Number: Several Project #: 99026 Analyst: CC / ST

Species: *Chironomus tentans* and *Hyalella azteca* Analysis

Test Facility: Aquatec Biological Sciences, South Burlington, Vermont Dates: 6/20/99

Project: Menzie-Cura Industriplex Acute Tests 8/19/99

		ALKALINITY				HARDNESS			
Date	Sample Type	Sample ml	Initial ml	Final ml	Alkalinity (mg/L)	Sample ml	Initial ml	Final ml	Hardness (mg/L)
06/26/99	10446 Day 0	50	21.8	22.9	22.0	50	21.9	26.7	96.0
06/26/99	10447 Day 0	50	24.0	26.1	42.0	25	26.7	29.3	104.0
06/26/99	10448/9 Day 0	50	26.1	28.2	42.0	50	29.3	36.1	136.0
06/26/99	10472 Day 0	50	28.2	29.4	24.0	50	36.1	40.6	90.0
06/26/99	10473 Day 0	50	29.4	30.7	26.0	50	0.0	4.8	96.0
06/26/99	10474 Day 0	25	30.7	39.8	364.0	50	4.8	6.5	34.0
06/26/99	10475 Day 0	50	8.7	20.9	244.0	50	6.5	11.5	100.0
07/06/99	10446 Day 10 HA	50	0.0	1.1	22.0	50	0.0	4.5	90.0
07/06/99	10447 Day 10 HA	50	1.1	2.4	26.0	50	4.5	9.1	92.0
07/06/99	10448 Day 10 HA	50	2.4	4.0	32.0	50	9.1	14.7	112.0
07/06/99	10472 Day 10 HA	50	4.0	5.1	22.0	50	14.7	19.4	94.0
07/06/99	10473 Day 10 HA	50	5.1	6.2	22.0	50	19.4	23.9	90.0
07/06/99	10474 Day 10 HA	50	6.2	6.7	10.0	50	23.9	28.3	88.0
07/06/99	10475 Day 10 HA	50	6.7	7.2	10.0	50	28.3	32.6	86.0
07/06/99	10446 Day 10 CT	50	7.2	8.3	22.0	50	0.0	4.6	92.0
07/06/99	10447 Day 10 CT	50	8.3	9.6	26.0	50	4.6	9.2	92.0
07/06/99	10449 Day 10 CT	50	9.6	11.3	34.0	50	9.2	15.7	130.0
07/06/99	10472 Day 10 CT	50	11.3	12.3	20.0	50	15.7	20.7	100.0
07/06/99	10473 Day 10 CT	50	12.3	13.3	20.0	50	20.7	25.2	90.0
07/06/99	10474 Day 10 CT	50	13.3	13.9	12.0	50	25.2	30.0	96.0
07/06/99	10475 Day 10 CT	25	13.9	14.1	8.0	25	30.0	32.4	96.0

Alkalinity and Hardness Analysis

Client: Menzie-Cura	Project: Invasmatrix	BTR: Several

Sample Description: Overlying Water, H. azteca, C. tentans DAY 0: 6/26 DAY 10: 7/6 ACUTE

		ALKALINITY				HARDNESS				
Sample ID	Sample Date	Sample Vol.	Titrant Init. Vol.	Titrant Final Vol.	Analyst Date/ Init.	Sample Vol.	Titrant Init. Vol.	Titrant Final Vol.	Analyst Date/ Init.	Data entered Init.
10446	6/26/99	50	21.8	22.9	7/16 CC	50	21.9	26.7	7/16 CC	JM
10447	6/26/99	50	24.0	26.1		25:25 ①	26.7	29.3		JM
ctl. 10449/9	6/26/99	50	26.1	28.2		50	29.3	36.1		JM
10472	6/26/99	50	28.2	29.4		50	36.1	40.6		JM
10473	6/26/99	50	29.4	30.7		50	0	4.8		JM
10474	6/26/99	25:25 ①	30.7	39.8		50	4.8	6.5		JM
10475	6/26/99	50	8.7	20.9		50	6.5	11.5		JM
H. azteca										
10446	7/6/99	50	0	1.1	8/19 SAF	50	0	4.5	8/19 SAF	JM
10447	7/6/99	50	1.1	2.4		50	4.5	9.1		JM
ctl. 10448	7/6/99	50	2.4	4.0		50	9.1	14.7		JM
10472	7/6/99	50	4.0	5.1		50	14.7	19.4		JM
10473	7/6/99	50	5.1	6.2		50	19.4	23.9		JM
10474	7/6/99	50	6.2	6.7		50	23.9	28.3		JM
10475	7/6/99	50	6.7	7.2		50	28.3	32.6		JM
			~~7.2~~ 0	~~8.3~~ 0						
C. tentans										
10446	7/6/99	50	7.2	8.3	8/19 SAF	50	0	4.6	8/19 SAF	JM
10447	7/6/99	50	8.3	9.6		50	4.6	9.2		JM
ctl. 10449	7/6/99	50	9.6	11.3		50	9.2	15.7		JM
10472	7/6/99	50	11.3	12.3		50	15.7	20.7		JM
10473	7/6/99	50	12.3	13.3		50	20.7	25.2		JM
10474	7/6/99	50	13.3	13.9		50	25.2	30.0		JM
10475	7/6/99	25:25	13.9	14.1		25.25	30.0	32.4		JM

① 1:1 dilution, sample : D.I.

Hyalella azteca Initial Dry Wt.

Client: Menzie-Cura & Assoc.	Project: 99026	BTR: 3189 / 3196
Culture ID: HA62499	Age: 10 days	

Replicate	Number of Organisms weighed	Initial Pan Weight (mg)	Final Pan Weight (mg)	Avg. Dry Wt. (mg)
1	10	32.89	33.07	0.018
2	10	35.97	36.11	0.014
3	10	29.75	~~36~~ 29.91	0.016
4	10	38.95	39.11	0.016
5	10	25.40	25.58	0.018
6	10	29.41	29.55	0.014
7	10	32.27	32.41	0.014
8	10	33.13	33.33	0.020
Initials:	SR			
Date:	6/26			

Balance QC: Initial (20 mg = 19.99)		Final (20 mg = 20.00)	Balance
Asset #:	6/27 19.99	6/27 19.99	JJG
Date/time In 6/30 1800 Temp(°C)	Init. SR	Date/time out 6/27/99 1600 JJG	
Temp(°C) 88°C Init. JJG			
Comments:			

Reviewer: _____ Date: 8/19/99

Laboratory: Aquatec Biological Sciences, South Burlington, Vermont

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Organism Holding and Acclimation

Species: *Hyalella azteca*	Date Received: 6/24/99 No. Rec. 900
Supplier: EC & T	Hatch Date: 6/16/99
Apparent Conditon: Excellent	Culture ID: HA62499

Acclimation / Holding Procedures: Transfer to holding culture boxes, add laboratory reconstituted water. Acclimate to water to be used for testing: EPA/600/R-94/024 moderately hard reconstituted water (sediment overlying water formulation). Aerate lightly. Water change once (50%) weekly.
Daily Feeding: 1:1 mix of *Selenastrum* / YCT, 1-3 mL (maintain hint of green algal coloration on culture box bottom). Do not allow excess food/fungus to accumulate.
Monitoring: Examine over a light box daily, record apparent condition. Temperature daily; pH, D.O, on Mon., Weds., Fri., (miniumum); A&H, conductivity weekly.
Test starts: record date, time, initials for sediment test and SRT test starts.

1999 Date	Fed	Temp	pH	D.O.	Cond uct.			Water Chg.	Age / Condition	Init.
6/24	Sel/YCT 1:1	23.0	7.4	8.0	280			✓	8d / N	J
6/25	Sel/YCT 1:1	22.7	—	—	—				9d	J
6/26	Sel/YCT 1:1	23.0	8.0	7.4	300				10d	BR
6/27	Sel/YCT								11d	JJG
6/28	Sel/YCT 1:1							✓	12d	J
6/29									13d	
6/30									14d	

* N = normal, appear healthy. Record # dead if any observed.

Sediment test start (Date/time/Init.) 6/26/99 99026 BTRs 3189/3196 SRT test start: (Date/time/init.) 6/26/99

Sediment Characterization

Client: Menzie-Cura & Assoc.	Project: 99026	BTR: 3189 / 3196

Date sediments distributed to test chambers (100 mL homogenized sediment):

- *H. azteca* acute test: 6/25/99
- *C. tentans* acute test: 6/25/99
- *H. azteca* chronic test: 7/6/99 (Samples 10446, 10472, 10473)
- *C. tentans* chronic test:

Sample Number	porew pH	porew H2S	porew Amm	Sediment Visual Characterization
10446	6.6			Soft black mud
10447	7.1			Black, very liquid, fine
10472	6.8			Black, viscous mud.
10473	6.8			Black, very liquid, fine,
10474	7.6 pore water black/dark tan			Black, very liquid, fine, odorous
10475	7.6 pore water black/dark tan			Black, soupy, very fine sediment
10448 / 449 LCS				EPA artificial control sediment (77% med. and fine sand; 17% kaolinite clay; 5% 0.5 mm-sieved peat; 1% CaCO3). Stored dry, then hydrated prior to addition to test chambers.

Extract porewater, measure and record pH, decant and preserve sulfide and ammonia samples.

Entered by: [signature] Date: 6/25/99

Reviewer: [signature] Date: 8/17/99

Laboratory: Aquatec Biological Sciences, South Burlington, Vermont

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Results of Ammonia Analyses (Total, mg/L)				
Sample ID	Porewater	Day 0	Day 10 *Hyalella azteca*	Day 10 *Chironomus tentans*
10219	1.7	0.6	<0.5	1.1
10220	1.9	<0.5	<0.5	0.9
10221	13.5	3.0	0.6	1.9
10222/3	-	<0.5	<0.5	0.7
10224	3.6	<0.5	<0.5	1.3
10341	1.1	0.5	1.1	1.0
10342	5.2	2.0	0.9	1.1
10343	2.4	1.2	<0.5	0.8
10344	2.3	1.3	1.6	0.9
10345/6	-	<0.5	0.5	0.5
10446	1.4	<0.5	<0.5	0.7
10447	70	8.8	<0.5	1.6
10448/9	-	1.3	0.6	0.6
10472	14	1.7	1.1	1.4
10473	10	1.5	<0.5	0.8
10474	2030 *	259 *	9.1	11
10475	2130 *	175 *	13	14

* The result was outside of calibration range. The result should be viewed as an estimate of the ammonia concentration.

AMMONIA ANALYSIS

Client: MENZIE CURA	Project #: 99026	BTR: 3152/3153
Sample Description:		

1999 Sample Date	Sample Description	Meter Reading (ppm NH_3-N)
	Meter Calibration	
	1 ppm / 5 ppm	
	slope = - 55.7	
6/22	2 ppm ext. STD	1.87
	0.5 ppm check STD	0.497
6/21	Sample 10219 porewater	1.7
6/21	10220 porewater	1.86
6/21	10221 porewater	13.6
6/21	10221 1:5 dilution	2.7x5=13.5
6/21	10224 1:1 dilution	1.81 x 2 = 3.62
6/22	Blank (DI H_2O)	0.03
	1 ppm	0.85

Analyst:	Analysis Date: 6/22/99	Reviewer:	Review Date:

AMMONIA ANALYSIS

Client: MENZIE CURA	Project #: 99026	BTR: 3169
Sample Description: Pore water & Day 0 overlying water (OLW)		

Sample Date	Sample Description	Meter Reading (ppm NH_3-N)
	calibration 1ppm/5ppm slope = -58.9	
	2ppm std. = 1.94 0.5 std. = 0.519	
6/23/99	10341 - Porewater	1.08
6/23/99	10342 - Porewater	5.18
6/23/99	10343 - Porewater	2.39
6/23/99	10344 - Porewater	2.29
* 6/24	10341 H_2/Cr OLW - Day 0	0.517
6/24	10342 - H_2/Cr OLW - Day 0	2.03
6/24	10343 - H_2/Cr OLW - Day 0	1.24
6/24	10344 - H_2/Cr OLW - Day 0	1.28
6/24	10345/46 - H_2/Cr OLW - Day 0	<0.3

cc 6/24/99

cc 6/25/99

Analyst: CMC	Analysis Date: 6/24/99	Reviewer:	Review Date:

OLW = overlying water H_2 = Hydrolle zeolite Cr = Chrysolite [illegible]

* calibration 6/25 1ppm/5ppm slope = -56.2 2ppm std. std. = 1.95

ammform.doc

AMMONIA ANALYSIS

Client: MENZIE CURA	Project #: 99026	BTR:
Sample Description: Porewater & Day 0 (*C. tentans* / *H. azteca*) Total Ammonia		

Sample Date	Sample Description	Meter Reading (ppm NH_3-N)
	calibration 1ppm/5ppm slope = -56.8	
	2ppm external std. = 2.06	
6/25/99	10446 - Porewater	1.39
6/25/99	10447 - Porewater	69.7
6/25/99	10472 - Porewater	14.5
6/25/99	10473 - Porewater	10.5
6/25/99	10474 - Porewater	2030.
6/25/99	10475 - Porewater	2130.
	calibration check 2ppm ext. std. = 2.07	
6/26/99	10446 - Day 0 Overlying Water Ct / Ha	<0.4
6/26/99	10447 - Day 0 Overlying Water Ct / Ha	8.75
6/26/99	(10449) 10449 - Day 0 Overlying Water Ct / Ha	1.31
6/26/99	10472 - Day 0 Overlying Water Ct / Ha	1.70
6/26/99	10473 - Day 0 Overlying Water Ct / Ha	1.46
6/26/99	10474 - Day 0 Overlying Water Ct / Ha	259.
6/26/99	10475 - Day 0 Overlying Water Ct / Ha	175.

Analyst: [illegible]	Analysis Date:	Reviewer:	Review Date:

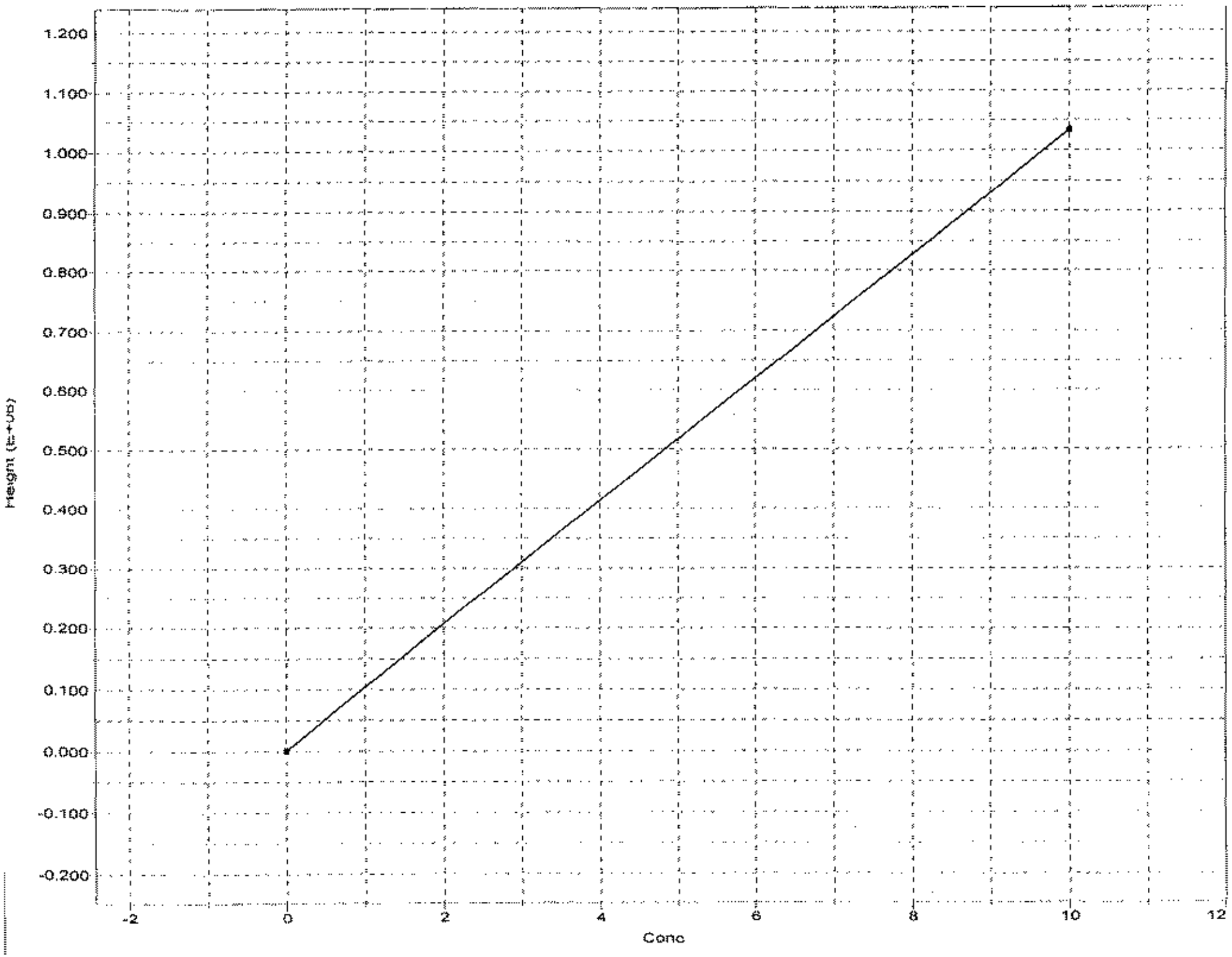
Time (sec)
Sync: 10.0013
CarryOver: 0.026946
CarryOver: -0.00440558
Baseline: -0.00792097
Cal 0: 0.00792017
Cal 2: 10
Blank: -0.00929728
Baseline: -0.00792097
ICV: 10.0128
ICB: -0.00581654
LCS: 4.84806
10219 day 0: 0.586331
10220 day 0: 0.205172
10221 day 0: 3.01772
10222/23 day 0: 0.0477088
10224 day 0: 0.434901
10219 HA day10: 0.240085
10219 CT day10: 1.12796
10220 HA day10: 0.142844
10220 CT day10: 0.861455
CCV: 10.0225
ICB: -0.0023325
Baseline: -0.00792097
10221 HA day10: 0.583907
10221 CT day10: 1.87958
10222 HA day10: 0.324207
10223 CT day10: 0.576897
10224 HA day10: 0.40842
10224 CT day10: 1.32086
10341 HA day10: 1.13018
10341 CT day10: 1.01347
10342 HA day10: 0.87296
10342 CT day10: 1.07607
CCV: 9.98046
ICB: -0.000542791
Baseline: -0.00792097
10343 HA day10: 0.205581
10343 CT day10: 0.797783
10344 HA day10: 1.56329
10344 CT day10: 0.925153
10345 HA day10: 0.490541
10346 CT day10: 0.526443
10446 HA day10: 0.35815
10446 CT day10: 0.710579
10447 HA day10: 0.448482
10447 CT day10: 1.5821
CCV: 10.0194
ICB: -0.0044217
Baseline: -0.00792097
10448 HA day10: 0.602155
10449 CT day10: 0.645552
10472 HA day10: 1.06475
10472 CT day10: 1.35526
10473 HA day10: 0.184791
10473 CT day10: 0.787523
10474 HA day10: 9.11503
10474 CT day10: 11.3396
10475 HA day10: 12.6528
10475 CT day10: 13.5355
CCV: 10.0069
ICB: -0.0126065
Baseline: -0.00792097

Mlenzie - Lum

ak Table: ammonia

le name: C:\FLOW 4\071499C.RST
te: July 14, 1999
erator: lks

ak	Cup	Name	Type	Dil	Wt	Height	Calc. (mg/L)	Flags
	2	Sync	SYNC	1	1	1033485	10.001280	
	0	CarryOver	CO	1	1	3600	0.026946	
	0	CarryOver	CO	1	1	354	-0.004496	LO
	0	Baseline	RB	1	1	0	-0.007921	BL
	1	Cal 0	C	1	1	1636	0.007920	
	2	Cal 2	C	1	1	1033353	10.000001	
	0	Blank	U	1	1	-142	-0.009297	LO
	0	Baseline	RB	1	1	0	-0.007921	BL
	2	ICV	U	1	1	1034676	10.012811	
0	1	ICB	U	1	1	217	-0.005817	LO
1	3	LCS	U	1	1	501396	4.848050	
2	4	10219 day 0	U	1	1	61359	0.586331	
3	5	10220 day 0	U	1	1	32328	0.305172	
4	6	10221 day 0	U	1	1	312408	3.017717	
5	7	10222/23 day 0	U	1	1	5744	0.047709	
6	8	10224 day 0	U	1	1	45723	0.434901	
7	9	10219 HA day10	U	1	1	25607	0.240085	
8	10	10219 CT day10	U	1	1	117283	1.127956	
9	11	10220 HA day10	U	1	1	15567	0.142844	
0	12	10220 CT day10	U	1	1	89766	0.861455	
1	2	CCV	U	1	1	1035671	10.022450	
2	1	CCB	U	1	1	577	-0.002332	LO
	0	Baseline	RB	1	1	0	-0.007921	BL
4	13	10221 HA day10	U	1	1	61108	0.583907	
5	14	10221 CT day10	U	1	1	194891	1.879580	
6	15	10222 HA day10	U	1	1	34293	0.324207	
7	16	10223 CT day10	U	1	1	70710	0.676897	
8	17	10224 HA day10	U	1	1	42989	0.408420	
9	18	10224 CT day10	U	1	1	137202	1.320863	
0	19	10341 HA day10	U	1	1	117513	1.130183	
1	20	10341 CT day10	U	1	1	105462	1.013469	
2	21	10342 HA day10	U	1	1	90956	0.872980	
3	22	10342 CT day10	U	1	1	111926	1.076071	
4	2	CCV	U	1	1	1031336	9.980465	
5	1	CCB	U	1	1	751	-0.000643	LO
	0	Baseline	RB	1	1	0	-0.007921	BL
7	23	10343 HA day10	U	1	1	22045	0.205581	
8	24	10343 CT day10	U	1	1	83192	0.797783	
9	25	10344 HA day10	U	1	1	162233	1.563290	
0	26	10344 CT day10	U	1	1	96343	0.925153	
1	27	10345 HA day10	U	1	1	51468	0.490541	
2	28	10346 CT day10	U	1	1	55175	0.526443	
3	29	10446 HA day10	U	1	1	37798	0.358150	
4	30	10446 CT day10	U	1	1	74188	0.710579	
5	31	10447 HA day10	U	1	1	47125	0.448482	
6	32	10447 CT day10	U	1	1	164175	1.582098	
7	2	CCV	U	1	1	1035356	10.019403	
8	1	CCB	U	1	1	359	-0.004442	LO
	0	Baseline	RB	1	1	0	-0.007921	BL
0	33	10448 HA day10	U	1	1	62992	0.602153	
1	34	10449 CT day10	U	1	1	67473	0.645552	
2	35	10472 HA day10	U	1	1	109725	1.054754	
3	36	10472 CT day10	U	1	1	140753	1.355256	
4	37	10473 HA day10	U	1	1	19898	0.184791	


1.200
1.100
1.000
0.900
0.800
0.700
0.600
0.500
0.400
0.300
0.200
0.100
0.000
-0.100
-0.200
Height (in+UB)
-2
0
2
4
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12
Conc

mmonia: Calibration, Peak 5-62

'ile name: C:\FLOW 4\071499C.RST
ate: July 14, 1999
perator: lks

Name	Conc	Height
Cal 0	0.0000	1636
Cal 2	10.0000	1033353

alib Coef:
=bx+a
: (intercept) 8.1787e+02
: 1.0325e+05

orr Coef: 0.999999

arryover: 0.348%

o Drift Peaks

:un Results Report
:esults: C:\FLOW_4\071499C.RST
:esults completed: 15:55 July 14, 1999.
perator: lks

			ammonia		
:ime	Cup	Name	Height	Calc.	Flags
---------- User request: Start Data Collect ----------					
.4:31	0	CarryOver	3600	0.026946	
.4:32	0	CarryOver	354	-0.004496	LO
		Mean & RSD:	1977	0.011225	NoRSD
14:33	0	Baseline	0	-0.007921	BL
14:35	1	Cal 0	1636	0.007920	
14:36	2	Cal 2	1033353	10.000001	
14:37	0	Blank	-142	-0.009297	LO
14:39	0	Baseline	0	-0.007921	BL
14:40	2	ICV	1034676	10.012811	
14:41	1	ICB	217	-0.005817	LO
14:43	3	LCS	501396	4.848050	
14:44	4	10219 day 0	61359	0.586331	
14:45	5	10220 day 0	32328	0.305172	
14:47	6	10221 day 0	312408	3.017717	
14:48	7	10222/23 day	5744	0.047709	
14:49	8	10224 day 0	45723	0.434901	
14:51	9	10219 HA day	25607	0.240085	
14:52	10	10219 CT day	117283	1.127956	
14:53	11	10220 HA day	15567	0.142844	
14:55	12	10220 CT day	89766	0.861455	
14:56	2	CCV	1035671	10.022450	
14:57	1	CCB	577	-0.002332	LO
14:59	0	Baseline	0	-0.007921	BL
15:00	13	10221 HA day	61108	0.583907	
15:01	14	10221 CT day	194891	1.879580	
15:03	15	10222 HA day	34293	0.324207	
15:04	16	10223 CT day	70710	0.676897	
15:05	17	10224 HA day	42989	0.408420	
15:07	18	10224 CT day	137202	1.320863	
15:08	19	10341 HA day	117513	1.130183	
15:09	20	10341 CT day	105462	1.013469	
15:11	21	10342 HA day	90956	0.872980	
15:12	22	10342 CT day	111926	1.076071	
15:13	2	CCV	1031336	9.980465	
15:15	1	CCB	751	-0.000643	LO
15:16	0	Baseline	0	-0.007921	BL
15:17	23	10343 HA day	22045	0.205581	
15:19	24	10343 CT day	83192	0.797783	
15:20	25	10344 HA day	162233	1.563290	
15:21	26	10344 CT day	96343	0.925153	
15:23	27	10345 HA day	51468	0.490541	
15:24	28	10346 CT day	55175	0.526443	
15:25	29	10446 HA day	37798	0.358150	

ın Results Report
esults: C:\FLOW_4\071499C.RST
esults completed: 15:55 July 14, 1999.
perator: lks

			ammonia		
ime	Cup	Name	Height	Calc.	Flags
5:27	30	10446 CT day	74188	0.710579	
5:28	31	10447 HA day	47125	0.448482	
5:29	32	10447 CT day	164175	1.582098	
5:31	2	CCV	1035356	10.019403	
5:32	1	CCB	359	-0.004442	LO
5:33	0	Baseline	0	-0.007921	BL
5:35	33	10448 HA day	62992	0.602153	
5:36	34	10449 CT day	67473	0.645552	
5:37	35	10472 HA day	109725	1.054754	
5:39	36	10472 CT day	140753	1.355256	
5:40	37	10473 HA day	19898	0.184791	
5:41	38	10473 CT day	82143	0.787623	
5:43	39	10474 HA day	19641	9.115034	
5:44	40	10474 CT day	24235	11.339641	
5:45	41	10475 HA day	66140	12.652802	
5:47	42	10475 CT day	70697	13.535489	
5:48	2	CCV	1034061	10.006860	
5:49	1	CCB	-504	-0.012806	LO
5:51	0	Baseline	0	-0.007921	BL

---------- User request: End Run ----------

Sulfide Screen

NVW 7/15/97

	NVW $S^{=} < 0.5$	JWW $S^{=} < 0.5$
10219	Y	Y
10222		
10221		
10224		
10341		
10342		
10343		
10344		
10446		
10447		
10472		
10473		
10473 MS	N	N
10474 (1-4)	Y	Y
10475 (1-5)		

Standard

5.0 ml Sample
0.150 ml Am-Sul
0.05 ml FeCl3

Preparation of Formulated Control Sediment
for
Freshwater Sediment Toxicity Tests

Procedure based on EPA/600/R-94/024

Batch No. 6/18/99 Preparation Date: 6/18/99 Prepared by: [illegible]

Ingredient	Amount (g)	Percent composition
Fine sand	1848 ✓	
Medium sand	924 ✓	77
Kaolinite clay	612 ✓	17
Blended and 0.~~3~~ 5 mm sieved Canadian sphagnum peat	180 ✓	5
$CaCO_3$	36 ✓	1
Total	3600	100

Store well-mixed and dry in a sealed Rubbermaid box. Label by batch number. Store copy of this documentation in project file. Store original in Sed/Water preparation notebook.

Hydrate to a cohesive sediment consistency before use.

Hydrated/placed in refrig.
Assigned sample #s
10222 - Hazeca
10223 - C mazus

DAILY CHECKLIST FOR AUTOMATED DELIVERY SEDIMENT TOXICITY TESTS

Project: 99026 Menzie-Cura
Industriplex
Week of June 20, 1999

H. azteca 10 d Survival & Growth
C. tentans 10 d Survival & Growth
BTR: 3152 / 3153

ACTIVITY / DAY	Sun.	Mon.	Tues.	Wed.	Thurs.	Fri.	Sat.
Prior to noon fill reservoirs (1L)	✓	✓	✓	✓	✓	✓	✓
Noon delivery cycle							
• splitter boxes filling?	✓	✓	✓	✓	✓	✓	✓
• syringes filling?	✓	✓	✓	✓	✓	✓	✓
• needles flowing?	✓	✓	✓	✓	[illegible]	✓	✓
• beaker screens clear, flowing?	✓	✓	✓	✓	✓	✓	✓
• drainage to waste ok?	✓	✓	✓	✓	✓	✓	✓
• empty waste buckets?	—	✓	—	✓	✓	✓	
Test monitoring							
• test temperature ok?	✓	✓	✓	✓	Pump [illegible]	✓	✓
• D.O. ok?	✓	✓	✓	✓	✓	✓	✓
• check for floating organisms	✓	✓	✓	✓	✓	✓	✓
• feeding completed?	H. azteca 1125 C. tentans 2130	✓	✓	✓	✓	✓	✓
Additional activities							
Prior to midnight fill reservoirs (1L)	✓	✓	✓	✓	✓	✓	✓
Check sediment water supply	✓	✓	✓	✓	✓	✓	✓
Corrective Action / Comments							
Initials/Date	6/24/99 JT	6/21/99 JT	6/22/99 JT	6/23/99 JT	6/24/99 JT	6/25/99 JJG	6/26 JJG

Procedure: All operating systems listed above must be checked on a daily basis when sediment toxicity tests are in progress. Corrective action must be taken whenever appropriate. Document corrective action on this form. If project-specific documentation is required, write a brief description (on Project Documentation form) and include with the test data package.

Comments:

Reviewer _____ Date _____

Laboratory: Aquatec Biological Sciences, South Burlington, Vermont

DAILY CHECKLIST FOR AUTOMATED DELIVERY SEDIMENT TOXICITY TESTS

Project: 99026 Menzie-Cura
Industriplex
Week of June 27, 1999

H. azteca 10 d Survival & Growth
C. tentans 10 d Survival & Growth
BTR: 3152 / 3153

ACTIVITY / DAY	Sun.	Mon.	Tues.	Wed.	Thurs.	Fri.	Sat.
Prior to noon fill reservoirs (1L)	✓	✓	✓	✓	✓	✓	✓
Noon delivery cycle							
• splitter boxes filling?	✓	✓	✓	✓	✓	✓	✓
• syringes filling?	✓	✓	✓	✓	✓	✓	✓
• needles flowing?	✓	✓	✓	✓	✓	✓	✓
• beaker screens clear, flowing?	✓	✓	✓	✓	✓	✓	✓
• drainage to waste ok?	✓	✓	✓	✓	✓	✓	✓
• empty waste buckets?	✓	✓	✓	✓	✓	✓	✓
Test monitoring							
• test temperature ok?	✓	✓	✓	✓	✓	✓	✓
• D.O. ok?	✓	✓	✓	✓	✓	✓	✓
• check for floating organisms	✓	✓	✓	✓	✓	✓	✓
• feeding completed?	✓	✓	✓	✓	✓	✓	✓
Additional activities							
Prior to midnight fill reservoirs (1L)	✓	✓	✓	✓	✓	✓	✓
Check sediment water supply	✓	✓	✓	✓	✓	✓	✓
Corrective Action / Comments							
Initials/Date	JJG 6/27	JJG 6/28	JJG 6/29	6/30	7/1	7/2	7/3

Procedure: All operating systems listed above must be checked on a daily basis when sediment toxicity tests are in progress. Corrective action must be taken whenever appropriate. Document corrective action on this form. If project-specific documentation is required, write a brief description (on Project Documentation form) and include with the test data package.

Comments: Removed 1 dead Chironomus from 4755 6/29/99 14:45 JJG

Reviewer _____ Date _____

Laboratory: Aquatec Biological Sciences, South Burlington, Vermont

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DAILY CHECKLIST FOR AUTOMATED DELIVERY SEDIMENT TOXICITY TESTS

Week of July 4, 1999

ACTIVITY / DAY	Sun.	Mon.	Tues.	Wed.	Thurs.	Fri.	Sat.
Prior to noon fill reservoirs (1L)	✓	✓	✓	✓	✓	✓	✓
Noon delivery cycle							
• splitter boxes filling?	✓	✓	✓	✓	✓	✓	✓
• syringes filling?	✓	✓	✓	✓	✓	✓	✓
• needles flowing?	✓	✓	✓	✓	✓	✓	✓
• beaker screens clear, flowing?	✓	✓	✓	✓	✓	✓	✓
• drainage to waste ok?	✓	✓	✓	✓	✓	✓	✓
• empty waste buckets?	✓	✓	✓	✓			✓
Test monitoring							
• test temperature ok?	✓	✓	✓	✓	✓	✓	✓
• D.O. ok?	✓	✓	✓	✓	✓	✓	✓
• check for floating organisms	✓	✓	✓	✓	✓	✓	✓
• feeding completed?	✓	✓	✓	✓	✓	✓	✓
Additional activities							
Prior to midnight fill reservoirs (1L)	✓	✓	✓	✓	✓	✓	✓
Check sediment water supply	✓	✓	✓	✓	✓	✓	✓
Corrective Action / Comments							
Initials/Date	7/4/99	7/5/99	7/6/99	7/7/99	7/8/99	7/9/99	7/10/99

Procedure: All operating systems listed above must be checked on a daily basis when sediment toxicity tests are in progress. Corrective action must be taken whenever appropriate. Document corrective action on this form. If project-specific documentation is required, write a brief description (on Project Documentation form) and include with the test data package.

Comments:

Reviewer _____ Date _____

Laboratory: Aquatec Biological Sciences, South Burlington, Vermont

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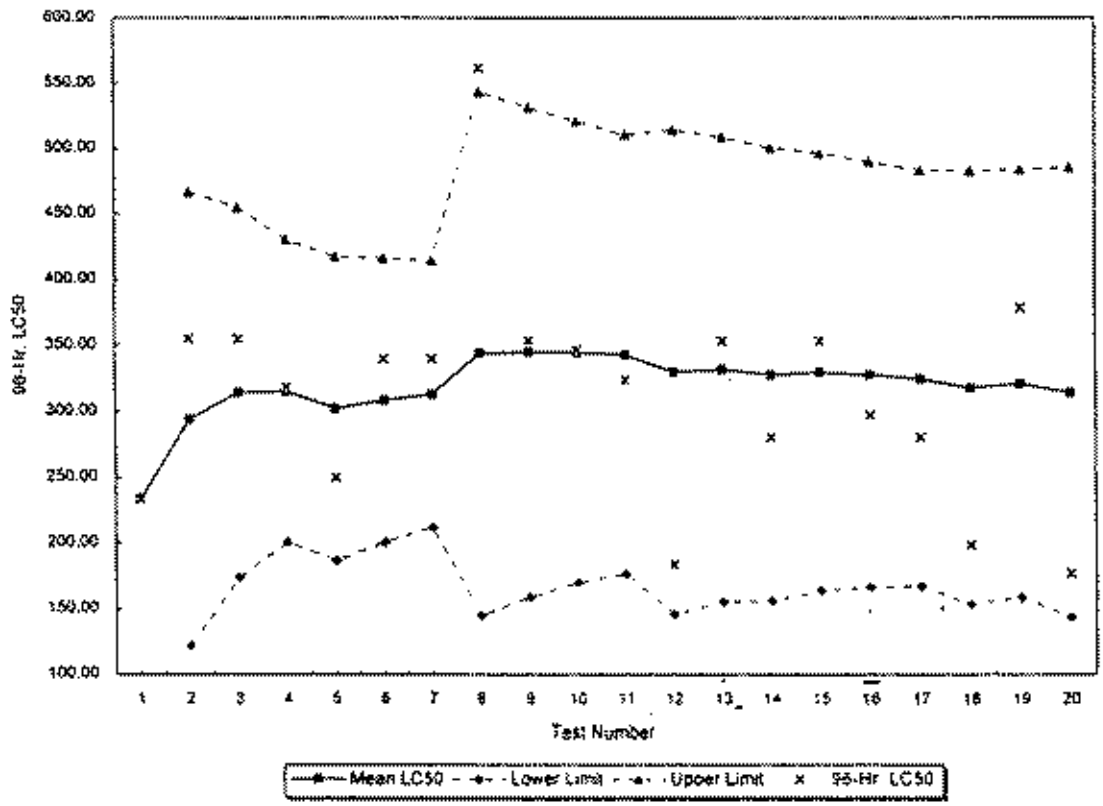
APPENDIX: D

CLICK TO CONTINUE

Reference Toxicant Control Chart
Hyalella azteca
in Potassium chloride (mg/L)

Test Number	Test Date	Organism Age (Days)	96-Hr. LC50	Mean LC50	Lower Limit	Upper Limit	Organism Source
1	02/14/97	10	233.258	233.26			Env. Consult & Testing
2	08/19/97	15	356.000	294.13	121.96	466.30	Env. Consult & Testing
3	08/19/97	15	355.000	314.42	173.84	454.99	Env. Consult & Testing
4	09/26/97	11	318.640	315.47	200.62	430.33	Env. Consult & Testing
5	12/20/97	10	250.000	302.36	186.95	417.81	Env. Consult & Testing
6	04/15/98	8	340.198	308.68	200.92	416.44	Env. Consult & Testing
7	04/17/98	10	340.198	313.18	211.97	414.40	Env. Consult & Testing
8	08/04/98	14	561.231	344.19	145.33	543.05	Env. Consult & Testing
9	08/22/98	10	353.553	345.23	159.11	531.35	Env. Consult & Testing
10	09/13/98	11	347.163	345.42	169.94	520.90	Env. Consult & Testing
11	10/26/98	12	324.210	343.50	176.53	510.46	Env. Consult & Testing
12	11/13/98	10	183.717	330.18	146.19	514.17	Env. Consult & Testing
13	02/19/99	9	353.553	331.98	155.34	508.61	Env. Consult & Testing
14	05/13/99	8	280.616	328.31	156.40	500.22	Env. Consult & Testing
15	06/21/99	12	353.553	329.99	163.82	496.16	Env. Consult & Testing
16	06/25/99	14	297.302	327.96	166.58	489.31	Env. Consult & Testing
17	06/26/99	10	280.616	326.17	167.25	483.08	Env. Consult & Testing
18	07/02/99	7	198.425	318.12	153.68	482.57	Env. Consult & Testing
19	07/07/99	8	378.929	321.32	159.10	483.55	Env. Consult & Testing
20	07/07/99	7	176.777	314.10	143.48	484.72	Aquatic Research Organisms



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