FINAL
Volume VI of VI

ECOLOGICAL ASSESSMENT REPORT, FOR OCTOBER, 1995 ECOLOGICAL ASSESSMENT OF SOLDIER CREEK TINKER AFB OKLAHOMA CITY, OKLAHOMA

CONTRACT NO.
F34650-93-D-0109
ORDER 5005

Prepared for
Department of the Air Force
Tinker AFB
Oklahoma City, Oklahoma

April 1997

APPENDIX K (continued)

TOXICITY LABORATORY RESULTS
June, 1995

SAMPLE: CREC02

Concentration	Replicate	Tare Weight	Total Weight	Organism Weight	# Organisms	Weight/ Organism
6.25	A	1.00124	1.00291	0.00167	9	0.000185
	B	0.99918	1.00108	0.00011	10 -	0.00011
	C	0.99759	0.99889	0.00130	7	0.000185
12.5	A	0.99905	1.00003	0.00125	7-2	0.000175
	B	0.99301	0.99382	0.00081	5-0	0.000162
	C	0.99498	0.99688	0.00190	10-2	0.000190
25	A	0.99252	0.99426	0.00174	18-0	0.0002175
	B	0.99210	0.99324	0.00117	10-0	0.000117
	C	0.99033	0.99179	0.00146	10-0	0.000146
50	A	0.98827	0.98943	0.00116	10-2	0.000116
	B	0.98949	0.99055	0.00106	8-2	0.0001325
	C	0.98747	0.98897	0.00150	8-0	0.0001875
100	A	0.98793	0.98985	0.00192	12-0	0.00016
	B	0.98965	0.99091	0.00126	10-2	0.000126
	C	0.99120	0.99311	0.00191	9-0	0.0002122
EE04 CONTROLS						

SAMPLE: EE01

Concentration	Replicate	Tare Weight	Total Weight	Organism Weight	# Organisms	Weight/ Organism
Gravel Control	A ☆	1.00645	1.00749	0.00112	8	0.000140
	B	1.00244	1.00412	0.00163	9-0	0.000181
	C	1.00166	1.00267	0.00101	9-0	0.000112
	D ☆	1.00025	1.00124	0.00115	7-0	0.000164
~~☆~~	E	1.00636	1.00736	0.00104	~~7~~ 7	0.00013
6.25	A	1.01727	1.01868	0.00141	7	0.000201
	B	1.01359	1.01472	0.00113	7	0.000161
	C	1.01905	1.02011	0.00106	8 ~~10~~	0.000133
12.5	A	1.00401	1.00488	0.00087	8	0.000109
	B	1.00774	1.00931	0.00157	10	0.000157
	C	1.01395	1.01494	0.00099	9	0.00011
25	A	1.01396	1.01523	0.00127	8	0.000159
	B	1.00116	1.00232	0.00116	8	0.000145
	C	1.00312	1.00419	0.00107	10	0.000107
50	A	1.00560	1.00660	0.00100	~~8~~ 7	0.000143
	B	0.97991	0.98122	0.00131	~~8~~ 7	0.000187
	C	0.99025	0.99145	0.00125	~~8~~ 7	0.000179
100	A	1.00236	1.00335	0.00099	8	0.000124
	B	1.00224	1.00276	0.00052	4	0.00013
	C	1.00183	1.00223	0.00040	3	0.00133

SAMPLE: EE02

Concentration	Replicate	Tare Weight	Total Weight	Organism Weight	# Organisms	Weight/ Organism
6.25	A	0.98547	0.98672	0.00125	10	0.000125
	B	0.98571	0.98705	0.00134	10	0.000134
	C	1.00075	1.00195	0.00120	8	0.00015
12.5	A	0.99216	0.99359	0.00143	4	0.0001075
	B	0.99059	0.99215	0.00156	10	0.000156
	C	0.98803	0.98893	0.00090	6	0.00015
25	A	0.99129	0.99165	0.00044	2	0.000220
	B	0.99803	0.99825	0.00022	2	~~0.000011~~ 0.0000075
	C					
50	A	0.99498	0.99576	0.00078	5	0.000156
	B	0.99710	0.99776	0.00066	2	0.00033
	C	0.99327	0.99341	0.00014	1	0.00014
100	A	0.95870	0.98901	0.00031	1	0.000310
	B					
	C	0.99005	0.99085	0.00080	3	0.000266
EE01 CONTROLS						

SAMPLE: EE03

Concentration	Replicate	Tare Weight	Total Weight	Organism Weight	# Organisms	Weight/ Organism
6.25	A	0.99309	0.99415	0.00106	~~7~~ 9	0.000106
	B	0.98394	0.98549	0.00155	10	0.000155
	C	0.98635	0.98711	0.00076	8	0.000095
12.5	A	0.99260	0.99385	0.00125	10	0.000125
	B	0.99603	0.99748	0.00146	10	0.000146
	C ☆	0.98987	0.99113	0.00126	7	0.00014
25	A	1.00620	1.00712	0.00092	7	0.000131
	B	1.01305	1.01432	0.00127	10	0.0001058
	C ☆	1.01897	1.02046	0.00149	10	0.000146
50	A ☆	1.00738	1.01884	0.00146	9	0.000146
	B	1.01469	1.01585	0.00116	9	0.000128
	C ☆	1.01197	1.01347	0.00162	10	0.000149
(12) 100	A	0.99525	0.99615	0.0009	9	0.0000818 9 adult
	B	1.01455	1.01576	0.00121	9	0.000134 1
☆	C 6	1.01081	1.01173	0.00089	8	0.000111 6 adu

EE01 CONTROLS		
Con	A	0.1018
	B	0.1846
	C	0.1123
	D	0.0884
	E	0.1300

NOEC : 50%

SAMPLE: EW02						
Concentration	Replicate	Tare Weight	Total Weight	Organism Weight	# Organisms	Weight/ Organism
6.25	A	1.01397	1.01439	0.00112	8 3	0.00014
	B	1.00964	1.00994	0.00003	3	0.0001
	C	0.99506	0.99580	0.00074	5	0.000148
12.5	A	0.99625	0.99798	0.00173	9	0.000192
	B	0.98921	0.98980	0.00059	5	0.000118
	C	0.99915 ~~+0.13 77~~	0.99986	0.00071	7	0.000101
☆ 25	A	0.99595 0.99498	0.99695	0.00117	10 ~~8~~	0.00009
	B	0.99677	0.99795	0.00118	7	0.000168
	C	0.99434	0.99506	0.00072	6	0.00012
50	A	0.99891	0.99943	0.00052	5	0.00010
	B	1.00395	1.00472	0.00077	8	0.0000962
	C	1.01412	1.01483	0.00071	7 (8) ~~9~~	0.0000887
100	A	1.01255	1.01328	0.00073	8	0.000103
	B	0.99683	0.99751	0.00068	10 ~~4~~	0.00068
	C	0.99545	0.99586	0.00041	5	0.000082
EW01 CONTROLS						

SAMPLE: EE06

Concentration	Replicate	Tare Weight	Total Weight	Organism Weight	# Organisms	Weight/ Organism
Gravel Control	A	1.00048	1.00193	0.00145	7	0.000207
	B	1.00489	1.00746	0.00257	9	0.000285
	C	1.00260	1.00413	0.00153	9	0.00017
	D	0.99897	1.00084	0.00187	9	0.0002077
	E	0.99660	0.99796	0.00136	8	0.00017
Silt Control	A	1.01272	1.01421	0.00149	8	0.0001862
	B	1.01479	1.01629	0.0015	8	0.0001875
	C	0.99970	1.00062	0.00092	7	0.0001314
Tot wt .99991 → 6.25	A	0.99862 ~~1.00048~~	~~1.00001~~	0.00129	5	0.000258
	B	0.99846	0.99993	0.00147	8	0.00018375
	C	1.00025	1.00154	0.00129	7 ~~11~~	0.0001842
12.5	A	1.01451	1.01547	0.00109	6	0.0001816
	B	1.01624	1.01737	0.00126	9	0.00014
☆	C	1.01003	1.01107	~~0.00107~~	9	0.0001188
1.01583 25	A	1.01523	~~1.00154~~	0.00070	6	0.0001166
	B					
	C					
50	A	1.00127 ~~1.01227~~	1.00226	0.00099	5	0.000198
	B	1.01281	1.01427		5	
	C	1.01227	1.01325	0.00103	7	0.000147
100	A ☆	1.01153	1.01209	0.00067	2	0.000335
	B	1.00974	1.01040	0.00066	3	0.00022
opped/mislandlost	C	1.01992	1.02061	~~0.00078~~	1	~~0.00078~~

SAMPLE: EE07

Concentration	Replicate	Tare Weight	Total Weight	Organism Weight	# Organisms	Weight/ Organism
6.25	A	1.01466	1.01607	0.00141	6	0.000235
	B	1.01645	1.01784	0.00139	8	0.0001737
	C	1.00875	1.00932	0.00057	5	0.000114
12.5	A	1.01593	1.01684	0.00091	5	0.000182
	B	1.01298	1.01330	0.00054	4	0.000135
	C	1.01355	1.01466	0.00111	7	0.000158
25	A	1.01029	1.01109	0.00089	6	0.000148
	B	1.00965	1.01094	0.00129	6	0.000215
	C	1.01654	1.01753	0.00099	5	0.000198
50	A	1.01088	1.01146	0.00064	5	0.000128
	B	1.00686	1.00771	0.00085	6	0.000142
	C	1.00657	1.00709	0.00052	4	0.00013
100	A	1.00855	1.00884	0.00029	1	0.00029
	B					
	C					
EE06 CONTROLS						

SAMPLE: EE08

Concentration	Replicate	Tare Weight	Total Weight	Organism Weight	# Organisms	Weight/ Organism
6.25	A	1.00956	1.01085	0.00129	7	0.000184
	B	1.00966	1.01148	0.00182	7	0.000026
	C	1.00993	1.01104	0.00111	7	0.0001526
12.5	A	1.00473	1.00602	0.00129	7	0.000184
	B	1.00925	1.01075	0.00150	6	0.00025
	C	1.00999	1.01036	0.00087	5	0.000174
25	A	1.01351	1.01440	0.00085	7	0.000121
	B	1.00067	1.00224	0.00157	8	0.000196
	C	1.00116	1.00317	0.00201	11	0.0001827
50	A	0.99898	0.99976	0.00178	9	0.0001977
	B	0.99569	0.99715	0.00146	7	0.0002086
	C	1.00915	1.00992	0.00177	9	0.0001966
100	A	1.00784	1.00839	0.00055	3	0.0001833
	B	1.00706	1.00836	0.00130	7	0.0001857
	C	1.00817	1.00870	0.00053	3	0.0001766
EE06 CONTROLS						

SAMPLE: EE09						
Concentration	Replicate	Tare Weight	Total Weight	Organism Weight	# Organisms	Weight/ Organism
6.25	A	1.01412	1.01582	0.00139	7	0.000154
	B	1.01324	1.01407	0.00083	5	0.000166
	C	1.01150	1.01205	0.00055	4	0.000137
12.5	A	1.00866	1.00979	0.00113	4	0.000282
	B	1.00873	1.00971	0.00098	4	0.000245
	C	1.00902	1.01026	0.00124	5	0.000248
25	A	1.00450	1.00552	0.00102	7	0.000146
	B	1.01180	1.01336	0.00156	8	0.000195
	C	1.01379	1.01481	0.00102	7	0.000146
50	A	1.01346	1.01451	0.00105	4	0.000263
	B	1.00997	1.01132	0.00135	6	0.000225
	C	1.01359	1.01436	0.00077	4	0.000193
100	A	0.99538	0.99630	0.00092	5	0.000184
	B	1.00021	1.00165	0.00144	8	0.00018
	C	1.00280	1.00380	0.00100	7	0.000143
EE06 CONTROLS						

NOEC - 100% (12.5% sig different)

SAMPLE: EW01							
Concentration	Replicate	Tare Weight	Total Weight	Organism Weight	# Organisms	Weight/ Organism	
Silt Control	A	0.99497	0.99573	0.00076	4	0.00019	.1900
	B	0.98693	0.98838	0.00145	8	0.0001812	.1812
	C	0.99985	1.00145	0.0016	8	0.0002	.2000
Gravel Control	A	0.99946	1.00076	0.0013	8	0.0001625	.1625
	B	1.00488	1.00597	0.00109	10	0.000109	.1090
	C	1.00843	1.00851	0.00008	1	0.00008	.0800
6.25	A	1.00813	1.00890	0.00077	9	0.0000855	.0855
	B	1.00823	1.00919	0.00096	7	0.0001371	.1371
	C	1.01417	1.01565	0.00148	9	0.0001644	.1644
12.5	A	1.01467	1.01558	0.00091	11	0.0000827	.0827
	B	1.01326	1.01404	0.00078	7	0.0001114	.1114
	C	1.01371	1.01479	0.00108	9	0.00012	.1200
25	A	1.01135	1.01275	0.0014	10	0.00014	.1400
	B	1.01818	1.01910	0.00092	9	0.0001022	.1022
	C	0.98728	0.98796	0.00068	7	0.0000971	.0971
50	A	1.00795	1.00903	0.00108	8	0.000135	.1350
	B	1.01071	1.01169	0.00098	9	0.0001088	.1088
	C	1.00888	1.01017	0.00129	9	0.0001433	.1433
100	A	1.00386	1.00479	0.00093	8	0.0001162	.1162
	B	1.00346	1.00421	0.00075	4	0.0001875	.1875
	C	1.00277	1.00336	0.00059	4	0.0001475	.1475

12.5%: significantly different from controls

NOEC: 100%

AM acute >100
chron surv 100%
ch growth 100%

Od acute >100
Chronic surv 10%
" repro 10%

SAMPLE: CREC01

Concentration	Replicate	Tare Weight (g)	Total Weight (g)	Organism Weight (g)	# Organisms	Weight/ Organism (g)	x 1000
6.25	A	1.00564	1.00626	0.00062	6	0.000133	.1033
	B	1.00410	1.00492	0.00082	8	0.000125	.1025
	C	1.00330	1.00411	0.00081	6	0.000135	.1350
12.5	A	1.00082	1.00167	0.00085	8	0.000106	.1060
	B	1.01458	1.01603	0.00115	9	0.0001277	.1277
	C	1.01610	1.01684	0.00074	10	0.000074	.0740
25	A	0.99544	0.99598	0.00057	9	0.0000633	.0633
	B	0.99003	0.99060	0.00057	5	0.000114	.1140
	C	1.00230	1.00288	0.00058	6	0.0000966	.0966
50	A	0.99969	1.00043	0.00074	6	0.0001233	.1233
	B	0.99836	0.99937	0.00101	6	0.0001683	.1683
	C	0.98526	0.98593	0.00077	7	0.00011	.1100
100	A	0.99478	0.99532	0.00054	6	0.00009	.0900
	B	0.98407	0.98474	0.00067	9	0.0000744	.0744
	C	1.00565	1.00673	0.00108	(10)	0.000108	.1080
EW01 CONTROLS							

SAMPLE: EE04

	0.99395					
Concentration	Replicate	Tare Weight	Total Weight	Organism Weight	# Organisms	Weight/ Organism
Gravel Control	A	1.00030	0.99513	0.00118	9	0.000131
	B	1.00251	0.99559	0.00157	10	0.000157
	C	1.00171	0.99702	0.00142	9	0.000158
	D	0.99994	1.00158	0.00161	10	0.000161
	E	1.00304	1.00472	0.00168	12	0.00014
Silt Control	A	1.00092	1.00265	0.00173	10	0.000173
	B	1.00251	1.00388	0.00137	7	0.000196
	C	1.00171	1.00242	0.00071	8	0.000089
6.25	A	1.00304	1.00471	0.00137	9	0.00152
	B	1.00928	1.01084	0.00156	9	0.000173
	C	1.01327	1.01488	0.00151	7-0	0.000216
12.5	A	1.01114	1.01287	0.00173	10	0.000173
	B	1.00311	1.00472	0.00161	10	0.000161
	C	1.01110	1.01291	0.00181	9	0.000201
25	A	1.01156	1.01280	0.00124	10	0.000124
	B	1.00177	1.00312	0.00135	9	0.00015
	C	1.00339	1.00486	0.00147	9	0.000163
50	A	1.00179	1.00373	0.00194	10	0.000194
	B	1.00111	1.00230	0.00119	9	0.000132
	C	0.99689	0.99811	0.00132	10	0.000132
100	A	1.00001	1.00064	0.00063	5	0.000126
	B	0.99973	1.00099	0.00126	5	0.000252
	C	0.99695	0.99729	0.00034	2	0.00017

SAMPLE: EE10

Concentration	Replicate	Tare Weight	Total Weight	Organism Weight	# Organisms	Weight/ Organism
6.25	A	1.01294	1.01475	0.00181	11	0.0001645
	B	1.01361	1.01504	0.00143	5-0	0.000286
	C	1.00935	1.01072	0.00137	8-0	0.0001725
12.5	A	1.00779	1.00929	0.00150	10-0	0.00015
	B	1.00325	1.00416	0.00091	8-0	0.00011375
	C	1.00601	1.00696	0.00095	8-0	0.00011875
25	A 1.00291	1.00155	~~1.00338~~	0.00136	10-0	0.000136
	B	1.01044	~~1.01232~~	0.00088	8-0	0.00011
	C 1.01099	1.01034	~~1.01199~~	0.00065	~~6~~	0.0001083
50	A	1.00823	1.00910	0.00087	~~8~~	0.00010875
	B	1.00528	1.00713	0.00185	9-0	0.0002055
	C	1.00849	1.00975	0.00126	~~9~~	0.00014
100	A 1.00634	1.00509	~~1.00634~~	0.00125	10-~~1~~	0.000125
	B	1.00692	1.00765	0.00073	6-0	0.0001216
	C	1.00801	1.00903	0.00102	10-0	0.000102
EE04 CONTROLS						

SAMPLE: EE05

Concentration	Replicate	Tare Weight	Total Weight	Organism Weight	# Organisms	Weight/ Organism
6.25	A	0.99426	0.99583	0.00157	9-0	0.000174
	B	1.00289	1.00498	0.00134	10-0	0.000139
	C	0.99820	0.99975	0.00155	9	0.000172
12.5	A	1.00157	1.00330	0.00173	4-0	0.000432
	B	0.99616	0.99735	0.00119	5-0	0.000238
	C	1.00557	1.00592	0.00035	2-0	0.000175
25	A	1.00576	1.00635	0.00059	4-0	0.0001475
	B	1.00754	1.00845	0.00091	7	0.00013
	C	1.00588	1.00601	0.00113	2	0.000565
50	A	1.00771	1.00899	0.00128	5	0.000256
	B	1.00962	1.01015	0.00053	5	0.000106
	C	1.00837	1.00877	0.00040	3	0.000133
100	A	1.00535	1.00567	0.00032	3-0	0.000106
	B	1.00346	1.00420	0.00074	5-0	0.000148
	C	1.00397			4-0	
EE04 CONTROLS						

SAMPLE: EW03

Concentration	Replicate	Tare Weight	Total Weight	Organism Weight	# Organisms	Weight/ Organism
6.25	A	~~1.01054~~	~~[illegible]~~			
	B	1.00546	1.00645	0.00099	10	0.000099
	C	1.00498	1.00655	0.00157	10	0.000157
12.5	A	1.01401	1.01535	0.00134	9	0.0001488
	B	0.98813	0.98936	0.00123	9	0.0001366
	C	0.99560	0.99684	0.00124	8	0.000155
25	A	0.99090	0.99194	0.00104	7	0.00014857
	B 0.99123	0.99029	~~0.99123~~	0.00094	8	0.0001175
	C	0.99045	0.99117	0.00072	9 - all broken	
50	A	0.98823	0.98898	0.00076	7	0.0001085
	B	0.98998	0.99081	0.00083	5	0.000166
	C	0.99293	0.99406	0.00113	5	0.000226
100	A	0.98652	0.98728	0.00076	5	0.000152
	B	0.98731	0.98810	0.00099	8	0.0000987
	C	1.00734	1.00847	0.00113	5	0.000226

EE01 CONTROLS

6.25 A

TABLE 1
TINKER AFB
***HYALELLA AZTECA* CHRONIC-JANUARY 12, 1995**

SAMPLE	CONCENTRATIO	NUMBER EXPOSE	NUMBER DEAD	PERCENT MORTALIT	NUMBER YOUNG	LC50
LAB CONTROL		30	3	10.0	51	
SC-EW03	6.25	30	6	20.0	30	
	12.5	30	3	10.0	30	
	25	30	4	13.3	20	**76.80**
	50	30	7	23.3	4	
	100	30	24	80.0	0	
SC-EE01	6.25	30	13	43.3	2	
	12.5	30	11	36.7	10	
	25	30	11	36.7	25	**69.10**
	50	30	4	13.3	71	
	100	30	21	70.0	5	
SC-EE02	6.25	30	10	33.3	2	
	12.5	30	9	30.0	5	
	25	30	9	30.0	13	**86.29**
	50	30	14	46.7	18	
	100	30	19	63.3	1	
SC-EE03	6.25	30	9	30.0	5	
	12.5	30	8	26.7	11	
	25	30	21	70.0	2	**82.03**
	50	30	4	13.3	13	
	100	30	16	53.3	0	
CC-EC01	6.25	30	9	30.0	29	
	12.5	30	14	46.7	38	
	25	30	10	33.3	46	**>100**
	50	30	4	13.3	36	
	100	30	7	23.3	2	

TABLE 1
TINKER AFB
***HYALELLA AZTECA* CHRONIC-JANUARY 17, 1995**

SAMPLE	CONCENTRATIO	NUMBER EXPOSED	NUMBER DEAD	PERCENT MORTALIT	NUMBER YOUNG	LC50
LAB CONTROL		30	6	20.0	2	
SC-EW01	6.25	30	19	63.3	0	
	12.5	30	19	63.3	0	
	25	30	30	100.0	0	< 6.25
	50	30	30	100.0	0	
	100	30	30	100.0	0	
SC-EW02	4	30	22	73.3	0	
	8	30	25	83.3	0	
	16	30	22	73.3	0	< 4.00
	32	30	29	96.7	0	
	64	30	30	100.0	0	
SC-EE06	5	30	20	66.7	0	
	10	30	26	86.7	0	
	20	30	24	80.0	0	< 5.00
	40	30	26	86.7	0	
	80	30	26	86.7	0	
SC-EE07	5	30	26	86.7	1	
	10	30	28	93.3	0	
	20	30	29	96.7	0	< 5.00
	40	30	29	96.7	0	
	80	30	28	93.3	0	
SC-EE10	6.25	30	11	36.7	1	
	12.5	30	22	73.3	0	
	25	30	20	66.7	0	8.75
	50	30	20	66.7	0	
	100	30	15	50.0	0	

TABLE 1
TINKER AFB
***HYALELLA AZTECA* CHRONIC-JANUARY 25, 1995**

SAMPLE	CONCENTRATIO	NUMBER EXPOSED	NUMBER DEAD	PERCENT MORTALIT	NUMBER YOUNG	LC50
LAB CONTROL		30	7	23.3	2	
SC-EE04	6.25	30	30	100.0	0	
	12.5	30	30	100.0	0	
	25	30	30	100.0	0	**< 6.25**
	50	30	30	100.0	0	
	100	30	30	100.0	0	
SC-EE05	6.25	30	29	96.7	0	
	12.5	30	28	93.3	0	
	25	30	30	100.0	0	**< 6.25**
	50	30	30	100.0	0	
	100	30	30	100.0	0	
SC-EE08	6.25	30	18	60.0	0	
	12.5	30	21	70.0	0	
	25	30	25	83.3	0	**5.85**
	50	30	19	63.3	0	
	100	30	27	90.0	0	
SC-EE09	6.25	30	17	56.7	0	
	12.5	30	21	70.0	0	
	25	30	24	80.0	0	**8.97**
	50	30	28	93.3	0	
	100	30	30	100.0	0	
CC-EC02	6.25	30	25	83.3	0	
	12.5	30	24	80.0	0	
	25	30	19	63.3	0	**< 6.25**
	50	30	23	76.7	0	
	100	30	22	73.3	0	

SC-EW03

Conc.	Number Exposed	Number Resp.	Observed Proportion Responding	Adjusted Proportion Responding	Predicted Proportion Responding
Control	30	3	0.1000	0.0000	0.1331
6.2500	30	6	0.2000	0.0771	0.0000
12.5000	30	3	0.1000	-.0382	0.0000
25.0000	30	4	0.1333	0.0002	0.0009
50.0000	30	7	0.2333	0.1156	0.1155
100.0000	30	24	0.8000	0.7693	0.7693

Chi - Square Heterogeneity = 1.447

Mu = 1.885367
Sigma = 0.155643

Parameter	Estimate	Std. Err.	95% Confidence Limits
Intercept	-7.113441	3.540136	(-14.052108, -0.174774)
Slope	6.424978	1.840170	(2.818244, 10.031712)
Spontaneous Response Rate	0.133149	0.031235	(0.071929, 0.194370)

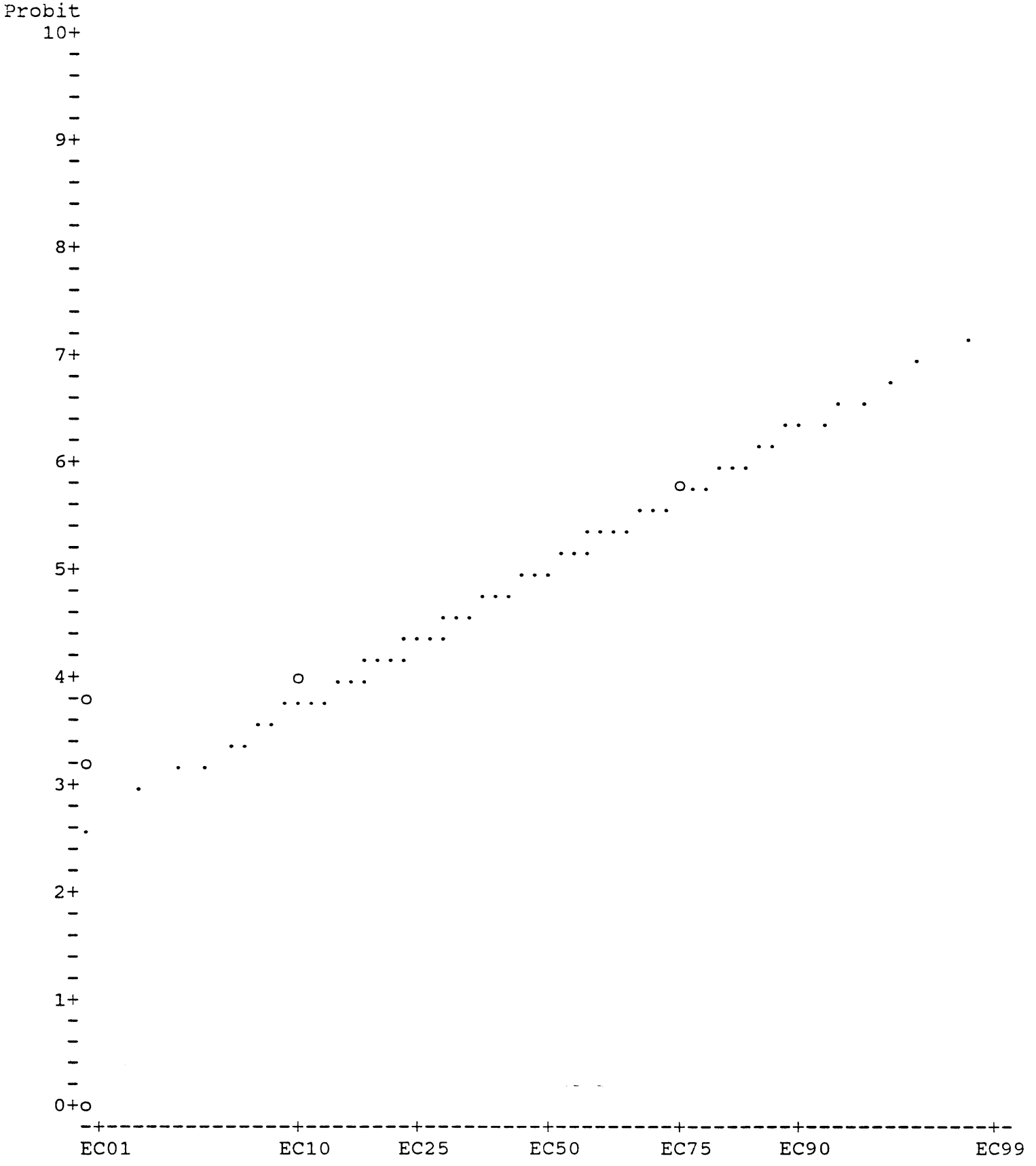
SC-EW03

Estimated EC Values and Confidence Limits

Point	Conc.	Lower 95% Confidence	Upper Limits
EC 1.00	33.3653	9.8321	47.9787
EC 5.00	42.5942	16.9975	56.6264
EC10.00	48.5172	22.6907	62.0412
EC15.00	52.9735	27.5177	66.1247
EC50.00	76.8010	58.6822	91.7336
EC85.00	111.3461	93.0251	171.1958
EC90.00	121.5733	99.9976	205.8498
EC95.00	138.4788	110.3694	272.7825
EC99.00	176.7821	131.1001	468.5636

SC-EW03

PLOT OF ADJUSTED PROBITS AND PREDICTED REGRESSION LINE



TRIMMED SPEARMAN-KARBER METHOD. MONTANA STATE UNIV

FOR REFERENCE, CITE:
HAMILTON, M.A., R.C. RUSSO, AND R.V. THURSTON, 1977.
TRIMMED SPEARMAN-KARBER METHOD FOR ESTIMATING MEDIAN
LETHAL CONCENTRATIONS IN TOXICITY BIOASSAYS.
ENVIRON. SCI. TECHNOL. 11(7): 714-719;
CORRECTION 12(4):417 (1978).

DATE: 12 JAN 9 TEST NUMBER: 6 DURATION: 10 DAYS
CHEMICAL: SC-EE01 SPECIES: HYALELLA

RAW DATA:

CONCENTRATION(PERCENT)	6.25	12.50	25.00	50.00	100.00
NUMBER EXPOSED:	30	30	30	30	30
MORTALITIES:	13	11	11	4	21
SPEARMAN-KARBER TRIM:		32.50%			

SPEARMAN-KARBER ESTIMATES: LC50: 69.10
95% LOWER CONFIDENCE: 55.34
95% UPPER CONFIDENCE: 86.27

NOTE: MORTALITY PROPORTIONS WERE NOT MONOTONICALLY INCREASING.
ADJUSTMENTS WERE MADE PRIOR TO SPEARMAN-KARBER ESTIMATION.

SC-EE02

Conc.	Number Exposed	Number Resp.	Observed Proportion Responding	Adjusted Proportion Responding	Predicted Proportion Responding
Control	30	3	0.1000	0.0000	0.1068
6.2500	30	10	0.3333	0.2536	0.1677
12.5000	30	9	0.3000	0.2163	0.2392
25.0000	30	9	0.3000	0.2163	0.3247
50.0000	30	14	0.4667	0.4029	0.4206
100.0000	30	19	0.6333	0.5895	0.5216

Chi - Square Heterogeneity = 2.640

Mu = 1.935969
Sigma = 1.183545

Parameter	Estimate	Std. Err.	95% Confidence Limits
Intercept	3.364262	0.521793	(2.341547, 4.386976)
Slope	0.844920	0.329487	(0.199124, 1.490715)
Spontaneous Response Rate	0.106838	0.056230	(-0.003373, 0.217049)

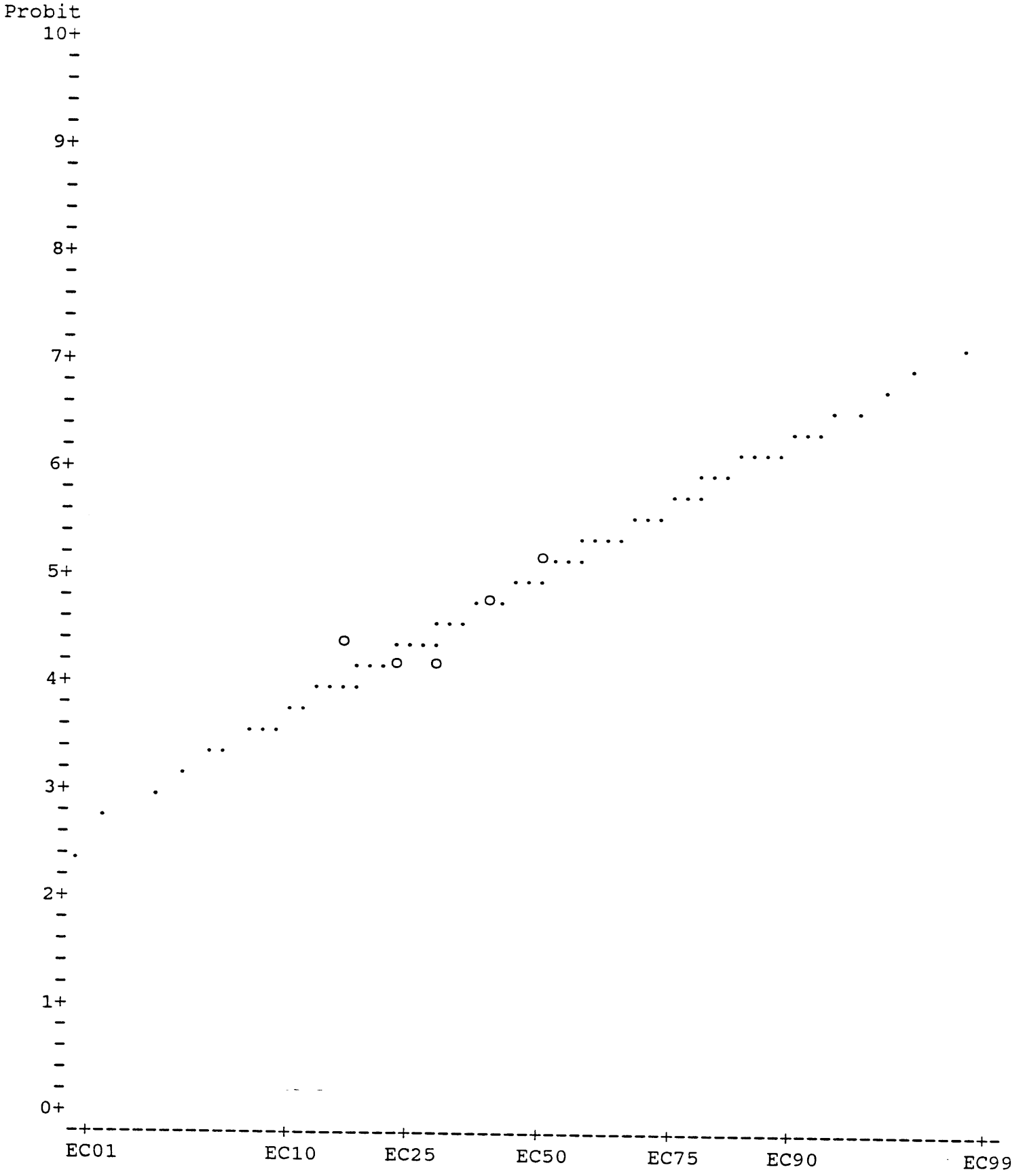
SC-EE02

Estimated EC Values and Confidence Limits

Point	Conc.	Lower 95% Confidence Limits	Upper 95% Confidence Limits
EC 1.00	0.1523	0.0000	1.8824
EC 5.00	0.9753	0.0000	5.6546
EC10.00	2.6251	0.0003	10.4242
EC15.00	5.1209	0.0049	16.1568
EC50.00	86.2917	34.4266	1823.9734
EC85.00	1454.1010	265.1099	188155152.0000
EC90.00	2836.6113	396.2356	3132318000.0000
EC95.00	7634.5156	711.0906	%204217483000.0000
EC99.00	48893.2620	2092.3752	% 525365870.0000E+06

SC-EE02

PLOT OF ADJUSTED PROBITS AND PREDICTED REGRESSION LINE



TRIMMED SPEARMAN-KARBER METHOD. MONTANA STATE UNIV

FOR REFERENCE, CITE:
HAMILTON, M.A., R.C. RUSSO, AND R.V. THURSTON, 1977.
TRIMMED SPEARMAN-KARBER METHOD FOR ESTIMATING MEDIAN
LETHAL CONCENTRATIONS IN TOXICITY BIOASSAYS.
ENVIRON. SCI. TECHNOL. 11(7): 714-719;
CORRECTION 12(4):417 (1978).

DATE: 12 JAN 9 TEST NUMBER: 7 DURATION: 10 DAYS
CHEMICAL: SC-EE03 SPECIES: HYALELLA

RAW DATA:

CONCENTRATION(PERCENT)	6.25	12.50	25.00	50.00	100.00
NUMBER EXPOSED:	30	30	30	30	30
MORTALITIES:	9	8	21	4	16
SPEARMAN-KARBER TRIM:		46.67%			

SPEARMAN-KARBER ESTIMATES: LC50: 82.03
95% LOWER CONFIDENCE: 35.72
95% UPPER CONFIDENCE: 188.37

NOTE: MORTALITY PROPORTIONS WERE NOT MONOTONICALLY INCREASING.
ADJUSTMENTS WERE MADE PRIOR TO SPEARMAN-KARBER ESTIMATION.

TRIMMED SPEARMAN-KARBER METHOD. MONTANA STATE UNIV

FOR REFERENCE, CITE:
HAMILTON, M.A., R.C. RUSSO, AND R.V. THURSTON, 1977.
TRIMMED SPEARMAN-KARBER METHOD FOR ESTIMATING MEDIAN
LETHAL CONCENTRATIONS IN TOXICITY BIOASSAYS.
ENVIRON. SCI. TECHNOL. 11(7): 714-719;
CORRECTION 12(4):417 (1978).

DATE: 17 JAN 9 TEST NUMBER: 5 DURATION: 10 DAYS
CHEMICAL: SC-EE10 SPECIES: HYALLELLA

RAW DATA:

CONCENTRATION(PERCENT)	6.25	12.50	25.00	50.00	100.00
NUMBER EXPOSED:	30	30	30	30	30
MORTALITIES:	11	22	20	20	15
SPEARMAN-KARBER TRIM:		36.67%			

SPEARMAN-KARBER ESTIMATES: LC50: 8.75
95% LOWER CONFIDENCE: 6.40
95% UPPER CONFIDENCE: 11.96

NOTE: MORTALITY PROPORTIONS WERE NOT MONOTONICALLY INCREASING.
ADJUSTMENTS WERE MADE PRIOR TO SPEARMAN-KARBER ESTIMATION.

SC-EE04 8

Conc.	Number Exposed	Number Resp.	Observed Proportion Responding	Adjusted Proportion Responding	Predicted Proportion Responding
Control	30	7	0.2333	0.0000	0.2334
6.2500	30	18	0.6000	0.4782	0.5074
12.5000	30	21	0.7000	0.6087	0.5840
25.0000	30	25	0.8333	0.7826	0.6576
50.0000	30	19	0.6333	0.5217	0.7256
100.0000	30	27	0.9000	0.8696	0.7862

Chi - Square Heterogeneity = 6.843

Mu = 0.767054
Sigma = 1.554296

Parameter	Estimate	Std. Err.	95% Confidence Limits	
Intercept	4.506494	0.461462	(3.602029,	5.410960)
Slope	0.643378	0.312016	(0.031828,	1.254929)
Spontaneous Response Rate	0.233386	0.077215	(0.082044,	0.384727)

SC-EE04 B

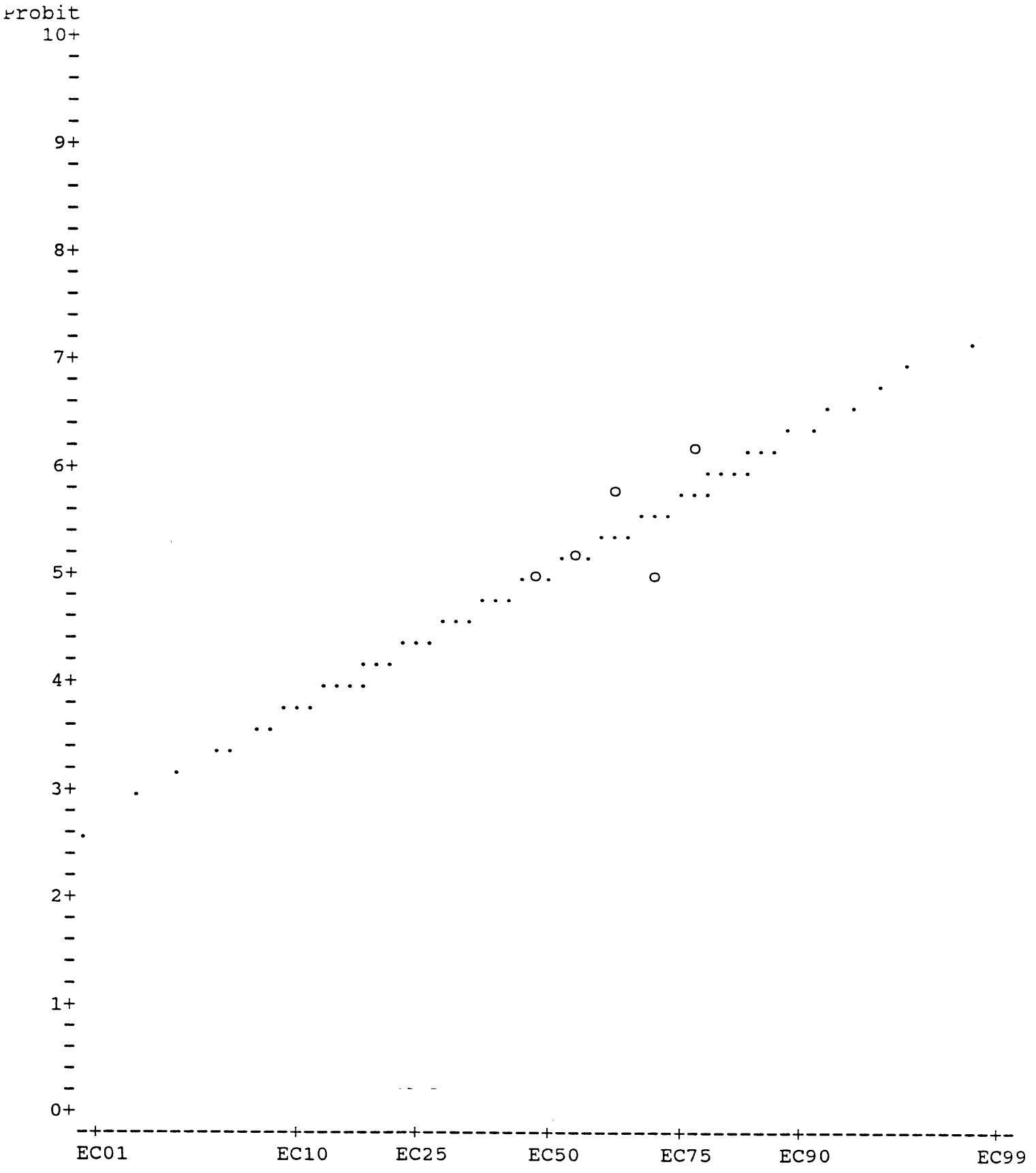
Estimated EC Values and Confidence Limits

Point	Conc.	Lower 95% Confidence Limits	Upper 95% Confidence Limits
EC 1.00	0.0014	0.0000	0.1838
EC 5.00	0.0162	0.0000	0.6564
EC10.00	0.0596	0.0000	1.3035
EC15.00	0.1433	0.0000	2.0823
EC50.00	5.8486	0.0000	19.0044
EC85.00	238.7405	60.4249	% 100000002.0000E+12
EC90.00	574.1689	103.3494	% 100000002.0000E+12
EC95.00	2107.2446	214.8042	% 100000002.0000E+12
EC99.00	24144.1816	792.4912	% 100000002.0000E+12

NOTE - Upper limits greater than or equal to 1.E20 are really infinite

SC-EE04

PLOT OF ADJUSTED PROBITS AND PREDICTED REGRESSION LINE



SC-EE09

Conc.	Number Exposed	Number Resp.	Observed Proportion Responding	Adjusted Proportion Responding	Predicted Proportion Responding
Control	30	7	0.2333	0.0000	0.2393
6.2500	30	17	0.5667	0.4304	0.3844
12.5000	30	21	0.7000	0.6056	0.6063
25.0000	30	24	0.8000	0.7371	0.7976
50.0000	30	28	0.9333	0.9124	0.9188
100.0000	30	30	1.0000	1.0000	0.9750

Chi - Square Heterogeneity = 1.229

Mu = 0.952897
Sigma = 0.534141

Parameter	Estimate	Std. Err.	95% Confidence Limits
Intercept	3.216019	0.572148	(2.094609, 4.337429)
Slope	1.872166	0.430075	(1.029218, 2.715114)
Spontaneous Response Rate	0.239276	0.077603	(0.087174, 0.391378)

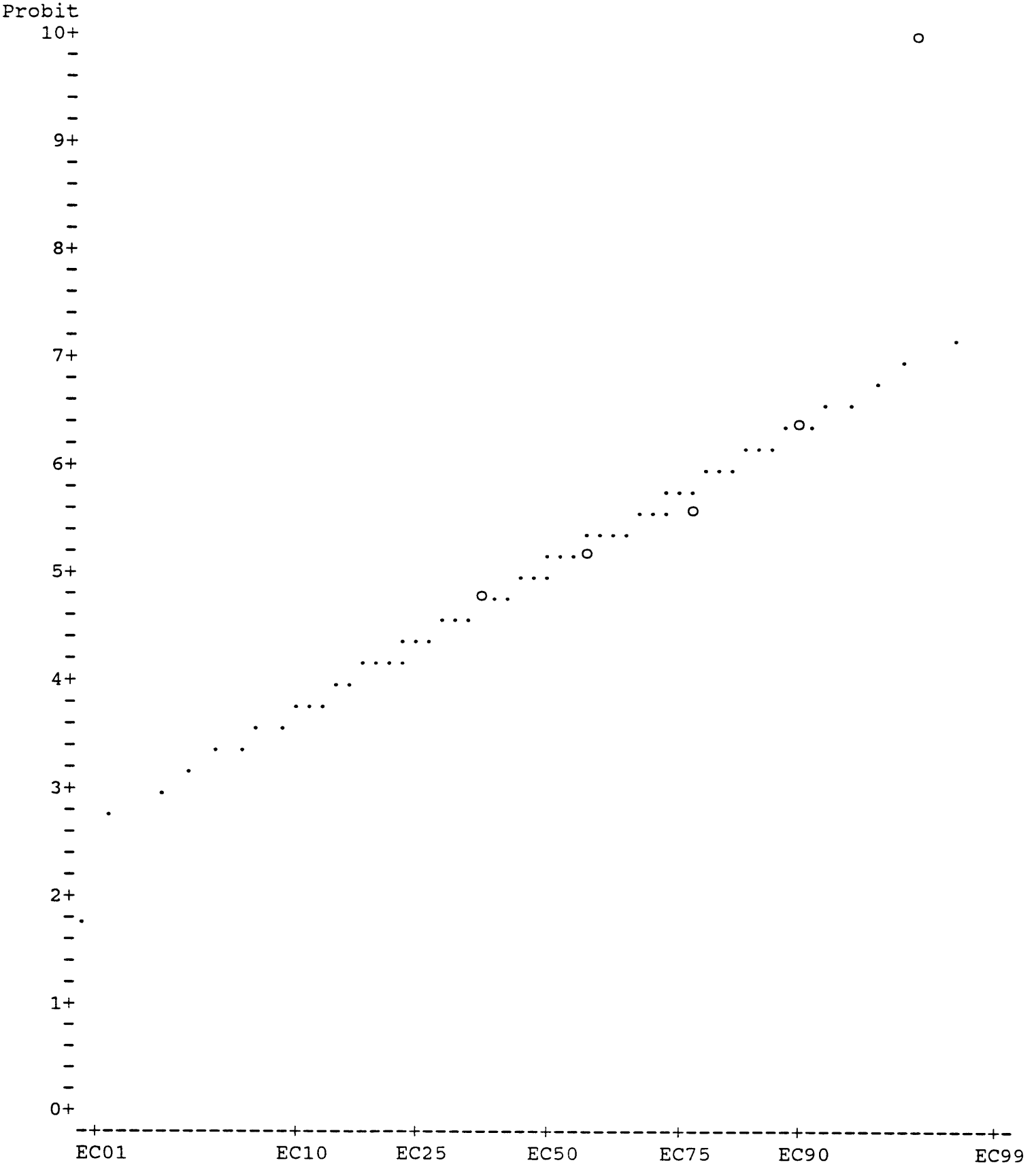
SC-EE09

Estimated EC Values and Confidence Limits

Point	Conc.	Lower 95% Confidence	Upper Limits
EC 1.00	0.5132	0.0234	1.7134
EC 5.00	1.1866	0.1057	3.1019
EC10.00	1.8550	0.2353	4.2742
EC15.00	2.5079	0.4028	5.3210
EC50.00	8.9722	3.6692	14.2956
EC85.00	32.0981	20.7987	61.7211
EC90.00	43.3962	27.6128	99.0625
EC95.00	67.8429	40.1375	209.0557
EC99.00	156.8440	75.8846	905.0641

SC-EE09

PLOT OF ADJUSTED PROBITS AND PREDICTED REGRESSION LINE



FATHEAD MINNOW SURVIVAL AND GROWTH
7-DAY CHRONIC TOXICITY TEST

Log No. 361

JOB NO. F93506 T3
INDUSTRY: TINKER
CONTACT:
EFFLUENT:
NPDES PERMIT NO:
SAMPLE TYPE:
DILUTION WATER: Spring

PERSON CONDUCTING TEST:
BEGINNING: 1620 hrs; 3/17/95
ENDING: ____ hrs; / / .
TEST
DILUTIONS:
AGE:
ORGANISM SOURCE:

PHOTOPERIOD: 16 hr light
FEEDING REGIME:
0.1 ml Artemia @ 3times/day
TEST VESSEL CAPACITY: 1 liter
TEST SOLUTION VOLUME: 500 mL
NO. ORGANISMS/TREATMENT: 10
NO. REPLICATES: 3 4

CONC (%)	REP ID	SURVIVAL (#) START	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7
Con	A	10	9	9	① 9	8	8	8	8
	B	10	9	9	① 9	9	9	9	9
	C	10	10	10	① 10	① 10	10	10	10
EC 149	A	10	9	9	9	9	9	9	9
	B	10	10	10	10	9	9	8	8
	C	10	10	10	10	10	10	10	10
CC RAW	A	10	10	10	10	10	10	10	10
	B	10	10	10	② 10	~~9~~ 9	10	10	10
	C	10	10	10	10	10	10	9	9
CC SPARTA	A	10	10	10	10	10	10	10	10
	B	10	10	10	10	10	10	10	10
	C	10	9	8	8	10	10	10	10
EC 179	A	10	10	10	10	10	10	10	10
	B	10	10	10	10	10	10	10	9
	C	10	10	10	10	10	10	9	8
TIME:		MAR	MAR	MAR	1415	1610	1555	1630	1345
INITIAL:		1620	1515	1120	LJT	LJT	mm	mm	mm

GROWTH RESULTS

CONC (%)	REP ID	Boat ID	Tare wt (g)	Combined wt (g)	Tot Fish wt (g)	# of Fish	Avg Fish wt (mg)
Con	A		1.11344	1.11758			
	B		1.10454	1.10955			
	C		1.12353	1.12944			
149	A		1.12784	1.13420			
	B		1.11439	1.11826			
	C		1.12953	1.13582			
Raw	A		1.11944	1.12499			
	B		1.08958	1.10685			
	C		1.13826	1.15431			
Sparta	A		1.09275	1.12065			
	B		1.11398	1.14352			
	C		1.11686	1.13612			
179	~~179~~ A		1.10738	1.11588			
	B		1.09422	1.10486			
	C		1.10976	1.11850			

① One fish smaller than others.

② Two smaller fish

Log # 1/362
Job #
Client: Tinker
fish + C dubia

CHRONIC TOXICITY TEST DATA SHEET

TEMPERATURE

CONCENTRATION	Start	Day 1 OLD	Day 1 NEW	Day 2 OLD	Day 2 NEW	Day 3 OLD	Day 3 NEW	Day 4 OLD	Day 4 NEW	Day 5 OLD	Day 5 NEW	Day 6 OLD	Day 6 NEW	Day 7 OLD	Day 7 NEW	Day 8 OLD
Control	24.8															
EC-149																
CC-Raulins																
CC Spratz																
EC-179																
Spring Control																

DISSOLVED OXYGEN

CONCENTRATION	Start	Day 1 OLD	Day 1 NEW	Day 2 OLD	Day 2 NEW	Day 3 OLD	Day 3 NEW	Day 4 OLD	Day 4 NEW	Day 5 OLD	Day 5 NEW	Day 6 OLD	Day 6 NEW	Day 7 OLD	Day 7 NEW	Day 8 OLD
Control	8.1	10.5	7.8	7.8	7.9	8.1	8.3		8.3		8.1		8.6			
EC-149	8.1	10.7	7.7	7.3	8.4	7.7	8.4	7.4	8.3	7.5	8.1	8.0	8.6			
CC-Raw	8.2	4.6	7.7	6.9	8.6	7.6	8.4	7.4	8.4	7.6	8.2	7.8	8.5			
CC-Spratz	8.3	10.6	7.8	6.6	8.6	7.6	8.5	7.4	8.4	7.4	8.2	7.6	8.6			
EC-179	8.3	4.6	7.9	6.4	8.7	7.8	8.5	7.4	8.4	7.5	8.2	7.5	8.6			
Spring Control	8.1	11.2	6.8	6.8	7.8	8.0	8.5	7.8	8.5	7.6	8.1		8.2			

pH

CONCENTRATION	Start	Day 1 OLD	Day 1 NEW	Day 2 OLD	Day 2 NEW	Day 3 OLD	Day 3 NEW	Day 4 OLD	Day 4 NEW	Day 5 OLD	Day 5 NEW	Day 6 OLD	Day 6 NEW	Day 7 OLD	Day 7 NEW	Day 8 OLD
Control	7.65	7.80	7.76	7.70	7.64	7.83	7.72		7.63		7.74	8.58	7.71			
EC-149	7.66	8.18	8.08	8.10	8.39	8.51	8.67	8.66	8.46	8.67	8.68	8.80	8.66			
CC-Raw	8.29	8.15	8.14	8.13	8.45	8.61	8.62	8.67	8.66	8.66	8.73	8.74	8.65			
CC-Spratz	8.32	8.21	8.17	8.07	8.31	8.45	8.64	8.61	8.68	8.61	8.73	8.80	8.75			
EC-179	8.38	8.27	8.27	8.20	8.20	8.55	8.73	8.77	8.78	8.71	8.80	8.89	8.80			
Spring Control	8.38	7.86	7.87	8.15	8.23	8.65	9.05	8.85	9.03	8.85	8.48	8.55	8.44			

CONDUCTIVITY

CONCENTRATION	Start	Day 1 OLD	Day 1 NEW	Day 2 OLD	Day 2 NEW	Day 3 OLD	Day 3 NEW	Day 4 OLD	Day 4 NEW	Day 5 OLD	Day 5 NEW	Day 6 OLD	Day 6 NEW	Day 7 OLD	Day 7 NEW	Day 8 OLD
Control	677	650	636	647	642	737	657		678		676	751	701			
EC-149	436	410	415	485	350	502	434	499	426	501	449	601	445			
CC-Raw	780	766	685	830	592	812	750	804	748	818	717	802	797			
CC-Spratz	781	804	557	878	645	874	850	813	842	811	832	868	815			
EC-179	533	594	562	587	445	670	555	587	570	586	535	601	557			
Spring Control	713	446	303	446	677	736	716	672	753	670	301	580	584			

	HRD	AIK
	200	220
EC-149		
CC Raw	250	210
CC Spratz	250	220

	AIK	HRD
	160	200
Spring H_2O		
Control	180	115

361
C. dubia
Tinker

CHRONIC TOXICITY TEST DATA SHEET

TEMPERATURE

CONCENTRATION	Start	Day 1 OLD	Day 1 NEW	Day 2 OLD	Day 2 NEW	Day 3 OLD	Day 3 NEW	Day 4 OLD	Day 4 NEW	Day 5 OLD	Day 5 NEW	Day 6 OLD	Day 6 NEW	Day 7 OLD	Day 7 NEW	Day 8 OLD
H. Control	25.2															
EC 149																
CC Rawling																
CC Spoate																
EC 179																

DISSOLVED OXYGEN

CONCENTRATION	Start	Day 1 OLD	Day 1 NEW	Day 2 OLD	Day 2 NEW	Day 3 OLD	Day 3 NEW	Day 4 OLD	Day 4 NEW	Day 5 OLD	Day 5 NEW	Day 6 OLD	Day 6 NEW	Day 7 OLD	Day 7 NEW	Day 8 OLD
H Control	8.1	6.8		7.5		8.1		8.0		7.9		8.9		8.6		
EC149	8.1	6.8		7.5		8.0		8.0		7.9		8.1		8.4		
CC Rawling	8.3	7.0		7.6		8.0		8.0		7.8		8.0		8.4		
CC Spoate	8.2	7.3		7.7		8.1		8.0		7.6		8.0		8.4		
EC 179	8.2	7.3		7.5		8.1		8.0		7.6		8.0		8.5		

pH

CONCENTRATION	Start	Day 1 OLD	Day 1 NEW	Day 2 OLD	Day 2 NEW	Day 3 OLD	Day 3 NEW	Day 4 OLD	Day 4 NEW	Day 5 OLD	Day 5 NEW	Day 6 OLD	Day 6 NEW	Day 7 OLD	Day 7 NEW	Day 8 OLD
H Control	7.65	7.80		7.52		7.82		7.73		7.78		8.47		7.62		
EC 149	7.46	8.18		8.36		8.78		8.83		8.76		8.61		8.60		
CC Rgal	8.29	8.15		8.42		8.72		8.79		8.78		8.55		8.67		
CC Spoate	8.32	8.20		8.51		8.75		8.83		8.80		8.62		8.60		
EC 179	8.38	8.26		8.31		8.82		8.89		8.88				8.78		

CONDUCTIVITY

CONCENTRATION	Start	Day 1 OLD	Day 1 NEW	Day 2 OLD	Day 2 NEW	Day 3 OLD	Day 3 NEW	Day 4 OLD	Day 4 NEW	Day 5 OLD	Day 5 NEW	Day 6 OLD	Day 6 NEW	Day 7 OLD	Day 7 NEW	Day 8 OLD
H control	1077	1050		647		757		707		725		524		594		
149	436	410		398		450		456		422		624		409		
Raw	780	760		518		780		765		743		900		588		
Spoate	781	800		498		814		686		885		686		812		
179	553	563		707		560		581		622		659		566		

Ceriodaphnia SURVIVAL AND REPRODUCTION CHRONIC TOXICITY TEST

JOB NO: F93506
INDUSTRY: Tinker
CONTACT:
EFFLUENT:
NPDES PERMIT NO:
PERSON CONDUCTING TEST:

BEGINNING: ____ hrs; 3/17/95
ENDING: ____ hrs; / /
FEEDING REGIME:
.05 mL yct/15 mL
.05 mL algal suspension/15 mL

Log No. 3602
PHOTOPERIOD: 16 light, 8 dark
ORGANISM SOURCE: WCC
TEST VESSEL CAPACITY: 30 mL
TEST SOLUTION VOLUME: 15mL
NO. REPLICATES:
DILUTION WATER:

CONC	CHAMBER	TIME / OBSERVER	NUMBER OF YOUNG PRODUCED							
			START	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7
Con	1								8	10
	2							3	3	0
	3						2	4	6	8
	4							3	6	6
	5						2	3	1	8
	6								7	10
	7							4	8	5
	8								9	4
	9							2	0	0
	10							3	5	0
EC149	11							3	9	10
	12						1	D		
	13							1	2	3
	14						2	0	0	2
	15							1	2	2
	16							3	7	7
	17							2	3	7
	18						4	3	0	12
	19							4	7	7
	20						2	2	2	9
CC Rawling	21						2	0	6	9
	22						3	4	4	1
	23							4	9	7
	24						3	1	2	4
	25						2	0	8	8
	26							2	9	8
	27						3	0	6	9
	28							2	0	6
	29							3	6	9
	30							3	9	8

Ceriodaphnia SURVIVAL AND REPRODUCTION CHRONIC TOXICITY TEST

JOB NO: F435D6 | BEGINNING: ____hrs; / / . | Log No. 362
INDUSTRY: TINKER | ENDING: ____hrs; / / | PHOTOPERIOD: 16 light, 8 dark
CONTACT: | FEEDING REGIME: | ORGANISM SOURCE: WCC
EFFLUENT: | .05 mL yct/15 mL | TEST VESSEL CAPACITY: 30 mL
NPDES PERMIT NO: | .05 mL algal suspension/15 mL | TEST SOLUTION VOLUME: 15mL
PERSON CONDUCTING TEST: | | NO. REPLICATES:
| | DILUTION WATER:

TIME
OBSERVER

CONC | CHAMBER | NUMBER OF YOUNG PRODUCED

CONC	CHAMBER	START	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7
CC									
Sprate	31						2	7	9
	32							5	7
	33						3	7	8
	34						2	8	8
	35					2	3	2	11
	36						3	5	8
	37						4	7	8
	38			(D)					
	39						2	2	10
	40						4	8	8
EC									
1.49	41						4	10	9
	42						2	7	8
	43							8	13
	44						3	7	12
	45						3	9	6
	46					3	3	0	8
	47						2	7	6
	48						1	3	0
	49						2	6	0
	50							2	0

Ceriodaphnia dubia GRID Ceriodaphnia dubia GRID MONITORING DATA

Grid Letter: ~~G~~ ~~M~~ ~~G~~ ~~M~~ ~~G~~ M Start Date: 3/17/95 Sample ID: Tinker Log #: 36

AD	ID	1	AD	ID	1	AD	ID	1	AD	ID	1		ID	1
2	3	4	2	3	4	2	3	4	2	3	4	2	3	4
5	6	7	5	6	7	5	6	7	5	6	7	5	6	7
AD	ID 4	1 ✓	AD	ID 39	1 ✓	AD	ID 28	1 ✓	AD	ID 46	1 ✓		ID 35	1
2 ✓	3 ✓	4 ✓	2 ✓	3 ✓	4 ✓	2 ✓	3 ✓	4 ✓	2 ✓	3 ✓	4 3	2 ✓	3 ✓	4 [illegible]
5 3	6 6	7 6	5 2	6 2	7 10	5 2	6 ✓	7 6	5 3	6 ✓	7 8	5 3	6 2	7 1[illegible]
AD	ID 34	1 ✓	AD	ID 47	1 ✓	AD	ID 20	1 ✓	AD	ID 21	1 ✓		ID 10	1
2 ✓	3 ✓	4 ✓	2 ✓	3 ✓	4 ✓	2 ✓	3 ✓	4 2	2 ✓	3 ✓	4 2	2 ✓	3 ✓	4 ✓
5 2	6 8	7 8	5 2	6 7	7 6	5 2	6 2	7 9	5 ✓	6 6	7 9	5 3	6 5	7 0
AD	ID 11	1 ✓	AD	ID 42	1 ✓	AD	ID 3	1 ✓	AD	ID 36	1 ✓		ID 27	1 ✓
2 ✓	3 ✓	4 ✓	2 ✓	3 ✓	4 ✓	2 ✓	3 ✓	4 2	2 ✓	3 ✓	4 ✓	2 ✓	3 ✓	4 [illegible]
5 3	6 9	7 10	5 2	6 7	7 8	5 4	6 6	7 8	5 3	6 5	7 8	5 ✓	6 6	7 9
AD	ID 19	1 ✓	AD	ID 29	1 ✓	AD	ID 40	1 ✓	AD	ID 7	1 ✓		ID 13	1 ✓
2 ✓	3 ✓	4 ✓	2 ✓	3 ✓	4 ✓	2 ✓	3 ✓	4 ✓	2 ✓	3 ✓	4 ✓	2 ✓	3 ✓	4 ✓
5 4	6 7	~~4~~ MAR 7 7	5 3	6 6	7 9	5 4	6 8	7 8	5 4	6 8	7 5	5 1	6 2	7 3
AD	ID 6	1 ✓	AD	ID 12	1 ✓	AD	ID 22	1 ✓	AD	ID 41	1 ✓		ID 33	1 ✓
2 ✓	3 ✓	4 ✓	2 ✓	3 ✓	4 1	2 ✓	3 ✓	4 3	2 ✓	3 ✓	4 ✓	2 ✓	3 ✓	4 ✓
5 ✓	6 7	7 10	5 D	6	7	5 4	6 4	~~0~~ MAR 7 1	5 4	6 10	7 9	5 3	6 7	7 8

Comments:

Cup ID	Sample Concentration	Day ø	Initials LJT	Time
1–10:	Control	1	LJT	1130
11–20:	Elm Creek @ 149	2	MAR	1720
21–30:	Crutcho Creek at Radlings	3	LJT	1330
31–40:	Crutcho Creek @ Spaatz	4	LJT	1530
41–50:	Elm Creek @ 179	5	MM	1720
51–60:		6	mm	1715
		7	MLS	1600

Ceriodaphnia dubia GRID Ceriodaphnia dubia GRID MONITORING DATA

Grid Letter: ~~X~~ ~~Ø~~ ~~X~~ ~~Ø~~ ~~X~~ O Start Date: 3/17/95 Sample ID: Tinker Log #: 3

AD	ID	1
2	3	4
5	6	7

AD	ID	1
2	3	4
5	6	7

AD	ID	1
2	3	4
5	6	7

AD	ID	1
2	3	4
5	6	7

	ID	1
2	3	4
5	6	7

AD	ID 25	1 ✓
2 ✓	3 ✓	4 2
5 ✓	6 8	7 8

AD	ID 32	1 ✓
2 ✓	3 ✓	4 ✓
5 ✓	6 5	7 7

AD	ID 44	1 ✓
2 ✓	3 ✓	4 ✓
5 3	6 7	7 12

AD	ID 17	1 ✓
2 ✓	3 ✓	4 ✓
5 2	6 5	7 7

	ID 49	1
2 ✓	3 ✓	4 2
5 2	6 6	7 C

AD	ID 9	1 ✓
2 ✓	3 ✓	4 ✓
5 2	6 ✓	7 0

AD	ID 16	1 ✓
2 ✓	3 ✓	4 ✓
5 3	6 7	7 7

AD	ID 38	1 ✓
2 4	3	4
5	6	7

AD	ID 2	1 ✓
2 ✓	3 ✓	4 ✓
5 3	6 3	7 0

	ID 26	1 ✓
2 ✓	3 ✓	4 ✓
5 2	6 9	7

AD	ID 24	1 ✓
2 ✓	3 ✓	4 3
5 1	6 2	7 4

AD	ID 8	1 ✓
2 ✓	3 ✓	4 ✓
5 ✓	6 9	7 4

AD	ID 50	1 ✓
2 ✓	3 ✓	4 ✓
5 ✓	6 2	7 0

AD	ID 15	1 ✓
2 ✓	3 ✓	4 ✓
5 1	6 2	7 2

	ID 48	1 ✓
2 ✓	3 ✓	4 ✓
5 1	6 3	7 C

AD	ID 31	1 ✓
2 ✓	3 ✓	4 ✓
5 2	6 7	7 9

AD	ID 45	1 ✓
2 ✓	3 ✓	4 ✓
5 3	6 9	7 6

AD	ID 43	1 ✓
2 ✓	3 ✓	4 ✓
5 ✓	6 8	7 13

AD	ID 37	1 ✓
2 ✓	3 ✓	4 ✓
5 4	6 7	7 8

	ID 30	1 ✓
2 ✓	3 ✓	4 ✓
5 3	6 9	7 8

AD	ID 1	1 ✓
2 ✓	3 ✓	4 ✓
5 ✓	6 8	7 10

AD	ID 14	1 ✓
2 ✓	3 ✓	4 2
5 ✓	6 ✓	7 2

AD	ID 23	1 ✓
2 ✓	3 ✓	4 ✓
5 4	6 9	7 7

AD	ID 18	1 ✓
2 ✓	3 ✓	4 4
5 3	6 ✓	7 12

	ID 5	1 ✓
2 ✓	3 ✓	4 ✓
5 3	6 1	7 8

Comments:

Cup ID	Sample Concentration
1–10:	Control
11–20:	Elm Creek @ 149
21–30:	Coutcho Creek at Rawlings
31–40:	Coutcho Creek at Spaatz
41–50:	Elm Creek @ 179
51–60:	

Day	Initials LJT	Time
1	LJT	1130
2	MAR	1220
3	LJT	1330
4	LJT	1530
5	MM	1715
6	MM	1705
7	MAR	1700

FISHERS EXACT TEST

IDENTIFICATION	NUMBER OF ALIVE	DEAD	TOTAL ANIMALS
CONTROL	10	0	10
EC 149	9	1	10
TOTAL	19	1	20

CRITICAL FISHERS VALUE (10,10,10) (p=0.05) IS 6. b VALUE IS 9.
Since b is greater than 6 there is no significant difference between CONTROL and TREATMENT at the 0.05 level.

FISHERS EXACT TEST

IDENTIFICATION	NUMBER OF ALIVE	DEAD	TOTAL ANIMALS
CONTROL	10	0	10
CC RAWLINGS	10	0	10
TOTAL	20	0	20

CRITICAL FISHERS VALUE (10,10,10) (p=0.05) IS 6. b VALUE IS 10.
Since b is greater than 6 there is no significant difference between CONTROL and TREATMENT at the 0.05 level.

FISHERS EXACT TEST

IDENTIFICATION	NUMBER OF ALIVE	DEAD	TOTAL ANIMALS
CONTROL	10	0	10
CC SPAATZ	9	1	10

TOTAL	19	1	20

CRITICAL FISHERS VALUE (10,10,10) (p=0.05) IS 6. b VALUE IS 9.
Since b is greater than 6 there is no significant difference between CONTROL and TREATMENT at the 0.05 level.

FISHERS EXACT TEST

IDENTIFICATION	NUMBER OF ALIVE	NUMBER OF DEAD	NUMBER OF TOTAL ANIMALS
CONTROL	10	0	10
EC 179	10	0	10
TOTAL	20	0	20

CRITICAL FISHERS VALUE (10,10,10) (p=0.05) IS 6. b VALUE IS 10.
Since b is greater than 6 there is no significant difference between CONTROL and TREATMENT at the 0.05 level.

SUMMARY OF FISHERS EXACT TESTS

GROUP	IDENTIFICATION	NUMBER EXPOSED	NUMBER DEAD	SIG (P=.05)
	CONTROL	10	0	
1	EC 149	10	1	
2	CC RAWLINGS	10	0	
3	CC SPAATZ	10	1	
4	EC 179	10	0	

Tinker C. dubia Crutcho and Elm Creeks - Log #362
File: 362cd Transform: NO TRANSFORMATION

Chi-square test for normality: actual and expected frequencies

INTERVAL	<-1.5	-1.5 to <-0.5	-0.5 to 0.5	>0.5 to 1.5	>1.5
EXPECTED	3.350	12.100	19.100	12.100	3.350
OBSERVED	4	11	19	16	0

Calculated Chi-Square goodness of fit test statistic = 4.8337
Table Chi-Square value (alpha = 0.01) = 13.277

Data PASS normality test. Continue analysis.

Tinker C. dubia Crutcho and Elm Creeks - Log #362
File: 362cd Transform: NO TRANSFORMATION

Bartletts test for homogeneity of variance

Calculated B statistic = 3.09
Table Chi-square value = 13.28 (alpha = 0.01)
Table Chi-square value = 9.49 (alpha = 0.05)

Average df used in calculation ==> df (avg n - 1) = 9.00
Used for Chi-square table value ==> df (#groups-1) = 4

Data PASS homogeneity test at 0.01 level. Continue analysis.

NOTE: If groups have unequal replicate sizes the average replicate size is used to calculate the B statistic (see above).

TITLE: Tinker C. dubia Crutcho and Elm Creeks - Log #362
FILE: 362cd
TRANSFORM: NO TRANSFORMATION NUMBER OF GROUPS: 5

GRP	IDENTIFICATION	REP	VALUE	TRANS VALUE
1	control	1	18.0000	18.0000
1	control	2	6.0000	6.0000
1	control	3	20.0000	20.0000
1	control	4	15.0000	15.0000
1	control	5	14.0000	14.0000
1	control	6	17.0000	17.0000
1	control	7	17.0000	17.0000
1	control	8	13.0000	13.0000
1	control	9	2.0000	2.0000
1	control	10	8.0000	8.0000
2	EC 149	1	22.0000	22.0000
2	EC 149	2	1.0000	1.0000
2	EC 149	3	6.0000	6.0000
2	EC 149	4	4.0000	4.0000
2	EC 149	5	5.0000	5.0000
2	EC 149	6	17.0000	17.0000
2	EC 149	7	14.0000	14.0000
2	EC 149	8	19.0000	19.0000
2	EC 149	9	18.0000	18.0000
2	EC 149	10	15.0000	15.0000
3	CC Rawlings	1	17.0000	17.0000
3	CC Rawlings	2	12.0000	12.0000
3	CC Rawlings	3	20.0000	20.0000
3	CC Rawlings	4	10.0000	10.0000
3	CC Rawlings	5	18.0000	18.0000
3	CC Rawlings	6	19.0000	19.0000
3	CC Rawlings	7	18.0000	18.0000
3	CC Rawlings	8	8.0000	8.0000
3	CC Rawlings	9	18.0000	18.0000
3	CC Rawlings	10	20.0000	20.0000
4	CC Spaatz	1	18.0000	18.0000
4	CC Spaatz	2	12.0000	12.0000
4	CC Spaatz	3	18.0000	18.0000
4	CC Spaatz	4	18.0000	18.0000
4	CC Spaatz	5	18.0000	18.0000
4	CC Spaatz	6	16.0000	16.0000
4	CC Spaatz	7	19.0000	19.0000
4	CC Spaatz	8	0.0000	0.0000
4	CC Spaatz	9	14.0000	14.0000
4	CC Spaatz	10	20.0000	20.0000
5	EC 179	1	23.0000	23.0000
5	EC 179	2	17.0000	17.0000
5	EC 179	3	21.0000	21.0000
5	EC 179	4	22.0000	22.0000
5	EC 179	5	18.0000	18.0000
5	EC 179	6	14.0000	14.0000
5	EC 179	7	15.0000	15.0000
5	EC 179	8	4.0000	4.0000
5	EC 179	9	8.0000	8.0000
5	EC 179	10	2.0000	2.0000

Tinker C. dubia Crutcho and Elm Creeks - Log #362
File: 362cd Transform: NO TRANSFORMATION

SUMMARY STATISTICS ON TRANSFORMED DATA TABLE 1 of 2

GRP	IDENTIFICATION	N	MIN	MAX	MEAN
1	control	10	2.000	20.000	13.000
2	EC 149	10	1.000	22.000	12.100
3	CC Rawlings	10	8.000	20.000	16.000
4	CC Spaatz	10	0.000	20.000	15.300
5	EC 179	10	2.000	23.000	14.400

Tinker C. dubia Crutcho and Elm Creeks - Log #362
File: 362cd Transform: NO TRANSFORMATION

SUMMARY STATISTICS ON TRANSFORMED DATA TABLE 2 of 2

GRP	IDENTIFICATION	VARIANCE	SD	SEM
1	control	34.000	5.831	1.844
2	EC 149	54.767	7.400	2.340
3	CC Rawlings	18.889	4.346	1.374
4	CC Spaatz	34.678	5.889	1.862
5	EC 179	55.378	7.442	2.353

Tinker C. dubia Crutcho and Elm Creeks - Log #362
File: 362cd Transform: NO TRANSFORMATION

ANOVA TABLE

SOURCE	DF	SS	MS	F
Between	4	103.320	25.830	0.653
Within (Error)	45	1779.400	39.542	
Total	49	1882.720		

Critical F value = 2.61 (0.05,4,40)
Since F < Critical F FAIL TO REJECT Ho:All groups equal

Tinker C. dubia Crutcho and Elm Creeks - Log #362
File: 362cd Transform: NO TRANSFORMATION

DUNNETTS TEST - TABLE 1 OF 2 Ho:Control<Treatment

GROUP	IDENTIFICATION	TRANSFORMED MEAN	MEAN CALCULATED IN ORIGINAL UNITS	T STAT	SIG
1	control	13.000	13.000		
2	EC 149	12.100	12.100	0.320	
3	CC Rawlings	16.000	16.000	-1.067	
4	CC Spaatz	15.300	15.300	-0.818	
5	EC 179	14.400	14.400	-0.498	

Dunnett table value = 2.23 (1 Tailed Value, P=0.05, df=40,4)

Tinker C. dubia Crutcho and Elm Creeks - Log #362
File: 362cd Transform: NO TRANSFORMATION

DUNNETTS TEST - TABLE 2 OF 2 Ho:Control<Treatment

GROUP	IDENTIFICATION	NUM OF REPS	Minimum Sig Diff (IN ORIG. UNITS)	% of CONTROL	DIFFERENCE FROM CONTROL
1	control	10			
2	EC 149	10	6.271	48.2	0.900
3	CC Rawlings	10	6.271	48.2	-3.000
4	CC Spaatz	10	6.271	48.2	-2.300
5	EC 179	10	6.271	48.2	-1.400

				P		
Control	vs	Elm Creek	14C	9.6×10^{-4}		10 day data
			13C	0.016		$n = 30$
		C. Creek	Raw	0.14	NS	$b = 3$
			spactz	0.063	NS	

				P		
Control	vs	Elm creek	14C	0.35×10^{-2}		10 and 11 day data
			13C	0.99×10^{-3}		$n = 60$
		C. Creek	Raw	0.0550	NS Bateloc	$b = 6$
			spactz	0.0762	NS	

Control vs C. Creek Raw w/o outlier replicate

Dixons outlier test

C.C. Raw

1	6
2	7
3	7
4	8
5	9
6	10

$$r_{1,0} = \frac{Y_2 - Y_{\dots}}{Y_n - Y_{\dots}} = \frac{7 - 2}{10 - 2}$$

$r_{10} = 0.625$

$r_{10[6]} = 0.560$ at $\alpha = 0.05$

control	vs	C.C. Raw	$n = 30$	$m = 20$	$q = 1.263$
			$n = 60$	$m = 50$	$q = 0.553$

	# Dead	# Alive				# Dead	# Alive		
Control	2	28		30	Control	1	29		30
Elm Cr.	22	8		30	Elm Cr.	23	7		30
149					149				
	24	36		60		24	36		60
	32.424		0.30103			32.424		0	
	32.424		21.05077			32.424		22.41249	
	23.793		29.48414			23.793		30.94654	
	41.571		4.605521			41.571		3.702431	
	-81.92					-81.92			
	48.29		55.44146			48.29		57.06146	
	0.0008					0.0002			
	# Dead	# Alive							
Control	0	30		30					
Elm Cr.	24	6		30					
149									
	24	36		60					
	32.424		0						
	32.424		23.79271						
	23.793		32.42366						
	41.571		2.857332						
	-81.92								
	48.29		59.0737						
	2E-05								
		Probability=		**0.00096**					

	# Dead	# Alive				# Dead	# Alive		
Control	2	28		30	Control	1	29		30
Elm Cr.	16	14		30	Elm Cr.	17	13		30
179					179				
	18	42		60		18	42		60
	32.424		0.30103			0		0	
	32.424		13.32062			32.424		14.55107	
	15.806		29.48414			15.806		30.94654	
	51.148		10.94041			51.148		9.79428	
	-81.92					-81.92			
	49.881		54.0462			17.458		55.29189	
	0.0155					4E-17			
	# Dead	# Alive							
Control	0	30		30					
Elm Cr.	18	12		30					
179									
	18	42		60					
	32.424		0						
	32.424		15.80634						
	15.806		32.42366						
	51.148		8.680337						
	-81.92								
	49.881		56.91034						
	0.0009								
		Probability=		**0.016415**					

	# Dead	# Alive				# Dead	# Alive		
Control	2	28		30	Control	1	29		30
C.Creek	10	20		30	C.Creek	11	19		30
Raw					Raw				
	12	48		60		12	48		60
	32.424		0.30103			0		0	
	32.424		6.559763			32.424		7.601156	
	8.6803		29.48414			8.6803		30.94654	
	61.094		18.38612			61.094		17.08509	
	-81.92					-81.92			
	52.701		54.73106			20.278		55.63279	
	0.1314					4E-16			
	# Dead	# Alive							
Control	0	30		30					
C. Creek	12	18		30					
Raw									
	12	48		60					
	32.424		0						
	32.424		8.680337						
	8.6803		32.42366						
	61.094		15.80634						
	-81.92								
	52.701		56.91034						
	0.0149								
		Probability=		**0.146241**					

	# Dead	# Alive				# Dead	# Alive		
Control	2	28		30	Control	1	29		30
C.Creek	8	22		30	C.Creek	9	21		30
Spaatz					Spaatz				
	10	50		60		10	50		60
	32.424		0.30103			0		0	
	32.424		4.605521			32.424		5.559763	
	6.5598		29.48414			6.5598		30.94654	
	64.483		21.05077			64.483		19.70834	
	-81.92					-81.92			
	53.97		55.44146			21.546		56.21465	
	0.2296					9E-16			
	# Dead	# Alive							
Control	0	30		30					
C. Creek	10	20		30					
Spaatz									
	10	50		60					
	32.424		0						
	32.424		6.559763						
	6.5598		32.42366						
	64.483		18.38612						
	-81.92								
	53.97		57.36955						
	0.0334								
	Probability=		**0.262974**						

	# Dead	# Alive				# Dead	# Alive		
Control	3	57		60	Control	2	58		60
Elm Cr.	48	12		60	Elm Cr.	49	11		60
149					149				
	51	69		120		51	69		120
	81.92		0.778151			81.92		0.30103	
	81.92		61.09391			81.92		62.7841	
	66.191		76.60774			66.191		78.37117	
	98.233		8.680337			98.233		7.601156	
	-198.8					-198.8			
	129.44		147.1601			129.44		149.0575	
	2E-08					3E-09			
	# Dead	# Alive				# Dead	# Alive		
Control	1	59		60	Control	0	60		60
Elm Cr.	50	10		60	Elm Cr.	51	9		60
149					149				
	51	69		120		51	69		120
	81.92		0			81.92		0	
	81.92		64.48307			81.92		66.19065	
	66.191		80.14202			66.191		81.92017	
	98.233		6.559763			98.233		5.559763	
	-198.8					-198.8			
	129.44		151.1849			129.44		153.6706	
	4E-10					3E-11			
	Probability=			**2.35E-08**					

	# Dead	# Alive				# Dead	# Alive		
Control	3	57		60	Control	2	58		60
Elm Cr.	36	24		60	Elm Cr.	37	23		60
179					179				
	39	81		120		39	81		120
	81.92		0.778151			81.92		0.30103	
	81.92		41.57054			81.92		43.13874	
	46.31		76.60774			46.31		78.37117	
	120.76		23.79271			120.76		22.41249	
	-198.8					-198.8			
	132.09		142.7491			132.09		144.2234	
	2E-05					5E-06			
	# Dead	# Alive				# Dead	# Alive		
Control	1	59		60	Control	0	60		60
Elm Cr.	38	22		60	Elm Cr.	39	21		60
149					149				
	39	81		120		39	81		120
	81.92		0			81.92		0	
	81.92		44.71852			81.92		46.30959	
	46.31		80.14202			46.31		81.92017	
	120.76		21.05077			120.76		19.70834	
	-198.8					-198.8			
	132.09		145.9113			132.09		147.9381	
	1E-06					1E-07			
		Probability=		**2.99E-05**					

	# Dead	# Alive				# Dead	# Alive		
Control	3	57		60	Control	2	58		60
C.Creek	17	43		60	C.Creek	18	42		60
Raw					Raw				
	20	100		120		20	100		120
	81.92		0.778151			81.92		0.30103	
	81.92		14.55107			81.92		15.80634	
	18.386		76.60774			18.386		78.37117	
	157.97		52.78115			157.97		51.14768	
	-198.8					-198.8			
	141.37		144.7181			141.37		145.6262	
	0.0352					0.0142			
	# Dead	# Alive				# Dead	# Alive		
Control	1	59		60	Control	0	60		60
C.Creek	19	41		60	C. Creek	20	40		60
Raw					Raw				
	20	100		120		20	100		120
	81.92		0			81.92		0	
	81.92		17.08509			81.92		18.38612	
	18.386		80.14202			18.386		81.92017	
	157.97		49.52443			157.97		47.91165	
	-198.8					-198.8			
	141.37		146.7515			141.37		148.2179	
	0.0046					0.0011			
		Probability=		**0.055048**					

	# Dead	# Alive				# Dead	# Alive		
Control	3	57		60	Control	2	58		60
C.Creek	16	44		60	C.Creek	17	43		60
Spaatz					Spaatz				
	19	101		120		19	101		120
	81.92		0.778151			81.92		0.30103	
	81.92		13.32062			81.92		14.55107	
	17.085		76.60774			17.085		78.37117	
	159.97		54.4246			159.97		52.78115	
	-198.8					-198.8			
	142.07		145.1311			142.07		146.0044	
	0.047					0.0196			
	# Dead	# Alive				# Dead	# Alive		
Control	1	59		60	Control	0	60		60
C.Creek	18	42		60	C. Creek	17	41		58
Spaatz					Spaatz				
	19	101		120		17	101		118
	81.92		0			81.92		0	
	81.92		15.80634			78.371		14.55107	
	17.085		80.14202			14.551		81.92017	
	159.97		51.14768			159.97		49.52443	
	-198.8					-194.7			
	142.07		147.096			140.15		145.9957	
	0.0066					0.0029			
	Probability=			**0.076158**					

	#Alive	#Dead				#Alive	#Dead		
EC149	8	22		30	EC149	7	23		30
C. Creek	22	8		30	C. Creek	23	7		30
Spaatz					Spaatz				
	30	30		60		30	30		60
	32.42		4.605521			32.42		3.702431	
	32.42		21.05077			32.42		22.41249	
	32.42		21.05077			32.42		22.41249	
	32.42		4.605521			32.42		3.702431	
	-81.9					-81.9			
	47.77		51.31257			47.77		52.22985	
	0.029					0.012			
	#Alive	#Dead				#Alive	#Dead		
EC149	6	24		30	EC149	5	25		30
C. Creek	24	6		30	C. Creek	25	5		30
Spaatz					Spaatz				
	30	30		60		30	30		60
	32.42		2.857332			32.42		2.079181	
	32.42		23.79271			32.42		25.19065	
	32.42		23.79271			32.42		25.19065	
	32.42		2.857332			32.42		2.079181	
	-81.9					-81.9			
	47.77		53.30008			47.77		54.53965	
	0.004					0.001			
	#Alive	#Dead				#Alive	#Dead		
EC149	4	26		30	EC149	3	27		30
C. Creek	26	4		30	C. Creek	27	3		30
Spaatz					Spaatz				
	30	30		60		30	30		60
	32.42		1.380211			32.42		0.778151	
	32.42		26.60562			32.42		28.03698	
	32.42		26.60562			32.42		28.03698	
	32.42		1.380211			32.42		0.778151	
	-81.9					-81.9			
	47.77		55.97166			47.77		57.63027	
	3E-04					5E-05			

	#Alive	#Dead				#Alive	#Dead		
EC149	2	28		30	EC149	1	29		30
C. Creek	28	2		30	C. Creek	29	1		30
Spaatz					Spaatz				
	30	30		60		30	30		60
	32.42		0.30103			32.42		0	
	32.42		29.48414			32.42		30.94654	
	32.42		29.48414			32.42		30.94654	
	32.42		0.30103			32.42		0	
	-81.9					-81.9			
	47.77		59.57034			47.77		61.89308	
	8E-06					7E-07			
	#Alive	#Dead							
EC149	0	30		30					
C. Creek	30	0		30					
Spaatz									
	30	30		60					
	32.42		0						
	32.42		32.42366						
	32.42		32.42366		**Probability=**		**0.046**		
	32.42		0						
	-81.9								
	47.77		64.84732						
	4E-08								

	#Alive	#Dead				#Alive	#Dead		
EC149	8	22		30	EC149	7	23		30
C. Creek	10	20		30	C. Creek	11	19		30
Raw					Raw				
	18	42		60		18	42		60
	32.42		4.605521			32.42		3.702431	
	32.42		6.559763			32.42		7.601156	
	15.81		21.05077			15.81		22.41249	
	51.15		18.38612			51.15		17.08509	
	-81.9					-81.9			
	49.88		50.60217			49.88		50.80118	
	0.486					0.399			
	#Alive	#Dead				#Alive	#Dead		
EC149	6	24		30	EC149	5	25		30
C. Creek	12	18		30	C. Creek	13	17		30
Raw					Raw				
	18	42		60		18	42		60
	32.42		2.857332			32.42		2.079181	
	32.42		8.680337			32.42		9.79428	
	15.81		23.79271			15.81		25.19065	
	51.15		15.80634			51.15		14.55107	
	-81.9					-81.9			
	49.88		51.13672			49.88		51.61518	
	0.285					0.177			
	#Alive	#Dead				#Alive	#Dead		
EC149	4	26		30	EC149	3	27		30
C. Creek	14	16		30	C. Creek	15	15		30
Raw					Raw				
	18	42		60		18	42		60
	32.42		1.380211			32.42		0.778151	
	32.42		10.94041			32.42		12.1165	
	15.81		26.60562			15.81		28.03698	
	51.15		13.32062			51.15		12.1165	
	-81.9					-81.9			
	49.88		52.24686			49.88		53.04813	
	0.094					0.042			

	#Alive	#Dead				#Alive	#Dead		
EC149	2	28		30	EC149	1	29		30
C. Creek	16	14		30	C. Creek	17	13		30
Raw					Raw				
	18	42		60		18	42		60
	32.42		0.30103			32.42		0	
	32.42		13.32062			32.42		14.55107	
	15.81		29.48414			15.81		30.94654	
	51.15		10.94041			51.15		9.79428	
	-81.9					-81.9			
	49.88		54.0462			49.88		55.29189	
	0.016					0.004			
	#Alive	#Dead							
EC149	0	30		30					
C. Creek	18	14		32					
Raw									
	18	44		62					
	32.42		0						
	35.42		15.80634						
	15.81		32.42366		**Probability=**		**1.504**		
	54.42		10.94041						
	-85.5								
	52.58		59.17041						
	0.001								

	# Dead	# Alive				# Dead	# Alive		
Control	3	57		60	Control	2	58		60
C. Creek	9	41		50	C. Creek	10	40		50
Raw					Raw				
	12	98		110		12	98		110
	81.92		0.778151			81.92		0.30103	
	64.483		5.559763			64.483		6.559763	
	8.6803		76.60774			8.6803		78.37117	
	153.97		49.52443			153.97		47.91165	
	-178.2					-178.2			
	130.86		132.4701			130.86		133.1436	
	0.1993					0.1016			
	# Dead	# Alive				# Dead	# Alive		
Control	1	59		60	Control	0	60		60
C. Creek	11	39		50	C. Creek	12	38		50
Raw					Raw				
	12	98		110		12	98		110
	81.92		0			81.92		0	
	64.483		7.601156			64.483		8.680337	
	8.6803		80.14202			8.6803		81.92017	
	153.97		46.30959			153.97		44.71852	
	-178.2					-178.2			
	130.86		134.0528			130.86		135.319	
	0.0409					0.0115			
Probability=		**0.353**							

	# Dead	# Alive				# Dead	# Alive		
Control	2	28		30	Control	1	29		30
C. Creek	2	18		20	C. Creek	3	17		20
Raw					Raw				
	4	46		50		4	46		50
	32.424		0.30103			32.424		0	
	18.386		0.30103			18.386		0.778151	
	1.3802		29.48414			1.3802		30.94654	
	57.741		15.80634			57.741		14.55107	
	-64.48					-64.48			
	45.447		45.89254			45.447		46.27576	
	0.6408					0.4368			
	# Dead	# Alive							
Control	0	30		30					
C. Creek	4	16		20					
	4	46		50					
	32.424		0						
	18.386		1.380211						
	1.3802		32.42366						
	57.741		13.32062						
	-64.48				**Probability=**		**1.265**		
	45.447		47.12449						
	0.1869								

	# Dead	# Alive				# Dead	# Alive		
Control	2	28		30	Control	1	29		30
C. Creek	2	18		20	C. Creek	3	17		20
Raw					Raw				
	4	46		50		4	46		50
	32.424		0.30103			32.424		0	
	18.386		0.30103			18.386		0.778151	
	1.3802		29.48414			1.3802		30.94654	
	57.741		15.80634			57.741		14.55107	
	-64.48					-64.48			
	45.447		45.89254			45.447		46.27576	
	0.6408					0.4368			
	# Dead	# Alive							
Control	0	30		30					
C. Creek	4	16		20					
	4	46		50					
	32.424		0						
	18.386		1.380211						
	1.3802		32.42366						
	57.741		13.32062						
	-64.48				Probability=		1.265		
	45.447		47.12449						
	0.1869								

	# Dead	# Alive				# Dead	# Alive		
Control	3	57		60	Control	2	58		60
C. Creek	9	41		50	C. Creek	10	40		50
Raw					Raw				
	12	98		110		12	98		110
	81.92		0.778151			81.92		0.30103	
	64.483		5.559763			64.483		6.559763	
	8.6803		76.60774			8.6803		78.37117	
	153.97		49.52443			153.97		47.91165	
	-178.2					-178.2			
	130.86		132.4701			130.86		133.1436	
	0.1993					0.1016			
	# Dead	# Alive				# Dead	# Alive		
Control	1	59		60	Control	0	60		60
C. Creek	11	39		50	C. Creek	12	38		50
Raw					Raw				
	12	98		110		12	98		110
	81.92		0			81.92		0	
	64.483		7.601156			64.483		8.680337	
	8.6803		80.14202			8.6803		81.92017	
	153.97		46.30959			153.97		44.71852	
	-178.2					-178.2			
	130.86		134.0528			130.86		135.319	
	0.0409					0.0115			
Probability=		**0.353**							

fatheads						
fathead minnows						
1.11364	1.11758	3.94	8	0.4925	0.54487	
1.10459	1.10955	4.96	9	0.551111		
1.12353	1.12944	5.91	10	0.591		
1.12784	1.1342	6.36	9	0.706667	0.606472	1.49
1.11439	1.11826	3.87	8	0.48375		
1.12953	1.13582	6.29	10	0.629		
1.11944	1.12499	5.55	10	0.555	1.335111	Raw
1.08958	1.10625	16.67	10	1.667		
1.13826	1.15431	16.05	9	1.783333		
1.09275	1.12065	27.9	10	2.79	2.583333	Spartz
1.11398	1.14332	29.34	10	2.934		
1.11586	1.13612	20.26	10	2.026		
1.10738	1.11588	8.5	10	0.85	1.041574	1.79
1.09422	1.10486	10.64	9	1.182222		
1.10976	1.1185	8.74	8	1.0925		

newtin
File: newtin.dat Transform: NO TRANSFORMATION

Chi-square test for normality: actual and expected frequencies

INTERVAL	<-1.5	-1.5 to <-0.5	-0.5 to 0.5	>0.5 to 1.5	>1.5
EXPECTED	1.943	7.018	11.078	7.018	1.943
OBSERVED	2	10	5	10	2

Calculated Chi-Square goodness of fit test statistic = 5.8722
Table Chi-Square value (alpha = 0.01) = 13.277

Data PASS normality test. Continue analysis.

newtin
File: newtin.dat Transform: NO TRANSFORMATION

Shapiro Wilks test for normality

D = 57.682

= 0.984

Critical W (P = 0.05) (n = 29) = 0.926
Critical W (P = 0.01) (n = 29) = 0.898

Data PASS normality test at P=0.01 level. Continue analysis.

newtin
File: newtin.dat Transform: NO TRANSFORMATION

Hartley test for homogeneity of variance

Calculated H statistic (max Var/min Var) = 4.94
Closest, conservative, Table H statistic = 8.5 (alpha = 0.01)

Used for Table H ==> R (# groups) = 3, df (# reps-1) = 9
Actual values ==> R (# groups) = 3, df (# avg reps-1) = 8.67
(average df used)

Data PASS homogeneity test. Continue analysis.

NOTE: This test requires equal replicate sizes. If they are unequal but do not differ greatly, the Hartley test may still be used as an approximate test (average df are used).

newtin
File: newtin.dat Transform: NO TRANSFORMATION

Bartletts test for homogeneity of variance

Calculated B statistic = 4.94
Table Chi-square value = 9.21 (alpha = 0.01)
Table Chi-square value = 5.99 (alpha = 0.05)

Average df used in calculation ==> df (avg n - 1) = 8.67
Used for Chi-square table value ==> df (#groups-1) = 2

Data PASS homogeneity test at 0.01 level. Continue analysis.

NOTE: If groups have unequal replicate sizes the average replicate size is used to calculate the B statistic (see above).

TITLE: newtin
FILE: newtin.dat
TRANSFORM: NO TRANSFORMATION NUMBER OF GROUPS: 3

GRP	IDENTIFICATION	REP	VALUE	TRANS VALUE
1	lab control	1	10.0000	10.0000
1	lab control	2	10.0000	10.0000
1	lab control	3	8.0000	8.0000
1	lab control	4	9.0000	9.0000
1	lab control	5	10.0000	10.0000
1	lab control	6	10.0000	10.0000
2	Elm creek	1	1.0000	1.0000
2	Elm creek	2	3.0000	3.0000
2	Elm creek	3	4.0000	4.0000
2	Elm creek	4	5.0000	5.0000
2	Elm creek	5	3.0000	3.0000
2	Elm creek	6	6.0000	6.0000
2	Elm creek	7	2.0000	2.0000
2	Elm creek	8	2.0000	2.0000
2	Elm creek	9	0.0000	0.0000
2	Elm creek	10	1.0000	1.0000
2	Elm creek	11	5.0000	5.0000
2	Elm creek	12	4.0000	4.0000
3	Crutcho creek	1	8.0000	8.0000
3	Crutcho creek	2	10.0000	10.0000
3	Crutcho creek	3	7.0000	7.0000
3	Crutcho creek	4	6.0000	6.0000
3	Crutcho creek	5	9.0000	9.0000
3	Crutcho creek	6	9.0000	9.0000
3	Crutcho creek	7	7.0000	7.0000
3	Crutcho creek	8	7.0000	7.0000
3	Crutcho creek	9	8.0000	8.0000
3	Crutcho creek	10	8.0000	8.0000
3	Crutcho creek	11	6.0000	6.0000

newtin
File: newtin.dat Transform: NO TRANSFORMATION

SUMMARY STATISTICS ON TRANSFORMED DATA TABLE 1 of 2

GRP	IDENTIFICATION	N	MIN	MAX	MEAN
1	lab control	6	8.000	10.000	9.500
2	Elm creek	12	0.000	6.000	3.000
3	Crutcho creek	11	6.000	10.000	7.727

newtin
File: newtin.dat Transform: NO TRANSFORMATION

SUMMARY STATISTICS ON TRANSFORMED DATA TABLE 2 of 2

GRP	IDENTIFICATION	VARIANCE	SD	SEM
1	lab control	0.700	0.837	0.342
2	Elm creek	3.455	1.859	0.537
3	Crutcho creek	1.618	1.272	0.384

newtin
File: newtin.dat Transform: NO TRANSFORMATION

ANOVA TABLE

SOURCE	DF	SS	MS	F
Between	2	213.766	106.883	48.167
Within (Error)	26	57.682	2.219	
Total	28	271.448		

Critical F value = 3.37 (0.05,2,26)
Since F > Critical F REJECT Ho:All groups equal

newtin
File: newtin.dat Transform: NO TRANSFORMATION

BONFERRONI T-TEST - TABLE 1 OF 2 Ho:Control<Treatment

GROUP	IDENTIFICATION	TRANSFORMED MEAN	MEAN CALCULATED IN ORIGINAL UNITS	T STAT	SIG
1	lab control	9.500	9.500		
2	Elm creek	3.000	3.000	8.727	*
3	Crutcho creek	7.727	7.727	2.345	*

Bonferroni T table value = 2.06 (1 Tailed Value, P=0.05, df=26,2)

newtin
File: newtin.dat Transform: NO TRANSFORMATION

BONFERRONI T-TEST - TABLE 2 OF 2 Ho:Control<Treatment

GROUP	IDENTIFICATION	NUM OF REPS	Minimum Sig Diff (IN ORIG. UNITS)	% of CONTROL	DIFFERENCE FROM CONTROL
1	lab control	6			
2	Elm creek	12	1.531	16.1	6.500
3	Crutcho creek	11	1.554	16.4	1.773

ewtin
le: newtin.dat Transform: NO TRANSFORMATION

ANOVA TABLE

SOURCE	DF	SS	MS	F
Between	2	213.766	106.883	48.167
Within (Error)	26	57.682	2.219	
Total	28	271.448		

Critical F value = 3.37 (0.05,2,26)
Since F > Critical F REJECT Ho:All groups equal

newtin
File: newtin.dat Transform: NO TRANSFORMATION

TUKEY method of multiple comparisons

ROUP	IDENTIFICATION	TRANSFORMED MEAN	ORIGINAL MEAN	GROUP 0 0 0 2 3 1
2	Elm creek	3.000	3.000	\
3	Crutcho creek	7.727	7.727	* \
1	lab control	9.500	9.500	* . \

* = significant difference (p=0.05) . = no significant difference
Tukey value (3,26) = 3.53 s = 2.219

newtin
File: newtin.dat Transform: NO TRANSFORMATION

WILLIAMS TEST (Isotonic regression model) TABLE 1 OF 2

GROUP	IDENTIFICATION	N	ORIGINAL MEAN	TRANSFORMED MEAN	ISOTONIZED MEAN
1	lab control	6	9.500	9.500	9.500
2	Elm creek	12	3.000	3.000	5.261
3	Crutcho creek	11	7.727	7.727	5.261

newtin
File: newtin.dat Transform: NO TRANSFORMATION

WILLIAMS TEST (Isotonic regression model) TABLE 2 OF 2

IDENTIFICATION	ISOTONIZED MEAN	CALC. WILLIAMS	SIG P=.05	TABLE WILLIAMS	DEGREES OF FREEDOM
lab control	9.500				
Elm creek	5.261	5.692	*	1.71	k= 1, v=26
Crutcho creek	5.261	5.608	*	1.79	k= 2, v=26

s = 1.489
Note: df used for table values are approximate when v > 20.

newtin
File: newtin.dat Transform: NO TRANSFORMATION

KRUSKAL-WALLIS ANOVA BY RANKS - TABLE 1 OF 2

GROUP	IDENTIFICATION	TRANSFORMED MEAN	MEAN CALCULATED IN ORIGINAL UNITS	RANK SUM
1	lab control	9.500	9.500	150.500
2	Elm creek	3.000	3.000	79.000
3	Crutcho creek	7.727	7.727	205.500

Calculated H Value = 22.456 Critical H Value Table = 5.990
Since Calc H > Crit H REJECT Ho:All groups are equal.

newtin
File: newtin.dat Transform: NO TRANSFORMATION

DUNNS MULTIPLE COMPARISON - KRUSKAL-WALLIS - TABLE 2 OF 2

GROUP	IDENTIFICATION	TRANSFORMED MEAN	ORIGINAL MEAN	GROUP 0 0 0 2 3 1 - - -
2	Elm creek	3.000	3.000	\
3	Crutcho creek	7.727	7.727	* \
1	lab control	9.500	9.500	* . \

* = significant difference (p=0.05) . = no significant difference
Table q value (0.05,3) = 2.394 Unequal reps - multiple SE values

SAMPLE: EW01						
Concentration	Replicate	Tare Weight	Total Weight	Organism Weight (g)	# Organisms	Weight/ Organism (mg)
Silt Control	A	0.99497	0.99573	0.00076	4	0.1900
	B	0.98693	0.98838	0.00145	8	0.1813
	C	0.99985	1.00145	0.0016	8	0.2000
Gravel Control	A	0.99946	1.00076	0.0013	8	0.1625
	B	1.00488	1.00597	0.00109	10	0.1090
	C	1.00843	1.00851	8E-05	1	0.0800
6.25	A	1.00813	1.0089	0.00077	9	0.0856
	B	1.00823	1.00919	0.00096	7	0.1371
	C	1.01417	1.01565	0.00148	9	0.1644
12.5	A	1.01467	1.01558	0.00091	11	0.0827
	B	1.01326	1.01404	0.00078	7	0.1114
	C	1.01371	1.01479	0.00108	9	0.1200
25	A	1.01135	1.01275	0.0014	10	0.1400
	B	1.01818	1.0191	0.00092	9	0.1022
	C	0.98728	0.98796	0.00068	7	0.0971
50	A	1.00795	1.00903	0.00108	8	0.1350
	B	1.01071	1.01169	0.00098	9	0.1089
	C	1.00888	1.01017	0.00129	9	0.1433
100	A	1.00386	1.00479	0.00093	8	0.1163
	B	1.00346	1.00421	0.00075	4	0.1875
	C	1.00277	1.00336	0.00059	4	0.1475

SAMPLE: EW02						
Concentration	Replicate	Tare Weight	Total Weight	Organism Weight	# Organisms	Weight/ Organism (mg)
6.25	A	1.01327	1.01439	0.00112	8	0.1400
	B	1.00964	1.00994	0.0003	3	0.1000
	C	0.99806	0.9988	0.00074	5	0.1480
12.5	A	0.99625	0.99798	0.00173	9	0.1922
	B	0.98921	0.9898	0.00059	5	0.1180
	C	0.99915	0.99986	0.00071	7	0.1014
25	A	0.99498	0.99595	0.00097	10	0.0970
	B	0.99677	0.99795	0.00118	7	0.1686
	C	0.99434	0.99506	0.00072	6	0.1200
50	A	0.99891	0.99943	0.00052	5	0.1040
	B	1.00395	1.00472	0.00077	8	0.0963
	C	1.01412	1.01483	0.00071	8	0.0887
100	A	1.01255	1.01338	0.00083	8	0.1037
	B	0.99688	0.99751	0.00063	10	0.0630
	C	0.99545	0.99586	0.00041	5	0.0820
EW01 CONTROLS						

SAMPLE: CREC01						
Concentration	Replicate	Tare Weight	Total Weight	Organism Weight	# Organisms	Weight/ Organism (mg)
6.25	A	1.00564	1.00626	0.00062	6	0.1033
	B	1.0041	1.00492	0.00082	8	0.1025
	C	1.0033	1.00411	0.00081	6	0.1350
12.5	A	1.00082	1.00167	0.00085	8	0.1063
	B	1.01488	1.01603	0.00115	9	0.1278
	C	1.0161	1.01684	0.00074	10	0.0740
25	A	0.99541	0.99598	0.00057	9	0.0633
	B	0.99003	0.9906	0.00057	5	0.1140
	C	1.0023	1.00288	0.00058	6	0.0967
50	A	0.99969	1.00043	0.00074	6	0.1233
	B	0.99836	0.99937	0.00101	6	0.1683
	C	0.98516	0.98593	0.00077	7	0.1100
100	A	0.99478	0.99532	0.00054	6	0.0900
	B	0.98407	0.98474	0.00067	9	0.0744
	C	1.00565	1.00673	0.00108	10	0.1080
EW01 CONTROLS						

SAMPLE: EE01						
Concentration	Replicate	Tare Weight	Total Weight	Organism Weight	# Organisms	Weight/ Organism (mg)
Gravel Control	A	1.00645	1.00749	0.00104	8	0.1300
	B	1.00244	1.00412	0.00168	9	0.1867
	C	1.00166	1.00267	0.00101	9	0.1122
	D	1.00025	1.00129	0.00104	7	0.1486
	E	1.00636	1.00726	0.0009	7	0.1286
6.25	A	1.01727	1.01868	0.00141	7	0.2014
	B	1.01359	1.01472	0.00113	7	0.1614
	C	1.01905	1.02011	0.00106	8	0.1325
12.5	A	1.00401	1.00488	0.00087	8	0.1087
	B	1.00774	1.00931	0.00157	10	0.1570
	C	1.01395	1.01494	0.00099	9	0.1100
25	A	1.01396	1.01523	0.00127	8	0.1588
	B	1.00116	1.00232	0.00116	8	0.1450
	C	1.00312	1.00419	0.00107	10	0.1070
50	A	1.0056	1.0066	0.001	7	0.1429
	B	0.97991	0.98122	0.00131	7	0.1871
	C	0.99025	0.99145	0.0012	9	0.1333
100	A	1.00236	1.00335	0.00099	8	0.1238
	B	1.00224	1.00276	0.00052	4	0.1300
	C	1.00183	1.00223	0.0004	3	0.1333

SAMPLE: EE02						
Concentration	Replicate	Tare Weight	Total Weight	Organism Weight	# Organisms	Weight/ Organism (mg)
6.25	A	0.98547	0.98672	0.00125	10	0.1250
	B	0.98571	0.98705	0.00134	10	0.1340
	C	1.00075	1.00195	0.0012	8	0.1500
12.5	A	0.99216	0.99259	0.00043	4	0.1075
	B	0.99059	0.99215	0.00156	10	0.1560
	C	0.98803	0.98893	0.0009	6	0.1500
25	A	0.99129	0.99165	0.00036	2	0.1800
	B	0.99803	0.99822	0.00019	2	0.0950
	C			0		
50	A	0.99498	0.99576	0.00078	5	0.1560
	B	0.9971	0.99776	0.00066	2	0.3300
	C	0.99327	0.99341	0.00014	1	0.1400
100	A	0.9887	0.98901	0.00031	1	0.3100
	B			0		
	C	0.99005	0.99085	0.0008	3	0.2667
EE01 CONTROLS						

SAMPLE: EE03						
Concentration	Replicate	Tare Weight	Total Weight	Organism Weight	# Organisms	Weight/ Organism (mg)
6.25	A	0.99309	0.99415	0.00106	9	0.1178
	B	0.98394	0.98549	0.00155	10	0.1550
	C	0.98635	0.98711	0.00076	8	0.0950
12.5	A	0.9926	0.99385	0.00125	10	0.1250
	B	0.99603	0.99744	0.00141	10	0.1410
	C	0.98987	0.99105	0.00118	7	0.1686
25	A	1.0062	1.00712	0.00092	7	0.1314
	B	1.01305	1.01432	0.00127	10	0.1270
	C	1.01897	1.0204	0.00143	10	0.1430
50	A	1.01738	1.0188	0.00142	9	0.1578
	B	1.01469	1.01585	0.00116	9	0.1289
	C	1.01197	1.01347	0.0015	10	0.1500
100	A	0.99525	0.99611	0.00086	9	0.0956
	B	1.01455	1.01576	0.00121	9	0.1344
	C	1.01081	1.01173	0.00092	6	0.1533
EE01 CONTROLS						

SAMPLE: EW03						
Concentration	Replicate	Tare Weight	Total Weight	Organism Weight	# Organisms	Weight/ Organism (mg)
6.25	A	1.01654	1.01754	0.001	9	0.1111
	B	1.00546	1.00645	0.00099	10	0.0990
	C	1.00498	1.00655	0.00157	10	0.1570
12.5	A	1.01401	1.01535	0.00134	9	0.1489
	B	0.98813	0.98936	0.00123	9	0.1367
	C	0.9956	0.99684	0.00124	8	0.1550
25	A	0.9909	0.99194	0.00104	7	0.1486
	B	0.99029	0.99123	0.00094	8	0.1175
	C	0.99045	0.99117	0.00072	9	0.0800
50	A	0.98823	0.98898	0.00075	7	0.1071
	B	0.98998	0.99081	0.00083	5	0.1660
	C	0.99293	0.99406	0.00113	5	0.2260
100	A	0.98652	0.98728	0.00076	5	0.1520
	B	0.98731	0.9881	0.00079	8	0.0987
	C	1.00734	1.00847	0.00113	5	0.2260
EE01 CONTROLS						

SAMPLE: EE06						
Concentration	Replicate	Tare Weight	Total Weight	Organism Weight	# Organisms	Weight/ Organism (mg)
Gravel Control	A	1.00048	1.00193	0.00145	7	0.2071
	B	1.00489	1.00746	0.00257	9	0.2856
	C	1.0026	1.00413	0.00153	9	0.1700
	D	0.99897	1.00084	0.00187	9	0.2078
	E	0.9966	0.99796	0.00136	8	0.1700
Silt Control	A	1.01272	1.01421	0.00149	8	0.1862
	B	1.01479	1.01629	0.0015	8	0.1875
	C	0.9997	1.00062	0.00092	7	0.1314
6.25	A	0.99862	0.99991	0.00129	5	0.2580
	B	0.99846	0.99993	0.00147	8	0.1837
	C	1.00025	1.00154	0.00129	7	0.1843
12.5	A	1.01451	1.01547	0.00096	6	0.1600
	B	1.01624	1.01737	0.00113	9	0.1256
	C	1.01003	1.01107	0.00104	9	0.1156
25	A	1.01513	1.01583	0.0007	6	0.1167
	B	1.02174	1.02244	0.0007	9	0.0778
	C	1.01757	1.01817	0.0006	6	0.1000
50	A	1.00127	1.00226	0.00099	5	0.1980
	B	1.01281	1.01417	0.00136	5	0.2720
	C	1.01227	1.01325	0.00098	7	0.1400
100	A	1.01153	1.01209	0.00056	2	0.2800
	B	1.00974	1.0104	0.00066	3	0.2200
	C	1.01992	1.02061	0.00069	1	0.6900

SAMPLE: EE07						
Concentration	Replicate	Tare Weight	Total Weight	Organism Weight	# Organisms	Weight/ Organism (mg)
6.25	A	1.01466	1.01607	0.00141	6	0.2350
	B	1.01645	1.01784	0.00139	8	0.1738
	C	1.00875	1.00932	0.00057	5	0.1140
12.5	A	1.01598	1.01684	0.00086	5	0.1720
	B	1.01276	1.0133	0.00054	4	0.1350
	C	1.01355	1.01466	0.00111	7	0.1586
25	A	1.0102	1.01109	0.00089	6	0.1483
	B	1.00965	1.01094	0.00129	6	0.2150
	C	1.01654	1.01753	0.00099	5	0.1980
50	A	1.01082	1.01146	0.00064	5	0.1280
	B	1.00686	1.00771	0.00085	6	0.1417
	C	1.00657	1.00707	0.0005	4	0.1250
100	A	1.00855	1.00884	0.00029	1	0.2900
EE06 CONTROLS						

SAMPLE: EE08						
Concentration	Replicate	Tare Weight	Total Weight	Organism Weight	# Organisms	Weight/ Organism (mg)
6.25	A	1.00956	1.01085	0.00129	7	0.1843
	B	1.00966	1.01148	0.00182	7	0.2600
	C	1.00993	1.01104	0.00111	7	0.1586
12.5	A	1.00473	1.00602	0.00129	7	0.1843
	B	1.00925	1.01075	0.0015	6	0.2500
	C	1.00949	1.01036	0.00087	5	0.1740
25	A	1.01355	1.0144	0.00085	7	0.1214
	B	1.00067	1.00224	0.00157	8	0.1963
	C	1.00116	1.00317	0.00201	11	0.1827
50	A	0.99798	0.99976	0.00178	9	0.1978
	B	0.99569	0.99715	0.00146	7	0.2086
	C	1.00815	1.00992	0.00177	9	0.1967
100	A	1.00784	1.00839	0.00055	3	0.1833
	B	1.00706	1.00836	0.0013	7	0.1857
	C	1.00817	1.0087	0.00053	3	0.1767
EE06 CONTROLS						

SAMPLE: EE09						
Concentration	Replicate	Tare Weight	Total Weight	Organism Weight	# Organisms	Weight/ Organism (mg)
6.25	A	1.01443	1.01582	0.00139	9	0.1544
	B	1.01324	1.01407	0.00083	5	0.1660
	C	1.0115	1.01205	0.00055	4	0.1375
12.5	A	1.00866	1.00979	0.00113	4	0.2825
	B	1.00873	1.00971	0.00098	4	0.2450
	C	1.00902	1.01026	0.00124	5	0.2480
25	A	1.0045	1.00552	0.00102	7	0.1457
	B	1.0118	1.01336	0.00156	8	0.1950
	C	1.01379	1.01481	0.00102	7	0.1457
50	A	1.01346	1.01451	0.00105	4	0.2625
	B	1.00997	1.01132	0.00135	6	0.2250
	C	1.01359	1.01436	0.00077	4	0.1925
100	A	0.99538	0.9963	0.00092	5	0.1840
	B	1.00021	1.00165	0.00144	8	0.1800
	C	1.0028	1.0038	0.001	7	0.1429
EE06 CONTROLS						

SAMPLE: EE04						
Concentration	Replicate	Tare Weight	Total Weight	Organism Weight	# Organisms	Weight/ Organism (mg)
Gravel Control	A	0.99395	0.99513	0.00118	9	0.1311
	B	0.99732	0.99889	0.00157	10	0.1570
	C	0.9956	0.99702	0.00142	9	0.1578
	D	0.99997	1.00158	0.00161	10	0.1610
	E	1.00304	1.00472	0.00168	12	0.1400
Silt Control	A	1.00092	1.00265	0.00173	10	0.1730
	B	1.00251	1.00388	0.00137	7	0.1957
	C	1.00171	1.00242	0.00071	8	0.0887
6.25	A	1.00304	1.00441	0.00137	9	0.1522
	B	1.00928	1.01084	0.00156	9	0.1733
	C	1.01327	1.01478	0.00151	7	0.2157
12.5	A	1.01114	1.01287	0.00173	10	0.1730
	B	1.00311	1.00472	0.00161	10	0.1610
	C	1.0111	1.01291	0.00181	9	0.2011
25	A	1.01156	1.0128	0.00124	10	0.1240
	B	1.00177	1.00312	0.00135	9	0.1500
	C	1.00339	1.00486	0.00147	9	0.1633
50	A	1.00179	1.00373	0.00194	10	0.1940
	B	1.00111	1.0023	0.00119	9	0.1322
	C	0.99679	0.99811	0.00132	10	0.1320
100	A	1.00001	1.00064	0.00063	5	0.1260
	B	0.99973	1.00099	0.00126	5	0.2520
	C	0.99695	0.99729	0.00034	2	0.1700

SAMPLE: EE05						
Concentration	Replicate	Tare Weight	Total Weight	Organism Weight	# Organisms	Weight/ Organism (mg)
6.25	A	0.99726	0.99877	0.00151	9	0.1678
	B	1.00289	1.00478	0.00189	10	0.1890
	C	0.9982	0.99975	0.00155	9	0.1722
12.5	A	1.00157	1.0033	0.00173	4	0.4325
	B	0.99616	0.99735	0.00119	5	0.2380
	C	1.00557	1.00642	0.00085	8	0.1063
25	A	1.00576	1.00635	0.00059	4	0.1475
	B	1.00754	1.00845	0.00091	7	0.1300
	C	1.00588	1.00601	0.00013	2	0.0650
50	A	1.00771	1.00899	0.00128	5	0.2560
	B	1.00962	1.0101	0.00048	3	0.1600
	C	1.00837	1.00877	0.0004	3	0.1333
100	A	1.00535	1.00567	0.00032	3	0.1067
	B	1.00346	1.0042	0.00074	5	0.1480
	C	1.00399	1.00475	0.00076	4	0.1900
EE04 CONTROLS						

SAMPLE: EE10						
Concentration	Replicate	Tare Weight	Total Weight	Organism Weight	# Organisms	Weight/ Organism (mg)
6.25	A	1.01294	1.01475	0.00181	11	0.1645
	B	1.01361	1.01504	0.00143	5	0.2860
	C	1.00935	1.01072	0.00137	8	0.1713
12.5	A	1.00779	1.00929	0.0015	10	0.1500
	B	1.00325	1.00416	0.00091	8	0.1137
	C	1.00601	1.00696	0.00095	8	0.1188
25	A	1.00155	1.00291	0.00136	10	0.1360
	B	1.01044	1.01132	0.00088	8	0.1100
	C	1.01034	1.01099	0.00065	6	0.1083
50	A	1.00823	1.0091	0.00087	8	0.1088
	B	1.00528	1.00713	0.00185	9	0.2056
	C	1.00849	1.00975	0.00126	9	0.1400
100	A	1.00509	1.00634	0.00125	10	0.1250
	B	1.00692	1.00765	0.00073	6	0.1217
	C	1.00801	1.00903	0.00102	10	0.1020
EE04 CONTROLS						

SAMPLE: CREC02						
Concentration	Replicate	Tare Weight	Total Weight	Organism Weight	# Organisms	Weight/Organism (mg)
6.25	A	1.00124	1.00291	0.00167	9	0.1856
	B	0.99998	1.00108	0.0011	10	0.1100
	C	0.99759	0.99889	0.0013	7	0.1857
12.5	A	0.99905	1.0003	0.00125	7	0.1786
	B	0.99301	0.99382	0.00081	5	0.1620
	C	0.99498	0.99688	0.0019	10	0.1900
25	A	0.99252	0.99426	0.00174	8	0.2175
	B	0.9921	0.99327	0.00117	10	0.1170
	C	0.99033	0.99179	0.00146	10	0.1460
50	A	0.98827	0.98943	0.00116	10	0.1160
	B	0.98949	0.99055	0.00106	8	0.1325
	C	0.98747	0.98897	0.0015	8	0.1875
100	A	0.98792	0.98985	0.00193	12	0.1608
	B	0.98965	0.99091	0.00126	10	0.1260
	C	0.9912	0.99311	0.00191	9	0.2122
EE04 CONTROLS						

TEST SUMMARY: CR-EC01-TX-201
Ceriodaphnia dubia 48-Hour Static Acute

Test protocol:	WCC SOP 401.2
Test organism:	*Ceriodaphnia dubia*
Source:	WCC Culture Laboratory
Age of test organism:	<24 hours
Test initiation:	6/14/95
Test termination:	6/16/95
Temperature:	25 +/- 1 °C
Light:	50 - 100 foot candles
Photoperiod:	16 hours light/8 hours dark
Test vessel:	30 mL styrene
Test volume:	20 mL
Organisms/replicate:	5
Replicates/concentration:	4
Feeding regime:	none
Aeration during test:	none
Dilution Water:	Hard Reconstituted Synthetic
Test duration:	48 hours
Effect measured:	Mortality
Reference Toxicant Data:	
LC_{50} (g/L NaCl):	1.51

TEST RESULTS: CR-EC01-TX-201
Ceriodaphnia dubia 48-Hour Static Acute

$LC_{50} > 100\%$

Statictical analysis method: N/A

Treatment (% Sample)	Survival (%)	pH	Conductivity (umhos/cm)	DO (mg/L)	Temperature (°C)	Hardness (mg/L $CaCO_3$)	Alkalinity (mg/L $CaCO_3$)
Control	100	8.40-8.63	738 (731-744)	8.5 (8.3-8.6)	24.5 (24.0-25.0)	270	
6.25	100	8.53-8.54	770 (767-773)	8.4 (8.3-8.4)	24.5 (24.0-25.0)		
12.5	100	8.50-8.54	796 (776-816)	8.4 (8.3-8.4)	24.5 (24.0-25.0)		
25	100	8.43-8.58	794 (788-800)	8.4 (8.3-8.5)	24.5 (24.0-25.0)		
50	100	8.29-8.57	821 (748-893)	8.4 (8.3-8.5)	24.5 (24.0-25.0)		
100	100	8.17-8.57	1010 (972-1047)	8.4 (8.3-8.5)	24.5 (24.0-25.0)	324	350

SURFACE WATER SAMPLE ARRIVAL INFORMATION

Collection Date/Time:	6/13/95 @ 1245
Use Date/Time:	6/14/95 @ 1440
Method of Shipment:	Overnight Courier
Temperature (°C):	2
pH:	8.13
Ammonia (mg/L):	0.1
Conductivity (umhos/cm):	1047
DO (mg/L):	8.2

TEST SUMMARY: SC-EW02-TX-201
Ceriodaphnia dubia Chronic Renewal

Test protocol:	WCC SOP 501.1
Test organism:	*Ceriodaphnia dubia*
Source:	WCC Culture Laboratory
WCC Batch:	6/16/95
Age of test organism:	<24 hours
Test initiation:	6/16/95
Test termination:	6/23/95
Temperature:	25 +/- 1 °C
Light:	50 - 100 foot candles
Photoperiod:	16 hours light/8 hours dark
Test vessel:	30 mL styrene
Test volume:	15 mL
Organisms/replicate:	1
Replicates/concentration:	10
Feeding regime:	0.05 mL *Selenastrum* and 0.05 mL YTC daily
Aeration during test:	none
Dilution Water:	Hard Reconstituted Synthetic
Test duration:	7 days
Effect measured:	Survival and reproduction

Toxicity test methods and procedures were followed in accordance with EPA 600/4-89/001

Reference Toxicant Data:	
NOEC (g/L NaCl):	0.75

TEST RESULTS: CR-EC01-TX-201
Ceriodaphnia dubia Chronic Survival and Reproduction Test

Survival NOEC:	100%
Statistical analysis method:	N/A
Normality test:	
Homogeneity of variance test:	
Reproduction NOEC:	100%
Statistical analysis method:	Dunnetts
Normality test:	Pass
Homogeneity of variance test:	Pass

Treatment (% Sample)	Survival (%)	pH	Conductivity (umhos/cm)	DO (mg/L)	Temperature (°C)
Control	100	8.30-8.71	861 (748-983)	7.9 (7.2-8.4)	24.6 (24.0-25.2)
6.25	100	8.01-8.66	880 (785-1031)	8.1 (7.1-8.6)	24.6 (24.0-25.2)
12.5	100	8.25-8.69	907 (806-1030)	8.1 (7.1-8.6)	24.6 (24.0-25.2)
25	100	8.30-8.69	927 (838-1058)	8.1 (7.0-8.5)	24.6 (24.0-25.2)
50	100	8.36-8.76	977 (890-1049)	8.1 (7.0-8.5)	24.6 (24.0-25.2)
100	100	8.26-8.64	1064 (998-1143)	8.2 (7.1-8.6)	24.6 (24.0-25.2)

	Hardness (mg/L $CaCO_3$)	Alkalinity (mg/L $CaCO_3$)	Ammonia (mg/L)
Control	150		
EC01	324	350	0.1

TEST SUMMARY: CR-EC01-TX-201
Pimephales promelas 48-Hour Static Acute

Test protocol:	WCC SOP 410.2
Test organism:	*Pimephales promelas*
Source:	Woodward-Clyde Consultants
Age of test organism:	13 days
Test initiation:	6/14/95
Test termination:	6/16/95
Temperature:	20 +/- 1 °C
Light:	50 - 100 foot candles
Photoperiod:	16 hours light/8 hours dark
Test vessel:	500 mL plastic beaker
Test volume:	250 mL
Organisms/replicate:	10
Replicates/concentration:	2
Feeding regime:	none
Aeration during test:	none
Dilution Water:	Hard Reconstituted Synthetic
Test duration:	48 hours
Effect measured:	Mortality
Reference Toxicant Data:	
LC_{50} (g/L NaCl):	5.26

TEST RESULTS: CR-EC01-TX-201
Pimephales promelas 48-Hour Static Acute

LC_{50} > 100%

Statictical analysis method: N/A

Treatment (% Sample)	Survival (%)	pH	Conductivity (umhos/cm)	DO (mg/L)	Temperature (°C)	Hardness (mg/L $CaCO_3$)	Alkalinity (mg/L $CaCO_3$)
Control	100	8.29-8.31	340 (327-353	8.0 (7.4-8.5)	20.9 (20.8-21.0)	158	146
6.25	100	8.24-8.37	408 (400-416)	7.7 (7.3-8.1)	20.9 (20.8-21.0)		
12.5	100	8.27-8.43	431 (419-442)	7.8 (7.3-8.2)	20.9 (20.8-21.0)		
25	100	8.24-8.49	521 (502-540)	7.8 (7.4-8.2)	20.9 (20.8-21.0)		
50	100	8.21-8.58	708 (685-730)	7.9 (7.5-8.2)	20.9 (20.8-21.0)		
100	100	8.13-8.61	1048 (1029-1066)	7.8 (7.3-8.2)	20.9 (20.8-21.0)	324	350

SURFACE WATER SAMPLE ARRIVAL INFORMATION

Collection Date/Time:	6/13/95 @ 1245
Use Date/Time:	6/14/95 @ 1510
Method of Shipment:	Overnight Courier
Temperature (°C):	2
pH:	8.13
Ammonia (mg/L):	0.1
Conductivity (umhos/cm):	1029
DO (mg/L):	8.2
Description:	Clear

TEST SUMMARY: CR-EC01-TX-201
Pimephales promelas Chronic Renewal

Test protocol:	WCC SOP 510.1
Test organism:	*Pimephales promelas*
Source:	Environmental Consulting & Testing
Age of test organism:	<24 hours
Test initiation:	6/16/95 @ 1630
Test termination:	6/23/95 @ 1045
Temperature:	25 +/- 1 °C
Light:	50 - 100 foot candles
Photoperiod:	16 hours light/8 hours dark
Test vessel:	500 mL plastic beaker
Test volume:	250 mL
Organisms/replicate:	10
Replicates/concentration:	4
Feeding regime:	0.1 mL brine shrimp nauplii twice daily
Aeration during test:	none
Dilution Water:	Hard Reconstituted Synthetic
Test duration:	7 days
Effect measured:	Survival and growth

Toxicity test methods and procedures were followed in accordance with EPA 600/4-89/001

Reference Toxicant Data:	
NOEC (g/L NaCl):	3

TEST RESULTS: CR-EC01-TX-201
Pimephales promelas Chronic Survival and Growth Test

Survival NOEC:		100%
	Statistical analysis method:	N/A
	Normality test:	
	Homogeneity of variance test:	
Growth NOEC:		100%
	Statistical analysis method:	Dunnetts
	Normality test:	Chi-Square - Pass
	Homogeneity of variance test:	Bartletts - Pass

Treatment (% Sample)	Survival (%)	pH	Conductivity (umhos/cm)	DO (mg/L)	Temperature (°C)
Control	100	7.86-8.50	343 (309-366)	7.8 (6.6-8.4)	24.7 (24.0-25.2)
6.25	100	7.91-8.51	384 (357-434)	7.7 (6.3-8.5)	24.7 (24.0-25.2)
12.5	100	7.94-8.51	422 (361-449)	7.7 (6.5-8.6)	24.7 (24.0-25.2)
25	100	7.97-8.53	510 (474-546)	7.7 (6.4-8.6)	24.7 (24.0-25.2)
50	100	8.04-8.56	681 (670-723)	7.8 (6.1-8.6)	24.7 (24.0-25.2)
100	100	8.20-8.62	1045 (957-1084)	7.8 (6.4-8.6)	24.7 (24.0-25.2)

	Hardness (mg/L $CaCO_3$)	Alkalinity (mg/L $CaCO_3$	Ammonia (mg/L)
Control	150		
EW02	310	336	0.85

48-hr Ceriodaphnia dubia TOXICITY TEST

LOG NO. 439-442
JOB NO. F9350CF
INDUSTRY: Timber
CONTACT:

EFFLUENT: Controls
START DATE: 6 14 95
START TIME: 1400
DILUTION WATER:

CONC (%)	REP ID	SURVIVAL (#) 0	24	48	DEAD	TEMPERATURE (oC) 0	24	48	DO (mg/L) 0	24	48	pH (S.U.) 0	24	48	CONDUCTIVITY (umhos/cm) 0	24	48
Hard 140	A	5	5	4		24.0		25.0	8.6		8.2	7.71		8.20	410		380
EW 01	B	5	5	5													
	C	5	5	5													
	D	5	5	5													
Hd 270	A	5	5	5					8.4		8.3	7.63		8.40	731		744
EW 02	B	5	5	5													
CR-EC01	C	5	5	5													
	D	5	5	5													
Mod. Hd 100	A	5	5	5					8.6		8.4	7.59		8.21	429		414
EW 03	B	5	5	5													
	C	5	5	5													
	D	5	5	5													
	A																
	B																
	C																
	D																
	A																
	B																
	C																
	D																
Initials		MHE	LJ	LJ													
Time		1405	0935	1053													

Comments

PARAMETER	Control	
Total Hardness (mg/L CaCO3)		
Total Alkalinity (mg/L CaCO3 @ 4.5)		

48-hr Ceriodaphnia dubia TOXICITY TEST

LOG NO. 442
JOB NO. F93506
INDUSTRY: Tinker
CONTACT:

EFFLUENT: CR-EC-01
START DATE: 6-14-95
START TIME: 1440
DILUTION WATER: Hd-270

CONC (%)	REP ID	SURVIVAL (#) 0	24	48	DEAD	TEMPERATURE (oC) 0	24	48	DO (mg/L) 0	24	48	pH (S.U.) 0	24	48	CONDUCTIVITY (umhos/cm) 0	24	48
6.25	A	5	5	5		24.0		25.0	8.4		8.3	8.53		8.54	773		767
	B	5	5	5													
	C	5	5	5													
	D	5	5	5													
12.5	A	5	5	5					8.4		8.3	8.50		8.54	810		776
	B	5	5	5													
	C	5	5	5													
	D	5	5	5													
25	A	5	5	5					8.5		8.3	8.43		8.58	850		788
	B	5	5	5													
	C	5	5	5													
	D	5	5	5													
50	A	5	5	5					8.5		8.3	8.29		8.57	918		893
	B	5	5	5													
	C	5	5	5													
	D	5	5	5													
100	A	5	5	5					8.5		8.3	8.17		8.57	1011		972
	B	5	5	5													
	C	5	5	5													
	D	5	5	5													
	Initials	MHE	LST	LST													
	Time	1440	0940	0850													

Comments

PARAMETER	Control	
Total Hardness (mg/L CaCO3)		
Total Alkalinity (mg/L CaCO3 @ 4.5)		

48-hr Pimephales promleas TOXICITY TEST

LOG NO. 442
JOB NO. F935060
INDUSTRY: Tinker
CONTACT: EC IT - 13 days old

EFFLUENT: CR-EC01
START DATE: 6-14-95
START TIME: 1510
DILUTION WATER: Spring

CONC (%)	REP ID	SURVIVAL (#) 0	24	48	DEAD	TEMPERATURE (oC) 0	24	48	DO (mg/L) 0	24	48	pH (S.U.) 0	24	48	CONDUCTIVITY (umhos/cm) 0	24	48
6.25	A	10	10	10		21.0		20.5	8.1		7.3	8.24		8.31	414		406
	B	10	10	10													
12.5	A	10	10	10					8.2		7.3	8.29		8.43	409		419
	B	10	10	10													
25	A	10	10	10					8.2		7.4	8.24		8.49	803		840
	B	10	10	10													
50	A	10	10	10					8.2		7.5	8.21		8.58	1625		1730
	B	10	10	10													
100	A	10	10	10					8.2		7.3	8.13		8.61	3224		3466
	B	10	10	10													
	A																
	B																
	A																
	B																
	A																
	B																
	A																
	B																
	A																
	B																
Initials		MLS	MLS	SSB													
Time		1510	1605	1535													

Comments

PARAMETER	Control	
Total Hardness (mg/L CaCO3)		
Total Alkalinity (mg/L CaCO3 @ 4.5)		

Ceriodaphnia SURVIVAL AND REPRODUCTION CHRONIC TOXICITY TEST

Log No. 448

JOB NO: F93506 | BEGINNING: _____ hrs; 6/16/95 | PHOTOPERIOD: 16 light, 8 dark
INDUSTRY: Tinker | ENDING: _____ hrs; 6/23/95 | ORGANISM SOURCE: WCC
CONTACT: | FEEDING REGIME: | TEST VESSEL CAPACITY: 30 mL
EFFLUENT: ER-E001 | .05 mL yct/15 mL | TEST SOLUTION VOLUME: 15mL
NPDES PERMIT NO: | .05 mL algal suspension/15 mL | NO. REPLICATES:
PERSON CONDUCTING TEST: | | DILUTION WATER:

CONC	CHAMBER	START	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7
	TIME								
	OBSERVER								
		NUMBER OF YOUNG PRODUCED							
					1	14	50	162	199
6.25%	1					2	6	12	16
	2					4	0	12	12
	3						7	0	9
	4				1	4	0	16	0
	5						16	13	0
	6						6	14	0
	7						5	10	0
	8					3	5	11	0
	9						7	13	0
	10							11	0
		START	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7
					3	26	54	121	166
12.5%	11						4	9	5
	12					6	0	13	1
	13					5	15	2	0
	14						5	6	0
	15					3	0	0	10
	16				3	0	0	0	11
	17					2	0	11	0
	18					3	5	11	12
	19						4	5	0
	20					4	0	7	11
		START	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7
					4	31	93	181	227
25%	21					4	8	2	9
	22						6	9	0
	23					4	7	15	15
	24						3	17	7
	25						9	15	12
	26						10	7	0
	27					2	8	4	0
	28					7	8	11	0
	29					4	7	0	0
	30				4	6	0	8	10

Ceriodaphnia SURVIVAL AND REPRODUCTION CHRONIC TOXICITY TEST

JOB NO. F93506 | BEGINNING: _____ hrs; 6/16/95 | Log No. 448
INDUSTRY: Tinker | ENDING: _____ hrs; 6/23/95 | PHOTOPERIOD: 16 light, 8 dark
CONTACT: | FEEDING REGIME: | ORGANISM SOURCE: WCC
EFFLUENT: CK-E001 | .05 mL yct/15 mL | TEST VESSEL CAPACITY: 30 mL
NPDES PERMIT NO: | .05 mL algal suspension/15 mL | TEST SOLUTION VOLUME: 15mL
PERSON CONDUCTING TEST: | | NO. REPLICATES:
| | DILUTION WATER:

CONC	CHAMBER	TIME / OBSERVER	NUMBER OF YOUNG PRODUCED							
			START	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7
						7	54	104	196	253
50%	31						8	0	11	8	21
	32							6	15	15	36
	33						9	0	11	2	22
	34						5	11	17	0	33
	35						6	10	5	0	21
	36					6	7	0	2	4	19
	37					1	9	0			10
	38							5	6	12	23
	39							8	11	7	26
	40						3	7	14	15	39
			START	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7
						16	40	57	172	210	
100%	41							9	4	0	13
	42							10	8	10	28
	43					2	4	0	0	11	17
	44						4	0	13	15	32
	45						3	3	11	0	17
	46							9	8	0	17
	47					5	0	8	0	0	13
	48					4	6	0	11	2	23
	49					1	6	0	17	0	24
	50					4	1	8	13	0	26
			START	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7

Ceriodaphnia dubia GRID Ceriodaphnia dubia GRID MONITORING DATA

Grid Letter: tav ~~A~~ ~~F~~ ~~X~~ ~~Q~~ ~~A~~ ~~T~~ Start Date: 6/16/95 Sample ID: CR-EC01 Log #: 44

AD	ID	1	AD	ID	1	AD	ID	1	AD	ID	1		ID	1
2	3	4	2	3	4	2	3	4	2	3	4	2	3	4
5	6	7	5	6	7	5	6	7	5	6	7	5	6	7
AD	ID 18	1 ✓	AD	ID 9	1 ✓	AD	ID 2	1 ✓	AD	ID 33	1 ✓		ID 46	1 ✓
2 0	3 0	4 3	2 0	3 0	4 0	2 0	3 0	4 4	2 0	3 0	4 9	2 0	3 0	4 0
5 5	6 11	7 12	5 7	6 13	7 0	5 0	6 12	7 12	5 0	6 11	7 2	5 9	6 8	7 0
AD	ID 32	1 ✓	AD	ID 28	1 ✓	AD	ID 44	1 ✓	AD	ID 14	1 ✓		ID 23	1 ✓
2 0	3 0	4 0	2 0	3 0	4 7	2 0	3 0	4 4	2 0	3 0	4 0	2 0	3 0	4 4
5 6	6 15	7 15	5 8	6 11	7 0	5 0	6 13	7 15	5 5	6 6	7 0	5 7	6 15	7 1[illegible]
AD	ID 12	1 ✓	AD	ID 22	1 ✓	AD	ID 15	1 ✓	AD	ID 27	1 ✓		ID 43	1 ✓
2 0	3 0	4 6	2 0	3 0	4 0	2 0	3 0	4 3	2 0	3 0	4 2	2 0	3 0	4 4
5 0	6 13	7 1	5 6	6 9	7 0	5 0	6 10	7 10	5 8	6 4	7 0	5 0	6 0	7 11
AD	ID 1	1 ✓	AD	ID 34	1 ✓	AD	ID 42	1 ✓	AD	ID 5	1 ✓		ID 40	1 ✓
2 0	3 0	4 2	2 0	3 0	4 5	2 0	3 0	4 0	2 0	3 0	4 0	2 0	3 0	4 3
5 6	6 12	7 16	5 11	6 17	7 0	5 10	6 8	7 10	5 0	6 13	7 0	5 7	6 14	7 15
AD	ID 45	1 ✓	AD	ID 21	1 ✓	AD	ID 6	1 ✓	AD	ID 11	1 ✓		ID 41	1 ✓
2 0	3 0	4 3	2 0	3 0	4 4	2 0	3 0	4 0	2 0	3 0	4 0	2 0	3 0	4 0
5 3	6 11	7 0	5 8	6 2	7 9	5 6	6 14	7 0	5 4	6 9	7 0	5 9	6 4	7 0

Comments: Day 0 Initials MLS Time 1640

Cup ID	Sample Concentration	Day	Initials	Time
1–10:	6.25	1	MAR	1350
11–20:	12.5	2	SJB	1320
21–30:	25	3	SJB	1030
31–40:	50	4	LJT	1420
41–50:	100	5	LJT	1540
51–60:		6	MAR	1510
		7	LJT	1210

Ceriodaphnia dubia GRID Ceriodaphnia dubia GRID MONITORING DATA

Grid Letter: ~~P~~ ~~T~~ ~~D~~ ~~J~~ L Start Date: 6/16/95 Sample ID: CR-EC01 Log #: 14

AD	ID	1	AD	ID	1	AD	ID	1	AD	ID	1		ID	1
2	3	4	2	3	4	2	3	4	2	3	4	2	3	4
5	6	7	5	6	7	5	6	7	5	6	7	5	6	7
AD	ID 13	1 ✓	AD	ID 39	1 ✓	AD	ID 20	1 ✓	AD	ID 38	1 ✓		ID 10	1 ✓
2 0	3 0	4 5	2 0	3 0	4 0	2 0	3 0	4 4	2 0	3 0	4 0	2 0	3 0	4 0
5 2	6 10	7 0	5 8	6 11	7 7	5 0	6 7	7 11	5 8	6 6	7 12	5 0	6 11	7 0
AD	ID 31	1 ✓	AD	ID 3	1 ✓	AD	ID 37	1 ✓	AD	ID 8	1 ✓		ID 48	1
2 0	3 0	4 8	2 0	3 0	4 0	2 0	3 1	4 9	2 0	3 0	4 3	2 0	3 4	4 6
5 0	6 11	7 2	5 7	6 0	7 9	5 0	6	7	5 5	6 11	7 0	5 0	6 11	7 2
AD	ID 17	1 ✓	AD	ID 26	1 ✓	AD	ID 30	1 ✓	AD	ID 16	1 ✓		ID 25	1 ✓
2 0	3 0	4 2	2 0	3 0	4 0	2 0	3 4	4 6	2 0	3 3	4 0	2 0	3 0	4 0
5 0	6 11	7 0	5 6	6 7	7 0	5 0	6 8	7 10	5 0	6 0	7 11	5 9	6 15	7 1[illegible]
AD	ID 36	1 ✓	AD	ID 50	1 ✓	AD	ID 4	1 ✓	AD	ID 35	1 ✓		ID 49	1 ✓
2 0	3 6	4 7	2 0	3 4	4 1	2 0	3 1	4 4	2 0	3 0	4 6	2 0	3 1	4 6
5 0	6 2	7 4	5 8	6 13	7 0	5 0	6 16	7 0	5 10	6 5	7 0	5 0	6 17	7 0
AD	ID 24	1 ✓	AD	ID 7	1 ✓	AD	ID 47	1 ✓	AD	ID 29	1 ✓		ID 19	1 ✓
2 0	3 0	4 0	2 0	3 0	4 0	2 0	3 5	4 0	2 0	3 0	4 4	2 0	3 0	4 0
5 3	6 17	7 0	5 5	6 10	7 0	5 8	6 0	7 0	5 7	6 0	7 0	5 4	6 8	7 0

Comments:

Cup ID	Sample Concentration	Day	Initials	Time
		∅	MLS	1650
		1	MAR	1335
1–10:	6.25	2	SJB	1320
11–20:	12.5	3	SJB	1020
21–30:	25	4	LJT	1430
31–40:	50	5	LJT	1540
41–50:	100	6	MAR	1502
51–60:		7	LJT	1210

C. dubia CR [illegible]
Log # 114
6/16/95

CHRONIC TOXICITY TEST DATA SHEET

TEMPERATURE

CONCENTRATION	Start	Day 1 OLD	Day 1 NEW	Day 2 OLD	Day 2 NEW	Day 3 OLD	Day 3 NEW	Day 4 OLD	Day 4 NEW	Day 5 OLD	Day 5 NEW	Day 6 OLD	Day 6 NEW	Day 7 OLD	Day 7 NEW	Day 8 OLD
6.25%	25°	24.0	24.0	24.2	24.8	24.8	24.8	25.0	24.6	25.2	25.2	24.5	24.8	24.2		
12.5																
25																
50																
100																

DISSOLVED OXYGEN

DLE

CONCENTRATION	Start	Day 1 OLD	Day 1 NEW	Day 2 OLD	Day 2 NEW	Day 3 OLD	Day 3 NEW	Day 4 OLD	Day 4 NEW	Day 5 OLD	Day 5 NEW	Day 6 OLD	Day 6 NEW	Day 7 OLD	Day 7 NEW	Day 8 OLD
6.25	7.9	7.1	8.3	7.7	~~7.1~~ 8.5	8.2	8.1	7.1	8.3	7.9	8.1	8.6	8.2	8.0		
12.5	7.9	7.1	8.3	7.0	~~7.1~~ 8.5	8.2	8.1	7.7	8.4	7.9	8.2	8.6	8.2	8.0		
25	7.8	7.0	8.3	7.0	~~7.0~~ 8.5	8.2	8.1	7.8	8.4	8.0	8.2	8.5	8.2	8.1		
50	7.8	7.0	8.3	7.1	~~7.0~~ 8.4	8.2	8.2	7.7	8.4	7.9	8.1	8.5	8.2	8.2		
100	8.[illegible]	7.1	8.4	8.2	~~7.1~~ 8.6	8.2	8.2	7.8	8.4	7.9	8.3	8.5	8.3	8.2		
									~~8.~~ LJT							

pH

CONCENTRATION	Start	Day 1 OLD	Day 1 NEW	Day 2 OLD	Day 2 NEW	Day 3 OLD	Day 3 NEW	Day 4 OLD	Day 4 NEW	Day 5 OLD	Day 5 NEW	Day 6 OLD	Day 6 NEW	Day 7 OLD	Day 7 NEW	Day 8 OLD
6.25	8.59	8.36	8.56	8.61	8.66	8.54	8.54	8.45	8.50	8.22	8.46	8.28	8.46	8.45		
12.5	8.58	8.38	8.57	8.63	8.69	8.54	8.54	8.45	8.52	8.25	8.47	8.32	8.45	8.44		
25	8.55	8.48	8.56	8.69	8.66	8.50	8.53	8.49	8.51	8.30	8.45	8.35	8.41	8.44		
50	8.49	8.58	8.55	8.76	8.60	8.[illegible]	8.50	8.55	8.51	8.38	8.35	8.45	8.36	8.54		
100	8.47	8.50	8.49	8.64	8.56	8.58	8.45	8.47	8.54	8.46	8.31	8.40	8.26	8.62		

CONDUCTIVITY

CONCENTRATION	Start	Day 1 OLD	Day 1 NEW	Day 2 OLD	Day 2 NEW	Day 3 OLD	Day 3 NEW	Day 4 OLD	Day 4 NEW	Day 5 OLD	Day 5 NEW	Day 6 OLD	Day 6 NEW	Day 7 OLD	Day 7 NEW	Day 8 OLD
6.25	785	799	786	8.51	895	885	879	936	889	962	880	1031	859	898 LJT		
12.5	8[illegible]	827	819	853	929	9[illegible]7	904	931	910	998	913	1030	869	930		
25	8[illegible]	862	857	861	948	9[illegible]	929	9[illegible]	928	993	934	1058	892	931		
50	9[illegible]	890	934	950	986	10[illegible]	966	9[illegible]5	967	1049	965	1100	949	1004		
100	1[illegible]4	998	1087	1057	1061	1042	1020	1023	1047	1143	1060	1112	1056	1077		

MAR 1640 | LJT DLE 1745 | MLS 1600 LJT | LJT 1200 | LJT 1145

CREC01 CERIO CHRONIC
File: CDCREC01 Transform: NO TRANSFORMATION

Chi-square test for normality: actual and expected frequencies

INTERVAL	<-1.5	-1.5 to <-0.5	-0.5 to 0.5	>0.5 to 1.5	>1.5
EXPECTED	4.020	14.520	22.920	14.520	4.020
OBSERVED	1	22	20	11	6

Calculated Chi-Square goodness of fit test statistic = 8.3227
Table Chi-Square value (alpha = 0.01) = 13.277

Data PASS normality test. Continue analysis.

CREC01 CERIO CHRONIC
File: CDCREC01 Transform: NO TRANSFORMATION

Bartletts test for homogeneity of variance

Calculated B statistic = 5.15
Table Chi-square value = 15.09 (alpha = 0.01)
Table Chi-square value = 11.07 (alpha = 0.05)

Average df used in calculation ==> df (avg n - 1) = 9.00
Used for Chi-square table value ==> df (#groups-1) = 5

Data PASS homogeneity test at 0.01 level. Continue analysis.

NOTE: If groups have unequal replicate sizes the average replicate size is used to calculate the B statistic (see above).

TITLE: CREC01 CERIO CHRONIC
TLE: CDCREC01
ANSFORM: NO TRANSFORMATION NUMBER OF GROUPS: 6

GRP	IDENTIFICATION	REP	VALUE	TRANS VALUE
1	CONTROL	1	12.0000	12.0000
1	CONTROL	2	18.0000	18.0000
1	CONTROL	3	18.0000	18.0000
1	CONTROL	4	22.0000	22.0000
1	CONTROL	5	16.0000	16.0000
1	CONTROL	6	13.0000	13.0000
1	CONTROL	7	24.0000	24.0000
1	CONTROL	8	17.0000	17.0000
1	CONTROL	9	29.0000	29.0000
1	CONTROL	10	21.0000	21.0000
2	6.25	1	36.0000	36.0000
2	6.25	2	28.0000	28.0000
2	6.25	3	16.0000	16.0000
2	6.25	4	21.0000	21.0000
2	6.25	5	13.0000	13.0000
2	6.25	6	20.0000	20.0000
2	6.25	7	15.0000	15.0000
2	6.25	8	19.0000	19.0000
2	6.25	9	20.0000	20.0000
2	6.25	10	11.0000	11.0000
	12.5	1	13.0000	13.0000
3	12.5	2	20.0000	20.0000
3	12.5	3	17.0000	17.0000
3	12.5	4	11.0000	11.0000
3	12.5	5	13.0000	13.0000
3	12.5	6	14.0000	14.0000
3	12.5	7	13.0000	13.0000
3	12.5	8	31.0000	31.0000
3	12.5	9	12.0000	12.0000
3	12.5	10	22.0000	22.0000
4	25	1	23.0000	23.0000
4	25	2	15.0000	15.0000
4	25	3	41.0000	41.0000
4	25	4	20.0000	20.0000
4	25	5	36.0000	36.0000
4	25	6	13.0000	13.0000
4	25	7	14.0000	14.0000
4	25	8	26.0000	26.0000
4	25	9	11.0000	11.0000
4	25	10	28.0000	28.0000
5	50	1	21.0000	21.0000
5	50	2	36.0000	36.0000
5	50	3	22.0000	22.0000
5	50	4	33.0000	33.0000
5	50	5	21.0000	21.0000
5	50	6	19.0000	19.0000
5	50	7	10.0000	10.0000
5	50	8	26.0000	26.0000
5	50	9	26.0000	26.0000
5	50	10	39.0000	39.0000

6	100	1	13.0000	13.0000
6	100	2	28.0000	28.0000
6	100	3	17.0000	17.0000
6	100	4	32.0000	32.0000
6	100	5	17.0000	17.0000
6	100	6	17.0000	17.0000
6	100	7	13.0000	13.0000
6	100	8	23.0000	23.0000
6	100	9	24.0000	24.0000
6	100	10	26.0000	26.0000

CREC01 CERIO CHRONIC
File: CDCREC01 Transform: NO TRANSFORMATION

ANOVA TABLE

SOURCE	DF	SS	MS	F
Between	5	455.750	91.150	1.604
Within (Error)	54	3069.500	56.843	
Total	59	3525.250		

Critical F value = 2.45 (0.05,5,40)
Since F < Critical F FAIL TO REJECT Ho:All groups equal

CREC01 CERIO CHRONIC
File: CDCREC01 Transform: NO TRANSFORMATION

DUNNETTS TEST - TABLE 1 OF 2 Ho:Control<Treatment

GROUP	IDENTIFICATION	TRANSFORMED MEAN	MEAN CALCULATED IN ORIGINAL UNITS	T STAT	SIG
1	CONTROL	19.000	19.000		
2	6.25	19.900	19.900	-0.267	
3	12.5	16.600	16.600	0.712	
4	25	22.700	22.700	-1.097	
5	50	25.300	25.300	-1.868	
6	100	21.000	21.000	-0.593	

Dunnett table value = 2.31 (1 Tailed Value, P=0.05, df=40,5)

CREC01 CERIO CHRONIC
File: CDCREC01 Transform: NO TRANSFORMATION

DUNNETTS TEST - TABLE 2 OF 2 Ho:Control<Treatment

GROUP	IDENTIFICATION	NUM OF REPS	Minimum Sig Diff (IN ORIG. UNITS)	% of CONTROL	DIFFERENCE FROM CONTROL

1	CONTROL	10			
2	6.25	10	7.789	41.0	-0.900
3	12.5	10	7.789	41.0	2.400
4	25	10	7.789	41.0	-3.700
5	50	10	7.789	41.0	-6.300
6	100	10	7.789	41.0	-2.000

FATHEAD MINNOW SURVIVAL AND GROWTH Log No. [illegible]
7-DAY CHRONIC TOXICITY TEST

JOB NO. F9350 6
INDUSTRY: Tinker
CONTACT:
EFFLUENT: CREEK
NPDES PERMIT NO:
SAMPLE TYPE:
DILUTION WATER:

PERSON CONDUCTING TEST:
BEGINNING: ____hrs 2/14 .
ENDING: ____hrs 6/23 .
TEST
DILUTIONS:
AGE:
ORGANISM SOURCE:

PHOTOPERIOD: 16 hr light
FEEDING REGIME:
0.1 ml Artemia @ 3times/day
TEST VESSEL CAPACITY: 1 liter
TEST SOLUTION VOLUME: 500 mL
NO. ORGANISMS/TREATMENT: 10
NO. REPLICATES: 4

CONC (%)	REP ID	SURVIVAL (#) START	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7
Con	A	10	10	~~10~~	10	10	10	10	10
	B	10	10	10	10	10	10	10	10
	C	10	10	10	10	10	10	10	10
	D	10	10	10	10	10	10	10	10
6.25	A	10	10	10	10	10	10	10	10
	B	10	10	10	10	10	10	10	10
	C	10	10	10	10	10	10	10	10
	D	10	10	10	10	10	10	10	10
12.5	A	10	10	10	10	10	10	10	10
	B	10	9	9	9	9	9	9	9
	C	10	10	10	10	10	10	10	10
	D	10	10	10	10	10	10	10	10
25	A	10	10	10	10	10	10	10	10
	B	10	10	10	10	10	10	10	10
	C	10	10	10	10	10	10	10	10
	D	10	10	10	10	10	10	10	10
	TIME:	1600	1145	1738	1500	1550	1445	1045	1610
	INITIAL:	MLS	[illegible]	MAR	MLS	MAR	DLE	[illegible]	[illegible]

GROWTH RESULTS

CONC (%)	REP ID	Boat ID	Tare wt (g)	Combined wt (g)	Tot Fish wt (g)	# of Fish	Avg Fish wt (mg)
Con	A		1.016835	1.022230	0.00545	10	0.545
	B		1.00487	1.009100	0.00413	10	0.413
	C		1.010[illegible]2	1.015510	0.00538	10	0.538
	D		1.01042	1.017100	0.00658	10	0.658
6.25	A		1.00508	1.009911	0.00483	10	0.483
	B		1.00976	1.015520	0.00544	10	0.544
	C		1.01265	1.019061	0.00641	10	0.641
	D		1.01374	1.018674	0.00493	10	0.493
12.5	A		1.01363	1.018952	0.00489	10	0.489
	B		1.01410	1.019455	0.00529	9	0.588
	C		.99970	1.004458	0.00488	10	0.488
	D	1.00279	~~.99287~~	1.005074	0.00525	10	0.525
25	A		1.00806	1.014184	0.00612	10	0.612
	B		1.00753	1.012254	0.00472	10	0.472
	C		1.00944	1.016264	0.00682	10	0.682
	D		1.01535	1.023454	0.00810	10	0.810

FATHEAD MINNOW SURVIVAL AND GROWTH — Log No: ____

7-DAY CHRONIC TOXICITY TEST

JOB NO. F93506
INDUSTRY: Tinker
CONTACT:
EFFLUENT: CREEK 1
NPDES PERMIT NO:
SAMPLE TYPE:
DILUTION WATER:

PERSON CONDUCTING TEST:
BEGINNING: ____hrs; 6/14 .
ENDING: ____hrs; 6/29 .
TEST
DILUTIONS:
AGE:
ORGANISM SOURCE:

PHOTOPERIOD: 16 hr light
FEEDING REGIME:
0.1 ml Artemia @ 3times/day
TEST VESSEL CAPACITY: 1 liter
TEST SOLUTION VOLUME: 500 mL
NO. ORGANISMS/TREATMENT: 10
NO. REPLICATES: 4

CONC (%)	REP ID	SURVIVAL (#) START	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7
50	A	10	10	10	10	10	10	10	10
	B	10	10	10	10	10	10	10	10
	C	10	10	10	10	10	10	10	10
	D	10	10	10	10	10	10	10	10
100	A	10	10	10	11	11	11	11	11
	B	10	10	10	10	10	10	10	10
	C	10	10	10	10	10	10	10	10
	D	10	10	10	10	10	10	10	10
	TIME:	1600	1145	1745	1500	1505	1445	1045	1610
	INITIAL:	MLS	JJB	MAR	MLS	MAR	DCE	JJB	TNT

GROWTH RESULTS

CONC (%)	REP ID	Boat ID	Tare wt (g)	Combined wt (g)	Tot Fish wt (g)	# of Fish	Avg Fish wt (mg)
50	A		1.00548	1.01200	0.00652	10	0.652
	B		1.00696	1.01372	0.00676	10	0.676
	C		1.00283	1.01050	0.00767	10	0.767
	D		1.01115	1.01850	0.00735	10	0.735
100	A		1.01444	1.02190	0.00746	11	0.678
	B		1.01783	1.02449	0.00666	10	0.666
	C		1.01534	1.02327	0.00793	10	0.793
	D		.99509	1.00221	0.00712	10	0.712

C ECO1
Log #448
6/16/95
F.H.

CHRONIC TOXICITY TEST DATA SHEET

TEMPERATURE

CONCENTRATION	Start	Day 1 OLD	Day 1 NEW	Day 2 OLD	Day 2 NEW	Day 3 OLD	Day 3 NEW	Day 4 OLD	Day 4 NEW	Day 5 OLD	Day 5 NEW	Day 6 OLD	Day 6 NEW	Day 7 OLD	Day 7 NEW	Day 8 OLD
CON	25.0	24	24	24.2	25.0	24.8	24.8	25.0	25.0	25.2	25.2	24.8	24.8	24.5		
6.25	↓															
12.5																
25																
50																
100																

DISSOLVED OXYGEN

CONCENTRATION	Start	Day 1 OLD	Day 1 NEW	Day 2 OLD	Day 2 NEW (con 8.5)	Day 3 OLD	Day 3 NEW	Day 4 OLD (new)	Day 4 NEW (old)	Day 5 OLD	Day 5 NEW	Day 6 OLD	Day 6 NEW	Day 7 OLD	Day 7 NEW	Day 8 OLD
CON	7.7	—	7.8	8.4	8.5	7.4	8.0	8.2	7.7	7.4	8.1	7.7	8.2	6.6		
6.25	7.7	6.3	7.4	8.4	8.5	7.5	8.0	8.3	7.7	7.5	8.0	7.9	8.1	6.7		
12.5	7.6	6.5	7.7	8.4	8.6	7.2	8.1	8.1	7.8	7.4	8.1	8.0	8.1	6.6		
25	7.6	6.9	7.7	8.5	8.6	7.2	8.0	8.1	7.7	7.4	8.3	7.9	8.2	6.4		
50	7.7	7.1	7.6	8.5	8.6	7.3	8.1	8.2	7.7	7.4	8.3	7.9	8.1	6.1		
100	7.8	7.0	7.6	8.5		7.3	8.1	8.2	7.6	7.5	8.3	7.8	8.2	6.4		

pH

CONCENTRATION	Start	Day 1 OLD	Day 1 NEW	Day 2 OLD	Day 2 NEW (con 8.43)	Day 3 OLD	Day 3 NEW	Day 4 OLD (new)	Day 4 NEW (old)	Day 5 OLD	Day 5 NEW	Day 6 OLD	Day 6 NEW	Day 7 OLD	Day 7 NEW	Day 8 OLD
CON	8.32	—	8.42	8.32	8.47	8.24	8.20	8.35	8.24	7.98	8.24	8.33	8.50	7.86		
6.25	8.29	8.49	8.29	8.29	8.48	8.25	8.16	8.43	8.25	7.98	8.28	8.36	8.51	7.91		
12.5	8.30	8.52	8.27	8.28	8.51	8.29	8.21	8.40	8.25	8.02	8.31	8.35	8.50	7.94		
25	8.29	8.51	8.28	8.31	8.53	8.35	8.20	8.48	8.31	8.19	8.32	8.38	8.48	7.92		
50	8.31	8.56	8.33	8.38	8.54	8.45	8.21	8.53	8.29	8.13	8.35	8.44	8.46	8.04		
100	8.33	8.62	8.33	8.49		8.51	8.19	7.91	8.44	8.32	8.28	8.54	8.43	8.20		

CONDUCTIVITY

CONCENTRATION	Start	Day 1 OLD	Day 1 NEW	Day 2 OLD	Day 2 NEW (con 344)	Day 3 OLD	Day 3 NEW	Day 4 OLD (new)	Day 4 NEW (old)	Day 5 OLD	Day 5 NEW	Day 6 OLD	Day 6 NEW	Day 7 OLD	Day 7 NEW	Day 8 OLD
CON	340	393	334	368	440	311	309	330	357	340	322	360	329	354		
6.25	376	434	377	364	424	324	357	346	383	317	361	381	394	383		
12.5	420	520	496	361	514	429	409	411	449	444	410	424	416	447		
25	499	695	516	474	644	506	501	481	521	535	502	528	510	546		
50	699	1032	695	686	1068	674	688	676	700	723	682	682	695	723		
100	1021		1072	1084		957	1015	1020	1033	1049	1029	1018	1043	1077		

DLE

MAR 15:30

INIT 14:04

OT 1710

DLE 1015

CREC01 FATHEAD MINNOW CHRONIC
File: FMCREC01 Transform: NO TRANSFORMATION

Chi-square test for normality: actual and expected frequencies

INTERVAL	<-1.5	-1.5 to <-0.5	-0.5 to 0.5	>0.5 to 1.5	>1.5
EXPECTED	1.608	5.808	9.168	5.808	1.608
OBSERVED	0	10	7	7	0

Calculated Chi-Square goodness of fit test statistic = 6.9989
Table Chi-Square value (alpha = 0.01) = 13.277

Data PASS normality test. Continue analysis.

CREC01 FATHEAD MINNOW CHRONIC
File: FMCREC01 Transform: NO TRANSFORMATION

Bartletts test for homogeneity of variance

Calculated B statistic = 5.09
Table Chi-square value = 15.09 (alpha = 0.01)
Table Chi-square value = 11.07 (alpha = 0.05)

Average df used in calculation ==> df (avg n - 1) = 3.00
Used for Chi-square table value ==> df (#groups-1) = 5

Data PASS homogeneity test at 0.01 level. Continue analysis.

NOTE: If groups have unequal replicate sizes the average replicate size is used to calculate the B statistic (see above).

TITLE: CREC01 FATHEAD MINNOW CHRONIC
FILE: FMCREC01
TRANSFORM: NO TRANSFORMATION NUMBER OF GROUPS: 6

GRP	IDENTIFICATION	REP	VALUE	TRANS VALUE
1	CONTROL	1	0.5450	0.5450
1	CONTROL	2	0.4130	0.4130
1	CONTROL	3	0.5380	0.5380
1	CONTROL	4	0.6580	0.6580
2	6.25	1	0.4830	0.4830
2	6.25	2	0.5440	0.5440
2	6.25	3	0.6410	0.6410
2	6.25	4	0.4930	0.4930
3	12.5	1	0.4890	0.4890
3	12.5	2	0.5880	0.5880
3	12.5	3	0.4880	0.4880
3	12.5	4	0.5280	0.5280
4	25	1	0.6120	0.6120
4	25	2	0.4720	0.4720
4	25	3	0.6820	0.6820
4	25	4	0.8100	0.8100
5	50	1	0.6520	0.6520
5	50	2	0.6760	0.6760
5	50	3	0.7670	0.7670
5	50	4	0.7350	0.7350
6	100	1	0.6780	0.6780
6	100	2	0.6660	0.6660
6	100	3	0.7930	0.7930
6	100	4	0.7120	0.7120

CREC01 FATHEAD MINNOW CHRONIC
File: FMCREC01 Transform: NO TRANSFORMATION

ANOVA TABLE

SOURCE	DF	SS	MS	F
Between	5	0.154	0.031	4.429
Within (Error)	18	0.130	0.007	
Total	23	0.285		

Critical F value = 2.77 (0.05,5,18)
Since F > Critical F REJECT Ho:All groups equal

CREC01 FATHEAD MINNOW CHRONIC
File: FMCREC01 Transform: NO TRANSFORMATION

DUNNETTS TEST - TABLE 1 OF 2 Ho:Control<Treatment

GROUP	IDENTIFICATION	TRANSFORMED MEAN	MEAN CALCULATED IN ORIGINAL UNITS	T STAT	SIG
1	CONTROL	0.539	0.539		
2	6.25	0.540	0.540	-0.030	
3	12.5	0.523	0.523	0.258	
4	25	0.644	0.644	-1.783	
5	50	0.708	0.708	-2.857	
6	100	0.712	0.712	-2.937	

Dunnett table value = 2.41 (1 Tailed Value, P=0.05, df=18,5)

CREC01 FATHEAD MINNOW CHRONIC
File: FMCREC01 Transform: NO TRANSFORMATION

DUNNETTS TEST - TABLE 2 OF 2 Ho:Control<Treatment

GROUP	IDENTIFICATION	NUM OF REPS	Minimum Sig Diff (IN ORIG. UNITS)	% of CONTROL	DIFFERENCE FROM CONTROL
1	CONTROL	4			
2	6.25	4	0.143	26.5	-0.002
3	12.5	4	0.143	26.5	0.015
4	25	4	0.143	26.5	-0.105
5	50	4	0.143	26.5	-0.169
6	100	4	0.143	26.5	-0.174

№ 1526

CHAIN OF CUSTODY RECORD

JOB # Task 3 F93506	PROJECT NAME TAFB Soldier Creek	ANALYSES REQUIRED	WOODWARD-CLYDE CONSULTANTS P.O. BOX 680925 FRANKLIN, TN 37068-0925 (615) 790-0003 FAX (615) 790-0023
SAMPLERS: (Signature)			

SAMPLE IDENTIFICATION	DATE	TIME	SAMPLE TYPE	NUMBER OF CONTAINERS	Toxicity						REMARKS
CR-E(01-TX-20)	6/13/95	1245	Water	3	✓						38048 23522

RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)	RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)
Daphne Oldrich	6/13/95 1800				
RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)	RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)
RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED AT LAB BY: (Signature)	DATE/TIME	GENERAL COMMENTS	
		Maria Saunders	6/14/95 - 0910	2°C	

Distribution: Original and Yellow copies accompany sample shipment to laboratory
Pink copy retained by samplers. Yellow copy retained by laboratory. Laboratory returns White copy to samplers.

№ 1527

CHAIN OF CUSTODY RECORD

JOB #	PROJECT NAME
Task 3 F93506	TAFB Soldier Creek

SAMPLERS: (Signature)

WOODWARD-CLYDE CONSULTANTS
P.O. BOX 680925
FRANKLIN, TN 37068-0925
(615) 790-0003 FAX (615) 790-0023

SAMPLE IDENTIFICATION	DATE	TIME	SAMPLE TYPE	NUMBER OF CONTAINERS	ANALYSES REQUIRED: Toxicity	REMARKS
CR-EC01-TX-201	6/13/95	1245	Water	2	✓	5804823522
CR-EC01-TX-201	6/13/95	1300	Sed	2	✓	

RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)	RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)
	6/13/95 1800				
RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)	RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)
RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED AT LAB BY: (Signature)	DATE/TIME	GENERAL COMMENTS	
		Marla Saunders	6/14/95 0905	2°C	

Distribution: Original and Yellow copies accompany sample shipment to laboratory
Pink copy retained by samplers. Yellow copy retained by laboratory. Laboratory returns White copy to samplers.

TEST SUMMARY: CR-EC02-TX-201
Ceriodaphnia dubia 48-Hour Static Acute

Test protocol:	WCC SOP 401.2
Test organism:	*Ceriodaphnia dubia*
Source:	WCC Culture Laboratory
Age of test organism:	<24 hours
Test initiation:	6/13/95
Test termination:	6/15/95
Temperature:	25 +/- 1 °C
Light:	50 - 100 foot candles
Photoperiod:	16 hours light/8 hours dark
Test vessel:	30 mL styrene
Test volume:	20 mL
Organisms/replicate:	5
Replicates/concentration:	4
Feeding regime:	none
Aeration during test:	none
Dilution Water:	Hard Reconstituted Synthetic
Test duration:	48 hours
Effect measured:	Mortality
Reference Toxicant Data:	
LC_{50} (g/L NaCl):	1.51

TEST RESULTS: CR-EC02-TX-201
Ceriodaphnia dubia 48-Hour Static Acute

$LC_{50} > 100\%$

Statictical analysis method: N/A

Treatment (% Sample)	Survival (%)	pH	Conductivity (umhos/cm)	DO (mg/L)	Temperature (°C)	Hardness (mg/L $CaCO_3$)	Alkalinity (mg/L $CaCO_3$)
Control	100	8.57-8.62	777 (764-790)	8.4 (8.3-8.5)	24.9 (24.8-25.0)	270	
6.25	100	8.59-8.63	755 (748-762)	8.4 (8.3-8.5)	24.9 (24.8-25.0)		
12.5	100	8.58-8.63	767 (761-772)	8.4 (8.3-8.5)	24.9 (24.8-25.0)		
25	100	8.61-8.61	779 (763-794)	8.4 (8.2-8.5)	24.9 (24.8-25.0)		
50	100	8.54-8.69	795 (792-807)	8.5 (8.4-8.6)	24.9 (24.8-25.0)		
100	100	8.49-8.76	811 (795-827)	8.6 (8.5-8.6)	24.9 (24.8-25.0)	276	282

SURFACE WATER SAMPLE ARRVIAL INFORMATION

Collection Date/Time:	6/12/95 @ 1400
Use Date/Time:	6/13/95 @ 1545
Method of Shipment:	Overnight Courier
Temperature (°C):	2.0
pH:	8.49
Ammonia (mg/L):	0.17
Conductivity (umhos/cm):	827
DO (mg/L):	8.6

TEST SUMMARY: CR-EC02-TX-201
Ceriodaphnia dubia Chronic Renewal

Test protocol:	WCC SOP 501.1
Test organism:	*Ceriodaphnia dubia*
Source:	WCC Culture Laboratory
WCC Batch:	6/14/95 to 6/15/95
Age of test organism:	<24 hours
Test initiation:	6/15/95
Test termination:	6/22/95
Temperature:	25 +/- 1 °C
Light:	50 - 100 foot candles
Photoperiod:	16 hours light/8 hours dark
Test vessel:	30 mL styrene
Test volume:	15 mL
Organisms/replicate:	1
Replicates/concentration:	10
Feeding regime:	0.05 mL *Selenastrum* and 0.05 mL YTC daily
Aeration during test:	none
Dilution Water:	Hard Reconstituted Synthetic
Test duration:	7 days
Effect measured:	Survival and reproduction

Toxicity test methods and procedures were followed in accordance with EPA 600/4-89/001

Reference Toxicant Data:	
NOEC (g/L NaCl):	0.75

TEST RESULTS: CR-EC02-TX-201
Ceriodaphnia dubia Chronic Survival and Reproduction Test

Survival NOEC:	100%
Statistical analysis method:	N/A
Normality test:	
Homogeneity of variance test:	
Reproduction NOEC:	100%
Statistical analysis method:	Steel's Many-One Rank
Normality test:	Pass
Homogeneity of variance test:	Fail

Treatment (% Sample)	Survival (%)	pH	Conductivity (umhos/cm)	DO (mg/L)	Temperature (°C)
Control	100	8.24-8.73	493 (452-944)	7.9 (7.2-8.6)	24.6 (24.0-25.2)
6.25	90	8.26-8.61	839 (755-956)	8.1 (7.1-8.4)	24.6 (24.0-25.2)
12.5	100	8.25-8.59	853 (763-933)	8.1 (7.3-8.6)	24.6 (24.0-25.2)
25	100	8.27-8.58	840 (768-928)	8.0 (7.2-8.6)	24.6 (24.0-25.2)
50	90	8.34-8.62	837 (777-889)	8.0 (7.1-8.6)	24.6 (24.0-25.2)
100	90	8.28-8.69	822 (789-842)	8.1 (7.0-8.6)	24.6 (24.0-25.2)

	Hardness (mg/L $CaCO_3$)	Alkalinity (mg/L $CaCO_3$)	Ammonia (mg/L)
Control	270		
CR-EC02	276	282	0.17

TEST SUMMARY: CR-EC02-TX-201
Pimephales promelas 48-Hour Static Acute

Test protocol:	WCC SOP 410.2
Test organism:	*Pimephales promelas*
Source:	Woodward-Clyde Consultants
Age of test organism:	6 days
Test initiation:	6/13/95
Test termination:	6/15/95
Temperature:	20 +/- 1 °C
Light:	50 - 100 foot candles
Photoperiod:	16 hours light/8 hours dark
Test vessel:	500 mL plastic beaker
Test volume:	250 mL
Organisms/replicate:	10
Replicates/concentration:	2
Feeding regime:	none
Aeration during test:	none
Dilution Water:	Spring Water
Test duration:	48 hours
Effect measured:	Mortality
Reference Toxicant Data:	
LC_{50} (g/L NaCl):	5.26

TEST RESULTS: CR-EC02-TX-201
Pimephales promelas 48-Hour Static Acute

LC_{50} > 100%

Statictical analysis method: N/A

Treatment (% Sample)	Survival (%)	pH	Conductivity (umhos/cm)	DO (mg/L)	Temperature (°C)	Hardness (mg/L $CaCO_3$)	Alkalinity (mg/L $CaCO_3$)
Control	95	7.65-8.45	351 (343-359)	8.3 (8.0-8.5)	20.8 (20.8-20.8)	158	146
6.25	100	8.15-8.49	375 (357-392)	8.1 (8.1-8.1)	20.8 (20.8-20.8)		
12.5	100	8.12-8.59	402 (386-417)	8.1 (8.1-8.1)	20.8 (20.8-20.8)		
25	90	8.12-8.55	457 (442-472)	8.1 (8.1-8.1)	20.8 (20.8-20.8)		
50	100	8.24-8.65	577 (562-591)	8.1 (8.0-8.1)	20.8 (20.8-20.8)		
100	95	8.23-8.75	737 (652-822)	8.3 (8.1-8.4)	20.8 (20.8-20.8)	276	282

SURFACE WATER SAMPLE ARRVIAL INFORMATION

Collection Date/Time:	6/12/95 @ 1400
Use Date/Time:	6/13/95 @ 1545
Method of Shipment:	Overnight Courier
Temperature (°C):	2.0
pH:	8.49
Ammonia (mg/L):	0.17
Conductivity (umhos/cm):	652
DO (mg/L):	8.6
Description:	Clear

TEST SUMMARY: CR-EC02-TX-201
Pimephales promelas Chronic Renewal

Test protocol:	WCC SOP 510.1
Test organism:	*Pimephales promelas*
Source:	Environmental Consulting & Testing
Age of test organism:	<24 hours
Test initiation:	6/15/95 @ 1520
Test termination:	6/22/95 @ 1500
Temperature:	25 +/- 1 °C
Light:	50 - 100 foot candles
Photoperiod:	16 hours light/8 hours dark
Test vessel:	500 mL plastic beaker
Test volume:	250 mL
Organisms/replicate:	10
Replicates/concentration:	4
Feeding regime:	0.1 mL brine shrimp nauplii twice daily
Aeration during test:	none
Dilution Water:	Spring Water
Test duration:	7 days
Effect measured:	Survival and growth

Toxicity test methods and procedures were followed in accordance with EPA 600/4-89/001

Reference Toxicant Data:	
NOEC (g/L NaCl):	3.0

TEST RESULTS: CR-EC02-TX-201

Pimephales promelas Chronic Survival and Growth Test

Survival NOEC:	100%
Statistical analysis method:	Dunnetts
Normality test:	Pass
Homogeneity of variance test:	Pass
Growth NOEC:	100%
Statistical analysis method:	Steel's Many One Rank Sum
Normality test:	Pass
Homogeneity of variance test:	Fail

Treatment (% Sample)	Survival (%)	pH	Conductivity (umhos/cm)	DO (mg/L)	Temperature (°C)
Control	92.5	7.99-8.41	348 (316-379)	7.7 (7.0-8.4)	24.6 (24.0-25.2)
6.25	80	8.04-8.49	374 (330-421)	7.7 (6.7-8.5)	24.6 (24.0-25.2)
12.5	90	8.07-8.51	398 (370-424)	7.7 (6.8-8.6)	24.6 (24.0-25.2)
25	85	8.06-8.52	458 (431-485)	7.7 (6.7-8.6)	24.6 (24.0-25.2)
50	82.5	8.06-8.56	578 (546-608)	7.7 (6.6-8.6)	24.6 (24.0-25.2)
100	67.5	8.18-8.59	814 (773-847)	7.7 (6.7-8.6)	24.6 (24.0-25.2)

	Hardness (mg/L $CaCO_3$)	Alkalinity (mg/L $CaCO_3$	Ammonia (mg/L)
Control	270		
CR-EC02	276	282	0.17

48-hr Ceriodaphnia dubia TOXICITY TEST

LOG NO. 437
JOB NO. F-92506
INDUSTRY: Tinker
CONTACT:

EFFLUENT: CR-EC02
START DATE: 12-13-95
START TIME: 1545
DILUTION WATER: Hard-270

CONC (%)	REP ID	SURVIVAL (#) 0	24	48	DEAD	TEMPERATURE (oC) 0	24	48	DO (mg/L) 0	24	48	pH (S.U.) 0	24	48	CONDUCTIVITY (umhos/cm) 0	24	48
6.25	A	5	5	5		24.8		25.0	8.5		8.3	8.63		8.59	748		762
	B	5	5	5													
	C	5	5	5													
	D	5	5	5													
12.5	A	5	5	5					8.5		8.3	8.63		8.58	772		761
	B	5	5	5													
	C	5	5	5													
	D	5	5	5													
25	A	5	5	5					8.5		8.2	8.61		8.61	794		763
	B	5	5	5													
	C	5	5	5													
	D	5	5	5													
50	A	5	5	5					8.6		8.4	8.54		8.69	807		782
	B	5	5	5													
	C	5	5	5													
	D	5	5	5													
100	A	5	5	5					8.6		8.5	8.49		8.76	827		795
	B	5	5	5													
	C	5	5	5													
	D	5	5	5													
	Initials	LDT	LDT	LDT													
	Time	1515	1430	0930													

Comments

PARAMETER	Control	
Total Hardness (mg/L CaCO3)		
Total Alkalinity (mg/L CaCO3 @ 4.5)		

48-hr Ceriodaphnia dubia TOXICITY TEST

433-

LOG NO. 1137
JOB NO. 198506
INDUSTRY: Lumber
CONTACT:

EFFLUENT: ~~effluent~~ Controls
START DATE: 6-13-15
START TIME: 1510 ~~MLS~~
DILUTION WATER: ~~RO Water~~ Controls

CONC (%)	REP ID	SURVIVAL (#) 0	24	48	DtAd	TEMPERATURE (oC) 0	24	48	DO (mg/L) 0	24	48	pH (S.U.) 0	24	48	CONDUCTIVITY (umhos/cm) 0	24	48
1.10	A	5	5	5		24.2		25.0	8.5		8.2	7.61		8.28	500		497
(CON)	B	5	5	5													
w/ EECI	C	5	5	5													
	D	5	5	5													
2.50	A	5	5	5					8.5		8.2	8.54		8.54	689		731
(CON)	B	5	5	5													
w/EECI	C	5	5	5													
	D	5	5	5													
4.70	A	5	5	5					8.5		8.3	8.62		8.57	764		790
(CON)	B	5	5	5													
w/EECI	C	5	5	5													
2 CREEK	D	5	5	5													
8.00	A	5	5	5					8.5		8.2	8.51		8.49	582		578
(CON)	B	5	5	5													
~~w/ CH (APP)~~	C	5	5	5													
w/ EECI	D	5	5	5													
	A																
	B																
	C																
	D																
Initials		JAB	LSL	CJL													
Time		1510	1510	0930													

Comments

PARAMETER	Control	
Total Hardness (mg/L CaCO3)		
Total Alkalinity (mg/L CaCO3 @ 4.5)		

Ceriodaphnia SURVIVAL AND REPRODUCTION CHRONIC TOXICITY TEST

JOB NO. F93506 | BEGINNING: _____ hrs; 6/15/95 | Log No. 447
INDUSTRY: Tinker | ENDING: _____ hrs; 6/22/95 | PHOTOPERIOD: 16 light, 8 dark
CONTACT: | FEEDING REGIME: | ORGANISM SOURCE: WCC
EFFLUENT: CK-E002 | .05 mL yct/15 mL | TEST VESSEL CAPACITY: 30 mL
NPDES PERMIT NO: | .05 mL algal suspension/15 mL | TEST SOLUTION VOLUME: 15mL
PERSON CONDUCTING TEST: | | NO. REPLICATES:
| | DILUTION WATER:

NUMBER OF YOUNG PRODUCED

CONC	CHAMBER	START	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7	
	TIME					23	60	93	174	
	OBSERVER									
6.25%	1						4	5	11	20
	2					1	6			7
	3						4	5	12	21
	4					8	C	4	8	20
	5					2	3	C	11	16
	6					5	4	C	9	18
	7					3	C	3	8	14
	8					1	6	C	13	20
	9					3	5	9	3	23
	10					0	2	7	6	15
					10% mortality					

CONC	CHAMBER	START	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7	
					2	21	57	140	242	
12.5%	11					3	7	C	14	24
	12						7	6	9	22
	13						1	8	14	23
	14					4	7	C	11	22
	15					2	4	C	13	19
	16					5	7	9	5	26
	17						9	8	13	30
	18				2	C	5	4	11	25
	19					1	8	9	9	27
	20					4	8	9	3	24

CONC	CHAMBER	START	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7	
					9	39	93	160	210	
25%	21				3	9	C	15	9	24
	22						5	10	9	24
	23						9	11	16	36
	24				2	C	8	14	15	39
	25					3	C	11	6	20
	26					4	6	C	8	18
	27				4	34 C	32 6	34% 5	10	25
	28					6	5	C	13	24
	29					6	5	C	13	27
	30					2	4	1	11	18

Ceriodaphnia SURVIVAL AND REPRODUCTION CHRONIC TOXICITY TEST

JOB NO. F93506
INDUSTRY: Tinker
CONTACT:
EFFLUENT: OK - EC02
NPDES PERMIT NO:
PERSON CONDUCTING TEST:

BEGINNING: ____ hrs; 6/15/95
ENDING: ____ hrs; 6/22/95
FEEDING REGIME:
.05 mL yct/15 mL
.05 mL algal suspension/15 mL

Log No. 447
PHOTOPERIOD: 16 light, 8 dark
ORGANISM SOURCE: WCC
TEST VESSEL CAPACITY: 30 mL
TEST SOLUTION VOLUME: 15mL
NO. REPLICATES:
DILUTION WATER:

CONC	CHAMBER	TIME / OBSERVER	START	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7
		NUMBER OF YOUNG PRODUCED				6	30	115	229	309
50%	31					4	0	15	15	12
	32						7	8	14	0
	33							11	13	11
	34							9	13	15
	35						4	9	13	6
	36						3	9	15	13
	37						5	10	0	15
	38					(0)				
	39					2	0	10	16	5
	40						5	7	13	0
			START	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7
						3	36	125	243	299
100%	41						4	13	14	0
	42							9	14	14
	43						5	11	16	5
	44					3	0	8	19	15
	45						2	5	15	3
	46						7	11	3	16
	47						3	7	(1) 10	
	48						3	9	13	0
	49						4	12	9	0
	50						5	5	5	3
			START	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7

Ceriodaphnia dubia GRID Ceriodaphnia dubia GRID MONITORING DATA

Grid Letter: I + M T X Q U Start Date: 6/15 Sample ID: CR-ECO2 Log #: 44

AD ID 1 2 3 4 5 6 7	AD ID 1 2 3 4 5 6 7	AD ID 1 2 3 4 5 6 7	AD ID 1 2 3 4 5 6 7	ID 1 2 3 4 5 6 7	
AD ID 10 1 ✓ 2 ✓ 3 ✓ 4 0 5 2 6 7 7 6	AD ID 45 1 ✓ 2 ✓ 3 ✓ 4 2 5 5 6 15 7 3	AD ID 17 1 ✓ 2 ✓ 3 ✓ 4 0 5 9 6 8 7 13	AD ID 34 1 ✓ 2 ✓ 3 ✓ 4 0 5 9 6 13 7 15	ID 3 1 ✓ 2 ✓ 3 ✓ 4 C 5 4 6 5 7 1	
AD ID 28 1 ✓ 2 ✓ 3 ✓ 4 6 5 5 6 0 7 13	AD ID 1 1 ✓ 2 ✓ 3 ✓ 4 0 5 4 6 5 7 11	AD ID 40 1 ✓ 2 ✓ 3 ✓ 4 5 5 7 6 13 7 0	AD ID 42 1 ✓ 2 ✓ 3 ✓ 4 0 5 9 6 14 7 14	ID 20 1 ✓ 2 ✓ 3 ✓ 4 4 5 8 6 9 7 3	
AD ID 46 1 ✓ 2 ✓ 3 ✓ 4 7 5 11 6 3 7 16	AD ID 33 1 ✓ 2 ✓ 3 ✓ 4 0 5 11 6 13 7 11	AD ID 23 1 ✓ 2 ✓ 3 ✓ 4 0 5 9 6 11 7 16	AD ID 14 1 ✓ 2 ✓ 3 ✓ 4 4 5 7 6 0 7 11	ID 50 1 ✓ 2 ✓ 3 ✓ 4 5 5 5 6 5 7 3	
AD ID 11 1 ✓ 2 ✓ 3 ✓ 4 3 5 7 6 0 7 14	AD ID 49 1 ✓ 2 ✓ 3 ✓ 4 4 5 12 6 9 7 C	AD ID 2 1 ✓ 2 ✓ 3 ✓ 4 1 D 5 6 6 7	AD ID 32 1 ✓ 2 ✓ 3 ✓ 4 7 5 8 6 16 7 C	ID 27 1 2 ✓ 3 4 4 2 5 6 6 5 7 1	
AD ID 41 1 ✓ 2 ✓ 3 ✓ 4 4 5 12 6 14 7 0	AD ID 22 1 ✓ 2 ✓ 3 ✓ 4 0 5 8 6 10 7 9	AD ID 31 1 ✓ 2 ✓ 3 4 4 0 5 12 6 15 7 12	AD ID 21 1 ✓ 2 ✓ 3 3 4 9 5 0 6 15 7 9	ID 13 1 ✓ 2 ✓ 3 ✓ 4 C 5 1 6 8 7 1	

Comments:

Day 0 6 15 Initials LJT Time 10:45

Cup ID	Sample Concentration
1–10:	~~Control~~ LJT 6.25
11–20:	~~6.25~~ LJT 12.5
21–30:	25
31–40:	50
41–50:	100
51–60:	

1	LJT	1700
2	MAR	1140
3	MAR	1410
4	SJR	1130
5	LJT	1500
6	LJT	1520
7	LJT	1605

Ceriodaphnia dubia GRID Ceriodaphnia dubia GRID MONITORING DATA

Grid Letter: W D L H N S M Start Date: 2/15/95 Sample ID: CR-ECO2 Log #: 44

AD	ID	1
2	3	4
5	6	7

AD	ID	1
2	3	4
5	6	7

AD	ID	1
2	3	4
5	6	7

AD	ID	1
2	3	4
5	6	7

	ID	1
2	3	4
5	6	7

AD	ID 4	1 ✓
2 ✓	3 ✓	4 8
5 0	6 4	7 8

AD	ID 35	1 ✓
2 ✓	3 ✓	4 4
5 9	6 13	7 6

AD	ID 8	1 ✓
2 ✓	3 ✓	4 1
5 6	6 C	7 13

AD	ID 18	1 ✓
2 ✓	3 2	4 0
5 8	6 4	7 11

	ID 39	1 ✓
2 ✓	3 2	4 C
5 10	6 16	7 8

AD	ID 19	1 ✓
2 ✓	3 ✓	4 1
5 8	6 9	7 9

AD	ID 12	1 ✓
2 ✓	3 ✓	4 0
5 7	6 6	7 9

AD	ID 43	1 ✓
2 ✓	3 ✓	4 5
5 11	6 16	7 5

AD	ID 6	1 ✓
2 ✓	3 ✓	4 5
5 4	6 0	7 9

	ID 37	1 ✓
2 ✓	3 ✓	4 5
5 10	6 0	7 15

AD	ID 44	1 ✓
2 ✓	3 3	4 D
5 8	6 19	7 15

AD	ID 36	1 ✓
2 ✓	3 ✓	4 3
5 9	6 15	7 13

AD	ID 25	1 ✓
2 ✓	3 ✓	4 3
5 0	6 11	7 6

AD	ID 15	1 ✓
2 ✓	3 ✓	4 2
5 4	6 C	7 13

	ID 47	1 ✓
2 ✓	3 ✓	4 3
5 7	6 10	7

AD	ID 5	1 ✓
2 ✓	3 ✓	4 2
5 3	6 0	7 11

AD	ID 14	1 ✓
2 ✓	3 ✓	4 5
5 7	6 9	7 5

AD	ID 38	1 ✓
2 ✓	3 D/C	4
5 /	6	7

AD	ID 26	1 ✓
2 ✓	3 0	4 4
5 6	6 C	7 8

	ID 9	1 ✓
2 ✓	3 0	4 3
5 8	6 9	7 3

AD	ID 30	1 ✓
2 ✓	3 ✓	4 2
5 4	6 1	7 11

AD	ID 24	1 ✓
2 ✓	3 2	4 0
5 8	6 14	7 15

AD	ID 48	1 ✓
2 ✓	3 ✓	4 3
5 9	6 13	7 C

AD	ID 7	1 ✓
2 ✓	3 ✓	4 3
5 0	6 3	7 8

	ID 29	1 ✓
2 ✓	3 ✓	4 6
5 8	6 C	7 13

Comments:

Cup ID	Sample Concentration
1–10:	6.25
11–20:	12.5
21–30:	25
31–40:	50
41–50:	100
51–60:	

Day	Initials	Time
0	SJR	1630
1	LJT	1655
2	LMJR	1430
3	MMK	1417
4	SJR	1130
5	LJT	1445
6	LJT	1525
7	LJT	1600

Log: 17
6/15/95
Hrd: 270

CHRONIC TOXICITY TEST DATA SHEET

TEMPERATURE

CONCENTRATION	Start	Day 1 OLD	Day 1 NEW	Day 2 OLD	Day 2 NEW	Day 3 OLD	Day 3 NEW	Day 4 OLD	Day 4 NEW	Day 5 OLD	Day 5 NEW	Day 6 OLD	Day 6 NEW	Day 7 OLD	Day 7 NEW	Day 8 OLD
LJT 6.25%	25.	25.0	25.0	24.0	24.0	24.2	25.0	25.0	24.8	25.0	25.0	25.2	25.2	24.8		
12.5%																
25																
50																
100																

DISSOLVED OXYGEN

CONCENTRATION	Start	Day 1 OLD	Day 1 NEW	Day 2 OLD	Day 2 NEW	Day 3 OLD	Day 3 NEW	Day 4 OLD	Day 4 NEW	Day 5 OLD	Day 5 NEW	LJT 1630 Day 6 OLD	Day 6 NEW	Day 7 OLD	Day 7 NEW	Day 8 OLD
6.25	8.7	7.5	8.3	7.1	8.5	8.1	8.4	8.2	8.2	7.9	8.2	7.8	8.4	7.5		
12.5	8.6	7.5	8.4	7.3	8.6	8.1	8.4	8.1	8.1	7.8	8.3	7.8	8.3	7.6		
25	8.6	7.5	8.4	7.2	8.6	8.1	8.4	8.0	8.2	7.9	8.3	7.8	8.3	7.6		
50	8.6	7.5	8.4	7.1	8.5	8.0	8.5	8.1	8.2	7.7	8.3	7.8	8.3	7.6		
100	8.6	7.5	8.4	7.0	8.6	8.1	8.6	8.0	8.2	7.9	8.4	7.9	8.4	7.6		

pH

CONCENTRATION	Start	Day 1 OLD	Day 1 NEW	Day 2 OLD	Day 2 NEW	Day 3 OLD	Day 3 NEW	Day 4 OLD	Day 4 NEW	Day 5 OLD	Day 5 NEW	Day 6 OLD	Day 6 NEW	Day 7 OLD	Day 7 NEW	Day 8 OLD
6.25	8.61	8.31	8.57	8.42	8.56	8.58	8.47	8.49	8.53	8.42	8.53	8.26	8.47	8.40		
12.5	8.59	8.30	8.57	8.41	8.59	8.56	8.49	8.47	8.52	8.44	8.53	8.25	8.48	8.41		
25	8.54	8.32	8.53	8.44	8.55	8.58	8.53	8.49	8.50	8.44	8.54	8.27	8.40	8.44		
50	8.48	8.36	8.51	8.47	8.48	8.62	8.50	8.59	8.44	8.49	8.49	8.31	8.36	8.48		
100	8.40	8.51	8.43	8.54	8.37	8.69	8.45	8.61	8.36	8.57	8.43	8.42	8.38	8.56		

CONDUCTIVITY

CONCENTRATION	Start	Day 1 OLD	Day 1 NEW	Day 2 OLD	Day 2 NEW	Day 3 OLD	Day 3 NEW	Day 4 OLD	Day 4 NEW	Day 5 OLD	Day 5 NEW	Day 6 OLD	Day 6 NEW	Day 7 OLD	Day 7 NEW	Day 8 OLD
6.25	755	757	742	802	826	836	801	907	852	892	859	956	864	905		
12.5	763	781	781	801	836	876	789	900	875	913	887	933	878	915		
25	768	782	791	815	839	840	798	879	868	877	897	928	867	870		
50	771	784	801	822	834	832	812	879	845	856	957	939	848	881		
100	801	796	694	840	835	840	870	838	805	816	789	842	814	832		

MAR 1530

LJT 1745

LJT 1640

LJT 1200

CREC02 CERIO CHRONIC
File: CDEC02 Transform: NO TRANSFORMATION

Chi-square test for normality: actual and expected frequencies

INTERVAL	<-1.5	-1.5 to <-0.5	-0.5 to 0.5	>0.5 to 1.5	>1.5
EXPECTED	4.020	14.520	22.920	14.520	4.020
OBSERVED	3	16	21	16	4

Calculated Chi-Square goodness of fit test statistic = 0.7215
Table Chi-Square value (alpha = 0.01) = 13.277

Data PASS normality test. Continue analysis.

CREC02 CERIO CHRONIC
File: CDEC02 Transform: NO TRANSFORMATION

Bartletts test for homogeneity of variance

Calculated B statistic = 23.52
Table Chi-square value = 15.09 (alpha = 0.01)
Table Chi-square value = 11.07 (alpha = 0.05)

Average df used in calculation ==> df (avg n - 1) = 9.00
Used for Chi-square table value ==> df (#groups-1) = 5

Data FAIL homogeneity test at 0.01 level. Try another transformation.

NOTE: If groups have unequal replicate sizes the average replicate size is used to calculate the B statistic (see above).

CREC02 CERIO CHRONIC
File: CDEC02 Transform: 1/SQUARE ROOT(Y+0.5)

Chi-square test for normality: actual and expected frequencies

INTERVAL	<-1.5	-1.5 to <-0.5	-0.5 to 0.5	>0.5 to 1.5	>1.5
EXPECTED	4.020	14.520	22.920	14.520	4.020
OBSERVED	3	15	28	10	4

Calculated Chi-Square goodness of fit test statistic = 2.8078
Table Chi-Square value (alpha = 0.01) = 13.277

Data PASS normality test. Continue analysis.

CREC02 CERIO CHRONIC
File: CDEC02 Transform: 1/SQUARE ROOT(Y+0.5)

Bartletts test for homogeneity of variance

Calculated B statistic = 147.92
Table Chi-square value = 15.09 (alpha = 0.01)
Table Chi-square value = 11.07 (alpha = 0.05)

Average df used in calculation ==> df (avg n - 1) = 9.00
Used for Chi-square table value ==> df (#groups-1) = 5

Data FAIL homogeneity test at 0.01 level. Try another transformation.

NOTE: If groups have unequal replicate sizes the average replicate size is used to calculate the B statistic (see above).

TITLE: CREC02 CERIO CHRONIC
TLE: CDEC02
RANSFORM: NO TRANSFORMATION NUMBER OF GROUPS: 6

GRP	IDENTIFICATION	REP	VALUE	TRANS VALUE
1	CONTROL	1	13.0000	13.0000
1	CONTROL	2	24.0000	24.0000
1	CONTROL	3	21.0000	21.0000
1	CONTROL	4	15.0000	15.0000
1	CONTROL	5	14.0000	14.0000
1	CONTROL	6	20.0000	20.0000
1	CONTROL	7	19.0000	19.0000
1	CONTROL	8	16.0000	16.0000
1	CONTROL	9	18.0000	18.0000
1	CONTROL	10	15.0000	15.0000
2	6.25	1	20.0000	20.0000
2	6.25	2	7.0000	7.0000
2	6.25	3	21.0000	21.0000
2	6.25	4	20.0000	20.0000
2	6.25	5	16.0000	16.0000
2	6.25	6	18.0000	18.0000
2	6.25	7	14.0000	14.0000
2	6.25	8	20.0000	20.0000
2	6.25	9	23.0000	23.0000
2	6.25	10	15.0000	15.0000
3	12.5	1	24.0000	24.0000
3	12.5	2	22.0000	22.0000
3	12.5	3	23.0000	23.0000
3	12.5	4	22.0000	22.0000
3	12.5	5	19.0000	19.0000
3	12.5	6	26.0000	26.0000
3	12.5	7	30.0000	30.0000
3	12.5	8	25.0000	25.0000
3	12.5	9	27.0000	27.0000
3	12.5	10	24.0000	24.0000
4	25	1	24.0000	24.0000
4	25	2	27.0000	27.0000
4	25	3	36.0000	36.0000
4	25	4	39.0000	39.0000
4	25	5	20.0000	20.0000
4	25	6	18.0000	18.0000
4	25	7	25.0000	25.0000
4	25	8	24.0000	24.0000
4	25	9	27.0000	27.0000
4	25	10	18.0000	18.0000
5	50	1	43.0000	43.0000
5	50	2	31.0000	31.0000
5	50	3	35.0000	35.0000
5	50	4	37.0000	37.0000
5	50	5	32.0000	32.0000
5	50	6	40.0000	40.0000
5	50	7	30.0000	30.0000
5	50	8	0.0000	0.0000
5	50	9	36.0000	36.0000
5	50	10	25.0000	25.0000

6	100	1	30.0000	30.0000
6	100	2	37.0000	37.0000
6	100	3	37.0000	37.0000
6	100	4	45.0000	45.0000
6	100	5	25.0000	25.0000
6	100	6	37.0000	37.0000
6	100	7	20.0000	20.0000
6	100	8	25.0000	25.0000
6	100	9	25.0000	25.0000
6	100	10	18.0000	18.0000

CREC02 CERIO CHRONIC
File: CDEC02 Transform: NO TRANSFORMATION

STEELS MANY-ONE RANK TEST - Ho:Control<Treatment

GROUP	IDENTIFICATION	TRANSFORMED MEAN	RANK SUM	CRIT. VALUE	df	SIG
1	CONTROL	17.500				
2	6.25	17.400	109.50	75.00	10.00	
3	12.5	24.200	147.50	75.00	10.00	
4	25	25.800	142.50	75.00	10.00	
5	50	30.900	145.00	75.00	10.00	
6	100	29.900	148.00	75.00	10.00	

Critical values use k = 5, are 1 tailed, and alpha = 0.05

48-hr Pimephales promleas TOXICITY TEST

LOG NO. 437
JOB NO. FQ3506
INDUSTRY: Tinker
CONTACT:

EFFLUENT: CR-ECO2
START DATE: 6-13-95
START TIME: 1435
DILUTION WATER: ~~Hard-ASTM~~ MLS Spring

CONC (%)	REP ID	SURVIVAL (#) 0	24	48	DEAD	TEMPERATURE (oC) 0	24	48	DO (mg/L) 0	24	48	pH (S.U.) 0	24	48	CONDUCTIVITY (umhos/cm) 0	24	48
6.25	A	10	10	10	0	26.8		26.8	8.1		8.1	8.15		8.49	357		372
	B	10	10	10	0												
12.5	A	10	10	10	0				8.1		8.1	8.12		8.59	386		417
	B	10	10	10	0												
25	A	10	10	10	0				8.1		8.1	8.12		8.55	442		472
	B	10	10	8	2												
50	A	10	10	10	0				8.0		8.1	8.24		8.65	502		591
	B	10	10	10	0												
100	A	10	10	0	0				8.4		8.1	8.23		8.75	652		822
	B	10	10	9	1												
	A																
	B																
	A																
	B																
	A																
	B																
	A																
	B																
	A																
	B																
Initials		MLS	MLS	MLS													
Time		1435	1520	1450													

Comments

PARAMETER	Control	
Total Hardness (mg/L CaCO3)		
Total Alkalinity (mg/L CaCO3 @ 4.5)		

FATHEAD MINNOW SURVIVAL AND GROWTH Log No. 741
7-DAY CHRONIC TOXICITY TEST

JOB NO. F93506
INDUSTRY: TINKER
CONTACT:
EFFLUENT: CR-EC02
NPDES PERMIT NO:
SAMPLE TYPE:
DILUTION WATER:

PERSON CONDUCTING TEST:
BEGINNING: ___hrs; 4/15/95
ENDING: ___hrs; 4/22/95
TEST
DILUTIONS:
AGE: <24 hr
ORGANISM SOURCE:

PHOTOPERIOD: 16 hr light
FEEDING REGIME:
0.1 ml Artemia @ 3times/day
TEST VESSEL CAPACITY: 1 liter
TEST SOLUTION VOLUME: 500 mL
NO. ORGANISMS/TREATMENT: 10
NO. REPLICATES: 4

CONC (%)	REP ID	SURVIVAL (#) START	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7
6.25	A	10	6	6	5	5	5	5	5
	B	10	10	10	10	10	10	10	10
	C	10	7	7	7	7	7	7	7
	D	10	10	10	10	10	10	10	10
12.5	A	10	7	7	6	6	6	6	6
	B	10	10	10	TNT 9 10	10	10	10	10
	C	10	10	10	10	10	10	10	10
	D	10	10	10	10	10	10	10	10
25	A	10	10	10	9	9	9	9	9
	B	10	7	7	7	7	MMH 7 6	6	6
	C	10	10	10	10	10	10	10	10
	D	10	9	9	9	9	9	9	9
50	A	10	9	9	9	8	8	8	8
	B	10	10	10	10	10	10	10	10
	C	10	10	10	10	10	10	10	10
	D	10	5	5	5	5	5	5	5
	TIME:	1620	1720	1300	1500	1140	1555	1425	1430
	INITIAL:	MLS	TNT	MLS	TNT	MLS	MMH	SE	SE

GROWTH RESULTS

CONC (%)	REP ID	Boat ID	Tare wt (g)	Combined wt (g)	Tot Fish wt (g)	# of Fish	Avg Fish wt (mg)
6.25	A		.97477	0.97795	0.00318	5	0.636
	B		.97573	.98024	0.00451	10	0.451
	C		.98525	.98992	0.00467	7	0.667
	D		.98343	.98931	0.00583	10	0.583
12.5	A		.97865	.98199	0.00334	6	0.557
	B		.97733	0.98375	0.00642	10	0.642
	C		.98415	0.99085	0.00519	10	0.519
	D		.98566	.99223	0.00657	10	0.657
25	A		.98380	.99031	0.00643	9	0.714
	B		.97592	.98394	0.00502	6	0.837
	C		.97935	.98554	0.00619	10	0.619
	D		.98413	0.99015	0.00602	9	0.669
50	A		.98284	0.98835	0.00551	8	0.689
	B		.97956	.98554	0.00598	10	0.598
	C		.98244	.98872	0.00628	10	0.628
	D		.99215	.99546	0.00331	5	0.662

FATHEAD MINNOW SURVIVAL AND GROWTH Log No. 171
7-DAY CHRONIC TOXICITY TEST

JOB NO. F93506
INDUSTRY: TINKER
CONTACT:
EFFLUENT: CL-EC02
NPDES PERMIT NO:
SAMPLE TYPE:
DILUTION WATER:

PERSON CONDUCTING TEST:
BEGINNING: ____ hrs; 4/19/95
ENDING: ____ hrs; / / .
TEST
DILUTIONS:
AGE: 24
ORGANISM SOURCE:

PHOTOPERIOD: 16 hr light
FEEDING REGIME:
0.1 ml Artemia @ 3times/day
TEST VESSEL CAPACITY: 1 liter
TEST SOLUTION VOLUME: 500 mL
NO. ORGANISMS/TREATMENT: 10
NO. REPLICATES: 4

CONC (%)	REP ID	SURVIVAL (#) START	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7
100	A	10	4	6	6	6	6	6	6
	B	10	7	7	6	6	6	6	6
	C	10	10	9	9	9	8	8	8
	D	10	8	8	7	7	7	7	7
	TIME:	1620	1720	1300	1900	1140	1605	1425	1430
	INITIAL:	MLS	THT	MLS	THT	MLS	MHR	SJB	SJB

GROWTH RESULTS

CONC (%)	REP ID	Boat ID	Tare wt (g)	Combined wt (g)	Tot Fish wt (g)	# of Fish	Avg Fish wt (mg)
100	A	.98582	~~.78457~~	.99125	0.00543	6	0.905
	B		.98140	.98612	0.00472	6	0.787
	C		.97678	.98149	0.00471	8	0.589
	D		.98454	.98950	0.00496	7	0.709

Log 4/4'1
6/15/95

CHRONIC TOXICITY TEST DATA SHEET

TEMPERATURE

CONCENTRATION	Start	Day 1 OLD	Day 1 NEW	Day 2 OLD	Day 2 NEW	Day 3 OLD	Day 3 NEW	Day 4 OLD	Day 4 NEW	Day 5 OLD	Day 5 NEW	Day 6 OLD	Day 6 NEW	Day 7 OLD	Day 7 NEW	Day 8 OLD
6.25	24.8	25.0	25.0	24	24	24.2	25.0	25.0	24.8	25.0	25.0	25.2	25.2	24.8		
12.5																
25																
50																
100																

DISSOLVED OXYGEN

CONCENTRATION	Start	Day 1 OLD	Day 1 NEW	Day 2 OLD	Day 2 NEW	Day 3 OLD	Day 3 NEW	Day 4 OLD	Day 4 NEW	Day 5 OLD (new)	Day 5 NEW (old)	Day 6 OLD	Day 6 NEW	Day 7 OLD	Day 7 NEW	Day 8 OLD
6.25	8.1	7.0	8.1	6.7	7.9	7.2	8.5	7.3	8.3	8.1	7.2	7.5	8.2	—		
12.5	8.1	7.3	x 6	6.8	7.9	7.2	8.6	7.3	8.2	8.2	7.3	7.5	8.2	—		
25	8.1	7.3	8.0	6.7	7.9	7.2	8.6	7.4	8.1	8.2	7.3	7.5	8.2	7.2		
50	8.1	7.5	8.1	6.6	8.0	7.0	8.6	7.4	8.1	8.1	7.1	7.5	8.2	7.0		
100	8.2	7.4	8.4	6.7	8.0	7.0	8.6	7.4	8.1	8.2	7.2	7.5	8.3	7.1		

pH

CONCENTRATION	Start	Day 1 OLD	Day 1 NEW	Day 2 OLD	Day 2 NEW	Day 3 OLD	Day 3 NEW	Day 4 OLD	Day 4 NEW	Day 5 OLD (new)	Day 5 NEW (old)	Day 6 OLD	Day 6 NEW	Day 7 OLD	Day 7 NEW	Day 8 OLD
6.25	8.10	8.24	8.29	8.36	8.31	8.30	8.49	8.20	8.22	8.31	8.15	8.04	8.26	—		
12.5	8.04	8.24	8.32	8.36	8.33	8.23	8.51	8.18	8.24	8.34	8.18	8.07	8.27	—		
25	8.16	8.24	8.31	8.37	8.35	8.25	8.52	8.20	8.23	8.36	8.20	8.06	8.26	8.35		
50	8.28	8.32	8.40	8.44	8.40	8.32	8.56	8.28	8.21	8.35	8.28	8.06	8.29	8.35		
100	8.32	8.40	8.39	8.54	8.44	8.52	8.59	8.39	8.18	8.27	8.39	8.24	8.24	8.45		

CONDUCTIVITY

CONCENTRATION	Start	Day 1 OLD	Day 1 NEW	Day 2 OLD	Day 2 NEW	Day 3 OLD	Day 3 NEW	Day 4 OLD	Day 4 NEW	Day 5 OLD (new)	Day 5 NEW (old)	Day 6 OLD	Day 6 NEW	Day 7 OLD	Day 7 NEW	Day 8 OLD
6.25	355	358	360	403	373	398	379	381	330	355	385	421	361	—		
12.5	378	361	389	404	401	419	402	421	370	371	415	424	386	—		
25	432	443	445	433	464	478	461	485	431	442	465	477	443	479		
50	546	522	562	577	512	502	585	608	553	560	583	602	560	590		
100	732	801	757	821	833	827	823	847	791	773	820	810	802	846		

MAR 14.26 JT 1515

REC02 FATHEAD MINNOW CHRONIC
File: B:\TOXSTAT\FMEC02. Transform: NO TRANSFORMATION

Chi-square test for normality: actual and expected frequencies

INTERVAL	<-1.5	-1.5 to <-0.5	-0.5 to 0.5	>0.5 to 1.5	>1.5
EXPECTED	1.608	5.808	9.168	5.808	1.608
OBSERVED	0	7	8	9	0

Calculated Chi-Square goodness of fit test statistic = 5.3637
Table Chi-Square value (alpha = 0.01) = 13.277

Data PASS normality test. Continue analysis.

REC02 FATHEAD MINNOW CHRONIC
File: B:\TOXSTAT\FMEC02. Transform: NO TRANSFORMATION

Bartletts test for homogeneity of variance

Calculated B statistic = 16.50
Table Chi-square value = 15.09 (alpha = 0.01)
Table Chi-square value = 11.07 (alpha = 0.05)

Average df used in calculation ==> df (avg n - 1) = 3.00
Used for Chi-square table value ==> df (#groups-1) = 5

Data FAIL homogeneity test at 0.01 level. Try another transformation.

NOTE: If groups have unequal replicate sizes the average replicate size is used to calculate the B statistic (see above).

REC02 FATHEAD MINNOW CHRONIC
File: B:\TOXSTAT\FMEC02. Transform: 1/SQUARE ROOT(Y+0.5)

Chi-square test for normality: actual and expected frequencies

INTERVAL	<-1.5	-1.5 to <-0.5	-0.5 to 0.5	>0.5 to 1.5	>1.5
EXPECTED	1.608	5.808	9.168	5.808	1.608
OBSERVED	0	9	8	7	0

Calculated Chi-Square goodness of fit test statistic = 5.3637
Table Chi-Square value (alpha = 0.01) = 13.277

Data PASS normality test. Continue analysis.

REC02 FATHEAD MINNOW CHRONIC
File: B:\TOXSTAT\FMEC02. Transform: 1/SQUARE ROOT(Y+0.5)

Bartletts test for homogeneity of variance

Calculated B statistic = 23.97
Table Chi-square value = 15.09 (alpha = 0.01)
Table Chi-square value = 11.07 (alpha = 0.05)

Average df used in calculation ==> df (avg n - 1) = 3.00
Used for Chi-square table value ==> df (#groups-1) = 5

Data FAIL homogeneity test at 0.01 level. Try another transformation.

NOTE: If groups have unequal replicate sizes the average replicate size is used to calculate the B statistic (see above).

TITLE: REC02 FATHEAD MINNOW CHRONIC
ILE: B:\TOXSTAT\FMEC02.
RANSFORM: NO TRANSFORMATION NUMBER OF GROUPS: 6

GRP	IDENTIFICATION	REP	VALUE	TRANS VALUE
1	CONTROL	1	0.5040	0.5040
1	CONTROL	2	0.8250	0.8250
1	CONTROL	3	0.7240	0.7240
1	CONTROL	4	0.7030	0.7030
2	6.25	1	0.6360	0.6360
2	6.25	2	0.4510	0.4510
2	6.25	3	0.6670	0.6670
2	6.25	4	0.5830	0.5830
3	12.5	1	0.5570	0.5570
3	12.5	2	0.6420	0.6420
3	12.5	3	0.5190	0.5190
3	12.5	4	0.6570	0.6570
4	25	1	0.7140	0.7140
4	25	2	0.8370	0.8370
4	25	3	0.6190	0.6190
4	25	4	0.6690	0.6690
5	50	1	0.6890	0.6890
5	50	2	0.5980	0.5980
5	50	3	0.6280	0.6280
5	50	4	0.6620	0.6620
5	100	1	0.9050	0.9050
6	100	2	0.7870	0.7870
6	100	3	0.5890	0.5890
6	100	4	0.0709	0.0709

REC02 FATHEAD MINNOW CHRONIC
File: B:\TOXSTAT\FMEC02. Transform: NO TRANSFORMATION

STEELS MANY-ONE RANK TEST - Ho:Control<Treatment

GROUP	IDENTIFICATION	TRANSFORMED MEAN	RANK SUM	CRIT. VALUE	df	SIG
1	CONTROL	0.689				
2	6.25	0.584	13.00	10.00	4.00	
3	12.5	0.594	14.00	10.00	4.00	
4	25	0.710	18.00	10.00	4.00	
5	50	0.644	14.00	10.00	4.00	
6	100	0.588	18.00	10.00	4.00	

Critical values use k = 5, are 1 tailed, and alpha = 0.05

FATHEAD MINNOW SURVIVAL CR-EC02 - LOG #447
File: fms447 Transform: NO TRANSFORMATION

apiro Wilks test for normality

D = 0.613

W = 0.901

Critical W (P = 0.05) (n = 24) = 0.916
Critical W (P = 0.01) (n = 24) = 0.884

Data PASS normality test at P=0.01 level. Continue analysis.

FATHEAD MINNOW SURVIVAL CR-EC02 - LOG #447
File: fms447 Transform: NO TRANSFORMATION

Bartletts test for homogeneity of variance

Calculated B statistic = 4.05
Table Chi-square value = 15.09 (alpha = 0.01)
Table Chi-square value = 11.07 (alpha = 0.05)

Average df used in calculation ==> df (avg n - 1) = 3.00
ed for Chi-square table value ==> df (#groups-1) = 5

Data PASS homogeneity test at 0.01 level. Continue analysis.

NOTE: If groups have unequal replicate sizes the average replicate size is used to calculate the B statistic (see above).

TITLE: FATHEAD MINNOW SURVIVAL CR-EC02 - LOG #447
FILE: fms447
TRANSFORM: NO TRANSFORMATION NUMBER OF GROUPS: 6

GRP	IDENTIFICATION	REP	VALUE	TRANS VALUE
1	CONTROL	1	0.9000	0.9000
1	CONTROL	2	0.8000	0.8000
1	CONTROL	3	1.0000	1.0000
1	CONTROL	4	1.0000	1.0000
2	6.25%	1	0.5000	0.5000
2	6.25%	2	1.0000	1.0000
2	6.25%	3	0.7000	0.7000
2	6.25%	4	1.0000	1.0000
3	12.5%	1	0.6000	0.6000
3	12.5%	2	1.0000	1.0000
3	12.5%	3	1.0000	1.0000
3	12.5%	4	1.0000	1.0000
4	25%	1	0.9000	0.9000
4	25%	2	0.6000	0.6000
4	25%	3	1.0000	1.0000
4	25%	4	0.9000	0.9000
5	50%	1	0.8000	0.8000
5	50%	2	1.0000	1.0000
5	50%	3	1.0000	1.0000
5	50%	4	0.5000	0.5000
6	100%	1	0.6000	0.6000
6	100%	2	0.6000	0.6000
6	100%	3	0.8000	0.8000
6	100%	4	0.7000	0.7000

FATHEAD MINNOW SURVIVAL CR-EC02 - LOG #447
File: fms447 Transform: NO TRANSFORMATION

SUMMARY STATISTICS ON TRANSFORMED DATA TABLE 1 of 2

GRP	IDENTIFICATION	N	MIN	MAX	MEAN
1	CONTROL	4	0.800	1.000	0.925
2	6.25%	4	0.500	1.000	0.800
3	12.5%	4	0.600	1.000	0.900
4	25%	4	0.600	1.000	0.850
5	50%	4	0.500	1.000	0.825
6	100%	4	0.600	0.800	0.675

FATHEAD MINNOW SURVIVAL CR-EC02 - LOG #447
File: fms447 Transform: NO TRANSFORMATION

SUMMARY STATISTICS ON TRANSFORMED DATA TABLE 2 of 2

GRP	IDENTIFICATION	VARIANCE	SD	SEM
1	CONTROL	0.009	0.096	0.048
2	6.25%	0.060	0.245	0.122
3	12.5%	0.040	0.200	0.100
4	25%	0.030	0.173	0.087
5	50%	0.056	0.236	0.118
6	100%	0.009	0.096	0.048

FATHEAD MINNOW SURVIVAL CR-EC02 - LOG #447
File: fms447 Transform: NO TRANSFORMATION

ANOVA TABLE

SOURCE	DF	SS	MS	F
Between	5	0.157	0.031	0.912
Within (Error)	18	0.612	0.034	
Total	23	0.770		

Critical F value = 2.77 (0.05,5,18)
Since F < Critical F FAIL TO REJECT Ho:All groups equal

FATHEAD MINNOW SURVIVAL CR-EC02 - LOG #447
File: fms447 Transform: NO TRANSFORMATION

DUNNETTS TEST - TABLE 1 OF 2 Ho:Control<Treatment

GROUP	IDENTIFICATION	TRANSFORMED MEAN	MEAN CALCULATED IN ORIGINAL UNITS	T STAT	SIG
1	CONTROL	0.925	0.925		
2	6.25%	0.800	0.800	0.959	
3	12.5%	0.900	0.900	0.192	
4	25%	0.850	0.850	0.575	
5	50%	0.825	0.825	0.767	
6	100%	0.675	0.675	1.917	

Dunnett table value = 2.41 (1 Tailed Value, P=0.05, df=18,5)

FATHEAD MINNOW SURVIVAL CR-EC02 - LOG #447
File: fms447 Transform: NO TRANSFORMATION

DUNNETTS TEST - TABLE 2 OF 2 Ho:Control<Treatment

GROUP	IDENTIFICATION	NUM OF REPS	Minimum Sig Diff (IN ORIG. UNITS)	% of CONTROL	DIFFERENCE FROM CONTROL

1	CONTROL	4			
2	6.25%	4	0.314	34.0	0.125
3	12.5%	4	0.314	34.0	0.025
4	25%	4	0.314	34.0	0.075
5	50%	4	0.314	34.0	0.100
6	100%	4	0.314	34.0	0.250

№ 15_J

CHAIN OF CUSTODY RECORD

JOB #	PROJECT NAME	ANALYSES REQUIRED	
F93506 Task 3	TAFB Soldier Creek		WOODWARD-CLYDE CONSULTANTS P.O. BOX 680925 FRANKLIN, TN 37068-0925 (615) 790-0003 FAX (615) 790-0023
SAMPLERS: (Signature)			

SAMPLE IDENTIFICATION	DATE	TIME	SAMPLE TYPE	NUMBER OF CONTAINERS	Toxicity						REMARKS
CR-EC2-TX-201	6/12/95	14:00	water	3	✓						Fed Exp 580482345 2

RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)	RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)
	6/12/95 18:00				
RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)	RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)
RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED AT LAB BY: (Signature)	DATE/TIME	GENERAL COMMENTS	
			6/13/95 0854	2.5°C upon arrival	

Distribution: Original and Yellow copies accompany sample shipment to laboratory
Pink copy retained by samplers. Yellow copy retained by laboratory. Laboratory returns White copy to samplers.

№ 1521

CHAIN OF CUSTODY RECORD

JOB #	PROJECT NAME
F93506 Task 3	TAF B Soldier Creek

SAMPLERS: (Signature)

WOODWARD-CLYDE CONSULTANTS
P.O. BOX 680925
FRANKLIN, TN 37068-0925
(615) 790-0003 FAX (615) 790-0023

SAMPLE IDENTIFICATION	DATE	TIME	SAMPLE TYPE	NUMBER OF CONTAINERS	ANALYSES REQUIRED: Toxicity	REMARKS
CR-ECO2-TX-201	6/12/95	14:00	Water	2	✓	Fed Exp 580482345 2
CR-ECO2-TX-241	"	14:30	Seed	2	✓	

RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)	RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)
	6/12/95 18:00				
RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)	RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)
RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED AT LAB BY: (Signature)	DATE/TIME	GENERAL COMMENTS	
		Lyle Jones	6/13/95 0854	2°C upon arrival	

Distribution: Original and Yellow copies accompany sample shipment to laboratory
Pink copy retained by samplers. Yellow copy retained by laboratory. Laboratory returns White copy to samplers.

48-hr Ceriodaphnia dubia TOXICITY TEST

433-
LOG NO. 437
JOB NO. 199506
INDUSTRY: Timber
CONTACT:

EFFLUENT: ~~CR MILL EFF~~ Controls
START DATE: 6-13-95
START TIME: 1510 MLS
DILUTION WATER: ~~MLS Hard~~ Controls

CONC (%)	REP ID	SURVIVAL (#) 0	24	48	PtAb	TEMPERATURE (oC) 0	24	48	DO (mg/L) 0	24	48	pH (S.U.) 0	24	48	CONDUCTIVITY (umhos/cm) 0	24	48
170	A	5	5	5		24.2		25.0	8.5		8.2	7.64		8.38	500		499
CON	B	5	5	5													
w/ EFF1	C	5	5	5													
	D	5	5	5													
250	A	5	5	5					8.5		8.2	8.54		8.54	689		731
CON	B	5	5	5													
w/ EFF2	C	5	5	5													
	D	5	5	5													
270	A	5	5	5					8.5		8.3	8.62		8.57	764		790
CON	B	5	5	5													
w/ EFF3	C	5	5	5													
X CR CON	D	5	5	5													
500	A	5	5	5					8.5		8.2	8.54		8.49	582		578
CON	B	5	5	5													
~~w/ CR EFF~~ X	C	5	5	5													
w/ EFF4	D	5	5	5													
	A																
	B																
	C																
	D																
Initials		DB	LSI	LJT													
Time		1510	1510	0950													

Comments

PARAMETER	Control	
Total Hardness (mg/L CaCO3)		
Total Alkalinity (mg/L CaCO3 @ 4.5)		

48-hr Ceriodaphnia dubia TOXICITY TEST

LOG NO. 433
JOB NO. F935006
INDUSTRY: Timber
CONTACT:

EFFLUENT: EE01
START DATE: 12-13-95
START TIME: 1430
DILUTION WATER: 140 - Hard

CONC (%)	REP ID	SURVIVAL (#) 0	24	48	beAo	TEMPERATURE (oC) 0	24	48	DO (mg/L) 0	24	48	pH (S.U.) 0	24	48	CONDUCTIVITY (umhos/cm) 0	24	48
6.25	A	5	5	5		21.8		25.0	8.5		8.3	8.41		8.30	4116		4.37
	B	5	5	5													
	C	5	5	5													
	D	5	5	5													
12.5	A	5	5	5					8.5		8.5	2.42		8.31	4301		4.39
	B	5	5	5													
	C	5	5	5													
	D	5	5	5													
25	A	5	5	5					8.5		8.2	8.44		8.36	4552		4.37
	B	5	5	5													
	C	5	5	5													
	D	5	5	5													
50	A	5	5	5					8.5		8.2	8.47		8.50	4418		4.29
	B	5	5	5													
	C	5	5	5													
	D	5	5	5													
100	A	5	5	5					8.6		8.2	8.51		8.62	4439		4.09
	B	5	5	5													
	C	5	5	5													
	D	5	5	5													
Initials		SJB	LJS	LJS													
Time		1430	1400	1430													

Comments

PARAMETER	Control	
Total Hardness (mg/L CaCO3)		
Total Alkalinity (mg/L CaCO3 @ 4.5)		

48-hr Pimephales promleas TOXICITY TEST

LOG NO. 433
JOB NO. F93506
INDUSTRY: Timber
CONTACT: ~~EC&T~~ MCS WCC - 6 day old

EFFLUENT: EE01
START DATE: 6-13-95
START TIME: 1445
DILUTION WATER: Spring

CONC (%)	REP ID	SURVIVAL (#) 0	24	48	DEAD	TEMPERATURE (oC) 0	24	48	DO (mg/L) 0	24	48	pH (S.U.) 0	24	48	CONDUCTIVITY (umhos/cm) 0	24	48
100	A	10	10	10	0	~~29.8~~		21.0	8.5		8.0	7.65		8.49	343		359
	B	10	10	9	1	20.8											
6.25	A	10	9	9	1				8.5		8.1	7.84		8.40	331		354
	B	10	10	10	0												
12.5	A	10	10	10	0				8.5		8.2	7.93		8.42	335		364
	B	10	9	9	1												
25	A	10	10	9	1				8.5		8.1	7.97		8.46	344		377
	B	10	10	9	MLS 1												
50	A	10	10	9	1				8.6		7.9	8.06		8.51	360		391
	B	10	10	10	0												
100	A	10	10	10	0				8.7		7.9	8.22		8.58	390		426
	B	10	10	10	0												
	A																
	B																
	A																
	B																
	A																
	B																
	A																
	B																
Initials		MLS	MLS	MLS													
Time		1445	1500	0930													

Comments

PARAMETER	Control	
Total Hardness (mg/L CaCO3)		
Total Alkalinity (mg/L CaCO3 @ 4.5)		

Ceriodaphnia SURVIVAL AND REPRODUCTION CHRONIC TOXICITY TEST

JOB NO. F93506 | BEGINNING: 1515 hrs; 6/18/95 | Log No. 452
INDUSTRY: Tinker | ENDING: 1445 hrs; 6/26/95 | PHOTOPERIOD: 16 light, 8 dark
CONTACT: EE&T | FEEDING REGIME: | ORGANISM SOURCE: WCC
EFFLUENT: 2EO1 | .05 mL yct/15 mL | TEST VESSEL CAPACITY: 30 mL
NPDES PERMIT NO: | .05 mL algal suspension/15 mL | TEST SOLUTION VOLUME: 15mL
PERSON CONDUCTING TEST: | NO. REPLICATES:
TIME | DILUTION WATER:
OBSERVER

NUMBER OF YOUNG PRODUCED

CONC	CHAMBER	START	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7	
					25	31	77	92	152	
Control	1						2	0	6	8
	2					2	0	4	3	9
	3				5	0	6	0	8	19
	4				4	0	8	0	8	20
	5				2	0	4	3	7	16
	6				2	0	5	0	5	15
	7				2	4	0	6	3	15
	8				3	0	6	0	8	17
	9				4	0	8	0	5	17
	10				3	0	4	2	7	16
		START	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7	
					23	23	64	85	116	
6.25%	11				3	0	4	2	0	9
	12				2	0	4	0	6	12
	13				3	0	6	0	0	9
	14						3	4	6	13
	15				2	0	8	0	4	14
	16				4	0	2	0	3	9
	17				2	0	0	8	2	12
	18						5	7	2	14
	19				3	0	6	0	2	11
	20				4	0	3	0	6	13
		START	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7	
					14	20	48	72	115	
12.5%	21				2	0	0	6	1	9
	22					3	0	0	6	9
	23				4	0	3	0	2	9
	24					3	0	6	0	9
	25						5	0	8	13
	26				1	0	0	3	7	11
	27				4	0	3	2	0	9
	28						8	0	9	17
	29				3	0	4	0	7	14
	30						5	7	3	15

Ceriodaphnia SURVIVAL AND REPRODUCTION CHRONIC TOXICITY TEST

JOB NO: 93306 | BEGINNING: _____ hrs; 6/18/95 | Log No. 452
INDUSTRY: Tinker | ENDING: _____ hrs; 6/26/95 | PHOTOPERIOD: 16 light, 8 dark
CONTACT: | FEEDING REGIME: | ORGANISM SOURCE: WCC
EFFLUENT: EEO1 | .05 mL yct/15 mL | TEST VESSEL CAPACITY: 30 mL
NPDES PERMIT NO: | .05 mL algal suspension/15 mL | TEST SOLUTION VOLUME: 15mL
PERSON CONDUCTING TEST: | | NO. REPLICATES:
| | DILUTION WATER:

CONC	TIME / OBSERVER / CHAMBER	NUMBER OF YOUNG PRODUCED							
		START	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7
					7	17	55	76	101
25%	31				3	0	4	6	0
	32				2	0	4	0	3
	33					3	4	2	0
	34					3	0	6	0
	35				2	0	3	6	2
	36						4	0	3
	37						5	1	3
	38						3	0	6
	39						8	0	6
	40					4	3	0	2
		START	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7
					13	16	37	68	104
50%	41						4	0	5
	42							3	8
	43			(D)					
	44				3	0	2	3	2
	45				4	0	5	0	7
	46				2	0	4	6	1
	47				2	0	0	5	6
	48				1	0	6	0	3
	49					3	0	6	2
	50				1	0	0	3	2
					10% mortality				
		START	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7
					16	24	45	93	129
100%	51						7	0	3
	52				4	0	2	9	0
	53						3	2	8
	54				3	0	0	5	7
	55				2	0	6	0	4
	56				3	0	0	4	0
	57						1	11	2
	58					2	1	0	6
	59							9	1
	60				4	6	1	8	5

Ceriodaphnia dubia GRID Ceriodaphnia dubia GRID MONITORING DATA

Grid Letter: [illegible] Start Date: 6-18-95 Sample ID: EE01 Log #: 45

AD	ID 1	1 ✓	AD	ID 36	1 ✓	AD	ID 23	1 ✓	AD	ID 18	1 ✓		ID 4	1 ✓
2 ✓	3 ✓	4 0	2 ✓	3 ✓	4 0	2 ✓	3 4	4 0	2 ✓	3 ✓	4 0	2 ✓	3 4	4 0
5 2	6 0	7 6	5 4	6 0	7 3	5 3	6 0	7 2	5 5	6 7	7 2	5 8	6 0	7 8
AD	ID 38	1 ✓	AD	ID 22	1 ✓	AD	ID 2	1 ✓	AD	ID 17	1 ✓		ID 43	1 ✓
2 ✓	3 ✓	4 0	2 ✓	3 ✓	4 3	2 ✓	3 ✓	4 2	2 ✓	3 2	4 0	2 D/O	3	4
5 3	6 0	7 6	5 0	6 0	7 6	5 0	6 4	7 3	5 0	6 8	7 2	5	6	7
AD	ID 44	1 ✓	AD	ID 56	1 ✓	AD	ID 16	1 ✓	AD	ID 42	1 ✓		ID 21	1 ✓
2 ✓	3 3	4 0	2 ✓	3 3	4 0	2 ✓	3 4	4 0	2 ✓	3 ✓	4 0	2 ✓	3 2	4 0
5 2	6 3	7 2	5 0	6 4	7 0	5 2	6 0	7 3	5 0	6 8	7 8	5 0	6 6	7 1
AD	ID 24	1 ✓	AD	ID 3	1 ✓	AD	ID 37	1 ✓	AD	ID 57	1 ✓		ID 39	1 ✓
2 ✓	3 ✓	4 3	2 ✓	3 5	4 0	2 ✓	3 ✓	4 0	2 ✓	3 ✓	4 0	2 ✓	3 ✓	4 0
5 0	6 6	7 0	5 6	6 0	7 8	5 5	6 1	7 3	5 1	6 11	7 2	5 8	6 0	7 6
AD	ID 19	1 ✓	AD	ID 58	1 ✓	AD	ID 41	1 ✓	AD	ID 20	1 ✓		ID 59	1 ✓
2 ✓	3 3	4 0	2 ✓	3 ✓	4 2	2 ✓	3 ✓	4 0	2 ✓	3 4	4 0	2 ✓	3 ✓	4 1
5 6	6 0	7 2	5 1	6 0	7 6	5 4	6 0	7 5	5 3	6 0	7 6	5 0	6 9	7 1
AD	ID 60	1 ✓	AD	ID 40	1 ✓	AD	ID 45	1 ✓	AD	ID 25	1 ✓		ID 5	1 ✓
2 ✓	3 4	4 6	2 ✓	3 ✓	4 4	2 ✓	3 4	4 0	2 ✓	3 ✓	4 0	2 ✓	3 2	4 0
5 1	6 8	7 5	5 3	6 0	7 2	5 5	6 0	7 7	5 5	6 ✓	7 8	5 4	6 3	7 7

Comments:

Cup ID	Sample Concentration	Day	Initials	Time
1–10:		1		
11–20:		2		
21–30:		3		
31–40:		4		
41–50:		5		
51–60:		6		
		7		

Ceriodaphnia dubia GRID Ceriodaphnia dubia GRID MONITORING DATA

Grid Letter: ~~[illegible]~~ Start Date: 6-18-95 Sample ID: EE01 Log #: 45

AD	ID 32	1 ✓	AD	ID 33	1 ✓	AD	ID 10	1 ✓	AD	ID 46	1 ✓		ID 28	1 ✓
2 ✓	3 2	4 0	2 ✓	3 ✓	4 3	2 ✓	3 3	4 0	2 ✓	3 2	4 0	2 ✓	3 0	4 0
5 4	6 0	7 3	5 4	6 2	7 0	5 4	6 2	7 7	5 4	6 6	7 1	5 8	6 0	7 9
AD	ID 47	1 ✓	AD	ID 11	1 ✓	AD	ID 50	1 ✓	AD	ID 27	1 ✓		ID 8	1 ✓
2 ✓	3 2	4 0	2 ✓	3 3	4 0	2 ✓	3 1	4 0	2 ✓	3 4	4 0	2 ✓	3 3	4 0
5 0	6 5	7 6	5 4	6 2	7 0	5 0	6 3	7 2	5 3	6 2	7 0	5 6	6 0	7 8
AD	ID 12	1 ✓	AD	ID 51	1 ✓	AD	ID 34	1 ✓	AD	ID 7	1 ✓		ID 49	1 ✓
2 ✓	3 2	4 0	2 ✓	3 ✓	4 0	2 ✓	3 3	4 0	2 ✓	3 2	4 4	2 ✓	3 0	4 5
5 4	6 0	7 6	5 7	6 0	7 3	5 0	6 6	7 0	5 0	6 6	7 3	5 0	6 6	7 2
AD	ID 6	1 ✓	AD	ID 35	1 ✓	AD	ID 54	1 ✓	AD	ID 15	1 ✓		ID 48	1 ✓
2 ✓	3 2	4 0	2 ✓	3 2	4 0	2 ✓	3 3	4 0	2 ✓	3 2	4 0	2 ✓	3 1	4 0
5 8	6 0	7 5	5 3	6 6	7 2	5 0	6 5	7 7	5 8	6 0	7 4	5 6	6 0	7 3
AD	ID 14	1 ✓	AD	ID 26	1 ✓	AD	ID 53	1 ✓	AD	ID 55	1 ✓		ID 13	1 ✓
2 ✓	3 0	4 ✓	2 ✓	3 1	4 0	2 ✓	3 ✓	4 0	2 ✓	3 2	4 0	2 ✓	3 3	4 0
5 3	6 4	7 6	5 0	6 3	7 7	5 3	6 2	7 8	5 6	6 0	7 4	5 6	6 0	7 0
AD	ID 29	1 ✓	AD	ID 52	1 ✓	AD	ID 9	1 ✓	AD	ID 30	1 ✓		ID 31	1 ✓
2 ✓	3 3	4 0	2 ✓	3 4	4 0	2 ✓	3 4	4 0	2 ✓	3 ✓	4 0	2 ✓	3 3	4 0
5 4	6 0	7 7	5 2	6 9	7 0	5 8	6 0	7 5	5 5	6 7	7 3	5 4	6 6	7 0

Comments:

Cup ID	Sample Concentration	Day 6-18	Initials MAR	Time 1515
1–10:		1	SJB	1135
11–20:		2	LJT	1312
21–30:		3	LJT	1420
31–40:		4	LJT	1416
41–50:		5	MAR	1618
51–60:		6	MAR	2010
		7	MAR	1445

C. dubia
~~EW-01~~ EEC.
6-18-95
~~AA~~ Hard 150

CHRONIC TOXICITY TEST DATA SHEET

TEMPERATURE

CONCENTRATION	Start	Day 1 OLD	Day 1 NEW	Day 2 OLD	Day 2 NEW	Day 3 OLD	Day 3 NEW	Day 4 OLD	Day 4 NEW	Day 5 OLD	Day 5 NEW	Day 6 OLD	Day 6 NEW	Day 7 OLD	Day 7 NEW	Day 8 OLD
Con	24.2	24.2	24.8	21.0	21.8	25.2	25.2	24.8	24.8	24.5		24.2	24.2	24.6		
6.25																
12.5																
25																
50																
100																

DISSOLVED OXYGEN

CONCENTRATION	Start	Day 1 OLD	Day 1 NEW	Day 2 OLD	Day 2 NEW	Day 3 OLD	Day 3 NEW	Day 4 OLD	Day 4 NEW	Day 5 OLD	Day 5 NEW	Day 6 OLD	Day 6 NEW	Day 7 OLD	Day 7 NEW	Day 8 OLD
Con	8.0	7.0	8.0	7.9	8.1	7.8	8.3	8.8	8.3	7.9	8.1	4.54	7.7	7.5		
6.25	8.1	8.0	8.1	7.8	8.1	7.8	8.2	8.3	8.3	7.9	8.1	4.45	7.7	7.5		
12.5	8.2	8.2	8.1	7.8	8.0	7.8	8.2	8.3	8.2	7.9	8.2	4.39	7.8	7.3		
25	8.2	8.2	8.1	7.8	8.1	7.9	8.2	8.4	8.2	7.8	8.1	4.41	7.7	7.4		
50	8.2	8.1	8.2	7.8	8.2	7.8	8.2	8.5	8.2	7.8	8.2	4.40	7.6	7.4		
100	8.2	8.2	8.2	7.7	8.2	7.9	8.2	8.8	8.3	7.8	8.2		8.0	7.5		

pH

CONCENTRATION	Start	Day 1 OLD	Day 1 NEW	Day 2 OLD	Day 2 NEW	Day 3 OLD	Day 3 NEW	Day 4 OLD	Day 4 NEW	Day 5 OLD	Day 5 NEW	Day 6 OLD	Day 6 NEW	Day 7 OLD	Day 7 NEW	Day 8 OLD
Con	8.54	8.33	8.30	8.36	8.37	7.99	8.37	8.18	8.33	8.20	8.47	8.00	8.37	8.01		
6.25	8.50	8.24	8.31	8.30	8.31	7.91	8.34	8.13	8.34	8.19	8.47	7.13	8.37	8.06		
12.5	8.50	8.24	8.33	8.32	8.33	7.93	8.35	8.17	8.34	8.19	8.44	7.15	8.41	8.07		
25	8.52	8.27	8.36	8.31	8.35	8.01	8.35	8.23	8.35	8.21	8.37	7.16	8.42	8.07		
50	8.55	8.31	8.40	8.32	8.41	8.10	8.38	8.33	8.36	8.29	8.34	7.33	8.45	8.14		
100	8.58	8.40	8.45	8.36	8.47	8.24	8.39	8.48	8.37	8.45	8.32	7.53	8.44	8.14		

CONDUCTIVITY

CONCENTRATION	Start	Day 1 OLD	Day 1 NEW	Day 2 OLD	Day 2 NEW	Day 3 OLD	Day 3 NEW	Day 4 OLD	Day 4 NEW	Day 5 OLD	Day 5 NEW	Day 6 OLD	Day 6 NEW	Day 7 OLD	Day 7 NEW	Day 8 OLD
Con	451	477	432	439	439	452	450	469	451	467	402	454	424	460		
6.25	433	445	431	423	423	430	430	451	423	454	419	443	419	447		
12.5	430	442	421	431	395	435	419	456	419	463	432	439	418	448		
25	421	428	415	426	419	441	438	446	411	444	431	414	401	458		
50	409	415	406	414	414	447	438	432	401	430	442	416	395	453		
100	390	394	391	411	411	461	415	467	382	410	445	408	370	433		

MHP 1420 CDT 0CE 1714 MLS 1450 CDT CDT 1250 CDT 1145 MAE 1810 MAE 1816 CDT 1145 CDT 1530

EE01 CERIO CHRONIC
File: CDEE01 Transform: NO TRANSFORMATION

Chi-square test for normality: actual and expected frequencies

INTERVAL	<-1.5	-1.5 to <-0.5	-0.5 to 0.5	>0.5 to 1.5	>1.5
EXPECTED	4.020	14.520	22.920	14.520	4.020
OBSERVED	3	14	26	14	3

Calculated Chi-Square goodness of fit test statistic = 0.9687
Table Chi-Square value (alpha = 0.01) = 13.277

Data PASS normality test. Continue analysis.

EE01 CERIO CHRONIC
File: CDEE01 Transform: NO TRANSFORMATION

Bartletts test for homogeneity of variance

Calculated B statistic = 10.47
Table Chi-square value = 15.09 (alpha = 0.01)
Table Chi-square value = 11.07 (alpha = 0.05)

Average df used in calculation ==> df (avg n - 1) = 9.00
Used for Chi-square table value ==> df (#groups-1) = 5

Data PASS homogeneity test at 0.01 level. Continue analysis.

NOTE: If groups have unequal replicate sizes the average replicate size is used to calculate the B statistic (see above).

TITLE: EE01 CERIO CHRONIC
FILE: CDEE01
TRANSFORM: NO TRANSFORMATION NUMBER OF GROUPS: 6

GRP	IDENTIFICATION	REP	VALUE	TRANS VALUE
1	CONTROL	1	8.0000	8.0000
1	CONTROL	2	9.0000	9.0000
1	CONTROL	3	19.0000	19.0000
1	CONTROL	4	20.0000	20.0000
1	CONTROL	5	16.0000	16.0000
1	CONTROL	6	15.0000	15.0000
1	CONTROL	7	15.0000	15.0000
1	CONTROL	8	17.0000	17.0000
1	CONTROL	9	17.0000	17.0000
1	CONTROL	10	16.0000	16.0000
2	6.25	1	9.0000	9.0000
2	6.25	2	12.0000	12.0000
2	6.25	3	9.0000	9.0000
2	6.25	4	13.0000	13.0000
2	6.25	5	14.0000	14.0000
2	6.25	6	9.0000	9.0000
2	6.25	7	12.0000	12.0000
2	6.25	8	14.0000	14.0000
2	6.25	9	11.0000	11.0000
2	6.25	10	13.0000	13.0000
	12.5	1	9.0000	9.0000
3	12.5	2	9.0000	9.0000
3	12.5	3	9.0000	9.0000
3	12.5	4	9.0000	9.0000
3	12.5	5	13.0000	13.0000
3	12.5	6	11.0000	11.0000
3	12.5	7	9.0000	9.0000
3	12.5	8	17.0000	17.0000
3	12.5	9	14.0000	14.0000
3	12.5	10	15.0000	15.0000
4	25	1	13.0000	13.0000
4	25	2	9.0000	9.0000
4	25	3	9.0000	9.0000
4	25	4	9.0000	9.0000
4	25	5	13.0000	13.0000
4	25	6	7.0000	7.0000
4	25	7	9.0000	9.0000
4	25	8	9.0000	9.0000
4	25	9	14.0000	14.0000
4	25	10	9.0000	9.0000
5	50	1	9.0000	9.0000
5	50	2	16.0000	16.0000
5	50	3	0.0000	0.0000
5	50	4	10.0000	10.0000
5	50	5	16.0000	16.0000
5	50	6	13.0000	13.0000
5	50	7	13.0000	13.0000
5	50	8	9.0000	9.0000
5	50	9	11.0000	11.0000
5	50	10	6.0000	6.0000

6	100	1	10.0000	10.0000
6	100	2	15.0000	15.0000
6	100	3	13.0000	13.0000
6	100	4	15.0000	15.0000
	100	5	12.0000	12.0000
6	100	6	7.0000	7.0000
6	100	7	14.0000	14.0000
6	100	8	9.0000	9.0000
6	100	9	10.0000	10.0000
6	100	10	24.0000	24.0000

EE01 CERIO CHRONIC
File: CDEE01 Transform: NO TRANSFORMATION

ANOVA TABLE

SOURCE	DF	SS	MS	F
Between	5	179.333	35.867	2.719
Within (Error)	54	712.400	13.193	
Total	59	891.733		

Critical F value = 2.45 (0.05,5,40)
Since F > Critical F REJECT Ho:All groups equal

EE01 CERIO CHRONIC
File: CDEE01 Transform: NO TRANSFORMATION

DUNNETTS TEST - TABLE 1 OF 2 Ho:Control<Treatment

GROUP	IDENTIFICATION	TRANSFORMED MEAN	MEAN CALCULATED IN ORIGINAL UNITS	T STAT	SIG
1	CONTROL	15.200	15.200		
2	6.25	11.600	11.600	2.216	
3	12.5	11.500	11.500	2.278	
4	25	10.100	10.100	3.140	*
5	50	10.300	10.300	3.017	*
6	100	12.900	12.900	1.416	

Dunnett table value = 2.31 (1 Tailed Value, P=0.05, df=40,5)

EE01 CERIO CHRONIC
File: CDEE01 Transform: NO TRANSFORMATION

DUNNETTS TEST - TABLE 2 OF 2 Ho:Control<Treatment

GROUP	IDENTIFICATION	NUM OF REPS	Minimum Sig Diff (IN ORIG. UNITS)	% of CONTROL	DIFFERENCE FROM CONTROL

1	CONTROL	10			
2	6.25	10	3.752	24.7	3.600
3	12.5	10	3.752	24.7	3.700
4	25	10	3.752	24.7	5.100
5	50	10	3.752	24.7	4.900
6	100	10	3.752	24.7	2.300

FATHEAD MINNOW SURVIVAL AND GROWTH
7-DAY CHRONIC TOXICITY TEST

Log No. 143

JOB NO. F93506
INDUSTRY: TINKER
CONTACT:
EFFLUENT: EDO1
NPDES PERMIT NO:
SAMPLE TYPE:
DILUTION WATER:

PERSON CONDUCTING TEST:
BEGINNING: ___ hrs; 6/15/95
ENDING: ___ hrs; 6/22/95
TEST
DILUTIONS: 5
AGE: 2-24 hr
ORGANISM SOURCE:

PHOTOPERIOD: 16 hr light
FEEDING REGIME:
0.1 ml Artemia @ 3times/day
TEST VESSEL CAPACITY: 1 liter
TEST SOLUTION VOLUME: 500 mL
NO. ORGANISMS/TREATMENT: 10
NO. REPLICATES: 4

CONC (%)	REP ID	SURVIVAL (#) START	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7
CON	A	10	9	9	9	9	9	9	9
	B	10	8	8	8	8	8	8	8
	C	10	10	10	10	10	10	10	10
	D	10	10	10	10	10	10	10	10
6.25	A	10	10	10	9	9	9	9	9
	B	10	10	10	10	10	10	10	10
	C	10	10	10	10	10	10	10	10
	D	10	9	9	9	8	8	8	8
12.5	A	10	9	9	9	9	9	9	9
	B	10	10	10	10	10	10	10	10
	C	10	10	10	10	10	10	10	10
	D	10	9	9	9	9	9	9	9
25	A	10	10	10	10	10	10	10	9
	B	10	10	10	10	10	10	10	10
	C	10	10	10	10	10	10	10	10
	D	10	9	9	9	9	9	9	9
TIME:		1600	1630	1045	1415	1115	1645	1355	1500
INITIAL:		MLS	TNT	MLS	TNT	MLS	MAR	DCE	SJB

GROWTH RESULTS

CONC (%)	REP ID	Boat ID	Tare wt (g)	Combined wt (g)	Tot Fish wt (g)	# of Fish	Avg Fish wt (mg)
Con	A		.99218	.99672	0.00454	9	0.504
	B		.98635	.99295	0.00660	8	0.825
	C		.98386	.99110	0.00724	10	0.724
	D		.99059	.99762	0.00703	10	0.703
6.25	A		.98598	.99276	0.00678	9	0.753
	B		.98763	0.99455	0.00692	10	0.692
	C	.98678	~~.98680~~	.99355	0.00677	10	0.677
	D		.99107	.99780	0.00673	8	0.841
12.5	A		.99573	1.00055	0.00512	9	0.569
	B		.99490	1.00144	0.00654	10	0.654
	C		.99291	.99948	0.00657	10	0.657
	D		.99309	.99899	0.0059	9	0.656
25	A		.99467	1.00084	0.00617	9	0.686
	B		99424	1.00115	0.00691	10	0.691
	C		.98715	.99363	0.00648	10	0.648
	D		.99612	1.00244	0.00632	9	0.702

FATHEAD MINNOW SURVIVAL AND GROWTH
7-DAY CHRONIC TOXICITY TEST

Log No. 443

JOB NO. 493506
INDUSTRY: TINKER
CONTACT:
EFFLUENT: CEDI
NPDES PERMIT NO:
SAMPLE TYPE:
DILUTION WATER:

PERSON CONDUCTING TEST:
BEGINNING: ____ hrs; 4/15/95
ENDING: ____ hrs; / / .
TEST
DILUTIONS:
AGE: 4-24 hr
ORGANISM SOURCE:

PHOTOPERIOD: 16 hr light
FEEDING REGIME:
0.1 ml Artemia @ 3times/day
TEST VESSEL CAPACITY: 1 liter
TEST SOLUTION VOLUME: 500 mL
NO. ORGANISMS/TREATMENT: 10
NO. REPLICATES: 4

CONC (%)	REP ID	SURVIVAL (#) START	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7
50	A	10	10	10	10	10	10	10	10
	B	10	10	10	10	10	10	10	10
	C	10	10	10	10	10	10	10	10
	D	10	10	~~10~~ 9	9	9	9	9	9
100	A	10	10	10	10	10	10	10	10
	B	10	10	10	10	10	10	10	10
	C	10	10	10	10	10	10	10	10
	D	10	10	10	10	10	10	10	10
	TIME:	1600	1630	1100	1115	1115	1650	1355	1530
	INITIAL:	MLS	~~THT~~	MLS	THT	MLS	MLS	DLE	DLE

GROWTH RESULTS

CONC (%)	REP ID	Boat ID	Tare wt (g)	Combined wt (g)	Tot Fish wt (g)	# of Fish	Avg Fish wt (mg)
50	A	~~.99528~~	.99528	1.00083	0.00555	10	0.555
	B	~~1.00284~~	1.00284	1.00947	0.00663	10	0.663
	C	~~.99130~~	.99130	.99754	0.00624	10	0.624
	D	~~.99009~~	.99009	.99637	0.00628	9	0.698
100	A	~~.99643~~	.99643	1.00187	0.00544	10	0.544
	B	~~.99662~~	.99662	1.00178	0.00516	10	0.516
	C	~~.99185~~	.99185	0.99695	0.0051	10	0.510
	D	~~.99440~~	.99440	.99970	0.0053	10	0.530

e. ~~EDTA~~ ~~EDA~~ EEC fish

LOG #: 443

SAM: 6/15/95

Hd 140

CHRONIC TOXICITY TEST DATA SHEET

TEMPERATURE

Thurs

CONCENTRATION	Start	Day 1 OLD	Day 1 NEW	Day 2 OLD	Day 2 NEW	Day 3 OLD	Day 3 NEW	Day 4 OLD	Day 4 NEW	Day 5 OLD	Day 5 NEW	Day 6 OLD	Day 6 NEW	Day 7 OLD	Day 7 NEW	Day 8 OLD
CON	24.8	25.0	25.0	24	24	24.2	24.8	24.8	24.5	25.0	25.0	25.2	25.2	24.8		
6.25																
12.5																
25																
50																
100																

DISSOLVED OXYGEN

CONCENTRATION	Start	Day 1 OLD	Day 1 NEW	Day 2 OLD	Day 2 NEW	Day 3 OLD	Day 3 NEW	Day 4 OLD	Day 4 NEW	Day 5 OLD	Day 5 NEW (old)	Day 6 OLD	Day 6 NEW	Day 7 OLD	Day 7 NEW	Day 8 OLD
CON	8.4	7.2	7.3	7.1	7.8	7.5	8.4	7.6	8.0	8.0	7.0	7.6	8.3	7.3		
6.25	8.3	7.3	7.3	7.1	7.7	7.5	8.4	7.6	7.9	8.1	6.9	7.6	8.2	7.0		
12.5	8.2	7.3	7.5	7.2	7.7	7.4	8.5	7.6	7.9	8.1	7.1	7.7	8.2	7.5		
25	8.2	7.2	7.6	7.1	7.8	7.4	8.5	7.6	8.0	8.0	7.1	7.7	8.1	7.8		
50	8.3	7.2	7.7	7.2	7.9	7.4	8.5	7.6	8.0	8.1	7.2	7.8	8.1	8.0		
100	8.1	7.2	8.0	7.2	8.2	7.5	8.5	7.7	8.2	8.2	8.0	8.1	8.2	8.3		

pH

CONCENTRATION	Start	Day 1 OLD	Day 1 NEW	Day 2 OLD	Day 2 NEW	Day 3 OLD	Day 3 NEW	Day 4 OLD	Day 4 NEW	Day 5 OLD	Day 5 NEW (old)	Day 6 OLD	Day 6 NEW	Day 7 OLD	Day 7 NEW	Day 8 OLD
CON	8.34	8.30	8.10	8.41	8.34	8.32	8.32	8.17	8.29	8.40	8.08	7.99	8.35	8.31		
6.25	8.08	8.20	8.10	8.41	8.24	8.29	8.30	8.17	8.26	8.41	8.15	8.12	8.22	8.27		
12.5	8.09	8.26	8.14	8.43	8.22	8.28	8.29	8.18	8.28	8.42	8.18	8.10	8.20	8.43		
25	8.09	8.25	8.16	8.43	8.27	8.31	8.20	8.19	8.29	8.38	8.21	8.18	8.22	8.31		
50	8.04	8.20	8.16	8.48	8.33	8.38	8.26	8.38	8.35	8.31	8.27	8.14	8.25	8.27		
100	8.31	8.30	8.40	8.63	8.44	8.45	8.24	8.36	8.36	8.41	8.22	8.39	8.32	8.36		

CONDUCTIVITY

CONCENTRATION	Start	Day 1 OLD	Day 1 NEW	Day 2 OLD	Day 2 NEW	Day 3 OLD	Day 3 NEW	Day 4 OLD	Day 4 NEW	Day 5 OLD	Day 5 NEW (old)	Day 6 OLD	Day 6 NEW	Day 7 OLD	Day 7 NEW	Day 8 OLD
CON	310	334	324	354	352	368	324	361	341	341	314	379	347	372		
6.25	315	320	328	347	340	364	320	352	314	336	365	376	334	365		
12.5	318	291	332	340	338	361	318	361	304	332	368	371	334	345		
25	317	321	340	352	346	374	320	367	324	330	369	372	341	348		
50	313	321	337	362	362	386	342	377	330	335	375	376	332	348		
100	317	321	326	349	351	414	382	411	337	333	372	379	356	342		

AM 1417 CDT 1515 CDT 1200

ee01fm
File: ee01fm Transform: NO TRANSFORMATION

Chi-square test for normality: actual and expected frequencies

INTERVAL	<-1.5	-1.5 to <-0.5	-0.5 to 0.5	>0.5 to 1.5	>1.5
EXPECTED	1.608	5.808	9.168	5.808	1.608
OBSERVED	0	7	9	8	0

Calculated Chi-Square goodness of fit test statistic = 4.2910
Table Chi-Square value (alpha = 0.01) = 13.277

Data PASS normality test. Continue analysis.

ee01fm
File: ee01fm Transform: NO TRANSFORMATION

Hartley test for homogeneity of variance
Bartletts test for homogeneity of variance

These two tests can not be performed because at least one group has zero variance.

Data FAIL to meet homogeneity of variance assumption.
Additional transformations are useless.

TITLE: ee01fm
TITLE: ee01fm
TRANSFORM: NO TRANSFORMATION NUMBER OF GROUPS: 6

GRP	IDENTIFICATION	REP	VALUE	TRANS VALUE
1	Control	1	9.0000	9.0000
1	Control	2	8.0000	8.0000
1	Control	3	10.0000	10.0000
1	Control	4	10.0000	10.0000
2	6.25%	1	9.0000	9.0000
2	6.25%	2	10.0000	10.0000
2	6.25%	3	10.0000	10.0000
2	6.25%	4	8.0000	8.0000
3	12.5%	1	9.0000	9.0000
3	12.5%	2	10.0000	10.0000
3	12.5%	3	10.0000	10.0000
3	12.5%	4	9.0000	9.0000
4	25%	1	9.0000	9.0000
4	25%	2	10.0000	10.0000
4	25%	3	10.0000	10.0000
4	25%	4	9.0000	9.0000
5	50%	1	10.0000	10.0000
5	50%	2	10.0000	10.0000
5	50%	3	10.0000	10.0000
5	50%	4	9.0000	9.0000
[illegible]	100%	1	10.0000	10.0000
[illegible]	100%	2	10.0000	10.0000
6	100%	3	10.0000	10.0000
6	100%	4	10.0000	10.0000

ee01fm
File: ee01fm Transform: NO TRANSFORMATION

SUMMARY STATISTICS ON TRANSFORMED DATA TABLE 1 of 2

GRP	IDENTIFICATION	N	MIN	MAX	MEAN
1	Control	4	8.000	10.000	9.250
2	6.25%	4	8.000	10.000	9.250
3	12.5%	4	9.000	10.000	9.500
4	25%	4	9.000	10.000	9.500
5	50%	4	9.000	10.000	9.750
6	100%	4	10.000	10.000	10.000

[illegible]e01fm
[illegible]le: ee01fm Transform: NO TRANSFORMATION

SUMMARY STATISTICS ON TRANSFORMED DATA TABLE 2 of 2

GRP	IDENTIFICATION	VARIANCE	SD	SEM
1	Control	0.917	0.957	0.479
2	6.25%	0.917	0.957	0.479
3	12.5%	0.333	0.577	0.289
4	25%	0.333	0.577	0.289
5	50%	0.250	0.500	0.250
6	100%	0.000	0.000	0.000

ee01fm
File: ee01fm Transform: NO TRANSFORMATION

STEELS MANY-ONE RANK TEST - Ho:Control<Treatment

GROUP	IDENTIFICATION	TRANSFORMED MEAN	RANK SUM	CRIT. VALUE	df	SIG
1	Control	9.250				
2	6.25%	9.250	18.00	10.00	4.00	
3	12.5%	9.500	19.00	10.00	4.00	
4	25%	9.500	19.00	10.00	4.00	
5	50%	9.750	20.50	10.00	4.00	
6	100%	10.000	22.00	10.00	4.00	

Critical values use k = 5, are 1 tailed, and alpha = 0.05

EE01 FATHEAD MINNOW CHRONIC
File: FMEE01 Transform: NO TRANSFORMATION

Chi-square test for normality: actual and expected frequencies

INTERVAL	<-1.5	-1.5 to <-0.5	-0.5 to 0.5	>0.5 to 1.5	>1.5
EXPECTED	1.608	5.808	9.168	5.808	1.608
OBSERVED	0	8	9	7	0

Calculated Chi-Square goodness of fit test statistic = 4.2910
Table Chi-Square value (alpha = 0.01) = 13.277

Data PASS normality test. Continue analysis.

EE01 FATHEAD MINNOW CHRONIC
File: FMEE01 Transform: NO TRANSFORMATION

Bartletts test for homogeneity of variance

Calculated B statistic = 13.71
Table Chi-square value = 15.09 (alpha = 0.01)
Table Chi-square value = 11.07 (alpha = 0.05)

Average df used in calculation ==> df (avg n - 1) = 3.00
Used for Chi-square table value ==> df (#groups-1) = 5

Data PASS homogeneity test at 0.01 level. Continue analysis.

NOTE: If groups have unequal replicate sizes the average replicate size is used to calculate the B statistic (see above).

TITLE: EE01 FATHEAD MINNOW CHRONIC
TITLE: FMEE01
TRANSFORM: NO TRANSFORMATION NUMBER OF GROUPS: 6

GRP	IDENTIFICATION	REP	VALUE	TRANS VALUE
1	CONTROL	1	0.5040	0.5040
1	CONTROL	2	0.8250	0.8250
1	CONTROL	3	0.7240	0.7240
1	CONTROL	4	0.7030	0.7030
2	6.25	1	0.7530	0.7530
2	6.25	2	0.6920	0.6920
2	6.25	3	0.6770	0.6770
2	6.25	4	0.8410	0.8410
3	12.5	1	0.5690	0.5690
3	12.5	2	0.6540	0.6540
3	12.5	3	0.6570	0.6570
3	12.5	4	0.6560	0.6560
4	25	1	0.6860	0.6860
4	25	2	0.6910	0.6910
4	25	3	0.6480	0.6480
4	25	4	0.7020	0.7020
5	50	1	0.5550	0.5550
5	50	2	0.6630	0.6630
5	50	3	0.6240	0.6240
5	50	4	0.6980	0.6980
6	100	1	0.5440	0.5440
6	100	2	0.5160	0.5160
6	100	3	0.5100	0.5100
6	100	4	0.5300	0.5300

EE01 FATHEAD MINNOW CHRONIC
File: FMEE01 Transform: NO TRANSFORMATION

ANOVA TABLE

SOURCE	DF	SS	MS	F
Between	5	0.107	0.021	4.200
Within (Error)	18	0.090	0.005	
Total	23	0.198		

Critical F value = 2.77 (0.05,5,18)
Since F > Critical F REJECT Ho:All groups equal

EE01 FATHEAD MINNOW CHRONIC
File: FMEE01 Transform: NO TRANSFORMATION

DUNNETTS TEST - TABLE 1 OF 2 Ho:Control<Treatment

GROUP	IDENTIFICATION	TRANSFORMED MEAN	MEAN CALCULATED IN ORIGINAL UNITS	T STAT	SIG
1	CONTROL	0.689	0.689		
2	6.25	0.741	0.741	-1.035	
3	12.5	0.634	0.634	1.100	
4	25	0.682	0.682	0.145	
5	50	0.635	0.635	1.080	
6	100	0.525	0.525	3.280	*

Dunnett table value = 2.41 (1 Tailed Value, P=0.05, df=18,5)

EE01 FATHEAD MINNOW CHRONIC
File: FMEE01 Transform: NO TRANSFORMATION

DUNNETTS TEST - TABLE 2 OF 2 Ho:Control<Treatment

GROUP	IDENTIFICATION	NUM OF REPS	Minimum Sig Diff (IN ORIG. UNITS)	% of CONTROL	DIFFERENCE FROM CONTROL
1	CONTROL	4			
2	6.25	4	0.120	17.5	-0.052
3	12.5	4	0.120	17.5	0.055
4	25	4	0.120	17.5	0.007
5	50	4	0.120	17.5	0.054
6	100	4	0.120	17.5	0.164

№ 1515

CHAIN OF CUSTODY RECORD

JOB #	PROJECT NAME
DSK Task 3 ~~F93102~~ F93506	TAFB - Soldier Creek

SAMPLERS: (Signature) [signature]

WOODWARD-CLYDE CONSULTANTS
P.O. BOX 680925
FRANKLIN, TN 37068-0925
(615) 790-0003 FAX (615) 790-0023

SAMPLE IDENTIFICATION	DATE	TIME	SAMPLE TYPE	NUMBER OF CONTAINERS	ANALYSES REQUIRED: Toxicity						REMARKS
											FedExp # 5804823452
SC-EE01-TX-201	6/12/95	09:45	water	3	✓						

RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)	RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)
[signature]	6/12/95 18:00				
RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)	RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)
RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED AT LAB BY: (Signature)	DATE/TIME	GENERAL COMMENTS	
		Liza Jeer	6/13/95 0853	1.5°C upon arrival	

Distribution: Original and Yellow copies accompany sample shipment to laboratory
Pink copy retained by samplers. Yellow copy retained by laboratory. Laboratory returns White copy to samplers.

CHAIN OF CUSTODY RECORD

№ 1420

JOB #	PROJECT NAME
Task 3 F93506	TAFB Soldier Creek

SAMPLERS: (Signature)

WOODWARD-CLYDE CONSULTANTS
P.O. BOX 680925
FRANKLIN, TN 37068-0925
(615) 790-0003 FAX (615) 790-0023

SAMPLE IDENTIFICATION	DATE	TIME	SAMPLE TYPE	NUMBER OF CONTAINERS	ANALYSES REQUIRED: Toxicity	REMARKS
SC-EE01-TX-201	6/12/95	09:45	Water	2	✓	Fed Exp 580482345?
SC-EE01-TX-201	6/12/95	10:00	Soil	2	✓	

RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)	RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)
	6/12/95 18:00				
RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)	RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)
RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED AT LAB BY: (Signature)	DATE/TIME	GENERAL COMMENTS	
			6/13/95 0855	2 °C upon arrival	

Distribution: Original and Yellow copies accompany sample shipment to laboratory
Pink copy retained by samplers. Yellow copy retained by laboratory. Laboratory returns White copy to samplers.

Failed - restarted 6/18/95

Cdubia
LOG # 445
START: 6/15/95
Hd 140

CHRONIC TOXICITY TEST DATA SHEET

TEMPERATURE

CONCENTRATION	Start	Day 1 OLD	Day 1 NEW	Day 2 OLD	Day 2 NEW	Day 3 OLD	Day 3 NEW	Day 4 OLD	Day 4 NEW	Day 5 OLD	Day 5 NEW	Day 6 OLD	Day 6 NEW	Day 7 OLD	Day 7 NEW	Day 8 OLD
CON	24.8	25.0	25.0	24.0	24.0	24.2	24.8									
6.25																
12.5																
25																
50																
100																

DISSOLVED OXYGEN

CONCENTRATION	Start	Day 1 OLD	Day 1 NEW	Day 2 OLD	Day 2 NEW	Day 3 OLD	Day 3 NEW	Day 4 OLD	Day 4 NEW	Day 5 OLD	Day 5 NEW	Day 6 OLD	Day 6 NEW	Day 7 OLD	Day 7 NEW	Day 8 OLD
CON	8.3	7.5	8.0	7.2	7.9	8.1	8.3									
6.25	8.3	7.6	8.2	7.2	8.0	8.3	8.3									
12.5	8.4	7.6	8.2	7.1	8.1	8.3	8.3									
25	8.3	7.6	8.3	7.1	8.2	8.3	8.4									
50	8.4	7.5	8.3	7.0	8.1	8.3	8.4									
100	8.5	7.7	8.3	7.1	8.2	8.3	8.4									

pH

CONCENTRATION	Start	Day 1 OLD	Day 1 NEW	Day 2 OLD	Day 2 NEW	Day 3 OLD	Day 3 NEW	Day 4 OLD	Day 4 NEW	Day 5 OLD	Day 5 NEW	Day 6 OLD	Day 6 NEW	Day 7 OLD	Day 7 NEW	Day 8 OLD
CON	8.26	8.18	8.38	8.22	8.37		8.54									
6.25	8.32	8.09	8.06	8.21	8.39	8.38	8.52									
12.5	8.36	8.07	8.38	8.21	8.37	8.37	8.52									
25	8.38	8.11	8.37	8.18	8.40	8.48	8.53									
50	8.41	8.15	8.39	8.20	8.41	8.44	8.55									
100	8.42	8.13	8.41	8.41	8.42	8.43	8.56									

CONDUCTIVITY

CONCENTRATION	Start	Day 1 OLD	Day 1 NEW	Day 2 OLD	Day 2 NEW	Day 3 OLD	Day 3 NEW	Day 4 OLD	Day 4 NEW	Day 5 OLD	Day 5 NEW	Day 6 OLD	Day 6 NEW	Day 7 OLD	Day 7 NEW	Day 8 OLD
CON	414	418	417	433	432		424									
6.25	402	410	411	464	423	455	424									
12.5	405	453	416	453	427	438	421									
25	397	440	412	448	417	421	416									
50	388	452	403	447	408	445	403									
100	378	417	364	421	395	433	391									

Ceriodaphnia dubia GRID Ceriodaphnia dubia GRID MONITORING DATA

Grid Letter: ~~VG~~ ~~ID~~ ~~DT~~ ∞ Start Date: 6/15/95 Sample ID: EE01 Log #: 443

AD	ID 10	1 ✓	AD	ID 36	1 ✓	AD	ID 49	1 ✓	AD	ID 45	1 ✓		ID 53	1 ✓
2 D/O	3	4	2	3	4	2 3	3	4	2 2	3	4	2 ✓	3	4
5	6	7	5	6	7	5	6	7	5	6	7	5	6	7
AD	ID 23	1 ✓	AD	ID 31	1 ✓	AD	ID 22	1 ✓	AD	ID 37	1 ✓		ID 2	1 ✓
2 ✓	3	4	2	3	4	2 ✓	3	4	2 ✓	3	4	2 ✓	3	4
5	6	7	5	6	7	5	6	7	5	6	7	5	6	7
AD	ID 44	1 ✓	AD	ID 35	1 ✓	AD	ID 55	1 ✓	AD	ID 8	1 ✓		ID 16	1 ✓
2 1	3	4	2 ✓	3	4	2 1	3	4	2 ✓	3	4	2 D/O	3	4
5	6	7	5	6	7	5	6	7	5	6	7	5	6	7
AD	ID 13	1 ✓	AD	ID 57	1 ✓	AD	ID 34	1 ✓	AD	ID 59	1 ✓		ID 26	1 ✓
2 ✓	3	4	2 ✓	3	4	2 ✓	3	4	2 ✓	3	4	2 3	3	4
5	6	7	5	6	7	5	6	7	5	6	7	5	6	7
AD	ID 27	1 ✓	AD	ID 3	1 ✓	AD	ID 18	1 ✓	AD	ID 43	1 ✓		ID 50	1 ✓
2 ✓	3	4	2 1	3	4	2 D/O	3	4	2 ✓	3	4	2 ✓	3	4
5	6	7	5	6	7	5	6	7	5	6	7	5	6	7
AD	ID 7	1 ✓	AD	ID 33	1 ✓	AD	ID 17	1 ✓	AD	ID 29	1 ✓		ID 9	1 ✓
2 D/O	3	4	2	3	4	2	3	4	2	3	4	2 D/O	3	4
5	6	7	5	6	7	5	6	7	5	6	7	5	6	7

Comments:

Day 6-15 Initials MAR Time 1650

Cup ID	Sample Concentration			
1–10:	CONTROL HD ITO	1	LJT	1450
11–20:	6.25	2	MAR	1345
21–30:	12.5	3		
31–40:	25	4		
41–50:	50	5		
51–60:	100	6		
		7		

Ceriodaphnia dubia GRID Ceriodaphnia dubia GRID MONITORING DATA

Grid Letter: ~~W~~ ~~C~~ ~~D~~ K Start Date: 6/15/95 Sample ID: EE01 Log #: 44

AD	ID 15	1 ✓	AD	ID 41	1 ✓	AD	ID 11	1 ✓	AD	ID 24	1 ✓		ID 1	1
2 ✓	3	4	2 ✓	3	4	2 ✓	3	4	2 ✓	3	4	2 ✓	3	4
5	6	7	5	6	7	5	6	7	5	6	7	5	6	7
AD	ID 58	1 ✓	AD	ID 28	1 ✓	AD	ID 54	1 ✓	AD	ID 30	1 ✓		ID 60	1 ✓
2 ✓	3	4	2 ✓	3	4	2 ✓	3	4	2 ✓	3	4	2 ✓	3	4
5	6	7	5	6	7	5	6	7	5	6	7	5	6	7
AD	ID 21	1 ✓	AD	ID 38	1 ✓	AD	ID 5	1 ✓	AD	ID 25	1 ✓		ID 14	1 ✓
2 ✓	3	4	2 ✓	3	4	2 ✓	3	4	2 ✓	3	4	2 ✓	3	4
5	6	7	5	6	7	5	6	7	5	6	7	5	6	7
AD	ID 47	1 ✓	AD	ID 39	1 ✓	AD	ID 51	1 ✓	AD	ID 32	1 ✓		ID 40	1 ✓
2 D/O	3	4	2	3	4	2	3	4	2	3	4	2	3	4
5	6	7	5	6	7	5	6	7	5	6	7	5	6	7
AD	ID 4	1 ✓	AD	ID 46	1 ✓	AD	ID 12	1 ✓	AD	ID 56	1 ✓		ID 52	1 ✓
2 ✓	3	4	2 ✓	3	4	2 ✓	3	4	2 ✓	3	4	2 ✓	3	4
5	6	7	5	6	7	5	6	7	5	6	7	5	6	7
AD	ID 20	1 D	AD	ID 42	1 ✓	AD	ID 48	1 ✓	AD	ID 6	1 ✓		ID 19	1 ✓
2	3	4	2 ✓	3	4	2 ✓	3	4	2 ✓	3	4	2 1	3	4
5	6	7	5	6	7	5	6	7	5	6	7	5	6	7

Comments:

Day 6-15 Initials MAR Time 1650

Cup ID	Sample Concentration		
1–10:	CONTROL ND 140	1	LJT 1445
11–20:	6.25	2	MAR 1335
21–30:	12.5	3	
31–40:	25	4	
41–50:	50	5	
51–60:	100	6	
		7	

48-hr Ceriodaphnia dubia TOXICITY TEST

LOG NO. 433-437
JOB NO. 193506
INDUSTRY: Timber
CONTACT:

EFFLUENT: ~~CR EE02~~ mls Controls
START DATE: 6-13-95
START TIME: 1510
DILUTION WATER: ~~270 Hard~~ mls Controls

CONC (%)	REP ID	SURVIVAL (#) 0	24	48	DEAD	TEMPERATURE (oC) 0	24	48	DO (mg/L) 0	24	48	pH (S.U.) 0	24	48	CONDUCTIVITY (umhos/cm) 0	24	48
140	A	5	5	5		24.8		25.0	8.5		8.2	7.64		8.28	500		499
CON	B	5	5	5													
w/ EE01	C	5	5	5													
	D	5	5	5													
250	A	5	5	5					8.5		8.2	8.54		8.54	689		739
CON	B	5	5	5													
w/EE02	C	5	5	5													
	D	5	5	5													
270	A	5	5	5					8.5		8.3	8.62		8.57	764		790
CON	B	5	5	5													
w/EE03	C	5	5	5													
& CREC02	D	5	5	5													
200	A	5	5	5					8.5		8.2	8.54		8.49	582		578
CON	B	5	5	5													
~~w/CR EE02~~ mls	C	5	5	5													
w/EE04	D	5	5	5													
	A																
	B																
	C																
	D																
	Initials	JB	LJI	LJI													
	Time	1510	1500	0930													

Comments

PARAMETER	Control	
Total Hardness (mg/L CaCO3)		
Total Alkalinity (mg/L CaCO3 @ 4.5)		

48-hr Ceriodaphnia dubia TOXICITY TEST

LOG NO. 434
JOB NO. F93506
INDUSTRY: Tanker
CONTACT:

EFFLUENT: EE02
START DATE: 6-13-95
START TIME: 1445
DILUTION WATER: Hard-250

CONC (%)	REP ID	SURVIVAL (#) 0	24	48	pHAD	TEMPERATURE (oC) 0	24	48	DO (mg/L) 0	24	48	pH (S.U.) 0	24	48	CONDUCTIVITY (umhos/cm) 0	24	48
6.25	A	5	5	5		24.8		25.0	8.5		8.3	8.52		8.51	653		686
	B	5	5	5													
	C	5	5	5													
	D	5	5	5													
12.5	A	5	5	5					8.5		8.3	8.53		8.51	673		676
	B	5	5	5													
	C	5	5	5													
	D	5	5	5													
25	A	5	5	5					8.5		8.3	8.54		8.53	661		665
	B	5	5	5													
	C	5	5	5													
	D	5	5	5													
50	A	5	5	5					8.5		8.3	8.49		8.54	609		603
	B	5	5	5													
	C	5	5	5													
	D	5	5	5													
100	A	5	5	5					8.5		8.0	8.45		8.56	522		496
	B	5	5	5													
	C	5	5	5													
	D	5	5	5													
	Initials	SJD	LJT	LJT													
	Time	1445	1400	0930													

Comments

PARAMETER	Control	
Total Hardness (mg/L CaCO3)		
Total Alkalinity (mg/L CaCO3 @ 4.5)		

48-hr Pimephales promleas TOXICITY TEST

LOG NO. 1434
JOB NO. 9525016
INDUSTRY: Timber
CONTACT: WEC - 6 days old

EFFLUENT: EE02
START DATE: 6-13-95
START TIME: ~~1400~~ 1515
DILUTION WATER: Spring

CONC (%)	REP ID	SURVIVAL (#) 0	24	48	DEAD	TEMPERATURE (oC) 0	24	48	DO (mg/L) 0	24	48	pH (S.U.) 0	24	48	CONDUCTIVITY (umhos/cm) 0	24	48
6.25	A	10	10	10	0	~~24.8~~		21.0	8.0		8.0	8.05		8.43	312		357
	B	10	10	10	0	20.8											
12.5	A	10	10	10	0				8.0		8.0	8.03		8.44	351		365
	B	10	10	10	0												
25	A	10	10	10	0				8.0		8.0	8.05		8.46	368		383
	B	10	10	9	1												
50	A	10	10	15	0				8.2		8.1	8.16		8.49	411		432
	B	10	10	9	1												
100	A	10	10	9	1				8.3		8.1	8.29		8.53	490		513
	B	10	10	10	0												
	A																
	B																
	A																
	B																
	A																
	B																
	A																
	B																
	A																
	B																
Initials		MLS	MLS	MLS													
Time		1515	1520	0930													

Comments

PARAMETER	Control	
Total Hardness (mg/L CaCO3)		
Total Alkalinity (mg/L CaCO3 @ 4.5)		

Ceriodaphnia SURVIVAL AND REPRODUCTION CHRONIC TOXICITY TEST

JOB NO. F93506
INDUSTRY: Tinker
CONTACT:
EFFLUENT: EC02
NPDES PERMIT NO:
PERSON CONDUCTING TEST:

BEGINNING: 1628 hrs; 6/15/95
ENDING: _____ hrs; 6/22/95
FEEDING REGIME:
.05 mL yct/15 mL
.05 mL algal suspension/15 mL

Log No. 444
PHOTOPERIOD: 16 light, 8 dark
ORGANISM SOURCE: WCC
TEST VESSEL CAPACITY: 30 mL
TEST SOLUTION VOLUME: 15mL
NO. REPLICATES:
DILUTION WATER:

TIME
OBSERVER

NUMBER OF YOUNG PRODUCED

CONC	CHAMBER	START	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7
						19	45	114	204
Control	1					6	0	8	14
	2					3	0	7	7
	3						6	7	4
	4						10	6	14
	5					2	2	4	10
	6							8	11
	7							10	9
	8					3	0	9	8
	9						8	4	3
	10							6	11
		START	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7
						2	31	60	114
6.25%	11							5	11
	12							2	4
	13				(D)				
	14						8	(D) 10	
	15						5	3	9
	16						6	(D) 2	
	17						5	0	10
	18						5	5	11
	19					2	0	7	3
	20							0	6
		START	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7
							17	49	94
12.5%	21		(D) LIT					7	8
	22						7	10	0
	23							0	8
	24			(D)					
	25		(D)						
	26						5	9	0
	27						4	0	9
	28						(D)		
	29							6	11
	30							0	7

Ceriodaphnia SURVIVAL AND REPRODUCTION CHRONIC TOXICITY TEST

JOB NO: 93306 | BEGINNING: 1629 hrs; 6/15/95 | Log No. 444
INDUSTRY: Tinker | ENDING: _____ hrs; / / | PHOTOPERIOD: 16 light, 8 dark
CONTACT: | FEEDING REGIME: | ORGANISM SOURCE: WCC
EFFLUENT: E002 | .05 mL yct/15 mL | TEST VESSEL CAPACITY: 30 mL
NPDES PERMIT NO: | .05 mL algal suspension/15 mL | TEST SOLUTION VOLUME: 15mL
PERSON CONDUCTING TEST: | | NO. REPLICATES:
| | DILUTION WATER:

TIME
OBSERVER

CONC	CHAMBER	NUMBER OF YOUNG PRODUCED							
		START	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7
						5	28	72	139
25%	31						5	10	12
	32						5	0	11
	33							13	8
	34							12	4
	35						2	0	10
	36					3	4	0	11
	37					2	0	7	3
	38						(D) 4		5
	39						3	2	8
	40				(D)				
		START	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7
						7	49	91	163
50%	41							14	11
	42						7	11	0
	43						(D)		
	44						6	(D) 3	
	45					2	5	0	13
	46						2	6	12
	47					3	6	0	15
	48						6	8	14
	49					2	7	0	10
	50				(D)				
		START	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7
						12	35	81	137
100%	51							0	0
	52						6	8	9
	53					2	1	0	8
	54						2	4	9
	55					3	6	10	0
	56					2	4	8	0
	57							5	5
	58					3	0	8	11
	59					2	4	0	3
	60							3	4

Ceriodaphnia dubia GRID Ceriodaphnia dubia GRID MONITORING DATA

Grid Letter: Y ~~W~~ ~~Y~~ ~~Z~~ ~~X~~ λ Start Date: 6-15-95 Sample ID: EE02 Log #: 4

AD	ID	1	2	3	4	5	6	7
	15	✓	✓	0	0	5	3	9
	35	✓	✓	0	0	2	0	10
	46	✓	✓	0	0	2	6	12
	17	✓	✓	0	0	5	0	10
	55	✓	✓	0	3	6	10	[illegible]
	31	✓	✓	0	0	5	10	12
	8	✓	✓	0	8	0	9	8
	57	✓	✓	0	0	0	5	8
	43	✓	✓	0	0	D/0		
	50	✓	✓	D-0				
	25	✓						
	2	✓	✓	0	3	0	7	7
	36	✓	✓	0	3	4	0	11 ~~8~~ LJT
	59	✓	✓	0	2	4	0	3
	53	✓	✓	0	2	1	0	8
	10	✓	✓	0	0	0	6	11
	19	✓	✓	0	2	0	7	3
	60	✓	✓	0	0	0	3	9
	38	✓	✓	0	0	D/4		
	58	✓	✓	0	3	0	8	1
	5	✓	✓	0	0	2	4	10
	27	✓	✓	0	0	4	0	9
	11	✓	✓	0	0	0	5	11
	40	✓	✓	D-0				
	48	✓	✓	0	0	6	8	11
	21	✓	✓	0	0	0	7	8
	12	✓	✓	0	0	0	2	4
	29	✓	✓	0	0	0	6	11
	23	✓	✓	0	0	0	0	8
	52	✓	✓	0	0	6	8	9

Comments:

Cup ID	Sample Concentration	Day 10-15	Initials MAR	Time 1628
1–10:	Con 250	1	LJT	1605
11–20:	6.25	2	MAR	1415
21–30:	12.5	3	STB	1330
31–40:	25	4	STB	1100
41–50:	50	5	MAR	1340
51–60:	100	6	LJT	1235
		7	LJT	1545

Ceriodaphnia dubia GRID Ceriodaphnia dubia GRID MONITORING DATA

Grid Letter: ~~I~~ ~~J~~ ~~J~~ ~~N~~ ~~N~~ W Start Date: 6-15-95 Sample ID: EE02 Log #: 44

AD	ID	1	2	3	4	5	6	7
	1	✓	✓	0	0	0	8	14
	41	✓	✓	0	0	0	14	11
	56	✓	✓	0	2	4	8	0
	44	✓	✓	0	0	6	D-3	
	16	✓	✓	0	0	6	D-2	
	34	✓	✓	0	0	0	12	4
	14	✓	✓	0	0	3	D-10	
	51	✓	✓	0	0	0	0	0
	26	✓	✓	0	0	6	9	0
	45	✓	✓	0	2	8	0	13
	18	✓		0	0	5	0	11
	54	✓		0	0	2	4	8
	22	✓		0	0	7	10	0
	4	✓	0	0	0	10	6	14
	9	✓	0	0	0	8	4	3
	47	✓	✓	0	3	6	0	15
	42	✓	✓	0	0	7	11	0
	37	✓	✓	0	2	0	7	3
	32	✓	✓	0	0	5	0	11
	49	✓	✓	0	2	7	0	10
	28	✓	✓	0	0	D/0		
	6	✓	✓	0	0	0	8	11
	24	✓	D/0					
	3	✓	✓	0	0	6	7	4
	39	✓	✓	0	0	3	2	8
	7	✓	✓	0	0	0	10	8
	20	✓	✓	0	0	0	0	6
	33	✓	✓	0	0	0	13	8
	30	✓	✓	0	0	0	0	9
	13	✓	✓	0	0			

Comments:

Day 6-15 Initials MAR Time 1700

Cup ID	Sample Concentration			
1–10:	Con 250	1	LJT	1615
11–20:	6.25	2	MAR	1409
21–30:	12.5	3	SJG	1330
31–40:	25	4	SJG	1100
41–50:	50	5	MAR	1335
51–60:	100	6	LJT	1235
		7	LJT	1600

Loc 14
EE02
6-15-95
C. dubia

CHRONIC TOXICITY TEST DATA SHEET

TEMPERATURE

CONCENTRATION	Start	Day 1 OLD	Day 1 NEW	Day 2 OLD	Day 2 NEW	Day 3 OLD	Day 3 NEW	Day 4 OLD	Day 4 NEW	Day 5 OLD	Day 5 NEW	Day 6 OLD	Day 6 NEW	Day 7 OLD	Day 7 NEW	Day 8 OLD
CON	25.0	25.0	25.0	24.0	24.0	24.2	25.0	25.0	24.8	25.0	25.0	25.2	25.2	24.8		
6.25																
12.5																
25																
50																
100																

DISSOLVED OXYGEN

CONCENTRATION	Start	Day 1 OLD	Day 1 NEW	Day 2 OLD	Day 2 NEW	Day 3 OLD	Day 3 NEW	Day 4 OLD	Day 4 NEW	Day 5 OLD	Day 5 NEW	Day 6 OLD	Day 6 NEW	Day 7 OLD	Day 7 NEW	Day 8 OLD
CON	8.5	7.5	8.3	7.1	8.2	8.1	8.2	8.2	8.1	7.9	8.2	7.6	8.2	7.5		
6.25	8.3	7.5	8.3	7.3	8.2	8.2	8.2	8.2	8.1	7.9	8.3	7.6	8.2	7.6		
12.5	8.4	7.6	8.3	7.3	8.2	8.2	8.3	8.2	8.1	8.0	8.3	7.7	8.3	7.6		
25	8.4	7.5	8.2	7.2	8.3	8.2	8.4	8.2	8.1	7.9	8.3	7.8	8.3	7.6		
50	8.4	7.3	8.3	7.2	8.3	8.2	8.4	8.2	8.1	7.8	8.3	7.6	8.2	7.5		
100	8.5	7.4	8.2	7.2	8.3	8.2	8.5	7.1	8.1	7.9	8.3	7.6	8.3	7.5		

pH

CONCENTRATION	Start	Day 1 OLD	Day 1 NEW	Day 2 OLD	Day 2 NEW	Day 3 OLD	Day 3 NEW	Day 4 OLD	Day 4 NEW	Day 5 OLD	Day 5 NEW	Day 6 OLD 8.27	Day 6 NEW	Day 7 OLD	Day 7 NEW	Day 8 OLD
CON	8.58	8.25	8.50	8.39	8.55	8.53	8.62	8.42	8.50	8.47	8.48	[illegible]	8.54	8.37		
6.25	8.57	8.24	8.51	8.35	8.53	8.45	8.63	8.41	8.46	8.46	8.51	8.25	8.53	8.38		
12.5	8.56	8.21	8.50	8.36	8.52	8.45	8.61	8.42	8.47	8.47	8.50	8.25	8.52	8.37		
25	8.53	8.25	8.48	8.39	8.50	8.45	8.60	8.42	8.47	8.48	8.49	8.27	8.48	8.36		
50	8.47	8.20	8.43	8.42	8.54	8.47	8.56	8.43	8.45	8.49	8.44	8.26	8.42	8.37		
100	8.33	8.32	8.40	8.44	~~8.04~~ 8.40	8.52	8.52	8.45	8.41	8.54	8.37	8.30	8.39	8.37		
					DUE											

CONDUCTIVITY

CONCENTRATION	Start	Day 1 OLD	Day 1 NEW	Day 2 OLD	Day 2 NEW	Day 3 OLD	Day 3 NEW	Day 4 OLD	Day 4 NEW	Day 5 OLD	Day 5 NEW	Day 6 OLD	Day 6 NEW	Day 7 OLD	Day 7 NEW	Day 8 OLD
CON	[illegible]	707	665	685	688	718	712	690	655	686	640	818	650	875		
6.25	[illegible]	701	670	617	682	704	693	666	660	697	809	799	817	774		
12.5	[illegible]	716	647	581	673	707	680	685	654	678	788	800	800	832		
25	671	678	601	572	651	704	654	662	633	654	743	760	759	870		
50	588	628	484	525	586	632	599	668	585	613	640	695	670	704		
100	343	542	403	336	513	525	507	518	497	514	511	515	504	567		

MWR 1630 | LJT DUE 1750 | LJT 1640 | LJT 1200

ee02cd
File: ee02cd Transform: NO TRANSFORMATION

Chi-square test for normality: actual and expected frequencies

INTERVAL	<-1.5	-1.5 to <-0.5	-0.5 to 0.5	>0.5 to 1.5	>1.5
EXPECTED	4.020	14.520	22.920	14.520	4.020
OBSERVED	2	9	28	21	0

Calculated Chi-Square goodness of fit test statistic = 11.1514
Table Chi-Square value (alpha = 0.01) = 13.277

Data PASS normality test. Continue analysis.

ee02cd
File: ee02cd Transform: NO TRANSFORMATION

Hartley test for homogeneity of variance
Bartletts test for homogeneity of variance

These two tests can not be performed because at least one group has zero variance.

Data FAIL to meet homogeneity of variance assumption.
Additional transformations are useless.

FISHERS EXACT TEST

IDENTIFICATION	NUMBER OF ALIVE	DEAD	TOTAL ANIMALS
CONTROL	10	0	10
6.25%	7	3	10
TOTAL	17	3	20

CRITICAL FISHERS VALUE (10,10,10) (p=0.05) IS 6. b VALUE IS 7.
Since b is greater than 6 there is no significant difference between CONTROL and TREATMENT at the 0.05 level.

FISHERS EXACT TEST

IDENTIFICATION	NUMBER OF ALIVE	DEAD	TOTAL ANIMALS
CONTROL	10	0	10
12.5%	7	3	10
TOTAL	17	3	20

CRITICAL FISHERS VALUE (10,10,10) (p=0.05) IS 6. b VALUE IS 7.
Since b is greater than 6 there is no significant difference between CONTROL and TREATMENT at the 0.05 level.

FISHERS EXACT TEST

IDENTIFICATION	NUMBER OF ALIVE	DEAD	TOTAL ANIMALS
CONTROL	10	0	10
25%	8	2	10

TOTAL	18	2	20

CRITICAL FISHERS VALUE (10,10,10) (p=0.05) IS 6. b VALUE IS 8.
Since b is greater than 6 there is no significant difference between CONTROL and TREATMENT at the 0.05 level.

FISHERS EXACT TEST

IDENTIFICATION	NUMBER OF ALIVE	DEAD	TOTAL ANIMALS
CONTROL	10	0	10
50%	7	3	10
TOTAL	17	3	20

CRITICAL FISHERS VALUE (10,10,10) (p=0.05) IS 6. b VALUE IS 7.
Since b is greater than 6 there is no significant difference between CONTROL and TREATMENT at the 0.05 level.

SUMMARY OF FISHERS EXACT TESTS

GROUP	IDENTIFICATION	NUMBER EXPOSED	NUMBER DEAD	SIG (P=.05)
	CONTROL	10	0	
1	6.25%	10	3	
2	12.5%	10	3	
3	25%	10	2	
4	50%	10	3	

TITLE: ee02cd
FILE: ee02cd
TRANSFORM: NO TRANSFORMATION NUMBER OF GROUPS: 6

RP	IDENTIFICATION	REP	VALUE	TRANS VALUE
1	Control	1	1.0000	1.0000
1	Control	2	1.0000	1.0000

1	Control	3	1.0000	1.0000
1	Control	4	1.0000	1.0000
1	Control	5	1.0000	1.0000
1	Control	6	1.0000	1.0000
	Control	7	1.0000	1.0000
1	Control	8	1.0000	1.0000
1	Control	9	1.0000	1.0000
1	Control	10	1.0000	1.0000
2	6.25%	1	1.0000	1.0000
2	6.25%	2	1.0000	1.0000
2	6.25%	3	0.0000	0.0000
2	6.25%	4	0.0000	0.0000
2	6.25%	5	1.0000	1.0000
2	6.25%	6	0.0000	0.0000
2	6.25%	7	1.0000	1.0000
2	6.25%	8	1.0000	1.0000
2	6.25%	9	1.0000	1.0000
2	6.25%	10	1.0000	1.0000
3	12.5%	1	1.0000	1.0000
3	12.5%	2	1.0000	1.0000
3	12.5%	3	1.0000	1.0000
3	12.5%	4	0.0000	0.0000
3	12.5%	5	0.0000	0.0000
3	12.5%	6	1.0000	1.0000
3	12.5%	7	1.0000	1.0000
3	12.5%	8	0.0000	0.0000
3	12.5%	9	1.0000	1.0000
3	12.5%	10	1.0000	1.0000
4	25%	1	1.0000	1.0000
4	25%	2	1.0000	1.0000
	25%	3	1.0000	1.0000
4	25%	4	1.0000	1.0000
4	25%	5	1.0000	1.0000
4	25%	6	1.0000	1.0000
4	25%	7	1.0000	1.0000
4	25%	8	0.0000	0.0000
4	25%	9	1.0000	1.0000
4	25%	10	0.0000	0.0000
5	50%	1	1.0000	1.0000
5	50%	2	1.0000	1.0000
5	50%	3	0.0000	0.0000
5	50%	4	0.0000	0.0000
5	50%	5	1.0000	1.0000
5	50%	6	1.0000	1.0000
5	50%	7	1.0000	1.0000
5	50%	8	1.0000	1.0000
5	50%	9	1.0000	1.0000
5	50%	10	0.0000	0.0000
6	100%	1	1.0000	1.0000
6	100%	2	1.0000	1.0000
6	100%	3	1.0000	1.0000
6	100%	4	1.0000	1.0000
6	100%	5	1.0000	1.0000
6	100%	6	1.0000	1.0000
6	100%	7	1.0000	1.0000
6	100%	8	1.0000	1.0000
6	100%	9	1.0000	1.0000
6	100%	10	1.0000	1.0000

ee02cd
File: ee02cd Transform: NO TRANSFORMATION

SUMMARY STATISTICS ON TRANSFORMED DATA TABLE 1 of 2

GRP	IDENTIFICATION	N	MIN	MAX	MEAN
1	Control	10	1.000	1.000	1.000
2	6.25%	10	0.000	1.000	0.700
3	12.5%	10	0.000	1.000	0.700
4	25%	10	0.000	1.000	0.800
5	50%	10	0.000	1.000	0.700
6	100%	10	1.000	1.000	1.000

ee02cd
File: ee02cd Transform: NO TRANSFORMATION

SUMMARY STATISTICS ON TRANSFORMED DATA TABLE 2 of 2

GRP	IDENTIFICATION	VARIANCE	SD	SEM
1	Control	0.000	0.000	0.000
2	6.25%	0.233	0.483	0.153
3	12.5%	0.233	0.483	0.153
4	25%	0.178	0.422	0.133
5	50%	0.233	0.483	0.153
6	100%	0.000	0.000	0.000

ee02cd
File: ee02cd Transform: NO TRANSFORMATION

STEELS MANY-ONE RANK TEST - Ho:Control<Treatment

GROUP	IDENTIFICATION	TRANSFORMED MEAN	RANK SUM	CRIT. VALUE	df	SIG
1	Control	1.000				
2	6.25%	0.700	90.00	75.00	10.00	
3	12.5%	0.700	90.00	75.00	10.00	
4	25%	0.800	95.00	75.00	10.00	
5	50%	0.700	90.00	75.00	10.00	
6	100%	1.000	105.00	75.00	10.00	

Critical values use k = 5, are 1 tailed, and alpha = 0.05

EE02 CERIO CHRONIC
File: CDEE02 Transform: NO TRANSFORMATION

Chi-square test for normality: actual and expected frequencies

INTERVAL	<-1.5	-1.5 to <-0.5	-0.5 to 0.5	>0.5 to 1.5	>1.5
EXPECTED	4.020	14.520	22.920	14.520	4.020
OBSERVED	5	13	19	21	2

Calculated Chi-Square goodness of fit test statistic = 4.9754
Table Chi-Square value (alpha = 0.01) = 13.277

Data PASS normality test. Continue analysis.

EE02 CERIO CHRONIC
File: CDEE02 Transform: NO TRANSFORMATION

Bartletts test for homogeneity of variance

Calculated B statistic = 4.09
Table Chi-square value = 15.09 (alpha = 0.01)
Table Chi-square value = 11.07 (alpha = 0.05)

Average df used in calculation ==> df (avg n - 1) = 9.00
Used for Chi-square table value ==> df (#groups-1) = 5

Data PASS homogeneity test at 0.01 level. Continue analysis.

NOTE: If groups have unequal replicate sizes the average replicate size is used to calculate the B statistic (see above).

TITLE: EE02 CERIO CHRONIC
FILE: CDEE02
TRANSFORM: NO TRANSFORMATION NUMBER OF GROUPS: 6

GRP	IDENTIFICATION	REP	VALUE	TRANS VALUE
1	CONTROL	1	28.0000	28.0000
1	CONTROL	2	17.0000	17.0000
1	CONTROL	3	17.0000	17.0000
1	CONTROL	4	30.0000	30.0000
1	CONTROL	5	18.0000	18.0000
1	CONTROL	6	19.0000	19.0000
1	CONTROL	7	18.0000	18.0000
1	CONTROL	8	25.0000	25.0000
1	CONTROL	9	15.0000	15.0000
1	CONTROL	10	17.0000	17.0000
2	6.25	1	16.0000	16.0000
2	6.25	2	6.0000	6.0000
2	6.25	3	0.0000	0.0000
2	6.25	4	18.0000	18.0000
2	6.25	5	17.0000	17.0000
2	6.25	6	8.0000	8.0000
2	6.25	7	15.0000	15.0000
2	6.25	8	16.0000	16.0000
2	6.25	9	12.0000	12.0000
2	6.25	10	6.0000	6.0000
3	12.5	1	15.0000	15.0000
3	12.5	2	17.0000	17.0000
3	12.5	3	8.0000	8.0000
3	12.5	4	0.0000	0.0000
3	12.5	5	0.0000	0.0000
3	12.5	6	15.0000	15.0000
3	12.5	7	13.0000	13.0000
3	12.5	8	0.0000	0.0000
3	12.5	9	17.0000	17.0000
3	12.5	10	9.0000	9.0000
4	25	1	27.0000	27.0000
4	25	2	16.0000	16.0000
4	25	3	21.0000	21.0000
4	25	4	16.0000	16.0000
4	25	5	12.0000	12.0000
4	25	6	18.0000	18.0000
4	25	7	12.0000	12.0000
4	25	8	4.0000	4.0000
4	25	9	13.0000	13.0000
4	25	10	0.0000	0.0000
5	50	1	25.0000	25.0000
5	50	2	18.0000	18.0000
5	50	3	0.0000	0.0000
5	50	4	9.0000	9.0000
5	50	5	23.0000	23.0000
5	50	6	20.0000	20.0000
	50	7	24.0000	24.0000
5	50	8	25.0000	25.0000
5	50	9	19.0000	19.0000
5	50	10	0.0000	0.0000

6	100	1	0.0000	0.0000
6	100	2	23.0000	23.0000
6	100	3	11.0000	11.0000
6	100	4	14.0000	14.0000
6	100	5	19.0000	19.0000
6	100	6	14.0000	14.0000
6	100	7	13.0000	13.0000
6	100	8	22.0000	22.0000
6	100	9	9.0000	9.0000
6	100	10	12.0000	12.0000

EE02 CERIO CHRONIC
File: CDEE02 Transform: NO TRANSFORMATION

ANOVA TABLE

SOURCE	DF	SS	MS	F
Between	5	740.683	148.137	2.805
Within (Error)	54	2852.300	52.820	
Total	59	3592.983		

Critical F value = 2.45 (0.05,5,40)
Since F > Critical F REJECT Ho:All groups equal

EE02 CERIO CHRONIC
File: CDEE02 Transform: NO TRANSFORMATION

DUNNETTS TEST - TABLE 1 OF 2 Ho:Control<Treatment

GROUP	IDENTIFICATION	TRANSFORMED MEAN	MEAN CALCULATED IN ORIGINAL UNITS	T STAT	SIG
1	CONTROL	20.400	20.400		
2	6.25	11.400	11.400	2.769	*
3	12.5	9.400	9.400	3.384	*
4	25	13.900	13.900	2.000	
5	50	16.300	16.300	1.261	
6	100	13.700	13.700	2.061	

Dunnett table value = 2.31 (1 Tailed Value, P=0.05, df=40,5)

EE02 CERIO CHRONIC
File: CDEE02 Transform: NO TRANSFORMATION

DUNNETTS TEST - TABLE 2 OF 2 Ho:Control<Treatment

GROUP	IDENTIFICATION	NUM OF REPS	Minimum Sig Diff (IN ORIG. UNITS)	% of CONTROL	DIFFERENCE FROM CONTROL

1	CONTROL	10			
2	6.25	10	7.508	36.8	9.000
3	12.5	10	7.508	36.8	11.000
4	25	10	7.508	36.8	6.500
5	50	10	7.508	36.8	4.100
6	100	10	7.508	36.8	6.700

7-DAY CHRONIC TOXICITY TEST

JOB NO. F935D6
INDUSTRY: Tinker
CONTACT:
EFFLUENT: EEO2
NPDES PERMIT NO:
SAMPLE TYPE:
DILUTION WATER: Spring

PERSON CONDUCTING TEST:
BEGINNING: 1615 hrs; 6/15/95
ENDING: ____ hrs; 6/21/95
TEST
DILUTIONS:
AGE: < 24 hrs
ORGANISM SOURCE: EC ET

PHOTOPERIOD: 16 hr light
FEEDING REGIME:
0.1 ml Artemia @ 3times/day
TEST VESSEL CAPACITY: 1 liter
TEST SOLUTION VOLUME: 500 mL
NO. ORGANISMS/TREATMENT: 10
NO. REPLICATES: 4

CONC (%)	REP ID	SURVIVAL (#) START	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7
6.25	A	10	10	10	10	10	10	10	10
	B	10	9	9	9	9	9	9	9
	C	10	10	10	10	10	10	10	10
	D	10	10	10	10	10	10	10	10
12.5	A	10	10	10	10	10	10	10	10
	B	10	10	10	10	10	10	10	10
	C	10	10	10	10	10	10	10	10
	D	10	10	10	10	10	10	10	10
25	A	10	10	10	10	10	10	10	10
	B	10	10	10	10	10	10	10	10
	C	10	10	10	10	10	10	10	10
	D	10	10	10	10	10	10	10	10
50	A	10	9	9	9	9	9	9	9
	B	10	10	10	10	10	10	10	10
	C	10	10	10	10	10	10	10	10
	D	10	9	9	9	9	9	9	9
	TIME:	1615	1600	1115	1435	1120	1020	1025	1230
	INITIAL:	MLS	SM	MLS	JNJ	MLS	MH2	SM	MLS

GROWTH RESULTS

CONC (%)	REP ID	Boat ID	Tare wt (g)	Combined wt (g)	Tot Fish wt (g)	# of Fish	Avg Fish wt (mg)
6.25	A	~~.99764~~	.99764	1.00432	0.00468	10	0.468
	B	~~.99522~~	.99522	.99885	0.00367	9	0.408
	C	~~.98143~~	.98143	.99344	0.00401	10	0.401
	D	~~.99552~~	.99552	1.00050	0.00498	10	0.498
12.5	A	~~.99293~~	.99293	.99848	0.00555	10	0.555
	B	~~.99371~~	.99371	.99807	0.00436	10	0.436
	C	~~.97761~~	.98181	.99400	0.00419	10	0.419
	D	~~.99208~~	.99208	.99725	0.00517	10	0.517
25	A	~~.99308~~	.99308	1.00006	0.00642	10	0.642
	B	~~.99448~~	.99448	1.00067	0.00619	10	0.619
	C	~~.99282~~	.99282	.99847	0.00565	10	0.565
	D	~~.99266~~	.99266	.99849	0.00583	10	0.583
50	A	~~.99121~~	.99121	.99689	0.00568	9	0.631
	B	~~.98833~~	.98833	.99288	0.00455	10	0.455
	C	~~.98403~~	.98403	.98887	0.00484	10	0.484
	D	~~.98612~~	.98612	.99102	0.00449	9	0.544
		SEM					

7-DAY CHRONIC TOXICITY TEST

JOB NO. F93526
INDUSTRY: Tanker
CONTACT:
EFFLUENT: EE02
NPDES PERMIT NO:
SAMPLE TYPE:
DILUTION WATER: Spring

PERSON CONDUCTING TEST:
BEGINNING: 1615 hrs 1/15/95
ENDING: ____ hrs; / / .
TEST
DILUTIONS:
AGE: ~24 hrs
ORGANISM SOURCE: EC & T

PHOTOPERIOD: 16 hr light
FEEDING REGIME:
0.1 ml Artemia @ 3times/day
TEST VESSEL CAPACITY: 1 liter
TEST SOLUTION VOLUME: 500 mL
NO. ORGANISMS/TREATMENT: 10
NO. REPLICATES: 4

CONC (%)	REP ID	SURVIVAL (#) START	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7
100	A	10	9	9	9	9	9	9	9
	B	10	10	10	10	10	10	10	10
	C	10	10	10	10	10	10	10	~~9~~ 10
	D	10	10	10	10	10	10	10	10
	TIME:	1615	1630	1115	1455	1125	1025	1335	1530
	INITIAL:	MLS	SJC	MLS	TJT	MLS	MAR	SJC	MLS

GROWTH RESULTS

CONC (%)	REP ID	Boat ID	Tare wt (g)	Combined wt (g)	Tot Fish wt (g)	# of Fish	Avg Fish wt (mg)
100	A	~~.97964~~	.97964	.99492	0.00528	9	0.587
	B	~~.98250~~	.98250	.99155	0.00505	10	0.505
	C	~~.98783~~	.98783	.99338	0.00555	10	0.555
	D	~~.98845~~ JEW	.98845	~~.99421~~	0.00579	10	0.579

fish -202
Log# 444
6/15/95

CHRONIC TOXICITY TEST DATA SHEET

TEMPERATURE

CONCENTRATION	Start	Day 1 OLD	Day 1 NEW	Day 2 OLD	Day 2 NEW	Day 3 OLD	Day 3 NEW	Day 4 OLD	Day 4 NEW	Day 5 OLD	Day 5 NEW	Day 6 OLD	Day 6 NEW	Day 7 OLD	Day 7 NEW	Day 8 OLD
6.25	24.8	25.0	25.0	24	24	24.2	24.8	24.8	24.8	25.0	25.0	25.2	25.0	24.8		
12.5																
25																
50																
100																

DISSOLVED OXYGEN

CONCENTRATION	Start	Day 1 OLD	Day 1 NEW	Day 2 OLD	Day 2 NEW	Day 3 OLD	Day 3 NEW	Day 4 OLD	Day 4 NEW	Day 5 ~~OLD~~ New	Day 5 ~~NEW~~ Old	Day 6 OLD	Day 6 NEW	Day 7 OLD	Day 7 NEW	Day 8 OLD
6.25	8.3	7.1	8.0	7.2	7.8	7.8	8.3	7.6	8.0	8.1	7.5	7.0	8.1	7.3		
12.5	8.1	7.2	7.5	7.2	7.8	7.9	8.4	7.5	7.9	8.1	7.6	7.0	8.1	7.1		
25	8.0	7.2	7.5	7.1	7.8	8.0	8.3	7.6	7.9	8.1	7.5	6.9	8.0	6.9		
50	8.0	7.3	7.5	6.9	7.9	8.0	8.3	7.5	7.9	8.1	7.3	6.8	8.0	7.4		
100	7.8	7.4	7.7	6.9	8.0	8.1	8.4	7.5	8.0	8.1	7.2	7.2	8.1	7.5		

pH

CONCENTRATION	Start	Day 1 OLD	Day 1 NEW	Day 2 OLD	Day 2 NEW	Day 3 OLD	Day 3 NEW	Day 4 OLD	Day 4 NEW	Day 5 OLD	Day 5 NEW	Day 6 OLD	Day 6 NEW	Day 7 OLD	Day 7 NEW	Day 8 OLD
6.25	8.12	8.30	8.03	8.39	8.28	8.40	8.41	8.19	8.28	8.42	8.21	8.10	8.18	8.27		
12.5	8.14	8.31	8.17	8.40	8.29	8.42	8.43	8.19	8.29	8.43	8.20	8.09	8.19	8.25		
25	8.16	8.32	8.22	8.43	8.31	8.43	8.43	8.20	8.27	8.27	8.15	8.09	8.20	8.23		
50	8.21	8.32	8.24	8.41	8.33	8.43	8.47	8.18	8.25	8.34	8.14	8.06	8.21	8.38		
100	8.35	8.29	8.26	8.46	8.36	8.47	8.51	8.20	8.31	8.33	8.23	8.25	8.25	8.43		

CONDUCTIVITY

CONCENTRATION	Start	Day 1 OLD	Day 1 NEW	Day 2 OLD	Day 2 NEW	Day 3 OLD	Day 3 NEW	Day 4 OLD	Day 4 NEW	Day 5 OLD	Day 5 NEW	Day 6 OLD	Day 6 NEW	Day 7 OLD	Day 7 NEW	Day 8 OLD
6.25	336	352	~~[illegible]~~ New 348	359	342	367	353	351	320	337	373	361	339	368		
12.5	348	359	380	361	351	368	350	369	333	342	364	362	345	371		
25	364	372	353	370	373	392	370	346	358	370	386	373	342	370		
50	403	401	370	429	415	435	413	432	402	399	427	435	406	430		
100	483	500	411	507	500	523	496	515	484	478	515	519	480	510		

MAR 14.13 LST 1515 LST 1200

ee01fm
File: ee02fm Transform: NO TRANSFORMATION

Chi-square test for normality: actual and expected frequencies

INTERVAL	<-1.5	-1.5 to <-0.5	-0.5 to 0.5	>0.5 to 1.5	>1.5
EXPECTED	1.608	5.808	9.168	5.808	1.608
OBSERVED	0	5	15	4	0

Calculated Chi-Square goodness of fit test statistic = 7.6011
Table Chi-Square value (alpha = 0.01) = 13.277

Data PASS normality test. Continue analysis.

ee01fm
File: ee02fm Transform: NO TRANSFORMATION

Hartley test for homogeneity of variance
Bartletts test for homogeneity of variance

These two tests can not be performed because at least one group has zero variance.

Data FAIL to meet homogeneity of variance assumption.
Additional transformations are useless.

TITLE: ee01fm
TITLE: ee02fm
ANSFORM: NO TRANSFORMATION NUMBER OF GROUPS: 6

GRP	IDENTIFICATION	REP	VALUE	TRANS VALUE
1	Control	1	9.0000	9.0000
1	Control	2	8.0000	8.0000
1	Control	3	10.0000	10.0000
1	Control	4	10.0000	10.0000
2	6.25%	1	10.0000	10.0000
2	6.25%	2	9.0000	9.0000
2	6.25%	3	10.0000	10.0000
2	6.25%	4	10.0000	10.0000
3	12.5%	1	10.0000	10.0000
3	12.5%	2	10.0000	10.0000
3	12.5%	3	10.0000	10.0000
3	12.5%	4	10.0000	10.0000
4	25%	1	10.0000	10.0000
4	25%	2	10.0000	10.0000
4	25%	3	10.0000	10.0000
4	25%	4	10.0000	10.0000
5	50%	1	9.0000	9.0000
5	50%	2	10.0000	10.0000
5	50%	3	10.0000	10.0000
5	50%	4	9.0000	9.0000
	100%	1	9.0000	9.0000
	100%	2	10.0000	10.0000
6	100%	3	10.0000	10.0000
6	100%	4	10.0000	10.0000

ee01fm
File: ee02fm Transform: NO TRANSFORMATION

SUMMARY STATISTICS ON TRANSFORMED DATA TABLE 1 of 2

GRP	IDENTIFICATION	N	MIN	MAX	MEAN
1	Control	4	8.000	10.000	9.250
2	6.25%	4	9.000	10.000	9.750
3	12.5%	4	10.000	10.000	10.000
4	25%	4	10.000	10.000	10.000
5	50%	4	9.000	10.000	9.500
6	100%	4	9.000	10.000	9.750

e01fm
le: ee02fm Transform: NO TRANSFORMATION

SUMMARY STATISTICS ON TRANSFORMED DATA TABLE 2 of 2

EE02 FATHEAD MINNOW CHRONIC
File: FMEE02 Transform: NO TRANSFORMATION

Chi-square test for normality: actual and expected frequencies

INTERVAL	<-1.5	-1.5 to <-0.5	-0.5 to 0.5	>0.5 to 1.5	>1.5
EXPECTED	1.608	5.808	9.168	5.808	1.608
OBSERVED	0	10	5	9	0

Calculated Chi-Square goodness of fit test statistic = 9.8908
Table Chi-Square value (alpha = 0.01) = 13.277

Data PASS normality test. Continue analysis.

EE02 FATHEAD MINNOW CHRONIC
File: FMEE02 Transform: NO TRANSFORMATION

Bartletts test for homogeneity of variance

Calculated B statistic = 5.61
Table Chi-square value = 15.09 (alpha = 0.01)
Table Chi-square value = 11.07 (alpha = 0.05)

Average df used in calculation ==> df (avg n - 1) = 3.00
Used for Chi-square table value ==> df (#groups-1) = 5

Data PASS homogeneity test at 0.01 level. Continue analysis.

NOTE: If groups have unequal replicate sizes the average replicate size is used to calculate the B statistic (see above).

TITLE: EE02 FATHEAD MINNOW CHRONIC
FILE: FMEE02
TRANSFORM: NO TRANSFORMATION NUMBER OF GROUPS: 6

GRP	IDENTIFICATION	REP	VALUE	TRANS VALUE
1	CONTROL	1	0.5040	0.5040
1	CONTROL	2	0.8250	0.8250
1	CONTROL	3	0.7240	0.7240
1	CONTROL	4	0.7030	0.7030
2	6.25	1	0.4860	0.4860
2	6.25	2	0.4080	0.4080
2	6.25	3	0.4010	0.4010
2	6.25	4	0.4980	0.4980
3	12.5	1	0.5550	0.5550
3	12.5	2	0.4360	0.4360
3	12.5	3	0.4190	0.4190
3	12.5	4	0.5170	0.5170
4	25	1	0.6920	0.6920
4	25	2	0.6190	0.6190
4	25	3	0.5650	0.5650
4	25	4	0.5830	0.5830
5	50	1	0.6310	0.6310
5	50	2	0.4550	0.4550
5	50	3	0.4840	0.4840
5	50	4	0.5440	0.5440
6	100	1	0.5870	0.5870
6	100	2	0.5050	0.5050
6	100	3	0.5550	0.5550
6	100	4	0.5790	0.5790

EE02 FATHEAD MINNOW CHRONIC
File: FMEE02 Transform: NO TRANSFORMATION

ANOVA TABLE

SOURCE	DF	SS	MS	F
Between	5	0.156	0.031	5.167
Within (Error)	18	0.106	0.006	
Total	23	0.262		

Critical F value = 2.77 (0.05,5,18)
Since F > Critical F REJECT Ho:All groups equal

EE02 FATHEAD MINNOW CHRONIC
File: FMEE02 Transform: NO TRANSFORMATION

DUNNETTS TEST - TABLE 1 OF 2 Ho:Control<Treatment

GROUP	IDENTIFICATION	TRANSFORMED MEAN	MEAN CALCULATED IN ORIGINAL UNITS	T STAT	SIG
1	CONTROL	0.689	0.689		
2	6.25	0.448	0.448	4.395	*
3	12.5	0.482	0.482	3.784	*
4	25	0.615	0.615	1.356	
5	50	0.529	0.529	2.930	*
6	100	0.557	0.557	2.419	*

Dunnett table value = 2.41 (1 Tailed Value, P=0.05, df=18,5)

EE02 FATHEAD MINNOW CHRONIC
File: FMEE02 Transform: NO TRANSFORMATION

DUNNETTS TEST - TABLE 2 OF 2 Ho:Control<Treatment

GROUP	IDENTIFICATION	NUM OF REPS	Minimum Sig Diff (IN ORIG. UNITS)	% of CONTROL	DIFFERENCE FROM CONTROL
1	CONTROL	4			
2	6.25	4	0.132	19.2	0.241
3	12.5	4	0.132	19.2	0.207
4	25	4	0.132	19.2	0.074
5	50	4	0.132	19.2	0.160
6	100	4	0.132	19.2	0.132

№ 15,3

CHAIN OF CUSTODY RECORD

JOB #	PROJECT NAME	ANALYSES REQUIRED
F93506 Task 3	TAFB - Soldier Creek	

WOODWARD-CLYDE CONSULTANTS
P.O. BOX 680925
FRANKLIN, TN 37068-0925
(615) 790-0003 FAX (615) 790-0023

SAMPLERS: (Signature)

SAMPLE IDENTIFICATION	DATE	TIME	SAMPLE TYPE	NUMBER OF CONTAINERS	Toxicity						REMARKS
											Fed Ex 530482345 2
SC-EE02-TX-201	6/12/95	11:30	Water	3	✓						

RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)	RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)
	6/12/95 18:00				
RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)	RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)
RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED AT LAB BY: (Signature)	DATE/TIME	GENERAL COMMENTS	
		Luja Jau	6/13/95 0855	2.5°C upon arrival	

Distribution: Original and Yellow copies accompany sample shipment to laboratory
Pink copy retained by samplers. Yellow copy retained by laboratory. Laboratory returns White copy to samplers.

№ 15.3

CHAIN OF CUSTODY RECORD

JOB #	PROJECT NAME
F93506 Task 3	TAFB Soldier Creek

SAMPLERS: (Signature)

ANALYSES REQUIRED: Toxicity

WOODWARD-CLYDE CONSULTANTS
P.O. BOX 680925
FRANKLIN, TN 37068-0925
(615) 790-0003 FAX (615) 790-0023

SAMPLE IDENTIFICATION	DATE	TIME	SAMPLE TYPE	NUMBER OF CONTAINERS	Toxicity	REMARKS
SC-EE02-TY-201	6/12/95	11:30	Water	2	✓	Fed Ex 590482345?
SC-EE02-TY-201	11	12:00	Seed	2	✓	

RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)	RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)
	6/12/95 18:00				
RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)	RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)
RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED AT LAB BY: (Signature)	DATE/TIME	GENERAL COMMENTS	
		Lyn Jeer	6/13/95 0854	3°C upon arrival	

Distribution: Original and Yellow copies accompany sample shipment to laboratory
Pink copy retained by samplers. Yellow copy retained by laboratory. Laboratory returns White copy to samplers.

48-hr Ceriodaphnia dubia TOXICITY TEST

LOG NO. 433-437
JOB NO. 193506
INDUSTRY: Linker
CONTACT:

EFFLUENT: ~~CR, EEO2~~ mls Controls
START DATE: 6-13-95
START TIME: 1510
DILUTION WATER: ~~270 Hard~~ mls Controls

CONC (%)	REP ID	SURVIVAL (#) 0	24	48	DEAD	TEMPERATURE (oC) 0	24	48	DO (mg/L) 0	24	48	pH (S.U.) 0	24	48	CONDUCTIVITY (umhos/cm) 0	24	48
110	A	5	5	5		24.8		25.0	8.5		8.2	7.64		8.28	500		499
CON	B	5	5	5													
w/ EE01	C	5	5	5													
	D	5	5	5													
250	A	5	5	5					8.5		8.2	8.54		8.54	689		739
CON	B	5	5	5													
w/EE02	C	5	5	5													
	D	5	5	5													
270	A	5	5	5					8.5		8.3	8.62		8.57	764		790
CON	B	5	5	5													
w/EE03	C	5	5	5													
& CREEO2	D	5	5	5													
300	A	5	5	5					8.5		8.2	8.54		8.49	582		578
CON	B	5	5	5													
~~w/CR EE02~~ mls	C	5	5	5													
w/EE04	D	5	5	5													
	A																
	B																
	C																
	D																
	Initials	SJB	LJL	LJL													
	Time	1510	1500	0930													

Comments

PARAMETER	Control	
Total Hardness (mg/L CaCO3)		
Total Alkalinity (mg/L CaCO3 @ 4.5)		

48ACUT.XLS

48-hr Ceriodaphnia dubia TOXICITY TEST

LOG NO. 425
JOB NO. P93501r
INDUSTRY: Tinker
CONTACT:

EFFLUENT: 8803
START DATE: 6-13-95
START TIME: 1500
DILUTION WATER: Hard -270

CONC (%)	REP ID	SURVIVAL (#) 0	24	48	DEAD	TEMPERATURE (oC) 0	24	48	DO (mg/L) 0	24	48	pH (S.U.) 0	24	48	CONDUCTIVITY (umhos/cm) 0	24	48
6.25	A	5	5	5		24.8		25.0	8.5		8.3	8.03		8.57	753		786
	B	5	5	5													
	C	5	5	5													
	D	5	5	5													
12.5	A	5	5	5					8.5		8.4	8.03		8.58	767		788
	B	5	5	5													
	C	5	5	5													
	D	5	5	5													
25	A	5	5	5					8.5		8.3	8.00		8.58	750		755
	B	5	5	5													
	C	5	5	5													
	D	5	5	5													
50	A	5	5	5					8.5		8.1	8.55		8.63	699		779
	B	5	5	5													
	C	5	5	5													
	D	5	5	5													
100	A	5	5	5					8.5		8.2	8.57		8.63	644		595
	B	5	5	5													
	C	5	5	5													
	D	5	5	5													
	Initials	LST	LDL	CJT													
	Time	1500	1415	1035													

Comments

PARAMETER	Control	
Total Hardness (mg/L CaCO3)		
Total Alkalinity (mg/L CaCO3 @ 4.5)		

48-hr Pimephales promleas TOXICITY TEST

LOG NO. 435
JOB NO. F93506
INDUSTRY: Tronex
CONTACT: WCC - Todays old

EFFLUENT: EEO3
START DATE: 10-13-95
START TIME: 1415
DILUTION WATER: Spring

CONC (%)	REP ID	SURVIVAL (#) 0	24	48	DEAD	TEMPERATURE (oC) 0	24	48	DO (mg/L) 0	24	48	pH (S.U.) 0	24	48	CONDUCTIVITY (umhos/cm) 0	24	48
6.25	A	10	10	10	0	~~24.8~~		20.9	8.2		8.1	8.13		8.46	359		375
	B	10	10	5	2	20.8											
12.5	A	10	9	9	1				8.3		8.1	8.12		8.46	369		387
	B	10	10	10	0												
25	A	10	10	10	0				8.2		8.1	8.15		8.49	405		425
	B	10	10	9	1												
50	A	10	10	10	0				8.3		8.1	8.19		8.42	483		506
	B	10	10	10	0												
100	A	10	10	10	0				8.3		8.0	8.38		8.53	602		636
	B	10	10	10	0												
	A																
	B																
	A																
	B																
	A																
	B																
	A																
	B																
	A																
	B																
Initials		MLS	MLS	MLS													
Time		1430	1500	0940													

Comments

PARAMETER	Control	
Total Hardness (mg/L CaCO3)		
Total Alkalinity (mg/L CaCO3 @ 4.5)		

Ceriodaphnia SURVIVAL AND REPRODUCTION CHRONIC TOXICITY TEST

Log No. 445

JOB NO. F93506 | BEGINNING: 1630 hrs: 6/15/95 | PHOTOPERIOD: 16 light, 8 dark
INDUSTRY: Tinker | ENDING: _____ hrs: 6/22/95 | ORGANISM SOURCE: WCC
CONTACT: | FEEDING REGIME: | TEST VESSEL CAPACITY: 30 mL
EFFLUENT: EEC 3 | .05 mL yct/15 mL | TEST SOLUTION VOLUME: 15mL
NPDES PERMIT NO: | .05 mL algal suspension/15 mL | NO. REPLICATES:
PERSON CONDUCTING TEST: | | DILUTION WATER:

CONC	CHAMBER	NUMBER OF YOUNG PRODUCED								
	TIME									
	OBSERVER									
		START	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7	
						7	51	95	175	
Control	1							6	7	13
	2					3	5	6	16	2
	3						9	2	10	21
	4						5	4	6	15
	5					1	0	6	7	14
	6						3	4	10	20
	7						6	3	10	19
	8						5	0	11	16
	9						10	3	5	18
	10					3	1	7	4	15
		START	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7	
						2	18	29	83	
6.25%	11						1	2	7	10
	12						7	5	5	17
	13		D							0
	14							5	6	6
	15					1	1	3	3	8
	16						8	2	4	14
	17						3	1	5	9
	18						1	0	9	12
	19							0	6	6
	20					1	3	0	9	13
					10% mortality					
		START	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7	
						4	21	62	127	
	21		D							0
	22						2	7	11	22
	23						3	2	3	13
	24					1	6	0	5	12
	25							0	9	15
	26						~~5~~ 6	5	2	16
	27					1	0	3	6	10
	28			D						0
	29							9	11	2
	30					2	0	6	10	18
					20% mortality					

Ceriodaphnia SURVIVAL AND REPRODUCTION CHRONIC TOXICITY TEST

JOB NO: 93306 | BEGINNING: 1630 hrs; 6/15/95 | Log No. 445
INDUSTRY: Tanker | ENDING: _____ hrs; / / | PHOTOPERIOD: 16 light, 8 dark
CONTACT: | FEEDING REGIME: | ORGANISM SOURCE: WCC
EFFLUENT: E203 | .05 mL yct/15 mL | TEST VESSEL CAPACITY: 30 mL
NPDES PERMIT NO: | .05 mL algal suspension/15 mL | TEST SOLUTION VOLUME: 15mL
PERSON CONDUCTING TEST: | | NO. REPLICATES:
| | DILUTION WATER:

CONC	CHAMBER	TIME / OBSERVER	NUMBER OF YOUNG PRODUCED							
			START	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7
						3	9	30	79	130	
25%	31							9	6	2	17
	32							6	0	9	15
	33						2	7	0	8	17
	34							3	2	6	11
	35						2	(D) 7			9
	36					3	0	3	10	2	18
	37						JT 2	JT 5	11	3	14
	38							6	0	11	28
	39				(D)						0
	40						2	0	0	10	12
						20% mortality					
			START	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7
						13	21	63	104	151	
50%	41						2	7	12	0	21
	42					4	0	6	14	11	35
	43						2	0	0	8	16
	44				(D)						0
	45					JT 5	JT 4	9	9	3	21
	46					5	0	6	6	2	19
	47							(D) 3			3
	48						1	5	0	10	16
	49					4	(D)				4
	50						3	0	0	13	16
						30% mortality					
			START	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7
						3	23	78	124	190	
100%	51						2	3	10	0	20
	52						3	4	0	7	14
	53					3	5	4	0	11	23
	54						4	5	0	10	19
	55						4	5	6	3	18
	56							10	5	0	15
	57						3	5	0	9	16
	58							5	9	10	24
	59							5	5	6	16
	60							4	8	10	22

Ceriodaphnia dubia GRID Ceriodaphnia dubia GRID MONITORING DATA

Grid Letter: ~~XJ~~ ~~A~~ ~~Ø3~~ ~~Ø~~T Start Date: 6/15/95 Sample ID: EE03 Log #: 44

AD	ID	1	2	3	4	5	6	7
	7	✓	✓	0	0	6	3	10
	32	✓	✓	0	0	6	0	9
	44	✓	D					
	31	✓	✓	0	0	9	6	2
	15	✓	✓	0	1	1	3	3
	50	✓	✓	0	3	0	0	13
	3	✓	✓	0	0	9	2	10
	12	✓	✓	0	0	7	5	5
	53	✓	✓	3	5	4	0	11
	58	✓	✓	0	0	5	9	1
	29	✓	✓	0	0	0	9	11
	20	✓	✓	0	1	3	0	9
	36	✓	✓	3	0	3	10	2
	45	✓	✓	0	0	9	9	3
	18	✓	✓	0	0	1	0	9
	37	✓	✓	0	0	0	11	3
	43	✓	✓	0	2	6	0	8
	23	✓	✓	0	0	3	2	8
	5	✓	✓	0	1	0	6	7
	38	✓	✓	0	0	0	6	1
	4	✓	✓	0	0	5	4	6
	13	D						
	57	✓	✓	0	2	5	0	9
	27	✓	✓	0	1	0	3	6
	52	✓	✓	0	3	4	0	7
	25	✓	✓	0	0	0	6	9
	51	✓	✓	0	2	8	10	0
	21	D						
	46	✓	✓	5	0	6	6	2
	10	✓	✓	0	3	1	7	4

Comments:

Cup ID	Sample Concentration	Day Ø	Initials SJE	Time 1630
1–10:	Control	1	LJT	1620
11–20:	6.25	2	MLS	1430
21–30:	12.5	3	SJE	1330
31–40:	25	4	SJE	1100
41–50:	50	5	MAR	1354
51–60:	100	6	LJT	1250
		7	LJT	1530

Ceriodaphnia dubia GRID Ceriodaphnia dubia GRID MONITORING DATA

Grid Letter: W Start Date: 6/15/95 Sample ID: EE03 Log #: 44

AD	ID 40	1 ✓	AD	ID 14	1 ✓	AD	ID 33	1 ✓	AD	ID 24	1 ✓		ID 8	1 ✓
2 ✓	3 C	4 2	2 ✓	3 C	4 0	2 ✓	3 0	4 2	2 ✓	3 0	4 1	2 ✓	3 C	4 C
5 0	6 0	7 10	5 0	6 0	7 6	5 7	6 0	7 8	5 6	6 0	7 8	5 0	6 5	7 11
AD	ID 1	1 ✓	AD	ID 55	1 ✓	AD	ID 28	1 ✓	AD	ID 59	1 ✓		ID 17	1 ✓
2 ✓	3 0	4 0	2 ✓	3 0	4 9	2 D	3	4	2 ✓	3 0	4 0	2 ✓	3 0	4 0
5 0	6 4	7 7	5 5	6 6	7 3	5	6	7	5 5	6 5	7 6	5 3	6 1	7 5
AD	ID 22	1 ✓	AD	ID 49	1 ✓	AD	ID 11	1 ✓	AD	ID 54	1 ✓		ID 19	1 ✓
2 ✓	3 0	4 0	2 ✓	3 4	4 0	2 ✓	3 0	4	2 ✓	3 0	4 4	2 ✓	3 D	4 0
5 2	6 7	7 11	5	6	7	5 1	6 2	7 7	5 5	6 0	7 10	5 0	6 0	7 6
AD	ID 60	1 ✓	AD	ID 26	1 ✓	AD	ID 2	1 ✓	AD	ID 34	1 ✓		ID 48	1 ✓
2 ✓	3 0	4 0	2 ✓	3 0	4 0	2 ✓	3 0	4 3	2 ✓	3 0	4 0	2 ✓	3 0	4 1
5 4	6 8	7 10	5 6	6 8	7 2	5 5	6 6	7 10	5 3	6 2	7 6	5 5	6 0	7 10
AD	ID 9	1 ✓	AD	ID 42	1 ✓	AD	ID 35	1 ✓	AD	ID 16	1 ✓		ID 56	1 ✓
2 ✓	3 0	4 0	2 ✓	3 4	4 0	2 ✓	3 0	4 2	2 ✓	3 0	4 0	2 ✓	3 0	4 1
5 10	6 3	7 5	5 6	6 14	7 11	5 0/7	6	7	5 8	6 0	7 4	5 10	6 8	7
AD	ID 39	1 ✓	AD	ID 41	1 ✓	AD	ID 6	1 ✓	AD	ID 47	1 ✓		ID 30	1 ✓
2 D	3	4	2 ✓	3 0	4 2	2 ✓	3 0	4 0	2 ✓	3 0	4 0	2 ✓	3 0	4 2
5	6	7	5 7	6 12	7 0	5 3	6 7	7 10	5 D/3	6	7	5 0	6 6	7

Comments:

Cup ID	Sample Concentration
1–10:	
11–20:	
21–30:	
31–40:	
41–50:	
51–60:	

Day	Initials	Time
1	LJT	1615
2	MLS	1430
3	SJB	1330
4	SJB	1100
5	MAR	1347
6	LJT	1250
7		

C. dubia
Log # 445
6/15/95
Hard H_2O: 270

CHRONIC TOXICITY TEST DATA SHEET

TEMPERATURE

CONCENTRATION	Start	Day 1 OLD	Day 1 NEW	Day 2 OLD	Day 2 NEW	Day 3 OLD	Day 3 NEW	Day 4 OLD	Day 4 NEW	Day 5 OLD	Day 5 NEW	Day 6 OLD	Day 6 NEW	Day 7 OLD	Day 7 NEW	Day 8 OLD
Control	25°	25.0	25.0	24.0	24.0	24.2	24.8	24.8	24.8	25.0	25.0	25.2	25.2	24.8		
6.25																
12.5																
25																
50																
100																

DISSOLVED OXYGEN

CONCENTRATION	Start	Day 1 OLD	Day 1 NEW	Day 2 OLD	Day 2 NEW	Day 3 OLD	Day 3 NEW	Day 4 OLD	Day 4 NEW	Day 5 OLD	Day 5 NEW	Day 6 OLD	Day 6 NEW	Day 7 OLD	Day 7 NEW	Day 8 OLD
Con	8.6	7.4	8.4	7.2	8.3	8.0	8.3	8.1	8.3	8.0	8.2	7.9	8.0	7.7		
6.25	8.5	7.6	8.1	7.2	8.4	8.0	8.3	8.2	8.3	8.0	8.2	7.8	8.0	7.6		
12.5	8.5	7.5	8.4	7.2	8.4	8.1	8.4	8.1	8.3	7.9	8.2	7.9	8.0	7.6		
25	8.5	7.6	8.4	7.2	8.5	8.1	8.4	8.1	8.4	7.9	8.2	7.8	8.1	7.5		
50	8.5	7.6	8.4	7.2	8.5	8.2	8.4	8.0	8.4	7.9	8.2	7.8	8.2	7.6		
100	8.6	7.5	8.4	7.0	8.5	8.3	8.5	8.1	8.3	7.9	8.1	7.8	8.3	7.5		

pH

CONCENTRATION	Start	Day 1 OLD	Day 1 NEW	Day 2 OLD	Day 2 NEW	Day 3 OLD	Day 3 NEW	Day 4 OLD	Day 4 NEW	Day 5 OLD	Day 5 NEW	Day 6 OLD	Day 6 NEW	Day 7 OLD	Day 7 NEW	Day 8 OLD
Con	8.63	8.38	8.57	8.42	8.61	8.56	8.73	8.49	8.56	8.57	8.53	8.34	8.41	8.24		
6.25	8.63	8.38	8.56	8.41	8.59	8.57	8.72	8.49	8.54	8.55	8.51	8.34	8.43	8.42		
12.5	8.61	8.31	8.56	8.43	8.59	8.56	8.71	8.49	8.54	8.56	8.51	8.33	8.48	8.49		
25	8.58	8.32	8.53	8.43	8.56	8.60	8.69	8.49	8.53	8.58	8.49	8.31	8.46	8.44		
50	8.52	8.35	8.49	8.43	8.51	8.60	8.66	8.49	8.50	8.57	8.47	8.35	8.40	8.45		
100	8.42	8.30	8.45	8.45	8.41	8.61	8.60	8.42	8.46	8.57	8.43	8.32	8.34	8.45		

CONDUCTIVITY

CONCENTRATION	Start	Day 1 OLD	Day 1 NEW	Day 2 OLD	Day 2 NEW	Day 3 OLD	Day 3 NEW	Day 4 OLD	Day 4 NEW	Day 5 OLD	Day 5 NEW	Day 6 OLD	Day 6 NEW	Day 7 OLD	Day 7 NEW	Day 8 OLD
Con	748	750	760	670	820	846	944	882	894	878	878	915	865	452		
6.25	733	778	769	751	820	814	918	907	872	861	851	911	844	852		
12.5	731	777	742	773	806	798	901	902	864	885	851	881	832	879		
25	711	760	744	754	788	753	878	825	834	863	818	860	811	855		
50	677	770	667	714	777	810	800	803	773	786	772	778	770	785		
100	611	651		566	640	654	669	675	639	644	623	652	622	658		

mAE 1600

LST 1620
ALE 1752

1231
1200

ee03cd
File: ee03cd Transform: NO TRANSFORMATION

Chi-square test for normality: actual and expected frequencies

INTERVAL	<-1.5	-1.5 to <-0.5	-0.5 to 0.5	>0.5 to 1.5	>1.5
EXPECTED	4.020	14.520	22.920	14.520	4.020
OBSERVED	5	3	45	7	0

Calculated Chi-Square goodness of fit test statistic = 38.5642
Table Chi-Square value (alpha = 0.01) = 13.277

Data FAIL normality test. Try another transformation.

Warning - The two homogeneity tests are sensitive to non-normal data and should not be performed.

ee03cd
File: ee03cd Transform: NO TRANSFORMATION

Hartley test for homogeneity of variance
Bartletts test for homogeneity of variance

These two tests can not be performed because at least one group has zero variance.

Data FAIL to meet homogeneity of variance assumption.
Additional transformations are useless.

TITLE: ee03cd
TLE: ee03cd
RANSFORM: NO TRANSFORMATION NUMBER OF GROUPS: 6

GRP	IDENTIFICATION	REP	VALUE	TRANS VALUE
1	Control	1	1.0000	1.0000
1	Control	2	1.0000	1.0000
1	Control	3	1.0000	1.0000
1	Control	4	1.0000	1.0000
1	Control	5	1.0000	1.0000
1	Control	6	1.0000	1.0000
1	Control	7	1.0000	1.0000
1	Control	8	1.0000	1.0000
1	Control	9	1.0000	1.0000
1	Control	10	1.0000	1.0000
2	6.25%	1	1.0000	1.0000
2	6.25%	2	1.0000	1.0000
2	6.25%	3	0.0000	0.0000
2	6.25%	4	1.0000	1.0000
2	6.25%	5	1.0000	1.0000
2	6.25%	6	1.0000	1.0000
2	6.25%	7	1.0000	1.0000
2	6.25%	8	1.0000	1.0000
2	6.25%	9	1.0000	1.0000
2	6.25%	10	1.0000	1.0000
3	12.5%	1	0.0000	0.0000
3	12.5%	2	1.0000	1.0000
3	12.5%	3	1.0000	1.0000
3	12.5%	4	1.0000	1.0000
3	12.5%	5	1.0000	1.0000
3	12.5%	6	1.0000	1.0000
3	12.5%	7	1.0000	1.0000
3	12.5%	8	0.0000	0.0000
3	12.5%	9	1.0000	1.0000
3	12.5%	10	1.0000	1.0000
4	25%	1	1.0000	1.0000
4	25%	2	1.0000	1.0000
4	25%	3	1.0000	1.0000
4	25%	4	1.0000	1.0000
4	25%	5	0.0000	0.0000
4	25%	6	1.0000	1.0000
4	25%	7	1.0000	1.0000
4	25%	8	1.0000	1.0000
4	25%	9	0.0000	0.0000
4	25%	10	1.0000	1.0000
5	50%	1	1.0000	1.0000
5	50%	2	1.0000	1.0000
5	50%	3	1.0000	1.0000
5	50%	4	0.0000	0.0000
5	50%	5	1.0000	1.0000
5	50%	6	1.0000	1.0000
5	50%	7	0.0000	0.0000
5	50%	8	1.0000	1.0000
5	50%	9	0.0000	0.0000
5	50%	10	1.0000	1.0000

6	100%	1	1.0000	1.0000
6	100%	2	1.0000	1.0000
6	100%	3	1.0000	1.0000
6	100%	4	1.0000	1.0000
6	100%	5	1.0000	1.0000
6	100%	6	1.0000	1.0000
6	100%	7	1.0000	1.0000
6	100%	8	1.0000	1.0000
6	100%	9	1.0000	1.0000
6	100%	10	1.0000	1.0000

ee03cd
File: ee03cd Transform: NO TRANSFORMATION

SUMMARY STATISTICS ON TRANSFORMED DATA TABLE 1 of 2

GRP	IDENTIFICATION	N	MIN	MAX	MEAN
1	Control	10	1.000	1.000	1.000
2	6.25%	10	0.000	1.000	0.900
3	12.5%	10	0.000	1.000	0.800
4	25%	10	0.000	1.000	0.800
5	50%	10	0.000	1.000	0.700
6	100%	10	1.000	1.000	1.000

ee03cd
File: ee03cd Transform: NO TRANSFORMATION

SUMMARY STATISTICS ON TRANSFORMED DATA TABLE 2 of 2

GRP	IDENTIFICATION	VARIANCE	SD	SEM
1	Control	0.000	0.000	0.000
2	6.25%	0.100	0.316	0.100
3	12.5%	0.178	0.422	0.133
4	25%	0.178	0.422	0.133
5	50%	0.233	0.483	0.153
6	100%	0.000	0.000	0.000

ee03cd
File: ee03cd Transform: NO TRANSFORMATION

STEELS MANY-ONE RANK TEST - Ho:Control<Treatment

ROUP	IDENTIFICATION	TRANSFORMED MEAN	RANK SUM	CRIT. VALUE	df	SIG
1	Control	1.000				
2	6.25%	0.900	100.00	75.00	10.00	
3	12.5%	0.800	95.00	75.00	10.00	

4	25%	0.800	95.00	75.00	10.00
5	50%	0.700	90.00	75.00	10.00
6	100%	1.000	105.00	75.00	10.00

Critical values use k = 5, are 1 tailed, and alpha = 0.05

EE03 CERIO CHRONIC
File: cdee03 Transform: NO TRANSFORMATION

i-square test for normality: actual and expected frequencies

INTERVAL	<-1.5	-1.5 to <-0.5	-0.5 to 0.5	>0.5 to 1.5	>1.5
EXPECTED	4.020	14.520	22.920	14.520	4.020
OBSERVED	5	12	24	15	4

Calculated Chi-Square goodness of fit test statistic = 0.7431
Table Chi-Square value (alpha = 0.01) = 13.277

Data PASS normality test. Continue analysis.

EE03 CERIO CHRONIC
File: cdee03 Transform: NO TRANSFORMATION

Hartley test for homogeneity of variance

Calculated H statistic (max Var/min Var) = 10.22
Closest, conservative, Table H statistic = 12.1 (alpha = 0.01)

,ed for Table H ==> R (# groups) = 6, df (# reps-1) = 9
Actual values ==> R (# groups) = 6, df (# avg reps-1) = 9.00

Data PASS homogeneity test. Continue analysis.

NOTE: This test requires equal replicate sizes. If they are unequal but do not differ greatly, the Hartley test may still be used as an approximate test (average df are used).

TITLE: EE03 CERIO CHRONIC
TLE: cdee03
RANSFORM: NO TRANSFORMATION NUMBER OF GROUPS: 6

GRP	IDENTIFICATION	REP	VALUE	TRANS VALUE
1	CONTROL	1	13.0000	13.0000
1	CONTROL	2	24.0000	24.0000
1	CONTROL	3	21.0000	21.0000
1	CONTROL	4	15.0000	15.0000
1	CONTROL	5	14.0000	14.0000
1	CONTROL	6	20.0000	20.0000
1	CONTROL	7	19.0000	19.0000
1	CONTROL	8	16.0000	16.0000
1	CONTROL	9	18.0000	18.0000
1	CONTROL	10	15.0000	15.0000
2	6.25	1	10.0000	10.0000
2	6.25	2	17.0000	17.0000
2	6.25	3	0.0000	0.0000
2	6.25	4	6.0000	6.0000
2	6.25	5	8.0000	8.0000
2	6.25	6	12.0000	12.0000
2	6.25	7	9.0000	9.0000
2	6.25	8	10.0000	10.0000
2	6.25	9	6.0000	6.0000
2	6.25	10	13.0000	13.0000
3	12.5	1	0.0000	0.0000
3	12.5	2	20.0000	20.0000
3	12.5	3	13.0000	13.0000
3	12.5	4	15.0000	15.0000
3	12.5	5	15.0000	15.0000
3	12.5	6	16.0000	16.0000
3	12.5	7	10.0000	10.0000
3	12.5	8	0.0000	0.0000
3	12.5	9	20.0000	20.0000
3	12.5	10	18.0000	18.0000
4	25	1	17.0000	17.0000
4	25	2	15.0000	15.0000
4	25	3	17.0000	17.0000
4	25	4	11.0000	11.0000
4	25	5	9.0000	9.0000
4	25	6	18.0000	18.0000
4	25	7	14.0000	14.0000
4	25	8	17.0000	17.0000
4	25	9	0.0000	0.0000
4	25	10	12.0000	12.0000
5	50	1	21.0000	21.0000
5	50	2	35.0000	35.0000
5	50	3	16.0000	16.0000
5	50	4	0.0000	0.0000
5	50	5	21.0000	21.0000
5	50	6	19.0000	19.0000
5	50	7	3.0000	3.0000
5	50	8	16.0000	16.0000
5	50	9	4.0000	4.0000
5	50	10	16.0000	16.0000

6	100	1	20.0000	20.0000
6	100	2	14.0000	14.0000
6	100	3	23.0000	23.0000
6	100	4	19.0000	19.0000
[illegible]	100	5	18.0000	18.0000
[illegible]	100	6	18.0000	18.0000
6	100	7	16.0000	16.0000
6	100	8	24.0000	24.0000
6	100	9	16.0000	16.0000
6	100	10	22.0000	22.0000

EE03 CERIO CHRONIC
File: cdee03 Transform: NO TRANSFORMATION

STEELS MANY-ONE RANK TEST - Ho:Control<Treatment

GROUP	IDENTIFICATION	TRANSFORMED MEAN	RANK SUM	CRIT. VALUE	df	SIG
1	CONTROL	17.500				
2	6.25	9.100	60.50	75.00	10.00	*
3	12.5	12.700	86.50	75.00	10.00	
4	25	13.000	80.00	75.00	10.00	
5	50	15.100	102.00	75.00	10.00	
6	100	19.000	118.00	75.00	10.00	

Critical values use k = 5, are 1 tailed, and alpha = 0.05

FATHEAD MINNOW SURVIVAL AND GROWTH
7-DAY CHRONIC TOXICITY TEST

Log No. 5145

JOB NO. F93500
INDUSTRY: Tinker
CONTACT:
EFFLUENT: EE03
NPDES PERMIT NO:
SAMPLE TYPE:
DILUTION WATER:

PERSON CONDUCTING TEST:
BEGINNING: ___hrs; 4/9/15
ENDING: ___hrs; 4/16/15
TEST
DILUTIONS:
AGE:
ORGANISM SOURCE:

PHOTOPERIOD: 16 hr light
FEEDING REGIME:
0.1 ml Artemia @ 3times/day
TEST VESSEL CAPACITY: 1 liter
TEST SOLUTION VOLUME: 500 mL
NO. ORGANISMS/TREATMENT: 10
NO. REPLICATES: 4

CONC (%)	REP ID	SURVIVAL (#) START	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7
6.25	A	10	10	10	10	10	10	10	10
	B	10	10	10	10	10	10	10	10
	C	10	10	10	10	10	10	10	10
	D	10	10	10	10	10	10	10	10
12.5	A	10	10	10	10	10	10	10	10
	B	10	10	10	10	10	10	10	10
	C	10	10	10	10	10	10	10	10
	D	10	10	10	10	10	10	10	10
25	A	10	10	10	10	10	10	10	10
	B	10	10	10	10	10	10	10	10
	C	10	10	10	10	10	10	10	10
	D	10	10	10	10	10	10	10	10
50	A	10	10	10	10	10	10	10	10
	B	10	10	10	10	10	10	10	10
	C	10	10	10	10	10	10	9	9
	D	10	10	10	10	10	10	10	10
	TIME:	1520	1530	1324	1420	1300	1320	1500	1510
	INITIAL:	MAR	MAR	MLS	MLS	MLS	MLS	SDB	SDB

GROWTH RESULTS

CONC (%)	REP ID	Boat ID	Tare wt (g)	Combined wt (g)	Tot Fish wt (g)	# of Fish	Avg Fish wt (mg)	
6.25	A	~~.98415~~	.98415	.99139	0.00724	10	0.724	
	B	~~.98627~~	.98622	.99185	0.00563	10	0.563	
	C	~~.98457~~	.98457	.99154	0.00697	10	0.697	
	D	~~.98411~~	.98044	.98760	0.00716	10	0.716	
12.5	A	~~.96995~~	.96995	.97648	0.00653	10	0.653	
	B	~~.99903~~	.97903	0.98606	0.00702	10	0.702	
	C	~~.98140~~	.98140	.98791	0.00651	10	0.651	
	D	~~.99544~~	.99544	1.00282	0.00738	10	0.738	
25	A	~~.97750~~	.97750	.98290	0.00540	10	0.540	
	B	~~.97265~~	.97265	~~1.00066~~ .97926		10	0.661	① 0.00661
	C	~~.97660~~	.97660	.98314	0.00654	10	0.654	
	D	~~.97656~~	.97656	0.98265	0.00609	10	0.609	
50	A	~~.98021~~	.98021	.98648	0.00627	10	0.627	
	B	~~.98524~~	.98524	0.99135	0.00611	10	0.611	
	C	~~.97626~~	.97626	.98141	0.00515	9	0.573	
	D	~~.97364~~	.97364	.98793	0.01429	10	1.427	
		SDB						

FATHEAD MINNOW SURVIVAL AND GROWTH
7-DAY CHRONIC TOXICITY TEST

Log No. 94 45

JOB NO. F93506
INDUSTRY: Turkey
CONTACT:
EFFLUENT: E EC 3
NPDES PERMIT NO:
SAMPLE TYPE:
DILUTION WATER:

PERSON CONDUCTING TEST:
BEGINNING: ____hrs; / / .
ENDING: ____hrs; / / .
TEST
DILUTIONS:
AGE:
ORGANISM SOURCE:

PHOTOPERIOD: 16 hr light
FEEDING REGIME:
0.1 ml Artemia @ 3times/day
TEST VESSEL CAPACITY: 1 liter
TEST SOLUTION VOLUME: 500 mL
NO. ORGANISMS/TREATMENT: 10
NO. REPLICATES: 4

CONC (%)	REP ID	SURVIVAL (#) START	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7
100	A	10	10	10	10	10	10	10	10
	B	10	8	8	8	8	8	8	8
	C	10	10	10	10	10	10	10	10
	D	10	10	10	10	10	10	10	9
TIME:		1525	1532	1324	1420	1400	1320	1515	1515
INITIAL:		MAR	MAR	MLS	MLS	MLS	MLS	SR	SR

GROWTH RESULTS

CONC (%)	REP ID	Boat ID	Tare wt (g)	Combined wt (g)	Tot Fish wt (g)	# of Fish	Avg Fish wt (mg)
100	A	~~.97659~~	.98159	.98766	0.00707	10	0.707
	B	~~.97602~~	.97602	.98270	0.00668	8	0.835
	C	~~.97708~~	.97708	.98375	0.00667	10	0.667
	D	~~.97613~~	.97613	.98105	0.00492	9	0.547
		JLU					

L[illegible] 1445
6/15/95

CHRONIC TOXICITY TEST DATA SHEET

TEMPERATURE

CONCENTRATION	Start	Day 1		Day 2		Day 3		Day 4		Day 5		Day 6		Day 7		Day 8
		OLD	NEW	OLD	NEW	OLD	NEW	OLD	NEW	OLD	NEW	OLD	NEW	OLD	NEW	OLD
6.25	24.8	25.0	25.0	24	24	24.2	25.0	25.0	24.8	25.0	25.0	25.2	25.2	24.8		
12.5																
25																
50																
100																

DISSOLVED OXYGEN

CONCENTRATION	Start	Day 1		Day 2		Day 3		Day 4		Day 5		Day 6		Day 7		Day 8
		OLD	NEW	OLD	NEW	OLD	NEW	OLD	NEW	~~OLD~~ new	~~NEW~~ old	OLD	NEW	OLD	NEW	OLD
6.25	8.5	7.3	7.8	6.7	8.0	7.5	8.5	7.4	7.8	8.1	7.6	7.2	8.1	~~5.7~~ 5.2		
12.5	8.4	7.4	7.9	6.7	8.0	7.5	8.6	7.4	7.7	8.1	7.6	7.2	8.2	~~5.0~~		
25	8.4	7.4	7.9	6.7	8.0	7.5	8.5	7.3	7.6	8.1	7.6	7.2	8.2	5.8		
50	8.4	7.6	8.0	6.9	8.1	7.4	8.5	7.4	7.8	8.1	7.6	7.3	8.2	5.5		
100	8.5	7.6	8.1	6.6	8.2	7.4	8.5	7.4	8.0	8.2	7.7	7.3	8.1	5.0		

pH

CONCENTRATION	Start	Day 1		Day 2		Day 3		Day 4		Day 5		Day 6		Day 7		Day 8
		OLD	NEW	OLD	NEW	OLD	NEW	OLD	NEW	~~OLD~~ old	~~NEW~~ new	OLD	NEW	OLD	NEW	OLD
6.25	8.21	8.21	8.38	8.40	8.36	8.32	8.51	8.17	8.16	8.31	8.20	8.16	8.17			
12.5	8.24	8.21	8.34	8.40	8.36	8.31	8.50	8.19	8.18	8.33	8.16	8.17	8.22	8.12		
25	8.25	8.17	8.35	8.36	8.37	8.30	8.50	8.18	8.18	8.24	8.18	8.07	8.30	8.07		
50	8.26	8.13	8.36	8.37	8.39	8.28	8.51	8.19	8.18	8.34	8.21	8.02	8.27	8.06		
100	8.41	8.23	8.46	8.36	8.42	8.33	8.52	8.22	8.29	8.29	8.25	8.03	8.32	8.01		

CONDUCTIVITY

CONCENTRATION	Start	Day 1		Day 2		Day 3		Day 4		Day 5		Day 6		Day 7		Day 8
		OLD	NEW	OLD	NEW	OLD	NEW	OLD	NEW	~~OLD~~ old	~~NEW~~ new	OLD	NEW	OLD	NEW	OLD
6.25	350	3[illegible]5	352	385	34354	352	364	391	334	344	400	401	349	417		
12.5	364	351	369	383	371	356	372	386	353	363	386	396	358	412		
25	393	413	407	412	410	419	413	424	372	397	420	431	395	417		
50	404	381	381	477	451	487	490	493	461	471	496	505	468	514		
100	423	473	421	416	411	464	410	510	407	412	439	461	464	451		

MAR 451
14360 1710

ee03fm
File: ee03 Transform: NO TRANSFORMATION

i-square test for normality: actual and expected frequencies

INTERVAL	<-1.5	-1.5 to <-0.5	-0.5 to 0.5	>0.5 to 1.5	>1.5
EXPECTED	1.608	5.808	9.168	5.808	1.608
OBSERVED	0	3	17	4	0

Calculated Chi-Square goodness of fit test statistic = 11.8271
Table Chi-Square value (alpha = 0.01) = 13.277

Data PASS normality test. Continue analysis.

ee03fm
File: ee03 Transform: NO TRANSFORMATION

Hartley test for homogeneity of variance
Bartletts test for homogeneity of variance

These two tests can not be performed because at least one group has
zero variance.

Data FAIL to meet homogeneity of variance assumption.
Additional transformations are useless.

TITLE: ee03fm
FILE: ee03
TRANSFORM: NO TRANSFORMATION NUMBER OF GROUPS: 6

GRP	IDENTIFICATION	REP	VALUE	TRANS VALUE
1	Control	1	9.0000	9.0000
1	Control	2	8.0000	8.0000
1	Control	3	10.0000	10.0000
1	Control	4	10.0000	10.0000
2	6.25%	1	10.0000	10.0000
2	6.25%	2	10.0000	10.0000
2	6.25%	3	10.0000	10.0000
2	6.25%	4	10.0000	10.0000
3	12.5%	1	10.0000	10.0000
3	12.5%	2	10.0000	10.0000
3	12.5%	3	10.0000	10.0000
3	12.5%	4	10.0000	10.0000
4	25%	1	10.0000	10.0000
4	25%	2	10.0000	10.0000
4	25%	3	10.0000	10.0000
4	25%	4	10.0000	10.0000
5	50%	1	10.0000	10.0000
5	50%	2	10.0000	10.0000
5	50%	3	10.0000	10.0000
5	50%	4	9.0000	9.0000
6	100%	1	10.0000	10.0000
6	100%	2	8.0000	8.0000
6	100%	3	10.0000	10.0000
6	100%	4	9.0000	9.0000

ee03fm
File: ee03 Transform: NO TRANSFORMATION

SUMMARY STATISTICS ON TRANSFORMED DATA TABLE 1 of 2

GRP	IDENTIFICATION	N	MIN	MAX	MEAN
1	Control	4	8.000	10.000	9.250
2	6.25%	4	10.000	10.000	10.000
3	12.5%	4	10.000	10.000	10.000
4	25%	4	10.000	10.000	10.000
5	50%	4	9.000	10.000	9.750
6	100%	4	8.000	10.000	9.250

e03fm
File: ee03 Transform: NO TRANSFORMATION

SUMMARY STATISTICS ON TRANSFORMED DATA TABLE 2 of 2

GRP	IDENTIFICATION	VARIANCE	SD	SEM
1	Control	0.917	0.957	0.479
2	6.25%	0.000	0.000	0.000
3	12.5%	0.000	0.000	0.000
4	25%	0.000	0.000	0.000
5	50%	0.250	0.500	0.250
6	100%	0.917	0.957	0.479

ee03fm
File: ee03 Transform: NO TRANSFORMATION

STEELS MANY-ONE RANK TEST - Ho:Control<Treatment

GROUP	IDENTIFICATION	TRANSFORMED MEAN	RANK SUM	CRIT. VALUE	df	SIG
1	Control	9.250				
2	6.25%	10.000	22.00	10.00	4.00	
3	12.5%	10.000	22.00	10.00	4.00	
4	25%	10.000	22.00	10.00	4.00	
5	50%	9.750	20.50	10.00	4.00	
6	100%	9.250	18.00	10.00	4.00	

Critical values use k = 5, are 1 tailed, and alpha = 0.05

EE03 FATHEAD MINNOW CHRONIC
File: fmee03 Transform: 1/SQUARE ROOT(Y+0.5)

Chi-square test for normality: actual and expected frequencies

INTERVAL	<-1.5	-1.5 to <-0.5	-0.5 to 0.5	>0.5 to 1.5	>1.5
EXPECTED	1.608	5.808	9.168	5.808	1.608
OBSERVED	0	8	9	7	0

Calculated Chi-Square goodness of fit test statistic = 4.2910
Table Chi-Square value (alpha = 0.01) = 13.277

Data PASS normality test. Continue analysis.

EE03 FATHEAD MINNOW CHRONIC
File: fmee03 Transform: 1/SQUARE ROOT(Y+0.5)

Hartley test for homogeneity of variance

Calculated H statistic (max Var/min Var) = 52.26
Closest, conservative, Table H statistic = 184.0 (alpha = 0.01)

sed for Table H ==> R (# groups) = 6, df (# reps-1) = 3
Actual values ==> R (# groups) = 6, df (# avg reps-1) = 3.00

Data PASS homogeneity test. Continue analysis.

NOTE: This test requires equal replicate sizes. If they are unequal but do not differ greatly, the Hartley test may still be used as an approximate test (average df are used).

TITLE: EE03 FATHEAD MINNOW CHRONIC
FILE: fmee03
TRANSFORM: 1/SQUARE ROOT(Y+0.5) NUMBER OF GROUPS: 6

GRP	IDENTIFICATION	REP	VALUE	TRANS VALUE
1	CONTROL	1	0.5040	0.9980
1	CONTROL	2	0.8250	0.8687
1	CONTROL	3	0.7240	0.9039
1	CONTROL	4	0.7030	0.9117
2	6.25	1	0.7240	0.9039
2	6.25	2	0.5630	0.9699
2	6.25	3	0.6970	0.9140
2	6.25	4	0.7160	0.9068
3	12.5	1	0.6530	0.9313
3	12.5	2	0.7020	0.9121
3	12.5	3	0.6510	0.9321
3	12.5	4	0.7380	0.8988
4	25	1	0.5400	0.9806
4	25	2	0.6610	0.9281
4	25	3	0.6540	0.9309
4	25	4	0.6090	0.9496
5	50	1	0.6270	0.9420
5	50	2	0.6110	0.9487
5	50	3	0.5720	0.9658
5	50	4	1.4290	0.7200
6	100	1	0.7070	0.9102
6	100	2	0.8350	0.8655
6	100	3	0.6670	0.9257
6	100	4	0.5470	0.9773

EE03 FATHEAD MINNOW CHRONIC
File: fmee03 Transform: 1/SQUARE ROOT(Y+0.5)

ANOVA TABLE

SOURCE	DF	SS	MS	F
Between	5	0.006	0.001	0.333
Within (Error)	18	0.062	0.003	
Total	23	0.067		

Critical F value = 2.77 (0.05,5,18)
Since F < Critical F FAIL TO REJECT Ho:All groups equal

EE03 FATHEAD MINNOW CHRONIC
File: fmee03 Transform: 1/SQUARE ROOT(Y+0.5)

DUNNETTS TEST - TABLE 1 OF 2 Ho:Control<Treatment

GROUP	IDENTIFICATION	TRANSFORMED MEAN	MEAN CALCULATED IN ORIGINAL UNITS	T STAT	SIG
1	CONTROL	0.921	0.689		
2	6.25	0.924	0.675	-0.079	
3	12.5	0.919	0.686	0.052	
4	25	0.947	0.616	-0.689	
5	50	0.894	0.810	0.683	
6	100	0.920	0.689	0.024	

Dunnett table value = 2.41 (1 Tailed Value, P=0.05, df=18,5)

EE03 FATHEAD MINNOW CHRONIC
File: fmee03 Transform: 1/SQUARE ROOT(Y+0.5)

DUNNETTS TEST - TABLE 2 OF 2 Ho:Control<Treatment

GROUP	IDENTIFICATION	NUM OF REPS	Minimum Sig Diff (IN ORIG. UNITS)	% of CONTROL	DIFFERENCE FROM CONTROL
1	CONTROL	4			
2	6.25	4	-0.281	-40.8	0.014
3	12.5	4	-0.281	-40.8	0.003
4	25	4	-0.281	-40.8	0.073
5	50	4	-0.281	-40.8	-0.121
6	100	4	-0.281	-40.8	0.000

№ 1500

CHAIN OF CUSTODY RECORD

JOB #	PROJECT NAME
93506 F93506 Task 3 DSK	TAFB- Soldier Creek

SAMPLERS: (Signature) [signature]

WOODWARD-CLYDE CONSULTANTS
P.O. BOX 680925
FRANKLIN, TN 37068-0925
(615) 790-0003 FAX (615) 790-0023

ANALYSES REQUIRED: Toxicity

SAMPLE IDENTIFICATION	DATE	TIME	SAMPLE TYPE	NUMBER OF CONTAINERS	Toxicity						REMARKS
											Fed Exp 5804823452
SC-EE03-TX-201 ~~SW-203~~ DSK DSK	6/12/95	09:00	Water	3	✓						

RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)	RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)
[signature]	6/12/95 18:00				
RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)	RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)
RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED AT LAB BY: (Signature)	DATE/TIME	GENERAL COMMENTS	
		Liza Teer	6/13/95 0854	2°C upon arrival	

Distribution: Original and Yellow copies accompany sample shipment to laboratory
Pink copy retained by samplers. Yellow copy retained by laboratory. Laboratory returns White copy to samplers.

№ 1529

CHAIN OF CUSTODY RECORD

JOB #	PROJECT NAME
93506 F93162 Task3	TAFB Soldier Creek

SAMPLERS: (Signature)

WOODWARD-CLYDE CONSULTANTS
P.O. BOX 680925
FRANKLIN, TN 37068-0925
(615) 790-0003 FAX (615) 790-0023

ANALYSES REQUIRED

SAMPLE IDENTIFICATION	DATE	TIME	SAMPLE TYPE	NUMBER OF CONTAINERS	Toxicity						REMARKS
											Fed Exp 5804823452
SC-EE03-TX-~~103~~ 201	6/12/95	09:00	Water	2	✓						
SC-EE03-TX-~~103~~ 201	6/12/95	09:15	Soil	2	✓						

RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)	RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)
	6/12/95 18:00				
RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)	RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)
RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED AT LAB BY: (Signature)	DATE/TIME	GENERAL COMMENTS	
		Liza Teer	6/13/95 0855	3°C upon arrival	

Distribution: Original and Yellow copies accompany sample shipment to laboratory
Pink copy retained by samplers. Yellow copy retained by laboratory. Laboratory returns White copy to samplers.

TEST SUMMARY: SC-EE04-TX-201
Ceriodaphnia dubia 48-Hour Static Acute

Test protocol:	WCC SOP 401.2
Test organism:	*Ceriodaphnia dubia*
Source:	WCC Culture Laboratory
Age of test organism:	<24 hours
Test initiation:	6/13/95
Test termination:	6/15/95
Temperature:	25 +/- 1 °C
Light:	50 - 100 foot candles
Photoperiod:	16 hours light/8 hours dark
Test vessel:	30 mL styrene
Test volume:	20 mL
Organisms/replicate:	5
Replicates/concentration:	4
Feeding regime:	none
Aeration during test:	none
Dilution Water:	Hard Reconstituted Synthetic
Test duration:	48 hours
Effect measured:	Mortality
Reference Toxicant Data:	
LC_{50} (g/L NaCl):	1.51

TEST RESULTS: SC-EE04-TX-201
Ceriodaphnia dubia 48-Hour Static Acute

$LC_{50} > 100\%$

Statictical analysis method: N/A

Treatment (% Sample)	Survival (%)	pH	Conductivity (umhos/cm)	DO (mg/L)	Temperature (°C)	Hardness (mg/L $CaCO_3$)	Alkalinity (mg/L $CaCO_3$)
Control	100	8.49-8.54	580 (578-582)	8.4 (8.2-8.5)	24.8-25.0	200	
6.25	100	8.47-8.55	563 (558-568)	8.4 (8.3-8.5)	24.8-25.0		
12.5	100	8.48-8.53	559 (550-568)	8.4 (8.3-8.5)	24.8-25.0		
25	100	8.50-8.53	543 (535-551)	8.5 (8.4-8.5)	24.8-25.0		
50	100	8.50-8.53	512 (492-531)	8.5 (8.4-8.5)	24.8-25.0		
100	100	8.48-8.64	466 (458-474)	8.4 (8.2-8.5)	24.8-25.0	204	186

SURFACE WATER SAMPLE ARRVIAL INFORMATION

Collection Date/Time:	6/12/95 @ 0700
Use Date/Time:	6/13/95 @ 1515
Method of Shipment:	Overnight Courier
Temperature (°C):	2.5
pH:	8.48
Ammonia (mg/L):	0.56
Conductivity (umhos/cm):	458
DO (mg/L):	8.5

TEST SUMMARY: SC-EE04-TX-201
Ceriodaphnia dubia Chronic Renewal

Test protocol:	WCC SOP 501.1
Test organism:	*Ceriodaphnia dubia*
Source:	WCC Culture Laboratory
WCC Batch:	6/14/95
Age of test organism:	<24 hours
Test initiation:	6/15/95
Test termination:	6/22/95
Temperature:	25 +/- 1 °C
Light:	50 - 100 foot candles
Photoperiod:	16 hours light/8 hours dark
Test vessel:	30 mL styrene
Test volume:	15 mL
Organisms/replicate:	1
Replicates/concentration:	10
Feeding regime:	0.05 mL *Selenastrum* and 0.05 mL YTC daily
Aeration during test:	none
Dilution Water:	Hard Reconstituted Synthetic
Test duration:	7 days
Effect measured:	Survival and reproduction

Toxicity test methods and procedures were followed in accordance with EPA 600/4-89/001

Reference Toxicant Data:	
NOEC (g/L NaCl):	0.75

TEST RESULTS: SC-EE04-TX-201
Ceriodaphnia dubia Chronic Survival and Reproduction Test

Survival NOEC:	100%
Statistical analysis method:	Fishers Exact
Normality test:	Fail
Homogeneity of variance test:	Fail
Reproduction NOEC:	<6.25% *
Statistical analysis method:	Dunnetts
Normality test:	Pass
Homogeneity of variance test:	Pass

Treatment (% Sample)	Survival (%)	pH	Conductivity (umhos/cm)	DO (mg/L)	Temperature (°C)
Control	90	8.23-8.69	636 (554-718)	8.0 (7.3-8.6)	24.6 (24.0-25.2)
6.25	80	8.22-8.67	619 (536-701)	8 (7.3-8.6)	24.6 (24.0-25.2)
12.5	70	8.21-8.67	603 (530-675)	8.0 (7.4-8.6)	24.6 (24.0-25.2)
25	90	8.21-8.65	581 (517-644)	8.0 (7.4-8.6)	24.6 (24.0-25.2)
50	100	8.21-8.63	535 (489-581)	8.0 (7.4-8.6)	24.6 (24.0-25.2)
100	100	8.29-8.68	457 (437-477)	8.1 (7.5-8.6)	24.6 (24.0-25.2)

	Hardness (mg/L $CaCO_3$)	Alkalinity (mg/L $CaCO_3$)	Ammonia (mg/L)
Control	200		
EE04	204	186	0.56

TEST SUMMARY: SC-EE04-TX-201
Pimephales promelas 48-Hour Static Acute

Test protocol:	WCC SOP 410.2
Test organism:	*Pimephales promelas*
Source:	Woodward-Clyde Consultants
Age of test organism:	6 days
Test initiation:	6/13/95
Test termination:	6/15/95
Temperature:	20 +/- 1 °C
Light:	50 - 100 foot candles
Photoperiod:	16 hours light/8 hours dark
Test vessel:	500 mL plastic beaker
Test volume:	250 mL
Organisms/replicate:	10
Replicates/concentration:	2
Feeding regime:	none
Aeration during test:	none
Dilution Water:	Spring Water
Test duration:	48 hours
Effect measured:	Mortality
Reference Toxicant Data:	
LC_{50} (g/L NaCl):	5.26

TEST RESULTS: SC-EE04-TX-201
Pimephales promelas 48-Hour Static Acute

LC_{50} > 100%

Statictical analysis method: N/A

Treatment (% Sample)	Survival (%)	pH	Conductivity (umhos/cm)	DO (mg/L)	Temperature (°C)	Hardness (mg/L $CaCO_3$)	Alkalinity (mg/L $CaCO_3$)
Control	95	7.65-8.45	351 (343-359)	8.3 (8.0-8.5)	20.9 (20.8-21.0)	158	146
6.25	100	8.11-8.48	378 (362-394)	8.1 (8.0-8.2)	20.9 (20.8-21.0)		
12.5	95	8.18-8.46	355 (331-379)	8.1 (8.0-8.2)	20.9 (20.8-21.0)		
25	100	8.20-8.50	373 (355-390)	8.2 (8.1-8.2)	20.9 (20.8-21.0)		
50	95	8.21-8.42	402 (378-426)	8.2 (8.1-8.2)	20.9 (20.8-21.0)		
100	100	8.33-8.61	447 (412-481)	8.2 (8.1-8.3)	20.9 (20.8-21.0)	204	186

SURFACE WATER SAMPLE ARRVIAL INFORMATION

Collection Date/Time:	6/12/95 @ 0700
Use Date/Time:	6/13/95 @ 1410
Method of Shipment:	Overnight Courier
Temperature (°C):	2.5
pH:	8.48
Ammonia (mg/L):	0.56
Conductivity (umhos/cm):	412
DO (mg/L):	8.5
Description:	Clear

TEST SUMMARY: SC-EE04-TX-201
Pimephales promelas Chronic Renewal

Test protocol:	WCC SOP 510.1
Test organism:	*Pimephales promelas*
Source:	Environmental Consulting & Testing
Age of test organism:	<24 hours
Test initiation:	6/15/95 @ 1515
Test termination:	6/22/95 @ 1500
Temperature:	25 +/- 1 °C
Light:	50 - 100 foot candles
Photoperiod:	16 hours light/8 hours dark
Test vessel:	500 mL plastic beaker
Test volume:	250 mL
Organisms/replicate:	10
Replicates/concentration:	4
Feeding regime:	0.1 mL brine shrimp nauplii twice daily
Aeration during test:	none
Dilution Water:	Spring Water
Test duration:	7 days
Effect measured:	Survival and growth

Toxicity test methods and procedures were followed in accordance with EPA 600/4-89/001

Reference Toxicant Data:	
NOEC (g/L NaCl):	3.0

TEST RESULTS : SC- EE04-TX-201

Pimephales promelas Chronic Survival and Growth Test

Survival NOEC:		100%
	Statistical analysis method:	Steels Many-One Rank Test
	Normality test:	Shapiro-Wilk's - Pass
	Homogeneity of variance test:	Bartletts - Fail
Growth NOEC:		100%
	Statistical analysis method:	Steels Many-One Rank Test
	Normality test:	Chi-square - Pass
	Homogeneity of variance test:	Bartletts - Fail

Treatment (% Sample)	Survival (%)	pH	Conductivity (umhos/cm)	DO (mg/L)	Temperature (°C)
Control	92.5	7.99-8.41	348 (316-379)	7.7 (7.0-8.4)	24.6 (24.0-25.2)
6.25	100	8.00-8.48	353 (340-366)	7.6 (6.6-8.5)	24.6 (24.0-25.2)
12.5	90	8.00-8.48	356 (329-382)	7.6 (6.7-8.5)	24.6 (24.0-25.2)
25	95	8.05-8.51	369 (344-394)	7.6 (6.6-8.6)	24.6 (24.0-25.2)
50	97.5	8.09-8.52	400 (365-435)	7.7 (6.7-8.6)	24.6 (24.0-25.2)
100	65	8.14-8.56	451 (391-511)	7.7 (6.7-8.6)	24.6 (24.0-25.2)

	Hardness (mg/L $CaCO_3$)	Alkalinity (mg/L $CaCO_3$	Ammonia (mg/L)
Control	200		
EE04	204	186	0.56

48-hr Ceriodaphnia dubia TOXICITY TEST

433-

LOG NO. 437
JOB NO. 193506
INDUSTRY: Tinker
CONTACT:

EFFLUENT: ~~CR EE02~~ MLS Controls
START DATE: 6-13-95
START TIME: 1510
DILUTION WATER: ~~270 Hard~~ MLS Controls

CONC (%)	REP ID	SURVIVAL (#) 0	24	48	DEAD	TEMPERATURE (oC) 0	24	48	DO (mg/L) 0	24	48	pH (S.U.) 0	24	48	CONDUCTIVITY (umhos/cm) 0	24	48
140	A	5	5	5		24.8		25.0	8.5		8.2	7.64		8.28	500		499
CON	B	5	5	5													
w/ EE01	C	5	5	5													
	D	5	5	5													
250	A	5	5	5					8.5		8.2	8.54		8.54	689		739
CON	B	5	5	5													
w/ EE02	C	5	5	5													
	D	5	5	5													
270	A	5	5	5					8.5		8.3	8.62		8.57	764		790
CON	B	5	5	5													
w/ EE03	C	5	5	5													
& CR EE02	D	5	5	5													
200	A	5	5	5					8.5		8.2	8.54		8.49	582		578
CON	B	5	5	5													
~~w/ CR EE02~~ MLS	C	5	5	5													
w/ EE04	D	5	5	5													
	A																
	B																
	C																
	D																
	Initials	SJB	LJT	LJT													
	Time	1510	1500	0930													

Comments

PARAMETER	Control	
Total Hardness (mg/L CaCO3)		
Total Alkalinity (mg/L CaCO3 @ 4.5)		

48-hr Ceriodaphnia dubia TOXICITY TEST

LOG NO. 436
JOB NO. F93506
INDUSTRY: Tinker
CONTACT:

EFFLUENT: EE04
START DATE: 6-13-95
START TIME: 1515
DILUTION WATER: 200-Hard

CONC (%)	REP ID	SURVIVAL (#) 0	24	48	DEAD	TEMPERATURE (oC) 0	24	48	DO (mg/L) 0	24	48	pH (S.U.) 0	24	48	CONDUCTIVITY (umhos/cm) 0	24	48
6.25	A	5	5	5		24.8		25.0	8.5		8.3	8.55		8.47	558		568
	B	5	5	5													
	C	5	5	5													
	D	5	5	5													
12.5	A	5	5	5					8.5		8.3	8.53		8.48	550		568
	B	5	5	5													
	C	5	5	5													
	D	5	5	5													
25	A	5	5	5					8.5		8.4	8.53		8.50	535		551
	B	5	5	5													
	C	5	5	5													
	D	5	5	5													
50	A	5	5	5					8.5		8.4	8.50		8.53	492		531
	B	5	5	5													
	C	5	5	5													
	D	5	5	5													
100	A	5	5	5					8.5		8.2	8.48		8.64	458		474
	B	5	5	5													
	C	5	5	5													
	D	5	5	5													
	Initials	LJT	LJT	LJT													
	Time	1515	1330	0915													

Comments

PARAMETER	Control	
Total Hardness (mg/L CaCO3)		
Total Alkalinity (mg/L CaCO3 @ 4.5)		

48-hr Pimephales promleas TOXICITY TEST

LOG NO. 486
JOB NO. F93506
INDUSTRY: Timber
CONTACT: WCC - 6 days old

EFFLUENT: EE04
START DATE: 6-13-95
START TIME: 1410
DILUTION WATER: Spring

CONC (%)	REP ID	SURVIVAL (#) 0	24	48	DEAD	TEMPERATURE (oC) 0	24	48	DO (mg/L) 0	24	48	pH (S.U.) 0	24	48	CONDUCTIVITY (umhos/cm) 0	24	48
6.25	A	10	10	10	0	20.8		21.0	8.2		8.0	8.11		8.48	362		374
	B	10	10	10	0												
12.5	A	10	9	9	1				8.2		8.0	8.18		8.46	331		379
	B	10	10	10	0												
25	A	10	10	10	0				8.2		8.1	8.20		8.50	355		390
	B	10	10	10	0												
50	A	10	10	10	0				8.2		8.1	8.21		8.52	378		426
	B	10	9	9	1												
100	A	10	10	10	0				8.3		8.1	8.33		8.61	412		481
	B	10	10	10	0												
	A																
	B																
	A																
	B																
	A																
	B																
	A																
	B																
	A																
	B																
	Initials	MLS	MLS	MLS													
	Time	1415	1530	0925													

Comments

PARAMETER	Control	
Total Hardness (mg/L CaCO3)		
Total Alkalinity (mg/L CaCO3 @ 4.5)		

48ACUT.XLS

PATHEAD MINNOW SURVIVAL AND GROWTH Log No. ___

7–DAY CHRONIC TOXICITY TEST

JOB NO. F93506
INDUSTRY: Tinker
CONTACT:
EFFLUENT: EE04
NPDES PERMIT NO:
SAMPLE TYPE:
DILUTION WATER:

PERSON CONDUCTING TEST:
BEGINNING: ___hrs; 6/15/95
ENDING: ___hrs; 6/22/95
TEST
DILUTIONS:
AGE:
ORGANISM SOURCE:

PHOTOPERIOD: 16 hr light
FEEDING REGIME:
0.1 ml Artemia @ 3times/day
TEST VESSEL CAPACITY: 1 liter
TEST SOLUTION VOLUME: 500 mL
NO. ORGANISMS/TREATMENT: 10
NO. REPLICATES: ~~3~~ 4

CONC (%)	REP ID	SURVIVAL (#) START	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7
6.25	A	10	10	10	10	10	10	10	10
	B	10	10	10	10	10	10	10	10
	C	10	10	10	10	10	10	10	10
	D	10	10	10	10	10	10	10	10
12.5	A	10	10	10	10	10	10	10	10
	B	10	10	10	10	10	10	10	10
	C	10	10	10	10	10	10	10	10
	D	10	MAR ~~6~~ 7	6	6	6	6	6	6
25	A	10	10	10	10	10	10	10	10
	B	10	7	7	7	7	7	7	7
	C	10	10	10	10	11	11	11	11
	D	10	10	10	10	10	10	10	10
50	A	10	10	10	10	10	10	10	10
	B	10	10	10	10	10	10	10	10
	C	10	10	10	10	10	10	10	10
	D	10	10	10	10	10	9	9	9
TIME:		1515	1701	1330	1540	1430	1535	1400	1500
INITIAL:		MAR	MAR	SJG	TH	MLS	MAR	SJG	SJG

GROWTH RESULTS

CONC (%)	REP ID	Boat ID	Tare wt (g)	Combined wt (g)	Tot Fish wt (g)	# of Fish	Avg Fish wt (mg)
6.25	A	~~.97440~~	.97440	0.98065	0.00625	10	0.625
	B	~~.97441~~	.97441	.98073	0.00632	10	0.632
	C	~~.97805~~	.97805	.98442	0.00637	10	0.637
	D	~~.97349~~	.97349	.97982	0.00633	10	0.633
12.5	A	~~.97178~~	.97178	.97819	0.00641	10	0.641
	B	~~.97792~~	.97792	0.98475	0.00683	10	0.683
	C	~~.97766~~	.97766	.98481	0.00715	10	0.715
	D	~~.97865~~	.97865	0.98335	0.0047	6	0.783
25	A	~~.97758~~	.97758	.98356	0.00598	10	0.598
	B	~~.97937~~	.97937	.98281	0.00344	7	0.491
	C	~~.98189~~	.98189	0.98825	0.00636	11	0.578
	D	~~.98532~~	.98532	0.99155	0.00623	10	0.623
50	A	~~.98570~~	.98570	.99159	0.00589	10	0.589
	B	~~.98947~~	.98947	.99548	0.00601	10	0.601
	C	~~.98699~~	.98699	.99237	0.00538	10	0.538
	D	~~.98743~~	.98743	.99253	0.0051	9	0.567
		SEW					

FATHEAD MINNOW SURVIVAL AND GROWTH
7-DAY CHRONIC TOXICITY TEST

Log No. [illegible]

JOB NO. F93506
INDUSTRY: Tinker
CONTACT:
EFFLUENT: 8804
NPDES PERMIT NO:
SAMPLE TYPE:
DILUTION WATER:

PERSON CONDUCTING TEST:
BEGINNING: ___hrs; 2/10/95
ENDING: ___hrs; / / .
TEST
DILUTIONS:
AGE:
ORGANISM SOURCE:

PHOTOPERIOD: 16 hr light
FEEDING REGIME:
0.1 ml Artemia @ 3times/day
TEST VESSEL CAPACITY: 1 liter
TEST SOLUTION VOLUME: 500 mL
NO. ORGANISMS/TREATMENT: 10
NO. REPLICATES: ~~3~~ 4

CONC (%)	REP ID	SURVIVAL (#) START	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7
100	A	10	5	5	5	5	5	5	5
	B	10	10	10	10	10	10	10	10
	C	10	6	6	6	6	6	6	6
	D	10	5	5	5	5	5	5	5
	TIME:	1510	1710	1330	1540	1430	1540	1405	1500
	INITIAL:	MAR	MAR	SJB	TAT	MLS	MAR	SJO	SJB

GROWTH RESULTS

CONC (%)	REP ID	Boat ID	Tare wt (g)	Combined wt (g)	Tot Fish wt (g)	# of Fish	Avg Fish wt (mg)
100	A	~~.98052~~	.98178	.98510	0.00332	5	0.664
	B	~~.98371~~	.97936	.98359	0.00429	10	0.429
	C		.98371	.98780	0.00409	6	0.682
	D		.98052	~~0.98475~~ 0.98475	0.00423	5	0.846

J # 4416
6/15/95

CHRONIC TOXICITY TEST DATA SHEET

TEMPERATURE

CONCENTRATION	Start	Day 1 OLD	Day 1 NEW	Day 2 OLD	Day 2 NEW	Day 3 OLD	Day 3 NEW	Day 4 OLD	Day 4 NEW	Day 5 OLD	Day 5 NEW	Day 6 OLD	Day 6 NEW	Day 7 OLD	Day 7 NEW	Day 8 OLD
6.25	24.8	25.0	25.0	24	24	24.2	25.0	25.0	24.8	25.0	25.0	25.2	25.2	24.8		
12.5																
25																
50																
100																

DISSOLVED OXYGEN

CONCENTRATION	Start	Day 1 OLD	Day 1 NEW	Day 2 OLD	Day 2 NEW	Day 3 OLD	Day 3 NEW	Day 4 OLD	Day 4 NEW	Day 5 new OLD	Day 5 old NEW	Day 6 OLD	Day 6 NEW	Day 7 OLD	Day 7 NEW	Day 8 OLD
6.25	8.0	7.4	8.3	6.4	8.1	7.2	8.5	7.2	8.0	8.1	8.0	6.6	8.3	7.0		
12.5	8.1	7.1	8.3	6.8	8.1	7.2	8.5	7.2	8.0	7.1	7.6	6.7	8.3	6.8		
25	8.1	7.1	8.2	6.8	8.0	7.3	8.6	7.3	8.0	8.2	7.3	6.6	8.2	7.0		
50	8.0	7.5	8.1	6.7	8.2	7.4	8.6	7.3	8.0	7.2	7.3	6.7	8.2	7.0		
100	8.2	7.4	8.1	6.8	8.2	7.4	8.6	7.4	8.2	7.2	7.2	6.7	8.3	7.1		

pH

CONCENTRATION	Start	Day 1 OLD	Day 1 NEW	Day 2 OLD	Day 2 NEW	Day 3 OLD	Day 3 NEW	Day 4 OLD	Day 4 NEW	Day 5 new OLD	Day 5 old NEW	Day 6 OLD	Day 6 NEW	Day 7 OLD	Day 7 NEW	Day 8 OLD
6.25	7.20	8.19	8.15	8.38	8.37	8.26	8.48	8.14	8.25	8.32	8.14	8.00	8.21	8.13		
12.5	8.19	8.20	8.42	8.38	8.38	8.28	8.48	8.17	8.26	8.35	8.09	8.00	8.24	8.12		
25	8.17	8.22	8.36	8.38	8.39	8.29	8.51	8.18	8.27	8.35	8.10	8.05	8.25	8.16		
50	8.26	8.25	8.37	8.39	8.42	8.29	8.52	8.20	8.31	8.37	8.13	8.09	8.27	8.31		
100	8.24	8.25	8.40	8.49	8.46	8.36	8.56	8.22	8.14	8.42	8.22	8.17	8.27	8.28 SET		

CONDUCTIVITY

CONCENTRATION	Start	Day 1 OLD	Day 1 NEW 344	Day 2 OLD	Day 2 NEW	Day 3 OLD	Day 3 NEW	Day 4 OLD	Day 4 NEW	Day 5 new OLD	Day 5 old NEW	Day 6 OLD	Day 6 NEW	Day 7 OLD	Day 7 NEW	Day 8 OLD
6.25	347	351	350	364	344	351	361	356	341	333	360	360	340	335		
12.5	340	346	352	351	352	352	356	351	329	337	359	354	339	340		
25	343	342	356	350	360	365	366	357	344	350	371	344	351	345		
50	349	344	365	387	397	398	401	383	374	370	406	435	380	405		
100	434	430	311	444	443	456	455	450	435	433	461	511	435	462		

MARK CST 14.28 1515

CST 1200

ee04fm
File: S:\NEWTOXLA\EE04FM. Transform: NO TRANSFORMATION

Shapiro Wilks test for normality

D = 41.500

W = 0.944

Critical W (P = 0.05) (n = 24) = 0.916
Critical W (P = 0.01) (n = 24) = 0.884

Data PASS normality test at P=0.01 level. Continue analysis.

ee04fm
File: S:\NEWTOXLA\EE04FM. Transform: NO TRANSFORMATION

Hartley test for homogeneity of variance
Bartletts test for homogeneity of variance

These two tests can not be performed because at least one group has
zero variance.

Data FAIL to meet homogeneity of variance assumption.
Additional transformations are useless.

TITLE: ee04fm
FILE: S:\NEWTOXLA\EE04FM.
TRANSFORM: NO TRANSFORMATION NUMBER OF GROUPS: 6

GRP	IDENTIFICATION	REP	VALUE	TRANS VALUE
1	Control	1	9.0000	9.0000
1	Control	2	8.0000	8.0000
1	Control	3	10.0000	10.0000
1	Control	4	10.0000	10.0000
2	6.25%	1	10.0000	10.0000
2	6.25%	2	10.0000	10.0000
2	6.25%	3	10.0000	10.0000
2	6.25%	4	10.0000	10.0000
3	12.5%	1	10.0000	10.0000
3	12.5%	2	10.0000	10.0000
3	12.5%	3	10.0000	10.0000
3	12.5%	4	6.0000	6.0000
4	25%	1	10.0000	10.0000
4	25%	2	7.0000	7.0000
4	25%	3	10.0000	10.0000
4	25%	4	11.0000	11.0000
5	50%	1	10.0000	10.0000
5	50%	2	10.0000	10.0000
5	50%	3	10.0000	10.0000
5	50%	4	9.0000	9.0000
6	100%	1	5.0000	5.0000
6	100%	2	10.0000	10.0000
6	100%	3	6.0000	6.0000
6	100%	4	5.0000	5.0000

ee04fm
File: S:\NEWTOXLA\EE04FM. Transform: NO TRANSFORMATION

SUMMARY STATISTICS ON TRANSFORMED DATA TABLE 1 of 2

GRP	IDENTIFICATION	N	MIN	MAX	MEAN
1	Control	4	8.000	10.000	9.250
2	6.25%	4	10.000	10.000	10.000
3	12.5%	4	6.000	10.000	9.000
4	25%	4	7.000	11.000	9.500
5	50%	4	9.000	10.000	9.750
6	100%	4	5.000	10.000	6.500

ee04fm
File: S:\NEWTOXLA\EE04FM. Transform: NO TRANSFORMATION

SUMMARY STATISTICS ON TRANSFORMED DATA TABLE 2 of 2

GRP	IDENTIFICATION	VARIANCE	SD	SEM
1	Control	0.917	0.957	0.479
2	6.25%	0.000	0.000	0.000
3	12.5%	4.000	2.000	1.000
4	25%	3.000	1.732	0.866
5	50%	0.250	0.500	0.250
6	100%	5.667	2.380	1.190

ee04fm
File: S:\NEWTOXLA\EE04FM. Transform: NO TRANSFORMATION

STEELS MANY-ONE RANK TEST - Ho:Control<Treatment

GROUP	IDENTIFICATION	TRANSFORMED MEAN	RANK SUM	CRIT. VALUE	df	SIG
1	Control	9.250				
2	6.25%	10.000	22.00	10.00	4.00	
3	12.5%	9.000	19.00	10.00	4.00	
4	25%	9.500	20.00	10.00	4.00	
5	50%	9.750	20.50	10.00	4.00	
6	100%	6.500	13.00	10.00	4.00	

Critical values use k = 5, are 1 tailed, and alpha = 0.05

EE04 FATHEAD MINNOW CHRONIC
File: fmee04 Transform: NO TRANSFORMATION

Chi-square test for normality: actual and expected frequencies

INTERVAL	<-1.5	-1.5 to <-0.5	-0.5 to 0.5	>0.5 to 1.5	>1.5
EXPECTED	1.608	5.808	9.168	5.808	1.608
OBSERVED	0	6	11	7	0

Calculated Chi-Square goodness of fit test statistic = 3.8331
Table Chi-Square value (alpha = 0.01) = 13.277

Data PASS normality test. Continue analysis.

EE04 FATHEAD MINNOW CHRONIC
File: fmee04 Transform: NO TRANSFORMATION

Bartletts test for homogeneity of variance

Calculated B statistic = 22.64
Table Chi-square value = 15.09 (alpha = 0.01)
Table Chi-square value = 11.07 (alpha = 0.05)

Average df used in calculation ==> df (avg n - 1) = 3.00
Used for Chi-square table value ==> df (#groups-1) = 5

Data FAIL homogeneity test at 0.01 level. Try another transformation.

NOTE: If groups have unequal replicate sizes the average replicate size is used to calculate the B statistic (see above).

EE04 FATHEAD MINNOW CHRONIC
File: fmee04 Transform: NO TRANSFORMATION

Chi-square test for normality: actual and expected frequencies

INTERVAL	<-1.5	-1.5 to <-0.5	-0.5 to 0.5	>0.5 to 1.5	>1.5
EXPECTED	1.608	5.808	9.168	5.808	1.608
OBSERVED	0	6	11	7	0

Calculated Chi-Square goodness of fit test statistic = 3.8331
Table Chi-Square value (alpha = 0.01) = 13.277

Data PASS normality test. Continue analysis.

EE04 FATHEAD MINNOW CHRONIC
File: fmee04 Transform: NO TRANSFORMATION

Hartley test for homogeneity of variance

Calculated H statistic (max Var/min Var) = 1182.16
Closest, conservative, Table H statistic = 184.0 (alpha = 0.01)

Used for Table H ==> R (# groups) = 6, df (# reps-1) = 3
Actual values ==> R (# groups) = 6, df (# avg reps-1) = 3.00

Data FAIL homogeneity test. Try another transformation.

NOTE: This test requires equal replicate sizes. If they are unequal but do not differ greatly, the Hartley test may still be used as an approximate test (average df are used).

EE04 FATHEAD MINNOW CHRONIC
File: fmee04 Transform: NO TRANSFORMATION

hapiro Wilks test for normality

D = 0.166

W = 0.881

Critical W (P = 0.05) (n = 24) = 0.916
Critical W (P = 0.01) (n = 24) = 0.884

Data FAIL normality test. Try another transformation.

Warning - The two homogeneity tests are sensitive to non-normal data and should not be performed.

EE04 FATHEAD MINNOW CHRONIC
File: fmee04 Transform: NO TRANSFORMATION

Bartletts test for homogeneity of variance

Calculated B statistic = 22.64
Table Chi-square value = 15.09 (alpha = 0.01)
ble Chi-square value = 11.07 (alpha = 0.05)

Average df used in calculation ==> df (avg n - 1) = 3.00
Used for Chi-square table value ==> df (#groups-1) = 5

Data FAIL homogeneity test at 0.01 level. Try another transformation.

NOTE: If groups have unequal replicate sizes the average replicate size is used to calculate the B statistic (see above).

TITLE: EE04 FATHEAD MINNOW CHRONIC
FILE: fmee04
TRANSFORM: NO TRANSFORMATION NUMBER OF GROUPS: 6

GRP	IDENTIFICATION	REP	VALUE	TRANS VALUE
1	CONTROL	1	0.5040	0.5040
1	CONTROL	2	0.8250	0.8250
1	CONTROL	3	0.7240	0.7240
1	CONTROL	4	0.7030	0.7030
2	6.25	1	0.6250	0.6250
2	6.25	2	0.6320	0.6320
2	6.25	3	0.6370	0.6370
2	6.25	4	0.6330	0.6330
3	12.5	1	0.6410	0.6410
3	12.5	2	0.6830	0.6830
3	12.5	3	0.7150	0.7150
3	12.5	4	0.7830	0.7830
4	25	1	0.5980	0.5980
4	25	2	0.4910	0.4910
4	25	3	0.5780	0.5780
4	25	4	0.6230	0.6230
5	50	1	0.5890	0.5890
5	50	2	0.6010	0.6010
5	50	3	0.5380	0.5380
5	50	4	0.5670	0.5670
6	100	1	0.6640	0.6640
6	100	2	0.4290	0.4290
6	100	3	0.6820	0.6820
6	100	4	0.8460	0.8460

EE04 FATHEAD MINNOW CHRONIC
File: fmee04 Transform: NO TRANSFORMATION

STEELS MANY-ONE RANK TEST - Ho:Control<Treatment

GROUP	IDENTIFICATION	TRANSFORMED MEAN	RANK SUM	CRIT. VALUE	df	SIG
1	CONTROL	0.689				
2	6.25	0.632	14.00	10.00	4.00	
3	12.5	0.706	17.00	10.00	4.00	
4	25	0.573	13.00	10.00	4.00	
5	50	0.574	14.00	10.00	4.00	
6	100	0.655	16.00	10.00	4.00	

Critical values use k = 5, are 1 tailed, and alpha = 0.05

Ceriodaphnia SURVIVAL AND REPRODUCTION CHRONIC TOXICITY TEST

JOB NO: F93506 | BEGINNING: 1636 hrs; 12/13/95 | Log No. 4446
INDUSTRY: Tinker | ENDING: _____ hrs; 12/22/95 | PHOTOPERIOD: 16 light, 8 dark
CONTACT: | FEEDING REGIME: | ORGANISM SOURCE: WCC
EFFLUENT: ECC4 | .05 mL yct/15 mL | TEST VESSEL CAPACITY: 30 mL
NPDES PERMIT NO: | .05 mL algal suspension/15 mL | TEST SOLUTION VOLUME: 15mL
PERSON CONDUCTING TEST: | | NO. REPLICATES:
| | DILUTION WATER:

CONC	CHAMBER	TIME / OBSERVER	NUMBER OF YOUNG PRODUCED							
			START	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7
							34	44	165	173
Control	1								7	5
	2						6	3	7	4
	3						1	5	3	16
	4						6	5	5	5
	5						2	5	7	8
	6						5	5	6	6
	7						3	5	10	8
	8						1	3	7	8
	9						(D)			
	10						~~DX~~	~~5~~	~~5~~	8
							5X			
						10% mortality				
			START	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7
						3	17	35	52	89
6.25%	11							5	6	5
	12						2	5	6	5
	13								5	
	14							5	5	5
	15						2	5	3	7
	16								(D)	
	17						5		(D)	
	18					3	6	3	6	3
	19						1	5	7	9
	20						4	5	2	3
						20% mortality				
			START	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7
						0	29	37	61	102
12.5%	21					(D)				
	22					(D)				
	23						3	2	5	6
	24						6	5	6	6
	25					2	3		7	3
	26						(D)			
	27						2	3	7	4
	28							7	5	9
	29						2	5	5	7
	30					2	5	5	5	6
						3	mortality			

Ceriodaphnia SURVIVAL AND REPRODUCTION CHRONIC TOXICITY TEST

Log No. 446

JOB NO: 193506
INDUSTRY: Tinker
CONTACT:
EFFLUENT: 2204
NPDES PERMIT NO:
PERSON CONDUCTING TEST:

BEGINNING: 1636 hrs; 6/15/95
ENDING: _____ hrs; / /
FEEDING REGIME:
.05 mL yct/15 mL
.05 mL algal suspension/15 mL

PHOTOPERIOD: 16 light, 8 dark
ORGANISM SOURCE: WCC
TEST VESSEL CAPACITY: 30 mL
TEST SOLUTION VOLUME: 15mL
NO. REPLICATES:
DILUTION WATER:

CONC	TIME / OBSERVER / CHAMBER	START	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7	
		NUMBER OF YOUNG PRODUCED								
		START	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7	
					22	46	95	157	213	
25%	31				5	0	6	7	8	26
	32				2	0	10	10	7	29
	33				1	0 ~~8~~	6	~~8~~ 7	7	21
	34					3	7	0	7	17
	35					3	6	8	0	17
	36				4	8	0	7	7	26
	37				2	2	7	7	7	25
	38				4	0	7	5	9	28
	39				D					0
	40				4	8	0	8	4	24
		START	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7	
					14	52	116	179	234	
50%	41					4	4	7	0	20
	42					5	9	7	3	24
	43				1	0	10	9	6	26
	44					3	5	0	4	12
	45				4	0	9	~~8~~ 10	9	31
	46				3	5	0	10	11	32
	47					4	7	0	9	20
	48					4	9	6	2	21
	49				2	0	7	9	10	28
	50				4	10	0	5	~~4~~ 1	20
		START	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7	
					15	34	102	195	269	
100%	51					1	6	11	10	28
	52				3	0	10	10	11	34
	53					3	10	3	0	16
	54				4	0	8	11		25
	55					3	8	1	12	24
	56				2	~~2~~	~~11~~	~~12~~	4	30
	57				1	0	10	13	11	35
	58				4	3	0	13	13	33
	59					2	5	10	0	17
	60				1	7	0	9	8	25

Ceriodaphnia dubia GRID Ceriodaphnia dubia GRID MONITORING DATA

Grid Letter: JTQ JTA MC Start Date: 6 15 -95 Sample ID: EC04 Log #: 4

AD ID 5 1 ✓	AD ID 26 1 ✓	AD ID 51 1 —	AD ID 44 1 —	ID 11 1 —
2 ✓ 3 0 4 2	2 — 3 D-0 4	2 ✓ 3 0 4 1	2 — 3 0 4 3	2 ✓ 3 0 4 0
5 0 6 7 7 8	5 / 6 7	5 0 6 11 7 10	5 5 6 0 7 4	5 5 6 0 7 5
AD ID 13 1 /	AD ID 39 1 ✓	AD ID 7 1 ✓	AD ID 47 1 ✓	ID 58 1 —
2 ✓ 3 D 4 0	2 — 3 D-0 4	2 — 3 0 4 2	2 — 3 0 4 4	2 — 3 4 4 3
5 0 6 0 7 D 3	5 / 6 7	5 0 6 10 7 8	5 7 6 0 7 9	5 0 6 13 7 13
AD ID 37 1 ✓	AD ID 22 1 /	AD ID 43 1 —	AD ID 55 1 ✓	ID 27 1 —
2 ✓ 3 2 4 2	2 — 3 D-0 4	2 — 3 1 4 0	2 — 3 0 4 3	2 — 3 0 4 2
5 7 6 7 7 7	5 / 6 7	5 10 6 9 7 6	5 8 6 1 7 12	5 3 6 7 7 4
AD ID 1 1 ✓	AD ID 23 1 —	AD ID 42 1 —	AD ID 10 1 ✓	ID 49 1 —
2 ✓ 3 0 4 0	2 ✓ 3 0 4 5	2 ✓ 3 0 4 5	2 — 3 0 4 8	2 — 3 2 4 0
5 0 6 7 7 5	5 2 6 0 7 6	5 9 6 7 7 3	5 0 6 6 7 8	5 7 6 9 7 10
AD ID 17 1 /	AD ID 31 1 ✓	AD ID 15 1 ✓	AD ID 16 1 —	ID 29 1 —
2 — 3 0 4 5	2 — 3 5 4 0	2 ✓ 3 0 4 2	2 — 3 3 4 8	2 ✓ 3 0 4 2
5 0 6 D-0 7	5 6 6 7 7 8	5 0 6 2 7 7	5 0 6 10 7 11	5 0 6 0 7 7
AD ID 4 1 ✓	AD ID 33 1 ✓	AD ID 35 1 —	AD ID 19 1 ✓	ID 53 1 —
2 ✓ 3 0 4 6	2 — 3 1 4 0	2 — 3 0 4 3	2 — 3 0 4 1	2 — 3 0 4 3
5 0 6 8 7 5	5 7 6 10 7 7	5 6 6 8 7 0	5 0 6 7 7 9	5 10 6 3 7 0

Comments:

Day 6-15 Initials MAR Time 10:40

Cup ID	Sample Concentration
1–10:	CON
11–20:	6.25
21–30:	12.5
31–40:	25
41–50:	50
51–60:	100

1	LJT	1640
2	LJT	1415
3	SJB	1330
4	SJB	1115
5	MAR	1400
6	LJT	1315
7	LJT	1500

Ceriodaphnia dubia GRID

Ceriodaphnia dubia GRID MONITORING DATA

Grid Letter: A∝IJMKS Start Date: 6-15-15 Sample ID: EE04 Log #: 446

AD ID 57 1✓ 2✓ 3 1 4 0 5 10 6 13 7 11	AD ID 48 1✓ 2✓ 3 0 4 4 5 9 6 6 7 2	AD ID 14 1✓ 2✓ 3 0 4 0 5 5 6 0 7 5	AD ID 59 1✓ 2✓ 3 C 4 2 5 5 6 10 7 C	ID 7 1✓ 2✓ 3 0 4 2 5 0 6 0 7 5
AD ID 24 1✓ 2✓ 3 0 4 6 5 0 6 0 7 6	AD ID 56 1✓ 2✓ 3 2 4 0 5 11 6 12 7 9	AD ID 41 1✓ 2✓ 3 0 4 4 5 9 6 7 7 0	AD ID 6 1✓ 2✓ 3 0 4 8 5 0 6 6 7 6	ID 28 1✓ 2✓ 3 0 4 0 5 7 6 0 7 9
AD ID 52 1✓ 2✓ 3 3 4 0 5 10 6 10 7 11	AD ID 34 1✓ 2✓ 3 0 4 3 5 7 6 0 7 7	AD ID 8 1✓ 2✓ 3 C 4 1 5 2 6 7 7 8	AD ID 40 1✓ 2✓ 3 4 4 8 5 0 6 8 7 4	ID 54 1✓ 2✓ 3 4 4 0 5 8 6 11 7 5
AD ID 9 1✓ 2✓ 3 C 4 0 5 6 7	AD ID 30 1✓ 2✓ 3 2 4 0 5 7 6 0 7 6	AD ID 25 1✓ 2✓ 3 4 4 8 5 0 6 7 7 3	AD ID 18 1✓ 2✓ 3 3 4 0 5 8 6 6 7 3	ID 45 1✓ 2✓ 3 4 4 0 5 8 6 10 7 9
AD ID 32 1✓ 2✓ 3 2 4 0 5 10 6 10 7 7	AD ID 38 1✓ 2✓ 3 4 4 0 5 7 6 8 7 9	AD ID 21 1✓ 2✓ 3 0 4 5 6 7	AD ID 2 1✓ 2✓ 3 0 4 6 5 0 6 7 7 4	ID 16 1✓ 2✓ 3 C 4 0 5 0 6 D 7
AD ID 60 1✓ 2✓ 3 1 4 7 5 0 6 9 7 8	AD ID 50 1✓ 2✓ 3 4 4 10 5 0 6 5 7 1	AD ID 36 1✓ 2✓ 3 4 4 8 5 0 6 7 7 7	AD ID 20 1✓ 2✓ 3 0 4 4 5 0 6 2 7 3	ID 3 1✓ 2✓ 3 0 4 1 5 8 6 3 7 16

Comments:

Day AM 1S Initials LJT JMR Time 1L: 210

Cup ID	Sample Concentration
1–10:	Con
11–20:	6.25
21–30:	12.5
31–40:	25
41–50:	50
51–60:	100

1	LJT	1645
2	LJT	1405
3	SDB	1330
4	SDB	1115
5	JMR	1405
6	LJT	1315
7	LJT	1500

Lc 1446
LC04
6-15-15

CHRONIC TOXICITY TEST DATA SHEET

TEMPERATURE

CONCENTRATION	Start	Day 1 OLD	Day 1 NEW	Day 2 OLD	Day 2 NEW	Day 3 OLD	Day 3 NEW	Day 4 OLD	Day 4 NEW	Day 5 OLD	Day 5 NEW	Day 6 OLD	Day 6 NEW	Day 7 OLD	Day 7 NEW	Day 8 OLD
CON	25.0	25.0	25.0	24.0	24.0	24.2	25.0	25.0	24.8	25.0	25.0	25.2	25.2	24.8		
6.25																
12.5																
25																
50																
100																

DISSOLVED OXYGEN

CONCENTRATION	Start	Day 1 OLD	Day 1 NEW	Day 2 OLD	Day 2 NEW	Day 3 OLD	Day 3 NEW	Day 4 OLD	Day 4 NEW	Day 5 OLD	Day 5 NEW	Day 6 OLD	Day 6 NEW	Day 7 OLD	Day 7 NEW	Day 8 OLD
CON	8.6	7.5	8.3	7.3	8.6	8.1	8.4	8.1	8.2	7.9	8.4	7.5	8.4	7.8		
6.25	8.5	7.8	8.3	7.3	8.6	8.0	8.5	8.1	8.3	7.4	8.3	7.6	8.5	7.8		
12.5	8.5	7.6	8.3	7.4	8.6	8.0	8.6	8.1	8.3	8.0	8.4	7.7	8.3	7.7		
25	8.4	7.6	8.3	7.4	8.5	8.1	8.6	8.1	8.4	7.9	8.3	7.6	8.2	7.7		
50	8.4	7.5	8.4	7.4	8.5	8.1	8.6	8.1	8.4	7.8	8.3	7.6	8.2	7.8		
100	8.5	7.6	8.4	7.5	8.5	8.2	8.6	8.1	8.4	7.9	8.3	7.6	8.1	7.8		

pH

CONCENTRATION	Start	Day 1 OLD	Day 1 NEW	Day 2 OLD	Day 2 NEW	Day 3 OLD	Day 3 NEW	Day 4 OLD	Day 4 NEW	Day 5 OLD	Day 5 NEW	Day 6 OLD	Day 6 NEW	Day 7 OLD	Day 7 NEW	Day 8 OLD
CON	8.48	8.24	8.43	8.28	8.47	8.48	8.69	8.39	8.53	8.42	8.52	8.23	8.52	8.37		
6.25	8.46	8.22	8.41	8.29	8.45	8.49	8.67	8.40	8.52	8.43	8.50	8.23	8.51	8.35		
12.5	8.46	8.21	8.41	8.30	8.44	8.50	8.67	8.40	8.52	8.44	8.50	8.21	8.50	8.34		
25	8.45	8.22	8.41	8.32	8.44	8.53	8.65	8.42	8.49	8.44	8.49	8.21	8.47	8.37		
50	8.41	8.22	8.41	8.40	8.41	8.54	8.63	8.45	8.48	8.57	8.48	8.21	8.42	8.41		
100	8.36	8.31	8.47	8.53	8.40	8.68	8.58	8.50	8.40	8.59	8.45	8.36	8.26	8.48		

CONDUCTIVITY

CONCENTRATION	Start	Day 1 OLD	Day 1 NEW	Day 2 OLD	Day 2 NEW	Day 3 OLD	Day 3 NEW	Day 4 OLD	Day 4 NEW	Day 5 OLD	Day 5 NEW	Day 6 OLD	Day 6 NEW	Day 7 OLD	Day 7 NEW	Day 8 OLD
CON	554	604	575	580	590	601	682	718	673	695	680	625	604	660		
6.25	564	585	564	567	584	591	683	684	657	673	664	669	653	701		
12.5	560	571	560	563	576	550	664	679	643	676	657	651	641	675		
25	547	594	541	544	543	557	637	644	618	637	623	628	613	635		
50	480	524	510	521	520	522	574	571	570	577	560	561	557	581		
100	437	471	463	472	454	454	463	471	450	472	450	454	443	491		

MAR 1540 LJT 0815 1150 LJT 1630 LJT 1200

FISHERS EXACT TEST

IDENTIFICATION	NUMBER OF ALIVE	DEAD	TOTAL ANIMALS
CONTROL	9	1	10
6.25%	8	2	10
TOTAL	17	3	20

CRITICAL FISHERS VALUE (10,10,9) (p=0.05) IS 4. b VALUE IS 8.
Since b is greater than 4 there is no significant difference between CONTROL and TREATMENT at the 0.05 level.

FISHERS EXACT TEST

IDENTIFICATION	NUMBER OF ALIVE	DEAD	TOTAL ANIMALS
CONTROL	9	1	10
12.5%	7	3	10
TOTAL	16	4	20

CRITICAL FISHERS VALUE (10,10,9) (p=0.05) IS 4. b VALUE IS 7.
Since b is greater than 4 there is no significant difference between CONTROL and TREATMENT at the 0.05 level.

FISHERS EXACT TEST

IDENTIFICATION	NUMBER OF ALIVE	DEAD	TOTAL ANIMALS
CONTROL	9	1	10
25%	9	1	10

TOTAL	18	2	20

CRITICAL FISHERS VALUE (10,10,9) (p=0.05) IS 4. b VALUE IS 9.
Since b is greater than 4 there is no significant difference between CONTROL and TREATMENT at the 0.05 level.

SUMMARY OF FISHERS EXACT TESTS

GROUP	IDENTIFICATION	NUMBER EXPOSED	NUMBER DEAD	SIG (P=.05)
	CONTROL	10	1	
1	6.25%	10	2	
2	12.5%	10	3	
3	25%	10	1	

TITLE: ee04cd
FILE: EE04CD
TRANSFORM: ARC SINE(SQUARE ROOT(Y)) NUMBER OF GROUPS: 6

GRP	IDENTIFICATION	REP	VALUE	TRANS VALUE
1	Control	1	1.0000	1.0472
1	Control	2	1.0000	1.0472
1	Control	3	1.0000	1.0472
1	Control	4	1.0000	1.0472
1	Control	5	1.0000	1.0472
1	Control	6	1.0000	1.0472
1	Control	7	1.0000	1.0472
1	Control	8	1.0000	1.0472
1	Control	9	0.0000	0.5236
1	Control	10	1.0000	1.0472
2	6.25%	1	1.0000	1.0472
2	6.25%	2	1.0000	1.0472
2	6.25%	3	1.0000	1.0472
2	6.25%	4	1.0000	1.0472
2	6.25%	5	1.0000	1.0472
2	6.25%	6	0.0000	0.5236
2	6.25%	7	0.0000	0.5236
2	6.25%	8	1.0000	1.0472
2	6.25%	9	1.0000	1.0472
2	6.25%	10	1.0000	1.0472
3	12.5%	1	0.0000	0.5236
3	12.5%	2	0.0000	0.5236
3	12.5%	3	1.0000	1.0472
3	12.5%	4	1.0000	1.0472
3	12.5%	5	1.0000	1.0472
3	12.5%	6	0.0000	0.5236

3	12.5%	7	1.0000	1.0472
3	12.5%	8	1.0000	1.0472
3	12.5%	9	1.0000	1.0472
3	12.5%	10	1.0000	1.0472
	25%	1	1.0000	1.0472
	25%	2	1.0000	1.0472
4	25%	3	1.0000	1.0472
4	25%	4	1.0000	1.0472
4	25%	5	1.0000	1.0472
4	25%	6	1.0000	1.0472
4	25%	7	1.0000	1.0472
4	25%	8	1.0000	1.0472
4	25%	9	0.0000	0.5236
4	25%	10	1.0000	1.0472
5	50%	1	1.0000	1.0472
5	50%	2	1.0000	1.0472
5	50%	3	1.0000	1.0472
5	50%	4	1.0000	1.0472
5	50%	5	1.0000	1.0472
5	50%	6	1.0000	1.0472
5	50%	7	1.0000	1.0472
5	50%	8	1.0000	1.0472
5	50%	9	1.0000	1.0472
5	50%	10	1.0000	1.0472
6	100%	1	1.0000	1.0472
6	100%	2	1.0000	1.0472
6	100%	3	1.0000	1.0472
6	100%	4	1.0000	1.0472
6	100%	5	1.0000	1.0472
6	100%	6	1.0000	1.0472
	100%	7	1.0000	1.0472
6	100%	8	1.0000	1.0472
6	100%	9	1.0000	1.0472
6	100%	10	1.0000	1.0472

ee04cd
File: EE04CD Transform: ARC SINE(SQUARE ROOT(Y))

SUMMARY STATISTICS ON TRANSFORMED DATA TABLE 1 of 2

GRP	IDENTIFICATION	N	MIN	MAX	MEAN
1	Control	10	0.524	1.047	0.995
2	6.25%	10	0.524	1.047	0.942
3	12.5%	10	0.524	1.047	0.890
4	25%	10	0.524	1.047	0.995
5	50%	10	1.047	1.047	1.047
6	100%	10	1.047	1.047	1.047

:04cd
ile: EE04CD Transform: ARC SINE(SQUARE ROOT(Y))

SUMMARY STATISTICS ON TRANSFORMED DATA TABLE 2 of 2

GRP	IDENTIFICATION	VARIANCE	SD	SEM
1	Control	0.027	0.166	0.052
2	6.25%	0.049	0.221	0.070
3	12.5%	0.064	0.253	0.080
4	25%	0.027	0.166	0.052
5	50%	0.000	0.000	0.000
6	100%	0.000	0.000	0.000

EE04 CERIO CHRONIC
File: CDEE04 Transform: NO TRANSFORMATION

Chi-square test for normality: actual and expected frequencies

INTERVAL	<-1.5	-1.5 to <-0.5	-0.5 to 0.5	>0.5 to 1.5	>1.5
EXPECTED	4.020	14.520	22.920	14.520	4.020
OBSERVED	4	14	23	17	2

Calculated Chi-Square goodness of fit test statistic = 1.4576
Table Chi-Square value (alpha = 0.01) = 13.277

Data PASS normality test. Continue analysis.

EE04 CERIO CHRONIC
File: CDEE04 Transform: NO TRANSFORMATION

Bartletts test for homogeneity of variance

Calculated B statistic = 1.36
Table Chi-square value = 15.09 (alpha = 0.01)
Table Chi-square value = 11.07 (alpha = 0.05)

Average df used in calculation ==> df (avg n - 1) = 9.00
Used for Chi-square table value ==> df (#groups-1) = 5

Data PASS homogeneity test at 0.01 level. Continue analysis.

NOTE: If groups have unequal replicate sizes the average replicate size is used to calculate the B statistic (see above).

TITLE: EE04 CERIO CHRONIC
FILE: CDEE04
TRANSFORM: NO TRANSFORMATION NUMBER OF GROUPS: 6

GRP	IDENTIFICATION	REP	VALUE	TRANS VALUE
1	CONTROL	1	12.0000	12.0000
1	CONTROL	2	17.0000	17.0000
1	CONTROL	3	28.0000	28.0000
1	CONTROL	4	19.0000	19.0000
1	CONTROL	5	17.0000	17.0000
1	CONTROL	6	20.0000	20.0000
1	CONTROL	7	20.0000	20.0000
1	CONTROL	8	18.0000	18.0000
1	CONTROL	9	0.0000	0.0000
1	CONTROL	10	22.0000	22.0000
2	6.25	1	10.0000	10.0000
2	6.25	2	7.0000	7.0000
2	6.25	3	0.0000	0.0000
2	6.25	4	10.0000	10.0000
2	6.25	5	11.0000	11.0000
2	6.25	6	0.0000	0.0000
2	6.25	7	5.0000	5.0000
2	6.25	8	20.0000	20.0000
2	6.25	9	17.0000	17.0000
2	6.25	10	9.0000	9.0000
3	12.5	1	0.0000	0.0000
3	12.5	2	0.0000	0.0000
3	12.5	3	13.0000	13.0000
3	12.5	4	12.0000	12.0000
3	12.5	5	22.0000	22.0000
3	12.5	6	0.0000	0.0000
3	12.5	7	15.0000	15.0000
3	12.5	8	16.0000	16.0000
3	12.5	9	9.0000	9.0000
3	12.5	10	15.0000	15.0000
4	25	1	26.0000	26.0000
4	25	2	29.0000	29.0000
4	25	3	21.0000	21.0000
4	25	4	17.0000	17.0000
4	25	5	17.0000	17.0000
4	25	6	26.0000	26.0000
4	25	7	25.0000	25.0000
4	25	8	28.0000	28.0000
4	25	9	0.0000	0.0000
4	25	10	24.0000	24.0000
5	50	1	20.0000	20.0000
5	50	2	24.0000	24.0000
5	50	3	26.0000	26.0000
5	50	4	12.0000	12.0000
5	50	5	31.0000	31.0000
5	50	6	32.0000	32.0000
5	50	7	20.0000	20.0000
5	50	8	21.0000	21.0000
5	50	9	28.0000	28.0000
5	50	10	20.0000	20.0000

6	100	1	28.0000	28.0000
6	100	2	34.0000	34.0000
6	100	3	16.0000	16.0000
6	100	4	23.0000	23.0000
6	100	5	24.0000	24.0000
6	100	6	34.0000	34.0000
6	100	7	35.0000	35.0000
6	100	8	33.0000	33.0000
6	100	9	17.0000	17.0000
6	100	10	25.0000	25.0000

EE04 CERIO CHRONIC
File: CDEE04 Transform: NO TRANSFORMATION

ANOVA TABLE

SOURCE	DF	SS	MS	F
Between	5	2634.000	526.800	10.024
Within (Error)	54	2838.000	52.556	
Total	59	5472.000		

Critical F value = 2.45 (0.05,5,40)
Since F > Critical F REJECT Ho:All groups equal

EE04 CERIO CHRONIC
File: CDEE04 Transform: NO TRANSFORMATION

DUNNETTS TEST - TABLE 1 OF 2 Ho:Control<Treatment

GROUP	IDENTIFICATION	TRANSFORMED MEAN	MEAN CALCULATED IN ORIGINAL UNITS	T STAT	SIG
1	CONTROL	17.300	17.300		
2	6.25	8.900	8.900	2.591	*
3	12.5	10.200	10.200	2.190	
4	25	21.300	21.300	-1.234	
5	50	23.400	23.400	-1.881	
6	100	26.900	26.900	-2.961	

Dunnett table value = 2.31 (1 Tailed Value, P=0.05, df=40,5)

EE04 CERIO CHRONIC
File: CDEE04 Transform: NO TRANSFORMATION

DUNNETTS TEST - TABLE 2 OF 2 Ho:Control<Treatment

GROUP	IDENTIFICATION	NUM OF REPS	Minimum Sig Diff (IN ORIG. UNITS)	% of CONTROL	DIFFERENCE FROM CONTROL

1	CONTROL	10			
2	6.25	10	7.489	43.3	8.400
3	12.5	10	7.489	43.3	7.100
4	25	10	7.489	43.3	-4.000
5	50	10	7.489	43.3	-6.100
6	100	10	7.489	43.3	-9.600

CHAIN OF CUSTODY RECORD

JOB #	PROJECT NAME
Task 3 F93506	TAFB Soldier Creek Ecol. Survey

SAMPLERS: (Signature)

WOODWARD-CLYDE CONSULTANTS
P.O. BOX 680925
FRANKLIN, TN 37068-0925
(615) 790-0003 FAX (615) 790-0023

SAMPLE IDENTIFICATION	DATE	TIME	SAMPLE TYPE	NUMBER OF CONTAINERS	ANALYSES REQUIRED: Toxicity	REMARKS
~~SC-EE04-SW~~						DSU
SC-EE04-TY-201	6/12/95	07:00	water	3	✓	FedExp 580482345 2

RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)	RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)
	6/12/95 1800				
RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)	RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)
RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED AT LAB BY: (Signature)	DATE/TIME	GENERAL COMMENTS	
			6/13/95 0854	2.5°C upon arrival	

Distribution: Original and Yellow copies accompany sample shipment to laboratory
Pink copy retained by samplers. Yellow copy retained by laboratory. Laboratory returns White copy to samplers.

№ 15,0

CHAIN OF CUSTODY RECORD

JOB #	PROJECT NAME
Task 3 R93506	TAFB- Soldier Creek -Ecol. Survey

SAMPLERS: (Signature)

WOODWARD-CLYDE CONSULTANTS
P.O. BOX 680925
FRANKLIN, TN 37068-0925
(615) 790-0003 FAX (615) 790-0023

SAMPLE IDENTIFICATION	DATE	TIME	SAMPLE TYPE	NUMBER OF CONTAINERS	ANALYSES REQUIRED: Toxicity	REMARKS
SC-EE04-TX-201	6/12/95	07:00	water	2	✓	Fed Exp 580482345 2
SC-EE04-TX-201	11	07:30	soil	2	✓	

RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)	RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)
	6/12/95 18:00				
RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)	RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)
RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED AT LAB BY: (Signature)	DATE/TIME	GENERAL COMMENTS	
		Lyn Jeer	6/13/95 0855	3 °C upon arrival	

Distribution: Original and Yellow copies accompany sample shipment to laboratory
Pink copy retained by samplers. Yellow copy retained by laboratory. Laboratory returns White copy to samplers.

TEST SUMMARY: SC-EE05-TX-201
Ceriodaphnia dubia 48-Hour Static Acute

Test protocol:	WCC SOP 401.2
Test organism:	*Ceriodaphnia dubia*
Source:	WCC Culture Laboratory
Age of test organism:	<24 hours
Test initiation:	6/9/95
Test termination:	6/11/95
Temperature:	25 +/- 1 °C
Light:	50 - 100 foot candles
Photoperiod:	16 hours light/8 hours dark
Test vessel:	30 mL styrene
Test volume:	20 mL
Organisms/replicate:	5
Replicates/concentration:	4
Feeding regime:	none
Aeration during test:	none
Dilution Water:	Hard Reconstituted Synthetic
Test duration:	48 hours
Effect measured:	Mortality
Reference Toxicant Data:	
LC_{50} (g/L NaCl):	1.51

TEST RESULTS: SC-EE05-TX-201
Ceriodaphnia dubia 48-Hour Static Acute

LC_{50} > 100%

Statictical analysis method: N/A

Treatment (% Sample)	Survival (%)	pH	Conductivity (umhos/cm)	DO (mg/L)	Temperature (°C)	Hardness (mg/L $CaCO_3$)	Alkalinity (mg/L $CaCO_3$)
Control	100	8.17-8.19	451 (437-464)	8.4 (8.2-8.6)	24.6-24.6	120	
6.25	100	7.89-8.34	436 (430-442)	8.4 (8.3-8.4)	24.6-24.6		
12.5	85	8.36-8.39	457 (447-467)	8.4 (8.3-8.5)	24.6-24.6		
25	70	8.39-8.50	431 (422-440)	8.4 (8.3-8.5)	24.6-24.6		
50	70	8.00-8.41	396 (382-410)	8.4 (8.3-8.4)	24.6-24.6		
100	100	7.76-8.51	379 (334-424)	8.4 (8.3-8.4)	24.6-24.6	146	134

SURFACE WATER SAMPLE ARRVIAL INFORMATION

Collection Date/Time:	6/8/95 @ 1600
Use Date/Time:	6/9/95 @ 1310
Method of Shipment:	Overnight Courier
Temperature (°C):	2.5
pH:	8.53
Ammonia (mg/L):	14.3
Conductivity (umhos/cm):	424
DO (mg/L):	8.3

TEST SUMMARY: SC-EE05-TX-201
Ceriodaphnia dubia Chronic Renewal

Test protocol:	WCC SOP 501.1
Test organism:	*Ceriodaphnia dubia*
Source:	WCC Culture Laboratory
WCC Batch:	6/11/95
Age of test organism:	<24 hours
Test initiation:	6/12/95
Test termination:	6/19/95
Temperature:	25 +/- 1 °C
Light:	50 - 100 foot candles
Photoperiod:	16 hours light/8 hours dark
Test vessel:	30 mL styrene
Test volume:	15 mL
Organisms/replicate:	1
Replicates/concentration:	10
Feeding regime:	0.05 mL *Selenastrum* and 0.05 mL YTC daily
Aeration during test:	none
Dilution Water:	Hard Reconstituted Synthetic
Test duration:	7 days
Effect measured:	Survival and reproduction

Toxicity test methods and procedures were followed in accordance with EPA 600/4-89/001

Reference Toxicant Data:	
NOEC (g/L NaCl):	0.75

TEST RESULTS: SC-EE05-TX-201
Ceriodaphnia dubia Chronic Survival and Reproduction Test

Survival NOEC:		6.25%*
	Statistical analysis method:	Fishers Exact
	Normality test:	Fail
	Homogeneity of variance test:	Fail
Reproduction NOEC:		<6.25% *
	Statistical analysis method:	Dunnetts
	Normality test:	Pass
	Homogeneity of variance test:	Pass

Treatment (% Sample)	Survival (%)	pH	Conductivity (umhos/cm)	DO (mg/L)	Temperature (°C)
Control	100	7.46-8.42	511 (415-606)	8.0 (7.2-8.8)	24.5 (24.0-25.0)
6.25	80	7.63-8.44	465 (411-519)	8.0 (7.3-8.7)	24.5 (24.0-25.0)
12.5	50	7.71-8.49	431 (358-504)	8.0 (7.3-8.7)	24.5 (24.0-25.0)
25	70	7.95-8.53	413 (363-463)	8.0 (7.3-8.6)	24.5 (24.0-25.0)
50	80	8.02-8.62	388 (354-422)	8.0 (7.4-8.5)	24.5 (24.0-25.0)
100	80	8.13-8.72	310 (273-346)	8.2 (7.4-8.9)	24.5 (24.0-25.0)

	Hardness (mg/L $CaCO_3$)	Alkalinity (mg/L $CaCO_3$)	Ammonia (mg/L)
Control	120		
EE05	146	134	14.3

TEST SUMMARY: SC-EE05-TX-201
Pimephales promelas 48-Hour Static Acute

Test protocol:	WCC SOP 410.2
Test organism:	*Pimephales promelas*
Source:	Woodward-Clyde Consultants
Age of test organism:	6 days
Test initiation:	6/9/95
Test termination:	6/11/95
Temperature:	20 +/- 1 °C
Light:	50 - 100 foot candles
Photoperiod:	16 hours light/8 hours dark
Test vessel:	500 mL plastic beaker
Test volume:	250 mL
Organisms/replicate:	10
Replicates/concentration:	2
Feeding regime:	none
Aeration during test:	none
Dilution Water:	Spring Water
Test duration:	48 hours
Effect measured:	Mortality
Reference Toxicant Data:	
LC_{50} (g/L NaCl):	5.26

TEST RESULTS: SC-EE05-TX-201
Pimephales promelas 48-Hour Static Acute

LC_{50} > 100%

Statictical analysis method: N/A

Treatment (% Sample)	Survival (%)	pH	Conductivity (umhos/cm)	DO (mg/L)	Temperature (°C)	Hardness (mg/L $CaCO_3$)	Alkalinity (mg/L $CaCO_3$)	Ammonia (mg/L)
Control	95	8.25-8.28	342 (317-366)	8.0 (7.9-8.1)	20.0 (20.0-20.0)	158	146	
6.25	85	8.27-8.46	328 (313-343)	8.0 (7.9-8.0)	20.0 (20.0-20.0)			
12.5	75	8.40-8.49	327 (313-340)	8.0 (8.0-8.0)	20.0 (20.0-20.0)			
25	65	8.41-8.50	327 (312-341)	8.1 (8.0-8.1)	20.0 (20.0-20.0)			
50	95	8.46-8.49	328 (314-342)	8.1 (8.0-8.1)	20.0 (20.0-20.0)			
100	85	8.52-8.66	316 (303-328)	8.1 (8.0-8.2)	20.0 (20.0-20.0)	146	134	14.3

SURFACE WATER SAMPLE ARRVIAL INFORMATION

Collection Date/Time:	6/8/95 @ 1600
Use Date/Time:	6/9/95 @ 1600
Method of Shipment:	Overnight Courier
Temperature (°C):	2.5
pH:	8.53
Ammonia (mg/L):	14.3
Conductivity (umhos/cm):	303
DO (mg/L):	8.3
Description:	Clear

TEST SUMMARY: SC-EE05-TX-201
Pimephales promelas Chronic Renewal

Test protocol:	WCC SOP 510.1
Test organism:	*Pimephales promelas*
Source:	Environmental Consulting & Testing
Age of test organism:	<24 hours
Test initiation:	6/12/95 @ 1700
Test termination:	6/19/95 @ 1330
Temperature:	25 +/- 1 °C
Light:	50 - 100 foot candles
Photoperiod:	16 hours light/8 hours dark
Test vessel:	500 mL plastic beaker
Test volume:	250 mL
Organisms/replicate:	10
Replicates/concentration:	4
Feeding regime:	0.1 mL brine shrimp nauplii twice daily
Aeration during test:	none
Dilution Water:	Spring Water
Test duration:	7 days
Effect measured:	Survival and growth

Toxicity test methods and procedures were followed in accordance with EPA 600/4-89/001

Reference Toxicant Data:	
NOEC (g/L NaCl):	3.0

TEST RESULTS : SC- EE05-TX-201
Pimephales promelas Chronic Survival and Growth Test

Survival NOEC:		100%
	Statistical analysis method:	Steels Many-One Rank Test
	Normality test:	Shapiro-Wilk's - Pass
	Homogeneity of variance test:	Bartletts - Fail
Growth NOEC:		100%
	Statistical analysis method:	Dunnetts
	Normality test:	Chi-square - Pass
	Homogeneity of variance test:	Bartletts - Pass

Treatment (% Sample)	Survival (%)	pH	Conductivity (umhos/cm)	DO (mg/L)	Temperature (°C)
Control	100	7.59-8.48	373 (287-459)	7.5 (6.5-8.5)	24.5 (24.0-25.0)
6.25	95	7.78-8.43	323 (282-363)	7.5 (6.5-8.5)	24.5 (24.0-25.0)
12.5	95	7.94-8.45	332 (312-352)	7.6 (6.5-8.6)	24.5 (24.0-25.0)
25	100	7.91-8.47	319 (291-347)	7.5 (6.3-8.6)	24.5 (24.0-25.0)
50	90	7.92-8.50	324 (300-348)	7.4 (6.2-8.5)	24.5 (24.0-25.0)
100	95	7.91-8.76	303 (272-333)	7.6 (6.0-9.2)	24.5 (24.0-25.0)

	Hardness (mg/L $CaCO_3$)	Alkalinity (mg/L $CaCO_3$	Ammonia (mg/L)
Control	120		
EE05	146	134	14.3

48-hr Ceriodaphnia dubia TOXICITY TEST

LOG NO. 423-426
JOB NO. F935016/3
INDUSTRY: TINKER AFB
CONTACT:

EFFLUENT: ~~EFF~~ TST / CONTROL
START DATE: 6/9/95
START TIME: 1310
DILUTION WATER: CONTROL

CONC (%)	REP ID	SURVIVAL (#) 0	24	48	DEAD	TEMPERATURE (oC) 0	24	48	DO (mg/L) 0	24	48	pH (S.U.) 0	24	48	CONDUCTIVITY (umhos/cm) 0	24	48
HD 120	A	5	5	5	0	24.4		24.4	8.4		8.2	8.19		8.17	4607		4604
	B	5	5	5	0												
	C	5	5	5	0												
	D	5	5	5	0												
	A																
	B																
	C																
	D																
HD 250	A	5	5	5	0	24.4		24.4	8.4		8.2	8.50		8.49	5600		5546
	B	5	5	5	0												
	C	5	5	5	0												
	D	5	5	5	0												
	A																
	B																
	C																
	D																
	A																
	B																
	C																
	D																
	Initials	LST	MAR	LST													
	Time	1310	1047	1035													

Comments

PARAMETER	Control	
Total Hardness (mg/L CaCO3)		
Total Alkalinity (mg/L CaCO3 @ 4.5)		

X

48-hr Ceriodaphnia dubia TOXICITY TEST

LOG NO. 423
JOB NO. F93506
INDUSTRY: TINKER AFB
CONTACT:

EFFLUENT: FE05
START DATE: 6/9/95
START TIME: 1310
DILUTION WATER: MD 120

CONC (%)	REP ID	SURVIVAL (#) 0	24	48	DEAD	TEMPERATURE (oC) 0	24	48	DO (mg/L) 0	24	48	pH (S.U.) 0	24	48	CONDUCTIVITY (umhos/cm) 0	24	48
6.25	A	5	5	5	0	24.4		24.0	8.4		8.3	7.87		7.81	442		430
~~12.5~~	B	5	5	4	0												
	C	5	5	5	0												
	D	5	5	5	0												
12.5	A	5	5	4	1				8.5		8.3	7.89		7.84	447		407
	B	5	5	4	1												
	C	5	5	4	1												
	D	5	5	5	0												
25	A	5	2	2	3				8.5		8.3	7.90		7.89	400		440
	B	5	5	3	2												
	C	5	5	5	0												
	D	5	5	4	1												
50	A	5	5	4	1				8.4		8.3	7.86		8.41	382		410
	B	5	5	3	2												
	C	5	4	3	2												
	D	5	5	5/4	1												
100	A	5	5	5	0				8.4		8.3	7.74		8.51	424		334
	B	5	5	5	0												
	C	5	5	5	0												
	D	5	5	5	0												
Initials		CJ	MAR	CJT													
Time		1310	1013	1030													

Comments

PARAMETER	Control	
Total Hardness (mg/L CaCO3)		
Total Alkalinity (mg/L CaCO3 @ 4.5)		

48-hr Pimephales promleas TOXICITY TEST

LOG NO. 423
JOB NO. F93506
INDUSTRY: Timber
CONTACT:

EFFLUENT: EE05
START DATE: 6-9-95
START TIME: 1600
DILUTION WATER: Spring

CONC (%)	REP ID	SURVIVAL (#) 0	24	48	DEAD	TEMPERATURE (oC) 0	24	48	DO (mg/L) 0	24	48	pH (S.U.) 0	24	48	CONDUCTIVITY (umhos/cm) 0	24	48
CON	A	10	10	9	1	20°C			7.9		8.1	8.28		8.25	311		366
	B	10	10	10	0												
6.25	A	10	10	9	1				7.9		8.0	8.27		8.26	313		343
	B	10	9	8	2												
12.5	A	10	9	7	3				8.0		8.0	8.40		8.49	313		340
	B	10	9	8	2												
25	A	10	9	5	5				8.1		8.0	8.41		8.50	312		341
	B	10	9	8	2												
50	A	10	10	9	1				8.1		8.0	8.46		8.49	314		337
	B	10	10	10	0												
100	A	10	9	8	2				8.2		8.0	8.66		8.52	303		328
	B	10	9	9	1												
	A																
	B																
	A																
	B																
	A																
	B																
	A																
	B																
	Initials	MLS	MLS	CJT													
	Time	1600	0800	1600													

Comments

PARAMETER	Control	
Total Hardness (mg/L CaCO3)		
Total Alkalinity (mg/L CaCO3 @ 4.5)		

[illegible] MINNOW SURVIVAL AND GROWTH Log No. [illegible]

7–DAY CHRONIC TOXICITY TEST

JOB NO. F935C6
INDUSTRY: Tinker
CONTACT:
EFFLUENT: E805
NPDES PERMIT NO:
SAMPLE TYPE:
DILUTION WATER: Spring

PERSON CONDUCTING TEST: MLS
BEGINNING: 1700 hrs; 6/12/95
ENDING: ____ hrs; 6/19/95
TEST
DILUTIONS: .5
AGE: < 24 hrs
ORGANISM SOURCE: EC&T

PHOTOPERIOD: 16 hr light
FEEDING REGIME: 2
0.1 ml Artemia @ ~~3~~ times/day
TEST VESSEL CAPACITY: 1 ~~liter~~ 500
TEST SOLUTION VOLUME: ~~500~~ mL 25
NO. ORGANISMS/TREATMENT: 10
NO. REPLICATES: ~~3~~ 4

CONC (%)	REP ID	SURVIVAL (#) START	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7
Con	A	10	10	~~9~~ 10	10	10	10	10	10
	B	10	10	10	10	10	10	10	10
	C	10	10	10	10	10	10	10	10
	D	10	10	10	10	10	10	10	10
6.25	A	10	10	10	10	10	10	10	10
	B	10	10	10	10	10	9	9	9
	C	10	10	10	10	~~10~~ 9	10	10	10
	D	10	10	10	9	9	9	9	9
12.5	A	10	10	10	10	10	~~9~~ 10	10	10
	B	10	10	9	9	9	9	9	9
	C	10	10	10	10	10	10	9	9
	D	10	10	10	10	10	10	10	10
25	A	10	10	10	9	9	9	10	10
	B	10	10	10	10	10	10	10	10
	C	10	10	10	10	10	10	10	10
	D	10	10	10	10	10	10	10	10
	TIME:	1700	1430	1415	1440	1455	1330	1400	1330
	INITIAL:	MLS	MLS	SJE	SJE	MAR	MLS	MLS	TNT

GROWTH RESULTS

CONC (%)	REP ID	Boat ID	Tare wt (g)	Combined wt (g)	Tot Fish wt (g)	# of Fish	Avg Fish wt (mg)
Con	A		.99329	.99876	0.00547	10	0.547
	B		.99291	.99754	0.00463	10	0.463
	C		1.00770	1.01335	0.00565	10	0.565
	D		1.00789	1.01433	0.00644	10	0.644
6.25	A		1.01273	1.01936	0.00663	10	0.663
~~Marked 8.25~~	B	1.00805	~~1.00017~~	1.01417	0.00602	9	0.669
	C		1.00354	1.00962	0.00608	10	0.608
	D		.98992	.99500	0.00508	9	0.564
12.5	A		.99760	1.00361	0.00601	10	0.601
	B		.99982	1.00492	0.0051	9	0.567
	C		.98877	.99443	0.00566	9	0.629
	D		.99377	0.99868	0.00491	10	0.491
25	A		.99403	.99958	0.00555	10	0.555
	B		.98927	.99423	0.00496	10	0.496
	C		.99271	.99884	0.00613	10	0.613
	D		.99373	.99780	0.00607	10	0.607

7-DAY CHRONIC TOXICITY TEST

JOB NO. F935C6
INDUSTRY: Tinker
CONTACT:
EFFLUENT: EECS
NPDES PERMIT NO:
SAMPLE TYPE:
DILUTION WATER: Spring

PERSON CONDUCTING TEST:
BEGINNING: 1700 hrs; 6/12/95
ENDING: ___ hrs; / / .
TEST
DILUTIONS: .5
AGE: <24 hr
ORGANISM SOURCE: EC&T

PHOTOPERIOD: 16 hr light
FEEDING REGIME: 2
0.1 ml Artemia @ 3 times/day
TEST VESSEL CAPACITY: 1 ~~liter~~ 500
TEST SOLUTION VOLUME: ~~500~~ mL 35
NO. ORGANISMS/TREATMENT: 10
NO. REPLICATES: 4

CONC (%)	REP ID	SURVIVAL (#) START	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7
50	A	10	10	9	9 ~~9~~	9	9	9	9
	B	10	10	10	10	10	10	10	8
	C	10	10	10	10	9	9	9	9
	D	10	10	10	10	10	10	10	10
100	A	10	10	10	10	10	10	10	10 ★
	B	10	10	10	10	9	9	9	10
	C	10	10	10	10	10	10	10	9
	D	10	10	10	10	10	10	10	9
	TIME:	1700	1430	1415	1430	1515	1350	1400	1330
	INITIAL:	MLS	MLS	JJC	JJR	MAR	MLS	MLS	INT

GROWTH RESULTS

CONC (%)	REP ID	Boat ID	Tare wt (g)	Combined wt (g)	Tot Fish wt (g)	# of Fish	Avg Fish wt (mg)
50	A		.99248	.99837	0.00589	9	0.654
	B		.99324	.99838	0.00514	8	0.643
	C		.98033	0.98520	0.00487	9	0.541
	D		.98107	.98675	0.00538	10	0.538
100	A		1.00264	1.00835	0.00571	9	0.634
	B		1.00059	1.00623	0.00564	10	0.564
	C		.99218	.99641	~~0.00423~~ SEE	9	0.470
	D		.99220	.99773	~~0.00553~~ SEE	9	0.614

C2[illegible]
Fathead
1-009 429
6-12-95
Spring H20

CHRONIC TOXICITY TEST DATA SHEET

TEMPERATURE

CONCENTRATION	Start	Day 1 OLD	Day 1 NEW	Day 2 OLD	Day 2 NEW	Day 3 OLD	Day 3 NEW	Day 4 OLD	Day 4 NEW	Day 5 OLD	Day 5 NEW	Day 6 OLD	Day 6 NEW	Day 7 OLD	Day 7 NEW	Day 8 OLD
(00 1)	24.0	24.8	24.8	24.0	24.0	25.0	25.0	24.2	25.0	24.0	24.0	24.2	25.0	24.5		
6.25																
12.5																
25																
50																
100																

DISSOLVED OXYGEN

CONCENTRATION	Start	Day 1 OLD	Day 1 NEW	Day 2 OLD	Day 2 NEW	Day 3 OLD	Day 3 NEW	Day 4 OLD	Day 4 NEW	Day 5 OLD	Day 5 NEW	Day 6 OLD	Day 6 NEW	Day 7 OLD	Day 7 NEW	Day 8 OLD
(00)	7.7	8.1	8.0	7.5	8.0	7.0	8.1	7.3	7.3	6.5	7.9	8.0	8.5			
6.25	7.6	8.1	8.0	7.3	8.0	7.0	8.2	7.3	7.5	6.5	7.9	8.0	8.5			
12.5	7.7	8.0	8.0	7.3	8.2	6.1	8.1	7.4	7.4	6.5	8.0	8.0	8.6	7.6		
25	7.7	8.0	8.0	7.2	8.2	6.3	8.0	7.3	7.3	6.7	7.9	7.9	8.6	6.4		
50	7.7	8.0	8.0	6.8	8.2	6.1	8.0	7.4	7.5	6.5	8.0	7.9	8.5	6.2		
100	7.7	8.1	8.0	6.8	8.2	6.0	8.0	7.4	8.8	6.5	8.1	7.9	8.5	6.3		

pH

CONCENTRATION	Start	Day 1 OLD	Day 1 NEW	Day 2 OLD	Day 2 NEW	Day 3 OLD	Day 3 NEW	Day 4 OLD	Day 4 NEW	Day 5 OLD	Day 5 NEW	Day 6 OLD	Day 6 NEW	Day 7 OLD	Day 7 NEW	Day 8 OLD
(01)	7.99	8.25	8.18	8.13	8.27	7.89	8.32	8.12	7.12	8.31	8.32	8.43	8.48	8.05		
6.25	8.00	8.21	8.11	8.02	8.34	7.78	8.10	8.11	7.13	8.28	8.30	8.36	8.43	7.95		
12.5	8.04	8.22	8.17	8.06	8.33	7.95	8.11	8.12	7.14	8.38	8.32	8.38	8.45	8.05		
25	8.06	8.21	8.20	8.04	8.38	7.91	8.13	8.11	7.16	8.28	8.34	8.35	8.47	7.95		
50	7.21	8.20	8.21	7.93	8.49	7.92	8.10	8.11	8.67	8.26	8.39	8.35	8.50	7.93		
100	8.02	7.56	8.12	7.95	8.76	7.91	8.03	8.11		8.28	8.57	8.36	8.70	7.91		

CONDUCTIVITY

CONCENTRATION	Start	Day 1 OLD	Day 1 NEW	Day 2 OLD	Day 2 NEW	Day 3 OLD	Day 3 NEW	Day 4 OLD	Day 4 NEW	Day 5 OLD	Day 5 NEW	Day 6 OLD	Day 6 NEW	Day 7 OLD	Day 7 NEW	Day 8 OLD
(00)	340	321	324	409	287	319	320	303	319	382	341	360	459	352		
6.25	328	348	323	353	282	303	321	352	317	350	333	351	327			
12.5	304	343	312	355	317	352	318	346	3[illegible]	346	343	345	324	357		
25	302	326	311	311	315	347	315	341	3[illegible]	342	324	347	323	341		
50	315	334	311	333	300	343	310	356	296	336	321	342	318	335		
100	272	310	286	323	255	333	299	320		325	310	322	310	319		

ee05fm
File: ee05fm Transform: NO TRANSFORMATION

'hapiro Wilks test for normality

D = 5.000

W = 0.911

Critical W (P = 0.05) (n = 24) = 0.916
Critical W (P = 0.01) (n = 24) = 0.884

Data PASS normality test at P=0.01 level. Continue analysis.

ee05fm
File: ee05fm Transform: NO TRANSFORMATION

Hartley test for homogeneity of variance
Bartletts test for homogeneity of variance

These two tests can not be performed because at least one group has
zero variance.

Data FAIL to meet homogeneity of variance assumption.
'ditional transformations are useless.

TITLE: ee05fm
TLE: ee05fm
RANSFORM: NO TRANSFORMATION NUMBER OF GROUPS: 6

GRP	IDENTIFICATION	REP	VALUE	TRANS VALUE
1	Control	1	10.0000	10.0000
1	Control	2	10.0000	10.0000
1	Control	3	10.0000	10.0000
1	Control	4	10.0000	10.0000
2	6.25%	1	10.0000	10.0000
2	6.25%	2	9.0000	9.0000
2	6.25%	3	10.0000	10.0000
2	6.25%	4	9.0000	9.0000
3	12.5%	1	10.0000	10.0000
3	12.5%	2	9.0000	9.0000
3	12.5%	3	9.0000	9.0000
3	12.5%	4	10.0000	10.0000
4	25%	1	10.0000	10.0000
4	25%	2	10.0000	10.0000
4	25%	3	10.0000	10.0000
4	25%	4	10.0000	10.0000
5	50%	1	9.0000	9.0000
5	50%	2	8.0000	8.0000
5	50%	3	9.0000	9.0000
5	50%	4	10.0000	10.0000
6	100%	1	10.0000	10.0000
6	100%	2	10.0000	10.0000
6	100%	3	9.0000	9.0000
6	100%	4	9.0000	9.0000

ee05fm
File: ee05fm Transform: NO TRANSFORMATION

SUMMARY STATISTICS ON TRANSFORMED DATA TABLE 1 of 2

GRP	IDENTIFICATION	N	MIN	MAX	MEAN
1	Control	4	10.000	10.000	10.000
2	6.25%	4	9.000	10.000	9.500
3	12.5%	4	9.000	10.000	9.500
4	25%	4	10.000	10.000	10.000
5	50%	4	8.000	10.000	9.000
6	100%	4	9.000	10.000	9.500

e05fm
ile: ee05fm Transform: NO TRANSFORMATION

SUMMARY STATISTICS ON TRANSFORMED DATA TABLE 2 of 2

GRP	IDENTIFICATION	VARIANCE	SD	SEM
1	Control	0.000	0.000	0.000
2	6.25%	0.333	0.577	0.289
3	12.5%	0.333	0.577	0.289
4	25%	0.000	0.000	0.000
5	50%	0.667	0.816	0.408
6	100%	0.333	0.577	0.289

ee05fm
File: ee05fm Transform: NO TRANSFORMATION

STEELS MANY-ONE RANK TEST - Ho:Control<Treatment

GROUP	IDENTIFICATION	TRANSFORMED MEAN	RANK SUM	CRIT. VALUE	df	SIG
1	Control	10.000				
2	6.25%	9.500	14.00	10.00	4.00	
3	12.5%	9.500	14.00	10.00	4.00	
4	25%	10.000	18.00	10.00	4.00	
5	50%	9.000	12.00	10.00	4.00	
6	100%	9.500	14.00	10.00	4.00	

Critical values use k = 5, are 1 tailed, and alpha = 0.05

EE05 FATHEAD MINNOW CHRONIC
File: FMEE05 Transform: NO TRANSFORMATION

i-square test for normality: actual and expected frequencies

INTERVAL	<-1.5	-1.5 to <-0.5	-0.5 to 0.5	>0.5 to 1.5	>1.5
EXPECTED	1.608	5.808	9.168	5.808	1.608
OBSERVED	0	7	7	10	0

Calculated Chi-Square goodness of fit test statistic = 6.9989
Table Chi-Square value (alpha = 0.01) = 13.277

Data PASS normality test. Continue analysis.

EE05 FATHEAD MINNOW CHRONIC
File: FMEE05 Transform: NO TRANSFORMATION

Bartletts test for homogeneity of variance

Calculated B statistic = 0.67
Table Chi-square value = 15.09 (alpha = 0.01)
Table Chi-square value = 11.07 (alpha = 0.05)

Average df used in calculation ==> df (avg n - 1) = 3.00
Used for Chi-square table value ==> df (#groups-1) = 5

Data PASS homogeneity test at 0.01 level. Continue analysis.

NOTE: If groups have unequal replicate sizes the average replicate size is used to calculate the B statistic (see above).

TITLE: EE05 FATHEAD MINNOW CHRONIC
FILE: FMEE05
TRANSFORM: NO TRANSFORMATION NUMBER OF GROUPS: 6

GRP	IDENTIFICATION	REP	VALUE	TRANS VALUE
1	CONTROL	1	0.5470	0.5470
1	CONTROL	2	0.4630	0.4630
1	CONTROL	3	0.5650	0.5650
1	CONTROL	4	0.6440	0.6440
2	6.25	1	0.6630	0.6630
2	6.25	2	0.6690	0.6690
2	6.25	3	0.6080	0.6080
2	6.25	4	0.5640	0.5640
3	12.5	1	0.6010	0.6010
3	12.5	2	0.5670	0.5670
3	12.5	3	0.6290	0.6290
3	12.5	4	0.4910	0.4910
4	25	1	0.5550	0.5550
4	25	2	0.4960	0.4960
4	25	3	0.6130	0.6130
4	25	4	0.6070	0.6070
5	50	1	0.6540	0.6540
5	50	2	0.6430	0.6430
5	50	3	0.5410	0.5410
5	50	4	0.5380	0.5380
	100	1	0.6340	0.6340
6	100	2	0.5640	0.5640
6	100	3	0.4700	0.4700
6	100	4	0.6140	0.6140

EE05 FATHEAD MINNOW CHRONIC
File: FMEE05 Transform: NO TRANSFORMATION

ANOVA TABLE

SOURCE	DF	SS	MS	F
Between	5	0.013	0.003	0.750
Within (Error)	18	0.072	0.004	
Total	23	0.085		

Critical F value = 2.77 (0.05,5,18)
Since F < Critical F FAIL TO REJECT Ho:All groups equal

EE05 FATHEAD MINNOW CHRONIC
File: FMEE05 Transform: NO TRANSFORMATION

DUNNETTS TEST - TABLE 1 OF 2 Ho:Control<Treatment

GROUP	IDENTIFICATION	TRANSFORMED MEAN	MEAN CALCULATED IN ORIGINAL UNITS	T STAT	SIG
1	CONTROL	0.555	0.555		
2	6.25	0.626	0.626	-1.593	
3	12.5	0.572	0.572	-0.386	
4	25	0.568	0.568	-0.291	
5	50	0.594	0.594	-0.878	
6	100	0.570	0.570	-0.352	

Dunnett table value = 2.41 (1 Tailed Value, P=0.05, df=18,5)

EE05 FATHEAD MINNOW CHRONIC
File: FMEE05 Transform: NO TRANSFORMATION

DUNNETTS TEST - TABLE 2 OF 2 Ho:Control<Treatment

GROUP	IDENTIFICATION	NUM OF REPS	Minimum Sig Diff (IN ORIG. UNITS)	% of CONTROL	DIFFERENCE FROM CONTROL
1	CONTROL	4			
2	6.25	4	0.108	19.4	-0.071
3	12.5	4	0.108	19.4	-0.017
4	25	4	0.108	19.4	-0.013
5	50	4	0.108	19.4	-0.039
6	100	4	0.108	19.4	-0.016

Ceriodaphnia SURVIVAL AND REPRODUCTION CHRONIC TOXICITY TEST

JOB NO. F93506 | BEGINNING: 1430 hrs; 6/12/95 | Log No. 429
INDUSTRY: Tinker | ENDING: 1230 hrs; 6/19/95 | PHOTOPERIOD: 16 light, 8 dark
CONTACT: | FEEDING REGIME: | ORGANISM SOURCE: WCC
EFFLUENT: ECCS | .05 mL yct/15 mL | TEST VESSEL CAPACITY: 30 mL
NPDES PERMIT NO: | .05 mL algal suspension/15 mL | TEST SOLUTION VOLUME: 15mL
PERSON CONDUCTING TEST: | | NO. REPLICATES:
| | DILUTION WATER:

CONC	CHAMBER	TIME / OBSERVER	NUMBER OF YOUNG PRODUCED							
			START	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7
						45	74	86	99	162
Control	1					6	4	0	0	7
	2					6	4	0	3	4
	3					2	3	0	0	10
	4					2	4	0	0	10
	5					7	2	0	0	8
	6					5	3	3	0	4
	7					2	2	0	0	8
	8					4	2	3	0	7
	9					4	2	4	10	1
	10					7	3	2	0	4
			START	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7
						35	60	66	74	77
6.25%	11					4	3	0	0	0
	12					3	2	1	1	0
	13					6	3	0	0	0
	14					2	3	0	3	3
	15					2	5	2	0	0
	16					(D) 3				
	17					4	0	0	0	0
	18					5	0	0	4	0
	19					2	5	3	0	0
	20					3	0	(D)		
						20% mortality				
			START	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7
						~~26~~ 30	~~54~~ 62	~~76~~ 76	~~72~~ 81	~~59~~ 81
12.5%	21					2	6	6	0	0
	22					3	7	4	0	0
	23					(D) 3				
	24					5	0	0	4	0
	25					3	7	0	(D)	
	26					(D) 3				
	27					(D) 2				
	28					3	1	0	1	0
	29					2	7	3	0	(D)
	30					4	8	1	0	0
						50% mortality				

Ceriodaphnia SURVIVAL AND REPRODUCTION CHRONIC TOXICITY TEST

JOB NO: 93506 | BEGINNING: 1430 hrs; 6/12/95 | Log No. 429
INDUSTRY: Tinker | ENDING: 1230 hrs; 6/17/95 | PHOTOPERIOD: 16 light, 8 dark
CONTACT: | FEEDING REGIME: | ORGANISM SOURCE: WCC
EFFLUENT: 2205 | .05 mL yct/15 mL | TEST VESSEL CAPACITY: 30 mL
NPDES PERMIT NO: | .05 mL algal suspension/15 mL | TEST SOLUTION VOLUME: 15mL
PERSON CONDUCTING TEST: | | NO. REPLICATES:
| | DILUTION WATER:

CONC	CHAMBER	START	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7	
	TIME				34	61	66	82	92	
	OBSERVER									
	NUMBER OF YOUNG PRODUCED									
25%	31				2	4	4	0	0	10
	32				(D) 2					2
	33				4	0	0	2	6	12
	34				5	0	0	5	0	10
	35				5	5	0	4	0	14
	36				2	5	1	2	0	10
	37				4	6	0	3	0	13
	38				(D) 2					2
	39				3	7	0	0	4	14
	40				5	(D)				5
					30% mortality					
		START	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7	
					30	65	110	148	168	
50%	41				1	7	6	5	0	19
	42				4	0	4	4	0	12
	43				4	0	5	0	0	9
	44				2	6	13	7	(D)	28
	45				(D)					0
	46				6	5	0	3	3	17
	47				5	0	4	7	5	21
	48				2	10	13	0	7	22
	49				3	7	0	5	0	15
	50				3	0	0	7	5	15
					20% mortality					
		START	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7	
					30	54	107	177	182	
100%	51				1	0	9	13	2	25
	52				3	3	1	11	(D)	18
	53				4	0	(D) 11			15
	54				3	0	7	11	0	21
	55				5	6	0	7	0	18
	56				5	0	3	4	0	9
	57				1	4	12	12	0	29
	58					4	6	0	0	10
	59				5	0	7	10	0	22
	60				3	7	0	2	3	15
					20% mortality					

Ceriodaphnia dubia GRID Ceriodaphnia dubia GRID MONITORING DATA

Grid Letter: ØØ ~~Ø~~ I N ~~N~~ ~~O~~ Start Date: 6-12-95 Sample ID: EE05 Log #: 42

AD	ID 17	1 ✓	AD	ID 35	1 ✓	AD	ID 4	1 ✓	AD	ID 30	1 ✓		ID 13	1 ✓
2 ✓	3 4	4 0	2 ✓	3 5	4 5	2 ✓	3 2	4 4	2 ✓	3 4	4 8	2 ✓	3 6	4 3
5 0	6 0	7 0	5 0	6 4	7 0	5 0	6 0	7 10	5 1	6 0	7 0	5 0	6 0	7 0
AD	ID 10	1 ✓	AD	ID 42	1 ✓	AD	ID 57	1 ✓	AD	ID 23	1 ✓		ID 36	1 ✓
2 ✓	3 7	4 3	2 ✓	3 4	4 0	2 ✓	3 1	4 4	2 ✓	3 D3	4	2 ✓	3 2	4 5
5 2	6 0	7 4	5 4	6 4	7 0	5 12	6 12	7 0	5	6	7	5 1	6 2	7 0
AD	ID 24	1 ✓	AD	ID 58	1 ✓	AD	ID 34	1 ✓	AD	ID 12	1 ✓		ID 47	1 ✓
2 ✓	3 5	4 0	2 ✓	3 ✓	4 4	2 ✓	3 5	4 0	2 ✓	3 3	4 2	2 ✓	3 5	4 0
5 0	6 4	7 0	5 6	6 0	7 0	5 0	6 5	7 0	5 1	6 1	7 0	5 4	6 7	7 5
AD	ID 59	1 ✓	AD	ID 41	1 ✓	AD	ID 22	1 ✓	AD	ID 6	1 ✓		ID 60	1 ✓
2 ✓	3 5	4 0	2 ✓	3 1	4 7	2 ✓	3 3	4 7	2 ✓	3 5	4 3	2 ✓	3 3	4 7
5 7	6 10	7 0	5 6	6 5	7 0	5 4	6 0	7 0	5 3	6 0	7 4	5 0	6 2	7 3
AD	ID 5	1 ✓	AD	ID 33	1 ✓	AD	ID 55	1 ✓	AD	ID 56	1 ✓		ID 18	1 ✓
2 ✓	3 7	4 2	2 ✓	3 4	4 0	2 ✓	3 5	4 6	2 ✓	3 4	4 0	2 ✓	3 5	4 0
5 0	6 0	7 8	5 0	6 2	7 6	5 0	6 7	7 0	5 12	6 13	7	5 0	6 4	7 0
AD	ID 46	1 ✓	AD	ID 11	1 ✓	AD	ID 54	1 ✓	AD	ID 9	1 ✓		ID 25	1 ✓
2 ✓	3 6	4 5	2 ✓	3 4	4 3	2 ✓	3 3	4 0	2 ✓	3 4	4 2	2 ✓	3 3	4 7
5 0	6 3	7 3	5 0	6 0	7 0	5 7	6 11	7 0	5 4	6 10	7 1	5 0	6 0	7

Comments:

Cup ID	Sample Concentration	Day	Initials	Time
		Ø	SJB	1430
1–10:	Control 120	1	SJB	1330
11–20:	6.25%	2	LJT	1555
21–30:	12.5	3	LJT	1345
31–40:	.25	4	LJT	1515
41–50:	50	5	MAR	
51–60:	100	6	SJB	1100
		7	LJT	1230

Ceriodaphnia dubia GRID Ceriodaphnia dubia GRID MONITORING DATA

Grid Letter: [illegible] Start Date: 6-12-95 Sample ID: EE05 Log #: 42

AD	ID 28	1 ✓	2 ✓	3 3	4 1	5 0	6 1	7 0	AD	ID 44	1 ✓	2 ✓	3 2	4 6	5 13	6 7	7 D 0	AD	ID 7	1 ✓	2 ✓	3 2	4 2	5 0	6 0	7 8	AD	ID 52	1 ✓	2 ✓	3 3	4 3	5 1	6 11	7 D 0		ID 20	1 ✓	2 ✓	3 3	4 0	5 M/0	6	7
AD	ID 40	1 ✓	2 ✓	3 5	4 0	5	6	7	AD	ID 14	1 ✓	2 ✓	3 2	4 8	5 0	6 3	7 3	AD	ID 37	1 ✓	2 ✓	3 4	4 6	5 0	6 3	7 0	AD	ID 26	1 ✓	2 ✓	3 D 3	4	5	6	7		ID 48	1 ✓	2 ✓	3 D 2	4 10	5 13	6 0	7 7
AD	ID 49	1 ✓	2 ✓	3 3	4 7	5 0	6 5	7 0	AD	ID 29	1 ✓	2 ✓	3 2	4 7	5 3	6 0	7 D 0	AD	ID 43	1 ✓	2 ✓	3 4	4 0	5 5	6 0	7 0	AD	ID 32	1 ✓	2 ✓	3 D 2	4	5	6	7		ID 16	1 ✓	2 ✓	3 D 3	4	5	6	7
AD	ID 15	1 ✓	2 ✓	3 2	4 5	5 2	6 0	7 0	AD	ID 1	1 ✓	2 ✓	3 6	4 4	5 0	6 0	7 7	AD	ID 31	1 ✓	2 ✓	3 2	4 4	5 4	6 0	7 0	AD	ID 51	1 ✓	2 ✓	3 1	4 0	5 9	6 13	7 2		ID 3	1 ✓	2 ✓	3 2	4 3	5 0	6 0	7 10
AD	ID 39	1 ✓	2 ✓	3 3	4 7	5 0	6 0	7 4	AD	ID 50	1 ✓	2 ✓	3 3	4 0	5 0	6 7	7 5	AD	ID 19	1 ✓	2 ✓	3 2	4 5	5 3	6 0	7 0	AD	ID 45	1 ✓	2 ✓	3 D	4	5	6	7		ID 27	1 ✓	2 ✓	3 D 2	4	5	6	7
AD	ID 8	1 ✓	2 ✓	3 4	4 2	5 3	6 0	7 7	AD	ID 21	1 ✓	2 ✓	3 2	4 6	5 6	6 0	7 0	AD	ID 38	1 ✓	2 ✓	3 D 2	4	5	6	7	AD	ID 2	1 ✓	2 ✓	3 6	4 4	5 0	6 3	7 4		ID 53	1 ✓	2 ✓	3 4	4 0	5 M/11	6	7

Comments:

Cup ID	Sample Concentration	Day	%	Initials	Time
				SJB	1430
1–10:	Control 120	1		SJB	1330
11–20:	6.25	2		LJT	1540
21–30:	12.5	3		LJT	1340
31–40:	25	4		LJT	1525
41–50:	50	5		MAR	1230
51–60:	100	6		SJB	1100
		7		LJT	1230

E. coli
Cerio
Log-Log
MH 95
12

CHRONIC TOXICITY TEST DATA SHEET

TEMPERATURE

CONCENTRATION	Start	Day 1		Day 2		Day 3		Day 4		Day 5		Day 6		Day 7		Day 8
		OLD	NEW	OLD	NEW	OLD	NEW	OLD	NEW	OLD	NEW	OLD	NEW	OLD	NEW	OLD
Con	24.0	24.2	24.8	24.0	24.0	25.0	25.0	25.0	25.0	25.0	25.0	24.2	25.0	24.8		
6.25																
12.5																
25																
50																
100																

DISSOLVED OXYGEN

CONCENTRATION	Start	Day 1		Day 2		Day 3		Day 4		Day 5		Day 6		Day 7		Day 8
		OLD	NEW	OLD	NEW	OLD	NEW	OLD	NEW	OLD	NEW	OLD	NEW	OLD	NEW	OLD
Con	8.4	8.7	8.8	7.9	8.4	7.8	8.3	7.6	8.5	7.2	8.1	8.0	8.4	7.6		
6.25	8.3	8.7	8.7	8.0	8.4	7.6	8.3	7.7	8.3	7.3	8.2	8.0	8.4	7.6		
12.5	8.3	8.6	8.7	7.9	8.3	7.6	8.3	7.6	8.4	7.3	8.3	8.0	8.4	7.6		
25	8.4	8.6	8.0	7.9	8.5	7.7	8.4	7.7	8.4	7.3	8.2	8.1	8.5	7.8		
50	8.4	8.4	8.0	8.0	8.5	7.6	8.4	7.7	8.3	7.4	8.3	8.1	8.5	8.0		
100	8.4	8.4	8.0	8.0	8.5	7.6	8.4	7.6	8.3	7.4	8.3	8.2	8.5	7.8		

pH

CONCENTRATION	Start	Day 1		Day 2		Day 3		Day 4		Day 5		Day 6		Day 7		Day 8
		OLD	NEW	OLD	NEW	OLD	NEW	OLD	NEW	OLD	NEW	OLD	NEW	OLD	NEW	OLD
Con	8.30	7.78	7.65	8.07	7.74	7.76	7.25	8.24	8.42	8.25	8.37	8.41	7.52	8.11		
6.25	8.37	8.20	8.31	8.10	8.37	7.63	8.38	8.22	8.44	8.19	8.41	8.39	8.30	8.10		
12.5	8.43	8.22	8.40	8.11	8.45	7.71	8.42	8.20	8.49	8.21	8.42	8.41	8.44	8.09		
25	8.47	8.24	8.47	8.11	8.55	7.95	8.50	8.13	8.53	8.21	8.47	8.44	8.53	8.14		
50	8.55	8.29	8.52	8.13	8.63	8.12	8.58	8.23	8.56	8.32	8.53	8.47	8.60	8.17		
100	8.62	8.39	8.61	8.32	8.72	8.13	8.68	8.29	8.68	8.41	8.61	8.59	8.69	8.27		

CONDUCTIVITY

CONCENTRATION	Start	Day 1		Day 2		Day 3		Day 4		Day 5		Day 6		Day 7		Day 8
		OLD	NEW	OLD	NEW	OLD	NEW	OLD	NEW	OLD	NEW	OLD	NEW	OLD	NEW	OLD
Con	485	415	389	508	490	464	431	464	460	456	427	457	606	465		
6.25	440	519	416	503	411	436	417	433	427	424	425	458	420	431		
12.5	410	504	416	422	358	430	411	433	403	423	413	447	414	430		
25	411	463	394	406	373	409	396	414	403	405	395	410	396	412		
50	399	414	367	422	363	388	364	395	354	383	365	382	368	409		
100	312	273	312	327	307	342	305	311	312	312	306	325	309	324		

ee05cd
File: ee05cd Transform: NO TRANSFORMATION

ıi-square test for normality: actual and expected frequencies

INTERVAL	<-1.5	-1.5 to <-0.5	-0.5 to 0.5	>0.5 to 1.5	>1.5
EXPECTED	4.020	14.520	22.920	14.520	4.020
OBSERVED	6	8	34	12	0

Calculated Chi-Square goodness of fit test statistic = 13.7166
Table Chi-Square value (alpha = 0.01) = 13.277

Data FAIL normality test. Try another transformation.

Warning - The two homogeneity tests are sensitive to non-normal data and should not be performed.

FISHERS EXACT TEST

IDENTIFICATION	NUMBER OF ALIVE	DEAD	TOTAL ANIMALS
CONTROL	10	0	10
6.25%	8	2	10
TOTAL	18	2	20

CRITICAL FISHERS VALUE (10,10,10) (p=0.05) IS 6. b VALUE IS 8.
Since b is greater than 6 there is no significant difference between CONTROL and TREATMENT at the 0.05 level.

FISHERS EXACT TEST

IDENTIFICATION	NUMBER OF ALIVE	DEAD	TOTAL ANIMALS
CONTROL	10	0	10
12.5%	5	5	10
TOTAL	15	5	20

CRITICAL FISHERS VALUE (10,10,10) (p=0.05) IS 6. b VALUE IS 5.
Since b is less than or equal to 6 there is a significant difference between CONTROL and TREATMENT at the 0.05 level.

FISHERS EXACT TEST

IDENTIFICATION	NUMBER OF ALIVE	DEAD	TOTAL ANIMALS
CONTROL	10	0	10
25%	7	3	10

TOTAL	17	3	20

CRITICAL FISHERS VALUE (10,10,10) (p=0.05) IS 6. b VALUE IS 7.
Since b is greater than 6 there is no significant difference between CONTROL and TREATMENT at the 0.05 level.

FISHERS EXACT TEST

IDENTIFICATION	NUMBER OF ALIVE	NUMBER OF DEAD	NUMBER OF TOTAL ANIMALS
CONTROL	10	0	10
50%	8	2	10
TOTAL	18	2	20

CRITICAL FISHERS VALUE (10,10,10) (p=0.05) IS 6. b VALUE IS 8.
Since b is greater than 6 there is no significant difference between CONTROL and TREATMENT at the 0.05 level.

FISHERS EXACT TEST

IDENTIFICATION	NUMBER OF ALIVE	NUMBER OF DEAD	NUMBER OF TOTAL ANIMALS
CONTROL	10	0	10
100%	8	2	10
TOTAL	18	2	20

CRITICAL FISHERS VALUE (10,10,10) (p=0.05) IS 6. b VALUE IS 8.
Since b is greater than 6 there is no significant difference between CONTROL and TREATMENT at the 0.05 level.

SUMMARY OF FISHERS EXACT TESTS

	NUMBER	NUMBER	SIG

GROUP	IDENTIFICATION	EXPOSED	DEAD	(P=.05)
	CONTROL	10	0	
1	6.25%	10	2	
2	12.5%	10	5	*
3	25%	10	3	
4	50%	10	2	
5	100%	10	2	

EE05 CERIO CHRONIC
File: CDEE05 Transform: NO TRANSFORMATION

Chi-square test for normality: actual and expected frequencies

INTERVAL	<-1.5	-1.5 to <-0.5	-0.5 to 0.5	>0.5 to 1.5	>1.5
EXPECTED	4.020	14.520	22.920	14.520	4.020
OBSERVED	4	15	24	13	4

Calculated Chi-Square goodness of fit test statistic = 0.2261
Table Chi-Square value (alpha = 0.01) = 13.277

Data PASS normality test. Continue analysis.

EE05 CERIO CHRONIC
File: CDEE05 Transform: NO TRANSFORMATION

Bartletts test for homogeneity of variance

Calculated B statistic = 13.23
Table Chi-square value = 15.09 (alpha = 0.01)
Table Chi-square value = 11.07 (alpha = 0.05)

Average df used in calculation ==> df (avg n - 1) = 9.00
Used for Chi-square table value ==> df (#groups-1) = 5

Data PASS homogeneity test at 0.01 level. Continue analysis.

NOTE: If groups have unequal replicate sizes the average replicate size is used to calculate the B statistic (see above).

TITLE: EE05 CERIO CHRONIC
FILE: CDEE05
TRANSFORM: NO TRANSFORMATION NUMBER OF GROUPS: 6

GRP	IDENTIFICATION	REP	VALUE	TRANS VALUE
1	CONTROL	1	17.0000	17.0000
1	CONTROL	2	17.0000	17.0000
1	CONTROL	3	15.0000	15.0000
1	CONTROL	4	16.0000	16.0000
1	CONTROL	5	17.0000	17.0000
1	CONTROL	6	15.0000	15.0000
1	CONTROL	7	12.0000	12.0000
1	CONTROL	8	16.0000	16.0000
1	CONTROL	9	21.0000	21.0000
1	CONTROL	10	16.0000	16.0000
2	6.25	1	7.0000	7.0000
2	6.25	2	7.0000	7.0000
2	6.25	3	9.0000	9.0000
2	6.25	4	16.0000	16.0000
2	6.25	5	9.0000	9.0000
2	6.25	6	3.0000	3.0000
2	6.25	7	4.0000	4.0000
2	6.25	8	9.0000	9.0000
2	6.25	9	10.0000	10.0000
2	6.25	10	3.0000	3.0000
3	12.5	1	14.0000	14.0000
3	12.5	2	14.0000	14.0000
3	12.5	3	3.0000	3.0000
3	12.5	4	9.0000	9.0000
3	12.5	5	10.0000	10.0000
3	12.5	6	3.0000	3.0000
3	12.5	7	2.0000	2.0000
3	12.5	8	5.0000	5.0000
3	12.5	9	12.0000	12.0000
3	12.5	10	13.0000	13.0000
4	25	1	10.0000	10.0000
4	25	2	2.0000	2.0000
4	25	3	12.0000	12.0000
4	25	4	10.0000	10.0000
4	25	5	14.0000	14.0000
4	25	6	10.0000	10.0000
4	25	7	13.0000	13.0000
4	25	8	2.0000	2.0000
4	25	9	14.0000	14.0000
4	25	10	5.0000	5.0000
5	50	1	19.0000	19.0000
5	50	2	12.0000	12.0000
5	50	3	9.0000	9.0000
5	50	4	28.0000	28.0000
5	50	5	0.0000	0.0000
5	50	6	17.0000	17.0000
5	50	7	21.0000	21.0000
5	50	8	22.0000	22.0000
5	50	9	15.0000	15.0000
5	50	10	15.0000	15.0000

6	100	1	25.0000	25.0000
6	100	2	18.0000	18.0000
6	100	3	15.0000	15.0000
6	100	4	21.0000	21.0000
6	100	5	18.0000	18.0000
6	100	6	9.0000	9.0000
6	100	7	29.0000	29.0000
6	100	8	10.0000	10.0000
6	100	9	22.0000	22.0000
6	100	10	15.0000	15.0000

EE05 CERIO CHRONIC
File: CDEE05 Transform: NO TRANSFORMATION

ANOVA TABLE

SOURCE	DF	SS	MS	F
Between	5	1069.400	213.880	7.798
Within (Error)	54	1481.000	27.426	
Total	59	2550.400		

Critical F value = 2.45 (0.05,5,40)
Since F > Critical F REJECT Ho:All groups equal

EE05 CERIO CHRONIC
File: CDEE05 Transform: NO TRANSFORMATION

DUNNETTS TEST - TABLE 1 OF 2 Ho:Control<Treatment

GROUP	IDENTIFICATION	TRANSFORMED MEAN	MEAN CALCULATED IN ORIGINAL UNITS	T STAT	SIG
1	CONTROL	16.200	16.200		
2	6.25	7.700	7.700	3.629	*
3	12.5	8.500	8.500	3.288	*
4	25	9.200	9.200	2.989	*
5	50	15.800	15.800	0.171	
6	100	18.200	18.200	-0.854	

Dunnett table value = 2.31 (1 Tailed Value, P=0.05, df=40,5)

EE05 CERIO CHRONIC
File: CDEE05 Transform: NO TRANSFORMATION

DUNNETTS TEST - TABLE 2 OF 2 Ho:Control<Treatment

GROUP	IDENTIFICATION	NUM OF REPS	Minimum Sig Diff (IN ORIG. UNITS)	% of CONTROL	DIFFERENCE FROM CONTROL

1	CONTROL	10			
2	6.25	10	5.410	33.4	8.500
3	12.5	10	5.410	33.4	7.700
4	25	10	5.410	33.4	7.000
5	50	10	5.410	33.4	0.400
6	100	10	5.410	33.4	-2.000

№ 14

CHAIN OF CUSTODY RECORD

JOB #	PROJECT NAME
F93506 Task 3	TAFB - Sabine Creek

SAMPLERS: (Signature)

ANALYSES REQUIRED: Toxicity

WOODWARD-CLYDE CONSULTANTS
P.O. BOX 680925
FRANKLIN, TN 37068-0925
(615) 790-0003 FAX (615) 790-0023

SAMPLE IDENTIFICATION	DATE	TIME	SAMPLE TYPE	NUMBER OF CONTAINERS	Toxicity	REMARKS
SC-EE05-TX-201	6/8/95	16:00	water	3	✓	Fed Exp # 580482343 0

RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)	RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)
	6/8/95 18:00				
RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)	RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)
RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED AT LAB BY: (Signature)	DATE/TIME	GENERAL COMMENTS	
		Lyla Deer	6/9/95 0905	2.5°C upon arrival	

Distribution: Original and Yellow copies accompany sample shipment to laboratory
Pink copy retained by samplers. Yellow copy retained by laboratory. Laboratory returns White copy to samplers.

№ 14

CHAIN OF CUSTODY RECORD

JOB # Task 5 F93506	PROJECT NAME TAFB - Soldier Creek	ANALYSES REQUIRED	WOODWARD-CLYDE CONSULTANTS P.O. BOX 680925 FRANKLIN, TN 37068-0925 (615) 790-0003 FAX (615) 790-0023
SAMPLERS: (Signature)			

SAMPLE IDENTIFICATION	DATE	TIME	SAMPLE TYPE	NUMBER OF CONTAINERS	Toxicity						REMARKS
											FedExp # 5804823430
SC-EE05-TY-201	6/8/95	16:00	Water	2	✓						
SC-EE05-TY-201	"	16:30	Soil	2	✓						

RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)	RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)
	6/8/95 18:00				
RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)	RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)
RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED AT LAB BY: (Signature)	DATE/TIME	GENERAL COMMENTS	
			6/9/95	3°C upon arrival	

Distribution: Original and Yellow copies accompany sample shipment to laboratory
Pink copy retained by samplers. Yellow copy retained by laboratory. Laboratory returns White copy to samplers.

TEST SUMMARY: SC-EE06-TX-201
Ceriodaphnia dubia 48-Hour Static Acute

Test protocol:	WCC SOP 401.2
Test organism:	*Ceriodaphnia dubia*
Source:	WCC Culture Laboratory
Age of test organism:	<24 hours
Test initiation:	6/9/95
Test termination:	6/11/95
Temperature:	25 +/- 1 °C
Light:	50 - 100 foot candles
Photoperiod:	16 hours light/8 hours dark
Test vessel:	30 mL styrene
Test volume:	20 mL
Organisms/replicate:	5
Replicates/concentration:	4
Feeding regime:	none
Aeration during test:	none
Dilution Water:	Hard Reconstituted Synthetic
Test duration:	48 hours
Effect measured:	Mortality
Reference Toxicant Data:	
LC_{50} (g/L NaCl):	1.51

TEST RESULTS: SC-EE06-TX-201
Ceriodaphnia dubia 48-Hour Static Acute

LC_{50} > 100%

Statictical analysis method: N/A

Treatment (% Sample)	Survival (%)	pH	Conductivity (umhos/cm)	DO (mg/L)	Temperature (°C)	Hardness (mg/L $CaCO_3$)	Alkalinity (mg/L $CaCO_3$)
Control	100	8.49-8.50	604 (546-662)	8.4 (8.2-8.6)	24.6 (24.6-24.6)	250	
6.25	100	7.56-8.50	673 (622-724)	8.7 (8.7-8.7)	24.6 (24.6-24.6)		
12.5	95	8.38-8.49	689 (684-694)	8.5 (8.3-8.7)	24.6 (24.6-24.6)		
25	100	8.39-8.50	663 (643-683)	8.4 (8.2-8.6)	24.6 (24.6-24.6)		
50	100	8.29-8.51	582 (550-614)	8.5 (8.3-8.6)	24.6 (24.6-24.6)		
100	100	8.16-8.56	529 (522-536)	8.4 (8.2-8.6)	24.6 (24.6-24.6)	258	150

SURFACE WATER SAMPLE ARRVIAL INFORMATION

Collection Date/Time:	6/8/95 @ 1230
Use Date/Time:	6/9/95 @ 1310
Method of Shipment:	Overnight Courier
Temperature (°C):	2.0
pH:	7.77
Ammonia (mg/L):	1.94
Conductivity (umhos/cm):	536
DO (mg/L):	8.3

TEST SUMMARY: SC-EE06-TX-201
Ceriodaphnia dubia Chronic Renewal

Test protocol:	WCC SOP 501.1
Test organism:	*Ceriodaphnia dubia*
Source:	WCC Culture Laboratory
WCC Batch:	6/12/95
Age of test organism:	<24 hours
Test initiation:	6/12/95
Test termination:	6/19/95
Temperature:	25 +/- 1 °C
Light:	50 - 100 foot candles
Photoperiod:	16 hours light/8 hours dark
Test vessel:	30 mL styrene
Test volume:	15 mL
Organisms/replicate:	1
Replicates/concentration:	10
Feeding regime:	0.05 mL *Selenastrum* and 0.05 mL YTC daily
Aeration during test:	none
Dilution Water:	Hard Reconstituted Synthetic
Test duration:	7 days
Effect measured:	Survival and reproduction

Toxicity test methods and procedures were followed in accordance with EPA 600/4-89/001

Reference Toxicant Data:	
NOEC (g/L NaCl):	0.75

TEST RESULTS: SC-EE06-TX-201
Ceriodaphnia dubia Chronic Survival and Reproduction Test

Survival NOEC:	100%
Statistical analysis method:	N/A
Normality test:	
Homogeneity of variance test:	
Reproduction NOEC:	100%
Statistical analysis method:	Dunnetts
Normality test:	Pass
Homogeneity of variance test:	Pass

Treatment (% Sample)	Survival (%)	pH	Conductivity (umhos/cm)	DO (mg/L)	Temperature (°C)
Control	90	7.81-8.64	707 (437-791)	8.1 (7.1-8.5)	24.5 (24.0-25.0)
6.25	90	8.14-8.61	653 (550-717)	8.1 (7.4-8.6)	24.5 (24.0-25.0)
12.5	80	8.16-8.62	665 (519-723)	8.1 (7.4-8.6)	24.5 (24.0-25.0)
25	90	8.91-8.60	689 (527-702)	8.1 (7.5-8.6)	24.5 (24.0-25.0)
50	100	8.19-8.59	613 (520-656)	8.1 (7.4-8.6)	24.5 (24.0-25.0)
100	80	8.22-8.61	541 (441-580)	8.2 (7.5-8.6)	24.5 (24.0-25.0)

	Hardness (mg/L $CaCO_3$)	Alkalinity (mg/L $CaCO_3$)	Ammonia (mg/L)
Control	250		
EE06	258	150	1.94

TEST SUMMARY: SC-EE06-TX-201
Pimephales promelas 48-Hour Static Acute

Test protocol:	WCC SOP 410.2
Test organism:	*Pimephales promelas*
Source:	Woodward-Clyde Consultants
Age of test organism:	6 days
Test initiation:	6/9/95
Test termination:	6/11/95
Temperature:	20 +/- 1 °C
Light:	50 - 100 foot candles
Photoperiod:	16 hours light/8 hours dark
Test vessel:	500 mL plastic beaker
Test volume:	250 mL
Organisms/replicate:	10
Replicates/concentration:	2
Feeding regime:	none
Aeration during test:	none
Dilution Water:	Spring Water
Test duration:	48 hours
Effect measured:	Mortality
Reference Toxicant Data:	
LC_{50} (g/L NaCl):	5.26

TEST RESULTS: SC-EE06-TX-201
Pimephales promelas 48-Hour Static Acute

LC_{50} > 100%

Statictical analysis method: N/A

Treatment (% Sample)	Survival (%)	pH	Conductivity (umhos/cm)	DO (mg/L)	Temperature (°C)	Hardness (mg/L $CaCO_3$)	Alkalinity (mg/L $CaCO_3$)
Control	95	8.25-8.28	342 (317-366)	8.0 (7.9-8.1)	20.0 (20.0-20.0)	158	146
6.25	100	8.14-8.19	351 (342-359)	8.1 (8.1-8.1)	20.0 (20.0-20.0)		
12.5	95	8.42-8.43	364 (352-376)	8.1 (8.0-8.1)	20.0 (20.0-20.0)		
25	85	8.42-8.47	386 (370-401)	8.1 (8.0-8.1)	20.0 (20.0-20.0)		
50	95	8.37-8.48	439 (422-456)	8.1 (8.0-8.1)	20.0 (20.0-20.0)		
100	90	8.26-8.48	550 (531-569)	8.1 (8.0-8.1)	20.0 (20.0-20.0)	258	150

SURFACE WATER SAMPLE ARRVIAL INFORMATION

Collection Date/Time:	6/8/95 @ 1230
Use Date/Time:	6/9/95 @ 1600
Method of Shipment:	Overnight Courier
Temperature (°C):	2.0
pH:	7.77
Ammonia (mg/L):	1.94
Conductivity (umhos/cm):	531
DO (mg/L):	8.3
Description:	Clear

TEST SUMMARY: SC-EE06-TX-201
Pimephales promelas Chronic Renewal

Test protocol:	WCC SOP 510.1
Test organism:	*Pimephales promelas*
Source:	Environmental Consulting & Testing
Age of test organism:	<24 hours
Test initiation:	6/12/95 @ 1730
Test termination:	6/19/95 @ 1500
Temperature:	25 +/- 1 °C
Light:	50 - 100 foot candles
Photoperiod:	16 hours light/8 hours dark
Test vessel:	500 mL plastic beaker
Test volume:	250 mL
Organisms/replicate:	10
Replicates/concentration:	4
Feeding regime:	0.1 mL brine shrimp nauplii twice daily
Aeration during test:	none
Dilution Water:	Spring Water
Test duration:	7 days
Effect measured:	Survival and growth

Toxicity test methods and procedures were followed in accordance with EPA 600/4-89/001

Reference Toxicant Data:	
NOEC (g/L NaCl):	3.0

TEST RESULTS : SC- EE06-TX-201

Pimephales promelas Chronic Survival and Growth Test

Survival NOEC:		100%
	Statistical analysis method:	Steels Many-One Rank Test
	Normality test:	Fail
	Homogeneity of variance test:	Fail
Growth NOEC:		100%
	Statistical analysis method:	Dunnetts
	Normality test:	Pass
	Homogeneity of variance test:	Pass

Treatment (% Sample)	Survival (%)	pH	Conductivity (umhos/cm)	DO (mg/L)	Temperature (°C)
Control	100	7.59-8.48	373 (287-459)	7.5 (6.5-8.5)	24.5 (24.0-25.0)
6.25	90	7.94-8.48	340 (284-371)	7.6 (6.3-8.5)	24.5 (24.0-25.0)
12.5	97.5	7.88-8.46	360 (312-352)	7.6 (6.0-8.4)	24.5 (24.0-25.0)
25	97.5	7.91-8.46	353 (317-416)	7.5 (6.0-8.4)	24.5 (24.0-25.0)
50	100	7.95-8.50	439 (382-528)	7.6 (6.1-8.4)	24.5 (24.0-25.0)
100	92.5	7.94-8.54	536 (520-565)	7.5 (6.2-8.4)	24.5 (24.0-25.0)

	Hardness (mg/L $CaCO_3$)	Alkalinity (mg/L $CaCO_3$	Ammonia (mg/L)
Control	158	146	
EE06	258	150	1.94

48-hr Ceriodaphnia dubia TOXICITY TEST

LOG NO. 423-426
JOB NO. F93506/3
INDUSTRY: TINKER AFB
CONTACT:

EFFLUENT: ~~EE05~~ TNT / CONTROL
START DATE: 6/9/95
START TIME: 1310
DILUTION WATER: CONTROL

CONC (%)	REP ID	SURVIVAL (#) 0	24	48	DEAD	TEMPERATURE (oC) 0	24	48	DO (mg/L) 0	24	48	pH (S.U.) 0	24	48	CONDUCTIVITY (umhos/cm) 0	24	48
HD 120	A	5	5	5	0	24.6		24.6	8.6		8.2	8.19		8.17	457		464
	B	5	5	5	0												
	C	5	5	5	0												
	D	5	5	5	0												
	A																
	B																
	C																
	D																
HD 250	A	5	5	5	0	24.6		24.6	8.6		8.2	8.50		8.49	6[illegible]		546
	B	5	5	5	0												
	C	5	5	5	0												
	D	5	5	5	0												
	A																
	B																
	C																
	D																
	A																
	B																
	C																
	D																
	Initials	LJT	MAR	LJT													
	Time	1310	1047	1030													

Comments

PARAMETER	Control	
Total Hardness (mg/L CaCO3)		
Total Alkalinity (mg/L CaCO3 @ 4.5)		

48ACUT.XLS

4

48-hr Ceriodaphnia dubia TOXICITY TEST

LOG NO. 424
JOB NO. P935016
INDUSTRY: TINKER AFB
CONTACT:

EFFLUENT: EE06
START DATE: 6/9/95
START TIME: 1310
DILUTION WATER: HD 250

CONC (%)	REP ID	SURVIVAL (#) 0	24	48	DEAD	TEMPERATURE (oC) 0	24	48	DO (mg/L) 0	24	48	pH (S.U.) 0	24	48	CONDUCTIVITY (umhos/cm) 0	24	48
6.25	A	5	5	5	0	24.4		24.6	7.7		8.7	7.50		8.50	720		620
	B	5	5	5	0												
	C	5	5	5	0												
	D	5	5	5	0												
12.5	A	5	5	5	0				7.7		8.3	7.38		8.45	681		694
	B	5	5	5	0												
	C	5	5	5	0												
	D	5	5	4	1												
25	A	5	5	5	0				8.4		8.2	8.39		8.50	643		683
	B	5	5	5	0												
	C	5	5	5	0												
	D	5	5	5	0												
50	A	5	5	5	0				7.6		8.3	8.29		8.51	601		550
	B	5	5	5	0												
	C	5	5	5	0												
	D	5	5	5	0												
100	A	5	5	5	0				8.6		8.2	8.14		8.50	536		522
	B	5	5	5	0												
	C	5	5	5	0												
	D	5	5	5	0												
Initials		LST	MHR	LST													
Time		1310	1015	1130													

Comments

PARAMETER	Control	
Total Hardness (mg/L CaCO3)		
Total Alkalinity (mg/L CaCO3 @ 4.5)		

48-hr Pimephales promleas TOXICITY TEST

LOG NO. 424
JOB NO. F935016
INDUSTRY: Tinker
CONTACT:

EFFLUENT: EE06
START DATE: 6-9-95
START TIME: 1600
DILUTION WATER: Spring

CONC (%)	REP ID	SURVIVAL (#) 0	24	48	DEAD	TEMPERATURE (oC) 0	24	48	DO (mg/L) 0	24	48	pH (S.U.) 0	24	48	CONDUCTIVITY (umhos/cm) 0	24	48
6.25	A	10	10	10	0	21.0			8.1		8.1	8.14		8.19	342		359
	B	10	10	10	0												
12.5	A	10	10	10	0				8.1		8.0	8.42		8.43	353		376
	B	10	10	9	1												
25	A	10	10	8	2				8.1		8.0	8.42		8.47	370		401
	B	10	9	9	1												
50	A	10	10	9	1				8.1		8.0	8.37		8.48	422		456
	B	10	10	10	0												
100	A	10	9	9	1				8.1		8.0	8.26		8.45	531		569
	B	10	10	9	1												
	A																
	B																
	A																
	B																
	A																
	B																
	A																
	B																
	A																
	B																
Initials		MLS	MLS	SSH													
Time		1600	0815	1045													

Comments

PARAMETER	Control	
Total Hardness (mg/L CaCO3)		
Total Alkalinity (mg/L CaCO3 @ 4.5)		

Ceriodaphnia SURVIVAL AND REPRODUCTION CHRONIC TOXICITY TEST

JOB NO: F93506 | BEGINNING: 1430 hrs; 6/12/95 | Log No. ~~434~~ 430 (JT)
INDUSTRY: Tinker | ENDING: 1230 hrs; 6/19/95 | PHOTOPERIOD: 16 light, 8 dark
CONTACT: | FEEDING REGIME: | ORGANISM SOURCE: WCC
EFFLUENT: EECO | .05 mL yct/15 mL | TEST VESSEL CAPACITY: 30 mL
NPDES PERMIT NO: | .05 mL algal suspension/15 mL | TEST SOLUTION VOLUME: 15mL
PERSON CONDUCTING TEST: | | NO. REPLICATES:
| | DILUTION WATER: MD 250

CONC	CHAMBER	TIME / OBSERVER	START	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7	
		NUMBER OF YOUNG PRODUCED				42	72	112	142	185	
6.25%	1					7	0	4	7	10	25
	2					3	0	5	0	8	16
	3					5	8	7	0	4	24
	4					2	1	(D) 0			3
	5					4	0	0	1	7	12
	6					2	9	4	0	1	16
	7					4	0	7	8	4	23
	8					3	8	5	6	0	22
	9					7	4	0	0	0	11
	10					5	0	8	5	9	30
						10% mortality					
			START	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7	
						33	74	127	188	250	
12.5%	11					2	6	12	5	0	25
	12					3	8	6	12	0	29
	13					7	0	7	12	14	40
	14					3	0	0	14	10	27
	15					(D) 2					2
	16					3	4	8	0	13	28
	17					5	7	0	11	8	31
	18					5	7	9	0	16	37
	19					3	9	11	7	1	31
	20				(D)						0
						20% mortality					
			START	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7	
						46	104	133	218	290	
25%	21					6	7	0	14	13	40
	22					3	9	3	13	0	28
	23					6	8	0	17	14	50
	24					2	0	(D)			6
	25					6	7	0	12	16	41
	26					2	9	9	1	0	20
	27					4	7	0	7	12	30
	28					~~JT~~ 7	0	10	JT 16	12	45
	29					3	3	1	0	0	7
	30					3	5	6	5	0	2
						10% mortality					

Ceriodaphnia SURVIVAL AND REPRODUCTION CHRONIC TOXICITY TEST

JOB NO: F93506 | BEGINNING: 1400 hrs; 6/12/95 | Log No. 430
INDUSTRY: Tinker | ENDING: 1230 hrs; 6/19/95 | PHOTOPERIOD: 16 light, 8 dark
CONTACT: | FEEDING REGIME: | ORGANISM SOURCE: WCC
EFFLUENT: EECG | .05 mL yct/15 mL | TEST VESSEL CAPACITY: 30 mL
NPDES PERMIT NO: | .05 mL algal suspension/15 mL | TEST SOLUTION VOLUME: 15mL
PERSON CONDUCTING TEST: | | NO. REPLICATES:
| | DILUTION WATER:

CONC	CHAMBER	TIME / OBSERVER	START	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7	
		NUMBER OF YOUNG PRODUCED				44	109	157	292	406	
50%	31					4	5	0	18	21	48
	32					7	9	0	18	15	49
	33						9	16	11	0	36
	34					6	0	0	6	13	25
	35					7	9	0	19	17	52
	36					3	10	13	15	1	42
	37					7	7	1	11	13	39
	38					5	9	7	2	15	41
	39					3	6	7	15	0	34
	40					2	1	4	17	16	40
		START	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7		
					46	126	153	267	374		
100%	41				6	7	0	14	17	44	
	42				5	7	0	15	17	44	
	43				6	10	7	0	16	39	
	44				3	8	7	9	0	27	
	45				6	9	0	15	18	48	
	46			(D)						0	
	47				4	8	1	13	0	26	
	48				4	11	12	18	(D)	45	
	49				7	12	0	15	19	53	
	50				5	5	0	12	32	48	
					20% mortality						
		START	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7		

Ceriodaphnia dubia GRID Ceriodaphnia dubia GRID MONITORING DATA

Grid Letter: [illegible] Start Date: [illegible]-12-95 Sample ID: SE06 Log #: 43[illegible]

AD	ID	1	AD	ID	1	AD	ID	1	AD	ID	1		ID	1
2	3	4	2	3	4	2	3	4	2	3	4	2	3	4
5	6	7	5	6	7	5	6	7	5	6	7	5	6	7
AD	ID 11	1 ✓	AD	ID 31	1 ✓	AD	ID 22	1 ✓	AD	ID 38	1 ✓		ID 3	1 ✓
2 ✓	3 2	4 6	2 ✓	3 4	4 5	2 ✓	3 3	4 9	2 ✓	3 5	4 9	2 ✓	3 5	4 8
5 12	6 5	7 0	5 0	6 18	7 21	5 3	6 13	7 0	5 7	6 2	7 18	5 7	6 0	7 4
AD	ID 20	1 ✓	AD	ID 10	1 ✓	AD	ID 42	1 ✓	AD	ID 32	1 ✓		ID 29	1 ✓
2 D	3	4	2 ✓	3 5	4 0	2 ✓	3 5	4 7	2 ✓	3 7	4 9	2 ✓	3 3	4 [illegible]
5	6	7	5 8	6 8	7 9	5 0	6 15	7 17	5 0	6 18	7 15	5 1	6 0	7 0
AD	ID 41	1 ✓	AD	ID 37	1 ✓	AD	ID 1	1 ✓	AD	ID 18	1 ✓		ID 50	1 ✓
2 ✓	3 6	4 7	2 ✓	3 7	4 7	2 ✓	3 7	4 0	2 ✓	3 5	4 7	2 ✓	3 5	4 [illegible]
5 0	6 14	7 17	5 1	6 11	7 13	5 4	6 7	7 10	5 9	6 0	7 16	5 0	6 15	7 20
AD	ID 8	1 ✓	AD	ID 46	1 ✓	AD	ID 28	1 ✓	AD	ID 43	1 ✓		ID 19	1 ✓
2 ✓	3 3	4 8	2 D	3	4	2 ✓	3 7	4 0	2 ✓	3 6	4 10	2 ✓	3 3	4 9
5 5	6 6	7 0	5	6	7	5 10	6 16	7 12	5 7	6 0	7 16	5 11	6 7	7 1
AD	ID 30	1 ✓	AD	ID 17	1 ✓	AD	ID 49	1 ✓	AD	ID 21	1 ✓		ID 4	1 ✓
2 ✓	3 3	4 8	2 ~~D~~ LJT ✓	3 5	4 7	2 ✓	3 7	4 12	2 ✓	3 6	4 7	2 ✓	3 2	4 1
5 6	6 5	7 0	5 0	6 11	7 8	5 0	6 15	7 19	5 0	6 14	7 13	5 M/O	6	7

Comments:

Cup ID	Sample Concentration in 250 Hdness	Day ∅	Initials SJB	Time 1400
1–10:	6.25%	1	SJB	1330
11–20:	12.5	2	LJT	1525
21–30:	25	3	LJT	1320
31–40:	50	4	MAR	1405
41–50:	100	5	MAR	1270
51–60:		6	SJB	1100
		7	LJT	1230

Ceriodaphnia dubia GRID Ceriodaphnia dubia GRID MONITORING DATA

Grid Letter: X LJT 6 8 X 8 Start Date: 6-12-95 Sample ID: 5806 Log #: 43

AD	ID	1
2	3	4
5	6	7

AD	ID	1
2	3	4
5	6	7

AD	ID	1
2	3	4
5	6	7

AD	ID	1
2	3	4
5	6	7

	ID	1
2	3	4
5	6	7

AD	ID 25	1 ✓
2 ✓	3 6	4 7
5 0	6 12	7 16

AD	ID 6	1 ✓
2 ✓	3 2	4 9
5 4	6 0	7 1

AD	ID 40	1 ✓
2 ✓	3 2	4 1
5 4	6 17	7 16

AD	ID 14	1 ✓
2 ✓	3 3	4 0
5 0	6 14	7 10

	ID 47	1
2 ✓	3 4	4
5 1	6 13	7 C

AD	ID 45	1 ✓
2 ✓	3 6	4 9
5 0	6 15	7 18

AD	ID 34	1 ✓ NO14 SB
2 ✓	3 6	4 0
5 0	6 6	7 13

AD	ID 23	1 ✓
2 ✓	3 6	4 8
5 0	6 17	7 19

AD	ID 5	1 ✓
2 ✓	3 4	4 0
5 0	6 1	7 7

	ID 48	1
2 ✓	3 4	4 1
5 12	6 18	7 D-

AD	ID 9	1 ✓
2 ✓	3 7	4 4
5 0	6 0	7 0

AD	ID 27	1 ✓
2 ✓	3 4	4 7
5 0	6 7	7 12

AD	ID 39	1 ✓
2 ✓	3 3	4 6
5 7	6 18	7 0

AD	ID 24	1 ✓
2 ✓	3 6	4 0
5 4/0	6	7

	ID 16	1 ✓
2 ✓	3 3	4 4
5 8	6 0	7 13

AD	ID 35	1 ✓
2 ✓	3 7	4 9
5 0	6 19	7 17

AD	ID 2	1 ✓
2 ✓	3 3	4 0
5 5	6	7 8

AD	ID 12	1 ✓
2 ✓	3 3	4 8
5 6	6 12	7 0

AD	ID 33	1 ✓
2 ✓	3 ✓	4 9
5 16	6 11	7 0

	ID 44	1 ✓
2 ✓	3 5	4 8
5 7	6 9	7 C

AD	ID 13	1 ✓
2 ✓	3 7	4 0
5 7	6 12	7 14

AD	ID 26	1 ✓
2 ✓	3 2	4 9
5 8	6 1	7 0

AD	ID 36	1 ✓
2 ✓	3 3	4 10
5 13	6 15	7 1

AD	ID 15	1 ✓
2 ✓	3 2	4
5	6	7

	ID 7	1 ✓
2 ✓	3 4	4 0
5 7	6 8	7 4

Comments:

Day 6 Initials SJO Time 1400

Cup ID	Sample Concentration
1–10:	6.25
11–20:	12.5
21–30:	25
31–40:	50
41–50:	100
51–60:	

Day	Initials	Time
1	SJO	1330
2	LJT	1530
3	LJT	1320
4	MAR	1415
5	MAR	1010
6	SJO	1100
7	LJT	1230

E: 6
C: 10
1-09 430
6-12-95

CHRONIC TOXICITY TEST DATA SHEET

TEMPERATURE

CONCENTRATION	Start	Day 1 OLD	Day 1 NEW	Day 2 OLD	Day 2 NEW	Day 3 OLD	Day 3 NEW	Day 4 OLD	Day 4 NEW	Day 5 OLD	Day 5 NEW	Day 6 OLD	Day 6 NEW	Day 7 OLD	Day 7 NEW	Day 8 OLD
6.25	24.0	24.2	24.2	24.0	24.0	25.0	24.8	25.0	25.0	24.0	24.0	24.2	24.8	24.8		
12.5																
25																
50																
100																

DISSOLVED OXYGEN

CONCENTRATION	Start	Day 1 OLD	Day 1 NEW	Day 2 OLD	Day 2 NEW	Day 3 OLD	Day 3 NEW	Day 4 OLD	Day 4 NEW	Day 5 OLD	Day 5 NEW	Day 6 OLD	Day 6 NEW	Day 7 OLD	Day 7 NEW	Day 8 OLD
6.25	8.3	8.5	9.0	7.9	8.6	7.6	8.3	7.8	8.4	7.4	8.3	8.2	8.4	7.8		
12.5	8.3	8.4	9.1	7.9	8.6	7.8	8.3	7.8	8.4	7.4	8.3	8.0	8.4	7.6		
25	8.3	8.5	9.0	8.0	8.5	7.7	8.3	7.9	8.6	7.5	8.3	8.1	8.4	7.9		
50	8.4	8.5	9.0	7.9	8.5	7.6	8.4	7.8	8.6	7.5	8.2	8.1	8.4	7.8		
100	8.4	8.5	9.1	8.0	8.6	7.6	8.5	7.9	8.7	7.5	8.3	8.1	8.5	7.9		

pH

CONCENTRATION	Start	Day 1 OLD	Day 1 NEW	Day 2 OLD	Day 2 NEW	Day 3 OLD	Day 3 NEW	Day 4 OLD	Day 4 NEW	Day 5 OLD	Day 5 NEW	Day 6 OLD	Day 6 NEW	Day 7 OLD	Day 7 NEW	Day 8 OLD
6.25	8.46	8.42	8.56	8.34	8.54	8.14	8.59	8.44	8.50	8.46	8.51	8.56	8.61	8.27		
12.5	8.42	8.41	8.54	8.35	8.55	8.16	8.54	8.44	8.50	8.47	8.50	8.57	8.62	8.27		
25	8.43	8.41	8.51	8.35	8.50	8.19	8.53	8.45	8.42	8.50	8.47	8.59	8.60	8.28		
50	8.38	8.43	8.49	8.38	8.41	8.19	8.40	8.46	8.40	8.51	8.41	8.59	8.58	8.31		
100	8.25	8.45	8.45	8.40	8.23	8.22	8.28	8.47	8.45	8.52	8.30	8.61	8.57	8.34		

CONDUCTIVITY

CONCENTRATION	Start	Day 1 OLD	Day 1 NEW	Day 2 OLD	Day 2 NEW	Day 3 OLD	Day 3 NEW	Day 4 OLD	Day 4 NEW	Day 5 OLD	Day 5 NEW	Day 6 OLD	Day 6 NEW	Day 7 OLD	Day 7 NEW	Day 8 OLD
6.25	626	574	644	634	658	688	681	699	663	550	672	717	660	673		
12.5	541	638	519	696	681	677	679	700	673	723	683	707	684	705		
25	625	667	527	678	657	681	675	694	660	671	663	702	658	674		
50	596	555	600	653	617	640	614	629	520	631	623	656	618	638		
100	586	516	500	580	519	567	540	517	441	551	547	580	552	523		

EE06 CERIO CHRONIC
File: CDEE06 Transform: NO TRANSFORMATION

hi-square test for normality: actual and expected frequencies

INTERVAL	<-1.5	-1.5 to <-0.5	-0.5 to 0.5	>0.5 to 1.5	>1.5
EXPECTED	4.020	14.520	22.920	14.520	4.020
OBSERVED	6	11	25	17	1

Calculated Chi-Square goodness of fit test statistic = 4.7097
Table Chi-Square value (alpha = 0.01) = 13.277

Data PASS normality test. Continue analysis.

EE06 CERIO CHRONIC
File: CDEE06 Transform: NO TRANSFORMATION

Bartletts test for homogeneity of variance

Calculated B statistic = 13.62
Table Chi-square value = 15.09 (alpha = 0.01)
Table Chi-square value = 11.07 (alpha = 0.05)

verage df used in calculation ==> df (avg n - 1) = 9.00
Used for Chi-square table value ==> df (#groups-1) = 5

Data PASS homogeneity test at 0.01 level. Continue analysis.

NOTE: If groups have unequal replicate sizes the average replicate size is used to calculate the B statistic (see above).

TITLE: EE06 CERIO CHRONIC
TITLE: CDEE06
TRANSFORM: NO TRANSFORMATION NUMBER OF GROUPS: 6

GRP	IDENTIFICATION	REP	VALUE	TRANS VALUE
1	CONTROL	1	31.0000	31.0000
1	CONTROL	2	10.0000	10.0000
1	CONTROL	3	20.0000	20.0000
1	CONTROL	4	15.0000	15.0000
1	CONTROL	5	23.0000	23.0000
1	CONTROL	6	21.0000	21.0000
1	CONTROL	7	21.0000	21.0000
1	CONTROL	8	20.0000	20.0000
1	CONTROL	9	21.0000	21.0000
1	CONTROL	10	16.0000	16.0000
2	6.25	1	28.0000	28.0000
2	6.25	2	16.0000	16.0000
2	6.25	3	24.0000	24.0000
2	6.25	4	3.0000	3.0000
2	6.25	5	12.0000	12.0000
2	6.25	6	16.0000	16.0000
2	6.25	7	23.0000	23.0000
2	6.25	8	22.0000	22.0000
2	6.25	9	11.0000	11.0000
2	6.25	10	30.0000	30.0000
3	12.5	1	25.0000	25.0000
3	12.5	2	29.0000	29.0000
3	12.5	3	40.0000	40.0000
3	12.5	4	27.0000	27.0000
3	12.5	5	2.0000	2.0000
3	12.5	6	28.0000	28.0000
3	12.5	7	31.0000	31.0000
3	12.5	8	37.0000	37.0000
3	12.5	9	31.0000	31.0000
3	12.5	10	0.0000	0.0000
4	25	1	40.0000	40.0000
4	25	2	28.0000	28.0000
4	25	3	50.0000	50.0000
4	25	4	6.0000	6.0000
4	25	5	41.0000	41.0000
4	25	6	20.0000	20.0000
4	25	7	30.0000	30.0000
4	25	8	45.0000	45.0000
4	25	9	7.0000	7.0000
4	25	10	22.0000	22.0000
5	50	1	48.0000	48.0000
5	50	2	49.0000	49.0000
5	50	3	36.0000	36.0000
5	50	4	25.0000	25.0000
5	50	5	52.0000	52.0000
5	50	6	42.0000	42.0000
5	50	7	39.0000	39.0000
5	50	8	41.0000	41.0000
5	50	9	34.0000	34.0000
5	50	10	40.0000	40.0000

6	100	1	44.0000	44.0000
6	100	2	44.0000	44.0000
6	100	3	39.0000	39.0000
6	100	4	27.0000	27.0000
[illegible]	100	5	48.0000	48.0000
	100	6	0.0000	0.0000
6	100	7	26.0000	26.0000
6	100	8	45.0000	45.0000
6	100	9	53.0000	53.0000
6	100	10	48.0000	48.0000

EE06 CERIO CHRONIC
File: CDEE06 Transform: NO TRANSFORMATION

ANOVA TABLE

SOURCE	DF	SS	MS	F
Between	5	4136.133	827.227	5.987
Within (Error)	54	7461.800	138.181	
Total	59	11597.933		

Critical F value = 2.45 (0.05,5,40)
Since F > Critical F REJECT Ho:All groups equal

EE06 CERIO CHRONIC
File: CDEE06 Transform: NO TRANSFORMATION

DUNNETTS TEST - TABLE 1 OF 2 Ho:Control<Treatment

GROUP	IDENTIFICATION	TRANSFORMED MEAN	MEAN CALCULATED IN ORIGINAL UNITS	T STAT	SIG
1	CONTROL	19.800	19.800		
2	6.25	18.500	18.500	0.247	
3	12.5	25.000	25.000	-0.989	
4	25	28.900	28.900	-1.731	
5	50	40.600	40.600	-3.957	
6	100	37.400	37.400	-3.348	

Dunnett table value = 2.31 (1 Tailed Value, P=0.05, df=40,5)

EE06 CERIO CHRONIC
File: CDEE06 Transform: NO TRANSFORMATION

DUNNETTS TEST - TABLE 2 OF 2 Ho:Control<Treatment

GROUP	IDENTIFICATION	NUM OF REPS	Minimum Sig Diff (IN ORIG. UNITS)	% of CONTROL	DIFFERENCE FROM CONTROL

1	CONTROL	10			
2	6.25	10	12.144	61.3	1.300
3	12.5	10	12.144	61.3	-5.200
4	25	10	12.144	61.3	-9.100
5	50	10	12.144	61.3	-20.800
6	100	10	12.144	61.3	-17.600

FATHEAD MINNOW SURVIVAL AND GROWTH
7-DAY CHRONIC TOXICITY TEST

Log No. 7-2

JOB NO. F93506
INDUSTRY: Tinker
CONTACT:
EFFLUENT: EEC6
NPDES PERMIT NO:
SAMPLE TYPE:
DILUTION WATER: Spring

PERSON CONDUCTING TEST: MLS
BEGINNING: 1730 hrs 6/12/95
ENDING: ____ hrs 6/19/95
TEST
DILUTIONS: 0.5
AGE: < 24 hr.
ORGANISM SOURCE: EC ET

PHOTOPERIOD: 16 hr light
FEEDING REGIME: 2
0.1 ml Artemia @ 3 times/day
TEST VESSEL CAPACITY: 1 liter 500
TEST SOLUTION VOLUME: 500 mL 250
NO. ORGANISMS/TREATMENT: 10
NO. REPLICATES: 4

CONC (%)	REP ID	SURVIVAL (#) START	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7
6.25	A	10	10	10	10	10	10	10	10
	B	10	10	10	10	10	9	7	7
	C	10	10	10	10	10	10	10	9
	D	10	10	10	10	10	10	10	10
12.5	A	10	10	10	10	10	10	10	10
	B	10	10	10	10	10	9	9	9
	C	10	10	10	10	10	10	10	10
	D	10	10	10	10	10	10	10	10
25	A	10	10	10	10	9	9	9	9
	B	10	10	10	10	10	10	10	10
	C	10	10	10	10	10	10	10	10
	D	10	10	10	10	10	10	10	10
50	A	10	10	10	10	10	10	10	10
	B	10	10	10	10	10	10	10	10
	C	10	10	10	10	10	10	10	10
	D	10	10	10	10	10	10	10	10
	TIME:	1730	1510	1540	1330	1520	1300	1315	1500
	INITIAL:	MLS	MLS	MLS	SJB	TNT	SSB	TNT	TNT

GROWTH RESULTS

CONC (%)	REP ID	Boat ID	Tare wt (g)	Combined wt (g)	Tot Fish wt (g)	# of Fish	Avg Fish wt (mg)
6.25	A		1.00240	1.00877	0.00637	10	0.637
	B		1.00758	1.01223	0.00465	7	0.664
	C		.99909	1.00419	0.0051	9	0.567
	D		1.00863	1.01483	0.00662	10	0.620
12.5	A		1.00733	1.01345	0.00612	10	0.612
	B		1.00261	1.00721	0.0046	9	0.511
	C		1.00474	1.01116	0.00642	10	0.642
	D		1.01154	1.01761	0.00615	10	0.615
25	A		1.00139	1.00836	0.00697	9	0.774
	B		1.00828	1.01434	0.00606	10	0.606
	C		1.00975	1.01594	0.00619	10	0.619
	D		99989	1.00558	0.00569	10	0.569
50	A		1.01119	1.01663	0.00544	10	0.544
	B		99895	1.00516	0.00621	10	0.621
	C		1.00200	1.00753	0.00553	10	0.553
	D		1.00000	1.00581	0.00581	10	0.581

FATHEAD MINNOW SURVIVAL AND GROWTH Log No. [illegible]

7-DAY CHRONIC TOXICITY TEST

JOB NO. F935C6
INDUSTRY: Tinker
CONTACT:
EFFLUENT: 8906
NPDES PERMIT NO:
SAMPLE TYPE:
DILUTION WATER: Spring

PERSON CONDUCTING TEST:
BEGINNING: 1730 hrs; 6/12/15
ENDING: ____ hrs; / / .
TEST
DILUTIONS:
AGE: < 24 hrs
ORGANISM SOURCE: EE & T

PHOTOPERIOD: 16 hr light
FEEDING REGIME: 2
0.1 ml Artemia @ 3 times/day
TEST VESSEL CAPACITY: 1 ~~liter~~ 500
TEST SOLUTION VOLUME: ~~500~~ mL 3
NO. ORGANISMS/TREATMENT: 10
NO. REPLICATES: 4

CONC (%)	REP ID	SURVIVAL (#) START	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7
100	A	10	10	10	10	10	9	9	9
	B	10	10	10	10	10	9	9	9
	C	10	10	10	10	10	10	10	10
	D	10	10	10	10	9	9	9	9
	TIME:	1730	1510	1540	1330	1520	1300	1315	1500
	INITIAL:	MLS	MLS	MLS	SJE	TMT	SJE	TMT	TMT

GROWTH RESULTS

CONC (%)	REP ID	Boat ID	Tare wt (g)	Combined wt (g)	Tot Fish wt (g)	# of Fish	Avg Fish wt (mg)
100	A		1.00327	1.00835	0.00508	9	0.564
	B		1.00113	1.00632	0.00519	9	0.577
	C		1.00009	1.00520	0.00511	10	0.511
	D		1.01194	1.01684	0.0049	9	0.544

Fa [illegible]
ACCJ430
6-12-95
Spring

CHRONIC TOXICITY TEST DATA SHEET

TEMPERATURE

CONCENTRATION	Start	Day 1 OLD	Day 1 NEW	Day 2 OLD	Day 2 NEW	Day 3 OLD	Day 3 NEW	Day 4 OLD	Day 4 NEW	Day 5 OLD	Day 5 NEW	Day 6 OLD	Day 6 NEW	Day 7 OLD	Day 7 NEW	Day 8 OLD
6.25	24.0	24.8	24.8	24.0	24.0	25.0	25.0	24.2	25.0	24.0	24.0	24.2	25.0	24.8		
12.5																
25																
50																
100																

DISSOLVED OXYGEN

CONCENTRATION	Start	Day 1 OLD	Day 1 NEW	Day 2 OLD	Day 2 NEW	Day 3 OLD	Day 3 NEW	Day 4 OLD	Day 4 NEW	Day 5 OLD	Day 5 NEW	Day 6 OLD	Day 6 NEW	Day 7 OLD	Day 7 NEW	Day 8 OLD
6.25	7.9	8.2	8.2	6.5	8.5	7.0	7.8	7.2	7.6	6.7	8.1	8.0	8.4	6.3		
12.5	7.9	7.2	8.0	6.7	8.4	6.9	8.0	7.1	7.6	6.7	8.0	8.0	8.4	6.0		
25	7.9	8.0	8.0	6.6	8.2	7.0	8.0	7.2	7.6	6.7	7.8	8.0	8.4	6.0		
50	7.9	7.9	8.0	6.6	8.2	7.0	8.0	7.3	7.8	6.7	7.8	8.0	8.4	6.1		
100	7.9	7.8	8.0	6.7	8.2	7.1	8.1	7.3	7.9	6.7	8.2	8.1	8.4	6.2		

pH

CONCENTRATION	Start	Day 1 OLD	Day 1 NEW	Day 2 OLD	Day 2 NEW	Day 3 OLD	Day 3 NEW	Day 4 OLD	Day 4 NEW	Day 5 OLD	Day 5 NEW	Day 6 OLD	Day 6 NEW	Day 7 OLD	Day 7 NEW	Day 8 OLD
6.25	8.03	8.28	8.20	7.98	8.24	7.94	8.12	8.23	7.95	8.35	8.26	8.39	8.48	7.99		
12.5	8.00	8.25	8.18	7.97	8.25	7.98	8.14	8.24	7.96	8.35	8.18	8.35	8.46	7.85		
25	8.02	8.25	8.18	8.00	8.23	7.96	8.13	8.26	7.96	8.34	8.18	8.37	8.46	7.91		
50	8.04	8.23	8.24	8.00	8.21	8.00	8.15	8.25	8.17	P.31	8.20	8.43	8.50	7.95		
100	8.13	8.23	8.36	8.01	8.21	8.02	8.23	8.35	8.18	8.30	8.33	8.43	8.54	7.94		

CONDUCTIVITY

CONCENTRATION	Start	Day 1 OLD	Day 1 NEW	Day 2 OLD	Day 2 NEW	Day 3 OLD	Day 3 NEW	Day 4 OLD	Day 4 NEW	Day 5 OLD	Day 5 NEW	Day 6 OLD	Day 6 NEW	Day 7 OLD	Day 7 NEW	Day 8 OLD
6.25	285	353	303	359	384	360	352	368	378	349	342	371	341	350		
12.5	308	372	320	372	340	358	352	367	371	361	355	362	358	366		
25	381	391	317	394	351	398	375	3[illegible]	416	385	378	388	385	389		
50	<132	439	350	444	412	454	425	441	528	438	435	443	438	443		
100	524	536	525	535	540	506	524	559	540	537	515	551	538	514		

EE06 FATHEAD MINNOW CHRONIC
File: FMEE06 Transform: NO TRANSFORMATION

Chi-square test for normality: actual and expected frequencies

INTERVAL	<-1.5	-1.5 to <-0.5	-0.5 to 0.5	>0.5 to 1.5	>1.5
EXPECTED	1.608	5.808	9.168	5.808	1.608
OBSERVED	0	7	10	7	0

Calculated Chi-Square goodness of fit test statistic = 3.7808
Table Chi-Square value (alpha = 0.01) = 13.277

Data PASS normality test. Continue analysis.

EE06 FATHEAD MINNOW CHRONIC
File: FMEE06 Transform: NO TRANSFORMATION

Bartletts test for homogeneity of variance

Calculated B statistic = 5.11
Table Chi-square value = 15.09 (alpha = 0.01)
Table Chi-square value = 11.07 (alpha = 0.05)

Average df used in calculation ==> df (avg n - 1) = 3.00
Used for Chi-square table value ==> df (#groups-1) = 5

Data PASS homogeneity test at 0.01 level. Continue analysis.

NOTE: If groups have unequal replicate sizes the average replicate size is used to calculate the B statistic (see above).

TITLE: EE06 FATHEAD MINNOW CHRONIC
TITLE: FMEE06
TRANSFORM: NO TRANSFORMATION NUMBER OF GROUPS: 6

GRP	IDENTIFICATION	REP	VALUE	TRANS VALUE
1	CONTROL	1	0.5470	0.5470
1	CONTROL	2	0.4630	0.4630
1	CONTROL	3	0.5650	0.5650
1	CONTROL	4	0.6440	0.6440
2	6.25	1	0.6370	0.6370
2	6.25	2	0.6640	0.6640
2	6.25	3	0.5670	0.5670
2	6.25	4	0.6200	0.6200
3	12.5	1	0.6120	0.6120
3	12.5	2	0.5110	0.5110
3	12.5	3	0.6420	0.6420
3	12.5	4	0.6150	0.6150
4	25	1	0.7740	0.7740
4	25	2	0.6060	0.6060
4	25	3	0.6190	0.6190
4	25	4	0.5690	0.5690
5	50	1	0.5440	0.5440
5	50	2	0.6210	0.6210
5	50	3	0.5530	0.5530
5	50	4	0.5810	0.5810
6	100	1	0.5640	0.5640
6	100	2	0.5770	0.5770
6	100	3	0.5110	0.5110
6	100	4	0.5440	0.5440

EE06 FATHEAD MINNOW CHRONIC
File: FMEE06 Transform: NO TRANSFORMATION

ANOVA TABLE

SOURCE	DF	SS	MS	F
Between	5	0.028	0.006	2.000
Within (Error)	18	0.062	0.003	
Total	23	0.090		

Critical F value = 2.77 (0.05,5,18)
Since F < Critical F FAIL TO REJECT Ho:All groups equal

EE06 FATHEAD MINNOW CHRONIC
File: FMEE06 Transform: NO TRANSFORMATION

DUNNETTS TEST - TABLE 1 OF 2 Ho:Control<Treatment

GROUP	IDENTIFICATION	TRANSFORMED MEAN	MEAN CALCULATED IN ORIGINAL UNITS	T STAT	SIG
1	CONTROL	0.555	0.555		
2	6.25	0.622	0.622	-1.736	
3	12.5	0.595	0.595	-1.039	
4	25	0.642	0.642	-2.253	
5	50	0.575	0.575	-0.516	
6	100	0.549	0.549	0.148	

Dunnett table value = 2.41 (1 Tailed Value, P=0.05, df=18,5)

EE06 FATHEAD MINNOW CHRONIC
File: FMEE06 Transform: NO TRANSFORMATION

DUNNETTS TEST - TABLE 2 OF 2 Ho:Control<Treatment

GROUP	IDENTIFICATION	NUM OF REPS	Minimum Sig Diff (IN ORIG. UNITS)	% of CONTROL	DIFFERENCE FROM CONTROL
1	CONTROL	4			
2	6.25	4	0.093	16.8	-0.067
3	12.5	4	0.093	16.8	-0.040
4	25	4	0.093	16.8	-0.087
5	50	4	0.093	16.8	-0.020
6	100	4	0.093	16.8	0.006

TINKER FHM SURVIVAL LOG # 430 - EE06
File: FSUR430 Transform: 1/SQUARE ROOT(Y+0.5)

`hapiro Wilks test for normality

D = 0.008

W = 0.810

Critical W (P = 0.05) (n = 24) = 0.916
Critical W (P = 0.01) (n = 24) = 0.884

Data FAIL normality test. Try another transformation.

Warning - The two homogeneity tests are sensitive to non-normal data and should not be performed.

TINKER FHM SURVIVAL LOG # 430 - EE06
File: FSUR430 Transform: 1/SQUARE ROOT(Y+0.5)

Hartley test for homogeneity of variance
Bartletts test for homogeneity of variance

These two tests can not be performed because at least one group has
ero variance.

Data FAIL to meet homogeneity of variance assumption.
Additional transformations are useless.

TITLE: TINKER FHM SURVIVAL LOG # 430 - EE06
FILE: FSUR430
TRANSFORM: 1/SQUARE ROOT(Y+0.5) NUMBER OF GROUPS: 6

GRP	IDENTIFICATION	REP	VALUE	TRANS VALUE
1	CONTROL	1	1.0000	0.8165
1	CONTROL	2	1.0000	0.8165
1	CONTROL	3	1.0000	0.8165
1	CONTROL	4	1.0000	0.8165
2	6.25%	1	1.0000	0.8165
2	6.25%	2	0.7000	0.9129
2	6.25%	3	0.9000	0.8452
2	6.25%	4	1.0000	0.8165
3	12.5%	1	1.0000	0.8165
3	12.5%	2	0.9000	0.8452
3	12.5%	3	1.0000	0.8165
3	12.5%	4	1.0000	0.8165
4	25%	1	0.9000	0.8452
4	25%	2	1.0000	0.8165
4	25%	3	1.0000	0.8165
4	25%	4	1.0000	0.8165
5	50%	1	1.0000	0.8165
5	50%	2	1.0000	0.8165
5	50%	3	1.0000	0.8165
5	50%	4	1.0000	0.8165
6	100%	1	0.9000	0.8452
6	100%	2	0.9000	0.8452
6	100%	3	1.0000	0.8165
6	100%	4	0.9000	0.8452

TINKER FHM SURVIVAL LOG # 430 - EE06
File: FSUR430 Transform: 1/SQUARE ROOT(Y+0.5)

SUMMARY STATISTICS ON TRANSFORMED DATA TABLE 1 of 2

GRP	IDENTIFICATION	N	MIN	MAX	MEAN
1	CONTROL	4	0.816	0.816	0.816
2	6.25%	4	0.816	0.913	0.848
3	12.5%	4	0.816	0.845	0.824
4	25%	4	0.816	0.845	0.824
5	50%	4	0.816	0.816	0.816
6	100%	4	0.816	0.845	0.838

TINKER FHM SURVIVAL LOG # 430 - EE06
File: FSUR430 Transform: 1/SQUARE ROOT(Y+0.5)

SUMMARY STATISTICS ON TRANSFORMED DATA TABLE 2 of 2

GRP	IDENTIFICATION	VARIANCE	SD	SEM
1	CONTROL	0.000	0.000	0.000
2	6.25%	0.002	0.045	0.023
3	12.5%	0.000	0.014	0.007
4	25%	0.000	0.014	0.007
5	50%	0.000	0.000	0.000
6	100%	0.000	0.014	0.007

TINKER FHM SURVIVAL LOG # 430 - EE06
File: FSUR430 Transform: 1/SQUARE ROOT(Y+0.5)

STEELS MANY-ONE RANK TEST - Ho:Control<Treatment

GROUP	IDENTIFICATION	TRANSFORMED MEAN	RANK SUM	CRIT. VALUE	df	SIG
1	CONTROL	0.816				
2	6.25%	0.848	22.00	10.00	4.00	
3	12.5%	0.824	20.00	10.00	4.00	
4	25%	0.824	20.00	10.00	4.00	
5	50%	0.816	18.00	10.00	4.00	
6	100%	0.838	24.00	10.00	4.00	

Critical values use k = 5, are 1 tailed, and alpha = 0.05

CHAIN OF CUSTODY RECORD

ANALYTICAL LAB
Quanterra
4955 Yarrow Street
Arvada, CO 80002

Woodward-Clyde

Client Name: WOODWARD-CLYDE FEDERAL SERVICES
Client Address: 3000 Tower Drive Ste 456, Del City, OK 73115 (405)677-2001

Project Name
SOLDIER CREEK SEDIMENT AND SURFACE WATER OPERABLE UNIT
ECOLOGICAL ASSESSMENT, JUNE 1995

Team Leader: Kennedy

Analytical Parameters *

Date	Time	Sample ID/Description	Matrix	# Samples	VOC (8240)	SVOC (8270)	PCB'S & Pest. (8080)	METALS + Hg, Se, As, Tl [6010/7000/ICP/MS (Ag, Cd, Cu, Pb)]	CYANIDE (9012)	~~TOC (415.1)~~ DSI Toxicity	Lipids (Biota)	Remarks
6/8 /95	12:30	SC-EE06-TX-201	water	2						✓		3° C upon arrival
"	12:45	SC-EE06-TX-201	Sed	2						✓		
		SC-____-__-___										
		SC-____-__-___										
		SC-____-__-___										
		SC-____-__-___										
		SC-____-__-___										
		SC-____-__-___										
		SC-____-__-___										
		SC-____-__-___										

*Water
VOC - three 40 ml vial - 4° C/HCL pH<2
SVOC - two 32 oz amber - 4° C
Metals + Hg - One 500 ml plastic - 4° C/HNO3 pH<2
PCB's/Pest. - Two 32 oz amber - 4° C
Cyanide - One 8 oz plastic - 4° C/NaOH pH>12

*Sediment
VOC - two 4 oz jars - 4° C
SVOC, Metals, Cyanide, PCB's & Pest. - One 16 oz jar - 4° C

*Biota
VOC,SVOC, PCBs & Pest., Metals, Cyanide - One 32 oz wide-mouth jar - collected in triplicate

CUSTODY TRANSFERS PRIOR TO SHIPPING

Relinquished By (Signed)	Received By (Signed)	Date	Time
[signature]		6/8/95	1800

SHIPPING DETAILS

Delivered to Shipper By Kennedy/Spires	
Method of Shipment FedEx	**Airbill Number** 5804823430
Received for Lab by (signed) Lya Teer	**Date/Time** 6/9/95 0905
WCFS Project Number	F93506

White - Client
Pink - Lab
Yellow - File

WCFSCOC.XLS

CHAIN OF CUSTODY RECORD

Woodward-Clyde ~~ANALYTICAL LAB~~
Quanterra
4955 Yarrow Street
Arvada, ~~CO 80~~002

Client Name:	**WOODWARD-CLYDE FEDERAL SERVICES**
Client Address:	3000 Tower Drive Ste 456, Del City, OK 73115 (405)677-2001
Project Name	SOLDIER CREEK SEDIMENT AND SURFACE WATER OPERABLE UNIT ECOLOGICAL ASSESSMENT, JUNE 1995
Team Leader:	**Kennedy**

Date	Time	Sample ID/Description	Matrix	# Samples	VOC (8240)	SVOC (8270)	PCB'S & Pest. (8080)	METALS + Hg, Se, As, Tl (6010/7000/CP/MS (Ag, Cd, Cu, Pb))	CYANIDE (9012)	~~TOC (415.1)~~ Toxicity	Lipids (Biota)	Remarks
Analytical Parameters *												
6/8/95	12:30	SC-EE06-TX-201	Water	3						✓		2°C upon arrival
		SC-____-___-___										
		SC-____-___-___										
		SC-____-___-___										
		SC-____-___-___										
		SC-____-___-___										
		SC-____-___-___										
		SC-____-___-___										
		SC-____-___-___										
		SC-____-___-___										

*Water — VOC - three 40 ml vial - 4° C/HCL pH<2; SVOC - two 32 oz amber - 4° C; Metals + Hg - One 500 ml plastic - 4° C/HNO3 pH<2; PCB's/Pest. - Two 32 oz amber - 4° C; Cyanide - One 8 oz plastic - 4° C/NaOH pH>12

*Sediment — VOC - two 4 oz jars - 4° C; SVOC, Metals, Cyanide, PCB's & Pest. - One 16 oz jar - 4° C

*Biota — VOC,SVOC, PCBs & Pest., Metals, Cyanide - One 32 oz wide-mouth jar - collected in triplicate

CUSTODY TRANSFERS PRIOR TO SHIPPING

Relinquished By (Signed)	Received By (Signed)	Date	Time
[signature]	Liza Jeer LJT	6/9/95	19:00

SHIPPING DETAILS

Delivered to Shipper By		
Kennedy/Spires		
Method of Shipment		**Airbill Number**
FedEx		5804823430
Received for Lab by (signed)		**Date/Time**
Liza Jeer		6/9/95 0900
WCFS Project Number		F93506

White - Client
Pink - Lab
Yellow - File

WCFSCOC.XLS

TRIMMED SPEARMAN-KARBER METHOD. MONTANA STATE UNIV

FOR REFERENCE, CITE:
HAMILTON, M.A., R.C. RUSSO, AND R.V. THURSTON, 1977.
TRIMMED SPEARMAN-KARBER METHOD FOR ESTIMATING MEDIAN
LETHAL CONCENTRATIONS IN TOXICITY BIOASSAYS.
ENVIRON. SCI. TECHNOL. 11(7): 714-719;
CORRECTION 12(4):417 (1978).

DATE: 28 DAY C TEST NUMBER: EE06 DURATION: 28 HOURS
CHEMICAL: EE06 SPECIES: HYALELLA A

RAW DATA:

CONCENTRATION(%)	6.25	12.50	25.00	50.00	100.00
NUMBER EXPOSED:	30	30	30	30	30
MORTALITIES:	10	6	9	13	24
SPEARMAN-KARBER TRIM:		26.67%			

SPEARMAN-KARBER ESTIMATES: LC50: 50.45
95% LOWER CONFIDENCE: 34.19
95% UPPER CONFIDENCE: 74.44

NOTE: MORTALITY PROPORTIONS WERE NOT MONOTONICALLY INCREASING.
ADJUSTMENTS WERE MADE PRIOR TO SPEARMAN-KARBER ESTIMATION.

HAEE06
File: HAEE06 Transform: NO TRANSFORMATION

Chi-square test for normality: actual and expected frequencies

INTERVAL	<-1.5	-1.5 to <-0.5	-0.5 to 0.5	>0.5 to 1.5	>1.5
EXPECTED	1.340	4.840	7.640	4.840	1.340
OBSERVED	1	7	3	9	0

Calculated Chi-Square goodness of fit test statistic = 8.7838
Table Chi-Square value (alpha = 0.01) = 13.277

Data PASS normality test. Continue analysis.

HAEE06
File: HAEE06 Transform: NO TRANSFORMATION

Hartley test for homogeneity of variance

Calculated H statistic (max Var/min Var) = 3.75
Closest, conservative, Table H statistic = 1362.0 (alpha = 0.01)

Used for Table H ==> R (# groups) = 6, df (# reps-1) = 2
Actual values ==> R (# groups) = 6, df (# avg reps-1) = 2.33
(average df used)

Data PASS homogeneity test. Continue analysis.

NOTE: This test requires equal replicate sizes. If they are unequal but do not differ greatly, the Hartley test may still be used as an approximate test (average df are used).

TITLE: HAEE06
FILE: HAEE06
TRANSFORM: NO TRANSFORMATION NUMBER OF GROUPS: 6

GRP	IDENTIFICATION	REP	VALUE	TRANS VALUE
1	GRAVEL CONTROL	1	7.0000	7.0000
1	GRAVEL CONTROL	2	9.0000	9.0000
1	GRAVEL CONTROL	3	9.0000	9.0000
1	GRAVEL CONTROL	4	9.0000	9.0000
1	GRAVEL CONTROL	5	8.0000	8.0000
2	6.25%	1	5.0000	5.0000
2	6.25%	2	8.0000	8.0000
2	6.25%	3	7.0000	7.0000
3	12.5%	1	6.0000	6.0000
3	12.5%	2	9.0000	9.0000
3	12.5%	3	9.0000	9.0000
4	25%	1	6.0000	6.0000
4	25%	2	9.0000	9.0000
4	25%	3	6.0000	6.0000
5	50%	1	5.0000	5.0000
5	50%	2	5.0000	5.0000
5	50%	3	7.0000	7.0000
6	100%	1	2.0000	2.0000
6	100%	2	3.0000	3.0000
6	100%	3	1.0000	1.0000

HAEE06
File: HAEE06 Transform: NO TRANSFORMATION

SUMMARY STATISTICS ON TRANSFORMED DATA TABLE 1 of 2

GRP	IDENTIFICATION	N	MIN	MAX	MEAN
1	GRAVEL CONTROL	5	7.000	9.000	8.400
2	6.25%	3	5.000	8.000	6.667
3	12.5%	3	6.000	9.000	8.000
4	25%	3	6.000	9.000	7.000
5	50%	3	5.000	7.000	5.667
6	100%	3	1.000	3.000	2.000

HAEE06
File: HAEE06 Transform: NO TRANSFORMATION

SUMMARY STATISTICS ON TRANSFORMED DATA TABLE 2 of 2

GRP	IDENTIFICATION	VARIANCE	SD	SEM
1	GRAVEL CONTROL	0.800	0.894	0.400

2	6.25%	2.333	1.528	0.882
3	12.5%	3.000	1.732	1.000
4	25%	3.000	1.732	1.000
5	50%	1.333	1.155	0.667
6	100%	1.000	1.000	0.577

HAEE06
File: HAEE06 Transform: NO TRANSFORMATION

ANOVA TABLE

SOURCE	DF	SS	MS	F
Between	5	88.467	17.693	10.099
Within (Error)	14	24.533	1.752	
Total	19	113.000		

Critical F value = 2.96 (0.05,5,14)
Since F > Critical F REJECT Ho:All groups equal

HAEE06
ile: HAEE06 Transform: NO TRANSFORMATION

BONFERRONI T-TEST - TABLE 1 OF 2 Ho:Control<Treatment

GROUP	IDENTIFICATION	TRANSFORMED MEAN	MEAN CALCULATED IN ORIGINAL UNITS	T STAT	SIG
1	GRAVEL CONTROL	8.400	8.400		
2	6.25%	6.667	6.667	1.793	
3	12.5%	8.000	8.000	0.414	
4	25%	7.000	7.000	1.448	
5	50%	5.667	5.667	2.828	*
6	100%	2.000	2.000	6.621	*

Bonferroni T table value = 2.63 (1 Tailed Value, P=0.05, df=14,5)

HAEE06
File: HAEE06 Transform: NO TRANSFORMATION

BONFERRONI T-TEST - TABLE 2 OF 2 Ho:Control<Treatment

GROUP	IDENTIFICATION	NUM OF REPS	Minimum Sig Diff (IN ORIG. UNITS)	% of CONTROL	DIFFERENCE FROM CONTROL
1	GRAVEL CONTROL	5			
2	6.25%	3	2.537	30.2	1.733
3	12.5%	3	2.537	30.2	0.400
4	25%	3	2.537	30.2	1.400

5	50%	3	2.537	30.2	2.733
6	100%	3	2.537	30.2	6.400

TEST SUMMARY: SC-EE07-TX-201
Ceriodaphnia dubia 48-Hour Static Acute

Test protocol:	WCC SOP 401.2
Test organism:	*Ceriodaphnia dubia*
Source:	WCC Culture Laboratory
Age of test organism:	<24 hours
Test initiation:	6/9/95
Test termination:	6/11/95
Temperature:	25 +/- 1 °C
Light:	50 - 100 foot candles
Photoperiod:	16 hours light/8 hours dark
Test vessel:	30 mL styrene
Test volume:	20 mL
Organisms/replicate:	5
Replicates/concentration:	4
Feeding regime:	none
Aeration during test:	none
Dilution Water:	Hard Reconstituted Synthetic
Test duration:	48 hours
Effect measured:	Mortality
Reference Toxicant Data:	
LC_{50} (g/L NaCl):	1.51

TEST RESULTS: SC-EE07-TX-201
Ceriodaphnia dubia 48-Hour Static Acute

LC_{50} > 100%

Statictical analysis method: N/A

Treatment (% Sample)	Survival (%)	pH	Conductivity (umhos/cm)	DO (mg/L)	Temperature (°C)	Hardness (mg/L $CaCO_3$)	Alkalinity (mg/L $CaCO_3$)
Control	100	8.49-8.50	604	8.4	24.6	250	
			(546-662)	(8.2-8.6)	(24.6-24.6)		
6.25	100	8.49-8.52	556	8.6	24.6		
			(439-672)	(8.4-8.8)	(24.6-24.6)		
12.5	100	8.48-8.50	682	8.6	24.6		
			(675-688)	(8.4-8.8)	(24.6-24.6)		
25	100	8.43-8.52	587	8.6	24.6		
			(586-588)	(8.4-8.7)	(24.6-24.6)		
50	100	8.35-8.52	644	8.5	24.6		
			(625-663)	(8.4-8.6)	(24.6-24.6)		
100	100	8.20-8.54	496	8.5	24.6	260	148
			(423-568)	(8.4-8.5)	(24.6-24.6)		

SURFACE WATER SAMPLE ARRVIAL INFORMATION

Collection Date/Time:	6/8/95 @ 0945
Use Date/Time:	6/9/95 @ 1310
Method of Shipment:	Overnight Courier
Temperature (°C):	2.0
pH:	7.78
Ammonia (mg/L):	0.771
Conductivity (umhos/cm):	568
DO (mg/L):	8.2

TEST SUMMARY: SC-EE07-TX-201
Ceriodaphnia dubia Chronic Renewal

Test protocol:	WCC SOP 501.1
Test organism:	*Ceriodaphnia dubia*
Source:	WCC Culture Laboratory
WCC Batch:	6/12/95
Age of test organism:	<24 hours
Test initiation:	6/12/95
Test termination:	6/19/95
Temperature:	25 +/- 1 °C
Light:	50 - 100 foot candles
Photoperiod:	16 hours light/8 hours dark
Test vessel:	30 mL styrene
Test volume:	15 mL
Organisms/replicate:	1
Replicates/concentration:	10
Feeding regime:	0.05 mL *Selenastrum* and 0.05 mL YTC daily
Aeration during test:	none
Dilution Water:	Hard Reconstituted Synthetic
Test duration:	7 days
Effect measured:	Survival and reproduction

Toxicity test methods and procedures were followed in accordance with EPA 600/4-89/001

Reference Toxicant Data:	
NOEC (g/L NaCl):	0.75

TEST RESULTS: SC-EE07-TX-201
Ceriodaphnia dubia Chronic Survival and Reproduction Test

Survival NOEC:		100%
	Statistical analysis method:	Steel's Many-One Rank
	Normality test:	Fail
	Homogeneity of variance test:	Fail
Reproduction NOEC:		100%
	Statistical analysis method:	Dunnetts
	Normality test:	Pass
	Homogeneity of variance test:	Pass

Treatment (% Sample)	Survival (%)	pH	Conductivity (umhos/cm)	DO (mg/L)	Temperature (°C)
Control	90	7.81-8.64	707 (437-791)	8.1 (7.1-8.5)	24.5 (24.0-25.0)
6.25	80	8.17-8.61	696 (540-772)	8 (7.1-8.5)	24.5 (24.0-25.0)
12.5	70	8.18-8.62	696 (644-768)	8 (7.2-8.5)	24.5 (24.0-25.0)
25	80	8.18-8.61	671 (544-769)	8.1 (7.2-8.5)	24.5 (24.0-25.0)
50	90	7.78-8.57	636 (609-858)	8.1 (7.2-8.5)	24.5 (24.0-25.0)
100	100	8.18-8.53	571 (507-615)	8.1 (7.2-8.7)	24.5 (24.0-25.0)

	Hardness (mg/L $CaCO_3$)	Alkalinity (mg/L $CaCO_3$)	Ammonia (mg/L)
Control	250		
EE07	260	148	0.771

TEST SUMMARY: SC-EE07-TX-201
Pimephales promelas 48-Hour Static Acute

Test protocol:	WCC SOP 410.2
Test organism:	*Pimephales promelas*
Source:	Woodward-Clyde Consultants
Age of test organism:	6 days
Test initiation:	6/9/95
Test termination:	6/11/95
Temperature:	20 +/- 1 °C
Light:	50 - 100 foot candles
Photoperiod:	16 hours light/8 hours dark
Test vessel:	500 mL plastic beaker
Test volume:	250 mL
Organisms/replicate:	10
Replicates/concentration:	2
Feeding regime:	none
Aeration during test:	none
Dilution Water:	Spring Water
Test duration:	48 hours
Effect measured:	Mortality
Reference Toxicant Data:	
LC_{50} (g/L NaCl):	5.26

TEST RESULTS: SC-EE07-TX-201
Pimephales promelas 48-Hour Static Acute

LC_{50} > 100%

Statictical analysis method: N/A

Treatment (% Sample)	Survival (%)	pH	Conductivity (umhos/cm)	DO (mg/L)	Temperature (°C)	Hardness (mg/L $CaCO_3$)	Alkalinity (mg/L $CaCO_3$)
Control	95	8.25-8.28	342 (317-366)	8.0 (7.9-8.1)	21.0 (20.0-21.0)	158	146
6.25	95	8.33-8.47	351 (333-369)	8.1 (8.1-8.1)	21.0 (20.0-21.0)		
12.5	100	8.43-8.46	366 (349-382)	8.1 (8.0-8.1)	21.0 (20.0-21.0)		
25	90	8.45-8.48	392 (372-412)	8.1 (8.0-8.1)	21.0 (20.0-21.0)		
50	85	8.41-8.51	462 (444-479)	8.1 (8.0-8.1)	21.0 (20.0-21.0)		
100	85	8.35-8.51	544 (523-565)	8.1 (8.0-8.1)	21.0 (20.0-21.0)	260	148

SURFACE WATER SAMPLE ARRVIAL INFORMATION

Collection Date/Time:	6/8/95 @ 0945
Use Date/Time:	6/9/95 @ 1600
Method of Shipment:	Overnight Courier
Temperature (°C):	2.0
pH:	7.78
Ammonia (mg/L):	0.771
Conductivity (umhos/cm):	568
DO (mg/L):	8.2
Description:	Clear

TEST SUMMARY: SC-EE07-TX-201
Pimephales promelas Chronic Renewal

Test protocol:	WCC SOP 510.1
Test organism:	*Pimephales promelas*
Source:	Environmental Consulting & Testing
Age of test organism:	<24 hours
Test initiation:	6/12/95 @ 1745
Test termination:	6/19/95 @ 1600
Temperature:	25 +/- 1 °C
Light:	50 - 100 foot candles
Photoperiod:	16 hours light/8 hours dark
Test vessel:	500 mL plastic beaker
Test volume:	250 mL
Organisms/replicate:	10
Replicates/concentration:	4
Feeding regime:	0.1 mL brine shrimp nauplii twice daily
Aeration during test:	none
Dilution Water:	Spring Water
Test duration:	7 days
Effect measured:	Survival and growth

Toxicity test methods and procedures were followed in accordance with EPA 600/4-89/001

Reference Toxicant Data:	
NOEC (g/L NaCl):	3.0

TEST RESULTS : SC- EE07-TX-201
Pimephales promelas Chronic Survival and Growth Test

Survival NOEC:	100%
Statistical analysis method:	N/A
Normality test:	
Homogeneity of variance test:	
Growth NOEC:	100%
Statistical analysis method:	Dunnetts
Normality test:	Pass
Homogeneity of variance test:	Pass

Treatment (% Sample)	Survival (%)	pH	Conductivity (umhos/cm)	DO (mg/L)	Temperature (°C)
Control	100	7.59-8.48	373 (287-459)	7.5 (6.5-8.5)	24.5 (24.0-25.0)
6.25	100	7.92-8.47	364 (334-383)	7.7 (7.0-8.4)	24.5 (24.0-25.0)
12.5	100	7.93-8.48	367 (349-382)	7.7 (6.8-8.4)	24.5 (24.0-25.0)
25	97.5	7.96-8.46	388 (338-410)	7.7 (6.8-8.4)	24.5 (24.0-25.0)
50	97.5	7.98-8.48	450 (385-478)	7.7 (6.8-8.4)	24.5 (24.0-25.0)
100	97.5	8.04-8.48	566 (533-597)	7.8 (6.8-8.4)	24.5 (24.0-25.0)

	Hardness (mg/L $CaCO_3$)	Alkalinity (mg/L $CaCO_3$)	Ammonia (mg/L)
Control	158	146	
EE07	260	148	0.771

48-hr Ceriodaphnia dubia TOXICITY TEST

LOG NO. 423-426
JOB NO. F93506/3
INDUSTRY: TINKER AFB
CONTACT:

EFFLUENT: ~~EE05~~ TNT / CONTROL
START DATE: 6/9/95
START TIME: 1310
DILUTION WATER: CONTROL

CONC (%)	REP ID	SURVIVAL (#) 0	24	48	DEAD	TEMPERATURE (oC) 0	24	48	DO (mg/L) 0	24	48	pH (S.U.) 0	24	48	CONDUCTIVITY (umhos/cm) 0	24	48
HD 120	A	5	5	5	0	24.4		24.4	8.6		8.2	8.19		8.17	4.57		4.04
	B	5	5	5	0												
	C	5	5	5	0												
	D	5	5	5	0												
	A																
	B																
	C																
	D																
HD 250	A	5	5	5	0	24.4		24.4	8.6		8.2	8.50		8.49	6.02		5.46
	B	5	5	5	0												
	C	5	5	5	0												
	D	5	5	5	0												
	A																
	B																
	C																
	D																
	A																
	B																
	C																
	D																
	Initials	LJJ	MAR	LJJ													
	Time	1310	1047	1030													

Comments

PARAMETER	Control	
Total Hardness (mg/L CaCO3)		
Total Alkalinity (mg/L CaCO3 @ 4.5)		

48ACUT.XLS

48-hr Ceriodaphnia dubia TOXICITY TEST

LOG NO. 425
JOB NO. F935D6
INDUSTRY: TINKER AFB
CONTACT:

EFFLUENT: EE07
START DATE: 6/9/95
START TIME: 1310
DILUTION WATER: HD250

CONC (%)	REP ID	SURVIVAL (#) 0	24	48	Dead	TEMPERATURE (oC) 0	24	48	DO (mg/L) 0	24	48	pH (S.U.) 0	24	48	CONDUCTIVITY (umhos/cm) 0	24	48
6.25	A	5	5	5	0	24.4		24.4	8.8		8.4	8.49		8.50	412		431
	B	5	5	5	0												
	C	5	5	5	0												
	D	5	5	5	0												
12.5	A	5	5	5	0				8.8		8.4	8.48		8.50	415		422
	B	5	5	5	0												
	C	5	5	5	0												
	D	5	5	5	0												
25	A	5	5	5	0				8.7		8.4	8.43		8.52	586		588
	B	5	5	5	0												
	C	5	5	5	0												
	D	5	5	5	0												
50	A	5	5	5	0				8.6		8.4	8.35		8.52	425		463
	B	5	5	5	0												
	C	5	5	5	0												
	D	5	5	5	0												
100	A	5	5	5	0				8.5		8.4	8.20		8.54	508		423
	B	5	5	5	0												
	C	5	5	5	0												
	D	5	5	5	0												
Initials		LJT	MAR	LJT													
Time		1310	1042	1035													

Comments

PARAMETER	Control	
Total Hardness (mg/L CaCO3)		
Total Alkalinity (mg/L CaCO3 @ 4.5)		

48ACUT.XLS

48-hr Pimephales promleas TOXICITY TEST

LOG NO. 425
JOB NO. F93506
INDUSTRY: Tinker
CONTACT:

EFFLUENT: EEO7
START DATE: 6-9-95
START TIME: 1600
DILUTION WATER: Spring

CONC (%)	REP ID	SURVIVAL (#) 0	24	48	DEAD	TEMPERATURE (oC) 0	24	48	DO (mg/L) 0	24	48	pH (S.U.) 0	24	48	CONDUCTIVITY (umhos/cm) 0	24	48
6.25	A	10	9	9	1	21°C		21.°C	8.1		8.1	8.47		8.33	333		369
	B	10	10	10	0												
12.5	A	10	10	10	0				8.1		8.0	8.46		8.43	349		382
	B	10	10	10	0												
25	A	10	10	9	1				8.1		8.0	8.45		8.48	372		412
	B	10	10	9	1												
50	A	10	9	7	3				8.2		8.0	8.41		8.51	444		479
	B	10	10	10	0												
100	A	10	9	8	2				8.2		8.0	9.35		8.51	565		523
	B	10	10	9	1												
	A																
	B																
	A																
	B																
	A																
	B																
	A																
	B																
	A																
	B																
Initials		MCS	MLS	CJB													
Time		1600	815	1615													

Comments

PARAMETER	Control	
Total Hardness (mg/L CaCO3)		
Total Alkalinity (mg/L CaCO3 @ 4.5)		

Ceriodaphnia SURVIVAL AND REPRODUCTION CHRONIC TOXICITY TEST

JOB NO: F9350b
INDUSTRY: Tinker
CONTACT:
EFFLUENT: 2207
NPDES PERMIT NO:
PERSON CONDUCTING TEST:

BEGINNING: 1400 hrs; 6/12/95
ENDING: 1230 hrs; 6/19/95
FEEDING REGIME:
.05 mL yct/15 mL
.05 mL algal suspension/15 mL

Log No. 431
PHOTOPERIOD: 16 light, 8 dark
ORGANISM SOURCE: WCC
TEST VESSEL CAPACITY: 30 mL
TEST SOLUTION VOLUME: 15mL
NO. REPLICATES:
DILUTION WATER:

CONC	CHAMBER	START	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7	
	TIME									
	OBSERVER									
		NUMBER OF YOUNG PRODUCED								
					51	95	101	101	193	
Control	1				4	10	6	0	11	31
	2				7	3	0	(D)		10
	3				7	3	0	0	10	20
	4				3	~~4~~ 4	~~0~~ 0	0	8	15
	5				8	3	0	0	12	23
	6				7	4	0	0	15	26
	7				3	4	0	0	14	21
	8				2	6	0	0	12	20
	9				6	3	0	0	12	21
	10				4	4	0	0	8	16
					10% mortality					
		START	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7	
					37	104	146	198	225	
6.25%	11				4	7	8	6	0	25
	12			~~(D)~~	1	4	7	7	10	29
	13				6	5	7	7	0	25
	14				4	6	12	6	0	28
	15				3	6	0	6	0	15
	16				3	(D) 9				12
	17			(D)						0
	18				6	7	0	13	11	37
	19				7	12	9	0	0	28
	20				3	6	1	7	0	17
					20% mortality					
		START	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7	
					35	111	155	192	241	
12.5%	21				4	10	5	1	14	34
	22				3	8	(D)			11
	23				2	9	10	10	5	26
	24				4	12	-	0	11	31
	25				3	6	9	8	1	27
	26				(D) 3					3
	27				5	3	0	5	9	22
	28				3	7	14	1	12	37
	29				5	(D) 6				11
	30				3	10	9	10	1	33
					30% Mortality					

Ceriodaphnia SURVIVAL AND REPRODUCTION CHRONIC TOXICITY TEST

JOB NO: 93506
INDUSTRY: Tanker
CONTACT:
EFFLUENT: E207
NPDES PERMIT NO:
PERSON CONDUCTING TEST:

BEGINNING: 1400 hrs; 6/12/95.
ENDING: 1230 hrs; 6/19/95
FEEDING REGIME:
.05 mL yct/15 mL
.05 mL algal suspension/15 mL

Log No. 431
PHOTOPERIOD: 16 light, 8 dark
ORGANISM SOURCE: WCC
TEST VESSEL CAPACITY: 30 mL
TEST SOLUTION VOLUME: 15mL
NO. REPLICATES:
DILUTION WATER:

CONC	TIME / OBSERVER / CHAMBER	NUMBER OF YOUNG PRODUCED							
		START	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7
					29	87	135	197	257
25%	31				3	10	10	14	0
	32				4	10	0	18	20
	33				4	10	11	15	1
	34					8	2	0	10
	35				2	8	9	5	2
	36				5	0	(D) 9		
	37				4	12	5	0	13
	38				5	0	2	10	14
	39			(D)					
	40				(D) 2				
					30% mortality				

CONC		START	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7
					35	130	206	323	383
50%	41				2	8	7	13	0
	42				5	0	8	17	10
	43				3	12	14	15	0
	44				6	12	0	14	16
	45				5	9	(D)		
	46				4	9	14	0	16
	47				2	11	15	17	0
	48				3	12	12	14	0
	49				5	12	10	14	18
	50				3	7	6	17	0
					10% mortality				

CONC		START	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7
					41	94	158	279	422
100%	51				5	5	0	14	17
	52				5	0	12	19	14
	53				4	0	15	13	16
	54				4	1	7	14	2
	55				5	0	6	17	13
	56				4	11	2	14	0
	57				5	5	0	15	19
	58				2	9	14	1	16
	59				4	12	0	17	19
	60				3	9	7	0	15

Ceriodaphnia dubia GRID Ceriodaphnia dubia GRID MONITORING DATA

Grid Letter: D BR DR TC Start Date: 6-12-95 Sample ID: E807 Log #: 43

AD	ID 5	1 ✓	AD	ID 58	1 ✓	AD	ID 16	1 ✓	AD	ID 51	1 ✓		ID 25	1
2 ✓	3 8	4 3	2 ✓	3 2	4 9	2 ✓	3 3	4 D 9	2 ✓	3 5	4 5	2 ✓	3 3	4
5 0	6 0	7 12	5 14	6 1	7 16	5	6	7	5 0	6 14	7 19	5 9	6 8	7
AD	ID 54	1 ✓	AD ✓	ID 37	1 ✓	AD	ID 43	1 ✓	AD	ID 2	1 ✓		ID 53	1 ✓
2 ✓	3 4	4 1	2 ✓	3 4	4 12	2 ✓	3 3	4 12	2 ✓	3 7	4 3	2 ✓	3 4	4 0
5 7	6 12	7 12	5 5	6 0	7 13	5 14	6 15	7 0	5 9	6 D-0	7	5 15	6 13	7 1
AD	ID 24	1 ✓	AD	ID 10	1 ✓	AD	ID 47	1 ✓	AD	ID 33	1 ✓		ID 18	1
2 ✓	3 4	4 12	2 ✓	3 4	4 4	2 ✓	3 2	4 11	2 ✓	3 4	4 10	2 ✓	3 6	4
5 4	6 0	7 11	5 0	6 0	7 8	5 15	6 13	7 0	5 11	6 15	7 1	5 0	6 13	7 1
AD	ID 55	1 ✓	AD	ID 38	1 ✓	AD	ID 23	1 ✓	AD	ID 50	1 ✓		ID 3	1 ✓
2 ✓	3 5	4 0	2 ✓	3 5	4 0	2 ✓	3 2	4 9	2 ✓	3 3	4 7	2 ✓	3 7	4 3
5 6	6 17	7 13	5 2	6 10	7 14	5 6	6 10	7 0	5 6	6 17	7 0	5 0	6 0	7 1
AD	ID 36	1 ✓	AD	ID 1	1 ✓	AD	ID 32	1 ✓	AD	ID 17	1 ✓		ID 46	1 ✓
2 ✓	3 5	4 0	2 ✓	3 4	4 10	2 ✓	3 4	4 10	2 D	3	4	2 ✓	3 4	4 9
5 D/9	6	7	5 6	6 0	7 11	5 0	6 18	7 20	5	6	7	5 14	6 0	7 1
AD	ID 15	1 ✓	AD	ID 52	1 ✓	AD	ID 26	1 ✓	AD	ID 39	1 ✓		ID 9	1
2 ✓	3 3	4 6	2 ✓	3 5	4 0	2 D	3 D 3	4	2 D	3	4	2 ✓	3 6	4 3
5 0	6 6	7 0	5 13	6 18	7 14	5	6	7	5	6	7	5 0	6 0	7 1

Comments:

Cup ID	Sample Concentration	Day ✓	Initials SJE	Time 1400
1–10:	Control	1	SJE	1300
11–20:	6.25%	2	LJT	1615
21–30:	12.5	3	LJT	1400
31–40:	25	4	LJT	1445
41–50:	50	5	MAR	1340
51–60:	100	6	SJE	1320
		7	LJT	1230

Ceriodaphnia dubia GRID Ceriodaphnia dubia GRID MONITORING DATA

Grid Letter: TQZMKPD Start Date: 6-12-95 Sample ID: EE07 Log #: 43

AD	ID 28	1 ✓	AD	ID 4	1 ✓	AD	ID 59	1 ✓	AD	ID 12	1 ✓		ID 35	1 ✓
2 ✓	3 3	4 7	2 ✓	3 3	4 4	2 ✓	3 4	4 10	2 ✓	3 1	4 4	2 ✓	3 2	4 [illegible]
5 14	6 1	7 12	5 0	6 0	7 8	5 0	6 17	7 19	5 7	6 7	7 10	5 9	6 5	7 [illegible]
AD	ID 60	1 ✓	AD	ID 42	1 ✓	AD	ID 31	1 ✓	AD	ID 20	1 ✓		ID 57	1 ✓
2 ✓	3 3	4 9	2 ✓	3 5	4 0	2 ✓	3 3	4 10	2 ✓	3 3	4 6	2 ✓	3 5	4 [illegible]
5 7	6 0	7 15	5 8	6 17	7 10	5 10	6 14	7 0	5 1	6 7	7 0	5 0	6 15	7 [illegible]
AD	ID 14	1 ✓	AD	ID 45	1 ✓	AD	ID 22	1 ✓	AD	ID 40	1 ✓		ID 7	1 ✓
2 ✓	3 4	4 6	2 ✓	3 5	4 9	2 ✓	3 3	4 8	2 ✓	3 D 2	4	2 ✓	3 3	4 4
5 12	6 6	7 0	5 D/0	6	7	5 D/0	6	7	5	6	7	5 0	6 0	7 14
AD	ID 30	1 ✓	AD	ID 11	1 ✓	AD	ID 49	1 ✓	AD	ID 29	1 ✓		ID 44	1 ✓
2 ✓	3 3	4 10	2 ✓	3 4	4 7	2 ✓	3 5	4 12	2 ✓	3 5	4 D 6	2 ✓	3 6	4 [illegible]
5 9	6 10	7 1	5 8	6 6	7 0	5 0	6 14	7 18	5	6	7	5 0	6 14	7 [illegible]
AD	ID 56	1 ✓	AD	ID 27	1 ✓	AD	ID 6	1 ✓	AD	ID 13	1 ✓		ID 48	1 ✓
2 ✓	3 4	4 11	2 ✓	3 5	4 8	2 ✓	3 7	4 4	2 ✓	3 6	4 8	2 ✓	3 3	4 [illegible]
5 0	6 14	7 0	5 0	6 5	7 9	5 0	6 0	7 10	5 7	6 7	7 0	5 12	6 14	7 0
AD	ID 8	1 ✓	AD	ID 41	1 ✓	AD	ID 19	1 ✓	AD	ID 34	1 ✓		ID 21	1 ✓
2 ✓	3 2	4 6	2 ✓	3 2	4 8	2 ✓	3 7	4 12	2 ✓	3 ✓	4 8	2 ✓	3 4	4 [illegible]
5 0	6 0	7 12	5 ~~12~~ 7 mad	6 13	7 0	5 9	6 0	7 6	5 2	6 0	7 10	5 5	6 1	7 [illegible]

Comments:

Cup ID	Sample Concentration	Day	Initials	Time
		0	SDB	1400
1–10:	Control 250	1	SDB	1330
11–20:	6.25	2	LJT	1620
21–30:	12.5	3	LJT	1345
31–40:	25	4	LJT	1435
41–50:	50	5	MAR	1348
51–60:	100	6	SDB	1320
		7	LJT	1215

EEO 1
Ceriodaphnia
1009431
6-12-95

CHRONIC TOXICITY TEST DATA SHEET

TEMPERATURE

CONCENTRATION	Start	Day 1 OLD	Day 1 NEW	Day 2 OLD	Day 2 NEW	Day 3 OLD	Day 3 NEW	Day 4 OLD	Day 4 NEW	Day 5 OLD	Day 5 NEW	Day 6 OLD	Day 6 NEW	Day 7 OLD	Day 7 NEW	Day 8 OLD
CON	24.0	24.2	24.8	24.0	24.0	25.0	24.8	25.0	25.0	24.0	24.0	24.2	24.8	24.8		
6.25																
12.5																
25																
50																
100																

DISSOLVED OXYGEN

CONCENTRATION	Start	Day 1 OLD	Day 1 NEW	Day 2 OLD	Day 2 NEW	Day 3 OLD	Day 3 NEW	Day 4 OLD	Day 4 NEW	Day 5 OLD	Day 5 NEW	Day 6 OLD	Day 6 NEW	Day 7 OLD	Day 7 NEW	Day 8 OLD
CON	8.5	8.5	8.8	7.9	8.4	7.6	8.3	7.6	8.4	7.1	8.2	8.0	8.3	7.8		
6.25	7.2	8.5	7.8	7.9	8.4	7.7	8.2	7.5	8.3	7.1	8.2	8.0	8.3	7.6		
12.5	8.6	8.3	8.0	7.8	8.4	7.6	8.3	7.6	8.4	7.2	8.2	8.0	8.4	7.7		
25	8.5	8.4	8.2	7.7	8.5	7.6	8.3	7.7	8.4	7.2	8.1	8.3	8.4	7.7		
50	7.5	8.5	8.0	7.8	8.5	7.6	8.4	7.7	8.5	7.2	8.1		8.4	7.7		
100	7.2	8.4	8.0	7.7	8.7	7.6	8.4	7.5	8.7	7.2	8.3		8.4	7.7		

pH

CONCENTRATION	Start	Day 1 OLD	Day 1 NEW	Day 2 OLD	Day 2 NEW	Day 3 OLD	Day 3 NEW	Day 4 OLD	Day 4 NEW	Day 5 OLD	Day 5 NEW	Day 6 OLD	Day 6 NEW	Day 7 OLD	Day 7 NEW	Day 8 OLD
CON	8.51	8.40	7.81	8.26	7.91	8.18	8.57	8.39	8.55	8.35	8.53	8.58	8.64	8.24		
6.25	8.51	8.35	7.49	8.25	8.43	8.17	8.54	8.31	8.54	8.32	8.48	8.57	8.61	8.25		
12.5	8.50	8.40	8.52	8.34	8.51	8.18	8.53	8.36	8.52	8.34	—	8.56	8.62	8.26		
25	8.45	8.39	8.52	8.22	8.48	8.18	8.49	8.32	8.47	8.32	8.47	8.56	8.61	8.27		
50	8.38	8.40	8.47	8.25	8.39	8.19	8.34	8.33	8.41	8.34	8.38	8.78	8.57	8.28		
100	8.25	8.40	8.38	8.23	8.21	8.15	8.20	8.37	8.25	8.36	8.30	8.22	8.53	8.31		

CONDUCTIVITY

CONCENTRATION	Start	Day 1 OLD	Day 1 NEW	Day 2 OLD	Day 2 NEW	Day 3 OLD	Day 3 NEW	Day 4 OLD	Day 4 NEW	Day 5 OLD	Day 5 NEW	Day 6 OLD	Day 6 NEW	Day 7 OLD	Day 7 NEW	Day 8 OLD
CON	432	654	781	791	762	746	799	753	680	749	702	750	703	696		
6.25	510	752	629	725	689	729	682	722	677	718	675	772	693	706		
12.5	604	651	644	724	680	708	678	709	678	704	—	708	692	709		
25	541	581	663	730	695	702	662	681	664	684	668	764	671	698		
50	609	665	634	666	689	654	627	699	632	646	632	858	636	651		
100	513	580	577	611	613	615	580	592	573	573	574		580	587		

EE07 CERIO CHRONIC
File: CDEE07 Transform: NO TRANSFORMATION

Chi-square test for normality: actual and expected frequencies

INTERVAL	<-1.5	-1.5 to <-0.5	-0.5 to 0.5	>0.5 to 1.5	>1.5
EXPECTED	4.020	14.520	22.920	14.520	4.020
OBSERVED	6	12	23	17	2

Calculated Chi-Square goodness of fit test statistic = 2.8515
Table Chi-Square value (alpha = 0.01) = 13.277

Data PASS normality test. Continue analysis.

EE07 CERIO CHRONIC
File: CDEE07 Transform: NO TRANSFORMATION

Bartletts test for homogeneity of variance

Calculated B statistic = 12.78
Table Chi-square value = 15.09 (alpha = 0.01)
Table Chi-square value = 11.07 (alpha = 0.05)

Average df used in calculation ==> df (avg n - 1) = 9.00
Used for Chi-square table value ==> df (#groups-1) = 5

Data PASS homogeneity test at 0.01 level. Continue analysis.

NOTE: If groups have unequal replicate sizes the average replicate size is used to calculate the B statistic (see above).

TITLE: EE07 CERIO CHRONIC
ILE: CDEE07
RANSFORM: NO TRANSFORMATION NUMBER OF GROUPS: 6

GRP	IDENTIFICATION	REP	VALUE	TRANS VALUE
1	CONTROL	1	31.0000	31.0000
1	CONTROL	2	10.0000	10.0000
1	CONTROL	3	20.0000	20.0000
1	CONTROL	4	15.0000	15.0000
1	CONTROL	5	23.0000	23.0000
1	CONTROL	6	21.0000	21.0000
1	CONTROL	7	21.0000	21.0000
1	CONTROL	8	20.0000	20.0000
1	CONTROL	9	21.0000	21.0000
1	CONTROL	10	16.0000	16.0000
2	6.25	1	25.0000	25.0000
2	6.25	2	29.0000	29.0000
2	6.25	3	28.0000	28.0000
2	6.25	4	28.0000	28.0000
2	6.25	5	15.0000	15.0000
2	6.25	6	12.0000	12.0000
2	6.25	7	0.0000	0.0000
2	6.25	8	37.0000	37.0000
2	6.25	9	34.0000	34.0000
2	6.25	10	17.0000	17.0000
3	12.5	1	34.0000	34.0000
3	12.5	2	11.0000	11.0000
3	12.5	3	27.0000	27.0000
3	12.5	4	31.0000	31.0000
3	12.5	5	27.0000	27.0000
3	12.5	6	3.0000	3.0000
3	12.5	7	27.0000	27.0000
3	12.5	8	37.0000	37.0000
3	12.5	9	11.0000	11.0000
3	12.5	10	33.0000	33.0000
4	25	1	37.0000	37.0000
4	25	2	52.0000	52.0000
4	25	3	41.0000	41.0000
4	25	4	20.0000	20.0000
4	25	5	26.0000	26.0000
4	25	6	14.0000	14.0000
4	25	7	34.0000	34.0000
4	25	8	31.0000	31.0000
4	25	9	0.0000	0.0000
4	25	10	2.0000	2.0000
5	50	1	30.0000	30.0000
5	50	2	40.0000	40.0000
5	50	3	44.0000	44.0000
5	50	4	48.0000	48.0000
5	50	5	14.0000	14.0000
5	50	6	43.0000	43.0000
5	50	7	41.0000	41.0000
5	50	8	41.0000	41.0000
5	50	9	49.0000	49.0000
5	50	10	33.0000	33.0000

6	100	1	43.0000	43.0000
6	100	2	50.0000	50.0000
6	100	3	48.0000	48.0000
6	100	4	36.0000	36.0000
	100	5	41.0000	41.0000
	100	6	31.0000	31.0000
6	100	7	47.0000	47.0000
6	100	8	41.0000	41.0000
6	100	9	50.0000	50.0000
6	100	10	34.0000	34.0000

EE07 CERIO CHRONIC
File: CDEE07 Transform: NO TRANSFORMATION

ANOVA TABLE

SOURCE	DF	SS	MS	F
Between	5	4195.150	839.030	6.911
Within (Error)	54	6556.100	121.409	
Total	59	10751.250		

Critical F value = 2.45 (0.05,5,40)
Since F > Critical F REJECT Ho:All groups equal

EE07 CERIO CHRONIC
File: CDEE07 Transform: NO TRANSFORMATION

DUNNETTS TEST - TABLE 1 OF 2 Ho:Control<Treatment

GROUP	IDENTIFICATION	TRANSFORMED MEAN	MEAN CALCULATED IN ORIGINAL UNITS	T STAT	SIG
1	CONTROL	19.800	19.800		
2	6.25	22.500	22.500	-0.548	
3	12.5	24.100	24.100	-0.873	
4	25	25.700	25.700	-1.197	
5	50	38.300	38.300	-3.754	
6	100	42.100	42.100	-4.525	

Dunnett table value = 2.31 (1 Tailed Value, P=0.05, df=40,5)

EE07 CERIO CHRONIC
File: CDEE07 Transform: NO TRANSFORMATION

DUNNETTS TEST - TABLE 2 OF 2 Ho:Control<Treatment

GROUP	IDENTIFICATION	NUM OF REPS	Minimum Sig Diff (IN ORIG. UNITS)	% of CONTROL	DIFFERENCE FROM CONTROL

1	CONTROL	10			
2	6.25	10	11.383	57.5	-2.700
3	12.5	10	11.383	57.5	-4.300
4	25	10	11.383	57.5	-5.900
5	50	10	11.383	57.5	-18.500
6	100	10	11.383	57.5	-22.300

TINKER C. DUBIA SURVIVAL LOG #431 - EE07
File: CDSUR431 Transform: ARC SINE(SQUARE ROOT(Y))

Ii-square test for normality: actual and expected frequencies

INTERVAL	<-1.5	-1.5 to <-0.5	-0.5 to 0.5	>0.5 to 1.5	>1.5
EXPECTED	4.020	14.520	22.920	14.520	4.020
OBSERVED	4	6	36	14	0

Calculated Chi-Square goodness of fit test statistic = 16.5026
Table Chi-Square value (alpha = 0.01) = 13.277

Data FAIL normality test. Try another transformation.

Warning - The two homogeneity tests are sensitive to non-normal data and should not be performed.

TINKER C. DUBIA SURVIVAL LOG #431 - EE07
File: CDSUR431 Transform: ARC SINE(SQUARE ROOT(Y))

Hartley test for homogeneity of variance
Bartletts test for homogeneity of variance

These two tests can not be performed because at least one group has zero variance.

Data FAIL to meet homogeneity of variance assumption.
Additional transformations are useless.

FISHERS EXACT TEST

IDENTIFICATION	NUMBER OF ALIVE	NUMBER OF DEAD	NUMBER OF TOTAL ANIMALS
CONTROL	9	1	10
6.25%	8	2	10
TOTAL	17	3	20

CRITICAL FISHERS VALUE (10,10,9) (p=0.05) IS 4. b VALUE IS 8.
Since b is greater than 4 there is no significant difference between CONTROL and TREATMENT at the 0.05 level.

FISHERS EXACT TEST

IDENTIFICATION	NUMBER OF ALIVE	NUMBER OF DEAD	NUMBER OF TOTAL ANIMALS
CONTROL	9	1	10
12.5%	7	3	10
TOTAL	16	4	20

CRITICAL FISHERS VALUE (10,10,9) (p=0.05) IS 4. b VALUE IS 7.
Since b is greater than 4 there is no significant difference between CONTROL and TREATMENT at the 0.05 level.

FISHERS EXACT TEST

IDENTIFICATION	NUMBER OF ALIVE	NUMBER OF DEAD	NUMBER OF TOTAL ANIMALS
CONTROL	9	1	10
25%	7	3	10

TOTAL	16	4	20

CRITICAL FISHERS VALUE (10,10,9) (p=0.05) IS 4. b VALUE IS 7.
Since b is greater than 4 there is no significant difference between CONTROL and TREATMENT at the 0.05 level.

FISHERS EXACT TEST

IDENTIFICATION	NUMBER OF ALIVE	NUMBER OF DEAD	TOTAL ANIMALS
CONTROL	9	1	10
50%	9	1	10
TOTAL	18	2	20

CRITICAL FISHERS VALUE (10,10,9) (p=0.05) IS 4. b VALUE IS 9.
Since b is greater than 4 there is no significant difference between CONTROL and TREATMENT at the 0.05 level.

FISHERS EXACT TEST

IDENTIFICATION	NUMBER OF DEAD	NUMBER OF ALIVE	TOTAL ANIMALS
CONTROL	1	9	10
100%	0	10	10
TOTAL	1	19	20

CRITICAL FISHERS VALUE (10,10,1) (p=0.05) IS LESS THAN 0. b VALUE IS 0.
NO SIGNIFICANT DIFFERENCE

SUMMARY OF FISHERS EXACT TESTS

GROUP	IDENTIFICATION	NUMBER EXPOSED	NUMBER DEAD	SIG (P=.05)

	CONTROL	10	1	
1	6.25%	10	2	
2	12.5%	10	3	
3	25%	10	3	
4	50%	10	1	
5	100%	10	0	

TITLE: TINKER C. DUBIA SURVIVAL LOG #431 - EE07
FILE: CDSUR431
TRANSFORM: ARC SINE(SQUARE ROOT(Y)) NUMBER OF GROUPS: 6

GRP	IDENTIFICATION	REP	VALUE	TRANS VALUE
1	CONTROL	1	1.0000	1.0472
1	CONTROL	2	0.0000	0.5236
1	CONTROL	3	1.0000	1.0472
1	CONTROL	4	1.0000	1.0472
1	CONTROL	5	1.0000	1.0472
1	CONTROL	6	1.0000	1.0472
1	CONTROL	7	1.0000	1.0472
1	CONTROL	8	1.0000	1.0472
1	CONTROL	9	1.0000	1.0472
1	CONTROL	10	1.0000	1.0472
2	6.25%	1	1.0000	1.0472
2	6.25%	2	1.0000	1.0472
2	6.25%	3	1.0000	1.0472
2	6.25%	4	1.0000	1.0472
2	6.25%	5	1.0000	1.0472
2	6.25%	6	0.0000	0.5236
2	6.25%	7	0.0000	0.5236
2	6.25%	8	1.0000	1.0472
2	6.25%	9	1.0000	1.0472
2	6.25%	10	1.0000	1.0472
3	12.5%	1	1.0000	1.0472
3	12.5%	2	0.0000	0.5236
3	12.5%	3	1.0000	1.0472
3	12.5%	4	1.0000	1.0472
3	12.5%	5	1.0000	1.0472
3	12.5%	6	0.0000	0.5236
3	12.5%	7	1.0000	1.0472
3	12.5%	8	1.0000	1.0472
3	12.5%	9	0.0000	0.5236
3	12.5%	10	1.0000	1.0472
4	25%	1	1.0000	1.0472
4	25%	2	1.0000	1.0472
4	25%	3	1.0000	1.0472
4	25%	4	1.0000	1.0472
4	25%	5	1.0000	1.0472
4	25%	6	0.0000	0.5236
4	25%	7	1.0000	1.0472
4	25%	8	1.0000	1.0472
4	25%	9	0.0000	0.5236

4	25%	10	0.0000	0.5236
5	50%	1	1.0000	1.0472
5	50%	2	1.0000	1.0472
5	50%	3	1.0000	1.0472
5	50%	4	1.0000	1.0472
5	50%	5	0.0000	0.5236
5	50%	6	1.0000	1.0472
5	50%	7	1.0000	1.0472
5	50%	8	1.0000	1.0472
5	50%	9	1.0000	1.0472
5	50%	10	1.0000	1.0472
6	100%	1	1.0000	1.0472
6	100%	2	1.0000	1.0472
6	100%	3	1.0000	1.0472
6	100%	4	1.0000	1.0472
6	100%	5	1.0000	1.0472
6	100%	6	1.0000	1.0472
6	100%	7	1.0000	1.0472
6	100%	8	1.0000	1.0472
6	100%	9	1.0000	1.0472
6	100%	10	1.0000	1.0472

TINKER C. DUBIA SURVIVAL LOG #431 - EE07
File: CDSUR431 Transform: ARC SINE(SQUARE ROOT(Y))

SUMMARY STATISTICS ON TRANSFORMED DATA TABLE 1 of 2

GRP	IDENTIFICATION	N	MIN	MAX	MEAN
1	CONTROL	10	0.524	1.047	0.995
2	6.25%	10	0.524	1.047	0.942
3	12.5%	10	0.524	1.047	0.890
4	25%	10	0.524	1.047	0.890
5	50%	10	0.524	1.047	0.995
6	100%	10	1.047	1.047	1.047

TINKER C. DUBIA SURVIVAL LOG #431 - EE07
File: CDSUR431 Transform: ARC SINE(SQUARE ROOT(Y))

SUMMARY STATISTICS ON TRANSFORMED DATA TABLE 2 of 2

GRP	IDENTIFICATION	VARIANCE	SD	SEM
1	CONTROL	0.027	0.166	0.052
2	6.25%	0.049	0.221	0.070
3	12.5%	0.064	0.253	0.080
4	25%	0.064	0.253	0.080
5	50%	0.027	0.166	0.052
6	100%	0.000	0.000	0.000

TINKER C. DUBIA SURVIVAL LOG #431 - EE07
File: CDSUR431 Transform: ARC SINE(SQUARE ROOT(Y))

STEELS MANY-ONE RANK TEST - Ho:Control<Treatment

GROUP	IDENTIFICATION	TRANSFORMED MEAN	RANK SUM	CRIT. VALUE	df	SIG
1	CONTROL	0.995				
2	6.25%	0.942	100.00	75.00	10.00	
3	12.5%	0.890	95.00	75.00	10.00	
4	25%	0.890	95.00	75.00	10.00	
5	50%	0.995	105.00	75.00	10.00	
6	100%	1.047	110.00	75.00	10.00	

Critical values use k = 5, are 1 tailed, and alpha = 0.05

7-DAY CHRONIC TOXICITY TEST

JOB NO. F93506
INDUSTRY: Tinker
CONTACT:
EFFLUENT: EE07
NPDES PERMIT NO:
SAMPLE TYPE:
DILUTION WATER: Spring

PERSON CONDUCTING TEST:
BEGINNING: 1746 hrs; 6/12/95
ENDING: ____ hrs; 6/19/95
TEST
DILUTIONS: 0.5
AGE: < 24 hr
ORGANISM SOURCE: EC & T

PHOTOPERIOD: 16 hr light
FEEDING REGIME:
0.1 ml Artemia @ 3 times/day
TEST VESSEL CAPACITY: ~~1 liter~~ 500 ml
TEST SOLUTION VOLUME: ~~500~~ 350 mL
NO. ORGANISMS/TREATMENT: 10
NO. REPLICATES: 4

CONC (%)	REP ID	SURVIVAL (#) START	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7
6.25	A	10	10	10	10	10	10	10	10
	B	10	10	10	10	10	10	10	10
	C	10	10	10	10	10	10	10	10
	D	10	10	10	10	10	10	10	10
12.5	A	10	10	10	10	10	10	10	10
	B	10	10	10	10	10	10	10	10
	C	10	10	10	10	10	10	10	10
	D	10	10	10	10	10	10	10	10
25	A	10	10	10	10	10	9	9	9
	B	10	10	10	10	10	10	10	10
	C	10	10	10	10	10	10	10	10
	D	10	10	10	10	10	10	10	10
50	A	10	10	10	10	10	10	10	10
	B	10	10	10	10	10	10	10	10
	C	10	10	10	10	10	10	10	10
	D	10	10	10	10	10	10	9	9
	TIME:	1745	1510	SG	1415	1545	1345	1330	1600
	INITIAL:	MLS	LJT	SG	SJG	MAR	SJR	MLS	TNT

GROWTH RESULTS

CONC (%)	REP ID	Boat ID	Tare wt (g)	Combined wt (g)	Tot Fish wt (g)	# of Fish	Avg Fish wt (mg)	
6.25	A		1.01578	1.02037	0.00459	10	0.459	
	B		.98892	.99381	0.00489	10	0.489	
	C		.99630	~~.99387~~ .99745	1.00115 ①	10	0.483	① 0.00483
	D		.99541	1.00052	0.00511	10	0.511	
12.5	A		.99054	.99517	0.00463	10	0.463	
	B		.99740	1.00294	0.00554	10	0.554	
	C		.99738	.98786	0.00548	10	0.548	
	D		.99728	.98490	0.00562	10	0.562	
25	A		.99052	.99567	0.00515	9	0.572	
	B		1.00765	1.01323	0.00558	10	0.558	
	C		1.00658	1.01152	0.00494	10	0.494	
	D	.98107	~~.99989~~	.98640	0.00533	10	0.533	
50	A		.97973	.98447	0.00474	10	0.474	
	B		.98540	.99060	0.0052	10	0.520	
	C		.98830	.99397	0.00567	10	0.567	
	D		.98805	.99293	0.00488	9	0.542	

7-DAY CHRONIC TOXICITY TEST

JOB NO. F93506
INDUSTRY: Tinker
CONTACT:
EFFLUENT: 2507
NPDES PERMIT NO:
SAMPLE TYPE:
DILUTION WATER: Spring

PERSON CONDUCTING TEST:
BEGINNING: 1745 hrs; 6/12 95
ENDING: ___ hrs; / / .
TEST
DILUTIONS: 0.5
AGE: <24 hr
ORGANISM SOURCE: Spring

PHOTOPERIOD: 16 hr light
FEEDING REGIME:
0.1 ml Artemia @ 3 times/day
TEST VESSEL CAPACITY: ~~1 liter~~ 500 mL
TEST SOLUTION VOLUME: ~~500~~ 250 mL
NO. ORGANISMS/TREATMENT: 10
NO. REPLICATES: ~~3~~ 4

CONC (%)	REP ID	SURVIVAL (#) START	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7
100	A	10	10	10	10	10	10	10	10
	B	10	10	10	10	~~10~~ 9	9	9	9
	C	10	10	10	10	10	10	10	10 ~~8~~ 9
	D	10	10	10	10	10	10	10	10
	TIME:	1745	1545	0245	1415	1555	1345	1330	1400
	INITIAL:	MLS	LJT	SJ	SJ	MAR	SJE	MLS	TAT

GROWTH RESULTS

CONC (%)	REP ID	Boat ID	Tare wt (g)	Combined wt (g)	Tot Fish wt (g)	# of Fish	Avg Fish wt (mg)
100	A		.99264	.99675	0.00411	10	0.411
	B		.99541	0.99990	0.00449	9	0.4988
	C		.99117	.99699	0.00582	10	0.582
	D		.99310	.99856	0.00546	10	0.546

For [illegible]
Log 431
6-12-95
Spring

CHRONIC TOXICITY TEST DATA SHEET

TEMPERATURE

CONCENTRATION	Start	Day 1 OLD	Day 1 NEW	Day 2 OLD	Day 2 NEW	Day 3 OLD	Day 3 NEW	Day 4 OLD	Day 4 NEW	Day 5 OLD	Day 5 NEW	Day 6 OLD	Day 6 NEW	Day 7 OLD	Day 7 NEW	Day 8 OLD
0.05	24.0	24.8	24.8	24.0	24.0	25.0	24.6	24.2	25.0	24.0	24.0	24.2	24.8	24.8		
0.25																
0.5																
1																
100																

DISSOLVED OXYGEN

CONCENTRATION	Start	Day 1 OLD	Day 1 NEW	Day 2 OLD	Day 2 NEW	Day 3 OLD	Day 3 NEW	Day 4 OLD	Day 4 NEW	Day 5 OLD	Day 5 NEW	Day 6 OLD	Day 6 NEW	Day 7 OLD	Day 7 NEW	Day 8 OLD
0.05	8.3	8.1	8.3	7.2	8.6	7.0	7.8	7.2	7.1	7.0	7.6	8.0	8.4	7.0		
0.25	8.0	7.9	8.0	7.2	8.3	7.1	7.8	7.3	7.3	6.8	8.0	8.0	8.4	7.1		
0.5	7.8	7.9	8.0	7.1	8.3	7.1	8.0	7.3	7.5	6.8	8.0	8.0	8.4	6.9		
1	7.8	7.7	8.0	7.2	8.2	7.0	8.0	7.0	7.5	6.8	7.9	8.0	8.4	7.3		
100	7.8	8.0	8.3	7.3	8.6	7.0	8.9	7.0	8.3	6.8	8.0	8.1	8.4	7.3		

pH

CONCENTRATION	Start	Day 1 OLD	Day 1 NEW	Day 2 OLD	Day 2 NEW	Day 3 OLD	Day 3 NEW	Day 4 OLD	Day 4 NEW	Day 5 OLD	Day 5 NEW	Day 6 OLD	Day 6 NEW	Day 7 OLD	Day 7 NEW	Day 8 OLD
0.05	7.99	8.25	8.18	8.10	8.35	8.02	8.11	8.16	7.93	8.24	7.97	8.41	8.47	8.10		
0.25	8.03	8.22	8.21	8.03	8.26	8.02	8.13	8.16	7.93	8.25	8.30	8.41	8.48	8.09		
0.5	7.99	8.23	8.17	8.05	8.23	8.02	8.11	8.17	7.96	8.26	8.23	8.42	8.46	8.07		
1	8.09	8.24	8.23	8.10	8.22	8.00	8.16	8.16	7.98	8.24	8.23	8.38	8.48	8.18		
100	8.09	8.31	8.32	8.15	8.16	8.04	8.22	8.17	8.17	8.26	8.29	8.39	8.48	8.08		

CONDUCTIVITY

CONCENTRATION	Start	Day 1 OLD	Day 1 NEW	Day 2 OLD	Day 2 NEW	Day 3 OLD	Day 3 NEW	Day 4 OLD	Day 4 NEW	Day 5 OLD	Day 5 NEW	Day 6 OLD	Day 6 NEW	Day 7 OLD	Day 7 NEW	Day 8 OLD
0.05	341	316	350	371	357	379	352	363	316	372	~~334~~ 370	383	357	377		
0.25	352	378	353	376	353	362	358	378	347	371	367	380	364	377		
0.5	352	339	376	402	378	409	383	409	372	402	379	410	393	406		
1	437	403	385	460	437	478	440	476	438	454	449	472	454	463		
100	533	558	548	513	551	561	548	591	548	569	570	597	567	594		

EE07 FATHEAD MINNOW CHRONIC
File: FHEE07 Transform: NO TRANSFORMATION

Chi-square test for normality: actual and expected frequencies

INTERVAL	<-1.5	-1.5 to <-0.5	-0.5 to 0.5	>0.5 to 1.5	>1.5
EXPECTED	1.608	5.808	9.168	5.808	1.608
OBSERVED	0	6	11	7	0

Calculated Chi-Square goodness of fit test statistic = 3.8331
Table Chi-Square value (alpha = 0.01) = 13.277

Data PASS normality test. Continue analysis.

EE07 FATHEAD MINNOW CHRONIC
File: FHEE07 Transform: NO TRANSFORMATION

Bartletts test for homogeneity of variance

Calculated B statistic = 5.35
Table Chi-square value = 15.09 (alpha = 0.01)
Table Chi-square value = 11.07 (alpha = 0.05)

Average df used in calculation ==> df (avg n - 1) = 3.00
Used for Chi-square table value ==> df (#groups-1) = 5

Data PASS homogeneity test at 0.01 level. Continue analysis.

NOTE: If groups have unequal replicate sizes the average replicate size is used to calculate the B statistic (see above).

TITLE: EE07 FATHEAD MINNOW CHRONIC
FILE: FHEE07
TRANSFORM: NO TRANSFORMATION NUMBER OF GROUPS: 6

GRP	IDENTIFICATION	REP	VALUE	TRANS VALUE
1	CONTROL	1	0.5470	0.5470
1	CONTROL	2	0.4630	0.4630
1	CONTROL	3	0.5650	0.5650
1	CONTROL	4	0.6440	0.6440
2	6.25	1	0.4590	0.4590
2	6.25	2	0.4890	0.4890
2	6.25	3	0.4830	0.4830
2	6.25	4	0.5110	0.5110
3	12.5	1	0.4630	0.4630
3	12.5	2	0.5540	0.5540
3	12.5	3	0.5480	0.5480
3	12.5	4	0.5620	0.5620
4	25	1	0.5720	0.5720
4	25	2	0.5580	0.5580
4	25	3	0.4940	0.4940
4	25	4	0.5330	0.5330
5	50	1	0.4740	0.4740
5	50	2	0.5200	0.5200
5	50	3	0.5670	0.5670
5	50	4	0.5420	0.5420
[illegible]	100	1	0.4110	0.4110
[illegible]	100	2	0.4988	0.4988
6	100	3	0.5820	0.5820
6	100	4	0.5460	0.5460

EE07 FATHEAD MINNOW CHRONIC
File: FHEE07 Transform: NO TRANSFORMATION

ANOVA TABLE

SOURCE	DF	SS	MS	F
Between	5	0.012	0.002	0.667
Within (Error)	18	0.049	0.003	
Total	23	0.061		

Critical F value = 2.77 (0.05,5,18)
Since F < Critical F FAIL TO REJECT Ho:All groups equal

EE07 FATHEAD MINNOW CHRONIC
File: FHEE07 Transform: NO TRANSFORMATION

DUNNETTS TEST - TABLE 1 OF 2 Ho:Control<Treatment

GROUP	IDENTIFICATION	TRANSFORMED MEAN	MEAN CALCULATED IN ORIGINAL UNITS	T STAT	SIG
1	CONTROL	0.555	0.555		
2	6.25	0.486	0.486	1.788	
3	12.5	0.532	0.532	0.594	
4	25	0.539	0.539	0.400	
5	50	0.526	0.526	0.749	
6	100	0.509	0.509	1.170	

Dunnett table value = 2.41 (1 Tailed Value, P=0.05, df=18,5)

EE07 FATHEAD MINNOW CHRONIC
File: FHEE07 Transform: NO TRANSFORMATION

DUNNETTS TEST - TABLE 2 OF 2 Ho:Control<Treatment

GROUP	IDENTIFICATION	NUM OF REPS	Minimum Sig Diff (IN ORIG. UNITS)	% of CONTROL	DIFFERENCE FROM CONTROL
1	CONTROL	4			
2	6.25	4	0.093	16.8	0.069
3	12.5	4	0.093	16.8	0.023
4	25	4	0.093	16.8	0.015
5	50	4	0.093	16.8	0.029
6	100	4	0.093	16.8	0.045

№ 14

CHAIN OF CUSTODY RECORD

JOB #	PROJECT NAME
F9350C	TAFB – ~~Sand~~ Soldier Creek

SAMPLERS: (Signature)

WOODWARD-CLYDE CONSULTANTS
P.O. BOX 680925
FRANKLIN, TN 37068-0925
(615) 790-0003 FAX (615) 790-0023

SAMPLE IDENTIFICATION	DATE	TIME	SAMPLE TYPE	NUMBER OF CONTAINERS	ANALYSES REQUIRED: Toxicity	REMARKS
SC-EE07-TX-201	6/8/95	09:45	Water	2	✓	Fed Exp # 5864 8234 30
SC-EE07-TX-201	6/8/95	10:00	Sed.	2	✓	

RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)	RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)
	6/8/95 18:00				
RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)	RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)
RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED AT LAB BY: (Signature)	DATE/TIME	GENERAL COMMENTS	
			6/9/95 0905	2°C upon arrival	

Distribution: Original and Yellow copies accompany sample shipment to laboratory
Pink copy retained by samplers. Yellow copy retained by laboratory. Laboratory returns White copy to samplers.

CHAIN OF CUSTODY RECORD

Woodward-Clyde

ANALYTICAL LAB
Quanterra
4955 Yarrow Street
Arvada, CO 80002

Client Name:	**WOODWARD-CLYDE FEDERAL SERVICES**
Client Address:	3000 Tower Drive Ste 456, Del City, OK 73115 (405)677-2001
Project Name	SOLDIER CREEK SEDIMENT AND SURFACE WATER OPERABLE UNIT ECOLOGICAL ASSESSMENT, JUNE 1995
Team Leader:	**Kennedy**

Date	Time	Sample ID/Description	Matrix	# Samples	VOC (8240)	SVOC (8270)	PCB'S & Pest. (8080)	METALS + Hg, Se, As, Tl [6010/7000/ICP/MS (Ag, Cd, Cu, Pb)]	CYANIDE (9012)	TOC (415.1) Toxicity	Lipids (Biota)	Remarks
6/9/95	09:45	SC-SE07-IY-201	Water	3						✓		2°C upon arrival
		SC-___-___-___										
		SC-___-___-___										
		SC-___-___-___										
		SC-___-___-___										
		SC-___-___-___										
		SC-___-___-___										
		SC-___-___-___										
		SC-___-___-___										
		SC-___-___-___										

Analytical Parameters *

*Water
VOC - three 40 ml vial - 4° C/HCL pH<2
SVOC - two 32 oz amber - 4° C
Metals + Hg - One 500 ml plastic - 4° C/HNO3 pH<2
PCB's/Pest. - Two 32 oz amber - 4° C
Cyanide - One 8 oz plastic - 4° C/NaOH pH>12

*Sediment
VOC - two 4 oz jars - 4° C
SVOC, Metals, Cyanide, PCB's & Pest. - One 16 oz jar - 4° C

*Biota
VOC,SVOC, PCBs & Pest., Metals, Cyanide - One 32 oz wide-mouth jar - collected in triplicate

CUSTODY TRANSFERS PRIOR TO SHIPPING

Relinquished By (Signed)	Received By (Signed)	Date	Time
		6/8/95	18:00

SHIPPING DETAILS

Delivered to Shipper By Kennedy/Spires		
Method of Shipment FedEx		**Airbill Number** 58048 23430
Received for Lab by (signed) Lya Deer		**Date/Time** 6/9/95 0905
WCFS Project Number		F93506

White - Client
Pink - Lab
Yellow - File

WCFSCOC.XLS

TEST SUMMARY: SC-EE08-TX-201
Ceriodaphnia dubia 48-Hour Static Acute

Test protocol:	WCC SOP 401.2
Test organism:	*Ceriodaphnia dubia*
Source:	WCC Culture Laboratory
Age of test organism:	<24 hours
Test initiation:	6/9/95
Test termination:	6/11/95
Temperature:	25 +/- 1 °C
Light:	50 - 100 foot candles
Photoperiod:	16 hours light/8 hours dark
Test vessel:	30 mL styrene
Test volume:	20 mL
Organisms/replicate:	5
Replicates/concentration:	4
Feeding regime:	none
Aeration during test:	none
Dilution Water:	Hard Reconstituted Synthetic
Test duration:	48 hours
Effect measured:	Mortality
Reference Toxicant Data:	
LC_{50} (g/L NaCl):	1.51

TEST RESULTS: SC-EE08-TX-201
Ceriodaphnia dubia 48-Hour Static Acute

LC_{50} 24.79%

Statictical analysis method: Spearman-Karber

Treatment (% Sample)	Survival (%)	pH	Conductivity (umhos/cm)	DO (mg/L)	Temperature (°C)	Hardness (mg/L $CaCO_3$)	Alkalinity (mg/L $CaCO_3$)
Control	100	8.49-8.50	604	8.4	24.6	250	
			(546-662)	(8.2-8.6)	(24.6-24.6)		
6.25	75	8.47-8.51	634	8.6	24.6		
			(580-687)	(8.2-8.9)	(24.6-24.6)		
12.5	90	8.46-8.52	697	8.6	24.6		
			(656-738)	(8.2-8.9)	(24.6-24.6)		
25	15	8.41-8.52	682	8.5	24.6		
			(712-652)	(8.3-8.7)	(24.6-24.6)		
50	60	8.31-8.56	744	8.5	24.6		
			(726-761)	(8.3-8.6)	(24.6-24.6)		
100	30	8.16-8.59	838	8.4	24.6	260	148
			(843-832)	(8.1-8.6)	(24.6-24.6)		

SURFACE WATER SAMPLE ARRVIAL INFORMATION

Collection Date/Time:	6/8/95 @ 0730
Use Date/Time:	6/9/95 @ 1310
Method of Shipment:	Overnight Courier
Temperature (°C):	0.5
pH:	7.82
Ammonia (mg/L):	3.88
Conductivity (umhos/cm):	843
DO (mg/L):	8.5

TEST SUMMARY: SC-EE08-TX-201
Ceriodaphnia dubia Chronic Renewal

Test protocol:	WCC SOP 501.1
Test organism:	*Ceriodaphnia dubia*
Source:	WCC Culture Laboratory
WCC Batch:	6/12/95
Age of test organism:	<24 hours
Test initiation:	6/12/95
Test termination:	6/19/95
Temperature:	25 +/- 1 °C
Light:	50 - 100 foot candles
Photoperiod:	16 hours light/8 hours dark
Test vessel:	30 mL styrene
Test volume:	15 mL
Organisms/replicate:	1
Replicates/concentration:	10
Feeding regime:	0.05 mL *Selenastrum* and 0.05 mL YTC daily
Aeration during test:	none
Dilution Water:	Hard Reconstituted Synthetic
Test duration:	7 days
Effect measured:	Survival and reproduction

Toxicity test methods and procedures were followed in accordance with EPA 600/4-89/001

Reference Toxicant Data:	
NOEC (g/L NaCl):	0.75

TEST RESULTS: SC-EE08-TX-201
Ceriodaphnia dubia Chronic Survival and Reproduction Test

Survival NOEC:	50%
Statistical analysis method:	Steel's Many-One Rank
Normality test:	Fail
Homogeneity of variance test:	Fail
Reproduction NOEC:	100%
Statistical analysis method:	Dunnetts
Normality test:	Pass
Homogeneity of variance test:	Pass

Treatment (% Sample)	Survival (%)	pH	Conductivity (umhos/cm)	DO (mg/L)	Temperature (°C)
Control	90	7.81-8.64	707 (437-791)	8.1 (7.1-8.5)	24.5 (24.0-25.0)
6.25	100	7.71-8.63	682 (426-747)	8.1 (7.0-8.7)	24.5 (24.0-25.0)
12.5	80	8.20-8.62	736 (650-779)	8 (7.2-8.6)	24.5 (24.0-25.0)
25	100	8.19-8.59	741 (577-827)	8 (7.2-8.6)	24.5 (24.0-25.0)
50	70	8.25-8.56	796 (662-861)	8 (7.3-8.7)	24.5 (24.0-25.0)
100	0	8.20-8.56	863 (602-968)	8.1 (7.5-8.8)	24.5 (24.0-25.0)

	Hardness (mg/L $CaCO_3$)	Alkalinity (mg/L $CaCO_3$)	Ammonia (mg/L)
Control	250		
EE08	250	174	3.88

TEST SUMMARY: SC-EE08-TX-201
Pimephales promelas 48-Hour Static Acute

Test protocol:	WCC SOP 410.2
Test organism:	*Pimephales promelas*
Source:	Woodward-Clyde Consultants
Age of test organism:	6 days
Test initiation:	6/9/95
Test termination:	6/11/95
Temperature:	20 +/- 1 °C
Light:	50 - 100 foot candles
Photoperiod:	16 hours light/8 hours dark
Test vessel:	500 mL plastic beaker
Test volume:	250 mL
Organisms/replicate:	10
Replicates/concentration:	2
Feeding regime:	none
Aeration during test:	none
Dilution Water:	Spring Water
Test duration:	48 hours
Effect measured:	Mortality
Reference Toxicant Data:	
LC_{50} (g/L NaCl):	5.26

TEST RESULTS: SC-EE08-TX-201
Pimephales promelas 48-Hour Static Acute

LC_{50} > 100%

Statictical analysis method: N/A

Treatment (% Sample)	Survival (%)	pH	Conductivity (umhos/cm)	DO (mg/L)	Temperature (°C)	Hardness (mg/L $CaCO_3$)	Alkalinity (mg/L $CaCO_3$)
Control	95	8.25-8.28	342 (317-366)	8.0 (7.9-8.1)	21.0 (20.0-21.0)	158	146
6.25	100	8.21-8.43	378 (364-391)	8.1 (8.0-8.1)	21.0 (20.0-21.0)		
12.5	95	8.42-8.46	408 (395-421)	8.1 (8.0-8.1)	21.0 (20.0-21.0)		
25	70	8.42-8.47	477 (465-488)	8.1 (8.1-8.1)	21.0 (20.0-21.0)		
50	95	8.36-8.50	626 (609-643)	8.1 (8.0-8.1)	21.0 (20.0-21.0)		
100	75	8.28-8.55	809 (715-902)	8.2 (8.1-8.2)	21.0 (20.0-21.0)	250	174

SURFACE WATER SAMPLE ARRVIAL INFORMATION

Collection Date/Time:	6/8/95 @ 0730
Use Date/Time:	6/9/95 @ 1600
Method of Shipment:	Overnight Courier
Temperature (°C):	0.5
pH:	7.82
Ammonia (mg/L):	3.88
Conductivity (umhos/cm):	843
DO (mg/L):	8.5
Description:	Clear

TEST SUMMARY: SC-EE08-TX-201
Pimephales promelas Chronic Renewal

Test protocol:	WCC SOP 510.1
Test organism:	*Pimephales promelas*
Source:	Environmental Consulting & Testing
Age of test organism:	<24 hours
Test initiation:	6/12/95 @ 1800
Test termination:	6/19/95 @ 1630
Temperature:	25 +/- 1 °C
Light:	50 - 100 foot candles
Photoperiod:	16 hours light/8 hours dark
Test vessel:	500 mL plastic beaker
Test volume:	250 mL
Organisms/replicate:	10
Replicates/concentration:	4
Feeding regime:	0.1 mL brine shrimp nauplii twice daily
Aeration during test:	none
Dilution Water:	Spring Water
Test duration:	7 days
Effect measured:	Survival and growth

Toxicity test methods and procedures were followed in accordance with EPA 600/4-89/001

Reference Toxicant Data:	
NOEC (g/L NaCl):	3.0

TEST RESULTS : SC- EE08-TX-201
Pimephales promelas Chronic Survival and Growth Test

Survival NOEC:		25%
	Statistical analysis method:	Steel's Many-One Rank
	Normality test:	Pass
	Homogeneity of variance test:	Fail
Growth NOEC:		100%
	Statistical analysis method:	Dunnetts
	Normality test:	Pass
	Homogeneity of variance test:	Pass

Treatment (% Sample)	Survival (%)	pH	Conductivity (umhos/cm)	DO (mg/L)	Temperature (°C)
Control	100	7.59-8.48	373 (287-459)	7.5 (6.5-8.5)	24.5 (24.0-25.0)
6.25	97.5	7.72-8.46	397 (365-491)	7.7 (6.7-8.5)	24.5 (24.0-25.0)
12.5	97.5	7.66-8.46	408 (285-520)	7.7 (6.7-8.4)	24.5 (24.0-25.0)
25	75	7.99-8.47	477 (440-500)	7.6 (6.7-8.5)	24.5 (24.0-25.0)
50	70	8.01-8.47	625 (598-652)	7.7 (6.8-8.5)	24.5 (24.0-25.0)
100	90	8.10-8.46	893 (754-956)	7.8 (6.8-8.6)	24.5 (24.0-25.0)

	Hardness (mg/L $CaCO_3$)	Alkalinity (mg/L $CaCO_3$	Ammonia (mg/L)
Control	158	146	
EE08	250	174	3.88

48-hr Ceriodaphnia dubia TOXICITY TEST

LOG NO. 423-426
JOB NO. F93506/3
INDUSTRY: TINKER AFB
CONTACT:

EFFLUENT: ~~EE05~~ TNT / CONTROL
START DATE: 6/9/95
START TIME: 1310
DILUTION WATER: CONTROL

CONC (%)	REP ID	SURVIVAL (#) 0	24	48	DEAD	TEMPERATURE (oC) 0	24	48	DO (mg/L) 0	24	48	pH (S.U.) 0	24	48	CONDUCTIVITY (umhos/cm) 0	24	48
HD 120	A	5	5	5	0	24.6		24.6	8.6		8.2	8.19		8.17	[illegible]		[illegible]
	B	5	5	5	0												
	C	5	5	5	0												
	D	5	5	5	0												
	A																
	B																
	C																
	D																
HD 250	A	5	5	5	0	24.6		24.6	8.6		8.2	8.50		8.49	[illegible]		[illegible]
	B	5	5	5	0												
	C	5	5	5	0												
	D	5	5	5	0												
	A																
	B																
	C																
	D																
	A																
	B																
	C																
	D																
	Initials	LJT	MAR	LJT													
	Time	1310	1047	1030													

Comments

PARAMETER	Control	
Total Hardness (mg/L CaCO3)		
Total Alkalinity (mg/L CaCO3 @ 4.5)		

'11

48-hr Ceriodaphnia dubia TOXICITY TEST

LOG NO. 426
JOB NO. F93506
INDUSTRY: TINKER AFB
CONTACT:

EFFLUENT: EE 08
START DATE: 6/9/95
START TIME: 1310
DILUTION WATER: MD 050

CONC (%)	REP ID	SURVIVAL (#) 0	24	48	Dt Ab	TEMPERATURE (oC) 0	24	48	DO (mg/L) 0	24	48	pH (S.U.) 0	24	48	CONDUCTIVITY (umhos/cm) 0	24	48
6.25	A	5	0	0	5	24.0		24.0	7.9		8.2	8.47		8.51	580		687
	B	5	5	5	0												
	C	5	5	5	0												
	D	5	5	5	0												
12.5	A	5	4	4	1				7.9		8.2	8.46		8.52	650		738
	B	5	5	5	0												
	C	5	5	5	0												
	D	5	5	4	1												
25	A	5	0 DOA	0	5				7.7		8.3	8.41		8.52	712		859
	B	5	0	0	5												
	C	5	0	0	5												
	D	5	3	3	2												
50	A	5	4 DOA	3	2				7.6		8.3	8.31		8.56	704		761
	B	5	0 5	3	2												
	C	5	0 5	3	2												
	D	5	4	3	2												
100	A	5	4	1	4				7.6		8.1	8.14		8.59	843		832
	B	5	5	2	3												
	C	5	5	1	4												
	D	5	5	2	3												
	Initials	LJT	MAR	LJT													
	Time	1310	1050	1035													

Comments

PARAMETER	Control	
Total Hardness (mg/L CaCO3)		
Total Alkalinity (mg/L CaCO3 @ 4.5)		

TRIMMED SPEARMAN-KARBER METHOD. MONTANA STATE UNIV

FOR REFERENCE, CITE:
HAMILTON, M.A., R.C. RUSSO, AND R.V. THURSTON, 1977.
TRIMMED SPEARMAN-KARBER METHOD FOR ESTIMATING MEDIAN
LETHAL CONCENTRATIONS IN TOXICITY BIOASSAYS.
ENVIRON. SCI. TECHNOL. 11(7): 714-719;
CORRECTION 12(4):417 (1978).

DATE: 6/9/95 TEST NUMBER: 426 DURATION: 48 HOURS
CHEMICAL: EE08 SPECIES: C. DUBIA

RAW DATA:

CONCENTRATION(%)	6.25	12.50	25.00	50.00	100.00
NUMBER EXPOSED:	20	20	20	20	20
MORTALITIES:	5	2	17	8	14

SPEARMAN-KARBER TRIM: 30.00%

SPEARMAN-KARBER ESTIMATES: LC50: 24.79
95% LOWER CONFIDENCE: 14.23
95% UPPER CONFIDENCE: 43.19

NOTE: MORTALITY PROPORTIONS WERE NOT MONOTONICALLY INCREASING.
ADJUSTMENTS WERE MADE PRIOR TO SPEARMAN-KARBER ESTIMATION.

48-hr Pimephales promleas TOXICITY TEST

LOG NO. 426
JOB NO. F93506
INDUSTRY: Timber
CONTACT:

EFFLUENT: EE08
START DATE: 6-9-95
START TIME: 1600
DILUTION WATER: Spring

CONC (%)	REP ID	SURVIVAL (#) 0	24	48	DEAD	TEMPERATURE (oC) 0	24	48	DO (mg/L) 0	24	48	pH (S.U.) 0	24	48	CONDUCTIVITY (umhos/cm) 0	24	48
6.25	A	10	10	10	0				8.1		8.0	8.43		8.21	364		391
	B	10	10	10	0												
12.5	A	10	10	10	0				8.1		8.0	8.46		8.42	395		421
	B	10	10	9	1												
25	A	10	10	7	3				8.1		8.1	8.42		8.47	465		488
	B	10	8	7	3												
50	A	10	9	9	1				8.1		8.0	8.36		8.50	609		645
	B	10	10	10	0												
100	A	10	9	8	2				8.2		8.1	8.28		8.55	902		715
	B	10	10	7	3												
	A																
	B																
	A																
	B																
	A																
	B																
	A																
	B																
	A																
	B																
Initials		MCS	MCS	SB													
Time		1000	815	1050													

Comments

PARAMETER	Control	
Total Hardness (mg/L CaCO3)		
Total Alkalinity (mg/L CaCO3 @ 4.5)		

Ceriodaphnia SURVIVAL AND REPRODUCTION CHRONIC TOXICITY TEST

JOB NO. F93506
INDUSTRY: Tinker
CONTACT:
EFFLUENT: EE08
NPDES PERMIT NO:
PERSON CONDUCTING TEST:

BEGINNING: 1430 hrs; 6/12/95
ENDING: 1230 hrs; 6/19/95
FEEDING REGIME:
.05 mL yct/15 mL
.05 mL algal suspension/15 mL

Log No. 432
PHOTOPERIOD: 16 light, 8 dark
ORGANISM SOURCE: WCC
TEST VESSEL CAPACITY: 30 mL
TEST SOLUTION VOLUME: 15mL
NO. REPLICATES:
DILUTION WATER:

TIME
OBSERVER

NUMBER OF YOUNG PRODUCED

CONC	CHAMBER	START	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7	
					44	60	92	157	230	
6.25%	1				2	5	2	7	2	18
	2				2	0	3	9	10	24
	3				7	0	2	3	2	14
	4				9	0	6	7	11	33
	5				5	0	4	9	8	26
	6				2	5	5	7	0	19
	7				6	0	2	6	10	24
	8				5	0	3	7	10	25
	9				4	2	0	4	10	20
	10				3	4	0	6	10	23
					2% mortality					
		START	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7	
					39	77	109	168	223	
12.5%	11				5	4	5	3	10	28
	12				(1) 3					3
	13				2	8	4	7	0	21
	14				7	6	6	3	10	31
	15				7	6	4	5	10	32
	16					8	6	8	0	22
	17				5	6	5	11	10	37
	18				10	7	0	6	14	37
	19			(6)						0
	20				2	5	5	11	1	24
					20% mortality					
		START	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7	
					30	71	96	154	206	
25%	21				2	5	4	5	0	16
	22				6	6	6	5	5	28
	23				2	4	4	0	6	16
	24				2	8	4	10	5	29
	25				5	6	5	7	7	30
	26				5	4	0	5	13	27
	27				4	7	6	8	10	35
	28				2	6	4	7	0	19
	29				2	7	4	7	9	29
	30									
					0% mortality					

Ceriodaphnia SURVIVAL AND REPRODUCTION CHRONIC TOXICITY TEST

JOB NO: F93506 | BEGINNING: 1450 hrs; 6/12/95 | Log No. 432
INDUSTRY: Tinker | ENDING: _____ hrs; / / | PHOTOPERIOD: 16 light, 8 dark
CONTACT: | FEEDING REGIME: | ORGANISM SOURCE: WCC
EFFLUENT: EE08 | .05 mL yct/15 mL | TEST VESSEL CAPACITY: 30 mL
NPDES PERMIT NO: | .05 mL algal suspension/15 mL | TEST SOLUTION VOLUME: 15mL
PERSON CONDUCTING TEST: | | NO. REPLICATES:
| | DILUTION WATER:

TIME
OBSERVER

NUMBER OF YOUNG PRODUCED

CONC	CHAMBER	START	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7
					45	74	95	125	154
50%	31				4	7	0	8	6
	32				4	2	5	3	0
	33				5	0	3	8	4
	34				2	0	0	0	(D)
	35				2	(D)			
	36				5	0	7	1	5
	37				4	7	6	0	6
	38				5	6	0	6	1
	39				9	7	0	4	7
	40				2	0	(D)		
					30% mortality				

CONC	CHAMBER	START	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7
					6	6	6	6	6
100%	41				3	(D)			
	42				2	(D)			
	43					(D)			
	44				(D)				
	45					(D)			
	46						(D)		
	47					(D)			
	48				(D) 1				
	49						(D)		
	50					(D)			
					100% mortality				

CONC	CHAMBER	START	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7

Ceriodaphnia dubia GRID Ceriodaphnia dubia GRID MONITORING DATA

Grid Letter: P O N S 6 X-D Start Date: 6-12-95 Sample ID: EE08 Log #: 43

AD	ID	1	AD	ID	1	AD	ID	1	AD	ID	1		ID	1
2	3	4	2	3	4	2	3	4	2	3	4	2	3	4
5	6	7	5	6	7	5	6	7	5	6	7	5	6	7
AD	ID 14	1 ✓	AD	ID 25	1 ✓	AD	ID 40	1 ✓	AD	ID 7	1 ✓		ID 21	1 ✓
2 ✓	3 7	4 6	2 ✓	3 5	4 0	2 ✓	3 2	4 0	2 ✓	3 6	4 0	2 ✓	3 2	4 5
5 0	6 8	7 10	5 5	6 7	7 7	5 N/O	6	7	5 2	6 6	7 10	5 4	6 5	7 0
AD	ID 6	1 ✓	AD	ID 48	1 ✓	AD	ID 34	1 ✓	AD	ID 13	1 ✓		ID 49	1 ✓
2 ✓	3 2	4 5	2 ✓	3 D 1	4	2 ✓	3 2	4 0	2 ✓	3 2	4 8	2 ✓	3 ✓	4 0
5 5	6 7	7 0	5	6	7	5 0	6 0	7 D 0	5 4	6 7	7 0	5 N/O	6	7
AD	ID 39	1 ✓	AD	ID 27	1 ✓	AD	ID 5	1 ✓	AD	ID 46	1 ✓		ID 22	1 ✓
2 ✓	3 9	4 7	2 ✓	3 4	4 7	2 ✓	3 5	4 0	2 ✓	3 ✓	4 0	2 ✓	3 6	4 0
5 0	6 4	7 7	5 0	6 6	7 10	5 4	6 9	7 8	5 N/O	6	7	5 0	6 8	7 8
AD	ID 20	1 ✓	AD	ID 41	1 ✓	AD	ID 33	1 ✓	AD	ID 15	1 ✓		ID 44	1 ✓
2 ✓	3 2	4 5	2 ✓	3 ✓	4 D	2 ✓	3 8	4 0	2 ✓	3 7	4 0	2 ✓	3 D	4
5 5	6 11	7 1	5	6	7	5 3	6 8	7 4	5 4	6 5	7 10	5	6	7
AD	ID 28	1 ✓	AD	ID 9	1 ✓	AD	ID 26	1 ✓	AD	ID 8	1 ✓		ID 37	1 ✓
2 ✓	3 2	4 6	2 ✓	3 4	4 2	2 ✓	3 5	4 4	2 ✓	3 5	4 0	2 ✓	3 4	4 7
5 4	6 7	7 0	5 0	6 4	7 10	5 0	6 8	7 13	5 8	6 7	7 10	5 6	6 0	7 6

Comments:

Cup ID	Sample Concentration in 250 Hardness	Day ¢	Initials SJB	Time 1430
1–10:	6.25	1	SJB	1300
11–20:	12.5	2	LJT	1640
21–30:	25	3	LJT	1300
31–40:	50	4	LJT	1535
41–50:	100	5	MAR	1327
51–60:		6	SJB	1300
		7	LJT	1230

Ceriodaphnia dubia GRID Ceriodaphnia dubia GRID MONITORING DATA

Grid Letter: [illegible] Start Date: 6-12-95 Sample ID: EE08 Log #: 43

AD	ID	1	AD	ID	1	AD	ID	1	AD	ID	1		ID	1
2	3	4	2	3	4	2	3	4	2	3	4	2	3	4
5	6	7	5	6	7	5	6	7	5	6	7	5	6	7
AD	ID 1	1 ✓	AD	ID 18	1 ✓	AD	ID 24	1 ✓	AD	ID 11	1 ✓		ID 32	1 ✓
2 ✓	3 2	4 5	2 ✓	3 10	4 7	2 ✓	3 2	4 8	2 ✓	3 3	4 4	2 ✓	3 4	4 2
5 2	6 7	7 2	5 0	6 6	7 14	5 4	6 10	7 0	5 8	6 3	7 10	5 5	6 3	7 0
AD	ID 35	1 ✓	AD	ID 29	1 ✓	AD	ID 10	1 ✓	AD	ID 47	1 ✓		ID 3	1 ✓
2 ✓	3 2	4 D	2 ✓	3 2	4 7	2 ✓	3 3	4 4	2 ✓	3 0	4 D	2 ✓	3 4	4 C
5	6	7	5 4	6 7	7 8	5 0	6 6	7 10	5	6	7	5 2	6 3	7 2
AD	ID 19	1 ✓	AD	ID 2	1 ✓	AD	ID 38	1 ✓	AD	ID 42	1 ✓		ID 36	1 ✓
2 D	3 ✓	4	2 ✓	3 2	4 0	2 ✓	3 5	4 6	2 ✓	3 2	4 D	2 ✓	3 5	4 C
5	6	7	5 3	6 9	7 10	5 0	6 6	7 1	5	6	7	5 7	6 1	7 5
AD	ID 50	1 ✓	AD	ID 31	1 ✓	AD	ID 43	1 ✓	AD	ID 16	1 ✓		ID 45	1 ✓
2 ✓	3 0	4 D	2 ✓	3 4	4 7	2 ✓	3 0	4 D	2 ✓	3 0	4 8	2 ✓	3 0	4
5	6	7	5 0	6 8	7 6	5	6	7	5 6	6 8	7 0	5	6	7
AD	ID 12	1 ✓	AD	ID 23	1 ✓	AD	ID 4	1 ✓	AD	ID 30	1 ✓		ID 17	1 ✓
2 ✓	3 D 3	4	2 ✓	3 2	4 4	2 ✓	3 ~~8~~ 8	4 0	2 ✓	3 4	4 0	2 ✓	3 5	4 0
5	6	7	5 4	6 0	7 6	5 6	6 7	7 11	5 7	6 9	7 8	5 5	6 11	7 10

Comments:

Cup ID	Sample Concentration	Day ¢	Initials SJB	Time 1430
1–10:	6.25%	1	SJB	1300
11–20:	12.5	2	LJT	1630
21–30:	25	3	LJT	1300
31–40:	50	4	LJT	1535
41–50:	100	5	MAR	13.31
51–60:		6	SJB	1300
		7	LJT	1230

C2C6
C6C10
409432
6-12-95

CHRONIC TOXICITY TEST DATA SHEET

TEMPERATURE

CONCENTRATION	Start	Day 1 OLD	Day 1 NEW	Day 2 OLD	Day 2 NEW	Day 3 OLD	Day 3 NEW	Day 4 OLD	Day 4 NEW	Day 5 OLD	Day 5 NEW	Day 6 OLD	Day 6 NEW	Day 7 OLD	Day 7 NEW	Day 8 OLD
6.25	24.0	24.8	24.8	24.0	24.0	25.0	25.0	25.0	25.0	24.0	24.0	24.2	25.0	24.8		
12.5																
25																
50																
100																

DISSOLVED OXYGEN

CONCENTRATION	Start	Day 1 OLD	Day 1 NEW	Day 2 OLD	Day 2 NEW	Day 3 OLD	Day 3 NEW	Day 4 OLD	Day 4 NEW	Day 5 OLD	Day 5 NEW	Day 6 OLD	Day 6 NEW	Day 7 OLD	Day 7 NEW	Day 8 OLD
6.25	8.4	8.4	8.8	7.7	8.7	7.5	8.4	7.8	8.3	7.0	8.2	8.0	8.3	7.8		
12.5	8.3	8.3	8.8	7.7	8.60	7.5	8.3	7.7	8.3	7.2	8.2	8.0	8.3	7.8		
25	8.3	8.3	8.0	7.7	8.62	7.4	8.3	7.7	8.2	7.2	8.2	8.1	8.3	7.6		
50	8.4	8.4	8.0	7.7	8.7	7.6	8.4	7.6	8.3	7.3	8.1	8.1	8.3	7.6		
100	8.3	8.4	8.0	7.7	8.[illegible]	7.5	8.2	7.6	8.3		8.2	8.1	8.4	—		

pH

CONCENTRATION	Start	Day 1 OLD	Day 1 NEW	Day 2 OLD	Day 2 NEW	Day 3 OLD	Day 3 NEW	Day 4 OLD	Day 4 NEW	Day 5 OLD	Day 5 NEW	Day 6 OLD	Day 6 NEW	Day 7 OLD	Day 7 NEW	Day 8 OLD
6.25	7.71	8.40	8.54	8.116	8.54	8.17	8.52	8.35	8.52	8.33	8.47	~~8.67~~	8.63	8.28		
12.5	8.41	8.38	8.55	8.21	8.55	8.30	8.52	8.34	8.54	8.37	8.48	8.55	8.62	8.27		
25	8.39	8.42	8.52	8.27	8.53	8.[illegible]	8.37	8.37	8.56	8.40	8.46	8.54	8.59	8.26		
50	8.35	8.44	8.47	8.30	8.[illegible]	8.[illegible]	8.30	8.[illegible]	8.[illegible]	8.43	8.38	8.56	8.56	8.32		
100	8.20	8.35	8.37	8.36		8.[illegible]	8.27	8.41	8.[illegible]		8.28	8.57	8.52	—		
												8.56				

Day 2 NEW: mV

Day 8 OLD: 8.51, 8.53, 8.47, 8.35, 8.17

CONDUCTIVITY

CONCENTRATION	Start	Day 1 OLD	Day 1 NEW	Day 2 OLD	Day 2 NEW	Day 3 OLD	Day 3 NEW	Day 4 OLD	Day 4 NEW	Day 5 OLD	Day 5 NEW	Day 6 OLD	Day 6 NEW	Day 7 OLD	Day 7 NEW	Day 8 OLD
6.25	420	618	618	733	611	747	708	715	732	628	684	~~456~~	707	698		
12.5	693	650	710	750	721	779	720	770	733	744	721	709	728	743		
25	707	727	741	777	751	807	807	827	763	781	653	723	752	783		
50	711	705	797	844	801	841	819	833	815	800	806	733	812	817		
100	823	723	912	968	912	812	900	932	916		923	662	920	—		
												602				

EE08 CERIO CHRONIC
File: CDEE08 Transform: NO TRANSFORMATION

Chi-square test for normality: actual and expected frequencies

INTERVAL	<-1.5	-1.5 to <-0.5	-0.5 to 0.5	>0.5 to 1.5	>1.5
EXPECTED	4.020	14.520	22.920	14.520	4.020
OBSERVED	5	10	29	13	3

Calculated Chi-Square goodness of fit test statistic = 3.6767
Table Chi-Square value (alpha = 0.01) = 13.277

Data PASS normality test. Continue analysis.

EE08 CERIO CHRONIC
File: CDEE08 Transform: NO TRANSFORMATION

Hartley test for homogeneity of variance

Calculated H statistic (max Var/min Var) = 14.23
Closest, conservative, Table H statistic = 12.1 (alpha = 0.01)

Used for Table H ==> R (# groups) = 6, df (# reps-1) = 9
Actual values ==> R (# groups) = 6, df (# avg reps-1) = 9.00

Data FAIL homogeneity test. Try another transformation.

NOTE: This test requires equal replicate sizes. If they are unequal
but do not differ greatly, the Hartley test may still be used
as an approximate test (average df are used).

EE08 CERIO CHRONIC
File: CDEE08 Transform: NO TRANSFORMATION

Bartletts test for homogeneity of variance

Calculated B statistic = 17.33
Table Chi-square value = 15.09 (alpha = 0.01)
Table Chi-square value = 11.07 (alpha = 0.05)

Average df used in calculation ==> df (avg n - 1) = 9.00
Used for Chi-square table value ==> df (#groups-1) = 5

Data FAIL homogeneity test at 0.01 level. Try another transformation.

NOTE: If groups have unequal replicate sizes the average replicate size is

used to calculate the B statistic (see above).

EE08 CERIO CHRONIC
File: CDEE08 Transform: 1/SQUARE ROOT(Y+0.5)

Chi-square test for normality: actual and expected frequencies

INTERVAL	<-1.5	-1.5 to <-0.5	-0.5 to 0.5	>0.5 to 1.5	>1.5
EXPECTED	4.020	14.520	22.920	14.520	4.020
OBSERVED	1	13	28	14	4

Calculated Chi-Square goodness of fit test statistic = 3.5725
Table Chi-Square value (alpha = 0.01) = 13.277

Data PASS normality test. Continue analysis.

EE08 CERIO CHRONIC
File: CDEE08 Transform: 1/SQUARE ROOT(Y+0.5)

Hartley test for homogeneity of variance

Calculated H statistic (max Var/min Var) = 302.73
Closest, conservative, Table H statistic = 12.1 (alpha = 0.01)

Used for Table H ==> R (# groups) = 6, df (# reps-1) = 9
Actual values ==> R (# groups) = 6, df (# avg reps-1) = 9.00

Data FAIL homogeneity test. Try another transformation.

NOTE: This test requires equal replicate sizes. If they are unequal
but do not differ greatly, the Hartley test may still be used
as an approximate test (average df are used).

EE08 CERIO CHRONIC
File: CDEE08 Transform: 1/SQUARE ROOT(Y+0.5)

Bartletts test for homogeneity of variance

Calculated B statistic = 70.86
Table Chi-square value = 15.09 (alpha = 0.01)
Table Chi-square value = 11.07 (alpha = 0.05)

Average df used in calculation ==> df (avg n - 1) = 9.00
Used for Chi-square table value ==> df (#groups-1) = 5

Data FAIL homogeneity test at 0.01 level. Try another transformation.

NOTE: If groups have unequal replicate sizes the average replicate size is

used to calculate the B statistic (see above).

TITLE: EE08 CERIO CHRONIC
FILE: CDEE08
TRANSFORM: NO TRANSFORMATION NUMBER OF GROUPS: 6

GRP	IDENTIFICATION	REP	VALUE	TRANS VALUE
1	CONTROL	1	31.0000	31.0000
1	CONTROL	2	10.0000	10.0000
1	CONTROL	3	20.0000	20.0000
1	CONTROL	4	15.0000	15.0000
1	CONTROL	5	23.0000	23.0000
1	CONTROL	6	21.0000	21.0000
1	CONTROL	7	21.0000	21.0000
1	CONTROL	8	20.0000	20.0000
1	CONTROL	9	21.0000	21.0000
1	CONTROL	10	16.0000	16.0000
2	6.25	1	18.0000	18.0000
2	6.25	2	24.0000	24.0000
2	6.25	3	14.0000	14.0000
2	6.25	4	32.0000	32.0000
2	6.25	5	26.0000	26.0000
2	6.25	6	19.0000	19.0000
2	6.25	7	24.0000	24.0000
2	6.25	8	30.0000	30.0000
2	6.25	9	20.0000	20.0000
2	6.25	10	23.0000	23.0000
3	12.5	1	28.0000	28.0000
3	12.5	2	3.0000	3.0000
3	12.5	3	21.0000	21.0000
3	12.5	4	31.0000	31.0000
3	12.5	5	26.0000	26.0000
3	12.5	6	22.0000	22.0000
3	12.5	7	31.0000	31.0000
3	12.5	8	37.0000	37.0000
3	12.5	9	0.0000	0.0000
3	12.5	10	24.0000	24.0000
4	25	1	16.0000	16.0000
4	25	2	22.0000	22.0000
4	25	3	16.0000	16.0000
4	25	4	24.0000	24.0000
4	25	5	24.0000	24.0000
4	25	6	30.0000	30.0000
4	25	7	27.0000	27.0000
4	25	8	19.0000	19.0000
4	25	9	28.0000	28.0000
4	25	10	0.0000	0.0000
5	50	1	25.0000	25.0000
5	50	2	14.0000	14.0000
5	50	3	23.0000	23.0000
5	50	4	2.0000	2.0000
5	50	5	2.0000	2.0000
5	50	6	18.0000	18.0000
5	50	7	23.0000	23.0000
5	50	8	18.0000	18.0000
5	50	9	27.0000	27.0000
5	50	10	2.0000	2.0000

6	100	1	3.0000	3.0000
6	100	2	2.0000	2.0000
6	100	3	0.0000	0.0000
6	100	4	0.0000	0.0000
6	100	5	0.0000	0.0000
6	100	6	0.0000	0.0000
6	100	7	0.0000	0.0000
6	100	8	10.0000	10.0000
6	100	9	0.0000	0.0000
6	100	10	0.0000	0.0000

EE08 CERIO CHRONIC
File: CDEE08 Transform: NO TRANSFORMATION

ANOVA TABLE

SOURCE	DF	SS	MS	F
Between	5	3276.400	655.280	10.113
Within (Error)	54	3499.000	64.796	
Total	59	6775.400		

Critical F value = 2.45 (0.05,5,40)
Since F > Critical F REJECT Ho:All groups equal

EE08 CERIO CHRONIC
File: CDEE08 Transform: NO TRANSFORMATION

DUNNETTS TEST - TABLE 1 OF 2 Ho:Control<Treatment

GROUP	IDENTIFICATION	TRANSFORMED MEAN	MEAN CALCULATED IN ORIGINAL UNITS	T STAT	SIG
1	CONTROL	19.800	19.800		
2	6.25	23.000	23.000	-0.889	
3	12.5	22.300	22.300	-0.694	
4	25	20.600	20.600	-0.222	
5	50	15.400	15.400	1.222	
6	100	1.500	1.500	5.083	*

Dunnett table value = 2.31 (1 Tailed Value, P=0.05, df=40,5)

EE08 CERIO CHRONIC
File: CDEE08 Transform: NO TRANSFORMATION

DUNNETTS TEST - TABLE 2 OF 2 Ho:Control<Treatment

GROUP	IDENTIFICATION	NUM OF REPS	Minimum Sig Diff (IN ORIG. UNITS)	% of CONTROL	DIFFERENCE FROM CONTROL

1	CONTROL	10			
2	6.25	10	8.316	42.0	-3.200
3	12.5	10	8.316	42.0	-2.500
4	25	10	8.316	42.0	-0.800
5	50	10	8.316	42.0	4.400
6	100	10	8.316	42.0	18.300

EE08 CERIO CHRONIC
File: CDEE08 Transform: NO TRANSFORMATION

STEELS MANY-ONE RANK TEST - Ho:Control<Treatment

GROUP	IDENTIFICATION	TRANSFORMED MEAN	RANK SUM	CRIT. VALUE	df	SIG
1	CONTROL	19.800				
2	6.25	23.000	120.50	75.00	10.00	
3	12.5	22.300	125.50	75.00	10.00	
4	25	20.600	116.00	75.00	10.00	
5	50	15.400	97.00	75.00	10.00	
6	100	1.500	55.50	75.00	10.00	*

Critical values use k = 5, are 1 tailed, and alpha = 0.05

TINKER C. DUBIA SURVIVAL LOG #432 - EE08
File: CDSUR432 Transform: ARC SINE(SQUARE ROOT(Y))

Chi-square test for normality: actual and expected frequencies

INTERVAL	<-1.5	-1.5 to <-0.5	-0.5 to 0.5	>0.5 to 1.5	>1.5
EXPECTED	4.020	14.520	22.920	14.520	4.020
OBSERVED	3	3	47	7	0

Calculated Chi-Square goodness of fit test statistic = 42.6120
Table Chi-Square value (alpha = 0.01) = 13.277

Data FAIL normality test. Try another transformation.

Warning - The two homogeneity tests are sensitive to non-normal data and should not be performed.

TINKER C. DUBIA SURVIVAL LOG #432 - EE08
File: CDSUR432 Transform: ARC SINE(SQUARE ROOT(Y))

Hartley test for homogeneity of variance
Bartletts test for homogeneity of variance

These two tests can not be performed because at least one group has zero variance.

Data FAIL to meet homogeneity of variance assumption.
Additional transformations are useless.

TITLE: TINKER C. DUBIA SURVIVAL LOG #432 - EE08
FILE: CDSUR432
TRANSFORM: ARC SINE(SQUARE ROOT(Y)) NUMBER OF GROUPS: 6

GRP	IDENTIFICATION	REP	VALUE	TRANS VALUE
1	CONTROL	1	1.0000	1.0472
1	CONTROL	2	0.0000	0.5236
1	CONTROL	3	1.0000	1.0472
1	CONTROL	4	1.0000	1.0472
1	CONTROL	5	1.0000	1.0472
1	CONTROL	6	1.0000	1.0472
1	CONTROL	7	1.0000	1.0472
1	CONTROL	8	1.0000	1.0472
1	CONTROL	9	1.0000	1.0472
1	CONTROL	10	1.0000	1.0472
2	6.25%	1	1.0000	1.0472
2	6.25%	2	1.0000	1.0472
2	6.25%	3	1.0000	1.0472
2	6.25%	4	1.0000	1.0472
2	6.25%	5	1.0000	1.0472
2	6.25%	6	1.0000	1.0472
2	6.25%	7	1.0000	1.0472
2	6.25%	8	1.0000	1.0472
2	6.25%	9	1.0000	1.0472
2	6.25%	10	1.0000	1.0472
3	12.5%	1	1.0000	1.0472
3	12.5%	2	0.0000	0.5236
3	12.5%	3	1.0000	1.0472
3	12.5%	4	1.0000	1.0472
3	12.5%	5	1.0000	1.0472
3	12.5%	6	1.0000	1.0472
3	12.5%	7	1.0000	1.0472
3	12.5%	8	1.0000	1.0472
3	12.5%	9	0.0000	0.5236
3	12.5%	10	1.0000	1.0472
4	25%	1	1.0000	1.0472
4	25%	2	1.0000	1.0472
4	25%	3	1.0000	1.0472
4	25%	4	1.0000	1.0472
4	25%	5	1.0000	1.0472
4	25%	6	1.0000	1.0472
4	25%	7	1.0000	1.0472
4	25%	8	1.0000	1.0472
4	25%	9	1.0000	1.0472
4	25%	10	1.0000	1.0472
5	50%	1	1.0000	1.0472
5	50%	2	1.0000	1.0472
5	50%	3	1.0000	1.0472
5	50%	4	0.0000	0.5236
5	50%	5	0.0000	0.5236
5	50%	6	1.0000	1.0472
5	50%	7	1.0000	1.0472
5	50%	8	1.0000	1.0472
5	50%	9	1.0000	1.0472
5	50%	10	0.0000	0.5236

6	100%	1	0.0000	0.5236
6	100%	2	0.0000	0.5236
6	100%	3	0.0000	0.5236
6	100%	4	0.0000	0.5236
6	100%	5	0.0000	0.5236
6	100%	6	0.0000	0.5236
6	100%	7	0.0000	0.5236
6	100%	8	0.0000	0.5236
6	100%	9	0.0000	0.5236
6	100%	10	0.0000	0.5236

TINKER C. DUBIA SURVIVAL LOG #432 - EE08
File: CDSUR432 Transform: ARC SINE(SQUARE ROOT(Y))

SUMMARY STATISTICS ON TRANSFORMED DATA TABLE 1 of 2

GRP	IDENTIFICATION	N	MIN	MAX	MEAN
1	CONTROL	10	0.524	1.047	0.995
2	6.25%	10	1.047	1.047	1.047
3	12.5%	10	0.524	1.047	0.942
4	25%	10	1.047	1.047	1.047
5	50%	10	0.524	1.047	0.890
6	100%	10	0.524	0.524	0.524

TINKER C. DUBIA SURVIVAL LOG #432 - EE08
File: CDSUR432 Transform: ARC SINE(SQUARE ROOT(Y))

SUMMARY STATISTICS ON TRANSFORMED DATA TABLE 2 of 2

GRP	IDENTIFICATION	VARIANCE	SD	SEM
1	CONTROL	0.027	0.166	0.052
2	6.25%	0.000	0.000	0.000
3	12.5%	0.049	0.221	0.070
4	25%	0.000	0.000	0.000
5	50%	0.064	0.253	0.080
6	100%	0.000	0.000	0.000

TINKER C. DUBIA SURVIVAL LOG #432 - EE08
File: CDSUR432 Transform: ARC SINE(SQUARE ROOT(Y))

STEELS MANY-ONE RANK TEST - Ho:Control<Treatment

GROUP	IDENTIFICATION	TRANSFORMED MEAN	RANK SUM	CRIT. VALUE	df	SIG
1	CONTROL	0.995				
2	6.25%	1.047	110.00	75.00	10.00	
3	12.5%	0.942	100.00	75.00	10.00	

4	25%	1.047	110.00	75.00	10.00	
5	50%	0.890	95.00	75.00	10.00	
6	100%	0.524	60.00	75.00	10.00	*

Critical values use k = 5, are 1 tailed, and alpha = 0.05

FATHEAD MINNOW SURVIVAL AND GROWTH
7-DAY CHRONIC TOXICITY TEST

Log No. 432

JOB NO. F93506
INDUSTRY: Tinker
CONTACT:
EFFLUENT: EEC8
NPDES PERMIT NO:
SAMPLE TYPE:
DILUTION WATER: Spring

PERSON CONDUCTING TEST: MLS
BEGINNING: 1800 hrs 6/12/95
ENDING: ____ hrs 6/19/95
TEST
DILUTIONS: 0.5
AGE: < 24 hr
ORGANISM SOURCE: EC & T

PHOTOPERIOD: 16 hr light
FEEDING REGIME: 2
0.1 ml Artemia @ 3 times/day
TEST VESSEL CAPACITY: ~~1 liter~~ 500 ml
TEST SOLUTION VOLUME: ~~500 mL~~ 250 ml
NO. ORGANISMS/TREATMENT: 10
NO. REPLICATES: 4

CONC (%)	REP ID	SURVIVAL (#) START	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7
6.25	A	10	10	10	10	10	9	9	9
	B	10	10	10	10	10	10	10	10
	C	10	10	10	10	10	10	10	10
	D	10	10	10	10	10	10	10	10
12.5	A	10	10	10	10	10	10	10	10
	B	10	10	10	10	9	9	9	9
	C	10	10	10	10	10	10	10	10
	D	10	10	10	10	10	10	10	10
25	A	10	10	6	5	5	5	5	5
	B	10	10	10	10	10	10	10	10
	C	10	10	10	9	9	9	9	8
	D	10	10	8	7	SC ~~8~~ 7	7	7	7
50	A	10	10	8	8	8	8	8	7
	B	10	10	9	8	8	8	8	7
	C	10	10	10	10	10	10	10	9
	D	10	10	8	5	5	5	5	5
	TIME:	1800	1630	1500	1430	1530	1215	1405	1630
	INITIAL:	MLS	LJT	SR	SR	JJR	MLS	TNT	TNT

GROWTH RESULTS

CONC (%)	REP ID	Boat ID	Tare wt (g)	Combined wt (g)	Tot Fish wt (g)	# of Fish	Avg Fish wt (mg)
6.25	A		.99777	1.00276	0.00519	9	0.577
	B	1.00017	~~1.00805~~	1.00529	0.00512	10	0.512
	C		.99330	.99884	0.00554	10	0.554
	D		.98954	.99367	0.00513	10	0.513
12.5	A		1.00594	1.01067	0.00473	10	0.473
	B	.99072	~~1.00594~~	0.99528	0.00456	9	0.507
	C		.99974	1.00456	0.00482	10	0.482
	D		.99519	.99962	0.00443	10	0.443
25	A		.99847	1.00104	0.00257	5	0.514
	B		99718	1.00070	0.00352	10	0.352
	C		.99848	1.00216	0.00368	8	0.460
	D		.99753	1.00138	0.00385	7	0.550
50	A		.99962	1.00257	0.00295	7	0.421
	B		.98848	99170	0.00292	7	0.417
	C		1.00251	1.00526	0.00275	9	0.306
	D		.99902	1.00107	0.00205	5	0.410
			~~.99753~~	~~1.00107~~ SEW		8 SEW	

FATHEAD MINNOW SURVIVAL AND GROWTH
7-DAY CHRONIC TOXICITY TEST

Log No. 432

JOB NO. F93506
INDUSTRY: Tinker
CONTACT:
EFFLUENT: EEC8
NPDES PERMIT NO:
SAMPLE TYPE:
DILUTION WATER: Spring

PERSON CONDUCTING TEST: MLS
BEGINNING: 1800 hrs; 4/14/95
ENDING: ____ hrs; / / .
TEST
DILUTIONS: C.S
AGE: < 24 h.
ORGANISM SOURCE: EC & T

PHOTOPERIOD: 16 hr light
FEEDING REGIME: 2
0.1 ml Artemia @ 3 times/day
TEST VESSEL CAPACITY: 1 liter 500 ml
TEST SOLUTION VOLUME: ~~500 mL~~ 25
NO. ORGANISMS/TREATMENT: 10
NO. REPLICATES: ~~3~~ 4

CONC (%)	REP ID	SURVIVAL (#) START	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7
100	A	10	10	10	10	10	9	9	9
	B	10	10	10	10	10	10	10	10
	C	10	10	9	9	9	9	9	9
	D	10	10	8	8	8	8	8	8
	TIME:	1800	1630	1500	1430	1515	1215	1405	1630
	INITIAL:	MLS	MLS	SSB	SSB	MLS	MLS	TNT	TNT

GROWTH RESULTS

CONC (%)	REP ID	Boat ID	Tare wt (g)	Combined wt (g)	Tot Fish wt (g)	# of Fish	Avg Fish wt (mg)
100	A		.99483	.99778	0.00297	9	0.330
	B		.99494	.99770	0.00276	10	0.276
	C		.99619	.99930	0.00311	9	0.346
	D		.99418	0.99716	~~0.00298~~ ① 0.00298	8	0.448

2006
Tank 0
Log 432
6-12-15
Spring

CHRONIC TOXICITY TEST DATA SHEET

TEMPERATURE

CONCENTRATION	Start	Day 1 OLD	Day 1 NEW	Day 2 OLD	Day 2 NEW	Day 3 OLD	Day 3 NEW	Day 4 OLD	Day 4 NEW	Day 5 OLD	Day 5 NEW	Day 6 OLD	Day 6 NEW	Day 7 OLD	Day 7 NEW	Day 8 OLD
6.25	24.0	24.2	24.2	24.0	24.0	25.0	24.6	24.2	25.0	24.0	24.0	24.2	24.8	24.8		
12.5																
25																
50																
100																

DISSOLVED OXYGEN

CONCENTRATION	Start	Day 1 OLD	Day 1 NEW	Day 2 OLD	Day 2 NEW	Day 3 OLD	Day 3 NEW	Day 4 OLD	Day 4 NEW	Day 5 OLD	Day 5 NEW	Day 6 OLD	Day 6 NEW	Day 7 OLD	Day 7 NEW	Day 8 OLD
6.25	8.4	8.5	8.3	6.9	8.3	7.0	7.7	7.2	7.8	7.0	7.8	8.0	8.4	6.7		
12.5	8.0	8.2	8.3	6.9	8.2	7.1	7.7	7.2	7.7	7.1	7.8	8.0	8.4	6.7		
25	7.7	8.2	8.4	6.8	8.2	6.9	7.8	7.2	7.7	7.1	7.8	8.0	8.5	6.7		
50	7.8	8.1	8.5	6.8	8.3	6.9	7.8	7.2	7.7	7.1	7.7	8.1	8.5	6.9		
100	7.8	8.0	8.3	6.8	8.3	7.0	7.8	7.1	8.6	7.0	7.9	8.2	8.5	6.9		

pH

CONCENTRATION	Start	Day 1 OLD	Day 1 NEW	Day 2 OLD	Day 2 NEW	Day 3 OLD	Day 3 NEW	Day 4 OLD	Day 4 NEW	Day 5 OLD	Day 5 NEW	Day 6 OLD	Day 6 NEW	Day 7 OLD	Day 7 NEW	Day 8 OLD
6.25	7.98	7.72	8.18	8.07	8.23	8.05	8.12	8.26	8.00	8.43	8.17	8.46	8.46	8.11		
12.5	8.03	7.89	8.17	8.10	8.24	8.04	8.11	8.25	7.99	8.43	8.18	8.43	8.46	8.07		
25	7.99	8.22	8.15	8.11	8.24	8.05	8.16	8.24	8.00	8.46	8.14	8.44	8.47	8.14		
50	8.01	8.05	8.20	8.14	8.24	8.04	8.17	8.24	8.01	8.43	8.23	8.43	8.47	8.15		
100	8.14	8.26	8.37	8.18	8.14	8.10	8.25	8.25	8.11	8.44	8.34	8.46	8.46	8.16		

CONDUCTIVITY

CONCENTRATION	Start	Day 1 OLD	Day 1 NEW	Day 2 OLD	Day 2 NEW	Day 3 OLD	Day 3 NEW	Day 4 OLD	Day 4 NEW	Day 5 OLD	Day 5 NEW	Day 6 OLD	Day 6 NEW	Day 7 OLD	Day 7 NEW	Day 8 OLD
6.25	365	491	398	414	404	405	376	402	370	392	374	389	392	380		
12.5	285	520	400	422	402	420	403	418	396	423	403	416	400	400		
25	446	500	410	499	475	437	471	481	466	426	426	493	466	467		
50	552	607	598	643	602	602	611	630	605	640	618	643	628	610		
100	754	603	587	921	851	912	891	928	895	817	845	956	928	906		

EE08 FATHEAD MINNOW CHRONIC
File: FMEE08 Transform: NO TRANSFORMATION

Chi-square test for normality: actual and expected frequencies

INTERVAL	<-1.5	-1.5 to <-0.5	-0.5 to 0.5	>0.5 to 1.5	>1.5
EXPECTED	1.608	5.808	9.168	5.808	1.608
OBSERVED	0	7	9	8	0

Calculated Chi-Square goodness of fit test statistic = 4.2910
Table Chi-Square value (alpha = 0.01) = 13.277

Data PASS normality test. Continue analysis.

EE08 FATHEAD MINNOW CHRONIC
File: FMEE08 Transform: NO TRANSFORMATION

Bartletts test for homogeneity of variance

Calculated B statistic = 5.05
Table Chi-square value = 15.09 (alpha = 0.01)
Table Chi-square value = 11.07 (alpha = 0.05)

Average df used in calculation ==> df (avg n - 1) = 3.00
Used for Chi-square table value ==> df (#groups-1) = 5

Data PASS homogeneity test at 0.01 level. Continue analysis.

NOTE: If groups have unequal replicate sizes the average replicate size is used to calculate the B statistic (see above).

TITLE: EE08 FATHEAD MINNOW CHRONIC
FILE: FMEE08
TRANSFORM: NO TRANSFORMATION NUMBER OF GROUPS: 6

GRP	IDENTIFICATION	REP	VALUE	TRANS VALUE
1	CONTROL	1	0.5470	0.5470
1	CONTROL	2	0.4630	0.4630
1	CONTROL	3	0.5650	0.5650
1	CONTROL	4	0.6440	0.6440
2	6.25	1	0.5770	0.5770
2	6.25	2	0.5120	0.5120
2	6.25	3	0.5540	0.5540
2	6.25	4	0.5130	0.5130
3	12.5	1	0.4730	0.4730
3	12.5	2	0.5070	0.5070
3	12.5	3	0.4820	0.4820
3	12.5	4	0.4430	0.4430
4	25	1	0.5140	0.5140
4	25	2	0.3520	0.3520
4	25	3	0.4600	0.4600
4	25	4	0.5500	0.5500
5	50	1	0.4210	0.4210
5	50	2	0.4170	0.4170
5	50	3	0.3060	0.3060
5	50	4	0.4100	0.4100
5	100	1	0.3300	0.3300
6	100	2	0.2760	0.2760
6	100	3	0.3460	0.3460
6	100	4	0.4480	0.4480

EE08 FATHEAD MINNOW CHRONIC
File: FMEE08 Transform: NO TRANSFORMATION

ANOVA TABLE

SOURCE	DF	SS	MS	F
Between	5	0.131	0.026	6.500
Within (Error)	18	0.069	0.004	
Total	23	0.200		

Critical F value = 2.77 (0.05,5,18)
Since F > Critical F REJECT Ho:All groups equal

EE08 FATHEAD MINNOW CHRONIC
File: FMEE08 Transform: NO TRANSFORMATION

DUNNETTS TEST - TABLE 1 OF 2 Ho:Control<Treatment

GROUP	IDENTIFICATION	TRANSFORMED MEAN	MEAN CALCULATED IN ORIGINAL UNITS	T STAT	SIG
1	CONTROL	0.555	0.555		
2	6.25	0.539	0.539	0.352	
3	12.5	0.476	0.476	1.755	
4	25	0.469	0.469	1.917	
5	50	0.389	0.389	3.717	*
6	100	0.350	0.350	4.578	*

Dunnett table value = 2.41 (1 Tailed Value, P=0.05, df=18,5)

EE08 FATHEAD MINNOW CHRONIC
File: FMEE08 Transform: NO TRANSFORMATION

DUNNETTS TEST - TABLE 2 OF 2 Ho:Control<Treatment

GROUP	IDENTIFICATION	NUM OF REPS	Minimum Sig Diff (IN ORIG. UNITS)	% of CONTROL	DIFFERENCE FROM CONTROL
1	CONTROL	4			
2	6.25	4	0.108	19.4	0.016
3	12.5	4	0.108	19.4	0.079
4	25	4	0.108	19.4	0.086
5	50	4	0.108	19.4	0.166
6	100	4	0.108	19.4	0.205

TINKER FHM SURVIVAL LOG #432 - EE08
File: FHMSUR432 Transform: ARC SINE(SQUARE ROOT(Y))

Shapiro Wilks test for normality

D = 0.400

W = 0.911

Critical W (P = 0.05) (n = 24) = 0.916
Critical W (P = 0.01) (n = 24) = 0.884

Data PASS normality test at P=0.01 level. Continue analysis.

TINKER FHM SURVIVAL LOG #432 - EE08
File: FHMSUR432 Transform: ARC SINE(SQUARE ROOT(Y))

Hartley test for homogeneity of variance
Bartletts test for homogeneity of variance

These two tests can not be performed because at least one group has
zero variance.

Data FAIL to meet homogeneity of variance assumption.
Additional transformations are useless.

TITLE: TINKER FHM SURVIVAL LOG #432 - EE08
FILE: FHMSUR432
TRANSFORM: ARC SINE(SQUARE ROOT(Y)) NUMBER OF GROUPS: 6

GRP	IDENTIFICATION	REP	VALUE	TRANS VALUE
1	CONTROL	1	1.0000	1.4120
1	CONTROL	2	1.0000	1.4120
1	CONTROL	3	1.0000	1.4120
1	CONTROL	4	1.0000	1.4120
2	6.25%	1	0.9000	1.2490
2	6.25%	2	1.0000	1.4120
2	6.25%	3	1.0000	1.4120
2	6.25%	4	1.0000	1.4120
3	12.5%	1	1.0000	1.4120
3	12.5%	2	0.9000	1.2490
3	12.5%	3	1.0000	1.4120
3	12.5%	4	1.0000	1.4120
4	25%	1	0.5000	0.7854
4	25%	2	1.0000	1.4120
4	25%	3	0.8000	1.1071
4	25%	4	0.7000	0.9912
5	50%	1	0.7000	0.9912
5	50%	2	0.7000	0.9912
5	50%	3	0.9000	1.2490
5	50%	4	0.5000	0.7854
6	100%	1	0.9000	1.2490
6	100%	2	1.0000	1.4120
6	100%	3	0.9000	1.2490
6	100%	4	0.8000	1.1071

TINKER FHM SURVIVAL LOG #432 - EE08
File: FHMSUR432 Transform: ARC SINE(SQUARE ROOT(Y))

SUMMARY STATISTICS ON TRANSFORMED DATA TABLE 1 of 2

GRP	IDENTIFICATION	N	MIN	MAX	MEAN
1	CONTROL	4	1.412	1.412	1.412
2	6.25%	4	1.249	1.412	1.371
3	12.5%	4	1.249	1.412	1.371
4	25%	4	0.785	1.412	1.074
5	50%	4	0.785	1.249	1.004
6	100%	4	1.107	1.412	1.254

TINKER FHM SURVIVAL LOG #432 - EE08
File: FHMSUR432 Transform: ARC SINE(SQUARE ROOT(Y))

SUMMARY STATISTICS ON TRANSFORMED DATA TABLE 2 of 2

GRP	IDENTIFICATION	VARIANCE	SD	SEM
1	CONTROL	0.000	0.000	0.000
2	6.25%	0.007	0.081	0.041
3	12.5%	0.007	0.081	0.041
4	25%	0.069	0.262	0.131
5	50%	0.036	0.190	0.095
6	100%	0.016	0.125	0.062

TINKER FHM SURVIVAL LOG #432 - EE08
File: FHMSUR432 Transform: ARC SINE(SQUARE ROOT(Y))

STEELS MANY-ONE RANK TEST - Ho:Control<Treatment

GROUP	IDENTIFICATION	TRANSFORMED MEAN	RANK SUM	CRIT. VALUE	df	SIG
1	CONTROL	1.412				
2	6.25%	1.371	16.00	10.00	4.00	
3	12.5%	1.371	16.00	10.00	4.00	
4	25%	1.074	12.00	10.00	4.00	
5	50%	1.004	10.00	10.00	4.00	*
6	100%	1.254	12.00	10.00	4.00	

Critical values use k = 5, are 1 tailed, and alpha = 0.05

CHAIN OF CUSTODY RECORD

ANALYTICAL LAB
~~Quanterra~~
4955 Yarrow Street
Arvada, ~~CO 80002~~
Woodward-Clyde

Client Name:	**WOODWARD-CLYDE FEDERAL SERVICES**
Client Address:	3000 Tower Drive Ste 456, Del City, OK 73115 (405)677-2001
Project Name	SOLDIER CREEK SEDIMENT AND SURFACE WATER OPERABLE UNIT ECOLOGICAL ASSESSMENT, JUNE 1995
Team Leader:	**Kennedy**

Date	Time	Sample ID/Description	Matrix	# Samples	Analytical Parameters * VOC (8240)	SVOC (8270)	PCB'S & Pest. (8080)	METALS + Hg, Se, As, Tl [6010/7000/CP/MS (Ag, Cd, Cu, Pb)]	CYANIDE (9012)	~~TOC (415.1)~~ Toxicity	Lipids (Biota)	Remarks
6/9/95	07:30	SC-EE08-TX-201	Water	2						✓		2°C upon arrival
11	08:30	SC-EE08-TX-201	Sed	2						✓		
		SC-_____										
		SC-_____										
		SC-_____										
		SC-_____										
		SC-_____										
		SC-_____										
		SC-_____										
		SC-_____										

*Water VOC - three 40 ml vial - 4° C/HCL pH<2
SVOC - two 32 oz amber - 4° C
Metals + Hg - One 500 ml plastic - 4° C/HNO3 pH<2
PCB's/Pest. - Two 32 oz amber - 4° C
Cyanide - One 8 oz plastic - 4° C/NaOH pH>12

*Sediment VOC - two 4 oz jars - 4° C
SVOC, Metals, Cyanide, PCB's & Pest. - One 16 oz jar - 4° C

*Biota VOC,SVOC, PCBs & Pest., Metals, Cyanide - One 32 oz wide-mouth jar - collected in triplicate

CUSTODY TRANSFERS PRIOR TO SHIPPING

Relinquished By (Signed)	Received By (Signed)	Date	Time
		6/8/95	1800

SHIPPING DETAILS

Delivered to Shipper By Kennedy/Spires		
Method of Shipment FedEx		**Airbill Number** 580482343O
Received for Lab by (signed)		**Date/Time** 6/9/95 0805
WCFS Project Number		F93506

White - Client
Pink - Lab
Yellow - File

CHAIN OF CUSTODY RECORD

ANALYTICAL LAB
~~Quanterra~~
~~4955 Yarrow Street~~
~~Arvada, CO 80002~~

Woodward-Clyde

Client Name: WOODWARD-CLYDE FEDERAL SERVICES
Client Address: 3000 Tower Drive Ste 456, Del City, OK 73115 (405)677-2001

Project Name
SOLDIER CREEK SEDIMENT AND SURFACE WATER OPERABLE UNIT
ECOLOGICAL ASSESSMENT, JUNE 1995

Team Leader: Kennedy

Analytical Parameters *

Date	Time	Sample ID/Description	Matrix	# Samples	VOC (8240)	SVOC (8270)	PCB'S & Pest. (8080)	METALS + Hg, Se, As, Tl [6010/7000/ICP/MS (Ag, Cd, Cu, Pb)]	CYANIDE (9012)	~~TOC (415.1)~~ Toxicity	Lipids (Biota)	Remarks
6/8/95	07:30	SC-EE08-TX-201	Water	3						✓		0.5°C upon arrival
		SC-____-__-___										
		SC-____-__-___										
		SC-____-__-___										
		SC-____-__-___										
		SC-____-__-___										
		SC-____-__-___										
		SC-____-__-___										
		SC-____-__-___										
		SC-____-__-___										

*Water
VOC - three 40 ml vial - 4° C/HCL pH<2
SVOC - two 32 oz amber - 4° C
Metals + Hg - One 500 ml plastic - 4° C/HNO3 pH<2
PCB's/Pest. - Two 32 oz amber - 4° C
Cyanide - One 8 oz plastic - 4° C/NaOH pH>12

*Sediment
VOC - two 4 oz jars - 4° C
SVOC, Metals, Cyanide, PCB's & Pest. - One 16 oz jar - 4° C

*Biota
VOC,SVOC, PCBs & Pest., Metals, Cyanide - One 32 oz wide-mouth jar - collected in triplicate

CUSTODY TRANSFERS PRIOR TO SHIPPING

Relinquished By (Signed)	Received By (Signed)	Date	Time
[signature]		6/8/95	18:00

SHIPPING DETAILS

Delivered to Shipper By
Kennedy/Spires

Method of Shipment
FedEx

Airbill Number
5804823430

Received for Lab by (signed)
Lya Teer

Date/Time
6/9/95 0910

WCFS Project Number F93506

White - Client
Pink - Lab
Yellow - File

WCFSCOC.XLS

TEST SUMMARY: SC-EE09-TX-201
Ceriodaphnia dubia 48-Hour Static Acute

Test protocol:	WCC SOP 401.2
Test organism:	*Ceriodaphnia dubia*
Source:	WCC Culture Laboratory
Age of test organism:	<24 hours
Test initiation:	6/8/95
Test termination:	6/10/95
Temperature:	25 +/- 1 °C
Light:	50 - 100 foot candles
Photoperiod:	16 hours light/8 hours dark
Test vessel:	30 mL styrene
Test volume:	20 mL
Organisms/replicate:	5
Replicates/concentration:	4
Feeding regime:	none
Aeration during test:	none
Dilution Water:	Hard Reconstituted Synthetic
Test duration:	48 hours
Effect measured:	Mortality
Reference Toxicant Data:	
LC_{50} (g/L NaCl):	1.51

TEST RESULTS: SC-EE09-TX-201
Ceriodaphnia dubia 48-Hour Static Acute

LC_{50} >100%

Statictical analysis method: N/A

Treatment (% Sample)	Survival (%)	pH	Conductivity (umhos/cm)	DO (mg/L)	Temperature (°C)	Hardness (mg/L $CaCO_3$)	Alkalinity (mg/L $CaCO_3$)
Control	100	8.51-8.54	645 (643-646)	8.4 (8.1-8.6)	24.7 (24.5-24.8)	250	
6.25	100	8.38-8.50	664 (623-705)	8.4 (8.1-8.6)	24.7 (24.5-24.8)		
12.5	100	8.41-8.51	595 (461-728)	8.4 (8.2-8.6)	24.7 (24.5-24.8)		
25	95	8.39-8.53	735 (706-764)	8.5 (8.2-8.7)	24.7 (24.5-24.8)		
50	80	8.31-8.55	801 (759-843)	8.5 (8.2-8.7)	24.7 (24.5-24.8)		
100	65	8.16-8.57	907 (824-989)	8.4 (8.0-8.7)	24.7 (24.5-24.8)	250	178

SURFACE WATER SAMPLE ARRVIAL INFORMATION

Collection Date/Time:	6/7/95 @ 1515
Use Date/Time:	6/8/95 @ 1500
Method of Shipment:	Overnight Courier
Temperature (°C):	1.0
pH:	7.78
Ammonia (mg/L):	17.6
Conductivity (umhos/cm):	989
DO (mg/L):	8.6

TEST SUMMARY: SC-EE09-TX-201
Ceriodaphnia dubia Chronic Renewal

Test protocol:	WCC SOP 501.1
Test organism:	*Ceriodaphnia dubia*
Source:	WCC Culture Laboratory
WCC Batch:	6/10/95
Age of test organism:	<24 hours
Test initiation:	6/10/95
Test termination:	6/17/95
Temperature:	25 +/- 1 °C
Light:	50 - 100 foot candles
Photoperiod:	16 hours light/8 hours dark
Test vessel:	30 mL styrene
Test volume:	15 mL
Organisms/replicate:	1
Replicates/concentration:	10
Feeding regime:	0.05 mL *Selenastrum* and 0.05 mL YTC daily
Aeration during test:	none
Dilution Water:	Hard Reconstituted Synthetic
Test duration:	7 days
Effect measured:	Survival and reproduction

Toxicity test methods and procedures were followed in accordance with EPA 600/4-89/001

Reference Toxicant Data:	
NOEC (g/L NaCl):	0.75

TEST RESULTS: SC-EE09-TX-201
Ceriodaphnia dubia Chronic Survival and Reproduction Test

Survival NOEC:	50%
Statistical analysis method:	Steel's Many-One Rank
Normality test:	Fail
Homogeneity of variance test:	Fail
Reproduction NOEC:	12.5%
Statistical analysis method:	Dunnetts
Normality test:	Pass
Homogeneity of variance test:	Pass

Treatment (% Sample)	Survival (%)	pH	Conductivity (umhos/cm)	DO (mg/L)	Temperature (°C)
Control	100	7.81-8.64	692 (338-801)	8.1 (7.5-8.5)	24.5 (24.0-25.0)
6.25	80	7.30-8.53	664 (380-794)	8.1 (7.5-8.5)	24.5 (24.0-25.0)
12.5	90	8.05-8.52	703 (419-784)	8.1 (7.5-8.6)	24.5 (24.0-25.0)
25	70	8.09-8.52	754 (487-835)	8.1 (7.5-8.6)	24.5 (24.0-25.0)
50	90	8.19-8.57	812 (558-899)	8.1 (7.5-8.6)	24.5 (24.0-25.0)
100	40	8.12-8.61	968 (762-1074)	8.2 (7.4-8.8)	24.5 (24.0-25.0)

	Hardness (mg/L $CaCO_3$)	Alkalinity (mg/L $CaCO_3$)	Ammonia (mg/L)
Control	250		
EE09	250	178	17.6

TEST SUMMARY: SC-EE09-TX-201
Pimephales promelas 48-Hour Static Acute

Test protocol:	WCC SOP 410.2
Test organism:	*Pimephales promelas*
Source:	Woodward-Clyde Consultants
Age of test organism:	6 days
Test initiation:	6/8/95
Test termination:	6/10/95
Temperature:	20 +/- 1 °C
Light:	50 - 100 foot candles
Photoperiod:	16 hours light/8 hours dark
Test vessel:	500 mL plastic beaker
Test volume:	250 mL
Organisms/replicate:	10
Replicates/concentration:	2
Feeding regime:	none
Aeration during test:	none
Dilution Water:	Spring Water
Test duration:	48 hours
Effect measured:	Mortality
Reference Toxicant Data:	
LC_{50} (g/L NaCl):	5.26

TEST RESULTS: SC-EE09-TX-201
Pimephales promelas 48-Hour Static Acute

LC_{50} > 100%

Statictical analysis method: N/A

Treatment (% Sample)	Survival (%)	pH	Conductivity (umhos/cm)	DO (mg/L)	Temperature (°C)	Hardness (mg/L $CaCO_3$)	Alkalinity (mg/L $CaCO_3$)
Control	90	7.68-8.54	682 (643-720)	8.4 (8.2-8.6)	20.9 (20.4-21.3)	158	146
6.25	95	8.38-8.43	697 (689-705)	8.4 (8.2-8.6)	20.9 (20.4-21.3)		
12.5	100	8.41-8.51	701 (674-728)	8.4 (8.1-8.7)	20.9 (20.4-21.3)		
25	85	8.39-8.53	775 (764-785)	8.5 (8.2-8.7)	20.9 (20.4-21.3)		
50	90	8.31-8.53	852 (843-860)	8.5 (8.2-8.7)	20.9 (20.4-21.3)		
100	90	8.16-8.59	995 (989-1000)	8.4 (8.1-8.7)	20.9 (20.4-21.3)	250	174

SURFACE WATER SAMPLE ARRVIAL INFORMATION

Collection Date/Time:	6/7/95 @ 1515
Use Date/Time:	6/8/95 @ 1600
Method of Shipment:	Overnight Courier
Temperature (°C):	1.0
pH:	7.78
Ammonia (mg/L):	17.6
Conductivity (umhos/cm):	989
DO (mg/L):	8.6
Description:	Clear

TEST SUMMARY: SC-EE09-TX-201
Pimephales promelas Chronic Renewal

Test protocol:	WCC SOP 510.1
Test organism:	*Pimephales promelas*
Source:	Environmental Consulting & Testing
Age of test organism:	<24 hours
Test initiation:	6/10/95 @ 1845
Test termination:	6/17/95 @ 1330
Temperature:	25 +/- 1 °C
Light:	50 - 100 foot candles
Photoperiod:	16 hours light/8 hours dark
Test vessel:	500 mL plastic beaker
Test volume:	250 mL
Organisms/replicate:	10
Replicates/concentration:	4
Feeding regime:	0.1 mL brine shrimp nauplii twice daily
Aeration during test:	none
Dilution Water:	Spring Water
Test duration:	7 days
Effect measured:	Survival and growth

Toxicity test methods and procedures were followed in accordance with EPA 600/4-89/001

Reference Toxicant Data:

NOEC (g/L NaCl):	3.0

TEST RESULTS : SC- EE09-TX-201
Pimephales promelas Chronic Survival and Growth Test

Survival NOEC:	100%
Statistical analysis method:	Steel's Many-One Rank
Normality test:	Fail
Homogeneity of variance test:	Fail
Growth NOEC:	100%
Statistical analysis method:	Dunnetts
Normality test:	Pass
Homogeneity of variance test:	Pass

Treatment (% Sample)	Survival (%)	pH	Conductivity (umhos/cm)	DO (mg/L)	Temperature (°C)
Control	100	7.47-8.36	376 (325-459)	7.7 (7.0-8.5)	24.5 (24.0-25.0)
6.25	100	7.54-8.48	388 (333-447)	7.8 (7.0-8.5)	24.5 (24.0-25.0)
12.5	100	7.61-8.34	418 (394-456)	7.7 (7.0-8.5)	24.5 (24.0-25.0)
25	100	7.68-8.37	475 (280-597)	7.7 (6.9-8.6)	24.5 (24.0-25.0)
50	97.5	7.82-8.37	648 (550-769)	7.8 (6.9-8.5)	24.5 (24.0-25.0)
100	95	7.97-8.43	964 (789-1139)	8.0 (6.4-8.9)	24.5 (24.0-25.0)

	Hardness (mg/L $CaCO_3$)	Alkalinity (mg/L $CaCO_3$	Ammonia (mg/L)
Control	158	146	
EE09	250	178	17.6

48-hr Ceriodaphnia dubia TOXICITY TEST

LOG NO. 421
JOB NO. F93206
INDUSTRY: Tanker
CONTACT:

EFFLUENT: Control
START DATE: 6-8-95
START TIME: 1500
DILUTION WATER: Hard 250

CONC (%)	REP ID	SURVIVAL (#) 0	24	48	btAb	TEMPERATURE (oC) 0	24	48	DO (mg/L) 0	24	48	pH (S.U.) 0	24	48	CONDUCTIVITY (umhos/cm) 0	24	48
Con	A	5	5	5		24.8		24.5	8.6		7.1	7.64		8.01	673		676
	B	5	5	5													
	C	5	5	5													
	D	5	5	5													
	A																
	B																
	C																
	D																
	A																
	B																
	C																
	D																
	A																
	B																
	C																
	D																
	A																
	B																
	C																
	D																
Initials		SLB	LJT	MLS													
Time		1500	1345	0830													

Comments

PARAMETER	Control	
Total Hardness (mg/L CaCO3)		
Total Alkalinity (mg/L CaCO3 @ 4.5)		

GRID

48-hr Ceriodaphnia dubia TOXICITY TEST

LOG NO. 421
JOB NO. E93506-3
INDUSTRY: Tinher
CONTACT:

EFFLUENT: [redacted] EE09
START DATE: 6-8-95
START TIME: 1500
DILUTION WATER: Hard 250

CONC (%)	REP ID	SURVIVAL (#) 0	24	48	DEAD	TEMPERATURE (oC) 0	24	48	DO (mg/L) 0	24	48	pH (S.U.) 0	24	48	CONDUCTIVITY (umhos/cm) 0	24	48
6.25	A	5	5	5	0	24.8		24.5	8.6		8.1	8.38		8.30	1.05		1.03
	B	5	5	5	0												
	C	5	5	5	0												
	D	5	5	5	0												
12.5	A	5	5	5	0				7.6		8.2	8.41		8.51	7.28		1.61
	B	5	5	5	0												
	C	5	5	5	0												
	D	5	5	5	0												
25	A	5	5	5	0				8.7		8.2	8.39		8.53	7.64		7.06
	B	5	5	5	0												
	C	5	5	5	0												
	D	5	5	4	1												
50	A	5	5	4	1				8.7		8.2	8.31		8.55	2.43		1.59
	B	5	5	4	1												
	C	5	5	4	1												
	D	5	5	4	1												
100	A	5	5	4	1				8.7		8.0	8.14		8.27	9.89		8.04
	B	5	4	4	1												
	C	5	3	2	3												
	D	5	4	3	2												
Initials		SJD	LJT	MLS													
Time		1530	1345	0840													

Comments

PARAMETER	Control	
Total Hardness (mg/L CaCO3)		
Total Alkalinity (mg/L CaCO3 @ 4.5)		

48-hr Pimephales promleas TOXICITY TEST

LOG NO. 421
JOB NO. EQ3506-3
INDUSTRY: Tinker
CONTACT:

EFFLUENT: EE09
START DATE: 6/8/95
START TIME: 1600
DILUTION WATER: Hard 250

CONC (%)	REP ID	SURVIVAL (#) 0	24	48	DIAG	TEMPERATURE (oC) 0	24	48	DO (mg/L) 0	24	48	pH (S.U.) 0	24	48	CONDUCTIVITY (umhos/cm) 0	24	48
Control	A	10	10	8	2	20.4		21.3	8.0		8.0	7.54		7.68	1043		1100
	B	10	10	10	0												
6.25	A	10	10	10	0				8.0		8.2	8.38		8.43	705		1284
	B	10	10	9	1												
12.5	A	10	10	10	0				8.7		8.1	8.41		8.51	728		1314
	B	10	10	10	0												
25	A	10	7	7	3				8.7		8.2	8.39		8.53	1064		1785
	B	10	10	10	0												
50	A	10	10	9	1				8.7		8.2	8.31		8.56	873		2460
	B	10	9	9	1												
100	A	10	9	8	3				8.7		8.1	8.14		8.59	989		1600
	B	10	10	10	0												
	A																
	B																
	A																
	B																
	A																
	B																
	A																
	B																
Initials		MLS	LJT	MLS													
Time		1600	1430	0800													

Comments

PARAMETER	Control	
Total Hardness (mg/L CaCO3)		
Total Alkalinity (mg/L CaCO3 @ 4.5)		

Ceriodaphnia SURVIVAL AND REPRODUCTION CHRONIC TOXICITY TEST

JOB NO. F93506 | BEGINNING: 1115 hrs; 6/10/95 | Log No. 427
INDUSTRY: Tinker | ENDING: 1200 hrs; 6/17/95 | PHOTOPERIOD: 16 light, 8 dark
CONTACT: | FEEDING REGIME: | ORGANISM SOURCE: WCC
EFFLUENT: EC09 | .05 mL yct/15 mL | TEST VESSEL CAPACITY: 30 mL
NPDES PERMIT NO: | .05 mL algal suspension/15 mL | TEST SOLUTION VOLUME: 15mL
PERSON CONDUCTING TEST: | | NO. REPLICATES:
| | DILUTION WATER:

CONC	CHAMBER	TIME / OBSERVER	NUMBER OF YOUNG PRODUCED							
			START	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7
						7	44	100	181	199
Control	1						3	6	9	2
	2						3	7	10	2
	3						4	6	6	0
	4						5	6	6	0
	5					3	3	3	4	6
	6						4	6	11	0
	7						4	8	11	5
	8						3	7	7	3
	9						2	4	9	3
	10					4	6	3	8	2
			START	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7
						10	46	90	162	192
6.25	11						5	7	8	0
	12					2	4	0	8	9
	13						4	8	10	0
	14						3	6	10	0
	15			~~5~~	(6)					
	16						4	6	7	0
	17					2	4	0	7	11
	18					4	8	(1)		
	19					2	0	7	12	10
	20						4	10	10	0
			20% mortality							
			START	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7
						6	51	102	165	194
12.5	21						6	7	8	1
	22					3	8	0	6	6
	23					3	8	0	5	7
	24						4	2	7	5
	25						3	7	9	0
	26						3	4	6	7
	27						3	7	7	0
	28						4	(1) 8		
	29						4	9	9	0
	30						2	7	6	0
						10% mortality				

Ceriodaphnia SURVIVAL AND REPRODUCTION CHRONIC TOXICITY TEST

JOB NO. F9358 | BEGINNING: 1115 hrs; 6/10/95 | Log No. 427
INDUSTRY: Tanker | ENDING: 1200 hrs; 6/17/95 | PHOTOPERIOD: 16 light, 8 dark
CONTACT: | FEEDING REGIME: | ORGANISM SOURCE: WCC
EFFLUENT: EC09 | .05 mL yct/15 mL | TEST VESSEL CAPACITY: 30 mL
NPDES PERMIT NO: | .05 mL algal suspension/15 mL | TEST SOLUTION VOLUME: 15mL
PERSON CONDUCTING TEST: | | NO. REPLICATES:
| | DILUTION WATER:

CONC	CHAMBER	START	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7	
	TIME									
	OBSERVER									
		NUMBER OF YOUNG PRODUCED								
25	31				6	26	66	93	107	
	32				2	0	7	7	10	26
	33					2	5	6	0	13
	34					2	7	5	1	15
	35				1	5	(D)			6
	36					3	7	0	0	10
	37					2	3	5		10
	38				(D) 3					3
	39					2	5	4	0	11
	40					3	6	C	3	12
						(D) 1				1
					30% mortality					
		START	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7	
					5	21	61	107	127	
50	41						6	6	0	12
	42				4	4	0	6	2	16
	43					1	5	9	0	15
	44					4	7	C	6	17
	45					4	7	0	5	16
	46						4	7	0	11
	47					3	3	7	0	13
	48					(D)				0
	49				1	0	6	8	7	22
	50						2	3	0	5
					10% mortality					
		START	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7	
						3	11	11	13	
100	51						0	0	0	0
	52							(D)		0
	53					(D) 1				1
	54						2	C	C	2
	55						(D)			0
	56						2	C	C	2
	57							(D)		0
	58				(D)					0
	59							(D)		0
	60					2	4	C	2	8
					60% mortality					

Ceriodaphnia dubia GRID Ceriodaphnia dubia GRID MONITORING DATA

Grid Letter: TY ~~II~~ TABU Start Date: 6-10-95 Sample ID: EE09 Log #: 42

AD	ID 33	1 ✓	2 ✓	3 ✓	4 2	5 7	6 5	7 1	AD	ID 8	1 ✓	2 ✓	3 ✓	4 3	5 7	6 7	7 3	AD	ID 56	1 ✓	2 ✓	3 ✓	4 0	5 2	6 0	7 0	AD	ID 20	1 ✓	2 ✓	3 ✓	4 4	5 10	6 10	7 0		ID 60	1	2 ✓	3 ✓	4	5 4	6 0	7
AD	ID 29	1 ✓	2 ✓	3 ✓	4 4	5 9	6 9	7 0	AD	ID 43	1 ✓	2 ✓	3 ✓	4 1	5 5	6 9	7 0	AD	ID 21	1 ✓	2 ✓	3 ✓	4 6	5 7	6 8	7 1	AD	ID 46	1 ✓	2 ✓	3 ✓	4 0	5 4	6 7	7 0		ID 10	1	2 ✓	3 4	4	5 3	6 8	7 2
AD	ID 18	1 ✓	2 ✓	3 4	4 8	5 D	6	7	AD	ID 4	1 ✓	2 ✓	3 ✓	4 5	5 6	6 6	7 0	AD	ID 57	1 ✓	2 ✓	3 ✓	4 0	5 0	6 D	7	AD	ID 54	1 ✓	2 ✓	3 ✓	4 0	5 2	6 0	7 0		ID 28	1	2 ✓	3 ✓	4 4	5 D 8	6	7
AD	ID 26	1 ✓	2 ✓	3 ✓	4 3	5 4	6 6	7 7	AD	ID 11	1 ✓	2 ✓	3 ✓	4 5	5 7	6 8	7 0	AD	ID 37	1 ✓	2 ✓	3 M 3	4	5	6	7	AD	ID 19	1 ✓	2 ✓	3 2	4 0	5 7	6 12	7 10		ID 40	1	2 ✓	3 ✓	4	5	6	7
AD	ID 59	1 ✓	2 ✓	3 ✓	4 0	5 0	6 D	7	AD	ID 13	1 ✓	2 ✓	3 ✓	4 4	5 8	6 10	7 0	AD	ID 32	1 ✓	2 ✓	3 ✓	4 2	5 5	6 6	7 0	AD	ID 5	1 ✓	2 ✓	3 3	4 3	5 3	6 4	7 6		ID 50	1	2 ✓	3 0	4 0	5 2	6 3	7 0
AD	ID 15	1 ✓	2 M	3	4	5	6	7	AD	ID 22	1 ✓	2 ✓	3 3	4 8	5 0	6 6	7 6	AD	ID 47	1 ✓	2 ✓	3 ✓	4 3	5 3	6 7	7 0	AD	ID 51	1 ✓	2 ✓	3 ✓	4 0	5 0	6 0	7 0		ID 39	1	2 ✓	3 ✓	4 3	5 6	6 0	7 3

Comments:

Cup ID	Sample Concentration	Day	Initials	Time
		6-10	MAR	1115
1–10:	~~Control~~ ~~6.25~~ CONTROL	1	MAR	1105
11–20:	~~6.25~~ 6.25	2	SJB	1500
21–30:	~~25~~ 12.5	3	SJB	1300
31–40:	~~50~~ 25	4	LJT	1500
41–50:	50	5	LJT	1445
51–60:	100	6	LJT	1415
		7	LJT	1200

Ceriodaphnia dubia GRID Ceriodaphnia dubia GRID MONITORING DATA

Grid Letter: ~~P Ø T W V Ø~~ II Start Date: 6-10-95 Sample ID: EE09 Log #: -

AD	ID 24	1 ✓	2 ✓	3 ✓	4 4	5 2	6 7	7 8	AD	ID 35	1 ✓	2 ✓	3 ✓	4 3	5 7	6 0	7 0
AD	ID 58	1 ✓	2 ✓	3 M	4	5	6	7	AD	ID 16	1 ✓	2 ✓	3 ✓	4 4	5 6	6 7	7 0
	ID 27	1 ✓	2 ✓	3 ✓	4 3	5 7	6 7	7 0	AD	ID 52	1 ✓	2 ✓	3 ✓	4 0	5 D	6	7
AD	ID 3	1 ✓	2 ✓	3 ✓	4 4	5 6	6 6	7 0	AD	ID 44	1 ✓	2 ✓	3 ✓	4 4	5 7	6 0	7 6
AD	ID 23	1 ✓	2 ✓	3 3	4 8	5 0	6 5	7 7		ID 53	1 ✓	2 ✓	3 ✓	4 D	5	6	7
AD	ID 17	1 ✓	2 ✓	3 2	4 4	5 0	6 7	7 11	AD	ID 49	1 ✓	2 ✓	3 1	4 0	5 6	6 8	7 7
AD	ID 34	1 ✓	2 ✓	3 1	4 5	5 D	6	7	AD	ID 2	1 ✓	2 ✓	3 ✓	4 3	5 7	6 10	7 2
	ID 12	1 ✓	2 ✓	3 2	4 4	5 0	6 8	7 9	AD	ID 42	1 ✓	2 ✓	3 4	4 4	5 0	6 6	7 2
AD	ID 9	1 ✓	2 ✓	3 ✓	4 2	5 4	6 9	7 3	AD	ID 1	1 ✓	2 ✓	3 ✓	4 3	5 6	6 9	7 2
AD	ID 48	1 ✓	2 ✓	3 ✓	4 D	5	6	7		ID 30	1 ✓	2 ✓	3 ✓	4 2	5 7	6 6	7 0
AD	ID 55	1 ✓	2 ✓	3 ✓	4 0	5 D	6	7	AD	ID 14	1 ✓	2 ✓	3 ✓	4 3	5 6	6 10	7 0
AD	ID 41	1 ✓	2 ✓	3 ✓	4 0	5 6	6 6	7 0	AD	ID 25	1 ✓	2 ✓	3 ✓	4 3	5 7	6 9	7 0
	ID 6	1 ✓	2 ✓	3 ✓	4 4	5 6	6 11	7 0	AD	ID 45	1 ✓	2 ✓	3 ✓	4 4	5 7	6 0	7 5
AD	ID 7	1 ✓	2 ✓	3 ✓	4 4	5 8	6 11	7 0	AD	ID 36	1 ✓	2 ✓	3 ✓	4 2	5 3	6 5	7 0
AD	ID 31	1 ✓	2 ✓	3 2	4 0	5 7	6 7	7 10		ID 38	1 ✓	2 ✓	3 ✓	4 2	5 5	6 4	7 0

Comments:

Cup ID	Sample Concentration	Day 6-10	Initials	Time
1–10:	Control	1	MAR	1108
11–20:	6.25	2	MAR	1054
21–30:	12.5	3	SD	1500
31–40:	25	4	JJR	1300
41–50:	50	5	LJT	1430
51–60:	100	6	LJT	1435
		7	LJT	1400
			LJT	1200

EE09
Log: 427
6-10-95
C. dubia

CHRONIC TOXICITY TEST DATA SHEET

TEMPERATURE

CONCENTRATION	Start	Day 1 OLD	Day 1 NEW	Day 2 OLD	Day 2 NEW	Day 3 OLD	Day 3 NEW	Day 4 OLD	Day 4 NEW	Day 5 OLD	Day 5 NEW	Day 6 OLD	Day 6 NEW	Day 7 OLD	Day 7 NEW	Day 8 OLD
CON 250	25.2	24.0	~~24.8~~ MLS 24.8	24.0	24.0	24.2	24.8	24.0	24.0	25.0	25.0	25.0	24.5	24.0		
6.25																
12.5																
25																
50																
100																

DISSOLVED OXYGEN

CONCENTRATION	Start	Day 1 OLD	Day 1 NEW	Day 2 OLD	Day 2 NEW	Day 3 OLD	Day 3 NEW	Day 4 OLD	Day 4 NEW	Day 5 OLD	Day 5 NEW	Day 6 OLD	Day 6 NEW	Day 7 OLD	Day 7 NEW	Day 8 OLD
CON	8.2	8.3	8.3	7.8	8.0	8.5	8.0	7.9	8.0	7.6	8.2	7.5	8.2	7.7		
6.25	8.3	8.3	8.3	7.7	7.2	8.5	8.0	8.2	8.6	7.6	8.3	7.5	8.1	7.7		
12.5	8.3	8.2	8.4	7.7	7.3	8.6	8.1	8.0	8.7	7.6	8.4	7.5	8.4	7.7		
25	8.2	8.1	8.4	7.7	7.3	8.6	8.1	8.0	8.6	7.6	8.3	7.5	8.4	7.6		
50	8.2	8.1	8.3	7.7	7.3	8.6	8.1	8.1	8.5	7.5	8.3	7.5	8.5	7.7		
100	8.3	8.3	8.3	7.6	8.1	8.7	8.1	8.1	8.6	7.6	8.5	7.4	8.5	7.7		

pH

CONCENTRATION	Start	Day 1 OLD	Day 1 NEW	Day 2 OLD	Day 2 NEW	Day 3 OLD	Day 3 NEW	Day 4 OLD	Day 4 NEW	Day 5 OLD	Day 5 NEW	Day 6 OLD	Day 6 NEW	Day 7 OLD	Day 7 NEW	Day 8 OLD
CON	7.68	8.35	8.53	7.92	7.30	8.51	7.72	7.81	7.73	8.23	8.30	8.36	8.49	8.39		
6.25	8.45	8.41	8.47	8.05	8.41	8.52	8.46	8.35	8.49	8.25	8.47	8.35	8.48	8.43		
12.5	8.47	8.43	8.47	8.09	8.43	8.51	8.51	8.46	8.52	8.20	8.46	8.36	8.47	8.44		
25	8.41	8.44	8.41	8.15	8.40	8.52	8.50	8.46	8.48	8.20	8.41	8.37	8.43	8.45		
50	8.31	8.47	8.32	8.19	8.31	8.57	8.47	8.49	8.38	8.20	8.29	8.37	8.31	8.51		
100	8.12	8.57	8.17	8.29	8.18	8.61	8.42	8.55	8.25	8.31	8.15	8.46	8.24	8.55		

CONDUCTIVITY

CONCENTRATION	Start	Day 1 OLD	Day 1 NEW	Day 2 OLD	Day 2 NEW	Day 3 OLD	Day 3 NEW	Day 4 OLD	Day 4 NEW	Day 5 OLD	Day 5 NEW	Day 6 OLD	Day 6 NEW	Day 7 OLD	Day 7 NEW	Day 8 OLD
CON	752	706	648	741	238	659	788	861	773	755	648	727	647	708		
6.25	692	640	593	794	380	477	619	741	710	741	698	783	704	725		
12.5	729	751	455	776	419	547	745	748	722	757	720	773	728	784		
25	725	633	719	835	487	762	780	817	760	834	760	826	772	811		
50	817	558	742	895	540	758	857	771	822	879	842	819	857	868		
100	954	742	997	1025	553	963	1018	774	987	1061	967	1074	985	1024		

EE09 CERIO CHRONIC
File: CDEE09 Transform: NO TRANSFORMATION

Chi-square test for normality: actual and expected frequencies

INTERVAL	<-1.5	-1.5 to <-0.5	-0.5 to 0.5	>0.5 to 1.5	>1.5
EXPECTED	4.020	14.520	22.920	14.520	4.020
OBSERVED	4	15	24	15	2

Calculated Chi-Square goodness of fit test statistic = 1.0977
Table Chi-Square value (alpha = 0.01) = 13.277

Data PASS normality test. Continue analysis.

EE09 CERIO CHRONIC
File: CDEE09 Transform: NO TRANSFORMATION

Hartley test for homogeneity of variance

Calculated H statistic (max Var/min Var) = 11.98
Closest, conservative, Table H statistic = 12.1 (alpha = 0.01)

sed for Table H ==> R (# groups) = 6, df (# reps-1) = 9
actual values ==> R (# groups) = 6, df (# avg reps-1) = 9.00

Data PASS homogeneity test. Continue analysis.

NOTE: This test requires equal replicate sizes. If they are unequal but do not differ greatly, the Hartley test may still be used as an approximate test (average df are used).

TITLE: EE09 CERIO CHRONIC
FILE: CDEE09
TRANSFORM: NO TRANSFORMATION NUMBER OF GROUPS: 6

GRP	IDENTIFICATION	REP	VALUE	TRANS VALUE
1	CONTROL	1	20.0000	20.0000
1	CONTROL	2	22.0000	22.0000
1	CONTROL	3	16.0000	16.0000
1	CONTROL	4	17.0000	17.0000
1	CONTROL	5	19.0000	19.0000
1	CONTROL	6	21.0000	21.0000
1	CONTROL	7	23.0000	23.0000
1	CONTROL	8	20.0000	20.0000
1	CONTROL	9	18.0000	18.0000
1	CONTROL	10	23.0000	23.0000
2	6.25	1	20.0000	20.0000
2	6.25	2	23.0000	23.0000
2	6.25	3	22.0000	22.0000
2	6.25	4	19.0000	19.0000
2	6.25	5	0.0000	0.0000
2	6.25	6	17.0000	17.0000
2	6.25	7	24.0000	24.0000
2	6.25	8	12.0000	12.0000
2	6.25	9	31.0000	31.0000
2	6.25	10	24.0000	24.0000
3	12.5	1	22.0000	22.0000
3	12.5	2	23.0000	23.0000
3	12.5	3	23.0000	23.0000
3	12.5	4	21.0000	21.0000
3	12.5	5	19.0000	19.0000
3	12.5	6	20.0000	20.0000
3	12.5	7	17.0000	17.0000
3	12.5	8	12.0000	12.0000
3	12.5	9	22.0000	22.0000
3	12.5	10	15.0000	15.0000
4	25	1	26.0000	26.0000
4	25	2	13.0000	13.0000
4	25	3	15.0000	15.0000
4	25	4	6.0000	6.0000
4	25	5	10.0000	10.0000
4	25	6	10.0000	10.0000
4	25	7	3.0000	3.0000
4	25	8	11.0000	11.0000
4	25	9	12.0000	12.0000
4	25	10	1.0000	1.0000
5	50	1	12.0000	12.0000
5	50	2	16.0000	16.0000
5	50	3	15.0000	15.0000
5	50	4	17.0000	17.0000
5	50	5	16.0000	16.0000
5	50	6	11.0000	11.0000
5	50	7	13.0000	13.0000
5	50	8	0.0000	0.0000
5	50	9	22.0000	22.0000
5	50	10	5.0000	5.0000

6	100	1	0.0000	0.0000
6	100	2	0.0000	0.0000
6	100	3	1.0000	1.0000
6	100	4	2.0000	2.0000
6	100	5	0.0000	0.0000
6	100	6	2.0000	2.0000
6	100	7	0.0000	0.0000
6	100	8	0.0000	0.0000
6	100	9	0.0000	0.0000
6	100	10	8.0000	8.0000

EE09 CERIO CHRONIC
File: CDEE09 Transform: NO TRANSFORMATION

ANOVA TABLE

SOURCE	DF	SS	MS	F
Between	5	2647.733	529.547	17.255
Within (Error)	54	1657.200	30.689	
Total	59	4304.933		

Critical F value = 2.45 (0.05,5,40)
Since F > Critical F REJECT Ho:All groups equal

EE09 CERIO CHRONIC
File: CDEE09 Transform: NO TRANSFORMATION

DUNNETTS TEST - TABLE 1 OF 2 Ho:Control<Treatment

GROUP	IDENTIFICATION	TRANSFORMED MEAN	MEAN CALCULATED IN ORIGINAL UNITS	T STAT	SIG
1	CONTROL	19.900	19.900		
2	6.25	19.200	19.200	0.283	
3	12.5	19.400	19.400	0.202	
4	25	10.700	10.700	3.713	*
5	50	12.700	12.700	2.906	*
6	100	1.300	1.300	7.508	*

Dunnett table value = 2.31 (1 Tailed Value, P=0.05, df=40,5)

EE09 CERIO CHRONIC
File: CDEE09 Transform: NO TRANSFORMATION

DUNNETTS TEST - TABLE 2 OF 2 Ho:Control<Treatment

GROUP	IDENTIFICATION	NUM OF REPS	Minimum Sig Diff (IN ORIG. UNITS)	% of CONTROL	DIFFERENCE FROM CONTROL

1	CONTROL	10			
2	6.25	10	5.723	28.8	0.700
3	12.5	10	5.723	28.8	0.500
4	25	10	5.723	28.8	9.200
5	50	10	5.723	28.8	7.200
6	100	10	5.723	28.8	18.600

EE09 CERIO CHRONIC
File: CDEE09 Transform: NO TRANSFORMATION

STEELS MANY-ONE RANK TEST - Ho:Control<Treatment

GROUP	IDENTIFICATION	TRANSFORMED MEAN	RANK SUM	CRIT. VALUE	df	SIG
1	CONTROL	19.900				
2	6.25	19.200	111.50	75.00	10.00	
3	12.5	19.400	104.50	75.00	10.00	
4	25	10.700	65.00	75.00	10.00	*
5	50	12.700	65.00	75.00	10.00	*
6	100	1.300	55.00	75.00	10.00	*

Critical values use k = 5, are 1 tailed, and alpha = 0.05

TINKER C. DUBIA SURVIVAL LOG #427 - EE09
File: CDSUR427 Transform: ARC SINE(SQUARE ROOT(Y))

Chi-square test for normality: actual and expected frequencies

INTERVAL	<-1.5	-1.5 to <-0.5	-0.5 to 0.5	>0.5 to 1.5	>1.5
EXPECTED	4.020	14.520	22.920	14.520	4.020
OBSERVED	4	9	36	11	0

Calculated Chi-Square goodness of fit test statistic = 14.4364
Table Chi-Square value (alpha = 0.01) = 13.277

Data FAIL normality test. Try another transformation.

Warning - The two homogeneity tests are sensitive to non-normal data and should not be performed.

TINKER C. DUBIA SURVIVAL LOG #427 - EE09
File: CDSUR427 Transform: ARC SINE(SQUARE ROOT(Y))

Hartley test for homogeneity of variance
Bartletts test for homogeneity of variance

These two tests can not be performed because at least one group has zero variance.

Data FAIL to meet homogeneity of variance assumption.
Additional transformations are useless.

TITLE: TINKER C. DUBIA SURVIVAL LOG #427 - EE09
ILE: CDSUR427
RANSFORM: ARC SINE(SQUARE ROOT(Y)) NUMBER OF GROUPS: 6

GRP	IDENTIFICATION	REP	VALUE	TRANS VALUE
1	CONTROL	1	1.0000	1.0472
1	CONTROL	2	1.0000	1.0472
1	CONTROL	3	1.0000	1.0472
1	CONTROL	4	1.0000	1.0472
1	CONTROL	5	1.0000	1.0472
1	CONTROL	6	1.0000	1.0472
1	CONTROL	7	1.0000	1.0472
1	CONTROL	8	1.0000	1.0472
1	CONTROL	9	1.0000	1.0472
1	CONTROL	10	1.0000	1.0472
2	6.25%	1	1.0000	1.0472
2	6.25%	2	1.0000	1.0472
2	6.25%	3	1.0000	1.0472
2	6.25%	4	1.0000	1.0472
2	6.25%	5	0.0000	0.5236
2	6.25%	6	1.0000	1.0472
2	6.25%	7	1.0000	1.0472
2	6.25%	8	0.0000	0.5236
2	6.25%	9	1.0000	1.0472
2	6.25%	10	1.0000	1.0472
3	12.5%	1	1.0000	1.0472
3	12.5%	2	1.0000	1.0472
3	12.5%	3	1.0000	1.0472
3	12.5%	4	1.0000	1.0472
3	12.5%	5	1.0000	1.0472
3	12.5%	6	1.0000	1.0472
3	12.5%	7	1.0000	1.0472
3	12.5%	8	0.0000	0.5236
3	12.5%	9	1.0000	1.0472
3	12.5%	10	1.0000	1.0472
4	25%	1	1.0000	1.0472
4	25%	2	1.0000	1.0472
4	25%	3	1.0000	1.0472
4	25%	4	1.0000	1.0472
4	25%	5	0.0000	0.5236
4	25%	6	1.0000	1.0472
4	25%	7	0.0000	0.5236
4	25%	8	1.0000	1.0472
4	25%	9	1.0000	1.0472
4	25%	10	0.0000	0.5236
5	50%	1	1.0000	1.0472
5	50%	2	1.0000	1.0472
5	50%	3	1.0000	1.0472
5	50%	4	1.0000	1.0472
5	50%	5	1.0000	1.0472
5	50%	6	1.0000	1.0472
5	50%	7	1.0000	1.0472
5	50%	8	0.0000	0.5236
5	50%	9	1.0000	1.0472
5	50%	10	1.0000	1.0472

6	100%	1	1.0000	1.0472
6	100%	2	0.0000	0.5236
6	100%	3	0.0000	0.5236
6	100%	4	1.0000	1.0472
6	100%	5	0.0000	0.5236
6	100%	6	1.0000	1.0472
6	100%	7	0.0000	0.5236
6	100%	8	0.0000	0.5236
6	100%	9	0.0000	0.5236
6	100%	10	1.0000	1.0472

TINKER C. DUBIA SURVIVAL LOG #427 - EE09
File: CDSUR427 Transform: ARC SINE(SQUARE ROOT(Y))

SUMMARY STATISTICS ON TRANSFORMED DATA TABLE 1 of 2

GRP	IDENTIFICATION	N	MIN	MAX	MEAN
1	CONTROL	10	1.047	1.047	1.047
2	6.25%	10	0.524	1.047	0.942
3	12.5%	10	0.524	1.047	0.995
4	25%	10	0.524	1.047	0.890
5	50%	10	0.524	1.047	0.995
6	100%	10	0.524	1.047	0.733

TINKER C. DUBIA SURVIVAL LOG #427 - EE09
File: CDSUR427 Transform: ARC SINE(SQUARE ROOT(Y))

SUMMARY STATISTICS ON TRANSFORMED DATA TABLE 2 of 2

GRP	IDENTIFICATION	VARIANCE	SD	SEM
1	CONTROL	0.000	0.000	0.000
2	6.25%	0.049	0.221	0.070
3	12.5%	0.027	0.166	0.052
4	25%	0.064	0.253	0.080
5	50%	0.027	0.166	0.052
6	100%	0.073	0.270	0.086

TINKER C. DUBIA SURVIVAL LOG #427 - EE09
File: CDSUR427 Transform: ARC SINE(SQUARE ROOT(Y))

STEELS MANY-ONE RANK TEST - Ho:Control<Treatment

GROUP	IDENTIFICATION	TRANSFORMED MEAN	RANK SUM	CRIT. VALUE	df	SIG
1	CONTROL	1.047				
2	6.25%	0.942	95.00	75.00	10.00	
3	12.5%	0.995	100.00	75.00	10.00	

4	25%	0.890	90.00	75.00	10.00	
5	50%	0.995	100.00	75.00	10.00	
6	100%	0.733	75.00	75.00	10.00	*

Critical values use k = 5, are 1 tailed, and alpha = 0.05

7–DAY CHRONIC TOXICITY TEST

JOB NO. F93506
INDUSTRY: Tinker
CONTACT:
EFFLUENT: EE09
NPDES PERMIT NO:
SAMPLE TYPE: Grab
DILUTION WATER: Spring #1

PERSON CONDUCTING TEST:
BEGINNING: 1345 hrs; 6/10/95
ENDING: ____ hrs; / /95
TEST
DILUTIONS: .5
AGE: < 24 hrs
ORGANISM SOURCE: EC&T Batch 55

PHOTOPERIOD: 16 hr light
FEEDING REGIME: 2
0.1 ml Artemia @ 3 times/day
TEST VESSEL CAPACITY: ~~1 liter~~ 500
TEST SOLUTION VOLUME: ~~500~~ mL 2
NO. ORGANISMS/TREATMENT: 10
NO. REPLICATES: 4

CONC (%)	REP ID	SURVIVAL (#) START	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7
Con	A	10	10	10	10	10	10	10	10
	B	10	10	10	10	10	10	10	10
	C	10	10	10	10	10	10	10	10
	D	10	10	10	10	10	10	10	10
6.25	A	10	10	10	10	10	10	10	10
	B	10	10	10	10	10	10	10	10
	C	10	10	10	10	10	10	10	10
	D	10	10	10	10	10	10	10	10
12.5	A	10	10	10	10	10	10	10	10
	B	10	10	10	10	10	10	10	10
	C	10	10	10	10	10	10	10	10
	D	10	10	10	10	10	10	10	10
25	A	10	10	10	10	10	10	10	10
	B	10	10	10	10	10	10	10	10
	C	10	10	10	10	10	10	10	10
	D	10	10	10	10	10	10	10	10
	TIME:	1345	1130	NAC	1315	1400	1300	1420	1330
	INITIAL:	LJT	LJT	1337	MLS	MLS	SJB	SJB	TNT

GROWTH RESULTS

CONC (%)	REP ID	Boat ID	Tare wt (g)	Combined wt (g)	Tot Fish wt (g)	# of Fish	Avg Fish wt (mg)
CON	A		.98875	.99293	0.00418	10	0.418
	B		1.00904	1.01500	0.00596	10	0.596
	C		1.00729	1.01303	0.00574	10	0.574
	D		1.00716	1.01393	0.00677	10	0.677
6.25	A		1.00775	1.01342	0.00567	10	0.567
	B		1.00711	1.01282	0.00571	10	0.571
	C	1.01242	1.00639	~~1.01707~~	0.00623	10	0.623
	D		1.00899	1.01401	0.00502	10	0.502
12.5	A		.99060	.99697	0.00637	10	0.637
	B		.98619	.99233	0.00614	10	0.614
	C		.99702	1.00318	0.00616	10	0.616
	D		.99012	.99522	0.0051	10	0.51
25	A		.98983	.99467	0.00484	10	0.484
	B		1.00618	1.01187	0.00569	10	0.569
	C		1.00170	1.00645	0.00475	10	0.475
	D		1.00300	1.00808	0.00508	10	0.508

7-DAY CHRONIC TOXICITY TEST

JOB NO. F93506
INDUSTRY: Tinker
CONTACT:
EFFLUENT: EEC9
NPDES PERMIT NO:
SAMPLE TYPE:
DILUTION WATER: Spring #1

PERSON CONDUCTING TEST:
BEGINNING: ____ hrs; 6/10/95
ENDING: ____ hrs; / / .
TEST
DILUTIONS: 5
AGE: < 24 hrs
ORGANISM SOURCE: ECPT Batch 55

PHOTOPERIOD: 16 hr light
FEEDING REGIME:
0.1 ml Artemia @ ~~3~~ 2 times/day
TEST VESSEL CAPACITY: ~~1 liter~~ 500 ml
TEST SOLUTION VOLUME: ~~500~~ 250 mL
NO. ORGANISMS/TREATMENT: 10
NO. REPLICATES: ~~8~~ 4

CONC (%)	REP ID	SURVIVAL (#) START	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7
50	A	10	10	10	10	10	10	10	10
	B	10	10	10	10	10	10	10	10
	C	10	10	10	10	10	10	10	9
	D	10	10	10	10	10	10	10	10
100	A	10	10	10	10	10	10	10	10
	B	10	10	10	10	9	9	9	9
	C	10	10	9	9	9	9	9	9
	D	10	10	10	10	10	10	10	10
TIME:		1845	1130	~~1330~~ 1330	1315	1400	1300	1420	1350
INITIAL:		LJT	LJT	MLS	MLS	MLS	SJC	SJC	JH

GROWTH RESULTS

CONC (%)	REP ID	Boat ID	Tare wt (g)	Combined wt (g)	Tot Fish wt (g)	# of Fish	Avg Fish wt (mg)
50	A		.99670	1.00198	0.00528	10	0.528
	B		.99831	1.00330	0.00499	10	0.499
	C		.99179	.99680	0.00501	9	0.557
	D		.98923	.99314	0.00391	10	0.391
100	A		.99801	.99312	0.00511	10	0.511
	B		1.01860	1.02688	0.00828	9	0.920
	C		1.01632	1.02477	0.01045	9	1.161
	D		.99018	.99508	0.0049	10	0.49

Fatheads
Log427
6-10-95
Spring H_2O

CHRONIC TOXICITY TEST DATA SHEET

TEMPERATURE

CONCENTRATION	Start	Day 1 OLD	Day 1 NEW	Day 2 OLD	Day 2 NEW	Day 3 OLD	Day 3 NEW	Day 4 OLD	Day 4 NEW	Day 5 OLD	Day 5 NEW	Day 6 OLD	Day 6 NEW	Day 7 OLD	Day 7 NEW	Day 8 OLD
CON	24.0	24.6	24.8	24.0	24.0	24.8	24.8	24.0	24.0	26.0	25.0	24.2	25.0	24.0		
6.25																
12.5																
25																
50																
100																

DISSOLVED OXYGEN

CONCENTRATION	Start	Day 1 OLD	Day 1 NEW	Day 2 OLD	Day 2 NEW	Day 3 OLD	Day 3 NEW	Day 4 OLD	Day 4 NEW	Day 5 OLD	Day 5 NEW	Day 6 OLD	Day 6 NEW	Day 7 OLD	Day 7 NEW	Day 8 OLD
CON	8.0	8.0	8.0	7.4	7.0	8.5	8.1	7.4	8.5	7.5	8.2	7.3	7.2	7.1		
6.25	8.1	7.1	7.0	7.4	7.0	7.3	8.0	7.5	8.5	7.5	8.2	7.4	7.4	7.1		
12.5	8.1	7.8	7.6	7.4	7.0	8.0	8.0	7.5	8.5	7.4	8.3	7.5	7.7	7.0		
25	8.0	7.7	8.2	7.3	7.1	8.0	8.0	7.3	8.6	7.6	8.3	7.4	7.8	6.9		
50	7.8	8.1	8.4	7.3	8.2	7.9	8.2	7.2	8.5	7.1	8.4	7.4	7.8	6.9		
100	8.1	7.1	8.10	7.3	8.3	7.8	8.0	7.3	8.5	7.2	8.6	7.3	8.5	6.4		

pH

CONCENTRATION	Start	Day 1 OLD	Day 1 NEW	Day 2 OLD	Day 2 NEW	Day 3 OLD	Day 3 NEW	Day 4 OLD	Day 4 NEW	Day 5 OLD	Day 5 NEW	Day 6 OLD	Day 6 NEW	Day 7 OLD	Day 7 NEW	Day 8 OLD
CON	8.30	7.67	8.32	7.77	7.36	7.74	7.74	7.69	8.29	7.75	8.36	8.36	7.73	8.31		
6.25	8.24	8.31	8.36	8.12	7.54	8.13	8.18	7.99	8.27	8.01	8.33	8.34	7.77	8.18		
12.5	8.27	8.33	8.34	8.14	7.61	8.18	8.34	8.01	8.27	8.06	8.34	8.32	8.15	8.21		
25	8.23	8.35	8.30	8.15	7.68	8.21	8.31	8.00	8.25	8.03	8.31	8.34	8.07	8.21		
50	8.16	8.31	8.22	8.19	7.82	8.16	8.30	8.05	8.22	8.06	8.30	8.34	8.10	8.22		
100	8.03	8.36	8.104	8.23	7.97	8.23	8.23	8.11	8.18	8.10	8.14	8.34	8.24	8.20		

CONDUCTIVITY

CONCENTRATION	Start	Day 1 OLD	Day 1 NEW	Day 2 OLD	Day 2 NEW	Day 3 OLD	Day 3 NEW	Day 4 OLD	Day 4 NEW	Day 5 OLD	Day 5 NEW	Day 6 OLD	Day 6 NEW	Day 7 OLD	Day 7 NEW	Day 8 OLD
CON	339	328	327	351	338	443	367	459	343	405	325	428	341	343		
6.25	356	369	333	370	350	399	381	408	355	447	340	407	362	399		
12.5	405	411	405	408	419	446	410	455	394	456	398	451	376	403		
25	481	397	489	280	487	442	472	544	452	519	480	522	479	524		
50	628	637	596	350	640	626	646	720	601	769	649	703	648	696		
100	721	994	739	1035	853	987	995	1079	973	1131	960	1026	962	1043		

EE09 FATHEAD MINNOW CHRONIC
File: fmee09 Transform: 1/SQUARE ROOT(Y+0.5)

Chi-square test for normality: actual and expected frequencies

INTERVAL	<-1.5	-1.5 to <-0.5	-0.5 to 0.5	>0.5 to 1.5	>1.5
EXPECTED	1.608	5.808	9.168	5.808	1.608
OBSERVED	0	7	9	8	0

Calculated Chi-Square goodness of fit test statistic = 4.2910
Table Chi-Square value (alpha = 0.01) = 13.277

Data PASS normality test. Continue analysis.

EE09 FATHEAD MINNOW CHRONIC
File: fmee09 Transform: 1/SQUARE ROOT(Y+0.5)

Bartletts test for homogeneity of variance

Calculated B statistic = 12.85
Table Chi-square value = 15.09 (alpha = 0.01)
Table Chi-square value = 11.07 (alpha = 0.05)

Average df used in calculation ==> df (avg n - 1) = 3.00
Used for Chi-square table value ==> df (#groups-1) = 5

Data PASS homogeneity test at 0.01 level. Continue analysis.

NOTE: If groups have unequal replicate sizes the average replicate size is used to calculate the B statistic (see above).

TITLE: EE09 FATHEAD MINNOW CHRONIC
FILE: fmee09
TRANSFORM: 1/SQUARE ROOT(Y+0.5) NUMBER OF GROUPS: 6

GRP	IDENTIFICATION	REP	VALUE	TRANS VALUE
1	CONTROL	1	0.4180	1.0437
1	CONTROL	2	0.5960	0.9552
1	CONTROL	3	0.5740	0.9649
1	CONTROL	4	0.6770	0.9217
2	6.25	1	0.5670	0.9681
2	6.25	2	0.5710	0.9663
2	6.25	3	0.6230	0.9436
2	6.25	4	0.5020	0.9990
3	12.5	1	0.6370	0.9378
3	12.5	2	0.6140	0.9475
3	12.5	3	0.6160	0.9466
3	12.5	4	0.5100	0.9950
4	25	1	0.4840	1.0081
4	25	2	0.5690	0.9672
4	25	3	0.4750	1.0127
4	25	4	0.5080	0.9960
5	50	1	0.5280	0.9863
5	50	2	0.4990	1.0005
5	50	3	0.5570	0.9727
5	50	4	0.3910	1.0594
5	100	1	0.5110	0.9945
6	100	2	0.9200	0.8392
6	100	3	1.1610	0.7759
6	100	4	0.4900	1.0050

EE09 FATHEAD MINNOW CHRONIC
File: fmee09 Transform: 1/SQUARE ROOT(Y+0.5)

ANOVA TABLE

SOURCE	DF	SS	MS	F
Between	5	0.026	0.005	1.667
Within (Error)	18	0.056	0.003	
Total	23	0.082		

Critical F value = 2.77 (0.05,5,18)
Since F < Critical F FAIL TO REJECT Ho:All groups equal

EE09 FATHEAD MINNOW CHRONIC
File: fmee09 Transform: 1/SQUARE ROOT(Y+0.5)

DUNNETTS TEST - TABLE 1 OF 2 Ho:Control<Treatment

GROUP	IDENTIFICATION	TRANSFORMED MEAN	MEAN CALCULATED IN ORIGINAL UNITS	T STAT	SIG
1	CONTROL	0.971	0.566		
2	6.25	0.969	0.566	0.055	
3	12.5	0.957	0.594	0.379	
4	25	0.996	0.509	-0.636	
5	50	1.005	0.494	-0.860	
6	100	0.904	0.771	1.749	

Dunnett table value = 2.41 (1 Tailed Value, P=0.05, df=18,5)

EE09 FATHEAD MINNOW CHRONIC
File: fmee09 Transform: 1/SQUARE ROOT(Y+0.5)

DUNNETTS TEST - TABLE 2 OF 2 Ho:Control<Treatment

GROUP	IDENTIFICATION	NUM OF REPS	Minimum Sig Diff (IN ORIG. UNITS)	% of CONTROL	DIFFERENCE FROM CONTROL
1	CONTROL	4			
2	6.25	4	-0.237	-41.9	0.000
3	12.5	4	-0.237	-41.9	-0.028
4	25	4	-0.237	-41.9	0.057
5	50	4	-0.237	-41.9	0.072
6	100	4	-0.237	-41.9	-0.204

TINKER FHM SURVIVAL LOG #427 - EE09
File: FHMSUR427 Transform: ARC SINE(SQUARE ROOT(Y))

hapiro Wilks test for normality

D = 0.046

W = 0.771

Critical W (P = 0.05) (n = 24) = 0.916
Critical W (P = 0.01) (n = 24) = 0.884

Data FAIL normality test. Try another transformation.

Warning - The two homogeneity tests are sensitive to non-normal data and should not be performed.

TINKER FHM SURVIVAL LOG #427 - EE09
File: FHMSUR427 Transform: ARC SINE(SQUARE ROOT(Y))

Hartley test for homogeneity of variance
Bartletts test for homogeneity of variance

These two tests can not be performed because at least one group has
ero variance.

Data FAIL to meet homogeneity of variance assumption.
Additional transformations are useless.

TITLE: TINKER FHM SURVIVAL LOG #427 - EE09
FILE: FHMSUR427
TRANSFORM: ARC SINE(SQUARE ROOT(Y)) NUMBER OF GROUPS: 6

GRP	IDENTIFICATION	REP	VALUE	TRANS VALUE
1	CONTROL	1	1.0000	1.4120
1	CONTROL	2	1.0000	1.4120
1	CONTROL	3	1.0000	1.4120
1	CONTROL	4	1.0000	1.4120
2	6.25%	1	1.0000	1.4120
2	6.25%	2	1.0000	1.4120
2	6.25%	3	1.0000	1.4120
2	6.25%	4	1.0000	1.4120
3	12.5%	1	1.0000	1.4120
3	12.5%	2	1.0000	1.4120
3	12.5%	3	1.0000	1.4120
3	12.5%	4	1.0000	1.4120
4	25%	1	1.0000	1.4120
4	25%	2	1.0000	1.4120
4	25%	3	1.0000	1.4120
4	25%	4	1.0000	1.4120
5	50%	1	1.0000	1.4120
5	50%	2	1.0000	1.4120
5	50%	3	0.9000	1.2490
5	50%	4	1.0000	1.4120
6	100%	1	1.0000	1.4120
6	100%	2	0.9000	1.2490
6	100%	3	0.9000	1.2490
6	100%	4	1.0000	1.4120

TINKER FHM SURVIVAL LOG #427 - EE09
File: FHMSUR427 Transform: ARC SINE(SQUARE ROOT(Y))

SUMMARY STATISTICS ON TRANSFORMED DATA TABLE 1 of 2

GRP	IDENTIFICATION	N	MIN	MAX	MEAN
1	CONTROL	4	1.412	1.412	1.412
2	6.25%	4	1.412	1.412	1.412
3	12.5%	4	1.412	1.412	1.412
4	25%	4	1.412	1.412	1.412
5	50%	4	1.249	1.412	1.371
6	100%	4	1.249	1.412	1.331

TINKER FHM SURVIVAL LOG #427 - EE09
File: FHMSUR427 Transform: ARC SINE(SQUARE ROOT(Y))

SUMMARY STATISTICS ON TRANSFORMED DATA TABLE 2 of 2

GRP	IDENTIFICATION	VARIANCE	SD	SEM
1	CONTROL	0.000	0.000	0.000
2	6.25%	0.000	0.000	0.000
3	12.5%	0.000	0.000	0.000
4	25%	0.000	0.000	0.000
5	50%	0.007	0.081	0.041
6	100%	0.009	0.094	0.047

TINKER FHM SURVIVAL LOG #427 - EE09
File: FHMSUR427 Transform: ARC SINE(SQUARE ROOT(Y))

STEELS MANY-ONE RANK TEST - Ho:Control<Treatment

GROUP	IDENTIFICATION	TRANSFORMED MEAN	RANK SUM	CRIT. VALUE	df	SIG
1	CONTROL	1.412				
2	6.25%	1.412	18.00	10.00	4.00	
3	12.5%	1.412	18.00	10.00	4.00	
4	25%	1.412	18.00	10.00	4.00	
5	50%	1.371	16.00	10.00	4.00	
6	100%	1.331	14.00	10.00	4.00	

Critical values use k = 5, are 1 tailed, and alpha = 0.05

CHAIN OF CUSTODY RECORD

Log 421

Woodward-Clyde
P.O. Box 68095
Franklin, TN
37068

ANALYTICAL LAB
~~Quanterra~~
4955 Yarrow Street
Arvada, CO 80002

Client Name:	**WOODWARD-CLYDE FEDERAL SERVICES**
Client Address:	3000 Tower Drive Ste 456, Del City, OK 73115 (405)677-2001
Project Name	SOLDIER CREEK SEDIMENT AND SURFACE WATER OPERABLE UNIT ECOLOGICAL ASSESSMENT, JUNE 1995
Team Leader:	Kennedy

Date	Time	Sample ID/Description	Matrix	# Samples	VOC (8240)	SVOC (8270)	PCB's & Pest. (8080)	METALS + Hg, Se, As, Tl (6010/7000/ICP/MS (Ag, Cd, Cu, Pb))	CYANIDE (9012)	~~TOC (415.1)~~ Toxicity	Lipids (Biota)	Remarks
6/7/95	15:~~15~~	SC-EE09-TX-201	water	3						✓		10C
		SC-_____										
		SC-_____										
		SC-_____										
		SC-_____										
		SC-_____										
		SC-_____										
		SC-_____										
		SC-_____										
		SC-_____										

Analytical Parameters *

*Water
VOC - three 40 ml vial - 4° C/HCL pH<2
SVOC - two 32 oz amber - 4° C
Metals + Hg - One 500 ml plastic - 4° C/HNO3 pH<2
PCB's/Pest. - Two 32 oz amber - 4° C
Cyanide - One 8 oz plastic - 4° C/NaOH pH>12

*Sediment
VOC - two 4 oz jars - 4° C
SVOC, Metals, Cyanide, PCB's & Pest. - One 16 oz jar - 4° C

*Biota
VOC,SVOC, PCBs & Pest., Metals, Cyanide - One 32 oz wide-mouth jar - collected in triplicate

CUSTODY TRANSFERS PRIOR TO SHIPPING

Relinquished By (Signed)	Received By (Signed)	Date	Time
	Maria Saunders	6/7/95	18:00

SHIPPING DETAILS

Delivered to Shipper By		
Kennedy/Spires		
Method of Shipment		**Airbill Number**
FedEx		5804823441
Received for Lab by (signed)		**Date/Time** 1035
Maria Saunders		6/8/95
WCFS Project Number		F93506

White - Client
Pink - Lab
Yellow - File

CHAIN OF CUSTODY RECORD

Log 421

Woodward-Clyde
P.O. Box 68095
Franklin, TN
37068

ANALYTICAL LAB
Quanterra
4955 Yarrow Street
Arvada, CO 80002

Client Name:	**WOODWARD-CLYDE FEDERAL SERVICES**
Client Address:	3000 Tower Drive Ste 456, Del City, OK 73115 (405)677-2001
Project Name	SOLDIER CREEK SEDIMENT AND SURFACE WATER OPERABLE UNIT ECOLOGICAL ASSESSMENT, JUNE 1995
Team Leader:	Kennedy

Date	Time	Sample ID/Description	Matrix	# Samples	VOC (8240)	SVOC (8270)	PCB'S & Pest. (8080)	METALS + Hg, Se, As, Tl [6010/7000/ICP/MS (Ag, Cd, Cu, Pb)]	CYANIDE (9012)	~~TOC (415.1)~~ DOE Toxicity	Lipids (Biota)	Remarks
6/7/95	15:15	SC-EE09-TX-201	water	2						✓		0.8°C
"	15:45	SC-EE09-TX-201	Sed	2						✓		
		SC-_____										
		SC-_____										
		SC-_____										
		SC-_____										
		SC-_____										
		SC-_____										
		SC-_____										
		SC-_____										

Analytical Parameters *

*Water — VOC - three 40 ml vial - 4° C/HCL pH<2; SVOC - two 32 oz amber - 4° C; Metals + Hg - One 500 ml plastic - 4° C/HNO3 pH<2; PCB's/Pest. - Two 32 oz amber - 4° C; Cyanide - One 8 oz plastic - 4° C/NaOH pH>12

*Sediment — VOC - two 4 oz jars - 4° C; SVOC, Metals, Cyanide, PCB's & Pest. - One 16 oz jar - 4° C

*Biota — VOC,SVOC, PCBs & Pest., Metals, Cyanide - One 32 oz wide-mouth jar - collected in triplicate

CUSTODY TRANSFERS PRIOR TO SHIPPING

Relinquished By (Signed)	Received By (Signed)	Date	Time
	Maria Saunders	6/7/95	18:00

SHIPPING DETAILS

Delivered to Shipper By		
Kennedy/Spires		
Method of Shipment		**Airbill Number**
FedEx		5804823441
Received for Lab by (signed)		**Date/Time**
Maria Saunders		6/8/95 1055
WCFS Project Number		F93506

White - Client
Pink - Lab
Yellow - File

WCFSCOC.XLS

TEST SUMMARY: SC-EE10-TX-201
Ceriodaphnia dubia 48-Hour Static Acute

Test protocol:	WCC SOP 401.2
Test organism:	*Ceriodaphnia dubia*
Source:	WCC Culture Laboratory
Age of test organism:	<24 hours
Test initiation:	6/8/95
Test termination:	6/10/95
Temperature:	25 +/- 1 °C
Light:	50 - 100 foot candles
Photoperiod:	16 hours light/8 hours dark
Test vessel:	30 mL styrene
Test volume:	20 mL
Organisms/replicate:	5
Replicates/concentration:	4
Feeding regime:	none
Aeration during test:	none
Dilution Water:	Hard Reconstituted Synthetic
Test duration:	48 hours
Effect measured:	Mortality
Reference Toxicant Data:	
LC_{50} (g/L NaCl):	1.51

TEST RESULTS: SC-EE10-TX-201
Ceriodaphnia dubia 48-Hour Static Acute

LC_{50} >100%

Statictical analysis method: N/A

Treatment (% Sample)	Survival (%)	pH	Conductivity (umhos/cm)	DO (mg/L)	Temperature (°C)	Hardness (mg/L $CaCO_3$)	Alkalinity (mg/L $CaCO_3$)
Control	100	8.51-8.54	645 (643-646)	8.4 (8.1-8.6)	24.7 (24.5-24.8)	250	
6.25	100	8.48-8.50	612 (514-710)	8.3 (7.9-8.6)	24.7 (24.5-24.8)		
12.5	95	8.47-8.49	754 (729-778)	8.3 (8.0-8.6)	24.7 (24.5-24.8)		
25	100	8.49-8.50	661 (624-697)	8.3 (8.0-8.5)	24.7 (24.5-24.8)		
50	100	8.27-8.53	756 (736-779)	8.5 (8.0-8.9)	24.7 (24.5-24.8)		
100	100	8.05-8.53	980 (945-1015)	8.5 (8.0-8.9)	24.7 (24.5-24.8)	240	186

SURFACE WATER SAMPLE ARRVIAL INFORMATION

Collection Date/Time:	6/7/95 @ 1400
Use Date/Time:	6/8/95 @ 1500
Method of Shipment:	Overnight Courier
Temperature (°C):	3.8
pH:	7.75
Ammonia (mg/L):	10
Conductivity (umhos/cm):	1015
DO (mg/L):	8.7

TEST SUMMARY: SC-EE10-TX-201
Ceriodaphnia dubia Chronic Renewal

Test protocol:	WCC SOP 501.1
Test organism:	*Ceriodaphnia dubia*
Source:	WCC Culture Laboratory
WCC Batch:	6/10/95
Age of test organism:	<24 hours
Test initiation:	6/10/95
Test termination:	6/17/95
Temperature:	25 +/- 1 °C
Light:	50 - 100 foot candles
Photoperiod:	16 hours light/8 hours dark
Test vessel:	30 mL styrene
Test volume:	15 mL
Organisms/replicate:	1
Replicates/concentration:	10
Feeding regime:	0.05 mL *Selenastrum* and 0.05 mL YTC daily
Aeration during test:	none
Dilution Water:	Hard Reconstituted Synthetic
Test duration:	7 days
Effect measured:	Survival and reproduction

Toxicity test methods and procedures were followed in accordance with EPA 600/4-89/001

Reference Toxicant Data:	
NOEC (g/L NaCl):	0.75

TEST RESULTS: SC-EE10-TX-201
Ceriodaphnia dubia Chronic Survival and Reproduction Test

Survival NOEC:	100%
Statistical analysis method:	Steel's Many-One Rank
Normality test:	Fail
Homogeneity of variance test:	Fail
Reproduction NOEC:	50%
Statistical analysis method:	Steel's Many-One Rank
Normality test:	Pass
Homogeneity of variance test:	Fail

Treatment (% Sample)	Survival (%)	pH	Conductivity (umhos/cm)	DO (mg/L)	Temperature (°C)
Control	100	7.81-8.64	692 (338-801)	8.1 (7.5-8.5)	24.5 (24.0-25.0)
6.25	90	7.86-8.54	727 (620-844)	8.2 (7.6-8.6)	24.5 (24.0-25.0)
12.5	80	8.23-8.54	732 (583-796)	8.2 (7.6-8.6)	24.5 (24.0-25.0)
25	70	8.23-8.53	758 (403-834)	8.1 (7.6-8.5)	24.5 (24.0-25.0)
50	70	8.25-8.54	788 (688-916)	8.1 (7.5-8.6)	24.5 (24.0-25.0)
100	80	8.04-8.60	958 (817-1060)	8.3 (7.6-9.6)	24.5 (24.0-25.0)

	Hardness (mg/L $CaCO_3$)	Alkalinity (mg/L $CaCO_3$)	Ammonia (mg/L)
Control	250		
EE10	240	186	10

TEST SUMMARY: SC-EE10-TX-201
Pimephales promelas 48-Hour Static Acute

Test protocol:	WCC SOP 410.2
Test organism:	*Pimephales promelas*
Source:	Woodward-Clyde Consultants
Age of test organism:	6 days
Test initiation:	6/8/95
Test termination:	6/10/95
Temperature:	20 +/- 1 °C
Light:	50 - 100 foot candles
Photoperiod:	16 hours light/8 hours dark
Test vessel:	500 mL plastic beaker
Test volume:	250 mL
Organisms/replicate:	10
Replicates/concentration:	2
Feeding regime:	none
Aeration during test:	none
Dilution Water:	Spring Water
Test duration:	48 hours
Effect measured:	Mortality
Reference Toxicant Data:	
LC_{50} (g/L NaCl):	5.26

TEST RESULTS: SC-EE10-TX-201
Pimephales promelas 48-Hour Static Acute

LC_{50} > 100%

Statictical analysis method: N/A

Treatment (% Sample)	Survival (%)	pH	Conductivity (umhos/cm)	DO (mg/L)	Temperature (°C)	Hardness (mg/L $CaCO_3$)	Alkalinity (mg/L $CaCO_3$)
Control	90	7.68-8.54	682 (643-720)	8.4 (8.2-8.6)	20.9 (20.4-21.3)	158	146
6.25	95	8.48-8.50	687 (664-710)	8.4 (8.2-8.6)	20.9 (20.4-21.3)		
12.5	100	8.47-8.48	651 (572-729)	8.4 (8.2-8.6)	20.9 (20.4-21.3)		
25	95	8.49-8.50	751 (697-804)	8.4 (8.2-8.5)	20.9 (20.4-21.3)		
50	90	8.27-8.52	785 (779-791)	8.5 (8.1-8.9)	20.9 (20.4-21.3)		
100	80	8.05-8.57	1036 (1015-1057)	8.5 (8.1-8.9)	20.9 (20.4-21.3)	250	174

SURFACE WATER SAMPLE ARRVIAL INFORMATION

Collection Date/Time:	6/7/95 @ 1400
Use Date/Time:	6/8/95 @ 1430
Method of Shipment:	Overnight Courier
Temperature (°C):	3.8
pH:	7.75
Ammonia (mg/L):	10
Conductivity (umhos/cm):	1015
DO (mg/L):	8.7
Description:	Clear

TEST SUMMARY: SC-EE10-TX-201
Pimephales promelas Chronic Renewal

Test protocol:	WCC SOP 510.1
Test organism:	*Pimephales promelas*
Source:	Environmental Consulting & Testing
Age of test organism:	<24 hours
Test initiation:	6/10/95 @ 1845
Test termination:	6/17/95 @ 1130
Temperature:	25 +/- 1 °C
Light:	50 - 100 foot candles
Photoperiod:	16 hours light/8 hours dark
Test vessel:	500 mL plastic beaker
Test volume:	250 mL
Organisms/replicate:	10
Replicates/concentration:	4
Feeding regime:	0.1 mL brine shrimp nauplii twice daily
Aeration during test:	none
Dilution Water:	Spring Water
Test duration:	7 days
Effect measured:	Survival and growth

Toxicity test methods and procedures were followed in accordance with EPA 600/4-89/001

Reference Toxicant Data:	
NOEC (g/L NaCl):	3.0

TEST RESULTS : SC- EE10-TX-201
Pimephales promelas Chronic Survival and Growth Test

Survival NOEC:		50%
	Statistical analysis method:	Steel's Many-One Rank
	Normality test:	Pass
	Homogeneity of variance test:	Fail
Growth NOEC:		100%
	Statistical analysis method:	Dunnetts
	Normality test:	Pass
	Homogeneity of variance test:	Pass

Treatment (% Sample)	Survival (%)	pH	Conductivity (umhos/cm)	DO (mg/L)	Temperature (°C)
Control	100	7.47-8.36	376 (325-459)	7.7 (7.0-8.5)	24.5 (24.0-25.0)
6.25	100	7.36-8.36	414 (365-474)	7.7 (6.2-8.8)	24.5 (24.0-25.0)
12.5	95	7.56-8.37	417 (247-475)	7.7 (6.4-8.7)	24.5 (24.0-25.0)
25	100	7.65-8.40	503 (419-543)	7.6 (6.6-8.7)	24.5 (24.0-25.0)
50	87.5	7.77-8.35	668 (569-733)	7.7 (6.9-8.7)	24.5 (24.0-25.0)
100	85	7.92-8.40	994 (767-1096)	8.0 (6.6-9.6)	24.5 (24.0-25.0)

	Hardness (mg/L $CaCO_3$)	Alkalinity (mg/L $CaCO_3$	Ammonia (mg/L)
Control	158	146	
EE10	240	186	10

TEST RESULTS: SC-EE10-TX-201
Ceriodaphnia dubia 48-Hour Static Acute

LC_{50} >100%

Statictical analysis method: N/A

Treatment (% Sample)	Survival (%)	pH	Conductivity (umhos/cm)	DO (mg/L)	Temperature (°C)	Hardness (mg/L $CaCO_3$)	Alkalinity (mg/L $CaCO_3$)
Control	100	8.51-8.54	645 (643-646)	8.4 (8.1-8.6)	24.7 (24.5-24.8)	250	
6.25	100	8.48-8.50	612 (514-710)	8.3 (7.9-8.6)	24.7 (24.5-24.8)		
12.5	95	8.47-8.49	754 (729-778)	8.3 (8.0-8.6)	24.7 (24.5-24.8)		
25	100	8.49-8.50	661 (624-697)	8.3 (8.0-8.5)	24.7 (24.5-24.8)		
50	100	8.27-8.53	756 (736-779)	8.5 (8.0-8.9)	24.7 (24.5-24.8)		
100	100	8.05-8.53	980 (945-1015)	8.5 (8.0-8.9)	24.7 (24.5-24.8)	240	186

SURFACE WATER SAMPLE ARRVIAL INFORMATION

Collection Date/Time:	6/7/95 @ 1400
Use Date/Time:	6/8/95 @ 1500
Method of Shipment:	Overnight Courier
Temperature (°C):	3.8
pH:	7.75
Ammonia (mg/L):	10
Conductivity (umhos/cm):	1015
DO (mg/L):	8.7

48-hr Ceriodaphnia dubia TOXICITY TEST

LOG NO. 421--423
JOB NO. F93506
INDUSTRY: TARGET
CONTACT:

EFFLUENT: Control
START DATE: 6-8-95
START TIME: 1500
DILUTION WATER: Hard 250

CONC (%)	REP ID	SURVIVAL (#) 0	24	48	DEAD	TEMPERATURE (oC) 0	24	48	DO (mg/L) 0	24	48	pH (S.U.) 0	24	48	CONDUCTIVITY (umhos/cm) 0	24	48
Con	A	5	5	5		24.8		24.5	8.4		7.1	7.64		8.51	473		496
	B	5	5	5													
	C	5	5	5													
	D	5	5	5													
	A																
	B																
	C																
	D																
	A																
	B																
	C																
	D																
	A																
	B																
	C																
	D																
	A																
	B																
	C																
	D																
	Initials	SLB	LJT	MLS													
	Time	1520	1345	0830													

Comments

PARAMETER	Control	
Total Hardness (mg/L CaCO3)		
Total Alkalinity (mg/L CaCO3 @ 4.5)		

GRID JT

48-hr Ceriodaphnia dubia TOXICITY TEST

LOG NO. 422
JOB NO. F93506
INDUSTRY: Tinker
CONTACT:

EFFLUENT: EE10
START DATE: 6-8-95
START TIME: 1515
DILUTION WATER: Hard 250

CONC (%)	REP ID	SURVIVAL (#) 0	24	48	DEAD	TEMPERATURE (oC) 0	24	48	DO (mg/L) 0	24	48	pH (S.U.) 0	24	48	CONDUCTIVITY (umhos/cm) 0	24	48
6.25	A	5	5	5	0	24.8		24.5	8.4		7.9	8.48		8.50	710		514
	B	5	5	5	0												
	C	5	5	5	0												
	D	5	~~5~~ 4	5	0												
12.5	A	5	5	5	0				8.6		8.0	8.47		8.49	729		778
	B	5	5	5	0												
	C	5	5	5	0												
	D	5	5	4	1												
25	A	5	5	5	0				8.5		8.0	8.49		8.50	697		629
	B	5	5	5	0												
	C	5	5	5	0												
	D	5	5	5	0												
50	A	5	5	5	0				8.9		8.0	8.27		8.53	779		734
	B	5	5	5	0												
	C	5	5	5	0												
	D	5	5	5	0												
100	A	5	5	5	0				8.9		8.0	8.05		8.53	1015		MAR ~~566~~ 945
	B	5	5	5	0												
	C	5	5	5	0												
	D	5	5	5	0												
	Initials	SJB	LJT	MLS													
	Time	1515	1345	845													

Comments
After 48: five C. dubia were observed in 6.25 D by MLS and MAR

PARAMETER	Control	
Total Hardness (mg/L CaCO3)		
Total Alkalinity (mg/L CaCO3 @ 4.5)		

48-hr Pimephales promleas TOXICITY TEST

LOG NO. 422
JOB NO. F93526-3
INDUSTRY: Tinker
CONTACT:

EFFLUENT: EE10
START DATE: 6/9/95
START TIME: 1430
DILUTION WATER: Hard 250

CONC (%)	REP ID	SURVIVAL (#) 0	24	48	DIAG	TEMPERATURE (oC) 0	24	48	DO (mg/L) 0	24	48	pH (S.U.) 0	24	48	CONDUCTIVITY (umhos/cm) 0	24	48
6.25	A	10	9	9	1	20.4		21.3	8.4		8.0	8.48		8.50	710		694
	B	10	10	10	0												
12.5	A	10	10	10	0				8.4		8.2	8.47		8.48	724		572
	B	10	10	10	0												
25	A	10	9	9	1				8.5		8.2	8.49		8.50	697		804
	B	10	10	10	0												
50	A	10	10	10	0				8.9		8.1	8.27		8.52	779		791
	B	10	10	8	2												
100	A	10	8	7	3				8.9		8.1	8.05		8.57	1015		1057
	B	10	10	9	1												
	A																
	B																
	A																
	B																
	A																
	B																
	A																
	B																
	A																
	B																
Initials		MLS	LST	MLS													
Time		Hard	1435	0820													

Comments

PARAMETER	Control	
Total Hardness (mg/L CaCO3)		
Total Alkalinity (mg/L CaCO3 @ 4.5)		

FATHEAD MINNOW SURVIVAL AND GROWTH
7-DAY CHRONIC TOXICITY TEST

Log No. 428

JOB NO. F93506
INDUSTRY: Tinker
CONTACT:
EFFLUENT: EEIC
NPDES PERMIT NO:
SAMPLE TYPE:
DILUTION WATER: Spring #1

PERSON CONDUCTING TEST:
BEGINNING: 1345 hrs; 1/9/95
ENDING: ____ hrs; / / .
TEST
DILUTIONS:
AGE: < 24 hrs
ORGANISM SOURCE: EC ET Batch 55

PHOTOPERIOD: 16 hr light
FEEDING REGIME: 2
0.1 ml Artemia @ 3 times/day
TEST VESSEL CAPACITY: 1 liter 500
TEST SOLUTION VOLUME: 500 mL 25
NO. ORGANISMS/TREATMENT: 10
NO. REPLICATES: 4

CONC (%)	REP ID	SURVIVAL (#) START	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7
6.25	A	10	10	10	10	10	10	10	10
	B	10	10	10	10	10	10	10	10
	C	10	10	10	10	10	10	10	10
	D	10	10	10	10	10	10	10	10
12.5	A	10	10	10	9	9	9	9	9
	B	10	9	9	9	9	9	9	9
	C	10	10	10	10	10	10	10	10
	D	10	10	10	10	10	10	10	10
25	A	10	10	10	11	11	11	11	11
	B	10	10	10	10	10	10	10	10
	C	10	10	10	10	10	10	10	10
	D	10	10	10	10	10	10	10	10
50	A	10	10	10	10	10	9	9	9
	B	10	10	10	10	10	10	10	10
	C	10	10	9	9	9	9	8	8
	D	10	10	10	9	9	9	9	8
	TIME:	1845	STB	1400	1515	1420	1320	1300	1130
	INITIAL:	LJT	1130	MLS	MLS	MLS	STB	STB	THT

GROWTH RESULTS

CONC (%)	REP ID	Boat ID	Tare wt (g)	Combined wt (g)	Tot Fish wt (g)	# of Fish	Avg Fish wt (mg)
1.25	A		99200	.99759	0.00559	10	0.559
	B		1.00451	1.01044	0.00593	10	0.593
	C		100.895	1.01513	0.00618	10	0.615
	D		1.00937	1.01495	0.00558	10	0.555
12.5	A		.99220	.99789	0.00569	9	0.632
	B		99326	.99937	0.00611	9	0.679
	C		.99730	.99360	0.0063	10	0.580
	D		.99912	1.00455	0.00543	10	0.543
25	A		1.00430	1.00955	0.00525	11	0.477
	B		1.00550	1.01134	0.00584	10	0.584
	C		1.00577	1.01130	0.00553	10	0.543
	D		1.00357	1.00969	0.00612	10	0.612
50	A		1.00384	1.00990	0.00606	9	0.673
	B		.99635	1.00142	0.00507	10	0.507
	C		.99358	.99367	0.00529	5	1.036
	D		.99300	.99840	0.00540	5	0.675

FATHEAD MINNOW SURVIVAL AND GROWTH
7-DAY CHRONIC TOXICITY TEST

Log No. 428

JOB NO. F93506
INDUSTRY: Tinker
CONTACT:
EFFLUENT: EE10
NPDES PERMIT NO:
SAMPLE TYPE:
DILUTION WATER: Spring #1

PERSON CONDUCTING TEST:
BEGINNING: 1845 hrs; 6/10/95
ENDING: ____hrs; / / .
TEST
DILUTIONS:
AGE: < 24 hr
ORGANISM SOURCE: EC & T Batch 55

PHOTOPERIOD: 16 hr light
FEEDING REGIME: 2
0.1 ml Artemia @ ~~3~~ times/day
TEST VESSEL CAPACITY: ~~1 liter~~ 500
TEST SOLUTION VOLUME: ~~500~~ mL 25
NO. ORGANISMS/TREATMENT: 10
NO. REPLICATES: ~~3~~ 4

CONC (%)	REP ID	SURVIVAL (#) START	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7
100	A	10	10	9	9	9	9	9	9
	B	10	10	10	10	9	9	9	9
	C	10	10	9	8	8	8	8	8
	D	10	10	9	9	9	9	9	8
	TIME:	1845	SJO	1425	1515	1420	1320	1500	1130
	INITIAL:	LJT	1130	MLS	MLS	MLS	SJO	SJO	TAT

GROWTH RESULTS

CONC (%)	REP ID	Boat ID	Tare wt (g)	Combined wt (g)	Tot Fish wt (g)	# of Fish	Avg Fish wt (mg)
100	A		1.00165	1.00735	0.0057	9	0.633
	B		1.00414	1.00875	0.00461	9	0.512
	C		.99251	.99751	0.005	8	0.625
	D		.99655	1.00138	0.00483	8	0.604

Fatheads
Log 428
6-10-95
Spring H2O

CHRONIC TOXICITY TEST DATA SHEET

TEMPERATURE

CONCENTRATION	Start	Day 1 OLD	Day 1 NEW	Day 2 OLD	Day 2 NEW	Day 3 OLD	Day 3 NEW	Day 4 OLD	Day 4 NEW	Day 5 OLD	Day 5 NEW	Day 6 OLD	Day 6 NEW	Day 7 OLD	Day 7 NEW	Day 8 OLD
~~Con~~ 6.25	24.5	24.6	24.8	24.0	24.0	24.8	24.8	24.0	24.0	23.0	24.8	24.2	25.6	25.0		
~~6~~ 12.5																
25																
50																
100																

DISSOLVED OXYGEN

CONCENTRATION	Start	Day 1 OLD	Day 1 NEW	Day 2 OLD	Day 2 NEW	Day 3 OLD	Day 3 NEW	Day 4 OLD	Day 4 NEW	Day 5 OLD	Day 5 NEW	Day 6 OLD	Day 6 NEW	Day 7 OLD	Day 7 NEW	Day 8 OLD
6.25	8.1	8.0	8.0	6.8	6.2	8.0	7.8	7.2	8.5	7.3	8.0	7.3	7.8	①		
12.5	8.2	8.3	7.6	6.8	6.4	8.0	7.8	7.2	8.1	7.3	7.8	7.3	7.6	①		
25	8.1	7.9	8.0	6.8	6.6	8.0	8.2	7.2	8.1	7.3	7.7	7.3	7.6	①		
50	7.9	7.8	8.5	6.9	7.5	7.9	8.2	7.2	8.7	7.3	8.0	7.4	7.7	7.2		
100	7.6	7.8	9.2	6.6	8.9	7.9	8.0	6.9	8.6	7.0	8.8	7.2	8.5	7.4		

pH

CONCENTRATION	Start	Day 1 OLD	Day 1 NEW	Day 2 OLD	Day 2 NEW	Day 3 OLD	Day 3 NEW	Day 4 OLD	Day 4 NEW	Day 5 OLD	Day 5 NEW	Day 6 OLD	Day 6 NEW	Day 7 OLD	Day 7 NEW	Day 8 OLD
6.25	8.30	8.34	8.36	8.28	7.36	8.17	8.31	8.03	8.33	8.04	8.04	8.31	8.06	①		
12.5	8.29	8.37	8.34	8.14	7.56	8.17	8.29	8.06	8.36	8.02	8.04	8.30	8.01	①		
25	8.23	8.40	8.37	8.21	7.65	8.19	8.30	8.04	8.36	8.02	8.02	8.29	8.03	①		
50	8.14	8.35	8.[illegible]	8.08	7.77	8.20	8.30	8.06	8.31	8.04	8.04	8.31	8.07	8.31		
100	8.01	8.35	7.92	8.22	8.01	8.25	8.40	8.08	8.41	8.05	8.05	8.28	8.24	8.36		

CONDUCTIVITY

CONCENTRATION	Start	Day 1 OLD	Day 1 NEW	Day 2 OLD	Day 2 NEW	Day 3 OLD	Day 3 NEW	Day 4 OLD	Day 4 NEW	Day 5 OLD	Day 5 NEW	Day 6 OLD	Day 6 NEW	Day 7 OLD	Day 7 NEW	Day 8 OLD
6.25	374	387	371	365	466	434	408	453	418	414	383	431	387	①		
12.5	414	423	413	397	435	447	404	465	415	421	421	443	413	①		
25	502	511	506	419	505	525	481	530	496	503	503	511	472	①		
50	658	693	689	509	602	733	632	702	681	675	675	679	644	708		
100	958	1027	960	707	898	1037	987	1066	995	1016	1011	1057	980	~~709~~ 1096	DOE	

① Old solutions, 6.25%, 12.5% and 25% were discarded before [illegible] meters were [illegible]

EE10 FATHEAD MINNOW CHRONIC
File: FMEE10 Transform: NO TRANSFORMATION

Chi-square test for normality: actual and expected frequencies

INTERVAL	<-1.5	-1.5 to <-0.5	-0.5 to 0.5	>0.5 to 1.5	>1.5
EXPECTED	1.608	5.808	9.168	5.808	1.608
OBSERVED	0	7	8	9	0

Calculated Chi-Square goodness of fit test statistic = 5.3637
Table Chi-Square value (alpha = 0.01) = 13.277

Data PASS normality test. Continue analysis.

EE10 FATHEAD MINNOW CHRONIC
File: FMEE10 Transform: NO TRANSFORMATION

Bartletts test for homogeneity of variance

Calculated B statistic = 4.47
Table Chi-square value = 15.09 (alpha = 0.01)
Table Chi-square value = 11.07 (alpha = 0.05)

Average df used in calculation ==> df (avg n - 1) = 3.00
Used for Chi-square table value ==> df (#groups-1) = 5

Data PASS homogeneity test at 0.01 level. Continue analysis.

NOTE: If groups have unequal replicate sizes the average replicate size is used to calculate the B statistic (see above).

TITLE: EE10 FATHEAD MINNOW CHRONIC
FILE: FMEE10
TRANSFORM: NO TRANSFORMATION NUMBER OF GROUPS: 6

GRP	IDENTIFICATION	REP	VALUE	TRANS VALUE
1	CONTROL	1	0.4180	0.4180
1	CONTROL	2	0.5960	0.5960
1	CONTROL	3	0.5740	0.5740
1	CONTROL	4	0.6770	0.6770
2	6.25	1	0.5590	0.5590
2	6.25	2	0.5930	0.5930
2	6.25	3	0.6180	0.6180
2	6.25	4	0.5580	0.5580
3	12.5	1	0.6320	0.6320
3	12.5	2	0.6790	0.6790
3	12.5	3	0.5800	0.5800
3	12.5	4	0.5430	0.5430
4	25	1	0.4770	0.4770
4	25	2	0.5840	0.5840
4	25	3	0.5430	0.5430
4	25	4	0.6120	0.6120
5	50	1	0.6730	0.6730
5	50	2	0.5070	0.5070
5	50	3	0.6360	0.6360
5	50	4	0.6750	0.6750
5	100	1	0.6330	0.6330
6	100	2	0.5120	0.5120
6	100	3	0.6250	0.6250
6	100	4	0.6040	0.6040

EE10 FATHEAD MINNOW CHRONIC
File: FMEE10 Transform: NO TRANSFORMATION

ANOVA TABLE

SOURCE	DF	SS	MS	F
Between	5	0.013	0.003	0.600
Within (Error)	18	0.087	0.005	
Total	23	0.100		

Critical F value = 2.77 (0.05,5,18)
Since F < Critical F FAIL TO REJECT Ho:All groups equal

EE10 FATHEAD MINNOW CHRONIC
File: FMEE10 Transform: NO TRANSFORMATION

DUNNETTS TEST - TABLE 1 OF 2 Ho:Control<Treatment

GROUP	IDENTIFICATION	TRANSFORMED MEAN	MEAN CALCULATED IN ORIGINAL UNITS	T STAT	SIG
1	CONTROL	0.566	0.566		
2	6.25	0.582	0.582	-0.315	
3	12.5	0.609	0.609	-0.845	
4	25	0.554	0.554	0.245	
5	50	0.623	0.623	-1.130	
6	100	0.593	0.593	-0.545	

Dunnett table value = 2.41 (1 Tailed Value, P=0.05, df=18,5)

EE10 FATHEAD MINNOW CHRONIC
File: FMEE10 Transform: NO TRANSFORMATION

DUNNETTS TEST - TABLE 2 OF 2 Ho:Control<Treatment

GROUP	IDENTIFICATION	NUM OF REPS	Minimum Sig Diff (IN ORIG. UNITS)	% of CONTROL	DIFFERENCE FROM CONTROL
1	CONTROL	4			
2	6.25	4	0.120	21.3	-0.016
3	12.5	4	0.120	21.3	-0.042
4	25	4	0.120	21.3	0.012
5	50	4	0.120	21.3	-0.057
6	100	4	0.120	21.3	-0.027

TINKER FHM SURVIVAL LOG #428 - EE10
File: 428 Transform: ARC SINE(SQUARE ROOT(Y))

Chi-square test for normality: actual and expected frequencies

INTERVAL	<-1.5	-1.5 to <-0.5	-0.5 to 0.5	>0.5 to 1.5	>1.5
EXPECTED	1.608	5.808	9.168	5.808	1.608
OBSERVED	0	6	13	5	0

Calculated Chi-Square goodness of fit test statistic = 4.9364
Table Chi-Square value (alpha = 0.01) = 13.277

Data PASS normality test. Continue analysis.

TINKER FHM SURVIVAL LOG #428 - EE10
File: 428 Transform: ARC SINE(SQUARE ROOT(Y))

Hartley test for homogeneity of variance
Bartletts test for homogeneity of variance

These two tests can not be performed because at least one group has zero variance.

Data FAIL to meet homogeneity of variance assumption.
Additional transformations are useless.

TITLE: TINKER FHM SURVIVAL LOG #428 - EE10
ILE: 428
TRANSFORM: ARC SINE(SQUARE ROOT(Y)) NUMBER OF GROUPS: 6

GRP	IDENTIFICATION	REP	VALUE	TRANS VALUE
1	CONTROL	1	1.0000	1.4120
1	CONTROL	2	1.0000	1.4120
1	CONTROL	3	1.0000	1.4120
1	CONTROL	4	1.0000	1.4120
2	6.25%	1	1.0000	1.4120
2	6.25%	2	1.0000	1.4120
2	6.25%	3	1.0000	1.4120
2	6.25%	4	1.0000	1.4120
3	12.5%	1	0.9000	1.2490
3	12.5%	2	0.9000	1.2490
3	12.5%	3	1.0000	1.4120
3	12.5%	4	1.0000	1.4120
4	25%	1	1.0000	1.4120
4	25%	2	1.0000	1.4120
4	25%	3	1.0000	1.4120
4	25%	4	1.0000	1.4120
5	50%	1	0.9000	1.2490
5	50%	2	1.0000	1.4120
5	50%	3	0.8000	1.1071
5	50%	4	0.8000	1.1071
6	100%	1	0.9000	1.2490
6	100%	2	0.9000	1.2490
6	100%	3	0.8000	1.1071
6	100%	4	0.8000	1.1071

TINKER FHM SURVIVAL LOG #428 - EE10
File: 428 Transform: ARC SINE(SQUARE ROOT(Y))

SUMMARY STATISTICS ON TRANSFORMED DATA TABLE 1 of 2

GRP	IDENTIFICATION	N	MIN	MAX	MEAN
1	CONTROL	4	1.412	1.412	1.412
2	6.25%	4	1.412	1.412	1.412
3	12.5%	4	1.249	1.412	1.331
4	25%	4	1.412	1.412	1.412
5	50%	4	1.107	1.412	1.219
6	100%	4	1.107	1.249	1.178

INKER FHM SURVIVAL LOG #428 - EE10
File: 428 Transform: ARC SINE(SQUARE ROOT(Y))

SUMMARY STATISTICS ON TRANSFORMED DATA TABLE 2 of 2

GRP	IDENTIFICATION	VARIANCE	SD	SEM
1	CONTROL	0.000	0.000	0.000
2	6.25%	0.000	0.000	0.000
3	12.5%	0.009	0.094	0.047
4	25%	0.000	0.000	0.000
5	50%	0.021	0.145	0.073
6	100%	0.007	0.082	0.041

TINKER FHM SURVIVAL LOG #428 - EE10
File: 428 Transform: ARC SINE(SQUARE ROOT(Y))

STEELS MANY-ONE RANK TEST - Ho:Control<Treatment

GROUP	IDENTIFICATION	TRANSFORMED MEAN	RANK SUM	CRIT. VALUE	df	SIG
1	CONTROL	1.412				
2	6.25%	1.412	18.00	10.00	4.00	
3	12.5%	1.331	14.00	10.00	4.00	
4	25%	1.412	18.00	10.00	4.00	
5	50%	1.219	12.00	10.00	4.00	
6	100%	1.178	10.00	10.00	4.00	*

Critical values use k = 5, are 1 tailed, and alpha = 0.05

Ceriodaphnia SURVIVAL AND REPRODUCTION CHRONIC TOXICITY TEST

JOB NO: F93506 | BEGINNING: 1103 hrs; 6/16/95. | Log No. 423
INDUSTRY: Tinker | ENDING: 1150 hrs; 6/17/95 | PHOTOPERIOD: 16 light, 8 dark
CONTACT: | FEEDING REGIME: | ORGANISM SOURCE: WCC
EFFLUENT: EE10 | .05 mL yct/15 mL | TEST VESSEL CAPACITY: 30 mL
NPDES PERMIT NO: | .05 mL algal suspension/15 mL | TEST SOLUTION VOLUME: 15mL
PERSON CONDUCTING TEST: | | NO. REPLICATES:
| | DILUTION WATER:

CONC	CHAMBER	TIME / OBSERVER	NUMBER OF YOUNG PRODUCED							
			START	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7
						11	46	101	173	220
6.25	1						4	6	10	13
	2						4	7	5	0
	3						3	6	8	0
	4						4	9	12	0
	5						5	9	6	3
	6					2	0	5	10	0
	7			(D)						
	8					4	8	5	(D)	13
	9					3	0	5	10	6
	10					2	7	0	11	12
						10% mortality				
			START	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7
						22	41	83	180	254
12.5	11					2	1	6	11	7
	12					3	0	9	15	11
	13						3	6	10	0
	14					(D)				
	15								(D) 6	
	16					4	0	8	9	10
	17					3	8	0	14	12
	18					4	(D) 0	(D) 7	(D) 15	13
	19					2	0	6	11	9
	20					4	7	0	6	12
						20% Mortality				
			START	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7
						14	60	58	153	209
25	21					2	0	6	10	13
	22					3	7	0	12	12
	23					2	(D) 4			
	24						4	8	10	0
	25						7	0	5	14
	26						4	6	9	0
	27			(D)						
	28					4	(D) 6			
	29						4	8	7	6
	30					3	10	0	12	11
						30% mortality				

Ceriodaphnia SURVIVAL AND REPRODUCTION CHRONIC TOXICITY TEST

JOB NO.
INDUSTRY:
CONTACT:
EFFLUENT:
NPDES PERMIT NO:
PERSON CONDUCTING TEST:

BEGINNING: 1100 hrs; 6/10/95
ENDING: 1150 hrs; 6/17/95
FEEDING REGIME:
.05 mL yct/15 mL
.05 mL algal suspension/15 mL

Log No. 428
PHOTOPERIOD: 16 light, 8 dark
ORGANISM SOURCE: WCC
TEST VESSEL CAPACITY: 30 mL
TEST SOLUTION VOLUME: 15mL
NO. REPLICATES:
DILUTION WATER:

NUMBER OF YOUNG PRODUCED

CONC	CHAMBER	START	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7	
	TIME				21	64	110	176	227	
	OBSERVER									
50	31				3	9	0	9	5	26
	32				2	0	7	9	9	27
	33					1	10	6	12	29
	34				2	7 (D)				9
	35				5	10 (D)				15
	36				2	0	7	(D)		9
	37					4	8	12	6	30
	38				4	0	8	13	9	34
	39				3	8	0	9	8	28
	40							8	2	26
					30% mortality					

CONC	CHAMBER	START	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7	
					7	15	31	58	72	
100	41				1	4	0	10	8	23
	42					(D)				6
	43					1	6	8	0	15
	44						5	0	0	5
	45				2	3	0	0	6	11
	46				1	0	0	2	0	3
	47						1	2	0	3
	48				3	0	0	0	0	3
	49			(D)						0
	50						4	5	0	9
					20% mortality					

CONC	CHAMBER	START	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7

Ceriodaphnia dubia GRID Ceriodaphnia dubia GRID MONITORING DATA

Grid Letter: ~~N~~ ~~X~~ ~~Z~~ ~~LEQ~~ V Start Date: 6-10-95 Sample ID: EE10 Log #: 428

AD	ID	1	AD	ID	1	AD	ID	1	AD	ID	1		ID	1
2	3	4	2	3	4	2	3	4	2	3	4	2	3	4
5	6	7	5	6	7	5	6	7	5	6	7	5	6	7
AD	ID 34	1 ✓	AD	ID 7	1 M/O	AD	ID 44	1 ✓	AD	ID 46	1 ✓		ID 38	1 ✓
2 ✓	3 2	4 D 7	2	3	4	2 ✓	3 ✓	4 0	2 ✓	3 1	4 0	2 ✓	3 4	4 0
5	6	7	5	6	7	5 5	6 0	7 0	5 0	6 2	7 0	5 8	6 13	7 9
AD	ID 10	1 ✓	AD	ID 21	1 ✓	AD	ID 33	1 ✓	AD	ID 26	1 ✓		ID 6	1 ✓
2 ✓	3 2	4 7	2 ✓	3 2	4 0	2 ✓	3 ✓	4 1	2 ✓	3 ✓	4 4	2 ✓	3 2	4 0
5 0	6 11	7 12	5 6	6 10	7 13	5 10	6 6	7 12	5 6	6 9	7 0	5 5	6 10	7 0
AD	ID 22	1 ✓	AD	ID 28	1 ✓	AD	ID 37	1 ✓	AD	ID 13	1 ✓		ID 18	1 ✓
2 ✓	3 3	4 7	2 ✓	3 4	4 6 D	2 ✓	3 ✓	4 4	2 ✓	3 ✓	4 3	2 ✓	3 4	4 0
5 0	6 12	7 12	5	6	7	5 8	6 12	7 6	5 6	6 10	7 0	5 7	6 15	7 13
AD	ID 45	1 ✓	AD	ID 41	1 ✓	AD	ID 1	1 ✓	AD	ID 16	1 ✓		ID 27	1 ✓
2 ✓	3 2	4 3	2 ✓	3 1	4 4	2 ✓	3 ✓	4 4	2 ✓	3 4	4 0	2 M	3	4
5 0	6 0	7 6	5 0	6 10	7 8	5 6	6 10	7 13	5 8	6 9	7 10	5	6	7
AD	ID 40	1 ✓	AD	ID 11	1 ✓	AD	ID 24	1 ✓	AD	ID 31	1 ✓		ID 3	1 ✓
2 ✓	3 ✓	4 4	2 ✓	3 2	4 1	2 ✓	3 ✓	4 4	2 ✓	3 3	4 9	2 ✓	3 ✓	4 3
5 6	6 8	7 2	5 6	6 11	7 7	5 8	6 10	7 0	5 0	6 9	7 5	5 6	6 8	7 0

Comments:

Cup ID	Sample Concentration	Day 6-10	Initials MAR	Time 1103
1–10:	6.25	1	MAR	1100
11–20:	12.5	2	SJB	1440
21–30:	25	3	SJB	1300
31–40:	50	4	LJT	1420
41–50:	100	5	LJT	1415
51–60:		6	LJT	1500
		7	LJT	1150

Ceriodaphnia dubia GRID Ceriodaphnia dubia GRID MONITORING DATA

Grid Letter: J S D M K P A Start Date: 6-10-95 Sample ID: EE10 Log #: 42

AD ID 1 2 3 4 5 6 7	AD ID 1 2 3 4 5 6 7	AD ID 1 2 3 4 5 6 7	AD ID 1 2 3 4 5 6 7	ID 1 2 3 4 5 6 7
AD ID 5 1 ✓ 2 ✓ 3 ✓ 4 5 5 9 6 6 7 3	AD ID 20 1 ✓ 2 ✓ 3 4 4 7 5 0 6 6 7 12	AD ID 25 1 ✓ 2 ✓ 3 ✓ 4 7 5 0 6 5 7 14	AD ID 14 1 ✓ 2 — 3 M 4 5 6 7	ID 42 1 F 2 ✓ 3 ✓ D 4 C 5 6 7
AD ID 43 1 ✓ 2 ✓ 3 ✓ 4 1 5 6 6 8 7 0	AD ID 32 1 ✓ 2 ✓ 3 2 4 0 5 7 6 9 7 9	AD ID 2 1 ✓ 2 ✓ 3 ✓ 4 4 5 7 6 5 7 0	AD ID 29 1 ✓ 2 ✓ 3 ✓ 4 4 5 8 6 7 7 6	ID 12 1 ✓ 2 ✓ 3 3 4 8 5 9 6 15 7 11
AD ID 9 1 ✓ 2 ✓ 3 3 4 0 5 5 6 10 7 6	AD ID 23 1 ✓ 2 ✓ 3 2 D 4 5 6 7	AD ID 35 1 ✓ 2 ✓ 3 5 D 10 5 6 7	AD ID 39 1 ✓ 2 ✓ 3 3 4 8 5 0 6 9 7 8	ID 19 1 ✓ 2 ✓ 3 2 4 C 5 6 6 11 7 9
AD ID 36 1 ✓ 2 ✓ 3 2 4 0 5 7 D 6 7	AD ID 15 1 ✓ 2 ✓ 3 ✓ D 6 5 6 7	AD ID 48 1 ✓ 2 ✓ 3 3 4 0 5 0 6 0 7 0	AD ID 8 1 ✓ 2 ✓ 3 4 4 8 5 8 6 0 7 13	ID 50 1 ✓ 2 ✓ 3 ✓ 4 C 5 4 6 5 7 C
AD ID 4 1 ✓ 2 ✓ 3 ✓ 4 4 5 9 6 12 7 0	AD ID 47 1 ✓ 2 ✓ 3 ✓ 4 0 5 1 6 2 7 0	AD ID 30 1 — 2 ✓ 3 3 4 10 5 0 6 12 7 11	AD ID 17 1 — 2 ✓ 3 3 4 8 5 C 6 14 7 12	ID 49 1 — 2 M 3 4 5 6 7

Comments:

Day 0-10 Initials MAR Time 1055

Cup ID	Sample Concentration
1–10:	6.25
11–20:	12.5
21–30:	25
31–40:	50
41–50:	100
51–60:	

1	MAR	1108
2	SJE	1440
3	SJE	1300
4	LJT	1430
5	LJT	1430
6	LJT	1455
7	LJT	1450

2210
Log 428
6-10-95
C. dubia

CHRONIC TOXICITY TEST DATA SHEET

TEMPERATURE

CONCENTRATION	Start	Day 1 OLD	Day 1 NEW	Day 2 OLD	Day 2 NEW	Day 3 OLD	Day 3 NEW	Day 4 OLD	Day 4 NEW	Day 5 OLD	Day 5 NEW	Day 6 OLD	Day 6 NEW	Day 7 OLD	Day 7 NEW	Day 8 OLD
6.25	25.2	24.6	~~24.8~~ 24.8	24.0	24.0	24.8	24.8	24.0	24.0	25.0	24.8	25.0	25.2	24.0		
12.5																
25																
50																
100																

DISSOLVED OXYGEN

CONCENTRATION	Start	Day 1 OLD	Day 1 NEW	Day 2 OLD	Day 2 NEW	Day 3 OLD	Day 3 NEW	Day 4 OLD	Day 4 NEW	Day 5 OLD	Day 5 NEW	Day 6 OLD	Day 6 NEW	Day 7 OLD	Day 7 NEW	Day 8 OLD
6.25	8.4	8.4	8.4	7.8	8.3	8.4	8.1	8.0	8.6	7.7	8.3	7.6	8.5	7.6		
12.5	8.4	8.4	8.4	7.8	8.3	8.4	8.1	7.9	8.6	7.7	8.3	7.6	8.5	7.7		
25	8.4	8.3	8.4	7.8	8.3	8.5	8.1	7.6	8.4	7.6	8.4	7.6	8.5	7.7		
50	8.4	8.3	8.4	7.7	8.3	8.5	8.1	7.8	8.6	7.6	8.6	7.5	8.5	7.6		
100	8.6	8.3	8.3	7.7	8.3	8.4	8.1	8.1	8.7	7.6	8.7	7.6	8.6	7.6		

pH

CONCENTRATION	Start	Day 1 OLD	Day 1 NEW	Day 2 OLD	Day 2 NEW	Day 3 OLD	Day 3 NEW	Day 4 OLD	Day 4 NEW	Day 5 OLD	Day 5 NEW	Day 6 OLD	Day 6 NEW	Day 7 OLD	Day 7 NEW	Day 8 OLD
6.25	8.49	8.40	8.52	8.25	8.44	8.46	8.54	8.46	8.51	8.24	8.42	8.36	8.50	8.52		
12.5	8.48	8.50	8.48	8.27	8.44	8.45	8.54	8.47	8.52	8.23	8.47	8.36	8.49	8.48		
25	8.46	8.49	8.43	8.28	8.36	8.48	8.53	8.47	8.48	8.23	8.42	8.37	8.45	8.49		
50	8.29	8.31	8.28	8.31	8.38	8.54	8.49	8.53	8.50	8.25	8.25	8.36	8.31	8.50		
100	8.09	8.37	8.00	8.34	8.11	8.59	8.46	8.40	8.33	8.30	8.09	8.45	8.25	8.54		

CONDUCTIVITY

CONCENTRATION	Start	Day 1 OLD	Day 1 NEW	Day 2 OLD	Day 2 NEW	Day 3 OLD	Day 3 NEW	Day 4 OLD	Day 4 NEW	Day 5 OLD	Day 5 NEW	Day 6 OLD	Day 6 NEW	Day 7 OLD	Day 7 NEW	Day 8 OLD
6.25	698	691	710	713	720	844	747	741	746	770	716	716	749	717		
12.5	720	691	693	749	717	783	755	700	750	796	736	769	747	783		
25	759	787	774	789	730	760	703	796	778	813	774	806	784	834		
50	723	803	818	857	778	903	820	795	859	825	857	916	899	899		
100	777	817	826	1050	731	843	901	1029	1013	1041	1010	1010	1003	894		

TINKER C. DUBIA SURVIVAL LOG #428 - EE10
File: CDSUR428 Transform: ARC SINE(SQUARE ROOT(Y))

Chi-square test for normality: actual and expected frequencies

INTERVAL	<-1.5	-1.5 to <-0.5	-0.5 to 0.5	>0.5 to 1.5	>1.5
EXPECTED	4.020	14.520	22.920	14.520	4.020
OBSERVED	5	6	35	14	0

Calculated Chi-Square goodness of fit test statistic = 15.6436
Table Chi-Square value (alpha = 0.01) = 13.277

Data FAIL normality test. Try another transformation.

Warning - The two homogeneity tests are sensitive to non-normal data and should not be performed.

TINKER C. DUBIA SURVIVAL LOG #428 - EE10
File: CDSUR428 Transform: ARC SINE(SQUARE ROOT(Y))

Hartley test for homogeneity of variance
Bartletts test for homogeneity of variance

These two tests can not be performed because at least one group has zero variance.

Data FAIL to meet homogeneity of variance assumption.
Additional transformations are useless.

TITLE: TINKER C. DUBIA SURVIVAL LOG #428 - EE10
ILE: CDSUR428
TRANSFORM: ARC SINE(SQUARE ROOT(Y)) NUMBER OF GROUPS: 6

GRP	IDENTIFICATION	REP	VALUE	TRANS VALUE
1	CONTROL	1	1.0000	1.0472
1	CONTROL	2	1.0000	1.0472
1	CONTROL	3	1.0000	1.0472
1	CONTROL	4	1.0000	1.0472
1	CONTROL	5	1.0000	1.0472
1	CONTROL	6	1.0000	1.0472
1	CONTROL	7	1.0000	1.0472
1	CONTROL	8	1.0000	1.0472
1	CONTROL	9	1.0000	1.0472
1	CONTROL	10	1.0000	1.0472
2	6.25%	1	1.0000	1.0472
2	6.25%	2	1.0000	1.0472
2	6.25%	3	1.0000	1.0472
2	6.25%	4	1.0000	1.0472
2	6.25%	5	1.0000	1.0472
2	6.25%	6	1.0000	1.0472
2	6.25%	7	0.0000	0.5236
2	6.25%	8	1.0000	1.0472
2	6.25%	9	1.0000	1.0472
2	6.25%	10	1.0000	1.0472
3	12.5%	1	1.0000	1.0472
3	12.5%	2	1.0000	1.0472
3	12.5%	3	1.0000	1.0472
3	12.5%	4	1.0000	1.0472
3	12.5%	5	0.0000	0.5236
3	12.5%	6	0.0000	0.5236
3	12.5%	7	1.0000	1.0472
3	12.5%	8	1.0000	1.0472
3	12.5%	9	1.0000	1.0472
3	12.5%	10	1.0000	1.0472
4	25%	1	1.0000	1.0472
4	25%	2	1.0000	1.0472
4	25%	3	0.0000	0.5236
4	25%	4	1.0000	1.0472
4	25%	5	1.0000	1.0472
4	25%	6	1.0000	1.0472
4	25%	7	1.0000	1.0472
4	25%	8	0.0000	0.5236
4	25%	9	1.0000	1.0472
4	25%	10	0.0000	0.5236
5	50%	1	1.0000	1.0472
5	50%	2	1.0000	1.0472
5	50%	3	1.0000	1.0472
5	50%	4	1.0000	1.0472
5	50%	5	0.0000	0.5236
5	50%	6	0.0000	0.5236
5	50%	7	1.0000	1.0472
5	50%	8	1.0000	1.0472
5	50%	9	0.0000	0.5236
5	50%	10	1.0000	1.0472

6	100%	1	1.0000	1.0472
6	100%	2	0.0000	0.5236
6	100%	3	1.0000	1.0472
6	100%	4	1.0000	1.0472
6	100%	5	1.0000	1.0472
6	100%	6	1.0000	1.0472
6	100%	7	1.0000	1.0472
6	100%	8	1.0000	1.0472
6	100%	9	0.0000	0.5236
6	100%	10	1.0000	1.0472

TINKER C. DUBIA SURVIVAL LOG #428 - EE10
File: CDSUR428 Transform: ARC SINE(SQUARE ROOT(Y))

SUMMARY STATISTICS ON TRANSFORMED DATA TABLE 1 of 2

GRP	IDENTIFICATION	N	MIN	MAX	MEAN
1	CONTROL	10	1.047	1.047	1.047
2	6.25%	10	0.524	1.047	0.995
3	12.5%	10	0.524	1.047	0.942
4	25%	10	0.524	1.047	0.890
5	50%	10	0.524	1.047	0.890
6	100%	10	0.524	1.047	0.942

TINKER C. DUBIA SURVIVAL LOG #428 - EE10
File: CDSUR428 Transform: ARC SINE(SQUARE ROOT(Y))

SUMMARY STATISTICS ON TRANSFORMED DATA TABLE 2 of 2

GRP	IDENTIFICATION	VARIANCE	SD	SEM
1	CONTROL	0.000	0.000	0.000
2	6.25%	0.027	0.166	0.052
3	12.5%	0.049	0.221	0.070
4	25%	0.064	0.253	0.080
5	50%	0.064	0.253	0.080
6	100%	0.049	0.221	0.070

TINKER C. DUBIA SURVIVAL LOG #428 - EE10
File: CDSUR428 Transform: ARC SINE(SQUARE ROOT(Y))

STEELS MANY-ONE RANK TEST - Ho:Control<Treatment

ROUP	IDENTIFICATION	TRANSFORMED MEAN	RANK SUM	CRIT. VALUE	df	SIG
1	CONTROL	1.047				
2	6.25%	0.995	100.00	75.00	10.00	
3	12.5%	0.942	95.00	75.00	10.00	

4	25%	0.890	90.00	75.00	10.00
5	50%	0.890	90.00	75.00	10.00
6	100%	0.942	95.00	75.00	10.00

Critical values use k = 5, are 1 tailed, and alpha = 0.05

TINKER C. DUBIA REP. CHRONIC LOG #428 - EE10
File: CDEE10 Transform: NO TRANSFORMATION

Chi-square test for normality: actual and expected frequencies

INTERVAL	<-1.5	-1.5 to <-0.5	-0.5 to 0.5	>0.5 to 1.5	>1.5
EXPECTED	4.020	14.520	22.920	14.520	4.020
OBSERVED	6	12	23	18	1

Calculated Chi-Square goodness of fit test statistic = 4.5157
Table Chi-Square value (alpha = 0.01) = 13.277

Data PASS normality test. Continue analysis.

TINKER C. DUBIA REP. CHRONIC LOG #428 - EE10
File: CDEE10 Transform: NO TRANSFORMATION

Bartletts test for homogeneity of variance

Calculated B statistic = 20.24
Table Chi-square value = 15.09 (alpha = 0.01)
Table Chi-square value = 11.07 (alpha = 0.05)

Average df used in calculation ==> df (avg n - 1) = 9.00
Used for Chi-square table value ==> df (#groups-1) = 5

Data FAIL homogeneity test at 0.01 level. Try another transformation.

NOTE: If groups have unequal replicate sizes the average replicate size is used to calculate the B statistic (see above).

TITLE: TINKER C. DUBIA REP. CHRONIC LOG #428 - EE10
ILE: CDEE10
RANSFORM: NO TRANSFORMATION NUMBER OF GROUPS: 6

GRP	IDENTIFICATION	REP	VALUE	TRANS VALUE
1	CONTROL	1	20.0000	20.0000
1	CONTROL	2	22.0000	22.0000
1	CONTROL	3	16.0000	16.0000
1	CONTROL	4	17.0000	17.0000
1	CONTROL	5	19.0000	19.0000
1	CONTROL	6	21.0000	21.0000
1	CONTROL	7	23.0000	23.0000
1	CONTROL	8	20.0000	20.0000
1	CONTROL	9	18.0000	18.0000
1	CONTROL	10	23.0000	23.0000
2	6.25%	1	33.0000	33.0000
2	6.25%	2	16.0000	16.0000
2	6.25%	3	17.0000	17.0000
2	6.25%	4	25.0000	25.0000
2	6.25%	5	23.0000	23.0000
2	6.25%	6	17.0000	17.0000
2	6.25%	7	0.0000	0.0000
2	6.25%	8	33.0000	33.0000
2	6.25%	9	24.0000	24.0000
2	6.25%	10	32.0000	32.0000
3	12.5%	1	27.0000	27.0000
3	12.5%	2	38.0000	38.0000
3	12.5%	3	19.0000	19.0000
3	12.5%	4	0.0000	0.0000
3	12.5%	5	6.0000	6.0000
3	12.5%	6	31.0000	31.0000
3	12.5%	7	37.0000	37.0000
3	12.5%	8	39.0000	39.0000
3	12.5%	9	28.0000	28.0000
3	12.5%	10	29.0000	29.0000
4	25%	1	31.0000	31.0000
4	25%	2	34.0000	34.0000
4	25%	3	6.0000	6.0000
4	25%	4	22.0000	22.0000
4	25%	5	26.0000	26.0000
4	25%	6	19.0000	19.0000
4	25%	7	0.0000	0.0000
4	25%	8	10.0000	10.0000
4	25%	9	25.0000	25.0000
4	25%	10	36.0000	36.0000
5	50%	1	26.0000	26.0000
5	50%	2	27.0000	27.0000
5	50%	3	29.0000	29.0000
5	50%	4	9.0000	9.0000
5	50%	5	15.0000	15.0000
5	50%	6	9.0000	9.0000
5	50%	7	30.0000	30.0000
5	50%	8	34.0000	34.0000
5	50%	9	28.0000	28.0000
5	50%	10	20.0000	20.0000

6	100%	1	23.0000	23.0000
6	100%	2	0.0000	0.0000
6	100%	3	15.0000	15.0000
6	100%	4	5.0000	5.0000
6	100%	5	11.0000	11.0000
6	100%	6	3.0000	3.0000
6	100%	7	3.0000	3.0000
6	100%	8	3.0000	3.0000
6	100%	9	0.0000	0.0000
6	100%	10	9.0000	9.0000

TINKER C. DUBIA REP. CHRONIC LOG #428 - EE10
File: CDEE10 Transform: NO TRANSFORMATION

SUMMARY STATISTICS ON TRANSFORMED DATA TABLE 1 of 2

GRP	IDENTIFICATION	N	MIN	MAX	MEAN
1	CONTROL	10	16.000	23.000	19.900
2	6.25%	10	0.000	33.000	22.000
3	12.5%	10	0.000	39.000	25.400
4	25%	10	0.000	36.000	20.900
5	50%	10	9.000	34.000	22.700
6	100%	10	0.000	23.000	7.200

TINKER C. DUBIA REP. CHRONIC LOG #428 - EE10
File: CDEE10 Transform: NO TRANSFORMATION

SUMMARY STATISTICS ON TRANSFORMED DATA TABLE 2 of 2

GRP	IDENTIFICATION	VARIANCE	SD	SEM
1	CONTROL	5.878	2.424	0.767
2	6.25%	102.889	10.143	3.208
3	12.5%	177.156	13.310	4.209
4	25%	147.433	12.142	3.840
5	50%	80.011	8.945	2.829
6	100%	54.400	7.376	2.332

TINKER C. DUBIA REP. CHRONIC LOG #428 - EE10
File: CDEE10 Transform: NO TRANSFORMATION

STEELS MANY-ONE RANK TEST - Ho:Control<Treatment

ROUP	IDENTIFICATION	TRANSFORMED MEAN	RANK SUM	CRIT. VALUE	df	SIG
1	CONTROL	19.900				
2	6.25%	22.000	117.50	75.00	10.00	
3	12.5%	25.400	128.50	75.00	10.00	

4	25%	20.900	116.00	75.00	10.00	
5	50%	22.700	120.00	75.00	10.00	
6	100%	7.200	64.00	75.00	10.00	*

Critical values use k = 5, are 1 tailed, and alpha = 0.05

Log 422

CHAIN OF CUSTODY RECORD

No 1508

JOB #	PROJECT NAME
Task 3 of F93506	TAFB - Soldier Creek

SAMPLERS: (Signature)

ANALYSES REQUIRED

WOODWARD-CLYDE CONSULTANTS
P.O. BOX 680925
FRANKLIN, TN 37068-0925
(615) 790-0003 FAX (615) 790-0023

SAMPLE IDENTIFICATION	DATE	TIME	SAMPLE TYPE	NUMBER OF CONTAINERS	Toxicity						REMARKS
											Fed Exp # 5804823441
SC-EE10-TX-201	6/7/95	14:00	water	BSE 3	✓						

RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)	RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)
	6/7/95 18:00	Maria Saunders		6/8/95	1055
RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)	RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)
RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED AT LAB BY: (Signature)	DATE/TIME	GENERAL COMMENTS	
				Temp 3.8°C	

Distribution: Original and Yellow copies accompany sample shipment to laboratory
Pink copy retained by samplers. Yellow copy retained by laboratory. Laboratory returns White copy to samplers.

Log 422

№ 157

CHAIN OF CUSTODY RECORD

JOB #	PROJECT NAME
F93506	TRFB Soldier Creek

SAMPLERS: (Signature)

WOODWARD-CLYDE CONSULTANTS
P.O. BOX 680925
FRANKLIN, TN 37068-0925
(615) 790-0003 FAX (615) 790-0023

SAMPLE IDENTIFICATION	DATE	TIME	SAMPLE TYPE	NUMBER OF CONTAINERS	ANALYSES REQUIRED: Toxicity	REMARKS
SC-EE10-TX-201	6/7/95	14:00	water	2	✓	Fed Exp 580482344 1
SC-EE10-TX-201	6/7/95	14:15	sed	2	✓	

RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)	RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)
	6/7/95 18:00	Maria Saunders		6/8/95	1055
RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)	RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)
RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED AT LAB BY: (Signature)	DATE/TIME	GENERAL COMMENTS	
				3.2 °C	

Distribution: Original and Yellow copies accompany sample shipment to laboratory
Pink copy retained by samplers. Yellow copy retained by laboratory. Laboratory returns White copy to samplers.

TEST SUMMARY: SC-EW01
Ceriodaphnia dubia 48-Hour Static Acute

Test protocol:	WCC SOP 401.2
Test organism:	*Ceriodaphnia dubia*
Source:	WCC Culture Laboratory
Age of test organism:	<24 hours
Test initiation:	6/14/95
Test termination:	6/16/95
Temperature:	25 +/- 1 °C
Light:	50 - 100 foot candles
Photoperiod:	16 hours light/8 hours dark
Test vessel:	30 mL styrene
Test volume:	20 mL
Organisms/replicate:	5
Replicates/concentration:	4
Feeding regime:	none
Aeration during test:	none
Dilution Water:	Hard Reconstituted Synthetic
Test duration:	48 hours
Effect measured:	Mortality
Reference Toxicant Data:	
LC_{50} (g/L NaCl):	1.51

TEST RESULTS: SC-EW01-TX-201

Ceriodaphnia dubia 48-Hour Static Acute

LC_{50} > 100%

Statictical analysis method: N/A

Treatment (% Sample)	Survival (%)	pH	Conductivity (umhos/cm)	DO (mg/L)	Temperature (°C)	Hardness (mg/L $CaCO_3$)	Alkalinity (mg/L $CaCO_3$)
Control	100	7.71-8.20	425 (380-469)	8.4 (8.2-8.6)	24.0-25.0	140	
6.25	100	8.15-8.26	425 (414-436)	8.5 (8.3-8.6)	24.0-25.0		
12.5	100	8.05-8.28	414 (402-426)	8.5 (8.3-8.6)	24.0-25.0		
25	100	7.93-8.35	394 (380-408)	8.5 (8.4-8.6)	24.0-25.0		
50	100	7.85-8.39	371 (357-384)	8.4 (8.2-8.5)	24.0-25.0		
100	70	7.70-8.48	289 (241-336)	8.2 (8.1-8.3)	24.0-25.0	166	168

SURFACE WATER SAMPLE ARRVIAL INFORMATION

Collection Date/Time:	6/13/95 @ 1105
Use Date/Time:	6/14/95 @ 1400
Method of Shipment:	Overnight Courier
Temperature (°C):	1.5
pH:	7.94
Ammonia (mg/L):	16.4
Conductivity (umhos/cm):	241
DO (mg/L):	8.4

TEST SUMMARY: SC-EW01,
Ceriodaphnia dubia Chronic Renewal

Test protocol:	WCC SOP 501.1
Test organism:	*Ceriodaphnia dubia*
Source:	WCC Culture Laboratory
WCC Batch:	6/17/95 to 6/18/95
Age of test organism:	<24 hours
Test initiation:	6/16/95
Test termination:	6/23/95
Temperature:	25 +/- 1 °C
Light:	50 - 100 foot candles
Photoperiod:	16 hours light/8 hours dark
Test vessel:	30 mL styrene
Test volume:	15 mL
Organisms/replicate:	1
Replicates/concentration:	10
Feeding regime:	0.05 mL *Selenastrum* and 0.05 mL YTC daily
Aeration during test:	none
Dilution Water:	Hard Reconstituted Synthetic
Test duration:	7 days
Effect measured:	Survival and reproduction

Toxicity test methods and procedures were followed in accordance with EPA 600/4-89/001

Reference Toxicant Data:	
NOEC (g/L NaCl):	0.75

TEST RESULTS: SC-EW01-TX-201
Ceriodaphnia dubia Chronic Survival and Reproduction Test

Survival NOEC: 25%
- Statistical analysis method: Pass
- Normality test: Fail
- Homogeneity of variance test: Fail

Reproduction NOEC: 50%
- Statistical analysis method: Dunnetts
- Normality test: Pass
- Homogeneity of variance test: Pass

Treatment (% Sample)	Survival (%)	pH	Conductivity (umhos/cm)	DO (mg/L)	Temperature (°C)
Control	90	7.94-8.58	457 (422-516)	8.0 (7.4-8.5)	24.7 (24.0-25.2)
6.25	50	7.94-8.47	438 (419-468)	8 (7.3-8.5)	24.7 (24.0-25.2)
12.5	80	8.00-8.43	428 (410-452)	8.1 (7.4-8.6)	24.7 (24.0-25.2)
25	100	8.02-8.45	412 (398-431)	8.0 (7.2-8.6)	24.7 (24.0-25.2)
50	30	7.92-8.47	383 (365-400)	8.0 (7.3-8.5)	24.7 (24.0-25.2)
100	0	7.71-8.50	330 (320-337)	8.1 (7.2-8.5)	24.7 (24.0-25.2)

	Hardness (mg/L $CaCO_3$)	Alkalinity (mg/L $CaCO_3$)	Ammonia (mg/L)
Control	150		
EW01	166	168	16.4

TEST SUMMARY: SC-EW01
Pimephales promelas 48-Hour Static Acute

Test protocol:	WCC - 410.2
Test organism:	*Pimephales promelas*
Source:	Woodward-Clyde Consultants
Age of test organism:	13 days
Test initiation:	6/14/95
Test termination:	6/16/95
Temperature:	20 +/- 1 °C
Light:	50 - 100 foot candles
Photoperiod:	16 hours light/8 hours dark
Test vessel:	500 mL plastic beaker
Test volume:	250 mL
Organisms/replicate:	10
Replicates/concentration:	2
Feeding regime:	none
Aeration during test:	none
Dilution Water:	Hard Reconstituted Synthetic
Test duration:	48 hours
Effect measured:	Mortality
Reference Toxicant Data:	
LC_{50} (g/L NaCl):	5.26

TEST RESULTS: SC-EW01-TX-201

Pimephales promelas 48-Hour Static Acute

LC_{50} > 100%

Statictical analysis method: N/A

Treatment (% Sample)	Survival (%)	pH	Conductivity (umhos/cm)	DO (mg/L)	Temperature (°C)	Hardness (mg/L $CaCO_3$)	Alkalinity (mg/L $CaCO_3$)
Control	100	8.29-8.31	340 (327-353	7.9 (7.4-8.4)	20.9 (20.8-21.0)	158	146
6.25	100	8.04-8.34	339 (332-346)	7.8 (7.3-8.3)	20.9 (20.8-21.0)		
12.5	100	8.20-8.35	311 (277-345)	7.9 (7.3-8.4)	20.9 (20.8-21.0)		
25	100	8.18-8.39	330 (315-345)	7.9 (7.4-8.4)	20.9 (20.8-21.0)		
50	100	8.11-8.40	330 (314-346)	7.9 (7.4-8.4)	20.9 (20.8-21.0)		
100	100	7.94-8.42	332 (316-347)	8.0 (7.6-8.4)	20.9 (20.8-21.0)	166	168

SURFACE WATER SAMPLE ARRIVAL INFORMATION

Collection Date/Time:	6/13/95 @ 1105
Use Date/Time:	6/14/95 @ 1400
Method of Shipment:	Overnight Courier
Temperature (°C):	1.5
pH:	7.94
Ammonia (mg/L):	16.4
Conductivity (umhos/cm):	241
DO (mg/L):	8.4
Description:	Clear

TEST SUMMARY
Pimephales promelas Chronic Renewal

Test protocol:	WCC SOP 510.1
Test organism:	*Pimephales promelas*
Source:	Environmental Consulting & Testing
Age of test organism:	<24 hours
Test initiation:	6/16/95 @ 1530
Test termination:	6/23/95 @ 1600
Temperature:	25 +/- 1 °C
Light:	50 - 100 foot candles
Photoperiod:	16 hours light/8 hours dark
Test vessel:	500 mL plastic beaker
Test volume:	250 mL
Organisms/replicate:	10
Replicates/concentration:	4
Feeding regime:	0.1 mL brine shrimp nauplii twice daily
Aeration during test:	none
Dilution Water:	Hard Reconstituted Synthetic
Test duration:	7 days
Effect measured:	Survival and growth

Toxicity test methods and procedures were followed in accordance with EPA 600/4-89/001

Reference Toxicant Data:	
NOEC (g/L NaCl):	3

TEST RESULTS - EW01

Pimephales promelas Chronic Survival and Growth Test

Survival NOEC:		100%
	Statistical analysis method:	N/A
	Normality test:	
	Homogeneity of variance test:	
Growth NOEC:		100%
	Statistical analysis method:	Dunnetts
	Normality test:	Chi-Square - Pass
	Homogeneity of variance test:	Bartletts - Pass

Treatment (% Sample)	Survival (%)	pH	Conductivity (umhos/cm)	DO (mg/L)	Temperature (°C)
Control	100	7.86-8.50	346 (309-440)	7.8 (6.6-8.4)	24.7 (24.0-25.2)
6.25	100	7.98-8.61	341 (321-367)	7.7 (6.7-8.3)	24.7 (24.0-25.2)
12.5	100	7.92-8.55	332 (312-363)	7.6 (6.1-8.2)	24.7 (24.0-25.2)
25	100	7.92-8.51	330 (288-361)	7.5 (6.1-8.2)	24.7 (24.0-25.2)
50	100	7.78-8.48	332 (313-363)	7.6 (5.8-8.3)	24.7 (24.0-25.2)
100	97.5	7.69-8.57	332 (312-359)	7.5 (5.5-8.3)	24.7 (24.0-25.2)

	Hardness (mg/L $CaCO_3$)	Alkalinity (mg/L $CaCO_3$	Ammonia (mg/L)
Control	150		
EW01	166	168	16.4

Control

48-hr Ceriodaphnia dubia TOXICITY TEST

LOG NO. 439-442
JOB NO. F93506
INDUSTRY: Tinker
CONTACT:

EFFLUENT: Controls
START DATE: 6-14-95
START TIME: 1400
DILUTION WATER:

CONC (%)	REP ID	SURVIVAL (#) 0	24	48	DEAD	TEMPERATURE (oC) 0	24	48	DO (mg/L) 0	24	48	pH (S.U.) 0	24	48	CONDUCTIVITY (umhos/cm) 0	24	48
Hard 140	A	5	5	4		24.0		25.0°	8.6		8.2	7.71		8.20	469		380
EW-01	B	5	5	5													
	C	5	5	5													
	D	5	5	5													
Hd-270	A	5	5	5					8.4		8.3	8.63		8.40	731		744
EW 02	B	5	5	5													
CR-EC01	C	5	5	5													
	D	5	5	5													
Mod. Hd-100	A	5	5	5					8.6		8.4	7.59		8.21	429		419
EW 03	B	5	5	5													
	C	5	5	5													
	D	5	5	5													
	A																
	B																
	C																
	D																
	A																
	B																
	C																
	D																
	Initials	MAC	LJT	LJT													
	Time	1405	0930	0830													

Comments

PARAMETER	Control	
Total Hardness (mg/L CaCO3)		
Total Alkalinity (mg/L CaCO3 @ 4.5)		

48ACUT.XLS

48-hr Ceriodaphnia dubia TOXICITY TEST

LOG NO. 439
JOB NO. #93506
INDUSTRY: Tinker
CONTACT:

EFFLUENT: EW-01
START DATE: 6-14-95
START TIME: 1400
DILUTION WATER: Hard 140

CONC (%)	REP ID	SURVIVAL (#) 0	24	48	DEAD	TEMPERATURE (oC) 0	24	48	DO (mg/L) 0	24	48	pH (S.U.) 0	24	48	CONDUCTIVITY (umhos/cm) 0	24	48
6.25	A	5	5	5		24.0		25.0	8.4		8.3	8.15		8.26	411		436
	B	5	5	5													
	C	5	5	5													
	D	5	5	5													
12.5	A	5	5	5					8.4		8.3	8.05		8.28	402		426
	B	5	5	5													
	C	5	5	5													
	D	5	5	5													
25	A	5	5	5					8.4		8.4	7.93		8.35	380		408
	B	5	5	5													
	C	5	5	5													
	D	5	5	5													
50	A	5	5	5					8.5		8.2	7.85		8.39	357		384
	B	5	5	5													
	C	5	5	5													
	D	5	5	5													
100	A	5	5	4					8.3		8.1	7.70		8.48	211		336
	B	5	5	5													
	C	5	5	3													
	D	5	5	2													
Initials		MLS	LST	LST													
Time		1400	1340	1350													

Comments

PARAMETER	Control	
Total Hardness (mg/L CaCO3)		
Total Alkalinity (mg/L CaCO3 @ 4.5)		

48-hr Pimephales promleas TOXICITY TEST

LOG NO. 439
JOB NO. F93506
INDUSTRY: Tinker
CONTACT: EC & T-13 dup old

EFFLUENT: EW-01
START DATE: 6-14-95
START TIME: 1400
DILUTION WATER: Spring

CONC (%)	REP ID	SURVIVAL (#) 0	24	48	DEAD	TEMPERATURE (oC) 0	24	48	DO (mg/L) 0	24	48	pH (S.U.) 0	24	48	CONDUCTIVITY (umhos/cm) 0	24	48
CON	A	10	10	10		~~21.0~~		20.3	7.4		7.4	~~8.10~~		8.31	391		355
	B	10	10	10		21.0			7.4			8.29					
6.25	A	10	10	10					7.3		7.3	~~8.02~~		8.34	332		346
	B	10	10	10								8.04					
12.5	A	10	10	10					7.4		7.3	~~8.12~~		8.35	077		345
	B	10	10	10								8.20					
25	A	10	10	10					7.4		7.4	~~8.11~~		8.39	315		345
	B	10	10	10								8.18					
50	A	10	10	10					7.4		7.4	7.94		8.40	311		346
	B	10	10	10								8.11					
100	A	10	10	10					7.4		7.60	7.94		8.42	310		347
	B	10	10	10													
	A																
	B																
	A																
	B																
	A																
	B																
	A																
	B																
Initials		MLS	MLS	SDB													
Time		1400	1555	0830													

Comments

PARAMETER	Control	
Total Hardness (mg/L CaCO3)		
Total Alkalinity (mg/L CaCO3 @ 4.5)		

Ceriodaphnia SURVIVAL AND REPRODUCTION CHRONIC TOXICITY TEST

JOB NO. F93506 | BEGINNING: 1603 hrs; 6/16/95. | Log No. 449
INDUSTRY: Tinker | ENDING: _____ hrs; 6/23/95 | PHOTOPERIOD: 16 light, 8 dark
CONTACT: | FEEDING REGIME: | ORGANISM SOURCE: WCC
EFFLUENT: Conc | .05 mL yct/15 mL | TEST VESSEL CAPACITY: 30 mL
NPDES PERMIT NO: | .05 mL algal suspension/15 mL | TEST SOLUTION VOLUME: 15mL
PERSON CONDUCTING TEST: | | NO. REPLICATES:
| | DILUTION WATER:

NUMBER OF YOUNG PRODUCED

CONC	CHAMBER	START	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7
	TIME				4	22	70	128	187
	OBSERVER								
Control	1						6	9	4
	2						5	(D) 10	
	3						5	0	9
	4				2	0	3	8	4
	5					6	5	0	6
	6				2	0	5	10	4
	7					3	5	0	6
	8					3	5	0	7
	9					3	4	11	15
	10					3	5	10	4
					10% mortality				

CONC	CHAMBER	START	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7
					8	25	54	99	139
6.25%	11					4	6	0	3
	12						7	5	4
	13				3	0	8	9	10
	14				2	2	5	9	5
	15			(D)					
	16					4	5	6	C
	17			(D)					
	18			(D)					
	19				3	7	C	11	(D) 16
	20					(D)			
					50% Mortality				

CONC	CHAMBER	START	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7
					10	38	95	169	232
12.5%	21					5	5	0	8
	22				1	4	8	12	2
	23				2	2	6	11	11
	24			(D)					
	25					6	10	2	(D) 8
	26					3	8	9	C
	27						7	11	0
	28				4	0	8	13	12
	29					3	5	5	9
	30				3	5	0	8	13
					20% mortality				

Ceriodaphnia SURVIVAL AND REPRODUCTION CHRONIC TOXICITY TEST

JOB NO: P93506 | BEGINNING: 1603 hrs; 6/16/15 | Log No. 449
INDUSTRY: Tanker | ENDING: _____ hrs; 6/23/15 | PHOTOPERIOD: 16 light, 8 dark
CONTACT: | FEEDING REGIME: | ORGANISM SOURCE: WCC
EFFLUENT: Ewc1 | .05 mL yct/15 mL | TEST VESSEL CAPACITY: 30 mL
NPDES PERMIT NO: | .05 mL algal suspension/15 mL | TEST SOLUTION VOLUME: 15mL
PERSON CONDUCTING TEST: | | NO. REPLICATES:
| | DILUTION WATER:

CONC	CHAMBER	TIME							
		OBSERVER							
		NUMBER OF YOUNG PRODUCED							
		START	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7
					4	48	120	202	252
25%	31					7	0	13	14
	32				2	2	8	11	10
	33					8	11	12	0
	34				2	0	7	9	13
	35					6	8	8	2
	36					4	10	12	0
	37					5	10	9	2
	38					3	4	8	0
	39					5	6	0	6
	40					4	8	0	3
		START	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7
					9	41	89	106	119
50%	41				2	8	0	(D) 7	
	42					3	(D) 7		
	43				2	0	(D) 5		
	44				3	5	0	0	2
	45						(D) 7		
	46					5	(D) 3		
	47					5	9	(D) 0	
	48				(D)				
	49					5	9	10	0
	50				2	1	8	0	11
					70% mortality				
		START	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7
					13	46	72		
100%	51						(D)		
	52				2	7	(D)		
	53					4	(D)		
	54				3	0	(D)		
	55				3	0	(D) 6		
	56					2	(D) 7		
	57				5	5	(D)		
	58					5	(D) 0		
	59					7	(D) 7		
	60					(D) 3			
					100% mortality				

Ceriodaphnia dubia GRID Ceriodaphnia dubia GRID MONITORING DATA

Grid Letter: ~~K S E W D W Ω~~ Start Date: 6-16-95 Sample ID: EW01 Log #: 4

AD	ID	1	2	3	4	5	6	7
	1	✓	0	0	0	6	9	4
	25	✓	0	0	6	10	2	D 8
	15	✓	D 0					
	43	✓	0	2	0	D 5		
	14	✓	0	2	[illegible]	8	9	[illegible]
	45	✓	0	0	0	7	D/0	
	44	✓	0	3	5	0	0	2
	2	✓	0	0	0	5	D/0	
	24	✓	D 0					
	29	✓	0	0	[illegible]	5	8	9
	28	✓	0	4	0	8	13	12
	13	✓	0	3	0	8	9	12
	23	✓	0	2	2	6	11	11
	30	✓	0	3	5	0	8	13
	42	✓	0	0	[illegible]	D 7		
	59	✓	0	0	7	D 7		
	60	✓	0	0	D/3			
	41	✓	0	2	8	0	D/7	
	58	✓	0	0	5	D 6		
	3	✓	0	0	[illegible]	5	8	[illegible]
	27	✓	0	0	0	7	11 MAR ~~5~~	0
	12	✓	0	0	0	7	5	4
	21	✓	0	0	5	5	0	8
	4	✓	0	2	0	3	8	4
	26	✓	0	0	[illegible]	8	9	[illegible]
	22	✓	0	1	4	8 ~~4~~	12	2
	56	✓	0	0	2	D 7 ~~2~~		
	5	✓	0	0	6	5 ~~0~~	0	6
	57	✓	0	5	5	D 5		
	11	✓	0	0	[illegible]	6 4	0	3

MAR

Comments:

Cup ID	Sample Concentration	Day ∅	Initials MLS	Time 1020
1–10:	Con	1	LJT	1430
11–20:	6.25	2	SJG	1320
21–30:	12.5	3	SJG	1030
31–40:	25	4	MAR	1325
41–50:	50	5	LJT	1410
51–60:	100	6	MAR	1403
		7	LJT	1200

Ceriodaphnia dubia GRID Ceriodaphnia dubia GRID MONITORING DATA

Grid Letter: ~~3~~ ~~0~~ ~~X~~ ~~Z~~ ~~B~~ ~~Z~~ C Start Date: 6-16-95 Sample ID: EWC1 Log #: 44

AD	ID	1	2	3	4	5	6	7
	34	✓	0	2	0	7	9	13
	38	✓	0	0	3	4	8	0
	50	✓	0	2	1	8	0	11
	6	✓	0	2	0	5	10	4
	20	✓	0	0	0			
	52	✓	0	2	7	D		
	51	✓	0	0	0	D		
	7	✓	0	0	3	5	0	6
	17	✓	D-0					
	48	✓	0	D-0				
	18	✓	D-0					
	31	✓	0	0	7	0	13	14
	53	✓	0	0	4	D		
	35	✓	0	0	6	8	8	2
	49	✓	0	0	5	9	10	0
	37	✓	0	0	5	10	9	2
	36	✓	0	0	4	10	12	0
	8	✓	0	0	3	5	0	7
	19	✓	0	3	7	0	11	D 16
	32	✓	0	2	2	8	11	10
	46	✓	0	0	5	D 3		
	9	✓	0	0	3	4	11	15
	16	✓	0	0	4	5	6	0
	40	✓	0	0	4	8	0	3
	10	✓	0	0	3	5	10	4
	47	✓	0	0	5	9	D/0	
	33	✓	0	0	8	11	12	0
	55	✓	0	3	0	D 6		
	54	✓	0	3	0	D		
	39	✓	0	0	5	6	0	6

Comments:

Cup ID	Sample Concentration	Day Ø	Initials MLS	Time 1003
1–10:	Con	1	LJT	1425
11–20:	6.25	2	SJB	1320
21–30:	12.5	3	SJB	1030
31–40:	25	4	MAR	1325
41–50:	50	5	LJT	1400
51–60:	100	6	MAR	1410
		7	LJT	1200

Lo 447
Sample # EW01
Ceriodaphnia

CHRONIC TOXICITY TEST DATA SHEET

TEMPERATURE

CONCENTRATION	Start	Day 1 OLD	Day 1 NEW	Day 2 OLD	Day 2 NEW	Day 3 OLD	Day 3 NEW	Day 4 OLD	Day 4 NEW	Day 5 OLD	Day 5 NEW	Day 6 OLD	Day 6 NEW	Day 7 OLD	Day 7 NEW	Day 8 OLD
Con	25.0°	24.0	24.0	24.2	25.0	25.0	24.8	25.0	25.0	25.2	25.2	24.8	24.8	24.2		
6.25	25.0°															
12.5	↓															
25																
50																
100																

DISSOLVED OXYGEN

CONCENTRATION	Start	Day 1 OLD	Day 1 NEW	Day 2 OLD	Day 2 NEW	Day 3 OLD	Day 3 NEW	Day 4 OLD	Day 4 NEW	Day 5 OLD	Day 5 NEW	Day 6 OLD	Day 6 NEW	Day 7 OLD	Day 7 NEW	Day 8 OLD
Con	7.8	7.4	8.4	7.6	8.5	8.1	8.1	7.9	8.3	7.8	8.3	7.9	8.2	7.8		
6.25	7.9	7.3	8.4	8.1	8.5	8.1	8.1	7.9	8.4	7.8	8.3	7.8	8.2	7.9		
12.5	7.9	7.4	8.4	7.7	8.6	8.1	8.1	7.9	8.4	7.7	8.2	7.8	8.3	7.7		
25	7.8	7.2	8.4	8.2	8.6	8.0	8.1	7.9	8.4	7.7	8.3	7.7	8.3	7.8		
50	7.7	7.3	8.3	8.3	8.5	8.0	8.1	7.8	8.4	7.5	8.2	7.7	8.2	7.8		
100	7.7	7.2	8.3	8.3	8.5	8.1	8.1	7.8	8.5	7.8	8.2	—	8.3	7.8		

LJT 1030

pH

CONCENTRATION	Start	Day 1 OLD	Day 1 NEW	Day 2 OLD	Day 2 NEW	Day 3 OLD	Day 3 NEW	Day 4 OLD	Day 4 NEW	Day 5 OLD	Day 5 NEW	Day 6 OLD	Day 6 NEW	Day 7 OLD	Day 7 NEW	Day 8 OLD
Con	8.32	8.27	8.44	8.53	8.58	8.28	8.34	8.35	8.39	7.94	8.35	8.17	8.35	8.37		
6.25	8.31	8.24	8.39	8.44	8.47	8.28	8.30	8.27	8.32	7.94	8.26	8.15	8.26	8.30		
12.5	8.31	8.20	8.32	8.43	8.43	8.24	8.31	8.27	8.32	8.00	8.21	8.15	8.21	8.23		
25	8.28	8.19	8.23	8.45	8.39	8.21	8.26	8.21	8.33	8.02	8.12	8.21	8.08	8.20		
50	8.13	8.22	8.11	8.47	8.28	8.39	8.24	8.32	8.35	8.12	7.92	8.31	8.00	8.28		
100	7.96	8.33	8.19	8.44	8.18	8.46	8.18	8.56	8.36	8.25	7.81	—	7.71	—		

CONDUCTIVITY

CONCENTRATION	Start	Day 1 OLD	Day 1 NEW	Day 2 OLD	Day 2 NEW	Day 3 OLD	Day 3 NEW	Day 4 OLD	Day 4 NEW	Day 5 OLD	Day 5 NEW	Day 6 OLD	Day 6 NEW	Day 7 OLD	Day 7 NEW	Day 8 OLD
Con	428	440	456	483	450	485	445	465	516	442	435	448	433	422		
6.25	422	431	429	467	434	468	396	437	463	452	424	432	419	463		
12.5	416	426	421	452	418	470	413	435	431	447	416	424	410	446		
25	402	411	407	431	404	412	395	423	413	423	404	419	399	424		
50	392	387	382	400	376	418	365	317	380	393	366	382	377	396		
100	381	336	331	335	330	329	320	332	331	337	324	—	324			

MM/12 1630

LJT 12/6 0.E 1750

W.A. 1010 LJT

LJT 1200

LJT 1145

EW01 CERIO CHRONIC
File: CDEW01 Transform: NO TRANSFORMATION

Chi-square test for normality: actual and expected frequencies

INTERVAL	<-1.5	-1.5 to <-0.5	-0.5 to 0.5	>0.5 to 1.5	>1.5
EXPECTED	4.020	14.520	22.920	14.520	4.020
OBSERVED	3	19	20	14	4

Calculated Chi-Square goodness of fit test statistic = 2.0318
Table Chi-Square value (alpha = 0.01) = 13.277

Data PASS normality test. Continue analysis.

EW01 CERIO CHRONIC
File: CDEW01 Transform: NO TRANSFORMATION

Bartletts test for homogeneity of variance

Calculated B statistic = 14.58
Table Chi-square value = 15.09 (alpha = 0.01)
Table Chi-square value = 11.07 (alpha = 0.05)

Average df used in calculation ==> df (avg n - 1) = 9.00
Used for Chi-square table value ==> df (#groups-1) = 5

Data PASS homogeneity test at 0.01 level. Continue analysis.

NOTE: If groups have unequal replicate sizes the average replicate size is used to calculate the B statistic (see above).

TITLE: EW01 CERIO CHRONIC
FILE: CDEW01
TRANSFORM: NO TRANSFORMATION NUMBER OF GROUPS: 6

GRP	IDENTIFICATION	REP	VALUE	TRANS VALUE
1	CONTROL	1	19.0000	19.0000
1	CONTROL	2	15.0000	15.0000
1	CONTROL	3	14.0000	14.0000
1	CONTROL	4	17.0000	17.0000
1	CONTROL	5	17.0000	17.0000
1	CONTROL	6	21.0000	21.0000
1	CONTROL	7	14.0000	14.0000
1	CONTROL	8	15.0000	15.0000
1	CONTROL	9	33.0000	33.0000
1	CONTROL	10	22.0000	22.0000
2	6.25	1	13.0000	13.0000
2	6.25	2	16.0000	16.0000
2	6.25	3	32.0000	32.0000
2	6.25	4	26.0000	26.0000
2	6.25	5	0.0000	0.0000
2	6.25	6	15.0000	15.0000
2	6.25	7	0.0000	0.0000
2	6.25	8	0.0000	0.0000
2	6.25	9	37.0000	37.0000
2	6.25	10	0.0000	0.0000
3	12.5	1	18.0000	18.0000
3	12.5	2	27.0000	27.0000
3	12.5	3	32.0000	32.0000
3	12.5	4	0.0000	0.0000
3	12.5	5	26.0000	26.0000
3	12.5	6	20.0000	20.0000
3	12.5	7	18.0000	18.0000
3	12.5	8	37.0000	37.0000
3	12.5	9	25.0000	25.0000
3	12.5	10	29.0000	29.0000
4	25	1	34.0000	34.0000
4	25	2	33.0000	33.0000
4	25	3	31.0000	31.0000
4	25	4	31.0000	31.0000
4	25	5	24.0000	24.0000
4	25	6	26.0000	26.0000
4	25	7	26.0000	26.0000
4	25	8	15.0000	15.0000
4	25	9	17.0000	17.0000
4	25	10	15.0000	15.0000
5	50	1	17.0000	17.0000
5	50	2	10.0000	10.0000
5	50	3	7.0000	7.0000
5	50	4	10.0000	10.0000
5	50	5	7.0000	7.0000
5	50	6	8.0000	8.0000
5	50	7	14.0000	14.0000
5	50	8	0.0000	0.0000
5	50	9	24.0000	24.0000
5	50	10	22.0000	22.0000

6	100	1	0.0000	0.0000
6	100	2	9.0000	9.0000
6	100	3	4.0000	4.0000
6	100	4	3.0000	3.0000
6	100	5	9.0000	9.0000
6	100	6	9.0000	9.0000
6	100	7	10.0000	10.0000
6	100	8	11.0000	11.0000
6	100	9	14.0000	14.0000
6	100	10	3.0000	3.0000

EW01 CERIO CHRONIC
File: CDEW01 Transform: NO TRANSFORMATION

ANOVA TABLE

SOURCE	DF	SS	MS	F
Between	5	2396.283	479.257	6.214
Within (Error)	54	4164.700	77.124	
Total	59	6560.983		

Critical F value = 2.45 (0.05,5,40)
Since F > Critical F REJECT Ho:All groups equal

EW01 CERIO CHRONIC
File: CDEW01 Transform: NO TRANSFORMATION

DUNNETTS TEST - TABLE 1 OF 2 Ho:Control<Treatment

GROUP	IDENTIFICATION	TRANSFORMED MEAN	MEAN CALCULATED IN ORIGINAL UNITS	T STAT	SIG
1	CONTROL	18.700	18.700		
2	6.25	13.900	13.900	1.222	
3	12.5	23.200	23.200	-1.146	
4	25	25.200	25.200	-1.655	
5	50	11.900	11.900	1.731	
6	100	7.200	7.200	2.928	*

Dunnett table value = 2.31 (1 Tailed Value, P=0.05, df=40,5)

EW01 CERIO CHRONIC
File: CDEW01 Transform: NO TRANSFORMATION

DUNNETTS TEST - TABLE 2 OF 2 Ho:Control<Treatment

GROUP	IDENTIFICATION	NUM OF REPS	Minimum Sig Diff (IN ORIG. UNITS)	% of CONTROL	DIFFERENCE FROM CONTROL

1	CONTROL	10			
2	6.25	10	9.072	48.5	4.800
3	12.5	10	9.072	48.5	-4.500
4	25	10	9.072	48.5	-6.500
5	50	10	9.072	48.5	6.800
6	100	10	9.072	48.5	11.500

EW01 C. DUBIA CHRONIC SURVIVAL
File: 447CDS Transform: NO TRANSFORMATION

ıapiro Wilks test for normality

D = 7.100

W = 0.940

Critical W (P = 0.05) (n = 50) = 0.947
Critical W (P = 0.01) (n = 50) = 0.930

Data PASS normality test at P=0.01 level. Continue analysis.

EW01 C. DUBIA CHRONIC SURVIVAL
File: 447CDS Transform: NO TRANSFORMATION

Hartley test for homogeneity of variance
Bartletts test for homogeneity of variance

These two tests can not be performed because at least one group has
zero variance.

ˀata FAIL to meet homogeneity of variance assumption.
dditional transformations are useless.

FISHERS EXACT TEST

IDENTIFICATION	NUMBER OF ALIVE	DEAD	TOTAL ANIMALS
CONTROL	9	1	10
6.25	5	5	10
TOTAL	14	6	20

CRITICAL FISHERS VALUE (10,10,9) (p=0.05) IS 4. b VALUE IS 5.
Since b is greater than 4 there is no significant difference between CONTROL and TREATMENT at the 0.05 level.

FISHERS EXACT TEST

IDENTIFICATION	NUMBER OF ALIVE	DEAD	TOTAL ANIMALS
CONTROL	9	1	10
12.5	8	2	10
TOTAL	17	3	20

CRITICAL FISHERS VALUE (10,10,9) (p=0.05) IS 4. b VALUE IS 8.
Since b is greater than 4 there is no significant difference between CONTROL and TREATMENT at the 0.05 level.

FISHERS EXACT TEST

IDENTIFICATION	NUMBER OF DEAD	ALIVE	TOTAL ANIMALS
CONTROL	1	9	10
25	0	10	10

TOTAL	1	19	20

CRITICAL FISHERS VALUE (10,10,1) (p=0.05) IS LESS THAN 0. b VALUE IS 0.
NO SIGNIFICANT DIFFERENCE

FISHERS EXACT TEST

	NUMBER OF		
IDENTIFICATION	ALIVE	DEAD	TOTAL ANIMALS
CONTROL	9	1	10
50	3	7	10
TOTAL	12	8	20

CRITICAL FISHERS VALUE (10,10,9) (p=0.05) IS 4. b VALUE IS 3.
Since b is less than or equal to 4 there is a significant difference between CONTROL and TREATMENT at the 0.05 level.

FISHERS EXACT TEST

	NUMBER OF		
IDENTIFICATION	ALIVE	DEAD	TOTAL ANIMALS
CONTROL	9	1	10
100	0	10	10
TOTAL	9	11	20

CRITICAL FISHERS VALUE (10,10,9) (p=0.05) IS 4. b VALUE IS 0.
Since b is less than or equal to 4 there is a significant difference between CONTROL and TREATMENT at the 0.05 level.

SUMMARY OF FISHERS EXACT TESTS

GROUP	IDENTIFICATION	NUMBER EXPOSED	NUMBER DEAD	SIG (P=.05)

	CONTROL	10	1	
1	6.25	10	5	
2	12.5	10	2	
3	25	10	0	
4	50	10	7	*
5	100	10	10	*

TITLE: EW01 C. DUBIA CHRONIC SURVIVAL
FILE: 447CDS
TRANSFORM: NO TRANSFORMATION NUMBER OF GROUPS: 5

GRP	IDENTIFICATION	REP	VALUE	TRANS VALUE
1	CONTROL	1	1.0000	1.0000
1	CONTROL	2	0.0000	0.0000
1	CONTROL	3	1.0000	1.0000
1	CONTROL	4	1.0000	1.0000
1	CONTROL	5	1.0000	1.0000
1	CONTROL	6	1.0000	1.0000
1	CONTROL	7	1.0000	1.0000
1	CONTROL	8	1.0000	1.0000
1	CONTROL	9	1.0000	1.0000
1	CONTROL	10	1.0000	1.0000
2	6.25%	1	1.0000	1.0000
2	6.25%	2	1.0000	1.0000
2	6.25%	3	1.0000	1.0000
2	6.25%	4	1.0000	1.0000
2	6.25%	5	0.0000	0.0000
2	6.25%	6	1.0000	1.0000
2	6.25%	7	0.0000	0.0000
2	6.25%	8	0.0000	0.0000
2	6.25%	9	0.0000	0.0000
2	6.25%	10	0.0000	0.0000
3	12.5%	1	1.0000	1.0000
3	12.5%	2	1.0000	1.0000
3	12.5%	3	0.0000	0.0000
3	12.5%	4	0.0000	0.0000
3	12.5%	5	1.0000	1.0000
3	12.5%	6	1.0000	1.0000
3	12.5%	7	1.0000	1.0000
3	12.5%	8	1.0000	1.0000
3	12.5%	9	1.0000	1.0000
3	12.5%	10	1.0000	1.0000
4	25%	1	1.0000	1.0000
4	25%	2	1.0000	1.0000
4	25%	3	1.0000	1.0000
4	25%	4	1.0000	1.0000
4	25%	5	1.0000	1.0000
4	25%	6	1.0000	1.0000
4	25%	7	1.0000	1.0000
4	25%	8	1.0000	1.0000
4	25%	9	1.0000	1.0000

4	25%	10	1.0000	1.0000
5	50%	1	0.0000	0.0000
5	50%	2	0.0000	0.0000
5	50%	3	0.0000	0.0000
5	50%	4	1.0000	1.0000
5	50%	5	0.0000	0.0000
5	50%	6	0.0000	0.0000
5	50%	7	0.0000	0.0000
5	50%	8	0.0000	0.0000
5	50%	9	1.0000	1.0000
5	50%	10	1.0000	1.0000

EW01 C. DUBIA CHRONIC SURVIVAL
File: 447CDS Transform: NO TRANSFORMATION

SUMMARY STATISTICS ON TRANSFORMED DATA TABLE 1 of 2

GRP	IDENTIFICATION	N	MIN	MAX	MEAN
1	CONTROL	10	0.000	1.000	0.900
2	6.25%	10	0.000	1.000	0.500
3	12.5%	10	0.000	1.000	0.800
4	25%	10	1.000	1.000	1.000
5	50%	10	0.000	1.000	0.300

EW01 C. DUBIA CHRONIC SURVIVAL
File: 447CDS Transform: NO TRANSFORMATION

SUMMARY STATISTICS ON TRANSFORMED DATA TABLE 2 of 2

GRP	IDENTIFICATION	VARIANCE	SD	SEM
1	CONTROL	0.100	0.316	0.100
2	6.25%	0.278	0.527	0.167
3	12.5%	0.178	0.422	0.133
4	25%	0.000	0.000	0.000
5	50%	0.233	0.483	0.153

EW01 C. DUBIA CHRONIC SURVIVAL
File: 447CDS Transform: NO TRANSFORMATION

STEELS MANY-ONE RANK TEST - Ho:Control<Treatment

GROUP	IDENTIFICATION	TRANSFORMED MEAN	RANK SUM	CRIT. VALUE	df	SIG
1	CONTROL	0.900				
2	6.25%	0.500	85.00	76.00	10.00	
3	12.5%	0.800	100.00	76.00	10.00	
4	25%	1.000	110.00	76.00	10.00	

5	50%	0.300	75.00	76.00	10.00 *

Critical values use k = 4, are 1 tailed, and alpha = 0.05

7-DAY CHRONIC TOXICITY TEST

JOB NO. F93306
INDUSTRY: Tinker
CONTACT:
EFFLUENT: SW01
NPDES PERMIT NO:
SAMPLE TYPE:
DILUTION WATER:

PERSON CONDUCTING TEST:
BEGINNING: ____hrs; 6/14 .
ENDING: ____hrs; 6/27 .
TEST
DILUTIONS:
AGE:
ORGANISM SOURCE:

PHOTOPERIOD: 16 hr light
FEEDING REGIME:
0.1 ml Artemia @ 3times/day
TEST VESSEL CAPACITY: 1 liter
TEST SOLUTION VOLUME: 500 mL
NO. ORGANISMS/TREATMENT: 10
NO. REPLICATES: ~~3~~ 4

CONC (%)	REP ID	SURVIVAL (#) START	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7
6.25 A		10	10	10	10	10	10	10	10
B		10	10	10	10	10	10	10	10
C		10	10	10	10	10	10	10	10
D		10	10	10	10	10	10	10	10
12.5 A		10	10	10	10	10	10	10	10
B		10	10	10	10	10	10	10	10
C		10	10	10	10	10	10	10	10
D		10	10	10	10	10	10	10	10
25 A		10	10	10	10	10	10	10	10
B		10	10	10	10	10	10	10	10
C		10	10	10	10	10	10	10	10
D		10	10	10	10	10	10	10	10
50 A		10	10	10	10	10	10	10	10
B		10	10	~~10~~ 10	10	10	10	10	10
C		10	10	10	10	10	10	10	10
D		10	10	10	11	11	11	11	11
		[illegible]							
TIME:		1530	1200	1710	1530	1400	1445	1602	1600
INITIAL:		MLS	SJB	TAD	MLS	MLS	SJB	MAR	SJB

GROWTH RESULTS

CONC (%)	REP ID	Boat ID	Tare wt (g)	Combined wt (g)	Tot Fish wt (g)	# of Fish	Avg Fish wt (mg)
6.25	A		.99691	1.00132	0.00441	10	0.441
	B		.99611	1.00243	0.00632	10	0.632
	C		1.00103	1.00580	0.00477	10	0.477
	D		.99448	.99931	0.00483	10	0.483
12.5	A	.99569	~~.98813~~	.99961	0.00392	10	0.392
	B		.99008	.99620	0.00612	10	0.612
	C		.99235	.99681	0.00446	10	0.446
	D		.98863	.99346	0.00483	10	0.483
25	A		.98627	.99183	0.00556	10	0.556
	B		1.00196	1.00769	0.00573	10	0.573
	C		.99859	1.00380	0.00521	10	0.521
	D		1.00188	1.00722	0.00534	10	0.534
50	A		1.00433	1.00999	0.00566	10	0.566
	B		1.00263	1.00962	0.00699	10	0.699
	C		1.00586	1.01082	0.00496	10	0.496
	D		.99692	1.00356	0.00664	11	0.604

7–DAY CHRONIC TOXICITY TEST

JOB NO. F93506
INDUSTRY: Tinker
CONTACT:
EFFLUENT: two 01
NPDES PERMIT NO:
SAMPLE TYPE:
DILUTION WATER:

PERSON CONDUCTING TEST:
BEGINNING: ___hrs; / / .
ENDING: ___hrs; / / .
TEST
DILUTIONS:
AGE:
ORGANISM SOURCE:

PHOTOPERIOD: 16 hr light
FEEDING REGIME:
0.1 ml Artemia @ 3times/day
TEST VESSEL CAPACITY: 1 liter
TEST SOLUTION VOLUME: 500 mL
NO. ORGANISMS/TREATMENT: 10
NO. REPLICATES: 4

CONC (%)	REP ID	SURVIVAL (#) START	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7
100	A	10	10	10	10	10	10	10	9
	B	10	10	10	10	10	10	10	10
	C	10	10	10	10	10	10	10	10
	D	10	10	10	10	10	10	10	10
	TIME:	1530	1020	1510	1530	1400	1500	1602	1630
	INITIAL:	MLS	SJB	TNJ	MLS	MLS	SJB	MAR	SJB

GROWTH RESULTS

CONC (%)	REP ID	Boat ID	Tare wt (g)	Combined wt (g)	Tot Fish wt (g)	# of Fish	Avg Fish wt (mg)
100	A		.99589	.99933	0.00344	9	0.382
	B		.99979	1.00487	0.00508	10	0.508
	C		.99001	.99540	0.00539	10	0.539
	D		.99518	1.00128	0.0061	10	0.61

Sample # EW01
FH
6/10/95

CHRONIC TOXICITY TEST DATA SHEET

TEMPERATURE

CONCENTRATION	Start	Day 1 OLD	Day 1 NEW	Day 2 OLD	Day 2 NEW	Day 3 OLD	Day 3 NEW	Day 4 OLD	Day 4 NEW	Day 5 OLD	Day 5 NEW	Day 6 OLD	Day 6 NEW	Day 7 OLD	Day 7 NEW	Day 8 OLD
6.25	25 C	24	24	24.2	25.0	24.8	24.8	25.0	25.0	25.2	25.2	24.8	24.8	24.5		
12.5																
25																
50																
100																

DISSOLVED OXYGEN

CONCENTRATION	Start	Day 1 OLD	Day 1 NEW	Day 2 OLD	Day 2 NEW	Day 3 OLD	Day 3 NEW	Day 4 OLD	Day 4 NEW	Day 5 OLD	Day 5 NEW	Day 6 OLD	Day 6 NEW	Day 7 OLD	Day 7 NEW	Day 8 OLD
6.25	7.6	7.0	7.9	8.0	8.2	7.4	7.4	8.5	7.9	7.5	8.1	6.7	8.3	7.0		
12.5	7.6	7.0	7.9	7.9	8.2	7.5	7.9	8.2	7.7	7.6	8.0	6.1	8.2	6.6		
25	7.5	7.0	7.7	7.2	8.2	7.5	7.9	8.2	7.6	7.5	8.0	6.1	8.2	6.5		
50	7.6	7.0	7.7	7.2	8.3	7.5	8.0	8.8	7.7	7.5	7.9	5.8	8.3	7.3		
100	7.7	6.9	8.0	7.5	8.3	7.5	8.1	8.6	7.8	7.2	7.7	5.5	8.2	6.8		

pH

CONCENTRATION	Start	Day 1 OLD	Day 1 NEW	Day 2 OLD	Day 2 NEW	Day 3 OLD	Day 3 NEW	Day 4 OLD	Day 4 NEW	Day 5 OLD	Day 5 NEW	Day 6 OLD	Day 6 NEW	Day 7 OLD	Day 7 NEW	Day 8 OLD
6.25	8.27	8.61	8.40	8.45	8.43	8.35	8.25	8.21	8.22	7.98	8.20	7.79	8.32	8.02		
12.5	8.27	8.55	8.39	8.40	8.44	8.21	8.22	8.37	8.29	8.01	8.01	7.72	8.38	7.96		
25	8.23	8.51	8.38	8.42	8.43	8.31	8.19	8.31	8.32	7.99	7.99	7.92	8.31	7.96		
50	8.18	8.48	8.36	8.43	8.42	8.32	8.12	8.36	8.22	7.90	7.78	7.90	8.30	7.92		
100	8.03	8.47	8.29	8.57	8.31	8.31	7.95	8.23	8.22	7.92	7.69	7.88	8.07	7.92		

CONDUCTIVITY

CONCENTRATION	Start	Day 1 OLD	Day 1 NEW	Day 2 OLD	Day 2 NEW	Day 3 OLD	Day 3 NEW	Day 4 OLD	Day 4 NEW	Day 5 OLD	Day 5 NEW	Day 6 OLD	Day 6 NEW	Day 7 OLD	Day 7 NEW	Day 8 OLD
6.25	330	343	338	340	314	347	326	345	348	321	322	327	323	352		
12.5	326	331	329	339	325	342	318	347	336	324	326	363	329	347		
25	321	329	298	311	328	342	313	345	339	318	331	361	324	344		
50	326	331	316	312	325	340	316	342	335	317	329	363	326	338		
100	322	331	351	342	324	341	322	342	344	343	321	359	322	334		

MAR 1540

MAR 1400 LST 1650

EW01 FATHEAD MINNOW CHRONIC
File: FMEW01 Transform: NO TRANSFORMATION

Chi-square test for normality: actual and expected frequencies

INTERVAL	<-1.5	-1.5 to <-0.5	-0.5 to 0.5	>0.5 to 1.5	>1.5
EXPECTED	1.608	5.808	9.168	5.808	1.608
OBSERVED	0	7	11	6	0

Calculated Chi-Square goodness of fit test statistic = 3.8331
Table Chi-Square value (alpha = 0.01) = 13.277

Data PASS normality test. Continue analysis.

EW01 FATHEAD MINNOW CHRONIC
File: FMEW01 Transform: NO TRANSFORMATION

Bartletts test for homogeneity of variance

Calculated B statistic = 4.75
Table Chi-square value = 15.09 (alpha = 0.01)
Table Chi-square value = 11.07 (alpha = 0.05)

Average df used in calculation ==> df (avg n - 1) = 3.00
Used for Chi-square table value ==> df (#groups-1) = 5

Data PASS homogeneity test at 0.01 level. Continue analysis.

NOTE: If groups have unequal replicate sizes the average replicate size is used to calculate the B statistic (see above).

TITLE: EW01 FATHEAD MINNOW CHRONIC
FILE: FMEW01
TRANSFORM: NO TRANSFORMATION NUMBER OF GROUPS: 6

GRP	IDENTIFICATION	REP	VALUE	TRANS VALUE
1	CONTROL	1	0.5450	0.5450
1	CONTROL	2	0.4130	0.4130
1	CONTROL	3	0.5380	0.5380
1	CONTROL	4	0.6580	0.6580
2	6.25	1	0.4410	0.4410
2	6.25	2	0.6320	0.6320
2	6.25	3	0.4770	0.4770
2	6.25	4	0.4830	0.4830
3	12.5	1	0.3920	0.3920
3	12.5	2	0.6120	0.6120
3	12.5	3	0.4460	0.4460
3	12.5	4	0.4830	0.4830
4	25	1	0.5560	0.5560
4	25	2	0.5730	0.5730
4	25	3	0.5210	0.5210
4	25	4	0.5340	0.5340
5	50	1	0.5660	0.5660
5	50	2	0.6990	0.6990
5	50	3	0.4960	0.4960
5	50	4	0.6040	0.6040
6	100	1	0.3820	0.3820
6	100	2	0.5080	0.5080
6	100	3	0.5390	0.5390
6	100	4	0.6100	0.6100

EW01 FATHEAD MINNOW CHRONIC
File: FMEW01 Transform: NO TRANSFORMATION

ANOVA TABLE

SOURCE	DF	SS	MS	F
Between	5	0.029	0.006	0.857
Within (Error)	18	0.128	0.007	
Total	23	0.157		

Critical F value = 2.77 (0.05,5,18)
Since F < Critical F FAIL TO REJECT Ho:All groups equal

EW01 FATHEAD MINNOW CHRONIC
File: FMEW01 Transform: NO TRANSFORMATION

DUNNETTS TEST - TABLE 1 OF 2 Ho:Control<Treatment

GROUP	IDENTIFICATION	TRANSFORMED MEAN	MEAN CALCULATED IN ORIGINAL UNITS	T STAT	SIG
1	CONTROL	0.539	0.539		
2	6.25	0.508	0.508	0.511	
3	12.5	0.483	0.483	0.934	
4	25	0.546	0.546	-0.127	
5	50	0.591	0.591	-0.892	
6	100	0.510	0.510	0.486	

Dunnett table value = 2.41 (1 Tailed Value, P=0.05, df=18,5)

EW01 FATHEAD MINNOW CHRONIC
File: FMEW01 Transform: NO TRANSFORMATION

DUNNETTS TEST - TABLE 2 OF 2 Ho:Control<Treatment

GROUP	IDENTIFICATION	NUM OF REPS	Minimum Sig Diff (IN ORIG. UNITS)	% of CONTROL	DIFFERENCE FROM CONTROL
1	CONTROL	4			
2	6.25	4	0.143	26.5	0.030
3	12.5	4	0.143	26.5	0.055
4	25	4	0.143	26.5	-0.007
5	50	4	0.143	26.5	-0.053
6	100	4	0.143	26.5	0.029

№ 1524

CHAIN OF CUSTODY RECORD

JOB #	PROJECT NAME
F93506 Task 3	TAFB Soldier Creek

SAMPLERS: (Signature) Daphne Mitchell

WOODWARD-CLYDE CONSULTANTS
P.O. BOX 680925
FRANKLIN, TN 37068-0925
(615) 790-0003 FAX (615) 790-0023

SAMPLE IDENTIFICATION	DATE	TIME	SAMPLE TYPE	NUMBER OF CONTAINERS	ANALYSES REQUIRED: Toxicity	REMARKS
SC-EW01-TX-201	6/13/95	1105	Water	3	✓	FedEx 5804 823522

RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)	RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)
Daphne Mitchell	6/13/95 1800				
RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)	RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)
RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED AT LAB BY: (Signature)	DATE/TIME	GENERAL COMMENTS	
		Lisa Deer	6/14/95 0855	0.5°C upon arrival	

Distribution: Original and Yellow copies accompany sample shipment to laboratory
Pink copy retained by samplers. Yellow copy retained by laboratory. Laboratory returns White copy to samplers.

№ 15_2

CHAIN OF CUSTODY RECORD

JOB #	PROJECT NAME
F93506 Task 3	TAFB Soldiers Creek

SAMPLERS: (Signature)

WOODWARD-CLYDE CONSULTANTS
P.O. BOX 680925
FRANKLIN, TN 37068-0925
(615) 790-0003 FAX (615) 790-0023

SAMPLE IDENTIFICATION	DATE	TIME	SAMPLE TYPE	NUMBER OF CONTAINERS	ANALYSES REQUIRED: Toxicity	REMARKS
SC-EW01-TX-201	6/13/95	1105	Water	2	✓	FedEx 580482352 2
SCEW01-TX-201	6/13/95	1120	Sed	2	✓	

RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)	RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)
	6/13/95 1800				
RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)	RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)
RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED AT LAB BY: (Signature)	DATE/TIME	GENERAL COMMENTS	
			6/14/95 0855	1°C upon arrival	

Distribution: Original and Yellow copies accompany sample shipment to laboratory
Pink copy retained by samplers. Yellow copy retained by laboratory. Laboratory returns White copy to samplers.

TEST SUMMARY: SC-EW02-TX-201
Ceriodaphnia dubia 48-Hour Static Acute

Test protocol:	WCC SOP 401.2
Test organism:	*Ceriodaphnia dubia*
Source:	WCC Culture Laboratory
Age of test organism:	<24 hours
Test initiation:	6/14/95
Test termination:	6/16/95
Temperature:	25 +/- 1 °C
Light:	50 - 100 foot candles
Photoperiod:	16 hours light/8 hours dark
Test vessel:	30 mL styrene
Test volume:	20 mL
Organisms/replicate:	5
Replicates/concentration:	4
Feeding regime:	none
Aeration during test:	none
Dilution Water:	Hard Reconstituted Synthetic
Test duration:	48 hours
Effect measured:	Mortality
Reference Toxicant Data:	
LC_{50} (g/L NaCl):	1.51

TEST RESULTS: SC-EW02-TX-201
Ceriodaphnia dubia 48-Hour Static Acute

LC_{50} > 100%

Statictical analysis method: N/A

Treatment (% Sample)	Survival (%)	pH	Conductivity (umhos/cm)	DO (mg/L)	Temperature (°C)	Hardness (mg/L $CaCO_3$)	Alkalinity (mg/L $CaCO_3$)
Control	100	8.40-8.63	738 (731-744)	8.5 (8.3-8.6)	24.5 (24.0-25.0)	270	
6.25	95	8.50-8.57	658 (608-708)	8.5 (8.3-8.6)	24.5 (24.0-25.0)		
12.5	95	8.52-8.55	737 (681-792)	8.5 (8.3-8.7)	24.5 (24.0-25.0)		
25	100	8.52-8.57	782 (768-795)	8.5 (8.3-8.7)	24.5 (24.0-25.0)		
50	100	8.40-8.66	700 (620-780)	8.7 (8.3-9.0)	24.5 (24.0-25.0)		
100	100	8.31-8.59	755 (728-781)	8.8 (8.3-9.2)	24.5 (24.0-25.0)	310	336

SURFACE WATER SAMPLE ARRIVAL INFORMATION

Collection Date/Time:	6/13/95 @ 0830
Use Date/Time:	6/14/95 @ 1420
Method of Shipment:	Overnight Courier
Temperature (°C):	1.5
pH:	8.32
Ammonia (mg/L):	0.85
Conductivity (umhos/cm):	781
DO (mg/L):	8.8

TEST SUMMARY: SC-EW02-TX-201
Ceriodaphnia dubia Chronic Renewal

Test protocol:	WCC SOP 501.1
Test organism:	*Ceriodaphnia dubia*
Source:	WCC Culture Laboratory
WCC Batch:	6/16/95
Age of test organism:	<24 hours
Test initiation:	6/16/95
Test termination:	6/23/95
Temperature:	25 +/- 1 °C
Light:	50 - 100 foot candles
Photoperiod:	16 hours light/8 hours dark
Test vessel:	30 mL styrene
Test volume:	15 mL
Organisms/replicate:	1
Replicates/concentration:	10
Feeding regime:	0.05 mL *Selenastrum* and 0.05 mL YTC daily
Aeration during test:	none
Dilution Water:	Hard Reconstituted Synthetic
Test duration:	7 days
Effect measured:	Survival and reproduction

Toxicity test methods and procedures were followed in accordance with EPA 600/4-89/001

Reference Toxicant Data:	
NOEC (g/L NaCl):	0.75

TEST RESULTS: SC-EW02-TX-201
Ceriodaphnia dubia Chronic Survival and Reproduction Test

Survival NOEC:	100%
Statistical analysis method:	Wilcoxon Rank Sum with Bonferroni Adju
Normality test:	Fail
Homogeneity of variance test:	Fail
Reproduction NOEC:	100%
Statistical analysis method:	Dunnetts
Normality test:	Pass
Homogeneity of variance test:	Pass

Treatment (% Sample)	Survival (%)	pH	Conductivity (umhos/cm)	DO (mg/L)	Temperature (°C)
Control	100	8.30-8.71	861 (748-983)	7.9 (7.2-8.4)	24.6 (24.0-25.2)
6.25	80	8.30-8.73	845 (715-919)	8.0 (7.1-8.4)	24.6 (24.0-25.2)
12.5	70	8.32-8.72	851 (706-931)	8.0 (7.2-8.5)	24.6 (24.0-25.2)
25	70	8.37-8.71	842 (710-911)	8.0 (7.1-8.5)	24.6 (24.0-25.2)
50	80	8.42-8.71	814 (762-863)	8.0 (7.3-8.5)	24.6 (24.0-25.2)
100	70	8.30-8.68	774 (713-714)	8.0 (7.1-8.5)	24.6 (24.0-25.2)

	Hardness (mg/L $CaCO_3$)	Alkalinity (mg/L $CaCO_3$)	Ammonia (mg/L)
Control	150		
EW02	310	336	0.85

TEST SUMMARY: SC-EW02-TX-201
Pimephales promelas 48-Hour Static Acute

Test protocol:	WCC SOP 410.2
Test organism:	*Pimephales promelas*
Source:	Woodward-Clyde Consultants
Age of test organism:	13 days
Test initiation:	6/14/95
Test termination:	6/16/95
Temperature:	20 +/- 1 °C
Light:	50 - 100 foot candles
Photoperiod:	16 hours light/8 hours dark
Test vessel:	500 mL plastic beaker
Test volume:	250 mL
Organisms/replicate:	10
Replicates/concentration:	2
Feeding regime:	none
Aeration during test:	none
Dilution Water:	Hard Reconstituted Synthetic
Test duration:	48 hours
Effect measured:	Mortality
Reference Toxicant Data:	
LC_{50} (g/L NaCl):	5.26

TEST RESULTS: SC-EW02-TX-201
Pimephales promelas 48-Hour Static Acute

LC_{50} > 100%

Statictical analysis method: N/A

Treatment (% Sample)	Survival (%)	pH	Conductivity (umhos/cm)	DO (mg/L)	Temperature (°C)	Hardness (mg/L $CaCO_3$)	Alkalinity (mg/L $CaCO_3$)
Control	100	8.29-8.31	340 (327-353	8.0 (7.4-8.5)	20.9 (20.8-21.0)	158	146
6.25	95	8.31-8.41	339 (332-346)	8.1 (7.5-8.6)	20.9 (20.8-21.0)		
12.5	100	8.33-8.41	311 (277-345)	8.1 (7.5-8.6)	20.9 (20.8-21.0)		
25	100	8.34-8.46	330 (315-345)	8.0 (7.4-8.5)	20.9 (20.8-21.0)		
50	100	8.34-8.58	330 (314-346)	8.1 (7.5-8.7)	20.9 (20.8-21.0)		
100	100	8.32-8.54	332 (316-347)	8.2 (7.5-8.8)	20.9 (20.8-21.0)	310	336

SURFACE WATER SAMPLE ARRIVAL INFORMATION

Collection Date/Time:	6/13/95 @ 0830
Use Date/Time:	6/14/95 @ 1415
Method of Shipment:	Overnight Courier
Temperature (°C):	1.5
pH:	8.32
Ammonia (mg/L):	0.85
Conductivity (umhos/cm):	781
DO (mg/L):	8.8
Description:	Clear

TEST RESULTS: SC-EW02-TX-201
Pimephales promelas Chronic Renewal

Test protocol:	WCC SOP 510.1
Test organism:	*Pimephales promelas*
Source:	Environmental Consulting & Testing
Age of test organism:	<24 hours
Test initiation:	6/16/95 @ 1630
Test termination:	6/23/95 @ 1045
Temperature:	25 +/- 1 °C
Light:	50 - 100 foot candles
Photoperiod:	16 hours light/8 hours dark
Test vessel:	500 mL plastic beaker
Test volume:	250 mL
Organisms/replicate:	10
Replicates/concentration:	4
Feeding regime:	0.1 mL brine shrimp nauplii twice daily
Aeration during test:	none
Dilution Water:	Hard Reconstituted Synthetic
Test duration:	7 days
Effect measured:	Survival and growth

Toxicity test methods and procedures were followed in accordance with EPA 600/4-89/001

Reference Toxicant Data:	
NOEC (g/L NaCl):	3

TEST RESULTS: SC-EW02-TX-201

Pimephales promelas Chronic Survival and Growth Test

Survival NOEC:		100%
	Statistical analysis method:	N/A
	Normality test:	
	Homogeneity of variance test:	
Growth NOEC:		100%
	Statistical analysis method:	Dunnetts
	Normality test:	Chi-Square - Pass
	Homogeneity of variance test:	Bartletts - Pass

Treatment (% Sample)	Survival (%)	pH	Conductivity (umhos/cm)	DO (mg/L)	Temperature (°C)
Control	100	7.86-8.50	346 (309-440)	7.8 (6.6-8.4)	24.7 (24.0-25.2)
6.25	95	7.98-8.52	375 (339-408)	7.6 (6.2-8.3)	24.7 (24.0-25.2)
12.5	90	7.98-8.52	390 (338-416)	7.6 (5.8-8.2)	24.7 (24.0-25.2)
25	92.5	8.04-8.57	447 (425-482)	7.5 (5.9-8.3)	24.7 (24.0-25.2)
50	97.5	8.10-8.66	557 (526-594)	7.6 (5.7-8.3)	24.7 (24.0-25.2)
100	87.5	8.22-8.67	753 (684-779)	7.6 (5.7-8.3)	24.7 (24.0-25.2)

	Hardness (mg/L $CaCO_3$)	Alkalinity (mg/L $CaCO_3$	Ammonia (mg/L)
Control	150		
EW02	310	336	0.85

Controls

48-hr Ceriodaphnia dubia TOXICITY TEST

LOG NO. 439-442
JOB NO. PP135016
INDUSTRY: Tanker
CONTACT:

EFFLUENT: Controls
START DATE: 6/14/95
START TIME: 1400
DILUTION WATER:

CONC (%)	REP ID	SURVIVAL (#) 0	24	48	DEAD	TEMPERATURE (oC) 0	24	48	DO (mg/L) 0	24	48	pH (S.U.) 0	24	48	CONDUCTIVITY (umhos/cm) 0	24	48
Hard 140	A	5	5	4		24.0		25.0	8.6		8.2	7.71		8.20	410		380
EW01	B	5	5	5													
	C	5	5	5													
	D	5	5	5													
Hd 270	A	5	5	5					8.4		8.3	7.63		8.40	131		114
EW02	B	5	5	5													
CREEK01	C	5	5	5													
	D	5	5	5													
Mod. Hd 100	A	5	5	5					8.6		8.4	7.59		8.21	429		414
EW03	B	5	5	5													
	C	5	5	5													
	D	5	5	5													
	A																
	B																
	C																
	D																
	A																
	B																
	C																
	D																
Initials		WHC	LJ	LJT													
Time		1410	0930	0853													

Comments

PARAMETER	Control	
Total Hardness (mg/L CaCO3)		
Total Alkalinity (mg/L CaCO3 @ 4.5)		

L

48-hr Ceriodaphnia dubia TOXICITY TEST

LOG NO. 440
JOB NO. F93506a
INDUSTRY: Tucker
CONTACT:

EFFLUENT: EW002
START DATE: 6-14-95
START TIME: 1420
DILUTION WATER: Hard-270

CONC (%)	REP ID	SURVIVAL (#) 0	24	48	DEAD	TEMPERATURE (oC) 0	24	48	DO (mg/L) 0	24	48	pH (S.U.) 0	24	48	CONDUCTIVITY (umhos/cm) 0	24	48
6.25	A	5	5	5		24.0		25.0	7.4		8.3	8.51		8.52	731		708
	B	5	5	5											1007		
	C	5	5	5													
	D	5	4	4													
12.5	A	5	5	5					7.7		8.3	8.55		8.53	1008		792
	B	5	5	5											781		
	C	5	5	5													
	D	5	5	4													
25	A	5	5	5					7.7		8.3	8.52		857	1081		795
	B	5	5	5											716		
	C	5	5	5													
	D	5	5	5													
50	A	5	5	5					9.0		8.3	8.40		8.62	1008		780
	B	5	5	5											720		
	C	5	5	5													
	D	5	5	5													
100	A	5	5	5					9.3		8.3	8.31		8.59	781		728
	B	5	5	5													
	C	5	5	5													
	D	5	5	5													
Initials		MAF	LST	LST													
Time		1420	0935	0945													

Comments

PARAMETER	Control	
Total Hardness (mg/L CaCO3)		
Total Alkalinity (mg/L CaCO3 @ 4.5)		

48-hr Pimephales promleas TOXICITY TEST

LOG NO. 440
JOB NO. F935016
INDUSTRY: Tinker
CONTACT: ~~WEC - today~~ MLS
EC & T - 3 day

EFFLUENT: Eff02
START DATE: 6-14-95
START TIME: 1415
DILUTION WATER: Spring

CONC (%)	REP ID	SURVIVAL (#) 0	24	48	DIAD	TEMPERATURE (oC) 0	24	48	DO (mg/L) 0	24	48	pH (S.U.) 0	24	48	CONDUCTIVITY (umhos/cm) 0	24	48
6.25	A	10	10			21.0		20.8	7.4		7.5	8.31		8.41	512		630
	B	10	10	10													
12.5	A	10	10	9*					7.4		7.5	8.33		8.41	801		414
	B	10	10	10													
25	A	10	10	10					7.5		7.4	8.31		8.46	1105		469
	B	10	10	10													
50	A	10	10	10					7.7		7.5	8.34		8.58	512		588
	B	10	10	10													
100	A	10	10	10					7.2		7.5	8.32		8.54	681		784
	B	10	10	10													
	A																
	B																
	A																
	B																
	A																
	B																
	A																
	B																
	A																
	B																
Initials		MLS	MLS	SE													
Time		1415	1530	0832													

Comments
9* no baby females

PARAMETER	Control	
Total Hardness (mg/L CaCO3)		
Total Alkalinity (mg/L CaCO3 @ 4.5)		

Ceriodaphnia SURVIVAL AND REPRODUCTION CHRONIC TOXICITY TEST

JOB NO. F93506 | BEGINNING: 1605 hrs; 6/16/95 | Log No. 450
INDUSTRY: Tinker | ENDING: 1145 hrs; 6/23/95 | PHOTOPERIOD: 16 light, 8 dark
CONTACT: | FEEDING REGIME: | ORGANISM SOURCE: WCC
EFFLUENT: Ewo2 | .05 mL yct/15 mL | TEST VESSEL CAPACITY: 30 mL
NPDES PERMIT NO: | .05 mL algal suspension/15 mL | TEST SOLUTION VOLUME: 15mL
PERSON CONDUCTING TEST: | | NO. REPLICATES:
| | DILUTION WATER:

TIME
OBSERVER

NUMBER OF YOUNG PRODUCED

CONC	CHAMBER	START	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7
					9	31	83	129	190
Control	1					2	4	0	6
	2					3	5	0	10
	3					3	6	9	0
	4					2	6	9	5
	5						7	0	9
	6					2	5	0	6
	7				2	5	3	5	4
	8				7	2	J	0	3
	9					J 0	6	J 14	J 9
	10					3	5	9	4

CONC	CHAMBER	START	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7
					1	14	57	79	116
6.25%	11				1	C	6	C	(5)
	12					3	5	C	12
	13					4	8	9	3
	14						8	2	0
	15						5	4	C
	16							4	10
	17					4	C	C	3
	18					(1)			
	19					2	5	C	2
	20								7

20% mortality

CONC	CHAMBER	START	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7
					2	26	65	36	140
	21				2	7	C	12	13
	22						5	0	3
	23					4	11	5	0
	24						5	C	7
	25					2	3	1	8
	26					1	8	0	13
	27					(D) 4			
	28					3	7	0	13
	29				(D)				
	30					3	(D)		

Ceriodaphnia SURVIVAL AND REPRODUCTION CHRONIC TOXICITY TEST

JOB NO: 93506 | BEGINNING: _____ hrs; 6/16/ | Log No. 450
INDUSTRY: Tanker | ENDING: _____ hrs; 6/29/ | PHOTOPERIOD: 16 light, 8 dark
CONTACT: | FEEDING REGIME: | ORGANISM SOURCE: WCC
EFFLUENT: Ewc2 | .05 mL yct/15 mL | TEST VESSEL CAPACITY: 30 mL
NPDES PERMIT NO: | .05 mL algal suspension/15 mL | TEST SOLUTION VOLUME: 15mL
PERSON CONDUCTING TEST: | | NO. REPLICATES:
| | DILUTION WATER:

NUMBER OF YOUNG PRODUCED

CONC	CHAMBER	START	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7	
	TIME				4	26	55	92	135	
25%	31						3	7	C	10
	32						7	C	11	18
	33						7	12	2	21
	34					4	5	0	(D)	9
	35				(D)					
	36					(D)				
	37					3	7	C	3	13
	38				2	8	C	C	C	10
	39				2	7	0	15	15	39
	40							3	12	15
50%	41			2	4	23	78	143	198	
	42						10	0	7	17
	43					1	6	12	C	19
	44			2	0	6	12	13	C	33
	45					5	C	13	12	30
	46					3	(D)			3
	47						(D) 6			6
	48							3	12	15
	49					4	2	1	12	35
	50				2	C	5	16	12	35
							5	7	C	12
100%	51			4	14	48	81	155	225	
	52					2	5	12	(D)	19
	53					8	C	12	16	36
	54		(D)			2	7	C	14	15
	55								(D)	
	56				3	C	(D)			3
	57			4	0	5	2	11	1	23
	58				2	6	C	16	16	40
	59				3	C	9	12	1	25
	60					2	9	C	15	21
						4	8	C	8	20

Ceriodaphnia dubia GRID Ceriodaphnia dubia GRID MONITORING DATA

Grid Letter: ~~A~~ ~~B~~ ~~C~~ ~~D~~ J K Z F Start Date: 6/16/95 Sample ID: 81002 Log #: 45

AD	ID 16	1 ✓	AD	ID 31	1 ✓	AD	ID 41	1 ✓	AD	ID 2	1 ✓		ID 24	1 ✓
2 ✓	3 0	4 0	2 ✓	3 0	4 0	2 ✓	3 0	4 0	2 ✓	3 0	4 3	2 ✓	3 0	4 [illegible]
5 0	6 7	7 10	5 3	6 7	7 0	5 10	6 0	7 7	5 5	6 0	7 10	5 5	6 0	7 [illegible]
AD	ID 30	1 ✓	AD	ID 54	1 D/0	AD	ID 15	1 ✓	AD	ID 48	1 ✓		ID 39	1 ✓
2 ✓	3 0	4 3	2	3	4	2 ✓	3 0	4 0	2 ✓	3 0	4 4	2 ✓	3 2	4 [illegible]
5 D	6	7	5	6	7	5 5	6 4	7 40	5 8	6 1	7 12	5 0	6 15	7 [illegible]
AD	ID 40	1 ✓	AD	ID 1	1 ✓	AD	ID 25	1 ✓	AD	ID 58	1 ✓		ID 46	1 ✓
2 ✓	3 0	4 0	2 ✓	3 0	4 2	2 ✓	3 0	4 2	2 ✓	3 3	4 0	2 ✓	3 0	4 0
5 3	6 11	7 0	5 4	6 0	7 6	5 3	6 1	7 8	5 9	6 12	7 1	5 D 6	6	7
AD	ID 47	1 ✓	AD	ID 26	1 ✓	AD	ID 42	1 ✓	AD	ID 18	1 ✓		ID 52	1 ✓
2 ✓	3 0	4 0	2 ✓	3 0	4 1	2 ✓	3 0	4 1	2 ✓	3 0	4 D	2 ✓	3 0	4 8
5 0	6 3	7 12	5 8	6 0	7 13	5 6	6 12	7 0	5	6	7	5 0	6 12	7 16
AD	ID 28	1 ✓	AD	ID 60	1 ✓	AD	ID 3	1 ✓	AD	ID 33	1 ✓		ID 53	1 ✓
2 ✓	3 0	4 3	2 ✓	3 0	4 4	2 ✓	3 0	4 3	2 ✓	3 0	4 0	2 ✓	3 2	4 [illegible]
5 7	6 0	7 13	5 8	6 0	7 8	5 6	6 9	7 0	5 7	6 12	7 2	5 0	6 14	7 15
AD	ID 5	1 ✓	AD	ID 17	1 ✓	AD	ID 32	1 ✓	AD	ID 27	1 ✓		ID 43	1 ✓
2 ✓	3 0	4 0	2 ✓	3 0	4 4	2 ✓	3 0	4 0	2 ✓	3 0	4 D 4	2 2	3 0	4 6
5 7	6 0	7 9	5 0	6 0	7 3	5 7	6 0	7 11	5	6	7	5 12	6 13	7 0

Comments:

Cup ID	Sample Concentration	Day	Initials	Time
		Ø	MLS	1605
1–10:	Control	1	MAR	1440
11–20:	6.25%	2	MAR	1420
21–30:	12.5	3	SJB	1145
31–40:	25	4	LJT	1400
41–50:	50	5	LJT	1350
51–60:	100	6	MAR	1235
		7	LJT	1145

Ceriodaphnia dubia GRID Ceriodaphnia dubia GRID MONITORING DATA

Grid Letter: PAPZGE I Start Date: 6/16/95 Sample ID: EWC2 Log #: 45

AD	ID 4	1 ✓	2 ✓	3 0	4 2	5 6	6 9	7 5	AD	ID 50	1 ✓	2 ✓	3 0	4 0	5 5	6 7	7 0
AD	ID 23	1 —	2 ✓	3 0	4 4	5 11	6 8	7 0	AD	ID 14	1 —	2 ✓	3 0	4 0	5 8	6 62	7 0
	ID 6	1	2 ✓	3 0	4	5 5	6 0	7 6	AD	ID 51	1 ✓	2 ✓	3 0	4 2	5 5	6 12	7 D
AD	ID 59	1 ✓	2 ✓	3 0	4 2	5 9	6 0	7 10	AD	ID 13	1 ✓	2 ✓	3 0	4 4	5 8	6 9	7 3
AD	ID 34	1 ✓	2 ✓	3 0	4 4	5 5	6 0	7 D		ID 57	1	2 ✓	3 2	4 6	5 0	6 16	7 1
AD	ID 12	1 ✓	2 ✓	3 0	4 3	5 8	6 0	7 12	AD	ID 22	1 ✓	2 ✓	3 0	4 0	5 5	6 0	7 3
AD	ID 7	1 ✓	2 ✓	3 2	4 5	5 3	6 5	7 9	AD	ID 45	1 ✓	2 ✓	3 0	4 3	5 D	6	7
	ID 19	1	2 ✓	3 0	4 2	5 8	6 0	7 5	AD	ID 29	1 ✓	2 ✓	3 0	4	5	6	7
AD	ID 49	1 ✓	2 ✓	3 2	4 0	5 8	6 16	7 12	AD	ID 35	1 —	2 ✓	3 0	4	5	6	7
AD	ID 38	1 ✓	2 ✓	3 2	4 8	5 0	6 0	7 0		ID 9	1	2 ✓	3 0	4 0	5 6	6 14	7 9
AD	ID 8	1 ✓	2 ✓	3 7	4 2	5 5	6 0	7 3	AD	ID 44	1 ✓	2 ✓	3 0	4 5	5 0	6 13	7 12
AD	ID 21	1 ✓	2 ✓	3 2	4 7	5 0	6 12	7 13	AD	ID 55	1 ✓	2 ✓	3 3	4 0	5 D	6	7
	ID 20	1	2 ✓	3 0	4 0	5 0	6 0	7	AD	ID 11	1 ✓	2 ✓	3 1	4 0	5 6	6 0	7 D
AD	ID 36	1 ✓	2 ✓	3 0	4 D	5	6	7	AD	ID 56	1 ✓	2 4	3 0	4 5	5 2	6 11	7 1
AD	ID 10	1 ✓	2 ✓	3 0	4 3	5 5	6 9	7 4		ID 37	1	2 ✓	3 0	4 3	5 7	6 0	7 3

Comments:

Cup ID	Sample Concentration	Day ∅	Initials MLS	Time 1010
1–10:	Control	1	MAR	1445
11–20:	6.25%	2	MAR	1430
21–30:	12.5	3	SDR	1145
31–40:	25	4	LJT	1400
41–50:	50	5	LJT	1340
51–60:	100	6	MAR	1340
		7	LJT	1145

Cg #450
6/16/95

CHRONIC TOXICITY TEST DATA SHEET

TEMPERATURE

CONCENTRATION	Start	Day 1 OLD	Day 1 NEW	Day 2 OLD	Day 2 NEW	Day 3 OLD	Day 3 NEW	Day 4 OLD	Day 4 NEW	Day 5 OLD	Day 5 NEW	Day 6 OLD	Day 6 NEW	Day 7 OLD	Day 7 NEW	Day 8 OLD
Control	25.0°	24.0	24.0	24.3	24.6	24.2	25.0	25.0	24.8	25.2	25.2	24.8	24.8	24.2		
6.25%																
12.5																
25																
50																
100																

DISSOLVED OXYGEN

CONCENTRATION	Start	Day 1 OLD	Day 1 NEW	Day 2 OLD	Day 2 NEW	Day 3 OLD	Day 3 NEW	Day 4 OLD	Day 4 NEW	Day 5 OLD	Day 5 NEW	Day 6 OLD	Day 6 NEW	Day 7 OLD	Day 7 NEW	Day 8 OLD
Control	7.9	7.2	8.1	8.1	8.4	8.0	8.1	7.7	8.2	7.7	8.1	7.9	8.1	7.8		
6.25%	7.9	7.1	8.2	8.2	8.4	8.1	8.2	7.7	8.3	7.9	8.1	7.9	8.1	7.8		
12.5	7.8	7.2	8.2	8.2	8.5	8.1	8.3	7.8	8.3	7.8	8.2	7.8	8.1	7.8		
25	7.9	7.3	8.1	8.2	8.5	8.1	8.3	7.9	8.2	7.7	8.1	7.7	8.2	7.7		
50	7.9	7.3	8.2	8.2	8.5	8.0	8.3	7.9	8.3	7.7	8.2	7.6	8.2	7.7		
100	8.0	7.1	8.3	8.2	8.5	8.0	8.4	7.7	8.3	7.8	8.3	7.8	8.2	7.6		

pH

CONCENTRATION	Start	Day 1 OLD	Day 1 NEW	Day 2 OLD	Day 2 NEW	Day 3 OLD	Day 3 NEW	Day 4 OLD	Day 4 NEW	Day 5 OLD	Day 5 NEW	Day 6 OLD	Day 6 NEW	Day 7 OLD	Day 7 NEW	Day 8 OLD
Control	8.58	8.36	8.68	8.58	8.71	8.58	8.58	8.42	8.52	8.30	8.48	8.48	8.48	8.46		
6.25	8.56	8.36	8.62	8.57	8.73	8.48	8.48	8.34	8.52	8.30	8.49	8.48	8.48	8.45		
12.5	8.56	8.42	8.65	8.62	8.72	8.47	8.49	8.35	8.53	8.32	8.49	8.51	8.47	8.46		
25	8.56	8.43	8.60	8.65	8.71	8.53	8.50	8.40	8.51	8.37	8.47	8.52	8.44	8.49		
50	8.54	8.47	8.53	8.71	8.69	8.52	8.50	8.43	8.50	8.45	8.44	8.61	8.42	8.51		
100	8.51	8.55	8.44	8.68	8.64	8.52	8.51	8.54	8.48	8.51	8.37	8.61	8.30	8.63		

CONDUCTIVITY

CONCENTRATION	Start	Day 1 OLD	Day 1 NEW	Day 2 OLD	Day 2 NEW (pre)	Day 3 OLD	Day 3 NEW	Day 4 OLD	Day 4 NEW	Day 5 OLD	Day 5 NEW	Day 6 OLD	Day 6 NEW	Day 7 OLD	Day 7 NEW	Day 8 OLD
Control	748	760	727	889	~~880~~ 882	901	889	926	843	935	894	983	852	901		
6.25	766	768	823	861	890	910	715	744	878	919	881	966	838	930		
12.5	772	775	894	896	887	910	706	720	900	931	881	916	838	887		
25	771	781	819	893	874	893	710	722	881	911	861	902	829	911		
50	776	785	727	861	843	891	726	782	915	856	836	847	~~903~~ 888	863		
100	793	743	729	872	790	896	776	814	743	804	913	723	788	805		
										8						

MMR 1610 | LJT DCL 1745 | MLS 1455 LJT 1605 | LJT 1200 | LJT 1145

EW02 CERIO CHRONIC
File: CDEW02 Transform: NO TRANSFORMATION

.i-square test for normality: actual and expected frequencies

INTERVAL	<-1.5	-1.5 to <-0.5	-0.5 to 0.5	>0.5 to 1.5	>1.5
EXPECTED	4.020	14.520	22.920	14.520	4.020
OBSERVED	2	16	24	13	5

Calculated Chi-Square goodness of fit test statistic = 1.6148
Table Chi-Square value (alpha = 0.01) = 13.277

Data PASS normality test. Continue analysis.

EW02 CERIO CHRONIC
File: CDEW02 Transform: NO TRANSFORMATION

Bartletts test for homogeneity of variance

Calculated B statistic = 8.80
Table Chi-square value = 15.09 (alpha = 0.01)
ble Chi-square value = 11.07 (alpha = 0.05)

Average df used in calculation ==> df (avg n - 1) = 9.00
Used for Chi-square table value ==> df (#groups-1) = 5

Data PASS homogeneity test at 0.01 level. Continue analysis.

NOTE: If groups have unequal replicate sizes the average replicate size is used to calculate the B statistic (see above).

TITLE: EW02 CERIO CHRONIC
FILE: CDEW02
TRANSFORM: NO TRANSFORMATION NUMBER OF GROUPS: 6

GRP	IDENTIFICATION	REP	VALUE	TRANS VALUE
1	CONTROL	1	12.0000	12.0000
1	CONTROL	2	18.0000	18.0000
1	CONTROL	3	18.0000	18.0000
1	CONTROL	4	22.0000	22.0000
1	CONTROL	5	16.0000	16.0000
1	CONTROL	6	13.0000	13.0000
1	CONTROL	7	24.0000	24.0000
1	CONTROL	8	17.0000	17.0000
1	CONTROL	9	29.0000	29.0000
1	CONTROL	10	21.0000	21.0000
2	6.25	1	7.0000	7.0000
2	6.25	2	23.0000	23.0000
2	6.25	3	24.0000	24.0000
2	6.25	4	10.0000	10.0000
2	6.25	5	9.0000	9.0000
2	6.25	6	17.0000	17.0000
2	6.25	7	7.0000	7.0000
2	6.25	8	0.0000	0.0000
2	6.25	9	12.0000	12.0000
2	6.25	10	7.0000	7.0000
3	12.5	1	34.0000	34.0000
3	12.5	2	8.0000	8.0000
3	12.5	3	23.0000	23.0000
3	12.5	4	12.0000	12.0000
3	12.5	5	14.0000	14.0000
3	12.5	6	22.0000	22.0000
3	12.5	7	4.0000	4.0000
3	12.5	8	23.0000	23.0000
3	12.5	9	0.0000	0.0000
3	12.5	10	3.0000	3.0000
4	25	1	10.0000	10.0000
4	25	2	18.0000	18.0000
4	25	3	21.0000	21.0000
4	25	4	9.0000	9.0000
4	25	5	0.0000	0.0000
4	25	6	0.0000	0.0000
4	25	7	13.0000	13.0000
4	25	8	10.0000	10.0000
4	25	9	39.0000	39.0000
4	25	10	15.0000	15.0000
5	50	1	17.0000	17.0000
5	50	2	19.0000	19.0000
5	50	3	33.0000	33.0000
5	50	4	30.0000	30.0000
5	50	5	3.0000	3.0000
5	50	6	6.0000	6.0000
5	50	7	15.0000	15.0000
5	50	8	25.0000	25.0000
5	50	9	38.0000	38.0000
5	50	10	12.0000	12.0000

6	100	1	19.0000	19.0000
6	100	2	36.0000	36.0000
6	100	3	38.0000	38.0000
6	100	4	0.0000	0.0000
	100	5	3.0000	3.0000
6	100	6	23.0000	23.0000
6	100	7	40.0000	40.0000
6	100	8	25.0000	25.0000
6	100	9	21.0000	21.0000
6	100	10	20.0000	20.0000

EW02 CERIO CHRONIC
File: CDEW02 Transform: NO TRANSFORMATION

ANOVA TABLE

SOURCE	DF	SS	MS	F
Between	5	905.083	181.017	1.679
Within (Error)	54	5823.100	107.835	
Total	59	6728.183		

Critical F value = 2.45 (0.05,5,40)
Since F < Critical F FAIL TO REJECT Ho:All groups equal

EW02 CERIO CHRONIC
File: CDEW02 Transform: NO TRANSFORMATION

DUNNETTS TEST - TABLE 1 OF 2 Ho:Control<Treatment

GROUP	IDENTIFICATION	TRANSFORMED MEAN	MEAN CALCULATED IN ORIGINAL UNITS	T STAT	SIG
1	CONTROL	19.000	19.000		
2	6.25	11.600	11.600	1.593	
3	12.5	14.300	14.300	1.012	
4	25	13.500	13.500	1.184	
5	50	19.800	19.800	-0.172	
6	100	22.500	22.500	-0.754	

Dunnett table value = 2.31 (1 Tailed Value, P=0.05, df=40,5)

EW02 CERIO CHRONIC
File: CDEW02 Transform: NO TRANSFORMATION

DUNNETTS TEST - TABLE 2 OF 2 Ho:Control<Treatment

GROUP	IDENTIFICATION	NUM OF REPS	Minimum Sig Diff (IN ORIG. UNITS)	% of CONTROL	DIFFERENCE FROM CONTROL

1	CONTROL	10			
2	6.25	10	10.728	56.5	7.400
3	12.5	10	10.728	56.5	4.700
4	25	10	10.728	56.5	5.500
5	50	10	10.728	56.5	-0.800
6	100	10	10.728	56.5	-3.500

C. Dubia survival EW02 - Log #450
File: CDS450 Transform: ARC SINE(SQUARE ROOT(Y))

Chi-square test for normality: actual and expected frequencies

INTERVAL	<-1.5	-1.5 to <-0.5	-0.5 to 0.5	>0.5 to 1.5	>1.5
EXPECTED	4.020	14.520	22.920	14.520	4.020
OBSERVED	6	6	34	14	0

Calculated Chi-Square goodness of fit test statistic = 15.3695
Table Chi-Square value (alpha = 0.01) = 13.277

Data FAIL normality test. Try another transformation.

Warning - The two homogeneity tests are sensitive to non-normal data and should not be performed.

C. Dubia survival EW02 - Log #450
File: CDS450 Transform: ARC SINE(SQUARE ROOT(Y))

Hartley test for homogeneity of variance
Bartletts test for homogeneity of variance

These two tests can not be performed because at least one group has zero variance.

Data FAIL to meet homogeneity of variance assumption.
Additional transformations are useless.

FISHERS EXACT TEST

IDENTIFICATION	NUMBER OF ALIVE	DEAD	TOTAL ANIMALS
CONTROL	10	0	10
6.25%	8	2	10
TOTAL	18	2	20

CRITICAL FISHERS VALUE (10,10,10) (p=0.05) IS 6. b VALUE IS 8.
Since b is greater than 6 there is no significant difference between CONTROL and TREATMENT at the 0.05 level.

FISHERS EXACT TEST

IDENTIFICATION	NUMBER OF ALIVE	DEAD	TOTAL ANIMALS
CONTROL	10	0	10
12.5%	7	3	10
TOTAL	17	3	20

CRITICAL FISHERS VALUE (10,10,10) (p=0.05) IS 6. b VALUE IS 7.
Since b is greater than 6 there is no significant difference between CONTROL and TREATMENT at the 0.05 level.

FISHERS EXACT TEST

IDENTIFICATION	NUMBER OF ALIVE	DEAD	TOTAL ANIMALS
CONTROL	10	0	10
25%	7	3	10

TOTAL	17	3	20

CRITICAL FISHERS VALUE (10,10,10) (p=0.05) IS 6. b VALUE IS 7.
Since b is greater than 6 there is no significant difference between CONTROL and TREATMENT at the 0.05 level.

FISHERS EXACT TEST

IDENTIFICATION	NUMBER OF ALIVE	NUMBER OF DEAD	NUMBER OF TOTAL ANIMALS
CONTROL	10	0	10
50%	9	1	10
TOTAL	19	1	20

CRITICAL FISHERS VALUE (10,10,10) (p=0.05) IS 6. b VALUE IS 9.
Since b is greater than 6 there is no significant difference etween CONTROL and TREATMENT at the 0.05 level.

FISHERS EXACT TEST

IDENTIFICATION	NUMBER OF ALIVE	NUMBER OF DEAD	NUMBER OF TOTAL ANIMALS
CONTROL	10	0	10
100%	7	3	10
TOTAL	17	3	20

CRITICAL FISHERS VALUE (10,10,10) (p=0.05) IS 6. b VALUE IS 7.
Since b is greater than 6 there is no significant difference between CONTROL and TREATMENT at the 0.05 level.

SUMMARY OF FISHERS EXACT TESTS

	NUMBER	NUMBER	SIG

GROUP	IDENTIFICATION	EXPOSED	DEAD	(P=.05)
	CONTROL	10	0	
1	6.25%	10	2	
2	12.5%	10	3	
3	25%	10	3	
4	50%	10	1	
5	100%	10	3	

TITLE: C. Dubia survival EW02 - Log #450
FILE: cds450
TRANSFORM: NO TRANSFORM NUMBER OF GROUPS: 6

GRP	IDENTIFICATION	REP	VALUE	TRANS VALUE
1	Control	1	1.0000	1.0000
1	Control	2	1.0000	1.0000
1	Control	3	1.0000	1.0000
1	Control	4	1.0000	1.0000
1	Control	5	1.0000	1.0000
1	Control	6	1.0000	1.0000
1	Control	7	1.0000	1.0000
1	Control	8	1.0000	1.0000
1	Control	9	1.0000	1.0000
1	Control	10	1.0000	1.0000
2	6.25%	1	0.0000	0.0000
2	6.25%	2	1.0000	1.0000
2	6.25%	3	1.0000	1.0000
2	6.25%	4	1.0000	1.0000
2	6.25%	5	1.0000	1.0000
2	6.25%	6	1.0000	1.0000
2	6.25%	7	1.0000	1.0000
2	6.25%	8	1.0000	1.0000
2	6.25%	9	0.0000	0.0000
2	6.25%	10	1.0000	1.0000
3	12.5%	1	1.0000	1.0000
3	12.5%	2	1.0000	1.0000
3	12.5%	3	1.0000	1.0000
3	12.5%	4	1.0000	1.0000
3	12.5%	5	1.0000	1.0000
3	12.5%	6	1.0000	1.0000
3	12.5%	7	0.0000	0.0000
3	12.5%	8	1.0000	1.0000
3	12.5%	9	0.0000	0.0000
3	12.5%	10	1.0000	1.0000
4	25%	1	1.0000	1.0000
4	25%	2	1.0000	1.0000
4	25%	3	1.0000	1.0000
4	25%	4	0.0000	0.0000
4	25%	5	0.0000	0.0000
4	25%	6	0.0000	0.0000
4	25%	7	1.0000	1.0000
4	25%	8	1.0000	1.0000

4	25%	9	1.0000	1.0000
4	25%	10	1.0000	1.0000
5	50%	1	1.0000	1.0000
5	50%	2	1.0000	1.0000
5	50%	3	1.0000	1.0000
5	50%	4	1.0000	1.0000
5	50%	5	0.0000	0.0000
5	50%	6	0.0000	0.0000
5	50%	7	1.0000	1.0000
5	50%	8	1.0000	1.0000
5	50%	9	1.0000	1.0000
5	50%	10	1.0000	1.0000
6	100%	1	0.0000	0.0000
6	100%	2	1.0000	1.0000
6	100%	3	1.0000	1.0000
6	100%	4	0.0000	0.0000
6	100%	5	0.0000	0.0000
6	100%	6	1.0000	1.0000
6	100%	7	1.0000	1.0000
6	100%	8	1.0000	1.0000
6	100%	9	1.0000	1.0000
6	100%	10	1.0000	1.0000

C. Dubia survival EW02 - Log #450
File: cds450 Transform: NO TRANSFORM

SUMMARY STATISTICS ON TRANSFORMED DATA TABLE 1 of 2

GRP	IDENTIFICATION	N	MIN	MAX	MEAN
1	Control	10	1.000	1.000	1.000
2	6.25%	10	0.000	1.000	0.800
3	12.5%	10	0.000	1.000	0.800
4	25%	10	0.000	1.000	0.700
5	50%	10	0.000	1.000	0.800
6	100%	10	0.000	1.000	0.700

C. Dubia survival EW02 - Log #450
File: cds450 Transform: NO TRANSFORM

SUMMARY STATISTICS ON TRANSFORMED DATA TABLE 2 of 2

GRP	IDENTIFICATION	VARIANCE	SD	SEM
1	Control	0.000	0.000	0.000
2	6.25%	0.178	0.422	0.133
3	12.5%	0.178	0.422	0.133
4	25%	0.233	0.483	0.153
5	50%	0.178	0.422	0.133
6	100%	0.233	0.483	0.153

C. Dubia survival EW02 - Log #450
File: cds450 Transform: NO TRANSFORM

ANOVA TABLE

SOURCE	DF	SS	MS	F
Between	5	0.600	0.120	0.719
Within (Error)	54	9.000	0.167	
Total	59	9.600		

Critical F value = 2.45 (0.05,5,40)
Since F < Critical F FAIL TO REJECT Ho:All groups equal

C. Dubia survival EW02 - Log #450
File: cds450 Transform: NO TRANSFORM

BONFERRONI T-TEST - TABLE 1 OF 2 Ho:Control<Treatment

GROUP	IDENTIFICATION	TRANSFORMED MEAN	MEAN CALCULATED IN ORIGINAL UNITS	T STAT	SIG
1	Control	1.000	1.000		
2	6.25%	0.800	0.800	1.094	
3	12.5%	0.800	0.800	1.094	
4	25%	0.700	0.700	1.642	
5	50%	0.800	0.800	1.094	
6	100%	0.700	0.700	1.642	

Bonferroni T table value = 2.40 (1 Tailed Value, P=0.05, df=50,5)

C. Dubia survival EW02 - Log #450
File: cds450 Transform: NO TRANSFORM

BONFERRONI T-TEST - TABLE 2 OF 2 Ho:Control<Treatment

GROUP	IDENTIFICATION	NUM OF REPS	Minimum Sig Diff (IN ORIG. UNITS)	% of CONTROL	DIFFERENCE FROM CONTROL
1	Control	10			
2	6.25%	10	0.439	43.9	0.200
3	12.5%	10	0.439	43.9	0.200
4	25%	10	0.439	43.9	0.300
5	50%	10	0.439	43.9	0.200
6	100%	10	0.439	43.9	0.300

C. Dubia survival EW02 - Log #450
File: cds450 Transform: NO TRANSFORM

WILCOXON RANK SUM TEST W/ BONFERRONI ADJUSTMENT - Ho:Control<Treatment

ROUP	IDENTIFICATION	TRANSFORMED MEAN	RANK SUM	CRIT. VALUE	REPS	SIG
1	Control	1.000				
2	6.25%	0.800	95.00	74.00	10	
3	12.5%	0.800	95.00	74.00	10	
4	25%	0.700	90.00	74.00	10	
5	50%	0.800	95.00	74.00	10	
6	100%	0.700	90.00	74.00	10	

Critical values use k = 5, are 1 tailed, and alpha = 0.05

FATHEAD MINNOW SURVIVAL AND GROWTH
7-DAY CHRONIC TOXICITY TEST

Log No. 450

JOB NO. F93506
INDUSTRY: Tinker
CONTACT:
EFFLUENT: EW02
NPDES PERMIT NO:
SAMPLE TYPE:
DILUTION WATER:

PERSON CONDUCTING TEST:
BEGINNING: ____hrs 6/14/95
ENDING: ____hrs; / / .
TEST
DILUTIONS:
AGE:
ORGANISM SOURCE:

PHOTOPERIOD: 16 hr light
FEEDING REGIME:
0.1 ml Artemia @ 3times/day
TEST VESSEL CAPACITY: 1 liter
TEST SOLUTION VOLUME: 500 mL
NO. ORGANISMS/TREATMENT: 10
NO. REPLICATES: ~~3~~ 4

CONC (%)	REP ID	SURVIVAL (#) START	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7
6.25A		10	10	10	10	10	10	10	10
B		10	10	10	10	10	10	10	10
C		10	10	10	10	10	10	9	9
D		10	10	10	10	9	9	9	9
12.5A		10	10	10	10	10	10	10	10
B		10	10	10	10	10	10	10	10
C		10	10	10	10	10	10	9	9
D		10	10	10	10	10	7	7	7
25 A		10	10	10	10	10	10	10	10
B		10	10	10	10	10	10	10	10
C		10	9	9	10	10	9	9	9
D		10	10	10	9	9	8	8	8
50 A		10	10	10	10	10	10	10	10
B		10	10	10	10	10	10	10	10
C		10	10	10	10	10	10	10	9
D		10	10	10	10	10	10	10	10
		~~10~~							
TIME:		1630	1100	1703	1500	1420	1500	1400	1645
INITIAL:		MLS	SJB	MAR	MLS	MLS	DCE	SJB	TAT

GROWTH RESULTS

CONC (%)	REP ID	Boat ID	Tare wt (g)	Combined wt (g)	Tot Fish wt (g)	# of Fish	Avg Fish wt (mg)
6.25	A		.99984	1.00473	0.00489	10	0.489
	B		.99809	1.00422	0.00613	10	0.613
	C		.97818	.98364	0.00546	9	0.607
	D		.98154	.98583	0.00429	9	0.477
12.5	A		.98592	.99183	0.00591	10	0.591
	B		.98567	.99124	0.00557	10	0.557
	C		.98548	.99104	0.00556	9	0.618
	D		.99013	.99390	0.00377	7	0.539
25	A		.97963	.98630	0.00667	10	0.667
	B		.98576	.99093	0.00517	10	0.517
	C		.98140	.98627	0.00487	9	0.541
	D		.98644	.99103	0.00459	8	0.574
50	A		.98483	.99173	0.0069	10	0.690
	B	SB ~~.99444~~	.99444	1.00000	0.00556	10	0.556
	C	.99585	~~1.00386~~	1.00176	0.00591	9	0.657
	D		.98980	.99569	0.00589	10	0.589

FATHEAD MINNOW SURVIVAL AND GROWTH
7-DAY CHRONIC TOXICITY TEST

Log No. [illegible]

JOB NO. F9350C
INDUSTRY: Tinker
CONTACT:
EFFLUENT: [illegible]
NPDES PERMIT NO:
SAMPLE TYPE:
DILUTION WATER:

PERSON CONDUCTING TEST:
BEGINNING: ____hrs; / / .
ENDING: ____hrs; / / .
TEST
DILUTIONS:
AGE:
ORGANISM SOURCE:

PHOTOPERIOD: 16 hr light
FEEDING REGIME:
0.1 ml Artemia @ 3times/day
TEST VESSEL CAPACITY: 1 liter
TEST SOLUTION VOLUME: 500 mL
NO. ORGANISMS/TREATMENT: 10
NO. REPLICATES: 4

CONC (%)	REP ID	SURVIVAL (#) START	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7
100	A	10	10	10	10	10	10	10	10
	B	10	10	10	10	10	9	9	9
	C	10	10	10	10	10	8	8	8
	D	10	10	10	10	10	8	8	8
	TIME:	1630	1100	1710	1510	1420	1500	1600	1645
	INITIAL:	MLS	SJB	MWH2	MLS	MLS	DCE	SJB	TNT

GROWTH RESULTS

CONC (%)	REP ID	Boat ID	Tare wt (g)	Combined wt (g)	Tot Fish wt (g)	# of Fish	Avg Fish wt (mg)
100	A		.98722	.99479	0.00757	10	0.757
	B		1.00232	1.00815	0.00583	9	0.651
	C		.99891	1.00472	0.00581	8	0.726
	D		1.00058	1.00675	0.00617	8	0.771

HSI EWCR
Log # 450
6/16/95

CHRONIC TOXICITY TEST DATA SHEET

TEMPERATURE

CONCENTRATION	Start	Day 1 OLD	Day 1 NEW	Day 2 OLD	Day 2 NEW	Day 3 OLD	Day 3 NEW	Day 4 OLD	Day 4 NEW	Day 5 OLD	Day 5 NEW	Day 6 OLD	Day 6 NEW	Day 7 OLD	Day 7 NEW	Day 8 OLD
6.25% Control	25.0°	24.0	24.0	24.2	24.8		24.8	25.0	25.0	25.2	25.2	24.8	24.8	24.5		
12.5%																
25																
50																
100																

DISSOLVED OXYGEN

CONCENTRATION	Start	Day 1 OLD	Day 1 NEW	Day 2 OLD	Day 2 NEW	Day 3 OLD	Day 3 NEW	Day 4 new OLD	Day 4 old NEW	Day 5 OLD	Day 5 NEW	Day 6 OLD	Day 6 NEW	Day 7 OLD	Day 7 NEW	Day 8 OLD
6.25%	7.7	7.0	7.2	7.3	8.3	7.4	8.0	8.0	7.7	7.4	8.1	6.2	8.3	7.4		
12.5	7.7	7.0	7.2	7.4	8.3	7.5	8.0	8.1	7.8	7.3	8.1	5.8	8.2	7.7		
25	7.7	7.0	7.2	7.4	8.3	7.5	8.0	8.2	7.9	7.3	8.1	5.9	8.2	6.6		
50	7.7	7.0	7.5	7.4	8.3	7.5	8.1	8.2	7.9	7.4	8.2	5.7	8.2	6.6		
100	8.1	7.0	7.5	7.4	8.3	7.5	8.3	8.2	7.9	7.4	8.2	5.7	8.2	6.6		

pH

CONCENTRATION	Start	Day 1 OLD	Day 1 DLE NEW	Day 2 OLD	Day 2 NEW	Day 3 OLD	Day 3 NEW	Day 4 new OLD	Day 4 old NEW	Day 5 OLD	Day 5 NEW	Day 6 OLD	Day 6 NEW	Day 7 OLD	Day 7 NEW	Day 8 OLD
6.25	8.30	8.52	~~8.12~~	8.51	8.40	8.36	8.24	8.43	8.25	8.06	8.28	7.98	8.49	8.00		
12.5	8.30	8.52	8.26	8.48	8.41	8.38	8.07	8.43	8.28	8.07	8.32	7.98	8.52	8.00		
25	8.28	8.57	8.29	8.50	8.46	8.44	8.27	8.46	8.36	8.14	8.33	8.06	8.51	8.24		
50	8.41	8.58	8.36	8.46	8.52	8.47	8.31	8.46	8.43	8.26	8.38	8.10	8.50	8.12		
100	8.47	8.67	8.44	8.46	8.64	8.52	8.36	8.49	8.46	8.32	8.35	8.23	8.48	8.22		
			8.37													

CONDUCTIVITY

CONCENTRATION	Start	Day 1 OLD	Day 1 DLE 353 NEW	Day 2 OLD	Day 2 NEW	Day 3 OLD	Day 3 NEW	Day 4 new OLD	Day 4 old NEW	Day 5 OLD	Day 5 NEW	Day 6 OLD	Day 6 NEW	Day 7 OLD	Day 7 NEW	Day 8 OLD
6.25	353	362	~~377~~	388	353	320	339	341	388	408	370	411	369	382		
12.5	358	387	338	402	382	409	370	378	391	416	385	426	385	404		
25	425	442	444	458	433	456	425	433	464	466	439	482	440	458		
50	526	545	554	565	514	569	536	536	568	581	548	594	553	574		
100	719	756	792	737	779	725	703	752	754	776	694	768	766	777		
			~~353~~													

MMR 1550

MMR 14:09 CDT

EW02 FATHEAD MINNOW CHRONIC
File: FMEW02 Transform: NO TRANSFORMATION

Chi-square test for normality: actual and expected frequencies

INTERVAL	<-1.5	-1.5 to <-0.5	-0.5 to 0.5	>0.5 to 1.5	>1.5
EXPECTED	1.608	5.808	9.168	5.808	1.608
OBSERVED	0	10	5	9	0

Calculated Chi-Square goodness of fit test statistic = 9.8908
Table Chi-Square value (alpha = 0.01) = 13.277

Data PASS normality test. Continue analysis.

EW02 FATHEAD MINNOW CHRONIC
File: FMEW02 Transform: NO TRANSFORMATION

Bartletts test for homogeneity of variance

Calculated B statistic = 2.95
Table Chi-square value = 15.09 (alpha = 0.01)
Table Chi-square value = 11.07 (alpha = 0.05)

Average df used in calculation ==> df (avg n - 1) = 3.00
Used for Chi-square table value ==> df (#groups-1) = 5

Data PASS homogeneity test at 0.01 level. Continue analysis.

NOTE: If groups have unequal replicate sizes the average replicate size is used to calculate the B statistic (see above).

TITLE: EW02 FATHEAD MINNOW CHRONIC
ILE: FMEW02
RANSFORM: NO TRANSFORMATION NUMBER OF GROUPS: 6

GRP	IDENTIFICATION	REP	VALUE	TRANS VALUE
1	CONTROL	1	0.5450	0.5450
1	CONTROL	2	0.4130	0.4130
1	CONTROL	3	0.5380	0.5380
1	CONTROL	4	0.6580	0.6580
2	6.25	1	0.4890	0.4890
2	6.25	2	0.6130	0.6130
2	6.25	3	0.6070	0.6070
2	6.25	4	0.4770	0.4770
3	12.5	1	0.5910	0.5910
3	12.5	2	0.5570	0.5570
3	12.5	3	0.6180	0.6180
3	12.5	4	0.5390	0.5390
4	25	1	0.6670	0.6670
4	25	2	0.5170	0.5170
4	25	3	0.5410	0.5410
4	25	4	0.5740	0.5740
5	50	1	0.6900	0.6900
5	50	2	0.5560	0.5560
5	50	3	0.6570	0.6570
5	50	4	0.5890	0.5890
5	100	1	0.7570	0.7570
6	100	2	0.6510	0.6510
6	100	3	0.7260	0.7260
6	100	4	0.7710	0.7710

EW02 FATHEAD MINNOW CHRONIC
File: FMEW02 Transform: NO TRANSFORMATION

ANOVA TABLE

SOURCE	DF	SS	MS	F
Between	5	0.097	0.019	3.800
Within (Error)	18	0.083	0.005	
Total	23	0.180		

Critical F value = 2.77 (0.05,5,18)
Since F > Critical F REJECT Ho:All groups equal

EW02 FATHEAD MINNOW CHRONIC
File: FMEW02 Transform: NO TRANSFORMATION

DUNNETTS TEST - TABLE 1 OF 2 Ho:Control<Treatment

GROUP	IDENTIFICATION	TRANSFORMED MEAN	MEAN CALCULATED IN ORIGINAL UNITS	T STAT	SIG
1	CONTROL	0.539	0.539		
2	6.25	0.547	0.547	-0.160	
3	12.5	0.576	0.576	-0.755	
4	25	0.575	0.575	-0.725	
5	50	0.623	0.623	-1.690	
6	100	0.726	0.726	-3.755	

Dunnett table value = 2.41 (1 Tailed Value, P=0.05, df=18,5)

EW02 FATHEAD MINNOW CHRONIC
File: FMEW02 Transform: NO TRANSFORMATION

DUNNETTS TEST - TABLE 2 OF 2 Ho:Control<Treatment

GROUP	IDENTIFICATION	NUM OF REPS	Minimum Sig Diff (IN ORIG. UNITS)	% of CONTROL	DIFFERENCE FROM CONTROL
1	CONTROL	4			
2	6.25	4	0.120	22.4	-0.008
3	12.5	4	0.120	22.4	-0.038
4	25	4	0.120	22.4	-0.036
5	50	4	0.120	22.4	-0.084
6	100	4	0.120	22.4	-0.188

CHAIN OF CUSTODY RECORD

№ 1554

JOB #	PROJECT NAME	ANALYSES REQUIRED	
F93506 Task3	TAFB - Soldier Creek		WOODWARD-CLYDE CONSULTANTS P.O. BOX 680925 FRANKLIN, TN 37068-0925 (615) 790-0003 FAX (615) 790-0023
SAMPLERS: (Signature) Daphne Mickel			

SAMPLE IDENTIFICATION	DATE	TIME	SAMPLE TYPE	NUMBER OF CONTAINERS	Tetrad	REMARKS
SC-EW02-~~5~~ IX 201	6/13/95	0830	Water	3	✓	

RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)	RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)
Daphne Mickel	6/13/95 1900				
RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)	RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)
RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED AT LAB BY: (Signature)	DATE/TIME	GENERAL COMMENTS	
		Mandi Saunders	6/14/95 0900	1°C	

Distribution: Original and Yellow copies accompany sample shipment to laboratory
Pink copy retained by samplers. Yellow copy retained by laboratory. Laboratory returns White copy to samplers.

№ 1553

CHAIN OF CUSTODY RECORD

JOB # Task 3 F93S06

PROJECT NAME: TAFB Soldier Creek

SAMPLERS: (Signature) [signature]

WOODWARD-CLYDE CONSULTANTS
P.O. BOX 680925
FRANKLIN, TN 37068-0925
(615) 790-0003 FAX (615) 790-0023

ANALYSES REQUIRED: Toxicity

SAMPLE IDENTIFICATION	DATE	TIME	SAMPLE TYPE	NUMBER OF CONTAINERS	Toxicity						REMARKS
SC-EW02-~~SW~~ TX-201	6/13/95	0830	Water	2	✓						
SC-EW02-~~SD~~ TX-201	6/13/95	0845	Sediment	2	✓						

OOR

RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)	RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)
[signature]	6/13/95 1800				
RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)	RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)
RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED AT LAB BY: (Signature)	DATE/TIME	GENERAL COMMENTS	
		Lyn Jeer	6/14/95 0855	1 °C upon arrival	

Distribution: Original and Yellow copies accompany sample shipment to laboratory
Pink copy retained by samplers. Yellow copy retained by laboratory. Laboratory returns White copy to samplers.

TEST SUMMARY: SC-EW03-TX-201
Ceriodaphnia dubia 48-Hour Static Acute

Test protocol:	WCC SOP 401.2
Test organism:	*Ceriodaphnia dubia*
Source:	WCC Culture Laboratory
Age of test organism:	<24 hours
Test initiation:	6/14/95
Test termination:	6/16/95
Temperature:	25 +/- 1 °C
Light:	50 - 100 foot candles
Photoperiod:	16 hours light/8 hours dark
Test vessel:	30 mL styrene
Test volume:	20 mL
Organisms/replicate:	5
Replicates/concentration:	4
Feeding regime:	none
Aeration during test:	none
Dilution Water:	Hard Reconstituted Synthetic
Test duration:	48 hours
Effect measured:	Mortality
Reference Toxicant Data:	
LC_{50} (g/L NaCl):	1.51

TEST RESULTS: SC-EW03-TX-201
Ceriodaphnia dubia 48-Hour Static Acute

LC_{50} > 100%

Statictical analysis method: N/A

Treatment (% Sample)	Survival (%)	pH	Conductivity (umhos/cm)	DO (mg/L)	Temperature (°C)	Hardness (mg/L $CaCO_3$)	Alkalinity (mg/L $CaCO_3$)
Control	100	7.79-8.21	424 (419-429)	8.5 (8.4-8.6)	**24.5** (24.0-25.0)	100	
6.25	95	8.02-8.34	382 (343-420)	8.5 (8.4-8.6)	**24.5** (24.0-25.0)		
12.5	90	8.25-8.35	365 (323-407)	8.5 (8.4-8.6)	**24.5** (24.0-25.0)		
25	100	8.32-8.45	452 (450-453)	8.5 (8.4-8.6)	**24.5** (24.0-25.0)		
50	100	8.31-8.56	540 (518-561)	8.4 (8.3-8.5)	**24.5** (24.0-25.0)		
100	95	8.26-8.55	699 (662-736)	8.5 (8.3-8.6)	**24.5** (24.0-25.0)	110	326

SURFACE WATER SAMPLE ARRIVAL INFORMATION

Collection Date/Time:	6/13/95 @ 0730
Use Date/Time:	6/14/95 @ 1435
Method of Shipment:	Overnight Courier
Temperature (°C):	1.5
pH:	8.27
Ammonia (mg/L):	0.27
Conductivity (umhos/cm):	736
DO (mg/L):	8.6

TEST SUMMARY: SC-EW03-TX-201
Ceriodaphnia dubia Chronic Renewal

Test protocol:	WCC SOP 501.1
Test organism:	*Ceriodaphnia dubia*
Source:	WCC Culture Laboratory
WCC Batch:	6/16/95 to 6/18/95
Age of test organism:	<24 hours
Test initiation:	6/16/95
Test termination:	6/23/95
Temperature:	25 +/- 1 °C
Light:	50 - 100 foot candles
Photoperiod:	16 hours light/8 hours dark
Test vessel:	30 mL styrene
Test volume:	15 mL
Organisms/replicate:	1
Replicates/concentration:	10
Feeding regime:	0.05 mL *Selenastrum* and 0.05 mL YTC daily
Aeration during test:	none
Dilution Water:	Hard Reconstituted Synthetic
Test duration:	7 days
Effect measured:	Survival and reproduction

Toxicity test methods and procedures were followed in accordance with EPA 600/4-89/001

Reference Toxicant Data:	
NOEC (g/L NaCl):	0.75

TEST RESULTS: SC-EW03-TX-201
Ceriodaphnia dubia Chronic Survival and Reproduction Test

Survival NOEC:	100%
Statistical analysis method:	N/A
Normality test:	
Homogeneity of variance test:	
Reproduction NOEC:	50%
Statistical analysis method:	Dunnetts
Normality test:	Pass
Homogeneity of variance test:	Pass

Treatment (% Sample)	Survival (%)	pH	Conductivity (umhos/cm)	DO (mg/L)	Temperature (°C)
Control	100	7.87-8.64	369 (344-398)	8.1 (7.3-8.6)	24.7 (24.0-25.2)
6.25	100	7.88-8.51	372 (361-398)	8.1 (7.4-8.6)	24.7 (24.0-25.2)
12.5	90	7.97-8.48	399 (391-425)	8.1 (7.2-8.6)	24.7 (24.0-25.2)
25	80	8.08-8.54	453 (426-483)	8.1 (7.2-8.6)	24.7 (24.0-25.2)
50	90	8.27-8.58	560 (509-583)	8.1 (7.1-8.6)	24.7 (24.0-25.2)
100	90	8.24-8.67	736 (567-808)	8.1 (7.1-8.5)	24.7 (24.0-25.2)

	Hardness (mg/L $CaCO_3$)	Alkalinity (mg/L $CaCO_3$)	Ammonia (mg/L)
Control	150		
EW03	110	326	0.27

TEST SUMMARY: SC-EW03-TX-201
Pimephales promelas 48-Hour Static Acute

Test protocol:	WCC SOP 410.2
Test organism:	*Pimephales promelas*
Source:	Woodward-Clyde Consultants
Age of test organism:	13 days
Test initiation:	6/14/95
Test termination:	6/16/95
Temperature:	20 +/- 1 °C
Light:	50 - 100 foot candles
Photoperiod:	16 hours light/8 hours dark
Test vessel:	500 mL plastic beaker
Test volume:	250 mL
Organisms/replicate:	10
Replicates/concentration:	2
Feeding regime:	none
Aeration during test:	none
Dilution Water:	Hard Reconstituted Synthetic
Test duration:	48 hours
Effect measured:	Mortality
Reference Toxicant Data:	
LC_{50} (g/L NaCl):	5.26

TEST RESULTS: SC-EW03-TX-201
Pimephales promelas 48-Hour Static Acute

LC_{50} > 100%

Statictical analysis method: N/A

Treatment (% Sample)	Survival (%)	pH	Conductivity (umhos/cm)	DO (mg/L)	Temperature (°C)	Hardness (mg/L $CaCO_3$)	Alkalinity (mg/L $CaCO_3$)
Control	100	8.29-8.31	340 (327-353	7.9 (7.4-8.4)	20.9 (20.8-21.0)	158	146
6.25	100	8.24-8.37	377 (376-377)	7.9 (7.3-8.5)	20.9 (20.8-21.0)		
12.5	100	8.28-8.39	392 (378-406)	7.9 (7.3-8.5)	20.9 (20.8-21.0)		
25	85	8.29-8.51	447 (426-467)	8 (7.5-8.4)	20.9 (20.8-21.0)		
50	100	8.29-8.57	552 (531-573)	8 (7.5-8.4)	20.9 (20.8-21.0)		
100	100	8.27-8.59	786 (744-798)	7.8 (7.2-8.4)	20.9 (20.8-21.0)	110	326

SURFACE WATER SAMPLE ARRIVAL INFORMATION

Collection Date/Time:	6/13/95 @ 0730
Use Date/Time:	6/14/95 @ 1450
Method of Shipment:	Overnight Courier
Temperature (°C):	1.5
pH:	8.27
Ammonia (mg/L):	0.27
Conductivity (umhos/cm):	736
DO (mg/L):	8.6
Description:	Clear

TEST SUMMARY: SC-EW03-TX-201
Pimephales promelas Chronic Renewal

Test protocol:	WCC SOP 510.1
Test organism:	*Pimephales promelas*
Source:	Environmental Consulting & Testing
Age of test organism:	<24 hours
Test initiation:	6/16/95 @ 1620
Test termination:	6/23/95 @ 1500
Temperature:	25 +/- 1 °C
Light:	50 - 100 foot candles
Photoperiod:	16 hours light/8 hours dark
Test vessel:	500 mL plastic beaker
Test volume:	250 mL
Organisms/replicate:	10
Replicates/concentration:	4
Feeding regime:	0.1 mL brine shrimp nauplii twice daily
Aeration during test:	none
Dilution Water:	Hard Reconstituted Synthetic
Test duration:	7 days
Effect measured:	Survival and growth

Toxicity test methods and procedures were followed in accordance with EPA 600/4-89/001

Reference Toxicant Data:	
NOEC (g/L NaCl):	3

TEST RESULTS: SC-EW03-TX-201
Pimephales promelas Chronic Survival and Growth Test

Survival NOEC:		100%
	Statistical analysis method:	N/A
	Normality test:	
	Homogeneity of variance test:	
Growth NOEC:		100%
	Statistical analysis method:	Dunnetts
	Normality test:	Chi-Square - Pass
	Homogeneity of variance test:	Bartletts - Pass

Treatment (% Sample)	Survival (%)	pH	Conductivity (umhos/cm)	DO (mg/L)	Temperature (°C)
Control	100	7.86-8.50	346 (309-440)	7.8 (6.6-8.4)	24.7 (24.0-25.2)
6.25	100	8.00-8.60	376 (355-428)	7.6 (7.0-8.2)	24.7 (24.0-25.2)
12.5	100	7.99-8.57	393 (372-418)	7.7 (7.3-8.3)	24.7 (24.0-25.2)
25	97.5	8.05-8.57	447 (428-471)	7.7 (6.7-8.3)	24.7 (24.0-25.2)
50	100	8.15-8.62	556 (528-589)	7.7 (7.0-8.4)	24.7 (24.0-25.2)
100	100	8.21-8.65	748 (708-795)	7.7 (6.5-8.5)	24.7 (24.0-25.2)

	Hardness (mg/L $CaCO_3$)	Alkalinity (mg/L $CaCO_3$	Ammonia (mg/L)
Control	150		
EW03	110	326	0.27

Controls

48-hr Ceriodaphnia dubia TOXICITY TEST

LOG NO. 439-442
JOB NO. 1935016
INDUSTRY: Timber
CONTACT:

EFFLUENT: Controls
START DATE: 6/14/95
START TIME: 1400
DILUTION WATER:

CONC (%)	REP ID	SURVIVAL (#) 0	24	48	DEAD	TEMPERATURE (oC) 0	24	48	DO (mg/L) 0	24	48	pH (S.U.) 0	24	48	CONDUCTIVITY (umhos/cm) 0	24	48
Hard 140	A	5	5	4		24.0		25.0	8.6		8.2	7.71		8.20	401		380
EW 01	B	5	5	5													
	C	5	5	5													
	D	5	5	5													
Hd 270	A	5	5	5					8.4		8.3	7.63		8.40	131		144
EW 02	B	5	5	5													
CR-EC01	C	5	5	5													
	D	5	5	5													
Hd-100	A	5	5	5					8.6		8.4	7.59		8.21	429		414
EW 03	B	5	5	5													
	C	5	5	5													
	D	5	5	5													
	A																
	B																
	C																
	D																
	A																
	B																
	C																
	D																
Initials		MHE	LJ	LJT													
Time		1415	0930	1035													

Mod.

Comments

PARAMETER	Control	
Total Hardness (mg/L CaCO3)		
Total Alkalinity (mg/L CaCO3 @ 4.5)		

48-hr Ceriodaphnia dubia TOXICITY TEST

LOG NO. 441
JOB NO. F93506
INDUSTRY: Tinker
CONTACT:

EFFLUENT: EW03
START DATE: 6-14-95
START TIME: 1435
DILUTION WATER: Mod Hd-100

CONC (%)	REP ID	SURVIVAL (#) 0	24	48	DEAD	TEMPERATURE (oC) 0	24	48	DO (mg/L) 0	24	48	pH (S.U.) 0	24	48	CONDUCTIVITY (umhos/cm) 0	24	48
6.25	A	5	5	5		24.0		25.0	8.0		8.3	8.02		8.34	343		420
	B	5	5	5													
	C	5	5	5													
	D	5	4	4													
12.5	A	5	5	5					8.0		8.3	8.25		8.35	323		407
	B	5	5	5													
	C	5	5	4													
	D	5	5	4													
25	A	5	5	5					8.0		8.3	8.32		8.45	453		450
	B	5	5	5													
	C	5	5	5													
	D	5	5	5													
50	A	5	5	5					8.5		8.3	8.31		8.56	561		518
	B	5	5	5													
	C	5	5	5													
	D	5	5	5													
100	A	5	4	4					8.0		8.3	8.36		8.55	736		662
	B	5	5	5													
	C	5	5	5													
	D	5	5	5													
	Initials	MAR	CJL	CJL													
	Time	1435	1432	0850													

Comments

PARAMETER	Control	
Total Hardness (mg/L CaCO3)		
Total Alkalinity (mg/L CaCO3 @ 4.5)		

48-hr Pimephales promleas TOXICITY TEST

LOG NO. 441
JOB NO. F93506
INDUSTRY: finisher
CONTACT: EC & T-B days old

EFFLUENT: EW-03
START DATE: 6-14-95
START TIME: 1450
DILUTION WATER: Spring 1430

CONC (%)	REP ID	SURVIVAL (#) 0	24	48	DRAG	TEMPERATURE (oC) 0	24	48	DO (mg/L) 0	24	48	pH (S.U.) 0	24	48	CONDUCTIVITY (umhos/cm) 0	24	48
6.25	A	10	10	10		21.0		20.8	8.5		7.3	8.24		8.37	314		311
	B	10	10	10													
12.5	A	10	10	10					8.5		7.3	8.28		8.39	378		406
	B	10	10	10													
25	A	10	10	10					8.4		7.5	8.29		8.51	429		407
	B	10	10	7*													
50	A	10	10	10					8.4		7.5	8.29		8.57	521		513
	B	10	10	10													
100	A	10	10	10					8.4		7.2	8.27		8.59	644		798
	B	10	10	10													
	A																
	B																
	A																
	B																
	A																
	B																
	A																
	B																
	A																
	B																
Initials		MLS	MLS	SB													
Time		1430	1600	0830													

Comments
7th no dead bodies found

PARAMETER	Control	
Total Hardness (mg/L CaCO3)		
Total Alkalinity (mg/L CaCO3 @ 4.5)		

Ceriodaphnia SURVIVAL AND REPRODUCTION CHRONIC TOXICITY TEST

JOB NO. F9356 | BEGINNING: 1630 hrs; 6/16/95 | Log No. 451
INDUSTRY: Tinker | ENDING: _____ hrs; 6/23/95 | PHOTOPERIOD: 16 light, 8 dark
CONTACT: | FEEDING REGIME: | ORGANISM SOURCE: WCC
EFFLUENT: Eff03 | .05 mL yct/15 mL | TEST VESSEL CAPACITY: 30 mL
NPDES PERMIT NO: | .05 mL algal suspension/15 mL | TEST SOLUTION VOLUME: 15mL
PERSON CONDUCTING TEST: | | NO. REPLICATES:
| | DILUTION WATER:

TIME
OBSERVER

NUMBER OF YOUNG PRODUCED

CONC	CHAMBER	START	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7
				2	2	14	65	101	186
Control	1					3	5	0	10
	2			~~3~~ 2	0	~~3~~ 2	5	0	8
	3						7	0	10
	4						7	12	2
	5						3	12	16
	6					2	5	2	9
	7					3	5	0	3
	8			2	0	2	5	0	6
	9					2	4	0	5
	10						5	12	8

CONC	CHAMBER	START	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7
						4	40	63	139
6.25%	11					2	0	5	7
	12						8	0	10
	13						4	0	0
	14					2	0	15	12
	15						10	0	9
	16						2	2	7
	17						4	0	7
	18						2	0	6
	19								10
	20						10	0	8

CONC	CHAMBER	START	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7
						21	37	51	121
12.5%	21					2	0	0	4
	22							6	10
	23						3	5	4
	24						3	0	13
	25						3	0	(10)
	26						1	0	7
	27					4	6	5	9
	28					3	0	0	10
	29								10
	30					7	0	0	4
					10% mortality				

Ceriodaphnia SURVIVAL AND REPRODUCTION CHRONIC TOXICITY TEST

JOB NO: 93506
INDUSTRY: Tinker
CONTACT:
EFFLUENT: EW03
NPDES PERMIT NO:
PERSON CONDUCTING TEST:

BEGINNING: 1630 hrs; 6/16/95
ENDING: _____ hrs; 6/23/95
FEEDING REGIME:
.05 mL yct/15 mL
.05 mL algal suspension/15 mL

Log No. 451
PHOTOPERIOD: 16 light, 8 dark
ORGANISM SOURCE: WCC
TEST VESSEL CAPACITY: 30 mL
TEST SOLUTION VOLUME: 15mL
NO. REPLICATES:
DILUTION WATER:

CONC	TIME / OBSERVER / CHAMBER	NUMBER OF YOUNG PRODUCED							
		START	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7
					2	31	71	101	151
25%	31					7	0	10	~~12~~ 12
	32					2	4	0	10
	33					5	8	0	(D) 10
	34					0	(D)		
	35					3	9	0	11
	36						3	7	0
	37				2	0	4	6	0
	38					6	0	0	4
	39					4	7	0	13
	40					2	5	7	0
					20% mortality				

CONC		START	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7
					7	53	86	163	216
50%	41					4	1	14	12
	42					3	(D)		
	43						10	0	0
	44						7	14	0
	45					6	0	10	0
	46				4	6	0	15	11
	47				3	10	0	13	11
	48					5	9	0	9
	49					8	0	11	10
	50					4	6	0	0
					10% mortality				

CONC		START	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7
					13	55	99	177	238
100%	51				6	10	0	15	6
	52					3	8	11	0
	53				2	1	7	0	0
	54					2	11	0	6
	55				1	8	0	15	15
	56				1	0	7	13	11
	57					6	11	0	0
	58				1	6	0	15	11
	59				2	6	0	9	12
	60					(D)			
					10% mortality				

Ceriodaphnia dubia GRID Ceriodaphnia dubia GRID MONITORING DATA

Grid Letter: ~~J~~ ~~A~~ ~~H~~ ~~B~~ ~~K~~ ~~3~~ ~~C~~ Start Date: 6/16/95 Sample ID: EW03 Log #: 45

AD	ID	1	2	3	4	5	6	7
	10	✓	0	0	0	5	12	8
	53	✓	0	2	1	7	0	0
	35	✓	0	0	3	9	0	11
	29	✓	0	0	0	0	0	10
	9	✓	0	0	2	4	0	8
	54	✓	0	0	2	11	0	6
	13	✓	0	0	0	4	0	0
	6	✓	0	0	2	5	0	9
	34	✓	0	0	0	0		
	46	✓	0	4	6	0	15	1
	30	✓	0	0	7	0	0	4
	7	✓	0	0	3	5	0	8
	28	✓	0	0	8	0	0	10
	47	✓	0	3	10	0	13	11
	11	✓	0	0	2	0	8	[illegible]
	49	✓	0	0	8	0	11	10
	12	✓	0	0	0	8	0	10
	48	✓	0	0	5	9	0	9
	8	✓	2	0	2	5	0	6
	27	✓	0	0	4	6	0	9
	14	✓	0	0	2	0	15	12
	50	✓	0	0	4	6	0	0
	33	✓	0	0	5	8	0	10
	26	✓	0	0	0	1	0	7
	15	✓	0	0	0	10	0	9
	51	✓	0	6	10	0	15	6
	55	✓	0	1	8	0	15	15
	52	✓	0	0	3	8	11	0
	32	✓	0	0	2	4	0	10
	31	[illegible]	0	0	7	0	10	2

Comments:

Cup ID	Sample Concentration	Day ∅	Initials MLS	Time 1630
1–10:	100	1	MLS	1430
11–20:	6.25	2	SJG	1345
21–30:	12.5	3	SJG	1115
31–40:	25	4	LJT	1520
41–50:	50	5	LJT	1435
51–60:	100	6	MAR	1445
		7	LJT	1140

Ceriodaphnia dubia GRID Ceriodaphnia dubia GRID MONITORING DATA

Grid Letter: ~~X~~ ~~NR~~ ~~XV~~ ~~JK~~ Start Date: 6-16 Sample ID: EW03 Log #: 4

AD	ID	1	2	3	4	5	6	7
	22	✓	0	0	0	0	6	10
	50	✓	0	1	0	7	13	11
	19	✓	0	0	0	0	0	10
	38	✓	0	0	6	0	0	4
	5		0	0		3	12	1
	21	✓	0	0	2	0	0	4
	18	✓	0	0	0	2	0	6
	37	✓	0	2	0	4	6	0
	41	✓	0	0	4	1	14	12
	45		0	0		0	10	
	40	✓	0	0	2	5	7	0
	39	✓	0	0	4	7	0	13
	57	✓	0	0	6	11	0	0
	4	✓	0	0	0	7	12	2
	17		0	0		4	0	
	58	✓	0	1	6	0	15	11
	59	✓	0	2	6	0	9	12
	3	✓	0	0	0	7	0	10
	44	✓	0	0	0	7	14	0
	23		0	0		3	8	
	20	✓	0	0	0	6	0	8
	16	✓	0	0	0	2	0	7
	2	✓	0	0	0	5	0	8
	25	✓	0	0	0	3	0	0
	43		0	0		10	0	
	1	✓	0	0	3	5	0	10
	36	✓	0	0	0	3	7	0
	60	✓	0	0	D-0			
	42	✓	0	0	3	0		
	24		0	0		3	0	

Comments:

Cup ID	Sample Concentration	Day	Initials	Time
		Ø	MLS	1630
1–10:	con	1	MLS	1430
11–20:	6.25	2	SJB	1345
21–30:	12.5	3	SJB	1115
31–40:	25	4	LJT	1510
41–50:	50	5	LJT	1435
51–60:	100	6	MAR	1452
		7	LJT	1140

12506
151
8.003
Ceriodaphnia

CHRONIC TOXICITY TEST DATA SHEET

TEMPERATURE

CONCENTRATION	Start	Day 1 OLD	Day 1 NEW	Day 2 OLD	Day 2 NEW	Day 3 OLD	Day 3 NEW	Day 4 OLD	Day 4 NEW	Day 5 OLD	Day 5 NEW	Day 6 OLD	Day 6 NEW	Day 7 OLD	Day 7 NEW	Day 8 OLD
CON	25.0	24.0	24.0	24.2	25.0	25.0	24.8	25.0	25.0	25.0	25.2	24.8	24.8	24.5		
6.25																
12.5																
25																
50																
100																

DISSOLVED OXYGEN

CONCENTRATION	Start	Day 1 OLD	Day 1 NEW	Day 2 OLD	Day 2 NEW	Day 3 OLD	Day 3 NEW	Day 4 OLD	Day 4 NEW	Day 5 OLD	Day 5 NEW	Day 6 OLD	Day 6 NEW	Day 7 OLD	Day 7 NEW	Day 8 OLD
CON	8.0	7.3	8.2	8.2	8.5	8.2	8.2	7.7	8.3	7.8	8.0	8.6	8.0	8.2		
6.25	8.0	7.4	8.1	8.1	8.5	8.2	8.3	7.7	8.3	7.8	8.1	8.6	8.0	8.2		
12.5	7.7	7.2	8.2	8.1	8.6	8.2	8.3	7.9	8.2	7.9	8.1	8.5	8.1	8.2		
25	7.9	7.2	8.2	8.1	8.6	8.2	8.3	7.8	8.1	7.9	8.2	8.5	8.1	8.1		
50	8.0	7.1	8.2	8.1	8.6	8.3	8.4	7.7	8.2	7.9	8.2	8.6	8.1	8.0		
100	8.1	7.1	8.2	8.1	8.5	8.2	8.4	7.8	8.3	7.9	8.2	8.5	8.2	8.0		

LJT 1530

pH

CONCENTRATION	Start	Day 1 OLD	Day 1 NEW	Day 2 OLD	Day 2 NEW	Day 3 OLD	Day 3 NEW	Day 4 OLD	Day 4 NEW	Day 5 OLD	Day 5 NEW	Day 6 OLD	Day 6 NEW	Day 7 OLD	Day 7 NEW	Day 8 OLD
CON	8.42	8.12	8.51	8.61	8.58	8.10	8.39	8.03	8.15	7.87	8.22	8.07	8.15	8.03		
6.25	8.40	8.11	8.40	8.44	8.51	8.14	8.37	8.02	8.22	7.88	8.25	8.04	8.24	8.05		
12.5	8.37	8.09	8.38	8.34	8.48	8.23	8.34	8.06	8.28	7.97	8.27	8.13	8.27	8.18		
25	8.31	8.15	8.43	8.37	8.54	8.34	8.42	8.21	8.36	8.08	8.35	8.26	8.32	8.26		
50	8.30	8.16	8.46	8.38	8.52	8.31	8.46	8.39	8.40	8.17	8.37	8.13	8.28	8.44		
100	8.44	8.48	8.53	8.55	8.54	8.27	8.50	8.46	8.52	8.40	8.39	8.60	8.24	8.62		

LJT 1550

CONDUCTIVITY

CONCENTRATION	Start	Day 1 OLD	Day 1 NEW	Day 2 OLD	Day 2 NEW	Day 3 OLD	Day 3 NEW	Day 4 OLD	Day 4 NEW	Day 5 OLD	Day 5 NEW	Day 6 OLD	Day 6 NEW	Day 7 OLD	Day 7 NEW	Day 8 OLD
CON	391	378	374	398	387	356	361	344	368	370	355	368	393	362		
6.25	417	373	367	376	369	362	367	361	371	378	366	385	371	374		
12.5	391	400	390	403	401	394	391	391	396	425	392	414	391	401		
25	411	454	454	469	454	436	457	426	417	483	442	470	470	474		
50	433	565	580	583	580	504	569	527	544	538	555	581	578	560		
100	396	700	785	728	567	712	773	742	740	760	759	775	747	723		

MAR 1550

LJT 1740 DCC

MLS 1145

LJT 1200

LJT 1145

MAR 1810

EW03 CERIO CHRONIC
File: CDEW03 Transform: NO TRANSFORMATION

Chi-square test for normality: actual and expected frequencies

INTERVAL	<-1.5	-1.5 to <-0.5	-0.5 to 0.5	>0.5 to 1.5	>1.5
EXPECTED	4.020	14.520	22.920	14.520	4.020
OBSERVED	4	15	19	20	2

Calculated Chi-Square goodness of fit test statistic = 3.7696
Table Chi-Square value (alpha = 0.01) = 13.277

Data PASS normality test. Continue analysis.

EW03 CERIO CHRONIC
File: CDEW03 Transform: NO TRANSFORMATION

Bartletts test for homogeneity of variance

Calculated B statistic = 11.42
Table Chi-square value = 15.09 (alpha = 0.01)
Table Chi-square value = 11.07 (alpha = 0.05)

Average df used in calculation ==> df (avg n - 1) = 9.00
Used for Chi-square table value ==> df (#groups-1) = 5

Data PASS homogeneity test at 0.01 level. Continue analysis.

NOTE: If groups have unequal replicate sizes the average replicate size is used to calculate the B statistic (see above).

TITLE: EW03 CERIO CHRONIC
FILE: CDEW03
TRANSFORM: NO TRANSFORMATION NUMBER OF GROUPS: 6

GRP	IDENTIFICATION	REP	VALUE	TRANS VALUE
1	CONTROL	1	18.0000	18.0000
1	CONTROL	2	13.0000	13.0000
1	CONTROL	3	17.0000	17.0000
1	CONTROL	4	21.0000	21.0000
1	CONTROL	5	31.0000	31.0000
1	CONTROL	6	16.0000	16.0000
1	CONTROL	7	16.0000	16.0000
1	CONTROL	8	15.0000	15.0000
1	CONTROL	9	14.0000	14.0000
1	CONTROL	10	25.0000	25.0000
2	6.25	1	17.0000	17.0000
2	6.25	2	18.0000	18.0000
2	6.25	3	4.0000	4.0000
2	6.25	4	29.0000	29.0000
2	6.25	5	19.0000	19.0000
2	6.25	6	9.0000	9.0000
2	6.25	7	11.0000	11.0000
2	6.25	8	8.0000	8.0000
2	6.25	9	10.0000	10.0000
2	6.25	10	14.0000	14.0000
3	12.5	1	6.0000	6.0000
3	12.5	2	16.0000	16.0000
3	12.5	3	15.0000	15.0000
3	12.5	4	15.0000	15.0000
3	12.5	5	3.0000	3.0000
3	12.5	6	8.0000	8.0000
3	12.5	7	19.0000	19.0000
3	12.5	8	18.0000	18.0000
3	12.5	9	10.0000	10.0000
3	12.5	10	11.0000	11.0000
4	25	1	19.0000	19.0000
4	25	2	16.0000	16.0000
4	25	3	23.0000	23.0000
4	25	4	0.0000	0.0000
4	25	5	23.0000	23.0000
4	25	6	10.0000	10.0000
4	25	7	12.0000	12.0000
4	25	8	10.0000	10.0000
4	25	9	24.0000	24.0000
4	25	10	14.0000	14.0000
5	50	1	31.0000	31.0000
5	50	2	3.0000	3.0000
5	50	3	10.0000	10.0000
5	50	4	21.0000	21.0000
5	50	5	16.0000	16.0000
5	50	6	36.0000	36.0000
5	50	7	37.0000	37.0000
5	50	8	23.0000	23.0000
5	50	9	29.0000	29.0000
5	50	10	10.0000	10.0000

6	100	1	37.0000	37.0000
6	100	2	20.0000	20.0000
6	100	3	10.0000	10.0000
6	100	4	19.0000	19.0000
6	100	5	39.0000	39.0000
6	100	6	32.0000	32.0000
6	100	7	17.0000	17.0000
6	100	8	33.0000	33.0000
6	100	9	29.0000	29.0000
6	100	10	0.0000	0.0000

EW03 CERIO CHRONIC
File: CDEW03 Transform: NO TRANSFORMATION

ANOVA TABLE

SOURCE	DF	SS	MS	F
Between	5	1031.083	206.217	2.669
Within (Error)	54	4171.900	77.257	
Total	59	5202.983		

Critical F value = 2.45 (0.05,5,40)
Since F > Critical F REJECT Ho:All groups equal

EW03 CERIO CHRONIC
File: CDEW03 Transform: NO TRANSFORMATION

DUNNETTS TEST - TABLE 1 OF 2 Ho:Control<Treatment

GROUP	IDENTIFICATION	TRANSFORMED MEAN	MEAN CALCULATED IN ORIGINAL UNITS	T STAT	SIG
1	CONTROL	18.600	18.600		
2	6.25	13.900	13.900	1.196	
3	12.5	12.100	12.100	1.654	
4	25	15.100	15.100	0.890	
5	50	21.600	21.600	-0.763	
6	100	23.600	23.600	-1.272	

Dunnett table value = 2.31 (1 Tailed Value, P=0.05, df=40,5)

EW03 CERIO CHRONIC
File: CDEW03 Transform: NO TRANSFORMATION

DUNNETTS TEST - TABLE 2 OF 2 Ho:Control<Treatment

GROUP	IDENTIFICATION	NUM OF REPS	Minimum Sig Diff (IN ORIG. UNITS)	% of CONTROL	DIFFERENCE FROM CONTROL

1	CONTROL	10			
2	6.25	10	9.080	48.8	4.700
3	12.5	10	9.080	48.8	6.500
4	25	10	9.080	48.8	3.500
5	50	10	9.080	48.8	-3.000
6	100	10	9.080	48.8	-5.000

7-DAY CHRONIC TOXICITY TEST

JOB NO. F93506
INDUSTRY: Tinker
CONTACT:
EFFLUENT: SWC3
NPDES PERMIT NO:
SAMPLE TYPE:
DILUTION WATER:

PERSON CONDUCTING TEST:
BEGINNING: ___hrs 10/14 .
ENDING: ___hrs; / / .
TEST
DILUTIONS:
AGE:
ORGANISM SOURCE:

PHOTOPERIOD: 16 hr light
FEEDING REGIME:
0.1 ml Artemia @ 3times/day
TEST VESSEL CAPACITY: 1 liter
TEST SOLUTION VOLUME: 500 mL
NO. ORGANISMS/TREATMENT: 10
NO. REPLICATES: 4

CONC (%)	REP ID	SURVIVAL (#) START	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7
6.25	A	10	10	10	10	10	10	10	10
	B	10	10	10	10	10	10	10	10
	C	10	10	10	10	10	10	10	10
	D	10	10	10	DCE ~~9~~ 10	DCE ~~9~~ 10	10	10	10
12.5	A	10	10	10	10	10	10	10	10
	B	10	10	10	10	10	10	10	10
	C	10	10	10	10	10	10	10	10
	D	10	10	10	MLS ~~8~~ 10	MLS ~~8~~ 10	10	10	10
25	A	10	10	10	10	10	10	10	10
	B	10	10	10	10	10	10	10	10
	C	10	10	10	10	MLS ~~9~~ 10	10	10	10
	D	10	9	9	MLS ~~8~~ 9	9	9	9	9
50	A	10	10	10	10	10	10	10	10
	B	10	10	10	10	10	10	10	10
	C	10	10	10	10	10	10	10	10
	D	10	10	10	10	10	10	10	10
	TIME:	1620	1120	1645	1445	1350	1405	1130	1500
	INITIAL:	MLS	SJE	TNT	MLS	MLS	DCE	SJE	SJE

GROWTH RESULTS

CONC (%)	REP ID	Boat ID	Tare wt (g)	Combined wt (g)	Tot Fish wt (g)	# of Fish	Avg Fish wt (mg)
6.25	A		.99396	.99858	0.00462	10	0.462
	B		.99137	.99674	0.00537	10	0.537
	C		.99101	.99613	0.00512	10	0.512
	D		.98997	.99450	0.00453	10	0.453
12.5	A		.98811	.99373	0.00562	10	0.562
	B		.99803	1.00323	0.00520	10	0.520
	C		1.00135	1.00515	0.00380	10	0.380
	D		.99292	.99813	0.00521	10	0.521
25	A	.98977	MLS ~~.98627~~	.99464	0.00487	10	0.487
	B	.99172	~~1.00198~~	.99721	0.00549	10	0.549
	C		.99804	1.00726	0.00362	10	0.362
	D		.99668	1.00157	0.00469	9	0.521
50	A		.99335	.99865	0.00530	10	0.530
	B		1.00279	1.00900	0.00621	10	0.621
	C		.99643	1.00360	0.00718	10	0.718
	D		.99981	~~1.00494~~	1.00489	10	0.500
					0.00507		

7-DAY CHRONIC TOXICITY TEST

JOB NO. F9350 | PERSON CONDUCTING TEST: | PHOTOPERIOD: 16 hr light
INDUSTRY: Tinker | BEGINNING: ____hrs; / / . | FEEDING REGIME:
CONTACT: | ENDING: ____hrs; / / . | 0.1 ml Artemia @ 3times/day
EFFLUENT: 2003 | TEST | TEST VESSEL CAPACITY: 1 liter
NPDES PERMIT NO: | DILUTIONS: | TEST SOLUTION VOLUME: 500 mL
SAMPLE TYPE: | AGE: | NO. ORGANISMS/TREATMENT: 10
DILUTION WATER: | ORGANISM SOURCE: | NO. REPLICATES: 4

CONC (%)	REP ID	SURVIVAL (#) START	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7
100	A	10	10	10	10	10	10	10	10
	B	10	10	10	10	10	10	10	10
	C	10	10	10	MLS 10	10	10	10	10
	D	10	10	10	MLS 10	10	10	10	10
	TIME:	1620	1120	1645	1445	1350	1130	1500	1500
	INITIAL:	MLS	SJE	TW	MLS	MLS	SJE	SJE	SJE

GROWTH RESULTS

CONC (%)	REP ID	Boat ID	Tare wt (g)	Combined wt (g)	Tot Fish wt (g)	# of Fish	Avg Fish wt (mg)
100	A		.99355	.99943	0.00588	10	0.588
	B		.98589	.99187	0.00598	10	0.598
	C		.99067	.99762	0.00695	10	0.695
	D		.99409	1.00030	0.00621	10	0.621

F 75504

EW03
F. H
6/16/95

CHRONIC TOXICITY TEST DATA SHEET

TEMPERATURE

CONCENTRATION	Start	Day 1 OLD	Day 1 NEW	Day 2 OLD	Day 2 NEW	Day 3 OLD	Day 3 NEW	Day 4 OLD	Day 4 NEW	Day 5 OLD	Day 5 NEW	Day 6 OLD	Day 6 NEW	Day 7 OLD	Day 7 NEW	Day 8 OLD
6.25	25.0	24.0	24.0	24.2	24.8	24.8	24.8	25.0	25.0	25.2	25.2	25.2	25.2	24.5		
12.5	↓															
25																
50																
100																

DISSOLVED OXYGEN

CONCENTRATION	Start	Day 1 OLD	Day 1 NEW	Day 2 OLD	Day 2 NEW	Day 3 OLD	Day 3 NEW	Day 4 new ~~OLD~~	Day 4 old ~~NEW~~	Day 5 OLD	Day 5 NEW	Day 6 OLD	Day 6 NEW	Day 7 OLD	Day 7 NEW	Day 8 OLD
6.25	7.6	7.1	7.3	7.0	8.2	7.3	7.8	8.0	7.8	8.0	8.1	7.4	8.2	7.0		
12.5	7.6	7.2	7.2	7.1	8.3	7.3	7.7	8.1	7.8	7.9	8.1	7.6	8.3	7.3		
25	7.6	7.2	7.5	7.4	8.3	7.3	7.7	8.2	7.8	7.6	8.1	7.7	8.2	6.7		
50	7.7	7.1	7.6	7.4	8.4	7.4	7.7	8.2	7.9	7.7	8.2	7.7	8.3	7.0		
100	8.0	7.0	7.6	7.4	8.5	7.5	8.0	8.2	8.0	7.6	8.3	7.3	8.2	6.5		

pH

CONCENTRATION	Start	Day 1 OLD	Day 1 NEW	Day 2 OLD	Day 2 NEW	Day 3 OLD	Day 3 NEW	Day 4 new ~~OLD~~	Day 4 old ~~NEW~~	Day 5 OLD	Day 5 NEW	Day 6 OLD	Day 6 NEW	Day 7 OLD	Day 7 NEW	Day 8 OLD
6.25	8.33	8.60	8.24	8.38	8.53	8.32	8.23	8.45	8.24	8.04	8.22	8.27	8.51	8.00		
12.5	8.34	8.57	8.28	8.48	8.52	8.40	8.26	8.46	8.27	8.07	8.22	8.35	8.51	7.99		
25	8.35	8.57	8.32	8.53	8.53	8.44	8.26	8.49	8.31	8.11	8.21	8.34	8.50	8.05		
50	8.38	8.62	8.39	8.62	8.57	8.51	8.28	8.53	8.41	8.22	8.25	8.39	8.49	8.15		
100	8.47	8.65	8.57	8.59	8.59	8.50	8.36	8.56	8.38	8.33	8.29	8.41	8.47	8.21		

CONDUCTIVITY

CONCENTRATION	Start	Day 1 OLD	Day 1 NEW	Day 2 OLD	Day 2 NEW	Day 3 OLD	Day 3 NEW	Day 4 new ~~OLD~~	Day 4 old ~~NEW~~	Day 5 SEW OLD 381	Day 5 NEW	Day 6 OLD	Day 6 NEW	Day 7 OLD	Day 7 NEW	Day 8 OLD
6.25	347	372	361	374	379	400	355	372	360	~~[illegible]~~	361	384	364	428		
12.5	388	392	392	401	391	399	372	382	397	412	381	389	387	418		
25	438	441	450	465	443	435	428	432	449	470	432	443	442	471		
50	528	554	574	577	539	563	538	536	555	559	538	561	555	581		
100	728	724	708	724	776	713	724	742	758	784	754	768	763	795		

MAR 1000

MAR 14.20 LSI 1710

EW03 FATHEAD MINNOW CHRONIC
File: b:\toxstat\FMEW03. Transform: NO TRANSFORMATION

Chi-square test for normality: actual and expected frequencies

INTERVAL	<-1.5	-1.5 to <-0.5	-0.5 to 0.5	>0.5 to 1.5	>1.5
EXPECTED	1.608	5.808	9.168	5.808	1.608
OBSERVED	0	7	10	7	0

Calculated Chi-Square goodness of fit test statistic = 3.7808
Table Chi-Square value (alpha = 0.01) = 13.277

Data PASS normality test. Continue analysis.

EW03 FATHEAD MINNOW CHRONIC
File: b:\toxstat\FMEW03. Transform: NO TRANSFORMATION

Bartletts test for homogeneity of variance

Calculated B statistic = 191.17
Table Chi-square value = 15.09 (alpha = 0.01)
Table Chi-square value = 11.07 (alpha = 0.05)

Average df used in calculation ==> df (avg n - 1) = 3.00
Used for Chi-square table value ==> df (#groups-1) = 5

Data FAIL homogeneity test at 0.01 level. Try another transformation.

NOTE: If groups have unequal replicate sizes the average replicate size is used to calculate the B statistic (see above).

EW03 FATHEAD MINNOW CHRONIC
File: b:\toxstat\FMEW03. Transform: 1/Y (INVERSE)

Chi-square test for normality: actual and expected frequencies

INTERVAL	<-1.5	-1.5 to <-0.5	-0.5 to 0.5	>0.5 to 1.5	>1.5
EXPECTED	1.608	5.808	9.168	5.808	1.608
OBSERVED	0	7	8	9	0

Calculated Chi-Square goodness of fit test statistic = 5.3637
Table Chi-Square value (alpha = 0.01) = 13.277

Data PASS normality test. Continue analysis.

EW03 FATHEAD MINNOW CHRONIC
File: b:\toxstat\FMEW03. Transform: 1/Y (INVERSE)

Bartletts test for homogeneity of variance

Calculated B statistic = 7.46
Table Chi-square value = 15.09 (alpha = 0.01)
Table Chi-square value = 11.07 (alpha = 0.05)

Average df used in calculation ==> df (avg n - 1) = 3.00
Used for Chi-square table value ==> df (#groups-1) = 5

Data PASS homogeneity test at 0.01 level. Continue analysis.

NOTE: If groups have unequal replicate sizes the average replicate size is used to calculate the B statistic (see above).

TITLE: EW03 FATHEAD MINNOW CHRONIC
FILE: b:\toxstat\FMEW03.
TRANSFORM: 1/Y (INVERSE) NUMBER OF GROUPS: 6

GRP	IDENTIFICATION	REP	VALUE	TRANS VALUE
1	CONTROL	1	0.5450	1.8349
1	CONTROL	2	0.4130	2.4213
1	CONTROL	3	0.5380	1.8587
1	CONTROL	4	0.6580	1.5198
2	6.25	1	0.4620	2.1645
2	6.25	2	0.5370	1.8622
2	6.25	3	0.5120	1.9531
2	6.25	4	0.4530	2.2075
3	12.5	1	0.5620	1.7794
3	12.5	2	0.5200	1.9231
3	12.5	3	0.3800	2.6316
3	12.5	4	0.5210	1.9194
4	25	1	0.4870	2.0534
4	25	2	0.5490	1.8215
4	25	3	0.8620	1.1601
4	25	4	0.5210	1.9194
5	50	1	0.5300	1.8868
5	50	2	0.6210	1.6103
5	50	3	0.7180	1.3928
5	50	4	0.5000	2.0000
6	100	1	0.5880	1.7007
6	100	2	0.5980	1.6722
6	100	3	695.0000	0.0014
6	100	4	0.6210	1.6103

EW03 FATHEAD MINNOW CHRONIC
File: b:\toxstat\FMEW03. Transform: 1/Y (INVERSE)

ANOVA TABLE

SOURCE	DF	SS	MS	F
Between	5	1.831	0.366	1.768
Within (Error)	18	3.717	0.207	
Total	23	5.548		

Critical F value = 2.77 (0.05,5,18)
Since F < Critical F FAIL TO REJECT Ho:All groups equal

EW03 FATHEAD MINNOW CHRONIC
File: b:\toxstat\FMEW03. Transform: 1/Y (INVERSE)

DUNNETTS TEST - TABLE 1 OF 2 Ho:Control<Treatment

GROUP	IDENTIFICATION	TRANSFORMED MEAN	MEAN CALCULATED IN ORIGINAL UNITS	T STAT	SIG
1	CONTROL	1.909	0.539		
2	6.25	2.047	0.491	-0.429	
3	12.5	2.063	0.496	-0.481	
4	25	1.739	0.605	0.529	
5	50	1.722	0.592	0.579	
6	100	1.246	174.202	2.059	

Dunnett table value = 2.41 (1 Tailed Value, P=0.05, df=18,5)

EW03 FATHEAD MINNOW CHRONIC
File: b:\toxstat\FMEW03. Transform: 1/Y (INVERSE)

DUNNETTS TEST - TABLE 2 OF 2 Ho:Control<Treatment

GROUP	IDENTIFICATION	NUM OF REPS	Minimum Sig Diff (IN ORIG. UNITS)	% of CONTROL	DIFFERENCE FROM CONTROL
1	CONTROL	4			
2	6.25	4	-0.358	-66.6	0.048
3	12.5	4	-0.358	-66.6	0.043
4	25	4	-0.358	-66.6	-0.066
5	50	4	-0.358	-66.6	-0.054
6	100	4	-0.358	-66.6	-173.663

CHAIN OF CUSTODY RECORD

№ 1532

JOB #	PROJECT NAME
F93506-T3	TAFB Soldier Creek

SAMPLERS: (Signature)

ANALYSES REQUIRED: Toxicity

WOODWARD-CLYDE CONSULTANTS
P.O. BOX 680925
FRANKLIN, TN 37068-0925
(615) 790-0003 FAX (615) 790-0023

SAMPLE IDENTIFICATION	DATE	TIME	SAMPLE TYPE	NUMBER OF CONTAINERS	REMARKS
SC-EW03-~~S~~-201	6/13/95	0730	Water	3	FedEx 580482352 2
	QA1				

RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)	RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)
[signature]	6/13/95 1800				
RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)	RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)
RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED AT LAB BY: (Signature)	DATE/TIME	GENERAL COMMENTS	
		[signature]	6/14/95 0900	2 °C upon arrival	

Distribution: Original and Yellow copies accompany sample shipment to laboratory
Pink copy retained by samplers. Yellow copy retained by laboratory. Laboratory returns White copy to samplers.

№ 1551

CHAIN OF CUSTODY RECORD

JOB #	PROJECT NAME
F9350L-T3	TAFB Soldier Creek

SAMPLERS: (Signature)

WOODWARD-CLYDE CONSULTANTS
P.O. BOX 680925
FRANKLIN, TN 37068-0925
(615) 790-0003 FAX (615) 790-0023

SAMPLE IDENTIFICATION	DATE	TIME	SAMPLE TYPE	NUMBER OF CONTAINERS	ANALYSES REQUIRED: Toxicity	REMARKS
SC-EW03-~~SED~~TX-201	6/13/95	0730	H2O	2	✓	FedEx 5804823522
SC-EW03-~~SED~~TX-201	6/13/95	0750	Sd	2	✓	

RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)	RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)
	6/13/95 1900				
RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)	RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)
RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED AT LAB BY: (Signature)	DATE/TIME	GENERAL COMMENTS	
		Maria Saunders	6/14/95-0905	2°C	

Distribution: Original and Yellow copies accompany sample shipment to laboratory
Pink copy retained by samplers. Yellow copy retained by laboratory. Laboratory returns White copy to samplers.

6-8-95 Received samples from sites SC-EE09-TX-201 and SC-EE10-TX-201
VST Both sediment and water samples were in good condition. All samples were less than 4°C upon arrival.

	Temp	DO	pH	Ammonia	Hrd	Alk
SC-EE09-TX-201	1°C	8.6	7.78	17.6	250	178
SC-EE10-TX-201	3.8°C	8.7	7.75	2.53	240	186

Set up C. dubia and fathead minnow acute tests with concentrations of 100%, 50%, 25%, 12.5% and 6.25%. Water with a hardness of 250 was used as diluent water. Dilutions were prepared. The C. dubia samples were placed in a 25°C test chamber to warm up. The fish tests were performed at 25°C. The C. dubia and fish were added to the tests after they reached testing temperature.
VST

6-9-95 Received 4 samples - water and sediment

Sample	Temp	DO	pH	Ammonia	Hrd	Alk
SC-EE05-TX201	2.5	8.3	8.53	14.3	146	134
VST SC-EE06-TX201	3	8.3	7.77	1.94	258	150
SC-EE07-TX-201	2	8.2	7.88	0.77	260	148
SC-EE08-TX201	2	8.5	7.82	3.88	250	174

Diluted test samples to test concentrations using water with a hardness of 250 or 120 according to sample water hardness. Allowed C. dubia samples temperature to rise to 25°C, then added organisms. Added fish to samples when the temperature reached 20°C.
VST

Checked mortality in tests that were set up on 6-8-95 (EE09 and EE10).

CWE

6-10-95 MLS Ended fathead minnow and C. dubia acute tests samples EE09 and EE10. Checked samples EE05-EE08 acute fathead minnow and C. dubia tests. Did dilutions for chronic fathead minnow and C. dubia samples EE09 & EE10.

VST Added fathead minnows to chronic tests EE09 & EE10.

1/11/95 Made test dilutions for tests EE09 + EE10
T for both fish and C. dubia
Ended acute fish & C. dubia for samples
EE05, EE06, EE07 and EE08.

1/12/95 Made dilutions for tests EE09 + EE10 fish and
WT C. dubia. Started chronic fish and C dubia tests
for samples EE05, EE06, EE07 and EE08.

13/95 Renewed EE05, EE06, EE07, EE08, EE09,
LS and EE10. Started EE01, EE02, EE03, & EE04
and CREC02 acute fish and C. dubia.

1/95 Renewed EE05 to EE10 and checked
S EE01 - EE04 and CREC02 acutes. Started
Acute fish and C. dubia acutes on
EW01, EW02, EW03 and CREC01.

/95 Renewed EE05 to EE10. Started Chronic
, C. dubia and fathead tests for EE01,
EE02, EE03, EE04 and CREC02. Checked
acute tests.

'95 Renewed ~~EE05~~ EE01-EE10 and CREC02
Ended acutes for EW01, EW02, EW03 and
CREC01 and set these samples up for
chronic fathead and C. dubia tests.

1/95 Ended EE09 and EE10 chronics. Renewed
, EE01-EE08 and EW01-EW03 and CREC01-CREC02.

:/95 Renewed EE01-EE08 and EW01-EW03 and
DLS CREC01, CREC02. Make mud dilutions for EE06, EE07, EE08
and EE09. Dilutions were made using alpha cellulose recipe. Dilutions
were made according to Tinker log book #1 date 6 Nov 1994. Covered
~~1/95~~ sediment with spring water.

Formulated Sediment 10%, TOC, and 81% Sand Exposures:

1243 g Sand
219 g Silt and Clay
7.5 g Dolomite
489.6 g α-Cellulose (about 2% organic carbon treatments)
0.15 g Humic acid

EE06-EE09

95

Test/Conc.		D.O	~~pH~~ mls	~~Cond~~ mls
egatus	Con	8.2		
EE06	6.25	8.1		
	12.5	8.1		
	25	8.0		
	50	7.8		
	100	7.7		
EE07	6.25	8.0		
	12.5	7.9		
	25	7.6		
	50	7.5		
	100	7.6		
EE08	6.25	8.1		
	12.5	7.8		
	25	7.7		
	50	7.6		
	100	7.6		
EE09	6.25	8.0		
	12.5	8.0		
	25	7.9		
	50	7.8		
	100	7.7		

H. azteca

Test/Conc.		D.O.
Con		8.2
EE06	6.25	8.2
	12.5	8.2
	25	8.3
	50	8.3
	100	8.3
EE07	6.25	8.0
	12.5	8.1
	25	8.0
	50	7.7
	100	7.8
EE08	6.25	7.9
	12.5	8.0
	25	8.0
	50	8.1
	100	8.0
EE09	6.25	8.3
	12.5	8.3
	25	8.3
	50	8.3
	100	8.3

D nLS Added ten L. variegatus and ten H. azteca per replicate and randomly placed test vessels in renewal system.

/95 S

Overlying Water Parameters - Sediment

Sample	Ammonia	Cond	pH	DO
EE09	46.10 ppm	1326	7.59	3.7
EE10	3.88 ppm	762	7.35	5.7

S S Mixed sediment dilutions on samples EE04 and CR-EC02. They were both diluted with silty artificial sediment. Added spring water (carbon filtered) to each sediment test vessel and allowed to settle overnight.

Hazteca

/95

Test/Conc.		DO
~~EE04~~ ~~MAR~~ ~~50~~ MAR ~~100~~ MAR		MAR ~~6.6~~
CRECO2	6.25	6.7
	12.5	6.6
	25	6.6
	50	6.6
	100	6.4
EE04	6.25	6.5
	12.5	6.6
	25	6.6
	50	5.9
	100	6.0
Silty Con		7.3
Gravel Con		7.5
EE05	6.25	7.2 ~~7.2~~ SEW
	12.5	7.1
	25	7.2
	50	7.0
	100	6.5
EE10	6.25	7.3 SEW
	12.5	~~6.9~~ 7.1
	25	7.0
	50	7.0
	100	6.5

L. variegatus

Sample	Conc	D.O.
CRECO2	6.25	6.8
	12.5	6.6
	25	6.4
	50	6.3
	100	6.8
EE04	6.25	6.8
	12.5	6.4
	25	6.8
	50	6.2
	100	6.3
Silty Con		7.2
Gravel Con		7.5
EE05	6.25	7.4
	12.5	7.1
	25	7.2
	50	7.0
	100	6.3
EE10	6.25	7.2
	12.5	6.9
	25	6.5
	50	6.4
	100	6.0

	L.	Temp	DO		H. azteca	Temp	DO
EE08	6.25	27.5°	4.1	EE08	6.25	25.0°	3.7
	12.5	27.5°	4.0		12.5	26.0°	4.1
	25	26.9°	3.1		25	25.2°	5.0
	50	21.0°	4.2		50	26.0°	0.6
	100	21.0°	3.8		100	26.0°	2.6
EE09	6.25	22.0°	4.2	EE09	6.25	25.0°	3.5
	12.5	22.0°	4.5		12.5	24.0°	3.7
	25	25.8°	4.3		25	24.8°	3.6
	50	23.0°	4.8		50	26.0°	3.8
	100	23.0°	5.5		100	26.0°	5.3

2-95 Day 1 - EE04, 05, 10, CR - EC02

9R

	H. azteca				L. V.		
~~mar2~~	~~L. V.~~	Temp	DO	~~mar4~~	~~H. azteca~~	Temp	DC
	Silt con	21.5°	5.3		Silt con	Temp	DO
	gravel con	21.4°	5.7		gravel con	22.6°	5.7
	crec02 6.25	22.8°	4.5	crec02	6.25	21.9°	4.6
	12.5	23.2°	4.8		12.5	21.5°	4.4
	25	22.0	4.9		25	22.5°	4.4
	50	22.0°	4.9		50	22.5°	4.5
	100	23.0	5.9		100	22.0°	5.8
	EE04 6.25	23.0°	4.8	EE04	6.25	22.0°	5.0
	12.5	22.3°	3.6		12.5	21.0°	4.9
	25	22.2	4.5		25	21.2°	5.5
	50	21.0°	5.3		50	21.0°	5.0
	100	22.0°	6.0		100	23.0°	5.4
	EE05 6.25	22.0°	6.1	EE05	6.25	21.8°	5.3
	12.5	23.0°	5.2		12.5	22.0°	5.1
	25	22.0	5.5		25	21.0°	5.8
	50	21.7	5.2		50	22.0	5.3
	100	22.0	5.6		100	21.1°	5.-
	EE10 6.25	22.2°	5.4	EE10	6.25	22.8°	5.4
	12.5	23.6	4.9		12.5	21.9°	5.6
	25	22.3°	5.7		25	21.0°	5.7
	50	21.6	5.2		50	23.0°	6.3
	100	23.0	5.1		100	22.0°	5.5

2295 Mixed gravel samples ~~EE04, EE05, EE10 and~~ mcs
mls ~~mcs CREC02~~ EE01, EE02 and EE03 as well

6-23-95

EE09 6.25 A 9-1
B 9-0
C 9-1
12.5 A 7-0 ST
B 3-01
C 6-4
25 A 8-1
B 7-2
C 10

EE09 50 A 10
B 6-4
C 7 1 baby
100 A 7-1
B 4-2
C 6-0
Control A 10
B 8-2D
C 9-0

Beginning D.O. EE01, EE02, EE03, + EW03

6-23-95

H. azteca

Sample	Conc	D.O.
Gravel CoN		7.3
EE01	6.25	7.3
	12.5	7.3
	25	7.4
	50	7.3
	100	7.2
EE02	6.25	7.5
	12.5	7.1
	25	7.2
	50	6.9
	100	7.1
EE03	6.25	7.4
	12.5	7.4
	25	7.4
	50	7.4
	100	7.5
EW03	6.25	7.4
	12.5	7.5
	25	7.0
	50	6.8
	100	6.9

L. variegatus

Sample	conc	D.O.
Gravel CoN		7.4
EE01	6.25	7.4
	12.5	7.4
	25	7.6
	50	7.5
	100	7.4
EE02	6.25	7.4
	12.5	7.4
	25	7.2
	50	6.9
	100	6.7
EE03	6.25	7.4
	12.5	7.4
	25	7.4
	50	7.4
	100	7.5
EW03	6.25	7.4
	12.5	5.8
	25	7.0
	50	7.0
	100	6.6

6-23-95 Ending Parameters for EE06-EE09

L. variegatus

	Test 6	Test 7	Test 8	Test 9
)	5.4			
Con	7.72	LST		
nd	336	~~330~~		
mp	22.5	~~8~~		
)	4.2	5.1	3.5	4.3
t 6.25	7.67	7.77	7.72	7.77
nd	332	334	336	356
mp	21.8	21.2	21.8	22.0
)	3.7	4.6	4.3	4.1
t 12.5	7.46	7.72	7.76	7.69
nd	341	LST 334 ~~360~~	329	339
mp	21.5	21.5	21.5	22.0
0	2.0	3.8	3.4	3.2
t 25	7.34	7.46	7.51	7.54
nd	349	360	335	341
mp	21.2	22.0	21.0	21.9
	2.2	4.4	4.0	2.9
t 50	7.29	7.38	7.54	7.42
nd	352	LST ~~345~~ 360	338	355
mp	21.5	22.0	21.0	22.0
0	4.9	5.4	4.3	5.9
t 100	7.81	7.70	7.76	8.01
nd	330	345	332	334
mp	21.5	22.0	21.0	22.2

riegatus Ending Counts

Con A 10
B 10
C 10
D 10
E 10
F 10
~~LST EE06-6.25 A~~ G 10
~~B~~ H ~~9~~
6 6.25 A C 10
~~LST B~~ D 10
C 9
D 10

EE06-12.5 A 10
B 10
C 10
D 10
25 A 10
B 9
C 10
D 0 - none found
50 A 10+
B 7
C 10+
D 10+

EE06 100 A 10+
B 10+
C 10+
D 10+

Oligo's in EE06 50 & 1
May have been
indigenous.

23-95

H. Azteca				L. variegatus			
Sample	conc	D.O.	Temp	Sample	conc	DO	Temp
EW03	6.25	4.1	25.0	EW03	6.25	4.7	23.5
	12.5	4.2	25.0		12.5	4.8	23.5
	25	4.2	25.0		25	5.0	24.0
	50	3.5	25.0		50	5.1	23.5
	100	4.7	25.0		100	4.2	23.8

Day 3 - Parameters EE04, EE05, EE10, CRECO2

MAR

H. Azteca				L. Variegatus			
sample	conc	DO	Temp	Sample	conc	DO	Temp
Silt	con	5.4	26.8	Silt	con	4.0	21.6
Gravel	con	4.0	26.0	Gravel	con	4.3	23.0
EE04	6.25	2.8	26.0	EE04	6.25	4.8	21.6
	12.5	3.6	26.2		12.5	4.0	23.0
	25	3.8	26.0		25	3.5	21.6
	50	1.0	26.2		50	1.8	22.0
	100	5.0	26.2		100	5.0	21.4
EE05	6.25	4.2	26.0	EE05	6.25	4.0	22.0
	12.5	2.6	26.0		12.5	3.6	23.0
	25	4.4	26.2		25	4.7	21.4
	50	3.2	26.5		50	3.3	22.0
	100	5.2	26.2		100	5.4	23.0
E10	6.25	3.3	26.2	EE10	6.25	4.5	22.0
	12.5	4.3	26.2		12.5	4.4	23.0
	25	4.2	26.0		25	3.6	21.6
	50	4.4	26.5		50	5.0	23.0
	100	5.3	26.2		100	5.8	21.6
R-ECO2	6.25	3.4	26.5	CR-ECO2	6.25	4.7	23.0
	12.5	3.6	26.0		12.5	2.1	21.4
	25	3.2	26.0		25	3.5	23.0
	50	0.4	26.1		50	2.8	21.4
	100	4.0	26.5		100	4.2	21.6

6/25/95 Ending Counts EE04, EE05, EE10 and CR-EC02

H. azteca		EE04	EE05	EE10	CR-EC02
Con	A	10	10	10	
	B	10	10	10	
	C	9	10	6-1	
	A	8	10-0	8-1+1 baby	9
6.25	B	10	10-0	10	6
	C	5-2	10-0	10	7
12.5	A	~~5~~ 2 8	10+4 babies	9+2 babies	9+1 ba
	B	8	10	10 +5 babies	7
	C	5-1	9+2 babies	10	6-1
25	A	8-0	9+2	10	7-1
	B	8-0	10	8+1	8-2 +1
	C	5-4	8-2 -1 baby	9	2-4
50	A	9-1	10	10+1 baby	8-2
	B	7-2	9+3 babies	10	8-1
	C	8-0	10+3 babies	10	6+1 bab
100	A	5-2	10	10	10+1 bab
	B	7-0	6+3 babies	10-1	7-1
	C	4-1	7+1 baby -1 dead	5-0	6

15 Day 2 - EE01, EE02, EE03 & EW03

azteca		DO	temp	L. variegatus		DO	temp
Lvel Con		3.3	~~26.8~~ 25.5	Con		4.2	24.0
EE01	6.25	3.6	25.0	EE01	6.25	4.3	24.0
	12.5	3,3	25.2		12.5	4.6	21.0
	25	4.2	24.0		25	4.0	24.0
	50	4.1	25.0		50	4.6	24.0
	100	4.9	25.0		100	5.7	21.8
02	6.25	3.4	25.0	EE02	6.25	4.4	24.0
	12.5	3.4	24.0		12.5	4.4	23.8
	25	2.9	25.0		25	4.7	20.2
	50	3.2	24.0		50	5.4	23.4
	100	3.5	25.6		100	5.6	20.8
23	6.25	3.4	24.2	EE03	6.25	4.5	24.0
	12.5	3,6	25.4		12.5	4.6	21.8
	25	3.5	23.8		25	4.7	25.0
	50	3.6	25.0		50	4.8	24.0
	100	4.4	23.0		100	6.0	23.8
03	6.25	3.5	24.8	EW03	6.25	4.9	23.5
	12.5	2.9	25.0		12.5	4.3	24.0
	25	3.7	25.2		25	3.9	24.0
	50	2.1	23.4				

6/26/95 Beginning Parameters for EW01, EW02 and CR-EC01

	H. azteca	D.O.		L. variegatus	D.O.
	Gravel Con	5.7		Gravel Con	6.6
	Silt Con	6.2		Silt Con	6.7
1	6.25	5.6	EW01	6.25	5.9
	12.5	5.1		12.5	5.7
	25	4.3		25	3.6
	50	4.1		50	4.0
	100	2.6		100	4.4
2	6.25	5.4	EW02	6.25	6.6
	12.5	5.4		12.5	6.6
	25	5.2		25	6.6
	50	6.7		50	6.2
	100	5.7		100	6.5
EC01	6.25	5.7	CR-EC01	6.25	5.9
	12.5	5.8		12.5	6.1
	25	5.7		25	6.3
	50	5.5		50	6.4
	100	5.3		100	6.5

6/27/95 Ending Counts EE01, EE02, EE03 and EW03

H. azteca

		EE01	EE02	EE03	EW03
	A	9	9		
	B	9+1 baby	9		
	C	11	10		
1.25	A	10	10+2 babies	10	~~13~~ 13
	B	10	9	10	10
	C	10	5	10	8
12.5	A	9	10	10	10
	B	9	9	10	10
	C	9	10	10	10
25	A	10	9-1	9-1	8-2
	B	10	11	9-1	10
	C	9	9-1	9-1	9
50	A	7-1	8-1	9-1	7-
	B	10	6-1	10-2	10
	C	9	10	9	8
100	A	5-1+1 baby	~~10~~ more 3-5	6	7-1
	B	8+2 babies	2-3	9	8-1
	C	5-3	1-6	10	8

L. variegatus

		EE01	EE02	EE03	EW03	Control
6.25	A	10	~~10~~ 8 SUB	10	10	10
	B	10	10+	10	10+	10
	C	10+	10	10	10	10
	D	10	10	10	10	10
12.5	A	10+	10+	10	10+	10
	B	10	10	10+	2	10
	C	10	10	10	10	10
	D	~~10~~ more 10 SUB	10	10+	9	10
25	A	10	10	10	10	
	B	10	10	9	10	
	C	10+	10	10	10	
	D	10+	10	10+	05	
50	A	10	10	10+	10	
	B	10+	10	10	6	
	C	9	9	10	10	
	D	10	8	9	5	
100	A	10	10	10+	10	
	B	10	10	10	10	

25-95 Ending Counts EE04, EE05, EE10 & CREC02

Variegates		EE04	EE05	EE10	CREC02
on	A	10	Gravel	10	
	B	10		11	
	C	10		9	SILT
	D	10		10	
.25	A	10	10	10	10
	B	10	10	10	10
	C	10	10	10	9
	D	10	10	10	10
.5	A	10	10	10	10
	B	10	10	10	10
	C	10	10	10	12
	D	10	10	10	9
	A	10	10	10	10
	B	10	10	10	10
	C	10	10	10	10
	D	10	9	11	10
)	A	10	10	10	10
	B	10	10	10	10
	C	10	10	9	10
	D	10	9	10	10
)	A	10	10	10	10
	B	10	10	10	9-1
	C	10	10	10	10
	D	10	10	10	10

-25-95 nls Began mixing dilutions for final 3 samples EW01, EW02 & CREC01. Added springwater to each test vessel. Last set of Acutes.

6/27/95 Day 1 Parameters - EW01, EW02 ~~2~~ 2.5' and CR-EC01

H. azteca		D.O	Temp	L. variegatus		DO	Temp
el Con		4.8	22.0	~~Grave~~ LJT Gravel Con		5.4	21.8
ilt Con		6.6	22.0	~~Silt~~ Silt LJT Con		5.7	21.2
001	6.25	5.7	22.0	EW01	6.25	5.1	21.0
	12.5	4.5	22.0		12.5	5.8	21.8
	25	2.7	22.2		25	4.5	21.8
	50	1.2	23.0		50	1.6	21.2
	100	1.9	22.6		100	4.5	22.0
002	6.25	5.2	21.8	EW02	6.25	4.3	21.2
	12.5	4.2	22.2		12.5	5.8	22.0
	25	4.6	22.0		25	5.6	21.5
	50	5.0	21.8		50	5.5	22.0
	100	5.1	22.8		100	5.7	21.5
~~EW03~~	6.25	4.7	22.0	CR-EC01	6.25	5.8	21.8
01	12.5	5.5	22.0		12.5	6.2	21.8
	25	4.9	22.0		25	6.3	22.0
	50	6.0	22.0		50	6.3	21.8
	100	4.4	21.6		100	6.1	22.0

Beginning ~~Final~~ MLS Parameters: ~~EE04, EE05, EE10, & CREC02~~ EE06, EE07, EE08 & EE09 MLS

zteca chronic:

	Silt Control	EE06 ~~EE04~~ MLS	EE07 ~~EE05~~ MLS	EE08 ~~EE10~~ MLS	EE09 ~~CREC02~~ MLS	~~Gravel Con~~ MLS
pH						
DO	7.8					
Cond	324					
12.5	7.2					
d	339					
25						
d	338					
50						
d	338					
100						
d						

next page MLS

Mixed sediment dilutions on EE04, EE05, EE10 & CREC02. Topped off with spring water.

5/29/95 Beginning Parameters: EE04, EE05, EE10 & CR-EC02

H. aztecа Chronic:

	Gravel Con	EE04	EE05	EE10	CR-EC02	Silt Con
pH	8.06	8.12	8.06	7.87	7.90	7.86
DO 6.25	7.9	7.3	7.1	7.5	7.9	7.5
Cond	271	401	414	329	340	325
pH		8.23	8.03	7.90	8.03	
DO 12.5		7.3	7.1	7.4	7.7	
Cond		401	420	333	339	
pH		8.19	8.03	7.87	7.99	
DO 25		7.4	7.1	7.3	7.6	
Cond		389	415	337	346	
pH		8.14	8.10	7.94	8.00	
DO 50		7.3	7.1	7.2	7.6	
Cond		378	378	343	348	
pH		8.23	8.18	7.93	8.06	
DO 100		7.3	7.2	7.2	7.6	
Cond		339	383	349	357	

Day 1 Parameters - Chronic EE06, EE07, EE08 and EE09:

		DO	Temp
Gravel Con		4.9	23.9
Silt Con		5.3	24.0
EE06	6.25	5.0	24.2
	12.5	5.1	24.0
	25	5.2	23.0
	50	4.6	22.0
	100	5.0	25.0
EE07	6.25	4.0	23.0
	12.5	5.4	24.0
	25	4.8	24.0
	50	5.7	24.0
	100	3.9	24.0
EE08	6.25	6.3	23.8
	12.5	5.2	24.3
	25	4.1	23.5
	50	5.9	22.0
	100	5.4	24.0
EE09	6.25	2.8	24.5
	12.5	4.8	24.2
	25	5.0	24.5
	50	5.4	24.1
	100	5.4	25.0

0/95 Ending parameters: EW01, EW02 and CRECO1 Acute

H azteca

		EW01	EW02	CRECO1	
		2.1		1.5 4.51	Gravel
		7.35		~~7.35~~ SEW	
d	Con	336	~~342~~ SEW	380	
np		23.5		23.5	
		0.8	0.7	2.2	
		7.23	7.19	7.60	
d	6.25	343	~~351~~ 342 SEW	362	
np		~~25.5~~ SEW 24.2	24.0	24.0	
		0.6	0.6	0.7	
		7.13	7.05	7.24	
d	12.5	348	~~374~~ 351 SEW	367	
np		24.0	24.2	24.0	
		0.5	0.5	0.8	
t		6.84	6.94	7.32	
d	25	380	~~361~~ 374 SEW	378	
np		24.0	24.0	24.5	
		0.5	0.6	0.5	
		6.71	7.22	7.17	
d	50	403	361	412	
np		24.5	24.2	24.2	
		0.5	4.0	2.6	
t		7.41	7.73	7.61	
d	100	351	340	369	
np		24.2	24.0	24.0	

Ending Counts H. azteca EW01, EW02 & CRECO1

		EW01	EW02	CRECO1
Con	A	9-0		8-2 +3 babies Gravel
	B	9-1 +1 baby		10 +1 baby
	C	10		9-1 +1 baby
0.25	A	9-0	10-0	9-0
	B	10	8-2	10-0
	C	10 +4 babies	5-1 +1 baby	10-0
12.5	A	8-0	7-1	~~10-0~~ mc 9-1
	B	8-0	8-1	8-2
	C	9-0	7 +1 baby	9-1
25	A	3-0	7-2	10
	B	9-0	7-2	10
	C	6-4	8-0	10 +1 baby
	A	9-1	9-0	9-1

20/95 Ending Counts L. variegatus EW01, EW02, CR-ECO1

When test vessels were removed 25-30 L. variegatus escaped

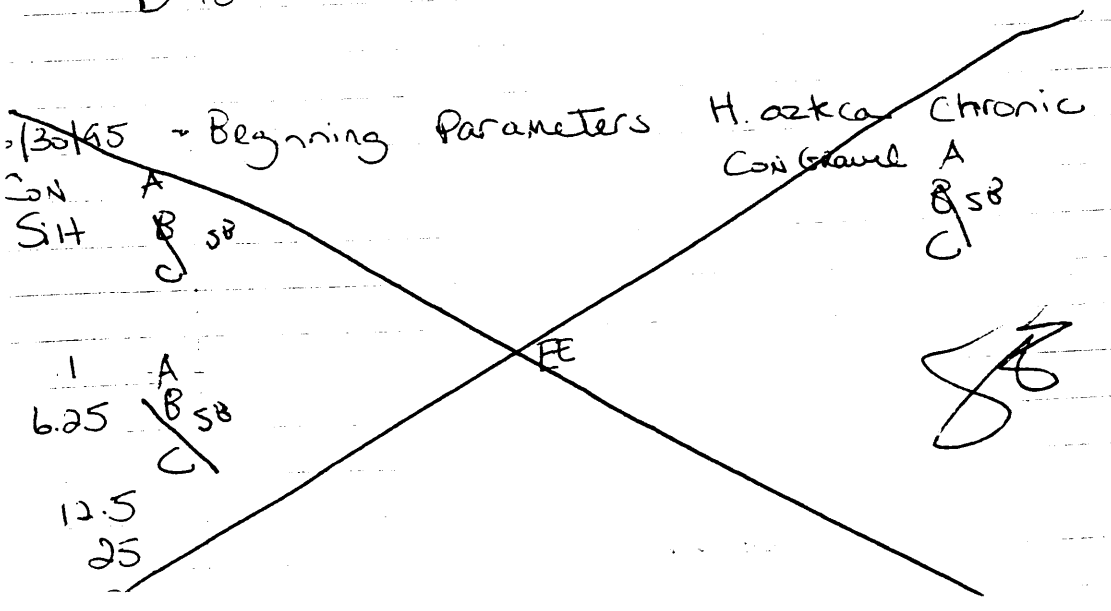
21	A	10
	B	10
	C	10
	D	10+
	A	10
	B	10+
	C	10
	D	10
6.25	A	10
	B	10
	C	10
	D	10
25	A	10
	B	10
	C	10
	D	7
25	A	10+
	B	10+
	C	10+
	D	10+
50	A	10+
	B	10+
	C	10+
	D	10+
100	A	10+
	B	10+
	C	10+
	D	10+

EW02

6.25	A	10
	B	10
	C	10
	D	10
12.5	A	10+
	B	10+
	C	10+
	D	10+
25	A	10+
	B	10+
	C	9
	D	10
50	A	10
	B	10
	C	10
	D	10
100	A	10
	B	10
	C	10
	D	10

CR-ECO1

6.25	A	10
	B	8
	C	10
	D	10
12.5	A	10+
	B	10
	C	10
	D	10
25	A	10+
	B	10+
	C	9
	D	6
50	A	9
	B	10
	C	10
	D	10
100	A	9
	B	10
	C	8
	D	10



6/30/95 Day 2 Parameters - Chronic EE06, EE07, EE08, and EE09

	D.O.	Temp
Lab Con	4.9	22.2
Well Con	3.1	26.0
6.25	2.3	24.2
12.5	0.8	25.5
25	0.6	26.0
50	0.7	22.4
100	0.4	25.4
6.25	1.9	24.5
12.5	5.1	23.0
25	0.5	26.0
50	0.4	26.4
100	4.4	22.8

	D.O.	Temp
EE08 6.25	2.2	25.8
12.5	0.8	22.2
25	0.6	26.0
50	5.2	22.8
100	1.9	23.4
EE09 6.25	1.4	25.2
12.5	0.8	26.2
25	0.7	26.2
50	2.7	25.8
100	4.4	26.2

Day 4 Parameters - EW01, EW02, and CR-EC01

	D.O.	Temp
~~Gravel~~		
Gravel Con		
Well Con		
EW01 6.25		
12.5		
25		
50		
100		
EW02 6.25		
12.5		
25		
50		
100		

	D.O.	Temp
CR-EC01 6.25		
12.5		
25		
50		
100		

5-B

Day 1

Tanks filled and fed YTC and leaf slurry.

Day 2 Parameters EE04, EE05, EE10, CR-EC02

		D.O.	Temp
Gravel Con		4.4	22°
Silt Con		4.5	23.2°
04	6.25	5.1	22.5°
	12.5	4.3	22°
	25	4.5	23°
	50	5.8	22.5°
	100	6.0	22.5°
05	6.25	7.4	22.3°
	12.5	4.7	22°
	25	5.2	22.5°
	50	3.5	22°
	100	5.6	22.8

		D.O	Temp.
EE10	6.25	6.0	22°
	12.5	5.8	21°
	25	6.2	21.8
	50	4.9	22.4
	100	6.6	22.3°
CR-EC02	6.25	3.7	22.8°
	12.5	3.7	22°
	25	5.2	22°
	50	1.8	22.4°
	100	6.4	22°

Day 1 Parameters EE01, EE02, EE03, EW03

		D.O.	Temp
Gravel Con		5.3	24°
1	6.25	4.4	23.5°
	12.5	6.0	23°
	25	5.2	23°
	50	5.6	23°
	100	6.6	24°
E02	6.25	4.6	24°
	12.5	4.6	24.3°
	25	4.4	23.5°
	50	4.5	24°
	100	5.6	23.5°

		D.O.	Temp
EE03	6.25	4.6	24.2°
	12.5	4.6	24.2°
	25	5.2	23.1°
	50	5.4	23.2°
	100	6.4	24°
EW03	6.25	4.3	23.5°
	12.5	3.9	23.5°
	25	4.7	23.5°
	50	3.8	23.6°
	100	5.1	24°

7-2-95 Day 4 Parameters EE06, 07, 08, 09

		Temp
Gravel con	3.5	22.0
Silt + con	3.5	23.8
EE06 6.25	1.0	23.2
12.5	0.6	24.0
25	0.5	24.0
50	0.6	23.8
100	3.6	23.8
E07 6.25	1.1	22.6
12.5	0.8	23.0
25	0.6	24.0
50	0.6	24.0

		Temp
EE08 6.25	1.2	23.8
12.5	1.1	21.9
25	0.4	23.6
50	1.0	22.0
100	.8	23.5
EE09 6.25	0.9	24.2
12.5	0.5	24.0
25	0.5	23.2
50	0.4	24.0
100	4.4	24.5

5

Day 4 Parameters EE04, EE05, EE10, CREC02

	DO	Temp
lcon	.5	22.3
con	3.5	22.8
6.25	.6	23.
2.5	.7	23
25	.4	22.8
50	.3	22.2
100	6.1	23.0
6.25	5.1	22.8
12.5	.5	23
25	.4	22.8
50	2.8	22.0
100	4.8	23.

	DO	Temp
EE10 6.25	5.2	22.2
12.5	3.3	22.0
25	3.3	23.0
50	.6	22.6
100	6.4	22.8
CR-EC02 6.25	3.4	23.0
12.5	2.3	22.8
25	.7	22.5
50	.3	22.8
100	4.8	23.2

Day 3 Parameters EE01, EE02, EE03, EW03

	DO	Temp
on	3.9	22.8
1 6.25	.9	21.8
.5	4.	22.0
25	1.1	22.2
50	2.6	21.8
100	5.9	22.5
2 6.25	2.6	22.5
12.5	3.2	22.8
25	1.5	22.2
50	.7	22.5
100	5.	23.

	DO	Temp
EE03 6.25	.9	22.8
12.5	2.6	21.8
25	.5	22.5
50	3.5	23.0
100	5.9	22.5
EW03 6.25	.2	21.8
12.5	1.	21.8
25	.9	21.8
50	.5	23.
100	2[illegible].4	23.

-95

Parameters Day ~~5~~ 6 MAR Parameters EE06, EE07, EE08, EE09

	DO	Temp
+R		
uel con	2.0	23.0
+ con	2.0	23.0
6 6.25	2.1	22.2
12.5	1.3	23.0
25	2.2	23.0
50	1.8	22.5
100	4.1	23.0
7 6.25	2.4	22.0
12.5	2.3	22.2
25	2.3	22.0
[illegible]	[illegible]	[illegible]

	DO	Temp
EE08 6.25	4.2	22.2
12.5	1.6	23.0
25	1.6	22.8
50	1.4	23.0
100	4.0	23.0
EE09 6.25	1.3	23.2
12.5	1.5	23.2
25	1.0	24.0
50	.7	24.0
100	5.1	24.2

7/5/95 Day 7 Parameters - EE06, EE07, EE08, EE09

LJT	G Con	EE06	EE07	EE08	EE09	S Con
	5.0	4.2	4.4	5.2	4.3	5.0
6.25%	7.24	7.22	7.47	7.70	7.47	7.33
nd	415	394	353	338	369	336
mp	23.0	23.0	22.8	22.5	23	22.8
)		4.2	4.5	5.2	4.2	
		7.33	7.33	7.43	7.41	
12.5%		413	573	362	368	
nd		22.8	22.8	22.6	22.8	
mp		4.3	4.3	4.8	3.8	
)		7.35	7.35	7.29	7.37	
25%		387	431	383	341	
nd		22.6	22.8	22.8	23	
mp		4.6	4.4	4.4	4.0	
)		7.24	7.32	7.46	7.36	
50%		417	547	367	380	
nd		22.6	23	22.8	23	
mp		5.9	5.5	5.4	5.2	
O		(LJT)	(LJT)			
H 100%		8.05 ~~346~~	7.96 ~~371~~	7.87	7.98	
		346	371	352	355	
mp		23	23	22.8	23.2	

*Day 7 Parameters were measured outside the testing chamber

Day 6 Parameters - EE04, EE05, EE10, CR-ECO2

LJT	G Con	EE04	EE05	EE10	CR-ECO2	S. Con
DO 6.25	0.6	1.0	1.2	1.3	1.6	1.0
temp	24.0	23.6	23.6	23.8	23.8	23.0
DO 12.5		1.2	1.2	1.5	2.0	
temp		23.5	23.6	24.0	23.8	
DO 25		1.7	1.0	0.6	1.8	
temp		24.0	23.8	24.6	24.0	
DO 50		1.6	1.1	1.1	2.1	
Temp		23.8	23.6	24.2	24.0	
DO 100		4.2	3.6	5.0	4.6	
temp		24.0	23.8	24.0	24.2	

7-6-95 Calibrated DO and pH meters.
LJT Beginning parameters for EW01, EW02 and CR-EC01 - Chronic Hatchery

	G. Con	EW01	EW02	CR-EC01	S. Con
DO	8.6	8.4	8.4	8.3	8.5
pH 6.25	8.02	8.24	8.28	8.36	8.25
Cond	438	335	339	443	352
Temp	—	—	—	—	—
DO		8.4	8.5	8.3	
pH 12.5		8.28	8.33	8.41	
Cond		338	343	412	
Temp		—	—	—	
DO		8.3	8.5	8.3	
pH 25		8.27	8.34	8.42	
Cond		343	346	418	
Temp		—	—	—	
DO		8.4	8.6	8.4	
pH 50		8.19	8.35	8.44	
Cond		349	349	419	
Temp		—	—	—	
DO		8.4	8.6	8.4	
pH 100		8.27	8.30	8.44	
Cond		~~39~~ LJT 352	335	391	
Temp		—	—	—	

Day 8 Parameters - EE06, EE07, EE08, EE09

	G. Con	EE06	EE07	EE08	EE09	S. Con
DO 6.25	1.2	.9	1.2	2.7	1.3	1.2
Temp	21.5	22.0	21.2	21.2	21.8	21.8
DO 12.5		.5	2.1	1.1	.9	
Temp		21.0	21.2	21.0	21.8	
DO 25		1.7	1.0	.4	.7	
Temp		21.5	21.0	21.2	21.0	
DO 50		1.4	.7	.3	.6	
Temp		22.2	21.0	21.0	22.0	
DO 100		4.2	5.4	4.3	4.6	
Temp		21.8	21.0	21.0	22.0	

11-7-95 Day 7 - Parameters EE01; EE02, EE03 and EW03

LST	G Con	EE01	EE02	EE03	EW03
	6.1	5.3	6.0	5.8	6.2
6.25	8.37	8.23	8.31	8.40	8.36
nd	414	400	427	408	410
mp	22.2	22.0	22.2	22.2	22.0
		6.0	6.0	6.0	6.4
12.5		8.31	8.29	8.41	8.33
nd		405	415	410	415
mp		22.0	22.0	22.2	21.8
)		6.2	6.1	6.2	6.4
25		8.27	8.32	8.40	~~8.4~~ 8.35
nd		396	407	415	407
mp		22.2	22.2	22.0	21.9
)		6.4	6.3	6.1	6.6
50		8.34	8.35	8.39	8.33
nd		383	400	406	399
mp		22.0	22.4	21.9	22.0
)		6.6	6.5	6.4	6.8
100		8.36	8.39	8.43	8.38
nd		360	388	392	382
mp		22.2	22.2	22.0	22.0

Day 7 parameters outside test chamber.

Day 9 Parameters EE06, EE07, EE08, EE09

	G.Con	EE06	EE07	EE08	EE09	S. Con
DO 6.25	1.6	1.0	0.8	2.0	0.6	1.0
Temp	20.6	20.6	20.4	21.2	21.2	21.0
DO 12.5		0.6	0.6	1.1	0.7	
Temp		21.0	22.0	22.4	21.8	
DO 25		1.0	1.0	0.5	1.8	
Temp		23.0	21.8	21.0	21.8	
DO 50		0.9	0.8	0.8	1.0	
Temp		20.4	21.4	23.2	22.0	
DO 100		4.5	4.1	4.8	4.2	
Temp		21.0	22.0	21.8	21.6	

7-8-95 LJT Calibrated DO meter, filled tanks with filtered Spring water and fed leaf slurry and Tetramin slurry/Algae mix. Measurements taken just after cycle

Day 10 Parameters for EE06, EE07, EE08 and EE09

	G Con	EE06	EE07	EE08	EE09	S Con
DO 6.25	1.3	1.1	1.0	1.3	0.8	1.1
Temp	21.8	21.6	21.4	21.2	21.0	21.4
DO 12.5		0.9	0.8	1.1	1.0	
Temp		21.5	21.4	21.4	21.4	
DO 25		1.3	1.1	1.0	1.2	
Temp		21.8	21.6	21.0	21.2	
DO 50		1.5	1.0	0.9	1.0	
Temp		21.6	21.2	21.2	21.4	
DO 100		4.6	4.3	5.0	4.6	
Temp		21.4	21.0	21.4	21.4	

Day 9 Parameters for EE04, EE05, EE10 and CR-EC02

	G Con	EE04	EE05	EE10	CR-EC02	S Con
DO 6.25	1.5	0.6	0.9	1.1	1.0	1.1
Temp	21.0	21.2	21.2	21.4	21.0	21.2
DO 12.5		1.0	1.0	1.2	1.0	
Temp		21.2	21.0	21.2	21.2	
DO 25		0.8	1.1	1.0	1.2	
Temp		21.0	21.0	21.4	21.0	
DO 50		0.6	1.0	1.0	1.4	
Temp		21.4	21.2	21.6	21.0	
DO 100		4.2	5.6	4.7	5.3	
Temp		21.0	21.2	21.2	21.0	

Day 8 Parameters - EE01, EE02, EE03 and EW03

	G Con	EE01	EE02	EE03	EW03
DO 6.25	1.0	1.2	0.8	1.0	0.8
Temp	21.0	20.8	21.2	21.0	21.2
DO 12.5		1.2	1.0	0.8	0.8
Temp		21.0	21.2	21.2	21.4
DO 25		1.0	1.1	0.9	1.0
Temp		21.0	21.0	21.4	21.2
DO 50		0.8	0.8	1.2	1.0
Temp		21.4	21.2	21.2	21.2
DO 100		6.2	6.0	5.6	4.2

7-9-95 Day 11 Parameters - EE06, EE07, EE08 and EE09

LJT	G.Con	EE06	EE07	EE08	EE09	S Con
6.25	2.0	1.6	1.4	2.0	1.5	1.8
~~mp~~	22.0	22.2	22.2	22.0	22.0	~~22.~~ 2
O 12.5		1.6	1.6	1.8	1.5	
mp		22.2	22.0	22.1	22.2	
O 25		1.8	1.6	1.6	1.3	
mp		22.0	22.2	22.2	22.2	
O 50		1.4	1,4	2.1	1.2	
mp		22.4	22.2	22.2	22.4	
O 100		4.5	4.8	4.7	5.1	
mp		22.2	22.2	22.0	22.2	

Day 10 Parameters - EE04, EE05, EE10 and CR-EC02

	G.Con	EE04	EE05	EE10	CR-EC02	S Con
O 6.25	1.8	1.6	2.0	1.8	2.2	1.6
mp	22.4	22.6	22.4	22.2	22.4	22.4
O 12.5		1.8	2.2	1.8	2.4	
		22.8	22.6	22.4	22.2	
O 25		1.6	1.8	2.0	2.0	
mp		22.8	22.4	22.4	22.4	
O 50		1.4	1.6	1.8	1.9	
Temp		22.8	22.6	22.6	22.6	
DO 100		6.3	5.8	6.1	6.4	
Temp		22.6	22.6	22.4	22.2	

Day 9 Parameters - EE01, EE02, EE03 and EW03

	G.Con	EE01	EE02	EE03	EW03
DO 6.25	2.0	2.4	2.5	2.3	2.5
Temp	23.0	23.1	23.0	23.0	23.0
DO 12.5		2.2	2.8	2.5	2.3
Temp		22.8	23.0	23.2	22.8
DO 25		2.2	3.0	2.3	2.3
Temp		22.8	23.2	23.2	23.0
O 50		2.0	2.8	2.2	2.0
Temp		23.1	22.8	23.0	23.2
DO 100		6.3	5.9	6.0	5.7
Temp		23.0	23.0	23.2	23.2

7-16-95 DO & pH meters and Cond. Meter calibrated, filled tanks with filtered spring water and fed leaf slurry and tetramin/Algae slurry.

Day 12 Parameters - EE06, EE07, EE08, EE09

	G.Con	EE06	EE07	EE08	EE09	S.Con
6.25	1.0	0.6	0.6	0.8	0.9	1.0
mp	24.6	24.6	24.0	24.4	24.0	23.0
12.5		0.8	0.7	1.0	1.0	
mp		24.4	23.4	23.4	24.2	
25		0.6	1.0	1.0	0.8	
mp		24.6	24.0	24.0	24.4	
50		1.0	1.3	1.0	1.2	
mp		24.0	24.4	24.0	23.8	
100		1.2	1.9	4.3	2.4	
mp		24.4	24.2	23.4	23.6	

Day 12 Parameters

	G.Con	EE06	EE07	EE08	EE09	S.Con
6.25	~~7.0~~ 7.69	8.47	7.44	7.65	7.44	7.50
Cond	~~24.6~~ 436	388	385	390	397	375
pH 12.5		7.52	7.40	7.39	7.41	
Cond		418	399	411	345	
pH 25		7.42	7.40	7.29	7.35	
Cond		458	407	423	411	
pH 50		7.33	7.45	7.41	7.51	
Cond		486	412	400	390	
pH 100		8.08	8.32	7.44	8.04	
Cond		371	384	383	375	

10-95 Day 10 Parameters - EE01, EE02, EE03 and EW03

	G. Con	EE01	EE02	EE03	EW03
	1.0	2.3	2.5	3.0	2.6
6.25	7.06	7.21	7.29	7.23	7.50
	387	454	444	595	398
	25.2	24.8	25.0	25.2	25.0
		2.5	2.4	2.6	2.8
12.5		7.47	7.46	7.05	7.26
		345	343	465	794
		25.0	25.2	25.0	24.8
		2.4	2.5	3.0	3.0
25		7.43	7.46	7.15	7.32
		462	371	752	466
		25.0	25.0	25.0	25.0
		3.6	4.0	4.4	4.2
50		7.55	7.45	6.98	7.51
		394	418	713	426
		25.2	24.8	25.2	25.2
		6.2	6.1	6.0	6.3
100		8.64	8.30	8.21	8.11
		362	377	384	385
		25.2	25.2	25.0	24.8

11-11-95 Filled tanks with filtered Spring water and fed leaf slurry, tetramin and algae mix. Calibrated DO meter.

Day 13 Parameters - EE06, EE07, EE08, EE09

		G.Con	EE06	EE07	EE08	EE09	S.Con
DO	6.25	1.1	0.9	0.8	0.5	1.2	0.7
Temp		24.1	23.0	23.5	23.8	22.5	22.9
DO	12.5		0.8	1.0	0.7	1.5	
Temp			22.5	23.9	23.7	22.5	
DO	25		0.6	0.5	0.8	0.6	
Temp			22.9	23.5	22.2	22.5	
DO	50		0.7	0.8	1.7	0.8	
Temp			23.9	22.8	23.9	22.8	
DO	100		4.0	3.9	4.0	4.8	
Temp			22.5	23.9	24.2	22.5	

Day 12 Parameters - EE04, EE05, EE10 and CR-EC02

		G.Con	EE04	EE05	EE10	CR-EC02	S.Con
DO	6.25	1.0	0.8	1.0	0.5	0.6	0.4
p		21.9	21.8	22.0	21.8	21.5	21.9
DO	12.5		0.5	1.8	0.4	0.5	
Temp			22.0	22.0	21.8	22.0	
DO	25		0.8	0.7	0.6	0.6	
Temp			22.5	22.2	21.8	21.8	
DO	50		1.2	0.6	1.4	0.5	
Temp			21.7	21.9 ~~29.0~~ sew	22.1	22.1	
DO	100		6.7	6.2	5.6	5.5	
Temp			22.5	22.0	22.5	21.8	

5/0 Filled tanks with filtered Spring H_2O and fed leaf slurry, tetramin and algae mix. Calibrated DO meter.

Day 14 Parameters - EE06, EE07, EE08, EE09

	G.con	EE06	EE07	EE08	S.con	EE09
	07	0.8	0.9	0.6	07	0.6
6.25	23.8	22.1	22.1	22.9	22.4	22.9
	8.02	7.95	7.82	7.65	7.92	7.83 MAR
	411	416	417	433	374	~~374~~ 431
		0.9	0.9	1.3		1.0
		22.2	22.1	22.7		23.0
12.5		7.84	7.78	7.86		8.01
		435	418	413		410
		1.0	0.8	0.6		1.0
25		22.2	23.0	22.7		23.2
		7.88	7.86	7.90		7.68
		422	446	419		578
		0.8	0.9	2.1		1.2
50		22.1	22.9	23.8		22.1
		7.83	8.05	7.97		8.08
		461	764	415		422
		3.5	4.0	4.2		3.7
100		22.3	22.2	23.0		22.8
		8.32	8.48	8.52		8.39
		~~414~~ MAR 386	414	396		414

note: E3 25 had high conductivity noticed black color

MAR

7-12-95 Dayle Parameters - EWO1, EWO2, CR-ECO1

wens	G.con.	EWO1	EWO2	CR-ECO1	S.con
	0.5	0.6	1.0	0.6	1.0
0.25	23.6	23.2	23.0	23.4	24.0
	8.12	8.00	8.08	8.12	8.13
	533	389	390	419	394
		0.7	0.6	0.5	
P 12.5		23.0	23.3	23.9	
		7.96	8.04	8.07	
		394	385	420	
		0.9	0.5	0.9	
P 25		23.2	23.6	23.0	
		8.03	7.83	8.05	
		405	396	417	
		1.5	0.6	0.7	
P 50		23.0 ~~1.5 SEW 7.8~~	23.2	23.2	
		~~23.0~~ 7.85	7.91	8.08	
		412	404	418	
		2.2	3.7	5.4	
P 100		23.7	23.1	23.0	
		8.16	8.26	8.44	
		388	388	391	

MA

13-95 Day 13 Parameters - EEO1, EEO2, EEO3, EWO3

	G.con	EEO1	EEO2	EEO3	EWO3
6.25	.3	.4	~~1.6~~ .6	1.0	.9
	24.0	24.0	24.2	25	24.6
12.5		.8	.8	.8	1.0
		24.2	25.0	25.0	25
25		.3	.3	.7	.6
		24.0	24.0	24.2	24.0
50		1.0	.7	1.1	1.0
		25.1	24.0	24.6	25.0
100		6.2	5.5	2.4	5.0
		24.6	24.0	24.6	25.0

Day 7 Parameters - EWO1, EWO2, CR-ECO1

	G.con	EWO1	EWO2	CREC01	S.con
6.25	.4	1.1	.8	.4	.4
	24.8	24.4	24.6	24.8	24.6
12.5		.4	.5	.3	
		24.6	24.8	24.8	
25		.7	.6	.5	
		24.4	24.8	24.6	
50		.5	.5	1.0	
		24.6	24.8	24.6	
100		1.4	3.4	4.1	
		24.4	24.5	24.6	

MAR

4-95 Day 15 parameters - EE04, EE05, EE10, CR-EC02

	G.con	EE04	EE05	EE10	CR-EC02	S.con
	0.8	1.1	0.9	0.8	0.8	~~1.3~~ 0.8 SEW
6.25	26.9	26.9	27.0	27.0	26.7	26.8
	7.79	7.98	8.09	7.79	7.68	7.97
	437	451	400	388	407	374
		1.0	0.8	0.8	0.8	
12.5		26.9	26.5	26.8 ~~SEW~~	26.9	
		8.01	7.86	7.96	7.71	
		431	413	389	419	
		1.0	0.9	1.7	0.8	
25		26.8	26.9	26.5	26.9	
		7.85	7.79	7.98	7.66	
		421	408	384	431	
		0.6	1.8	0.7	0.7	
50		26.9	26.8	26.9	26.8	
		7.95	8.16	7.80	7.67	
		413	406	411	444	
		5.8	5.4	5.4	5.8	
100		26.8	26.9	27.0	26.8	
		8.54	8.48	8.39	8.47	
		378	373	337	379	

Day 14 Parameters - EE01, EE02, EE03, EW03

	G.con	EE01	EE02	EE03	EW03
	0.8	1.1	0.6	0.6	0.9
6.25	26.2	25.9	26.3	26.2	26.4
	7.95	7.91	7.93	8.12	8.04
	465	479	406	398	414
		0.8	0.9	0.7	0.9
12.5		26.2	26.6	26.1	25.8
		8.17	7.79	8.08	8.05
		400	408	401	405
		0.6	0.8	0.6	1.7
25		25.9	26.0	26.2	25.5
		8.01	8.13	7.81	7.84
		405	416	732	421
		1.0	0.7	1.3	1.3
50		25.7	26.2	26.2	26.6
		8.16	7.74	8.13	7.72
		401	433	445	450
		6.3	5.6	6.4	5.4
100		25.9	25.8	26.2	26.7

5 Parameters Day 9 - EWO1, EWO2, CREC01

G.CON	EWO1	EWO2	CREC01	S.CON
.3	1.3	.7	.5	.7
23.0	22.8	23.2	23.2	23.0
	.5	.7	.5	
	24.2	24.2	24.2	
	1.9	.1	~~.5~~ .6 MAX	
	23.2	24.0	23.2	
	.6	.5	.9	
	24.2	24.2	23.0	
	2.6	3.9	4.0	
	23.0	23.8	23.0	

MAR

4t Parameters Day 10 - Ewo1, Ewo2, CR-Eco1

	G.cor	Ewo1	Ewo2	CR-Eco1	S.con
.25	.4	1.1	1.1	.6	1.2
	23.8	24.0	23.5	23.8	24.0
.5		.2	1.0	1.0	
		23.4	23.8	24.0	
25		1.8	1.2	.7	
		23.5	24.0	23.6	
50		1.0	.2	1.4	
		23.8	23.8	23.5	
100		4.0	5.1	6.4	
		24.0	23.5	23.5	

MAK

-95 Parameters Day 11 - EW01, EW02, CR-EC01

	G con	EW01	EW02	CR-EC01	S.con
0.25	.4	.7	1.5	.7	1.0
	23.8	23.8	23.2	23.8	23.8
12.5		.9	1.2	1.1	
		23.2	24.0	23.6	
25		.7	.9	.5	
		23.5	23.8	23.8	
50		1.2	1.2	.6	
		24.0	23.6	23.5	
100		6.1	5.7	7.3	
		23.8	23.2	23.0	

Parameters Day 19 - EE06, EE07, EE08, EE09,

	G.con	EE06	EE07	EE08	EE09	S.con
6.25	7.82	7.68	7.90	8.06	7.71	~~7.82~~ 7.6
	478	415	382	374	393	~~478~~ 413
12.5		7.54	7.57	7.81	7.63	
		410	402	388	398	
25		7.64	7.61	7.66	7.60	
		412	402	402	407	
50		7.61	7.91	7.70	7.51	
		418	392	398	440	
100		8.07	8.34	8.33	8.51	
		391	378	377	411	

Parameters Day 13 - EE04, EE05, EE10, CR-EC02

	G.con	EE04	EE05	EE10	CR-EC02	S con
6.25	8.0	7.96	8.19	7.79	7.89	7.87
	411	411	385	391	393	378
12.5		7.94	7.94	7.90	7.77	
		585	392	387	400	
25		8.04	7.96	7.90	7.67	
		400	388	382	409	
50		8.02	8.09	7.72	7.81	
		396	384	409	419	
100		8.43	8.43	8.30	8.38	
		378	373	375	375	

8-95 Tanks filled with Spring H_2O, fed leaf slurry, algae and tetramin mix.

Parameters Day 20 - EE06, EE07, EE08, EE09

	G.con	EE06	EE07	EE08	EE09	S.con
6.25	.3	.6	1.5	5.1	.3	.2
p	21.0	22.8	~~2.0~~ 22.8 mmR	22.5	22.0	23.0
12.5		1.0	1.5	.4	1.5	
np		23.0	22.6	22.0	22.8	
25		.7	.9	.6	1.0	
np		23.0	22.8	21.0	21.0	
50		2.3	2.0	1.1	1.9	
p		22.5	23.0	21.5	22.0	
100		5.1	mmR ~~2.3~~ 4.1	5.1	4.6	
np		22.5	22.5	22.3	22.8	

Parameters Day 19 - EE04, EE05, EE10, CR-EC02

	G.con	EE04	EE05	EE10	CR-EC02	S.con
6.25	.8	.6	.4	.5	1.2	.7
np	23.4	24.0	24.0	24.0	23.2	23.5
12.5		.6	1.0	.5	.6	
np		23.0	23.0	23.8	24.0	
25		mmR .4	.5	.7	.5	
np		23.0	24.0	23.0	23.8	
50		.4	.5	.4	.6	
p		23.6	23.0	23.5	23.5	
100		7.2	5.5	5.4	6.4	
p		23.2	24.2	23.8	23.2	

Parameters Day 18 - EE01, EE02, EE03, EW03

	G.con	EE01	EE02	EE03	EW03
6.25	.2	.1	.3	1.4	3.3
mp	22.5	22.0	22.5	23.0	22.0
12.5		.1	.6	.8	.5
np		22.5	23.4	22.8	23.4
25		.1	1.0	.1	.2
np		22.0	22.2	22.6	22.0
50		2.0	.2	3.3	3.0
np		22.0	22.5	22.4	23.0
100		6.4	5.9	6.3	5.4
np		22.4	22.4	22.0	23.0

-19-95 Filled tanks with filtered spring water and fed leaf slurry and algae/tetramin slurry mix.

Parameters Day 21 - EE06, EE07, EE08 and EE09

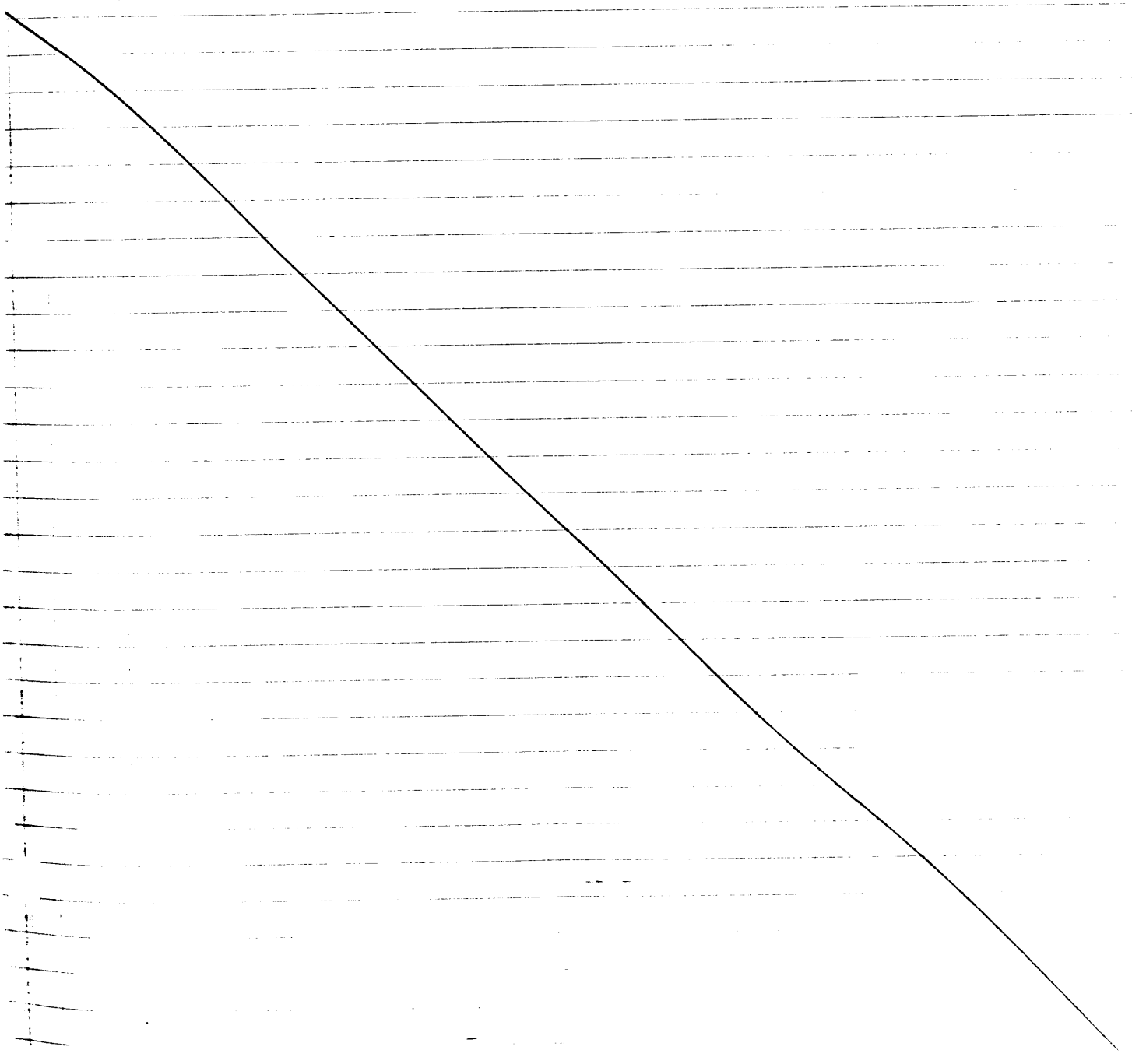
	G Con	EE06	EE07	EE08	EE09	SCo
DO	0.9	0.8	0.8	0.5	0.8	1.
Temp 6.25	23.2	21.0	20.8	21.8	22.0	21.
pH	7.54	7.45	7.56	7.41	7.55	7.5
Cond	404	384	387	400	397	38
DO		0.6	0.9	1.1	0.7	
Temp 12.5		21.0	21.0	21.6	23.0	
pH		7.39	7.52	7.49	7.51	
Cond		400	395	395	393	
DO		0.5	0.8	0.6	0.4	
Temp 25		21.0	22.2	21.6 JT	22.0	
pH		7.47	7.53	~~7.49~~ 7.59	7.29	
Cond		398	410	396	561	
DO		1.0	0.7	1.0	1.2	
Temp 50		21.2	22.0	21.4	23.0	
pH		7.37	7.56	7.63	7.60	
1		438	657	394	431	
DO		4.3	3.1	5.8	3.9	
Temp 100		21.2	22.8	22°	22.0	
pH		7.96	8.11	8.21	8.14	
Cond		383	421	389	414	
		JT ~~385~~				

7-19-95 Day 13 Parameters - EW01, EW02 and CR. EC01

	G. Con	EW01	EW02	CR. EC01	S. Con
	0.5	0.4	0.9	0.7	0.4
6.25	22.0	22.4	22.0	22.4	22.0
	~~8.10~~ 7.56	7.32	7.52	7.61	7.22
d	367	346	369	393	371
		0.7	1.1	1.0	
p 12.5		22.2	22.2	22.8	
		7.21	7.26	7.61	
d		381	383	392	
		1.1	0.7	0.5	
p 25		22.4	22.0	22.2	
		7.32	7.46	7.60	
d		376	375	405	
		0.7	1.2	1.7	
" 50		21.6	22.2	22.0	
		7.11	7.63	7.68	
d		442	379	397	
		3.3	4.8	5.0	
" 100		22.1	22.4	22.4	
		7.76	7.99	8.10	
d		373	373	372	

7-20-95 Day 14 Parameters - EW01, EW02, and CR-EC01

	G.Con	EW01	EW02	CR-EC01	S. Con
6.25	0.8	0.5	0.6	0.8	0.6
	22.2	22.4	22.0	22.2	22.6
12.5		0.6	0.8	0.9	
mp		22.2	22.2	22.4	
25		0.6	0.7	0.8	
mp		22.4	22.6	22.4	
50		0.8	1.4	1.8	
mp		22.4	22.4	22.6	
100		4.3	5.2	4.7	
mp		22.0	22.4	22.4	



LJT

Day 22 Parameters - EE04, EE05, EE10, & CR-ECO2

	G.CON	EE04	EE05	EE10	CR-ECO2	S.CON
	0.8	1.8	2.8	1.7	0.9	2.6
	21.8	22.3	22.7	22.3	21.8	21.8
6.25	7.91	7.85	7.93	7.70	7.79	7.93
	311	380	353	350	352	300
		0.9	0.7	0.8	1.8	~~300~~
12.5		23.1	21.7	21.8	22.3	
		7.58	7.77	7.73	7.53	
1		504	353	351	380	
		2.7	2.7	0.6	0.3	
P 25		22.2	22.2	21.7	22.0	
		7.87	7.97	7.91	7.73	
d		380	360	348	365	
		6.2	3.4	1.8	0.8	
50		21.9	21.9	22.3	21.9	
		8.18	8.01	7.54	7.60	
d		351	320	377	384	
		5.8	7.2	3.8	5.2	
P 100		21.8	22.2	21.7	21.9	
		8.17	8.32	8.22	8.14	
nd		341	340	358	347	

Day 21 Parameters - EE01, EE02, EE03, EW03

	G.CON	EE01	EE02	EE03	EW03	~~S.CON~~
	2.2	1.3	0.7	0.8	1.0	
P 6.25	23.0	22.3	23.0	23.0	22.8	
	7.94	7.59	7.64	7.81	7.89	
d	354	450	496	397	367	
		1.1	1.0	0.7	0.7	
P 12.5		23.2	23.1	22.3	22.7	
		7.84	7.83	7.77	7.62	
nd		394	380	387	470	
0		0.8	0.7	0.7	0.8	
mp 25		22.5	22.2	22.3	23.0	
4		7.83	7.54	7.64	7.68	
nd		387	419	421	415	
0		0.7	1.1	0.7	0.5	
14 50		22.8	22.8	23.0	23.0	
		7.91	7.90	7.69	7.87	
nd		369	378	422	377	
0		6.1	5.7	6.8	5.5	
mp 100		22.9	23.0	22.5	23.2	
					8.26	

7-22-96

Day 24 Parameters EE06, EE07, EE08 and EE09

	G.Con	EE06	EE07	EE08	EE09	SCON
O 6.25	0.5	0.7	0.7	0.9	0.6	0.3
mp	22.4°	22.2°	22.2°	22.2°	22.2°	22°
O 12.5		0.5	0.4	0.3	0.6	
mp		21.8°	22.8°	21.8°	22.5°	
O 25		0.7	0.5	0.7	1.7	
mp		22.4°	22°	22°	21.9°	
O 50		0.3	0.6	0.4	0.4	
mp		22.8°	21.9°	21.8°	22.4°	
O 100		3.9	4.4	4.4	3.8	
mp		22.4°	22.1°	22.4°	22.2°	

Day 23 Parameters EE04, EE05, EE10, ER-EC02

	G Con	EE04	EE05	EE10	ER-EC02	SCON
O 6.25	0.9	1.4	1.7	0.5	1.4	0.9
p	24.1	24°	24.1°	24.0°	24°	24°
O 12.5		1.2	1.8	0.8	1.4	
		24.3°	23.6°	24°	24°	
O 25		1.9	1.8	1.2	1.4	
mp		23.8°	23.9°	22.7°	23.8°	
O 50		0.6	2.8	1.9	0.5	
p		24.2°	23.9°	24.0°	24°	
O 100		6.2	5.6	6.1	7.2	
mp		24°	24.1°	24.0°	24°	

Day 22 Parameters EE01, EE02, EE03, EW03

	G Con	EE01	EE02	EE03	EW03	SCON
O 6.25	0.4	0.6	0.3	1.5	0.8	X
mp	23.8°	23.5°	23.8°	24.1°	23.7°	
O 12.5		1.1	0.3	0.4	0.6	
mp		23.8°	24.2°	24.3°	23.1°	
O 25		1.0	0.6	0.5	0.3	
mp		23.4°	23.7°	23.7°	23.5°	
O 50		2.6	0.4	1.5	0.3	
p		23.2°	23.9°	23.7°	24.2°	
O 100		6.2	5.5	6.3	5.1	
mp		24°	23.8°	24°	24°	

7-23-95 MH

Day 25 Parameters EE06, EE07, EE08, & EE09

	Gravel Control	EE06	EE07	EE08	EE09	Silt Control
6.25%	0.8 22.5	0.9 22.5	0.7 22.2	0.9 22.5	1.0 22.5	0.8 22.5
12.5%		1.0 22.2	0.9 22.2	0.8 22.2	1.1 22.5	
25%		0.6 22.5	1.0 22.2	0.8 22.5	1.7 22.5	
50%		1.8 23.0	2.3 22.8	2.5 22.5	1.3 22.5	
100%		5.6 22.5	6.0 22.5	4.8 22.5	4.2 22.5	

Day 24 Parameters EE04, EE05, EE10 & CR-EC-02

	Gravel Control	EE04	EE05	EE10	CR-EC-02	Silt Control
6.25%	1.2 24.2	1.5 24.0	1.8 24.0	0.8 24.0	1.3 24.0	1.0 24.0
12.5%		1.6 23.9	1.3 24.0	1.7 24.0	2.0 24.0	
25%		2.1 24.0	2.0 24.0	1.8 23.5	2.3 24.0	
50%		2.3 24.2	3.0 23.8	2.1 24.0	1.7 24.0	
100%		4.9 24.0	5.0 24.5	5.0 24.0	5.4 24.0	

Day 23 Parameters EE01, EE02, EE03 & EW03

	Gravel Control	EE01	EE02	EE03	EW03
6.25%	1.8 23.5	0.6 23.0	0.4 23.2	0.9 23.5	1.0 23.2
12.5%		1.1 23.5	0.7 23.5	0.5 23.2	1.3 23.2
25%		1.8 23.8	0.6 23.5	1.2 23.5	0.9 23.5
50%		1.5 23.5	2.2 23.8	1.9 24.0	2.3 23.5
100%		6.1 24.0	5.5 23.8	5.7 23.8	5.9 23.8

24-95 ~~Day~~ POST Day 26 Parameters EE06, EE07, EE08, and EE09

	G. Con	EE06	EE07	EE08	EE09	S. Con
	1.4	0.6	0.9	2.4	0.9	0.4
25	21.2	21.0	21.0	21.8	22.4	22.0
	7.51	7.35	7.41	7.28	7.28	7.41
____	363	362	357	381	385	346
		0.7	0.8	1.0	1.2	
12.5		21.0	21.0	21.0	23.8	
		7.23	7.39	7.04	7.29	
____		372	366	488	396	
		1.1	2.2	1.2	1.8	
25		21.0	23.0	22.0	22.2	
		7.28	7.28	7.30	7.01	
____		371	385	381	521	
		0.5	0.7	1.3	1.6	
50		21.5	22.2	21.0	23.0	
		7.29	7.34	7.42	7.51	
____		391	473	368	378	
		3.2	4.1	6.8	4.5	
100		21.8	24.0	22.5	23.0	
		7.66	7.81	8.07	8.01	
____		354	363	361	373	

Tanks filled with filtered spring water and fed algae + Tetramin slurry and leaf slurry.

Calibrated DO + pH meters.

CJT

24-9.5 Day 18 Parameters - EW01, EW02 and CR-EC01

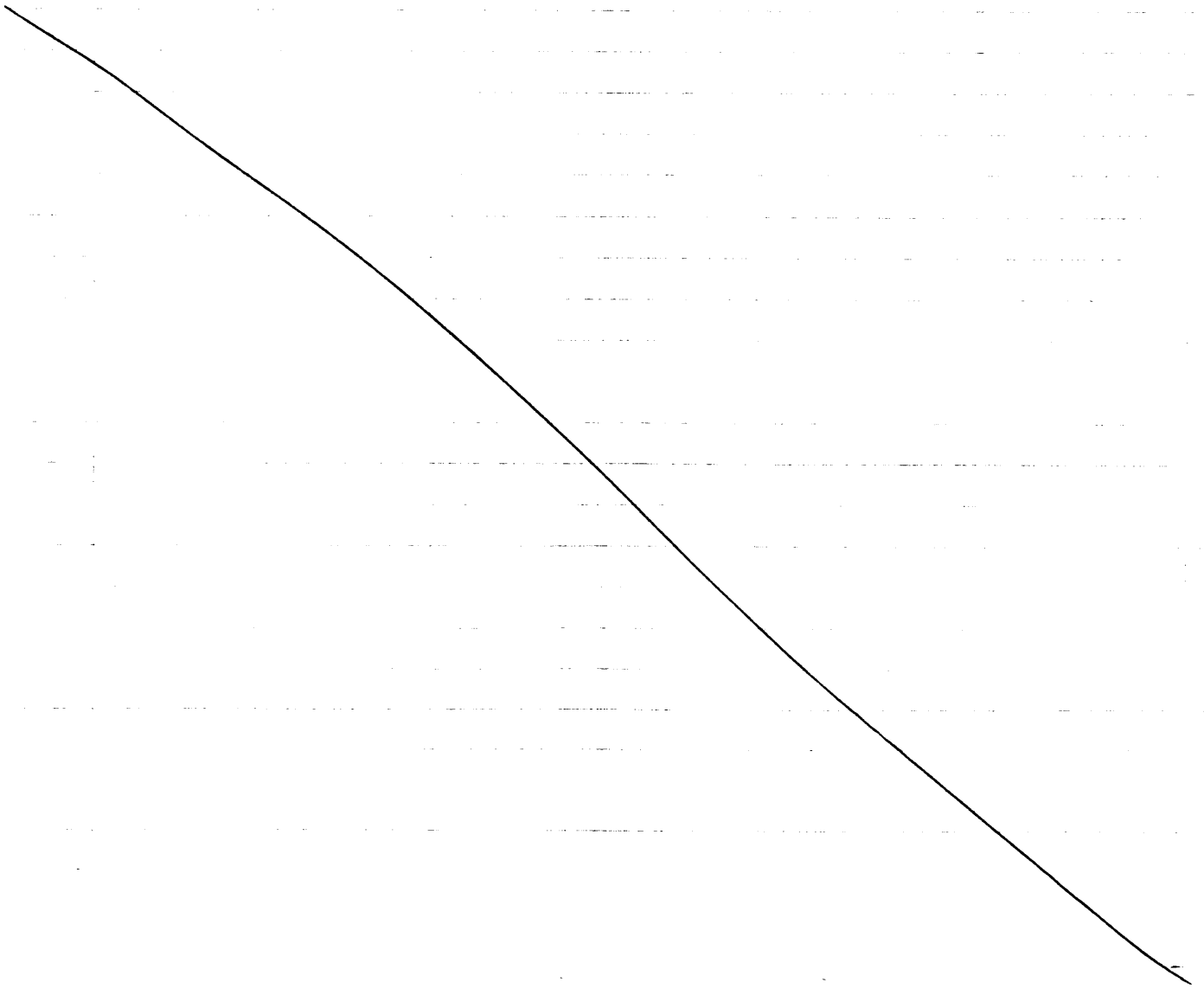
	G. Con	EW01	EW02	CR-EC01	S. Con
	1.1	0.7	1.1	0.7	0.9
b. 25	23.0	23.0	23.0	23.2	23.0
	7.64	7.45	7.64	7.74	7.39
d	389	362	353	365	347
		1.2	0.6	0.8	
p 12.5		23.0	23.0	23.0	
		7.29	7.29	7.67	
d		366	370	368	
		0.8	1.3	1.1	
mp 25		23.0	22.5	23.0	
I		7.34	7.43	7.56	
nd		360	354	379	
O		0.9	0.6	1.0	
mp 50		23.2	23.0	23.4	
H		7.06	7.44	7.61	
ond		422	360	375	
O		3.7	5.4	5.8	
emp 100		23.0	23.0	23.0	
		7.36	8.06	8.10	
ond		351	343	349	

,595 Day 19 - Parameters - EW01, EW02, & CREC01

ILS	Gravel Con	EW01	EW02	CREC01	SC
P 6.25	24.0	24.2	23.0	23.8	24.0
—	0.8	1.7	1.0	2.2	2.0
12.5		23.2	23.4	24.0	
		1.6	1.4	1.7	
25		23.0	24.0	22.9	
		1.5	0.8	2.0	
P 50		22.2	24.0	23.0	
		1.5	0.9	2.0	
P 100		24.0	24.0	23.0	
		4.2	6.0	6.0	

Filled tanks w/ spring water and fed algae/tetramin slurry and leaf slurry.

Calibrated DO meter.



LJT

6-95 Day 26 Parameters EE01, EE02, and EW03

	G-Con	EE01	EE02	EE03	EW03
	0.9	0.4	2.7	1.6	0.4
25	7.78	7.78	7.92	7.88	7.68
	384	607	389	388	487
___	22.5	23.0	22.2	22.5	22.5
		0.4	3.0	0.3	1.3
12.5		7.59	7.82	7.51	7.80
		466	365	452	394
___		23.8	21.5	22.0	22.0
		1.0	0.9	0.2	3.6
25		7.64	7.76	7.49	7.83
		402	387	428	362
2___		23.5	22.8	22.6	21.8
		5.6	0.6	0.4	2.2
50		7.87	7.58	7.68	7.75
!		362	413	384	363
2___		22.0	23.4	22.5	21.8
		7.4	6.1	7.3	8.0
100		8.16	7.72	7.99	8.14
		348	351	352	349
np___		22.0	21.5	21.2	22.5

Day 20 - Parameters EW01, EW02 and CR-EC01

	G.Con	EW01	EW02	CR-EC01	S.Con
	2.4	1.6	1.8	1.4	0.6
6.25	22.8	7.33	7.52	7.90	22.8
1	352	360	364	371	364
P___	7.66	22.4	22.5	22.4	7.55
		3.3	2.0	5.0	
12.5		7.57	7.61	7.93	
1		354	358	22.5	
P___		22.8	22.8	360	
		4.5	3.0	2.7	
25		7.71	7.70	7.84	
d		361	358	364	
P___		22.4	22.4	22.5	
		2.7	2.1	4.7	
50		7.53	7.64	7.91	
id		365	361	359	
P___		23.2	23.2	22.6	
		5.1	8.4	6.3	
100		8.00	8.16	8.22	
		350	348	352	

27-95 Day 28 Parameters EE04, EE05, EE10 and CREC02

CST	G.Con	EE04	EE05	EE10	CR·EC02	S.Con
	1.0	1.6	3.2	1.6	1.9	1.2
.25	7.52	7.64	7.86	7.50	7.73	7.34
	364	359	347	366	356	342
____	22.8	22.8	23.0	22.4	22.6	23.1
		1.4	3.6	1.1	2.0	
12.5		7.60	7.89	7.45	7.65	
		370	352	363	370	
____		23.0	22.8	22.6	23.0	
		2.8	7.85	3.0	1.3	
25		7.68	360	7.45	7.54	
		362	360	347	363	
____		23.2	23.8	22.8	23.5	
		2.0	4.0	1.6	0.7	
50		7.70	7.86	7.65	7.52	
		360 ~~[illegible]~~	360	347	423	
____		22.8	23.2	22.8	23.8	
		6.5	6.7	6.8	6.3	
100		8.02	8.13	8.20	8.23	
		341	353	355	353	
____		21.5	22.8	21.6	22.9	

CST Day 27 Parameters EE01, EE02, EE03 and EW03

	G.Con	EE01	EE02	EE03	EW03
6.25	1.2	0.6	1.6	1.2	0.6
2 ____	22.8	23.0	22.8	22.3	22.3
12.5		0.8	2.0	0.6	1.4
2 ____		22.8	22.8	22.4	23.0
25		0.7	2.4	0.8	3.0
2 ____		22.9	22.6	22.8	22.6
50		4.3	1.4	1.7	2.3
2 ____		23.0	22.9	22.6	22.9
100		5.9	7.3	5.6	7.4
1/4 ____		22.8	22.6	22.6	22.6

28-85 Day 28 Parameters EE01, EE02, EE03 and EW03

	G.Con	EE01	EE02	EE03	EW03
	1.3	~~731.6~~	0.7	0.7	1.0
25	7.26	7.31	7.48	7.5	7.53
	378	376	450	375	438
___	23.0	22.1	22.3	22.0	22.0
		1.1	0.6	0.6	1.1
12.5		7.30	7.38	7.42	7.54
		393	369	371	419
___		22.1	22.3	22.0	21.9
		2.1	0.7	1.6	1.2
25		7.46	7.41	7.55	7.53
		396	390	350	348
___		22.0	22.4	21.6	22.0
		1.1	0.5	0.9	1.4
50		7.51	7.49	7.52	7.51
		419	386	333	403
___		21.9	22.7	21.7	22.0
		6.8	7.6	6.2	6.3
100		7.99	~~7.99~~ 7.6	8.62	8.01
		347	351	349	309
___		21.9	22.4	21.7	22.1

Day 22 Parameters EW01, EW02 and CR·EC01

	G.Con	EW01	EW02	CR·EC01	S.Con
	2.3	1.4	1.6	1.6	1.0
6.25	~~348~~ 7.64	7.64	7.48	7.80	7.40
	348	352	360	362	360
___	22.0	22.2	22.4	22.4	22.6
		2.6	1.8	7.6	
12.5		7.60	7.58	7.86	
		347	349	360	
___		22.6	22.6	22.6	
		4.3	2.9	2.5	
25		7.63	7.62	7.63	
		359	350	350	
___		22.6	22.4	22.6	
		2.6	2.0	4.4	
0		7.47	7.66	7.86	
		358	364	343	
___		22.8	22.8	22.6	
		5.3	8.1	6.5	
100		8.07	8.20	8.18	

5 Day 23 Parameters: EWO1, EWO2, CR-ECO1

	G.con	EWO1	EWO2	CR-ECO1	S con
25	.4	1.3	1.1	.6	2.0
	24.8	252	25.2	25.0	24.8
15		1.1	.9	.7	
		25.2	24.8	25.0	
5		1.1	1.2	.7	
		250	24.8	25.2	
10		.6	.6	1.6	
		24.2	25.0	25.0	
00		3.5	4.2	4.1	
		25.2	25.0	24.0	

95 Day 24 Parameters - EWO1, EWO2 and CR-ECO1

	G Con	EWO1	EWO2	CR-ECO1	S.Con
	1.0	1.0	1.2	0.8	1.6
	22.9	23.6	23.4	23.8	23.4
2.5		0.8	1.0	1.0	
		23.4	23.6	23.6	
25		0.9	1.1	0.8	
		23.4	23.4	23.6	
50		0.6	0.8	1.4	
		24.0	23.8	23.4	
100		4.0	4.0	4.3	
		23.0	24.0	23.4	

Day 26 – EW01, EW02, CREC01

G.Con	EW01	EW02	CR-EC01	S.Con
~~2.2~~ MAR .6	1.1	1.6	.7	2.2
23.0	23.2	22.4	23.0	23.0
	.4	.7	1.0	
	22.0	23.2	23.5	
	2.2	1.5	.7	
	22.5	23.5	21.8	
	.6	1.0	3.4	
	23.0	23.2	22.6	
	4.9	5.2	6.0	
	22.8	23.0	22.0	

Mixed silty and gravel sediment using "old" 1994 recipe (no alpha cellulose). Did dilutions on EE06, EE07, EE08 & EE09. All samples were silty. Set up 3 silt controls & 6 gravel controls. Topped off with carbon filtered spring water (UV sterilized)

Day 27 - EW01, EW02 + CR-EC01

G.Con	EW01	EW02	CR-EC01	S Con
4.5	6.4	5.0	5.6	4.6
21.8	22.3	21.7	21.9	21.7
7.55	7.11	7.40	7.58	7.59
476	386	369	336	376
	4.5	4.9	5.5	
	22.1	21.6	21.9	
	7.14	7.31	7.41	
	373	375	372	
	4.6	4.7	5.4	
	21.7	21.6	21.7	
	7.07	7.34	7.53	
	377	376	376	
	4.4	4.5	5.5	
	21.6	21.8	21.6	
	7.25	7.30	7.54	
	381	400	364	
	5.0	5.6	5.2	
	22.0	21.8	21.5	
	7.67	7.87	7.45	
	370	341	377	

all paramoters in cup

.5 Day Ø Beginning Parameters for EE06, EE07, EE08 & EE09

	G. Con	Silt Con	EE06	EE07	EE08	EE09
	7.0	4.4	3.4	4.5	3.0	4.7
25						
—		~~4.5~~ MLS	~~4.5~~ 2.3	4.5	2.5	4.5
12.5						
—		~~4.8~~ MLS	~~3.6~~ 4.4	3.6	2.6	4.8
25						
—		~~5.2~~ MLS	~~3.8~~ 4.3	~~3.8~~ 4.2	2.5	5.2
50						
—		~~4.5~~ MLS	4.5	5.4	3.0	4.5
.00						

— All DO's above were taken 8-8-95 after the jars have been setting static since 8-3-95.

am Began randomly adding 5 H. azteca per test vessel until each vessel held 10 H. azteca.

95 Test aborted until test system has been
0 redesigned

5-95 Took DO's on jars from tests set up 8-3-95
Results listed above.

5 Day Ø EE01, EE02, EE03 and EW03

ST	Gravel Con	EE01	EE02	EE03	EW03
	7.7	7.6	7.4	7.0	7.4
--	7.72	7.80	7.96	7.87	8.04
	382	495	475	464	465
	22.2	22.1	22.2	22.2	22.2
—		7.7	7.2	7.0	7.2
2.5		7.85	7.79	7.85	7.96
		410	458	478	432
		22.2	22.4	22.1	22.1
—		7.7	6.9	6.9	7.3
25		7.88	7.84	7.80	7.99
		447	426	447	435
		22.2	22.3	22.2	22.3
—		7.5	6.6	6.7	7.3
50		7.95	7.79	7.81	8.02
		431	429	431	421
		22.3	22.2	22.1	22.2
—		7.3	6.6	6.8	6.9
100		8.05	7.98	7.90	7.97
		367	335	378	363
		22.1	22.2	22.3	22.2
—					

Pulled H. azteca from the cultures + began adding to test vessels.

Day 1 Parameters EW01, EW02, CR-EC01

	S.con	G.con	EW01	EW02	CREC01
25	5.8	5.9	6.0	5.5	5.7
—	22.0	21.8	22.1	21.8	22.0
2.5			5.7	6.0	5.7
—			22.1	21.8	21.8
5			5.6	5.9	5.8
—			22.0	22.0	21.5
50			5.1	5.6	5.6
—			22.0	21.5	21.8
1-1			4.0	5.6	5.2
—			21.8	21.8	22.1

-95 Day 3 Parameters EW01, EW02, CR-EC01

	S.Con	G.Con	EW01	EW02	CR-EC01
	5.9	5.5	5.7	5.9	6.0
0.25	20.5	20.5	20.5	21.4	21.3
	7.69	7.67	7.71	7.79	7.75
	346	345	345	355	353
			5.4	6.7	6.7
12.5			21.2	21.6	21.6
			7.71	7.83	7.80
			348	357	354
			5.3	6.7	5.7
25			21.6	21.8	21.8
			7.70	7.79	7.79
			350	351	356
			6.7	6.7	5.4
50			21.8	21.5	21.2
			7.84	7.77	7.81
			352	349	355
			6.0	5.6	5.7
100			21.8	21.2	21.5
			7.79	7.77	7.80
			348	348	352

Day 2 Parameters EE01, EE02, EE03, EW03

	G.Con	EE01	EE02	EE03	EW03
0.25	5.6	5.9	6.2	6.7	~~5.7~~
	23.8	23.6	23.7	21.0	23.5
	7.71	7.75	7.79	8.02	7.80
	357	364	381	438	368
		6.5	5.8	~~5.8~~ 6.5	6.1
12.5		21.0	23.5	20.6	20.5
		7.75	7.68	7.77	7.71
		369	~~296~~ 353 mem	375	350
		6.0	6.2	5.8	5.7
25		23.6	23.6	23.4	20.8
		7.71	7.73	7.74	7.77
		356	366	367	368
		6.5	6.1	6.3	6.2
50		20.8	23.8	23.5	21.2
		7.74	7.67	7.79	7.83
		359	361	371	~~3~~35
		6.0	6.3	5.6	6.2
100		20.7	21.2	21.0	20.8
		8.03	7.69	7.72	7.96

	S.Con	Gr.Con	EW01	EW02	CR-EC01
0.25	5.6	7.4	6.1	6.2	7.0
1	21.2	21.5	21.6	21.4	21.2
5			6.2	5.9	6.4
			21.0	21.5	21.4
25			5.7	6.3	6.0
			21.4	20.8	21.5
50			5.2	5.5	5.7
1			21.2	21.4	21.4
100			5.4	6.1	6.0
2			21.0	21.2	21.6

Parameters Day 4- EE01, EE02, EE03, EW03

	G.Con	EE01	EE02	EE03	EW03
0.25	6.1	6.0	6.1	6.4	~~6.4~~ mem 5.9
2	22.4	21.8	22.0	23.5	22.9
12.5		6.5	6.2	6.8	6.2
1		21.8	22.5	21.6	21.9
25		6.3	6.0	6.6	6.1
		21.9	22.4	21.5	23.5
50		6.9	6.4	6.6	6.1
1		21.6	21.8	22.2	23.6
100		5.9	6.5	6.4	6.3
		20.5	22.0	21.7	22.8

5 Parameters - Day 6 -EW01, EW02, CR-EC01

	S.Con	Gr.Con	EW01	EW02	CREC01
6.25	5.7	7.9	5.7	6.3	6.2
1	21.2	21.0	21.5	21.0	21.0
12.5			6.0	5.6	6.2
			21.0	21.4	21.1
25			6.1	5.6	5.9
			21.1	21.2	21.0
50			5.6	6.0	5.7
			21.2	20.8	20.9
100			5.4	5.8	5.9
			20.6	21.0	20.9

-95 Parameters: Day 7 EW01, EW02, & CREC01

mcs	S. Con	G. Con	EW-01	EW02	CREC01
P	23.8	23.0	23.5	23.4	23.2
	7.69	7.70	7.68	7.73	7.73
25	5.9	7.0	6.0	6.2	6.2
	371	450	359	364	358
			23.6	23.8	23.2
12.5			7.64	7.80	7.86
			5.9	5.8	6.2
			385	355	359
			23.6	24.0	24.0
25			7.66	7.83	7.92
			5.9	5.9	6.1
			360	354	356
			23.2	24.0	23.8
50			7.68	7.85	7.96
			5.6	6.1	6.0
			360	354	356
			23.5	23.9	23.8
100			7.70	7.76	7.96
			5.3	6.0	6.0
			360	371	354

Parameters: Day 6: EE01, EE02, EE03, EW03

	S. ~~Con~~ min	GCon	EE01	EE02	EE03	EW03
6.25		8.09	8.10	8.05	8.09	8.09
		6.1	6.2	6.2	6.4	6.5
		429	367	364	400	358
		240	23.8	23.2	24.2	24.0
			23.5	23.5	24.0	23.5
12.5			~~6.4~~ 8.05	8.07	8.11	8.07
			6.4	6.2	6.3	6.4
			364	357	365	359
			23.9	24.0	23.2	24.2
25			8.07	8.07	8.10	8.13
			6.3	6.3	6.5	6.3
			360	356	357	424
			21.6	23.0	23.0	24.0
			8.07	8.06	8.10	8.18
			6.6	6.2	6.3	6.3
			354	360	353	358
			23.8	22.8	23.2	24.0
100			8.05	8.06	8.10	8.09
			5.9	6.3	6.3	5.8

95

Parameters Day 8: EW01, EW02 & CREC01

s	SCon	GCon	EW01	EW02	CREC01
p	24.4	24.0	24.0	23.8	24.0
) 6.25	5.4	7.0	5.4	6.2	5.4
			23.8	24.0	23.8
12.5			5.2	5.2	5.7
			24.0	24.0	24.5
25			5.5	5.2	5.3
			24.2	24.0	24.0
50			5.1	5.6	5.6
			24.2	24.5	23.8
100			5.6	5.6	5.0

Parameters Day 7: EE01, EE02, EE03, EW03

	Gr.Con	EE01	EE02	EE03	EW03
	24.5	24.0	24.2	24.6	24.5
6.25	6.0	5.1	5.2	6.1	6.1
		23.8	24.0	23.8	24.8
12.5		5.4	5.2	5.7	5.4
		24.4	24.0	24.2	24.8
25		5.6	5.8	6.0	6.0
		24.0	24.2	23.8	24.4
50		4.9	5.3	5.2	5.7
		23.0	24.0	24.0	24.5
100		5.1	4.8	5.6	5.3

Parameters - Day 2 - EE06, EE07, EE08 & EE09

	Gr.Con	Silt Con	EE06	EE07	EE08	EE09
	22.0	22.0	23.8	24.2	22.8	22.2
6.25	5.1	5.0	4.7	4.9	4.9	5.4
			24.0	24.4	24.2	22.0
12.5			5.2	5.2	5.4	5.3
			22.0	23.2	22.8	24.0
25			5.3	~~5.3~~ 4.5 mm	4.6	5.2
			23.6	21.8	~~25~~	23.0
50			4.7	4.7	5.2	5.9
			22.2	23.2	22.4	~~4.5~~ mm 22.4
100			4.5	5.2 mm	5.0	4.5

	S.COD	Gr.COD	EE06	EE07	EE08	EE09
	5.2	5.8	4.5	4.6	4.9	5.2
0.25	21.0	20.8	21.2	20.9	20.8	20.6
	8.10	8.05	8.10	8.16	8.11	8.22
	249	254	245	241	231	247
			6.0	5.6	4.3	5.0
2.5			20.9	21.0	20.5	20.8
			8.15	8.18	8.16	8.17
			*350	245	237	243
			4.6	5.0	5.1	4.9
25			20.8	21.2	20.8	20.6
			8.14	8.11	8.15	8.11
			259	220	244	233
			4.8	5.3	4.8	5.0
50			20.5	20.8	20.7	21.0
			8.11	8.08	8.08	8.05
			216	235	238	243
			5.0	4.2	4.6	4.8
100			20.0	20.6	21.0	20.2
			8.10	8.12	8.14	8.14
			230	234	250	245

Parameters Day1 – EE04, EE05, EE10 + CR-EC02

	S.COD	Gr.COD	EE04	EE05	EE10	CR-EC02
	6.2	6.0	6.5	5.9	6.3	5.2
1.25	20.5	20.4	21.4	21.4	21.6	21.8
	8.04	8.11	8.14	8.12	8.14	8.13
	268	276	257	263	253	301
			4.9	6.2	6.5	6.1
12.5			21.2	21.8	21.6	22.0
			8.11	8.17	8.16	8.09
			245	289	263	250
			5.6	5.7	4.3	5.8
25			21.0	21.8	21.7	22.0
			8.11	8.14	8.15	8.10
			250	274	247	249
			5.5	6.0	5.4	4.9
50			21.6	21.6	21.5	21.8
			8.13	8.16	8.16	8.08
			246	261	255	248
			6.0	5.2	5.4	5.3
100			21.2	21.2	21.4	21.6
			8.12	8.16	8.10	8.06
			232	230	243	242

* checked 3 x's

	S.CON	G.CON	EE04	EE05	EE10	CR-EC02
6.25	5.2	5.9	5.5	5.1	4.6	5.1
	23.8	24.0	23.2	24.0	23.6	23.0
15			5.0	5.2	5.5	4.9
			23.8	23.0	24.0	23.2
25			4.6	5.4	5.3	5.2
			23.8	23.9	23.5	22.0
50			5.3	5.2	4.9	5.3
			22.5	23.5	23.2	23.0
100			5.3	4.9	5.2	5.0
			23.0	24.2	23.2	23.2

Parameters Day 11 - EW01, EW02, CR-EC01

	S.CON	G.CON	EW01	EW02	CR-EC01
6.25	23.8	24.0	24.0	24.2	23.8
	4.6	5.3	4.2	5.0	5.4
12.5			~~24.0~~	24.0	24.0
			4.4	4.1	5.6
25			24.1	24.0	23.6
			5.2	3.8	4.4
50			24.0	23.8	24.2
			4.3	4.0	4.7
100			23.9	24.4	24.2
			4.7	4.0	4.2

Parameters Day 10 - EE01, EE02, EE03, EW03

	G.CON	EE01	EE02	EE03	EW03
6.25	24.7	24.6	24.8	24.8	24.5
	4.3	4.7	4.4	4.6 ~~4.7~~ nom	4.8
12.5		24.4	24.2	23.8	25.0
		4.3	4.4	4.7	4.2
25		24.8	24.5	24.5	25.0
		4.6	4.6	4.4	4.3
50		24.0	24.7	24.2	24.6
		4.3	4.3	4.3	4.0
100		23.0	24.2	24.5	24.8
		4.5	4.5	4.2	3.6

G.Con	EE01	EE02	EE03	EW03
3.2	3.4	3.0	3.0	3.2
24.2	24.2	24.2	24.8	24.2
	3.4	3.0	3.5	3.6
	24.2	24.2	24.2	24.0
	3.4	3.0	3.8	3.0
	24.5	23.2	24.0	24.8
	3.0	3.4	3.0	4.0
	24.2	23.0	23.9	23.8
	3.1	2.9	2.9	3.0
	24.5	24.0	24.0	24.3

Parameters - Day 6: EE06, EE07 EE08 & EE09

S.Con	G.Con	EE06	EE07	EE08	EE09
4.0	5.5	5.2	5.4	4.6	4.8
22.0	22.6	22.5	22.0	22.2	22.5
		5.0	4.6	4.8	4.5
		22.2	22.0	22.4	22.6
		3.5	4.2	4.2	3.9
		22.0	22.2	23.0	22.6
		3.8	4.2	4.5	3.6
		22.2	22.4	22.5	23.4
		3.0	4.5	4.8	4.0
		23.0	22.0	22.6	22.2

Parameters Day 4 - EE04, EE05, EE10, CREE02

S.Con	G.Con	EE04	EE05	EE10	CREE02
3.4	3.5	4.1	4.5	3.2	3.1
23.2	23.0	23.2	23.5	23.2	23.2
		3.7	4.6	3.6	3.0
		23.5	23.2	23.4	23.2
		3.5	4.9	3.3	3.4
		23.5	23.5	23.5	23.4
		3.0	5.5	3.1	3.6
		23.4	23.0	23.2	23.2
		3.1	3.0	3.4	3.0
		23.2	23.4	23.0	23.4

Parameters Day 1 - EE06, EE07, EE08, EE09

S.con	G.con	EE06	EE07	EE08	EE09
23.4	23.4	24.4	24.0	23.0	28.8
5.0	5.1	4.5	4.8	5.0	5.2
8.02	8.01	8.03	8.13	8.03	8.06
364	362	368	368	358	365
		24.4	23.8	23.6	24.0
		4.4	4.7	4.7	4.4
		8.03	8.06	8.00	8.03
		370	368	366	358
		24.4	23.4	24.4	23.0
		4.2	5.0	3.8	5.1
		8.02	8.10	7.99	8.00
		368	366	364	361
		23.0	24.0	23.2	23.4
		5.0	4.3	4.8	4.9
		7.97	8.12	7.96	7.99
		375	371	358	361
		24.0	23.0	23.2	22.0
		4.0	4.8	4.5	4.7
		8.05	8.08	7.97	8.02
		372	363	358	343

Parameters Day 5 - EE04, EE05, EE10, CR-EC02

S.con	G.con	EE04	EE05	EE10	CR-EC02
24.0	23.8	24.0	25.0	23.4	24.0
5.0	5.0	5.6	4.4	5.2	5.2
8.04	7.94	8.05	24 mon 8.00	8.02	8.07
375	378	402	8.2 368	365	371
		24.0	24.0	23.5	24.4
		5.1	5.2	5.2	4.6
		8.05	8.10	8.08	8.04
		380	393	360	362
		24.0	24.2	24.0	24.0
		4.6	4.7	4.4	4.5
		7.99	8.08	8 06	8.00
		377	372	368	367
		24.0	24.0	5.0 22	24.8
		4.6	4.8	mon 5.0	4.5
		8.00	8.10	8 11	8.07
		370	367	352	367
		23.5	24.0	23.2	24.0
		5.2	4.6	5.6	4.7
		7.99	8.03	8.13	8.04

	G.CON	EE01	EE02	EE03	EW03
Temp	24.5	24.0	24.5	24.5	24.2
DO 6.25	4.7	4.7	4.6	4.8	4.9
pH	7.75	7.76	7.75	7.76	7.80
cond	357	359	355 ~~329~~ LOT	357	354
Temp		24.4	24.4	24.0	24.4
DO 12.5		5.3	4.7	4.6	4.4
pH		7.94	7.75	7.72	7.79
cond		364	359	359	352
Temp		25.0	24.0	24.2	24.6
DO 25		4.7	4.3	4.7	4.6
pH		7.86	7.75	7.71	7.76
cond		363	361	359	359
Temp		23.4	23.8	24.2	25.0
DO 50		4.6	4.7	4.7	4.7
pH		7.73	7.73	7.72	7.77
Cond		347	362	360	340
Temp		24.2	23.8	24.0	24.8
DO 100		4.7	4.8	4.7	4.1
pH		7.75	7.72	7.74	7.76
cond		319	361	359	350

Parameters Day 9 - EE06, EE07, EE08, EE09

	S.CON	G.CON	EE06	EE07	EE08	EE09
Temp	22.0	22.8	22.8	24.0	23.2	22.0
DO 6.25	4.7	4.7	4.1	4.9	4.9	4.6
pH	7.67	7.62	7.58	7.91	7.65	7.61
cond	336	344	348	368	358	366
Temp			24.2	24.2	24.0	22.0
DO 12.5			4.1	4.0	3.6	4.7
pH			7.70	7.82	7.64	7.60
cond			363	370	363	364
Temp			22.0	23.8	23.2	24.0
DO 25			4.7	3.8	3.9	4.2
pH			7.64	7.75	7.65	7.60
cond			350	328	354	367
Temp			23.2	23.0	24.0	23.2
DO 50			4.0	4.2	3.7	5.1
pH			7.60	7.72	7.64	7.77
cond			352	362	348	360
Temp			22.4	22.8	23.2	22.2
DO 100			4.2	4.3	4.0	4.2
pH			7.61	7.77	7.60	7.68
cond			349	521	358	341

-95 Day 16 Parameters EW01, EW02 and CR-EC01

	S Con	G. Con	EW01	EW02	CR-EC01
6.25	3.7	4.4	4.9	4.3	4.3
	23.0	22.8	22.5	23.8	23.9
12.5			4.4	4.7	4.5
			23.8	24.0	23.8
25			~~24.3~~	4.4	4.6
			24.0	23.6	24.5
50			4.2	23.6	4.9
			23.5	23.9	23.5
100			4.1	4.6	4.3
			23.6	24.0	24.6

Day 15 Parameters EE01, EE02, EE03 and EW03

	G. Con	EE01	EE02	EE03	EW03
6.25	3.8	4.1	4.2	4.8	3.8
	23.8	23.8	24.2	23.4	23.8
12.5		4.8	4.2	4.2	4.4
		23.2	23.8	23.8	23.7
25		4.4	4.1	4.1	4.5
		23.5	24.2	23.8	23.8
50		4.6	4.3	4.3	4.8
		23.2	23.8	24.0	23.5
100		4.2	4.5	~~4.2~~ 5.5 LOT	5.5
		23.8	23.8	23.8	23.8

Day 10 Parameters EE06, EE07, EE08 and EE09

	S.Con	G.Con	EE06	EE07	EE08	EE09
DO 6.25	4.1	4.4	3.5	3.6	3.5	4.2
Temp	23.5	23.0	23.8	23.8	23.2	22.5
DO 12.5			3.7	3.1	3.3	3.6
Temp			23.6	24.0	23.4	23.5
DO 25			3.5	3.5	3.4	3.7
Temp			23.9	23.9	23.7	23.0
DO 50			~~mp~~ 4.0 mgs	3.2	5.5	3.7
Temp			23.0	24.0	23.0	22.8
DO 100			3.4	4.1	3.6	4.2
Temp			23.5	23.0	23.2	22.5

		G. Con	EE01	EE02	EE03	EW03
mp		23.5	23.2	23.0	23.2	23.2
O		5.9	6.0	6.1	5.7	5.5
	6.25	7.69	7.73	7.81	7.86	7.79
nd		368	368	371	372	367
mp			23.0	22.8	23.2	23.2
O			6.0	6.1	5.7	5.0
H	12.5		7.75	7.80	7.84	7.78
nd			368	370	369	364
mp			23.8	22.8	23.2	24.0
O			5.8	6.2	5.4	5.1
H	25		7.82	7.83	7.77	7.79
nd			372	370	367	367
mp			23.5	23.5	23.2	24.0
O			6.0	6.2	5.0	4.8
H	50		7.79	7.81	7.77	7.84
nd			371	371	365	367
mp			23.5	23.2	23.5	24.0
O			6.1	6.0	5.5	4.6
H	100		7.80	7.81	7.77	7.80
d			372	370	375	367

Day 11 Parameters - EE06, EE07, EE08 & EE09

		S. Con	G. Con	EE06	EE07	EE08	EE09
mp		23.8	23.7	22.8	22.6	22.8	23.5
O		5.7	5.8	5.5	5.9	5.5	5.6
H	6.25	7.77	7.83	7.77	7.98	7.86	7.82
nd		375	372	376	387	372	374
emp				24.0	23.2	23.1	22.8
O				4.8	6.1	5.3	5.9
H	12.5			7.76	7.97	7.80	7.80
ond				377	383	372	372
emp				23.0	22.8	23.8	22.5
O				5.0	5.3	5.6	6.0
H	25			7.75	7.99	7.82	7.79
ond				380	394	381	369
emp				23.0	23.0	23.0	22.7
				4.4	5.7	5.0	5.7
H	50			7.75	8.01	7.79	7.79
nd				378	381	370	375
emp				22.6	23.2	23.6	23.0
O				4.7	4.8	4.7	5.0
H	100			7.79	7.96	7.79	7.87

.95 Day 17 Parameters EE01, EE02, EE03 & EW03

	G.Con	EE01	EE02	EE03	EW03
6.25	23.0	23.0	23.0	23.8	23.2
	5.2	5.3	5.1	5.2	5.5
12.5		23.0	23.0	22.8	23.4
		6.2	5.3	5.4	5.2
25		23.2	23.5	22.0	23.0
		5.5	5.4	5.7	5.3 (3)
50		22.2	23.0	21.8	23.8
		5.6	5.5	5.8	5.3
100		22.9	22.8	22.2	23.0
		4.9	5.2	5.5	5.0

Day 12 Parameters - EE06, EE07, EE08 & EE09

	S.Con	E.Con	EE06	EE07	EE08	EE09
6.25	(22.8	4.7	4.1	4.5	3.8	4.2
	4.8	22.2	23.5	24.0	23.8	23.5
~~12.5~~			5.4	4.0	4.3	4.5
12.5			23.8	23.4	23.8	22.0
			(22.0	3.5	4.0	4.4
25			4.5	23.5	23.5	22.0
			4.1	4.2	4.3	5.1
50			23.5	23.0	23.5	22.9
			4.0	4.0	4.8	4.5
100			22.5	23.5	23.5	22.4

Day 10 Parameters - EE04, EE05, EE10 & CREC02

	S.Con	G.Con	EE04	EE05	EE10	CREC02
6.25	23.0	23.0	~~23.5~~	23.6	23.5	23.0
	5.1	5.3	5.2	5.6	4.7	5.0
12.5			23.7	23.9	23.8	23.9
			5.1	5.2	4.9	4.8
25			23.0	24.0	23.0	23.5
			5.5	5.3	5.0	4.0
50			23.5	23.9	22.5	23.0
			5.0	5.5	4.5	4.3
100			23.0	23.2	23.0	23.0
			5.1	4.9	5.5	4.8

95 Day 14 - 2W01, 2W02, CR-EC01

	G.C01	S.C01	EW01	EW02	CR-EC01
6.25	6.3	6.1	7.3	5.5	5.7
	24.0	24.8	24.0	24.0	24.2
			5.6	5.2	6.1
12.5			24.3	24.2	24.5
			6.4	6.0	5.7
25			24.0	24.2	24.4
			5.5	6.1	6.2
50			24.6	24.4	24.2
			6.1	5.5	5.1
100			24.0	24.8	24.5

Day 11 - EE04, EE05, EE10, CR-EC02

	G.C01	S.C01	EE04	EE05	EE10	CR-EC02
6.25	6.6	6.7	7.4	6.1	6.1	7.2
	22.5	22.3	22.4	22.0	23.4	23.2
12.5			6.7	6.3	7.0	6.1
			22.8	24.6	22.8	23.8
25			6.8	6.4	6.1	5.5
			22.2	23.8	22.9	23.6
50			5.9	7.4	6.8	6.6
			23.8	23.2	22.0	22.2
100			6.4	6.0	6.1	6.7
			24.0	23.5	23.4	23.2

LJT

-95 Day 12 - EE04, EE05, EE10 and CR-EC02

	G Con		S Con	EE04	EE05	EE10	CR-EC02
6.25	6.2		6.0	6.0	6.0	6.4	6.2
	23.4		23.6	24.0	24.2	24.0	24.2
				5.8	6.0	6.3	6.4
12.5				24.2	24.0	23.9	24.0
				6.2	5.8	6.5	6.0
25				24.0	24.0	24.0	24.4
				6.4	6.1	6.4	6.2
50				23.8	24.2	24.2	24.2
				6.6	6.2	6.6	6.4
100				24.0	24.0	24.0	24.2

5-95 Day 21 - EW01, EW02, CR-EC01

	G Con		S Con	EW01	EW02	CR-EC01
	6.3		~~5.6~~ 6.1	6.6	6.2	6.0
6.25	7.74		7.65	7.78	7.82	7.85
nd	355		369	360	362	366
	22.8		23.8	23.0	23.5	24.2
				6.2	6.5	5.9
				7.80	7.90	7.89
12.5				359	362	364
nd				23.8	23.5	23.8
mp				5.7	6.2	6.0
				7.79	7.86	7.90
25				364	362	367
nd				24.5	23.2	24.8
mp				5.8	6.5	5.9
				7.79	7.84	7.89
50				365	365	365
ond				24.2	23.5	24.4
mp				5.9	6.0	5.8
O				7.82	7.84	7.85
H 100				367	364	365
ond				23.4	23.6	24.2
mp						

Day 10 - EE04, EE05, EE10 and CR:EC02

G.Con	S.Con	EE04	EE05	EE10	CR:EC02
5.6	5.2	6.0	6.5	5.4	5.0
7.73	7.64	7.83	7.79	7.86	7.80
365	374	376	366	361	371
23.5	24.2	23.4	23.8	23.0	24.0
		5.8	6.2	5.5	5.6
		7.84	7.94	7.84	7.79
		366	377	372	369
		23.7	24.0	22.5	23.2
		5.6	6.4	6.2	5.2
		7.83	7.94	7.85	7.81
		370	374	367	369
		24.0	24.0	23.0	23.8
		6.0	5.8	6.1	5.2
		7.81	7.92	7.83	7.83
		370	370	367	373
		23.8	24.2	22.2	23.8
		5.4	5.5	5.8	5.5
		7.75	7.88	7.84	7.87
		361	366	361	367
		22.8	24.0	22.2	24.0

Took down Day 21 gravel control for EW01, EW02 & CREC01, 8 H. azteca were found out of 10.

Day 22 Parameters EW01, EW02 & CREC01

S.Con	G.Con	EW01	EW02	CREC01
24.0	23.8	24.0	24.8	24.3
4.9	6.0	5.9	6.4	6.0
		25.0	23.0	25.0
		5.5	5.9	6.0
		24.0	24.8	25.0
		5.4	6.1	5.8
		24.0	24.2	23.2
		6.1	6.0	5.7
		25.0	24.5	25.0
		5.4	6.4	5.6

Parameters Day 25 - EW01, EW02, CR-EC01

	S.Con	G.Con	EW01	EW02	CR-EC01
	24.4	24.0	24.5	24.2	24.0
S	4.5	5.3	~~4.5~~ 6.2	4.3	4.6
	7.91	8.04	8.10	7.95	7.98
	340	358	360	364	364
			24.2	24.2	24.0
			4.0	5.7	4.7
12.5			8.11	7.95	7.96
			361	351	365
			24.2	24.5	24.2
			4.2	4.6	4.6
25			7.93	7.92	7.95
			362	367	349
			24.4	24.4	24.5
			4.3	4.3	4.4
50			7.91	7.96	8.03
			362	365	367
			24.2	24.5	24.5
			4.0	4.2	4.2
100			7.89	7.92	8.00
			361	365	362

Parameters Day 22 - EE01, EE02, EE03, EW03

	G.Con	EE01	EE02	EE03	EW03
no	24.1	23.2	23.6	24.0	24.0
6.25	4.3	4.9	4.5	4.6	5.1
	7.85	7.89	7.88	7.89	7.94
	344	357	362	366	339
1		23.2	23.5	23.0	24.2
10		4.7	4.5	4.5	4.4
12.5		7.90	7.86	7.87	8.01
		348	364	365	31?
2		24.0	23.9	23.6	23.4
no		4.6	4.4	4.9	4.4
25		7.88	7.91	7.89	7.941
		357	345	315	308
xd		22.5	23.8	23.0	24.0
no		4.5	4.2	5.0	4.6
50		7.90	7.92	7.91	7.88
		357	371	365	369
xd		23.4	23.2	23.4	24.0
no		4.5	4.7	5.2	4.4
100		7.87	7.88	7.92	7.89
					306

75 EE01, EE02, EE03, EW00
22 Gravel con. 6 adults + 1 neonate
EE 4, 5, 10, CR-EC02 - Took down day 15
Gravel Con - 9 adults

8.95 Day 24 - EW01, EW02 and CR-EC01

	G. Con	S Con	EW01	EW02	CR-EC01
)	3.9	3.9	4.4	4.5	4.6
mp 6.25	23.4	23.8	23.0	24.0	24.1
l	7.91	7.92	7.95	7.95	7.96
ond	367	373	371	368	369
			4.7	5.0	4.6
			24.4	23.8	24.2
mp 12.5			7.94	7.96	8.05
H			372	371	373
ond			4.9	4.6 ~~24.0~~ OT	4.3
O			24.5	24.0	24.0
emp 25			7.95	7.98	8.01
H			372	371	371
ond			4.2	4.9	4.6
O			23.0	23.8	24.0
emp 50			7.95	7.98	7.96
H			375	373	372
ond			4.5	4.7	4.7
O			23.9	24.4	24.8
Temp 100			8.16	7.96	7.99
pH			389	370	370
Cond					

8-95 Day 16 - EEC4, EEC5, EE10 and CR EC02

	G Con	S Con	EEC4	EEC5	EE10	CR EC02
	4.6	~~4.3~~	5.4	4.2	4.5	4.1
0.25	24.0	24.2	23.0	24.2	23.5	24.0
	7.70	7.62	7.77	7.88	7.95	7.92
	369	351	374	372	370	376
			4.8	5.3	4.7	3.6
12.5			23.0	23.2	22.8	24.0
			7.78	7.89	7.93	7.90
			373	380	378	374
			4.8	5.2	4.1	3.9
25			24.2	24.8	23.8	24.0
			7.78	7.98	7.87	7.91
			376	379	373	370
			4.5	5.0	4.8	4.3
			24.0	23.4	23.0	24.4
50			7.79	7.97	7.93	7.91
			374	377	376	378
			3.7	4.5	4.5	4.3
			23.0	24.0	22.5	24.1
100			8.07	7.99	7.92	7.99
			370	373	371	373

-95 Day 17 - EE04, EE05, EE10, CREC02

	S.Con	G.Con	EE04	EE05	EE10	CREC02
6.25	4.6	4.3	5.0	4.6	5.7	6.0
	24.0	23.4	23.6	23.8	23.6	24.6
2.5			5.5	4.7	4.6	5.2
			23.5	23.2	23.0	24.5
25			3.2	6.0	4.0	3.6
			24.0	22.0	23.6	23.0
50			4.5	5.4	3.9	5.6
			24.2	24.4	25.2	22.8
100			4.7	3.4	4.2	4.1
			23.2	24.2	24.4	24.0

-95 Day 26 - EW01, EW02, CR-EC01

	S.Con	G.Con	EW01	EW02	CR-EC01
6.25	6.4	6.6	6.6	6.8	6.8
	25.0	24.2	25.0	24.0	24.0
12.5			6.6	7.2	6.6
			24.6	25.2	23.8
25			6.9	6.5	6.1
			23.6	24.8	24.8
50			6.4	6.6	5.9
			25.0	24.9	24.2
100			6.5	5.9	6.1
			24.8	24.6	24.5

Day 25 - EE01, EE02, EE03, EW03

	G.Con	EE01	EE02	EE03	EW03
6.25	~~6.5~~ 6.3	6.0	6.5	5.8	6.8
	24.0	23.6	23.6	23.0	24.2
12.5		6.3	5.8	6.7	6.5
		23.5	24.0	23.2	22.8
25		6.7	5.9	6.0	6.1
		24.0	24.2	23.4	22.6
50		6.5	6.5	6.7	6.1
		23.0	23.8	23.4	22.4
100		6.9	6.5	6.2	5.9
		23.8	23.4	23.6	22.4

	S.Con	G.Con	EW01	EW02	CRECO1
0	5.5	5.5	6.3	5.4	5.7
.625	22.5	22.5	22.5	24.5	24.0
			5.5	5.4	5.5
mp 12.5			24.2	24.0	23.8
			4.9	5.5	5.2
25			24.8	24.2	25.0
			4.9	5.7	5.4
50			23.8	24.2	24.0
			5.2	5.6	5.1
100			23.8	24.2	25.0

Day 26 EE01, EE02, EE03 & EW03

	G.Con	EE01	EE02	EE03	EW03
	5.7	5.6	5.6	6.0	5.1
0 .625	22.8	23.8	22.2	23.2	23.8
	8.21	8.17	8.17	8.14	8.18
1	370	370	372	368	368
		6.2	5.6	4.9	6.0
P 12.5		23.2	23.8	22.5	23.9
		8.21	8.14	8.16	8.14
1		375	373	371	372
		5.4	4.9	5.6	5.9
P 25		22.8	22.5	23.0	24.1
		8.20	8.11	8.13	8.13
1		369	371	371	376
		6.1	5.8	5.8	5.9
P 50		23.2	23.8	24.0	23.8
		8.19	8.09	8.15	8.14
1		374	373	373	378
		5.0	5.3	5.9	6.5
P 100		24.8	24.0	24.4	23.9
		8.18	8.13	8.19	8.27
1		366	379	375	378

15 May 20 EW01, EW02 & CRECO1

	SCon	G. Con	EW01	EW02	CRECO1
	23.2	23.8	23.0	23.5	23.7
	4.8	5.5	5.2	5.0	4.9
25	7.15	7.27	7.40	7.48	7.58
	379	376	377	377	376
			23.8	23.0	23.8
			5.1	5.0	4.9
12.5			7.41	7.50	7.62
			354	372	379
			23.5	23.2	24.0
			4.9	5.0	5.0
25			7.46	7.52	7.72
			379	378	389
			23.2	23.4	24.0
			4.5	5.1	5.0
50			7.46	7.54	7.69
			382	378	370
			23.6	23.5	23.8
			4.7	5.2	5.0
100			7.46	7.55	7.64
			377	378	375

Final Counts EW01, EW02 & CRECO1

n A ~~MS~~ 4-0 mesh torn
B 8-0
C 8-0
n A 8-0
B 10-0
C 8-0

6.25 A 8-0
B 7-0
C 9-0
.5 A 11-0
B 3-0
C ~~MS~~ 9-0
5 A 10-0
B 9-0
C 6-0
) A 8-0
B 10-0
C 9-0

EW01 ~~MS~~ 100A 8-0
100B 4-0
100C 5-0

EW02 6.25 A 8-0
B ~~4-0~~ 5-0
C 3-0
12.5 A 9-0
B 5-0
C 7-0
25 A 10-0 - 3 babies
B 7-0
C 6-0
50 A 5-0
B 8-0
C 7-1
100 A 8-0
B 10-0
C 6-0

CRECO1 6.25 A 6-0
B 8-0
C 6-0
12.5 A 8-0
B 10-0
C 9-0
25 A 9-0
B 5-0
C 7-0
50 A 6-0
B 6-0
C 7-0
100 A 6-0
B 9-0
C 10-0

	G. Con	EE01	EE02	EE03	EW03
	22.2	22.8	22.4	22.9	22.2
	6.2	6.3	5.7	6.0	5.9
6.25	7.40	7.67	7.53	7.56	7.69
	388	380	369	363	375
		22.8	22.8	22.8	22.8
		6.0	5.8	5.8	6.0
12.5		7.50	7.55	7.54	7.60
		372	372	333	377
		23.0	22.8	22.2	23.0
		6.0	5.8	5.7	5.9
25		7.54	7.52	7.54	7.52
		375	373	333	378
		22.5	23.0	22.2	23.0
		5.6	5.9	5.8	5.5
50		7.52	7.51	7.54	7.53
		381	372	324	378
		23.0	23.0	23.0	23.0
		5.6	5.4	5.5	5.9
100		7.53	7.49	7.53	7.50
		378	379	324	382

Final Counts EE01, EE02, EE03, & EW03

1 Con A 9-0-4 babies
Con B 9-0-0
Con C 9-0-0
Con D 7-0-6 babies
Con E 7-0-1 baby

6.25 A 7-0-0
B 7-0-0
C 8-0-1 baby

12.5 A 8-0-0
B 10-0-0
C 9-0-0

25 A 8-0-0
B 8-0-0
C 10-0-3

50 A 7-0-0
B 7-0-0
C 9-0-0

100 A 8-0-0
B 4-0-0
C 3-0-0

EE02 6.25 A 10-0-0
B 10-0-1
C 8-0-1

12.5 A 4-0-0
B 10-0-0
C 6-1-0

25 A 2-0-0
B 2-0-0
C 0-0-0

50 A 5-0-0
B 2-0-0
C 1-0-0

100 A 1-0-0
B 6-0-0
C 3-0

EE03 6.25 A 9-0-1 baby
B 10-0
C 8-0

12.5 A 10-0
B 10-0

EE03 25A 7-0
B 10+2 babies
C 10+3 babies

50A 9+1 baby
50B 9
50C 10+2 babies

100A 6+1 dead
100B 9-0
100C 9+3 babies

EW03 6.25A 10-0
6.25B 10
6.25C 10+1 baby

12.5A 9+1 baby
12.5B 9+1 baby
12.5C 8+0 babies

25A 7+7 babies
25B 8+6 babies
25C 9+0

50A 7+3 babies
50B 6+1 baby

Day 21, [illegible]

S.Con	G.Con	EE04	EE05	EE10	CRECO2
		23.5	23.8	21.2	21.2
		5.2	5.1	5.6	5.1
		7.80	8.12	8.00	8.10
		385	389	390	405

Parameters Day 24 - EE04, EE07, EE08, EE09

S.Con	G.Con	EE04	EE07	EE08	EE09
4.5	4.7	4.0	4.0	4.1	4.0
22.0	22.2	22.0	24.5	23.2	22.0
		3.7	3.5	3.8	3.7
		24.0	25.0	24.0	21.8
		3.3	4.2	3.4	3.2
		22.8	24.0	23.5	24.0
		3.2	4.0	3.4	3.3
		23.5	23.0	24.5	23.2
		3.1	3.8	4.1	3.4
		22.5	23.8	23.2	22.4

Parameters Day 22 - EE04, EE05, EE10, CR-ECO2

S.Con	G.Con	EE04	EE05	EE10	CR-ECO2
4.3	5.4	5.0	5.2	3.9	3.6
23.0	23.0	23.0	23.2	23.5	23.0
		4.9	3.9	4.2	3.2
		23.2	24.0	24.8	24.0
		4.9	4.1	4.0	3.6
		23.0	24.8	24.0	23.2
		4.0	5.7	4.2	4.0
		24.0	25.0	22.0	22.4
		4.9	3.8	4.9	3.7
		23.0	23.8	23.4	23.2

Parameters Day 25 - EE04, EE07, EE08, EE09

S.Con	G.Con	EE06	EE07	EE08	EE09
4.0	4.5	4.2	3.9	4.0	5.1
23.2	23.0	22.0	23.0	22.5	23.8
7.97	7.96	7.88	7.95	7.93	7.99
421	372	384	388	383	372
		4.2	4.2	22.8	3.9
		23.5	23.0	24.5	22.0
		7.90	7.92	7.90	8.04
		381	289	382	377
		3.2	3.9	3.8	3.5
		22.8	22.2	24.0	23.5
		7.93	1.95	7.93	7.94

Parameters Day 24 - EE04, EE05, EE10 & CRECO2

S.Con	G.Con	EE04	EE05	EE10	CRECO2
4.7	4.3	5.0	4.0	4.0	3.8
22.5	23.2	23.0	23.5	22.8	23.2
		4.3	4.7	4.6	3.7
		23.0	23.4	23.0	22.2
		4.9	4.5	4.0	4.0
		23.0	22.5	23.2	22.2
		4.4	4.0	4.8	4.1
		22.0	24.5	22.2	22.8
		4.5	3.9	4.9	4.4
		21.8	23.5	22.6	23.0

Parameters Day 27 - 6-9

S.con	G.con	EE06	EE07	EE08	EE09
3.4	3.5	4.1	3.6	3.5	4.1
23.8	22.0	23.0	22.6	22.0	22.7
		4.1	3.0	3.9	4.0
		22.0	24.0	23.6	23.0
		3.0	3.2	3.4	4.1
		22.9	23.6	22.8	22.0
		3.2	3.9	3.5	3.6
		23.4	22.9	24.8	21.9
		3.6	4.0	3.2	3.2
		22.0	22.0	24.0	23.5

Parameters Day 25 - EE04, EE05, EE10, CR-EC02

Scon	G.con	EE04	EE05	EE10	CR-EC02
4.8	4.7	4.6	4.9	3.9	3.6
22.6	23.5	22.0	23.6	24.0	23.4
		3.7	4.0	4.1	4.2
		23.8	22.8	23.0	23.8
		3.5	4.4	4.4	3.9
		22.0	22.9	24.2	24.0
		4.1	4.2	4.1	4.4
		24.0	23.0	24.0	23.8
		4.6	4.6	4.7	4.2
		23.2	22.9	22.8	22.9

Ending parameters - EE06 - EE09

S.Con	G.Con	EE06	EE07	EE08	EE09
4.7	4.8	3.8	3.1	3.4	3.7
23.2	22.0	22.2	22.5	22.5	22.6
7.41	7.50	7.37	7.33	7.41	7.44
373	366	371	370	360	363

	S.Con	G.Con	EE04	EE05	EE10	CRECO2
6.25	22.0	22.0	22.4	22.2	23.0	22.2
	5.0	5.0	5.3	5.2	4.7	4.7
			23.4	22.8	21.8	23.2
12.5			5.1	4.9	5.3	4.3
			22.0	21.8	23.8	22.8
25			5.5	5.6	4.8	4.7
			22.8	24.0	21.8	21.8
50			5.0	5.6	5.4	5.0
			22.2	22.8	22.2	22.2
100			5.3	4.7	5.4	4.6

95 Day 27 - EE04, EE05, EE10 + CR-ECO2

	S.con	G.con	EE04	EE05	EE10	CR-ECO2
6.25	23.2	22.2	22.4	23.5	23.0	22.0
	4.2	5.2	4.2	5.5	3.7	3.5
12.5			23.4	23.0	22.2	23.0
			4.4	3.3	4.5	2.9
25			22.1	24.0	23.0	22.8
			5.7	4.1	4.2	3.6
50			23.0	24.2	22.2	21.8
			4.2	4.2	4.2	4.2
100			22.4	22.8	22.5	~~22.5~~ 22.0
			4.0	3.5	4.7	~~4.~~ 3.4

95 Day 28 - EE04, EE05, EE10, CR-ECO2

	S.con	G.con	EE04	EE05	EE10	CR ECO2
	22.7	22.1	22.8	22.9	22.8	22.2
6.25	5.0	5.7	6.2	6.1	5.8	5.2
	7.90	7.85	7.90	8.05	7.83	7.89
	368	360	372	376	366	362
			22.9	23.4	22.7	22.2
12.5			5.9	5.8	5.8	5.3
			7.82	7.94	7.84	7.87
			372	379	364	369
			22.4	22.2	22.8	22.0
25			6.0	6.0	6.1	5.4
			8.02	7.92	7.83	7.84
			371	362	371	366
			~~WT 371~~ 22.1	23.3	22.3	21.8
50			5.4	5.7	6.1	5.6
			7.93 ~~22.1~~ WT	7.85	7.86	7.84
			363	373	362	361
100			22.1 / 5.2	22.9 / 5.6	22.5 / 6.0	22.2 / 5.3
			7.90 / 31.3	7.95 / 31.7	7.87 / 366	7.85 / 360

Sediment type — LC50

EEC1 - Gravel - 100% even ✓
EEO2 - Gravel - 17.49 ✓ 75.6% Acute
C3 - Gravel >100%
C4 - Gravel - 87.63
05 - Gravel - 18.85
06 - Gravel - 50.45 ✓
07 - Silt - 28.65 ✓ 71.9% acute
C8 - Silt - 86.08 ✓
09 - Silt >100% ✓
10 - Silt >100%
EW01 - Silt >100% ✓
02 - Silt >100% ✓
C3 - Gravel >100% ✓
CR-EC01 - Gravel >100%
CR-EC02 - Silt >100%

LC50
Sur NOEC
Gro NOEC

225-6150
next week
soil samples
how many

HA Acutes LC50's
EEO2 75.6%
EE07 71.9%

Colony forming units per mL

Leroy
901 396-4455
17 min.

APPENDIX L

RISK MANAGEMENT CONSIDERATIONS

APPENDIX L
RISK MANAGEMENT CONSIDERATIONS

L.1 INTRODUCTION

Section 6.0 of the Ecological Assessment (EA) of the Soldier Creek Sediment and Surface Water Operable Unit at Tinker Air Force Base (Tinker) reached the following general conclusions:

- Although viable populations of plants and animals (other than humans and domesticated species) exist within the Operable Unit, they are characterized by very low diversity compared to that which would be expected in and along similar streams outside the urban/industrial setting of Tinker.

- Physical modifications, intrusive human activities, and industrial effluents are significant factors influencing the composition of both aquatic and riparian terrestrial biological communities throughout East and West Soldier Creeks.

- About 16 of the 46 contaminants of ecological concern (COECs; some of which are groups) appear to pose risks to ecological receptors. In general, the estimated potential risks to strictly-aquatic organisms (algae, invertebrates, and fish) are somewhat greater than the risks to terrestrial animals.

- The potential risks associated with both direct (aqueous) and dietary exposures are largely confined to the on-base portions of East and West Soldier Creek. Potential effects of a few sediment-related COECs and several surface-water-related COECs probably extend northward (downstream) beyond the study area boundaries at Interstate Highway 40 (I-40).

- The risks associated with some of the COECs (particularly to strictly-aquatic receptors) may be of ecological significance in that the structure and function of the local ecosystem are impaired (i.e., reduced diversity and reduced primary production). However, the degree to which these ecologically-relevant potential risks extend beyond the study area is unclear.

- Toxicity testing of bulk sediments and surface water, as well as aquatic biological surveys, generally corroborate the pattern of risk estimates based on the quotient method. However, the *magnitude* of risks implied by many of the hazard quotients (HQs) was not reflected in the toxicity-testing and biological-survey results.

The EA was, essentially, a modified "desktop" ecological risk assessment that relied heavily on conservative assumptions regarding the fate and transport of COECs and limited site-specific empirical measurements. Results of both the toxicity testing and the biological surveys reflect integrated exposures to the mixtures of COECs present, and therefore are of limited value in identifying which of the specific contaminants (as well as other factors) are the main sources of actual or potential adverse effects on ecological components.

L.2 UNCERTAINTY

Uncertainty is discussed at some length (albeit qualitatively) in Subsection 5.2 of the EA, primarily in the context of the likelihood of underestimation of potential risks. On balance, it appears that the conservative desktop approach resulted in overstatement of the risk. The more important elements of uncertainty fall into three categories.

L.2.1 Estimation of Exposures

As noted in Subsection 5.2 of the EA, both direct and indirect exposures to ecological receptors were probably overestimated for several reasons:

- Lack of adequate **analytical sensitivity** (due primarily to matrix effects and other factors beyond the control of samplers in the field, and also, for some target analytes [e.g., PCBs] lack of suitable analytical technology). This resulted in the use of conservative default assumptions such as the use of half of the quantitation (detection) limit in lieu of measured values.

- Lack of **replication** of samples. This necessitated using maximum measured concentrations (as opposed to 95% upper-confidence-limit [UCL] values) to represent the upper extremes[1].

[1] **It is acknowledged that lack of replication could conceivably have resulted in use of values that were "too low." However, inspection of the quarterly monitoring data (which include greater replication) generally shows that the maximum values used in the EA (for exposure point concentrations) are comparable, except in the case of certain pesticides in deeper layers of quarterly core samples.**

- Lack of empirical measurements of **COEC residues in forage/prey** (other than crayfish). This necessitated the use of conservative extrapolations based on bioaccumulation theory to estimate concentrations in most dietary components.

- Lack of information on **bioavailability** of COECs in physical media. This necessitated the use of the counterintuitive assumption of 100% availability (e.g., of metals in water) and/or the conservative equilibrium partitioning (EqP) approach to estimate concentrations in sediment pore-water and surface water.

Regarding the issue of analytical sensitivity, it is recommended that more sensitive methods be selected insofar as available for any future analyses of physical media. The minimum sample size for sediments should also be increased, to the extent possible. It should be noted, however, that there are substantial logistical constraints on obtaining adequate sample masses of depositional sediments in many of the study sections.

Regarding the issue of replication of samples, it is recommended that, within certain study sections (e.g., ponded portion of East Soldier Creek and EW01), a minimum of three sediment grab samples be taken per visit in any further sampling effort. Depending upon the specific objectives of additional sampling, subdivision of sections and further replication of grabs may be warranted.

Regarding the issue of COEC residues in forage/prey organisms, it is recommended that replicated samples of aquatic vascular plants, frogs, small rodents, and passerine birds be obtained, at least within sections where they are available, in any further sampling effort. It is unlikely that sufficient sample volumes for adequate analyses can be obtained for either invertebrates (anywhere) or fish (except perhaps in localized sections). However, the feasibility of using emergence traps or some other method for collection of invertebrates should also be considered.

Regarding the issue of bioavailability, it is recommended that dissolved fractions (*versus* total) of COECs, insofar as possible, be measured in any further sampling effort. Much more detailed chemical limnological data should be gathered during any future field efforts. For example, location-specific (and seasonal) data on hardness, nutrients, redox potential, and dissolved and suspended solids in surface water would be helpful. Any further analyses of bulk sediments should include redox potential and sulfide concentrations, and it may be appropriate to consider

sampling/analyses of pore water for a variety of constituents (e.g., dissolved fractions of selected COECs, dissolved organic carbon).

A final element of uncertainty that may be significant in exposure estimates is the assumed dietary compositions of the bird and mammal receptors. Unlike the above-listed elements, this source of uncertainty may contribute to either underestimation (but see Section 5.2.2.6) or overestimation of applied daily doses (ADDs). This issue could be resolved by performance of detailed food habits studies of selected receptors (e.g., red-winged blackbird, muskrat). If such animals are to be sacrificed, it is recommended that they also be used for analyses of COEC residues in their tissues.

L.2.2 Estimation of Effects

There were limited toxicological data available for some of the more obscure COECs, which resulted in a high rate of extrapolation from tests with surrogate receptors (or, in a few cases, from surrogate chemicals). When this was done, very conservative "uncertainty factors" were applied in deriving toxicity reference values (TRVs), and it is unlikely that potential hazards were underestimated. However, one critical source of uncertainty in this category is the lack of dietary toxicological data for amphibians and reptiles. This precluded detailed, semi-quantitative evaluation of risks to members of two vertebrate classes that may be the most vulnerable "wildlife" to exposures via the ingestion pathway. The only ways to resolve this uncertainty would be to: (1) perform controlled toxicity tests with amphibian or reptile receptors and a variety of COECs; and/or (2) perform detailed comparisons of selected observations (e.g., growth, fecundity) on wild amphibians/reptiles in the Operable Unit to those of counterparts in uncontaminated areas. Although technically feasible, such investigations would be relatively time-consuming and expensive (and, in the case of the field observations, difficult to interpret).

L.2.3 Confounding Factors

As discussed at some length in Section 2.0 (Problem Formulation) of the EA, there are numerous overt environmental perturbations (stresses) in the Operable Unit which are unrelated to the CERCLA releases. Many of these confounding factors relate to physical alterations of

habitats, but some relate to ongoing sources of contaminants. The latter, particularly, confound interpretation of the ecological significance of the CERCLA releases. But, as noted in the next subsection, the existence of ongoing sources of contaminants (or the prospect of control/removal of such sources) are also important considerations for remedial decision making.

L.3 CONTINUING SOURCES

Flows in East Soldier Creek are process-effluent-dominated. Although the quality of the effluents entering the creek is controlled to some extent by the applicable NPDES permits, it is evident from the surface-water measurements taken during quarterly monitoring and the EA (as well as from a review of Discharge Monitoring Reports [Appendix F]) that certain COECs are being continuously released via the outfalls. In short, there is a question of source control that needs to be addressed in conjunction with remedial decisions. An evaluation needs to be made of the incremental contributions of all direct and indirect discharges from current Tinker operations to concentrations of COECs in sediment, surface water, and biota. It is important to know the concentration and mass of chemicals released from current operations *versus* the potential COEC sources such as sediments, soils, storm water, and groundwater.

L.3.1 Industrial Waste Water Treatment Plant (IWTP)

For example, phenolic compounds like nonylphenols are presumably associated with their current uses in detergents, and the EA indicated that their occurrence is essentially confined to the sections of East Soldier Creek below the Industrial Waste Water Treatment Plant (IWTP). The nonylphenols are relatively resistant to biodegradation, and therefore the IWTP is strongly implicated as a major continuing source.

According to authorities at Tinker, there currently are plans to re-route the IWTP effluent to the local Publicly Owned Treatment Works (POTW). This will eliminate the major continuing source of phenolic compounds (and probably some other COECs) to East Soldier Creek. It should also be kept in mind that re-routing of the IWTP discharge will significantly decrease the flows, and hence dilution, in East Soldier Creek below the ponded area.

L.3.2 Other Outfalls

During the two ecological sampling events, surface-water concentrations of chromium, copper, molybdenum, and zinc were noticeably elevated in section EE02, which consists mainly of cooling tower blowdown (Outfall G). It is also noteworthy that by far the highest bulk-sediment concentrations of PCBs and several of the PAHs were measured in this outfall. The highest (or only) surface-water concentrations of several of the PAHs and dieldrin were measured in section EE05 (also known as Outfall F). This outfall was also the site of the highest (or only) measured bulk-sediment concentrations of chlorinated naphthalenes, certain PAHs, dieldrin, alpha-chlordane, and heptachlor.

L.4 PRELIMINARY REMEDIAL GOAL OPTIONS (RGOs)

This section presents preliminary concentration-based ecological remedial goal options (RGOs) for the Soldier Creek Sediment and Surface Water Operable Unit. Preliminary RGOs are initial chemical-specific, numerical, cleanup alternatives for each affected environmental medium. These RGOs are: (1) derived from site-specific exposure assumptions; (2) are protective of the environment; and (3) comply with potentially Applicable or Relevant and Appropriate Requirements (ARARs), e.g. Federal Ambient Water Quality Criteria. Any ultimate action will satisfy ARARs. The risk characterization presented in Section 5.0 provides the basis for determining the appropriate endpoints for the risk-based RGOs. Thus, risk-based RGOs were developed from: (1) analytical data obtained during sampling of biota, water, and sediment; (2) published information about the toxicity of the COECs; (3) exposure assumptions for the representative receptors; and (4) relationships among these findings.

The preliminary RGOs address COEC concentrations in abiotic media (surface water and sediment). Ingestion exposures from biotic media are taken into account by estimating concentrations in dietary components (primarily biological tissues) based on bioconcentration/accumulation of COECs, which were derived by applying appropriate bioconcentration/accumulation factors to abiotic media (as discussed in Section 4.0).

Preliminary RGOs were not developed for every COEC. Rather, they were developed for selected COECs on the premise that remediation of contaminants posing the greatest level of

risk (i.e., the risk "drivers") would concurrently reduce risk associated with COECs presenting lower risk, as long as the latter had similar fate and transport mechanisms.

L.4.1 SURFACE WATER

The National Contingency Plan (40 CFR 300.430(e)(2)) states that water quality criteria established under Sections 303 or 304 of the Clean Water Act shall be attained for remedial actions where relevant and appropriate under the circumstances of the release. For surface waters in Soldier Creek, the federal water quality criteria and Oklahoma water quality criteria are potential chemical-specific ARARs. These were used in conjunction with other benchmarks for screening analytical data for selection of COECs (Section 2.2). To the extent that they are available for selected COECs, chronic water quality criteria should be considered RGOs. A summary of the maximum HQs observed for all receptors for each constituent in surface water is presented in Table L-1.

L.4.1.1 Inorganics in Surface Water

Among the inorganics in surface water, none of the HQs exceeded 1 for **antimony** or **silver**. Though **arsenic** showed a relatively high HQ for algae, and a slightly elevated ratio for invertebrates, these HQs were driven entirely by a single elevated value measured at one location in 1994 (EE10) that was two orders of magnitude above all other values, and was not repeated in 1995. Moreover, bulk-sediment concentrations were not high enough to explain the elevated EE10 surface-water value. If this value is considered an outlier, then all HQs for arsenic in surface water fall to 1.0 or less.

HQs from about 1 to 12 (for the NOAEL scenario) were calculated for **cobalt**, **cyanide** and **mercury**. This was the result of the TRV for each of these constituents below the detection limit; none of these constituents were detected in surface waters of the Soldier Creek system during ecological studies in 1994 or 1995. HQs based on the LOAEL TRVs were all less than 1 for these constituents. Cobalt, cyanide, and mercury should be considered uncertainties with respect to characterization of risk. Development of RGOs for these constituents is not currently warranted.

Nickel also falls into the category of being driven by the detection limit, with the exception of one elevated concentration at station EW01 which resulted in NOAEL TRV-based HQs ranging from about 19 to 28. The nickel in surface water at EW01 may be associated with elevated sediment concentrations and/or a localized source near EW01. However, all measured nickel concentrations in surface water were below the Oklahoma ambient water quality criterion. Therefore, RGOs for nickel in surface water are not proposed. Nickel in sediments will be discussed in Section L.4.2.

Aluminum HQs ranged from about 1 to 12 for algae at EE05 and less than 1 to about 5 at other locations. The applicable EPA water quality criterion for aluminum is 748 ug/l. Note that none of the concentrations measured during quarterly monitoring events or ecological studies exceed the ambient chronic water quality criterion. Therefore, a surface water RGO for aluminum is not proposed.

Barium was ubiquitous and fairly consistent in concentration in surface water throughout the Soldier Creek System. HQs for fish were the highest of the surface water receptors, and ranged from about 1 to 11. However, the TRV used for fish was the result of application of an uncertainty factor of 100 to a reported benchmark based on invertebrates and is likely overstated. There are no ambient water quality criteria for barium. However, the *Quality Criteria for Water 1986* (EPA 1986) indicates that "*the soluble barium concentration in fresh and marine water generally would have to exceed 50 mg/L before toxicity to aquatic life would be expected*". The HQs were generally less than 1 for the other receptors. An RGO is not proposed for barium.

Cadmium demonstrated elevated HQs for fish, algae and invertebrates. Detection limits were all above the invertebrate TRV. However, cadmium was detected at least once at each ecological monitoring station during either 1994 or 1995. The Oklahoma ambient chronic water quality criterion of 2.9 ug/l was exceeded at EE05 during both 1994 (9.8 ug/l) and 1995 (6.8 ug/l). The Oklahoma water quality criterion can be used as a preliminary RGO for cadmium.

For **chromium**, elevated HQs calculated for each of the surface water receptors ranged from a maximum of about 6 for fish, up to 210 for algae. The Oklahoma water quality criterion of 50 ug/l can be used as a preliminary RGO for chromium.

Copper concentrations were elevated at EE02 and decreased progressively moving downstream. An appropriate RGO is the Oklahoma water quality standard for copper which, at 100 mg/l hardness, is 35.5 ug/l. This should be further adjusted to the specific hardness of the discharge and receiving stream.

HQs for **iron** ranged from as high as 1.7 for algae to 13 for fish. EPA's chronic ambient water quality criterion of 1,000 ug/l is an appropriate preliminary RGO for iron.

HQs for **lead** ranged from about 1 to 16 for fish and as high as 500 for invertebrates. Highest HQs were identified at stations EE02, EE06 and EW02. The Oklahoma water quality criterion of 14.9 ug/l (at a hardness of 100 mg/l) is an appropriate preliminary RGO for lead in surface water. This was exceeded at EE02 in 1995 and at EE06 and EW02 in 1994. Lead concentrations in sediments at EE06 (and EE05) also appear elevated compared to other sections of Soldier Creek and could be a potential source to the water column. Lead concentrations in sediments are discussed in Section L.4.2.

Manganese HQs (NOAEL scenario) were elevated for fish and invertebrates. The elevated HQs were largely due to an uncertainty factor of 10 incorporated into the calculation (see Table 4-10). Using the lowest applicable identified value and appropriate uncertainty factors is consistent with EPA's conservative approach. However, in the case of manganese, the *Quality Criteria for Water 1986* (EPA 1986) indicates that tolerance values for manganese range from 1.5 mg/l to over 1000 mg/l, and thus "*manganese is not considered to be a problem in fresh waters*". Therefore, RGOs are not presented for manganese.

Molybdenum concentrations (and HQs) are elevated near EE02 and decrease downstream, suggesting a source is present at or near EE02. The most sensitive receptors were fish and algae. However the TRV for fish was based on application of a 10-fold uncertainty factor to an empirical invertebrate NOAEL (see Table 4-10). TRVs were not available for algae, so those reported for vascular plants were used. There are no water quality criteria for molybdenum.

Because measured ecotoxicological values are available for both an invertebrate NOAEL and LOAEL, these are proposed as preliminary RGOs (i.e., 670 ug/l and 1150 ug/l, respectively).

Nickel HQs were highest for fish (Tables 5-8 and L-1), primarily due to a surface water concentration of 99 ug/l measured at EW01 during 1995. However, this is below the Oklahoma ambient chronic water quality criterion of 433 ug/l. An RGO is therefore not proposed for nickel.

Selenium HQs were elevated (NOAEL TRV as high as about 5) at a single location (EE10: see Tables 5-1 and 5-8) for fish and algae. This was the result of a single elevated concentration of selenium in 1994, which was not observed in 1995. There were no unusually elevated sediment selenium concentrations at or near EE10 that might explain the elevated surface-water concentration. All LOAEL-based HQs for selenium were less than 0.5. Because the single elevated HQ appears to be limited spatially and temporally, and all LOAEL-based HQs are less than 1, a surface water RGO for selenium is not warranted.

Vanadium HQs exceeded 1 only for fish (an HQ of about 4 in the maximum concentration NOAEL scenario). LOAEL-based HQs were all less than 0.4. Highest HQs occurred at EE02, suggesting the outfall at EE02 was a source. However, this is inconclusive since EE01 also exceeded an HQ of 1 for vanadium. The NOAEL was based on an uncertainty factor of 10 applied to a measured LOAEL. Because the LOAEL represents a measured endpoint value, and the highest LOAEL-based HQ was about 0.4 (based on a maximum concentration), a RGO for vanadium is not warranted.

Zinc HQs ranged from about 0.2 to 2 for fish, 1.4 to 18 for invertebrates, and 2.1 to 28 for algae. Concentrations (and therefore HQs) were fairly uniform throughout the Soldier Creek system, with the exception of elevated values (as compared to other locations) at EE02 and EE05, suggesting the outfalls located at EE02 and EE05 as sources. The Oklahoma ambient water quality criterion for zinc is an appropriate preliminary RGO (i.e., 291 ug/l based on a hardness of 100 mg/l). This should be further adjusted to the specific hardness of the discharge and receiving stream.

L.4.1.2 Organics

With the exception of PAHs, there are essentially no organics in surface water for which to establish preliminary RGOs. The following constituents do not exceed HQs of 1 for any of the aquatic (water column) receptors:

- acetone
- carbon disulfide
- toluene
- methylene chloride
- total xylenes
- 1,4-dichlorobenzene
- chlorinated aromatic hydrocarbons
- 2,4-dimethylphenol
- alpha chlordane
- alpha & delta BHC
- triphenyl phosphine sulfide (TPS)

In addition, **chlorobenzene**, **pentachlorophenol (PCP)**, **PCBs**, **aldrin**, **heptachlor, endosulfan sulfate**, **methoxychlor**, and **benzidine** were not detected in surface water, though HQs exceeding 1 resulted from calculations using one-half the detection limit. Due to the inherent uncertainty associated with these HQs, calculation of RGOs is not warranted.

HQs for **phenols and substituted phenols** exceeded 1 (maximum of about 6 for NOAEL TRV and maximum concentration scenario) at several stations, but were all due to a TRV below the detection limit (no detections were reported), with the exception of section EE08. At EE08, tentatively identified compounds 4-[1,1,3,3-tetramethyl butyl] and 4-[2,2,3,3-tetramethyl butyl] phenol were suggested during 1995. These tentatively identified compounds were included in the group of phenols and substituted phenols. Except for this tentative identification, there is no indication that phenols were present in water above the detection limit. Due to the relatively low HQs (based on a maximum concentration NOAEL scenario) and only tentative identification of constituents in this group, RGOs are not proposed for phenols and substituted phenols.

The remaining organics of potential concern in surface water are the phthalates (DEHP), heptachlor epoxide, nonylphenols, dieldrin and the PAH groups. For **DEHP**, the detection limit was above the TRV for algae and invertebrates. There were only two samples with measurable quantities of DEHP during the 1994 and 1995 ecological investigations: 1.9 ug/l at EW01 in 1994 (j-flagged) and 58 ug/l at EW03 in 1994. Of these measured values, only the 58 ug/l exceeded an HQ of 1 for any of the receptor endpoints. There is not a water quality criterion for DEHP. Because elevated HQs resulting from measured concentrations were limited to only one location and occurred only during 1994 (it was not repeated during 1995 at the same locations), a RGO is not proposed for DEHP.

The only **nonylphenol** detection was 5.4 ug/l and occurred at section EE08 (below the IWTP) during 1995. HQs for the maximum concentration NOAEL scenario ranged from about 4 to 5 for fish and invertebrates. HQs based on the LOAEL scenario were less than 0.6. TRVs used to develop these HQs also incorporated an uncertainty correction of 100. Due to the single hit for the nonyl phenols in the water column, the uncertainly associated with the TRV, and the relatively low HQs compared to other water column COECs, water column RGOs are not proposed for nonylphenols.

Heptachlor epoxide was measured above the detection limit at three locations: EE08 (0.14 ug/l), EE09 (0.098 ug/l) and EE10 (0.06 ug/l), all of which occurred during 1994. HQs ranged only as high as 2.6 for fish in the maximum concentration NOAEL scenario. Because the concentration was highest at EE08 and decreased in a downstream direction, the source of the heptachlor epoxide is likely in the vicinity of EE08 (i.e., the IWTP). EPA's ambient chronic water quality criterion for heptachlor epoxide is 0.0038 ug/l. This is below the detection limit for heptachlor epoxide of 0.05 ug/l. Because of the relatively low HQ compared to other water column COECs, and the fact that the water quality criterion is below the detection limit, a RGO is not proposed for heptachlor epoxide.

The only measured **dieldrin** concentration in water was an estimated (j-flagged) 0.072 ug/l at section EE05 in 1994. This resulted in HQs as high as 36 for invertebrates and 28 for fish (the detection limit for dieldrin [0.1 ug/l] is also above the TRVs for these organisms -- see Table 4-10). There were no other detectable levels of dieldrin in Soldier Creek during 1994 or 1995 in

the ecological investigations. The EPA water quality criterion for dieldrin is 0.0019 ug/l, which is below the detection limit for dieldrin. Because only a single estimated value was observed for dieldrin which occurred only in 1994, a RGO is not proposed for dieldrin.

As with many of the previously discussed organics, HQs for **PAHs** were driven largely by TRVs below the detection limit in water. Estimated values ("j"-flagged values) were reported at EE05 for phenanthrene (low molecular weight PAH); pyrene and fluoranthene (middle molecular weight PAHs); and chrysene, benzo(a)anthracene and benzo(k)fluoranthene (high molecular weight PAHs). An elevated value (above the detection limit) was reported at EW03 for pyrene in 1994, though concentrations were nondetect in 1995. It is interesting to note that these constituents were also the most commonly detected PAHs in sediments.

Of the PAHs detected, final chronic values (FCVs) have been developed by EPA for fluoranthene and phenanthrene in the process of developing sediment quality criteria. Final chronic values form the basis for chronic ambient water quality criteria, and therefore, present potential preliminary RGOs in the absence of other information. The FCVs for phenanthrene and fluoranthene are 6.325 ug/l and 6.156 ug/l, respectively.

There are no criteria or guidelines from which to establish preliminary RGOs for the remaining PAHs that were detected in surface water. The detection limit represents a limitation in interpreting potential risk, and in subsequently establishing RGOs as well. The detection limit reported for PAHs in the quarterly monitoring events and ecological studies was 10 ug/l. Given the limitation of the detection limit, but recognizing the potential risk posed by PAHs in the water column, an RGO of 10 ug/l is proposed for total PAHs in the water column.

L.4.2 SEDIMENTS

With the exception of a limited number of PAHs and pesticides, published sediment criteria or quality standards are generally not available. This is in large part because site-specific factors other than the bulk-sediment concentrations influence potential effects on the sediment environment. These include the chemical form of the contaminant; synergistic effects involving other constituents; structural and physiological attributes of the exposed biotic populations and communities; the physical stability of the sediment matrix; various aspects of

sediment chemistry (e.g., redox potential, organic carbon content, sulfide content); and various aspects of water quality (e.g., temperature, salinity, pH, hardness). In the absence of any published sediment criteria or sediment ARARs, preliminary risk-based sediment RGOs for specific COECs were developed. Moreover, a range of values is needed to support remedial decision making; that is, achieving the most protective bulk-sediment concentration may not be feasible for a variety of reasons. The risk manager needs a range of values to weigh all of the factors that need to be considered.

The following sections are divided into direct exposure and ingestion pathway exposures to sediments. Direct exposures are based on bulk sediment concentrations for inorganics and sediment pore water concentrations for organics. HQs for the direct exposures are summarized in Table L-1. A summary of the maximum HQs for the ingestion pathway scenario is presented in Table L-2. In the cases of inorganics where bioaccumulation from surface water played a major role, RGOs were not developed. Bioaccumulation represents an uncertainty for many of the inorganics in the ingestion exposure pathway. Specific approaches for derivation of preliminary sediment RGOs are discussed in the following sections.

L.4.2.1 Sediment Pore Water Inorganics - Direct Exposure

Pore water concentrations of inorganics could not be estimated in the absence of site-specific inorganic partitioning coefficients. However, bulk sediment concentrations of inorganics were compared to available sediment benchmarks, which were selected as TRVs in Table 5-4. These benchmarks should not be used as RGOs, but they provide an indication of potential or relative risk, and can be used to develop preliminary RGOs when viewed in conjunction with other information, such as benthic biodiversity discussed in section 2.1.2.2 and sediment toxicity information summarized in Tables 4-13 and 4-14. Table 4-14 suggests that chronic toxicity in sediments was predominantly limited to sections EE04 to EE09 in 1995. Sediment toxicity appeared more wide-spread during 1994, but the data suggest mitigation or reduction in sediment toxicity occurred between 1994 and 1995 (which may also be an indication of the resiliency of the system and relatively rapid recovery from system perturbations). Examination of Table 5-4 indicates that cadmium has the largest HQs (168 to 343 at EE05 and EE06) for inorganics in sediments. Copper (HQ = 150) and cyanide (HQ = 62) are also relatively high at EE05, as well as nickel at EW01 (HQ = 110). Lead, silver, vanadium, and zinc represent other

contributors to risk among the sediment inorganics. Preliminary inorganic RGOs were selected based on focusing on three of the primary risk drivers, i.e., cadmium, copper, and nickel.

The highest HQs for most COECs were generally located at sections EE05, EE06 and EW01. Of import here is that sediment toxicity during 1995 measured at EW01 was similar to that in the reference stream (Crutcho Creek). The NOEC for both EW01 and the Crutcho Creek was 100%, though survival was slightly less at EW01 (see Section 4.2.3). In fact, invertebrate richness at EW01 was greater than in the reference stream (Table 2-2). EW01 presents a unique location where "elevated" concentrations of cadmium, copper, and nickel were observed (that resulted in elevated HQs) as compared to most other sections of Soldier Creek, but where there is little to no impact on the benthic community based on comparison to locally available reference information. Therefore, concentrations of COECs in sediment at EW01 were used as guides for estimating preliminary RGOs for selected inorganics. This approach reduces the uncertainty inherent in interpreting benchmarks and takes into account site-specific characteristics. However, there is also uncertainty in the context of the appropriateness of the reference stream. In the absence of other information, and using concentrations measured at EW01 as guides, the following preliminary RGOs are presented:

Cadmium	4.8 mg/kg (dry wt)
Copper	89.5 mg/kg (dry wt)
Nickel	316 mg/kg (dry wt)

Note that the concentrations measured at EW01 in 1995 (Appendices C and D) were substantially less than those measured in 1994. The concentrations presented as preliminary RGOs represent concentrations measured at EW01 during 1995. As a comparison, the proposed RGO for copper is less than the sediment quality criterion developed by the Wisconsin DNR (100 mg/kg). The RGO proposed for cadmium is above the Wisconsin DNR sediment quality criterion of 1 mg/kg, and intermediate between the low (0.6 mg/kg) and severe (10 mg/kg) effects levels of the Ontario Ministry of the Environment. The proposed RGO for nickel exceeds the Wisconsin DNR sediment quality criterion of 100 mg/kg.

L.4.2.2 Sediment Pore Water Organics - Direct Exposure

Sediment pore-water organics were examined by estimating the concentration of the organics in pore water using equilibrium partitioning. The approach is discussed in Section 4.1.3.1. Results are discussed in Sections 5.1.1.3 and 5.1.1.4 and Tables 5-3 and 5-5. Primary risk drivers are organochlorine pesticides, PAHs and PCBs. Benzidine, and to lesser extent other constituents such as nonyl phenols also contributed to risk. Preliminary RGOs are presented for the pesticides, PAHs, and PCBs under the assumption that a reduction in risk from the major risk drivers will result in a concurrent reduction in risk to constituents of lesser concern.

High HQs for the organochlorine pesticides are the result of TRVs less than detection limits at many stream sections, with the key exceptions of EE05 and EE08. For example, though relatively high HQs were calculated, heptachlor epoxide, methoxychlor, and endosulfan sulfate were not detected in sediments during the ecological investigations. High HQs resulted because one-half detection limits were used in the HQ calculations. Alpha chlordane was detected only at EE05, delta BHC was detected only at EE08, and dieldrin was detected at both EE05 and EE08. Heptachlor was somewhat more ubiquitous than the other pesticides, and was measured at EE05 through EE10. The HQs calculated for EE05 and EE08 (discounting endosulfan sulfate because it was a nondetect) were dominated by dieldrin. Therefore, dieldrin is proposed as a guide for preliminary RGO development, since not only is it a major risk driver for the organopesticides, but a sediment quality criteria document also exists (EPA 1993). The sediment criterion is 11 ug dieldrin/g organic carbon (0.11 mg/kg assuming 1% organic carbon).

HQs associated with PAHs and PCBs were also elevated, and unlike most of the pesticides, were rather ubiquitous. Sediment quality criteria are available for the following PAHs (EPA 1993):

- acenaphthene 130 ug/g oc
- phenanthrene 180 ug/g oc
- fluoranthene 620 ug/g oc

These are proposed as preliminary RGOs for the PAHs under the assumption that if concentrations of these specific PAHs are reduced, there would be concurrent reductions in other PAHs (as well as other COECs). This is a reasonable assumption in the context that acenaphthene, phenanthrene, and fluoranthene represent prevalent PAHs measured in the Soldier Creek system. This assumption is limited in that it does not take into account potential toxic additivity of multiple other PAHs. However, fluoranthene and phenanthrene may represent the best guides in that not only are they prevalent, but they also represent some of the highest concentrations measured among the PAHs.

There are no formal sediment quality criteria for PCBs. An approach similar to that used for the inorganics in sediments was used for PCBs (see Section L.4.2.1). As discussed in Section L.4.2.1 (see also Section 4.2.3), sediment toxicity during 1995 observed at EW01 was similar to that in the reference stream (the NOEC for both EW01 and the reference stream was 100%, though survival was slightly less at EW01). Invertebrate richness at EW01 was greater than in the reference stream. The total PCB concentration at EW01 in 1995 was 5.5 mg/kg, and is recommended as the preliminary RGO. Expressed as a function of the organic carbon (56,200 mg/kg), this converts to an organic carbon-normalized PCB concentration of 91 ug PCB/ g organic carbon.

L.4.2.3 Sediment Inorganic COECs - Ingestion Pathway

Antimony, cobalt, cyanide and silver all had low HQs compared to the remaining inorganic COECs. The maximum HQs observed for these COECs were: antimony, 3.4; cobalt, 1.5; cyanide, 1.5; and silver, 0.2. The general approach for deriving preliminary RGOs for other inorganic COECs in sediments was conducted in the following manner:

- For inorganics where bioaccumulation to biota was the dominant contribution to the applied daily dose (ADD), RGOs for sediments were not developed because bioaccumulation to biota was based on concentrations in water rather than sediments. Concentrations in water could not be numerically associated with sediment concentrations in the absence of site-specific sediment inorganics partitioning information.

- For inorganics where sediment, crayfish and/or water ingestion provided a major contribution to the ADD, HQ derivations for each COEC in each study stream

section were examined to identify whether specific locations had HQs near 1 for LOAEL and NOAEL TRV scenarios. If these existed, then the corresponding COEC concentrations presented for water and/or bulk-sediment were chose as the concentrations upon which to base preliminary RGOs.

- If the HQs (for mean-max/NOAEL-LOAEL scenarios) at stream sections did not bracket an HQ of 1, then an iterative procedure was used to enter calculations into the spreadsheet model until an HQ of approximately 1 was attained, and that concentration was used as the preliminary RGO.

The contribution of various dietary items, sediment and water to the ADD are important in assessing the specific pathway of uptake (e.g., from plants or invertebrates *versus* from sediments). The average percent dietary contribution from each dietary item for inorganics are presented for each of the receptors in Appendix I and are summarized below.

COEC	Receptor(s) at Highest Risk	Primary Diet Items Contributing to ADD
Arsenic	Muskrat	Plants (99%)
Cadmium	Muskrat	Plants (66%) Crayfish (10%) Sediment (24%)
Chromium	Red-Winged Blackbird	Plants (82%) Invertebrates* (18%)
Lead	Green Heron	Sediment (35%) Invertebrates* (48%) Crayfish (16%)
Mercury	Green Heron	Invertebrates* (97%)
Molybdenum	Muskrat	Plants (91%)
Nickel	Green Heron	Sediments (58%) Invertebrates* (24%) Crayfish (17%)
Selenium	Red-winged Blackbird	Plants (93%)

* includes terrestrial invertebrates and aquatic invertebrates other than crayfish

Risk associated with several of these inorganic COECs consisted mostly of ingestion of invertebrates (other than crayfish) and/or plants. These include **arsenic**, **cadmium, chromium**, **mercury**, **molybdenum**, and **selenium**. This is an important distinction in interpreting the HQs, since the modeling approach used for estimating tissue concentrations in invertebrates and plants was based on applying a BCF to a surface water concentration. As indicated previously, sediment RGOs could not be developed for these constituents in the absence of sediment-partitioning information. Thus, toxicity contribution from these inorganics in sediments remains an uncertainty. Collection of plant and invertebrate data in the field would reduce the uncertainty, and would likely reduce the risk estimated using the "desktop" approach.

The remaining inorganic COECs consist of lead and nickel silver. Each of these COECs had relatively large contributions to the ADD from sediments and/or crayfish. Derivation of sediment RGOs for lead and nickel are discussed below.

Lead

Lead was calculated to present the greatest risk to the green heron. Contributions to the ADD were from a variety of sources, including sediment, crayfish and other invertebrates. Base on a LOAEL scenario (Table I-54), a sediment concentration of about 57 mg/kg (wet wt) and a water concentration of 5 mg/l resulted in an HQ of about 1. All NOAEL HQs were greater than 1 at section EE09. The iterative procedure discussed previously was used to estimate a sediment concentration that would achieve an HQ of 1. Results are shown in Table L-3. Initially, water, crayfish and sediment concentrations were input as the lowest mean values measured among all stations, which resulted in an HQ of 2.3 (shown as HQ Estimator 1 in Table L-3). The water and sediment concentrations were subsequently lowered until an HQ of 1 was reached. The model output suggests that a lead concentration in sediment must reach 1 mg/kg (wet wt) with a water concentration of 0.5 mg/l before a concurrent reduction to an HQ of 1 is reached for the green heron. This is an extremely low value. As a comparison, the concentrations of lead in sediments in the reference stream (Crutcho Creek) averaged about 12 mg/kg (dry wt).

Nickel

The green heron was also the most at risk with respect to nickel. Based on a LOAEL, an HQ of about 1 was associated with EE05 at a sediment concentration of 200 mg/kg (wet wt)(Table I-64). A NOAEL-based HQ of 1.6 was calculated at EE01 at a sediment concentration of 6.9 mg/kg (wet wt)(Table I-63). An estimated sediment concentration of 5 mg/kg

(wet wt) was subsequently found to reduce the HQ to 1 based on the NOAEL, assuming a crayfish tissue concentration of 1 mg/kg and concurrent reduction in the water concentration to 10 ug/l (Table L-4). As a comparison, the average concentration of nickel in Crutcho Creek was 9 mg/kg (dry wt).

A summary of preliminary bulk-sediment RGOs associated with these inorganic constituents is presented in the following table:

COEC	NOAEL-Based RGO (mg/kg wet wt)	LOAEL-based RGO (mg/kg wet wt)
Lead	1	57
Nickel	5	200

L.4.2.4 Sediment Organic COECs - Ingestion Pathway

Risk due to ingestion of organic contamination in sediments was driven by a small group of organic COECs, specifically PCBs and high molecular weight PAHs, both of which were rather ubiquitous. Localized risk was suggested with the organopesticides, primarily at stream section EE05. The highest risk among this group was due to heptachlor epoxide (Table L-2). However, as noted in Section L.4.2.2, heptachlor epoxide was not detected in either of the ecological investigations. Of the organics that were detected, the primary risk drivers were PCBs, heptachlor, and high molecular weight PAHs. Preliminary RGOs were developed on the premise that remediation of COECs driving the risk would concurrently reduce risk associated with COECs presenting low risk, as long as the COECs had similar fate and transport mechanisms, which is the case with all of the ingestion pathway organic COECs.

The most sensitive receptor to heptachlor was the red-winged blackbird. A closer examination of heptachlor (as with all the organopesticides) indicates that the primary contribution to the ADD in red-winged blackbirds is via ingestion of terrestrial invertebrates (99% at EE05 from Table I-197). Tissue concentrations in these dietary items were calculated based on bioconcentration from pore water. Field-measured concentrations in crayfish tissue were much

lower than those calculated for terrestrial invertebrates in the model, suggesting an overestimation of heptachlor in invertebrate tissues. Using concentrations measured at stream section EE05 as an example (since the highest HQs occurred at EE05), and if the crayfish tissue concentration is substituted for the modeled concentration in terrestrial invertebrates (and all other concentrations at EE05 remain unchanged) then the resulting NOAEL-based HQ is only 0.19 (Table L-5, HQ Estimator 2). This indicates that the modeling approach overestimates risk associated with ingestion of organopesticides. Risk is likely much greater to the aquatic inhabitants via direct exposure rather than through ingestion by terrestrial receptors. Therefore, an RGO is not presented for heptachlor. The RGO presented for PAHs and dieldrin in Section L.4.2.2 will reduce risk associated with ingestion-pathway exposures of organopesticides as well.

The most sensitive organism to ingestion-pathway PCB exposure was the raccoon (Table L-2). The ADD was comprised of 39% from terrestrial invertebrates, 33% from reptiles and amphibians, and 22% from birds (Table I-397). Using data from stream section EW02 (since the highest crayfish PCB concentrations were measured there), if the crayfish is used as a surrogate for the aquatic and terrestrial invertebrates, but the other dietary concentrations remain unchanged (as calculated through bioaccumulation in the model), then resulting HQs range from about 0.9 to 9 for the LOAEL and NOAEL scenarios where the sediment concentration is 0.68 mg/kg (wet wt) as shown in Table L-6. It is unlikely that ingestion exposure risks are as great as direct exposure to aquatic receptors (HQs were much higher for direct exposures as presented in Table L-1). A sediment concentration of 91 ug/g organic carbon was proposed as an RGO in Section L.4.2.2 based on direct exposures, and should be protective of indirect (ingestion pathway) exposures as well.

The most sensitive organism to the high molecular weight PAHs was the muskrat. The primary dietary contribution was from reptiles and amphibians, birds and mammals, which provided 99% of the ADD (Table I-327). Tissue concentrations in these dietary items were based on concentrations in the surface water and subsequent application of bioconcentration factors and food-chain multipliers. Thus, modification of the sediment concentration has little to no impact on calculated HQs. To examine potential water concentrations that would be necessary to reduce the HQs to the muskrat, an iterative procedure was used similar to that discussed in Section L.4.2.3. As shown in Table L-7, The water concentration necessary to result in HQs of

about 1 were 0.3 ug/l (NOAEL) to 4 ug/l (LOAEL). Preliminary RGOs of about 6 to 10 ug/l were presented for PAHs for surface water in Section 6.1. It is likely that aquatic organisms incurring direct exposures to PAHs are at greater risk than receptors via an ingestion pathway. Because of the conservatism and uncertainty in the HQ approach for the ingestion pathway, the surface water RGOs are believed satisfactory for the ingestion pathway exposures as well.

As noted previously, from a practical perspective it is not necessary to derive RGOs for each COEC. Any remedial action that is likely to succeed in achieving a PCB concentration of 91 mg/g carbon, a dieldrin concentration of 11 ug/g carbon, and individual PAH concentrations ranging from 130 to 620 ug/g organic carbon (Section L.4.2.2), would concomitantly reduce the bulk-sediment concentrations of other COECs (including several metals and other pesticides).

L.4.3 SUMMARY OF PRELIMINARY RGOs

A summary of preliminary RGOs from the preceding text is presented in the following table:

PRELIMINARY RGO SUMMARY		
COEC	**SURFACE WATER**	**SEDIMENT**
Aluminum	748 mg/l	
Cadmium	2.9 mg/l	4.8 mg/kg (dry wt)
Chromium	50 mg/l	54.8 mg/kg (dry wt)
Copper*	35.5 mg/l	89.5 mg/kg (dry wt)
Iron	1,000 mg/l	
Lead*	14.9 mg/l	1 mg/kg (NOAEL) to 56 mg/kg (LOAEL) (wet wt)
Molybdenum	670 mg/l	

PRELIMINARY RGO SUMMARY		
COEC	**SURFACE WATER**	**SEDIMENT**
Nickel*		5 mg/kg (NOAEL) to 200 mg/kg (LOAEL) (wet wt)
Zinc*	291 mg/l	
Dieldrin		11 ug/g organic carbon
PCBs		91 ug/g organic carbon
PAHs Acenapthene Phenanthrene Fluoranthene		 130 ug/g organic carbon 180 ug/g organic carbon 620 ug/g organic carbon

* RGO for water based on an assumed hardness of 100 mg/l and should be adjusted to site-specific hardness

These RGOs are presented as preliminary chemical-specific numerical cleanup alternatives. Development of RGOs based solely on HQs is likely overly conservative due to the inherent conservatism in the HQ approach.

Potential remedial actions (i.e., removal, isolation) have not been considered during RGO development. Issues such as practical attainability, the potential for contributing to rather than reducing risk, and natural attenuation have not been taken into consideration during development of preliminary RGOs. RGOs should be further refined as part of the remedial process by taking into account such issues.

TABLE L-1
MAXIMUM HAZARD QUOTIENTS WITHIN SOLDIER CREEK
(Direct Exposure)

COEC	Endpoint	Conc.	SURFACE WATER				PORE WATER	
			Fish	Inverts	Algae	Micro	Inverts	Plants
Aluminum	NOAEL	mean	2.815	0.479	7.283	DG	DG	DG
	NOAEL	max	4.790	0.814	12.391	DG	DG	DG
	LOAEL	mean	0.282	0.223	0.728	DG		
	LOAEL	max	0.479	0.380	1.239	DG		
Antimony	NOAEL	mean	0.033	0.053	0.188	DG	NA	NA
	NOAEL	max	0.040	0.064	0.225	DG	NA	NA
	LOAEL	mean	0.016	0.005	0.061	DG		
	LOAEL	max	0.019	0.006	0.074	DG		
Arsenic	NOAEL	mean	1.304	2.583	24.219	DG	0.900	0.900
	NOAEL	max	2.580	5.111	47.917	DG	1.450	1.450
	LOAEL	mean	0.130	0.258	2.422	DG		
	LOAEL	max	0.258	0.511	4.792	DG		
Barium	NOAEL	mean	9.224	0.922	2.140	DG	NA	NA
	NOAEL	max	11.207	1.121	2.600	DG	NA	NA
	LOAEL	mean	0.922	0.092	0.214	DG		
	LOAEL	max	1.121	0.112	0.260	DG		
Cadmium	NOAEL	mean	11.857	415.000	41.500	DG	257.5	257.5
	NOAEL	max	14.000	490.000	49.000	DG	343.3	343.3
	LOAEL	mean	4.770	41.500	4.150	DG		
	LOAEL	max	5.632	49.000	4.900	DG		
Chromium	NOAEL	mean	4.304	51.370	157.500	0.063	29.8	29.8
	NOAEL	max	5.739	68.493	210.000	0.084	49.2	49.2
	LOAEL	mean	0.430	5.137	15.750	0.006		
	LOAEL	max	0.574	6.849	21.000	0.008		
Cobalt	NOAEL	mean	0.024	1.786	0.025	DG	1.5	1.5
	NOAEL	max	0.024	1.786	0.025	DG	2.7	2.7
	LOAEL	mean	0.013	0.538	0.001	DG		
	LOAEL	max	0.013	0.538	0.001	DG		
Copper	NOAEL	mean	200.000	7.000	1400.000	1.400	76.5	76.5
	NOAEL	max	214.286	7.500	1500.000	1.500	150.0	150.0
	LOAEL	mean	20.000	4.667	140.000	0.140		
	LOAEL	max	21.429	5.000	150.000	0.150		
Cyanide	NOAEL	mean	6.410	12.500	1.667	DG	36.0	36.0
	NOAEL	max	6.410	12.500	1.667	DG	62.0	62.0
	LOAEL	mean	0.641	1.250	0.167	DG		
	LOAEL	max	0.641	1.250	0.167	DG		
Iron	NOAEL	mean	7.462	0.070	0.970	DG	NA	NA
	NOAEL	max	13.077	0.123	1.700	DG	NA	NA
	LOAEL	mean	0.746	0.007	0.097	DG		
	LOAEL	max	1.308	0.012	0.170	DG		
Lead	NOAEL	mean	8.660	272.500	0.327	1.635	5.2	5.2
	NOAEL	max	15.890	500.000	0.600	3.000	9.2	9.2
	LOAEL	mean	0.866	27.250	0.033	0.164		
	LOAEL	max	1.589	50.000	0.060	0.300		

TABLE L-1
MAXIMUM HAZARD QUOTIENTS WITHIN SOLDIER CREEK
(Direct Exposure)

COEC	Endpoint	Conc.	SURFACE WATER				PORE WATER	
			Fish	Inverts	Algae	Micro	Inverts	Plants
Manganese	NOAEL	mean	44.750	44.750	0.134	DG	1.9	1.9
	NOAEL	max	83.333	83.333	0.250	DG	2.6	2.6
	LOAEL	mean	4.475	4.475	0.013	DG		
	LOAEL	max	8.333	8.333	0.025	DG		
Mercury	NOAEL	mean	0.242	1.923	1.250	DG	2.5	2.5
	NOAEL	max	0.242	1.923	1.250	DG	4.8	4.8
	LOAEL	mean	0.024	0.192	0.125	DG		
	LOAEL	max	0.024	0.192	0.125	DG		
Molybdenum	NOAEL	mean	7.045	0.704	9.440	DG	5.2	5.2
	NOAEL	max	12.687	1.269	17.000	DG	9.7	9.7
	LOAEL	mean	4.104	0.410	0.944	DG		
	LOAEL	max	7.391	0.739	1.700	DG		
Nickel	NOAEL	mean	19.714	0.556	0.017	6.900	140.2	140.2
	NOAEL	max	28.286	0.798	0.025	9.900	260.6	260.6
	LOAEL	mean	1.971	0.056	0.009	0.690		
	LOAEL	max	2.829	0.080	0.012	0.990		
Selenium	NOAEL	mean	2.689	1.327	2.375	DG	0.7	0.7
	NOAEL	max	4.982	2.458	4.400	DG	1.2	1.2
	LOAEL	mean	0.269	0.133	0.238	DG		
	LOAEL	max	0.498	0.246	0.440	DG		
Silver	NOAEL	mean	0.008	0.577	0.050	0.050	28.6	28.6
	NOAEL	max	0.013	0.962	0.083	0.083	48.4	48.4
	LOAEL	mean	0.001	0.058	0.005	0.005		
	LOAEL	max	0.001	0.096	0.008	0.008		
Vanadium	NOAEL	mean	2.813	0.239	0.023	0.023	24.0	24.0
	NOAEL	max	3.875	0.330	0.031	0.031	40.6	40.6
	LOAEL	mean	0.281	0.024	0.002	0.002		
	LOAEL	max	0.388	0.033	0.003	0.003		
Zinc	NOAEL	mean	1.549	13.589	21.167	0.127	6.8	6.8
	NOAEL	max	2.073	18.190	28.333	0.170	11.5	11.5
	LOAEL	mean	0.155	1.359	2.117	0.013		
	LOAEL	max	0.207	1.819	2.833	0.017		
Acetone	NOAEL	mean	0.000	0.120	0.104	NA	1.856	1.616
	NOAEL	max	0.000	0.190	0.165	NA	2.568	2.235
	LOAEL	mean	0.000	0.012	0.010	NA	0.257	0.223
	LOAEL	max	0.000	0.019	0.017	NA	0.257	0.223
Carbon Disulfide	NOAEL	mean	0.002	0.002	0.001	NA	0.010	DG
	NOAEL	max	0.002	0.002	0.001	NA	0.011	DG
	LOAEL	mean	0.001	0.000	0.000	NA	0.001	DG
	LOAEL	max	0.001	0.000	0.000	NA	0.002	DG
Toluene	NOAEL	mean	0.003	0.014	0.146	NA	0.002	0.022
	NOAEL	max	0.005	0.025	0.266	NA	0.003	0.027
	LOAEL	mean	0.002	0.002	0.015	NA	0.000	0.002
	LOAEL	max	0.004	0.004	0.027	NA	0.000	0.003

TABLE L-1
MAXIMUM HAZARD QUOTIENTS WITHIN SOLDIER CREEK
(Direct Exposure)

COEC	Endpoint	Conc.	SURFACE WATER				PORE WATER	
			Fish	Inverts	Algae	Micro	Inverts	Plants
Methylene Chloride	NOAEL	mean	0.005	0.002	0.000	NA	0.005	0.001
	NOAEL	max	0.007	0.003	0.000	NA	0.006	0.001
	LOAEL	mean	0.000	0.000	0.000	NA	0.000	0.000
	LOAEL	max	0.001	0.000	0.000	NA	0.001	0.000
Total Xylenes	NOAEL	mean	0.168	0.259	DG	NA	0.484	DG
	NOAEL	max	0.305	0.472	DG	NA	0.500	DG
	LOAEL	mean	0.017	0.026	DG	NA	0.048	DG
	LOAEL	max	0.030	0.047	DG	NA	0.050	DG
Chlorobenzene	NOAEL	mean	27.500	0.010	0.000	NA	0.005	0.000
	NOAEL	max	50.000	0.018	0.000	NA	0.007	0.000
	LOAEL	mean	2.750	0.006	0.000	NA	0.003	0.000
	LOAEL	max	5.000	0.010	0.000	NA	0.004	0.000
1,4-Dichlorobenzene	NOAEL	mean	0.190	0.017	0.313	NA	0.455	8.525
	NOAEL	max	0.190	0.017	0.313	NA	0.586	10.982
	LOAEL	mean	0.019	0.005	0.031	NA	0.147	0.853
	LOAEL	max	0.019	0.005	0.031	NA	0.189	1.098
Chlorinated Aromatic	NOAEL	mean	0.000	0.000	DG	NA	6.048	DG
Hydrocarbons	NOAEL	max	0.000	0.000	DG	NA	11.266	DG
	LOAEL	mean	0.000	0.000	DG	NA	0.605	DG
	LOAEL	max	0.000	0.000	DG	NA	1.127	DG
2,4-Dimethylphenol	NOAEL	mean	0.064	0.003	0.002	NA	0.300	0.207
	NOAEL	max	0.064	0.003	0.002	NA	0.550	0.379
	LOAEL	mean	0.006	0.000	0.000	NA	0.030	0.021
	LOAEL	max	0.006	0.000	0.000	NA	0.055	0.038
Pentachlorophenol	NOAEL	mean	138.889	19.231	31.250	NA	79.878	54.654
	NOAEL	max	138.889	19.231	31.250	NA	104.668	71.615
	LOAEL	mean	13.889	1.923	3.125	NA	7.988	5.465
	LOAEL	max	13.889	1.923	3.125	NA	10.467	7.162
Phenol & Substituted	NOAEL	mean	9.929	15.444	0.005	NA	46.667	0.088
Phenols	NOAEL	max	12.714	19.778	0.006	NA	46.667	0.160
	LOAEL	mean	0.993	1.544	0.000	NA	4.667	0.009
	LOAEL	max	1.271	1.978	0.001	NA	4.667	0.016
Nonyl Phenols	NOAEL	mean	2.000	2.700	DG	NA	21.000	DG
	NOAEL	max	4.000	5.400	DG	NA	21.000	DG
	LOAEL	mean	0.200	0.270	DG	NA	2.100	DG
	LOAEL	max	0.400	0.540	DG	NA	2.100	DG
Phthalates	NOAEL	mean	0.098	23.684	9.844	NA	0.006	0.056
	NOAEL	max	0.181	43.609	18.125	NA	0.006	0.056
	LOAEL	mean	0.010	2.363	0.984	NA	0.001	0.006
	LOAEL	max	0.018	4.351	1.813	NA	0.001	0.006
Total PCBs	NOAEL	mean	234.375	166.667	75.000	NA	1266.667	570.000
	NOAEL	max	312.500	222.222	100.000	NA	1266.667	570.000
	LOAEL	mean	23.438	16.667	7.500	NA	126.667	57.000
	LOAEL	max	31.250	22.222	10.000	NA	126.667	57.000

TABLE L-1
MAXIMUM HAZARD QUOTIENTS WITHIN SOLDIER CREEK
(Direct Exposure)

COEC	Endpoint	Conc.	SURFACE WATER				PORE WATER	
			Fish	Inverts	Algae	Micro	Inverts	Plants
Aldrin	NOAEL	mean	2.778	25.773	DG	NA	15151.363	DG
	NOAEL	max	2.778	25.773	DG	NA	15872.856	DG
	LOAEL	mean	0.278	2.577	DG	NA	1515.136	DG
	LOAEL	max	0.278	2.577	DG	NA	1587.286	DG
alpha-Chlordane	NOAEL	mean	0.862	1.000	DG	NA	1637.184	DG
	NOAEL	max	0.862	1.000	DG	NA	2240.000	DG
	LOAEL	mean	0.086	0.100	DG	NA	163.718	DG
	LOAEL	max	0.086	0.100	DG	NA	224.000	DG
Dieldrin	NOAEL	mean	23.462	30.500	0.061	NA	93000.000	186.000
	NOAEL	max	27.692	36.000	0.072	NA	93000.000	186.000
	LOAEL	mean	2.346	3.050	0.006	NA	9300.000	18.600
	LOAEL	max	2.769	3.600	0.007	NA	9300.000	18.600
Heptachlor	NOAEL	mean	3.571	5.000	0.089	NA	11200.000	198.582
	NOAEL	max	3.571	5.000	0.089	NA	11200.000	198.582
	LOAEL	mean	0.357	0.500	0.009	NA	1120.000	19.858
	LOAEL	max	0.357	0.500	0.009	NA	1120.000	19.858
Heptachlor epoxide	NOAEL	mean	1.557	0.069	0.293	NA	22.287	94.836
	NOAEL	max	2.642	0.117	0.496	NA	23.348	99.352
	LOAEL	mean	0.156	0.007	0.029	NA	2.229	9.484
	LOAEL	max	0.264	0.012	0.050	NA	2.335	9.935
alpha & delta BHC	NOAEL	mean	0.003	0.038	0.000	NA	118.7	0.771
	NOAEL	max	0.003	0.038	0.000	NA	124.3	0.808
	LOAEL	mean	0.000	0.004	0.000	NA	11.9	0.077
	LOAEL	max	0.000	0.004	0.000	NA	12.4	0.081
Endosulfan Sulfate	NOAEL	mean	31.250	312.500	DG	NA	1179905.6	DG
	NOAEL	max	31.250	312.500	DG	NA	1375000.0	DG
	LOAEL	mean	3.125	31.250	DG	NA	117990.6	DG
	LOAEL	max	3.125	31.250	DG	NA	137500.0	DG
Methoxychlor	NOAEL	mean	8.088	68.750	DG	NA	50000.0	DG
	NOAEL	max	14.706	125.000	DG	NA	50000.0	DG
	LOAEL	mean	0.809	6.875	DG	NA	5000.0	DG
	LOAEL	max	1.471	12.500	DG	NA	5000.0	DG
Benzidine	NOAEL	mean	0.238	4.167	DG	NA	2393.5	DG
	NOAEL	max	0.238	4.167	DG	NA	3085.0	DG
	LOAEL	mean	0.024	0.417	DG	NA	239.4	DG
	LOAEL	max	0.024	0.417	DG	NA	308.5	DG
Phosphine sulfide, triphenyl	NOAEL	mean	0.025	0.253	DG	NA	0.000	DG
	NOAEL	max	0.034	0.335	DG	NA	0.000	DG
	LOAEL	mean	0.003	0.025	DG	NA	0.000	DG
	LOAEL	max	0.003	0.034	DG	NA	0.000	DG
Low MW PAHs	NOAEL	mean	480.315	95.313	184.848	NA	8919.4	17298.2
	NOAEL	max	566.929	112.500	218.182	NA	10559.8	20479.5
	LOAEL	mean	48.031	9.531	18.485	NA	891.9	1729.8
	LOAEL	max	56.693	11.250	21.818	NA	1056.0	2048.0

TABLE L-1
MAXIMUM HAZARD QUOTIENTS WITHIN SOLDIER CREEK
(Direct Exposure)

COEC	Endpoint	Conc.	SURFACE WATER				PORE WATER	
			Fish	Inverts	Algae	Micro	Inverts	Plants
Middle MW PAHs	NOAEL	mean	478.873	850.000	0.821	NA	6500.0	6.3
	NOAEL	max	887.324	1575.000	1.522	NA	6500.0	6.3
	LOAEL	mean	47.887	85.000	0.082	NA	650.0	0.6
	LOAEL	max	88.732	157.500	0.152	NA	650.0	0.6
High MW PAHs	NOAEL	mean	150.000	300.000	300.000	NA	1240.0	1240.0
	NOAEL	max	150.000	300.000	300.000	NA	1560.7	1560.7
	LOAEL	mean	15.000	30.000	30.000	NA	124.0	124.0
	LOAEL	max	15.000	30.000	30.000	NA	156.1	156.1

NA - Organism(s) were not selected as an endpoint for this COEC.

DG - Data Gap

TABLE L-2
MAXIMUM HAZARD QUOTIENTS WITHIN SOLDIER CREEK
(Ingestion Pathway Scenario)

COEC	Endpoint	Data	Green Heron	Red-Winged Blackbird	Muskrat	Raccoon
Antimony	NOAEL	Mean	1.2	2.8	0.0	0.0
	NOAEL	Max	1.4	3.4	0.0	0.0
	LOAEL	Mean	0.1	0.3	0.0	0.0
	LOAEL	Max	0.1	0.3	0.0	0.0
Arsenic	NOAEL	Mean	0.0	1.2	43.4	0.2
	NOAEL	Max	0.0	2.4	85.6	0.3
	LOAEL	Mean	0.0	1.2	4.3	0.0
	LOAEL	Max	0.0	2.4	8.6	0.0
Cadmium	NOAEL	Mean	1.0	1.9	6.2	1.0
	NOAEL	Max	1.2	2.2	7.5	1.3
	LOAEL	Mean	0.1	0.2	0.6	0.1
	LOAEL	Max	0.1	0.2	0.8	0.1
Chromium	NOAEL	Mean	9.6	79.4	0.6	2.4
	NOAEL	Max	12.1	105.8	0.9	3.0
	LOAEL	Mean	1.0	7.9	0.6	0.2
	LOAEL	Max	1.2	10.6	0.9	0.3
Cobalt	NOAEL	Mean	1.1	1.4	1.0	0.3
	NOAEL	Max	1.4	1.4	1.4	0.5
	LOAEL	Mean	0.1	0.1	0.1	0.0
	LOAEL	Max	0.1	0.1	0.1	0.0
Cyanide	NOAEL	Mean	1.1	0.0	0.4	0.0
	NOAEL	Max	1.5	0.0	0.6	0.0
	LOAEL	Mean	0.1	0.0	0.0	0.0
	LOAEL	Max	0.2	0.0	0.1	0.0
Lead	NOAEL	Mean	22.7	0.4	0.2	0.0
	NOAEL	Max	37.4	0.7	0.4	0.0
	LOAEL	Mean	2.3	0.1	0.0	0.0
	LOAEL	Max	3.7	0.2	0.0	0.0
Mercury	NOAEL	Mean	45.8	1.5	0.2	2.2
	NOAEL	Max	45.9	1.5	0.2	2.3
	LOAEL	Mean	4.6	1.0	0.0	0.2
	LOAEL	Max	4.6	1.0	0.0	0.2
Molybdenum	NOAEL	Mean	NA	NA	148.4	11.0
	NOAEL	Max	NA	NA	267.0	19.6
	LOAEL	Mean	NA	NA	14.8	1.1
	LOAEL	Max	NA	NA	26.7	2.0
Nickel	NOAEL	Mean	50.5	20.8	5.0	0.0
	NOAEL	Max	87.2	29.8	8.5	0.1
	LOAEL	Mean	5.1	2.1	5.0	0.0
	LOAEL	Max	8.7	3.0	8.5	0.0
Selenium	NOAEL	Mean	0.4	10.2	10.0	0.4
	NOAEL	Max	0.7	18.9	18.5	0.8
	LOAEL	Mean	0.3	8.4	4.9	0.2
	LOAEL	Max	0.6	15.6	9.0	0.4

TABLE L-2
MAXIMUM HAZARD QUOTIENTS WITHIN SOLDIER CREEK
(Ingestion Pathway Scenario)

COEC	Endpoint	Data	Green Heron	Red-Winged Blackbird	Muskrat	Raccoon
Silver	NOAEL	Mean	0.0	0.0	0.1	0.0
	NOAEL	Max	0.0	0.0	0.2	0.0
	LOAEL	Mean	0.0	0.0	0.0	0.0
	LOAEL	Max	0.0	0.0	0.0	0.0
Pentachlorophenol	NOAEL	Mean	NA	NA	0.3	0.3
	NOAEL	Mean	NA	NA	0.3	0.4
	NOAEL	Mean	NA	NA	0.2	0.2
	NOAEL	Mean	NA	NA	0.2	0.2
Total PCBs	NOAEL	Mean	14.6	17.1	0.2	27.2
	NOAEL	Mean	16.9	17.1	0.2	31.7
	NOAEL	Mean	11.4	13.3	0.1	2.7
	NOAEL	Mean	13.1	13.3	0.2	3.2
Aldrin	NOAEL	Mean	26.9	57.7	0.0	3.8
	NOAEL	Mean	28.2	60.5	0.0	4.0
	NOAEL	Mean	2.7	5.8	0.0	0.4
	NOAEL	Mean	2.8	6.0	0.0	0.4
alpha-Chlordane	NOAEL	Mean	5.6	11.9	0.0	0.2
	NOAEL	Mean	7.6	16.3	0.0	0.3
	NOAEL	Mean	5.6	11.9	0.0	0.2
	NOAEL	Mean	7.6	16.3	0.0	0.3
Dieldrin	NOAEL	Mean	2.3	4.8	0.4	2.4
	NOAEL	Mean	2.4	4.8	0.5	2.6
	NOAEL	Mean	0.2	0.5	0.4	0.2
	NOAEL	Mean	0.2	0.5	0.5	0.3
Heptachlor	NOAEL	Mean	11.5	24.7	0.0	1.2
	NOAEL	Mean	11.5	24.7	0.0	1.2
	NOAEL	Mean	1.1	2.5	0.0	0.1
	NOAEL	Mean	1.1	2.5	0.0	0.1
Heptachlor epoxide	NOAEL	Mean	85.3	184.3	0.1	0.4
	NOAEL	Mean	89.4	193.1	0.1	0.5
	NOAEL	Mean	60.9	131.6	0.0	0.3
	NOAEL	Mean	63.8	137.9	0.0	0.3
Endosulfan Sulfate	NOAEL	Mean	1.0	2.3	0.0	0.0
	NOAEL	Mean	1.2	2.7	0.0	0.0
	NOAEL	Mean	0.1	0.2	0.0	0.0
	NOAEL	Mean	0.1	0.3	0.0	0.0
Benzidine	NOAEL	Mean	NA	5.1	0.1	0.0
	NOAEL	Mean	NA	5.5	0.1	0.0
	NOAEL	Mean	NA	0.5	0.0	0.0
	NOAEL	Mean	NA	0.5	0.0	0.0
High MW PAHs	NOAEL	Mean	28.5	28.9	47.2	27.3
	NOAEL	Mean	29.8	28.9	49.0	29.0
	NOAEL	Mean	2.8	2.9	4.7	2.7
	NOAEL	Mean	3.0	2.9	4.9	2.9

TABLE L-3
HAZARD QUOTIENT CALCULATION
for Green Heron exposed to Lead

CONCENTRATION (mg/kg, Wet Weight Basis)

LOCATION	Plants	Crayfish	Other Aquatic Invertebrates	Terrestrial Invertebrates	Reptiles/ Amphibians	Birds	Mammals	Fish	Other Items	Sediment	Soil	Water (ug/L)
EE01	4.121	1.640	2.538	2.538	0.029	0.029	0.029	0.029	0.000	19.863	0.000	1.900
EE02	28.197	1.640	17.368	17.368	0.196	0.196	0.196	0.196	0.000	15.070	0.000	13.000
EE03	4.761	1.640	2.933	2.933	0.033	0.033	0.033	0.033	0.000	12.041	0.000	2.195
EE04	3.145	3.940	1.937	1.937	0.022	0.022	0.022	0.022	0.000	112.484	0.000	1.450
EE05	7.917	3.940	4.876	4.876	0.055	0.055	0.055	0.055	0.000	94.793	0.000	3.650
EE06	35.463	3.940	21.844	21.844	0.247	0.247	0.247	0.247	0.000	72.095	0.000	16.350
EE07	6.615	1.700	4.075	4.075	0.046	0.046	0.046	0.046	0.000	7.305	0.000	3.050
EE08	4.772	2.300	2.939	2.939	0.033	0.033	0.033	0.033	0.000	13.223	0.000	2.200
EE09	10.520	1.630	6.480	6.480	0.073	0.073	0.073	0.073	0.000	56.685	0.000	4.850
EE10	4.880	1.630	3.006	3.006	0.034	0.034	0.034	0.034	0.000	16.278	0.000	2.250
EW01	4.555	0.840	2.806	2.806	0.032	0.032	0.032	0.032	0.000	73.370	0.000	2.100
EW02	27.958	0.840	17.221	17.221	0.195	0.195	0.195	0.195	0.000	34.704	0.000	12.890
EW03	3.199	1.183	1.971	1.971	0.022	0.022	0.022	0.022	0.000	10.819	0.000	1.475
HQ Estimator 1	3.145	0.840	1.937	1.937	0.022	0.022	0.022	0.022	0.000	7.000	0.000	1.450
HQ Estimator 2	1.085	0.840	0.668	0.668	0.008	0.008	0.008	0.008	0.000	1.000	0.000	0.500

DIET COMPOSITION (%)	
Plants	0
Crayfish	25
Other Aquatic Invertebrates	10
Terrestrial Invertebrates	20
Reptiles/ Amphibians	15
Birds	0
Mammals	5
Fish	25
Other Items	0

EXPOSURE FACTORS	
Body Weight (kg)	0.2
Food Ingestion Rate (kg/day)	0.028
Sediment Ingestion Rate (kg/day)	0.001
Soil Ingestion Rate (kg/day)	0.000
Water Ingestion Rate (L/day)	0.017

LEGEND	
ADD	Applied Dietary Dose
TRV	Toxicity Reference Value
NOAEL	No-Observed-Adverse-Effect level
LOAEL	Lowest-Observed-Adverse-Effect level
HQ	Hazard Quotient

HAZARD QUOTIENTS

BASED ON MEAN CONCENTRATIONS

LOCATION	Area Use Factor	Applied Daily Dose	TRV (NOAEL)	HAZARD QUOTIENT
EE01	50	0.168	0.04	4.198
EE02	50	0.554	0.04	13.856
EE03	50	0.154	0.04	3.846
EE04	50	0.496	0.04	12.392
EE05	50	0.519	0.04	12.982
EE06	50	0.907	0.04	22.670
EE07	50	0.171	0.04	4.277
EE08	50	0.172	0.04	4.309
EE09	50	0.391	0.04	9.773
EE10	50	0.169	0.04	4.225
EW01	50	0.327	0.04	8.169
EW02	50	0.595	0.04	14.866
EW03	50	0.114	0.04	2.845
HQ Estimator 1	50	0.093	0.04	2.330
HQ Estimator 2	50	0.040	0.04	0.996

TABLE L-4
HAZARD QUOTIENT CALCULATION
for Green Heron exposed to Nickel

CONCENTRATION (mg/kg, Wet Weight Basis)

LOCATION	Plants	Crayfish	Other Aquatic Invertebrates	Terrestrial Invertebrates	Reptiles/ Amphibians	Birds	Mammals	Fish	Other Items	Sediment	Soil	Water (ug/L)
EE01	2.000	1.200	2.000	2.000	0.042	0.042	0.042	0.042	0.000	6.864	0.000	20.000
EE02	2.000	1.200	2.000	2.000	0.042	0.042	0.042	0.042	0.000	47.934	0.000	20.000
EE03	2.000	1.200	2.000	2.000	0.042	0.042	0.042	0.042	0.000	13.810	0.000	20.000
EE04	2.000	1.570	2.000	2.000	0.042	0.042	0.042	0.042	0.000	21.815	0.000	20.000
EE05	2.000	1.570	2.000	2.000	0.042	0.042	0.042	0.042	0.000	200.470	0.000	20.000
EE06	2.000	1.570	2.000	2.000	0.042	0.042	0.042	0.042	0.000	135.033	0.000	20.000
EE07	1.475	1.700	1.475	1.475	0.031	0.031	0.031	0.031	0.000	19.937	0.000	14.750
EE08	1.500	1.800	1.500	1.500	0.032	0.032	0.032	0.032	0.000	21.024	0.000	15.000
EE09	1.700	1.530	1.700	1.700	0.036	0.036	0.036	0.036	0.000	65.658	0.000	17.000
EE10	2.000	1.530	2.000	2.000	0.042	0.042	0.042	0.042	0.000	41.703	0.000	20.000
EW01	6.900	1.000	6.900	6.900	0.145	0.145	0.145	0.145	0.000	1002.100	0.000	69.000
EW02	1.650	1.000	1.650	1.650	0.035	0.035	0.035	0.035	0.000	51.675	0.000	16.500
EW03	1.600	1.900	1.600	1.600	0.034	0.034	0.034	0.034	0.000	12.551	0.000	16.000
HQ Estimator 1	1.500	1.000	1.500	1.500	0.032	0.032	0.032	0.032	0.000	6.900	0.000	15.000
HQ Estimator 2	1.000	1.000	1.000	1.000	0.021	0.021	0.021	0.021	0.000	5.000	0.000	10.000

DIET COMPOSITION (%)	
Plants	0
Crayfish	25
Other Aquatic Invertebrates	10
Terrestrial Invertebrates	20
Reptiles/ Amphibians	15
Birds	0
Mammals	5
Fish	25
Other Items	0

EXPOSURE FACTORS	
Body Weight (kg)	0.2
Food Ingestion Rate (kg/day)	0.028
Sediment Ingestion Rate (kg/day)	0.001
Soil Ingestion Rate (kg/day)	0.000
Water Ingestion Rate (L/day)	0.017

LEGEND

ADD	Applied Dietary Dose
TRV	Toxicity Reference Value
NOAEL	No-Observed-Adverse-Effect level
LOAEL	Lowest-Observed-Adverse-Effect level
HQ	Hazard Quotient

HAZARD QUOTIENTS
BASED ON MEAN CONCENTRATIONS

LOCATION	Area Use Factor	Applied Daily Dose	TRV (NOAEL)	HAZARD QUOTIENT
EE01	50	0.104	0.07	1.555
EE02	50	0.234	0.07	3.495
EE03	50	0.126	0.07	1.884
EE04	50	0.160	0.07	2.384
EE05	50	0.725	0.07	10.822
EE06	50	0.518	0.07	7.732
EE07	50	0.142	0.07	2.119
EE08	50	0.148	0.07	2.214
EE09	50	0.289	0.07	4.316
EE10	50	0.222	0.07	3.310
EW01	50	3.386	0.07	50.541
EW02	50	0.232	0.07	3.460
EW03	50	0.127	0.07	1.889
HQ Estimator 1	50	0.086	0.07	1.282
HQ Estimator 2	50	0.066	0.07	0.984

TABLE L-5
HAZARD QUOTIENT CALCULATION
for Red-Winged Blackbird exposed to Heptachlor

CONCENTRATION (mg/kg, Wet Weight Basis)

LOCATION	Plants	Crayfish	Other Aquatic Invertebrates	Terrestrial Invertebrates	Reptiles/ Amphibians	Birds	Mammals	Fish	Other Items	Sediment	Soil	Water
EEO1	0.001	0.078	0.506	0.443	0.066	0.044	0.020	0.041	0.000	0.046	0.000	0.025
EE02	0.002	0.078	0.836	0.731	0.066	0.044	0.020	0.041	0.000	0.084	0.000	0.025
EE03	0.000	0.078	0.064	0.056	0.066	0.044	0.020	0.041	0.000	0.005	0.000	0.025
EE04	0.000	0.078	0.115	0.100	0.066	0.044	0.020	0.041	0.000	0.004	0.000	0.025
EE05	0.238	0.078	91.253	79.847	0.066	0.044	0.020	0.041	0.000	2.964	0.000	0.025
EE06	0.001	0.078	0.352	0.308	0.066	0.044	0.020	0.041	0.000	0.021	0.000	0.025
EE07	0.001	0.013	0.403	0.352	0.066	0.044	0.020	0.041	0.000	0.006	0.000	0.025
EE08	0.003	0.042	1.097	0.960	0.066	0.044	0.020	0.041	0.000	0.021	0.000	0.025
EE09	0.000	0.042	0.025	0.022	0.066	0.044	0.020	0.041	0.000	0.003	0.000	0.025
EE10	0.007	0.042	2.510	2.196	0.066	0.044	0.020	0.041	0.000	0.026	0.000	0.025
EW01	0.001	0.017	0.529	0.463	0.066	0.044	0.020	0.041	0.000	0.052	0.000	0.025
EW02	0.001	0.017	0.366	0.320	0.066	0.044	0.020	0.041	0.000	0.006	0.000	0.025
EW03	0.002	0.017	0.580	0.508	0.066	0.044	0.020	0.041	0.000	0.004	0.000	0.025
HQ Estimator 1	0.011	0.078	4.150	3.632	0.066	0.044	0.020	0.041	0.000	0.088	0.000	0.025
HQ Estimator 2	0.238	0.078	0.078	0.078	0.066	0.044	0.020	0.041	0.000	2.964	0.000	0.025

DIET COMPOSITION (%)	
Plants	70
Crayfish	0
Other Aquatic Invertebrates	0
Terrestrial Invertebrates	30
Reptiles/ Amphibians	0
Birds	0
Mammals	0
Fish	0
Other Items	0

EXPOSURE FACTORS	
Body Weight (kg)	0.1
Food Ingestion Rate (kg/day)	0.010
Sediment Ingestion Rate (kg/day)	0.000
Soil Ingestion Rate (kg/day)	0.000
Water Ingestion Rate (L/day)	0.008

LEGEND	
ADD	Applied Dietary Dose
TRV	Toxicity Reference Value
NOAEL	No-Observed-Adverse-Effect level
LOAEL	Lowest-Observed-Adverse-Effect level
HQ	Hazard Quotient

HAZARD QUOTIENTS

BASED ON MEAN CONCENTRATIONS

LOCATION	Area Use Factor	Applied Daily Dose	TRV (NOAEL)	HAZARD QUOTIENT
EEO1	100	0.027	0.20	0.137
EE02	100	0.044	0.20	0.227
EE03	100	0.003	0.20	0.017
EE04	100	0.006	0.20	0.031
EE05	100	4.824	0.20	24.739
EE06	100	0.019	0.20	0.095
EE07	100	0.021	0.20	0.109
EE08	100	0.058	0.20	0.298
EE09	100	0.001	0.20	0.007
EE10	100	0.133	0.20	0.680
EW01	100	0.028	0.20	0.143
EW02	100	0.019	0.20	0.099
EW03	100	0.031	0.20	0.157
HQ Estimator 1	100	0.219	0.20	1.125
HQ Estimator 2	100	0.038	0.20	0.190

TABLE L-6
HAZARD QUOTIENT CALCULATION
for Raccoon exposed to Total PCBs

CONCENTRATION (mg/kg, Wet Weight Basis)

LOCATION	Plants	Crayfish	Other Aquatic Invertebrates	Terrestrial Invertebrates	Reptiles/ Amphibians	Birds	Mammals	Fish	Other Items	Sediment	Soil	Water
EE01	0.003	1.998	454.920	398.055	593.850	395.900	29.929	59.858	0.000	5.815	0.000	0.750
EE02	0.003	1.998	454.920	398.055	395.900	263.933	19.953	39.905	0.000	24.237	0.000	0.500
EE03	0.000	1.998	57.606	50.406	395.900	263.933	19.953	39.905	0.000	0.582	0.000	0.500
EE04	0.001	2.697	113.246	99.090	395.900	263.933	19.953	39.905	0.000	0.531	0.000	0.500
EE05	0.003	2.697	454.920	398.055	395.900	263.933	19.953	39.905	0.000	32.720	0.000	0.500
EE06	0.001	2.697	95.927	83.936	395.900	263.933	19.953	39.905	0.000	0.727	0.000	0.500
EE07	0.000	0.600	81.145	71.002	395.900	263.933	19.953	39.905	0.000	0.168	0.000	0.500
EE08	0.000	1.665	47.224	41.321	395.900	263.933	19.953	39.905	0.000	0.114	0.000	0.500
EE09	0.000	0.767	12.081	10.571	395.900	263.933	19.953	39.905	0.000	0.153	0.000	0.500
EE10	0.001	0.767	203.043	177.663	395.900	263.933	19.953	39.905	0.000	0.265	0.000	0.500
EW01	0.003	3.180	454.920	398.055	395.900	263.933	19.953	39.905	0.000	9.336	0.000	0.500
EW02	0.002	3.180	311.530	272.589	395.900	263.933	19.953	39.905	0.000	0.684	0.000	0.500
EW03	0.003	1.980	454.920	398.055	395.900	263.933	19.953	39.905	0.000	0.445	0.000	0.500
HQ Estimator 1	0.002	3.180	3.180	3.180	395.900	263.933	19.953	39.905	0.000	0.684	0.000	0.500
HQ Estimator 2	0.002	3.180	3.180	3.180	395.900	263.933	19.953	39.905	0.000	0.684	0.000	0.500

DIET COMPOSITION (%)	
Plants	38
Crayfish	30
Other Aquatic Invertebrates	0
Terrestrial Invertebrates	15
Reptiles/ Amphibians	5
Birds	5
Mammals	2
Fish	5
Other Items	0

EXPOSURE FACTORS	
Body Weight (kg)	4.2
Food Ingestion Rate (kg/day)	0.223
Sediment Ingestion Rate (kg/day)	0.020
Soil Ingestion Rate (kg/day)	0.000
Water Ingestion Rate (L/day)	0.360

LEGEND

ADD	Applied Dietary Dose
TRV	Toxicity Reference Value
NOAEL	No-Observed-Adverse-Effect level
LOAEL	Lowest-Observed-Adverse-Effect level
HQ	Hazard Quotient

HAZARD QUOTIENTS

BASED ON MEAN CONCENTRATIONS

LOCATION	Area Use Factor	Applied Daily Dose	TRV (NOAEL)	HAZARD QUOTIENT
EE01	18	1.089	0.04	27.216
EE02	18	0.935	0.04	23.384
EE03	18	0.417	0.04	10.417
EE04	18	0.488	0.04	12.211
EE05	18	0.945	0.04	23.616
EE06	18	0.467	0.04	11.672
EE07	18	0.442	0.04	11.046
EE08	18	0.402	0.04	10.058
EE09	18	0.356	0.04	8.892
EE10	18	0.595	0.04	14.883
EW01	18	0.926	0.04	23.149
EW02	18	0.739	0.04	18.467
EW03	18	0.915	0.04	22.873
HQ Estimator 1	18	0.352	0.04	8.812
HQ Estimator 2	18	0.352	0.40	0.881

TABLE L-7
HAZARD QUOTIENT CALCULATION
for Muskrat exposed to High MW PAHs

CONCENTRATION (mg/kg, Wet Weight Basis)

LOCATION	Plants	Crayfish	Other Aquatic Invertebrates	Terrestrial Invertebrates	Reptiles/ Amphibians	Birds	Mammals	Fish	Other Items	Sediment	Soil	Water (ug/L)
EE01	0.013	1.320	583.185	510.287	2873.077	1915.385	195.447	390.895	0.000	12.868	0.000	10.000
EE02	0.053	1.320	2423.548	2120.605	2873.077	1915.385	195.447	390.895	0.000	92.352	0.000	10.000
EE03	0.036	1.320	1637.862	1433.129	3591.347	2394.231	244.309	488.619	0.000	31.242	0.000	12.500
EE04	0.041	5.200	1867.674	1634.214	3591.347	2394.231	244.309	488.619	0.000	16.517	0.000	12.500
EE05	0.053	5.200	2423.548	2120.605	3591.347	2394.231	244.309	488.619	0.000	27.483	0.000	12.500
EE06	0.006	5.200	289.492	253.305	3979.212	2652.808	270.695	541.389	0.000	4.123	0.000	13.850
EE07	0.008	5.200	362.349	317.055	4309.616	2873.077	293.171	586.342	0.000	1.426	0.000	15.000
EE08	0.008	5.200	350.660	306.828	4309.616	2873.077	293.171	586.342	0.000	1.527	0.000	15.000
EE09	0.001	5.200	38.125	33.360	4309.616	2873.077	293.171	586.342	0.000	0.920	0.000	15.000
EE10	0.007	5.200	324.826	284.223	4309.616	2873.077	293.171	586.342	0.000	0.812	0.000	15.000
EW01	0.003	5.200	158.006	138.256	4309.616	2873.077	293.171	586.342	0.000	4.291	0.000	15.000
EW02	0.007	5.200	328.280	287.245	4309.616	2873.077	293.171	586.342	0.000	1.395	0.000	15.000
EW03	0.014	5.200	634.788	555.439	4309.616	2873.077	293.171	586.342	0.000	1.132	0.000	15.000
HQ Estimator 1	0.053	5.200	2423.548	2120.605	57.462	38.308	3.909	7.818	0.000	27.483	0.000	0.200
HQ Estimator 2	0.053	5.200	2423.548	2120.605	1149.231	766.154	78.179	156.358	0.000	27.483	0.000	4.000

DIET COMPOSITION (%)	
Plants	93
Crayfish	3
Other Aquatic Invertebrates	0
Terrestrial Invertebrates	0
Reptiles/ Amphibians	2
Birds	1
Mammals	1
Fish	0
Other Items	0

EXPOSURE FACTORS	
Body Weight (kg)	0.7
Food Ingestion Rate (kg/day)	0.070
Sediment Ingestion Rate (kg/day)	0.002
Soil Ingestion Rate (kg/day)	0.000
Water Ingestion Rate (L/day)	0.075

LEGEND	
ADD	Applied Dietary Dose
TRV	Toxicity Reference Value
NOAEL	No-Observed-Adverse-Effect level
LOAEL	Lowest-Observed-Adverse-Effect level
HQ	Hazard Quotient

HAZARD QUOTIENTS

BASED ON MEAN CONCENTRATIONS

LOCATION	Area Use Factor	Applied Daily Dose	TRV (NOAEL)	HAZARD QUOTIENT
EE01	100	7.575	0.24	31.564
EE02	100	7.797	0.24	32.486
EE03	100	9.511	0.24	39.631
EE04	100	9.483	0.24	39.511
EE05	100	9.514	0.24	39.641
EE06	100	10.463	0.24	43.596
EE07	100	11.322	0.24	47.176
EE08	100	11.323	0.24	47.177
EE09	100	11.320	0.24	47.168
EE10	100	11.321	0.24	47.169
EW01	100	11.330	0.24	47.207
EW02	100	11.322	0.24	47.175
EW03	100	11.322	0.24	47.175
HQ Estimator 1	100	0.246	0.24	1.024
HQ Estimator 2	100	3.109	2.40	1.295