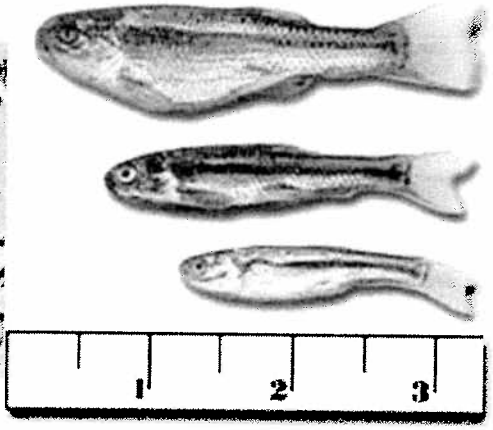
BIOMONITORING REPORT

FOR

CITY OF CALDWELL WWTP

LAB #1656838
PERMIT # ID0021504



DECEMBER 2016

PREPARED BY:

ANALYTICAL LABORATORIES, INC.
1802 N. 33RD STREET
BOISE, ID 83703
(208)342-5515

SUMMARY OF ANALYSES
CITY OF CALDWELL WWTP
DECEMBER 2016
PERMIT # ID0021504

The results for the *Ceriodaphnia dubia* reproduction study:

NOEC:	100%
LOEC:	>100%
IC25:	>100%
TUc:	1

The results for the *Ceriodaphnia dubia* survival study:

NOEC:	100%
LOEC:	>100%
IC25:	>100%
TUc:	1

No chronic toxicity was detected in EPA test method 1002.0 survival and reproduction data at any of the concentrations tested.

Introduction

Toxicity analysis consisting of chronic bioassay EPA Test Method 1002.0 was conducted on effluent samples collected by the City of Caldwell WWTP. Samples were collected December 14, December 16, and December 19, 2016, as 24-hour effluent composites. Once collected, samples were sent immediately to Analytical Laboratories, Inc. for analyses. Effluent composites were collected in one-gallon jugs for solution renewal water and in one liter cubitainers for water chemistries testing. Samples were chilled during transport by the addition of cold packs to the coolers. Method 1002.0, utilizing the freshwater flea *Ceriodaphnia dubia*, was conducted on December 14, 2016 and completed on December 21, 2016. Testing was conducted according to Short-Term Methods for Estimating the Chronic Toxicity of Effluents and receiving Waters to Freshwater Organisms, Fourth Edition October 2002 EPA-821-R-02-013 and Standard Methods for the Examination of Water and Wastewater, 19th Edition.

Methods and Materials

Test methods are designed to estimate and measure chronic toxicity of whole and partial effluents to the model freshwater aquatic organisms, freshwater flea *Ceriodaphnia dubia* in a 7-day static renewal test. Test water was collected as 24-hour effluent composites using mechanical sampling equipment. Samples were then transported to the laboratory for analyses. Effluent was used; whole or combined, with artificially prepared dilution water to prepare dilution series. Dilution water was prepared (20% v/v Perrier Mineral Water in deionized water) to produce a moderately hard dilution of control water. Water was prepared in bulk 24 hours prior to analyses and was aerated continuously to increase dissolved oxygen.

For Test Method 1002.0, *Ceriodaphnia dubia* neonates were produced in house from brood organisms that produce 8 or more young in their 3rd or subsequent broods. Brood animals are fed daily and transferred to new culture media at a minimum of 3 times a week. Survival and reproduction records are maintained to ensure healthy test organisms. Original mass cultures of organisms were started from brood organisms obtained from Aquatic Biosystems in Fort Collins, Colorado. Neonates less than 24 hours old were selected randomly from a known parentage, inspected, and arranged in five sample dilutions and a control with ten replicates to each. Analyses at a static renewal were performed over the next seven consecutive days. Data obtained was used to determine NOEC, LOEC, IC25 and TU_C for survival and reproduction (see Appendix I - Definition of Terms).

Test Design/Standard Conditions Method 1002.0

1. Test Type - static renewal (daily)

   Collection #1 – Renewal Day 1 and 2 – December 14, 2016

   Collection #2 – Renewal Day 3 and 4 – December 16, 2016

   Collection #3 – Renewal Day 5 and 6 – December 19, 2016

   Day 7 – Final counts and statistical review

2. Temperature - 25 +/- 1 degree Celsius.
3. Light Quality - Environmental Chamber Fisher/11-67966
4. Light Intensity - Incubation chamber (as above)
5. Photoperiod - 16 hours light; 8 hours dark
6. Test Chamber - 30 ml anchor-hocking
7. Renewal - All dilutions daily
8. Age - Neonates/less than 24 hours
9. Organisms per chamber - One
10. Replicates - Ten chambers/control and each dilution
11. Feeding - 0.1 ml YTC; 0.1 ml *Selenastrum capricornutum* suspension - once daily
12. Dilution water - 20% v/v Perrier Mineral Water in deionized water
13. Concentrations used - 100%, 69.5%, 39%, 19.5%, 9.75 % and Control
14. Duration - Seven days
15. Endpoint - Survival/reproduction
16. Acceptability - 80% or greater of control survival / 60% of control produce 3rd brood / Average of 15 young/surviving female
17. Source of organisms - In house

Interpretation - Statistical Review

Statistical endpoint of data from Methods 1000.0, and 1002.0 were determined by the use of WET Analysis Spreadsheet v1.6.1. The EPA uses this spreadsheet to analyze valid WET test data to obtain acute and chronic test endpoints identified in EPA's WET test methods under the NPDES program. The test analyses performed by this statistical software compare the raw data of test and control concentrations and determine if there are any statistically significant differences. The software infers normality and variance from the raw data, and chooses the appropriate analytical methodology. This minimizes the effect that extraneous circumstances may have on the NOEC, LOEC, and IC25. TUc (Chronic Toxicity Units) values are calculated by the following formulas:

For survival endpoints: 100/NOEC

For all other test endpoints: 100/IC25

Results - Method 1002.0

During EPA Method 1002.0, survival and reproduction test using *Ceriodaphnia dubia*, survival and reproduction values from specific dilutions of collected effluent are measured and compared to values obtained from control individuals.

Analyses of data for EPA method 1002.0 *Ceriodapnia dubia* Survival and Reproduction test indicated no chronic toxicity at any concentration.

Endpoints Determined - Method 1002.0

		NOEC	LOEC	IC25
Ceriodaphnia dubia	Survival	100%	>100%	>100%
	Reproduction	100%	>100%	>100%

The mortality was less than twenty percent (<20%) in controls. An average of at least 15 young per surviving female within three broods was established. Reproduction test was declared valid.

Test Quality Control

Quality control practices for effluent toxicity tests include certain precautions at each of the following steps:

1. Effluent sampling and handling. Sampling containers prepared as per section 7 of Methods for Measuring and Chronic Toxicity of Effluent to Freshwater and Marine Organisms were provided to client. Insulated transportation containers with cooling packs to chill samples were provided.
2. Condition of test organisms. Test organisms for Method 1000.0, and 1003.0 are purchased from Aquatic Biosystems, Inc. in Fort Collins, Colorado, a state and federally approved aquatic test organism supplier. Test organisms for Method 1002.0 were cultured in house.
3. Conditions of test equipment. All test equipment used is maintained according to manufacturer's specifications. Equipment such as balances, thermometers, etc. is calibrated annually by outside sources and certificates are maintained. All equipment maintenance and calibrations are recorded and archived.
4. Test conditions. Only test methods directly from EPA references or methodologies provided are used. Any deviations or alterations from these procedures are documented and approved prior to use.
5. Reference toxicants. Reference toxicants are used for Methods 1000.0, 1002.0 and 1003.0. Sodium chloride is made up in dilution control water at prescribed concentrations and is used to determine toxicity for each method. Reference toxicants are run once per month to ensure consistency in test methodology. Quality control data is provided and a graphical representation over time is attached.
6. Record Keeping. All raw data, data evaluation, and statistical analysis are included in report to client. Original hardcopies along with all test records are maintained at laboratory for client or future reference.

LIST OF TABLES AND APPENDICES

CITY OF CALDWELL WWTP
LAB ID # 1656838
DECEMBER 2016

METHOD 1002.0

Concentration	Initial Count	48-hour Count	96-hour Count	Final Count	Percent Survival	Average Young/ Remaining Female
Control	10	10	10	10	100%	30.8
9.75%	10	10	10	10	100%	36.5
19.5%	10	10	10	10	100%	34.0
39%	10	10	10	9	90%	33.2
69.5%	10	10	10	10	100%	32.2
100%	10	10	10	10	100%	33.6

Table I: *Ceriodaphnia dubia* Survival And Reproduction Summary

Concentration	Control		9.75%		19.5%		39%		69.5%		100%	
Day	DO	pH	DO	pH	DO	pH	DO	pH	DO	pH	DO	pH
1	7.4	8.0	7.3	7.9	7.2	8.0	7.2	8.1	7.2	8.2	7.1	8.3
2	7.5	8.0	7.4	8.1	7.5	8.1	7.6	8.2	7.7	8.3	7.7	8.4
3	7.4	8.2	7.3	8.2	7.3	8.2	7.4	8.3	7.5	8.4	7.5	8.5
4	8.1	7.9	7.8	8.0	7.8	8.2	7.8	8.3	7.8	8.4	7.9	8.4
5	8.5	8.1	8.0	8.0	8.1	8.0	8.3	8.1	8.6	8.2	8.5	8.3
6	7.3	7.8	7.3	7.9	7.2	7.9	7.1	8.1	7.6	8.2	7.5	8.4
7	5.7	7.6	5.7	7.6	5.6	7.8	7.3	8.1	7.8	8.2	7.9	8.3

Table II: Water Chemistries, Daily Renewals – Old Water pH & Dissolved Oxygen Values

CITY OF CALDWELL WWTP
LAB ID # 1656838
DECEMBER 2016

Concentration	CHLORINE RESIDUAL	ALKALINITY	CONDUCTIVITY	HARDNESS	AMMONIA	pH
	(mg/L)	(mg/L)	(umhos)	(mg/L)	(mg/L)	S.U.
12/14/2016	<0.10	176	771	154	0.45	7.2
12/16/2016	**<0.10**	**162**	**768**	**153**	**<0.04**	**7.3**
12/18/2016	<0.10	175	718	150	<0.04	7.4

Table III: Effluent Chemistries Summary

Definition of Terms

1. Safe Concentration. The highest concentrations of toxicant that will permit normal propagation of fish and other aquatic life in receiving waters, biologically defined rather than statistically.
2. NOEC (No-Observed Effect Concentration) - The highest concentration of toxicant in which the values for the observed parameters (survival, growth, reproduction) in which there is no statistically significant difference from controls and no observable effect on organism behavior or health.
3. LOEC (Lowest-Observed Effect Concentration) - The lowest concentration of toxicant in which the values for the observed parameters (survival, growth, reproduction) do have a statistical significant difference from controls. At this concentration there is evidence of toxicity.
4. TUc (chronic toxicity units) –
   For survival endpoints: 100/NOEC
   For all other test endpoints: 100/IC25
5. IC25 (Inhibition concentration - 25%) – Concentration where at least 25% of the organisms have some statistically significant effect.

   Taken from: Short-Term methods for Estimating the Chronic Toxicity of Effluents and receiving Waters to Freshwater Organisms, Fourth Edition. October 2002. EPA-821-R-02-013.

PAGE 1 OF 2

BENCH SHEET FOR CERIODAPHNIA SURVIVAL/REPRODUCTION TEST. EPA Method 1002.0

LAB ID# 16S6838 Analyst: LR Final Report Review: SC

Discharged: Effluent Test Start Date/Time: 12/14/16, 1000

Description: City of Caldwell WWTP Test Stop Date/Time: 12/21/16, 1530

Temp Received: Day 1: 3.9°C Day 2: 5.4°C Day 3: 1.3°C

Renewal Lab Numbers: **Day 0 & 1:** S6858 **Day ~~2 & 3~~ 2,3,4:** 57210 **Day ~~4 & 5~~ 5 & 6:** 57563

Conc Control

Day-Lab #	1	2	3	4	5	6	7	8	9	10	XXX	# Young	New D.O.	New pH	Old D.O.	Old pH	Daily Temp
0-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			7.5	7.5	XXX	XXX	23.3
1-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			7.6	7.6	7.4	8.0	24.6
2-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			7.7	7.9	7.5	8.0	22.3
3-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			7.6	7.9	7.4	8.2	22.4
4-	1/6	1/8	1/8	1/7	1/6	1/6	1/6	1/5	1/7	1/5	64		8.0	7.7	8.1	7.9	22.6
5-	2/10	2/12	2/9	2/12	2/10	2/9	2/11	2/11	2/13	2/12	109		8.5	8.1	8.5	8.1	23.6
6-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	0		7.9	7.6	7.3	7.8	22.0
7-	3/16	3/14	3/15	3/16	3/11	3/8	3/11	3/15	3/14	3/15	135				7.5	7.6	
Total	32	34	32	35	27	23	28	31	34	32	308						

Conc 9.75%

Day-Lab #	1	2	3	4	5	6	7	8	9	10	XXX	# Young	New D.O,	New pH	Old D.O.	Old pH	Daily Temp
0-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			7.6	7.9	XXX	XXX	23.8
1-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			7.8	7.7	7.3	7.9	24.3
2-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			7.8	7.8	7.4	8.1	23.1
3-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			7.8	8.0	7.3	8.2	22.9
4-	1/6	1/7	1/8	1/6	1/6	1/7	1/8	1/7	1/5	1/7	67		8.1	7.8	7.8	8.0	22.1
5-	2/11	2/12	2/12	2/13	2/11	2/11	2/13	2/11	2/12	2/13	119		8.5	7.9	8.0	8.0	22.7
6-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	0		8.0	7.9	7.3	7.9	22.6
7-	3/21	3/15	3/18	3/17	3/18	3/18	3/18	3/16	3/21	3/17	179				5.7	7.6	
Total	38	34	38	36	35	36	39	34	38	37	365						

Conc 19.5%

Day-Lab #	1	2	3	4	5	6	7	8	9	10	XXX	# Young	New D.O,	New pH	Old D.O.	Old pH	Daily Temp
0-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			7.7	7.9	XXX	XXX	23.1
1-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			8.1	7.6	7.2	8.0	24.1
2-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			8.0	7.7	7.5	8.1	23.0
3-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			7.8	7.9	7.3	8.2	23.1
4-	1/6	1/7	1/6	1/7	1/7	1/6	1/6	1/6	1/6	1/7	64		8.2	7.9	7.8	8.2	22.2
5-	2/11	2/11	2/9	2/12	2/11	2/8	2/15	2/14	2/9	2/9	109		8.8	7.9	8.1	8.0	22.5
6-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	0		8.2	7.9	7.2	7.9	22.7
7-	3/16	3/20	3/17	3/18	3/18	3/15	3/18	3/13	3/16	3/16	167				5.6	7.8	
Total	35	38	32	37	36	29	39	33	31	32	340						

BENCH SHEET FOR CERIODAPHNIA SURVIVAL/REPRODUCTION TEST. EPA Method 1002.0

LAB ID# 1656838 Analyst: WR Final Report Review: SC

Discharged: Effluent Test Start Date/Time: 12/14/16, 1000

Description: City of Caldwell WWTP Test Stop Date/Time: 12/21/16, ~~1430~~ WR 1550

Temp Received: Day 1: 3.9°C Day 2: 5.4°C Day 3: 1.3°C WR

Renewal Lab Numbers: **Day 0 & 1:** 56838 **Day ~~2 & 3~~** 2,3,4: 57210 **Day ~~4~~, 5 & 6:** 57563

Conc 39%

Day-Lab #	1	2	3	4	5	6	7	8	9	10	# Young	New D.O.	New pH	Old D.O.	Old pH	Daily Temp
0-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	XXX	XXX	XXX	XXX	XXX	XXX
1-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		8.0	7.7	XXX	XXX	22.6
2-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		8.5	7.6	7.2	8.1	24.0
3-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		8.2	7.7	7.6	8.2	23.1
4-	1/5	1/6	1/6	1/8	1/8	1/5	1/6	1/7	1/5	1/7	58	8.0	7.8	~~7.3~~ WR 7.4	~~8.2~~ 8.3	23.2
5-	2/10	2/11	2/11	2/14	2/11	2/10	2/8	2/12	D	2/13	100	8.5	7.8	7.8	8.3	22.3
6-	✓	✓	✓	✓	✓	✓	✓	✓	↓	✓	0	9.2	7.8	8.3	8.2	22.3
7-	3/17	3/18	3/16	3/13	3/18	3/13	3/12	3/17	↓	3/17	141	8.7	7.8	7.1	8.1	22.7
Total	32	35	33	35	37	28	26	36	0	37	299			7.3	8.1	

Conc 69.5%

Day-Lab #	1	2	3	4	5	6	7	8	9	10	# Young	New D.O,	New pH	Old D.O.	Old pH	Daily Temp
0-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	XXX	XXX	XXX	XXX	XXX	XXX
1-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		8.6	7.6	XXX	XXX	22.1
2-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		9.2	7.6	7.2	8.2	24.0
3-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		8.5	7.5	7.7	8.3	23.4
4-	1/6	1/7	1/7	1/6	1/7	1/6	1/6	1/6	1/6	1/5	62	8.4	7.6	7.5	8.4	23.1
5-	2/10	2/13	2/12	2/10	2/8	2/10	2/13	2/11	2/7	2/13	107	9.0	7.8	7.8	8.4	22.3
6-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	0	9.9	7.7	8.6	8.2	22.3
7-	3/17	3/16	3/17	3/15	3/11	3/12	3/15	3/20	3/14	3/16	153	9.3	7.8	7.6	8.2	22.9
Total	33	36	36	31	26	28	34	37	27	34	322			7.9	8.2	

Conc 100%

Day-Lab #	1	2	3	4	5	6	7	8	9	10	# Young	New D.O,	New pH	Old D.O.	Old pH	Daily Temp
0-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	XXX	XXX	XXX	XXX	XXX	XXX
1-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		9.0	7.6	XXX	XXX	22.1
2-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		10.0	7.6	7.1	8.3	24.0
3-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		8.9	7.5	7.7	8.4	23.2
4-	1/6	1/5	1/6	1/6	1/7	1/7	1/6	1/8	1/6	1/6	63	8.5	7.6	7.5	8.5	23.1
5-	2/10	2/10	2/11	2/10	2/9	2/12	2/11	2/10	2/10	2/10	103	8.4	7.8	7.9	8.4	22.4
6-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	0	9.6	7.8	8.5	8.3	22.9
7-	3/17	3/17	3/20	3/16	3/21	3/19	3/16	3/15	3/17	3/12	170	9.6	7.9	7.5	8.4	22.9
Total	33	32	37	32	37	38	33	33	33	28	336		WR 7.9	7.9	8.3	

Summary Sheet

Facility	Analytical Laboratories	**Analyst**	Will Reynolds
Test ID	1656838 City of Caldwell WWTP	**Species**	Ceriodaphnia dubia (water flea)
Date	12/21/2016	**Test Type**	Chronic Survival
IWC Conc.			

Input

Number of Organisms Exposed or Counted

	Concentrations					
Replicate	0	9.75	19.5	39	69.5	100
1	1	1	1	1	1	1
2	1	1	1	1	1	1
3	1	1	1	1	1	1
4	1	1	1	1	1	1
5	1	1	1	1	1	1
6	1	1	1	1	1	1
7	1	1	1	1	1	1
8	1	1	1	1	1	1
9	1	1	1	1	1	1
10	1	1	1	1	1	1

Number of Organisms Surviving or Responding

	Concentrations					
Replicate	0	9.75	19.5	39	69.5	100
1	1	1	1	1	1	1
2	1	1	1	1	1	1
3	1	1	1	1	1	1
4	1	1	1	1	1	1
5	1	1	1	1	1	1
6	1	1	1	1	1	1
7	1	1	1	1	1	1
8	1	1	1	1	1	1
9	1	1	1	0	1	1
10	1	1	1	1	1	1

Total Organisms	10	10	10	10	10	10
Total Responding	10	10	10	9	10	10
% Responding	100.0%	100.0%	100.0%	90.0%	100.0%	100.0%

Output

Summary Sheet

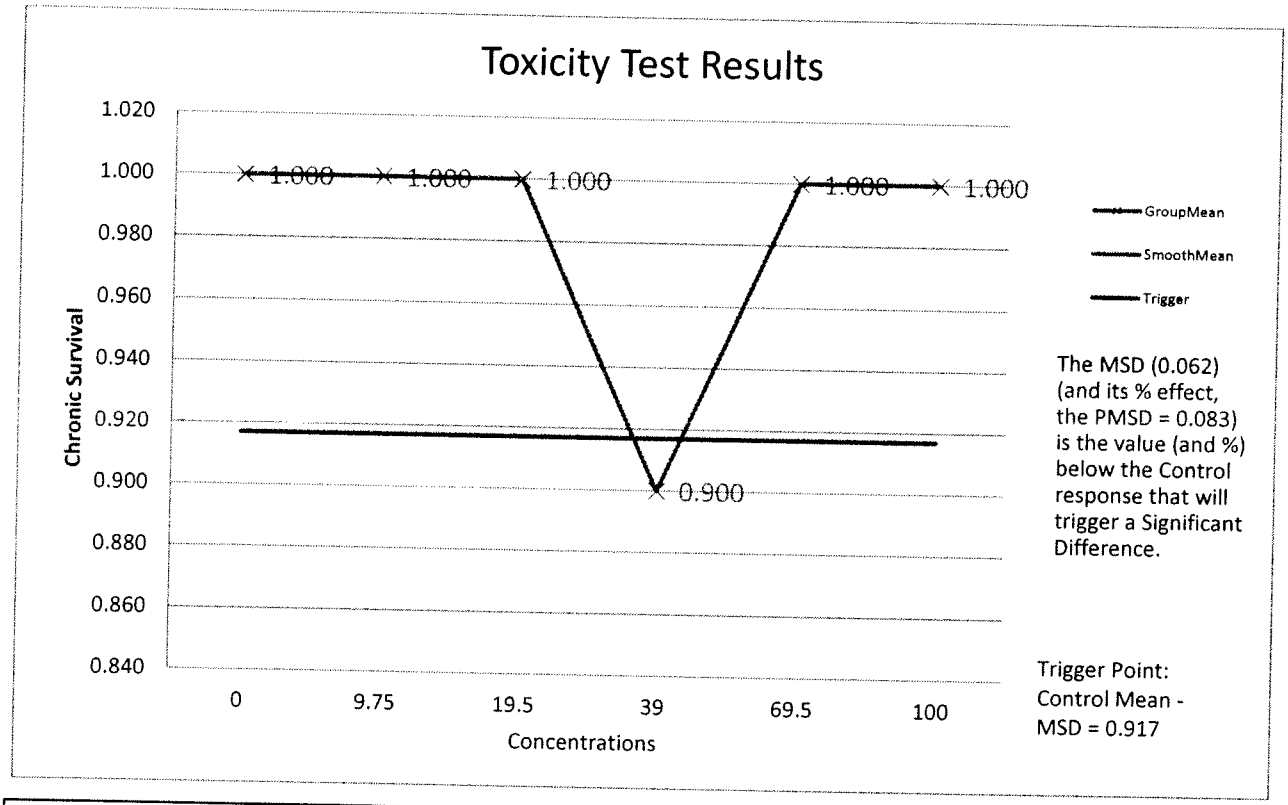
Statistical Data	Conc.	Mean	Stdev	CV	Steel test
	0	1.047	0.000	0.000	
Statistics are based on the transformed data used for endpoint calculations	9.75	1.047	0.000	0.000	NS
	19.5	1.047	0.000	0.000	NS
	39	0.995	0.166	0.166	NS
	69.5	1.047	0.000	0.000	NS
	100	1.047	0.000	0.000	NS

NOEC	LOEC	IC25	95% Confidence Intervals	
100	>100	>100	N/A	N/A

TST	Calculated t-value	Table t-value	Relative % Effect at IWC

MSD	PMSD
0.062	8.3%

Note - For statistical tests, "NS" indicates that the concentration is not statistically different from the control, while "Y" indicates that the concentration is statistically different from the control.



NOTICE

The United States Environmental Protection Agency (EPA), through its Office of Wastewater Management, funded and managed the development of the whole effluent toxicity (WET) Tool described here. This is a tool that calculates WET test endpoints for the EPA-approved WET test methods and is used by EPA internally for analyzing valid WET test data. Neither the EPA nor any of their employees, assumes any legal liability or responsibility for the accuracy, completeness, or usefulness of any information or process disclosed. Furthermore, the WET Tool is supplied "as-is" without guarantee or warranty, expressed or implied, including without limitation, any warranty of merchantability or fitness for a specific purpose.

Summary Sheet

Facility	Analytical Laboratories	**Analyst**	Will Reynolds
Test ID	1656838 City of Caldwell WWTP	**Species**	Ceriodaphnia dubia (water flea)
Date	12/21/2016	**Test Type**	Reproduction
IWC Conc.			

Input

	Concentrations					
Replicate	0	9.75	19.5	39	69.5	100
1	32	38	33	32	33	33
2	34	34	38	35	36	32
3	32	38	32	33	36	37
4	35	36	37	35	31	32
5	27	35	36	37	26	37
6	23	36	29	28	28	38
7	28	39	39	26	34	33
8	31	34	33	36	37	33
9	34	38	31		27	33
10	32	37	32	37	34	28
Mean	30.800	36.500	34.000	33.222	32.200	33.600
Stdev	3.736	1.780	3.300	3.930	3.994	2.989

Output

Statistical Data	Conc.	Mean	Stdev	CV	T-test
	0	30.800	3.736	0.121	
	9.75	36.500	1.780	0.049	NS
	19.5	34.000	3.300	0.097	NS
	39	33.222	3.930	0.118	NS
	69.5	32.200	3.994	0.124	NS
	100	33.600	2.989	0.089	NS

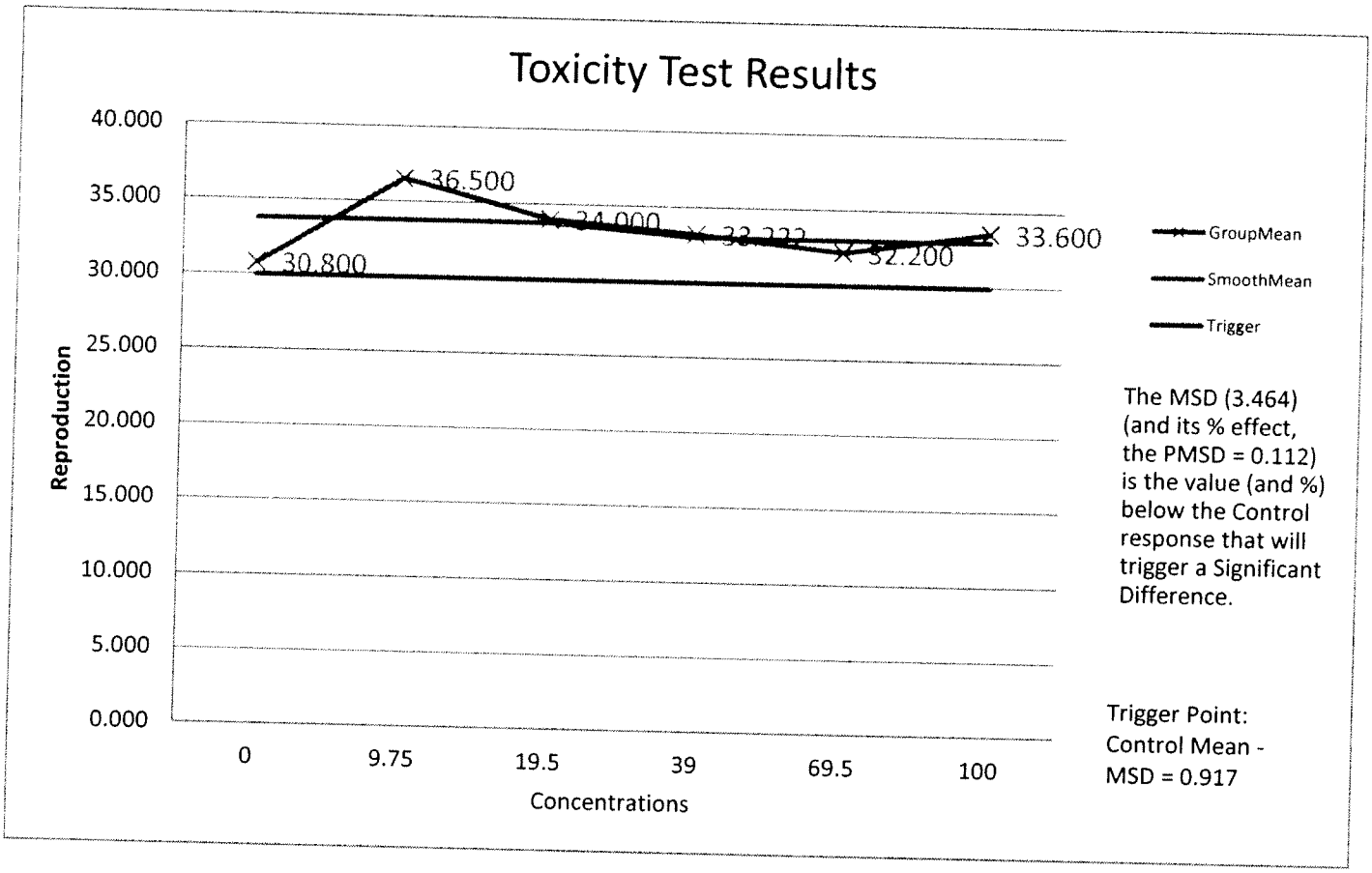
NOEC	LOEC	IC25	95% Confidence Intervals	
100	>100	>100	N/A	N/A

TST	Calculated t-value	Table t-value	Relative % Effect at IWC

MSD	PMSD
3.464	11.2%

Summary Sheet

Note - For statistical tests, "NS" indicates that the concentration is not statistically different from the control, while "Y" indicates that the concentration is statistically different from the control.



NOTICE

The United States Environmental Protection Agency (EPA), through its Office of Wastewater Management, funded and managed the development of the whole effluent toxicity (WET) Tool described here. This is a tool that calculates WET test endpoints for the EPA-approved WET test methods and is used by EPA internally for analyzing valid WET test data. Neither the EPA nor any of their employees, assumes any legal liability or responsibility for the accuracy, completeness, or usefulness of any information or process disclosed. Furthermore, the WET Tool is supplied "as-is" without guarantee or warranty, expressed or implied, including without limitation, any warranty of merchantability or fitness for a specific purpose.

Analytical Laboratories, Inc.

1804 N. 33rd Street
Boise, Idaho 83703
Phone (208) 342-5515

Date Report Printed: 12/23/2016 7:20:04 AM
http://www.analyticallaboratories.com
These test results relate only to the items tested.

Laboratory Analysis Report

Sample Number: 1656838

Attn: SALVADOR ARREOLA
CALDWELL WASTEWATER
PO BOX 1179
CALDWELL, ID 83607

Collected By:
Submitted By: WILL

Source of Sample:
CALDWELL-BIOMONITORING DAY 1 FE-C

Time of Collection: 6:48
Date of Collection: 12/14/2016
Date Received: 12/14/2016
Report Date: 12/23/2016

PWS#:
PWS Name:

Field Temp: 3.8 °C Temp Rcvd in Lab: 3.9 °C

Test Requested	MCL	Analysis Result	Units	MDL	Method	Date Completed	Analyst
Ceriodaphnia dubia		*			EPA 1002.0	12/22/2016	WR
Ammonia Direct (as N)		0.45	mg/L	0.04	EPA 350.1	12/16/2016	CJS
Alkalinity		176	mg/L		EPA 310.1	12/15/2016	CJS
Chlorine Residual, Cl2		<0.10	mg/L	0.10	EPA 330.5	12/14/2016	JD
Conductivity		771	umhos	2	EPA 120.1	12/14/2016	JD
Hardness		154	mg/L	5.0	SM 2340	12/15/2016	CJS
pH		7.2	S.U.		SM 4500-H B	12/14/2016	JD

MCL = Maximum Contamination Level
MDL = Method/Minimum Detection Limit
UR = Unregulated

Thank you for choosing Analytical Laboratories for your testing needs.

If you have any questions about this report, or any future analytical needs, please contact your client manager:

James Hibbs

Analytical Laboratories, Inc.

1804 N. 33rd Street
Boise, Idaho 83703
Phone (208) 342-5515

Date Report Printed: 1/4/2017 12:06:54 PM
http://www.analyticallaboratories.com
These test results relate only to the items tested.

Laboratory Analysis Report

Sample Number: 1657210

Attn: SALVADOR ARREOLA
CALDWELL WASTEWATER
PO BOX 1179
CALDWELL, ID 83607

Collected By: P ZARATE
Submitted By: C PATE

Source of Sample:
FE-C BIO-DAY 2

Time of Collection: 6:56
Date of Collection: 12/16/2016
Date Received: 12/16/2016
Report Date: 1/4/2017

Field Temp: 5.6 °C Temp Rcvd in Lab: 5.4 °C

PWS#:
PWS Name:

Test Requested	MCL	Analysis Result	Units	MDL	Method	Date Completed	Analyst
Ammonia Direct (as N)		<0.04	mg/L	0.04	EPA 350.1	12/31/2016	CJS
Alkalinity		162	mg/L CaCO3		EPA 310.1	12/28/2016	CJS
Chlorine Residual, Total		<0.10	mg/L	0.10	EPA 330.5	12/16/2016	JMS
Conductivity		768	umhos	2	EPA 120.1	12/16/2016	JMS
Hardness		153	mg/L	5.0	SM 2340	12/28/2016	CJS
pH		7.3	S.U.		EPA 150.1	12/16/2016	JMS

MCL = Maximum Contamination Level
MDL = Method/Minimum Detection Limit
UR = Unregulated

Thank you for choosing Analytical Laboratories for your testing needs.

If you have any questions about this report, or any future analytical needs, please contact your client manager:

James Hibbs

Analytical Laboratories, Inc.

1804 N. 33rd Street
Boise, Idaho 83703
Phone (208) 342-5515

Date Report Printed: 1/4/2017 12:06:54 PM
http://www.analyticallaboratories.com
These test results relate only to the items tested.

Laboratory Analysis Report

Sample Number: 1657563

Attn: SALVADOR ARREOLA
CALDWELL WASTEWATER
PO BOX 1179
CALDWELL, ID 83607

Collected By:
Submitted By: S. CURTIS

Source of Sample:
FE-C BIO-DAY 3

Time of Collection: 7:46
Date of Collection: 12/19/2016
Date Received: 12/19/2016
Report Date: 1/4/2017

Field Temp: 3.5 °C Temp Rcvd in Lab: 1.3 °C

PWS#:
PWS Name:

Test Requested	MCL	Analysis Result	Units	MDL	Method	Date Completed	Analyst
Ammonia Direct (as N)		<0.04	mg/L	0.04	EPA 350.1	12/29/2016	CJS
Alkalinity		175	mg/L		EPA 310.1	12/28/2016	CJS
Chlorine Residual, Cl2		<0.10	mg/L	0.10	EPA 330.5	12/19/2016	DS
Conductivity		718	umhos	2	EPA 120.1	12/19/2016	DS
Hardness		150	mg/L	5.0	SM 2340	12/28/2016	CJS
pH		7.4	S.U.		SM 4500-H B	12/19/2016	DS

MCL = Maximum Contamination Level
MDL = Method/Minimum Detection Limit
UR = Unregulated

Thank you for choosing Analytical Laboratories for your testing needs.

If you have any questions about this report, or any future analytical needs, please contact your client manager:

James Hibbs

CLIENT CODE=

SPC

CHAIN OF CUSTODY RECORD

ANALYTICAL LABS, INC.
1804 N. 33rd Street • Boise, ID 83703
(208) 342-5515 • Fax: (208) 342-5591 • 1-800-574-5773
Website: www.analyticallaboratories.com
E-mail: ali@analyticallaboratories.com

CLIENT INFORMATION:		PROJECT INFORMATION:	
Project Manager:	Sal Arreola	Project Name:	
Company:	Caldww	PWS Number:	
Address:	208 Johnson Ln	Purchase Order Number:	
	Caldwell, ID	Required Due Date:	
Phone: 455-3027	Fax:	E-mail Address:	
Sampled by: *(Please print)* R. Hawker		Transported by: *(Please print)* Will Reynolds	

TESTS REQUESTED

Lab ID	Date Sampled	Time Sampled	Sample Description (Source)	Sample Matrix	WET									
56838	12-14-16	0648	FE-C	WATER	✓									Remarks: Field Temp: 3.5°C

Invoice to: *(If different than above address)*

Special Instructions:

ALLOCATIONS OF RISK: Analytical Laboratories, Inc. will perform preparation and testing services, obtain findings and prepare reports in accordance with Good Laboratory Practices (GLP). If, for any reason, Analytical Laboratories, Inc. errors in the conduct of a test or procedure, their liability shall be limited to the cost of the test or procedure completed in error. Under no circumstances will Analytical Laboratories, Inc. be liable for any other cost associated with obtaining a sample or use of data.

Note: Samples are discarded 21 days after results are reported. Hazardous samples will be returned to client or disposed of at client expense.

	Print Name:	Company:	Date:	Time:
Relinquished By: *(Signature)* Patricia Zarate	Patricia Zarate	Caldww	12-14-16	
Received By: *(Signature)*	Will Reynolds	ALI	12-14-16	0855
Relinquished By: *(Signature)*	Will Reynolds	ALI	12-14-16	1010
Received By: *(Signature)* David Rehl	DAVID REHL	ALI	12/14/16	1010
SAMPLE RECEIPT Total # of Containers: 3	Chains of Custody Seals Y / N / (NA)	Intact: Y / N / (NA) Temperature Received: 3.9°C	Condition: good	

REV. 2/19/12

WHITE: STAYS WITH SAMPLE(S) YELLOW: LAB PINK: SAMPLER

CLIENT CODE=

CHAIN OF CUSTODY RECORD

ANALYTICAL LABS, INC.
1804 N. 33rd Street • Boise, ID 83703
(208) 342-5515 • Fax: (208) 342-5591 • 1-800-574-5773
Website: www.analyticallaboratories.com
E-mail: ali@analyticallaboratories.com

CLIENT INFORMATION:		PROJECT INFORMATION:
Project Manager: Sal Arreola		Project Name:
Company: Caldww		PWS Number:
Address: 208 Johnson Ln		Purchase Order Number:
Caldwell ID 83605		Required Due Date:
Phone: 455 3027	Fax:	E-mail Address:
Sampled by: (Please print) P. Zarate		Transported by: (Please print)

TESTS REQUESTED

Lab ID	Date Sampled	Time Sampled	Sample Description (Source)	Sample Matrix	WET ✓	Remarks:
57210	12-16-16	0656	FE-C	WATER		Field temp: 5.6°C

Invoice to: (If different than above address)

Special Instructions:

ALLOCATIONS OF RISK: Analytical Laboratories, Inc. will perform preparation and testing services, obtain findings and prepare reports in accordance with Good Laboratory Practices (GLP). If, for any reason, Analytical Laboratories, Inc. errors in the conduct of a test or procedure, their liability shall be limited to the cost of the test or procedure completed in error. Under no circumstances will Analytical Laboratories, Inc. be liable for any other cost associated with obtaining a sample or use of data.

Note: Samples are discarded 21 days after results are reported. Hazardous samples will be returned to client or disposed of at client expense.

	Print Name:	Company:	Date:	Time:
Relinquished By: (Signature) Patricia Zarate	Patricia Zarate	Caldww	12-16-16	0705
Received By: (Signature)	Chris Pate	A.L.I.	12-16-16	1020
Relinquished By: (Signature)	Chris Pate	A.L.I.	12-16-16	1045
Received By: (Signature) Emily Holm	Emily Holm	ALI	12/16/16	10:45

SAMPLE RECEIPT — Total # of Containers: 3 — Chains of Custody Seals Y / N / (NA) — Intact: Y / N / (NA) — Temperature Received: 5.4°C — Condition: Good

REV. 2/19/12

WHITE: STAYS WITH SAMPLE(S) YELLOW: LAB PINK: SAMPLER

CLIENT CODE=

CHAIN OF CUSTODY RECORD

#SPC

CLIENT INFORMATION:

Project Manager: SALVADOR ARREOLA
Company: CALDWW
Address: 208 Dhason LN
CALDWELL ID 83605
Phone: 455-3027
Fax:

PROJECT INFORMATION:

Project Name:
PWS Number:
Purchase Order Number:
Required Due Date:
E-mail Address:

Sampled by: *(Please print)*
Transported by: *(Please print)* S. CURTIS

ANALYTICAL LABS, INC.
1804 N. 33rd Street • Boise, ID 83703
(208) 342-5515 • Fax: (208) 342-5591 • 1-800-574-5773
Website: www.analyticallaboratories.com
E-mail: ali@analyticallaboratories.com

TESTS REQUESTED

Lab ID	Date Sampled	Time Sampled	Sample Description (Source)	Sample Matrix	WETT	Remarks:
57563	12-19-16	0746	FE-C Bio Day 3	WATER	1	FED ON ICE TEMP: 3.5°C

Invoice to: *(If different than above address)*

Special Instructions:

ALLOCATIONS OF RISK: Analytical Laboratories, Inc. will perform preparation and testing services, obtain findings and prepare reports in accordance with Good Laboratory Practices (GLP). If, for any reason, Analytical Laboratories, Inc. errors in the conduct of a test or procedure, their liability shall be limited to the cost of the test or procedure completed in error. Under no circumstances will Analytical Laboratories, Inc. be liable for any other cost associated with obtaining a sample or use of data.

Note: Samples are discarded 21 days after results are reported. Hazardous samples will be returned to client or disposed of at client expense.

	Print Name:	Company:	Date:	Time:
Relinquished By: *(Signature)* Rodger Hawkes	Rodger HAWKES	CALDWW	12-19-16	0859
Received By: *(Signature)*	SPENCER CURTIS	ALI	12-19-16	0942
Relinquished By: *(Signature)*	SPENCER CURTIS	ALI	12-19-16	1210
Received By: *(Signature)*	Tom Saylor	"	"	"

SAMPLE RECEIPT Total # of Containers: 3 Chains of Custody Seals Y / N / NA Intact: Y / N / NA Temperature Received: 1.3°C Condition: (GOOD)

REV. 2/19/12

WHITE: STAYS WITH SAMPLE(S) YELLOW: LAB PINK: SAMPLER

11

Table 3: Total Phosphorus Interim Effluent Limits and Compliance Schedule Dates		
6	January 31, 2024	Complete Bidding Deliverable: The permittee will provide DEQ and EPA with written notice that the Bid has been awarded.
7	April 30, 2024	Start Construction Deliverable: The permittee will provide DEQ and EPA with a copy of the Notice to Proceed with construction.
8	April 30, 2026	Complete Construction Deliverable: The permittee will provide DEQ and EPA with written notice that the construction is completed.
9	September 30, 2026	Process Optimization and Achieve Final Effluent Limitation Deliverable: The permittee must achieve compliance with the final effluent limitations and provide DEQ and EPA with written notice of compliance with final effluent limitations.
Notes: 1. The annual average total phosphorus concentration and load must be calculated as the sum of all daily discharges measured for total phosphorus during a calendar year, divided by the number of daily discharges measured for total phosphorus during that year. 2. The annual average total phosphorus concentration and load must be reported on the December DMR.		

D. Whole Effluent Toxicity Testing Requirements

The permittee must conduct chronic toxicity tests on effluent samples from outfall 001. Testing must be conducted in accordance with subsections 1 through 7, below.

1. Toxicity testing must be conducted on 24-hour composite samples of effluent. In addition, a split of each sample collected must be analyzed for the chemical and physical parameters required in Part I.B, above, with a required effluent sampling frequency of once per month or more frequently, using the sample type required in Part I.B. For parameters for which grab samples are required in Part I.B, grab samples must be taken during the same 24-hour period as the 24-hour composite sample used for the toxicity tests. When the timing of sample collection coincides with that of the sampling required in Part I.B, analysis of the split sample will fulfill the requirements of Part I.B as well.

2. Chronic Test Species and Methods

   a) For outfall 001, chronic tests must be conducted once per quarter. Quarters are defined as January – March, April through June, July – September, and October – December.

   b) The permittee must conduct short-term tests with the water flea, *Ceriodaphnia dubia* (survival and reproduction test), the fathead minnow, *Pimephales promelas* (larval survival and growth test), and a green alga, *Selenastrum capricornutum* (growth test) for the first three suites of tests. After this screening period, monitoring must be conducted using the most sensitive species, which is defined below.

(i) The most sensitive species is the species which, during the screening period, produces the greatest maximum toxicity result in chronic toxic units (TU_c), which is defined in Part I.D.2.d, below.

(ii) If all three species produce the identical maximum toxicity result (including no toxicity in 100% effluent) the permittee must use Ceriodaphnia dubia for subsequent tests.

(iii) If two species produce the identical maximum toxicity result, which is greater than 1.0 TU_c and also greater than the maximum toxicity result of the third species, the permittee may use either of the two species producing the greater maximum toxicity result for subsequent tests.

c) The presence of chronic toxicity must be determined as specified in *Short-Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms*, Fourth Edition, EPA/821-R-02-013, October 2002.

d) Results must be reported in TU_c (chronic toxic units), which is defined as follows:

(i) For survival endpoints, $TU_c = 100/NOEC$.

(ii) For all other test endpoints, $TU_c = 100/IC_{25}$.

(iii) IC_{25} means "25% inhibition concentration." The IC_{25} is a point estimate of the toxicant concentration, expressed in percent effluent, that causes a 25% reduction in a non-quantal biological measurement (e.g., reproduction or growth) calculated from a continuous model (e.g., Interpolation Method).

(iv) NOEC means "no observed effect concentration." The NOEC is the highest concentration of toxicant, expressed in percent effluent, to which organisms are exposed in a chronic toxicity test [full life-cycle or partial life-cycle (short term) test], that causes no observable adverse effects on the test organisms (i.e., the highest concentration of effluent in which the values for the observed responses are not statistically significantly different from the controls).

3. Quality Assurance

a) The toxicity testing on each organism must include a series of five test dilutions and a control. The dilution series must include the receiving water concentration (RWC), which is the dilution associated with the average monthly whole effluent toxicity limits, two dilutions above the RWC, and two dilutions below the RWC. The RWCs are:

(i) 62% effluent for April – June

(ii) 39% effluent for July – March

b) All quality assurance criteria and statistical analyses used for chronic tests and reference toxicant tests must be in accordance with *Short-Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to*

Freshwater Organisms, Fourth Edition, EPA/821-R-02-013, October 2002, and individual test protocols.

c) In addition to those quality assurance measures specified in the methodology, the following quality assurance procedures must be followed:

(i) If organisms are not cultured in-house, concurrent testing with reference toxicants must be conducted. If organisms are cultured in-house, monthly reference toxicant testing is sufficient. Reference toxicant tests must be conducted using the same test conditions as the effluent toxicity tests.

(ii) If either of the reference toxicant tests or the effluent tests do not meet all test acceptability criteria as specified in the test methods manual, the permittee must re-sample and re-test within 14 days of receipt of the test results.

(iii) Control and dilution water must be receiving water or lab water, as appropriate, as described in the manual. If the dilution water used is different from the culture water, a second control, using culture water must also be used. Receiving water may be used as control and dilution water upon notification of EPA and IDEQ. In no case shall water that has not met test acceptability criteria be used for either dilution or control.

4. Reporting

a) The permittee must submit the results of the toxicity tests with the discharge monitoring reports (DMRs). Results must be reported on the DMRs for the last month of the quarter in which the samples were taken.

b) The report of toxicity test results must include all relevant information outlined in Section 10, Report Preparation, of *Short-Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms*, Fourth Edition, EPA/821-R-02-013, October 2002. In addition to toxicity test results, the permittee must report: dates of sample collection and initiation of each test; flow rate at the time of sample collection; and the results of the monitoring required in Part I.B of this permit, for parameters with a required monitoring frequency of once per month or more frequently.

5. Preparation of initial investigation toxicity reduction evaluation (TRE) workplan: By January 31, 2017, the permittee must submit to EPA a copy of the permittee's initial investigation TRE workplan. This plan shall describe the steps the permittee intends to follow in the event that chronic toxicity is detected above the applicable effluent limits in Table 1 of this permit, and must include at a minimum:

a) A description of the investigation and evaluation techniques that would be used to identify potential causes/sources of toxicity, effluent variability, treatment system efficiency;

b) A description of the facility's method of maximizing in-house treatment efficiency, good housekeeping practices, and a list of all chemicals used in operation of the facility; and

c) If a toxicity identification evaluation (TIE) is necessary, who will conduct it (i.e., in-house or other).

d) The initial investigation TRE workplan must be sent to the following address:

US EPA Region 10
Attn: NPDES WET Coordinator
1200 Sixth Avenue
Suite 900 OWW-191
Seattle, WA 98101-3140

6. Accelerated testing: If chronic toxicity is detected above the applicable average monthly limit for whole effluent toxicity in Part I.B or I.C of this permit, the permittee must comply with the following:

a) The permittee must conduct six more bi-weekly (every two weeks) chronic toxicity tests, over a 12-week period. This accelerated testing shall be initiated within 10 calendar days of receipt of the test results indicating the initial exceedance.

b) The permittee must notify EPA of the exceedance in writing at the address in Part I.C.5.d, above, within 5 calendar days of receipt of the test results indicating the exceedance. The notification must include the following information:

(i) A status report on any actions required by the permit, with a schedule for actions not yet completed.

(ii) A description of any additional actions the permittee has taken or will take to investigate and correct the cause(s) of the toxicity.

(iii) Where no actions have been taken, a discussion of the reasons for not taking action.

c) If none of the six accelerated chronic toxicity tests required under Part I.C.6.a are above the applicable average monthly limit in Part I.B or I.C of this permit, the permittee may return to the regular chronic toxicity testing cycle specified in Part I.D.2.a.

d) If any of the six accelerated chronic toxicity tests required under Part I.C.6.a are above the applicable average monthly limit in Part I.B or I.C of this permit, then the permittee must implement the initial investigation TRE workplan as described in Part I.D.7.

7. Implementation of Initial Investigation TRE Workplan

a) The permittee must implement the initial investigation TRE workplan within 48 hours of the permittee's receipt of the accelerated toxicity test result demonstrating an exceedance of the applicable average monthly limit in Part I.B or I.C of this permit.

(i) If implementation of the initial investigation workplan clearly identifies the source of toxicity to the satisfaction of EPA (e.g., a temporary plant upset), the permittee may return to the regular chronic toxicity testing cycle specified in Part I.D.2.a.

(ii) If implementation of the initial investigation workplan does not clearly identify the source of toxicity to the satisfaction of EPA, then the permittee must begin implementation of further toxicity reduction evaluation (TRE) requirements in part I.D.8 below.

8. Detailed TRE/TIE

a) If implementation of the initial investigation workplan does not clearly identify the source of toxicity to the satisfaction of EPA, then, in accordance with the permittee's initial investigation workplan and EPA manual EPA 833-B-99-002 (*Toxicity Reduction Evaluation Guidance for Municipal Wastewater Treatment Plants*), the permittee must develop as expeditiously as possible a more detailed TRE workplan, which includes:

(i) Further actions to investigate and identify the cause of toxicity;

(ii) Actions the permittee will take to mitigate the impact of the discharge and to prevent the recurrence of toxicity; and

(iii) A schedule for these actions.

b) The permittee may initiate a TIE as part of the overall TRE process described in the EPA acute and chronic TIE manuals EPA/600/6-91/005F (Phase I), EPA/600/R-92/080 (Phase II), and EPA-600/R-92/081 (Phase III).

c) If the detailed TRE/TIE clearly identifies the source of toxicity to the satisfaction of EPA, the permittee may return to the regular chronic toxicity testing cycle specified in Part I.D.2.a.

9. Inconclusive TRE/TIE

a) If the detailed TRE described in Part I.D.8 is inconclusive, the permittee must conduct six bi-weekly (every two weeks) chronic toxicity tests, over a 12-week period. This accelerated testing shall be initiated within 10 calendar days of completing the detailed TRE/TIE.

b) If none of the six accelerated chronic toxicity tests required under Part I.D.9.a exceed the applicable average monthly limit in Part I.B or I.C of this permit, the permittee may return to the regular chronic toxicity testing cycle specified in Part I.D.2.a.

c) If any of the six accelerated chronic toxicity tests required under Part I.D.9.a exceed the applicable chronic toxicity trigger in Part I.D.6 of this permit, then the permittee must repeat the TRE/TIE process described in Part I.D.8.

E. Surface Water Monitoring

The permittee must conduct surface water monitoring. The program must meet the following requirements:

Ceriodaphnia dubia Stock Culture Log Month/Year: December 2016

Start Date: 12-6-16 End Date: Board#:

Trans.	1	2	3	4	5	6	7	8	9	10	Time
12-6 0	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	1430
12-7 1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	1305
12/8 2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	1310
12/9 3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	1040
12/10 4	1/7	✓	✓	1/7	1/6	1/1	1/7	1/5	1/5	✓	1220
12/11 5	✓	1/6	✓	✓	✓	✓	✓	✓	✓	1/7	1500
12/12 6	2/11	[illegible]	1/6	2/10	2/12	2/11	2/11	2/14	2/12	2/14	1500
12/13 7	3/22	✓	D	3/19	3/20	3/22	3/16	3/13	3/18	✓	1015
12/14 8	✓	3/14		✓	✓	✓	✓	✓	✓	3/12	1000
9											
10											
11											
12											
13											
14											

Survival > 80%: yes/no Average offspring per female > 20: yes/no

4

Start Date: End Date: Board#: 2

Trans.	1	2	3	4	5	6	7	8	9	10	Time
12/6 0	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	1435
12/7 1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	1310
12/8 2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	1315
12/9 3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	1045
12/10 4	1/8	✓	1/7	1/5	1/5	1/6	1/1	1/5	1/6	✓	1225
12/11 5	✓	1/6	✓	2/6	✓	✓	✓	✓	✓	1/4	1505
12/12 6	2/17	2/16	2/10	3/14	2/13	2/15	2/11	2/13	2/14	2/13	1505
12/13 7	3/20	✓	✓	✓	3/20	3/18	3/17	3/18	3/19	✓	1020
12/14 8	✓	3/16	3/18	[illegible]	✓	✓	✓	✓	✓	3/20	1005
9											
10											
11											
12											
13											
14											

Survival > 80%: yes/no Average offspring per female > 20: yes/no

Start Date: End Date: Board#: 3

Trans.	1	2	3	4	5	6	7	8	9	10	Time
12/6 0	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	1440
12/7 1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	1315
12/8 2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	1320
12/9 3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	1050
12/10 4	1/7	1/3	1/7	✓	1/4	1/7	1/5	1/6	1/6	✓	1230
12/11 5	✓	✓	✓	1/6	✓	✓	✓	✓	✓	✓	1510
12/12 6	2/14	2/8	2/14	2/13	2/13	2/11	2/13	2/15	2/14	✓	1510
12/13 7	2/14	✓	3/15	✓	3/23	3/19	3/17	3/18	3/16	✓	1025
12/14 8	✓	3/21	✓	3/16	✓	✓	✓	✓	✓	✓	1010
9											
10											
11											
12											
13											
14											

Survival > 80%: yes/no Average offspring per female > 20: yes/no

1300 Blue Spruce Drive, Suite C
Fort Collins, Colorado 80524

Toll Free: 800/331-5916
Tel: 970/484-5091 Fax:970/484-2514

Algae Preparation History

DATE: 12/5/2016

SPECIES: *Raphidocelis subcapitata**

INOCULATION DATE: 11/16/2016

HARVEST DATE: 11/21/2016

CONCENTRATION DATE: 11/23/2016

CELL COUNT (/ml): 3.0 x 10^7 cells/ml

Comments:

* Formerly known as *Pseudokirschneriella subcapitata* and *Selenastrum capricornutum*

** All concentrated algae diluted to proper cell count with reconstituted moderately hard DI water.

Supervisor

1300 Blue Spruce Drive, Suite C
Fort Collins, Colorado 80524

Toll Free: 800/331-5916
Tel:970/484-5091 Fax:970/484-2514

YTC TOTAL SOLIDS MEASUREMENT

(Method from EPA/505/8-89-002a)

YTC Process Date: 11/30/2016; Best if used by 2/28/2017
Average Total Solids: 1750 mg/l

Ingredient Lot Numbers

Pines International® Wheat Grass: COCDW12S50; Zeigler Finfish Starter #1 (Lot 06/05/2016); Fleischmanns Yeast; G-3

Analyzed Metals	Report Limits	Results (mg/L)
Aluminum	0.03	0.09
Arsenic	0.001	U
Cadmium	0.001	U
Chromium	0.005	U
Copper	0.005	0.046
Iron	0.02	0.26
Lead	0.001	U
Mercury	0.001	U
Nickel	0.005	U
Silver	0.001	U
Zinc	0.01	0.15

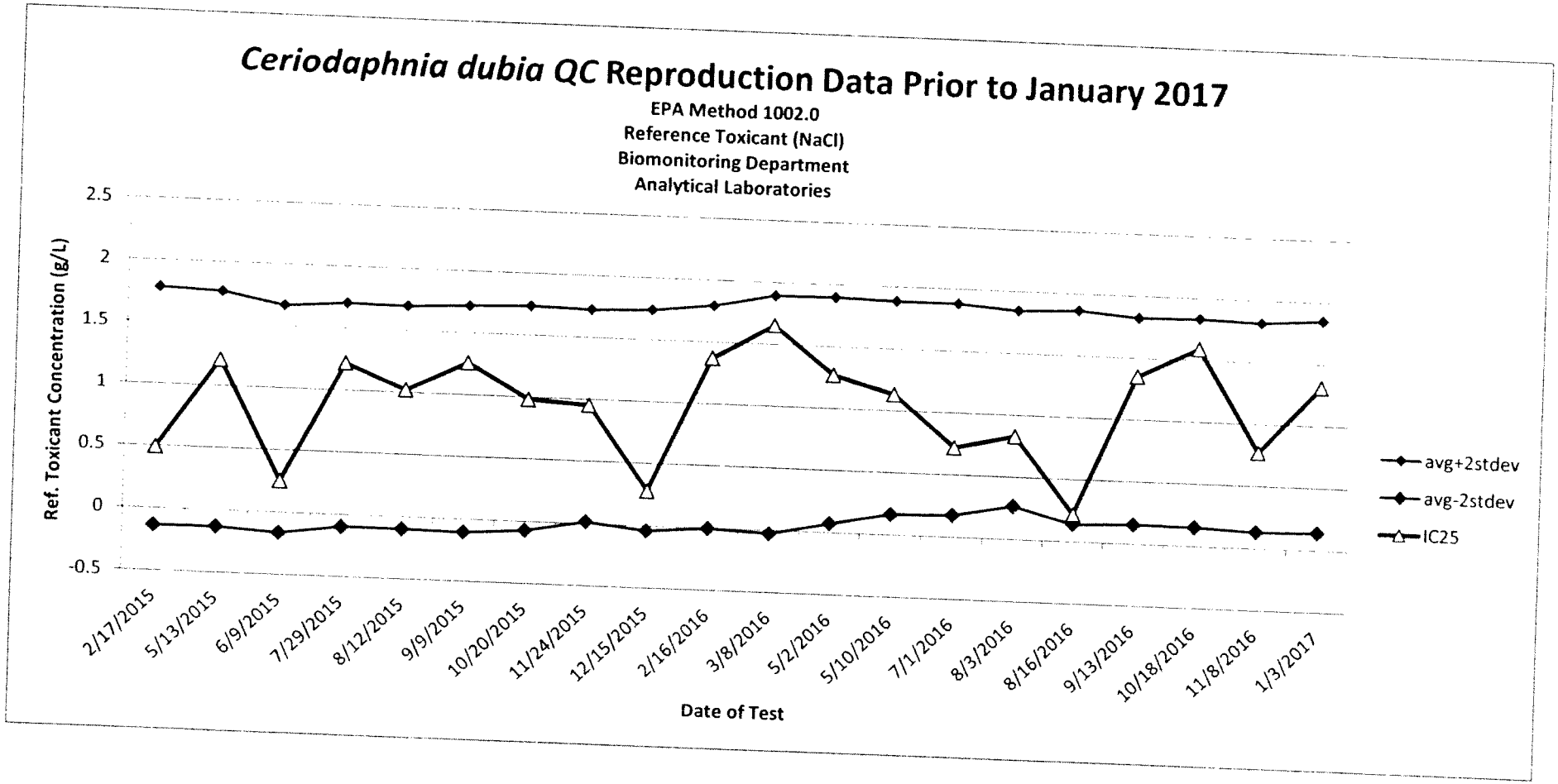
EPA Required Toxic Metals and Pesticide Analyses*

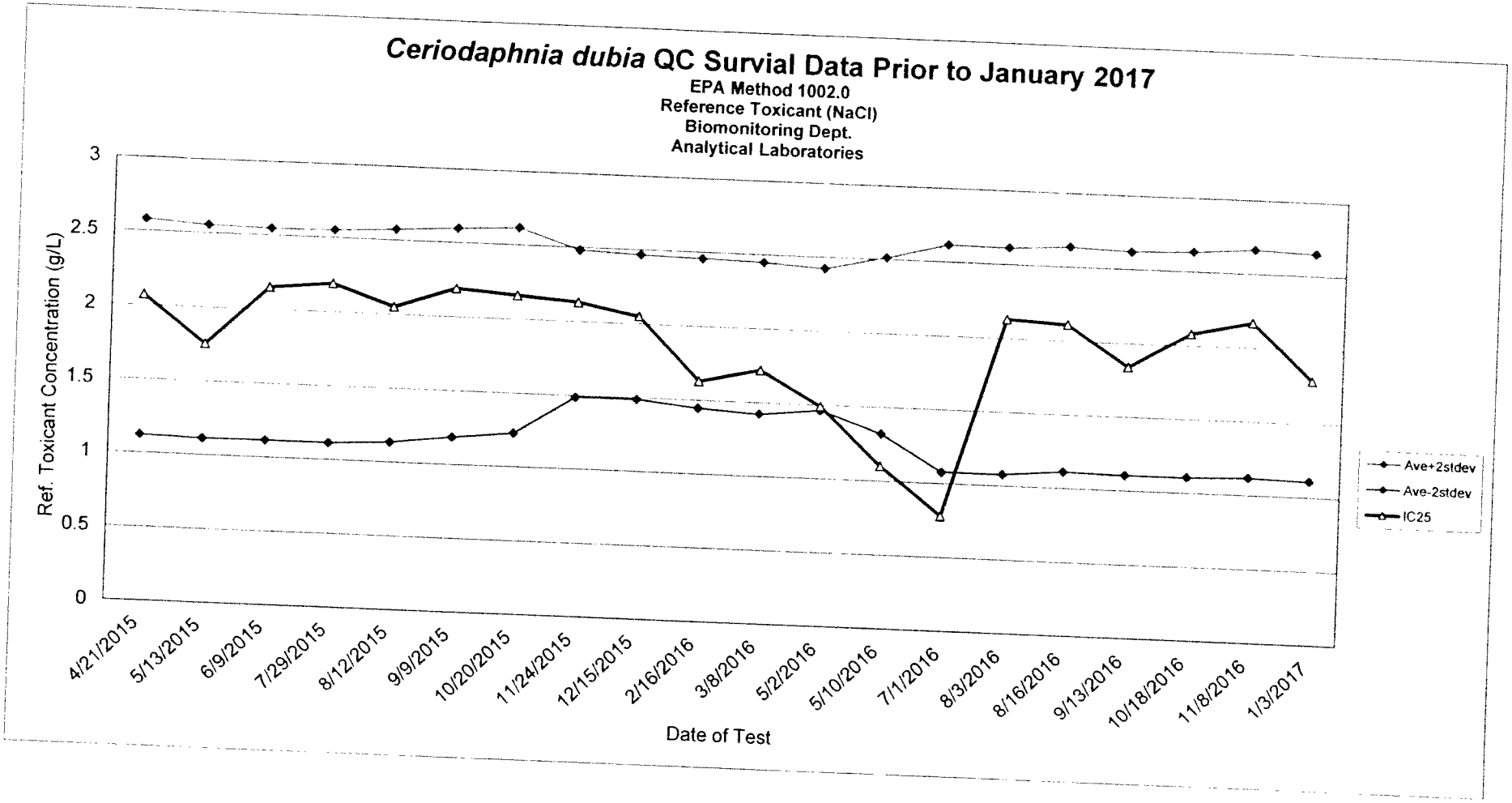
Compounds	Report Limits	Results (ug/L)
Aldrin	0.5	U
alpha-BHC	0.5	U
beta-BHC	0.5	U
delta-BHC	0.5	U
gamma-BHC (Lindane)	0.5	U
alpha-Chlordane	0.5	U
gamma-Chlordane	0.5	U
4,4' – DDD	0.5	U
4,4' – DDE	0.5	U
4,4' –DDT	0.5	U
Dieldrin	0.5	U
Endosulfan I	0.5	U
Endosulfan II	0.5	U
Endosulfan sulfate	0.5	U
Endrin	0.5	U
Endrin aldehyde	0.5	U
Endrin ketone	0.5	U
Heptachlor	0.8	U
Heptachlor epoxide	0.5	U
Methoxychlor	0.5	U
Chlordane (technical)	5.0	U
Toxaphene	25	U
Aroclor-1016	5.0	U
Aroclor-1221	5.0	U
Aroclor-1232	5.0	U
Aroclor-1242	5.0	U
Aroclor-1248	5.0	U
Aroclor-1254	5.0	U
Aroclor-1260	5.0	U
Aroclor-1262	5.0	U
Aroclor-1268	5.0	U

U – Indicates compound was analyzed for but not detected.
*Testing performed by Energy Labs, Billings, Montana

Literature Cited

1. Short-Term methods for Estimating the Chronic Toxicity of Effluents and receiving Waters to Freshwater Organisms, Fourth Edition. October 2002. EPA-821-R-02-013.
2. Methods for Measuring the Chronic Toxicity of Effluents to Freshwater and Marine Organisms, EPA/600/4-85/013, US EPA.
3. Standard Methods for the Examination of Water and Wastewater, 19 Edition, 1995, APHA, AWWA, WPCF.
4. Handbook for Analytical Quality Control in Water and Wastewater Laboratories, Environmental Monitoring and Support Laboratory, Cincinnati, EPA/600/4-79/019, US EPA


Ceriodaphnia dubia QC Reproduction Data Prior to January 2017
EPA Method 1002.0
Reference Toxicant (NaCl)
Biomonitoring Department
Analytical Laboratories
Ref. Toxicant Concentration (g/L)
2.5
2
1.5
1
0.5
0
-0.5
2/17/2015
5/13/2015
6/9/2015
7/29/2015
8/12/2015
9/9/2015
10/20/2015
11/24/2015
12/15/2015
2/16/2016
3/8/2016
5/2/2016
5/10/2016
7/1/2016
8/3/2016
8/16/2016
9/13/2016
10/18/2016
11/8/2016
1/3/2017
Date of Test
avg+2stdev
avg-2stdev
IC25


Ceriodaphnia dubia QC Survial Data Prior to January 2017
EPA Method 1002.0
Reference Toxicant (NaCl)
Biomonitoring Dept.
Analytical Laboratories
Ref. Toxicant Concentration (g/L)
3
2.5
2
1.5
1
0.5
0
4/21/2015
5/13/2015
6/9/2015
7/29/2015
8/12/2015
9/9/2015
10/20/2015
11/24/2015
12/15/2015
2/16/2016
3/8/2016
5/2/2016
5/10/2016
7/1/2016
8/3/2016
8/16/2016
9/13/2016
10/18/2016
11/8/2016
1/3/2017
Date of Test
Ave+2stdev
Ave-2stdev
IC25

BENCH SHEET FOR QC CERIODAPHNIA SURVIVAL/REPRODUCTION TEST. PAGE 1 OF 2

TEST MONTH Dec 2016

Test Start Date/Time: 12/13/16

Analyst: WR, CP

Test Stop Date/Time: 12/20/16, 1130

Conc. **CONTROL**

Day-Lab #	1	2	3	4	5	6	7	8	9	10	# Young	New D.O.	New pH	Old D.O.	Old pH	Daily Temp
0	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	XXX	XXX	XXX	XXX	XXX	XXX
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		7.1	7.7	XXX	XXX	22.6
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		7.8	7.6	7.6	7.7	23.0
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		8.1	7.7	8.0	7.8	22.0
4	1/6	1/9	1/7	1/7	1/4	1/9	1/7	1/9	1/8	1/8	74	7.82	7.7	7.6	8.0	22.7
5	✓	2/14	✓	2/14	✓	✓	✓	2/16	✓	✓	41	8.0	8.0	7.5	8.1	23.0
6	2/14	✓	2/14	✓	2/15	2/16	2/15	✓	2/15	2/17	106	8.2	8.1	8.2	8.1	22.3
7	3/20	3/23	3/22	3/19	3/24	3/21	3/17	3/23	✓	3/23	192	7.8	8.1	7.9	8.2	22.1
Total	40	46	43	37	43	46	39	48	23	48	413			7.8	7.8	

Conc. **0.50 g/L**

Day-Lab #	1	2	3	4	5	6	7	8	9	10	# Young	New D.O,	New pH	Old D.O.	Old pH	Daily Temp
0	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	XXX	XXX	XXX	XXX	XXX	XXX
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		8.1	7.8	XXX	XXX	22.6
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		7.9	7.9	7.6	7.9	22.9
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		8.1	7.9	7.9	7.8	22.5
4	1/6	1/7	1/6	1/8	1/7	1/8	1/7	1/9	✓	1/8	66	7.8	7.8	7.7	8.1	22.8
5	✓	2/16	✓	✓	✓	✓	✓	2/17	1/6	✓	39	7.7	8.1	7.5	8.1	23.2
6	2/15	✓	2/14	2/12	2/13	2/18	2/15	✓	2/12	2/16	115	7.7	8.0	7.6	8.1	22.3
7	3/20	3/23	3/19	3/24	3/21	3/21	3/17	3/22	✓	3/23	190	8.1	8.1	7.8	8.2	22.7
Total	41	46	39	44	41	47	39	48	18	47	410			7.8	8.0	

Conc. **1.25 g/L**

Day-Lab #	1	2	3	4	5	6	7	8	9	10	# Young	New D.O,	New pH	Old D.O.	Old pH	Daily Temp
0	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	XXX	XXX	XXX	XXX	XXX	XXX
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		8.1	7.8	XXX	XXX	22.5
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		7.9	7.8	7.7	7.9	22.9
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		8.0	7.8	8.2	7.9	22.7
4	1/7	1/6	1/6	1/5	1/7	1/6	1/6	1/7	D	1/7	57	7.7	7.9	7.7	8.1	22.9
5	✓	✓	✓	✓	✓	✓	✓	2/15	|	✓	15	7.7	8.1	7.6	8.2	23.2
6	2/13	2/15	2/12	2/19	2/15	2/11	2/13	✓	|	2/17	105	7.7	8.1	7.7	8.1	22.4
7	3/18	3/21	3/18	3/18	3/22	3/17	✓	3/23	↓	3/22	159	8.2	8.2	7.8	8.2	22.9
Total	38	42	36	32	44	34	19	45	0	46	336			7.8	8.1	

BENCH SHEET QC CERIODAPHNIA SURVIVAL/REPRODUCTION TEST. PAGE 2 OF 2

TEST MONTH Dec 2016

Test Start Date/Time: 12/13/16, 1130 Analyst: CR, CR

Test Stop Date/Time: 12/20/16

Conc. **2.00 g/L**

Day-Lab #	1	2	3	4	5	6	7	8	9	10	# Young	New D.O.	New pH	Old D.O.	Old pH	Daily Temp
0	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	XXX	XXX	XXX	XXX	XXX	XXX
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		8.1	7.9	XXX	XXX	22.6
2	✓	✓	✓	✓	D	✓	✓	D	D	✓		7.9	7.9	7.7	7.9	23.0
3	✓	✓	✓	✓	|	✓	✓	|	|	✓		8.1	7.9	8.2	7.9	22.6
4	✓	✓	✓	✓	|	✓	✓	|	|	✓		7.8	8.0	7.7	8.1	22.9
5	1/3	✓	✓	✓	|	1/2	✓	|	|	1/4	4	7.7	8.0	7.8	8.0	23.1
6	2/10	1/3	✓	2/6	|	2/10	1/1	|	|	✓	5	7.6	8.1	7.6	8.1	22.4
7	✓	2/11	1/6	✓	↓	✓	✓	↓	↓	2/11	43	8.1	8.2	8.0	8.3	23.3
Total	13	14	6	8	0	12	1	0	0	15	17			7.9	8.1	
											69					

Conc. **2.75 g/L**

Day-Lab #	1	2	3	4	5	6	7	8	9	10	# Young	New D.O,	New pH	Old D.O.	Old pH	Daily Temp
0	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	XXX	XXX	XXX	XXX	XXX	XXX
1	D	D	✓	✓	✓	✓	✓	✓	✓	✓		8.1	7.8	XXX	XXX	22.7
2	|	|	D	D	D	D	D	✓	D	✓		7.8	7.9	7.7	8.0	23.1
3	|	|	|	|	|	|	|	D	|	D		8.0	7.8	8.2	7.9	22.6
4	|	|	|	|	|	|	|	|	|	|		7.7	7.9			
5	|	|	|	|	|	|	|	|	|	|						
6	|	|	|	|	|	|	|	|	|	|						
7	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓						
Total	0	0	0	0	0	0	0	0	0	0						

Conc. **3.50 g/L**

Day-Lab #	1	2	3	4	5	6	7	8	9	10	# Young	New D.O,	New pH	Old D.O.	Old pH	Daily Temp
0	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	XXX	XXX	XXX	XXX	XXX	XXX
1	D	D	✓	✓	✓	✓	✓	✓	✓	✓		8.1	7.8	XXX	XXX	22.6
2	|	|	D	D	D	D	D	✓	D	D		7.8	7.9	7.9	8.0	23.1
3	|	|	|	|	|	|	|	D	|	|		8.0	7.8	7.8	7.8	22.5
4	|	|	|	|	|	|	|	|	|	|						
5	|	|	|	|	|	|	|	|	|	|						
6	|	|	|	|	|	|	|	|	|	|						
7	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓						
Total	0	0	0	0	0	0	0	0	0	0						

Summary Sheet

Facility	Analytical Laboratories	**Analyst**	Will Reynolds
Test ID	QC DECEMBER 2016	**Species**	Ceriodaphnia dubia (water flea)
Date	1/3/2017	**Test Type**	Chronic Survival
IWC Conc.			

Input

Number of Organisms Exposed or Counted

	Concentrations					
Replicate	0	0.5	1.25	2	2.75	3.5
1	1	1	1	1	1	1
2	1	1	1	1	1	1
3	1	1	1	1	1	1
4	1	1	1	1	1	1
5	1	1	1	1	1	1
6	1	1	1	1	1	1
7	1	1	1	1	1	1
8	1	1	1	1	1	1
9	1	1	1	1	1	1
10	1	1	1	1	1	1

Number of Organisms Surviving or Responding

	Concentrations					
Replicate	0	0.5	1.25	2	2.75	3.5
1	1	1	1	1	0	0
2	1	1	1	1	0	0
3	1	1	1	1	0	0
4	1	1	1	1	0	0
5	1	1	1	0	0	0
6	1	1	1	1	0	0
7	1	1	1	1	0	0
8	1	1	1	0	0	0
9	1	1	0	0	0	0
10	1	1	1	1	0	0

Total Organisms	10	10	10	10	10	10
Total Responding	10	10	9	7	0	0
% Responding	100.0%	100.0%	90.0%	70.0%	0.0%	0.0%

Output

Summary Sheet

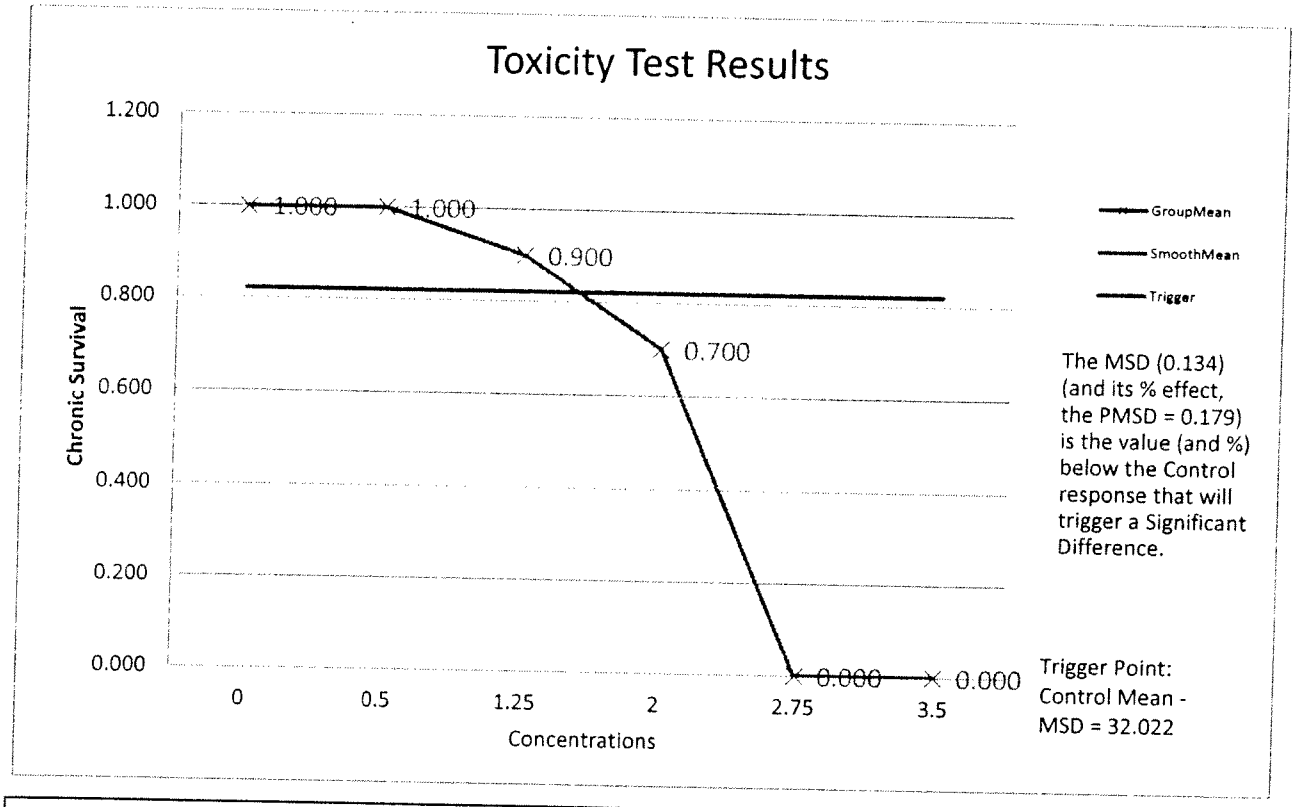
Statistical Data	Conc.	Mean	Stdev	CV	Steel test
	0	1.047	0.000	0.000	
Statistics are based on the transformed data used for endpoint calculations	0.5	1.047	0.000	0.000	NS
	1.25	0.995	0.166	0.166	NS
	2	0.890	0.253	0.284	NS
	2.75				Y
	3.5				Y

NOEC	LOEC	IC25	95% Confidence Intervals	
2	2.75	1.79	1.10	2.11

TST	Calculated t-value	Table t-value	Relative % Effect at IWC

MSD	PMSD
0.134	17.9%

Note - For statistical tests, "NS" indicates that the concentration is not statistically different from the control, while "Y" indicates that the concentration is statistically different from the control.



Summary Sheet

Facility	Analytical Laboratories	**Analyst**	Will Reynolds
Test ID	QC DECEMBER 2016	**Species**	Ceriodaphnia dubia (water flea)
Date	1/3/2017	**Test Type**	Reproduction
IWC Conc.			

Input

	Concentrations					
Replicate	0	0.5	1.25	2	2.75	3.5
1	40	41	38	13	0	0
2	46	46	42	14	0	0
3	43	39	36	6	0	0
4	37	44	32	8	0	0
5	43	41	44	0	0	0
6	46	47	34	12	0	0
7	39	39	19	1	0	0
8	48	48	45	0	0	0
9	23	18	0	0	0	0
10	48	47	46	15	0	0
Mean	41.300	41.000	33.600	6.900	0.000	0.000
Stdev	7.454	8.769	14.269	6.315	0.000	0.000

Output

Statistical Data	Conc.	Mean	Stdev	CV	Steel test
	0	41.300	7.454	0.180	
	0.5	41.000	8.769	0.214	NS
	1.25	33.600	14.269	0.425	NS
	2	6.900	6.315	0.915	Y
	2.75	0.000			Y
	3.5	0.000			Y

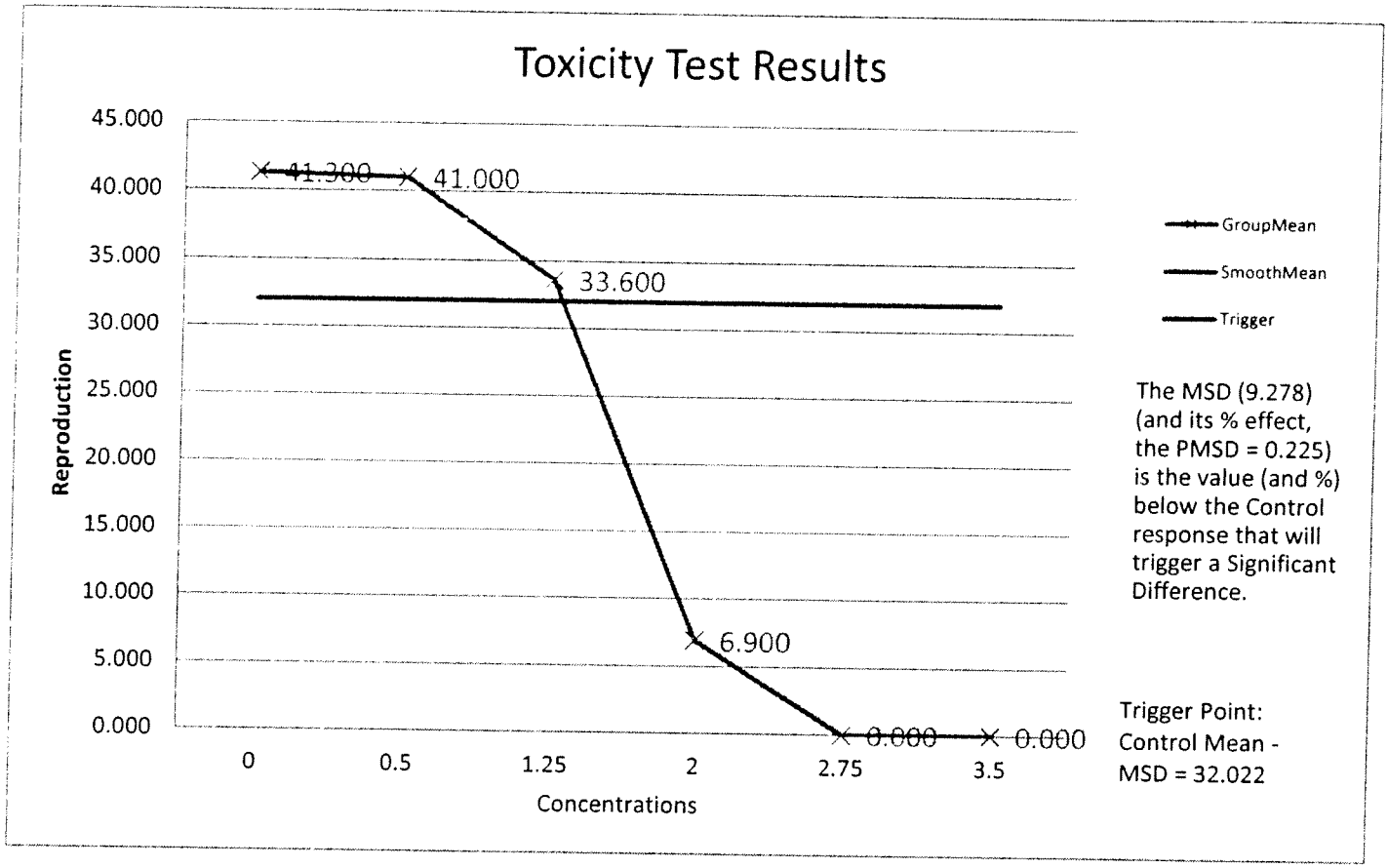
NOEC	LOEC	IC25	95% Confidence Intervals	
1.25	2	1.31	0.92	1.45

TST	Calculated t-value	Table t-value	Relative % Effect at IWC

MSD	PMSD
9.278	22.5%

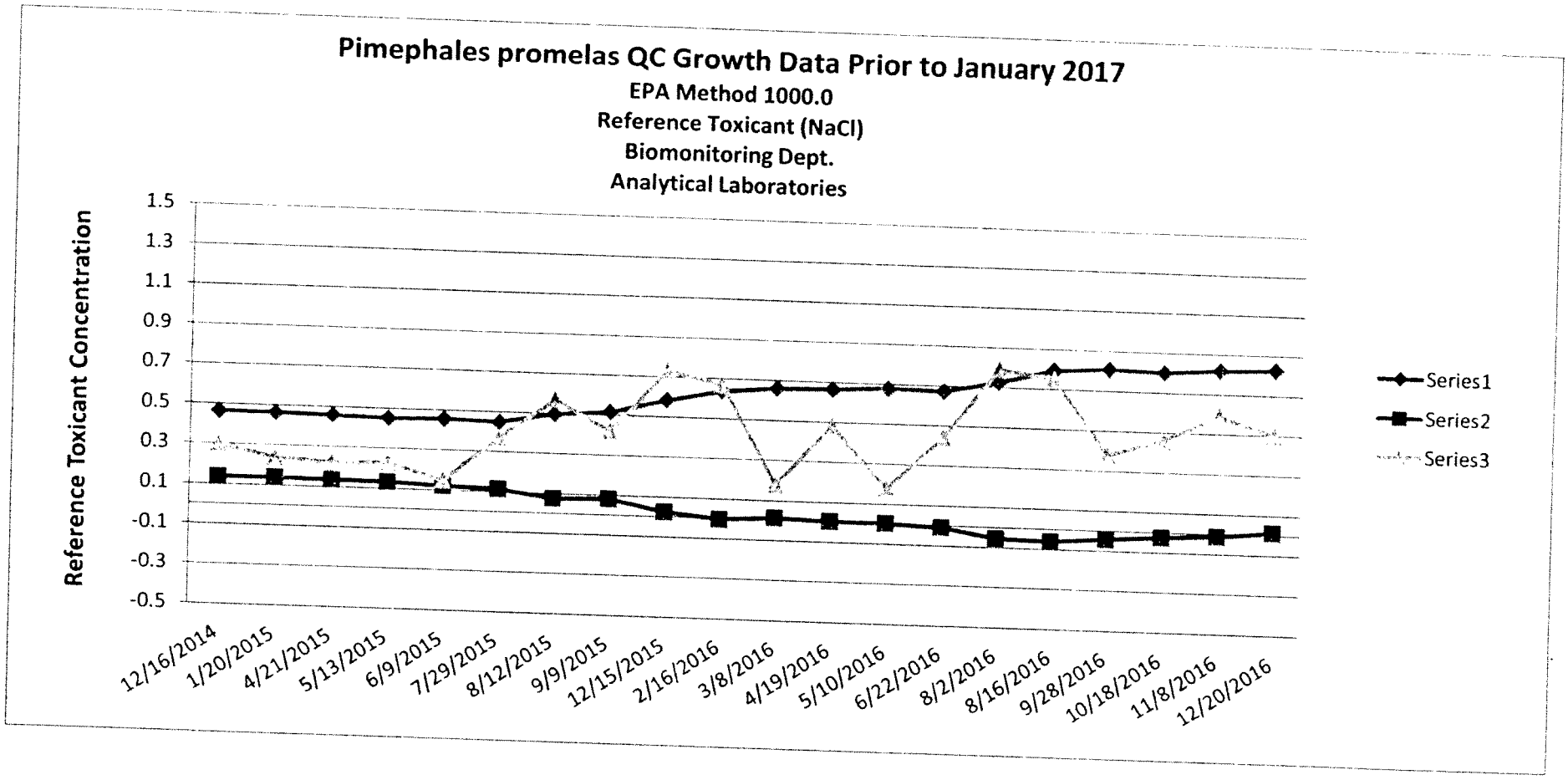
Summary Sheet

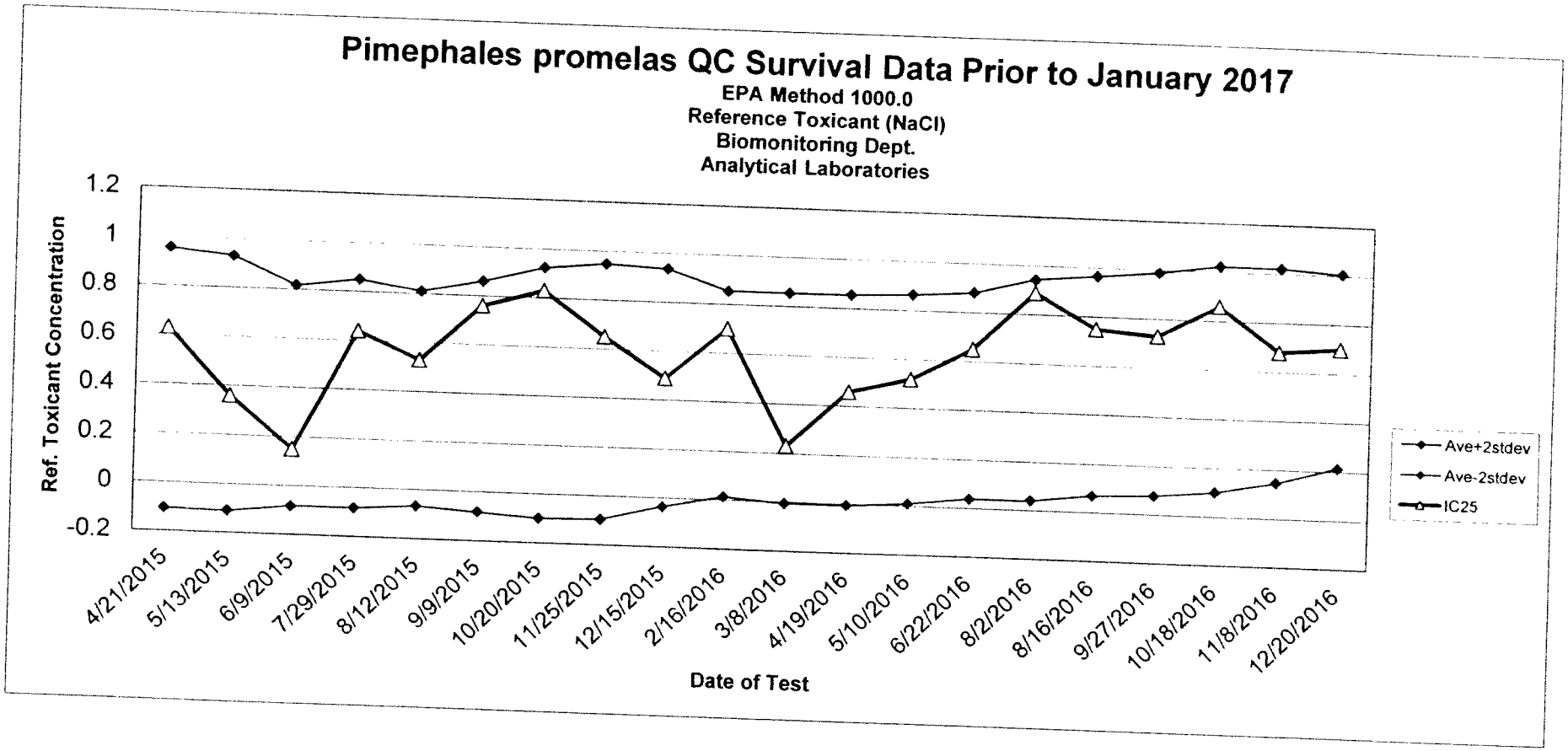
Note - For statistical tests, "NS" indicates that the concentration is not statistically different from the control, while "Y" indicates that the concentration is statistically different from the control.



NOTICE

The United States Environmental Protection Agency (EPA), through its Office of Wastewater Management, funded and managed the development of the whole effluent toxicity (WET) Tool described here. This is a tool that calculates WET test endpoints for the EPA-approved WET test methods and is used by EPA internally for analyzing valid WET test data. Neither the EPA nor any of their employees, assumes any legal liability or responsibility for the accuracy, completeness, or usefulness of any information or process disclosed. Furthermore, the WET Tool is supplied "as-is" without guarantee or warranty, expressed or implied, including without limitation, any warranty of merchantability or fitness for a specific purpose.


Pimephales promelas QC Growth Data Prior to January 2017
EPA Method 1000.0
Reference Toxicant (NaCl)
Biomonitoring Dept.
Analytical Laboratories
Reference Toxicant Concentration
1.5
1.3
1.1
0.9
0.7
0.5
0.3
0.1
-0.1
-0.3
-0.5
12/16/2014
1/20/2015
4/21/2015
5/13/2015
6/9/2015
7/29/2015
8/12/2015
9/9/2015
12/15/2015
2/16/2016
3/8/2016
4/19/2016
5/10/2016
6/22/2016
8/2/2016
8/16/2016
9/28/2016
10/18/2016
11/8/2016
12/20/2016
Series1
Series2
Series3


Pimephales promelas QC Survival Data Prior to January 2017
EPA Method 1000.0
Reference Toxicant (NaCl)
Biomonitoring Dept.
Analytical Laboratories
Ref. Toxicant Concentration
1.2
1
0.8
0.6
0.4
0.2
0
-0.2
4/21/2015
5/13/2015
6/9/2015
7/29/2015
8/12/2015
9/9/2015
10/20/2015
11/25/2015
12/15/2015
2/16/2016
3/8/2016
4/19/2016
5/10/2016
6/22/2016
8/2/2016
8/16/2016
9/27/2016
10/18/2016
11/8/2016
12/20/2016
Date of Test
Ave+2stdev
Ave-2stdev
IC25

Bench Sheet For Fathead Minnow QC Survival Test Method 1000.0

Test Month/Year: Dec 2016
Test Start Date/Time: 12/13/16
Analyst: WR/CP
Test Stop Date/Time: 12/20/16

Reference Toxicant Used: Sodium Chloride

Day			0	1	2	3	4	5	6	7	Remarks
Conc:	Beaker#										
Control		1	10	10	10	10	10	9	9	9	
		2	10	10	10	10	10	10	10	9	
		3	10	10	10	10	10	10	10	10	
		4	10	10	10	10	9	9	9	9	
New DO	XXX		7.7	7.5	7.6	7.7	7.6	8.0	8.5	XXX	
New pH	XXX		7.3	7.5	7.6	7.9	7.9	7.7	8.1	XXX	
Temp	XXX		24.0	23.2	22.9	22.5	22.7	22.3	22.4	XXX	
Old DO	XXX		XXX	6.5	6.3	6.1	5.9	7.0	6.9	7.5	
Old pH	XXX		XXX	7.7	7.7	7.6	7.6	7.8	7.6	7.6	
Conc: 0.25g/L		1	10	10	10	10	10	10	10	8	
		2	10	10	10	10	10	10	9	9	
		3	10	10	10	10	10	10	10	9	
		4	10	10	10	10	10	10	10	10	
New DO	XXX		7.7	7.5	7.6	7.7	7.6	8.0	8.5	XXX	
New pH	XXX		8.0	7.8	8.0	7.9	8.2	7.9	7.9	XXX	
Temp	XXX		23.6	23.2	22.9	22.7	22.6	23.2	22.9	XXX	
Old DO	XXX		XXX	6.5	6.4	6.4	6.0	6.6	6.9	7.4	
Old pH	XXX		XXX	7.6	7.7	7.6	7.6	7.8	7.6	7.4	
Conc: 1.5g/L		1	10	10	10	10	9	7	5	2	
		2	10	10	10	10	9	8	8	4	
		3	10	10	10	10	9	8	6	4	
		4	10	10	10	10	9	7	6	5	
New DO	XXX		7.7	7.5	7.5	7.7	7.6	8.0	8.5	XXX	
New pH	XXX		8.0	7.9	8.0	7.9	8.1	7.9	8.0	XXX	
Temp	XXX		23.9	23.2	22.7	23.2	22.7	23.0	23.1	XXX	
Old DO	XXX		XXX	6.6	6.7	6.2	6.2	6.8	7.0	7.6	
Old pH	XXX		XXX	7.7	7.7	7.6	7.7	7.7	7.6	7.6	
Conc: 2.5g/L		1	10	10	10	10	9	8	7	6	
		2	10	10	10	10	10	10	8	4	
		3	10	10	10	10	10	7	8	6	
		4	10	10	10	10	8	6	4	4	
New DO	XXX		7.7	7.5	7.5	7.7	7.6	8.0	8.5	XXX	
New pH	XXX		8.0	7.9	7.9	7.9	8.1	8.0	8.0	XXX	
Temp	XXX		23.5	23.2	22.5	23.7	22.9	22.8	23.0	XXX	
Old DO	XXX		XXX	6.3	6.7	6.6	6.3	6.8	7.1	7.6	
Old pH	XXX		XXX	7.7	7.7	7.7	7.7	7.7	7.6	7.6	
Conc:		1	10	10	10	10	10	8	4	4	
Conc: 3.5g/L		2	10	10	10	10	9	9	6	4	
		3	10	10	10	10	10	10	6	6	
		4	10	10	10	9	8	8	5	2	
New DO	XXX		7.7	7.5	7.5	7.7	7.6	8.2	8.5	XXX	
New pH	XXX		8.0	7.9	7.9	7.9	8.1	8.0	8.0	XXX	
Temp	XXX		23.5	23.3	22.8	23.3	23.0	22.8	22.8	XXX	
Old DO	XXX		XXX	6.3	6.8	6.6	6.3	7.0	7.1	7.5	
Old pH	XXX		XXX	7.7	7.8	7.6	7.7	7.8	7.6	7.6	
Conc: 8.5g/L		1	10	10	9	3	3	3	3	2	
		2	10	10	5	0	0	0	0	0	
		3	10	10	3	2	1	0	0	0	
		4	10	10	4	1	0	0	0	0	
New DO	XXX		7.8	7.5	7.5	7.3	7.6	8.2	8.6	XXX	
New pH	XXX		7.9	7.8	7.9	7.8	8.0	7.9	7.9	XXX	
Temp	XXX		23.6	23.4	23.3	23.1	22.8	22.7	22.7	XXX	
Old DO	XXX		XXX	6.9	7.0	6.3	6.3	7.1	7.4	7.2	
Old pH	XXX		XXX	7.6	7.7	7.6	7.7	7.7	7.6	7.7	
Feeding	A.M.		XXX	CP	WR	CP	CP	WR	WR	XXX	
	P.M.		WR	WR	WR	CP	CP	WR	WR	XXX	

Summary Sheet

Facility	Analytical Laboratories	**Analyst**	Will Reynolds
Test ID	QC DECEMBER 2016	**Species**	Pimephales promelas (fathead minnow)
Date	12/20/2016	**Test Type**	Chronic Survival
IWC Conc.			

Input

Number of Organisms Exposed or Counted

	Concentrations					
Replicate	0	0.25	1.5	2.5	3.5	8.5
1	10	10	10	10	10	10
2	10	10	10	10	10	10
3	10	10	10	10	10	10
4	10	10	10	10	10	10

Number of Organisms Surviving or Responding

	Concentrations					
Replicate	0	0.25	1.5	2.5	3.5	8.5
1	9	8	2	6	4	2
2	9	9	4	4	4	0
3	10	9	4	6	6	0
4	9	10	5	4	2	0

Total Organisms	40	40	40	40	40	40
Total Responding	37	36	15	20	16	2
% Responding	92.5%	90.0%	37.5%	50.0%	40.0%	5.0%

Output

Summary Sheet

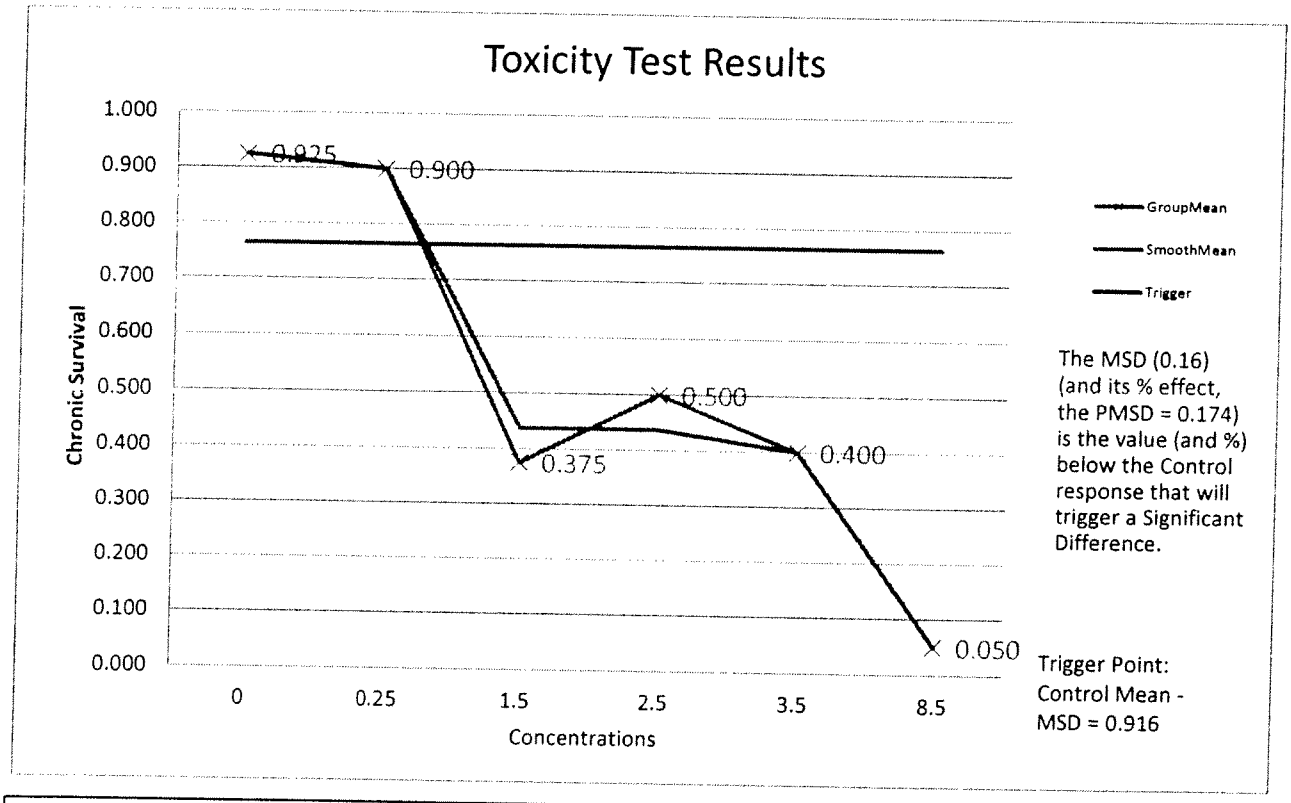
Statistical Data	Conc.	Mean	Stdev	CV	Dunnett test
	0	1.290	0.081	0.063	
Statistics are based on the transformed data used for endpoint calculations	0.25	1.254	0.125	0.099	NS
	1.5	0.655	0.136	0.208	Y
	2.5	0.785	0.116	0.148	Y
	3.5	0.680	0.173	0.254	Y
	8.5	0.235	0.152	0.649	Y

NOEC	LOEC	IC25	95% Confidence Intervals	
0.25	1.5	0.70	0.53	0.81

TST	Calculated t-value	Table t-value	Relative % Effect at IWC

MSD	PMSD
0.160	17.4%

Note - For statistical tests, "NS" indicates that the concentration is not statistically different from the control, while "Y" indicates that the concentration is statistically different from the control.



NOTICE

The United States Environmental Protection Agency (EPA), through its Office of Wastewater Management, funded and managed the development of the whole effluent toxicity (WET) Tool described here. This is a tool that calculates WET test endpoints for the EPA-approved WET test methods and is used by EPA internally for analyzing valid WET test data. Neither the EPA nor any of their employees, assumes any legal liability or responsibility for the accuracy, completeness, or usefulness of any information or process disclosed. Furthermore, the WET Tool is supplied "as-is" without guarantee or warranty, expressed or implied, including without limitation, any warranty of merchantability or fitness for a specific purpose.

BENCH SHEET FOR FATHEAD MINNOW INITIAL WEIGHT DATA QC EPA METHOD 1000.0

Month/Year: Dec 2016 Test Start Date: 12/13/16 Drying Temp: 100° C

Weighing Date: 12/14/16 Test End Date: 12/20/16 Drying Time: 23 hrs

Location/Client: QC

	Rep No.	Weight of Boat (g)	Boat and Dry Larvae (g)	Dry Weight of Larvae (g)	No. of Larvae	Mean Dry Weight of Larvae (mg)	Average
Initial	I1	1.2878	1.2892	.0014	10	.14	0.13 mg
	I2	1.2924	1.2936	.0012	↓	.12	
	I3	1.2918	1.2925	.0012		.12	
	I4	1.2920	1.2934	.0014		.14	

Reviewed By: SC

Fathead Minnow QC Weight Data

Analyst: LR Test Month/Year: Dec 2016 Drying Temp: 100°C

Weighing Date: 12/21/16 Drying Time: 23hrs

Conc.	Rep No.	Weight of Boat (g)	Boat and Dry Larvae (g)	Dry Weight of Larvae (g)	No. of Larvae	Mean Dry Weight of Larvae (mg)	Avg.-Init.= Avg. Wt. Gain (mg)
CONTROL	1	1.2810	1.2859	.0049	10	.49	
	2	1.2785	1.2829	.0044		.44	0.44mg - 0.13mg = 0.31mg
	3	1.2770	1.2814	.0044		.44	
	4	1.2711	1.2751	.0040		.40	
0.25g/L	x5	1.2953	1.2993	.0040		.40	
	x6	1.2652	1.2687	.0035		.35	0.40mg - 0.13mg = 0.27mg
	x7	1.2972	1.3013	.0041		.41	
	x8	1.2892	1.2936	.0044		.44	
1.5g/L	x9	1.2910	1.2922	.0012		.12	
	x10	1.2968	1.2977	.0009		.09	0.11mg - 0.13mg = -0.02mg
	x11	1.2979	1.2988	.0009		.09	
	x12	1.2872	1.2886	.0014		.14	
2.5g/L	x13	1.2952	1.2973	.0021		.21	
	x14	1.2981	1.2993	.0012		.12	0.18mg - 0.13mg = 0.05mg
	x15	1.2911	1.2931	.0020		.20	
	x16	1.2868	1.2887	.0019		.19	
3.5g/L	x17	1.2929	1.2943	.0014		.14	
	x18	1.2988	1.3008	.0020		.20	0.12mg - 0.13mg = -0.01mg
	x19	1.2942	1.2954	.0012		.12	
	x20	1.2896	1.2899	.0003		.03	
8.5g/L	x21	1.2917	1.2925	.0008		.08	0.08mg - 0.13mg = -0.05mg + 0.11mg
	x22	1.2952	—				
	x23	1.2985	—				
	x24	1.2985	—				

Reviewed By: SC

Summary Sheet

Facility	Analytical Laboratories	**Analyst**	Will Reynolds
Test ID	QC DECEMBER 2016	**Species**	Pimephales promelas (fathead minnow)
Date	12/20/2016	**Test Type**	Growth
IWC Conc.			

Input

	Concentrations					
Replicate	0	0.25	1.5	2.5	3.5	8.5
1	0.49	0.4	0.12	0.21	0.14	0.08
2	0.44	0.35	0.09	0.12	0.2	0
3	0.44	0.41	0.09	0.2	0.12	0
4	0.4	0.44	0.14	0.19	0.03	0
Mean	0.443	0.400	0.110	0.180	0.123	0.020
Stdev	0.037	0.037	0.024	0.041	0.070	0.040

Output

Statistical Data	Conc.	Mean	Stdev	CV	Dunnett test
	0	0.443	0.037	0.083	
	0.25	0.400	0.037	0.094	NS
	1.5	0.110	0.024	0.223	Y
	2.5	0.180	0.041	0.227	Y
	3.5	0.123	0.070	0.575	Y
	8.5	0.020	0.040	2.000	Y

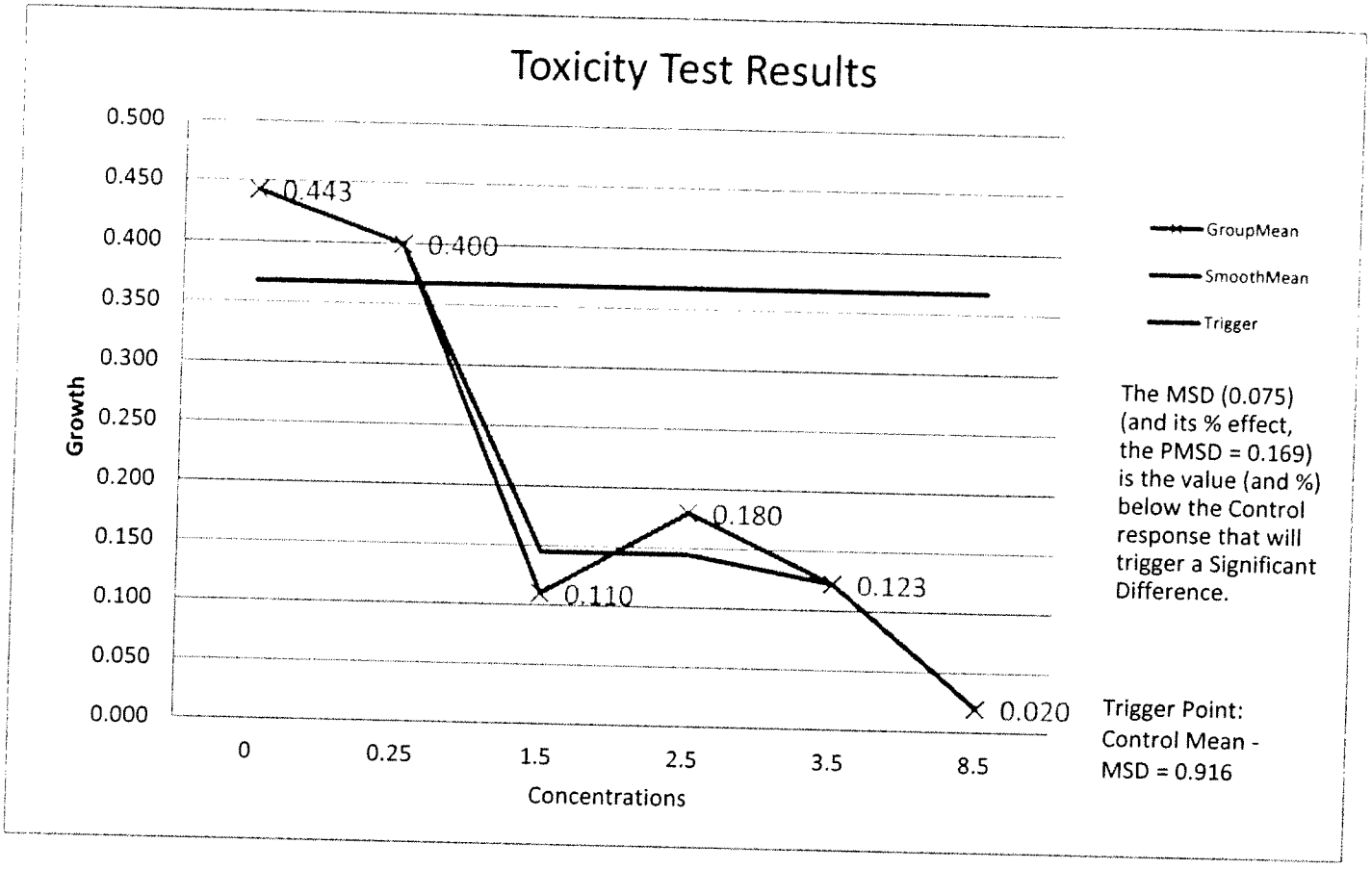
NOEC	LOEC	IC25	95% Confidence Intervals	
0.25	1.5	0.50	0.39	0.63

TST	Calculated t-value	Table t-value	Relative % Effect at IWC

MSD	PMSD
0.075	16.9%

Summary Sheet

Note - For statistical tests, "NS" indicates that the concentration is not statistically different from the control, while "Y" indicates that the concentration is statistically different from the control.



NOTICE

The United States Environmental Protection Agency (EPA), through its Office of Wastewater Management, funded and managed the development of the whole effluent toxicity (WET) Tool described here. This is a tool that calculates WET test endpoints for the EPA-approved WET test methods and is used by EPA internally for analyzing valid WET test data. Neither the EPA nor any of their employees, assumes any legal liability or responsibility for the accuracy, completeness, or usefulness of any information or process disclosed. Furthermore, the WET Tool is supplied "as-is" without guarantee or warranty, expressed or implied, including without limitation, any warranty of merchantability or fitness for a specific purpose.

BENCH SHEET FOR *S. capicornutum* ALGAL QC GROWTH TEST
EPA TEST METHOD 1003.0

TEST MONTH/YEAR# Dec 2016 ANALYST WR FINAL REPORT REVIEW: SC
TEST START DATE/TIME: 12/1/16, 1200
TEST END DATE/TIME: 12/15/16, 1600

Initial Algae Count (cells/mL)

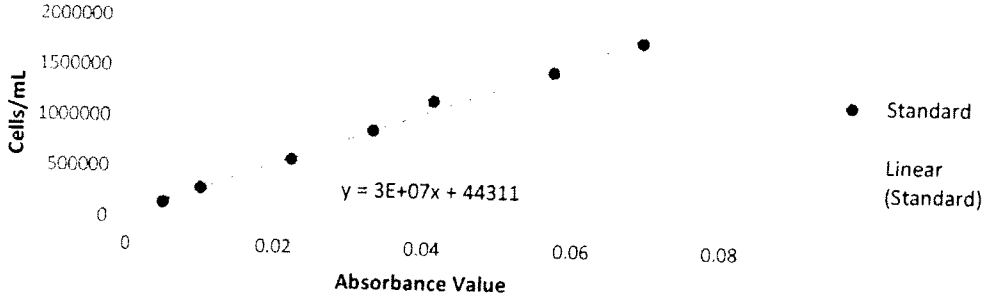
	Random Sample #1	Random Sample #2	Random Sample #3	Random Sample #4	Initial Average
	Absorbance Value: .020	Absorbance Value: .022	Absorbance Value: .022	Absorbance Value: .022	Absorbance Value: .022 Cells/mL: 0.689

Final Algae Count (cells/mL)

CONCENTRATION	Rep. 1	Rep. 2	Rep. 3	Rep. 4	Average
CONTROL	Absorbance Value: .056	Absorbance Value: .051	Absorbance Value: .055	Absorbance Value: .050	Absorbance Value: .053 Cells/mL: 1.63
0.5	Absorbance Value: .062	Absorbance Value: .054	Absorbance Value: .053	Absorbance Value: .052	Absorbance Value: .055 Cells/mL: 1.70
1.5	Absorbance Value: .050	Absorbance Value: .050	Absorbance Value: .050	Absorbance Value: .052	Absorbance Value: .051 Cells/mL: 1.56
5.5	Absorbance Value: .057	Absorbance Value: .061	Absorbance Value: .054	Absorbance Value: .061	Absorbance Value: .058 Cells/mL: 1.79
8.5	Absorbance Value: .043	Absorbance Value: .046	Absorbance Value: .047	Absorbance Value: .044	Absorbance Value: .046 Cells/mL: 1.43
10	Absorbance Value: .045	Absorbance Value: .051	Absorbance Value: .047	Absorbance Value: .049	Absorbance Value: .048 Cells/mL: 1.48

***Absorbance values (AV) obtained from Spectronic 601 spectrophotometer are used to determine cells/mL based on a standardized linear relationship ((3x10^7)(AV) + 44311).**

Selenastrum capricornutum **Conversion Chart**



BENCH SHEET FOR *S. capicornutum* ALGAL QC GROWTH TEST.
EPA METHOD 1003.0

Test Month/Year Dec 2016 Analyst: WP/CP Final Report Review: SC
Test Start Date/Time: 12/11/16, 1300
Test Stop Date/Time: 12/15/16, 1600

Daily pH and Temp.

CONCENTRATION	Day 0		Day 1		Day 2		Day 3		Day 4		Comments
	pH	Temp	pH	Temp	pH	Temp	pH	Temp	pH	Temp	
Control	8.3	24.8	9.6	23.7	10.3	24.3	11.0	24.0	10.8	24.5	
0.50 g/L	8.2	24.5	9.9	23.8	10.7	24.2	10.9	24.1	11.0	24.9	
1.5 g/L	8.3	24.2	10.0	24.0	10.7	24.3	10.9	23.9	10.9	25.0	
5.5 g/L	8.3	23.8	9.8	24.2	10.3	24.3	10.5	23.9	10.4	24.8	
8.5 g/L	8.3	23.5	9.7	24.4	10.0	24.6	10.0	23.8	9.9	24.8	
10 g/L	8.3	23.4	9.6	23.4	10.0	24.3	10.1	24.0	10.1	25.8	

Summary Sheet

Facility	Analytical Laboratories	**Analyst**	Will Reynolds
Test ID	QC DECEMBER 2016	**Species**	Selenastrum capricornutum (green algae)
Date	1/3/2017	**Test Type**	Growth
IWC Conc.			

Input

	Concentrations					
Replicate	0	0.5	1.5	5.5	8.5	10
1	0.056	0.062	0.05	0.057	0.048	0.045
2	0.051	0.054	0.05	0.061	0.046	0.051
3	0.055	0.053	0.05	0.054	0.047	0.047
4	0.05	0.052	0.052	0.061	0.044	0.049
Mean	0.053	0.055	0.051	0.058	0.046	0.048
Stdev	0.003	0.005	0.001	0.003	0.002	0.003

Output

Statistical Data	Conc.	Mean	Stdev	CV	Dunnett test
	0	0.053	0.003	0.056	
	0.5	0.055	0.005	0.083	NS
	1.5	0.051	0.001	0.020	NS
	5.5	0.058	0.003	0.058	NS
	8.5	0.046	0.002	0.037	Y
	10	0.048	0.003	0.054	NS

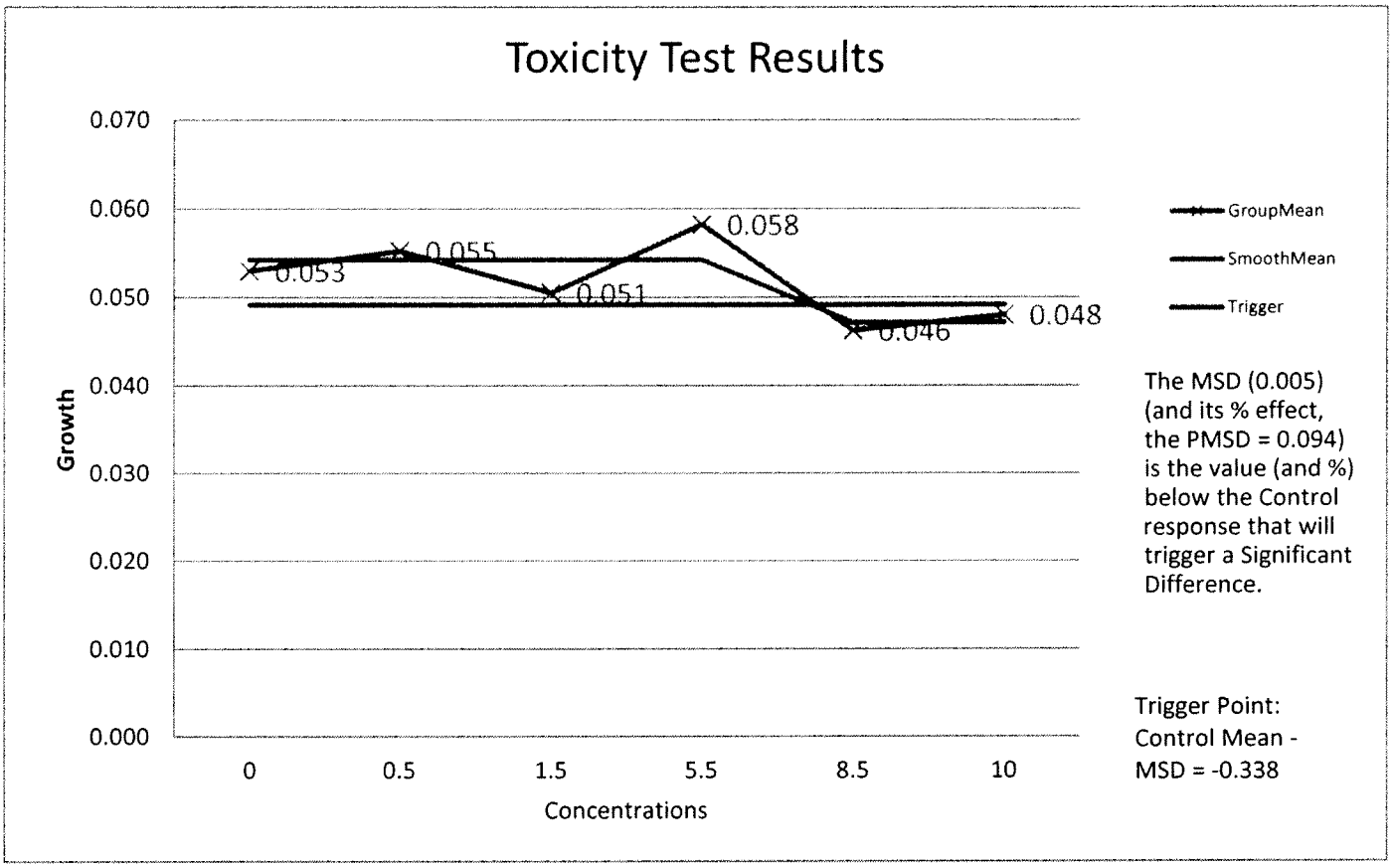
NOEC	LOEC	IC25	95% Confidence Intervals	
10	>10	>10	N/A	N/A

TST	Calculated t-value	Table t-value	Relative % Effect at IWC

MSD	PMSD
0.005	9.4%

Summary Sheet

Note - For statistical tests, "NS" indicates that the concentration is not statistically different from the control, while "Y" indicates that the concentration is statistically different from the control.



NOTICE

The United States Environmental Protection Agency (EPA), through its Office of Wastewater Management, funded and managed the development of the whole effluent toxicity (WET) Tool described here. This is a tool that calculates WET test endpoints for the EPA-approved WET test methods and is used by EPA internally for analyzing valid WET test data. Neither the EPA nor any of their employees, assumes any legal liability or responsibility for the accuracy, completeness, or usefulness of any information or process disclosed. Furthermore, the WET Tool is supplied "as-is" without guarantee or warranty, expressed or implied, including without limitation, any warranty of merchantability or fitness for a specific purpose.

1300 Blue Spruce Drive, Suite C
Fort Collins, Colorado 80524

Toll Free: 800/331-5916
Tel:970/484-5091 Fax:970/484-2514

YTC TOTAL SOLIDS MEASUREMENT

(Method from EPA/505/8-89-002a)

YTC Process Date: 12/21/2016; Best if used by 3/31/2017
Average Total Solids: 1710 mg/l

Ingredient Lot Numbers

Pines International® Wheat Grass: COCDW12S50; Zeigler Finfish Starter #1 (Lot 10-19-2016); Fleischmanns Yeast: G-3

Analyzed Metals	Report Limits	Results (mg/L)
Aluminum	0.03	0.08
Arsenic	0.001	U
Cadmium	0.001	U
Chromium	0.005	U
Copper	0.05	0.033
Iron	0.02	0.24
Lead	0.001	U
Mercury	0.001	U
Nickel	0.005	U
Silver	0.001	U
Zinc	0.01	0.14

EPA Required Toxic Metals and Pesticide Analyses*

Compounds	Report Limits	Results (ug/L)
Aldrin	0.5	U
alpha-BHC	0.5	U
beta-BHC	0.5	U
delta-BHC	0.5	U
gamma-BHC (Lindane)	0.5	U
alpha-Chlordane	0.5	U
gamma-Chlordane	0.5	U
4,4' – DDD	0.5	U
4,4' – DDE	0.5	U
4,4' –DDT	0.5	U
Dieldrin	0.5	U
Endosulfan I	0.5	U
Endosulfan II	0.5	U
Endosulfan sulfate	0.5	U
Endrin	0.5	U
Endrin aldehyde	0.5	U
Endrin ketone	0.5	U
Heptachlor	0.8	U
Heptachlor epoxide	0.5	U
Methoxychlor	0.5	U
Chlordane (technical)	5.0	U
Toxaphene	25	U
Aroclor-1016	5.0	U
Aroclor-1221	5.0	U
Aroclor-1232	5.0	U
Aroclor-1242	5.0	U
Aroclor-1248	5.0	U
Aroclor-1254	5.0	U
Aroclor-1260	5.0	U
Aroclor-1262	5.0	U
Aroclor-1268	5.0	U

U – Indicates compound was analyzed for but not detected.
* Testing performed by Energy Labs, Billings, Montana

1300 Blue Spruce Drive, Suite C
Fort Collins, Colorado 80524

Toll Free: 800/331-5916
Tel: 970/484-5091 Fax:970/484-2514

Algae Preparation History

DATE: 12/27/2016

SPECIES: *Raphidocelis subcapitata**

INOCULATION DATE: 12/13/2016

HARVEST DATE: 12/19/2016

CONCENTRATION DATE: 12/21/2016

CELL COUNT (/ml): 3.0×10^7 cells/ml

Comments:

* Formerly known as *Psuedokirschneriella subcapitata* and *Selenastrum capricornutum*

** All concentrated algae diluted to proper cell count with reconstituted moderately hard DI water.

Supervisor

from Mass Culture

Ceriodaphnia dubia Stock Culture Log

Month/Year: December/2016

Start Date: 12/21 End Date: Board#: (

Trans. Date	1	2	3	4	5	6	7	8	9	10	Time
12/21 0	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	0930
12/22 1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	1500
12/23 2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	1500
12/24 3	1/1	✓	1/2	✓	✓	✓	✓	✓	✓	✓	1500
12/26 4	2/7	1/5	2/4	1/2	1/5	1/4	✓	✓	✓	✓	1400
12/27 5	3/16	2/10	3/15	2/10	2/6	2/11	2/7	2/11	2/7	2/7	1235
12/28 6	✓	3/14	✓	✓	3/12	✓	✓	✓	3/13	✓	1130
12/29 7	4/13	✓	4/15	3/9	✓	3/8	3/15	3/11	✓	3/17	1215

Survival > 80%: 4 yes/no

Average offspring per female > 20: yes/no

Start Date: End Date: Board#: 2

Trans.	1	2	3	4	5	6	7	8	9	10	Time
12/21 0	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	0935
12/22 1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	1505
12/23 2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	1505
12/24 3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	1135
12/26 4	1/3	1/4	1/4	1/3	1/3	1/2	1/3	1/3	1/1	1/3	1405
12/27 5	2/11	2/6	2/12	2/9	2/13	2/6	2/9	2/13	2/12	2/13	1240
12/28 6	✓	✓	✓	✓	✓	✓	3/1	3/16	✓	✓	1135
12/29 7	3/14	3/11	3/15	3/14	3/13	3/15	3/12	✓	3/9	3/17	1220

Survival > 80%: yes/no

Average offspring per female > 20: yes/no

Start Date: End Date: Board#: 3

Trans.	1	2	3	4	5	6	7	8	9	10	Time
12/21 0	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	0940
12/22 1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	1510
12/23 2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	1510
12/24 3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	1140
12/26 4	1/8	1/4	1/2	1/14	1/7	1/3	1/1	1/5	1/4	1/5	1410
12/27 5	✓	2/12	2/11	2/11	2/9	2/7	2/8	2/6	2/12	2/12	1245
12/28 6	2/15	✓	✓	3/14	✓	✓	3/13	3/13	✓	✓	1140
12/29 7	3/14	3/11	3/12	✓	3/10	3/14	✓	✓	3/8	3/18	1225

Survival > 80%: yes/no

Average offspring per female > 20: yes/no

1300 Blue Spruce Drive, Suite C
Fort Collins, Colorado 80524

Toll Free: 800/331-5916
Tel: 970/484-5091 Fax:970/484-2514

Algae Preparation History

DATE: 12/5/2016

SPECIES: *Raphidocelis subcapitata**

INOCULATION DATE: 11/16/2016

HARVEST DATE: 11/21/2016

CONCENTRATION DATE: 11/23/2016

CELL COUNT (/ml): 3.0 x 10^6 cells/ml

Comments:

* Formerly known as *Pseudokirschneriella subcapitata* and *Selenastrum capricornutum*

** All concentrated algae diluted to proper cell count with reconstituted moderately hard DI water.

Supervisor

1300 Blue Spruce Drive, Suite C
Fort Collins, Colorado 80524

Toll Free: 800/331-5916
Tel:970/484-5091 Fax:970/484-2514

YTC TOTAL SOLIDS MEASUREMENT

(Method from EPA/505/8-89-002a)

YTC Process Date: 11/30/2016; Best if used by 2/28/2017
Average Total Solids: 1750 mg/l

Ingredient Lot Numbers

Pines International® Wheat Grass: COCDW12850; Zeigler Finfish Starter #1 (Lot 06/05/2016); Fleischmanns Yeast; G-3

Analyzed Metals	Report Limits	Results (mg/L)
Aluminum	0.03	0.09
Arsenic	0.001	U
Cadmium	0.001	U
Chromium	0.005	U
Copper	0.005	0.046
Iron	0.02	0.26
Lead	0.001	U
Mercury	0.001	U
Nickel	0.005	U
Silver	0.001	U
Zinc	0.01	0.15

EPA Required Toxic Metals and Pesticide Analyses*

Compounds	Report Limits	Results (ug/L)
Aldrin	0.5	U
alpha-BHC	0.5	U
beta-BHC	0.5	U
delta-BHC	0.5	U
gamma-BHC (Lindane)	0.5	U
alpha-Chlordane	0.5	U
gamma-Chlordane	0.5	U
4,4' – DDD	0.5	U
4,4' – DDE	0.5	U
4,4' –DDT	0.5	U
Dieldrin	0.5	U
Endosulfan I	0.5	U
Endosulfan II	0.5	U
Endosulfan sulfate	0.5	U
Endrin	0.5	U
Endrin aldehyde	0.5	U
Endrin ketone	0.5	U
Heptachlor	0.8	U
Heptachlor epoxide	0.5	U
Methoxychlor	0.5	U
Chlordane (technical)	5.0	U
Toxaphene	25	U
Aroclor-1016	5.0	U
Aroclor-1221	5.0	U
Aroclor-1232	5.0	U
Aroclor-1242	5.0	U
Aroclor-1248	5.0	U
Aroclor-1254	5.0	U
Aroclor-1260	5.0	U
Aroclor-1262	5.0	U
Aroclor-1268	5.0	U

U – Indicates compound was analyzed for but not detected.
*Testing performed by Energy Labs, Billings, Montana