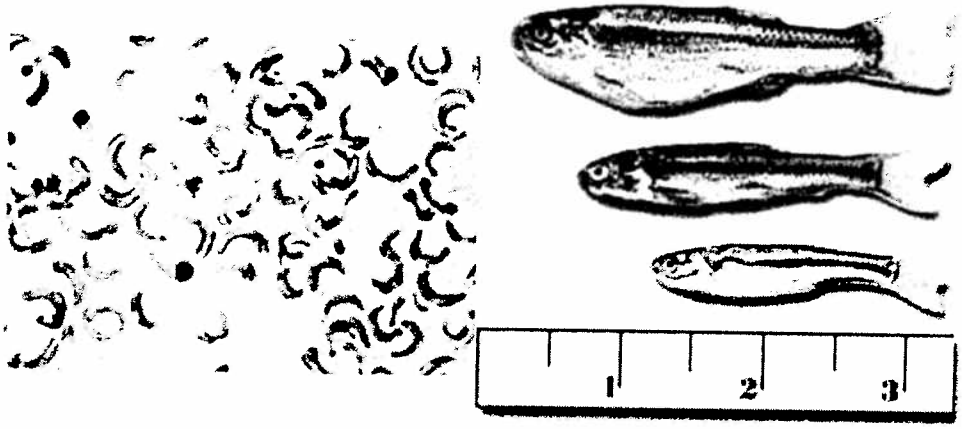
BIOMONITORING REPORT

FOR

CITY OF CALDWELL WWTP

LAB #1651252

PERMIT # ID0021504



NOVEMBER 2016

PREPARED BY:

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

SUMMARY OF ANALYSES

CITY OF CALDWELL WWTP

NOVEMBER 2016

PERMIT # ID0021504

The results for the Fathead Minnow survival study:

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

The results for the Fathead Minnow growth study:

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

The results for the *Ceriodaphnia dubia* reproduction study:

NOEC:	100%
LOEC:	>100%
IC25:	5.50%
TU_C:	18.2

The results for the *Ceriodaphnia dubia* survival study:

NOEC:	100%
LOEC:	>100%
IC25:	14.50%
TU_C:	1

The results for the algae, *Selenastrum capricornutum* growth study:

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

Interpretation

EPA Method 1000.0- *Pimephales promelas*

Statistical analyses of survival and growth data for test method 1000.0 demonstrated that all concentrations tested were not significantly different from the controls and displayed no chronic toxicity.

EPA Method 1002.0- *Ceriodaphnia dubia*

Statistical analyses of survival data for test method 1002.0 demonstrated that all concentrations tested displayed no chronic toxicity. For reproduction EPA test method 1002.0 a TUc unit was indicated that is higher than the average monthly limit, and maximum daily limit of 2.58 and 7.68, respectively. The results of test method 1002.0, *C. dubia* reproduction, indicate an interrupted dose response. This puts the certainty of the test results, and whether they are the effect of biological, or toxicological factors, into question.

EPA Method 1003.0 – *Selenastrum capricornutum*

Statistical analyses of growth inhibition data for test method 1003.0 demonstrated that all concentrations tested displayed no chronic toxicity. However, significantly greater growth in test concentrations may indicate a degrading enrichment effect caused by the sample.

Introduction

Toxicity analyses, consisting of two chronic bioassays, EPA Test Method 1000.0, EPA Test Method 1002.0 and EPA Test Method 1003.0 were conducted on effluent samples collected by the City of Caldwell WWTP. Samples were collected November 8, November 10, and November 11, 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 1000.0, using the freshwater fathead minnow *Pimephales promelas*, was conducted on November 8, 2016 and completed on November 15, 2016. Method 1002.0, utilizing the freshwater flea *Ceriodaphnia dubia*, was conducted on November 8, 2016 and completed on November 15, 2016. Method 1003.0 utilizing the green algae *Selenastrum capricornutum* was initiated November 8, 2016 and completed on November 12, 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 effluents to the cladoceran *Ceriodaphnia dubia* and the fathead minnow *Pimephales promelas* in a 7-day static renewal test. The green algae *Selenastrum capricornutum* was exposed in a static system to a series of concentrations of effluent for 96 hours to estimate chronic toxicity. 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 Millipore Milli-Q deionized water) to produce a moderately hard dilution and control water. Water was prepared in bulk 24 hours prior to analyses and was aerated for 24 hours prior to starting the test in order to produce sufficient dissolved oxygen in the control water. All test method design and overviews are provided below.

For Method 1000.0, utilizing the fathead minnow *Pimephales promelas*, larvae (less than 24 hours) were sent from Aquatic Biosystems, Inc. in Fort Collins, Colorado. Organisms were sent by UPS in oxygen saturated water contained in plastic bags in an insulated container. Once received, larvae were steadily acclimated to laboratory control water prior to transfer to test dilutions. Healthy larvae were transferred to test cells using wide-bore pipettes. Larvae were offered freshly hatched, freshwater-rinsed brine shrimp *Artemia nauplii*. Larvae were fed twice daily and water renewed daily using fresh test solution for seven consecutive days. Data obtained was used to determine NOEC, LOEC, IC25 and TUc for survival and growth (dry weight gain).

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 composite pool, inspected, and arranged in five sample dilutions and a control with ten replicates. Analyses at a static renewal were performed over the next seven consecutive days. Data obtained was used to determine NOEC, LOEC, and IC25 for survival and reproduction (see Appendix I - Definition of Terms).

For Test Method 1003.0, utilizing the green algae *Selenastrum capricornutum*, starter cultures are purchased from Aquatic Biosystems with an initial concentration of 3.0×10^7 cells/mL. This stock solution is diluted with algal medium to produce at initial concentration of >10,000 algae cells/mL in each replicate. A spectrophotometer is used at the beginning and after completion of the test to determine the cell density in each replicate prior to the start, and at the end of the test period. For the duration of the test, vessels are shaken twice daily to avoid sedimentation of algal cells for prolonged periods of time. Data obtained was used to determine NOEC, LOEC, IC25 and TUc (see Appendix I - Definition of Terms) for specific growth rate (increase in cell density).

Test Designed/Standard Conditions/Method 1000.0:

Test design and standard conditions for Method 1000.0 are as follows:

1. Test Type - static renewal (daily)

   Collection #1 – Renewal Day 1 and 2 – November 8, 2016

   Collection #2 – Renewal Day 3 and 4 – November 10, 2016

   Collection #3 – Renewal Day 5 and 6 – November 11, 2016

   Day 7 – Final counts and statistical review

2. Temperature - 25 +/ - 1 degrees 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 - 500 mL tall form beakers
7. Test Solution Volume - 250 ml / replicate
8. Renewal static - All dilutions daily
9. Age of Test Organisms - Larvae; less than 24 hours old
10. Individual/Chamber - 10 per chamber
11. Chamber Replicates - 4 replicates of each dilution and control
12. Feeding - 0.1 ml newly hatched brine shrimp twice daily; 8 hour intervals
13. Dilution Water - 20% v/v Perrier Mineral Water in deionized water
14. Dilution Concentrations - 100%, 69.5%, 39%, 19.5%, 9.75% and Control
15. Test Duration - 7 days
16. Endpoints - Survival and growth (individual dry weight gain)
17. Acceptability - 80% survival in controls. Average net dry weight gain of surviving controls equals or exceeds 0.25 mg/individual
18. Sample Volume Taken - 1 gallon for test solution renewal and 1 liter for daily composite water chemistries
19. Source of organisms - Aquatic Biosystems, Inc., Fort Collins, Colorado

Test Design/Standard Conditions Method 1002.0

1. Test Type - static renewal (daily)

   Collection #1 – Renewal Day 1 and 2 - November 8, 2016

   Collection #2 – Renewal Day 3 and 4 – November 10, 2016

   Collection #3 – Renewal Day 5 and 6 – November 11, 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

Test Designed/Standard Conditions/Method 1003.0

1. Test Type:	Static system Collection – November 8, 2016
2. Temperature:	25 degrees C. +/- 1 degree C.
3. Light Quality:	Incubator chamber (Percival Scientific Model AL30L2C8)
4. Light Intensity:	Incubation chamber (as above)
5. Photoperiod:	24 hours light
6. Test Chamber:	250 mL borosilicate glass bottles
7. Test Solution Volume:	100 ml / replicate
8. Age of Test Organisms:	4 day culture
9. Individual/Vessel:	7.34 x 10^5 cells per mL initially
10. Vessel Replicates:	4 replicates of control and each dilution
11. Feeding:	Initial addition of Algal culture medium (prepared by Aquatic Biosystems) at equal portion in each dilution.
12. Dilution Water:	20% diluted Perrier mineral water
13. Dilution Concentrations:	100%, 69.5%, 39%, 19.5%, 9.75% and Control
14. Test Duration:	96 hours
15. Endpoint:	Growth – Absorbance values obtained from Spectronic 601 are used to determine cells/mL based on a standardized linear relationship
16. Acceptability:	Mean cell density of at least 1.0 x 10^6 cells/mL in the controls; and variability (CV%) among control replicates less than or equal to 20%
Source of Algae:	Aquatic Biosystems, Fort Collins, Colorado

Interpretation - Statistical Review

Results - Method 1000.0

During Method 1000.0, larval survival and growth test using the fathead minnow *Pimephales promelas*, survival and growth from specific dilutions of collected wastewater were measured and compared to values obtained from controls prepared in 20% diluted mineral water.

Statistical analyses of survival and growth data for test method 1000.0 demonstrated that all concentrations tested were not significantly different from the controls and displayed no chronic toxicity.

Endpoints Determined - Method 1000.0

		NOEC	LOEC	IC25
Pimephales promelas	Survival	100%	>100%	>100%
	Growth	100%	>100%	>100%

Survival of controls exceeded eighty-percent (80%) and net dry weight gain of surviving individuals did exceed 0.25 mg/individuals in controls. Test was declared valid.

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.

Statistical analyses of survival data for test method 1002.0 demonstrated that all concentrations tested displayed no chronic toxicity. Statistical analyses of reproduction data, however, did show significant chronic toxicity

Endpoints Determined - Method 1002.0

		NOEC	LOEC	IC25
Ceriodaphnia dubia	Survival	100%	>100%	14.25%
	Reproduction	100%	>100%	5.50%

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.

Results - Method 1003.0

During EPA Method 1003.0, algal growth response test using the green algae *Selenastrum capricornutum*, growth from specific dilutions of collected effluent were measured and compared to values obtained from controls prepared in 20% diluted Perrier mineral water.

Statistical analyses of growth inhibition data for test method 1003.0 demonstrated that all concentrations tested were not significantly different from the controls and displayed no chronic toxicity.

Endpoints Determined - Method 1003.0

		NOEC	LOEC	IC25
Selenastrum capricornutum	Growth	100%	>100%	>100%

Final mean cell counts of control exceeded 1.0 x 10^6 cell/mL cell density and less than 20% variation in controls was established. 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 1002.0, 1003.0 are purchased from Aquatic Biosystems, Inc. in Fort Collins, Colorado, a state and federally approved aquatic test organism supplier.
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 both Methods 1000.0 and 1002.0. 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 # 1651252
NOVEMBER 2016

METHOD 1000.0

Concentration	Initial Count	48-hour Count	96-hour Count	Final Count	Percent Survival
Control	40	40	40	40	100%
9.75%	40	39	39	38	95%
19.5%	40	40	39	39	98%
39%	40	40	40	40	100%
69.5%	40	40	40	40	100%
100%	40	40	40	40	100%

Table I: Fathead Minnow Larvae Survival Summary

Concentration	APPROXIMATE AVERAGE INITIAL WEIGHT (mg)*	ENDING AVERAGE WEIGHT (mg)	ENDING AVERAGE WEIGHT GAIN (mg)
Control	0.12	0.47	0.35
9.75%	0.12	0.51	0.39
19.5%	0.12	0.49	0.37
39%	0.12	0.53	0.41
69.5%	0.12	0.52	0.40
100%	0.12	0.51	0.39

* Initial weight obtained by taking 40 individuals at beginning of procedure (weight is dry weight/mg, 100° C. for 24 hours.)

Table II: Fathead Minnow Larvae Growth Summary

Concentration	Day	1	2	3	4	5	6	7
Control	DO	5.9	5.9	5.9	6.2	6.4	7.4	6.2
	pH	7.5	7.6	7.6	7.7	7.9	7.6	7.4
9.75%	DO	6.0	5.8	6.3	6.2	6.3	7.5	6.1
	pH	7.5	7.6	7.7	7.8	7.7	7.6	7.5
19.5%	DO	6.0	5.5	6.2	6.1	6.3	6.6	6.0
	pH	7.5	7.7	7.8	7.8	7.7	7.8	7.6
39%	DO	6.0	5.8	6.2	6.1	6.2	6.0	5.8
	pH	7.6	7.8	7.9	7.9	7.8	7.8	7.7
69.5%	DO	5.8	5.8	6.1	6.2	6.4	6.1	5.7
	pH	7.8	7.9	8.0	8.0	8.0	8.0	7.9
100%	DO	5.8	6.8	6.0	6.1	6.4	6.3	5.5
	pH	8.0	8.1	8.1	8.2	8.1	8.1	8.0

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

CITY OF CALDWELL WWTP
LAB ID #1651252
NOVEMBER 2016

METHOD 1002.0

Concentration	Initial Count	48-hour Count	96-hour Count	Final Count	Percent Survival	Average Remaining Young/Female
Control	10	10	10	10	100%	33.9
9.75%	10	9	8	8	80%	23.1
19.5%	10	9	6	6	60%	28.3
39%	10	10	8	8	80%	26.4
69.5%	10	10	7	7	70%	26.9
100%	10	9	7	7	70%	26.6

Table IV: *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	7.6	7.8	7.8	8.0	7.5	7.9	7.5	8.0	7.5	8.2	7.6	8.3
2	7.6	8.1	7.6	8.1	7.4	8.2	7.5	8.2	7.5	8.3	7.5	8.3
3	7.7	7.7	7.7	8.2	7.5	8.1	7.5	8.2	7.5	8.3	7.7	8.4
4	7.6	8.2	7.6	8.3	7.6	8.3	7.6	8.3	7.7	8.4	7.7	8.5
5	7.6	8.0	7.7	8.1	7.6	8.3	7.6	8.4	7.7	8.5	7.7	8.5
6	7.8	7.8	7.7	8.0	7.7	8.0	7.9	8.2	7.8	8.3	7.9	8.4
7	7.5	8.0	7.5	7.9	7.2	7.9	7.6	8.1	7.9	8.3	7.7	8.3

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

CITY OF CALDWELL WWTP
LAB ID #1651252
NOVEMBER 2016

METHOD 1003.0

Conc	Day 0		Day 1		Day 2		Day 3		Day 4	
	pH	Temp	pH	Temp	pH	Temp	pH	Temp	pH	Temp
Control	8.1	28.7	9.9	24.0	10.8	24.1	10.7	24.3	10.6	23.9
9.75%	8.1	25.3	9.7	24.5	10.9	24.3	11.0	24.0	10.7	24.0
19.5%	8.2	25.4	9.6	24.3	10.9	24.7	10.9	24.4	10.7	24.5
39%	8.0	25.6	9.5	24.4	10.8	24.8	11.0	25.1	10.8	24.3
69.5%	8.0	25.5	9.6	24.8	10.8	25.2	11.0	25.3	10.9	24.2
100%	7.9	26.1	9.5	24.8	10.7	24.6	11.0	24.5	11.0	23.7

Table VI: *Selenastrum capricornutum* Water pH & Temperature

Concentration	Initial Cell Density	Final Cell Density Replicate 1	Final Cell Density Replicate 2	Final Cell Density Replicate 3	Final Cell Density Replicate 4	Final Cell Density Average
Control	0.73	2.11	2.08	1.99	1.84	2.01
9.75%	0.73	2.35	2.50	2.29	2.44	2.40
19.5%	0.73	2.80	2.89	2.71	2.74	2.79
39%	0.73	3.19	3.19	3.07	3.43	3.22
69.5%	0.73	5.23	5.29	5.38	5.14	5.26
100%	0.73	7.33	7.51	7.21	7.33	7.35

*Millions of cells per mL

Table VII: *Selenastrum capricornutum* Growth Response Summary

CITY OF CALDWELL WWTP
LAB ID # 1651252
NOVEMBER 2016

Sample Date	CHLORINE RESIDUAL (mg/L)	ALKALINITY (mg/L)	CONDUCTIVITY (umhos)	HARDNESS (mg/L)	AMMONIA (mg/L)	pH S.U.
11/8/2016	<0.10	201	716	152	<0.04	7.7
11/10/2016	<0.10	185	727	150	<0.04	7.4
11/11/2016	<0.10	187	747	152	<0.04	7.5

Table VIII: Effluent Chemistries Summary for EPA Method 1000.0 and 1002.0

Concentration	CHLORINE RESIDUAL (mg/L)	ALKALINITY (mg/L)	CONDUCTIVITY (umhos)	HARDNESS (mg/L)	AMMONIA (mg/L)	pH S.U.
CONTROL	<0.10	94	272	112	<0.04	7.6
9.75%	<0.10	100	286	117	<0.04	7.6
39%	<0.10	131	494	136	<0.04	7.7
100%	<0.10	192	825	175	<0.04	7.7

Effluent Chemistries Summary for EPA Method 1003.0

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) – 100/NOEC for Survival; 100/IC25 for all other endpoints
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.

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

LAB ID# 16512 62 Analyst: LR/CP Final Report Review: SC

Discharged: Effluent Test Start Date/Time: 11/8/16 1300

Description: Caldwell WWTP Test Stop Date/Time: 11/15/16 1330

Temp Received: Day 1: 5.5°C Day 2: 6.5°C Day 3: 4.4°C

Renewal Lab Numbers: **Day 0 & 1:** 51252 **Day 2 & 3:** 51740 **Day 4, 5 & 6:** 51935

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-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		7.6	7.5	XXX	XXX	24.4
2-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		7.3	7.8	7.6	7.8	23.6
3-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		7.4	7.4	7.6	8.1	22.5
4-	1/7	1/4	1/6	1/5	1/4	✓	1/5	1/6	1/6	✓	43	7.5	7.9	7.7	7.7	23.4
5-	2/14	2/14	2/10	✓	✓	1/2	✓	✓	✓	1/7	47	7.5	7.8	7.6	8.2	24.3
6-	✓	✓	✓	2/16	2/13	2/7	2/17	2/12	2/11	2/13	89	7.8	7.8	7.6	8.0	22.9
7-	3/18	3/17	3/15	3/20	3/17	✓	3/19	3/19	3/15	3/20	160	7.6	7.8	7.8	7.8	22.7
Total	39	35	31	41	34	9	41	37	32	40	339			7.5	8.0	

Conc 9.75%

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-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		7.8	7.8	XXX	XXX	23.8
2-	✓	✓	✓	✓	✓	✓	✓	✓	D	✓		7.5	7.7	7.8	8.0	23.5
3-	✓	✓	✓	✓	✓	0	✓	✓	↓	✓		7.6	7.5	7.6	8.1	22.6
4-	1/4	✓	✓	✓	✓	↓	~~1/9~~ 1/1	↓	↓	✓	5	7.7	7.9	7.7	8.2	23.3
5-	2/10	✓	1/1	✓	✓	↓	✓	✓	↓	✓	11	7.7	7.8	7.6	8.3	24.0
6-	✓	✓	✓	1/13	1/15	↓	1/14	2/13	↓	1/6	61	7.9	7.9	7.7	8.1	22.9
7-	3/19	✓	2/13	2/21	2/21	↓	2/16	3/18	↓	✓	108	7.8	8.0	7.7	8.0	22.8
Total	33	0	14	34	36	0	30	32	0	6	185			7.5	7.9	

Conc 19.5%

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-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		8.0	7.8	XXX	XXX	23.8
2-	✓	✓	✓	D	✓	✓	✓	✓	✓	✓		7.7	7.7	7.5	7.9	23.5
3-	✓	✓	✓	↓	✓	✓	✓	D	✓	0		7.8	7.6	7.4	8.2	22.6
4-	1/4	1/2	✓	↓	✓	✓	0	↓	✓	↓	6	7.9	7.8	7.5	8.1	23.3
5-	2/9	2/11	1/11	↓	✓	✓	↓	↓	✓	↓	31	8.0	7.7	7.6	8.3	24.0
6-	✓	✓	✓	↓	1/13	✓	↓	↓	2/12	↓	25	8.1	8.0	7.6	8.3	23.2
7-	3/21	3/15	2/21	↓	2/18	1/14	↓	↓	3/19	↓	108	8.0	7.9	7.7	8.0	22.7
Total	34	28	32	0	31	14	0	0	31	0	170			7.2	7.9	

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

LAB ID# 1651252 Analyst: WR/CP Final Report Review: SC

Discharged: EFFLUENT Test Start Date/Time: 11-8-16/1300

Description: Caldwell WWTP Test Stop Date/Time: 11-15-16/1330

Temp Received: Day 1: 5.8°C Day 2: 6.5°C Day 3: 4.4°C

Renewal Lab Numbers: **Day 0 & 1:** 51252 **Day 2 & 3:** 51740 **Day 4, 5 & 6:** 51935

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-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		8.4	7.7	XXX	XXX	23.6
2-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		8.3	7.7	7.5	8.0	23.5
3-	✓	✓	✓	D	D	✓	✓	✓	✓	✓		8.2	7.6	7.5	8.2	22.6
4-	1/5	✓	✓	↓	↓	✓	✓	✓	✓	1/4	9	8.3	7.6	7.5	8.2	23.2
5-	2/12	1/10	✓			✓	✓	✓	✓	✓	22	8.5	7.7	7.6	8.3	23.8
6-	✓	✓	✓			1/13	1/4	1/12	1/15	2/13	57	8.3	7.8	7.6	8.4	23.2
7-	3/18	2/A	1/15			~~3/15~~	~~2/15~~	2/19	2/20	3/17	123	8.3	7.8	7.9	8.2	22.7
Total	35	29	15	0	0	28	4	31	35	34	211			7.6	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-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		9.0	7.7	XXX	XXX	23.2
2-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		9.0	7.7	7.5	8.2	23.6
3-	✓	✓	✓	✓	✓	D	✓	✓	✓	D		8.7	7.6	7.5	8.3	22.6
4-	1/7	1/1	1/1	✓	D	↓	1/5	✓	✓	↓	14	8.9	7.6	7.5	8.3	23.2
5-	2/8	2/12	✓	✓	↓	↓	✓	1/2	✓	↓	22	9.4	7.7	7.7	8.4	24.1
6-	✓	✓	2/11	1/10	↓	↓	2/14	✓	1/7	↓	42	8.8	7.8	7.7	8.5	23.2
7-	3/18	3/17	3/21	2/8	↓	↓	3/20	2/11	2/15	↓	110	9.0	7.8	7.8	8.3	22.7
Total	33	30	33	18	0	0	39	13	22	0	188			7.9	8.3	

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-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		9.6	7.6	XXX	XXX	22.9
2-	✓	✓	✓	D	✓	✓	✓	✓	✓	✓		9.7	7.7	7.6	8.3	23.7
3-	✓	✓	✓	↓	✓	✓	D	✓	✓	D		9.3	7.6	7.5	8.3	22.0
4-	1/6	1/5	✓	↓	✓	✓	↓	✓	1/6	↓	17	9.4	7.6	7.7	8.4	23.2
5-	2/9	2/11	✓	↓	✓	✓	↓	✓	✓	↓	20	10.2	7.7	7.7	8.5	24.4
6-	✓	✓	✓	↓	1/10	✓	↓	1/16	2/15	↓	41	10.1	7.8	7.7	8.5	23.3
7-	3/19	3/20	✓	↓	2/13	1/12	↓	2/21	2/23	↓	108	9.5	7.8	7.9	8.4	22.8
Total	34	36	0	0	23	12	0	37	44	0	186			7.7	8.3	

Ceriodaphnia Survival and Reproduction Test-Reproduction

Start Date:	11/8/2016	Test ID:	1002	Sample ID:	NPDES Permit #0021504
End Date:	11/15/2016	Lab ID:	1651252	Sample Type:	effluent
Sample Date:		Protocol:	EPAF 94-EPA/600/4-91/002	Test Species:	CD-Ceriodaphnia dubia
Comments:	City of Caldwell WWTP				

Conc-gm/L	1	2	3	4	5	6	7	8	9	10
D-Control	39.000	35.000	31.000	41.000	34.000	9.000	41.000	37.000	32.000	40.000
9.75	33.000	0.000	14.000	34.000	36.000	0.000	30.000	32.000	0.000	6.000
19.5	34.000	28.000	32.000	0.000	31.000	14.000	0.000	0.000	31.000	0.000
39	35.000	29.000	15.000	0.000	0.000	28.000	4.000	31.000	35.000	34.000
69.5	33.000	30.000	33.000	18.000	0.000	0.000	39.000	13.000	22.000	0.000
100	34.000	36.000	0.000	0.000	23.000	12.000	0.000	37.000	44.000	0.000

			Transform: Untransformed					Rank	1-Tailed	Isotonic	
Conc-gm/L	Mean	N-Mean	Mean	Min	Max	CV%	N	Sum	Critical	Mean	N-Mean
D-Control	33.900	1.0000	33.9000	9.0000	41.0000	27.931	10			33.900	1.0000
*9.75	18.500	0.5457	18.5000	0.0000	36.0000	85.931	10	71.00	75.00	18.867	0.5565
*19.5	17.000	0.5015	17.0000	0.0000	34.0000	91.802	10	66.00	75.00	18.867	0.5565
*39	21.100	0.6224	21.1000	0.0000	35.0000	70.312	10	72.00	75.00	18.867	0.5565
*69.5	18.800	0.5546	18.8000	0.0000	39.0000	80.114	10	71.50	75.00	18.800	0.5546
100	18.600	0.5487	18.6000	0.0000	44.0000	97.673	10	81.00	75.00	18.600	0.5487

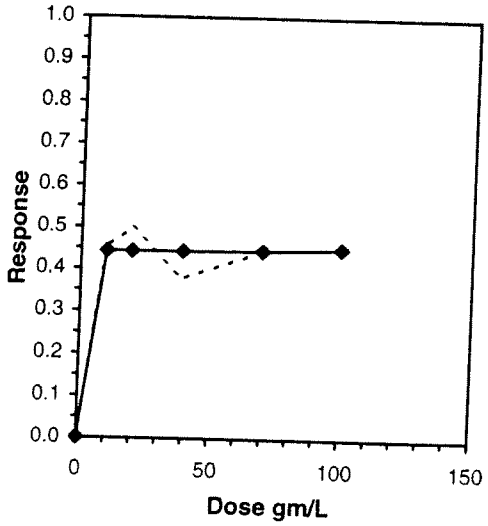
Auxiliary Tests	Statistic	Critical	Skew	Kurt
Kolmogorov D Test indicates non-normal distribution (p <= 0.01)	1.41853	1.035	-0.2205	-1.4332
Bartlett's Test indicates equal variances (p = 0.61)	3.55939	15.0863		

Hypothesis Test (1-tail, 0.05)	NOEC	LOEC	ChV	TU
Steel's Many-One Rank Test Treatments vs D-Control	100	>100		

Linear Interpolation (200 Resamples)

Point	gm/L	SD	95% CL		Skew
IC25*	5.4965	8.7827	4.4524	19.9373	6.5801

* indicates IC estimate less than the lowest concentration

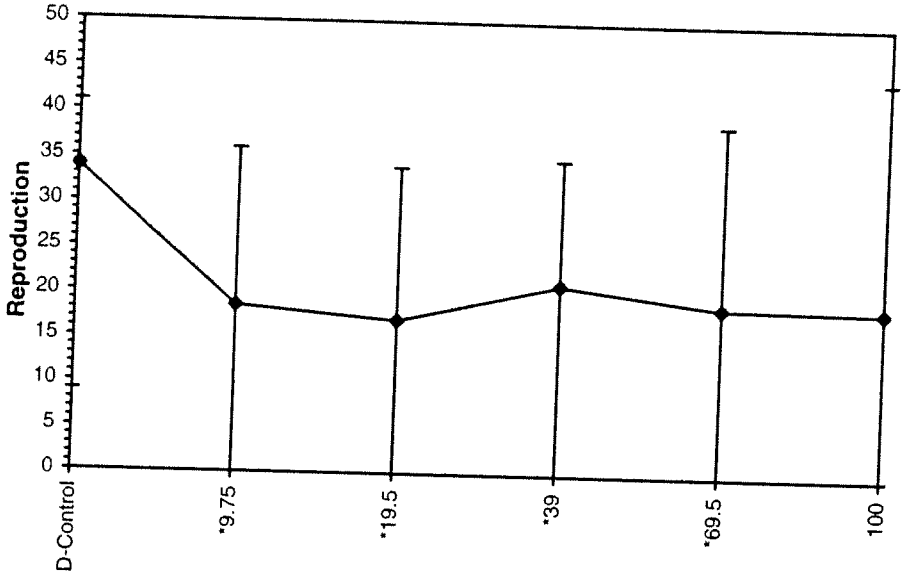


Reviewed by: Lc

Ceriodaphnia Survival and Reproduction Test-Reproduction

Start Date:	11/8/2016	Test ID:	1002	Sample ID:	NPDES Permit #0021504
End Date:	11/15/2016	Lab ID:	1651252	Sample Type:	effluent
Sample Date:		Protocol:	EPAF 94-EPA/600/4-91/002	Test Species:	CD-Ceriodaphnia dubia
Comments:	City of Caldwell WWTP				

Dose-Response Plot



Ceriodaphnia Survival and Reproduction Test-7 Day Survival

Start Date:	11/8/2016	Test ID:	1002	Sample ID:	NPDES Permit #0021504
End Date:	11/15/2016	Lab ID:	1651252	Sample Type:	effluent
Sample Date:		Protocol:	EPAF 94-EPA/600/4-91/002	Test Species:	CD-Ceriodaphnia dubia
Comments:	City of Caldwell WWTP				

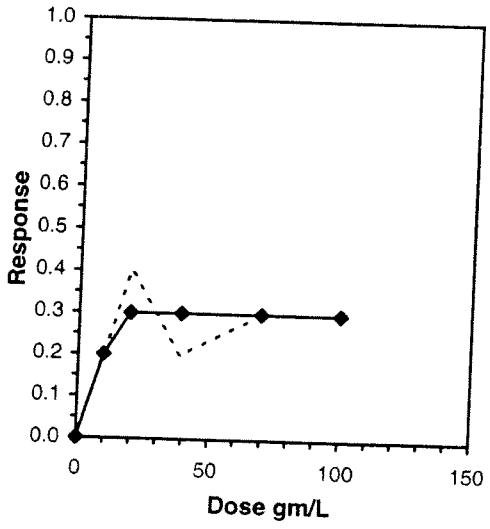
Conc-gm/L	1	2	3	4	5	6	7	8	9	10
D-Control	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
9.75	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	1.0000	1.0000	0.0000	1.0000
19.5	1.0000	0.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	1.0000	0.0000
39	1.0000	1.0000	1.0000	0.0000	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000
69.5	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	1.0000	1.0000	1.0000	0.0000
100	1.0000	1.0000	1.0000	0.0000	1.0000	1.0000	0.0000	1.0000	1.0000	0.0000

Conc-gm/L	Mean	N-Mean		Resp	Not Resp	Total	N	Fisher's Exact P	1-Tailed Critical	Isotonic Mean	Isotonic N-Mean
D-Control	1.0000	1.0000	1.0472	0	10	10	10			1.0000	1.0000
9.75	0.8000	0.8000	0.94248	2	8	10	10	0.2368	0.0500	0.8000	0.8000
*19.5	0.6000	0.6000	0.83776	4	6	10	10	0.0433	0.0500	0.7000	0.7000
39	0.8000	0.8000	0.94248	2	8	10	10	0.2368	0.0500	0.7000	0.7000
69.5	0.7000	0.7000	0.89012	3	7	10	10	0.1053	0.0500	0.7000	0.7000
100	0.7000	0.7000	0.89012	3	7	10	10	0.1053	0.0500	0.7000	0.7000

Hypothesis Test (1-tail, 0.05)	NOEC	LOEC	ChV	TU
Fisher's Exact Test	100	>100		
Treatments vs D-Control				

Linear Interpolation (200 Resamples)

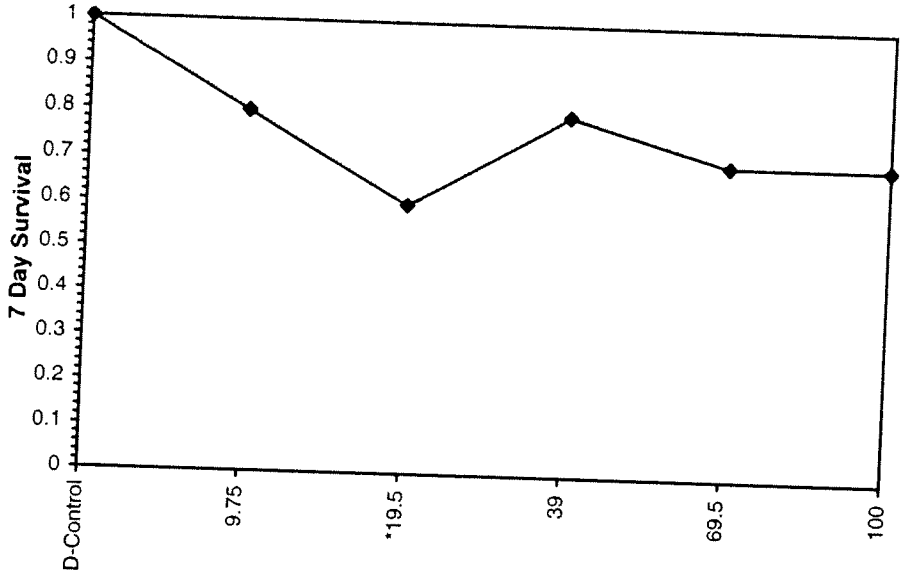
Point	gm/L	SD	95% CL	Skew
IC25	14.625			



Ceriodaphnia Survival and Reproduction Test-7 Day Survival

Start Date:	11/8/2016	Test ID:	1002	Sample ID:	NPDES Permit #0021504
End Date:	11/15/2016	Lab ID:	1651252	Sample Type:	effluent
Sample Date:		Protocol:	EPAF 94-EPA/600/4-91/002	Test Species:	CD-Ceriodaphnia dubia
Comments:	City of Caldwell WWTP				

Dose-Response Plot



Bench Sheet For Fathead Minnow Survival Test EPA METHOD 1000.0

LAB ID#: 1651252
Discharged: Effluent
Location: City of Caldwell WWTP
Renewal Lab ID# 3 Day 0,1: 51252 Day 2,3: 51740 Day 4,5,6: 51935

Analyst: WR/CP Final Report Review: SC
Test Start Date: 11/8/16
Test Stop Date: 11/15/16

Lab Id/Day:											
Day		0	1	2	3	4	5	6	7		
Conc:	Beaker#										Remarks
Control	1	10	10	10	10	10	10	10	10		
	2	10	10	10	10	10	10	10	10		
	3	10	10	10	10	10	10	10	10		
	4	10	10	10	10	10	10	10	10		
New DO		7.6	7.3	7.4	7.5	7.5	7.8	7.6	xxx		
New pH		7.5	7.8	7.4	7.9	7.8	7.8	7.8	xxx		
Temp		24.3	24.7	23.5	23.6	23.5	22.0	22.8	xxx		
Old DO		xxx	5.9	5.9	5.9	6.2	6.4	7.4	6.2		
Old pH		xxx	7.5	7.6	7.6	7.7	7.9	7.6	7.4		
Conc: 9.75%	1	10	10	10	10	10	10	10	10		
	2	10	10	10	10	10	10	10	10		
	3	10	9	9	9	9	9	9	8		
	4	10	10	10	10	10	10	10	10		
New DO		7.8	7.5	7.6	7.7	7.7	7.9	7.8	xxx		
New pH		7.8	7.7	7.5	7.9	7.8	7.9	8.0	xxx		
Temp		24.3	23.8	22.9	23.6	22.9	22.5	22.7	xxx		
Old DO		xxx	6.0	5.8	6.3	6.2	6.3	7.5	6.1		
Old pH		xxx	7.5	7.6	7.7	7.8	7.7	7.6	7.5		
Conc: 19.5%	1	10	10	10	10	10	10	10	10		
	2	10	10	10	10	10	10	10	10		
	3	10	10	10	10	9	9	9	9		
	4	10	10	10	10	10	10	10	10		
New DO		8.0	7.7	7.8	7.9	8.0	8.1	8.0	xxx		
New pH		7.8	7.7	7.6	7.8	7.7	8.0	7.9	xxx		
Temp		24.4	23.1	23.0	23.7	23.2	22.7	22.7	xxx		
Old DO		xxx	6.0	5.5	6.2	6.1	6.3	6.6	6.0		
Old pH		xxx	7.5	7.7	7.8	7.8	7.7	7.8	7.6		
Conc: 39%	1	10	10	10	10	10	10	10	10		
	2	10	10	10	10	10	10	10	10		
	3	10	10	10	10	10	10	10	10		
	4	10	10	10	10	10	10	10	10		
New DO		8.4	8.3	8.2	8.3	8.5	8.3	8.3	xxx		
New pH		7.7	7.7	7.6	7.6	7.7	7.8	7.8	xxx		
Temp		23.9	23.0	23.4	23.6	23.0	23.0	22.8	xxx		
Old DO		xxx	6.0	5.8	6.2	6.1	6.2	6.0	5.8		
Old pH		xxx	7.6	7.8	7.9	7.9	7.8	7.8	7.7		
Conc: 69.5%	1	10	10	10	10	10	10	10	10		
	2	10	10	10	10	10	10	10	10		
	3	10	10	10	10	10	10	10	10		
	4	10	10	10	10	10	10	10	10		
New DO		9.0	9.0	8.7	8.9	9.4	8.8	9.0	xxx		
New pH		7.7	7.7	7.6	7.6	7.7	7.8	7.8	xxx		
Temp		23.8	23.3	23.4	23.5	23.0	22.4	22.8	xxx		
Old DO		xxx	5.8	5.8	6.1	6.2	6.4	6.1	5.7		
Old pH		xxx	7.8	7.9	8.0	8.0	8.0	8.0	7.9		
Conc: 100%	1	10	10	10	10	10	10	10	10		
	2	10	10	10	10	10	10	10	10		
	3	10	10	10	10	10	10	10	10		
	4	10	10	10	10	10	10	10	10		
New DO		9.6	9.7	9.3	9.4	10.2	10.1	9.5	xxx		
New pH		7.6	7.7	7.6	7.6	7.7	7.8	7.8	xxx		
Temp		23.7	23.0	23.2	23.8	24.0	22.5	22.8	xxx		
Old DO		xxx	5.8	6.8	6.0	6.1	6.4	6.3	5.5		
Old pH		xxx	8.0	8.1	8.1	8.2	8.1	8.1	8.0		
Feeding	A.M.	xxx	CP	CP	CP	CP	WR	WR	xxx		
	P.M.	SC	CP	CP	CP	CP	WR	WR	xxx		

BENCH SHEET FOR FATHEAD MINNOW INITIAL WEIGHT DATA EPA METHOD 1000.0

LAB ID#: 1651252 Test Start Date: 11/8/16 Drying Temp: 160°C

Weighing Date: 11/9/16 Test End Date: 11/15/16 Drying Time: 24 hrs

Location/Client: City of Caldwell WWTP

	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	1.2885	1.2894	.0009	10	.09	[redacted] cp .12 mg
	I2	1.2927	1.2943	.0016	10	.16	
	I3	1.2918	1.2929	.0011	10	.11	
	I4	1.2923	1.2934	.0011	10	.11	

Reviewed By: SC

Fathead Minnow Weight Data EPA METHOD 1000.0

LAB ID#: 1651252 Test Start Date: 11/8/16 Drying Temp: 100°C

Weighing Date: 11/16/16 Test End Date: 11/15/16 Drying Time: 23hrs

Location/Client: City of Caldwell WWTP

Conc.	ID No.	Weight of Boat (g)	Weight of Boat and Dry Larvae (g)	Dry Weight of Larvae (g)	Original No. of Larvae	Mean Dry Weight of Larvae (mg)	Avg - Initial = Net Weight Gain
CONTROL	1	1.2813	1.2862	0.0049	10	.49	0.47mg - 0.12mg = 0.35mg
	2	1.2787	1.2833	0.0046		.46	
	3	1.2766	1.2817	0.0051		.51	
	4	1.2713	1.2754	0.0041		.41	
9.75%	X5	1.2950	1.3008	0.0058		.58	0.51mg - 0.12mg = 0.39mg
	X6	1.2647	1.2702	0.0055		.55	
	X7	1.2974	1.3011	0.0037		.37	
	X8	1.2887	1.2941	0.0054		.54	
19.5%	X9	1.2911	1.2959	0.0048		.48	0.49mg - 0.12mg = 0.37mg
	X10	1.2965	1.3020	0.0055		.55	
	X11	1.2977	1.3021	0.0044		.44	
	X12	1.2870	1.2920	0.0050		.50	
39%	X13	1.2950	1.3003	0.0053		.53	0.53mg - 0.12mg = 0.41mg
	X14	1.2981	1.3032	0.0051		.51	
	X15	1.2910	1.2958	0.0048		.48	
	X16	1.2864	1.2922	0.0058		.58	
69.5%	X17	1.2933	1.2984	0.0051		.51	0.52mg - 0.12mg = 0.40mg
	X18	1.2986	1.3038	0.0047		.47	
	X19	1.2938	1.2990	0.0052		.52	
	X20	1.2894	1.2950	0.0056		.56	
100%	X21	1.2913	1.2970	0.0057		.57	0.51mg - 0.12mg = 0.39mg
	X22	1.2949	1.2996	0.0047		.47	
	X23	1.2987	1.3037	0.0050		.50	
	X24	1.2992	1.3042	0.0050	↓	.50	

Reviewed By: SC

Larval Fish Growth and Survival Test-7 Day Growth

Start Date:	11/8/2016	Test ID:	1000	Sample ID:	NPDES Permit #0021504
End Date:	11/15/2016	Lab ID:	1651252	Sample Type:	effluent
Sample Date:		Protocol:	EPAF 94-EPA/600/4-91/002	Test Species:	PP-Pimephales promelas
Comments:	City of Caldwell WWTP				

Conc-%	1	2	3	4
D-Control	0.0005	0.0005	0.0005	0.0004
9.75	0.0006	0.0006	0.0004	0.0005
19.5	0.0005	0.0006	0.0004	0.0005
39	0.0005	0.0005	0.0005	0.0006
69.5	0.0005	0.0005	0.0005	0.0006
100	0.0006	0.0005	0.0005	0.0005

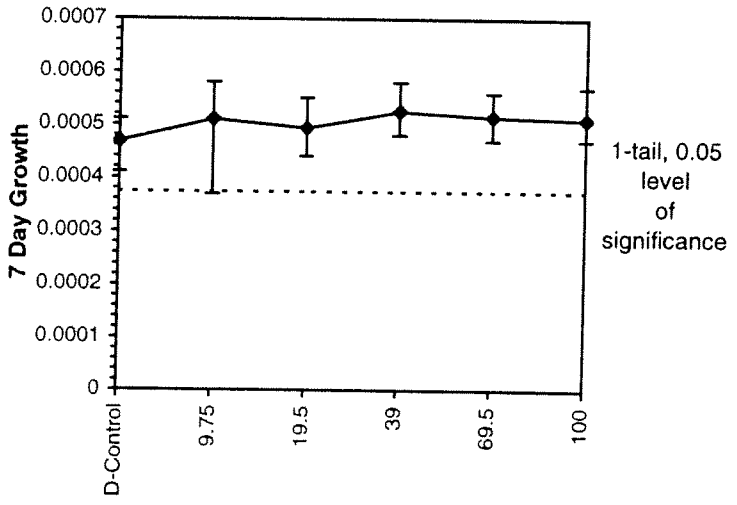
			Transform: Untransformed					1-Tailed			Isotonic	
Conc-%	Mean	N-Mean	Mean	Min	Max	CV%	N	t-Stat	Critical	MSD	Mean	N-Mean
D-Control	0.0005	1.0000	0.0005	0.0004	0.0005	9.303	4				0.0005	1.0000
9.75	0.0005	1.0909	0.0005	0.0004	0.0006	18.602	4	-1.100	2.410	0.0001	0.0005	1.0000
19.5	0.0005	1.0535	0.0005	0.0004	0.0006	9.286	4	-0.647	2.410	0.0001	0.0005	1.0000
39	0.0005	1.1230	0.0005	0.0005	0.0006	8.006	4	-1.488	2.410	0.0001	0.0005	1.0000
69.5	0.0005	1.1016	0.0005	0.0005	0.0006	7.178	4	-1.229	2.410	0.0001	0.0005	1.0000
100	0.0005	1.0909	0.0005	0.0005	0.0006	8.319	4	-1.100	2.410	0.0001	0.0005	1.0000

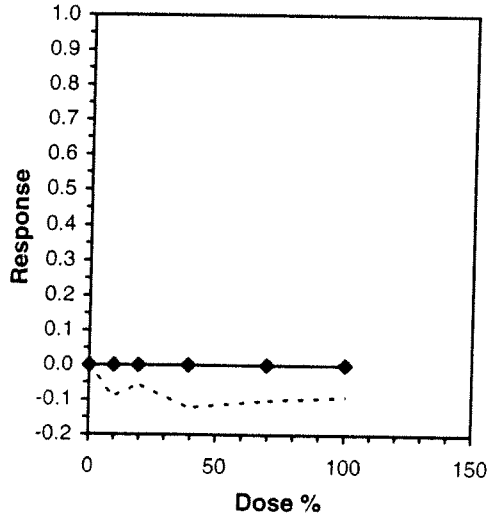
Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution (p > 0.01)	0.93396	0.884	-0.9012	1.54415
Bartlett's Test indicates equal variances (p = 0.54)	4.04185	15.0863		

Hypothesis Test (1-tail, 0.05)	NOEC	LOEC	ChV	TU	MSDu	MSDp	MSB	MSE	F-Prob	df
Dunnett's Test Treatments vs D-Control	100	>100		1	9.3E-05	0.19919	1.7E-09	3E-09	0.72815	5, 18

Linear Interpolation (200 Resamples)

Point	%	SD	95% CL(Exp)	Skew
IC25	>100			





Reviewed by

Larval Fish Growth and Survival Test-7 Day Survival

Start Date:	11/8/2016	Test ID:	1000	Sample ID:	NPDES Permit #0021504
End Date:	11/15/2016	Lab ID:	1651252	Sample Type:	effluent
Sample Date:		Protocol:	EPAF 94-EPA/600/4-91/002	Test Species:	PP-Pimephales promelas
Comments:	City of Caldwell WWTP				

Conc-%	1	2	3	4
D-Control	1.0000	1.0000	1.0000	1.0000
9.75	1.0000	1.0000	0.8000	1.0000
19.5	1.0000	1.0000	0.9000	1.0000
39	1.0000	1.0000	1.0000	1.0000
69.5	1.0000	1.0000	1.0000	1.0000
100	1.0000	1.0000	1.0000	1.0000

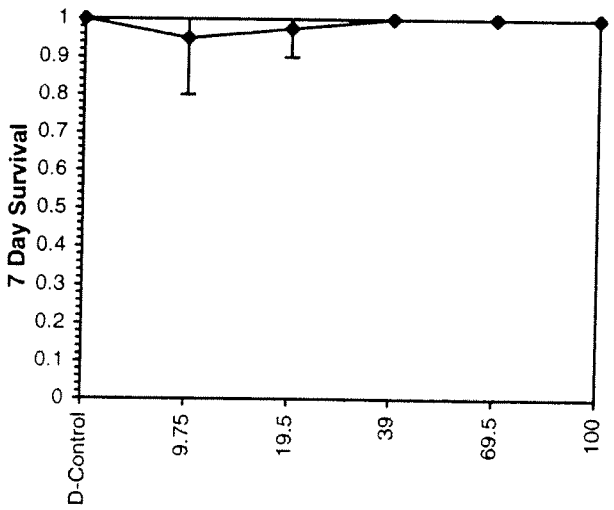
			Transform: Arcsin Square Root					Rank	1-Tailed	Isotonic	
Conc-%	Mean	N-Mean	Mean	Min	Max	CV%	N	Sum	Critical	Mean	N-Mean
D-Control	1.0000	1.0000	1.4120	1.4120	1.4120	0.000	4			1.0000	1.0000
9.75	0.9500	0.9500	1.3358	1.1071	1.4120	11.411	4	16.00	10.00	0.9850	0.9850
19.5	0.9750	0.9750	1.3713	1.2490	1.4120	5.942	4	16.00	10.00	0.9850	0.9850
39	1.0000	1.0000	1.4120	1.4120	1.4120	0.000	4	18.00	10.00	0.9850	0.9850
69.5	1.0000	1.0000	1.4120	1.4120	1.4120	0.000	4	18.00	10.00	0.9850	0.9850
100	1.0000	1.0000	1.4120	1.4120	1.4120	0.000	4	18.00	10.00	0.9850	0.9850

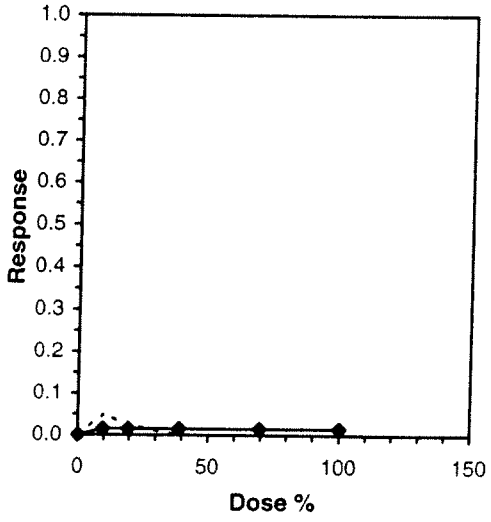
Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates non-normal distribution (p <= 0.01)	0.64364	0.884	-2.3883	7.9655
Equality of variance cannot be confirmed				

Hypothesis Test (1-tail, 0.05)	NOEC	LOEC	ChV	TU
Steel's Many-One Rank Test	100	>100		1
Treatments vs D-Control				

Linear Interpolation (200 Resamples)

Point	%	SD	95% CL(Exp)	Skew
IC25	>100			





Reviewed by

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

LAB ID# 1651252 Analyst: WR/CP
Discharged: Effluent
Description: City of Caldwell WWTP
Lab Id # used to make dilutions: 51252

Final Report Review: SC
Test Start Date/Time: 11/8/16 - 1300
Test Stop Date/Time: 11/12/16, 1530

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	8.1	25.7	9.9	24.0	10.8	24.1	10.7	24.3	10.6	23.9	
9.75%	8.1	25.3	9.7	24.5	10.9	24.3	11.0	24.0	10.7	24.0	
19.5%	8.2	25.4	9.6	24.3	10.9	24.7	10.9	24.4	10.7	24.5	
39%	8.0	25.6	9.5	24.4	10.8	24.8	11.0	25.1	10.8	24.3	
69.5%	8.0	25.5	9.6	24.8	10.8	25.2	11.0	25.3	10.9	24.2	
100%	7.9	26.1	9.5	24.8	10.7	24.6	11.0	24.5	11.0	23.7	

BENCH SHEET FOR *S. capicornutum* ALGAL GROWTH TEST **EPA TEST**

METHOD 1003.0

LAB ID# 151252 ANALYST: [illegible] FINAL REPORT REVIEW: SC

DISCHARGED: Effluent TEST START DATE/TIME: 11/8/16, 1530 (1300 WR)

DESCRIPTION: City of Calhoun WWTP TEST END DATE/TIME: 11/12/16, 1530

Lab ID# used to make Dilutions: 51252

Initial Algae Count (cells/mL)

	Random Sample #1	Random Sample #2	Random Sample #3	Random Sample #4	Initial Average
	Absorbance Value: .024 Cells/mL:	Absorbance Value: .023 Cells/mL:	Absorbance Value: .023 Cells/mL:	Absorbance Value: .022 Cells/mL:	Absorbance Value: .023 Cells/mL: .734

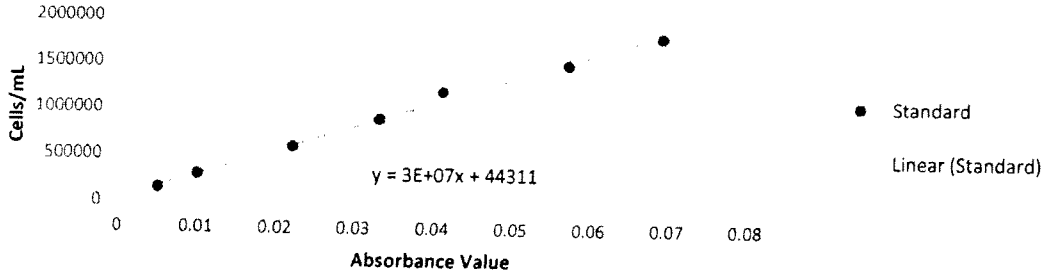
Final Algae Count (cells/mL)

CONCENTRATION	Rep. 1	Rep. 2	Rep. 3	Rep. 4	Average
CONTROL	Absorbance Value: .069 Cells/mL: 2.11	Absorbance Value: .068 Cells/mL: 2.08	Absorbance Value: .065 Cells/mL: 1.99	Absorbance Value: .060 Cells/mL: 1.84	Absorbance Value: .066 Cells/mL: 2.01
9.75%	Absorbance Value: .077 Cells/mL: 2.35	Absorbance Value: .082 Cells/mL: 2.50	Absorbance Value: .075 Cells/mL: 2.29	Absorbance Value: .080 Cells/mL: 2.44	Absorbance Value: .079 Cells/mL: 2.40
19.5%	Absorbance Value: .092 Cells/mL: 2.80	Absorbance Value: .095 Cells/mL: 2.89	Absorbance Value: .089 Cells/mL: 2.71	Absorbance Value: .090 Cells/mL: 2.74	Absorbance Value: .092 Cells/mL: 2.79
39%	Absorbance Value: .105 Cells/mL: 3.19	Absorbance Value: .105 Cells/mL: 3.19	Absorbance Value: .101 Cells/mL: 3.07	Absorbance Value: .113 Cells/mL: 3.43	Absorbance Value: .106 Cells/mL: 3.22
69.5%	Absorbance Value: .173 Cells/mL: 5.23	Absorbance Value: .175 Cells/mL: 5.29	Absorbance Value: .178 Cells/mL: 5.38	Absorbance Value: .170 Cells/mL: 5.14	Absorbance Value: .174 Cells/mL: 5.26
100%	Absorbance Value: .243 Cells/mL: 7.33	Absorbance Value: .249 Cells/mL: 7.51	Absorbance Value: .239 Cells/mL: 7.21	Absorbance Value: .243 Cells/mL: 7.33	Absorbance Value: .244 Cells/mL: 7.35

***Cells/mL are shown in millions**

***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**



Summary Sheet

Facility	Analytical Laboratories	**Analyst**	Chris Pate
Test ID	1651252 Caldwell WWTP	**Species**	Selenastrum capricornutum (green algae)
Date	12/6/2016	**Test Type**	Growth
IWC Conc.			

Input

	Concentrations					
Replicate	0	9.75	19.5	39	69.5	100
1	2.11	2.35	2.8	3.19	5.23	7.33
2	2.08	2.5	2.89	3.19	5.29	7.51
3	1.99	2.29	2.71	3.07	5.38	7.21
4	1.84	2.44	2.74	3.43	5.14	7.33
Mean	2.005	2.395	2.785	3.220	5.260	7.345
Stdev	0.121	0.093	0.079	0.151	0.101	0.124

Output

Statistical Data	Conc.	Mean	Stdev	CV	Dunnett test
	0	2.005	0.121	0.060	
	9.75	2.395	0.093	0.039	NS
	19.5	2.785	0.079	0.029	NS
	39	3.220	0.151	0.047	NS
	69.5	5.260	0.101	0.019	NS
	100	7.345	0.124	0.017	NS

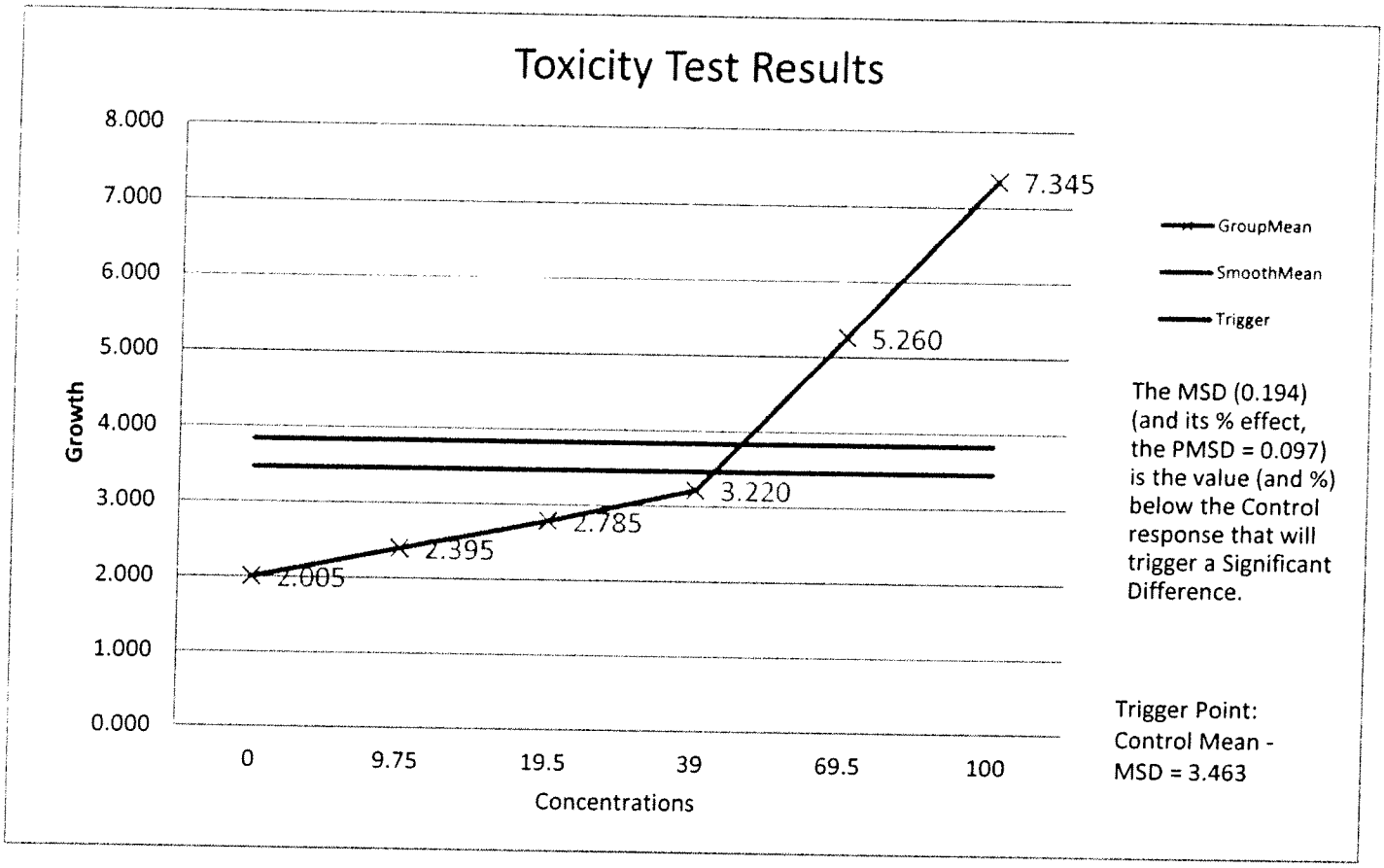
NOEC	LOEC	IC25	95% Confidence Intervals	
100	>100	>100	N/A	N/A

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

MSD	PMSD
0.194	9.7%

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.

CLIENT CODE=

Mike

CHAIN OF CUSTODY RECORD

*SPC

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:	Bio day 1
Company:	Caldwell	PWS Number:	
Address:	208 Johnson Ln	Purchase Order Number:	
	Caldwell, ID 83605	Required Due Date:	
Phone:	455-3227	Fax:	E-mail Address:
Sampled by: (Please print)	R. Hawker	Transported by: (Please print)	S. Curtis

TESTS REQUESTED

Lab ID	Date Sampled	Time Sampled	Sample Description (Source)	Sample Matrix	Geomean Fecal E. coli	BOD, TSS, NH3, TP	TP	WETT	Cu, Hardness	N. Nitrate/N. Nitrite, TKN	DOC, Diss. CPOA	Remarks:
51249	11-8-16	0753	FE-G	WATER	✓							FIELD TEMP: 10.2°C
51250	↓	0755	FE-C	↓		✓	✓	✓	✓	✓		
51251		0740	INF-C			✓						
51252		0755	FE-C				✓					
							✓	✓	✓	✓		Bio Day 1

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 Zavala	Caldww	11-8-16	0940
Received By: (Signature)	SPENCER CURTIS	ALI	11/9/16	0946
Relinquished By: (Signature)	SPENCER CURTIS	ALI	11-8-16	1150
Received By: (Signature)	Tom Saylor	"	"	"

SAMPLE RECEIPT: Total # of Containers: 10 Chains of Custody Seals Y / N / (NA) Intact: Y / N / (NA) Temperature Received: 5.3°C Condition: Good

REV: 2/19/12

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

Analytical Laboratories, Inc.

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

Date Report Printed: 11/22/2016 12:12:00 PM
http://www.analyticallaboratories.com
These test results relate only to the items tested.

Laboratory Analysis Report

Sample Number: 1651252

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

Collected By: R. HAWKER
Submitted By: S. CURTIS

Source of Sample:
FE-C BIO-DAY 1

Time of Collection: 7:55
Date of Collection: 11/8/2016
Date Received: 11/8/2016
Report Date: 11/22/2016

Field Temp:

Temp Rcvd in Lab:

PWS#:
PWS Name:

Test Requested	MCL	Analysis Result	Units	MDL	Method	Date Completed	Analyst
Ceriodaphnia dubia		*			EPA 1002.0	11/17/2016	WR
Pimephales promela		*			EPA 1000.0	11/17/2016	WR
Selenastrum		*			EPA 1003.0	11/17/2016	WR
Ammonia Direct (as N)		<0.04	mg/L	0.04	EPA 350.1	11/19/2016	CJS
Alkalinity		201	mg/L		EPA 310.1	11/16/2016	CJS
Chlorine Residual, Cl2		<0.10	mg/L	0.10	EPA 330.5	11/8/2016	NC
Conductivity		716	umhos	2	EPA 120.1	11/8/2016	NC
Hardness		152	mg/L	5.0	SM 2340	11/16/2016	CJS
pH		7.7	S.U.		SM 4500-H B	11/8/2016	NC

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=

CHAIN OF CUSTODY RECORD

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: 4553027 Fax:	E-mail Address:
Sampled by: (Please print) P. Zarate / R. Hawker	Transported by: (Please print) Will Reynolds

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	E. coli	WETT	BOD, TSS	NH4, TPO4	CWT					Remarks:
51739	11-10-16	0720	FE-G	WATER	✓									Field Temp 7.4°C
51740	11-10-16	0718	FE-C			✓	✓	✓						
51741	11-10-16	0703	INF-C				✓							Non wett: 51969
51742	11-9-16	1625	INF-C						✓					
51743	11-9-16	1630	FE-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	Caldww	11-10-16	0944
Received By: (Signature)	Will Reynolds	ALI	11-10-16	0946
Relinquished By: (Signature)	Will Reynolds	ALI	11-10-16	1100
Received By: (Signature)	Tom Saylor	ALI	11/10/16	11:00

SAMPLE RECEIPT Total # of Containers: 10 Chains of Custody Seals Y / N / (NA) Intact: Y / N / (NA) Temperature Received: 6.5°C Condition: good

REV. 2/19/12

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

Analytical Laboratories, Inc.

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

Date Report Printed: 12/1/2016 10:47:43 AM
http://www.analyticallaboratories.com
These test results relate only to the items tested.

Laboratory Analysis Report

Sample Number: 1651740

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

Collected By: P. ZARATE/R. HAWKER
Submitted By: W. REYNOLDS

Source of Sample:
FE-C BIO-DAY 2

Time of Collection: 7:18
Date of Collection: 11/10/2016
Date Received: 11/10/2016
Report Date: 12/1/2016

Field Temp: 7.4 °C Temp Rcvd in Lab: 6.5 °C

PWS#:
PWS Name:

Test Requested	MCL	Analysis Result	Units	MDL	Method	Date Completed	Analyst
Mercury, Hg		<0.0002	mg/L	0.0002	EPA 245.1	11/29/2016	JD
Ammonia Direct (as N)		<0.04	mg/L	0.04	EPA 350.1	11/19/2016	CJS
Alkalinity		185	mg/L		EPA 310.1	11/23/2016	CJS
Chlorine Residual, Cl2		<0.10	mg/L	0.10	EPA 330.5	11/10/2016	RME
Conductivity		727	umhos	2	EPA 120.1	11/10/2016	RME
Hardness		150	mg/L	5.0	SM 2340	11/16/2016	CJS
pH		7.4	S.U.		SM 4500-H B	11/10/2016	RME

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=

CHAIN OF CUSTODY RECORD

*SPC

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 Manager: Sal Arreola
Company: Caldww
Address: 208 Johnson 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) P. Zarate
Transported by: (Please print) S. CURTIS

TESTS REQUESTED

Lab ID	Date Sampled	Time Sampled	Sample Description (Source)	Sample Matrix	WET	CNT	Mercury (total recoverable)	Remarks:
51935	11-11-16	0723	FE-C	WATER	✓		✓	FIELD TEMP: 5.6°
51936	11-10-16	1452	FE-C			✓		
51937	11-10-16	1445	INF-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	11-11-16	1019
Received By: (Signature)	SPENCER CURTIS	ALI	11-11-16	1019
Relinquished By: (Signature)	SPENCER CURTIS	ALI	11-11-16	1125
Received By: (Signature)	Tom Saylor	"	"	"

SAMPLE RECEIPT Total # of Containers: 7 Chains of Custody Seals Y / N / NA Intact: Y / N / NA Temperature Received: 4.4°c Condition: Good

E.V 2/19/12

WHITE STAYS WITH SAMPLE (S) YELLOW LAB PINK SAMPLER

Analytical Laboratories, Inc.

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

Date Report Printed: 12/1/2016 7:25:40 AM
http://www.analyticallaboratories.com
These test results relate only to the items tested.

Laboratory Analysis Report

Sample Number: 1651935

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

Collected By: P. ZARATE
Submitted By: S. CURTIS

Source of Sample:
FE-C BIO-DAY 3

Time of Collection: 7:23
Date of Collection: 11/11/2016
Date Received: 11/11/2016
Report Date: 12/1/2016

Field Temp: 5.6 °C Temp Rcvd in Lab: 4.4 °C

PWS#:
PWS Name:

Test Requested	MCL	Analysis Result	Units	MDL	Method	Date Completed	Analyst
Mercury, Hg		<0.0002	mg/L	0.0002	EPA 245.1	11/29/2016	JD
Ammonia Direct (as N)		<0.04	mg/L	0.04	EPA 350.1	11/19/2016	CJS
Alkalinity		187	mg/L		EPA 310.1	11/23/2016	CJS
Chlorine Residual, Cl2		<0.10	mg/L	0.10	EPA 330.5	11/11/2016	JH
Conductivity		747	umhos	2	EPA 120.1	11/11/2016	JH
Hardness		152	mg/L	5.0	SM 2340	11/16/2016	CJS
pH		7.5	S.U.		SM 4500-H B	11/11/2016	JH

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: CALDWW BTOMONTFORWW

CHAIN OF CUSTODY RECORD

ANALYTICAL LABS, INC.
1804 N. 33rd Street • Boise, ID 83703
(208) 342-5515 • Fax (208) 342-5911 • 1-800-574-5773
Website: www.analyticallaboratories.com
E-mail: all@analyticallaboratories.com

CLIENT INFORMATION:

Project Manager:
Company:
Address:
Phone: Fax:
Sampled by: (Please print) S. CURTIS

PROJECT INFORMATION:

Project Name:
PWS Number:
Purchase Order Number:
Required Due Date:
E-mail Address:
Transported by: (Please print) S. CURTIS

TESTS REQUESTED

Lab ID	Date Sampled	Time Sampled	Sample Description (Source)	Sample Matrix	ALK, HARD, COND, pH, Cl2, NH3	Remarks:
51324	11/3/16	1515	ADDN. TESTING FOR CONTROL		X X X	
51325	↓	↓	LAB # 9.75%		X X X	
51326			1651252 39%		X X X	
51327	↓	↓	100%		X X X	

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)	SPENCER CURTIS	ALI	11-3-16	15:20
Received By: (Signature)				
Relinquished By: (Signature)				
Received By: (Signature)	Brian E-P	ALI	11/3/16	1520

SAMPLE RECEIPT — Total # of Containers: 6 — Chains of Custody Seals Y / N / NA — Intact: Y / N / NA — Temperature Received: 4.7 — Condition: Good

CV 2.19.12 — WHITE: STAYS WITH SAMPLE(S) — YELLOW: LAB — PINK: SAMPLER

Analytical Laboratories, Inc.

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

Date Report Printed: 12/1/2016 11:29:48 AM
http://www.analyticallaboratories.com
These test results relate only to the items tested.

Laboratory Analysis Report

Sample Number: 1651324

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

Collected By: S. CURTIS
Submitted By: S. CURTIS

Source of Sample:
CONTROL

Time of Collection: 15:15
Date of Collection: 11/8/2016
Date Received: 11/8/2016
Report Date: 11/30/2016

Field Temp:

Temp Rcvd in Lab:

PWS#:
PWS Name:

ADDITIONAL TESTING OF LAB#1651252

Test Requested	MCL	Analysis Result	Units	MDL	Method	Date Completed	Analyst
Ammonia Direct (as N)		<0.04	mg/L	0.04	EPA 350.1	11/19/2016	CJS
Alkalinity		94.0	mg/L		EPA 310.1	11/16/2016	CJS
Chlorine Residual, Cl2		<0.10	mg/L	0.10	EPA 330.5	11/8/2016	NC
Conductivity		272	umhos	2	EPA 120.1	11/8/2016	NC
Hardness		112	mg/L	5.0	SM 2340	11/23/2016	CJS
pH		7.6	S.U.		SM 4500-H B	11/8/2016	NC

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: 12/1/2016 11:30:26 AM
http://www.analyticallaboratories.com
These test results relate only to the items tested.

Laboratory Analysis Report

Sample Number: 1651325

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

Collected By: S. CURTIS
Submitted By: S. CURTIS

Source of Sample:
9.75%

Time of Collection: 15:15
Date of Collection: 11/8/2016
Date Received: 11/8/2016
Report Date: 11/30/2016

Field Temp:
Temp Rcvd in Lab:

PWS#:
PWS Name:

ADDITIONAL TESTING OF LAB#1651252

Test Requested	MCL	Analysis Result	Units	MDL	Method	Date Completed	Analyst
Ammonia Direct (as N)		<0.04	mg/L	0.04	EPA 350.1	11/19/2016	CJS
Alkalinity		100	mg/L		EPA 310.1	11/16/2016	CJS
Chlorine Residual, Cl2		<0.10	mg/L	0.10	EPA 330.5	11/8/2016	NC
Conductivity		286	umhos	2	EPA 120.1	11/8/2016	NC
Hardness		117	mg/L	5.0	SM 2340	11/23/2016	CJS
pH		7.6	S.U.		SM 4500-H B	11/8/2016	NC

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: 12/1/2016 11:31:08 AM
http://www.analyticallaboratories.com
These test results relate only to the items tested.

Laboratory Analysis Report

Sample Number: 1651326

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

Collected By: S. CURTIS
Submitted By: S. CURTIS

Source of Sample:
39%

Time of Collection: 15:15
Date of Collection: 11/8/2016
Date Received: 11/8/2016
Report Date: 11/30/2016

Field Temp:
Temp Rcvd in Lab:

PWS#:
PWS Name:

ADDITIONAL TESTING OF LAB#1651252

Test Requested	MCL	Analysis Result	Units	MDL	Method	Date Completed	Analyst
Ammonia Direct (as N)		<0.04	mg/L	0.04	EPA 350.1	11/19/2016	CJS
Alkalinity		131	mg/L		EPA 310.1	11/16/2016	CJS
Chlorine Residual, Cl2		<0.10	mg/L	0.10	EPA 330.5	11/8/2016	NC
Conductivity		494	umhos	2	EPA 120.1	11/8/2016	NC
Hardness		136	mg/L	5.0	SM 2340	11/23/2016	CJS
pH		7.7	S.U.		SM 4500-H B	11/8/2016	NC

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: 12/1/2016 11:31:58 AM
http://www.analyticallaboratories.com
These test results relate only to the items tested.

Laboratory Analysis Report

Sample Number: 1651327

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

Collected By: S. CURTIS
Submitted By: S. CURTIS

Source of Sample:
100%

Time of Collection: 15:15
Date of Collection: 11/8/2016
Date Received: 11/8/2016
Report Date: 11/30/2016

Field Temp:
Temp Rcvd in Lab:

PWS#:
PWS Name:

ADDITIONAL TESTING OF LAB#1651252

Test Requested	MCL	Analysis Result	Units	MDL	Method	Date Completed	Analyst
Ammonia Direct (as N)		<0.04	mg/L	0.04	EPA 350.1	11/19/2016	CJS
Alkalinity		192	mg/L		EPA 310.1	11/16/2016	CJS
Chlorine Residual, Cl2		<0.10	mg/L	0.10	EPA 330.5	11/8/2016	NC
Conductivity		825	umhos	2	EPA 120.1	11/8/2016	NC
Hardness		175	mg/L	5.0	SM 2340	11/23/2016	CJS
pH		7.7	S.U.		SM 4500-H B	11/8/2016	NC

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

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*

* Test ran: 11/1/16 – 11/8/16, Lab ID #1650075

Conc Control

Day-Lab #	1	2	3	4	5	6	7	8	9	10	XXX	XXX	XXX	XXX	XXX	XXX
0-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		7.6	7.7	XXX	XXX	23.8
1-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		7.6	7.6	7.8	8.1	23.0
2-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		7.7	7.6	7.9	8.1	22.0
3-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		7.8	7.8	8.0	8.2	23.0
4-	1/6	1/6	1/6	1/5	1/3	1/4	1/7	1/5	1/6	✓	48	7.8	7.6	7.8	8.2	23.0
5-	2/14	2/10	2/11	✓	✓	✓	✓	✓	✓	1/2	37	7.7	8.0	7.6	8.0	24.1
6-	✓	✓	✓	2/8	2/12	2/11	2/13	2/15	2/10	2/9	78	7.5	7.7	7.7	7.7	24.3
7-	3/15	3/5	3/10	3/14	3/18	3/14	3/16	✓	3/17	✓	109			7.6	8.2	
Total	35	21	27	27	33	29	36	20	33	11	272					

Source organisms for EPA Method 1002.0
lab # 1651252, City of Caldwell CWTP.

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: 11/7/2016

SPECIES: *Raphidocelis subcapitata**

INOCULATION DATE: 10/25/2016

HARVEST DATE: 10/31/2016

CONCENTRATION DATE: 11/2/2016

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

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: 10/19/2016: Best if used by 1/31/2017
Average Total Solids: 1738 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

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

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

ORGANISM HISTORY

DATE: 11-7-2016

SPECIES: *Pimephales promelas*

AGE: N/A

LIFE STAGE: Embryo

HATCH DATE: 11-7-2016

BEGAN FEEDING: N/A

FOOD: N/A

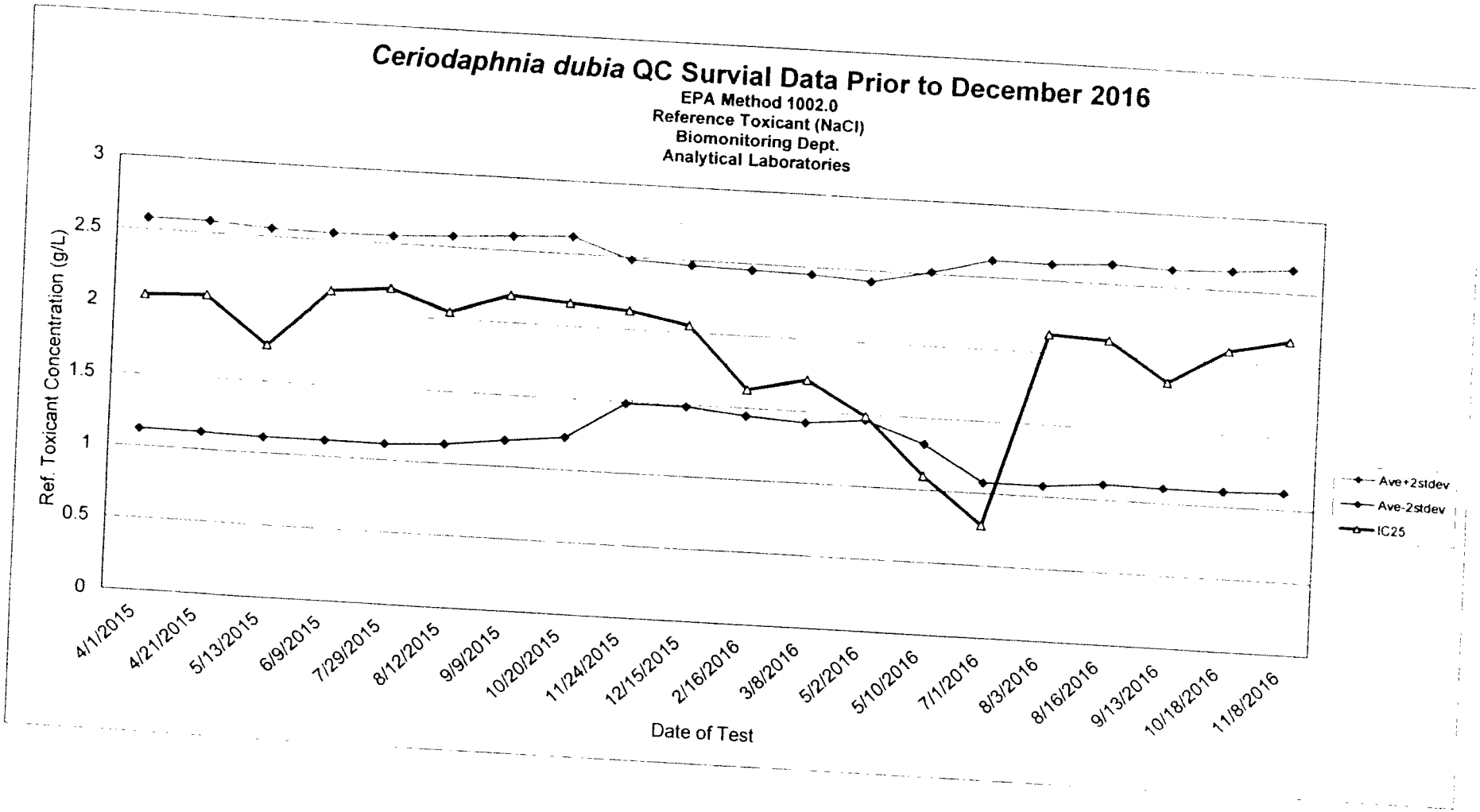
Water Chemistry Record:	Current	Range
TEMPERATURE:	25°C	--
SALINITY CONDUCTIVITY:	--	--
TOTAL HARDNESS (as $CaCO_3$):	118 mg/l	--
TOTAL ALKALINITY (as $CaCO_3$):	85 mg/l	--
pH:	8.17	--

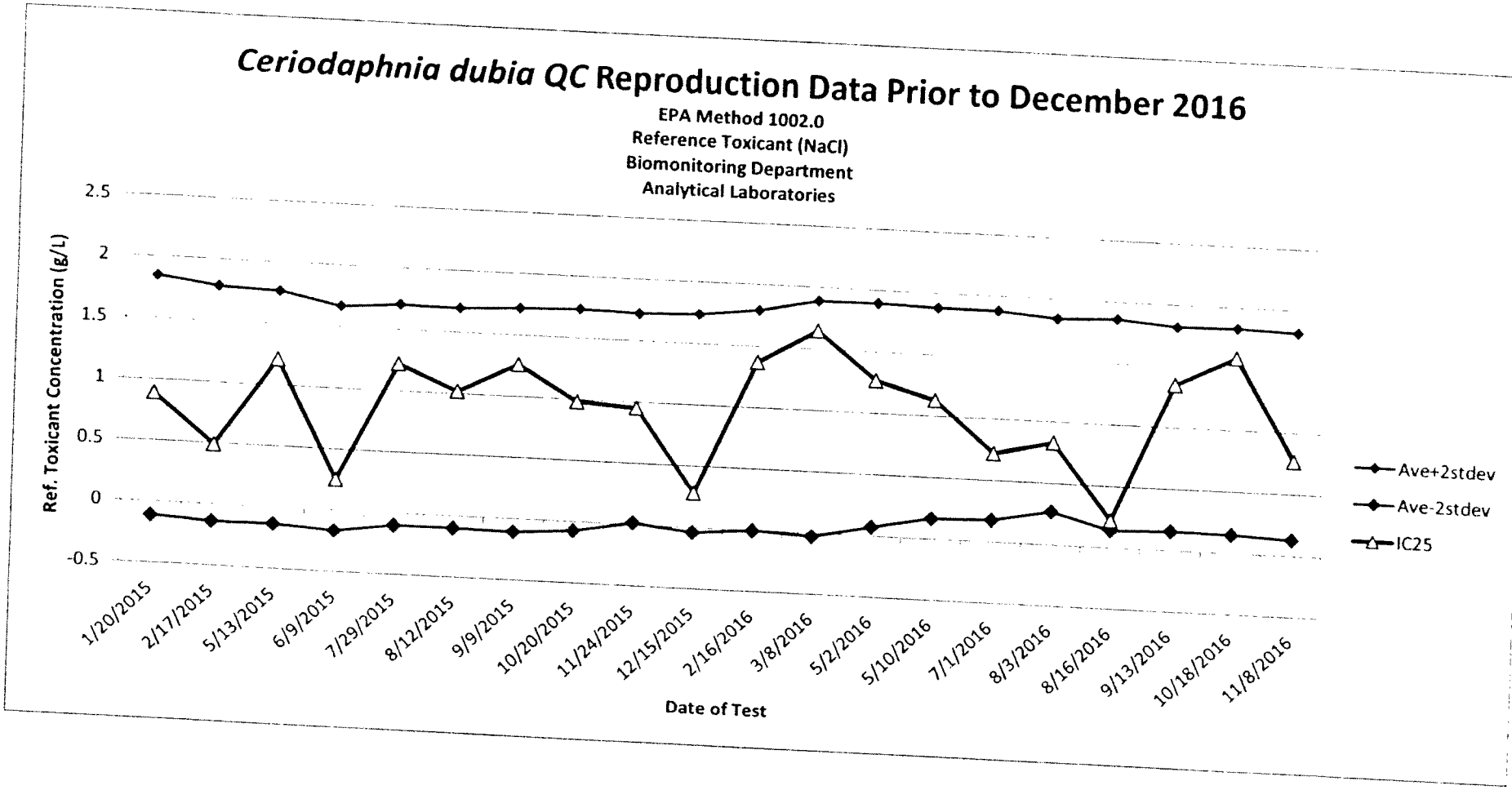
Comments:

Facility Supervisor

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 Survial Data Prior to December 2016
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
4/1/2015
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
Date of Test
Ave+2stdev
Ave-2stdev
IC25


Ceriodaphnia dubia QC Reproduction Data Prior to December 2016
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
1/20/2015
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
Date of Test
Ave+2stdev
Ave-2stdev
IC25

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

TEST MONTH November 2016

Test Start Date/Time: 11-1-16 /1330

Analyst: CP/WP

Test Stop Date/Time: ~~11-1-16 /1405~~ 11-8-16 /1300

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	✓	✓	✓	✓	✓	✓	✓	✓	D	✓		7.6	7.7	XXX	XXX	22.3
2	✓	✓	✓	✓	✓	✓	✓	✓		✓		7.6	7.6	7.6	7.8	23.3
3	✓	✓	✓	✓	✓	✓	✓	✓		✓		7.7	7.9	7.7	8.0	22.0
4	1/4	1/5	1/5	1/3	1/5	1/2	1/7	1/4		1/4	39	7.8	7.8	7.6	8.4	22.6
5	✓	✓	✓	✓	✓	2/13	✓	✓		✓	13	7.8	7.6	7.5	8.1	23.0
6	2/11	2/10	2/10	2/10	2/9	✓	2/15	2/12		2/12	89	7.7	8.0	7.4	8.2	23.8
7	3/12	3/~~5~~6	3/3	3/8	3/5	3/4	3/18	3/15	↓	3/19	77	7.5	~~8.5~~ 7.7	7.4	~~8.0~~ 8.0	24.7
Total	27	20	18	19	19	19	30	31	0	35	218			7.5	8.1	

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	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		7.7	8.0	XXX	XXX	22.0
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		7.8	8.0	7.6	8.0	23.6
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		7.7 ~~7.8~~	~~7.8~~ 8.0	7.7	8.0	22.1
4	1/2	1/4	1/4	1/4	1/4	✓	1/6	1/5	1/5	1/5	39	7.7	7.7	7.8	8.3	23.4
5	✓	✓	✓	✓	✓	1/6	✓	✓	✓	✓	6	7.7	7.8	7.5	8.1	23.6
6	2/7	2/9	2/8	2/10	2/10	✓	2/11	2/11	2/12	2/13	91	7.6	7.9	7.5	8.2	23.7
7	3/12	3/6	3/14	3/9	3/9	2/6	3/17	3/20	3/18	3/21	132	7.3	8.0	7.4	8.0	24.3
Total	21	19	26	23	23	12	34	36	35	39	268			7.4	8.1	

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	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		7.7	8.0	XXX	XXX	22.1
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		7.8	7.8	7.7	8.1	23.7
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		7.8	7.9	7.6	8.0	22.2
4	1/4	✓	✓	✓	✓	✓	1/2	1/4	✓	1/3	13	7.8	7.8	7.7	8.3	23.6
5	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	0	7.6	7.9	7.5	8.1	23.7
6	2/6	✓	✓	✓	1/1	✓	2/6	2/9	1/9	2/7	38	7.6	7.9	7.6	8.2	23.6
7	3/5	1/4	✓	1/7	2/1	1/6	3/7	3/2	2/6	✓	38	7.4	8.0	7.6	8.0	24.3
Total	15	4	0	7	2	6	15	15	15	10	89			7.6	8.2	

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

TEST MONTH November 2016

Test Start Date/Time: 11-1-16/1335

Analyst: cp/wa

Test Stop Date/Time: 11-8-16 / 1300

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	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		7.7	7.9	XXX	XXX	22.2
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		7.8	7.9	7.6	8.1	23.9
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		7.8	7.9	7.6	8.0	22.3
4	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		7.8	7.9	7.8	8.3	23.7
5	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		7.5	7.9	7.7	8.1	23.7
6	✓	✓	✓	✓	✓	✓	✓	✓	✓	1/3	3	7.7	7.9 wa	7.7	8.3	23.7
7	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		7.4	8.0	7.7	8.1	24.2
Total	0	0	0	0	0	0	0	0	0	3	3			7.5	8.1	

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	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		7.9	7.9	XXX	XXX	22.1
2	D	D	D	D	✓	D	D	D	D	D		7.7	7.8	7.6	8.1	23.8
3	↓	↓	↓	↓	✓	↓	↓	↓	↓	↓		7.8	7.9	7.7	8.0	22.3
4					✓							7.8	7.8	NA	8.3	23.6
5					D							7.6	7.9	NA	8.1	23.6
6					↓								wa			
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	D	D	D	D	✓	✓	D	D		7.8	7.9	XXX	XXX	22.3
2	↓	↓	↓	↓	↓	↓	✓	✓	↓	↓		7.8	7.8	7.5	8.1	23.7
3							D	D								
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 November 2016	**Species**	Ceriodaphnia dubia (water flea)
Date	11/8/2016	**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	1	0	0
6	1	1	1	1	0	0
7	1	1	1	1	0	0
8	1	1	1	1	0	0
9	0	1	1	1	0	0
10	1	1	1	1	0	0

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

Output

Summary Sheet

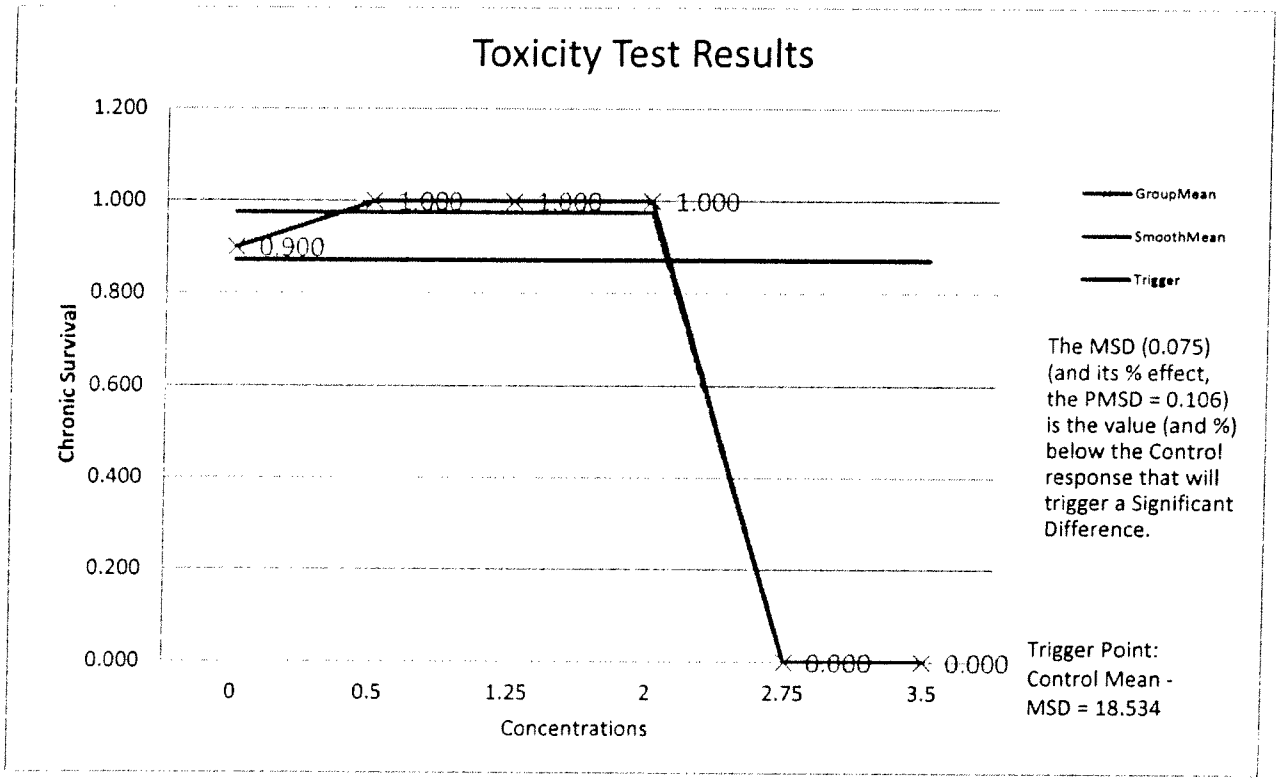
Statistical Data	Conc.	Mean	Stdev	CV	Steel test
	0	0.995	0.166	0.166	
Statistics are based on the transformed data used for endpoint calculations	0.5	1.047	0.000	0.000	NS
	1.25	1.047	0.000	0.000	NS
	2	1.047	0.000	0.000	NS
	2.75				Y
	3.5				Y

NOEC	LOEC	IC25	95% Confidence Intervals	
2	2.75	2.17	2.17	2.17

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

MSD	PMSD
0.075	10.6%

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	QC November 2016	**Species**	Ceriodaphnia dubia (water flea)
Date	11/8/2016	**Test Type**	Reproduction
IWC Conc.			

Input

	Concentrations					
Replicate	0	0.5	1.25	2	2.75	3.5
1	27	21	15			
2	20	19	4			
3	18	26				
4	19	23	7			
5	19	23	2			
6	19	12	6			
7	30	34	15			
8	31	36	15			
		35	15			
10	35	39	10	3		
Mean	24.222	26.800	9.889	3.000	#DIV/0!	#DIV/0!
Stdev	6.534	8.791	5.302	#DIV/0!	#DIV/0!	#DIV/0!

Output

Statistical Data	Conc.	Mean	Stdev	CV	Wilcoxon test
	0	24.222	6.534	0.270	
	0.5	26.800	8.791	0.328	NS
	1.25	9.889	5.302	0.536	Y
	2				
	2.75				Y
	3.5				Y

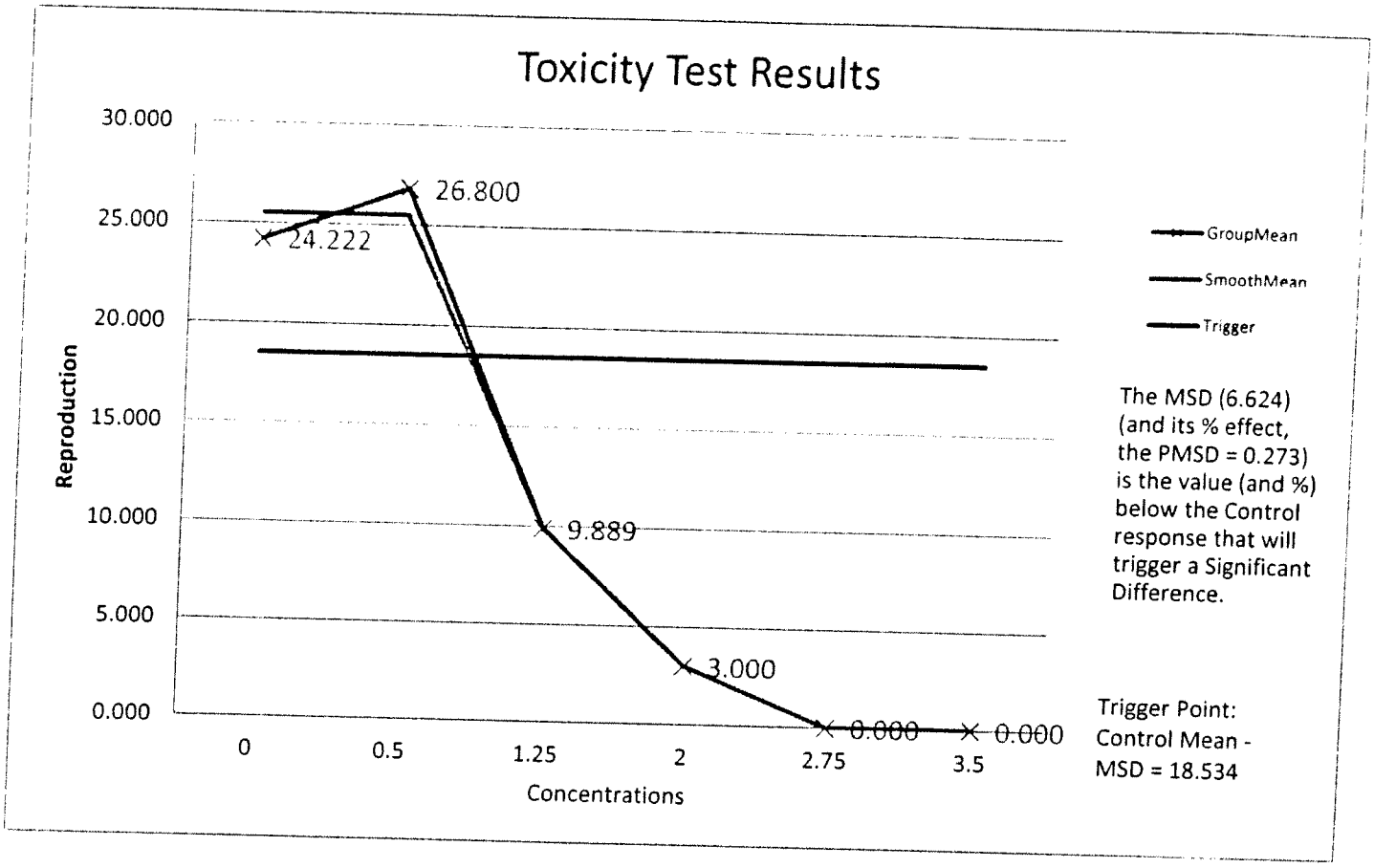
NOEC	LOEC	IC25	95% Confidence Intervals	
0.5	1.25	0.77	0.71	0.90

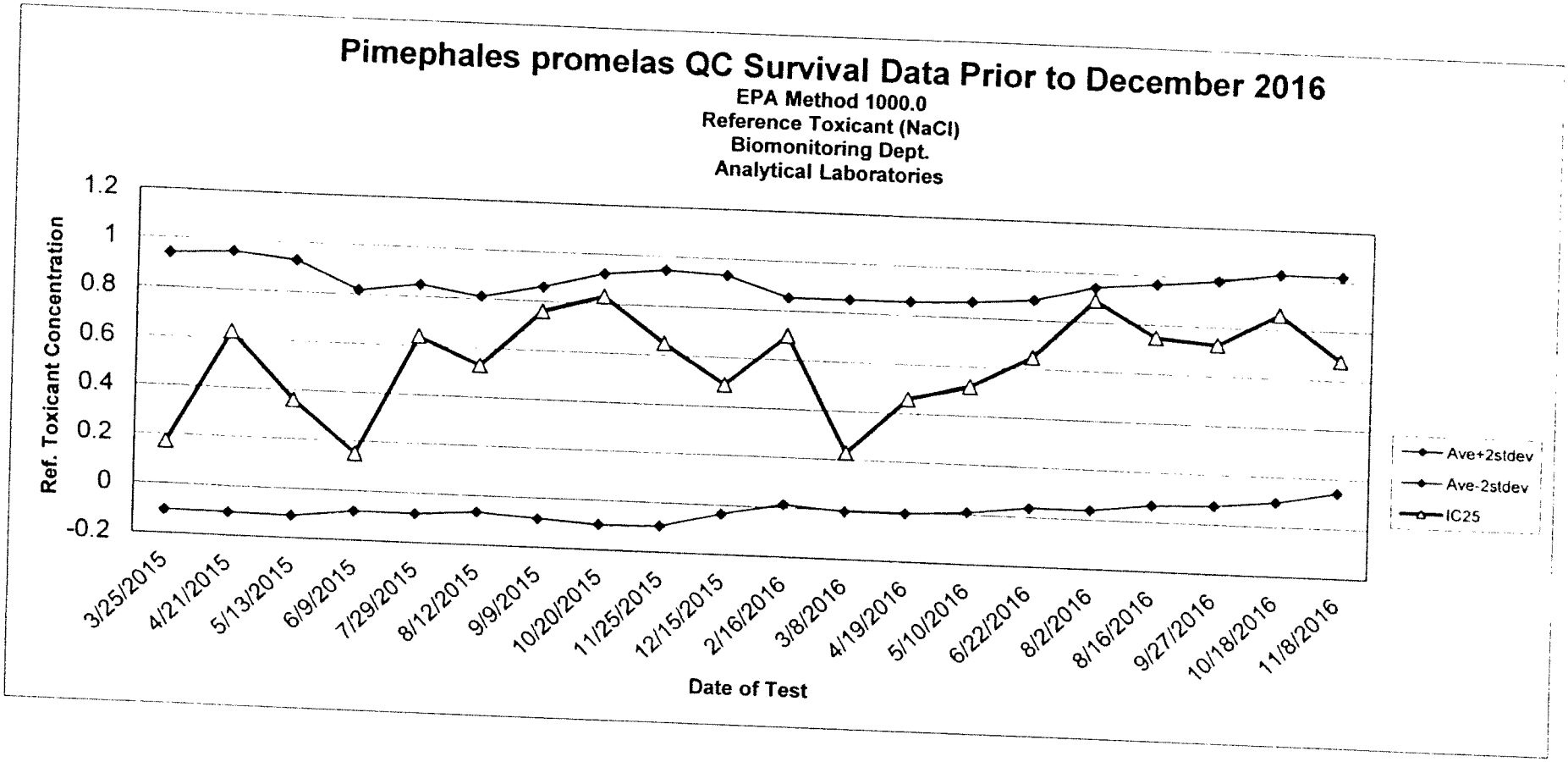
TST	Calculated t-value	Table t-value	Relative % Effect at IWC

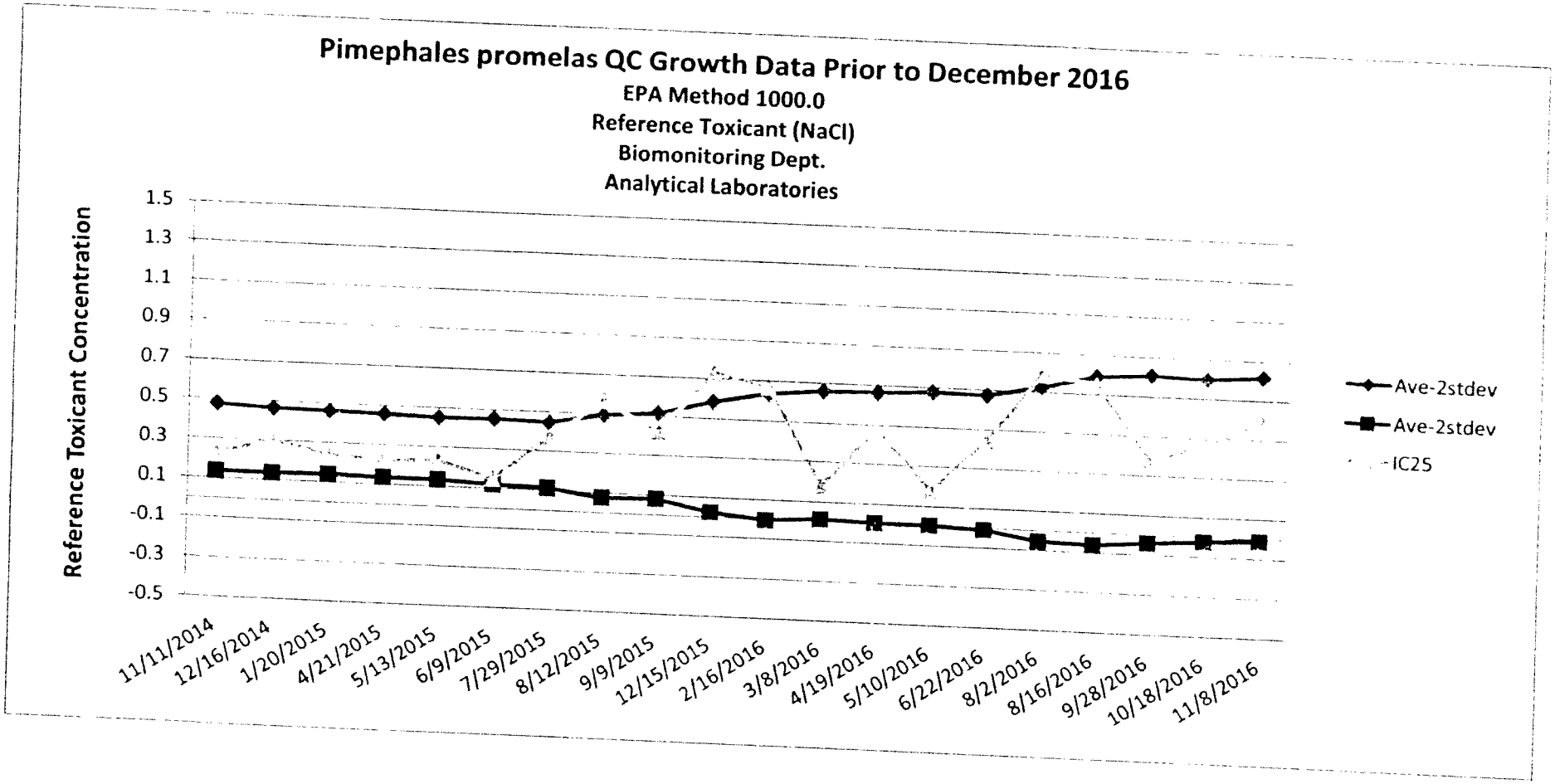
MSD	PMSD
6.624	27.3%

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.




Pimephales promelas QC Survival Data Prior to December 2016
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
3/25/2015
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
Date of Test
Ave+2stdev
Ave-2stdev
IC25


Pimephales promelas QC Growth Data Prior to December 2016
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
11/11/2014
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
Ave-2stdev
Ave-2stdev
IC25

Bench Sheet For Fathead Minnow QC Survival Test Method 1000.0

Test Month/Year: November 2016 Analyst: CP/WR

Test Start Date/Time: 11-1-16 / 1400 Test Stop Date/Time: 11-8-16 / 1100

Reference Toxicant Used: Sodium Chloride

Day		0	1	2	3	4	5	6	7	Remarks
Conc:	Beaker#									
Control	1	10	10	9	9	9	9	9	9	
	2	10	10	10	10	10	9	9	9	
	3	10	10	10	10	10	10	10	10	
	4	10	10	10	10	10	10	10	10	
New DO	XXX	7.6	7.6	7.7	7.8	7.8	7.7	7.5	XXX	
New pH	XXX	7.7	7.6	7.9	7.8	7.6	8.0	7.7	XXX	
Temp	XXX	24.0	22.7	22.0	22.9	22.8	23.0	24.0	XXX	
Old DO	XXX	XXX	6.0	5.9	6.2	5.4	5.8	6.3	6.4	
Old pH	XXX	XXX	7.7	7.6	7.5	7.5	7.7	7.7	7.7	
Conc: 0.25g/L	1	10	10	10	10	10	10	10	9	
	2	10	10	10	10	10	10	10	9	
	3	10	10	10	10	10	9	8	8	
	4	10	10	10	10	10	10	9	7	
New DO	XXX	7.7	7.7	7.8	7.8	7.8	7.6	7.4	XXX	
New pH	XXX	7.9	8.0	7.9	7.9	7.9	8.1	8.1	XXX	
Temp	XXX	23.9	22.5	22.0	23.4	23.5	22.9	24.1	XXX	
Old DO	XXX	XXX	5.8	5.9	5.9	5.6	6.1	6.3	6.4	
Old pH	XXX	XXX	7.5	7.6	7.7	7.5	7.7	7.6	7.7	
Conc: 1.5g/L	1	10	10	9	9	9	9	5	2	
	2	10	10	10	10	10	10	8	7	
	3	10	10	10	10	10	9	7	6 cp	
	4	10	10	10	10	9	7	7	4	
New DO	XXX	7.7	7.7	7.8	7.8	7.7	7.5	7.4	XXX	
New pH	XXX	7.9	8.0	7.9	7.9	7.9	8.1	8.0	XXX	
Temp	XXX	23.8	22.4	22.1	23.2	23.8	22.8	24.2	XXX	
Old DO	XXX	XXX	6.1	6.3	6.2	6.0	6.1	6.4	6.5	
Old pH	XXX	XXX	7.5	7.3	7.7	7.6	7.7	7.7	7.7	
Conc: 2.5g/L	1	10	10	10	10	10	10	8	6	
	2	10	10	10	10	10	10	9	7	
	3	10	10	10	10	10	8	6	4	
	4	10	10	10	10	10	10	10	9	
New DO	XXX	7.8	7.7	7.8	7.8	7.7	7.6	7.4	XXX	
New pH	XXX	7.9	7.9	7.9	7.9	7.9	8.1	8.0	XXX	
Temp	XXX	24.0	22.5	22.5	23.7	23.7	22.8	24.4	XXX	
Old DO	XXX	XXX	6.1	6.4	6.3	6.2	6.4	6.4	6.5	
Old pH	XXX	XXX	7.5	7.6	7.7	7.6	7.7	7.7	7.7	
Conc:	1	10	10	10	10	10	10	8	5 cp	
Conc: 3.5g/L	2	10	10	10	10	10	8	5	5	
	3	10	10	10	10	10	10	6	3	
	4	10	10	10	10	10	10	8	8	
New DO	XXX	7.8	7.8	7.8	7.8	7.8	7.7	7.4	XXX	
New pH	XXX	7.9	7.9	7.9	7.9	7.9	8.1	8.0	XXX	
Temp	XXX	24.0	22.7	22.5	23.6	24.0	22.9	24.3	XXX	
Old DO	XXX	XXX	6.5	6.4	6.4	6.3	6.4	6.6	6.6	
Old pH	XXX	XXX	7.6	7.6	7.7	7.6	7.7	7.7	7.7	
Conc: 8.5g/L	1	10	7	5	0	0	0			
	2	10	6	3	0	0	0			
	3	10	9	3	1	0	0			
	4	10	9	4	1	1	0			
New DO	XXX	7.9	7.8	7.9	7.8	7.8	6.5 WR		XXX	
New pH	XXX	7.9	7.9	7.8	7.8	7.9	7.7 WR		XXX	
Temp	XXX	24.1	22.7	22.8	23.4	23.7			XXX	
Old DO	XXX	XXX	6.6	6.5	6.7	6.8	6.5			
Old pH	XXX	XXX	7.6	7.5	7.8	7.7	7.7			
Feeding	A.M.	XXX	CP	WR	CP	CP	WR	WR	XXX	
	P.M.	CP	WR	WR	CP	CP	WR	WR	XXX	

Fathead Minnow QC Weight Data

Analyst: CP/VR Test Month/Year: Nov. 2016 Drying Temp: 100°C

Weighing Date: 11-8-16 Drying Time: 24 hours

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	1.2853	.0043	10	.43	
	2	1.2786 cc	1.2835	.0049		.49	0.11mg - 0.46mg = 0.35mg
	3	1.2787	1.2814	.0047		.47	
	4	1.2706	1.2750	.0044		.44	
0.25g/L	5	1.2735	1.2775	.0040		.40	
	6	1.2668	1.2709	.0041		.41	0.11mg - 0.41mg = 0.30mg
	7	1.2752	1.2800	.0048		.48	
	8	1.2711	1.2746	.0035		.35	
1.5g/L	9	1.2717	1.2725	.0008		.08	
	10	1.2639	1.2658	.0019		.19	0.11mg - 0.17mg = 0.06mg
	11	1.2673	1.2696	.0023		.23	
	12	1.2682	1.2701	.0019		.19	
2.5g/L	13	1.2662	1.2689	.0027		.27	
	14	1.2638	1.2667	.0029		.29	0.11mg - 0.26mg = 0.15mg
	15	1.2601	1.2616	.0015		.15	
	16	1.2619	1.2651	.0032		.32	
3.5g/L	17	1.2646	1.2665	.0019		.19	
	18	1.2684	1.2697	.0013		.13	0.11mg - 0.19mg = 0.08mg
	19	1.2722	1.2739	.0017		.17	
	20	1.2725	1.2753	.0028		.28	
8.5g/L	21	–					
	22	–					
	23	–					
	24	–					

Reviewed By: SC

BENCH SHEET FOR FATHEAD MINNOW INITIAL WEIGHT DATA EPA METHOD 1000.0

LAB ID#: QC Nov 2016 Test Start Date: 11-1-16/2016 Drying Temp: 100°C

Weighing Date: 11-2-16 Test End Date: 11-8-16 Drying Time: 21 hrs

Location/Client: Nov 2016 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	1.2881	1.2893	.0012	10	.12	0.11 mg
	I2	1.2929	1.2940	.0011	↓	.11	
	I3	1.2918	1.2930	.0012		.12	
	I4	1.2925	1.2935	.0010		.10	

Reviewed By: SC

Summary Sheet

Facility	Analytical Laboratories	**Analyst**	Will Reynolds
Test ID	QC November 2016	**Species**	Pimephales promelas (fathead minnow)
Date	11/8/2016	**Test Type**	Growth
IWC Conc.			

Input

	Concentrations					
Replicate	0	0.25	1.5	2.5	3.5	8.5
1	0.43	0.4	0.08	0.27	0.19	
2	0.49	0.41	0.19	0.29	0.13	
3	0.47	0.48	0.23	0.15	0.17	
4	0.44	0.35	0.19	0.32	0.28	
Mean	0.458	0.410	0.173	0.258	0.193	#DIV/0!
Stdev	0.028	0.054	0.064	0.075	0.063	#DIV/0!

Output

Statistical Data	Conc.	Mean	Stdev	CV	Dunnett test
	0	0.458	0.028	0.060	
	0.25	0.410	0.054	0.131	NS
	1.5	0.173	0.064	0.374	Y
	2.5	0.258	0.075	0.290	Y
	3.5	0.193	0.063	0.330	Y
	8.5				Y

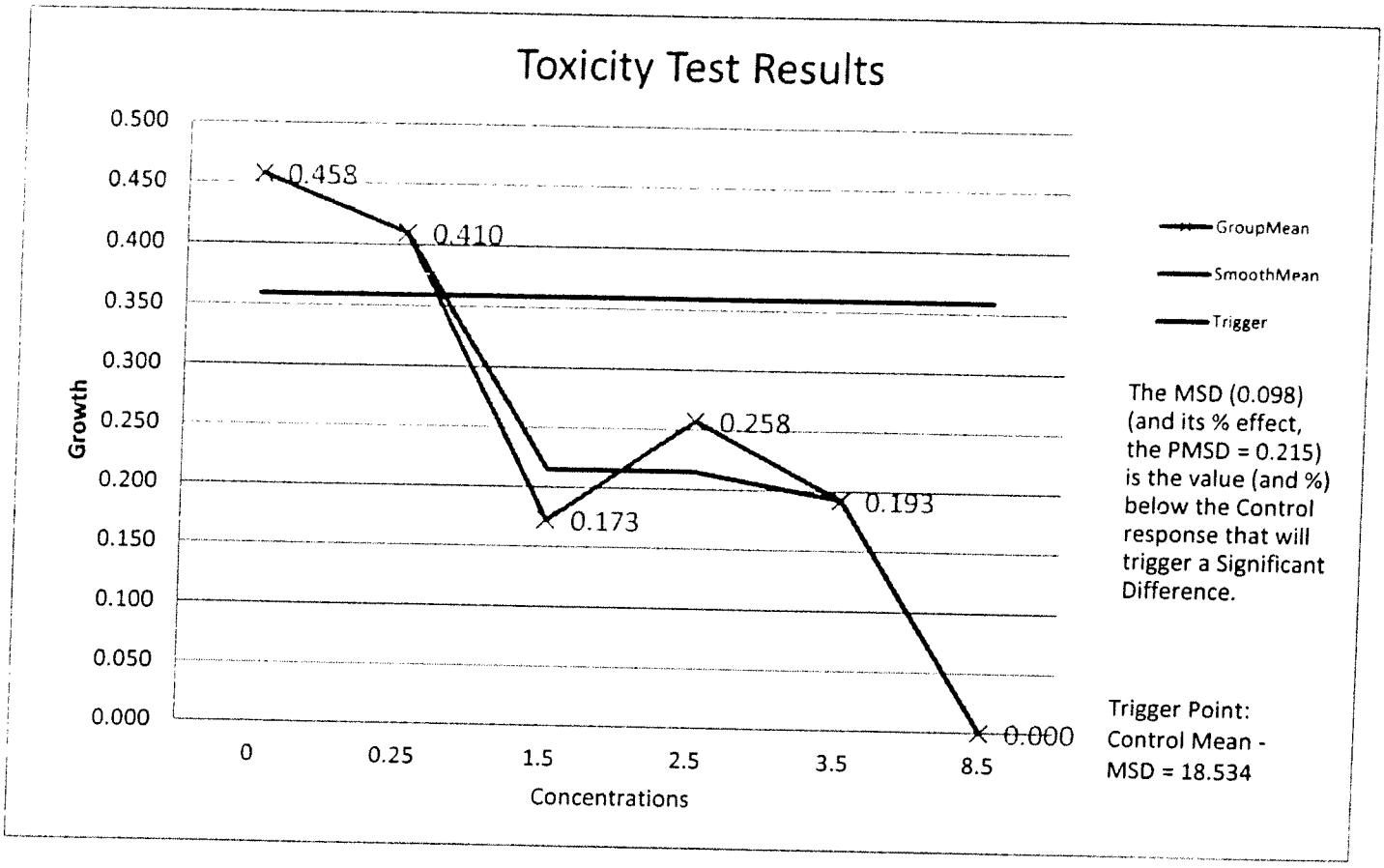
NOEC	LOEC	IC25	95% Confidence Intervals	
0.25	1.5	0.59	0.35	0.80

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

MSD	PMSD
0.098	21.5%

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.

Summary Sheet

Facility	Analytical Laboratories	**Analyst**	Will Reynolds
Test ID	QC November 2016	**Species**	Pimephales promelas (fathead minnow)
Date	11/8/2016	**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	9	2	6	5	0
2	9	9	7	7	5	0
3	10	8	6	4	3	0
4	10	7	4	9	8	0

Total Organisms	40	40	40	40	40	40
Total Responding	38	33	19	26	21	0
% Responding	95.0%	82.5%	47.5%	65.0%	52.5%	0.0%

Output

Summary Sheet

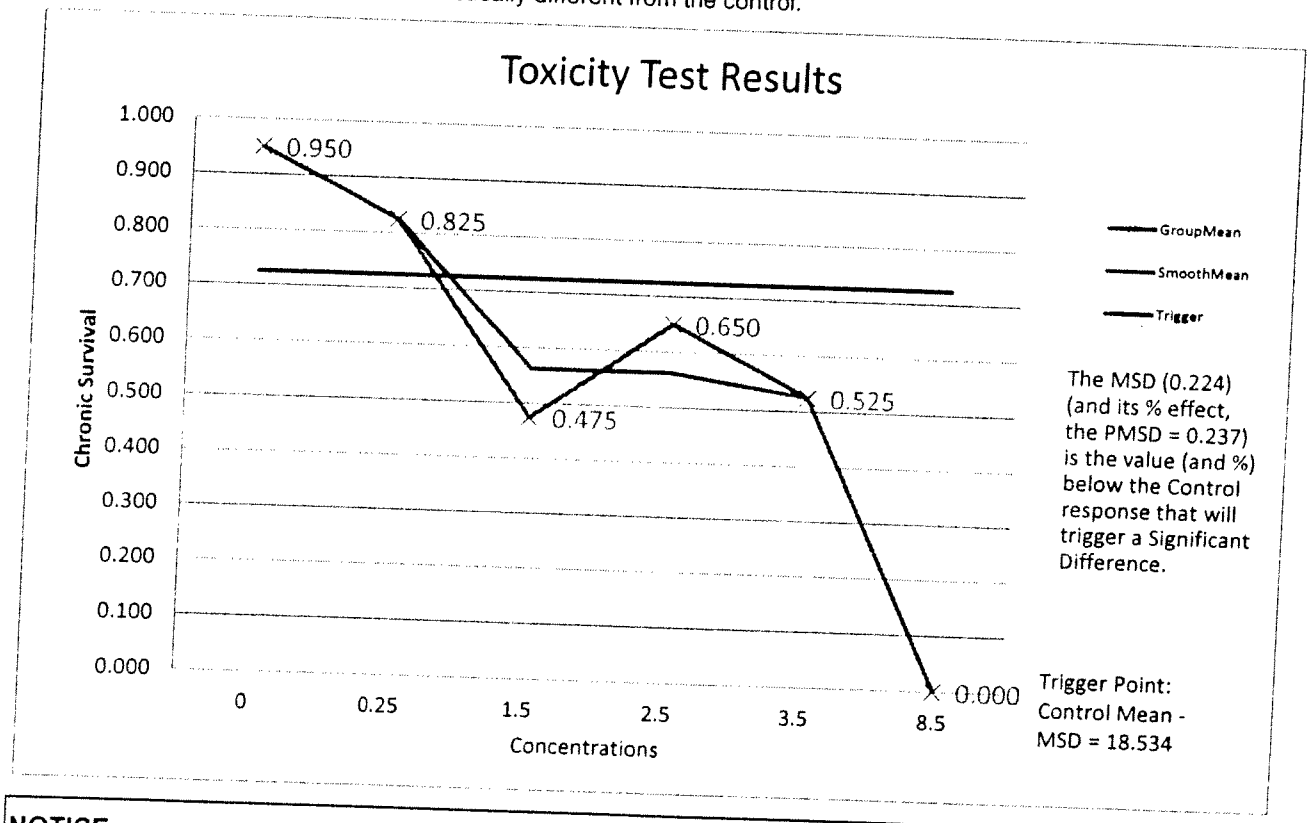
Statistical Data	Conc.	Mean	Stdev	CV	Dunnett test
	0	1.331	0.094	0.071	
Statistics are based on the transformed data used for endpoint calculations	0.25	1.149	0.125	0.109	NS
	1.5	0.756	0.233	0.308	Y
	2.5	0.953	0.235	0.247	Y
	3.5	0.814	0.218	0.268	Y
	8.5				Y

NOEC	LOEC	IC25	95% Confidence Intervals	
0.25	1.5	0.68	0.36	1.44

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

MSD	PMSD
0.224	23.7%

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 METHOD 1003.0

Test Month/Year NOV. 2016 Analyst: CP/WR Final Report Review: SC
Test Start Date/Time: 11/8/16 /1530
Test Stop Date/Time: 11/12/16 /1530

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	8.1	25.7	9.9	24.0	10.8	23.7	10.7	24.3	10.5	24.0	
0.50 g/L	8.3	26.0	9.7	24.2	10.6	23.6	10.8	24.3	10.8	24.1	
1.5 g/L	8.3	26.0	9.7	24.3	10.6	24.0	10.7	24.5	10.8	24.4	
5.5 g/L	8.2	25.8	9.6	24.4	10.1	24.2	10.3	24.5	10.3	24.3	
8.5 g/L	8.1	25.9	9.5	24.6	10.0	24.2	9.9	24.4	9.9	23.7	
10 g/L	8.1	25.9	9.5	24.8	10.1	24.2	10.1	24.3	10.1	24.3	

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

TEST MONTH/YEAR# Nov. 2016 ANALYST: CP/WR FINAL REPORT REVIEW: SC
TEST START DATE/TIME: 11-8-16 / 1530
TEST END DATE/TIME: 11-12-16 / 1530

Initial Algae Count (cells/mL)

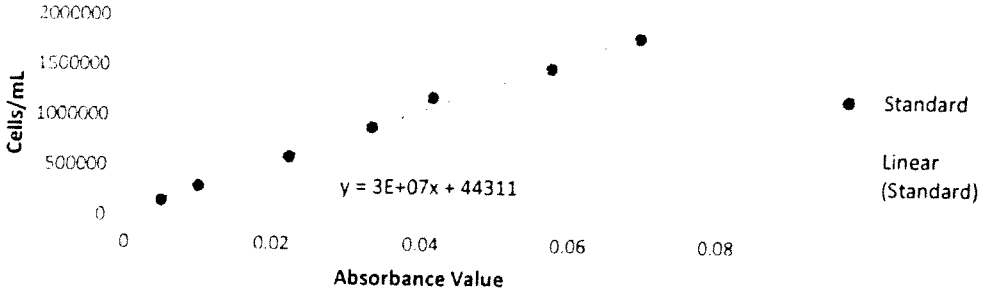
	Random Sample #1	Random Sample #2	Random Sample #3	Random Sample #4	Initial Average
	Absorbance Value: .013	Absorbance Value: .018	Absorbance Value: .019	Absorbance Value: .019	Absorbance Value: .019 Cells/mL: 599

Final Algae Count (cells/mL)

CONCENTRATION	Rep. 1	Rep. 2	Rep. 3	Rep. 4	Average
CONTROL	Absorbance Value: .069	Absorbance Value: .068	Absorbance Value: .065	Absorbance Value: .060	Absorbance Value: .066 Cells/mL: 2.01
0.5	Absorbance Value: .062	Absorbance Value: .060	Absorbance Value: .060	Absorbance Value: .065	Absorbance Value: .062 Cells/mL: 1.90
1.5	Absorbance Value: .078	Absorbance Value: .075	Absorbance Value: .063	Absorbance Value: .068	Absorbance Value: .072 Cells/mL: 221
5.5 ~~2.5~~	Absorbance Value: .061	Absorbance Value: .067	Absorbance Value: .051	Absorbance Value: .066	Absorbance Value: .063 Cells/mL: 1.94
~~3.5~~ ~~5.5~~	Absorbance Value: .050	Absorbance Value: .022	Absorbance Value: .030	Absorbance Value: .043	Absorbance Value: .036 Cells/mL: 1.13
10 ~~0.5~~	Absorbance Value: .053	Absorbance Value: .053	Absorbance Value: .051	Absorbance Value: .052	Absorbance Value: .052 Cells/mL: 161

***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**



Summary Sheet

Facility	Analytical Laboratories	**Analyst**	Will Reynolds
Test ID	QC November 2016	**Species**	Selenastrum capricornutum (green algae)
Date	11/12/2016	**Test Type**	Growth
IWC Conc.			

Input

	Concentrations					
Replicate	0	0.5	1.5	5.5	8.5	10
1	0.069	0.062	0.078	0.061	0.05	0.053
2	0.068	0.06	0.075	0.067	0.022	0.053
3	0.065	0.06	0.068	0.059	0.033	0.051
4	0.06	0.065	0.068	0.066	0.043	0.052
Mean	0.066	0.062	0.072	0.063	0.037	0.052
Stdev	0.004	0.002	0.005	0.004	0.012	0.001

Output

Statistical Data	Conc.	Mean	Stdev	CV	Steel test
	0	0.066	0.004	0.062	
	0.5	0.062	0.002	0.038	NS
	1.5	0.072	0.005	0.070	NS
	5.5	0.063	0.004	0.061	NS
	8.5	0.037	0.012	0.330	Y
	10	0.052	0.001	0.018	Y

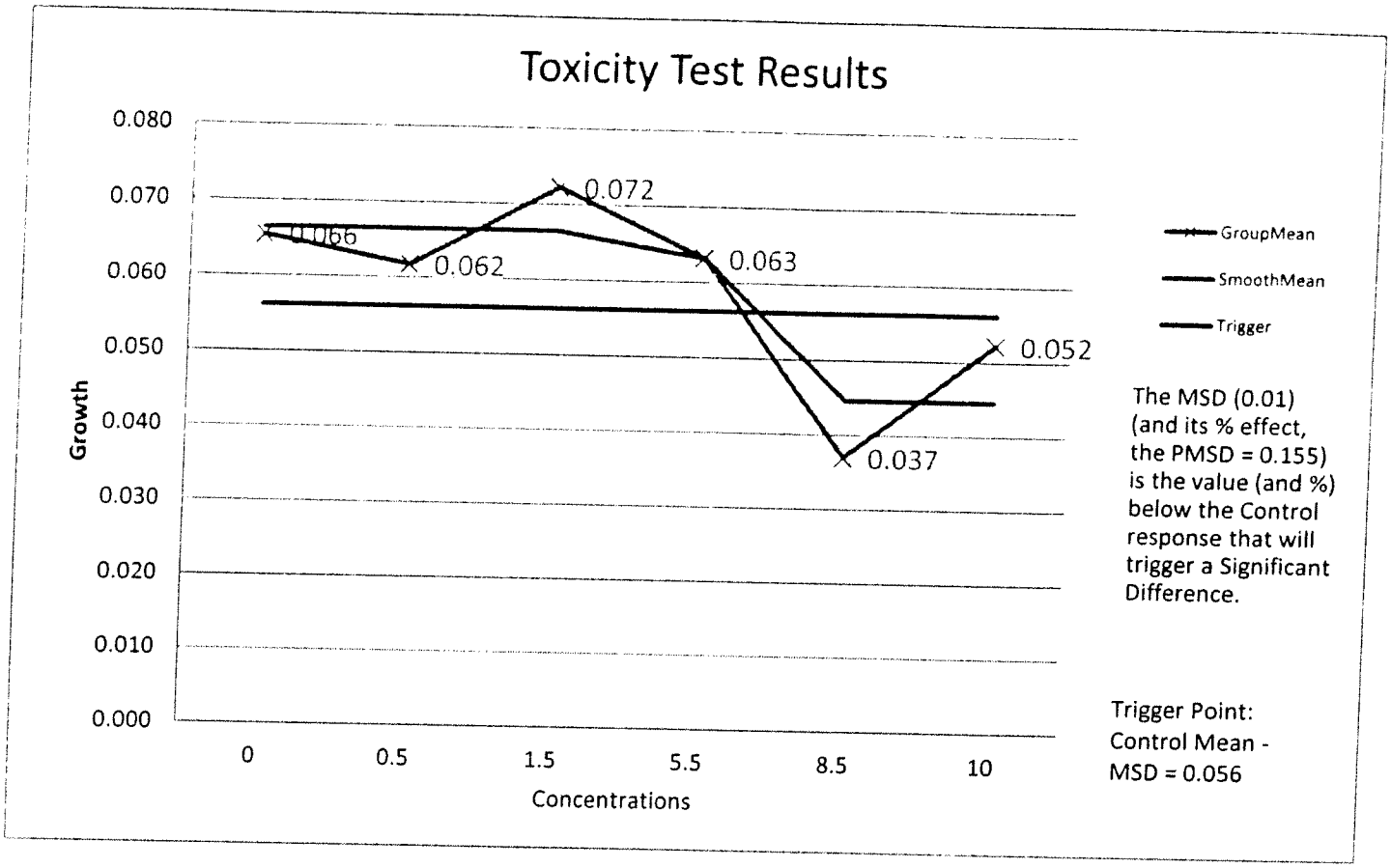
NOEC	LOEC	IC25	95% Confidence Intervals	
5.5	8.5	7.54	6.98	8.14

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

MSD	PMSD
0.010	15.5%

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.



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: 10.24.2016

SPECIES: *Raphidocelis subcapitata**

INOCULATION DATE: 10/11/2016

HARVEST DATE: 10.17.2016

CONCENTRATION DATE: 10/19/2016

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

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

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

ORGANISM HISTORY

DATE: 10 31 2016

SPECIES: *Pimephales promelas*

AGE: N/A

LIFE STAGE: Embryo

HATCH DATE: 10 31 2016

BEGAN FEEDING: N/A

FOOD: N/A

Water Chemistry Record:	Current	Range
TEMPERATURE:	25°C	--
SALINITY CONDUCTIVITY:	--	--
TOTAL HARDNESS (as $CaCO_3$):	120 mg/l	--
TOTAL ALKALINITY (as $CaCO_3$):	85 mg/l	--
pH:	8.20	--

Comments:

Facility 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: 10/19/2016; Best if used by 1/31/2017
Average Total Solids: 1238 mg/L

Ingredient Lot Numbers

Pines International's 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 (ng/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

Ceriodaphnia dubia Stock Culture Log Month/Year: Oct/Nov 2016

Start Date: 10-25 End Date: Board#: 1

Trans.	1	2	3	4	5	6	7	8	9	10	Time
10-25 0	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	1130
10-26 1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	1330
10-27 2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	1330
10-28 3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	1340
10-29 4	1/6	1/7	1/6	1/8	1/6	1/7	1/4	1/5	1/7	1/5	1320
10-31 5	2/15	2/18	2/14	D	2/15	3/14	2/10	2/9	2/9	2/15	1430
11-1 6	3/22	3/21	3/19		3/16	3/21	3/17	3/17	3/11	3/16	1200
7											
8											
9											
10											
11											
12											
13											
14											

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

4

Start Date: 10-25 End Date: Board#: 2

Trans.	1	2	3	4	5	6	7	8	9	10	Time
10-25 0	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	1135
10-26 1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	1335
10-27 2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	1335
10-28 3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	1345
10-29 4	1/8	1/6	1/6	1/6	1/6	1/8	1/6	1/7	1/7	1/8	1325
10-31 5	2/10	2/12	2/10	2/8	2/9	2/10	2/12	2/8	2/8	2/10	1235
11-1 6	3/13	3/13	3/13	3/14	3/9	3/12	3/13	3/16	3/11	3/8	1000
7											
8											
9											
10											
11											
12											
13											
14											

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

Start Date: 10-25 End Date: Board#: 3

Trans.	1	2	3	4	5	6	7	8	9	10	Time
10-25 0	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	1140
10-26 1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	1340
10-27 2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	1340
10-28 3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	1350
10-29 4	1/6	1/7	1/7	1/6	1/8	1/7	1/7	1/6	1/7	1/5	1335
10-31 5	2/10	2/13	2/11	2/12	2/13	2/9	2/7	2/12	2/12	2/10	1240
11-1 6	3/14	3/11	3/15	3/11	3/10	3/12	3/6	3/7	3/12	3/10	1000
7											
8											
9											
10											
11											
12											
13											
14											

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