

Michael Higuchi
MWH Global
19800 MacArthur Blvd., Suite 500
Irvine, CA 92612

August 10, 2016

Dear Michael:

I have enclosed one copy of our report “A Toxicity Evaluation of a Dry Weather Conditions Sample Collected for the East San Gabriel Valley CIMP” for the sample collected July 15, 2016. The results of our evaluation are summarized below.

Chronic Effects of East San Gabriel Valley CIMP Dry Weather Conditions Sample on *Ceriodaphnia dubia*

There was 100% survival in the sample. The TST analysis of the 100% sample indicated that the reproduction response was *not* statistically less than the Control treatment response; the 2010 EPA TST document states, “the test result is Pass and the ambient sample is declared not toxic”.

If you have any questions regarding the performance and interpretation of these tests, please feel free to contact my colleague Stephen Clark or myself at (707) 207-7760.

Sincerely,

Aaron Edgington, Ph. D.
Senior Aquatic Ecotoxicologist

Cc: Mitch Mysliwec, Larry Walker Associates



Pacific EcoRisk is accredited in accordance with NELAP (ORELAP ID 4043). Pacific EcoRisk certifies that the test results reported herein conform to the most current NELAP requirements for parameters for which accreditation is required and available. Any exceptions to NELAP requirements are noted, where applicable, in the body of the report. This report shall not be reproduced, except in full, without the written consent of Pacific EcoRisk. This testing was performed under Lab Order 26046.

A Toxicity Evaluation of a Dry Weather Conditions Sample Collected for the East San Gabriel Valley CIMP

Samples collected July 15, 2016

Submitted To:

MWH Global
19800 MacArthur Blvd., Suite 500
Irvine, CA 92612

Prepared By:

Pacific EcoRisk
2250 Cordelia Rd.
Fairfield, CA 94534

August 2016



PACIFIC ECORISK
ENVIRONMENTAL CONSULTING & TESTING

A Toxicity Evaluation of a Dry Weather Conditions Sample Collected for the East San Gabriel Valley CIMP

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1. INTRODUCTION

Under contract to MWH Global (MWH), Pacific EcoRisk (PER) performed a chronic toxicity evaluation of a dry weather conditions sample collected from the East San Gabriel Valley (ESGV) watershed. The sample was collected to address compliance requirements in the ESGV CIMP. The chronic toxicity evaluation consists of performing the US EPA short-term chronic 3-brood (6-8 day) survival and reproduction test with the crustacean *Ceriodaphnia dubia*.

This chronic toxicity test was performed on an ambient water sample collected by a MWH field team on July 15, 2016. This report describes the performance and results of this toxicity test.

2. SAMPLE COLLECTION AND HANDLING

On July 15, MWH staff collected an ambient water sample from one ESGV monitoring station (Table 1). The ambient water sample was collected into appropriately cleaned 20-L jerricans. The ambient water sample was transported, on ice and under chain-of-custody, to the PER laboratory facility in Fairfield, CA within 24 hours of collection. Upon receipt at the testing laboratory, an aliquot of the sample was analyzed to determine initial water quality characteristics (Table 2). The remainder of the sample was stored at $\leq 6^{\circ}\text{C}$, and used to initiate testing within 36 hours of collection.

The chain-of-custody record for the collection and delivery of the sample is presented in Appendix A.

Table 1. Collection of the ESGV ambient water sample.

Sample ID Code	Sample Collection Date (time)	Sample Receipt Date (time)
ESGV-05-LOW-001	7/15/16 (1300)	7/16/16 (0945)

Table 2. Initial water quality characteristics of ESGV ambient water sample.

Sample ID	Temp. ($^{\circ}\text{C}$)	pH	D.O. (mg/L)	Alkalinity (mg/L)	Hardness (mg/L)	Conductivity ($\mu\text{S}/\text{cm}$)	Total Ammonia (mg/L N)
ESGV-05-LOW-001	21.4*	8.65	6.8	109	239	1343	<1.00

* Sample cooler temperature was also above 6°C , suggesting that insufficient ice was available to achieve a temperature upon receive of $\leq 6^{\circ}\text{C}$. The client was notified for future sample collections.

3. TOXICITY TESTING PROCEDURES

The ESGV sample for this event was tested for toxicity using the following US EPA short-term chronic toxicity test:

- 3-brood (6-8 day) survival and reproduction test with the crustacean *Ceriodaphnia dubia*.

The method used in conducting the chronic toxicity test followed the “Short-term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms, Fourth Edition” (EPA-821-R-02-013).

3.1 Survival and Reproduction Toxicity Testing with *Ceriodaphnia dubia*

The short-term chronic *Ceriodaphnia* test consists of exposing individual females to the ambient sample for the length of time it takes for the Lab Control treatment females to produce 3 broods (typically 6-8 days), after which effects on survival and reproduction are evaluated. The specific procedures used in this test are described below.

The Lab Control water for this test consisted of synthetic freshwater (SRW), prepared by addition of reagent grade chemicals to Type 1 lab water. The ambient sample was tested at the 100% concentration only. Each treatment consisted of 200 mL of test solution to which the alga *Selenastrum capricornutum* and Yeast-Cerophyll®-Trout (YCT) had been added for food for the test organisms. “New” water quality characteristics (pH, dissolved oxygen [D.O.], and conductivity) were measured on these food-amended test solutions prior to use in the test.

There were 10 replicates each for each test treatment, each replicate consisting of 15 mL of test solution in a 30-mL test replicate container. These “3-brood” tests were initiated by allocating one neonate (<24 hours old, and within 8 hours of age) *Ceriodaphnia*, obtained from in-house laboratory cultures, into each replicate cup. The replicate cups were placed into a temperature-controlled room at 25°C, under cool-white fluorescent lighting on a 16L:8D photoperiod.

Each day of the test, fresh test solutions and a “new” set of replicate cups were prepared, as before. “New” water quality characteristics (pH, D.O., and conductivity) were measured on these solutions prior to use in the tests. The test replicate cups were removed from the temperature-controlled room and then each replicate was examined, with surviving ‘original’ individual organisms being transferred to the corresponding new replicate cup; the new replicate cups, now carrying *Ceriodaphnia* in fresh media, were then returned to the temperature-controlled room. Each old replicate cup was carefully examined to determine the number of neonate offspring produced by each original organism, after which the “old” water quality characteristics (pH, D.O., and conductivity) were measured for the old test solution from one randomly selected replicate at each treatment.

After it was determined that $\geq 60\%$ of the *Ceriodaphnia* in the Lab Control treatments had produced their third brood of offspring, the accompanying ambient water test was terminated. The resulting survival and reproduction (number of offspring) data were analyzed to determine any reductions, or toxicity, caused by the ambient water; all statistical analyses were performed using the CETIS[®] statistical software (TidePool Scientific, McKinleyville, CA). Note that the reproduction data was analyzed using the TST analysis. As per the 2010 EPA TST document, when the reproduction response at the 100% effluent concentration is *not* statistically less than the Control treatment response, “the test result is Pass and the (sample) is declared not toxic”. Conversely, when the reproduction response at the 100% receiving water concentration *is* statistically less than the Control treatment response, “the test result is Fail and the (sample) is declared toxic”.

3.1.1 Reference Toxicant Testing of the *Ceriodaphnia dubia*

In order to assess the sensitivity of the *Ceriodaphnia* test organisms to toxic stress, a reference toxicant test was performed. The reference toxicant test was performed similarly to the ambient water test, except that test solutions comprised of the Lab Control spring water mixture spiked with NaCl at concentrations of 500, 1000, 1500, 2000, and 2500 mg/L were used. The resulting test response data were statistically analyzed to determine key dose-response point estimates (e.g., IC₂₅); all statistical analyses were performed using the CETIS[®] software. These response endpoints were then compared to the typical response range established by the mean \pm 2 SD of the point estimates generated by the 20 most-recent previous reference toxicant tests performed by this lab.

4. RESULTS

4.1 Effects of ESGV Dry Weather Conditions Sample on *Ceriodaphnia dubia*

The results of this test are summarized below in Table 3. There was 100% survival in the dry weather conditions sample. The TST analysis indicated that reproduction response at the 100% dry weather conditions sample was ***not*** statistically less than the Control treatment response. The test data and summary of statistical analyses for this test are presented in Appendix B.

Table 3. Effects of ESGV dry weather conditions sample on <i>Ceriodaphnia dubia</i> .		
Treatment	Mean % Survival	Mean Reproduction (# neonates /female)
Lab Water Control	90	23.5
100%	100	31.1
Summary of Key Statistics		
TST Analysis =		Pass: Sample is <i>not</i> toxic
Test PMSD =		16.0%

5. AQUATIC TOXICITY DATA QUALITY CONTROL

Three QC measures were assessed during the toxicity testing:

- Maintenance of acceptable test conditions;
- Negative control testing; and
- Positive control (reference toxicant) testing.

5.1 Maintenance of Acceptable Test Conditions

Test conditions (pH, D.O., temperature, etc.) were all within acceptable limits for these tests. All analyses were performed according to laboratory Standard Operating Procedures.

5.2 Negative Control Testing

The response at the Lab Control treatment was within acceptable limits.

5.3 Positive Control Testing

5.3.1 Reference Toxicant Toxicity to *Ceriodaphnia dubia*

The results of this test are summarized below in Table 4. The survival EC₅₀ and reproduction IC₅₀ were within the “typical response” range established by previous reference toxicant tests performed in this laboratory. The test data and summary of statistical analyses for this test are presented in Appendix C.

Table 4. Reference toxicant testing: effects of sodium chloride on <i>Ceriodaphnia dubia</i> .		
NaCl Treatment (mg/L)	Mean % Survival	Mean Reproduction (# neonates/female)
Lab Control	100	37.0
500	100	39.4
1000	100	32.8*
1500	100	28.2*
2000	60	5.0*
2500	0*	-
Summary of Statistics		
Survival EC ₅₀ or Reproduction IC ₅₀ =	2020 mg/L NaCl	1700 mg/L NaCl
Typical Response Range (mean \pm 2 SD)	1037 - 2767 mg/L NaCl	710 - 2118 mg/L NaCl

* The response at this test treatment was significantly less than the Lab Control treatment response at $p < 0.05$.

6. SUMMARY AND CONCLUSIONS

The results for the toxicity evaluation of the sample collected for the East San Gabriel Valley CIMP are summarized below.

Chronic Effects of East San Gabriel Valley CIMP Dry Weather Conditions Sample on *Ceriodaphnia dubia*

There was 100% survival in the sample. The TST analysis of the 100% sample indicated that the reproduction response was ***not*** statistically less than the Control treatment response; the 2010 EPA TST document states, “the test result is Pass and the ambient sample is declared not toxic”.

Appendix A

Chain-of-Custody Record for the Collection and Delivery of the East San Gabriel Valley CIMP Dry Weather Conditions Sample

707 Fourth Street, Suite 200 Davis, CA 95616 530-753-6400 530-753-7030 Fax

Lab ID:

v

Crew: MWH

Appendix B

Test Data and Summary of Statistics for the Evaluation of the Chronic Toxicity of the East San Gabriel Valley CIMP Dry Weather Conditions Sample to *Ceriodaphnia dubia*

CETIS Summary Report

Report Date: 05 Aug-16 09:01 (p 1 of 1)
Test Code: 68662 | 06-3980-8672

Ceriodaphnia Survival and Reproduction Test							Pacific EcoRisk				
Batch ID:	12-0148-2182	Test Type:	Reproduction-Survival (7d)				Analyst:	Simin Delijani			
Start Date:	16 Jul-16 15:00	Protocol:	EPA-821-R-02-013 (2002)				Diluent:	Laboratory Water			
Ending Date:	22 Jul-16 15:05	Species:	Ceriodaphnia dubia				Brine:	Not Applicable			
Duration:	6d 0h	Source:	In-House Culture				Age:	1			
Sample ID:	12-6308-7193	Code:	Effluent				Client:	Larry Walker Associates			
Sample Date:	15 Jul-16 13:00	Material:	Effluent				Project:	26046			
Receive Date:	16 Jul-16 09:45	Source:	MWH								
Sample Age:	26h (21.6 °C)	Station:	ESGV-05-LOW-001								
Comparison Summary											
Analysis ID	Endpoint	NOEL	LOEL	TOEL	PMSD	TU	Method				
01-4258-0575	Reproduction	100	>100	NA	16.0%	1	TST-Welch's t Test				
Reproduction Summary											
C-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Lab Water Contr	10	23.5	13.7	33.3	0	38	4.31	13.6	58.0%	0.0%
100		10	31.1	24.5	37.7	14	41	2.91	9.19	29.6%	-32.3%
Reproduction Detail											
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Lab Water Contr	35	13	16	0	30	28	38	35	34	6
100		31	31	14	16	40	41	38	33	34	33

CETIS Analytical Report

Report Date: 05 Aug-16 09:01 (p 1 of 1)

Test Code: 68662 | 06-3980-8672

Ceriodaphnia Survival and Reproduction Test Pacific EcoRisk

Analysis ID: 01-4258-0575	Endpoint: Reproduction	CETIS Version: CETISv1.8.7
Analyzed: 05 Aug-16 9:00	Analysis: Parametric Bioequivalence-Two Sample	Official Results: Yes

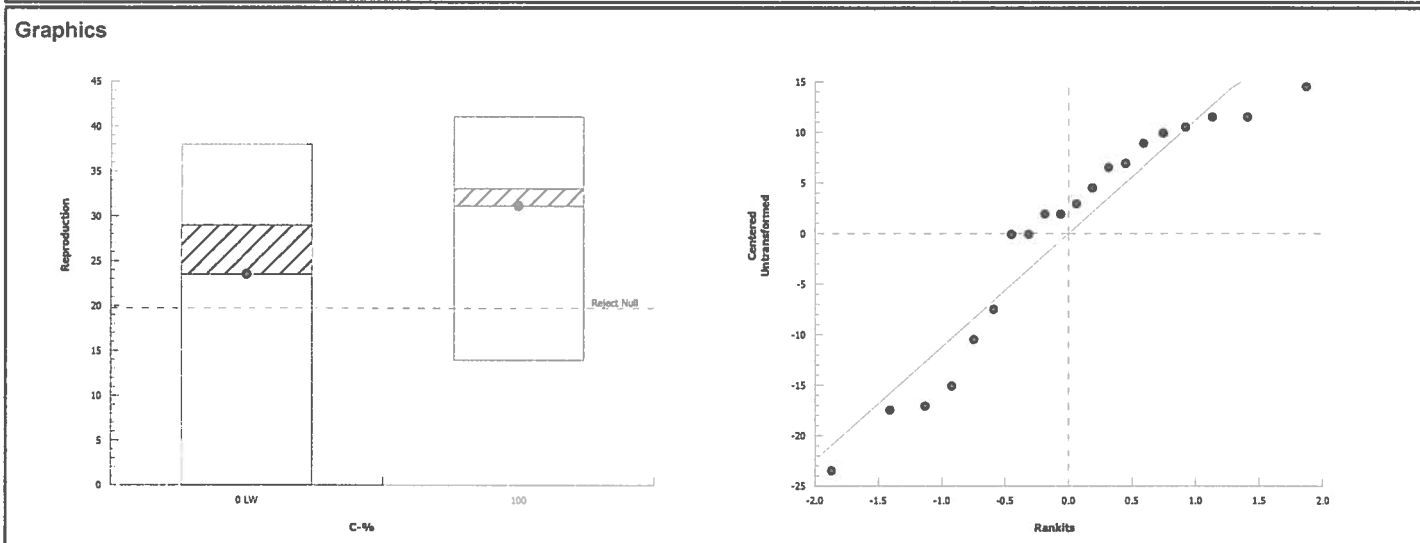
Data Transform	Zeta	Alt Hyp	Trials	Seed	TST b	PMSD	Test Result
Untransformed	NA	C*b < T	NA	NA	0.75	16.0%	Passes reproduction

TST-Welch's t Test									
Control	vs	C-%	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:20%)
Lab Water Control		100*	3.1	0.863	3.75	17	0.0033	CDF	Non-Significant Effect

ANOVA Table						
Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	288.8	288.8	1	2.14	0.1611	Non-Significant Effect
Error	2433.4	135.1889	18			
Total	2722.2		19			

Distributional Tests					
Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	2.2	6.54	0.2563	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.904	0.866	0.0488	Normal Distribution

Reproduction Summary											
C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Water Contr	10	23.5	13.7	33.3	29	0	38	4.31	58.0%	0.0%
100		10	31.1	24.5	37.7	33	14	41	2.91	29.6%	-32.3%



Short-Term Chronic 3-Brood *Ceriodaphnia dubia* Survival & Reproduction Test Data

Client: MWH: East San Gabriel CIMP Material: ESGV-05-LOW-001 Test Date: 7/16/16
 Project #: 26046 Test ID: 68662 Randomization: 10 2.1 Control Water: SRW

	Day	pH		D.O.		Cond. (μ S/cm)	Temp (°C)	Survival / Reproduction										SIGN-OFF		
		New	Old	New	Old			A	B	C	D	E	F	G	H	I	J	Date:	New WQ:	Test Init/Time:
Lab Water Control	0	7.64		8.5		312	25.1	0	0	0	0	0	0	0	0	0	0	Date: 7/16/16	New WQ: SD	Test Init/Time: 1500
	1	8.15	7.96	7.3	7.6	320	25.9	0	0	0	0	0	0	0	0	0	0	Date: 7/17/16	New WQ: 55B	Counts: WC
	2	8.00	8.13	7.7	8.0	314	25.3	0	0	0	40	6	0	0	0	0	0	Date: 7/18/16	New WQ: 44	Counts: 5F
	3	8.74	7.91	6.2	6.3	320	25.1	0	0	0	-	0	0	0	0	0	0	Date: 7/19/16	New WQ: 55B	Counts: DM
	4	8.74	7.54	8.3	7.3	320	25.8	7	5	5	-	5	6	7	7	6	1	Date: 7/20/16	New WQ: 55B	Counts: 8V
	5	7.84	7.53	8.6	7.1	315	25.2	13	8	11	-	11	9	14	11	14	5	Date: 7/21/16	New WQ: 26	Counts: 40M
	6	8.17	7.64	9.0	7.7	317	25.3	15	0	0	-	14	13	17	17	14	0	Date: 7/22/16	New WQ: 44	Counts: 186
	7										-							Date: 7/22/16	New WQ: 44	Counts: 186
	8										-							Date: 7/22/16	New WQ: 44	Counts: 186
Total=								35	13	16	40	30	28	38	35	34	6	Mean Neonates/Female = 23.5		
	Day	pH		D.O.		Cond. (μ S/cm)		Survival / Reproduction										SAMPLE ID		
		New	Old	New	Old			A	B	C	D	E	F	G	H	I	J			
100%	0	8.30		7.8		1276		0	0	0	0	0	0	0	0	0	0	43010		
	1	8.42	8.11	7.7	8.1	1309		0	0	0	0	0	0	0	0	0	0	43010		
	2	8.10	8.00	7.9	8.0	1281		0	0	0	0	0	0	0	0	0	0	43010		
	3	8.29	8.06	6.7	8.2	1278		0	0	0	0	0	0	0	0	0	0	43010		
	4	7.60	7.23	8.7	8.3	1318		4	6	5	6	7	5	6	6	6	4	43010		
	5	7.88	7.75	8.6	7.8	1298		11	11	9	10	12	12	13	10	17	11	43010		
	6	8.23	7.66	8.8	7.5	1298		16	14	0	0	21	24	19	17	15	18	43010		
	7																			
	8																			
Total=								31	31	14	16	40	41	38	33	34	33	Mean Neonates/Female = 31.1		

Appendix C

Test Data and Summary of Statistics for the Reference Toxicant Evaluation of the *Ceriodaphnia dubia*

CETIS Summary Report

Report Date: 21 Jul-16 08:22 (p 1 of 2)
 Test Code: 68447 | 09-9739-4449

Ceriodaphnia Survival and Reproduction Test							Pacific EcoRisk				
Batch ID:	11-2276-2073	Test Type:	Reproduction-Survival (7d)				Analyst:	Ashleigh Findley			
Start Date:	06 Jul-16 13:00	Protocol:	EPA-821-R-02-013 (2002)				Diluent:	Laboratory Water			
Ending Date:	12 Jul-16 14:52	Species:	Ceriodaphnia dubia				Brine:	Not Applicable			
Duration:	6d 2h	Source:	In-House Culture				Age:	1			
Sample ID:	03-6771-3807	Code:	NaCl				Client:	Pacific Ecorisk			
Sample Date:	06 Jul-16 13:00	Material:	Sodium chloride				Project:	25992			
Receive Date:	06 Jul-16 13:00	Source:	Reference Toxicant								
Sample Age:	NA (24 °C)	Station:	In House								
Comparison Summary											
Analysis ID	Endpoint	NOEL	LOEL	TOEL	PMSD	TU	Method				
03-0327-2042	Reproduction	500	1000	707.1	11.0%		Dunnett Multiple Comparison Test				
02-4965-7826	Survival	2000	2500	2236	NA		Fisher Exact/Bonferroni-Holm Test				
Point Estimate Summary											
Analysis ID	Endpoint	Level	mg/L	95% LCL	95% UCL	TU	Method				
05-4282-8277	Reproduction	IC5	677	601	915		Linear Interpolation (ICPIN)				
		IC10	854	708	1110						
		IC15	1040	813	1260						
		IC20	1240	917	1420						
		IC25	1450	1180	1520						
		IC40	1610	1580	1650						
		IC50	1700	1660	1740						
17-8269-3326	Survival	EC50	2020	1870	2190		Spearman-Kärber				
Reproduction Summary											
C-mg/L	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Lab Water Contr	10	37	34	40	29	44	1.33	4.22	11.4%	0.0%
500		10	39.4	37.3	41.5	34	45	0.909	2.88	7.3%	-6.49%
1000		10	32.8	28.9	36.7	22	40	1.72	5.45	16.6%	11.4%
1500		10	28.2	26.7	29.7	25	31	0.663	2.1	7.44%	23.8%
2000		10	5	1.54	8.46	0	13	1.53	4.83	96.6%	86.5%
2500		10	0	0	0	0	0	0	0		100.0%
Survival Summary											
C-mg/L	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Lab Water Contr	10	1	1	1	1	1	0	0	0.0%	0.0%
500		10	1	1	1	1	1	0	0	0.0%	0.0%
1000		10	1	1	1	1	1	0	0	0.0%	0.0%
1500		10	1	1	1	1	1	0	0	0.0%	0.0%
2000		10	0.6	0.231	0.969	0	1	0.163	0.516	86.1%	40.0%
2500		10	0	0	0	0	0	0	0		100.0%

CETIS Summary Report

Report Date:

21 Jul-16 08:22 (p 2 of 2)

Test Code:

68447 | 09-9739-4449

Ceriodaphnia Survival and Reproduction Test											Pacific EcoRisk
Reproduction Detail											
C-mg/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Lab Water Contr	37	29	32	37	44	41	36	37	39	38
500		45	39	38	41	40	34	40	41	37	39
1000		22	35	40	35	35	32	35	25	32	37
1500		25	29	25	29	31	27	30	27	30	29
2000		0	4	3	13	12	8	0	7	0	3
2500		0	0	0	0	0	0	0	0	0	0
Survival Detail											
C-mg/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Lab Water Contr	1	1	1	1	1	1	1	1	1	1
500		1	1	1	1	1	1	1	1	1	1
1000		1	1	1	1	1	1	1	1	1	1
1500		1	1	1	1	1	1	1	1	1	1
2000		0	1	1	1	1	1	0	1	0	0
2500		0	0	0	0	0	0	0	0	0	0
Survival Binomials											
C-mg/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Lab Water Contr	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
500		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
1000		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
1500		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
2000		0/1	1/1	1/1	1/1	1/1	1/1	0/1	1/1	0/1	0/1
2500		0/1	0/1	0/1	0/1	0/1	0/1	0/1	0/1	0/1	0/1





Ceriodaphnia Survival and Reproduction Test

Pacific EcoRisk

Test Type: Reproduction-Survival (7d)

Organism: Ceriodaphnia dubia (Water Flea)

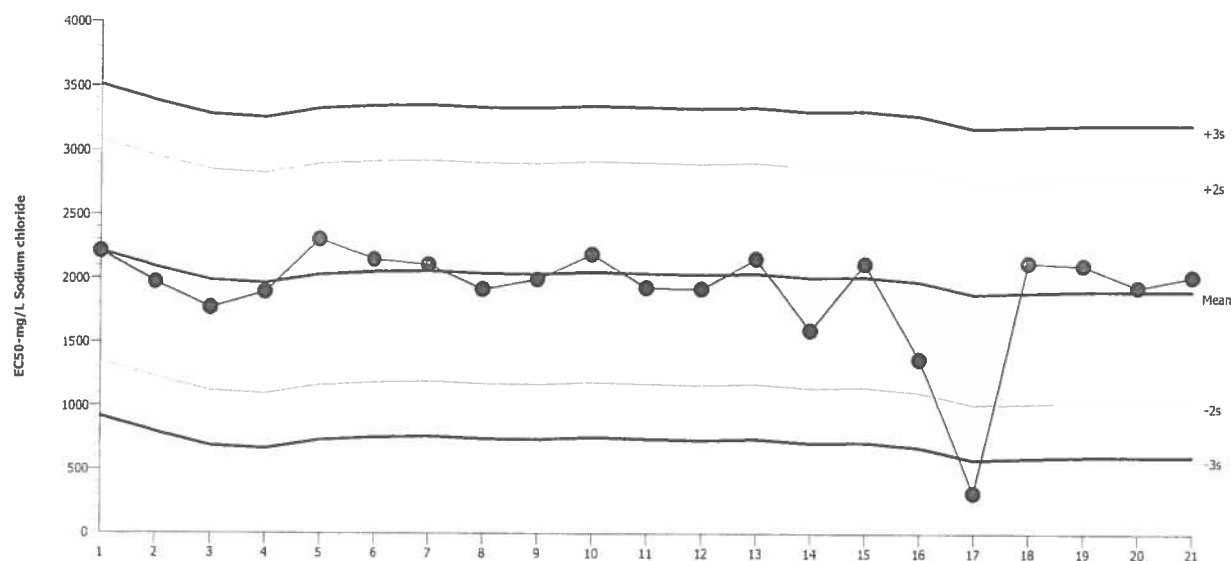
Material: Sodium chloride

Protocol: EPA-821-R-02-013 (2002)

Endpoint: Survival

Source: Reference Toxicant-REF

Ceriodaphnia Survival and Reproduction Test



Mean: 1902

Count: 20

-2s Warning Limit: 1037

-3s Action Limit: 605.2

Sigma: 432.3

CV: 22.70%

+2s Warning Limit: 2767

+3s Action Limit: 3199

Quality Control Data

Point	Year	Month	Day	Time	QC Data	Delta	Sigma	Warning	Action	Test ID	Analysis ID
1	2016	Mar	30	15:50	2213	311	0.7194			07-8389-0490	13-7425-5614
2		Apr	5	16:50	1968	65.99	0.1526			21-2208-7449	03-4421-6938
3			5	17:15	1768	-134.1	-0.3103			07-9537-0630	12-3666-5078
4			9	16:35	1890	-12.24	-0.02831			16-2790-0563	15-8288-9129
5			12	11:00	2304	401.9	0.9297			11-8664-2340	15-2726-4807
6			14	13:20	2147	244.6	0.5659			11-5444-8041	09-3601-4186
7			19	13:45	2105	203.4	0.4706			00-5841-7851	03-0627-9411
8			21	10:10	1913	10.72	0.02479			03-0762-1953	10-0659-7564
9			26	17:20	1991	88.67	0.2051			19-0034-1049	04-9378-9529
10			27	19:20	2189	286.5	0.6627			13-6115-3719	14-0378-6335
11		May	3	13:20	1923	21.39	0.04949			07-0818-2319	14-2354-2617
12			4	15:25	1914	12.28	0.0284			11-6927-8142	03-3221-2827
13			5	14:50	2153	250.6	0.5796			07-9136-0638	09-1917-4017
14			10	14:15	1594	-308.2	-0.713			04-1900-2071	02-7180-6176
15			17	16:30	2117	215	0.4973			02-0217-2091	01-8095-6167
16			24	14:40	1369	-533	-1.233			12-4725-4616	17-8748-4211
17		Jun	14	12:15	321.4	-1581	-3.656	(-)	(-)	06-1840-5245	14-8979-7423
18			23	10:40	2125	222.7	0.5152			16-6250-9087	17-5652-1508
19			23	13:25	2105	203.4	0.4706			07-7424-9431	12-9537-7598
20			28	13:00	1933	31	0.0717			09-5722-1456	07-9253-0885
21		Jul	6	13:00	2019	116.9	0.2704			09-9739-4449	17-8269-3326

Ceriodaphnia Survival and Reproduction Test

Pacific EcoRisk

Test Type: Reproduction-Survival (7d)

Organism: Ceriodaphnia dubia (Water Flea)

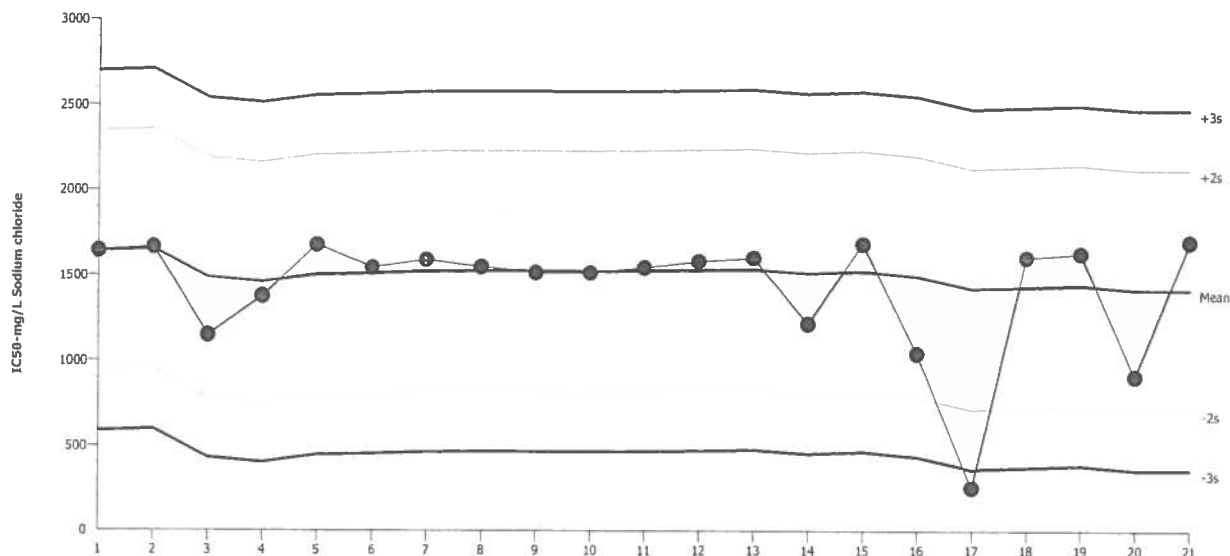
Material: Sodium chloride

Protocol: EPA-821-R-02-013 (2002)

Endpoint: Reproduction

Source: Reference Toxicant-REF

Ceriodaphnia Survival and Reproduction Test



Mean: 1414

Count: 20

-2s Warning Limit: 710

-3s Action Limit: 357.9

Sigma: 352.1

CV: 24.90%

+2s Warning Limit: 2118

+3s Action Limit: 2471

Quality Control Data

Point	Year	Month	Day	Time	QC Data	Delta	Sigma	Warning	Action	Test ID	Analysis ID
1	2016	Mar	30	15:50	1645	230.7	0.6553			07-8389-0490	19-2176-4194
2		Apr	5	16:50	1667	252.5	0.7171			21-2208-7449	11-3473-7153
3			5	17:15	1149	-265	-0.7527			07-9537-0630	20-4438-3182
4			9	16:35	1375	-38.82	-0.1102			16-2790-0563	19-4503-8901
5			12	11:00	1679	264.6	0.7514			11-8664-2340	20-0831-8360
6			14	13:20	1544	130.2	0.3698			11-5444-8041	15-6234-1844
7			19	13:45	1589	174.8	0.4965			00-5841-7851	09-1708-8190
8			21	10:10	1549	135.1	0.3836			03-0762-1953	19-2184-0860
9			26	17:20	1514	100.1	0.2842			19-0034-1049	15-4837-9696
10			27	19:20	1512	98.3	0.2792			13-6115-3719	02-1492-4413
11		May	3	13:20	1543	129.4	0.3676			07-0818-2319	01-7834-3632
12			4	15:25	1580	166.4	0.4725			11-6927-8142	19-5002-1552
13			5	14:50	1602	187.7	0.5332			07-9136-0638	05-4230-9164
14			10	14:15	1216	-198	-0.5622			04-1900-2071	20-3182-9235
15			17	16:30	1684	270.4	0.768			02-0217-2091	07-3645-9270
16			24	14:40	1042	-372.3	-1.057			12-4725-4616	17-2108-7232
17		Jun	14	12:15	255	-1159	-3.292	(-)	(-)	06-1840-5245	10-0782-9712
18			23	10:40	1603	189.2	0.5374			16-6250-9087	07-8286-1737
19			23	13:25	1628	214.2	0.6084			07-7424-9431	14-5397-9899
20			28	13:00	908.1	-505.9	-1.437			09-5722-1456	07-0717-9325
21		Jul	6	13:00	1696	282.1	0.8013			09-9739-4449	05-4282-8277

Short-Term Chronic 3-Brood *Ceriodaphnia dubia* Survival & Reproduction Test Data

Client:		Reference Toxicant		Material:		Sodium Chloride		Test Date:		7/16/16												
Project #:		25992		Test ID:		68447		Randomization:		10.7.2												
Control Water:		SRW + 5% ambient																				
Lab Water Control	Day	pH		D.O.		Conductivity (µS/cm)		Temp (°C)	Survival / Reproduction										SIGN-OFF			
		New	Old	New	Old	New	Old		A	B	C	D	E	F	G	H	I	J				
	0	8.12		8.5		336		24.0	0	0	0	0	0	0	0	0	0	0	0	Date: 7/16/16 New WQ: JBL 716 Sol'n Prep: JBL 55R Test Init: 7/16/16 Time: 1300		
	1	7.50	7.91	8.5	7.2	296	318	24.2	0	0	0	0	0	0	0	0	0	0	0	Date: 7/7/16 New WQ: BJ Sol'n Prep: SH Old WQ: EP Counts: BV Time: 1010		
	2	7.45	7.85	8.5	6.7	303	328	24.3	0	0	0	0	0	0	0	0	0	0	0	Date: 7/18/16 New WQ: JBL Sol'n Prep: AOK Old WQ: JBL Counts: DM Time: 1130		
	3	7.98	7.98	8.6	7.9	319	321	24.4	0	4	6	6	5	6	5	6	5	4		Date: 7/11/16 New WQ: JBL Sol'n Prep: JBL Old WQ: DM Counts: 126 Time: 1405		
	4	7.26	8.13	8.3	6.7	313	354	24.2	6	0	0	0	0	0	0	0	0	0	0	Date: 7/10/16 New WQ: JBL Sol'n Prep: SF Old WQ: JBL Counts: 1410 Time: 1410		
	5	7.75	7.98	8.3	6.7	310	329	24.2	11	10	9	12	16	14	12	12	14	14		Date: 7/11/16 New WQ: JBL Sol'n Prep: JBL Old WQ: JBL Counts: 5F Time: 1335		
	6	-	7.67	-	7.5	-	338	25.5	20	15	17	19	23	21	19	19	20	20		Date: 7/12/16 New WQ: - Sol'n Prep: - Old WQ: JBL Counts: EF Time: 1450		
	7																			Date: New WQ: Counts: Sol'n Prep: Old WQ: Time:		
8																			Date: Old WQ: Counts: Time:			
Total=								37	29	32	37	44	41	36	37	39	38	Mean Neonates/Female = 37.0				
500 mg/L	Day	pH		D.O.		Conductivity (µS/cm)			Survival / Reproduction										RT BATCH NUMBER			
		New	Old	New	Old	New	Old		A	B	C	D	E	F	G	H	I	J				
	0	7.99	8.11	8.7		1298	1445		0	0	0	0	0	0	0	0	0	0	0	225		
	1	7.50	7.78	8.6	7.8	1298	1445		0	0	0	0	0	0	0	0	0	0	0	225		
	2	7.43	7.66	8.6	6.9	1364	1461		0	0	0	0	0	0	0	0	0	0	0	225		
	3	7.78	7.86	8.8	8.1	1367	1459		0	4	0	5	6	7	5	5	5	6		225		
	4	7.22	8.02	8.6	6.0	1338	1383		7	0	5	9	0	9	0	0	10	0		225		
	5	7.68	7.89	8.4	6.7	1308	1370		14	13	13	14	15	0	11	13	1	13		225		
	6	-	7.63	-	7.4	-	1408		24	22	20	22	19	18	24	23	21	20		-		
	7																					
8																						
Total=								45	39	38	41	40	34	40	41	37	39	Mean Neonates/Female = 39.4				

Short-Term Chronic 3-Brood *Ceriodaphnia dubia* Survival & Reproduction Test Data
 Client: _____
 Project #: 25992

Reference Toxicant

Test ID: 68447

Material: Sodium Chloride

Test Date: ^{JBL 7/6} 6/7/16 7/6/16

Control Water: SRW +5% ambient

	Day	pH		D.O.		Conductivity (µS/cm)		Temp (°C)	Survival / Reproduction										
		New	Old	New	Old	New	Old		A	B	C	D	E	F	G	H	I	J	
1000 mg/L	0	7.96		8.9		2124			0	0	0	0	0	0	0	0	0	0	
	1	7.52	7.82	8.9	7.0	2198	2338		0	0	0	0	0	0	0	0	0	0	
	2	7.46	7.61	8.9	6.7	2333	2434		0	0	0	0	0	0	0	0	0	0	
	3	7.73	7.86	9.0	7.9	2275	2518		0	5	0	5	6	4	5	3	5	6	
	4	7.23	7.94	8.7	6.3	2264	2375		6	0	7	0	0	0	0	0	0	0	
	5	7.68	7.88	8.7	6.7	2191	2409		13	12	14	12	12	13	12	8	10	12	
	6	-	7.61	-	7.6	-	2410		3	18	19	18	17	15	18	14	17	19	
	7																		
	8																		
Total=									22	35	40	35	35	32	35	25	22	37	Mean Neonates/Female = 32.8
1500 mg/L	0	7.94		9.1		3050			0	0	0	0	0	0	0	0	0	0	
	1	7.50	7.80	9.2	7.3	3180	3221		0	0	0	0	0	0	0	0	0	0	
	2	7.49	7.41	9.3	6.9	3170 314	3253		0	0	0	0	0	0	0	0	0	0	
	3	7.70	7.86	9.4	7.9	3170	3462		0	0	2	3	4	4	0	3	5	5	
	4	7.20	7.90	9.0	6.6	3148	3380		5	4	2	0	0	0	5	0	0	0	
	5	7.62	7.87	8.9	6.6	3097	3329		7	11	8	10	10	8	9	8	10	7	
	6	-	7.59	-	7.7	-	3398		3	18	19	18	17	15	18	14	17	19	ET 7/6/16
	7								13	14	13	16	17	15	16	16	15	17	
	8																		
Total=									25	29	25	29	31	27	30	27	30	29	Mean Neonates/Female = 28.2

Short-Term Chronic 3-Brood *Ceriodaphnia dubia* Survival & Reproduction Test Data

JBL 7/6

Client: _____ Reference Toxicant: _____

Material: Sodium ChlorideTest Date: 6/7/16 7/6/16Project #: 25992 Test ID: 68447Control Water: SRW + 5% ambient

	Day	pH		D.O.		Conductivity ($\mu\text{S}/\text{cm}$)		Temp ($^{\circ}\text{C}$)	Survival / Reproduction										
		New	Old	New	Old	New	Old		A	B	C	D	E	F	G	H	I	J	
2000 mg/L	0	7.92		9.3		3980			0	0	0	0	0	0	0	0	0	0	
	1	7.60	7.79	9.6	7.0	4050	4168		0	0	0	0	0	0	0	0	0	0	
	2	7.53	7.61	9.5	6.7	3992	4268		x/0	0	0	0	0	0	x/0	0	x/0	0	
	3	7.71	7.86	9.7	7.7	4669	4336		-	0	0	3	4	0	-	0	-	0	
	4	7.16	7.88	9.2	6.6	4033	4340		-	1	0	1	9	0	-	0	-	0	
	5	7.59	7.88	9.3	6.8	3940	4280		-	3	0	4	0	0	-	2	-	3	
	6	-	7.59	-	7.7	-	4242		-	0	3	5	8	8	-	5	-	x/0	
	7								-						-		-	-	
	8								-						-		-	-	
Total=									x/0	4	3	13	12	8	x/0	7	x/0	43	Mean Neonates/Female = 5.0
2500 mg/L	0	7.91		9.6		4860			0	0	0	0	0	0	0	0	0	0	
	1	7.61	7.78	9.9	7.5	4930	5097		0	0	0	x/0	0	x/0	0	0	0	0	
	2	7.51	7.57	9.8	6.7	4970	5377		x/0	x/0	x/0	-	x/0	-	x/0	x/0	x/0	x/0	
	3	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-	-	
	4	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-	-	
	5	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-	-	
	6								-	-	-	-	-	-	-	-	-	-	
	7								-	-	-	-	-	-	-	-	-	-	
	8								-	-	-	-	-	-	-	-	-	-	
Total=									x/0	x/0	x/0	x/0	x/0	x/0	x/0	x/0	x/0	x/0	Mean Neonates/Female = 0.0