

Michael Higuchi  
Stantec Consulting Services Inc.  
19800 MacArthur Blvd., Suite 550  
Irvine, CA 92612

August 7, 2018

Dear Michael:

I have enclosed a copy of our report “A Toxicity Evaluation of an Ambient Water Sample Collected for the East San Gabriel Valley CIMP” for the sample collected July 19, 2018. The results of this evaluation are summarized below.

**Chronic Effects of East San Gabriel Valley CIMP Ambient Water on *Ceriodaphnia dubia***

There was 100% survival in the ambient water sample, indicating that the sample was not toxic to *C. dubia* survival. The TST analysis of the 100% sample reproduction data shows that the reproduction response in the ambient water sample was **not** statistically less than the response at the Control treatment; in this scenario, the 2010 EPA TST document states, “the test result is Pass and the sample is declared not toxic”.

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

Sincerely,

Stevi Vasquez  
Project Manager

Cc: Mitch Mysliwiec, Larry Walker Associates  
Jonathan Abelson, Stantec



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 29112.

# **A Toxicity Evaluation of an Ambient Water Sample Collected for the East San Gabriel Valley CIMP**

Sample collected July 19, 2018

Submitted To:

Stantec Consulting Services Inc.  
19800 MacArthur Blvd., Suite 550  
Irvine, CA 92612

Prepared By:

Pacific EcoRisk  
2250 Cordelia Rd.  
Fairfield, CA 94534

**August 2018**



# A Toxicity Evaluation of an Ambient Water Sample Collected for the East San Gabriel Valley CIMP

Sample collected July 19, 2018

## Table of Contents

	Page
1. INTRODUCTION .....	1
2. SAMPLE COLLECTION AND HANDLING .....	1
3. TOXICITY TESTING PROCEDURES .....	2
3.1 Survival and Reproduction Toxicity Testing with <i>Ceriodaphnia dubia</i> .....	2
3.1.1 Reference Toxicant Testing of the <i>Ceriodaphnia dubia</i> .....	3
4. RESULTS .....	4
4.1 Effects of ESGV Ambient Water on <i>Ceriodaphnia dubia</i> .....	4
5. AQUATIC TOXICITY DATA QUALITY CONTROL .....	5
5.1 Maintenance of Acceptable Test Conditions .....	5
5.2 Negative Control Testing.....	5
5.3 Positive Control Testing .....	5
5.3.1 Reference Toxicant Toxicity to <i>Ceriodaphnia dubia</i> .....	5
6. SUMMARY AND CONCLUSIONS .....	6

## Appendices

Appendix A	Chain-of-Custody Record for the Collection and Delivery of the East San Gabriel Valley CIMP Ambient Water Sample
Appendix B	Test Data and Summary of Statistics for the Evaluation of the Chronic Toxicity of the East San Gabriel Valley CIMP Ambient Water Sample to <i>Ceriodaphnia dubia</i>
Appendix C	Test Data and Summary of Statistics for the Reference Toxicant Evaluation of the <i>Ceriodaphnia dubia</i>

## 1. INTRODUCTION

Under contract to Stantec Consulting Services Inc (Stantec), Pacific EcoRisk (PER) performed a chronic toxicity evaluation of an ambient water 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 Stantec field team on July 19, 2018. This report describes the performance and results of this toxicity test.

## 2. SAMPLE COLLECTION AND HANDLING

On July 19, Stantec staff collected an ambient water sample from one ESGV monitoring station (Table 1). The ambient water sample was collected into an appropriately cleaned sample container. 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	Sample Receipt Date
ESGV-19-LOW-001	7/19/18 (1120)	7/20/18 (0957)

Table 2. Initial water quality characteristics of ESGV ambient water sample.							
Sample ID	Temp. (°C)	pH	D.O. (mg/L)	Alkalinity (mg/L)	Hardness (mg/L)	Conductivity (µS/cm)	Total Ammonia (mg/L N)
ESGV-19-LOW-001	1.4	7.53	6.4	227	316	1129	1.5

### 3. TOXICITY TESTING PROCEDURES

The ESGV ambient water 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 *C. dubia* test consists of exposing individual females to the ambient water 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 Water Control medium for this test consisted of modified EPA synthetic moderately hard water, prepared by addition of reagent grade chemicals to Type 1 lab water. The ambient water 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 Food (YCT) had been added as 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 for each test treatment, each replicate consisting of 15 mL of test solution in a 30-mL plastic cup. The test was initiated by allocating one neonate (<24 hours old, and within 8 hours of age) *C. dubia*, obtained from in-house laboratory cultures, into each replicate cup. The test 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 were prepared and characterized as before, and a new set of replicate cups was prepared. The original test replicate cups were examined, with surviving original individual organisms being transferred to the corresponding new cup. The contents of each of the remaining old replicate cups was carefully examined and the number of neonate offspring produced by each original organism was determined, after which the “old” water quality characteristics (pH, D.O., and conductivity) were measured for the old media from one randomly-selected replicate at each treatment.

After it was determined that  $\geq 60\%$  of the *C. dubia* in the Lab Control had produced their third brood of offspring, the test was terminated. The resulting survival and reproduction data were analyzed to evaluate any impairment caused by the ambient water. All statistical analyses were performed using CETIS® (TidePool Scientific Software, McKinleyville, CA).

**3.1.1 Reference Toxicant Testing of the *Ceriodaphnia dubia***

The reference toxicant test was performed similarly to the ambient water test, except that test solutions consisted of Lab Water Control medium spiked with NaCl at test concentrations of 500, 1000, 1500, 2000, and 2500 mg/L. The resulting test response data were statistically analyzed to determine key concentration-response point estimates. All statistical analyses were performed using CETIS. These response endpoints were then compared to the typical response ranges established by the mean  $\pm$  2 SD of the point estimates generated by the most recent previous reference toxicant tests performed by this lab.

## 4. RESULTS

### 4.1 Effects of ESGV Ambient Water on *Ceriodaphnia dubia*

The results of this test are summarized below in Table 3. There was 100% survival in the ambient water sample, indicating that the sample was not toxic to *C. dubia* survival. The reproduction data were analyzed using the TST analytical method. The reproduction response in the 100% ambient water sample was **not** statistically less than the response at the Control treatment; in this scenario, the 2010 EPA TST document states, “the test result is Pass and the sample is declared not toxic”. The test data and summary of statistical analyses are presented in Appendix B.

Table 3. Effects of ESGV ambient water on <i>Ceriodaphnia dubia</i> .		
Treatment	Mean % Survival	Mean Reproduction (# neonates /female)
Lab Water Control	100	24.3
100%	100	30.7
Summary of Statistics		
TST Analysis =		Pass: Sample is not toxic

## 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 EC<sub>50</sub> and reproduction IC<sub>50</sub> were both consistent with the typical response ranges established by the reference toxicant test database for this species, indicating that these organisms were responding to toxic stress in a typical and consistent fashion. The test data and summary of statistical analyses for this test are presented in Appendix C.

Table 4. Reference toxicant testing: Effects of NaCl on <i>Ceriodaphnia dubia</i> .		
NaCl Treatment (mg/L)	Mean % Survival	Mean Reproduction (# neonates/female)
Lab Water Control	100	40.5
500	80	37.1
1000	100	<b>31.0*</b>
1500	100	<b>23.4*</b>
2000	50	<b>2.3*</b>
2500	<b>10*</b>	0.4
Summary of Statistics		
Survival EC <sub>50</sub> or Reproduction IC <sub>50</sub> =	1980 mg/L NaCl	1570 mg/L NaCl
Typical Response Range (mean $\pm$ 2 SD)	1769 - 2314 mg/L NaCl	1238 - 1861 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 ambient water sample collected for the East San Gabriel Valley CIMP are summarized below.

### **Chronic Effects of East San Gabriel Valley CIMP Ambient Water on *Ceriodaphnia dubia***


There was 100% survival in the ambient water sample, indicating that the sample was not toxic to *C. dubia* survival. The TST analysis of the 100% sample reproduction data shows that the reproduction response in the ambient water sample was ***not*** statistically less than the response at the Control treatment; in this scenario, the 2010 EPA TST document states, “the test result is Pass and the sample is declared not toxic”.

## **Appendix A**

### **Chain-of-Custody Record for the Collection and Delivery of the East San Gabriel Valley CIMP Ambient Water Sample**

1480 Drew Avenue, Suite 100 Davis, CA 95618 530-753-6400 530-753-7030 Fax

## Date:

Destination Lab: Pacific EcoRisk Stephen Clark Address: 2250 Cordelia Road Fairfield, CA 94534 Phone: 707-207-7760 Fax: 707-207-7916				 <p>LARRY WALKER ASSOCIATES</p>		Ceriodaphnia, chronic (EPA-821-R-02-013)												
Sampled By:																		
LWA Contact: Mitch Mysliwiec																		
Project: East San Gabriel Valley CIMP																		
Client Sample Id	Sample Date	Sample Time	Sample Matrix	Container			#	Type	Pres.	X								Notes
ESGV-19-LOW-001	7/19	11:20	Surface Water				2	20-L Jerrican	none	X								

Sender Comments: Please PDF signed COCs upon completion of sample login to Mitch Mysliwiec at MitchM@lwa.com  PLEASE CALL IF THERE ARE ANY QUESTIONS	Relinquished By (1): Signature: <i>Rita Newman</i> Print: Rita Newman Organization: <i>Startec</i> Date: <i>7/19/18</i> Time: <i>15:25</i>		Relinquished By (2):    Date: Time:	
	Received By (1): Signature: <i>Alejandra L. Romero</i> Print: Alejandra L. Romero Organization: <i>PER</i> Date: <i>7/20/18</i> Time: <i>0957</i>		Received By (2):    Date: Time:	
Laboratory Comments:				

## **Appendix B**

### **Test Data and Summary of Statistics for the Evaluation of the Chronic Toxicity of the East San Gabriel Valley CIMP Ambient Water Sample to *Ceriodaphnia dubia***

# CETIS Summary Report

Report Date: 31 Jul-18 08:38 (p 1 of 1)  
 Test Code: ESGV\_19CD\_C1 | 03-8541-6476

Ceriodaphnia Survival and Reproduction Test							Pacific EcoRisk				
Batch ID:	15-2372-3948		Test Type:	Reproduction-Survival (7d)			Analyst:	Stevi Vasquez			
Start Date:	20 Jul-18 14:15		Protocol:	EPA-821-R-02-013 (2002)			Diluent:	Not Applicable			
Ending Date:	26 Jul-18 16:00		Species:	Ceriodaphnia dubia			Brine:	Not Applicable			
Duration:	6d 2h		Source:	In-House Culture			Age:	1			
Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project					
ESGV_19CD_C1	04-9356-6164	20 Jul-18 14:15	20 Jul-18 14:15	n/a (24.7 °C)	Stantec	29112					
ESGV-19-LOW-001	01-5261-5126	19 Jul-18 11:20	20 Jul-18 09:57	27h (1.4 °C)							
Sample Code	Material Type	Sample Source	Station Location	Lat/Long							
ESGV_19CD_C1	Lab Control	East San Gabriel Valley CIMP	LABQA								
ESGV-19-LOW-001	Ambient Water	East San Gabriel Valley CIMP	LOW-001								
Single Comparison Summary											
Analysis ID	Endpoint	Comparison Method			P-Value	Comparison Result					
17-5849-8057	Reproduction	TST-Welch's t Test			1.3E-05	ESGV-19-LOW-001 passed reproduction					
Reproduction Summary											
Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
ESGV_19CD_C1	LW	10	24.3	23.3	25.3	22	27	0.448	1.42	5.84%	0.00%
ESGV-19-LOW-001		10	30.7	27.2	34.2	24	39	1.56	4.92	16.03%	-26.34%
Reproduction Detail											
Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
ESGV_19CD_C1	LW	27	23	24	24	25	22	25	25	25	23
ESGV-19-LOW-001		32	26	33	39	30	32	36	31	24	24

# CETIS Analytical Report

Report Date: 31 Jul-18 08:38 (p 1 of 1)

Test Code: ESGV\_19CD\_C1 | 03-8541-6476

## Ceriodaphnia Survival and Reproduction Test Pacific EcoRisk

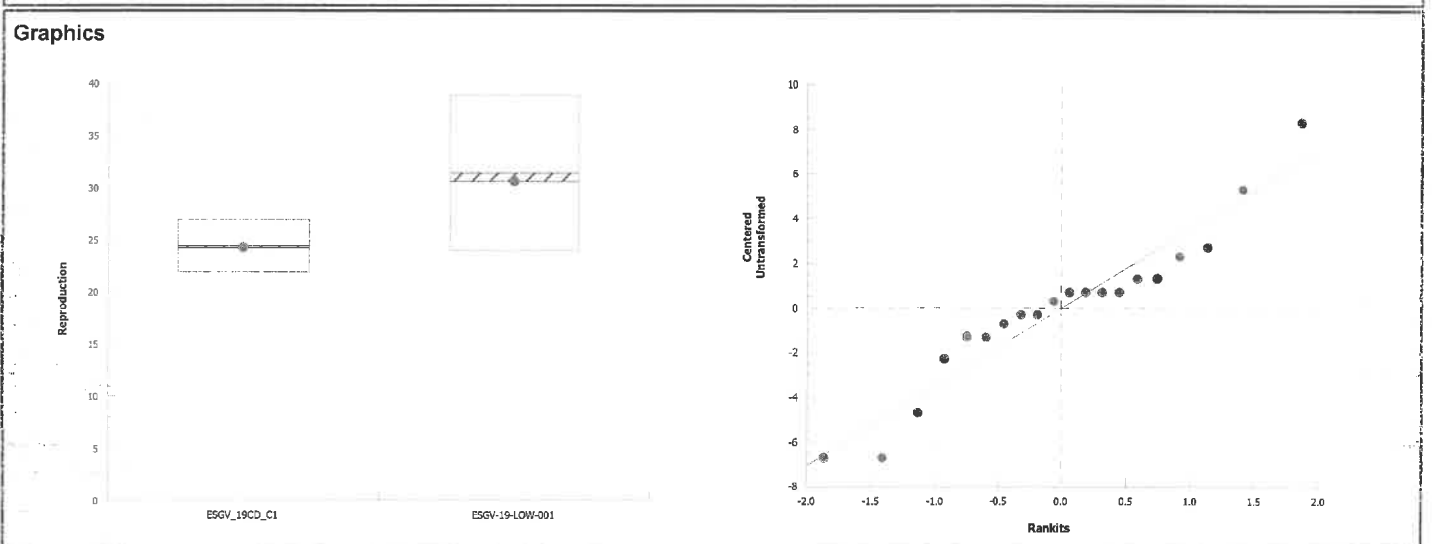
Analysis ID: 17-5849-8057	Endpoint: Reproduction	CETIS Version: CETISv1.9.2
Analyzed: 31 Jul-18 8:38	Analysis: Parametric Bioequivalence-Two Sample	Official Results: Yes

TST-Welch's t Test								
Sample I	vs	Sample II	Test Stat	Critical	DF	P-Type	P-Value	Decision( $\alpha$ :20%)
Lab Water Control		ESGV-19-LOW-001*	7.83	0.883	9	CDF	1.3E-05	Non-Significant Effect

ANOVA Table						
Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision( $\alpha$ :5%)
Between	204.8	204.8	1	15.6	9.4E-04	Significant Effect
Error	236.2	13.1222	18			
Total	441		19			

Distributional Tests					
Attribute	Test	Test Stat	Critical	P-Value	Decision( $\alpha$ :1%)
Variances	Variance Ratio F Test	12	6.54	0.0010	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.935	0.866	0.1901	Normal Distribution

Reproduction Summary											
Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
ESGV_19CD_C1	LW	10	24.3	23.3	25.3	24.5	22	27	0.448	5.84%	0.00%
ESGV-19-LOW-001		10	30.7	27.2	34.2	31.5	24	39	1.56	16.03%	-26.34%



Short-Term Chronic 3-Brood *Ceriodaphnia dubia* Survival & Reproduction Test DataClient: Stantec: East San Gabriel CIMPMaterial: ESGV-19-LOW-001Test Date: 7/20/18Project #: 29112Test ID: 79054Randomization: 10, 4, 6Control Water: Mod EPAMH

	Day	pH		D.O.		Cond. (µS/cm)	Temp (°C)	Survival / Reproduction										SIGN-OFF
		New	Old	New	Old			A	B	C	D	E	F	G	H	I	J	
Lab Water Control	0	8.06		7.7		350	24.7	0	0	0	0	0	0	0	0	0	0	Date: 7/20/18 New WQ: TK Test Init.: 50 Sol'n Prep: TK TK Time: 4:15
	1	8.17	7.94	8.1	8.4	343	25.2	0	0	0	0	0	0	0	0	0	0	Date: 7/21/18 New WQ: TA Counts: 12 Sol'n Prep: TK Old WQ: AR Time: 12:06
	2	8.13	8.09	7.4	8.6	336	25.0	0	0	0	0	0	0	0	0	0	0	Date: 7/22/18 New WQ: OD Counts: WC Sol'n Prep: BV Old WQ: AR Time: 15:30
	3	7.95	8.06	7.8	7.7	348	24.6	0	0	0	0	6	0	5	0	0	0	Date: 7/23/18 New WQ: BV Counts: 12 Sol'n Prep: EL Old WQ: BV Time: 18:00
	4	7.96	8.02	7.6	8.3	344	24.2	6	6	5	5	0	5	0	6	6	6	Date: 7/24/18 New WQ: CC Counts: CD Sol'n Prep: BV Old WQ: TF Time: 13:41
	5	7.91	7.95	7.8	7.4	347	25.7	10	8	8	10	10	9	10	9	9	8	Date: 7/25/18 New WQ: KM Counts: 26 Sol'n Prep: LE Old WQ: SE Time: 12:21
	6	8.00	7.89	7.6	7.2	344	23.4	11	9	11	9	9	8	10	10	10	9	Date: 7/26/18 New WQ: TK Counts: 10 Sol'n Prep: KB Old WQ: TK Time: 16:00
	7																	Date: New WQ: Counts: Sol'n Prep: Old WQ: Time:
	8																	Date: Old WQ: Counts: Time:
Total=								27	23	24	24	25	22	25	25	25	23	Mean Neonates/Female = 24.3
	Day	pH		D.O.		Cond. (µS/cm)	Temp (°C)	Survival / Reproduction										SAMPLE ID
		New	Old	New	Old			A	B	C	D	E	F	G	H	I	J	
100%	0	7.75		5.8		1092	25.0	0	0	0	0	0	0	0	0	0	0	50401
	1	7.77	8.39	7.7	8.4	1110	25.2	0	0	0	0	0	0	0	0	0	0	50401
	2	7.61	8.59	6.9	8.3	1073	25.1	0	0	0	0	0	0	0	0	0	0	50401
	3	7.59	8.50	7.8	7.6	1075	24.8	0	4	6	6	4	4	5	5	3	5	50401
	4	7.60	8.50	7.3	8.9	1099	24.5	6	0	0	0	11	0	0	0	7	7	50401
	5	7.89	8.45	8.0	7.5	1092	25.7	12	10	11	16	0	13	12	10	14	12	50401
	6	7.70	8.42	7.9	7.8	1112	23.5	14	12	16	17	15	15	19	16	13*	15*	50401
	7																	
	8																	
Total=								32	26	33	39	30	32	36	31	24	24	Mean Neonates/Female = 30.7

\* 4th brood

## **Appendix C**

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



# CETIS Summary Report

Report Date: 12 Jul-18 10:02 (p 1 of 2)  
 Test Code: 78973 | 13-9510-4137

Ceriodaphnia Survival and Reproduction Test				Pacific EcoRisk	
Batch ID:	19-5741-8039	Test Type:	Reproduction-Survival (7d)	Analyst:	Scott Ford
Start Date:	04 Jul-18 09:42	Protocol:	EPA-821-R-02-013 (2002)	Diluent:	Laboratory Water
Ending Date:	10 Jul-18 14:47	Species:	Ceriodaphnia dubia	Brine:	Not Applicable
Duration:	6d 5h	Source:	In-House Culture	Age:	1
Sample ID:	16-5231-3913	Code:	NaCl	Client:	Reference Toxicant
Sample Date:	04 Jul-18 09:42	Material:	Sodium chloride	Project:	29103
Receipt Date:	04 Jul-18 09:42	Source:	Reference Toxicant		
Sample Age:	n/a (24.1 °C)	Station:	In House		

Multiple Comparison Summary							
Analysis ID	Endpoint	Comparison Method	NOEL	LOEL	TOEL	TU	PMSD ✓
15-6045-2707	Reproduction	Steel Many-One Rank Sum Test	500	1000	707.1		14.7%
06-5281-0414	Survival	Fisher Exact/Bonferroni-Holm Test	2000	2500	2236		n/a

Point Estimate Summary							
Analysis ID	Endpoint	Point Estimate Method	Level	mg/L	95% LCL	95% UCL	TU ✓
19-4211-3444	Reproduction	Linear Interpolation (ICPIN)	IC5	298	103	612	
			IC10	553	206	736	
			IC15	719	309	862	
			IC20	885	412	1030	
			IC25	1040	852	1170	
			IC40	1440	1290	1550	
			IC50	1570	1490	1640	
10-4592-1027	Survival	Trimmed Spearman-Kärber	EC50	1980	1780	2200	

Reproduction Summary											
Conc-mg/L	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	LW	10	40.5	38.8	42.2	37	45	0.764	2.42	5.96%	0.00%
500		10	37.1	29	45.2	7	48	3.58	11.3	30.51%	8.40%
1000		10	31	29.3	32.7	28	36	0.76	2.4	7.75%	23.46%
1500		10	23.4	19.4	27.4	14	32	1.77	5.6	23.94%	42.22%
2000		10	2.3	0.139	4.46	0	9	0.955	3.02	131.32%	94.32%
2500		10	0.4	-0.505	1.3	0	4	0.4	1.26	316.23%	99.01%

Survival Summary											
Conc-mg/L	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	LW	10	1.000	1.000	1.000	1.000	1.000	0.000	0.000	0.00%	0.00%
500		10	0.800	0.498	1.000	0.000	1.000	0.133	0.422	52.70%	20.00%
1000		10	1.000	1.000	1.000	1.000	1.000	0.000	0.000	0.00%	0.00%
1500		10	1.000	1.000	1.000	1.000	1.000	0.000	0.000	0.00%	0.00%
2000		10	0.500	0.123	0.877	0.000	1.000	0.167	0.527	105.41%	50.00%
2500		10	0.100	0.000	0.326	0.000	1.000	0.100	0.316	316.23%	90.00%

# CETIS Summary Report

Report Date: 12 Jul-18 10:02 (p 2 of 2)  
 Test Code: 78973 | 13-9510-4137

Ceriodaphnia Survival and Reproduction Test											Pacific EcoRisk
Reproduction Detail											
Conc-mg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	LW	39	43	45	37	38	41	40	39	41	42
500		37	43	42	38	36	36	7	39	48	45
1000		31	36	33	31	30	29	28	30	29	33
1500		32	31	27	19	22	21	19	24	14	25
2000		4	2	0	0	5	0	0	3	9	0
2500		0	0	0	0	0	0	0	4	0	0
Survival Detail											
Conc-mg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	LW	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
500		1.000	1.000	1.000	0.000	1.000	1.000	0.000	1.000	1.000	1.000
1000		1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
1500		1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
2000		1.000	1.000	0.000	0.000	1.000	0.000	0.000	1.000	1.000	0.000
2500		0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.000	0.000	0.000
Survival Binomials											
Conc-mg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	LW	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	0/1	1/1	1/1	0/1	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		1/1	1/1	0/1	0/1	1/1	0/1	0/1	1/1	1/1	0/1
2500		0/1	0/1	0/1	0/1	0/1	0/1	0/1	1/1	0/1	0/1

## Ceriodaphnia Survival and Reproduction Test

Pacific EcoRisk

Test Type: Reproduction-Survival (7d)

Organism: Ceriodaphnia dubia (Water Flea)

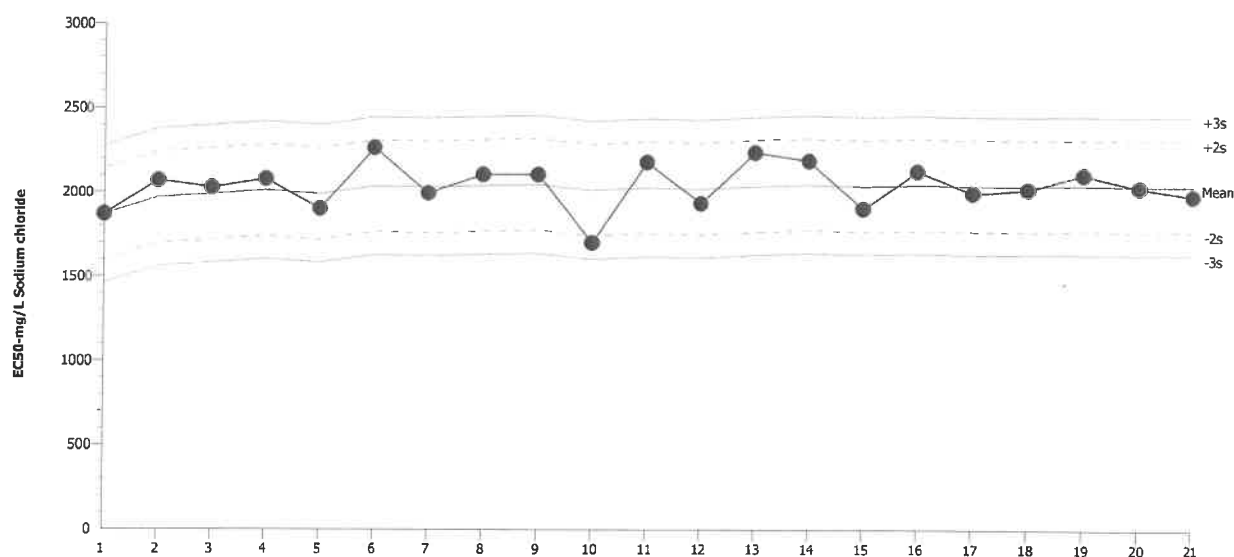
Material: Sodium chloride

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

Endpoint: Survival

Source: Reference Toxicant-REF

## Ceriodaphnia Survival and Reproduction Test



Mean: 2041

Count: 20

-2s Warning Limit: 1769

-3s Action Limit: 1632

Sigma: 136.3

CV: 6.68%

+2s Warning Limit: 2314

+3s Action Limit: 2450

## Quality Control Data

Point	Year	Month	Day	Time	QC Data	Delta	Sigma	Warning	Action	Test ID	Analysis ID
1	2018	Mar	27	15:40	1870	-170.6	-1.252			15-7709-0508	12-0438-3661
2		Apr	3	13:17	2071	30.13	0.2211			03-8853-1723	17-2561-1870
3			4	12:39	2028	-13.08	-0.09599			10-8174-0753	09-9063-1707
4			10	14:30	2079	38.37	0.2815			17-0581-3410	13-9709-2404
5			17	17:04	1900	-140.5	-1.031			05-5791-1322	03-7693-9332
6			24	14:05	2264	223	1.636			08-4120-4077	18-7420-0105
7		May	3	13:55	1993	-48.1	-0.3529			04-3475-5347	01-7717-3524
8			8	12:40	2105	64.43	0.4727			19-8220-6704	07-1221-2873
9			15	13:30	2105	64.43	0.4727			16-4268-6120	20-7219-2293
10			16	16:20	1699	-342	-2.509	(-)		20-5222-9935	20-8130-5363
11			22	10:35	2180	138.7	1.017			20-7596-9858	09-4058-4083
12			29	11:37	1932	-108.6	-0.7965			09-8749-9744	04-2627-6300
13		Jun	5	14:08	2236	195.1	1.431			04-5822-6675	02-2081-1071
14			7	11:31	2187	146.2	1.073			08-4916-1928	13-5513-7455
15			12	11:41	1901	-140	-1.027			14-4745-2011	18-9035-3977
16			13	14:25	2125	83.71	0.6142			19-2393-8522	07-5834-3927
17			19	14:34	1993	-48.1	-0.3529			03-7063-4652	04-3563-8944
18			26	16:28	2019	-22.1	-0.1621			09-6580-2317	07-9413-5393
19			27	14:43	2105	64.43	0.4727			03-9707-5652	20-4809-0982
20			28	13:15	2031	-9.527	-0.0699			16-4401-3277	19-4921-0162
21		Jul	4	9:42	1979	-62.09	-0.4556			13-9510-4137	10-4592-1027

## Ceriodaphnia Survival and Reproduction Test

Pacific EcoRisk

Test Type: Reproduction-Survival (7d)

Organism: Ceriodaphnia dubia (Water Flea)

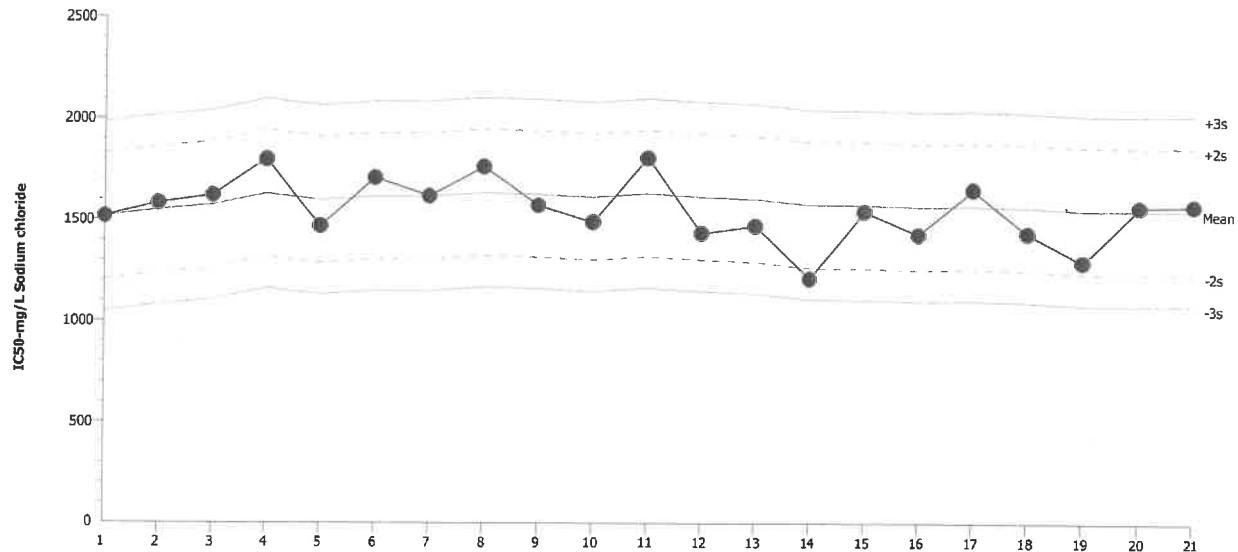
Material: Sodium chloride

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

Endpoint: Reproduction

Source: Reference Toxicant-REF

Ceriodaphnia Survival and Reproduction Test



Mean: 1549

Count: 20

-2s Warning Limit: 1238

-3s Action Limit: 1082

Sigma: 155.7

CV: 10.10%

+2s Warning Limit: 1861

+3s Action Limit: 2016

## Quality Control Data

Point	Year	Month	Day	Time	QC Data	Delta	Sigma	Warning	Action	Test ID	Analysis ID
1	2018	Mar	27	15:40	1517	-32.33	-0.2077			15-7709-0508	10-4058-6059
2		Apr	3	13:17	1584	34.88	0.224			03-8853-1723	02-8451-7867
3			4	12:39	1622	72.62	0.4664			10-8174-0753	02-8303-9537
4			10	14:30	1799	250.4	1.608			17-0581-3410	06-8235-6926
5			17	17:04	1469	-79.56	-0.511			05-5791-1322	01-2715-1650
6			24	14:05	1709	159.8	1.026			08-4120-4077	06-3652-7924
7		May	3	13:55	1618	68.98	0.443			04-3475-5347	06-7018-8986
8			8	12:40	1763	214.2	1.375			19-8220-6704	18-7671-4480
9			15	13:30	1572	22.84	0.1467			16-4268-6120	12-4013-1950
10			16	16:20	1489	-59.56	-0.3826			20-5222-9935	15-6036-6555
11			22	10:35	1807	258.3	1.659			20-7596-9858	13-3271-6615
12			29	11:37	1434	-115	-0.7386			09-8749-9744	08-7109-7854
13		Jun	5	14:08	1472	-77.04	-0.4948			04-5822-6675	13-8948-8302
14			7	11:31	1212	-337.3	-2.166	(-)		08-4916-1928	00-1438-9970
15			12	11:41	1542	-6.983	-0.04485			14-4745-2011	12-8648-9916
16			13	14:25	1428	-121	-0.7774			19-2393-8522	21-4567-7885
17			19	14:34	1652	103.5	0.6647			03-7063-4652	11-3261-1315
18			26	16:28	1434	-114.5	-0.7356			09-6580-2317	16-2552-7203
19			27	14:43	1293	-255.5	-1.641			03-9707-5652	10-7898-6671
20			28	13:15	1567	17.9	0.115			16-4401-3277	16-4152-8097
21		Jul	4	9:42	1575	25.64	0.1647			13-9510-4137	19-4211-3444

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

Client: \_\_\_\_\_ Reference Toxicant: \_\_\_\_\_ Material: Sodium Chloride Test Date: 7/4/18  
 Project #: 29103 Test ID: 78973 Randomization: 10.7.3 Control Water: Mod EPAMH

	Day	pH		D.O.		Cond. (µS/cm)		Temp (°C)	Survival / Reproduction										SIGN-OFF	
		New	Old	New	Old	New	Old		A	B	C	D	E	F	G	H	I	J		
Lab Water Control	0	7.69		8.0		365		24.1	0	0	0	0	0	0	0	0	0	0	Date: <u>7/4/18</u> New WQ: <u>NB</u> Test Init.: <u>CR</u>	Time: <u>0942</u>
	1	7.90	7.90	9.0	7.1	381	364	25.0	0	0	0	0	0	0	0	0	0	0	Date: <u>7/5/18</u> New WQ: <u>NB</u> Counts: <u>KL</u>	Time: <u>0955</u>
	2	8.00	8.24	9.7	8.2	346	368	25.5	0	0	0	0	0	0	0	0	0	0	Date: <u>7/6/18</u> New WQ: <u>12</u> Counts: <u>MS</u>	Time: <u>0941</u>
	3	8.04	8.07	7.8	7.4	345	374	24.4	8	7	9	8	6	8	7	7	7	7	Date: <u>7/7/18</u> New WQ: <u>MS</u> Counts: <u>26</u>	Time: <u>1307</u>
	4	8.23	7.91	8.3	7.0	342	342	24.6	0	12	14	13	13	13	15	12	14	13	Date: <u>7/8/18</u> New WQ: <u>KL</u> Counts: <u>TK</u>	Time: <u>1255</u>
	5	8.16	7.96	7.9	7.4	346	374	24.6	13	0	0	0	0	0	0	0	0	0	Date: <u>7/9/18</u> New WQ: <u>KL</u> Counts: <u>u</u>	Time: <u>1309</u>
	6	—	7.90	—	7.2	—	362	24.5	18	24	22	14	19	20	18	20	20	22	Date: <u>7/9/18</u> New WQ: <u>—</u> Counts: <u>MS</u>	Time: <u>1447</u>
	7																		Date: <u>—</u> New WQ: <u>—</u> Counts: <u>—</u>	Time: <u>—</u>
	8																		Date: <u>—</u> Old WQ: <u>—</u> Counts: <u>—</u>	Time: <u>—</u>
Total=									89	43	45	37	38	41	40	39	41	42	Mean Neonates/Female = <u>40.5</u>	
500 mg/L	Day	pH		D.O.		Cond. (µS/cm)		Temp (°C)	Survival / Reproduction										RT BATCH NUMBER	
		New	Old	New	Old	New	Old		A	B	C	D	E	F	G	H	I	J		
	0	7.90		7.9		1296		24.7	0	0	0	0	0	0	0	0	0	0	279	
	1	7.92	7.90	8.9	7.3	1307	1346	24.7	0	0	0	0	0	0	0	0	0	0	279	
	2	7.97	8.04	8.9	8.1	1284	1380	25.4	0	0	0	0	0	0	0	0	0	0	279	
	3	8.04	8.08	8.1	7.5	1309	1403	24.4	5	7	6	7	7	6	7	8	7	8	279	
	4	8.10	7.91	8.4	6.9	1293	1407	24.5	14	13	0	14	12	12	10	13	0	0	279	
	5	8.11	8.01	8.1	7.5	1327	1459	24.7	0	0	14	17	0	0	—	0	17	16	279	
	6	—	7.90	—	7.1	—	1403	24.5	18	23	22	10	17	18	—	18	24	21	—	
	7																			
	8																			
Total=									37	43	42	38	34	36	17	39	48	45	Mean Neonates/Female = <u>37.1</u>	

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

Client: \_\_\_\_\_ Reference Toxicant: \_\_\_\_\_ Material: Sodium Chloride Test Date: 7/4/18  
 Project #: 29103 Test ID: 78973 Randomization: 10.7.3 Control Water: Mod EPAMH

	Day	pH		D.O.		Cond. (µS/cm)		Temp (°C)	Survival / Reproduction										SIGN-OFF
		New	Old	New	Old	New	Old		A	B	C	D	E	F	G	H	I	J	
1000 mg/L	0	7.95		8.2		2258		24.5	0	0	0	0	0	0	0	0	0	0	
	1	7.92	7.94	9.0	7.0	2271	2348	24.3	0	0	0	0	0	0	0	0	0	0	
	2	7.96	8.00	9.0	8.1	2195	2406	25.3	0	0	0	0	0	0	0	0	0	0	
	3	8.01	8.09	8.2	7.6	2242	2339	24.3	7	6	7	6	7	5	5	8	8	5	
	4	8.06	7.92	8.4	7.1	2204	2460	24.5	0	12	0	11	8	10	9	10	9	0	
	5	8.12	7.97	8.4	7.6	2229	2447	24.9	10	18	11	0	0	0	0	0	0	12	
	6	—	7.90	—	7.1	—	2358	25.3	14	0	15	14	15	14	14	12	12	16	
	7																		
	8																		
Total=									31	36	33	31	80	29	28	30	29	33	Mean Neonates/Female = 31.0
1500 mg/L	0	7.97		8.5		3181		24.2	0	0	0	0	0	0	0	0	0	0	
	1	7.92	7.95	9.1	7.4	3165	3361	24.6	0	0	0	0	0	0	0	0	0	0	
	2	7.95	7.98	9.1	8.0	3096	3358	25.3	0	0	0	0	0	0	0	0	0	0	
	3	7.97	8.08	8.4	7.7	3157	3478	24.3	4	6	6	2	6	4	6	0	0	5	
	4	8.04	7.88	8.6	7.2	3131	3358	24.4	0	0	10	0	8	0	0	3	0	0	
	5	8.05	7.97	8.6	7.6	3121	3474	24.9	12	9	0	7	0	6	5	9	5	8	
	6	—	7.88	—	7.1	—	3358	24.3	16	16	11	10	8	11	8	12	9	12	
	7																		
	8																		
Total=									32	31	27	19	22	21	19	24	14	25	Mean Neonates/Female = 23.4

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

Client: \_\_\_\_\_ Reference Toxicant: \_\_\_\_\_ Material: Sodium Chloride Test Date: 7/4/18  
 Project #: 29103 Test ID: 78973 Randomization: 10.7.3 Control Water: Mod EPAMH

	Day	pH		D.O.		Cond. (µS/cm)		Temp (°C)	Survival / Reproduction										SIGN-OFF
		New	Old	New	Old	New	Old		A	B	C	D	E	F	G	H	I	J	
2000 mg/L	0	7.96		8.8		4123		25.1	0	0	0	0	0	0	0	0	0	0	
	1	7.91	7.93	9.3	7.6	4670	4259	24.3	0	0	0	0	0	0	0	0	0	0	
	2	7.94	8.01	9.2	8.1	4006	4231	25.3	0	0	*/0	0	0	*/0	*/0	0	0	0	
	3	7.95	8.06	8.7	7.6	4000	4393	24.9	0	0	-	0	0	-	-	0	0	*/0	
	4	8.02	7.84	8.7	7.2	3981	4274	24.5	0	0	-	0	0	-	-	0	0	-	
	5	8.02	7.96	9.0	7.6	4030	4280	24.7	4	2	-	*/0	1	-	-	0	4	-	
	6	-	7.87	-	7.1	-	4263	24.9	0	0	-	-	4	-	-	3	5	-	
	7																		
	8																		
Total=									4	2	*/0	*/0	5	*/0	*/0	3	9	*/0	Mean Neonates/Female = 2.3
2500 mg/L	0	7.94		8.9		4948		24.7	0	0	0	0	0	0	0	0	0	0	
	1	7.90	7.91	9.5	7.4	4995	5131	24.8	0	0	0	0	0	0	0	0	0	0	
	2	7.93	8.01	9.3	8.1	4878	5165	25.6	*/0	*/0	*/0	*/0	*/0	*/0	*/0	0	*/0	*/0	
	3	7.93	8.05	8.8	7.7	4945	4893	24.4	-	-	-	-	-	-	-	0	-	-	
	4	7.94	7.93	9.1	7.1	4925	NM	24.5	-	-	-	-	-	-	-	0	-	-	
	5	7.98	7.94	9.3	7.5	4950	5165	24.5	-	-	-	-	-	-	-	1	-	-	
	6	-	7.89	-	7.1	-	5175	25.2	-	-	-	-	-	-	-	3	-	-	
	7																		
	8																		
Total=									*/0	*/0	*/0	*/0	*/0	*/0	*/0	4	*/0	*/0	Mean Neonates/Female = 0.4