ROBERTSON - BRYAN, INC.
Solutions for Progress

9888 Kent Street • Elk Grove CA 95624
Phone: (916) 714-1801 • Fax: (916) 714-1804

TECHNICAL MEMORANDUM

Date:	October 30, 2015
Prepared for:	Greg Knapp (Lehigh), Nicole Granquist (Downey-Brand, LLC)
Prepared by:	Paul Bedore, M.S.
Reviewed by:	Michael Bryan, Ph.D.; Ben Giudice, Ph.D., P.E.
Project:	Lehigh Southwest Cement Company *Ceriodaphnia dubia* Toxicity Reduction Evaluation
Subject:	3rd Quarter 2015 Chronic Toxicity Monitoring Results

Overview

The purpose of this memorandum is to summarize and enclose the 3rd Quarter ("Q3") 2015 chronic toxicity monitoring results for Lehigh Southwest Cement Company ("Lehigh") conducted in accordance with the Regional Water Quality Control Board, San Francisco Bay Region's ("Regional Water Board"), June 27, 2013 amended Water Code section 13267 Order, Order No. R2-2013-1005-A1, ("Order"). Consistent with modification of the Order's monitoring requirements (T. Yin, personal communication, to P. Bedore on September 9, 2014), testing of Pond 9 water was conducted because the pond is to be monitored twice yearly – once during the dry season and once during the wet season.

Chronic WET testing in the 3rd quarter of 2015 was conducted on samples from Pond 4A, Pond 9, and Pond 14. Discharge from Pond 4A occurred for a very limited period in mid-September 2015, necessitating the sampling of Pond 4A. The test outcome for the Pond 4A samples is discussed below. For Pond 9, the Q3 2015 sampling corresponded to the required dry-season monitoring event, and *C. dubia* testing indicated < 1.0 TUc for the survival and reproduction end-points. Thus, no follow-up actions were necessary for Pond 9. For Pond 14, there was neither documented inflow nor any indication of discharge from Pond 14 during Q3 2015, but samples from Pond 14 were collected and tested as a precautionary measure in case a discharge occurred sometime in the quarter. However, low dissolved oxygen (DO) levels in some of the test treatments invalidated the result of the Pond 14 bioassay test (see Attachment 1). Because the weight of evidence suggests that that Pond 14 did not discharge during Q3 2015, and thus sampling and testing of a Pond 14 sample was likely unnecessary, bioassay testing of a fresh Pond 14 sample was not scheduled to make up for the invalidated test result. Samples were not collected from Pond 13 because the pond had not discharged during Q3 2015.

The full laboratory reports for bioassay and analytical testing of the Pond 4A, Pond 9, and Pond 14 samples can be found in Attachment 1 of this memorandum.

Discussion of Pond 4A Toxicity

Chronic toxicity testing with *C. dubia* at Pond 4A indicated 1.8 TUc for the survival endpoint and 3.5 TUc for the reproduction endpoint. For the reproduction endpoint, the dilution series testing showed that the test treatments consisting of 100% and 50% Pond 4A water showed high percent inhibition relative to the lab control (97% and 83%, respectively).

Consistent with Lehigh's ongoing TRE for *C. dubia* in Pond 4A, samples used in corresponding bioassay tests were analyzed for trace metal constituents. As previously reported in updates to Lehigh's TRE (*TRE Progress Update and Future TRE Activities*, memorandum dated September 30, 2013), nickel is suspected to be the principal contributor to *C. dubia* toxicity in Ponds 4A, 13, and 14, and has been sourced to quarry water discharged into and from Pond 4A. The update to Lehigh's TRE stated that when survival and reproduction TUc is ≤ 2, no further actions are necessary. Likewise, when survival and reproduction TUc is > 2 and the nickel concentration is ≥ 5.7 µg/L, the cause of toxicity is presumed to be related to nickel, and no further actions are necessary. The 5.7 µg/L threshold is the empirical reproduction IC25 derived for *C. dubia* in buffered synthetic simulated site water. The nickel concentration in a composite of the three Pond 4A renewal samples was 7 µg/L (i.e., the 100% Pond 4A water), greater than the 5.7 µg/L threshold. Thus, based on the protocols set forth in the TRE update, no further action is necessary on the sample. However, the nickel level in the 50% test treatment (half that contained in the 100% treatment or 3.5 µg/L), was below the threshold, and the 50% treatment exhibited 83% inhibition. Note that a hardness blank prepared to 790 mg/L as $CaCO_3$ (the approximate hardness of Pond 9, which was tested concurrently) exhibited 50% survival and 96% reproduction inhibition. While the hardness in Pond 4A was lower than usual at 356-494 mg/L as $CaCO_3$, hardness effects on toxicity cannot be ruled out.

Notwithstanding the influence of nickel and hardness described above, water discharged from Pond 4A in September 2015 was different than previous events in which toxicity was observed. In September 2015, Pond 4A water was not composed of quarry water but rather of water transferred from Pond 11, the holding pond for the facility's reclaimed water system. Lehigh identified that water transfers from Pond 11 to Pond 4A were the only cause of discharge from Pond 4A to Permanente Creek during the 3rd quarter. During the Q3 2015, transfers from Pond 11 to Pond 4A occurred for a limited duration the week prior to September 14. During the week toxicity samples were collected, water from Pond 11 was discharged into and thus out of Pond 4A from the morning of September 13 (Sunday) through 4 p.m. on September 16 (Wednesday), and for approximately 2 hours on September 17 (Thursday). Based on the information provided to us, no other water transfers from Pond 11 occurred in Q3 2015. Additionally, the limited volume of water discharged from Pond 4A in September 2014 was insufficient to cause surface water flow to the nearest downstream receiving water station, Pond 13 (the stream bed approximately 200 yards upstream of Pond 13 was dry).

The reclaimed water system collects various sources of water from the area around the facility's cement plant, including storm water runoff, groundwater seepage, water used in the truck wash, and potable water for reuse. The facility's NPDES permit allows Pond 11 water to be discharged from Pond 4A without undergoing treatment via the facility's Interim Treatment System (ITS). Pond 11 water must meet TSS limitations and is thus filtered. It is our understanding that water from Pond 11 is typically discharged to Pond 4A when there is a need to remove excess storm water runoff that has accumulated in the reclaimed water system. Lehigh discharges from the reclaimed water system on a very limited basis during the dry season, if at all, because the accumulation of reclaimed water during dry weather is minimal. However, during the months of July – September 2015, potable water leaks at the facility caused excess water to collect in the reclaimed water system and resulted in the need to transfer water to Pond 4A by September 2015. Lehigh has already implemented corrective actions to fix the potable water leaks. Thus, the conditions that necessitated discharge of reclaimed water to Pond 4A in September 2015 have been addressed and corrected, and are not expected to recur.

Toxicity sampling has not previously identified the reclaimed water system as a source of toxicity. Previous to September 2014, Pond 11 discharged directly into Pond 9, and toxicity monitoring of Pond 9 up to September 2014 triggered accelerated monitoring on one occasion, but accelerated monitoring was exited without triggering a TRE. In September and October 2014, the reclaimed water system discharged through Pond 4A for 18 days without additional treatment of this water via the ITS, during which reclaimed water was the only water discharged from Pond 4A. Pond 4A samples collected during September 2014 were not toxic toward *C. dubia* (< 1 TUc). From November 2014 – June 2015, reclaimed water was combined with quarry water prior to discharge to Pond 4A. Monitoring of Pond 4A since November 2014 has indicated that nickel levels are sufficiently high (> 20 µg/L) to explain observed toxicity in Pond 4A samples. Thus, the addition of potable water to the flow regime cannot be excluded as a possible basis for the sample results this quarter.

It is our understanding that transfers of reclaimed water directly to Pond 4A have not occurred since September 17, 2015, and that the treatment of quarry water with the ITS was reinitiated in early October 2015. In the long-term, all discharges from the Permanente Facility, including from the reclaimed water system, to Permanente Creek will be required to be treated with the full-scale unit currently under construction.

Future TRE Actions Related to Pond 4A

Reclaimed water typically composes a minor fraction of the water discharged from Pond 4A relative to quarry water, and because discharges of reclaimed water are caused by runoff from storm events, they are unplanned and episodic in nature. Further, transfers of reclaimed water have ceased in the near term because corrective actions have addressed the potable water leaks that necessitated discharging reclaimed water to Pond 4A in September 2015. Discharges from Pond 4A will be dominated by quarry dewatering for the foreseeable future. Because of this, TRE toxicity monitoring of Pond 4A will continue at a quarterly frequency, in accordance with the TRE update memo. However, to continue the evaluation of sources of toxicity to Pond 4A, efforts will be taken to specifically target toxicity monitoring of a discharge scenario

representative of conditions that occurred in September 2015, to ensure appropriate responsive action. Sufficient lead time is necessary for the bioassay laboratory to prepare for *C. dubia* toxicity testing, which can be up to two weeks. Future TRE actions to address the reclaimed water system as a source of toxicity will be predicated on the degree to which untreated discharges of reclaimed water, that is augmented with fresh water, dominate flow and cause additional toxicity to water in Pond 4A besides that already identified (i.e., from nickel, vanadium, and ion balance).

ATTACHMENT 1

Laboratory Reports

Paul Bedore
Robertson-Bryan, Inc.
9888 Kent Street
Elk Grove, CA 95624

October 13, 2015

Paul:

I have enclosed our report "Evaluation of the Chronic Toxicity of Lehigh Permanente Cement Plant Site Water Samples" for the samples collected September 14, 16, and 18, 2015. A summary of the results of this testing follows (note: TUc = 100/EC_{25} or 100/IC_{25}):

Chronic Effects of Lehigh Pond 4A Site Water on *Ceriodaphnia dubia*
The survival EC_{25} was 54.2% site water, resulting in 1.8 TUc. The reproduction IC_{25} was 28.5% site water, resulting in 3.5 TUc.

Ceriodaphnia dubia Test Endpoint =	Survival	Reproduction
Survival EC_{25} or Reproduction IC_{25} =	54.2% site water	28.5% site water
TUc =	1.8	3.5

Chronic Effects of Lehigh Pond 9 Site Water on *Ceriodaphnia dubia*
The survival EC_{25} was >100% site water, resulting in <1.0 TUc. The reproduction IC_{25} was >100% site water, resulting in <1.0 TUc.

Ceriodaphnia dubia Test Endpoint =	Survival	Reproduction
Survival EC_{25} or Reproduction IC_{25} =	>100% site water	>100% site water
TUc =	<1.0	<1.0

Chronic Effects of Lehigh Pond 14 Site Water on *Ceriodaphnia dubia*
The survival EC_{25} was >100% site water, resulting in <1.0 TUc. The reproduction IC_{25} was 30.7% site water, resulting in 3.3 TUc. However, the dissolved oxygen in multiple test treatments fell below 4.0 mg/L on Day 4 of testing even though the sample was aerated prior to use. Accordingly, we cannot be sure that the reduced dissolved oxygen did not have a deleterious effect on *C. dubia* reproduction for this sample. Therefore, it is our best professional judgment that the test results for the Pond 14 sample should not be used for regulatory compliance purposes.

Ceriodaphnia dubia Test Endpoint =	Survival	Reproduction
Survival EC_{25} or Reproduction IC_{25} =	>100% site water	30.7% site water
TUc =	<1.0	3.3

Please note that the NPDES Compliance Summary is attached to this cover letter; the Pond 14 table has not been updated to include the September 2015 testing due to the low dissolved oxygen that occurred during testing.

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

Regards,

Stephen L. Clark
Vice President & Special Projects Director

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 24624.

NPDES Compliance Summary

Lehigh Southwest Cement Company
Permanente Facility
Chronic Toxicity for SFBRWQCB Reporting

Testing Facility: Pacific EcoRisk
2250 Cordelia Rd.
Fairfield, CA 94534

Lehigh Pond 4A	Chronic Toxicity Test Species:	*Ceriodaphnia dubia*
	Test Protocol:	EPA-821-R-02-013
Sampling Dates: September 14, 16, and 18, 2015	Dilution Series:	6.25, 12.5, 25, 50, 100%
Test Dates: September 15-21, 2015	Test Endpoint:	Survival, Reproduction

Current Pond 4A Site Water Test Data.

Site Water Concentration	% Survival	Mean Reproduction (# neonates /female)
Hardness Blank	**50***	1.1
Lab Control	100	28.1
6.25%	100	23.8
12.5%	90	24.9
25%	100	23.7
50%	70	**4.7***
100%	60	**0.9***

Current Pond 4A Site Water Test Endpoints.

Endpoint	NOEC	EC_{15}-IC_{15}	EC_{25}-IC_{25}	EC_{40}-IC_{40}	EC_{50}-IC_{50}	TUc	TUc Method
Survival	100%	33.3%	54.2%	95.7%	>100%	1.8	100/EC_{25}
Reproduction	25%	21.4%	28.5%	34.0%	37.7%	3.5	100/IC_{25}

Lab Control Survival (after ~96 hrs)	100%
100% Site Water Survival (after ~96 hrs)	80%

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

Summary of 11 Test Window for *Ceriodaphnia dubia*: Pond 4A

Test #	Sample Dates	NOEC (%)	EC_{25} or IC_{25}	TUc	96-hr Survival	Comments
1	Mar 25, 27, & 29, 2013	<6.25% (repro)	6.1% (repro)	16.5	10%	
2	May 6, 8, & 10, 2013	<6.25% (repro)	2.9% (repro)	34.7	80%	
3	Dec 9, 11, & 13, 2013	100% (repro)	>100% (repro)	<1	100%	
4	Mar 10, 12, & 14, 2014	25% (repro)	4.81% (repro)	20.8	0%	
5	Apr 7, 9, & 11, 2014	6.25% (repro)	8.4% (repro)	11.9	0%	
6	Sept 22, 24, & 26, 2014	50% (repro)	>100% (repro)	<1	100%	
7	Nov 10, 12, & 14, 2014	100% (repro)	>100% (repro)	<1	100%	
8	Jan 19, 21, & 23, 2015	25% (repro)	40.1% (repro)	2.5	100%	
9	Apr 13, 15, & 17, 2015	50% (repro)	64.2% (repro)	1.6	100%	
10	Sept 14, 16, & 18, 2015	25% (repro)	28.5% (repro)	3.5	80%	
11						

NPDES Compliance Summary

Lehigh Southwest Cement Company
Permanente Facility
Chronic Toxicity for SFBRWQCB Reporting

Testing Facility: Pacific EcoRisk
2250 Cordelia Rd.
Fairfield, CA 94534

Lehigh Pond 9	Chronic Toxicity Test Species:	*Ceriodaphnia dubia*
	Test Protocol:	EPA-821-R-02-013
Sampling Dates: September 14, 16, and 18, 2015	Dilution Series:	6.25, 12.5, 25, 50, 100%
Test Dates: September 15-21, 2015	Test Endpoint:	Survival, Reproduction

Current Pond 9 Site Water Test Data.

Site Water Concentration	% Survival	Mean Reproduction (# neonates /female)
Hardness Blank	**50***	1.1
Lab Control	100	31.5
6.25%	80	27.2
12.5%	100	30.0
25%	90	23.2
50%	100	27.8
100%	100	**25.8***

Current Pond 9 Site Water Test Endpoints.

Endpoint	NOEC	EC_{15}-IC_{15}	EC_{25}-IC_{25}	EC_{40}-IC_{40}	EC_{50}-IC_{50}	TUc	TUc Method
Survival	100%	>100%	>100%	>100%	>100%	<1	100/EC_{25}
Reproduction	50%	20.1%	>100%	>100%	>100%	<1	100/IC_{25}

Lab Control Survival (after ~96 hrs)	100%
100% Site Water Survival (after ~96 hrs)	100%

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

Summary of 11 Test Window for *Ceriodaphnia dubia*: Pond 9

Test #	Sample Dates	NOEC (%)	EC_{25} or IC_{25}	TUc	96-hr Survival	Comments
1	Mar 25, 27, & 29, 2013	100% (repro)	>100% (repro)	<1	100%	
2	Jun 10, 12, & 14, 2013	50% (repro)	>100% (repro)	<1	100%	
3	Sept 9, 11, & 13, 2013	50% (repro)	86.7% (repro)	1.2	90%	
4	Dec 9, 11, & 13, 2013	50% (repro)	85.6% (repro)	1.2	100%	
5	Feb 3, 5, & 7, 2014	100% (repro)	>100% (repro)	<1	100%	
6	Mar 14 & 18, 2014	100% (repro)	>100% (repro)	<1	100%	
7	Apr 7, 9, & 11, 2014	100% (repro)	89.2% (repro)	1.1	90%	
8	Sept 22, 24, & 26, 2014	100% (repro)	>100% (repro)	<1	100%	
9	Jan 19, 21, & 23, 2015	50% (repro)	>100% (repro)	<1	100%	
10	Sept 14, 16, & 18, 2015	50% (repro)	>100% (repro)	<1	100%	
11						

Evaluation of the Chronic Toxicity of Lehigh Permanente Cement Plant Site Water Samples

Samples collected September 14, 16, and 18, 2015

Prepared For

Robertson-Bryan, Inc.
9888 Kent Street
Elk Grove, CA 95624

Prepared By

Pacific EcoRisk, Inc.
2250 Cordelia Rd.
Fairfield, CA 94534

October 2015

PACIFIC ECORISK
ENVIRONMENTAL CONSULTING & TESTING

Evaluation of the Chronic Toxicity of Lehigh Permanente Cement Plant Site Water Samples

Samples collected September 14, 16, and 18, 2015

Table of Contents

Page

1. INTRODUCTION 1
2. CHRONIC TOXICITY TEST PROCEDURES 1
   2.1 Sample Receipt and Handling 1
   2.2 Survival and Reproduction Toxicity Testing with *Ceriodaphnia dubia* 2
      2.2.1 Reference Toxicant Testing of the *Ceriodaphnia dubia* 3
3. RESULTS 4
   3.1 Effects of Lehigh Pond 4A Site Water on *Ceriodaphnia dubia* 4
   3.2 Effects of Lehigh Pond 9 Site Water on *Ceriodaphnia dubia* 5
   3.3 Effects of Lehigh Pond 14 Site Water on *Ceriodaphnia dubia* 6
4. AQUATIC TOXICITY DATA QUALITY CONTROL 7
5. SUMMARY AND CONCLUSIONS 9

Appendices

Appendix A Chain-of-Custody Records for the Collection and Delivery of the Lehigh Samples

Appendix B Test Data and Summary of Statistics for the Evaluation of the Chronic Toxicity of Lehigh Pond 4A Site Water to *Ceriodaphnia dubia*

Appendix C Test Data and Summary of Statistics for the Evaluation of the Chronic Toxicity of Lehigh Pond 9 Site Water to *Ceriodaphnia dubia*

Appendix D Test Data and Summary of Statistics for the Evaluation of the Chronic Toxicity of Lehigh Pond 14 Site Water to *Ceriodaphnia dubia*

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

1. INTRODUCTION

Under contract to the Robertson-Bryan, Pacific EcoRisk (PER) conducted an evaluation of the chronic toxicity of Lehigh Southwest Cement Company Permanente Facility (Lehigh) water samples from three sites, designated Pond 4A, Pond 9, and Pond 14. This evaluation consisted of performing the US EPA short-term chronic 3-brood (6-8 day) survival and reproduction test with the crustacean *Ceriodaphnia dubia*. These toxicity tests were conducted on samples collected on September 14, 16, and 18, 2015. In order to assess the sensitivity of the organisms to chemical stress, a reference toxicant test was performed. This report describes the performance and results of these tests.

2. CHRONIC TOXICITY TEST PROCEDURES

The method used in conducting the chronic toxicity tests followed the guidance established by the following EPA manual:

- "Short-term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms, Fourth Edition" (EPA-821-R-02-013).

2.1 Sample Receipt and Handling

On September 14, 16, and 18, three Lehigh water samples (designated Pond 4A, Pond 9, and Pond 14) were collected into appropriately cleaned sample containers. These samples were transported on the day of collection, on ice and under chain-of-custody, to the PER testing laboratory in Fairfield, CA. Upon receipt at the testing laboratory, aliquots of each water sample were collected for analysis of initial water quality characteristics (Table 1), with the remainder of each sample being stored at 0-6°C except when being used to prepare test solutions.

The chain-of-custody records for the collection and delivery of the samples are presented in Appendix A.

Table 1. Initial water quality characteristics of the Lehigh site water samples.

Sample ID	Sample Receipt Date	Temp. (˚C)	pH	D.O. (mg/L)	Alkalinity (mg/L)	Hardness (mg/L)	Conductivity (μS/cm)	Total Ammonia (mg/L N)
Pond 4A	9/14/15	1.9*	7.45	6.0	108	494	1257	<1.0
	9/16/15	6.5*	8.27	7.6	114	402	1287	<1.0
	9/18/15	2.5*	8.50	7.2	104	356	1290	<1.0
Pond 9	9/14/15	2.9*	7.47	7.5	251	780	1517	<1.0
	9/16/15	2.8*	7.70	9.3	269	744	1547	<1.0
	9/18/15	2.1*	7.59	6.7	254	658	1537	<1.0
Pond 14	9/14/15	6.2*	7.55	4.9	276	712	1589	<1.0
	9/16/15	5.5*	7.65	5.6	306	686	1647	<1.0
	9/18/15	11.5*	7.44	3.1	293	726	1629	<1.0

* This sample was transported and delivered on ice the day of sample collection.

2.2 Survival and Reproduction Toxicity Testing with *Ceriodaphnia dubia*

The short-term chronic *C. dubia* test consists of exposing individual females to a series of sample dilutions for the length of time it takes for the 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 testing are described below.

The Lab Water Control medium for this testing was modified EPA synthetic moderately hard water amended with 5% ambient water (collected from a clean reference site and 0.2 μm filtered). The Lab Water Control medium and the samples were used to prepare test solutions at test treatment concentrations of 6.25%, 12.5%, 25%, 50%, and 100% sample for each sample. At the request of the client, an additional Hardness Blank (consisting Type 1 water [reverse-osmosis, de-ionized water] amended with reagent-grade chemicals to a nominal hardness of 772 mg/L) was prepared and tested; prior to use, the Hardness Blank was filtered to remove any insoluble particulate material. For each test treatment, the test solution was amended with the alga *Selenastrum capricornutum* and Yeast-Cerophyll®-Trout (YCT) food to provide 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 these tests.

There were 10 replicates for each test treatment, each replicate consisting of 15 mL of test solution in a 30-mL plastic cup. These "3-brood" tests were initiated by allocating one neonate (<24 hrs old, and within 8 hrs 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 tests, 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 ≥60% of the *C. dubia* in a Lab Water Control treatment had produced their third brood of offspring, the corresponding site water test was terminated. The resulting survival and reproduction (number of offspring) data were analyzed to evaluate any impairment caused by the samples; all statistical analyses were performed using the CETIS® statistical software (TidePool Scientific, McKinleyville, CA).

2.2.1 Reference Toxicant Testing of the *Ceriodaphnia dubia*

In order to assess the sensitivity of the test organisms to toxic stress, a reference toxicant test was performed concurrently with the site water tests. The reference toxicant test was performed similarly to the site water tests 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 dose-response point estimates (e.g., EC_{50}); all statistical analyses were made using the CETIS® software. These response endpoints were then compared to the 'typical response' ranges established by the mean ± 2 SD of the point estimates generated by the most recent previous reference toxicant tests performed by this lab.

3. RESULTS

3.1 Effects of Lehigh Pond 4A Site Water on *Ceriodaphnia dubia*

The results of this test are summarized below in Table 2. The survival EC_{25} was 54.2% site water, resulting in 1.8 survival TUc (where TUc = $100/EC_{25}$). The reproduction IC_{25} was 28.5% site water, resulting in 3.5 reproduction TUc (where TUc = $100/IC_{25}$).

The test data and summary of statistical analyses for this test are presented in Appendix B.

Table 2. Effects of Lehigh Pond 4A site water on *Ceriodaphnia dubia* survival and reproduction.

Site Water Treatment	Mean % Survival	Mean Reproduction (# neonates /female)
Hardness Blank	**50***	1.1
Lab Water Control	100	28.1
6.25%	100	23.8
12.5%	90	24.9
25%	100	23.7
50%	70	**4.7***
100%	60	**0.9***
Summary of Key Statistics		
NOEC =	100% site water	25% site water
TUc (TUc = 100/NOEC) =	1.0	4.0
Survival EC_{25} or Reproduction IC_{25} =	54.2% site water	28.5% site water
TUc (TUc = $100/EC_{25}$ or $100/IC_{25}$) =	1.8	3.5
Survival EC_{50} or Reproduction IC_{50} =	>100% site water [a]	37.7% site water
TUc (TUc = $100/EC_{50}$ or $100/IC_{50}$) =	<1.0	2.7

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

a - Due to the absence of significant mortalities, the EC point estimates could not be calculated, but can be determined by inspection to be >100% site water.

3.2 Effects of Lehigh Pond 9 Site Water on *Ceriodaphnia dubia*

The results of this test are summarized below in Table 3. The survival EC_{25} was >100% site water, resulting in <1.0 survival TUc (where TUc = 100/EC_{25}). The reproduction IC_{25} was >100%, resulting in <1.0 reproduction TUc (where TUc = 100/IC_{25}).

The test data and summary of statistical analyses for this test are presented in Appendix C.

Table 3. Effects of Lehigh Pond 9 site water on *Ceriodaphnia dubia* survival and reproduction.

Site Water Treatment	Mean % Survival	Mean Reproduction (# neonates /female)
Hardness Blank	**50***	1.1
Lab Control	100	31.5
6.25%	80	27.2
12.5%	100	30.0
25%	90	23.2
50%	100	27.8
100%	100	**25.8***
Summary of Key Statistics		
NOEC =	100% site water	50% site water
TUc (TUc = 100/NOEC) =	1.0	2.0
Survival EC_{25} or Reproduction IC_{25} =	>100% site water [a]	>100% site water
TUc (TUc = 100/EC_{25} or 100/IC_{25}) =	<1.0	<1.0
Survival EC_{50} or Reproduction IC_{50} =	>100% site water [a]	>100% site water
TUc (TUc = 100/EC_{50} or 100/IC_{50}) =	<1.0	<1.0

* - The response at this test treatment was significantly less than the Lab Control treatment response ($p < 0.05$).
a - Due to the absence of significant mortalities, the EC point estimates could not be calculated, but can be determined by inspection to be >100% site water.

3.3 Effects of Lehigh Pond 14 Site Water on *Ceriodaphnia dubia*

The results of this test are summarized below in Table 4. The survival EC_{25} was >100% site water, resulting in <1.0 survival TUc (where TUc = 100/EC_{25}). The reproduction IC_{25} was 30.7%, resulting in 3.3 reproduction TUc (where TUc = 100/IC_{25}). However, the dissolved oxygen in multiple test treatments fell below 4.0 mg/L on Day 4 of testing even though the sample was aerated prior to use. Accordingly, we cannot be sure that the reduced dissolved oxygen did not have a deleterious effect on *C. dubia* reproduction for this sample. Therefore, it is our best professional judgment that the test results for the Pond 14 sample should not be used for regulatory compliance purposes.

The test data and summary of statistical analyses for this test are presented in Appendix D.

Table 4. Effects of Lehigh Pond 14 site water on *Ceriodaphnia dubia* survival and reproduction.

Site Water Treatment	Mean % Survival	Mean Reproduction (# neonates /female)
Hardness Blank	**50***	1.1
Lab Control	100	29.4
6.25%	90	30.3
12.5%	100	**24.7***
25%	100	**23.6***
50%	100	**18.3***
100%	100	**14.2***
Summary of Key Statistics		
NOEC =	100% site water	6.25% site water
TUc (TUc = 100/NOEC) =	1.0	16.0
Survival EC_{25} or Reproduction IC_{25} =	>100% site water [a]	30.7% site water
TUc (TUc = 100/EC_{25} or 100/IC_{25}) =	<1.0	3.3
Survival EC_{50} or Reproduction IC_{50} =	>100% site water [a]	91.2% site water
TUc (TUc = 100/EC_{50} or 100/IC_{50}) =	<1.0	1.1

* - The response at this test treatment was significantly less than the Lab Control treatment response ($p < 0.05$).
a - Due to the absence of significant mortalities, the EC point estimates could not be calculated, but can be determined by inspection to be >100% site water.

4. AQUATIC TOXICITY DATA QUALITY CONTROL

Four QC measures were assessed during the toxicity testing:

- Maintenance of acceptable test conditions;
- Negative Control testing;
- Assessment of concentration response relationship; and
- Positive Control (reference toxicant) testing.

Maintenance of Acceptable Test Conditions

On September 15, the D.O. concentrations in the Pond 14 site water sample was 4.1 mg/L, or just slightly over the concentration at which aeration is required (i.e., 4.0 mg/L). Due to concern that the D.O. would drop overnight during testing, the sample was aerated for a few minutes before use in test solution preparation; this occurred on a daily basis (i.e., D.O. was 3.1 mg/L for the sample collected September 18). Even though this aeration process was implemented, the dissolved oxygen in multiple treatments dropped below 4.0 mg/L on Day 4 of testing. Otherwise, all other test conditions (pH, D.O., temperature, etc.) were within acceptable limits for these tests. All analyses were performed according to laboratory Standard Operating Procedures.

Negative Control Testing

The responses at the Lab Control treatments were acceptable.

Concentration Response Relationships

There were valid concentration-response relationships for the site water and reference toxicant tests (EPA-821-B-00-004).

Positive Control Testing - Reference Toxicant Toxicity

The results of this test are summarized below in Table 5. The survival EC_{50} and reproduction IC_{50} for these tests were consistent with the "typical response" ranges established by the reference toxicant test database for this species, indicating that these test organisms were responding to toxicant stress in a typical and consistent fashion.

The test data and summary of statistical analyses for this test are presented in Appendix E.

Table 5. Reference toxicant testing: effects of NaCl on *Ceriodaphnia dubia*.

NaCl Treatment (mg/L)	Mean % Survival	Mean Reproduction (# neonates/female)
Lab Control	100	33.0
500	100	31.2
1000	100	**22.6***
1500	80	**12.6***
2000	**40***	1.6
2500	**0***	-
Summary of Statistics		
Survival EC_{50} or Reproduction IC_{50} =	1810 mg/L NaCl	1310 mg/L NaCl
"Typical Response" =	1231 - 2666 mg/L NaCl	721 - 2024 mg/L NaCl

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

5. SUMMARY AND CONCLUSIONS

Chronic Effects of Lehigh Pond 4A Site Water on *Ceriodaphnia dubia*
The survival EC_{25} was 54.2% site water, resulting in 1.8 TUc. The reproduction IC_{25} was 28.5% site water, resulting in 3.5 TUc.

Ceriodaphnia dubia Test Endpoint =	Survival	Reproduction
Survival EC_{25} or Reproduction IC_{25} =	54.2% site water	28.5% site water
TUc =	1.8	3.5

Chronic Effects of Lehigh Pond 9 Site Water on *Ceriodaphnia dubia*
The survival EC_{25} was >100% site water, resulting in <1.0 TUc. The reproduction IC_{25} was >100% site water, resulting in <1.0 TUc.

Ceriodaphnia dubia Test Endpoint =	Survival	Reproduction
Survival EC_{25} or Reproduction IC_{25} =	>100% site water	>100% site water
TUc =	<1.0	<1.0

Chronic Effects of Lehigh Pond 14 Site Water on *Ceriodaphnia dubia*
The survival EC_{25} was >100% site water, resulting in <1.0 TUc. The reproduction IC_{25} was 30.7% site water, resulting in 3.3 TUc. However, the dissolved oxygen in multiple test treatments fell below 4.0 mg/L on Day 4 of testing even though the sample was aerated prior to use. Accordingly, we cannot be sure that the reduced dissolved oxygen did not have a deleterious effect on *C. dubia* reproduction for this sample. Therefore, it is our best professional judgment that the test results for the Pond 14 sample should not be used for regulatory compliance purposes.

Ceriodaphnia dubia Test Endpoint =	Survival	Reproduction
Survival EC_{25} or Reproduction IC_{25} =	>100% site water	30.7% site water
TUc =	<1.0	3.3

Appendix A

Chain-of-Custody Records for the Collection and Delivery of the Lehigh Samples

Pacific EcoRisk
2250 Cordelia Rd., Fairfield, CA 94534
(707) 207-7760 FAX (707) 207-7916

CHAIN-OF-CUSTODY RECORD

Results To:	Robertson-Bryan, Inc	**Invoice To:**	Same
Address:	9888 Kent Street Elk Grove, CA 95624	**Address:**	
Phone:	(916) 405-8918	**Phone:**	
Attn:	Paul Bedore	**Attn:**	
E-mail:	paul@robertson-bryan.com	**E-mail:**	
Project Name:	Lehigh Toxicity & TRE		
P.O.#/Ref:			

REQUESTED ANALYSIS

	Client Sample ID	Sample Date	Sample Time	Sample Matrix*	Grab/ Comp	Container Number	Container Type	*Ceriodapnia dubia* Surival and Reproduction, EPA 1002.0
1	Pond 4A	9/14/15	1015	FW	Comp	1	2.5-gal LDPE Cube	x
2	~~Pond 13~~			~~FW~~	~~Grab~~	~~1~~	~~2.5-gal LDPE Cube~~	x
3	Pond 14	9/14/15	11:45	FW	Grab	1	2.5-gal LDPE Cube	x
4	Pond 9	9/14/15	11:17	FW	Grab	1	2.5-gal LDPE Cube	x
5								
6								
7								
8								
9								
10								

PB 9/14/15

Samples collected by: P. Bedore

Comments/Special Instruction:

Initiation Sample

Concurrent reference toxicant test

RELIQUINSHED BY:		**RECEIVED BY:**	
Signature: Paul Bedore		**Signature:** [illegible]	
Print: PAUL BEDORE		**Print:** Y. Khadiyeva	
Organization: RBI		**Organization:** PER	
Date: 9/14/15	**Time:** 13:52	**Date:** 9-14-15	**Time:** 1400
RELIQUINSHED BY:		**RECEIVED BY:**	
Signature:		**Signature:**	
Print:		**Print:**	
Organization:		**Organization:**	
Date:	**Time:**	**Date:**	**Time:**

***Example Matrix Codes:** (**EFF** - Effluent) (**FW** = Freshwater); (**SW** = Saltwater); (**WW** = Wastewater); (**STRMW** = Stormwater); (**SED** = Sediment); or other

Pacific EcoRisk
2250 Cordelia Rd., Fairfield, CA 94534
(707) 207-7760 FAX (707) 207-7916

CHAIN-OF-CUSTODY RECORD

Results To:	Robertson-Bryan, Inc	**Invoice To:**	Same
Address:	9888 Kent Street Elk Grove, CA 95624	**Address:**	
Phone:	(916) 405-8918	**Phone:**	
Attn:	Paul Bedore	**Attn:**	
E-mail:	paul@robertson-bryan.com	**E-mail:**	
Project Name:	Lehigh Toxicity & TRE		
P.O.#/Ref:			

REQUESTED ANALYSIS

	Client Sample ID	Sample Date	Sample Time	Sample Matrix*	Grab/ Comp	Container Number	Container Type	*Ceriodapnia dubia* Surival and Reproduction, EPA 1002.0										
1	Pond 4A	9-16-15	10:50	FW	Comp	1	2.5-gal LDPE Cube	x										
~~2~~	~~Pond 13~~			~~FW~~	~~Grab~~	~~1~~	~~2.5-gal LDPE Cube~~	~~x~~							BG			
3	Pond 14	9-16-15	11:55	FW	Grab	1	2.5-gal LDPE Cube	x										
4	Pond 9	9-16-15	11:20	FW	Grab	1	2.5-gal LDPE Cube	x										
5																		
6																		
7																		
8																		
9																		
10																		

Samples collected by: ~~P Bedore~~ Ben Giordice

Comments/Special Instruction:

Renewal Sample

Concurrent reference toxicant test

RELIQUINSHED BY:		RECEIVED BY:	
Signature:		Signature:	
Print: Cyle Moon		Print: DAHLIA MA	
Organization: RBI		Organization: PER	
Date: 9-16-15	Time: 1355	Date: 9/16/15	Time: 1355
RELIQUINSHED BY:		**RECEIVED BY:**	
Signature:		Signature:	
Print:		Print:	
Organization:		Organization:	
Date:	Time:	Date:	Time:

***Example Matrix Codes:** (**EFF** - Effluent) (**FW** = Freshwater); (**SW** = Saltwater); (**WW** = Wastewater); (**STRMW** = Stormwater); (**SED** = Sediment); or other

Pacific EcoRisk
2250 Cordelia Rd., Fairfield, CA 94534
(707) 207-7760 FAX (707) 207-7916

CHAIN-OF-CUSTODY RECORD

Results To:	Robertson-Bryan, Inc	**Invoice To:**	Same
Address:	9888 Kent Street Elk Grove, CA 95624	**Address:**	
Phone:	(916) 405-8918	**Phone:**	
Attn:	Paul Bedore	**Attn:**	
E-mail:	paul@robertson-bryan.com	**E-mail:**	
Project Name:	Lehigh Toxicity & TRE		
P.O.#/Ref:			

REQUESTED ANALYSIS

	Client Sample ID	Sample Date	Sample Time	Sample Matrix*	Grab/ Comp	Container Number	Container Type	*Ceriodapnia dubia* Surival and Reproduction, EPA 1002.0										
1	Pond 4A	9/18/15	8:00	FW	Comp	1	2.5-gal LDPE Cube	x										
2	~~Pond 13~~			~~FW~~	~~Grab~~	~~1~~	~~2.5-gal LDPE Cube~~	~~x~~										
3	Pond 14	9/18/15	10:40	FW	Grab	1	2.5-gal LDPE Cube	x										
4	Pond 9	9/18/15	10:12	FW	Grab	1	2.5-gal LDPE Cube	x										
5																		
6																		
7																		
8																		
9																		
10																		

Samples collected by: P Bedore

Comments/Special Instruction:

Renewal Sample

Concurrent reference toxicant test

RELIQUINSHED BY:		**RECEIVED BY:**	
Signature:	[signature]	**Signature:**	[signature]
Print:	Paul Bedore	**Print:**	Y. Khadiyeva
Organization:	RBI	**Organization:**	PER
Date: 9/18/15	**Time:** 1242	**Date:** 9-18-15	**Time:** 1242
RELIQUINSHED BY:		**RECEIVED BY:**	
Signature:		**Signature:**	
Print:		**Print:**	
Organization:		**Organization:**	
Date:	**Time:**	**Date:**	**Time:**

***Example Matrix Codes:** (**EFF** - Effluent) (**FW** = Freshwater); (**SW** = Saltwater); (**WW** = Wastewater); (**STRMW** = Stormwater); (**SED** = Sediment); or other

Appendix B

Test Data and Summary of Statistics for the Evaluation of the Chronic Toxicity of Lehigh Pond 4A Site Water to *Ceriodaphnia dubia*

CETIS Summary Report

Report Date: 24 Sep-15 09:28 (p 1 of 2)
Test Code: 64438 | 20-7215-6709

Ceriodaphnia Survival and Reproduction Test — **Pacific EcoRisk**

Batch ID:	04-8843-4443	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Alison Briden
Start Date:	15 Sep-15 14:20	**Protocol:**	EPA-821-R-02-013 (2002)	**Diluent:**	Laboratory Water
Ending Date:	21 Sep-15 15:50	**Species:**	Ceriodaphnia dubia	**Brine:**	Not Applicable
Duration:	6d 2h	**Source:**	In-House Culture	**Age:**	1

Sample ID:	05-7666-1310	**Code:**	Pond 4A	**Client:**	Lehigh Permanente
Sample Date:	14 Sep-15 10:15	**Material:**	Site Water	**Project:**	24624
Receive Date:	14 Sep-15 14:00	**Source:**	Lehigh Permanente		
Sample Age:	28h (1.9 °C)	**Station:**	Pond 4A		

Comparison Summary

Analysis ID	Endpoint	NOEL	LOEL	TOEL	PMSD	TU	Method
10-6826-7076	Reproduction	25	50	35.36	25.8%	4	Steel Many-One Rank Sum Test
16-9415-1318	Survival	100	>100	NA	NA	1	Fisher Exact/Bonferroni-Holm Test

Point Estimate Summary

Analysis ID	Endpoint	Level	%	95% LCL	95% UCL	TU	Method
00-1838-0833	Reproduction	IC5	2.34	1.33	26	42.7	Linear Interpolation (ICPIN)
		IC10	4.68	2.65	27.7	21.35	
		IC15	21.4	3.98	29.2	4.664	
		IC20	26.6	5.3	30.8	3.759	
		IC25	28.5	10.6	32.5	3.514	
		IC40	34	27.9	37.3	2.941	
		IC50	37.7	32.6	40.9	2.653	
05-8613-5242	Survival	EC5	14.7	0.24	29.5	6.825	Linear Regression (MLE)
		EC10	23.9	1.94	44.8	4.181	
		EC15	33.3	6.94	68.3	3.004	
		EC20	43.3	15.6	117	2.31	
		EC25	54.2	25.4	227	1.844	
		EC40	95.7	50.5	2100	1.045	
		EC50	135	66.3	9230	0.7426	

Reproduction Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Lab Water Contr	10	28.1	24.9	31.3	20	36	1.4	4.43	15.8%	0.0%
6.25		10	23.8	17.2	30.4	6	37	2.94	9.28	39.0%	15.3%
12.5		10	24.9	18.4	31.4	2	33	2.88	9.12	36.6%	11.4%
25		10	23.7	17.3	30.1	6	34	2.81	8.88	37.5%	15.7%
50		10	4.7	0.781	8.62	0	14	1.73	5.48	117.0%	83.3%
100		10	0.9	-0.137	1.94	0	4	0.458	1.45	161.0%	96.8%

Survival Summary

C-%	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%
6.25		10	1	1	1	1	1	0	0	0.0%	0.0%
12.5		10	0.9	0.674	1	0	1	0.1	0.316	35.1%	10.0%
25		10	1	1	1	1	1	0	0	0.0%	0.0%
50		10	0.7	0.354	1	0	1	0.153	0.483	69.0%	30.0%
100		10	0.6	0.231	0.969	0	1	0.163	0.516	86.1%	40.0%

Ceriodaphnia Survival and Reproduction Test — **Pacific EcoRisk**

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	29	29	28	29	33	20	26	24	36	27
6.25		28	30	24	14	33	17	25	37	24	6
12.5		25	29	32	33	2	18	26	25	29	30
25		26	25	15	32	6	34	28	30	15	26
50		8	1	0	1	14	2	0	0	9	12
100		3	0	1	0	0	4	0	1	0	0

Survival 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	1	1	1	1	1	1	1	1	1	1
6.25		1	1	1	1	1	1	1	1	1	1
12.5		1	1	1	1	0	1	1	1	1	1
25		1	1	1	1	1	1	1	1	1	1
50		1	1	0	1	1	1	0	0	1	1
100		1	0	1	1	0	1	0	1	0	1

Survival Binomials

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	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
6.25		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
12.5		1/1	1/1	1/1	1/1	0/1	1/1	1/1	1/1	1/1	1/1
25		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
50		1/1	1/1	0/1	1/1	1/1	1/1	0/1	0/1	1/1	1/1
100		1/1	0/1	1/1	1/1	0/1	1/1	0/1	1/1	0/1	1/1

CETIS Analytical Report

Report Date: 24 Sep-15 09:28 (p 1 of 1)
Test Code: 64438 | 20-7215-6709

Ceriodaphnia Survival and Reproduction Test — Pacific EcoRisk

Analysis ID:	16-9415-1318	**Endpoint:**	Survival	**CETIS Version:**	CETISv1.8.7
Analyzed:	23 Sep-15 17:46	**Analysis:**	STP 2x2 Contingency Tables	**Official Results:**	Yes

Data Transform	Zeta	Alt Hyp	Trials	Seed	NOEL	LOEL	TOEL	TU
Untransformed		C > T	NA	NA	100	>100	NA	1

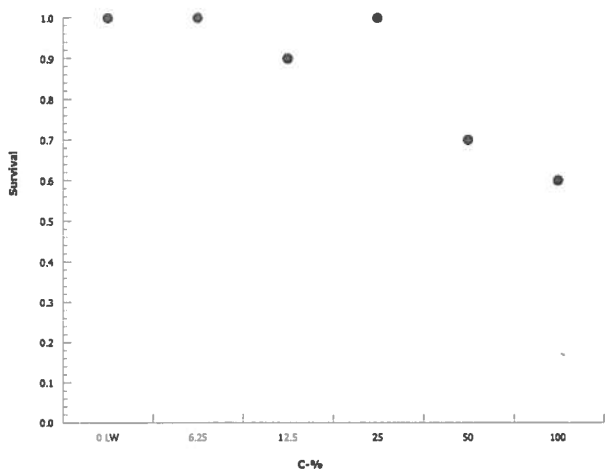
Fisher Exact/Bonferroni-Holm Test

Control	vs	C-%	Test Stat	P-Value	P-Type	Decision(α:5%)
Lab Water Control		6.25	1	1.0000	Exact	Non-Significant Effect
		12.5	0.5	1.0000	Exact	Non-Significant Effect
		25	1	1.0000	Exact	Non-Significant Effect
		50	0.105	0.4211	Exact	Non-Significant Effect
		100	0.0433	0.2167	Exact	Non-Significant Effect

Data Summary

C-%	Control Type	NR	R	NR + R	Prop NR	Prop R	%Effect
0	Lab Water Cont	10	0	10	1	0	0.0%
6.25		10	0	10	1	0	0.0%
12.5		9	1	10	0.9	0.1	10.0%
25		10	0	10	1	0	0.0%
50		7	3	10	0.7	0.3	30.0%
100		6	4	10	0.6	0.4	40.0%

Graphics



Ceriodaphnia Survival and Reproduction Test — **Pacific EcoRisk**

Analysis ID:	05-8613-5242	**Endpoint:**	Survival	**CETIS Version:**	CETISv1.8.7
Analyzed:	23 Sep-15 17:46	**Analysis:**	Linear Regression (MLE)	**Official Results:**	Yes

Linear Regression Options

Model Function	Threshold Option	Threshold	Optimized	Pooled	Het Corr	Weighted
Log-Normal [NED=A+B*log(X)]	Control Threshold	1E-07	Yes	Yes	No	Yes

Regression Summary

Iters	LL	AICc	BIC	Mu	Sigma	Adj R2	F Stat	Critical	P-Value	Decision(α:5%)
6	-17.8	53.6	41	2.13	0.586	0.678				Lack of Fit Not Tested

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC5	14.7	0.24	29.5	6.825	3.392	416.8
EC10	23.9	1.94	44.8	4.181	2.23	51.47
EC15	33.3	6.94	68.3	3.004	1.464	14.4
EC20	43.3	15.6	117	2.31	0.8567	6.405
EC25	54.2	25.4	227	1.844	0.4397	3.93
EC40	95.7	50.5	2100	1.045	0.04753	1.979
EC50	135	66.3	9230	0.7426	0.01083	1.507

Regression Parameters

Parameter	Estimate	Std Error	95% LCL	95% UCL	t Stat	P-Value	Decision(α:5%)
Threshold	8.56E-08	9.25E-05	-0.00018	0.000181	0.000925	0.9993	Non-Significant Parameter
Slope	1.71	0.68	0.374	3.04	2.51	0.0869	Non-Significant Parameter
Intercept	-3.64	1.14	-5.87	-1.4	-3.19	0.0498	Significant Parameter

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Model	10.70308	10.70308	1	12.5	0.0384	Significant
Residual	2.566151	0.855384	3			

Residual Analysis

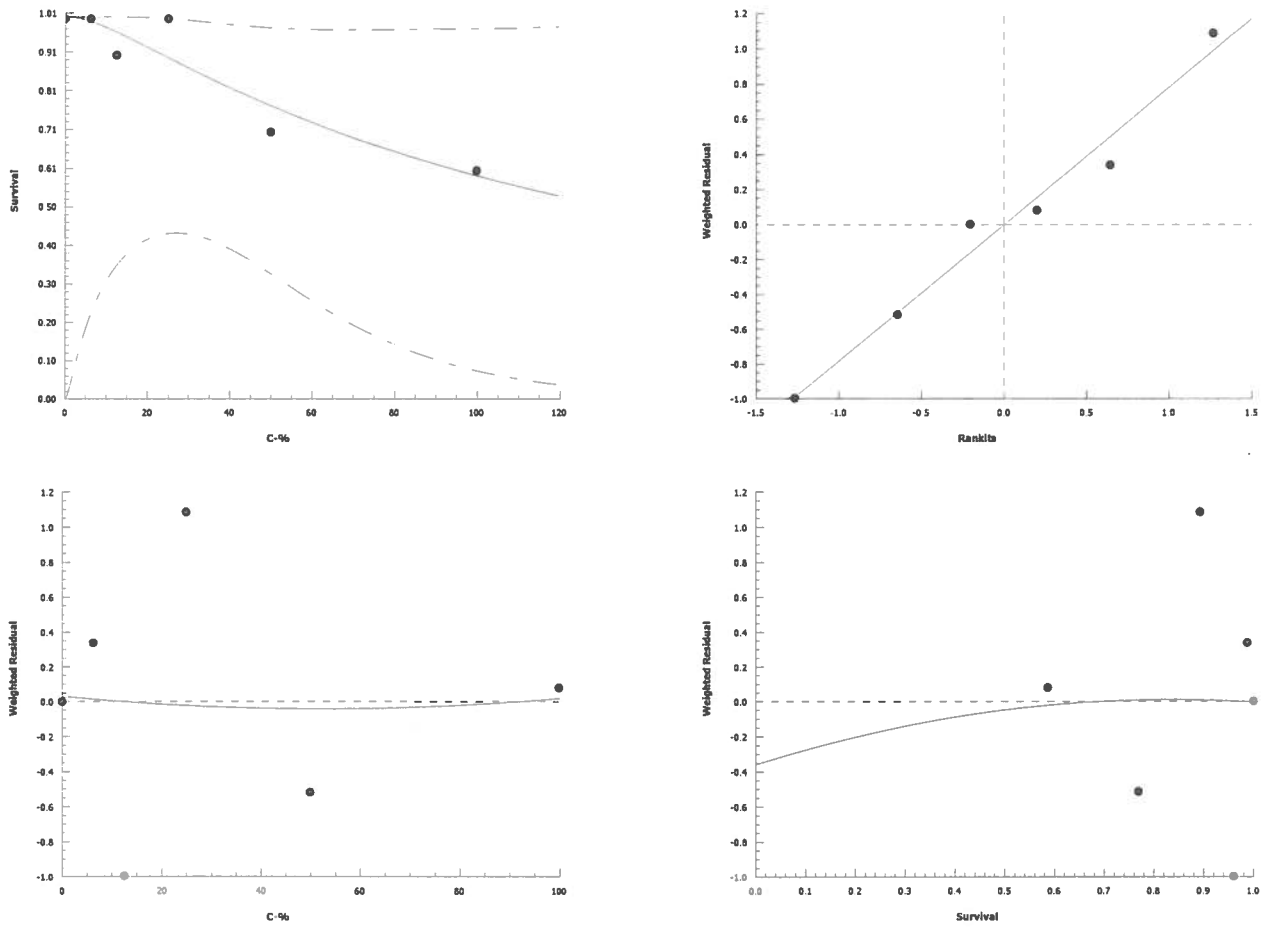
Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Goodness-of-Fit	Pearson Chi-Sq GOF	2.57	7.81	0.4635	Non-Significant Heterogenity
	Likelihood Ratio GOF	3.43	7.81	0.3302	Non-Significant Heterogenity
Distribution	Shapiro-Wilk W Normality	0.983	0.513	0.9637	Normal Distribution

Survival Summary

			Calculated Variate(A/B)								
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	A	B
0	Lab Water Contr	10	1	1	1	0	0	0.0%	0.0%	10	10
6.25		10	1	1	1	0	0	0.0%	0.0%	10	10
12.5		10	0.9	0	1	0.1	0.316	35.1%	10.0%	9	10
25		10	1	1	1	0	0	0.0%	0.0%	10	10
50		10	0.7	0	1	0.153	0.483	69.0%	30.0%	7	10
100		10	0.6	0	1	0.163	0.516	86.1%	40.0%	6	10

Ceriodaphnia Survival and Reproduction Test					Pacific EcoRisk
Analysis ID:	05-8613-5242	**Endpoint:**	Survival	**CETIS Version:**	CETISv1.8.7
Analyzed:	23 Sep-15 17:46	**Analysis:**	Linear Regression (MLE)	**Official Results:**	Yes

Graphics Log-Normal [NED=A+B*log(X)]



CETIS Analytical Report

Report Date: 24 Sep-15 09:28 (p 1 of 1)
Test Code: 64438 | 20-7215-6709

Ceriodaphnia Survival and Reproduction Test — **Pacific EcoRisk**

Analysis ID:	10-6826-7076	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.8.7
Analyzed:	23 Sep-15 17:46	**Analysis:**	Nonparametric-Control vs Treatments	**Official Results:**	Yes

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	NOEL	LOEL	TOEL	TU
Untransformed	NA	C > T	NA	NA	25.8%	25	50	35.36	4

Steel Many-One Rank Sum Test

Control vs	C-%	Test Stat	Critical	Ties	DF	P-Value	P-Type	Decision(α:5%)
Lab Water Control	6.25	91	75	3	18	0.3875	Asymp	Non-Significant Effect
	12.5	99	75	3	18	0.6654	Asymp	Non-Significant Effect
	25	91.5	75	2	18	0.4046	Asymp	Non-Significant Effect
	50*	55	75	0	18	0.0004	Asymp	Significant Effect
	100*	55	75	0	18	0.0004	Asymp	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	6844.483	1368.897	5	27.4	<0.0001	Significant Effect
Error	2700.5	50.00926	54			
Total	9544.983		59			

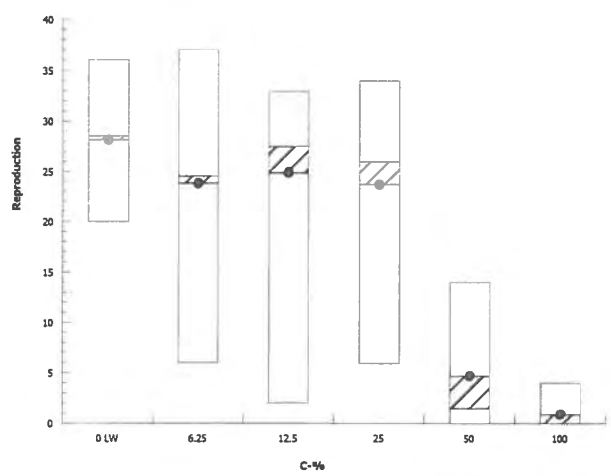
Distributional Tests

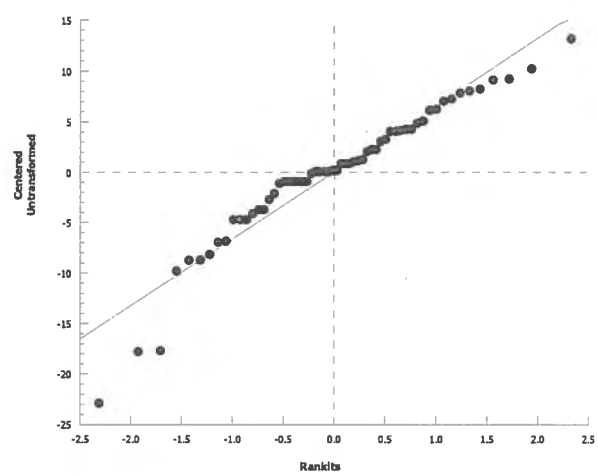
Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	26.8	15.1	<0.0001	Unequal Variances
Distribution	Shapiro-Wilk W Normality	0.934	0.946	0.0029	Non-normal Distribution

Reproduction Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Water Contr	10	28.1	24.9	31.3	28.5	20	36	1.4	15.8%	0.0%
6.25		10	23.8	17.2	30.4	24.5	6	37	2.94	39.0%	15.3%
12.5		10	24.9	18.4	31.4	27.5	2	33	2.88	36.6%	11.4%
25		10	23.7	17.3	30.1	26	6	34	2.81	37.5%	15.7%
50		10	4.7	0.781	8.62	1.5	0	14	1.73	117.0%	83.3%
100		10	0.9	-0.137	1.94	0	0	4	0.458	161.0%	96.8%

Graphics





CETIS Analytical Report

Report Date: 24 Sep-15 09:28 (p 1 of 1)
Test Code: 64438 | 20-7215-6709

Ceriodaphnia Survival and Reproduction Test — **Pacific EcoRisk**

Analysis ID:	00-1838-0833	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.8.7
Analyzed:	23 Sep-15 17:46	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Linear	Linear	1346479	200	Yes	Two-Point Interpolation

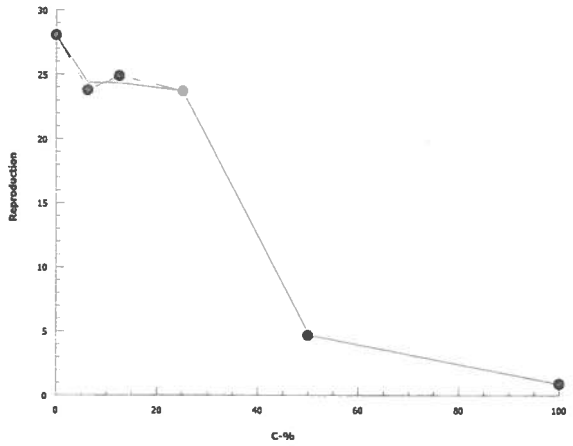
Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	2.34	1.33	26	42.7	3.839	75.42
IC10	4.68	2.65	27.7	21.35	3.616	37.71
IC15	21.4	3.98	29.2	4.664	3.42	25.14
IC20	26.6	5.3	30.8	3.759	3.249	18.86
IC25	28.5	10.6	32.5	3.514	3.079	9.412
IC40	34	27.9	37.3	2.941	2.684	3.584
IC50	37.7	32.6	40.9	2.653	2.446	3.065

Reproduction Summary

			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Lab Water Contr	10	28.1	20	36	1.4	4.43	15.8%	0.0%
6.25		10	23.8	6	37	2.94	9.28	39.0%	15.3%
12.5		10	24.9	2	33	2.88	9.12	36.6%	11.4%
25		10	23.7	6	34	2.81	8.88	37.5%	15.7%
50		10	4.7	0	14	1.73	5.48	117.0%	83.3%
100		10	0.9	0	4	0.458	1.45	161.0%	96.8%

Graphics



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

Client: **Lehigh Permanente** Material: **Pond 4A** Test Date: 9/15/15

Project #: 24624 Test ID: 64438 Randomization: 10.7.3 Control Water: Modified EPAMH + 5% American River

	Day	pH New	pH Old	D.O. New	D.O. Old	Cond. (µS/cm)	Temp (°C)	A	B	C	D	E	F	G	H	I	J	SIGN-OFF
Lab Water Control	0	8.12		7.5		316	24.9	0	0	0	0	0	0	0	0	0	0	Date: 9/15/15 New WQ: Test Init.: KP; Sol'n Prep: CD VM Time: 1400
	1	7.91	7.62	7.7	7.0	317	25.3	0	0	0	0	0	0	0	0	0	0	Date: 9/16/15 New WQ: RG Counts: CD; Sol'n Prep: CD Old WQ: SCD Time: 1500
	2	8.24	7.48	8.2	7.1	315	25.3	0	0	0	0	0	0	0	0	0	0	Date: 9/17/15 New WQ: VM Counts: AWS; Sol'n Prep: AW Old WQ: JBL Time: 1325
	3	8.05	7.89	8.6	7.0	317	25.6	4	4	3	3	4	4	2	4	5	5	Date: 9/18/15 New WQ: EL Counts: YJ; Sol'n Prep: AWS Old WQ: JBL Time: 1650
	4	8.24	7.96	7.7	7.6	316	25.3	0	11	9	9	10	8	11	9	11	10	Date: 9/19/15 New WQ: CD Counts: AWS; Sol'n Prep: AWS Old WQ: RG Time: 1500
	5	7.89	7.97	7.5	7.5	324	25.4	8	0	0	0	2	8	13	11	0	12	Date: 9/20/15 New WQ: SCD Counts: PP; Sol'n Prep: AW Old WQ: SCD Time: 1400
	6	–	7.81	–	7.5	392	25.2	17	14	16	17	17	20	0	0	20	0	Date: 9-21-15 New WQ: — Counts: YB; Sol'n Prep: — Old WQ: e.2. Time: 1550
	7																	Date: New WQ: Counts: Sol'n Prep: Old WQ: Time:
	8																	Date: Old WQ: Counts: Time:
							Total=	29	29	28	29	33	20	26	24	36	27	Mean Neonates/Female = 28.1

	Day	pH New	pH Old	D.O. New	D.O. Old	Cond. (µS/cm)	A	B	C	D	E	F	G	H	I	J	Sample ID
6.25%	0	8.06		8.0		387	0	0	0	0	0	0	0	0	0	0	39774
	1	7.95	7.54	7.9	7.4	387	0	0	0	0	0	0	0	0	0	0	39774
	2	8.17	7.30	8.2	7.6	392	0	0	0	0	0	0	0	0	0	0	39823
	3	7.96	7.90	8.1	6.9	386	4	3	1	0	4	1	3	6	4	0	39823
	4	8.17	7.95	7.7	7.6	380	6	9	4	6	11	7	0	12	2	0	39852
	5	7.96	7.90	7.4	7.2	400	0	0	0	8	0	9	9	0	0	0	39852
	6	–	7.80	–	6.8	417	18	18	19	0	18	18	13	19	18	6	
	7																
	8																
						Total=	28	30	24	14	33	17	25	37	24	6	Mean Neonates/Female = 23.8

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

Client: **Lehigh Permanente** Material: **Pond 4A** Test Date: 9/15/15

Project #: 24624 Test ID: 64438 Control Water: Modified EPAMH + 5% American River

	Day	pH New	pH Old	D.O. New	D.O. Old	Cond. (µS/cm)	Temp (°C)	A	B	C	D	E	F	G	H	I	J	SIGN-OFF
12.5%	0	8.04		7.9		452		0	0	0	0	0	0	0	0	0	0	
	1	7.96	7.53	8.1	7.7	448		0	0	0	0	0	0	0	0	0	0	
	2	8.13	7.47	8.3	6.9	455		0	0	0	0	0	0	0	0	0	0	
	3	9.93	7.88	8.3	6.7	455		2	4	4	4	2	3	4	4	4	3	
	4	8.11	7.92	7.6	7.6	448		3	9	0	9	0	7	9	11	9	7	
	5	7.96	7.88	7.5	7.7	466		0	0	9	0	x/0	8	12	10	0	0	
	6	–	7.82	–	7.1	508		20	16	19	20	–	0	1	0	16	20	
	7											–						
	8																	
							Total=	25	29	32	33	x/2	18	26	25	29	30	Mean Neonates/Female = 24.9

	Day	pH New	pH Old	D.O. New	D.O. Old	Cond. (µS/cm)		A	B	C	D	E	F	G	H	I	J	
25%	0	8.02		7.7		570		0	0	0	0	0	0	0	0	0	0	
	1	7.94	7.50	8.2	7.8	566		0	0	0	0	0	0	0	0	0	0	
	2	8.07	7.56	8.4	7.2	569		0	0	0	0	0	0	0	0	0	0	
	3	7.90	8.03	8.4	6.8	568		3	3	4	6	0	5	3	5	0	4	
	4	8.10	7.97	7.5	7.3	562		8	4	9	0	6	10	6	10	9	7	
	5	7.99	7.81	7.8	7.5	578		0	0	0	9	0	0	0	0	2	0	
	6	–	7.81	–	6.5	602		15	18	2	17	0	19	19	15	4	15	
	7																	
	8																	
							Total=	26	25	15	32	6	34	28	30	15	26	Mean Neonates/Female = 23.7

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

Client: **Lehigh Permanente** Material: **Pond 4A** Test Date: 9/15/15

Project #: 24624 Test ID: 64438 Control Water: Modified EPAMH + 5% American River

	Day	pH New	pH Old	D.O. New	D.O. Old	Cond. (µS/cm)	Temp (°C)	A	B	C	D	E	F	G	H	I	J	SIGN-OFF
50%	0	7.95		7.8		807		0	0	0	0	0	0	0	0	0	0	
	1	7.91	7.48	8.2	8.1	804		0	0	0	0	0	0	0	0	0	0	
	2	7.99	7.60	8.5	7.1	819		0	0	0	0	0	0	0	0	0	0	
	3	7.86	7.96	~~8.8~~ 8.1	7.1	800		0	0	X/0	0	0	0	X/0	X/0	0	0	
	4	8.05	7.97	7.9	7.5	791		0	0	-	0	0	0	-	-	0	0	
	5	8.12	7.84	7.7	7.4	813		0	1	-	1	2	2	-	-	0	0	
	6	-	7.83	-	6.5	855		8	0	-	0	12	0	-	-	9	12	
	7									-				-	✓			
	8									✓				-	✓			
							Total=	8	1	X/0	1	14	2	X/0	X/0	9	12	Mean Neonates/Female = 4.7

	Day	pH New	pH Old	D.O. New	D.O. Old	Cond. (µS/cm)		A	B	C	D	E	F	G	H	I	J	
100%	0	7.88		6.8		1235		0	0	0	0	0	0	0	0	0	0	
	1	7.90	—	8.2	—	1237		0	0	0	0	0	0	0	0	0	0	
	2	7.94	7.75	8.6	6.9	1275		0	X/0	0	0	0	0	0	0	0	0	
	3	7.84	8.04	8.4	6.8	1261		0	-	0	0	X/0	0	0	0	0	0	
	4	8.09	7.98	8.3	7.3	1253		0	-	0	0	-	0	0	0	0	0	
	5	8.27	7.82	7.9	7.6	1265		0	-	0	0	-	0	X/0	0	X/0	0	
	6		7.89		6.6	1315		3	-	1	0	-	4	-	1	-	0	
	7								-			-						
	8								-			✓						
							Total=	3	X/0	1	0	X/0	4	X/0	1	X/0	0	Mean Neonates/Female = 0.9

Appendix C

Test Data and Summary of Statistics for the Evaluation of the Chronic Toxicity of Lehigh Pond 9 Site Water to *Ceriodaphnia dubia*

CETIS Summary Report

Report Date: 12 Oct-15 11:29 (p 1 of 2)
Test Code: 64439 | 09-4551-9179

Ceriodaphnia Survival and Reproduction Test — **Pacific EcoRisk**

Batch ID:	18-8845-5009	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Alison Briden
Start Date:	15 Sep-15 14:45	**Protocol:**	EPA-821-R-02-013 (2002)	**Diluent:**	Laboratory Water
Ending Date:	21 Sep-15 15:15	**Species:**	Ceriodaphnia dubia	**Brine:**	Not Applicable
Duration:	6d 0h	**Source:**	In-House Culture	**Age:**	1

Sample ID:	06-2545-8823	**Code:**	Pond 9	**Client:**	Lehigh Permanente
Sample Date:	14 Sep-15 11:17	**Material:**	Site Water	**Project:**	24624
Receive Date:	14 Sep-15 14:00	**Source:**	Lehigh Permanente		
Sample Age:	27h (2.9 °C)	**Station:**	Pond 9		

Comparison Summary

Analysis ID	Endpoint	NOEL	LOEL	TOEL	PMSD	TU	Method
02-0680-3944	Reproduction	50	100	70.71	23.1%	2	Steel Many-One Rank Sum Test
12-8904-1968	Survival	100	>100	NA	NA	1	Fisher Exact/Bonferroni-Holm Test

Point Estimate Summary

Analysis ID	Endpoint	Level	%	95% LCL	95% UCL	TU	Method
18-5451-4617	Reproduction	IC5	3.39	1.47	21.1	29.46	Linear Interpolation (ICPIN)
		IC10	13.5	2.95	78.1	7.385	
		IC15	20.1	4.42	N/A	4.974	
		IC20	>100	N/A	N/A	<1	
		IC25	>100	N/A	N/A	<1	
		IC40	>100	N/A	N/A	<1	
		IC50	>100	N/A	N/A	<1	

Reproduction Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Lab Water Contr	10	31.5	28.4	34.6	23	38	1.39	4.4	14.0%	0.0%
0	Hardness Blank	10	1.1	0.18	2.02	0	4	0.407	1.29	117.0%	96.5%
6.25		10	27.2	19.5	34.9	6	37	3.41	10.8	39.6%	13.7%
12.5		10	30	27.7	32.3	25	35	1.02	3.23	10.8%	4.76%
25		10	23.2	15.3	31.1	0	33	3.48	11	47.4%	26.3%
50		10	27.8	24.9	30.7	20	32	1.26	3.99	14.4%	11.7%
100		10	25.8	22.5	29.1	17	33	1.44	4.57	17.7%	18.1%

Survival Summary

C-%	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%
0	Hardness Blank	10	0.5	0.123	0.877	0	1	0.167	0.527	105.0%	50.0%
6.25		10	0.8	0.498	1	0	1	0.133	0.422	52.7%	20.0%
12.5		10	1	1	1	1	1	0	0	0.0%	0.0%
25		10	0.9	0.674	1	0	1	0.1	0.316	35.1%	10.0%
50		10	1	1	1	1	1	0	0	0.0%	0.0%
100		10	1	1	1	1	1	0	0	0.0%	0.0%

Ceriodaphnia Survival and Reproduction Test — Pacific EcoRisk

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	34	32	29	37	30	33	28	31	38	23
0	Hardness Blank	2	2	4	1	0	0	0	1	1	0
6.25		30	37	25	29	10	31	6	35	36	33
12.5		25	33	26	29	29	35	29	34	30	30
25		31	27	21	26	7	0	28	30	29	33
50		32	20	31	22	29	32	28	29	27	28
100		24	31	26	17	26	29	33	26	22	24

Survival 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	1	1	1	1	1	1	1	1	1	1
0	Hardness Blank	1	1	1	0	1	0	0	0	1	0
6.25		1	1	1	1	0	1	0	1	1	1
12.5		1	1	1	1	1	1	1	1	1	1
25		1	1	1	1	0	1	1	1	1	1
50		1	1	1	1	1	1	1	1	1	1
100		1	1	1	1	1	1	1	1	1	1

Survival Binomials

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	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
0	Hardness Blank	1/1	1/1	1/1	0/1	1/1	0/1	0/1	0/1	1/1	0/1
6.25		1/1	1/1	1/1	1/1	0/1	1/1	0/1	1/1	1/1	1/1
12.5		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
25		1/1	1/1	1/1	1/1	0/1	1/1	1/1	1/1	1/1	1/1
50		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
100		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1

Ceriodaphnia Survival and Reproduction Test — **Pacific EcoRisk**

Analysis ID:	12-8904-1968	**Endpoint:**	Survival	**CETIS Version:**	CETISv1.8.7
Analyzed:	24 Sep-15 10:39	**Analysis:**	STP 2x2 Contingency Tables	**Official Results:**	Yes

Data Transform	Zeta	Alt Hyp	Trials	Seed	NOEL	LOEL	TOEL	TU
Untransformed		C > T	NA	NA	100	>100	NA	1

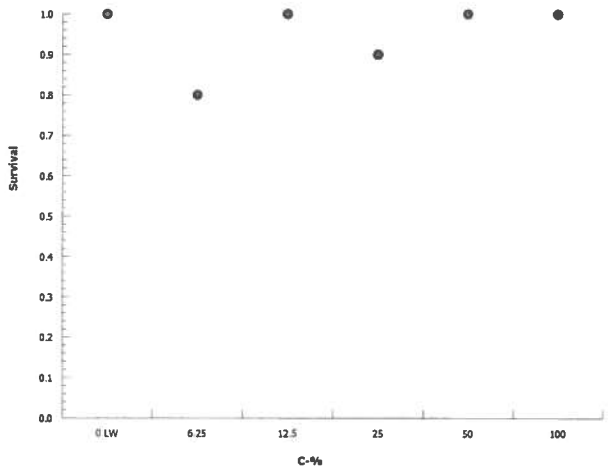
Fisher Exact/Bonferroni-Holm Test

Control	vs	C-%	Test Stat	P-Value	P-Type	Decision(α:5%)
Lab Water Control		6.25	0.237	1.0000	Exact	Non-Significant Effect
		12.5	1	1.0000	Exact	Non-Significant Effect
		25	0.5	1.0000	Exact	Non-Significant Effect
		50	1	1.0000	Exact	Non-Significant Effect
		100	1	1.0000	Exact	Non-Significant Effect

Data Summary

C-%	Control Type	NR	R	NR + R	Prop NR	Prop R	%Effect
0	Lab Water Cont	10	0	10	1	0	0.0%
6.25		8	2	10	0.8	0.2	20.0%
12.5		10	0	10	1	0	0.0%
25		9	1	10	0.9	0.1	10.0%
50		10	0	10	1	0	0.0%
100		10	0	10	1	0	0.0%

Graphics



Ceriodaphnia Survival and Reproduction Test — **Pacific EcoRisk**

Analysis ID:	02-0680-3944	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.8.7
Analyzed:	24 Sep-15 10:44	**Analysis:**	Nonparametric-Control vs Treatments	**Official Results:**	Yes

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	NOEL	LOEL	TOEL	TU
Untransformed	NA	C > T	NA	NA	23.1%	50	100	70.71	2

Steel Many-One Rank Sum Test

Control	vs	C-%	Test Stat	Critical	Ties	DF	P-Value	P-Type	Decision(α:5%)
Lab Water Control		6.25	97.5	75	5	18	0.6152	Asymp	Non-Significant Effect
		12.5	93.5	75	4	18	0.4745	Asymp	Non-Significant Effect
		25	75.5	75	5	18	0.0505	Asymp	Non-Significant Effect
		50	79.5	75	4	18	0.0977	Asymp	Non-Significant Effect
		100*	73.5	75	3	18	0.0350	Asymp	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	437.6833	87.53667	5	1.73	0.1432	Non-Significant Effect
Error	2730.9	50.57222	54			
Total	3168.583		59			

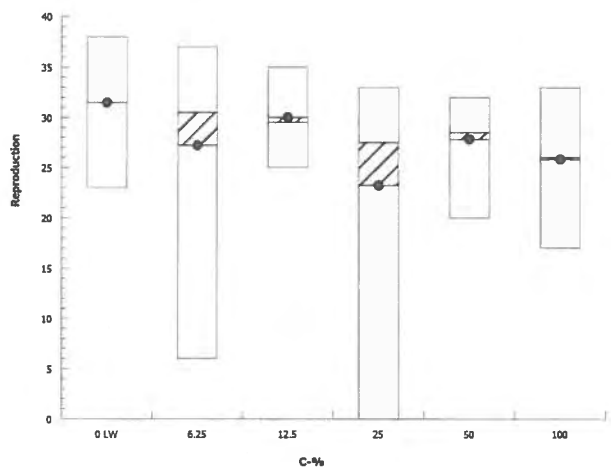
Distributional Tests

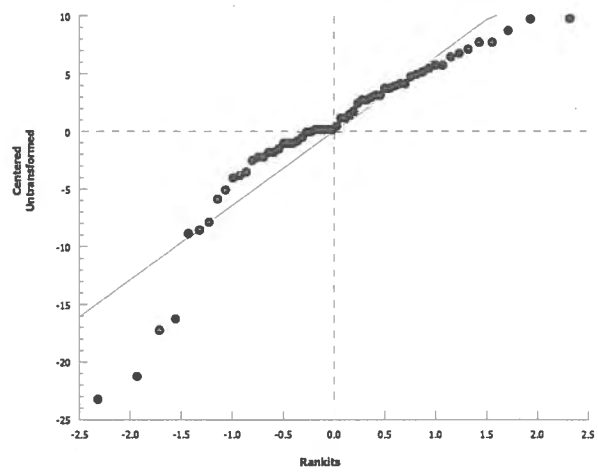
Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	24.8	15.1	0.0002	Unequal Variances
Distribution	Shapiro-Wilk W Normality	0.872	0.946	<0.0001	Non-normal Distribution

Reproduction Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Water Contr	10	31.5	28.4	34.6	31.5	23	38	1.39	14.0%	0.0%
6.25		10	27.2	19.5	34.9	30.5	6	37	3.41	39.6%	13.7%
12.5		10	30	27.7	32.3	29.5	25	35	1.02	10.8%	4.76%
25		10	23.2	15.3	31.1	27.5	0	33	3.48	47.4%	26.3%
50		10	27.8	24.9	30.7	28.5	20	32	1.26	14.4%	11.7%
100		10	25.8	22.5	29.1	26	17	33	1.44	17.7%	18.1%

Graphics





CETIS Analytical Report

Report Date: 24 Sep-15 10:44 (p 1 of 1)
Test Code: 64439 | 09-4551-9179

Ceriodaphnia Survival and Reproduction Test — **Pacific EcoRisk**

Analysis ID:	18-5451-4617	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.8.7
Analyzed:	24 Sep-15 10:44	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Linear	Linear	1429324	200	Yes	Two-Point Interpolation

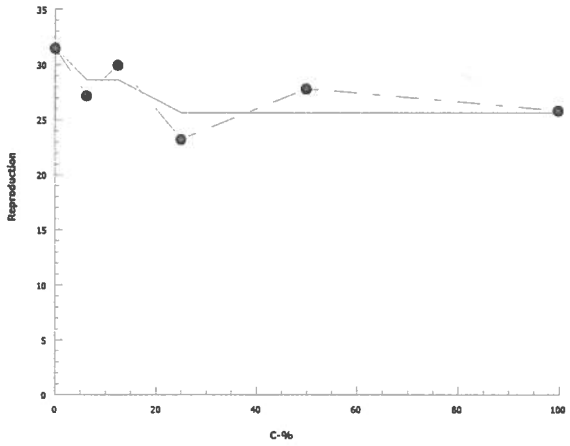
Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	3.39	1.47	21.1	29.46	4.735	67.88
IC10	13.5	2.95	78.1	7.385	1.281	33.94
IC15	20.1	4.42	N/A	4.974	NA	22.63
IC20	>100	N/A	N/A	<1	NA	NA
IC25	>100	N/A	N/A	<1	NA	NA
IC40	>100	N/A	N/A	<1	NA	NA
IC50	>100	N/A	N/A	<1	NA	NA

Reproduction Summary

			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Lab Water Contr	10	31.5	23	38	1.39	4.4	14.0%	0.0%
6.25		10	27.2	6	37	3.41	10.8	39.6%	13.7%
12.5		10	30	25	35	1.02	3.23	10.8%	4.76%
25		10	23.2	0	33	3.48	11	47.4%	26.3%
50		10	27.8	20	32	1.26	3.99	14.4%	11.7%
100		10	25.8	17	33	1.44	4.57	17.7%	18.1%

Graphics



Ceriodaphnia Survival and Reproduction Test — **Pacific EcoRisk**

Analysis ID:	08-9362-9312	**Endpoint:**	Survival	**CETIS Version:**	CETISv1.8.7
Analyzed:	24 Sep-15 10:40	**Analysis:**	Single 2x2 Contingency Table	**Official Results:**	Yes

Data Transform	Zeta	Alt Hyp	Trials	Seed	Test Result
Untransformed		C > T	NA	NA	Fails survival

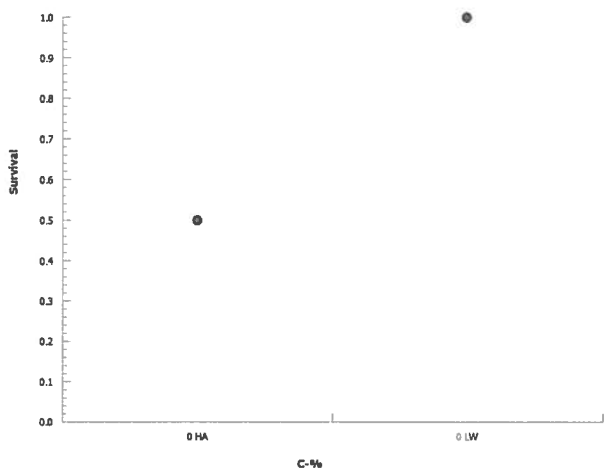
Fisher Exact Test

Control	vs	Control	Test Stat	P-Value	P-Type	Decision(α:5%)
Lab Water Control		Hardness Blank	0.0163	0.0163	Exact	Significant Effect

Data Summary

C-%	Control Type	NR	R	NR + R	Prop NR	Prop R	%Effect
0	Lab Water Cont	10	0	10	1	0	0.0%
0	Hardness Blank	5	5	10	0.5	0.5	50.0%

Graphics



Ceriodaphnia Survival and Reproduction Test — **Pacific EcoRisk**

Analysis ID:	04-9707-0482	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.8.7
Analyzed:	24 Sep-15 10:44	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Untransformed	NA	C > T	NA	NA	8.35%	Fails reproduction

Unequal Variance t Two-Sample Test

Control	vs	Control	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Lab Water Control		Hardness Blank	21	1.81	2.63	10	<0.0001	CDF	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	4620.8	4620.8	1	439	<0.0001	Significant Effect
Error	189.4	10.52222	18			
Total	4810.2		19			

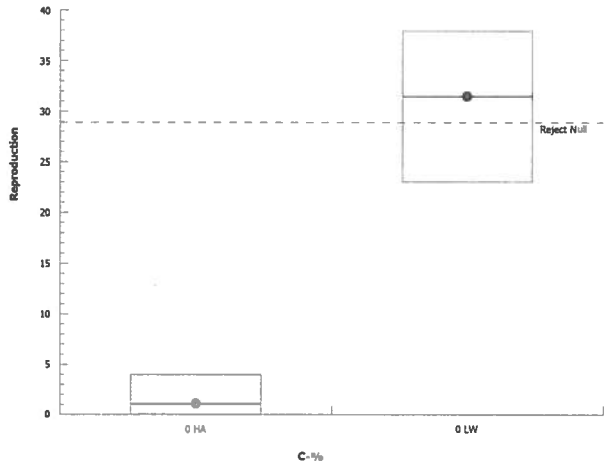
Distributional Tests

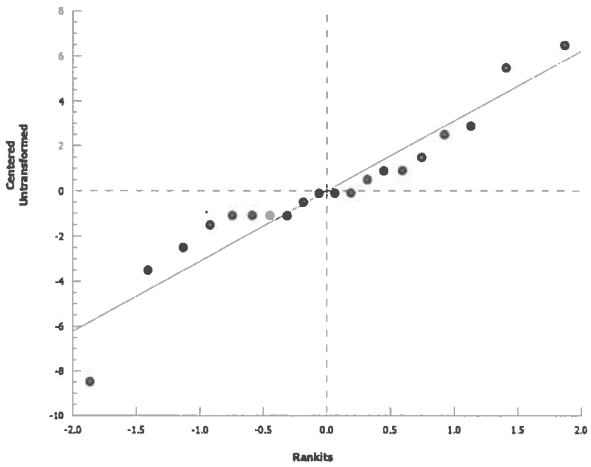
Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	11.7	6.54	0.0011	Unequal Variances
Distribution	Shapiro-Wilk W Normality	0.927	0.866	0.1345	Normal Distribution

Reproduction Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Water Contr	10	31.5	28.4	34.6	31.5	23	38	1.39	14.0%	0.0%
0	Hardness Blank	10	1.1	0.18	2.02	1	0	4	0.407	117.0%	96.5%

Graphics





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

Client: **Lehigh Permanente** Material: **Hardness Blank** Test Date: 9/15/15

Project #: 24624 Test ID: 64438-64441 Randomization: 10.71 Control Water: Modified EPAMH + 5% American River

	Day	pH New	pH Old	D.O. New	D.O. Old	Cond. (µS/cm)	Temp (°C)	A	B	C	D	E	F	G	H	I	J	SIGN-OFF
Simulated Effluent/Hardness Blank	0	7.99		8.4		1682	24.9	0	0	0	0	0	0	0	0	0	0	Date: 9/15/15 New WQ: VM Test Init.: KD Sol'n Prep: CD Time: 1445
	1	7.99	7.44	8.5	8.0	1714	25.3	0	0	0	0	0	0	0	0	0	0	Date: 9/16/15 New WQ: RG Counts: MF Sol'n Prep: CD Old WQ: SCD Time: 1335
	2	7.80	7.92	9.2	~~8.5~~ 7.2 JBL 9/17	1717	25.3	0	0	0	0	0	0	0	0	0	0	Date: 9/17/15 New WQ: VM Counts: AWS Sol'n Prep: AW Old WQ: UBL Time: 1620
	3	7.87	7.79	~~9.9~~ 9.9 EL 9/18/15	7.7	~~1746~~ 1746 EL 9/18/15	25.7	2	2	0	1	0	0	0	1	1	0	Date: 9/18/15 New WQ: EL Counts: AWS Sol'n Prep: AWS Old WQ: CD Time: 1700
	4	7.93	8.11	7.5	8.1	1726	25.0	0 (mistake)	0	4 (mistake)	Mb	0	Mb	Mb	Mb	0	0	Date: 9/19/15 New WQ: CD Counts: YJ Sol'n Prep: AWS Old WQ: SN Time: 1540
	5	7.78	8.03	8.2	6.2	1712	25.1	~~13~~ 0	0	~~13~~ 0 (mistake)	0	~~16~~ 0 (mistake)	–	–	–	0	X/0	Date: 9/20/15 New WQ: SCD Counts: CJD Sol'n Prep: AW Old WQ: SCD Time: 1525
	6	–	~~8.57~~ 7.99 SD 9/21/15	–	7.7	1961	25.0	0	0	0	–	0	–	–	–	0	–	Date: 9/21/15 New WQ: – Counts: SM Sol'n Prep: SM Old WQ: SCD Time: 1515
	7										–		–	–	–		–	Date: New WQ: Counts: Sol'n Prep: Old WQ: Time:
	8										–		–	–	–		–	Date: Old WQ: Counts: Sol'n Prep: Time:
							Total=	2	2	4	Y/1	0	Yb	Mb	Y/1	1	X/0	Mean Neonates/Female = 1.1

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

Client: **Lehigh Permanente** Material: **Pond 9** Test Date: 9/15/15

Project #: 24624 Test ID: 64439 Randomization: 10.7.1 Control Water: Modified EPAMH + 5% American River

	Day	pH New	pH Old	D.O. New	D.O. Old	Cond. (µS/cm)	Temp (°C)	A	B	C	D	E	F	G	H	I	J	SIGN-OFF
Lab Water Control	0	8.07		7.5		322	24.9	0	0	0	0	0	0	0	0	0	0	Date: 9/15/15 New WQ: Test Init. KP; Sol'n Prep: CO; VM; Time: ~~1450~~ 1445
	1	8.24	~~8.14~~ 7.98 SCD 9/16	8.4	8.1	314	25.3	0	0	0	0	0	0	0	0	0	0	Date: 9/16/15 New WQ: MG; Counts: MF; Sol'n Prep: CD; Old WQ: SCD; Time: 1335
	2	8.24	8.28	8.3	7.4	322	25.3	0	0	0	0	0	0	0	0	0	0	Date: 9/17/15 New WQ: VM; Counts: AWS; Sol'n Prep: A; Old WQ: JBL; Time: 1620
	3	~~8.10~~ JBL	7.89	8.1	6.9	320	25.7	4	5	3	2	4	5	4	5	7	6	Date: 9/18/15 New WQ: EL; Counts: AWS; Sol'n Prep: AWS; Old WQ: CD; Time: 1700
	4	8.22	7.97	7.4	7.1	316	25.0	0	9	12	0	9	13	11	10	12	0	Date: 9/19/15 New WQ: CD; Counts: YJ; Sol'n Prep: AWS; Old WQ: SN; Time: 1540
	5	7.84	8.10	8.1	6.9	337	25.1	13	0	12	16	17	15	13	0	0	0	Date: 9/20/15 New WQ: SCD; Counts: CJD; Sol'n Prep: A; Old WQ: SCD; Time: 1525
	6	–	8.07	–	7.7	408	25.0	17	18	2	19	0	0	0	16	19	17	Date: 9/21/15 New WQ: –; Counts: SM; Sol'n Prep: S; Old WQ: SCD; Time: 1515
	7																	Date: New WQ: Counts: Sol'n Prep: Old WQ: Time:
	8																	Date: Old WQ: Counts: Time:
							Total=	34	32	29	37	30	33	28	31	38	23	Mean Neonates/Female = 31.5

	Day	pH New	pH Old	D.O. New	D.O. Old	Cond. (µS/cm)	A	B	C	D	E	F	G	H	I	J	Sample ID
6.25%	0	8.08		7.6		399	0	0	0	0	0	0	0	0	0	0	39775
	1	8.12	7.90	8.2	8.1	410	0	0	0	0	0	0	0	0	0	0	39775
	2	8.13	8.16	8.3	7.4	418	0	0	0	0	0	0	0	0	0	0	39824
	3	7.97	7.83	8.2	7.6	409	5	6	5	4	4	4	6	5	6	5	39824
	4	8.10	8.03	7.8	7.3	417	9	12	11	9	5	10	4/6	10	11	11	39853
	5	~~7.98~~ 7.97 SCD 9/16	8.04	7.7	6.7	432	0	0	9	0	4/1	7	–	0	0	0	39853
	6	–	8.06	–	7.7	486	16	19	0	16	–	0	–	20	19	17	–
	7										–		–				
	8										–		–				
							Total=	30	37	25	29	4/10	31	4/6	35	36	33	Mean Neonates/Female = 27.2

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

Client: **Lehigh Permanente** Material: **Pond 9** Test Date: 9/15/15

Project #: 24624 Test ID: 64439 Control Water: Modified EPAMH + 5% American River

	Day	pH New	pH Old	D.O. New	D.O. Old	Cond. (µS/cm)	Temp (°C)	A	B	C	D	E	F	G	H	I	J	SIGN-OFF
12.5%	0	7.96		8.1		492		0	0	0	0	0	0	0	0	0	0	
	1	8.06	7.84	8.2	8.1	489		0	0	0	0	0	0	0	0	0	0	
	2	8.05	8.08	8.3	7.7	508		0	0	0	0	0	0	0	0	0	0	
	3	7.90	7.84	8.4	7.5	501		6	6	5	5	6	6	5	6	5	6	
	4	8.03	8.06	7.9	7.1	502		4	0	10	9	11	13	10	11	9	7	
	5	7.89	8.05	7.6	6.4	514		0	10	11	0	12	16	14	0	0	0	
	6	–	8.14	–	8.0	544		15	17	0	15	0	0	0	17	16	17	
	7																	
	8																	
							Total=	25	33	26	29	29	35	29	34	30	30	Mean Neonates/Female = 30.0

	Day	pH New	pH Old	D.O. New	D.O. Old	Cond. (µS/cm)		A	B	C	D	E	F	G	H	I	J	
25%	0	7.87		8.2		651		0	0	0	0	0	0	0	0	0	0	
	1	8.01	7.84	8.3	7.5	645		0	0	0	0	0	0	0	0	0	0	
	2	7.96	8.04	8.6	7.7	661		0	0	0	0	0	0	0	0	0	0	
	3	7.82	7.96	8.5	7.0	655		4	4	4	3	5	0	5	4	6	4	
	4	7.92	8.18	7.1	7.0	679		9	9	11	7	4/2	0	11	9	9	12	
	5	7.80	8.16	7.9	6.9	664		0	0	5	0	–	0	12	0	14	0	
	6	–	8.24	–	7.9	713		18	14	1	16	–	0	0	17	0	17	
	7											–						
	8											–						
							Total=	31	27	21	26	4/7	0	28	30	29	33	Mean Neonates/Female = 23.2

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

Client: **Lehigh Permanente** Material: **Pond 9** Test Date: 9/15/15

Project #: 24624 Test ID: 64439 Control Water: Modified EPAMH + 5% American River

	Day	pH New	pH Old	D.O. New	D.O. Old	Cond. (µS/cm)	Temp (°C)	A	B	C	D	E	F	G	H	I	J	SIGN-OFF
50%	0	7.75		8.4		949		0	0	0	0	0	0	0	0	0	0	
	1	7.95	7.96	8.3	7.7	944		0	0	0	0	0	0	0	0	0	0	
	2	7.84	8.19	8.6	7.4	962		0	0	0	0	0	0	0	0	0	0	
	3	7.73	8.24	8.7	7.5	972		4	3	4	3	0	6	3	2	5	4	
	4	7.82	8.33	7.9	7.1	963		13	7	12	6	13	11	10	10	8	11	
	5	7.70	8.25	8.1	7.2	974		0	0	15	0	16	4	15	0	0	0	
	6	—		—	7.9	1060		15	10	0	13	0	11	0	17	14	13	
	7																	
	8																	
							Total=	32	20	31	22	29	32	28	29	27	28	Mean Neonates/Female = 27.8

	Day	pH New	pH Old	D.O. New	D.O. Old	Cond. (µS/cm)		A	B	C	D	E	F	G	H	I	J	
100%	0	7.60		8.0		1477		0	0	0	0	0	0	0	0	0	0	
	1	7.94	8.04	8.5	8.2	1488		0	0	0	0	0	0	0	0	0	0	
	2	7.75	8.14	9.0	7.5	1533		0	0	0	0	0	0	0	0	0	0	
	3	7.64	8.16	9.1	7.6	1521		3	5	6	3	4	6	6	5	0	4	
	4	7.71	8.21	8.3	7.6	1529		7	10	8	6	12	12	11	7	7	8	
	5	7.56	8.14	9.1	7.2	1546		0	0	12	0	10	11	14	0	0	0	
	6	—	8.38	—	7.6	1521		14	16	0	8	0	0	2	14	15	12	
	7																	
	8																	
							Total=	24	31	26	17	26	29	33	26	22	24	Mean Neonates/Female = 25.8

Appendix D

Test Data and Summary of Statistics for the Evaluation of the Chronic Toxicity of Lehigh Pond 14 Site Water to *Ceriodaphnia dubia*

CETIS Summary Report

Report Date: 24 Sep-15 09:58 (p 1 of 2)
Test Code: 64441 | 13-0104-4106

Ceriodaphnia Survival and Reproduction Test — **Pacific EcoRisk**

Batch ID:	05-5557-6245	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Alison Briden
Start Date:	15 Sep-15 13:15	**Protocol:**	EPA-821-R-02-013 (2002)	**Diluent:**	Laboratory Water
Ending Date:	21 Sep-15 15:35	**Species:**	Ceriodaphnia dubia	**Brine:**	Not Applicable
Duration:	6d 2h	**Source:**	In-House Culture	**Age:**	1

Sample ID:	08-1336-0159	**Code:**	Pond 14	**Client:**	Lehigh Permanente
Sample Date:	14 Sep-15 11:45	**Material:**	Site Water	**Project:**	24624
Receive Date:	14 Sep-15 14:00	**Source:**	Lehigh Permanente		
Sample Age:	26h (6.2 °C)	**Station:**	Pond 14		

Comparison Summary

Analysis ID	Endpoint	NOEL	LOEL	TOEL	PMSD	TU	Method
01-5022-0365	Reproduction	6.25	12.5	8.839	15.3%	16	Dunnett Multiple Comparison Test
00-4241-1892	Survival	100	>100	NA	NA	1	Fisher Exact/Bonferroni-Holm Test

Point Estimate Summary

Analysis ID	Endpoint	Level	%	95% LCL	95% UCL	TU	Method
12-8433-0602	Reproduction	IC5	8.06	4.75	10.2	12.4	Linear Interpolation (ICPIN)
		IC10	9.87	7.61	14.9	10.13	
		IC15	11.7	9.41	26.4	8.559	
		IC20	21.8	11	33.5	4.583	
		IC25	30.7	12.4	47.2	3.255	
		IC40	54.8	41.2	80	1.826	
		IC50	91.2	64.7	N/A	1.097	

Reproduction Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Lab Water Contr	10	29.4	27.1	31.7	24	34	1.01	3.2	10.9%	0.0%
6.25		10	30.3	27.6	33	26	37	1.2	3.8	12.5%	-3.06%
12.5		10	24.7	21.3	28.1	19	32	1.49	4.72	19.1%	16.0%
25		10	23.6	20.2	27	18	32	1.5	4.74	20.1%	19.7%
50		10	18.3	14.2	22.4	11	29	1.81	5.72	31.2%	37.8%
100		10	14.2	11.5	16.9	10	23	1.18	3.74	26.3%	51.7%

Survival Summary

C-%	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%
6.25		10	0.9	0.674	1	0	1	0.1	0.316	35.1%	10.0%
12.5		10	1	1	1	1	1	0	0	0.0%	0.0%
25		10	1	1	1	1	1	0	0	0.0%	0.0%
50		10	1	1	1	1	1	0	0	0.0%	0.0%
100		10	1	1	1	1	1	0	0	0.0%	0.0%

Ceriodaphnia Survival and Reproduction Test — **Pacific EcoRisk**

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	27	31	32	32	30	25	24	34	30	29
6.25		27	34	26	37	31	29	27	29	28	35
12.5		24	24	21	27	19	27	32	21	32	20
25		26	23	32	23	18	23	19	30	24	18
50		17	16	29	18	17	11	23	12	25	15
100		14	10	11	23	17	15	15	12	13	12

Survival 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	1	1	1	1	1	1	1	1	1	1
6.25		1	1	1	0	1	1	1	1	1	1
12.5		1	1	1	1	1	1	1	1	1	1
25		1	1	1	1	1	1	1	1	1	1
50		1	1	1	1	1	1	1	1	1	1
100		1	1	1	1	1	1	1	1	1	1

Survival Binomials

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	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
6.25		1/1	1/1	1/1	0/1	1/1	1/1	1/1	1/1	1/1	1/1
12.5		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
25		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
50		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
100		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1

CETIS Analytical Report

Report Date: 24 Sep-15 09:58 (p 1 of 1)
Test Code: 64441 | 13-0104-4106

Ceriodaphnia Survival and Reproduction Test — **Pacific EcoRisk**

Analysis ID:	00-4241-1892	**Endpoint:**	Survival	**CETIS Version:**	CETISv1.8.7
Analyzed:	24 Sep-15 9:45	**Analysis:**	STP 2x2 Contingency Tables	**Official Results:**	Yes

Data Transform	Zeta	Alt Hyp	Trials	Seed	NOEL	LOEL	TOEL	TU
Untransformed		C > T	NA	NA	100	>100	NA	1

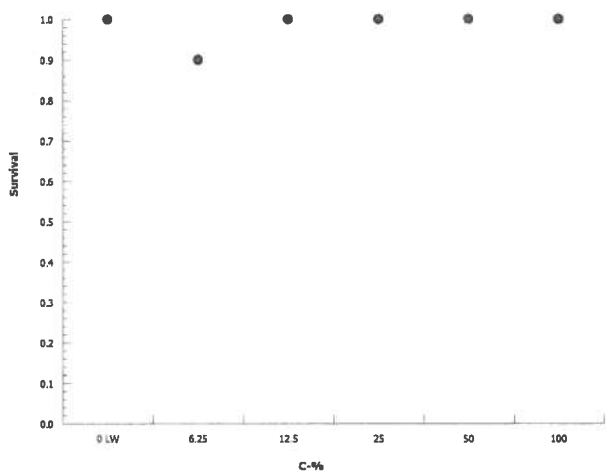
Fisher Exact/Bonferroni-Holm Test

Control	vs	C-%	Test Stat	P-Value	P-Type	Decision(α:5%)
Lab Water Control		6.25	0.5	1.0000	Exact	Non-Significant Effect
		12.5	1	1.0000	Exact	Non-Significant Effect
		25	1	1.0000	Exact	Non-Significant Effect
		50	1	1.0000	Exact	Non-Significant Effect
		100	1	1.0000	Exact	Non-Significant Effect

Data Summary

C-%	Control Type	NR	R	NR + R	Prop NR	Prop R	%Effect
0	Lab Water Cont	10	0	10	1	0	0.0%
6.25		9	1	10	0.9	0.1	10.0%
12.5		10	0	10	1	0	0.0%
25		10	0	10	1	0	0.0%
50		10	0	10	1	0	0.0%
100		10	0	10	1	0	0.0%

Graphics



Analyst: ____ QA: ____

CETIS Analytical Report

Report Date: 24 Sep-15 09:58 (p 1 of 1)
Test Code: 64441 | 13-0104-4106

Ceriodaphnia Survival and Reproduction Test — **Pacific EcoRisk**

Analysis ID:	01-5022-0365	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.8.7
Analyzed:	24 Sep-15 9:58	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	NOEL	LOEL	TOEL	TU
Untransformed	NA	C > T	NA	NA	15.3%	6.25	12.5	8.839	16

Dunnett Multiple Comparison Test

Control vs	C-%	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Lab Water Control	6.25	-0.458	2.29	4.5	18	0.9347	CDF	Non-Significant Effect
	12.5*	2.39	2.29	4.5	18	0.0400	CDF	Significant Effect
	25*	2.95	2.29	4.5	18	0.0101	CDF	Significant Effect
	50*	5.64	2.29	4.5	18	<0.0001	CDF	Significant Effect
	100*	7.73	2.29	4.5	18	<0.0001	CDF	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1959.883	391.9767	5	20.3	<0.0001	Significant Effect
Error	1044.7	19.3463	54			
Total	3004.583		59			

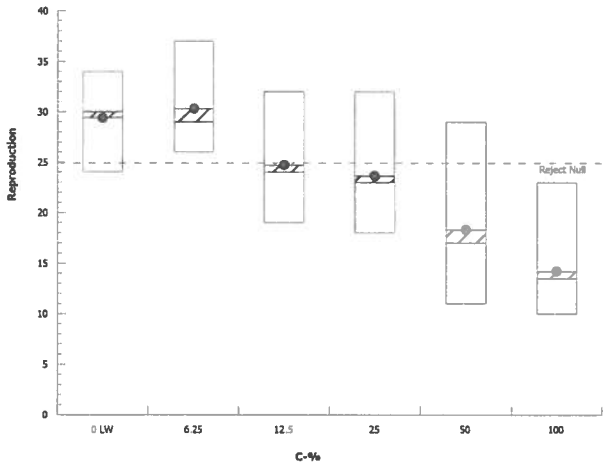
Distributional Tests

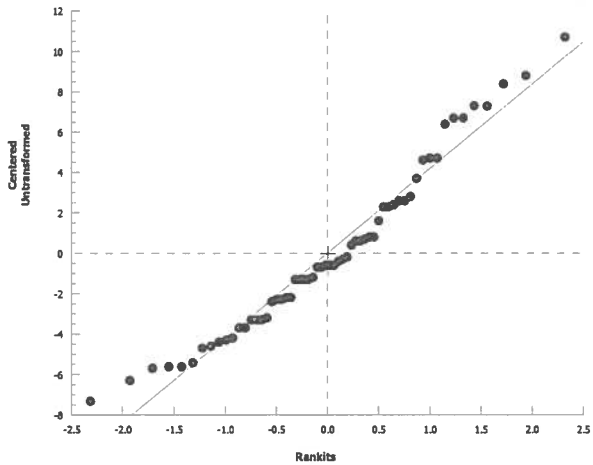
Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	3.78	15.1	0.5819	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.961	0.946	0.0502	Normal Distribution

Reproduction Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Water Contr	10	29.4	27.1	31.7	30	24	34	1.01	10.9%	0.0%
6.25		10	30.3	27.6	33	29	26	37	1.2	12.5%	-3.06%
12.5		10	24.7	21.3	28.1	24	19	32	1.49	19.1%	16.0%
25		10	23.6	20.2	27	23	18	32	1.5	20.1%	19.7%
50		10	18.3	14.2	22.4	17	11	29	1.81	31.2%	37.8%
100		10	14.2	11.5	16.9	13.5	10	23	1.18	26.3%	51.7%

Graphics





CETIS Analytical Report

Report Date: 24 Sep-15 09:58 (p 1 of 1)
Test Code: 64441 | 13-0104-4106

Ceriodaphnia Survival and Reproduction Test — **Pacific EcoRisk**

Analysis ID:	12-8433-0602	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.8.7
Analyzed:	24 Sep-15 9:58	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Linear	Linear	1512825	200	Yes	Two-Point Interpolation

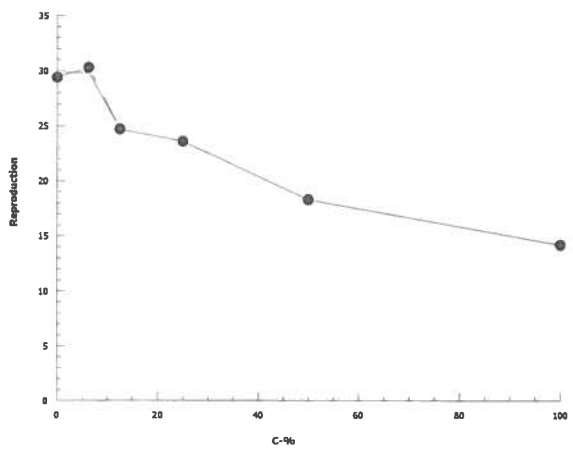
Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	8.06	4.75	10.2	12.4	9.798	21.07
IC10	9.87	7.61	14.9	10.13	6.693	13.14
IC15	11.7	9.41	26.4	8.559	3.783	10.63
IC20	21.8	11	33.5	4.583	2.985	9.118
IC25	30.7	12.4	47.2	3.255	2.118	8.093
IC40	54.8	41.2	80	1.826	1.25	2.427
IC50	91.2	64.7	N/A	1.097	NA	1.545

Reproduction Summary

			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Lab Water Contr	10	29.4	24	34	1.01	3.2	10.9%	0.0%
6.25		10	30.3	26	37	1.2	3.8	12.5%	-3.06%
12.5		10	24.7	19	32	1.49	4.72	19.1%	16.0%
25		10	23.6	18	32	1.5	4.74	20.1%	19.7%
50		10	18.3	11	29	1.81	5.72	31.2%	37.8%
100		10	14.2	10	23	1.18	3.74	26.3%	51.7%

Graphics



Analyst: AB QA: DD

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

Client: **Lehigh Permanente** Material: **Pond 14** Test Date: 9/15/15

Project #: 24624 Test ID: 64441 Randomization: 10.7.1 Control Water: Modified EPAMH + 5% American River

	Day	pH New	pH Old	D.O. New	D.O. Old	Cond. (µS/cm)	Temp (°C)	A	B	C	D	E	F	G	H	I	J	SIGN-OFF
Lab Water Control	0	7.65		8.0		318	24.9	0	0	0	0	0	0	0	0	0	0	Date: 9/15/15 New WQ: YJ Test Init.: KP Sol'n Prep: CD Time: 1315
	1	7.91	7.93	8.3	~~7.3~~ 5N 9/16/15	347	25.3	0	0	0	0	0	0	0	0	0	0	Date: 9/16/15 New WQ: RG Counts: KP Sol'n Prep: CD Old WQ: 5N Time: 1425
	2	7.80	7.63	7.8	6.5	344	25.4	0	0	0	0	0	0	0	0	0	0	Date: 9/17/15 New WQ: C.L. Counts: AWS Sol'n Prep: AW Old WQ: SCD Time: 1005
	3	7.88	7.80	7.8	6.1	311	25.6	5	4	5	5	5	4	5	4	5	5	Date: 9/18/15 New WQ: JBL Counts: AW Sol'n Prep: AWS Old WQ: JBL Time: 1700
	4	7.56	8.02	7.6	2.6	320	25.3	7	8	10	11	11	7	8	8	9	10	Date: 9/19/15 New WQ: CD Counts: AWS Sol'n Prep: AWS Old WQ: 5N Time: 1550
	5	7.78	7.41	7.4	7.2	324	25.1	0	0	0	16	0	14	11	0	16	13	Date: 9/20/15 New WQ: SCD Counts: AW Sol'n Prep: AW Old WQ: SCD Time: 1515
	6	—	7.75	—	7.7	380	25.1	15	19	17	0	14	21	0	22	0	1	Date: 9/21/15 New WQ: — Counts: AW Sol'n Prep: — Old WQ: AW Time: 1535
	7																	Date: New WQ: Counts: Sol'n Prep: Old WQ: Time:
	8																	Date: Old WQ: Counts: Time:
							Total=	27	31	32	32	30	25	24	34	30	~~28~~ 29	Mean Neonates/Female = ~~29.3~~ 29.4

	Day	pH New	pH Old	D.O. New	D.O. Old	Cond. (µS/cm)	A	B	C	D	E	F	G	H	I	J	Sample ID
6.25%	0	7.94		8.0		413	0	0	0	0	0	0	0	0	0	0	39776
	1	7.94	8.00	8.1	7.3	418	0	0	0	0	0	0	0	0	0	0	39776
	2	7.74	7.55	8.0	6.7	430	0	0	0	0	0	0	0	0	0	0	39825
	3	8.02	7.97	7.9	7.5	411	5	6	6	8	8	8	7	6	7	10	39825
	4	7.42	8.06	7.6	4.5	419	7	10	10	8	8	10	7	8	9	8	39854
	5	7.81	7.92	7.3	7.1	445	0	18	10	20	0	11	13	15	12	0	39854
	6	—	7.97	—	7.5	474	15	0	0	X/1	15	17	0	0	0	17	
	7									—							
	8									—							
						Total=	27	34	26	X/37	31	29	27	29	28	35	Mean Neonates/Female = 30.3

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

Client: **Lehigh Permanente** Material: **Pond 14** Test Date: 9/15/15

Project #: 24624 Test ID: 64441 Control Water: Modified EPAMH + 5% American River

	Day	pH New	pH Old	D.O. New	D.O. Old	Cond. (µS/cm)	Temp (°C)	A	B	C	D	E	F	G	H	I	J	SIGN-OFF
12.5%	0	8.14		7.6		503		0	0	0	0	0	0	0	0	0	0	
	1	7.98	8.09	8.1	7.4	501		0	0	0	0	0	0	0	0	0	0	
	2	7.80	7.70	8.0	6.4	517		0	0	0	0	0	0	0	0	0	0	
	3	8.08	8.07	8.0	7.4	502		6	5	6	8	6	8	8	6	8	7	
	4	7.38	8.13	7.7	5.3	508		9	7	6	9	4	5	9	5	6	7	
	5	7.79	8.06	7.5	7.3	510		9	0	9	10	9	14	15	8	0	6	
	6	—	8.06	—	7.5	539		0	12	0	12	3	16	16	2	18	0	
	7																	
	8																	
							Total=	24	24	21	27	19	27	32	21	32	20	Mean Neonates/Female = 24.7

	Day	pH New	pH Old	D.O. New	D.O. Old	Cond. (µS/cm)		A	B	C	D	E	F	G	H	I	J	
25%	0	8.29		7.6		662		0	0	0	0	0	0	0	0	0	0	
	1	8.03	8.18	8.1	7.2	652		0	0	0	0	0	0	0	0	0	0	
	2	8.05	7.79	7.8	6.5	675		0	0	0	0	0	0	0	0	0	0	
	3	8.15	8.19	8.0	7.5	651		7	8	8	7	7	6	6	5	7	7	
	4	7.41	8.21	7.6	4.3	670		8	7	10	9	7	8	7	7	9	6	
	5	7.74	8.16	7.6	7.1	~~716~~ 700		11	8	14	7	4	9	6	6	8	5	
	6	—	8.17	—	7.5	735		0	0	0	12	0	17	16	18	0	0	
	7																	
	8																	
							Total=	26	23	32	23	18	23	19	30	24	18	Mean Neonates/Female = 23.6

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

Client: **Lehigh Permanente** Material: **Pond 14** Test Date: 9/15/15

Project #: 24624 Test ID: 64441 Control Water: Modified EPAMH + 5% American River

	Day	pH New	pH Old	D.O. New	D.O. Old	Cond. (µS/cm)	Temp (°C)	A	B	C	D	E	F	G	H	I	J	SIGN-OFF
50%	0	8.34		7.9		979		0	0	0	0	0	0	0	0	0	0	
	1	8.15	8.31	8.2	7.5	978		0	0	0	0	0	0	0	0	0	0	
	2	8.21	8.10	7.7	7.0	998		0	0	0	0	0	0	0	0	0	0	
	3	8.21	8.36	8.1	7.4	968		6	6	6	7	5	5	6	5	6	5	
	4	7.46	8.36	7.1	7.5	988		7	6	9	4	7	6	5	7	7	5	
	5	7.64	8.26	7.9	7.3	~~1018~~ 1026 9-30-15		4	4	0	7	5	0	0	0	0	5	
	6	—	8.28	—	7.4	1131		0	0	14	15	0	0	12	0	12	0	
	7																	
	8																	
							Total=	17	16	29	18	17	11	23	12	25	15	Mean Neonates/Female = 18.3

	Day	pH New	pH Old	D.O. New	D.O. Old	Cond. (µS/cm)		A	B	C	D	E	F	G	H	I	J	
100%	0	8.38		8.0		1559		0	0	0	0	0	0	0	0	0	0	
	1	8.19	8.33	8.3	7.4	1564		0	0	0	0	0	0	0	0	0	0	
	2	8.30	8.24	7.5	6.5	1615		0	0	0	0	0	0	0	0	0	0	
	3	8.19	8.22	8.0	6.7	1583		5	4	3	5	6	4	6	4	4	6	
	4	7.89	8.26	8.3	3.0	1605		5	5	7	5	6	5	6	8	6	6	
	5	7.51	8.19	7.1	6.8	1631		4	1	1	0	5	6	3	0	3	0	
	6	—	8.27	—	7.5	1619		0	0	0	13	6	10	0	0	0	0	
	7																	
	8																	
							Total=	14	10	11	23	17	15	15	12	13	12	Mean Neonates/Female = 14.2

Appendix E

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

CETIS Summary Report

Report Date: 26 Sep-15 13:24 (p 1 of 2)
Test Code: 64351 | 06-9296-9441

Ceriodaphnia Survival and Reproduction Test — **Pacific EcoRisk**

Batch ID:	20-8133-0693	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Padrick Anderson
Start Date:	15 Sep-15 17:00	**Protocol:**	EPA-821-R-02-013 (2002)	**Diluent:**	Laboratory Water
Ending Date:	21 Sep-15 14:30	**Species:**	Ceriodaphnia dubia	**Brine:**	Not Applicable
Duration:	5d 21h	**Source:**	In-House Culture	**Age:**	1

Sample ID:	14-4899-8268	**Code:**	NaCl	**Client:**	Pacific Ecorisk
Sample Date:	15 Sep-15 17:00	**Material:**	Sodium chloride	**Project:**	24590
Receive Date:	15 Sep-15 17:00	**Source:**	Reference Toxicant		
Sample Age:	NA (24.4 °C)	**Station:**	In House		

Comparison Summary

Analysis ID	Endpoint	NOEL	LOEL	TOEL	PMSD	TU	Method
20-8428-9827	Reproduction	500	1000	707.1	16.2%		Dunnett Multiple Comparison Test
19-2068-4920	Survival	1500	2000	1732	NA		Fisher Exact/Bonferroni-Holm Test

Point Estimate Summary

Analysis ID	Endpoint	Level	mg/L	95% LCL	95% UCL	TU	Method
19-3853-7411	Reproduction	IC5	458	164	622		Linear Interpolation (ICPIN)
		IC10	587	327	763		
		IC15	683	491	905		
		IC20	779	610	1020		
		IC25	875	724	1080		
		IC40	1140	952	1310		
		IC50	1310	1140	1520		
13-6938-6312	Survival	EC5	1330	858	1540		Linear Regression (MLE)
		EC10	1430	991	1620		
		EC15	1490	1090	1680		
		EC20	1550	1180	1730		
		EC25	1600	1250	1780		
		EC40	1730	1450	1920		
		EC50	1810	1570	2030		

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	33	29.5	36.5	27	43	1.53	4.83	14.6%	0.0%
500		10	31.2	28.2	34.2	24	37	1.31	4.16	13.3%	5.45%
1000		10	22.6	18.1	27.1	10	31	1.97	6.22	27.5%	31.5%
1500		10	12.6	7.77	17.4	2	23	2.14	6.75	53.6%	61.8%
2000		10	1.6	0.161	3.04	0	5	0.636	2.01	126.0%	95.2%
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	0.8	0.498	1	0	1	0.133	0.422	52.7%	20.0%
2000		10	0.4	0.0306	0.769	0	1	0.163	0.516	129.0%	60.0%
2500		10	0	0	0	0	0	0	0		100.0%

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	27	33	29	43	35	30	28	33	37	35
500		37	27	29	24	32	29	30	36	35	33
1000		28	28	27	20	22	23	19	10	31	18
1500		11	2	15	23	16	10	20	17	7	5
2000		1	4	5	4	0	0	2	0	0	0
2500		0	0	0	0	0	0	0	0	0	0

Survival Detail

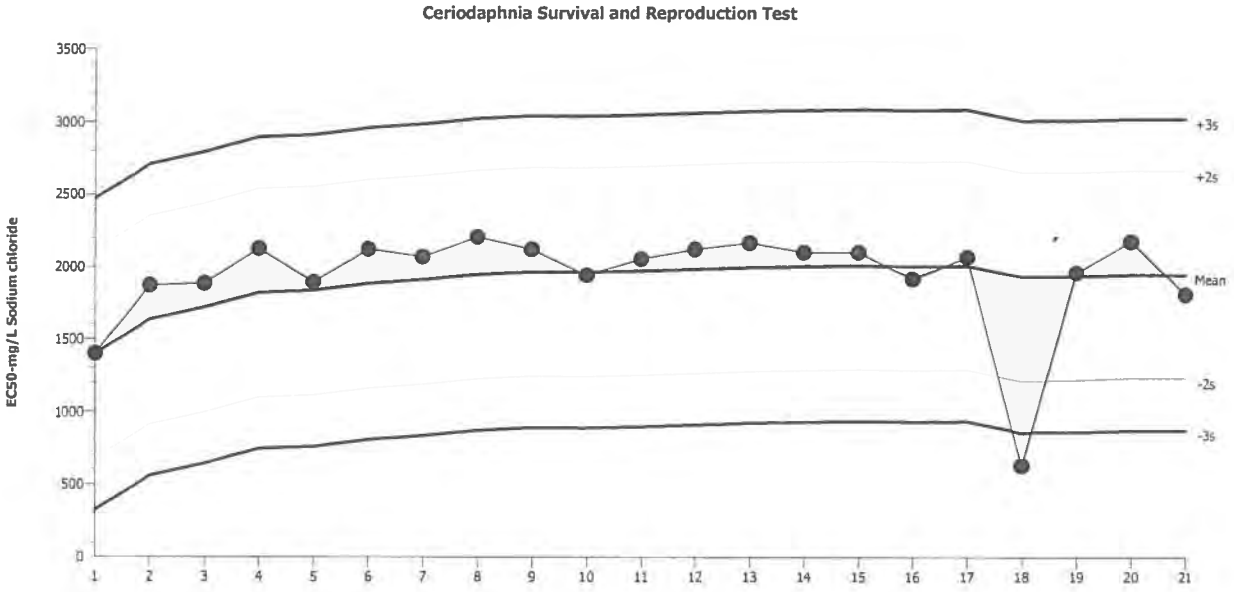
C-mg/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Lab Water Contr	1	1	1	1	1	1	1	1	1	1
500		1	1	1	1	1	1	1	1	1	1
1000		1	1	1	1	1	1	1	1	1	1
1500		1	0	1	1	1	1	1	1	1	0
2000		0	1	1	1	0	1	0	0	0	0
2500		0	0	0	0	0	0	0	0	0	0

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	0/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	0/1
2000		0/1	1/1	1/1	1/1	0/1	1/1	0/1	0/1	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



Mean:	1948	**Count:**	20	**-2s Warning Limit:**	1231	**-3s Action Limit:**	871.7
Sigma:	358.8	**CV:**	18.40%	**+2s Warning Limit:**	2666	**+3s Action Limit:**	3025

Quality Control Data

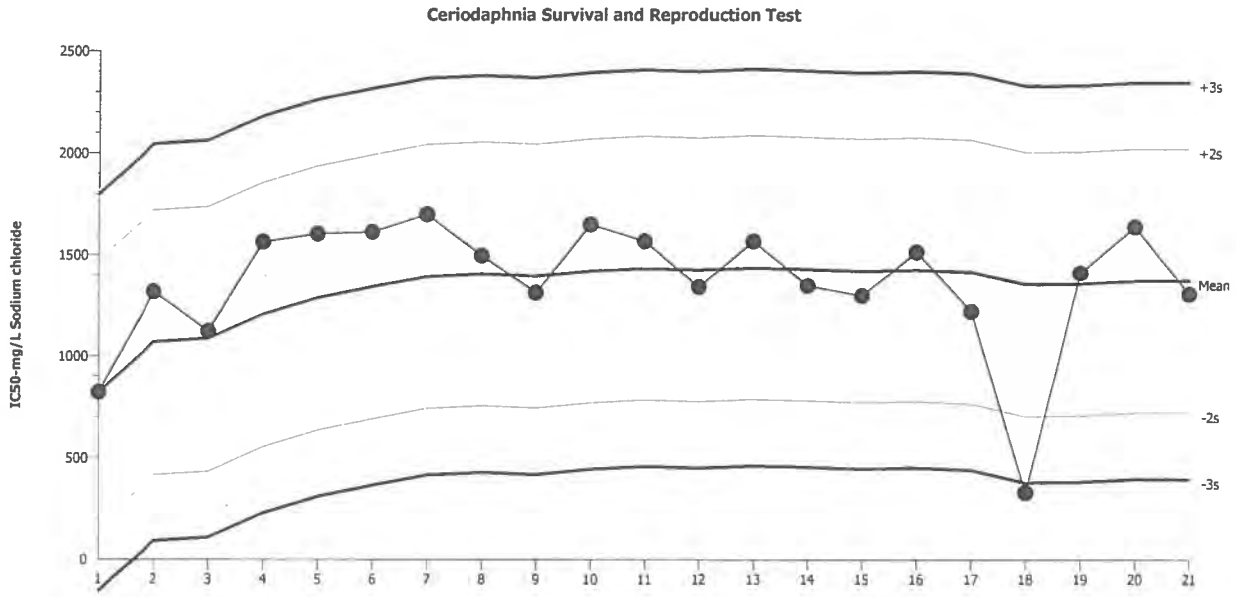
Point	Year	Month	Day	Time	QC Data	Delta	Sigma	Warning	Action	Test ID	Analysis ID
1	2015	Jul	3	11:30	1400	-548	-1.527			05-9489-9271	00-0716-5913
2			7	15:30	1869	-79.28	-0.2209			20-2387-0990	12-4449-9555
3			8	17:15	1882	-66.22	-0.1846			05-8720-1521	15-2237-3817
4			14	13:30	2128	180.2	0.5023			11-6494-1177	05-0094-1282
5			16	16:15	1890	-57.99	-0.1616			18-2463-5066	01-5531-2771
6			21	14:30	2125	176.7	0.4925			18-6122-3280	02-0448-3927
7			23	16:00	2071	123.1	0.3432			18-2978-9513	21-2000-6378
8			28	15:35	2209	260.5	0.7261			09-9848-9638	18-8641-5668
9		Aug	4	14:15	2125	176.7	0.4925			18-6262-4809	17-4094-6966
10			5	14:02	1943	-5.359	-0.01494			12-8114-3837	01-4064-2790
11			6	15:10	2056	108.3	0.3017			09-6403-5805	14-5628-8134
12			11	13:00	2125	176.7	0.4925			04-0682-9785	18-6727-4520
13			12	14:45	2170	221.8	0.6181			08-6231-6067	10-6559-9529
14			18	14:30	2105	157.4	0.4388			05-0587-0038	18-4448-4485
15			20	16:25	2105	157.4	0.4388			13-7567-4242	03-8731-5685
16			25	15:04	1918	-30.13	-0.08398			08-0273-8535	07-8040-7983
17			27	15:20	2071	123.1	0.3432			20-9513-2280	12-2014-2809
18		Sep	1	16:20	628.3	-1320	-3.678	(-)	(-)	20-3876-7118	01-6846-4039
19			8	15:50	1962	13.59	0.03788			12-2001-6899	03-5565-5622
20			9	15:00	2181	233.4	0.6506			11-9675-7954	13-3852-5596
21			15	15:45	1811	-137.1	-0.3822			06-9296-9441	13-6938-6312

CETIS QC Plot

Report Date: 24 Sep-15 15:48 (1 of 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:**	Reproduction	**Source:**	Reference Toxicant-REF



Mean:	1372	**Count:**	20	**-2s Warning Limit:**	720.9	**-3s Action Limit:**	395.1
Sigma:	325.8	**CV:**	23.70%	**+2s Warning Limit:**	2024	**+3s Action Limit:**	2350

Quality Control Data

Point	Year	Month	Day	Time	QC Data	Delta	Sigma	Warning	Action	Test ID	Analysis ID
1	2015	Jul	3	11:30	821.8	-550.2	-1.689			05-9489-9271	05-5772-7708
2			7	15:30	1317	-55.14	-0.1692			20-2387-0990	18-6587-1841
3			8	17:15	1120	-251.8	-0.7729			05-8720-1521	11-9271-0690
4			14	13:30	1565	193.1	0.5926			11-6494-1177	03-4668-7446
5			16	16:15	1605	232.9	0.7147			18-2463-5066	14-5318-5346
6			21	14:30	1614	242	0.7427			18-6122-3280	09-5780-3828
7			23	16:00	1701	328.7	1.009			18-2978-9513	11-8228-3766
8			28	15:35	1497	124.9	0.3835			09-9848-9638	06-9735-5946
9		Aug	4	14:15	1312	-60.46	-0.1856			18-6262-4809	10-5513-8068
10			5	14:02	1652	279.6	0.8581			12-8114-3837	13-6608-2649
11			6	15:10	1570	197.7	0.6067			09-6403-5805	01-9639-6894
12			11	13:00	1341	-30.65	-0.09409			04-0682-9785	05-0962-6341
13			12	14:45	1570	197.8	0.607			08-6231-6067	20-9974-7840
14			18	14:30	1348	-24.17	-0.0742			05-0587-0038	18-7837-5382
15			20	16:25	1298	-74.13	-0.2275			13-7567-4242	11-0810-8545
16			25	15:04	1517	145.1	0.4455			08-0273-8535	11-3164-3183
17			27	15:20	1219	-153	-0.4695			20-9513-2280	11-0915-0841
18		Sep	1	16:20	328.8	-1043	-3.202	(-)	(-)	20-3876-7118	03-5828-5757
19			8	15:50	1413	40.5	0.1243			12-2001-6899	17-0009-4551
20			9	15:00	1642	270	0.8286			11-9675-7954	01-7276-9080
21			15	15:45	1305	-67	-0.2056			06-9296-9441	19-3853-7411

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

Client: Reference Toxicant | Material: Sodium Chloride | Test Date: 9/15/15

Project #: 24590 | Test ID: 64351 | Randomization: 10.75 | Control Water: Modified EPAMH w/ 5% Ambient Water

Lab Water Control

Day	pH New	pH Old	D.O. New	D.O. Old	Conductivity (µS/cm) New	Conductivity (µS/cm) Old	Temp (°C)	A	B	C	D	E	F	G	H	I	J
0	8.18		7.3		341		24.4	0	0	0	0	0	0	0	0	0	0
1	8.01	7.89	8.3	7.7	314	402	25.3	0	0	0	0	0	0	0	0	0	0
2	7.78	8.13	8.3	7.7	322	349	25.3	0	0	0	0	0	0	0	0	0	0
3	7.93	7.75	8.1	7.5	330	364	25.6	5	5	4	7	6	6	6	5	6	5
4	7.64	7.98	7.7	8.4	321	446	25.3	5	10	0	0	11	7	4	7	0	11
5	7.97	7.86	7.5	7.5	319	350	25.1	0	0	12	14	0	0	13	0	15	0
6	–	7.87	–	7.9	–	371	25.4	17	18	13	22	18	17	0	21	16	19
7																	
8																	
							Total=	27	33	29	43	35	30	28	33	37	35

SIGN-OFF

	Date	Sol'n Prep	New WQ	Old WQ	Test Init. / Counts	Time
0	9/15/15	YJ	YJ		YJ	1700
1	9/16/15	YJ	RG	LC	SM	1005
2	9/17/15	YJ	VM	JBL	AW	1500
3	9/18/15	YJ	JBL	RG	AW	1530
4	9/19/15	YJ	CO	RG	AMT	1605
5	9.20.15	Ecu	EC	VM	AW	1405
6	9.21.15	–	–	SCD	PA	1430
7			–	SCD		
8						

Mean Neonates/Female = 33.0

500 mg/L

Day	pH New	pH Old	D.O. New	D.O. Old	Conductivity (µS/cm) New	Conductivity (µS/cm) Old	A	B	C	D	E	F	G	H	I	J	RT BATCH NUMBER
0	8.13		7.4		1251		0	0	0	0	0	0	0	0	0	0	191
1	7.96	7.91	8.5	8.1	1255	1523	0	0	0	0	0	0	0	0	0	0	191
2	7.70	8.06	8.3	7.9	1245	1447	0	0	0	0	0	0	0	0	0	0	191
3	7.97	7.72	8.2	7.5	1270	1387	5	5	6	5	6	5	6	5	6	5	191
4	7.56	8.02	7.9	6.9	1274	1583	0	9	0	7	0	7	12	0	0	10	191
5	7.94	7.84	7.9	5.2	1265	1457	11	0	11	0	14	0	0	12	14	0	191
6	–	7.94	–	7.5	–	1464	21	13	12	12	12	17	12	19	15	18	–
7																	
8											10.14.15						
							Total=	37	27	29	24	~~22~~ 32	29	30	36	35	33	

Mean Neonates/Female ~~30.2~~ 31.2 10.14.15

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

Client: **Reference Toxicant** Material: **Sodium Chloride** Test Date: 9/15/15

Project #: 24590 Test ID: 64351 Randomization: 1075 Control Water: Modified EPAMH w/ 5% Ambient Water

	Day	pH New	pH Old	D.O. New	D.O. Old	Conductivity (µS/cm) New	Conductivity (µS/cm) Old	Temp (°C)	A	B	C	D	E	F	G	H	I	J
1000 mg/L	0	8.12		7.6		2205			0	0	0	0	0	0	0	0	0	0
	1	7.96	7.96	8.6	8.1	2134	2654		0	0	0	0	0	0	0	0	0	0
	2	7.73	8.06	8.4	8.2	2237	2568		0	0	0	0	0	0	0	0	0	0
	3	7.97	7.72	8.5	7.6	2252	2644		4	5	4	3	5	5	5	5	5	6
	4	7.59	8.04	8.3	7.6	2172	2619		5	6	0	7	8	0	7	5	0	0
	5	7.90	7.86	8.5	6.3	2185	2507		1	1	6	0	0	8	0	0	14	12
	6	—	7.94	—	7.7	—	2467		18	16	17	10	9	10	7	0	12	0
	7																	
	8																	
								Total=	28	28	27	20	22	23	19	10	31	18

Mean Neonates/Female = 22.6

	Day	pH New	pH Old	D.O. New	D.O. Old	Conductivity (µS/cm) New	Conductivity (µS/cm) Old	Temp (°C)	A	B	C	D	E	F	G	H	I	J
1500 mg/L	0	8.10		7.8		3042			0	0	0	0	0	0	0	0	0	0
	1	7.96	7.99	8.7	8.2	3069	3400		0	0	0	0	0	0	0	0	0	0
	2	7.77	8.06	9.0	7.5	3060	3445		0	0	0	0	0	0	0	0	0	0
	3	7.96	7.75	8.7	7.7	3066	3430		3	2	3	3	3	3	2	2	3	2
	4	7.64	8.00	8.7	7.6	3074	3540		5	X/0	0	6	7	0	5	1	1	3
	5	7.88	7.87	8.6	6.2	3070	3460		0	—	6	8	0	7	13	8	3	0
	6	—	7.94	—	7.5	—	3390		3	—	6	6	6	0	0	6	0	X/0
	7									—								
										—								
								Total=	11	X/2	15	23	16	10	20	17	7	X/5

Mean Neonates/Female = 12.6

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

Client: **Reference Toxicant** Material: **Sodium Chloride** Test Date: ~~9~~ 9/15/15 (JN 9/15)

Project #: 24590 Test ID: 64351 Randomization: 10.75 Control Water: Modified EPAMH w/ 5% Ambient Water

	Day	pH New	pH Old	D.O. New	D.O. Old	Conductivity (µS/cm) New	Conductivity (µS/cm) Old	Temp (°C)	A	B	C	D	E	F	G	H	I	J	
2000 mg/L	0	8.08		8.1		3935			0	0	0	0	0	0	0	0	0	0	
	1	7.96	7.99	8.9	8.2	4100	4492		0	0	0	0	X/0	0	0	X/0	0	0	
	2	7.75	8.03	9.1	8.1	4040	4698		0	0	0	0	–	0	0	–	X/0	X/0	
	3	7.95	7.75	8.8	7.8	3985	4540		0	0	0	0	–	0	0	–	–	–	
	4	7.65	8.00	9.1	7.7	3941	4390		0	0	0	0	–	0	0	–	–	–	
	5	7.85	7.87	8.9	6.4	4050	4460		1	3	2	4	–	0	2	–	–	–	
	6	–	7.93	–	7.6	–	4290		X/0	1	3	0	–	0	X/0	–	–	–	
	7												–			–	–	–	
	8												–			–	–	–	
								Total=	X/1	4	5	4	X/0	0	X/2	X/0	X/0	X/0	Mean Neonates/Female = ~~1.4~~ 1.6 CD 9/26/15

Survival / Reproduction (2000 mg/L): A–J

	Day	pH New	pH Old	D.O. New	D.O. Old	Conductivity (µS/cm) New	Conductivity (µS/cm) Old		A	B	C	D	E	F	G	H	I	J	
2500 mg/L	0	8.06		8.5		4946			0	0	0	0	0	0	0	0	0	0	
	1	7.96	7.99	9.0	8.2	4894	5824		X/0	X/0	X/0	X/0	X/0	X/0	X/0	X/0	X/0	X/0	
	2	–	–	–	–	–	–		–	–	–	–	–	–	–	–	–	–	
	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 = X/0

Survival / Reproduction (2500 mg/L): A–J

REVISED

Wednesday, October 14, 2015

Paul Bedore
Robertson-Bryan, Inc.
9888 Kent Street
Elk Grove, CA 95624

Re Lab Order: Q090666 Collected By: CHARLENE DERHEIM
Project ID: LEHIGH TRE PO/Contract #:

Dear Paul Bedore:

Enclosed are the analytical results for sample(s) received by the laboratory on Friday, September 18, 2015. Results reported herein conform to the most current NELAC standards, where applicable, unless otherwise narrated in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Enclosures

Project Manager: Melinda F. Kelley

This report shall not be reproduced, except in full,
without the written consent of CALTEST ANALYTICAL LABORATORY

1885 North Kelly Road • Napa, California 94558
(707) 258-4000 • Fax (707) 226-1001 • e-mail: info@caltestlabs.com

REVISED

SAMPLE SUMMARY

Lab Order: Q090666
Project ID: LEHIGH TRE

Lab ID	Sample ID	Matrix	Date Collected	Date Received
Q090666001	**POND 4A**	Water	09/18/2015 08:00	09/18/2015 14:51
Q090666002	**POND 4A**	Water	09/18/2015 08:00	09/18/2015 14:51
Q090666003	**POND 9**	Water	09/18/2015 10:12	09/18/2015 14:51
Q090666004	**POND 9**	Water	09/18/2015 10:12	09/18/2015 14:51
Q090666005	**POND 14**	Water	09/18/2015 10:40	09/18/2015 14:51
Q090666006	**POND 14**	Water	09/18/2015 10:40	09/18/2015 14:51

This report shall not be reproduced, except in full,
without the written consent of CALTEST ANALYTICAL LABORATORY

1885 North Kelly Road • Napa, California 94558
(707) 258-4000 • Fax (707) 226-1001 • e-mail: info@caltestlabs.com

REVISED

NARRATIVE

Lab Order: Q090666
Project ID: LEHIGH TRE

General Qualifiers and Notes

Caltest authorizes this report to be reproduced only in its entirety. Results are specific to the sample(s) as submitted and only to the parameter(s) reported.

Caltest certifies that all test results for wastewater and hazardous waste analyses meet all applicable NELAC requirements; all microbiology and drinking water testing meet applicable ELAP requirements, unless stated otherwise.

All analyses performed by EPA Methods or Standard Methods (SM) 20th Edition except where noted (SMOL=online edition).

Caltest collects samples in compliance with 40 CFR, EPA Methods, Cal. Title 22, and Standard Methods.

Dilution Factors (DF) reported greater than '1' have been used to adjust the result, Reporting Limit (RL), and Method Detection Limit (MDL).

All Solid, sludge, and/or biosolids data is reported in Wet Weight, unless otherwise specified.

Filtrations performed at Caltest for dissolved metals (excluding mercury) and/or pH analysis are not performed within the 15 minute holding time as specified by 40CFR 136.3 table II.

Results Qualifiers: Report fields may contain codes and non-numeric data correlating to one or more of the following definitions:

ND - Non Detect - indicates analytical result has not been detected.

RL - Reporting Limit is the quantitation limit at which the laboratory is able to detect an analyte. An analyte not detected at or above the RL is reported as ND unless otherwise noted or qualified. For analyses pertaining to the State Implementation Plan of the California Toxics Rule, the Caltest Reporting Limit (RL) is equivalent to the Minimum Level (ML). A standard is always run at or below the ML. Where Reporting Limits are elevated due to dilution, the ML calibration criteria has been met.

J - reflects estimated analytical result value detected below the Reporting Limit (RL) and above the Method Detection Limit (MDL). The 'J' flag is equivalent to the DNQ Estimated Concentration flag.

E - indicates an estimated analytical result value.

B - indicates the analyte has been detected in the blank associated with the sample.

NC - means not able to be calculated for RPD or Spike Recoveries.

SS - compound is a Surrogate Spike used per laboratory quality assurance manual.

NOTE: This document represents a complete Analytical Report for the samples referenced herein and should be retained as a permanent record thereof.

Workorder Notes

Report revised to include Thallium results and to remove Titanium results previously reported in error.

This report shall not be reproduced, except in full,
without the written consent of CALTEST ANALYTICAL LABORATORY

1885 North Kelly Road • Napa, California 94558
(707) 258-4000 • Fax (707) 226-1001 • e-mail: info@caltestlabs.com

REVISED

ANALYTICAL RESULTS

Lab Order: Q090666
Project ID: LEHIGH TRE

Lab ID **Q090666001** Date Collected 9/18/2015 08:00 Matrix Water
Sample ID **POND 4A** Date Received 9/18/2015 14:51

Parameters	Result	Units	R. L.	MDL	DF	Prepared	Batch	Analyzed	Batch	Qual
Metals by ICPMS Collision Mode, Total		**Prep Method:**	EPA 200.8			**Prep by:**	UK			
		Analytical Method:	EPA 200.8					**Analyzed by:**	LM	
Aluminum	J8.8	ug/L	10	1.2	1	09/24/15 00:00	MPR 13854	09/25/15 19:05	MMS 7758	
Antimony	0.93	ug/L	0.50	0.050	1	09/24/15 00:00	MPR 13854	09/25/15 19:05	MMS 7758	
Arsenic	1.3	ug/L	0.50	0.060	1	09/24/15 00:00	MPR 13854	09/25/15 19:05	MMS 7758	
Barium	50	ug/L	0.10	0.080	1	09/24/15 00:00	MPR 13854	09/25/15 19:05	MMS 7758	
Beryllium	ND	ug/L	0.10	0.090	1	09/24/15 00:00	MPR 13854	09/25/15 19:05	MMS 7758	
Boron	140	ug/L	10	2.0	1	09/24/15 00:00	MPR 13854	09/25/15 19:05	MMS 7758	
Cadmium	0.13	ug/L	0.10	0.050	1	09/24/15 00:00	MPR 13854	09/25/15 19:05	MMS 7758	
Calcium	95	mg/L	0.10	0.040	2	09/24/15 00:00	MPR 13854	09/28/15 19:08	MMS 7758	
Chromium	5.1	ug/L	0.50	0.050	1	09/24/15 00:00	MPR 13854	09/25/15 19:05	MMS 7758	
Cobalt	J0.16	ug/L	0.50	0.020	1	09/24/15 00:00	MPR 13854	09/25/15 19:05	MMS 7758	
Copper	1.6	ug/L	0.50	0.15	1	09/24/15 00:00	MPR 13854	09/25/15 19:05	MMS 7758	
Lead	ND	ug/L	0.25	0.030	1	09/24/15 00:00	MPR 13854	09/25/15 19:05	MMS 7758	
Magnesium	43	mg/L	0.050	0.0050	1	09/24/15 00:00	MPR 13854	09/25/15 19:05	MMS 7758	
Molybdenum	150	ug/L	0.25	0.14	2	09/24/15 00:00	MPR 13854	09/28/15 19:08	MMS 7758	
Nickel	7.0	ug/L	0.50	0.060	1	09/24/15 00:00	MPR 13854	09/25/15 19:05	MMS 7758	
Potassium	46	mg/L	0.05	0.020	1	09/24/15 00:00	MPR 13854	09/25/15 19:05	MMS 7758	
Selenium	16	ug/L	1.0	0.40	1	09/24/15 00:00	MPR 13854	09/25/15 19:05	MMS 7758	
Silver	ND	ug/L	0.10	0.020	1	09/24/15 00:00	MPR 13854	09/25/15 19:05	MMS 7758	
Sodium	86	mg/L	0.10	0.040	2	09/24/15 00:00	MPR 13854	09/28/15 19:08	MMS 7758	
Thallium	0.30	ug/L	0.10	0.050	1	09/24/15 00:00	MPR 13854	10/13/15 15:20	MMS 7758	
Tin	ND	ug/L	1.0	0.20	1	09/24/15 00:00	MPR 13854	09/25/15 19:05	MMS 7758	
Vanadium	45	ug/L	2.0	0.30	1	09/24/15 00:00	MPR 13854	09/25/15 19:05	MMS 7758	
Zinc	3.8	ug/L	1.0	0.70	1	09/24/15 00:00	MPR 13854	09/25/15 19:05	MMS 7758	

Lab ID **Q090666002** Date Collected 9/18/2015 08:00 Matrix Water
Sample ID **POND 4A** Date Received 9/18/2015 14:51

Parameters	Result	Units	R. L.	MDL	DF	Prepared	Batch	Analyzed	Batch	Qual
Total Dissolved Solids Analysis		**Analytical Method:**	SM 2540 C-97					**Analyzed by:**	JDC	
Total Dissolved Solids	890	mg/L	20	8.0	2			09/23/15 15:49	WGR 5877	
Anions by Ion Chromatography		**Analytical Method:**	EPA 300.0					**Analyzed by:**	MYS	
Chloride	110	mg/L	10	2.0	10			10/01/15 07:25	WIC 5133	
Sulfate (as SO4)	390	mg/L	20	5.0	50			10/01/15 07:42	WIC 5133	
Alkalinity, Total Analysis		**Analytical Method:**	SM 2320 B-97					**Analyzed by:**	CLM	
Bicarbonate (as CACO3)	97	mg/L	10	1.2	1			09/28/15 12:34	WTI 2704	
Carbonate (as CACO3)	ND	mg/L	10	1.2	1			09/28/15 12:34	WTI 2704	
Hydroxide (as CACO3)	ND	mg/L	10	1.2	1			09/28/15 12:34	WTI 2704	
Alkalinity, Total (as CACO3)	97	mg/L	10	1.2	1			09/28/15 12:34	WTI 2704	

This report shall not be reproduced, except in full,
without the written consent of CALTEST ANALYTICAL LABORATORY

1885 North Kelly Road • Napa, California 94558
(707) 258-4000 • Fax (707) 226-1001 • e-mail: info@caltestlabs.com

REVISED

ANALYTICAL RESULTS

Lab Order: Q090666
Project ID: LEHIGH TRE

Lab ID **Q090666003** Date Collected 9/18/2015 10:12 Matrix Water
Sample ID **POND 9** Date Received 9/18/2015 14:51

Parameters	Result	Units	R. L.	MDL	DF	Prepared	Batch	Analyzed	Batch	Qual
Metals by ICPMS Collision Mode, Total		**Prep Method:**	EPA 200.8			**Prep by:**	UK			
		Analytical Method:	EPA 200.8					**Analyzed by:**	LM	
Aluminum	J4.4	ug/L	10	1.2	1	09/24/15 00:00	MPR 13854	09/25/15 19:22	MMS 7758	
Antimony	J0.09	ug/L	0.50	0.050	1	09/24/15 00:00	MPR 13854	09/25/15 19:22	MMS 7758	
Arsenic	J0.43	ug/L	0.50	0.060	1	09/24/15 00:00	MPR 13854	09/25/15 19:22	MMS 7758	
Barium	43	ug/L	0.10	0.080	1	09/24/15 00:00	MPR 13854	09/25/15 19:22	MMS 7758	
Beryllium	ND	ug/L	0.10	0.090	1	09/24/15 00:00	MPR 13854	09/25/15 19:22	MMS 7758	
Boron	140	ug/L	10	2.0	1	09/24/15 00:00	MPR 13854	09/25/15 19:22	MMS 7758	
Cadmium	0.20	ug/L	0.10	0.050	1	09/24/15 00:00	MPR 13854	09/25/15 19:22	MMS 7758	
Calcium	190	mg/L	0.25	0.10	5	09/24/15 00:00	MPR 13854	09/28/15 18:45	MMS 7758	
Chromium	J0.22	ug/L	0.50	0.050	1	09/24/15 00:00	MPR 13854	09/25/15 19:22	MMS 7758	
Cobalt	J0.36	ug/L	0.50	0.020	1	09/24/15 00:00	MPR 13854	09/25/15 19:22	MMS 7758	
Copper	0.69	ug/L	0.50	0.15	1	09/24/15 00:00	MPR 13854	09/25/15 19:22	MMS 7758	
Lead	ND	ug/L	0.25	0.030	1	09/24/15 00:00	MPR 13854	09/25/15 19:22	MMS 7758	
Magnesium	73	mg/L	0.10	0.010	2	09/24/15 00:00	MPR 13854	09/28/15 18:22	MMS 7758	
Molybdenum	140	ug/L	0.25	0.14	2	09/24/15 00:00	MPR 13854	09/28/15 18:22	MMS 7758	
Nickel	1.6	ug/L	0.50	0.060	1	09/24/15 00:00	MPR 13854	09/25/15 19:22	MMS 7758	
Potassium	10	mg/L	0.05	0.020	1	09/24/15 00:00	MPR 13854	09/25/15 19:22	MMS 7758	
Selenium	J0.98	ug/L	1.0	0.40	1	09/24/15 00:00	MPR 13854	09/25/15 19:22	MMS 7758	
Silver	ND	ug/L	0.10	0.020	1	09/24/15 00:00	MPR 13854	09/25/15 19:22	MMS 7758	
Sodium	51	mg/L	0.10	0.040	2	09/24/15 00:00	MPR 13854	09/28/15 18:22	MMS 7758	
Thallium	ND	ug/L	0.10	0.050	1	09/24/15 00:00	MPR 13854	10/13/15 15:26	MMS 7758	
Tin	ND	ug/L	1.0	0.20	1	09/24/15 00:00	MPR 13854	09/25/15 19:22	MMS 7758	
Vanadium	J1.5	ug/L	2.0	0.30	1	09/24/15 00:00	MPR 13854	09/25/15 19:22	MMS 7758	
Zinc	4.4	ug/L	1.0	0.70	1	09/24/15 00:00	MPR 13854	09/25/15 19:22	MMS 7758	

Lab ID **Q090666004** Date Collected 9/18/2015 10:12 Matrix Water
Sample ID **POND 9** Date Received 9/18/2015 14:51

Parameters	Result	Units	R. L.	MDL	DF	Prepared	Batch	Analyzed	Batch	Qual
Total Dissolved Solids Analysis		**Analytical Method:**	SM 2540 C-97					**Analyzed by:**	JDC	
Total Dissolved Solids	1200	mg/L	10	4.0	1			09/25/15 17:07	WGR 5882	
Anions by Ion Chromatography		**Analytical Method:**	EPA 300.0					**Analyzed by:**	MYS	
Chloride	55	mg/L	10	2.0	10			10/01/15 08:51	WIC 5133	
Sulfate (as SO4)	530	mg/L	20	5.0	50			10/01/15 09:08	WIC 5133	
Alkalinity, Total Analysis		**Analytical Method:**	SM 2320 B-97					**Analyzed by:**	CLM	
Bicarbonate (as CACO3)	262	mg/L	10	1.2	1			09/28/15 12:43	WTI 2704	
Carbonate (as CACO3)	ND	mg/L	10	1.2	1			09/28/15 12:43	WTI 2704	
Hydroxide (as CACO3)	ND	mg/L	10	1.2	1			09/28/15 12:43	WTI 2704	
Alkalinity, Total (as CACO3)	263	mg/L	10	1.2	1			09/28/15 12:43	WTI 2704	

This report shall not be reproduced, except in full,
without the written consent of CALTEST ANALYTICAL LABORATORY

1885 North Kelly Road • Napa, California 94558
(707) 258-4000 • Fax (707) 226-1001 • e-mail: info@caltestlabs.com

REVISED

ANALYTICAL RESULTS

Lab Order: Q090666
Project ID: LEHIGH TRE

Lab ID **Q090666005** Date Collected 9/18/2015 10:40 Matrix Water
Sample ID **POND 14** Date Received 9/18/2015 14:51

Parameters	Result	Units	R. L.	MDL	DF	Prepared	Batch	Analyzed	Batch	Qual
Metals by ICPMS Collision Mode, Total	**Prep Method:**		EPA 200.8			**Prep by:**	UK			
	Analytical Method:		EPA 200.8					**Analyzed by:**	LM	
Aluminum	J5.3	ug/L	10	1.2	1	09/24/15 00:00	MPR 13854	09/25/15 19:28	MMS 7758	
Antimony	J0.09	ug/L	0.50	0.050	1	09/24/15 00:00	MPR 13854	09/25/15 19:28	MMS 7758	
Arsenic	1.2	ug/L	0.50	0.060	1	09/24/15 00:00	MPR 13854	09/25/15 19:28	MMS 7758	
Barium	74	ug/L	0.10	0.080	1	09/24/15 00:00	MPR 13854	09/25/15 19:28	MMS 7758	
Beryllium	ND	ug/L	0.10	0.090	1	09/24/15 00:00	MPR 13854	09/25/15 19:28	MMS 7758	
Boron	140	ug/L	10	2.0	1	09/24/15 00:00	MPR 13854	09/25/15 19:28	MMS 7758	
Cadmium	ND	ug/L	0.10	0.050	1	09/24/15 00:00	MPR 13854	09/25/15 19:28	MMS 7758	
Calcium	140	mg/L	0.20	0.080	4	09/24/15 00:00	MPR 13854	09/28/15 19:59	MMS 7758	
Chromium	J0.22	ug/L	0.50	0.050	1	09/24/15 00:00	MPR 13854	09/25/15 19:28	MMS 7758	
Cobalt	J0.29	ug/L	0.50	0.020	1	09/24/15 00:00	MPR 13854	09/25/15 19:28	MMS 7758	
Copper	J0.43	ug/L	0.50	0.15	1	09/24/15 00:00	MPR 13854	09/25/15 19:28	MMS 7758	
Lead	ND	ug/L	0.25	0.030	1	09/24/15 00:00	MPR 13854	09/25/15 19:28	MMS 7758	
Magnesium	87	mg/L	0.10	0.010	2	09/24/15 00:00	MPR 13854	09/28/15 19:25	MMS 7758	
Molybdenum	14	ug/L	0.25	0.070	1	09/24/15 00:00	MPR 13854	09/25/15 19:28	MMS 7758	
Nickel	3.5	ug/L	0.50	0.060	1	09/24/15 00:00	MPR 13854	09/25/15 19:28	MMS 7758	
Potassium	6.3	mg/L	0.05	0.020	1	09/24/15 00:00	MPR 13854	09/25/15 19:28	MMS 7758	
Selenium	1.1	ug/L	1.0	0.40	1	09/24/15 00:00	MPR 13854	09/25/15 19:28	MMS 7758	
Silver	ND	ug/L	0.10	0.020	1	09/24/15 00:00	MPR 13854	09/25/15 19:28	MMS 7758	
Sodium	99	mg/L	0.20	0.080	4	09/24/15 00:00	MPR 13854	09/28/15 19:59	MMS 7758	
Thallium	ND	ug/L	0.10	0.050	1	09/24/15 00:00	MPR 13854	09/25/15 19:28	MMS 7758	
Tin	ND	ug/L	1.0	0.20	1	09/24/15 00:00	MPR 13854	09/25/15 19:28	MMS 7758	
Vanadium	J0.9	ug/L	2.0	0.30	1	09/24/15 00:00	MPR 13854	09/25/15 19:28	MMS 7758	
Zinc	ND	ug/L	1.0	0.70	1	09/24/15 00:00	MPR 13854	09/25/15 19:28	MMS 7758	

Lab ID **Q090666006** Date Collected 9/18/2015 10:40 Matrix Water
Sample ID **POND 14** Date Received 9/18/2015 14:51

Parameters	Result	Units	R. L.	MDL	DF	Prepared	Batch	Analyzed	Batch	Qual
Total Dissolved Solids Analysis	**Analytical Method:**		SM 2540 C-97					**Analyzed by:**	JDC	
Total Dissolved Solids	1300	mg/L	10	4.0	1			09/23/15 15:49	WGR 5877	
Anions by Ion Chromatography	**Analytical Method:**		EPA 300.0					**Analyzed by:**	MYS	
Chloride	82	mg/L	10	2.0	10			10/01/15 09:25	WIC 5133	
Sulfate (as SO4)	490	mg/L	20	5.0	50			10/01/15 09:43	WIC 5133	
Alkalinity, Total Analysis	**Analytical Method:**		SM 2320 B-97					**Analyzed by:**	CLM	
Bicarbonate (as CACO3)	304	mg/L	10	1.2	1			09/28/15 12:52	WTI 2704	
Carbonate (as CACO3)	ND	mg/L	10	1.2	1			09/28/15 12:52	WTI 2704	
Hydroxide (as CACO3)	ND	mg/L	10	1.2	1			09/28/15 12:52	WTI 2704	
Alkalinity, Total (as CACO3)	304	mg/L	10	1.2	1			09/28/15 12:52	WTI 2704	

This report shall not be reproduced, except in full,
without the written consent of CALTEST ANALYTICAL LABORATORY

1885 North Kelly Road • Napa, California 94558
(707) 258-4000 • Fax (707) 226-1001 • e-mail: info@caltestlabs.com

REVISED

QUALITY CONTROL DATA

Lab Order: Q090666
Project ID: LEHIGH TRE

Analysis Description:	Metals by ICPMS Collision Mode, Total	**QC Batch:**	MPR/13854
Analysis Method:	EPA 200.8	**QC Batch Method:**	EPA 200.8

METHOD BLANK: 659159

Parameter	Blank Result	Reporting Limit	MDL	Units	Qualifiers
Aluminum	ND	10	1.2	ug/L	
Antimony	ND	0.50	0.05	ug/L	
Arsenic	ND	0.50	0.06	ug/L	
Barium	ND	0.10	0.08	ug/L	
Beryllium	ND	0.10	0.09	ug/L	
Boron	ND	10	2.0	ug/L	
Cadmium	ND	0.10	0.05	ug/L	
Calcium	ND	0.05	0.02	mg/L	
Chromium	ND	0.50	0.05	ug/L	
Cobalt	ND	0.50	0.02	ug/L	
Copper	ND	0.50	0.15	ug/L	
Lead	ND	0.25	0.03	ug/L	
Magnesium	ND	0.050	0.005	mg/L	
Molybdenum	ND	0.25	0.07	ug/L	
Nickel	ND	0.50	0.06	ug/L	
Potassium	ND	0.05	0.02	mg/L	
Selenium	ND	1.0	0.40	ug/L	
Silver	ND	0.10	0.02	ug/L	
Sodium	ND	0.05	0.02	mg/L	
Thallium	ND	0.10	0.05	ug/L	
Tin	ND	1.0	0.2	ug/L	
Vanadium	ND	2.0	0.3	ug/L	
Zinc	ND	1.0	0.7	ug/L	

LABORATORY CONTROL SAMPLE: 659160

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% REC Limits	Qualifier
Aluminum	ug/L	100	92.3	92	85-115	
Antimony	ug/L	20	19.7	99	85-115	
Arsenic	ug/L	20	18.8	94	85-115	
Barium	ug/L	100	98.5	99	85-115	
Beryllium	ug/L	20	19.7	99	85-115	
Boron	ug/L	100	102	102	85-115	
Cadmium	ug/L	20	19.5	98	85-115	
Calcium	mg/L	10	9.63	96	85-115	
Chromium	ug/L	20	19.1	96	85-115	
Cobalt	ug/L	20	19.1	96	85-115	
Copper	ug/L	20	18.9	95	85-115	
Lead	ug/L	20	20	100	85-115	
Magnesium	mg/L	10	9.53	95	85-115	
Molybdenum	ug/L	20	19.5	98	85-115	
Nickel	ug/L	20	19.6	98	85-115	
Potassium	mg/L	10	9.59	96	85-115	

This report shall not be reproduced, except in full,
without the written consent of CALTEST ANALYTICAL LABORATORY

1885 North Kelly Road • Napa, California 94558
(707) 258-4000 • Fax (707) 226-1001 • e-mail: info@caltestlabs.com

REVISED

QUALITY CONTROL DATA

Lab Order: Q090666
Project ID: LEHIGH TRE

Analysis Description:	Metals by ICPMS Collision Mode, Total	**QC Batch:**	MPR/13854
Analysis Method:	EPA 200.8	**QC Batch Method:**	EPA 200.8

LABORATORY CONTROL SAMPLE: 659160

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% REC Limits	Qualifier
Selenium	ug/L	20	18.6	93	85-115	
Silver	ug/L	20	19.6	98	85-115	
Sodium	mg/L	10	9.48	95	85-115	
Thallium	ug/L	20	19	95	85-115	
Tin	ug/L	20	19.3	97	85-115	
Vanadium	ug/L	20	18.4	92	85-115	
Zinc	ug/L	20	19.2	96	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 659162 659163

Parameter	Units	Q090666001 Result	Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limit	RPD	Max RPD	Qualifiers
Aluminum	ug/L	8.8	100	112	109	103	100	70-130	2.7	20	
Antimony	ug/L	0.93	20	21	20.9	100	100	70-130	0.5	20	
Arsenic	ug/L	1.3	20	21.3	21.1	100	99	70-130	0.9	20	
Barium	ug/L	50	100	148	147	98	97	70-130	0.7	20	
Beryllium	ug/L	0	20	19.8	19.3	99	97	70-130	2.6	20	
Boron	ug/L	140	100	238	241	98	101	70-130	1.3	20	
Cadmium	ug/L	0.13	20	19.1	18.8	95	93	70-130	1.6	20	
Chromium	ug/L	5.1	20	25.2	25	101	100	70-130	0.8	20	
Cobalt	ug/L	0.16	20	19.7	19.6	98	97	70-130	0.5	20	
Copper	ug/L	1.6	20	20.1	20	93	92	70-130	0.5	20	
Lead	ug/L	0	20	19.1	18.9	96	95	70-130	1.1	20	
Magnesium	mg/L	43	10	53	52.8	100	98	70-130	0.4	20	
Nickel	ug/L	7	20	26.6	26.7	98	99	70-130	0.4	20	
Potassium	mg/L	46	10	56.4	55.6	104	96	70-130	1.4	20	
Selenium	ug/L	16	20	35.3	35.1	97	96	70-130	0.6	20	
Silver	ug/L	0	20	18.7	18.6	94	93	70-130	0.5	20	
Thallium	ug/L	0.3	20	18.5	18.6	91	92	70-130	0.5	20	
Tin	ug/L	0	20	20	20	100	100	70-130	0	20	
Vanadium	ug/L	45	20	65.6	64.6	103	98	70-130	1.5	20	
Zinc	ug/L	3.8	20	20.8	20.8	85	85	70-130	0	20	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 659162 659163

Parameter	Units	Q090666001 Result	Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limit	RPD	Max RPD	Qualifiers
Calcium	mg/L	95	10	105	101	100	RNC	70-130	3.9	20	1
Molybdenum	ug/L	150	20	170	164	100	70	70-130	3.6	20	
Sodium	mg/L	86	10	97.6	92.2	116	RNC	70-130	5.7	20	1

This report shall not be reproduced, except in full,
without the written consent of CALTEST ANALYTICAL LABORATORY

1885 North Kelly Road • Napa, California 94558
(707) 258-4000 • Fax (707) 226-1001 • e-mail: info@caltestlabs.com

REVISED

QUALITY CONTROL DATA

Lab Order: Q090666
Project ID: LEHIGH TRE

Analysis Description:	Metals by ICPMS Collision Mode, Total	**QC Batch:**	MPR/13854
Analysis Method:	EPA 200.8	**QC Batch Method:**	EPA 200.8

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 659164 659165

Parameter	Units	Q090666005 Result	Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limit	RPD	Max RPD	Qualifiers
Aluminum	ug/L	5.3	100	106	109	101	104	70-130	2.8	20	
Antimony	ug/L	0.09	20	19.5	20.2	97	101	70-130	3.5	20	
Arsenic	ug/L	1.2	20	20.5	21.3	97	101	70-130	3.8	20	
Barium	ug/L	74	100	168	176	94	102	70-130	4.7	20	
Beryllium	ug/L	0	20	19.7	19.2	99	96	70-130	2.6	20	
Boron	ug/L	140	100	237	246	97	106	70-130	3.7	20	
Cadmium	ug/L	0	20	18.2	19	91	95	70-130	4.3	20	
Chromium	ug/L	0.22	20	19.6	20.4	97	101	70-130	4	20	
Cobalt	ug/L	0.29	20	19.1	19.8	94	98	70-130	3.6	20	
Copper	ug/L	0.43	20	18.5	19	90	93	70-130	2.7	20	
Lead	ug/L	0	20	18.5	19.1	93	96	70-130	3.2	20	
Molybdenum	ug/L	14	20	34.1	35.7	101	109	70-130	4.6	20	
Nickel	ug/L	3.5	20	22.4	23.1	95	98	70-130	3.1	20	
Potassium	mg/L	6.3	10	16.1	16.6	98	103	70-130	3.1	20	
Selenium	ug/L	1.1	20	19.8	20.9	94	99	70-130	5.4	20	
Silver	ug/L	0	20	18.2	19	91	95	70-130	4.3	20	
Thallium	ug/L	0	20	17.9	18.6	90	93	70-130	3.8	20	
Tin	ug/L	0	20	19.4	20.2	97	101	70-130	4	20	
Vanadium	ug/L	0.9	20	20.4	21.2	98	102	70-130	3.8	20	
Zinc	ug/L	0	20	16.8	17.4	84	87	70-130	3.5	20	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 659164 659165

Parameter	Units	Q090666005 Result	Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limit	RPD	Max RPD	Qualifiers
Magnesium	mg/L	87	10	93.1	95.1	RNC	81	70-130	2.1	20	1

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 659164 659165

Parameter	Units	Q090666005 Result	Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limit	RPD	Max RPD	Qualifiers
Calcium	mg/L	140	10	148	151	80	110	70-130	2	20	
Sodium	mg/L	99	10	107	109	80	100	70-130	1.9	20	

Analysis Description:	Total Dissolved Solids Analysis	**QC Batch:**	WGR/5877
Analysis Method:	SM 2540 C-97	**QC Batch Method:**	SM 2540 C-97

METHOD BLANK: 658853

Parameter	Blank Result	Reporting Limit	MDL	Units	Qualifiers
Total Dissolved Solids	ND	10	4	mg/L	

This report shall not be reproduced, except in full,
without the written consent of CALTEST ANALYTICAL LABORATORY

1885 North Kelly Road • Napa, California 94558
(707) 258-4000 • Fax (707) 226-1001 • e-mail: info@caltestlabs.com

REVISED

QUALITY CONTROL DATA

Lab Order: Q090666
Project ID: LEHIGH TRE

Analysis Description:	Total Dissolved Solids Analysis	**QC Batch:**	WGR/5877
Analysis Method:	SM 2540 C-97	**QC Batch Method:**	SM 2540 C-97

LABORATORY CONTROL SAMPLE: 658854

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% REC Limits	Qualifier
Total Dissolved Solids	mg/L	500	492	98	80-120	

SAMPLE DUPLICATE: 658983

Parameter	Units	Q090638001 Result	DUP Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	2000	1950	2.5	20	

Analysis Description:	Total Dissolved Solids Analysis	**QC Batch:**	WGR/5882
Analysis Method:	SM 2540 C-97	**QC Batch Method:**	SM 2540 C-97

METHOD BLANK: 659399

Parameter	Blank Result	Reporting Limit	MDL	Units	Qualifiers
Total Dissolved Solids	ND	10	4	mg/L	

LABORATORY CONTROL SAMPLE: 659400

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% REC Limits	Qualifier
Total Dissolved Solids	mg/L	500	500	100	80-120	

SAMPLE DUPLICATE: 659412

Parameter	Units	Q090021050 Result	DUP Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	700	685	2.2	20	

Analysis Description:	Anions by Ion Chromatography	**QC Batch:**	WIC/5133
Analysis Method:	EPA 300.0	**QC Batch Method:**	EPA 300.0

METHOD BLANK: 659951

This report shall not be reproduced, except in full,
without the written consent of CALTEST ANALYTICAL LABORATORY

1885 North Kelly Road • Napa, California 94558
(707) 258-4000 • Fax (707) 226-1001 • e-mail: info@caltestlabs.com

REVISED

QUALITY CONTROL DATA

Lab Order: Q090666
Project ID: LEHIGH TRE

Analysis Description:	Anions by Ion Chromatography	**QC Batch:**	WIC/5133
Analysis Method:	EPA 300.0	**QC Batch Method:**	EPA 300.0

Parameter	Blank Result	Reporting Limit	MDL	Units	Qualifiers
Sulfate (as SO4)	ND	0.5	0.1	mg/L	
Chloride	ND	1	0.2	mg/L	

LABORATORY CONTROL SAMPLE: 659952

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% REC Limits	Qualifier
Sulfate (as SO4)	mg/L	10	9.67	97	90-110	
Chloride	mg/L	8	8.06	101	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 659953 659954

Parameter	Units	Q090709008 Result	Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limit	RPD	Max RPD	Qualifiers
Sulfate (as SO4)	mg/L	13	16	30.6	30.2	110	108	80-120	1.3	20	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 659953 659954

Parameter	Units	Q090709008 Result	Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limit	RPD	Max RPD	Qualifiers
Chloride	mg/L	23	100	124	123	101	100	80-120	0.8	20	

Analysis Description:	Alkalinity, Total Analysis	**QC Batch:**	WTI/2704
Analysis Method:	SM 2320 B-97	**QC Batch Method:**	SM 2320 B-97

METHOD BLANK: 659442

Parameter	Blank Result	Reporting Limit	MDL	Units	Qualifiers
Bicarbonate (as CACO3)	ND	10	1	mg/L	
Carbonate (as CACO3)	ND	10	1	mg/L	
Hydroxide (as CACO3)	ND	10	1	mg/L	
Alkalinity, Total (as CACO3)	ND	10	1	mg/L	

LABORATORY CONTROL SAMPLE: 659443

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% REC Limits	Qualifier
Bicarbonate (as CACO3)	mg/L	100	94.9	95	80-120	
Alkalinity, Total (as CACO3)	mg/L	100	94.9	95	80-120	

This report shall not be reproduced, except in full,
without the written consent of CALTEST ANALYTICAL LABORATORY

1885 North Kelly Road • Napa, California 94558
(707) 258-4000 • Fax (707) 226-1001 • e-mail: info@caltestlabs.com

REVISED

QUALITY CONTROL DATA

Lab Order: Q090666
Project ID: LEHIGH TRE

Analysis Description:	Alkalinity, Total Analysis	**QC Batch:**	WTI/2704
Analysis Method:	SM 2320 B-97	**QC Batch Method:**	SM 2320 B-97

SAMPLE DUPLICATE: 659444

Parameter	Units	Q090677001 Result	DUP Result	RPD	Max RPD	Qualifiers
Bicarbonate (as CACO3)	mg/L	333	332	0.3	20	
Carbonate (as CACO3)	mg/L	17	17.6	3.5	20	
Hydroxide (as CACO3)	mg/L	0	0	0	20	
Alkalinity, Total (as CACO3)	mg/L	350	349.6	0.1	20	

This report shall not be reproduced, except in full,
without the written consent of CALTEST ANALYTICAL LABORATORY

1885 North Kelly Road • Napa, California 94558
(707) 258-4000 • Fax (707) 226-1001 • e-mail: info@caltestlabs.com

REVISED

QUALITY CONTROL DATA QUALIFIERS

Lab Order: Q090666
Project ID: LEHIGH TRE

QUALITY CONTROL PARAMETER QUALIFIERS

Results Qualifiers: Report fields may contain codes and non-numeric data correlating to one or more of the following definitions:

NS - means not spiked and will not have recoveries reported for Analyte Spike Amounts

QC Codes Keys: These descriptors are used to help identify the specific QC samples and clarify the report.

MB - Method Blank

Method Blanks are reported to the same Method Detection Limits (MDLs) or Reporting Limits (RLs) as the analytical samples in the corresponding QC batch.

LCS/LCSD - Laboratory Control Spike / Laboratory Control Spike Duplicate

DUP - Duplicate of Original Sample Matrix

MS/MSD - Matrix Spike / Matrix Spike Duplicate

RPD - Relative Percent Difference

%Recovery - Spike Recovery stated as a percentage

1 RNC = Recovery Not Calculated. Matrix Spike/Matrix Spike Duplicate (MS/MSD) recoveries were not calculated due to the high native concentration in the sample selected for MS/MSD versus the laboratory spike concentration.

This report shall not be reproduced, except in full,
without the written consent of CALTEST ANALYTICAL LABORATORY

1885 North Kelly Road • Napa, California 94558
(707) 258-4000 • Fax (707) 226-1001 • e-mail: info@caltestlabs.com

REVISED

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Lab Order: Q090666
Project ID: LEHIGH TRE

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
Q090666001	**POND 4A**	EPA 200.8	MPR/13854	EPA 200.8	MMS/7758
Q090666003	**POND 9**	EPA 200.8	MPR/13854	EPA 200.8	MMS/7758
Q090666005	**POND 14**	EPA 200.8	MPR/13854	EPA 200.8	MMS/7758
Q090666002	**POND 4A**	SM 2540 C-97	WGR/5877		
Q090666006	**POND 14**	SM 2540 C-97	WGR/5877		
Q090666004	**POND 9**	SM 2540 C-97	WGR/5882		
Q090666002	**POND 4A**	EPA 300.0	WIC/5133		
Q090666004	**POND 9**	EPA 300.0	WIC/5133		
Q090666006	**POND 14**	EPA 300.0	WIC/5133		
Q090666002	**POND 4A**	SM 2320 B-97	WTI/2704		
Q090666004	**POND 9**	SM 2320 B-97	WTI/2704		
Q090666006	**POND 14**	SM 2320 B-97	WTI/2704		

This report shall not be reproduced, except in full,
without the written consent of CALTEST ANALYTICAL LABORATORY

1885 North Kelly Road • Napa, California 94558
(707) 258-4000 • Fax (707) 226-1001 • e-mail: info@caltestlabs.com

Caltest ANALYTICAL LABORATORY

1885 N. KELLY ROAD NAPA, CA 94558 (707) 258-4000 FAX (707) 226-1001

PAGE 1 OF 1

SAMPLE CHAIN OF CUSTODY

PROJECT NAME / PROJECT NUMBER: Lehigh TRE

P.O. NUMBER:

LAB ORDER # Q090666

CLIENT: Robertson-Bryan, Inc

REPORT ATTN: Paul Bedore

MAILING ADDRESS: 9888 Kent St., Elk Grove

STATE: CA

ZIP: 95624

BILLING ADDRESS: Same

ATTN: Paul Bedore

PHONE NUMBER: 916-405-8918

FAX PHONE NUMBER:

SAMPLER (PRINT & SIGN NAME): Charlene Derheim C. Derheim

TURN-AROUND TIME: [X] STANDARD [ ] RUSH

DUE DATE:

ANALYSES REQUESTED

CALTEST LAB #	DATE SAMPLED	TIME SAMPLED	SAMPLE MATRIX*	CONTAINER TYPE/ AMOUNT**	PRESERVATIVE	SAMPLE IDENTIFICATION / SITE	CLIENT LAB #	COMP. or GRAB	Total Metals & Cations (200.8)	Alkalinity, TDS, Chloride, Sulfate									REMARKS
	9/18/2015	0800	AQ	1x500mL	HNO3	Pond 4A		Comp	X										Composite samples of C. dubia initiation and renewal samples collected week of 9/14/15.
	9/18/2015	0800	AQ	1x500mL	None	Pond 4A		Comp		X									
	9/18/2015	1012	AQ	1x500mL	HNO3	Pond 9		Comp	X										
	9/18/2015	1012	AQ	1x500mL	None	Pond 9		Comp		X									
	9/18/2015	1046	AQ	1x500mL	HNO3	Pond 14		Comp	X										
	9/18/2015	1046	AQ	1x500mL	None	Pond 14		Comp		X									
	~~9/18/2015~~		~~AQ~~		~~HNO3~~	~~Pond 13~~		~~Comp~~	~~X~~										
	~~9/18/2015~~		~~AQ~~		~~None~~	~~Pond 13~~		~~Comp~~		~~X~~									
																			Metals: Al, Sb, As, Ba, Be, B, Cd, Cr, Co, Cu, Pb, Mo, Ni, Se, Ag, Tl, Sn, V, Zn, Ca, Mg, Na, K
																			Report ND < MDL & J-flags

RELINQUISHED BY	DATE/TIME	RECEIVED BY	RELINQUISHED BY	DATE/TIME	RECEIVED BY
Charlene Derheim	9/18/15 1400			9-18-15/1451	

FOR LAB USE ONLY

Samples: WC ___ MICRO ___ BIO ___ AA ___ SV ___ VOA ___ pH? Y/N TEMP: 2.0 SEALED: Y/N INTACT: Y/N

BD: BIO ___ WC ___ AA ___

CC: AA ___ SV ___ VOA ___

SIL: HP ___ PT ___ QT ___ VOA ___

W/HNO_3 ___ H_2SO_4 ___ NaOH ___

PIL: HNO_3 ___ H_2SO_4 ___ NaOH ___ HCL ___

COMMENTS:

*MATRIX: AQ = Aqueous Nondrinking Water, Digested Metals; FE = Low R.L.s, Aqueous Nondrinking Water, Digested Metals; DW = Drinking Water; SL = Soil Sludge, Solid ; FP = Free Product

**CONTAINER TYPES: AL = Amber Liter; AHL = 500 ml Amber; PT = Pint (Plastic); QT = Quart (Plastic); HG = Half Gallon (Plastic); SJ = Soil Jar; B4 = 4oz. BACT; BT = Brass Tube; VOA = 40mL VOA; OTC - Other Type Container

R ___ PR ___ M ___ F ___

09/17/15

WHITE - LABORATORY YELLOW - CLIENT COPY TO ACCOMPANY FINAL REPORT PINK - CLIENT COPY AS RECEIPT