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October 31, 2016

VIA U.S. MAIL AND ELECTRONIC MAIL

Ms. Dyan Whyte Assistant Executive Officer California Regional Water Quality Control Board San Francisco Bay Region 1515 Clay Street, Suite 1400 Oakland, California 94612

Re: 3rd Quarter 2016 Report – June 27, 2013 Amended Water Code section 13267 Order, Order No. R2-2013-1005-A1, Directives 8.f and g. - Chronic Toxicity

Dear Ms. Whyte:

Enclosed, 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"), Lehigh Southwest Cement Company ("Lehigh") provides and encloses the 3rd Quarter ("Q3") 2016 Chronic Toxicity Monitoring Report – TRE Update pursuant to Directives 8.f. and 8.g. of that Order. Sampling locations included Pond 4A, Pond 13, and Pond 14. As part of the toxicity control investigation component of Lehigh's Toxicity Reduction Evaluation ("TRE") for potential sources of toxicity to Pond 4A, testing was also conducted on influent and effluent from the Interim Treatment System ("ITS") and additional piloted treatment train additions.

If you or your staff have any questions regarding the above report or enclosed documents, please do not hesitate to contact me or Greg Knapp/Sam Barket at Lehigh.

Very truly yours,

Nicole E. Granquist

Nicole E. Granquist

Enclosure

Cc: Jack Gregg, Regional Water Quality Control Board, San Francisco Bay Region Greg Knapp, Director Environmental Region West, Lehigh Sam Barkett, Area Environmental Manager, Lehigh



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TECHNICAL MEMORANDUM

Date:	October 31, 2016
Prepared for:	Sam Barket and Greg Knapp
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:	3 rd Quarter 2016 TRE Update

Overview

The purpose of this memorandum is to summarize the 3rd Quarter ("Q3") 2016 chronic toxicity monitoring 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). Sampling locations included Pond 4A, Pond 13, and Pond 14. Consistent with modification of the Order's monitoring requirements (T. Yin, personal communication, to P. Bedore on September 9, 2014), Lehigh has been testing Pond 9 water twice yearly – once during the dry season and once during the wet season. However, Regional Water Board staff agreed that it was unnecessary for Lehigh to conduct Pond 9 testing during the 2016 dry season (T. Yin, personal communication, to P. Bedore on September 23, 2016).

As part of the evaluation of a toxicity control strategy for Lehigh's Toxicity Reduction Evaluation (TRE) for toxicity in Pond 4A, testing was also conducted on samples from a newly configured Pilot Treatment System (PTS) to test possible treatment scenarios for a Final Treatment System (FTS). Next steps in the evaluation of a toxicity control strategy for Lehigh's TRE are also discussed.

Pond 4A, Pond 13, Pond 14 Test Results

Chronic toxicity sampling for Pond 4A, Pond 13, and Pond 14 was conducted September 26–30, 2016. A summary of the results is shown in **Table 1**. At the time samples were collected, discharges into and out of Pond 4A occurred intermittently. There was no inflow from Permanente Creek to Pond 13 and water levels of Pond 13 appeared to have been low for a prolonged period of time, meaning the discharge from Pond 4A had not recently reached Pond 13. Flow was present into and out of Pond 14.



Table 1. Q3 2016 Ceriodaphnia dubia chronic toxicity test results for Pond 4A, 13, and 14 samples collected September
26–30, 2016.

Location	TUc – Survival	TUc – Reproduction			
Pond 4A	2	1.9			
Pond 13	1	1.3			
Pond 14	1	1			
Notes: TUc = 100/EC25 or 100/IC25					

Chronic toxicity testing in Q3 2016 with *Ceriodaphnia dubia* indicated survival and reproductive toxicity at Pond 4A and reproductive toxicity at Pond 13 (Table 1), while toxicity to *C. dubia* was not observed at Pond 14. As previously reported in updates to Lehigh's TRE (*TRE Progress Update and Future TRE Activities*, dated September 30, 2013), nickel is suspected to be the principal contributor to *C. dubia* toxicity and has been sourced to quarry water discharged to Pond 4A. The update to Lehigh's TRE stated that when survival and reproduction TUc is ≤ 2 (where TUc = 100/EC25 or 100/IC25), no further actions would be taken. Likewise, when survival and reproduction TUc is ≥ 2 and the nickel concentration is $\geq 5.7 \mu g/L$, the cause of toxicity is presumed to be related to nickel, and no further actions beyond the already planned treatment controls would be taken. Because toxicity observed among Pond 4A, Pond 13, and Pond 14 samples was ≤ 2 TUc, no further actions were taken.

Toxicity Control Evaluation Test Results

In Q3 2016, samples were collected from the PTS to test possible treatment scenarios for a FTS. The PTS combined the current biological treatment technology used in the Interim Treatment System (ITS) with an ultra-filtration/reverse osmosis (UF/RO) unit (**Figure 1**). Conceptually, quarry water was fed into the UF/RO creating a *permeate* (water that permeates through the membrane of the UF/RO unit) and a *concentrate* (water rejected from flowing through the UF/RO membrane). Permeate is relatively void of minerals, metals and other compounds that are rejected by the reverse-osmosis membrane, while these constituents are concentrated in the concentrate. The PTS unit was optimized to discharge 75% permeate and 25% concentrate, meaning the mineral and metals content of the concentrate was approximately four times greater than the raw quarry water that is fed into the PTS unit. Concentrate was then treated with a biological treatment system to remove metals and metalloids, including nickel and selenium. Biologically treated concentrate and permeate were discharged separately from the PTS, but under a FTS scenario, they would be recombined prior to discharge. During testing of the PTS, the low volume of biological effluent and permeate discharged from the PTS were directed back to the quarry and not to Pond 4A.



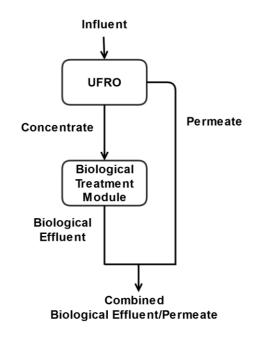


Figure 1. Simplified flow diagram of the Pilot Treatment System (PTS) used to test treatment scenarios for a Final Treatment System (FTS).

Pilot System Test Results

Operational startup and treatment optimization of the PTS occurred in mid-July 2016, and three PTS toxicity sampling events occurred – July 27, September 6, and September 26, 2016. Results for the July 27, 2016 test indicated that the PTS had not been fully optimized at the time samples were collected (e.g., there was good selenium removal, but poor nickel removal through the PTS) and that there were biological agents in the samples that completely covered the test organisms and caused direct mortality. Nickel and selenium removal in the PTS were optimized prior to the subsequent *C. dubia* toxicity tests.

Testing conducted for the second PTS toxicity testing event was completed on samples collected September 6, 2016. Although the PTS was producing 25% biological effluent and 75% permeate, testing was designed to determine whether removing a fraction of the concentrate was necessary to remove toxicity. Practically, this resulted in testing a number of different biological effluent/permeate mixtures for toxicity to *C. dubia*. To screen for the influence of biological agents on the test results, biological effluent/permeate mixtures were filtered – 0.20 µm filtration removes nearly all bacteria and protozoa. Filtration was used under the assumptions that biological agents observed in the PTS may not be present in the FTS effluent (either because biological interferences could be avoided/mitigated, or that Lehigh would be able to add a unit process to the FTS to treat for biological interferences). One treatment (25% biological effluent/75% permeate) was also tested unfiltered.



Results for the September 6, 2016 PTS toxicity tests are shown in **Table 2**. For filtered biological effluent/permeate mixtures, a mixture was considered toxic if survival or reproduction in the treatment differed from the control by 25% or greater and the difference was statistically significant. Toxicity to *C. dubia* reproduction was found across the 12.5–40% biological effluent treatments, but not the 6.25% biological effluent treatment. The theoretical biological effluent/permeate ratio that would be considered "not toxic" based on the test results (i.e., the IC25) was 10.7% biological effluent to 89.3% permeate. Thus, with the water quality produced at the time these samples were collected, approximately 56% of the concentrate produced by the PTS would need to be removed prior to biological treatment for the final combined mixture of filtered biological effluent (11%) and permeate (89%) to not be toxic to *C. dubia*. The proportion of concentrate needing to be removed (56%) corresponds to 14% of the raw influent flow. Toxicity observed in the 12.5–40% biological effluent treatments was not likely related to nickel, as nickel concentrations observed in these mixtures (0–5 µg/L; Table 2) was lower than the empirically derived IC25 for nickel in synthetic Pond 4A water (IC25 = 5.7 µg/L).

Filtration	Treatmenta	Survival (%)	Reproduction (neonates/ female)	Hardness (mg/L)	Ni ^ь (µg/L)
Not Filtered	Lab Water Control	100	24.3	100	0
	25% BE / 75% P	90	3.1*	669	2.9
Filtered	Lab Water Control	100	23.3	100	0
	6.25% BE / 93.75% P	90	22.4	168	0.9
	12.5% BE / 87.5% P	90	16.4*	335	1.5
	18.75% BE / 81.25% P	100	16.8*	502	2.2
	25% BE / 75% P	90	10.3*	669	2.9
	40% BE / 60% P	10	2.2*	1070	4.5

Table 2. Ceriodaphnia dubia chronic toxicity test results for Pilot Treatment System samples collected September 6	,
2016.	

Notes:

*Sample toxic relative to control (i.e., >25% effect relative to control).

^a BE = Biological Effluent; P = Permeate

^b Calculated using simple mixing calculations and the concentration of nickel in 100% biological effluent and 100% permeate.

Test results also indicated that the filtered 25% biological effluent treatment was less toxic than the unfiltered treatment (Table 2). Even though the laboratory did not see visible evidence of surface growths on the test organisms in the filtered and unfiltered treatments, the presence of pathogens cannot be ruled out (nor can it be confirmed). The 25% biological effluent treatment was retested (filtered and unfiltered) after 20 days and the toxicity was found to have slightly diminished over the holding time relative to the original test (**Table 3**).

The September 6, 2016 PTS samples were also split between the primary laboratory used to date for Lehigh's TRE (results from the primary lab are shown in Table 2) and a secondary laboratory to help confirm observed toxicity. Results from the secondary laboratory are provided in Attachment 1. Overall, the secondary laboratory showed toxicity in the range of that observed by the primary laboratory, although the dose-response relationship was non-ideal and there was



greater variability between treatments, limiting the utility of results from the secondary laboratory.

Table 3. Original and re-test results for *Ceriodaphnia dubia* chronic toxicity tests of Pilot Treatment System samples collected September 6, 2016.

	Treatment ^a	0	riginal Test (9/7/16)	I	Retest (9/27/16)
Filtration		Survival (%)	Reproduction (neonates / female & % Inhibition ^ь)	Survival (%)	Reproduction (neonates / female & % Inhibition ^b)
Not Filtered	Lab Water Control	100	24.3	100	33.8
	25% BE / 75% P	90	3.1* / 87%	90	11.0* / 67%
Filtered	Lab Water Control	100	23.3	100	28.7
	25% BE / 75% P	90	10.3* / 56%	100	16.2* / 43%
^a BE = Biologic	relative to control (i.e. cal Effluent; P = Permo difference in reproducti	eate	·		

Biological effluent and permeate were collected from the PTS on September 26, 2016 for another round of chronic toxicity testing with *C. dubia*. The September 26, 2016 samples were used to make filtered and unfiltered 25% biological effluent/75% permeate mixtures. The unfiltered 25% biological effluent/75% permeate sample was *not toxic* relative to the control (i.e., TUc < 1; **Table 4**). In contrast, the filtered 25% biological effluent/75% permeate treatment was toxic relative to the control for the reproduction end-point (i.e., TUc > 1), although the level of inhibition relative to the control was low (28%).

Filtered	Treatment ^a	Survival (%)	Reproduction (neonates/ female)	Hardness (mg/L)	Ni⁵ (µg/L)
Not Filtered	Lab Water Control	100	34.4	-	
	25% BE/75% P	100	30.2	623	2.6
Filtered	Lab Water Control	100	33.3		
	25% BE/75% P	100	24.0*	623	2.6

Notes:

*Sample toxic relative to control (i.e., >25% effect relative to control).

^a BE = Biological Effluent; P = Permeate

^b Calculated using simple mixing calculations and the concentration of nickel in unfiltered 100% biological effluent and 100% permeate.

The filtered 25% biological effluent/75% permeate mixture using PTS samples from September 26, 2016 was also tested in a dilution series in which this treatment was further diluted using a high hardness water that was made using a synthetic water recipe that corresponds to the mineral content of water from Pond 4A (adjusted to the hardness of the 25% biological effluent/75% permeate mixture). Diluting the filtered 25% biological effluent/75% permeate mixture with the high hardness water allowed for the hardness of each treatment to remain constant over the



dilution series, thereby controlling for the contribution of hardness and mineral balance to observed toxicity. Reproduction results for the filtered 25% biological effluent/75% permeate dilution series show that reproduction was relatively constant across all treatments (**Table 5**), providing evidence that the cause of reproductive impairment in the filtered 25% biological effluent/75% permeate treatment (i.e., the 100% treatment) was caused by high hardness and/or mineral balance.

 Table 5. Results for Ceriodaphnia dubia chronic toxicity dilution series test of a mixture of 25% Biological Effluent/75%

 Permeate using high hardness water as the diluent (samples collected from the Pilot System on September 26, 2016).

Treatment	Fraction of 25% BE/75% P Mixture in Treatment ^a	Fraction of High Hardness Water in Treatment ^b	Survival (%)	Reproduction (neonates/female) ^c
Lab Water Controld			100	34.4
High Hardness Water Control ^b			90	24.1*
6.25% Dilution	6.25%	93.75%	90	25.2
12.5% Dilution	12.5%	87.5%	80	26.7
25% Dilution	25%	75%	80	24.4*
50% Dilution	50%	50%	100	28.1
100% Dilution	100%	0%	100	24.0*

*Sample toxic relative to lab water control (i.e., >25% effect relative to control).

^a BE = Biological Effluent; P = Permeate

High hardness water = synthetic Pond 4A water recipe adjusted to the hardness of the 25% biological effluent+75% permeate mixture.

^c None of the 6.25–100% dilutions were toxic relative to the high hardness water control.

^d Bioassay lab's standard lab water control adjusted to moderate hardness (80–100 mg/L).

Conclusions from Pilot System Testing

Testing of the PTS showed that treatment scenarios utilizing a UF/RO/biological treatment system technology have the capability of removing nickel from raw quarry water to levels that are not expected to contribute to chronic toxicity and that such a system is capable of producing non-toxic effluent. However, PTS toxicity testing also showed that there is a potential for toxicants besides nickel to be present in effluent from a UF/RO/biological treatment system, and that a characteristic of these toxicants is that they are at least partially unstable over time. High mineral content could also contribute, in part, to toxicity observed in biological effluent/permeate mixtures, but its effect is not expected to diminish over time, as was observed for the September 6, 2016 samples. However, the slightly diminished toxicity observed in the September 6, 2016 sample that was held and re-tested a week later may simply reflect variability in results among bioassays, and not truly be reflective of diminished toxicity due to a change in the factor causing the toxicity. Due to the difference in test results between the September 6 and September 26, 2016 tests, it is unknown whether toxicants will be present in a FTS utilizing the UF/RO/biological treatment technology.

If such toxicants are present in the FTS, it would be possible to reduce their effect in a final combined effluent of biological effluent/permeate by diverting a fraction of UFRO concentrate from the treatment system. Lehigh intends to design the FTS so that it is capable of diverting



UFRO concentrate from the FTS, as needed, for use in Lehigh's manufacturing process or for being disposed of in a different manner. Overall, the UFRO/biological treatment toxicity control strategy has shown the potential to remove survival-related toxicity caused by nickel in raw quarry water, and has shown the potential to remove *C. dubia* reproductive toxicity as well.

Future TRE Actions

Additional toxicity investigations with PTS samples are not possible at this time because the PTS is not currently available to Lehigh (i.e., the vendor has leased the UF/RO unit for testing out of state). Until Q3 2016, Lehigh had been conducting toxicity control evaluations of the ITS, which is currently treating up to 400 gpm quarry water until the FTS is fully constructed and operational. The FTS is currently on schedule to be fully operational by October 1, 2017. Although ITS testing to date has shown that the ITS removes survival-related toxicity from raw quarry water, in O1–O2 2016, the ITS was also shown to contribute reproductive toxicity to the effluent. Continuing toxicological evaluations of the ITS at this time would provide little value in further developing a toxicity control strategy that is centered on the FTS because the testing of treatment scenarios using the PTS shows the potential for the FTS to be an effective toxicity control strategy for Lehigh's discharges. Also, the treatment technology and system engineering of the FTS differs considerably from the ITS, meaning conclusions drawn from further ITS investigations may not provide any utility in understanding sources and characteristics of toxicity that may or may not arise from effluent discharged from the FTS. Thus, toxicity control evaluation testing as part of Lehigh's TRE for potential sources of C. dubia toxicity to Pond 4A will continue once the FTS is fully operational.

Near term TRE actions that are planned to continue include quarterly *C. dubia* chronic toxicity testing of Ponds 4A, 13, and 14, in accordance with the quarterly monitoring provisions specified in Lehigh's 2013 TRE update memorandum (*TRE Progress Update and Future TRE Activities*, dated September 30, 2013). Planned quarterly monitoring does not mark a conclusion of efforts to confirm toxicity control. Rather, Lehigh will resume toxicity control evaluations at a time when the FTS is fully operational, which is anticipated to occur by October 1, 2017.

Lehigh seeks Regional Water Board concurrence on the request that was provided in the Q2 2016 Chronic Toxicity Monitoring Results memorandum (Submitted to the Regional Water Board on July 29, 2016) to completely discontinue all monitoring of Pond 9 for *C. dubia* chronic toxicity.

ATTACHMENT 1 Laboratory Reports





October 24, 2016

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

Paul:

I have enclosed our *Supplemental* report "Evaluation of the Chronic Toxicity of Lehigh Permanente Cement Plant Site Water Samples" for the samples collected September 26, 28, and 30, 2016. The 11 test summary for each site in the compliance summary section of the report has been updated to include test data from the March 2016 compliance testing; the revision does not change the conclusions of the testing. 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

As the survival EC25 could not be calculated, the survival toxic units were calculated using the NOEC. The survival NOEC was 50% site water, resulting in 2.0 TUc. The reproduction IC25 was 51.8% site water, resulting in 1.9 TUc (where TUc=100/IC25).

Ceriodaphnia dubia Test Endpoint =	Survival	Reproduction
Survival NOEC or Reproduction IC25 =	50% site water	51.8% site water
TUc =	2.0	1.9

Chronic Effects of Lehigh Pond 13 Site Water on Ceriodaphnia dubia

As the survival EC25 could not be calculated, the survival toxic units were calculated using the NOEC. The survival NOEC was 100% site water, resulting in <1.0 TUc (where TUc=100/NOEC). The reproduction IC25 was 76% site water, resulting in 1.3 TUc (where TUc=100/IC25).

Ceriodaphnia dubia Test Endpoint =	Survival	Reproduction
Survival NOEC or Reproduction IC25 =	>100% site water	76% site water
TUc =	<1.0	1.3

Chronic Effects of Lehigh Pond 14 Site Water on Ceriodaphnia dubia

As the survival EC25 could not be calculated, the survival toxic units were calculated using the NOEC. The survival NOEC was 100% site water, resulting in <1.0 TUc (where TUc=100/EC25). The reproduction IC25 was >100% site water, resulting in <1 TUc (where TUc=100/IC25).

<i>Ceriodaphnia dubia</i> Test Endpoint =	Survival	Reproduction
Survival NOEC or Reproduction IC25 =	>100% site water	>100% site water
TUc =	<1.0	<1

If you have any questions regarding the performance and interpretation of these tests, feel free to contact my colleague Chris Dudenhoeffer 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 26327.

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		
Lenigh I ond 4A	Test Protocol:	EPA-821-R-02-013		
Sampling Dates: September 26, 28 and 30, 2016	Dilution Series:	6.25, 12.5, 25, 50, 100%		
Test Dates: September 27-October 3, 2016	Test Endpoint:	Survival, Reproduction		

Current Pond 4A Site Water Test Data.									
Site Water Concentration			% Survival			Mean Reproduction (# neonates /female)			
Har	dness Bla	nk		90			24.1	*	
La	ab Contro	1		100			32.	0	
	6.25%			100			31.	8	
	12.5%			90			33.	3	
	25%		100			29.6			
	50%		100			25.1*			
	100%		20*			1.6			
		Current l	Pond 4A Site	e Water Test	End	lpoints.			
Endpoint	NOEC	EC15-IC15	EC25-IC25	EC40-IC40	EC	C50-IC50	TUc	TUc Method	
Survival	50%	N/A**	N/A**	N/A**	,	76.2%	2.0	NOEC	
Reproduction	25%	36.6%	51.8% 62.1%			59.0%	1.9	100/IC25	
Lab C	Lab Control Survival (after ~96 hrs)								
100% Si	te Water Su	ırvival (after ~	-96 hrs)	20%					

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

** Due to the absence of significant mortalities at multiple concentrations, the EC25 point estimates could not be calculated.

	Summary of 11 Test Window for Ceriodaphnia dubia: Pond 4A										
Test #	Sample Dates	NOEC (%)	EC25 or IC25	TUc	96-hr Survival	Comments					
1	Dec 9, 11, & 13, 2013	100% (repro)	>100% (repro)	<1	100%						
2	Mar 10, 12, & 14, 2014	25% (repro)	4.81% (repro)	20.8	0%						
3	Apr 7, 9, & 11, 2014	6.25% (repro)	8.4% (repro)	11.9	0%						
4	Sept 22, 24, & 26, 2014	50% (repro)	>100% (repro)	<1	100%						
5	Nov 10, 12, & 14, 2014	100% (repro)	>100% (repro)	<1	100%						
6	Jan 19, 21, & 23, 2015	25% (repro)	40.1% (repro)	2.5	100%						
7	Apr 13, 15, & 17, 2015	50% (repro)	64.2% (repro)	1.6	100%						
8	Sept 14, 16, & 18, 2015	25% (repro)	28.5% (repro)	3.5	80%						
9	Nov 30, Dec 2, & 4, 2015	12.5% (repro)	21.8% (repro)	4.6	30%						
10	Mar 21, 23, & 25, 2016	25% (repro)	36.2% (repro)	2.8	100%						
11	Sept 26, 28, & 30, 2016	25% (repro)	51.8% (repro)	1.9	10%						

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 13	Chronic Toxicity Test Species:	Ceriodaphnia dubia	
Lenigh I ond 15	Test Protocol:	EPA-821-R-02-013	
Sampling Dates: September 26, 28, and 30, 2016	Dilution Series:	6.25, 12.5, 25, 50, 100%	
Test Dates: September 27- October 3, 2016	Test Endpoint:	Survival, Reproduction	

Current Pond 13 Site Water Test Data.									
Site Water Concentration			% Survival			Mean Reproduction (# neonates /female)			
Hare	dness Bla	nk		90			24.1	[*	
La	ab Contro	1		90			31.	3	
	6.25%			100			33.	6	
	12.5%			90		32.2			
	25%		100			29.7			
	50%		100			27.1			
	100%		80			22.1			
		Current]	Pond 13 Site	Water Test	End	points.			
Endpoint	NOEC	EC15-IC15	EC25-IC25	EC40-IC40	EC	50-IC50	TUc	TUc Method	
Survival	100%	>100%	>100%	>100%	>	100%	<1	100/EC25	
Reproduction	eproduction 100% 45.2% 77.5%				>	100%	1.3	100/IC25	
Lab C	Lab Control Survival (after ~96 hrs)								
100% Sit	te Water Su	ırvival (after ~	-96 hrs)	90%					

* 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 13										
Test #	Sample Dates	NOEC (%)	EC25 or IC25	TUc	96-hr Survival	Comments					
1	Mar 25, 27, & 29, 2013	<6.25% (repro)	3.7% (repro)	27.3	30%						
2	May 6, 8, & 10, 2013	50% (repro)	6.1% (repro)	16.4	100%						
3	Dec 9, 11, & 13, 2013	100% (repro)	>100% (repro)	<1	100%						
4	Mar 14 & 18, 2014	50% (repro)	48% (repro)	2.1	100%						
5	Dec 8, 10, & 12, 2014	100% (repro)	43.9% (repro)	2.3	100%						
6	Jan 19, 21, & 23, 2015	100% (repro)	>100% (repro)	<1	100%						
7	Apr 13, 15, & 17, 2015	25% (repro)	29.5% (repro)	3.4	100%						
8	Nov 30, Dec 1, & 2, 2015	50 (repro)	76% (repro)	1.3	100%						
9	Mar 21, 23, & 25, 2016	100% (repro)	>100% (repro)	<1	100%						
10	Sept 26, 28, & 30 2016	100% (repro)	77.5% (repro)	1.3	90%						
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 14	Chronic Toxicity Test Species:	Ceriodaphnia dubia	
Leingii Folia 14	Test Protocol:	EPA-821-R-02-013	
Sampling Dates: September 26, 28, and 30, 2016	Dilution Series:	6.25, 12.5, 25, 50, 100%	
Test Dates: September 27- October 3, 2016	Test Endpoint:	Survival, Reproduction	

Current Pond 14 Site Water Test Data.										
Site Water Concentration			% Survival			Mean Reproduction (# neonates /female)				
Har	dness Bla	nk		90			24.1	*		
La	ab Contro	1		100			30.	3		
	6.25%			80			20.	9		
	12.5%			100		31.2				
	25%		90			30.3				
	50%		100			29.3				
	100%		100			25.8				
		Current]	Pond 14 Site	Water Test	End	points.				
Endpoint	NOEC	EC15-IC15	EC25-IC25	EC40-IC40	EC	50-IC50	TUc	TUc Method		
Survival	100%	>100%	>100%	>100%	>	100%	<1	100/EC25		
Reproduction 100% >100% >100%				>100%	>	100%	<1	100/IC25		
Lab C	100%									
100% Si	te Water Su	ırvival (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 14										
Test #	Sample Dates	NOEC (%)	EC25 or IC25	TUc	96-hr Survival	Comments					
1	May 6, 8, & 10, 2013	100%	87.1% (repro)	1.1	100%						
2	Dec 9, 11, & 13, 2013	100% (repro)	>100% (repro)	<1	100%						
3	Mar 14 & 18, 2014	100% (repro)	>100% (repro)	<1	100%						
4	Apr 7, 9, & 11, 2014	100% (repro)	>100% (repro)	<1	100%						
5	Sept 22, 24, & 26, 2014	100% (repro)	>100% (repro)	<1	100%						
6	Nov 10, 12, & 14, 2014	100% (repro)	>100% (repro)	<1	100%						
7	Jan 19, 21, & 23, 2015	100% (repro)	>100% (repro)	<1	100%						
8	Apr 13, 15, & 17, 2015	50% (repro)	66.7% (repro)	1.5	100%						
9	Nov 30, Dec 1, & 2, 2015	50% (repro)	>100% (repro)	<1	100%						
10	Mar 21, 23, & 25, 2016	100% (repro)	>100% (repro)	<1	100%						
11	Sept 26, 28, and 30, 2016	100% (repro)	>100% (repro)	<1	100%						

Supplemental Report

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

Samples collected September 26, 28, and 30, 2016

Prepared For

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

Prepared By

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

Original Report Submitted October 24, 2016 Revised Report Submitted October 24, 2016



Supplemental Report

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

Samples collected September 26, 28, and 30, 2016

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- Appendix G Test Data and Summary of Statistics for the Evaluation of the Chronic Toxicity of Lehigh Pond 14 Site Water to *Ceriodaphnia dubia*: Analysis Including Outlier Data
- Appendix H 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 13, 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 26, 28, and 30, 2016. 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 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 26, 28, and 30, three Lehigh water samples (designated Pond 4A, Pond 13, 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)	pН	D.O. (mg/L)	Alkalinity (mg/L)	Hardness (mg/L)	Conductivity (µS/cm)	Total Ammonia (mg/L N)	Sulfide (mg/L)			
	9/26/16	7.2*	7.75	7.2	180	672	1359	<1.0	0.022			
Pond 4A	9/28/16	4.4	7.69	7.4	176	705	1342	<1.0	0.004			
	9/30/16	1.2	7.47	7.9	187	690	1311	<1.0	0.000			
	9/26/16	2.1	7.71	9.9	184	722	1432	<1.0	0.004			
Pond 13	9/28/16	2.5	7.62	10.2	178	725	1424	<1.0	0.004			
	9/30/16	2.5	7.30	8.6	368	725	1403	<1.0	0.000			
	9/26/16	2.1	7.70	7.3	234	695	1554	<1.0	0.008			
Pond 14	9/28/16	3.1	7.60	7.0	242	765	1594	<1.0	0.001			
	9/30/16	6.5*	7.37	6.7	241	770	1568	<1.0	0.000			

* Sample was received on ice the day of sample collection; the temperature of the temperature blank was <6°C.

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 consisted of a synthetic reconstituted freshwater (SRW adjusted to EPA "moderately-hard" hardness), prepared by addition of reagent grade chemicals to Type 1 lab water. 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 match the hardness of Pond 4A) 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 $\geq 60\%$ 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 monthly 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., EC50); 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. As the survival EC25 could not be calculated, the survival toxic units were calculated using the NOEC. The survival NOEC was 50% site water, resulting in 2.0 TUc. The reproduction IC25 was 51.8% site water, resulting in 1.9 TUc (where TUc= IC25).

The test data and summary of statistical analyses for this test excluding the outliers are presented in Appendix B; the statistical analyses for this test including the outlier are presented in Appendix C.

Table 2. Effects of Lehigh Pond 4A site water on Ceriodaphnia dubia survivaland reproduction.								
Site Water Treatment	Mean % Survival	Mean Reproduction (# neonates /female)						
Hardness Blank	90	24.1 * ^b						
Lab Water Control	100	32.0						
6.25%	100	31.8						
12.5%	90	33.3 ^b						
25%	100	29.6						
50%	100	25.1* ^b						
100%	20*	1.6						
Summary	of Key Statistics							
NOEC =	50% site water	25% site water						
TUc (TUc = 100/NOEC) =	2.0	4.0						
Survival EC25 or Reproduction IC25 =	>100% site water ^a	51.8% site water						
TUc (TUc = 100/EC25 or 100/IC25) =	N/A	1.9						
Survival EC50 or Reproduction IC50 =	76.2 % site water	69.0% site water						
TUc (TUc = 100/EC50 or 100/IC50) =	1.3	1.5						

* - 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 at multiple concentrations, the EC25 point estimates could not be calculated.

b - There was an outlier replicate in the 12.5%, 50%, and Hardness Blank treatments. The results presented here are those with the outlier excluded. Per EPA guidance, the data are presented both excluding and including the outlier are presented in Appendix B and C, respectively.

3.2 Effects of Lehigh Pond 13 Site Water on *Ceriodaphnia dubia*

The results of this test are summarized below in Table 3. As the survival EC25 could not be calculated, the survival toxic units were calculated using the NOEC. The survival NOEC was 100% site water, resulting in <1.0 TUc (where TUc=100/NOEC). The reproduction IC25 was 77.5% site water, resulting in 1.3 TUc (where TUc=100/IC25).

The test data and summary of statistical analyses for this test excluding the outlier are presented in Appendix D; the statistical analyses for this test including the outlier are presented in Appendix E.

Table 3. Effects of Lehigh Pond 13 site water on Ceriodaphnia dubia survivaland reproduction.								
Site Water Treatment	Mean % Survival	Mean Reproduction						
She water Treatment	Ivicali 70 Sulvival	(# neonates /female)						
Hardness Blank	90	24.1* ^b						
Lab Control	90	31.3 ^b						
6.25%	100	33.6						
12.5%	90	32.2 ^b						
25%	100	29.7						
50%	100	27.1						
100%	80	22.1						
Summary	of Key Statistics							
NOEC =	100% site water	100% site water						
TUc (TUc = $100/NOEC$) =	1.0	1.0						
Survival EC25 or Reproduction IC25 =	>100% site water ^a	77.5% site water						
TUc (TUc = 100/EC25 or 100/IC25) =	<1.0	1.3						
Survival EC50 or Reproduction IC50 =	>100% site water ^a	>100% site water ^a						
TUc (TUc = 100/EC50 or 100/IC50) =	<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.

b - There was an outlier replicate in the Ctrl-C, 12.5-A%, and Hardness Blank-G treatments. The results presented here are those with the outlier excluded. Per EPA guidance, the data are presented both excluding and including the outlier in Appendix D and E, respectively.

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

The results of this test are summarized below in Table 4. As the survival EC25 could not be calculated, the survival toxic units were calculated using the NOEC. The survival NOEC was 100% site water, resulting in <1.0 TUc (where TUc=100/EC25). The reproduction IC25 was >100% site water, resulting in <1 TUc (where TUc=100/IC25).

The test data and summary of statistical analyses for this test excluding the outlier are presented in Appendix F; the statistical analyses for this test including the outlier are presented in Appendix G.

Table 4. Effects of Lehigh Pond 14 site water on Ceriodaphnia dubia survivaland reproduction.								
Site Water Treatment	Mean % Survival	Mean Reproduction (# neonates /female)						
Hardness Blank	90	24.1* ^b						
Lab Control	100	30.3						
6.25%	80	20.9						
12.5%	100	31.2						
25%	90	30.3 ^b						
50%	100	29.3						
100%	100	25.8						
Summary	of Key Statistics							
NOEC =	100% site water	100% site water						
TUc (TUc = $100/NOEC$) =	1.0	1.0						
Survival EC25 or Reproduction IC25 =	>100% site water ^a	>100% site water						
TUc (TUc = 100/EC25 or 100/IC25) =	<1.0	<1						
Survival EC50 or Reproduction IC50 =	>100% site water ^a	>100% site water						
TUc (TUc = 100/EC50 or 100/IC50) =	<1.0	<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.

b - There was an outlier replicate in the 25-D% and Hardness Blank-G treatments. The results presented here are those with the outlier excluded. Per EPA guidance, the data are presented both excluding and including the outlier in Appendix F and G, respectively.

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

All 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 6. The survival EC50 and reproduction IC50 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 H.

Table 6. Reference toxicant testing: effects of NaCl on Ceriodaphnia dubia.								
NaCl Treatment (mg/L)	Mean % Survival	Mean Reproduction (# neonates/female)						
Lab Control	100	33.5						
500	100	31.0						
1000	66.7	20.3*						
1500	100	20.7*						
2000	60	5.3*						
2500	0*	-						
Summary of Statistics								
Survival EC50 or Reproduction IC50 =	1740 mg/L NaCl	1620 mg/L NaCl						
"Typical Response" =	728 - 2715 mg/L NaCl	598 - 2054 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

As the survival EC25 could not be calculated, the survival toxic units were calculated using the NOEC. The survival NOEC was 50% site water, resulting in 2.0 TUc. The reproduction IC25 was 51.8% site water, resulting in 1.9 TUc (where TUc=100/IC25).

Ceriodaphnia dubia Test Endpoint =	Survival	Reproduction
Survival NOEC or Reproduction IC25 =	50% site water	51.8% site water
TUc =	2.0	1.9

Chronic Effects of Lehigh Pond 13 Site Water on Ceriodaphnia dubia

As the survival EC25 could not be calculated, the survival toxic units were calculated using the NOEC. The survival NOEC was 100% site water, resulting in <1.0 TUc (where TUc=100/NOEC). The reproduction IC25 was 76% site water, resulting in 1.3 TUc (where TUc=100/IC25).

Ceriodaphnia dubia Test Endpoint =	Survival	Reproduction
Survival NOEC or Reproduction IC25 =	>100% site water	76% site water
TUc =	<1.0	1.3

Chronic Effects of Lehigh Pond 14 Site Water on Ceriodaphnia dubia

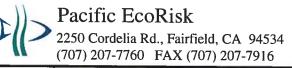
As the survival EC25 could not be calculated, the survival toxic units were calculated using the NOEC. The survival NOEC was 100% site water, resulting in <1.0 TUc (where TUc=100/NOEC). The reproduction IC25 was >100% site water, resulting in <1 TUc (where TUc=100/IC25).

Ceriodaphnia dubia Test Endpoint =	Survival	Reproduction
Survival NOEC or Reproduction IC25 =	>100% site water	>100% site water
TUc =	<1.0	<1

Appendix A

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





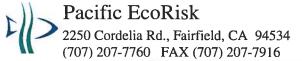
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CHAIN-OF-CUSTODY RECORD

Results To:	Robertson	n-Bryan, 1	Inc		Invoice To:	Same	Same REQUESTED ANALYSIS						
Address:	9888 Ken	t Street			Address:			_		TT			
	Elk Grove	e, CA 95	624		1			o au					
					1			val 002					
Phone:	Phone: (916) 405-8918 Pho				Phone:		<u></u>	A 1					
Attn:	Paul Bed	ore			Attn:			ЕР					
E-mail:	paul@rob	ertson-b	ryan.com		E-mail:	<u> </u>		jo dr					
Project Name:						L		luct					
P.O.#/Ref:	U							<i>Ceriodapnia dubia</i> Surival and Reproduction, EPA 1002.0					
		Sample	Sample	Sample	Grab/	<u> </u>	Container	Rep					
Client Sam	nple ID	Date	Time	Matrix*	Comp	Number	Type	Ŭ					
Pond 4A		9/26/16	10:00au	- FW	Comp	1	2.5-gal LDPE Cube	x	+ +	+		+	
Pond 9		110	1-1	FW	Comp		2.5-gal LDPE Cube					┥┥	
3 Pond 13			10:00a	~ FW	Comp			┨───┤──┼──	+	++			
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5													
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						Date:		Time:	Date:		-	Time:	
									Date.			inne:	

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

CHAIN-OF-CUSTODY RECORD



Results To:	Results To: Robertson-Bryan, Inc Inv							REQUESTED ANALYSIS						
Address:	9888 Ken	nt Street			Address:			- T						
	Elk Grov	e, CA 95	624					2.0						
		enenwo						Surival and A 1002.0						
Phone:	(916) 405	5-8918			Phone:									
Attn:	Attn: Paul Bedore							ibia , El						
E-mail:	paul@rot	pertson-b	ryan.com		E-mail:			tion de						
Project Name:	Lehigh T	oxicity an	d TRE T	esting	_			pupo						
P.O.#/Ref:								<i>Ceriodapnia dubia</i> Surival ar Reproduction, EPA 1002.0						
Client San	Client Sample ID Sample Sample Sample				Grab/		Container	Ъ́щ О						
		Date	Time	Matrix*		Number	Туре							
1 Pond 4A		9/28/16	8:00	FW	Comp	1	2.5-gal LDPE Cube	x						
2 Pond 9				FW	Comp	1	2.5-gal LDPE Cube	x						
3 Pond 13			0 10'.5D	FW	Comp	1	2.5-gal LDPE Cube	x						
4 Pond 14		9 28/40	11:15	FW	Comp	1	2.5-gal LDPE Cube	x						
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*Example Matrix Codes: (EFF - Effluent) (FW = Freshwater); (SW = Saltwater); (WW = Wastewater); (STRMW = Stormwater); (SED = Sediment); or other

CHAIN-OF-CUSTODY RECORD



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

Results To:	Robertson	n-Bryan, I	Inc		Invoice To:	Same			RE	QUES	TED A	NALY	SIS		
Address:	9888 Ken	t Street			Address:										
	Elk Grove	e, CA 95	624					Surival and A 1002.0							
1								ival 002							
Phone:	ne: (916) 405-8918				Phone:			A 1 Sur							
Attn:	Attn: Paul Bedore							Dia Dia							
E-mail:	paul@rob	ertson-b	ryan.com		E-mail:			tion						- 1	
Project Name:	Lehigh To	oxicity an	d TRE T	esting				duct							
P.O.#/Ref:	U			U				<i>Ceriodapnia dubia</i> Surival an Reproduction, EPA 1002.0							
		Sample	Sample	Sample	Grab/	Γ	Container	He je H							
Client San	nple ID	Date	Time	Matrix*		Number	Туре								
Pond 4A		9/30/16	800	FW	Comp	1	2.5-gal LDPE Cube	×							
Pond 9 - P	73	<i>42.76</i> C		FW	Comp	1	2.5-gal LDPE Cube	x							
Pond 13		9/30/16	850	FW	Comp	1	2.5-gal LDPE Cube	x							
Pond 14		7/30/16	920	FW	Comp	1	2.5-gal LDPE Cube	x							
5					PDg										
6					5										
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в															
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Samples colle	ected by:	H	Bidone						-112 - 101					+	
Comments/Sp	pecial Instr	ruction:				RELIQU	INSHED BY:		R	ECEI	VED B	Y:			
						Signatu	re: Paul Be	dire			ure: Ø		pu	2	
Statndard dilut	ion series o	on all samp	oles (6.25,	12.5, 25, 5	0, 100%)	Print:	Payl Bed	ore	P	rint: `	Je Kh	ac	liz	NG	7
						Organiz	ation: CISE				zation:				
Concurrent ref	erence toxi	cant test				Date:	9/20/16	Time: /1;2	5 0	ate: (9-31	0-1	6т	ime:	1125
Concurrent ha	rdness con	trol from P	ilot Systen	n test	RELIQUINSHED BY:			R	ECEI	VED B	Y:				
					Signature:				ignati	ıre:					
						Print:			P	Print:					
						Organization:			0)rgani:	zation:				
						Date: Time: Date:			Т	ime:					

*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*: Analysis Excluding Outlier Data

CETIS Sun	nmary Repo	rt				•		12 Oct-16 14:	36 (p 1 of 2) 1-3299-7615		
Ceriodaphnia	Survival and Re	product	tion Test								ic EcoRisk
Batch ID: Start Date: Ending Date: Duration:	09-8172-5943 27 Sep-16 12:1 03 Oct-16 15:00 6d 3h	5 P) S	est Type: rotocol: pecies: ource:	EPA-821-R-02-013 (2002) Ceriodaphnia dubia			E	Analyst: Diluent: Brine: Age:	Robert Gee Laboratory V Not Applicat		
-	00-2037-7482 26 Sep-16 10:0 26 Sep-16 14:1 26h (7.2 °C)	0 M 5 S	ode: laterial: ource: tation:	Pond 4A Influent Lehigh Permanente Pond 4A				Client: Project:	Lehigh Perm 26327	nanente	
Batch Note:	Excludes Outlie	rs 12.5 C	C, 50 D, Ha	irdness Ctl G							
Comparison S	Summary										
Analysis ID 19-9455-4016 08-8229-0606 05-6705-7130 01-4014-3952			NOEL <0 25 0 50	. LOEL 0 50 >0 100	TOEL 35.36 70.71	PMSD 8.15% 12.6% NA NA	TU 4 2	Bonf Fishe	al Variance t T erroni Adj t Te er Exact Test	wo-Sample Te est erroni-Holm Te	
Point Estimate	e Summary										· · · · · · · · ·
Analysis ID	Endpoint		Level	%	95% LCL	95% UCL	TU	Meth	bod		
09-1564-2473	Reproduction		IC5 IC10 IC15 IC20 IC25 IC40 IC50	19.8 27.6 36.6 45.6 51.8 62.1 69	9.63 19.4 24.7 35.7 42.8 57.7 65.5	27.7 35.3 45.9 52.3 55.4 65.4 72.3	5.054 3.628 2.734 2.193 1.932 1.611 1.45	Linea	ar Interpolatio	n (ICPIN)	
21-1721-2635	Survival		EC50	76.2	66	88.1	1.312	Trim	med Spearma	in-Kärber	
Reproduction	Summary										
	Control Type Lab Water Contr Hardness Contr	Count 10 9 10 9 10 9 10	Mean 32 24.1 31.8 33.3 29.6 25.1 1.6	95% LCL 29.5 21.9 28.3 30.4 27.6 22.4 -1.02	95% UCL 34.5 26.4 35.3 36.3 31.6 27.8 4.22	Min 27 20 23 25 24 18 0	Max 39 29 40 38 34 30 11	Std I 1.12 0.978 1.54 1.28 0.884 1.17 1.16	3.53 3 2.93 4.87 3.84 4 2.8	CV% 11.0% 12.2% 15.3% 11.5% 9.45% 14.0% 229.0%	%Effect 0.0% 24.7% 0.63% -4.17% 7.5% 21.5% 95.0%
Survival Sum	nary										
0	Control Type Lab Water Contr Hardness Contr	Count 10 10 10 10 10	Mean 1 0.9 1 0.9 1	95% LCL 1 0.674 1 0.674 1	95% UCL 1 1 1 1 1	Min 1 0 1 0 1	Max 1 1 1 1 1	Std E 0 0.1 0 0.1 0	Err Std De 0 0.316 0 0.316 0	CV% 0.0% 35.1% 0.0% 35.1% 0.0%	%Effect 0.0% 10.0% 0.0% 10.0% 0.0%
50 100		10 10	1 0.2	1 0	1 0.502	1 0	1 1	0 0.133	0	0.0% 211.0%	0.0% 80.0%

CETIS Summary Report

12 Oct-16	14:36 (p 2 of 2)
69786	6 01-3299-7615

Report Date:

Test Code:

Ceriodap	hnia Survival and Re	production	on Test							Pacif	fic EcoRis			
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	30	27	32	39	36	28	32	32	31	33			
0	Hardness Contr	26	25	29	21	23	24		27	20	22			
6.25		33	31	32	40	23	30	37	27	35	30			
12.5		37	38		34	25	35	35	31	32	33			
25		28	32	28	29	34	31	24	28	31	31			
50		27	24	30		18	27	27	27	23	23			
100		0	0	0	0	0	0	0	11	5	0			
Survival I	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 Contr	1	1	1	1	1	1	0	1	1	1			
6.25		1	1	1	1	1	1	1	1	1	1			
12.5		1	1	0	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		0	0	1	0	0	0	0	-1	0	0			
Survival I	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 Contr	1/1	1/1	1/1	1/1	1/1	1/1	0/1	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	0/1	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		0/1	0/1	1/1	0/1	0/1	0/1	0/1	1/1	0/1	0/1			

Analyst: R6 QA: SD

alytical Repo	ort					Report Date: Test Code:			16 14:19 (p 1 of 1) '86 01-3299-7615
a Survival and Re	produ	iction Test							Pacific EcoRisk
05-6705-7130 12 Oct-16 14:10	5	•		ntingency Ta	ble				
rm	Zeta	Alt Hyp	Trials	Seed		Test R	esult		
d		C > T	NA	NA		Passes	s survi	val	
Test									
vs Control			P-Value	Р-Туре					
ntrol Hardness	Contro	I 0.5	0.5000	Exact	Non-Signi	ficant Effect			
ry									
Control Type	NR	R	NR + R	Prop NR	Prop R	%Effect			
		-			÷				
	9		10	0.9	0.1	10.0%			
•		•							
UHC	C-%								
	a Survival and Re 05-6705-7130 12 Oct-16 14:10 rm d Test vs Control ntrol Hardness (ry Control Type Lab Water Cont Hardness Contr	05-6705-7130 12 Oct-16 14:16 rm Zeta d Test vs Control ntrol Hardness Contro ry Control Type NR Lab Water Cont 10 Hardness Contr 9 •	a Survival and Reproduction Test 05-6705-7130 Endpoint: Sur 12 Oct-16 14:16 Analysis: Sin rm Zeta Alt Hyp d C > T Test vs Control Test Stat ntrol Hardness Control 0.5 ry Control Type NR R Lab Water Cont 10 0 Hardness Contr 9 1 •	a Survival and Reproduction Test 05-6705-7130 Endpoint: Survival 12 Oct-16 14:16 Analysis: Single 2x2 Cor rm Zeta Alt Hyp Trials d C > T NA Test vs Control Test Stat P-Value ntrol Hardness Control 0.5 0.5000 ry Control Type NR R NR + R Lab Water Cont 10 0 10 Hardness Contr 9 1 10 •	a Survival and Reproduction Test 05-6705-7130 Endpoint: Survival 12 Oct-16 14:16 Analysis: Single 2x2 Contingency Ta mm Zeta Alt Hyp Trials Seed d C > T NA NA Test vs Control Test Stat P-Value P-Type ntrol Hardness Control 0.5 0.5000 Exact Ty Control Type NR R NR + R Prop NR Lab Water Cont 10 0 10 1 Hardness Control 9 1 10 0.9	a Survival and Reproduction Test 05-6705-7130 Endpoint: Survival 12 Oct-16 14:16 Analysis: Single 2x2 Contingency Table rm Zeta Alt Hyp Trials Seed d C>T NA NA Test vs Control Test Stat P-Value P-Type Decision(ntrol ntrol Hardness Control 0.5 0.5000 Exact Non-Signi ry Control Type NR R NR + R Prop NR Prop R Lab Water Cont 10 0 10 1 0 Hardness Control 9 1 10 0.9 0.1	Test Code: Test Code: Survival and Reproduction Test 05-6705-7130 Endpoint: Survival CETIS Version 12 Oct-16 14:16 Analysis: Single 2x2 Contingency Table Official Result rm Zeta Alt Hyp Trials Seed Test R d C > T NA NA Passes Test vs Control Test Stat P-Value P-Type Decision(α:5%) ntrol Hardness Control 0.5 0.5000 Exact Non-Significant Effect ry Control Type NR R NR + R Prop NR Prop R %Effect Lab Water Cont 10 0 10 0.9 0.1 10.0%	Test Code: a Survival and Reproduction Test 05-6705-7130 Endpoint: Survival CETIS Version: Official Results: 12 Oct-16 14:16 Analysis: Single 2x2 Contingency Table Official Results: rm Zeta Alt Hyp Trials Seed Test Result d C > T NA NA Passes survi	Test Code: 697 a Survival and Reproduction Test CETIS Version: CETIS Vision: CeTiS Vision:

Analyst: R6 QA: SD

CETIS Analytic	al Report						ort Date: Code:	12		:31 (p 1 of 1))1-3299-7615		
Ceriodaphnia Surviv	val and Reproduc	tion Test				-			Pac	ific EcoRisk		
			eproduction Irametric-Two	o Sample			IS Version: al Results:		1.8.7			
Data Transform	Zeta	Alt Hyp	PMSD	Test Resi	ult							
Untransformed	NA	C > T	NA	NA		8.15%	Fails repro					
Equal Variance t Tw	o-Sample Test					· · · · ·						
Control vs	Control	Test Stat	Critical	MSD DF	P-Value	P-Type	Decision(α:5%)				
Lab Water Control	Hardness Control	5.26	1.74		<0.0001	CDF	Significant					
ANOVA Table										· · · · · · · · · · · · · · · · · · ·		
Source	Sum Squares	Mean Sq	uare	DF	F Stat	P-Value	Decision(a:5%)				
	294.7953	294.7953		1	27.7	< 0.0001	Significant					
Error	180.8889	10.64052		17								
Total	475.6842			18								
Distributional Tests												
Attribute	Test		Test Stat	Critical	P-Value	Decision	(a:1%)					
Variances	Variance Ratio F		1.45	7.34	0.6147	Equal Variances						
Distribution	Shapiro-Wilk W N	ormality	0.97	0.861	0.7864	Normal Distribution						
Reproduction Summ	ary											
C-% Contro	ol Type Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect		
0 Lab W	ater Contr 10	32	29.5	34.5	32	27	39	1.12	11.0%	0.0%		
0 Hardne	ess Contr 9	24.1	21.9	26.4	24	20	29	0.978	12.2%	24.7%		
Graphics 30 30 5 20 15 5 5 5 5 5 5 5 5 5 5 5 5 5			Reject Null	Centerrod	7 6 5 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7	• •	•••	•	•	•		
o				J			1			1		

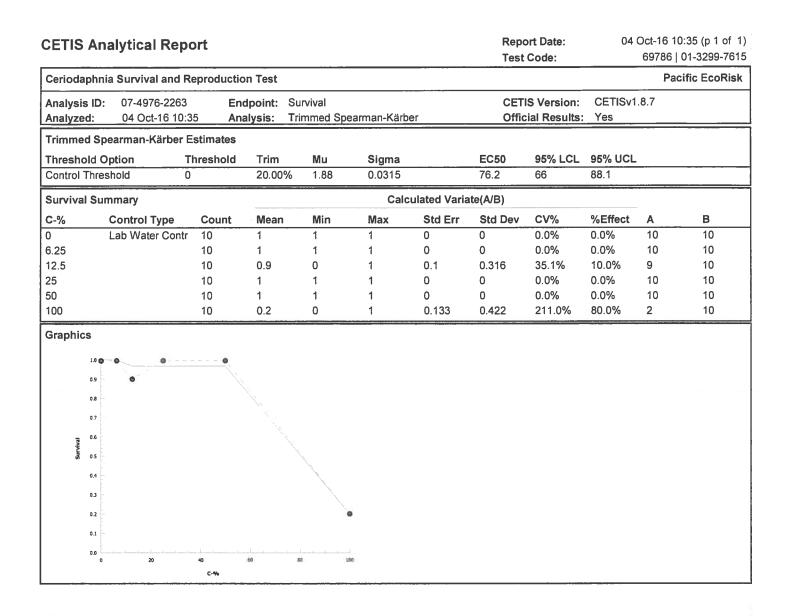
				Sh	ort-Ter	m Chro	nic 3-I	Brood	Ceria	daphr	nia du	bia Si	irviva	I&R	eproe	ductio	n Test	Data
	Client:		I	ehigh Pe	rmanente	е		M	laterial:	25%+75	r %-0.2-um	-Filt Bio	logical E	filuent/-P	ermeate	C30 Te	st Date:	9/27/16
Pro	ject #:	۲۶۵ 26	377 2637	27	Test ID:	10/27 698	75 697	86 F	Random							Control		
	Day	pН		D.O.		Cond.	Temp				Su	rvival / R	eproduc	tion				SIGN-OFF
		New	Oid	New	Old	(µS/cm)	("C)	Â	В	С	D	E .	F	G	Н	I	J	510N-0FF
	0	7.51		8,1		1712	25.1	0	0	0	0	0	0	0	0	0	Ó	Date: 912-111 New WQ: Test Init.: DM Sol'n Prep: DM Time: 1720
	1	7.39	7.76	8.3	7.0	1720	25.0	0	0	0	0	0	D	0	0	0	0	Date: 1128/16 New WQ: J.J. Counts: DM Sol'n Prep: DM Old WQ: J.J. Time: 235
	2	7,71	7.82	9,5	7.4	1729	253	0	0	Q	0	0	\odot	0	0	0	\diamond	Date: 9/24/17 New WQ: 32 Counts: TK Sol'n Prep: TV Old WQ: SF Time 1500
ontrol	3	7.50	7.68	8.9	7.1	1688	25.4	5	ч	0	0	0	0	3	0	0	0	Date: 1130 16 New WQ: RB Counts: DM Sol'n Prep: DM Old WQ: RB Time: 1215
	4	7.33	8.00	10.5	6.9	1732	25.2	0	0	S	2	4	3	6	5	4	3	Date: 10/1/16 New WQ: DM Counts: DM Sol ^a n Prep: DM Old WQ: DT Time: 1215
Hardness	5	7.86	7.62	9.1	8.9	1720	25.4	9	8	8	5	7	7	*/0	8	7	8	Date: w/L/it New WQ: PJ Counts: TK Sol'n Prep: TK Old WQ: SH4 Time: 1415
Hau	6		7.24	-	7.5	1786	23.4	12	17	16	14	12	14	-	14	9		Date: 10/3/16 New WQ: - Counts: 4429 Sol'n Prep. Old WQ: / JUC Time: 1515
	7													-				Date: New WQ: Counts: Sol'n Prep: Old WQ: Time:
	8													-				Date: New WQ: Counts: Sol'n Prep: Old WQ: Time:
							Total=	26	25	29	21	23	24	X/q	27	20	22	Mean Neonates/Female = 22.6

Environmental Consulting and Testing

Pacific EcoRisk

	arytic	al Repo	rt							eport est Co			69786 0	1-3299-761
Ceriodaphni	a Surv	ival and Re	produ	ction Test									Paci	fic EcoRis
Analysis ID: Analyzed:		5954-6677 Dot-16 10:35	5	Endpoint: Analysis:			ngency Table	es			Version: Results:	CETISv Yes	1.8.7	
Data Transfo	orm		Zeta	Alt F	lyp	Trials	Seed				NOEL	LOEL	TOEL	TU
Untransforme	ed			C > 1		NA	NA			5	50	100	70.71	2
Fisher Exact	/Bonfe	erroni-Holm	Test											
Control	vs	C-%		Test	Stat	P-Value	P-Type	Decision						
ab Water Co	ontrol	6.25		1		1.0000	Exact	Non-Sign	ificant Ef	fect				
		12.5		0.5		1.0000	Exact	Non-Sign						
		25		1		1.0000	Exact	Non-Sign						
		50		1		1.0000	Exact	Non-Sign		fect				
		100		0.000)357	0.0018	Exact	Significan	nt Effect					
Data Summa	ary			-										
>-%	Cont	trol Type	NR	R		NR + R	Prop NR	Prop R	%Effe	ct				
)	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			10	0		10	1	0	0.0%					
00			2	8		10	0.2	0.8	80.0%					
Graphics														
1.0	0	•		•										
li li			-											
0.9			•											
0.8														
0.7														
9.0														
5 0.6 Vi														
0.5														
0,4														
0.3														
0.2						•								
0.1														
0.0		<u> </u>												
0.0	D LW	6.25	12.5	25	50	100								

Analyst: R6 QA: SD



Analyst: R6 QA: SD

CETIS	Analytical R	eport					-	ort Date: Code:	04 (40 (p 1 of 1 1-3299-761
Cerioda	phnia Survival an	d Reproduc	tion Test							Paci	fic EcoRisl
Analysis Analyze			• •	production ametric-Mul	tiple Comp	arison		IS Version: cial Results:	CETISv1 Yes	.8.7	
Data Tra	ansform	Zeta	Alt Hyp	Trials	Seed		PMSD	NOEL	LOEL	TOEL	TU
Untransf	formed	NA	C > T	NA	NA		12.6%	25	50	35.36	4
Bonferr	oni Adj t Test								<u> </u>		
Control	vs C-%		Test Stat	Critical	MSD DI	P-Value	P-Type	Decision(α:5%)		
Lab Wat	er Control 6.25		0.118	2.32	3.92 18	1.0000	CDF	Non-Signif	icant Effect		
	12.5		-0.769	2.32	4.03 17	1.0000	CDF	Non-Signif	icant Effect		
	25		1.42	2.32	3.92 18	0.3248	CDF	Non-Signif	icant Effect		
	50*		3.97	2.32	4.03 17	0.0005	CDF	Significant	Effect		
ANOVA	Table										· · · · · · · · · · · · · · · · · · ·
Source	Sum	Squares	Mean Squ	are	DF	F Stat	P-Value	Decision(α:5%)		
Between	a 380.7	778	95.19444		4	6.68	0.0003	Significant	Effect		
Error	612.8	389	14.25323		43						
Total	993.6	567			47						
Distribu	tional Tests										
Attribute	e Test			Test Stat	Critical	P-Value	Decision	(a:1%)			
Variance	es Bartle	ett Equality of	Variance	2.77	13.3	0.5973	Equal Va				
Distributi		iro-Wilk W N		0.977	0.934	0.4704	Normal D				
Reprodu	uction Summary										
C-%	Control Typ	e Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Water 0		32	29.5	34.5	32	27	39	1.12	11.0%	0.0%
6.25		10	31.8	28.3	35.3	31.5	23	40	1.54	15.3%	0.63%
12.5		9	33.3	30.4	36.3	34	25	38	1.28	11.5%	-4.17%
25		10	29.6	27.6	31.6	30	24	34	0.884	9.45%	7.5%
50		9	25.1	22.4	27.8	27	18	30	1.17	14.0%	21.5%
Graphic	5			· · · · · · · · · · · · · · · · · · ·				······			
4	10					10					
						8					/
3	15	Z02	-							•	
3	io - 0					5					
ron				- Report Null	- 3	1			_00 ⁰		
Reproduction	5			161		Curransform			-		
Rep					č				part -		
2	-					0					
1	5					-2		No. of Concession, Name			
						-4					
10	0					-					
	-					-6		· 			
	D					-8		· 			
	o E					-10		1			
	0 LW 6.	25 12.5	25	50			.0 -1.5 -1.0	-0.5 0.0	0.5 1.0	1.5 2.0	2.5
		C-%									6.0

JEIIS	s Anal	ytical Repo	ort						Report I Fest Co			6 10:40 (p 1 of 1 86 01-3299-761
Cerioda	aphnia	Survival and Re	productio	1 Test								Pacific EcoRis
Analysi	-	09-1564-2473		point:	Reproduction					/ersion:	CETISv1.8.7	<u> </u>
Analyze		04 Oct-16 10:3		lysis:	Linear Interpola	tion (ICPIN)					Yes	
Linear	Interpo	lation Options										
X Trans	sform	Y Transform	See	d	Resamples	Exp 95%		Nethod				
Linear		Linear	1800	0141	200	Yes	Т	wo-Point In	terpolat	ion		
Point E	Estimate	es										
Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL						
IC5	19.8	9.63	27.7	5.054	3.614	10.39						
IC10	27.6	19.4	35.3	3.628		5.147						
IC15	36.6	24.7	45.9	2.734		4.043						
IC20	45.6	35.7	52.3	2.193		2.8						
IC25	51.8	42.8	55.4	1.932		2.335						
IC40	62.1	57.7	65.4	1.611	1.529	1.735						
IC50	69	65.5	72.3	1.45	1.383	1.527						
-	luction	Summary				Cal	culated	l Variate				
C-%		ontrol Type	Count	Mean		Max	Std E			V%	%Effect	
0	—La	ab Water Contr	10	32	27	39	1.12	3.53		1.0%	0.0%	
6.25			10	31.8	23	40	1.54	4.87		5.3%	0.63%	
12.5			9	33.3	25	38	1.28	3.84		1.5%	-4.17%	
25			10	29.6	24	34	0.884			.45%	7.5%	
50			9	25.1	18	30	1.17	3.52		4.0%	21.5%	
100			10	1.6	0	11	1.16	3.66	22	29.0%	95.0%	
Graphic	35 30 25	20	40 5		50 100							

Analyst: R/b QA: SD

Environmental Consulting and Testing

C	lient:			Lehigh	Permanei	nte		М	aterial:	-	P	ond 4A	L			Tes	t Date:	9127116
	ect #:		327	Lingu	Test ID:	69786			- Randomi			10.7.	7			Control	Water:	SRW
	Day	pl		D.	0.	Cond. (µS/cm)	Temp						eproducti					SIGN-OFF
		New	Old	New	Old		(°C)	A	В	С	D	E	F	G	н	1	1	Date 9/27/16 New WQ: Test Init 56
	0	8.01		8.		322	25.1	0	0	0	0	0	0	0	0	0	0	Sol'n Prep. 50 EP Time (215 Date: 9/28/16 New WQ: 57 Counts: 44
	I	7.86	7.84	7.6	7.0	342	25,4	0	0	0	0	0	Ο	U	0	0	0	Sol'n Prep: DM Old WQ: 5 Time: 1021
ы. 4	2	7.86	7.79	8,4	8,0	316	25.1	0	0	σ	0	0	0	0	0	0	0	Sol'n Prep: TL Old WQ: J7 Time: 1115
_	3	7.99	7.88	8.7	7,0	315	25.2	4	5	ч	0	0	4	6	Ť,	3	5	Date: 9130/16 New WQ: TAS Counts: DM Sol'n Prep: DM Old WQ: RB Time: 1250
Contro	4	7.81	8.00		7.8	331	25.4	0	jo	10	8	6	9	0	8	0	0	Date: 10/11/6 New WQ: FA Counts: DM Sol'n Prep: DM Old WO DT Time: 1335
Lah Water Control	5	7.90		8.2	6,7	3/4	25.D	12	ο	1	13	13	0	12	0	13	14	Date: O/L/II New WQ: Df Counts. SH Sol'n Prep: TK Old WQ: IF Time. [3]S Date: [0/3/16] New WQ: Counts. TSL
Lah	6	7.70	8.04	8.4	0.5	331	25.4	14	12	17	18	17	15	14	17	15	14	Date: 10/3/16 New WQ: - Counts: T3L Sol'n Prep: - Old WQ: JBL Time: 1500
	7		0.0-1															Date: New WQ: Counts. Sol'n Prep: Old WQ: Time:
	8				7					24 R					•			Date: Old WQ: Counts Time:
							Total	30	27	32	39	36	28	32	32	.31	33	Mean Neonates/Female = 32.0
	Day	p	H	D	.0.	Cend. (µS/cm)	i <u></u>				Survival	/ Reproc	luction					Sample ID
		New	Old	New	Old			A	В	С	D	E	F	G	Н	I	J	
	0	792		8.2		399		6	0	0	0	0	0	0	O_{-}	0	0	44182
	I	7.72	7.63	7.8	7,2	413		0	0	0	0	0	0	0	0	\odot	0	44182
	2	7.79	7.63	8.2	7.4	398		0	0	0	0	0	0	0	0	0	0	44192
	3	7,92	7.79		6.7	397		6	4	6	6	5	5	6	5	6	5	44192
%	4	7.76	7.87	8:6	7.5	404		0	0	0	0	0	10	13	0	0	0	44197
6.25%	5	7.71	8-12	8.1	6.1	390		13	13	12	17	In	Dje	18	12	14	12	44197
i	6	-	7.94		6.9	442		14	14	14	17	7	15	0	10	15	13	
	7																	
	8				<u> </u>													
							Total=	33	31	32	40	23	30	37	27	35	30	Mean Neonates/Female = 31 - 8

c	lient:			Lehigh	Permane	nte			laterial:	-		ond 4A			•		st Date:	9127111		
	ect #:	263	327		Test ID:	69786										Control	Water:	SRW		
	Day	pl		D.		Cond. (µS/cm)	Temp						eproduct			-		SIGN-OFF		
		New	Old	New	OId		(°C)	A	В	С	D	E	F	G	н	I	1			
	0	7.85		8.3		475		0	0	0	0	C	0	0	0	0	0			
	1	7.66	7.55	8,0	6.7	506		0	0	0	Ø	0	0	O	0	0	0			
	2	7.74	7,57	8.3	7,6	475		0	6	0	0	O	0	0	0	0	0			
	3	7.88	7.76	8.8	6.8	468		Ď	6	×lo	7	Ч	6	5	5	7	6			
12.5%	4	7.71	7.83	814	7.4	468		7	0	~	0	9	12	14	η	9	0			
12	5	7.64	8,06	8.2	6.8	464		15	16	-	15	Ó	- E	16	15	16	13			
	6	-	7.8	-	6.4	498		15	16	1	12	12	17	0	0	0	14			
_	7									-										
	8									~										
ł							Total=	37	38	xlo	34	25	35	35	31	32	33	Mean Neonates/Female = 30.0		
	Day		H		.O. Old	Cond. (µS/cm)		A	В	с	Survival D	/ Reproc	luction F	G	н	I				
	0	New 7701	Old	New 8.4	Uld	617										0	0			
		7.78						$\left(\right)$	0	0	0	0	0		0		0			
		1.61	7.49	7.8	7.7	618		0	0	\mathcal{O}_{-}	0	0	0	0	0	0				
	2	7.67	7.53	8.3	7,8	612		0	0	0	0	0	0	0	0	0	0			
	3	7.82	7.69	8.7	63	599		4	6	4	5	5	5	3	5	4	3			
25%	4	7,67	7.76	8.4	7.5	598		Ð	9	10	ο	14	0	7	8	0	0			
6	5	7.56	8.00	8.3	66	585		13	σ	14	12	D	13	14	15	12	14			
1	6	-	7.82	-	6.7	628		11	17	0	12	15	13	0	0	15	14			
	7																			
	8																			
							Total=	28	32	28	29	34	31	24	28	31	31	Mean Neonates/Female = 29.6		

С	lient:			Lehigh	Permaner	ıte		Μ	aterial:		F	ond 4A				Tes	t Date:	9127116
Proj	ect #:	263	27		Test ID:	69786										Control	Water:	SRW
	Day	pl	ł	D.		Cond. (µS/cm)	Temp				Su	vival / R						SIGN-OFF
		New	Old	New	Old		(°C)	A	В	С	D	E	F	G	Н	I	I	
	0	7.70		8.5		874		0	0	0	0	0	0	Ó	0	0	0	
	I	7.55	7,41	8.1	7.2	867		Ø	0	0	0	0	0	0	0	0	0	
	2	7.60	7,46	8.3	7,9	846		0	0	0	٥	0	Ó	6	0	G	0	
	3	7.75	7.79	8.9	7,2	849		S	5	5	3	3	ч	S	4	2	5	
50%	4	7162	772	8.6	7.7	846		0	0	0	0	0	0	8	10	8	3	
50	5	7.48	7.92	8.3	7.0	836		12	10	13	0	12	13	0	0	0	3	
	6	-	7.74	-	6.5	947		10	9	12	2	3	10	14	13	13	12	
	7		7.19											-				
	8							22										
2							Total=	27	24	30	5	18	27	27	27	23	23	Mean Neonates/Female = '23.\
	Day	pl	48888888888 H	D	0.			61				/ Reprod				20	20	
		New	OId	New	Old	Cond. (µS/cm)		A	В	С	D	Е	F	G	Н	1	J	
	0	2.65		8.3		1342		0	0	0	0	0	0	0	0	0	0	
	1		7,55	8.2	6.6	1332		0	0	0	0	40	ЩO	Ô	Ô	0	0	
	2	7,53	7.71	8.1	7,8	1305		¥/。	0	0	0	Ś	-	0	Ø	0	0	
	3	7.67	7.88		7.0	1303		-	D	0	XIO	/	_	×IO	4	5	0	
%	4	7.56	7.68		7.8	1298		_	Mo	0	_	/	~	-	7	*/0	×6	
100%	5	7,38	7,90		6,7-	1302		-	5	D	~	/	-	_	0			
	6		7.78	-	6.2	1346		~	-	0	~		_	-	0	ſ	1	
	7		1.1.0		4.0				-		~		-	~			1	
	8								_		_	~	~	-		-	~	
							Total=	X/o	X/D	0	XIO	×10	7/0	×lo	70	×15	×ю	Mean Neonates/Female = 10
				00000000	900000000	0000000000000000	a	/							11			

16 2014/16

Appendix C

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

CETIS Sur	nmary Repo	rt						Report Dat Test Code:				23 (p 1 of 2) 1-3299-7615
Ceriodaphnia	Survival and Re	eproducti	ion Test								Pacif	ic EcoRisk
Batch ID: Start Date: Ending Date: Duration:	09-8172-5943 27 Sep-16 12:1 03 Oct-16 15:00 6d 3h	5 Pi D Si	est Type: rotocol: pecies: purce:	Reproduction-S EPA-821-R-02 Ceriodaphnia d In-House Cultu	-013 (2002) Iubia			Analyst: Diluent: Brine: Age:	Robert Ge Laborator Not Applie	y Wate	r	
1 ·	00-2037-7482 26 Sep-16 10:0 : 26 Sep-16 14:1 26h (7.2 °C)	0 Ma 5 So	ode: aterial: ource: ation:	Pond 4A Influent Lehigh Perman Pond 4A	lente			Client: Project:	Lehigh Pe 26327	ermanei	nte	
Batch Note:	Includes Outlier	s 12.5 C,	50 D, Ha	rdness Ctl G								
Comparison	Summary											
Analysis ID	Endpoint		NOEL	LOEL	TOEL	PMSD	TU	Meth	od			
08-0467-8126	Reproduction		<0	0		11.2%			I Variance			
14-4710-9233	Reproduction		25	50	35.36	20.6%	4	Stee	l Many-One	Rank	Sum Test	
05-6705-7130			0	>0		NA		Fishe	er Exact Te	st		
15-5954-6677	Survival		50	100	70.71	NA	2	Fishe	er Exact/Bo	nferron	i-Holm Te	st
Point Estimat	e Summary							· · · · · ·				
Analysis ID	Endpoint		Level	%	95% LCL	95% UCL	TU	Meth	od			
19-6811-3164	Reproduction		IC5	11.1	3.52	28	9	Linea	ar Interpola	tion (IC	PIN)	
- 10 - 10 - 10 - 10 - 10 - 10 - 10 - 10			IC10	28.1	7.52	34.4	3.562	2				
			IC15	34.2	10.3	42	2.921					
			IC20	40.4	12.4	51.4	2.476	6				
			IC25	46.5	34.4	54.6	2.149					
			IC40	59.1	47.8	64.5	1.693					
07 4070 0000	Course in a l		IC50	66.5	56.4	71.4	1.503					
07-4976-2263	Surviva		EC50	76.2	66	88.1	1.312	2 Trimi	med Spear	man-Kä	arber	
Reproduction	Summary											
C-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std E	Err Std	Dev	CV%	%Effect
0	Lab Water Contr		32	29.5	34.5	27	39	1.12	3.53		11.0%	0.0%
0	Hardness Contr	10	22.6	18.7	26.5	9	29	1.75	5.52		24.4%	29.4%
6.25		10	31.8	28.3	35.3	23	40	1.54	4.87		15.3%	0.63%
12.5		10	30	22	38	0	38	3.52	11.1		37.2%	6.25%
25		10	29.6	27.6	31.6	24	34	0.884			9.45%	7.5%
50 100		10	23.1	18	28.2	5	30	2.27	7.17		31.0%	27.8%
		10	1.6	-1.02	4.22	0	11	1.16	3.66		229.0%	95.0%
Survival Sum	mary Control Type	Count	Mean	95% LCL	95% UCL	Min	Mase	044		Davis	C) (0/	0/ 55
0	Lab Water Contr		1	95% LCL	95% UCL	<u>Min</u>	Max 1	Std E	rr Std		CV%	%Effect
0		10	0.9	0.674	1	0	1	0.1	0.31		0.0% 35.1%	0.0%
6.25		10	1	1	1	1	1	0.1	0.31		0.0%	10.0% 0.0%
12.5		10	0.9	0.674	1	0	1	0.1	0.31		35.1%	0.0% 10.0%
25		10	1	1	1	1	1	0.1	0.51		0.0%	0.0%
50		10	1	1	1	1	1	0 0	0		0.0%	0.0%
100		10	0.2	0	0.502	0	1	0.133			211.0%	80.0%

Analyst: RC QA: SD

CETIS Summary Report

Ceriodaphnia Survival and Reproduction Test

Reproduc	tion 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	30	27	32	39	36	28	32	32	31	33
0	Hardness Contr	26	25	29	21	23	24	9	27	20	22
6.25		33	31	32	40	23	30	37	27	35	30
12.5		37	38	0	34	25	35	35	31	32	33
25		28	32	28	29	34	31	24	28	31	31
50		27	24	30	5	18	27	27	27	23	23
100		0	0	0	0	0	0	0	11	5	0
Survival D	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 Contr	1	1	1	1	1	1	0	1	1	1
6.25		1	1	1	1	1	1	1	1	1	1
12.5		1	1	0	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		0	0	1 = =	0	0	0	0	1	0	0
Survival B	inomials					·····					
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 Contr	1/1	1/1	1/1	1/1	1/1	1/1	0/1	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	0/1	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		0/1	0/1	1/1	0/1	0/1	0/1	0/1	1/1	0/1	0/1

RG QA: SD

12 Oct-16 14:23 (p 2 of 2)

69786 | 01-3299-7615

Pacific EcoRisk

Report Date: Test Code:

CETIS Ar	nalytic	al Repo	rt						ort Date: t Code:	12		19 (p 1 of 1) 1-3299-7615
Ceriodaphr	nia Survi	val and Re	produc	tion Test							Paci	fic EcoRisk
Analysis ID Analyzed:				-	Reproduction Parametric-Two	Sample			IS Version: cial Results		1.8.7	
Data Transf	orm		Zeta	Alt Hyp	Trials	Seed		PMSD	Test Res	ult		
Untransform	ed		NA	C > T	NA	NA		11.2%	Fails repr			
Equal Varia	nce t Tw	o-Sample	Test									
Control	vs	Control		Test St	at Critical	MSD E	F P-Value	P-Type	Decision	(a:5%)		
Lab Water C	Control	Hardness	Control	4.54	1.73		8 0.0001	CDF	Significan			
ANOVA Tab	le		<u> </u>		. , ,							
Source		Sum Squa	res	Mean S	quare	DF	F Stat	P-Value	Decision	(a:5%)		
Between			·	441.8	·	1	20.6	0.0003	Significan			
Error	:	386.4		21.4666	7	18						
Total		828.2				19						
Distribution	al Tests											
Attribute		Test			Test Stat	Critical	P-Value	Decision	(α:1%)			
Variances		Variance F	Ratio F		2.45	6.54	0.1981	Equal Va				
Distribution				ormality	0.911	0.866	0.0664		istribution			
Reproductio	zed: 12 Oct-16 14:18 Transform 2 Insformed N I Variance t Two-Sample T ol vs Ol vs Variance t Two-Sample T ol vs Ol Variance t Two-Sample T ol vs Control Hardness C /A Table 386.4 se Sum Square teen 441.8 386.4 828.2 butional Tests Ute tees Variance Ra ute Test tees Variance Ra ution Shapiro-Wil oduction Summary Control Type Lab Water Contr 1 Hardness Contr 1											
C-%		-	Count	Mean	95% LCL	95% UCI	L Median	Min	Max	Std Err	CV%	%Effect
0	Lab W	ater Contr	10	32	29.5	34.5	32	27	39	1.12	11.0%	0.0%
0	Hardn	ess Contr	10	22.6	18.7	26.5	23.5	9	29	1.75	24.4%	29.4%
30 30					Reject Null	J	Centranational and a contract of the contract	•			•	•
0		0 HC		01	w	18	-2.0	-1.5 -1.0	-0.5 0.0	0.5 1.	0 1.5	2.0
			C-%						Rankits			

Ceriodanhnia	Survival and Re	production	Test			<u>-</u>			Code:			1-3299-76 fic EcoRis
		-										
Analysis ID: Analyzed:				production	Control v	s Treatm	ents	+	IS Version: cial Results:	CETISv1. Yes	8.7	
Data Transfor	m	Zeta	Alt Hyp	Trials	Seed			PMSD	NOEL	LOEL	TOEL	TU
Untransformed		NA	C > T	NA	NA			20.6%	25	50	35.36	4
Steel Many-Or	ne Rank Sum Te	st										
Control	vs C-%		Test Stat	Critical	Ties I	DF P-Va	lue	P-Type	Decision(a:5%)		
ab Water Con	ntrol 6.25		104	76	5	8 0.774	42	Asymp		icant Effect		
	12.5		114	76	3 .	8 0.94	52	Asymp	Non-Signif	icant Effect		
	25		85.5	76	3 .	8 0.192	29	Asymp	Non-Signif	icant Effect		
	50*		59.5	76	2 '	8 0.00	11	Asymp	Significant	Effect		
NOVA Table	· · · · · · · · · · · · · · · · · · ·											
Source		ares	Mean Squ	lare	DF	F Sta	at	P-Value	Decision(
Between			131.4		4	2.99		0.0284	Significant	Effect		
Error			43.93111		45							
Fotal	2502.5				49							
Distributional	Tests											
Attribute	Test			Test Stat		P-Va		Decision				
Variances				20.7	13.3	0.000		Unequal V				
Distribution	Shapiro-V	Vilk W Norm	nality	0.776	0.937	<0.00	001	Non-norm	al Distributio	n		
Reproduction	ted: 04 Oct-16 10:35 Ana ransform Zeta sformed NA Many-One Rank Sum Test NA Many-One Rank Sum Test Image: Constraint of the second											
	aphnia Survival and Repro is ID: 14-4710-9233 ed: 04 Oct-16 10:35 ransform Zet sformed NA Many-One Rank Sum Test Many-One Rank Sum Test Many-One Rank Sum Test Mater Control 6.25 12.5 25 50* A Table Sum Squares in 525.6 1976.9 2502.5 utional Tests te Test res Bartlett Equali tion Shapiro-Wilk V fuction Summary Control Type Co Lab Water Contr 10 10 10 10 10 10 10 10 10 10		Mean	95% LCL	95% UC		ian	Min	Max	Std Err	CV%	%Effect
	Lab Water Contr		32	29.5	34.5	32		27	39	1.12	11.0%	0.0%
6.25			31.8	28.3	35.3	31.5		23	40	1.54	15.3%	0.63%
12.5			30	22	38	33.5		0	38	3.52	37.2%	6.25%
25			29.6	27.6	31.6	30		24	34	0.884	9.45%	7.5%
50		10	23.1	18	28.2	25.5		5	30	2.27	31.0%	27.8%
Graphics						10 [
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30	6	\square								and the second second		
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цо про 25 25 28				14		Centered Untransform	-					
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						-25			t.			
5						-						
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0	134 6.35			APLAN .								
0	LW 6.25		25	50		-2.	5 -2.0) -1.5 -1.0	-0.5 0.0 Rankits	0.5 1.0	1.5 2.0	2.5

Analyst: R6 QA: SD

CETIS	S Anal	ytical Repo	ort						-	ort Date: Code:		6 10:35 (p 1 of 1 86 01-3299-761
Ceriod	aphnia	Survival and Re	productio	n Test					1030			Pacific EcoRisk
Analys	-	19-6811-3164	-	point:	Reproduction				CETI	S Version:	CETISv1.8.7	
Analyz		04 Oct-16 10:3		lysis:	Linear Interpola	tion (ICPIN)				ial Results:		
Linear	Interpol	ation Options									· · · ·	
X Tran	sform	Y Transform	See	d	Resamples	Exp 95%	CL	Metho	d			
Linear		Linear	155	1765	200	Yes		Two-Po	oint Interp	olation		
Point E	Estimate	S										
Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL						
IC5	11.1	3.52	28	9	3.576	28.4						
IC10	28.1	7.52	34.4	3.562		13.3						
IC15	34.2	10.3	42	2.921	2.383	9.669						
IC20	40.4	12.4	51.4	2.476	1.946	8.051						
IC25	46.5	34.4	54.6	2.149	1.831	2.903						
IC40	59.1	47.8	64.5	1.693	1.55	2.093						
IC50	66.5	56.4	71.4	1.503	1.401	1.773						
Reproc	duction	Summary				Cal	culat	ed Varia	ate			
C-%	C	ontrol Type	Count	Mean	Min	Мах	Std	Err	Std Dev	CV%	%Effect	
0	La	ab Water Contr	10	32	27	39	1.12		3.53	11.0%	0.0%	
6.25			10	31.8	23	40	1.54		4.87	15.3%	0.63%	
12.5			10	30	0	38	3.52	:	11.1	37.2%	6.25%	
25			10	29.6	24	34	0.88	4 :	2.8	9.45%	7.5%	
50			10	23.1	5	30	2.27		7.17	31.0%	27.8%	
100			10	1.6	0	11	1.16	:	3.66	229.0%	95.0%	
Graphic uppropulate	35 30 225 	•										
	0	20	40 6 C-%	D	80 100						. <u> </u>	

Analyst: RC QA: SD

Appendix D

Test Data and Summary of Statistics for the Evaluation of the Chronic Toxicity of Lehigh Pond 13 Site Water to *Ceriodaphnia dubia*: Analysis Excluding Outlier Data

CETIS Sum	mary Repo	rt						port Date st Code:	ə: 04		l6 (p 1 of 2) 7-2117-9824
Ceriodaphnia	Survival and Re	produ	ction Test							Pacif	ic EcoRisk
Batch ID: Start Date: Ending Date: Duration:	10-2017-0884 27 Sep-16 11:45 03 Oct-16 15:05 6d 3h	5	Test Type: Protocol: Species: Source:	Reproduction-S EPA-821-R-02- Ceriodaphnia d In-House Cultur	013 (2002) ubia		Di	alyst: luent: ine: je:	Robert Gee Laboratory Wat Not Applicable 1	er	
Sample ID: Sample Date: Receive Date: Sample Age:	26h (2.1 °C)	5	Code: Material: Source: Station:	Pond 13 Influent Lehigh Perman Pond 13	ente			ient: oject:	Lehigh Perman 26327	ente	
Batch Note:	Excludes Outlier	rs Ctrl (C, 12.5 A	····							
Comparison S	Summary										
Analysis ID	Endpoint		NOEL		TOEL	PMSD	TU	Meth	-		
21-0040-5233	Reproduction		100	>100	NA	20.8%	1		xon/Bonferroni	-	
05-8827-9943	Survival		100	>100	NA	NA	1	FISTE	er Exact/Bonferro	oni-Holm Te	st
Point Estimate	e Summary										
Analysis ID	Endpoint		Level	%	95% LCL	95% UCL	TU	Meth	od		
10-4014-0713	Reproduction	_	IC5	19.3	10.3	34.4	5.172	Linea	ar Interpolation (I	CPIN)	
			IC10	29.6	17.4	58.5	3.377				
			IC15	45.2	22.6	69.5	2.211				
			IC20	61.3	37.5	N/A	1.632				
			IC25	77.5	48.6	N/A	1.29				
			IC40	>100	N/A	N/A	<1				
			IC50	>100	N/A	N/A	<1				
Reproduction	Summary										
C-%	Control Type	Coun	t Mean	95% LCL	95% UCL	Min	Max	Std E	Err Std Dev	CV%	%Effect
0	Lab Water Contr	9	31.3	28.7	33.9	26	38	1.13	3.39	10.8%	0.0%
6.25		10	33.6	30.7	36.5	28	42	1.3	4.12	12.2%	-7.23%
12.5		9	32.2	29.8	34.6	27	37	1.05	3.15	9.79%	-2.84%
25		10	29.7	26	33.4	23	36	1.65	5.21	17.5%	5.21%
50		10	27.1	23	31.2	19	37	1.8	5.7	21.1%	13.5%
100		10	22.1	14.7	29.5	4	33	3.25	10.3	46.6%	29.5%
Survival Sum	mary		·					16			
	Control Type	Coun	t Mean	95% LCL	95% UCL	Min	Max	Std E	Err Std Dev	CV%	%Effect
0	Lab Water Contr	10	0.9	0.674	1	0	1	0.1	0.316	35.1%	0.0%
6.25		10	1	1	1	1	1	0	0	0.0%	-11.1%
12.5		10	0.9	0.674	1	0	1	0.1	0.316	35.1%	0.0%
25		10	1	1	1	1	1	0	0	0.0%	-11.1%
50		10	1	1	1	1	1	0	0	0.0%	-11.1%
100		10	0.8	0.498	1	0	1	0.133	3 0.422	52.7%	11.1%

Analyst: RG QA: SD

CETIS42/75	8.	7.	16	
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	$\cap I$
Amplumh	R6

Analyst:_	R6	QA:	SD

Ceriodap	hnia Survival and Re	productio	on Test						ι.	Pacif	ic EcoRisk
Reprodu	ction 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	26		30	31	31	33	34	38	30
6.25		42	30	28	39	32	33	34	32	34	32
12.5			34	29	32	32	27	30	37	35	34
25		23	25	36	30	26	30	35	33	36	23
50		19	22	28	33	28	26	25	37	32	21
100		23	24	4	33	31	5	30	21	30	20
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	0	1	1	1	1	1	1	1
6.25		1	1	1	1	1	1	1	1	1	1
12.5		0	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	0	1	1	0	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	0/1	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		0/1	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	0/1	1/1	1/1	0/1	1/1	1/1	1/1	1/1

CETIS Summary Report

Report Date: Test Code:

04 Oct-16 11:16 (p 2 of 2)

69788 | 17-2117-9824

CETIS	Ana	lytic	cal Repo	rt							port Date: st Code:	04		12 (p 1 of 1 7-2117-982
Cerioda	phnia	Surv	ival and Re	produ	uction T	est							Paci	fic EcoRis
Analysis Analyze			075-1526 Dct-16 11:11	1	Endpo Analys	int: Sur is: STI		ngency Tabl	es		TIS Version: ficial Results:	CETISv Yes	1.8.7	
Data Tra	ansfor	m		Zeta	A	lt Hyp	Trials	Seed			NOEL	LOEL	TOEL	TU
Untransf	ormed				C	; > T	NA	NA			100	>100	NA	1
Fisher E	Exact/E	Bonfe	erroni-Holm	Test										
Control		VS	C-%		Т	est Stat	P-Value	P-Type	Decision					
Lab Wat	er Con	trol	6.25		1		1.0000	Exact	Non-Sign	ificant Effe	ect			
			12.5		0	.763	1.0000	Exact	Non-Signi	ificant Effe	ect			
			25		1		1.0000	Exact	Non-Signi					
			50		1		1.0000	Exact	Non-Signi					
			100		0	.5	1.0000	Exact	Non-Sign	ificant Effe	ect			
Data Su	mmar	y												
C-%		Cont	trol Type	NR	R	2	NR + R	Prop NR	Prop R	%Effec	t			
)		Lab \	Water Cont	9	1		10	0.9	0.1	0.0%				
.25				10	0		10	1	0	-11.1%				
2.5				9	1		10	0.9	0.1	0.0%				
5				10	0		10	1	0	-11.1%				
50				10	0		10	1	0	-11.1%				
00				8	2		10	0.8	0.2	11.1%				
Graphic	s													
	1.0		•			•								
			-		-									
	0.9	0		0										
	0.8						٥							
	0.7													
rival	8													
Sur	0.6													
	0.5													
	0.4													
	1													
1	0.3													
1	0.2													
	0.1													
	1.0													
1	0.0	LW	6.25	12 5	25	50	100							
	-		·	C-9										

CETIS Ana	lytical Repo	ort						•	ort Date: Code:	04 (16 (p 1 of 1 7-2117-9824
Ceriodaphnia	Survival and Re	productio	n Test					-			Paci	fic EcoRisk
Analysis ID: Analyzed:	21-0040-5233 04 Oct-16 11:1		•	production nparametric-	Multiple	Cor	nparison	+ = .	IS Version: cial Results:	CETISv1 Yes	.8.7	
Data Transfor	m	Zeta	Alt Hyp	Trials	Seed			PMSD	NOEL	LOEL	TOEL	TU
Untransformed		NA	C > T	NA	NA			20.8%	100	>100	NA	1
Wilcoxon/Bon	ferroni Adj Test											
Control	vs C-%		Test Stat	Critical	Ties	DF	P-Value	P-Type	Decision(a:5%)		
Lab Water Cor	trol 6.25		117	NA	3	17	1.0000	Exact		icant Effect		
	12.5		93.5	NA	3	16	1.0000	Exact	Non-Signif	icant Effect		
	25		92	NA	3	17	1.0000	Exact	Non-Signif	icant Effect		
	50		78	NA	2	17	0.1885	Exact	Non-Signif	icant Effect		
	100		72.5	NA	3	17	0.0561	Exact	Non-Signif	icant Effect		
ANOVA Table												
Source	Sum Squa	ires	Mean Sq	uare	DF		F Stat	P-Value	Decision(
Between	867.2651		173.453		5		4.97	0.0009	Significant	Effect		
Error	1813.856		34.88184		52			,				
Total	2681.121				57		-					
Distributional	Tests											
Attribute	Test			Test Stat	Critica	al	P-Value	Decision	(α:1%)			
Variances	Bartlett E	quality of Va	ariance	17.5	15.1		0.0036	Unequal V	Variances			
Distribution	Shapiro-V	Vilk W Norn	nality	0.948	0.944		0.0146	Normal D	istribution			
Reproduction	Summary											
C-%	Control Type	Count	Mean	95% LCL	95% U	ICL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Water Contr	9	31.3	28.7	33.9		31	26	38	1.13	10.8%	0.0%
6.25		10	33.6	30.7	36.5		32.5	28	42	1.3	12.2%	-7.23%
12.5		9	32.2	29.8	34.6		32	27	37	1.05	9.79%	-2.84%
25		10	29.7	26	33.4		30	23	36	1.65	17.5%	5.21%
50		10	27.1	23	31.2		27	19	37	1.8	21.1%	13.5%
100		10	22.1	14.7	29.5		23.5	4	33	3.25	46.6%	29.5%
Graphics							15 (~~		,			
40							10					
35							-		8		99 ⁰⁰	
5	797	-0-					y 5			Carbon and a second		
50 30		-	8			Centared	alocia		i 1 83	-		
2 25						S.			-			
				Z.		:			CO CONTRACTOR			
20			L				-5	0000				
15								•	ŀ			
10							-10					
							.)=					
5							-15	•				
o [{						-20	II	I		[]	1
01	.W 6.25		25 50	100				2.0 -1.5 -1.0	-0.5 0.0	0.5 1.0	1.5 2.0	2.5
		C-%							Rankits			

Analyst: <u><u>R</u>6 <u>QA:</u> <u>SD</u></u>

000-034-187-2

CETIS	S Anal	ytical Repo	ort						port Date: st Code:		l6 11:16 (p 1 of 1) 88 17-2117-9824
Ceriod	aphnia	Survival and Re	eproductio	n Test							Pacific EcoRisk
Analys Analyz		10-4014-0713 04 Oct-16 11:1		point: lysis:	Reproduction Linear Interpola	ation (ICPIN)			TIS Version: ficial Results:	CETISv1.8.7 Yes	
Linear	Interpo	lation Options									
X Trans	sform	Y Transform	See	d	Resamples	Exp 95% C	L Me	ethod			
Linear		Linear	515	011	200	Yes	Τw	o-Point Inte	rpolation		
Point E	Estimate	s									
Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL					
IC5	19.3	10.3	34.4	5.172		9.724					· · · · ·
IC10	29.6	17.4	58.5	3.377	1.709	5.745					
IC15	45.2	22.6	69.5	2.211	1.438	4.422					
IC20	61.3	37.5	N/A	1.632	NA	2.668					
IC25	77.5	48.6	N/A	1.29	NA	2.057					
IC40	>100	N/A	N/A	<1	NA	NA					
IC50	>100	N/A	N/A	<1	NA	NA					
Reprod	luction	Summary		*		Calcu	lated \	/ariate			
C-%	C	ontrol Type	Count	Mean	Min	Max S	td Err	Std Dev	/ CV%	%Effect	
0	La	ab Water Contr	9	31.3	26	38 1	.13	3.39	10.8%	0.0%	
6.25			10	33.6	28	42 1	.3	4.12	12.2%	-7.23%	
12.5			9	32.2	27	37 1	.05	3.15	9.79%	-2.84%	
25			10	29.7	23	36 1	.65	5.21	17.5%	5.21%	
50			10	27.1	19		.8	5.7	21.1%	13.5%	
100			10	22.1	4	33 3	.25	10.3	46.6%	29.5%	
Graphic	35 30 25	20	40 5	0	50 100						
			C-%								

Analyst: Rb QA: SD

						- Ierin Chru										Tes	t Date:	9127/16
	lient: ect #:	263	27	Lehigh	Permaner Test ID:				-			10.7						SRW
1989399	Day	pl		D.			Temp		_			vival / Re		ion				SIGN-OFF
	Day	New	Old	New D.	Old	Cond. (µS/cm)	(°C)	A	В	С	D	Е	F	G	Н	I	J	
88888	0	7.89		7.4		330	25.3	0	0	0	0	0	0	0	0	0	0	Date: 9/37/16 New WQ: Test Init.: DM Sol'n Prep: JO JL Time: 1145 Date: 9/36/14 New WO: Z-7 Counts. (u c
	1	8.03	8.09	7.7	6.3	319	25.0	0	0	0	0	0	0	0	ಲ	0	C	Sol'n Prep: DM Old WQ: 77 Time: 1250
	2	7.68	7.71	8.2	7.5	317	25.3	0	0	0	0	0	0	0	0	0	0	Date: 9/29/11 New WQ: RE Sol'n Prep: TV Old WQ: D-F Time: 1/15 Date: 7/32(16 New WQ: TA Counts. JO
lini	3	7.90	8.22	8.5	7.9	333	25.6	4	4	D	5	5	5	4	6	7_	5	Sol'n Prep: DM Old WQ: RB Time: 1245
tr Coli	4	7.89	7.96	8.0	7.7	363	25.4	9	8	×/0	D	10	9	0	8	0	0	Sol'n Prep: jolul 6 Old WQ: DT Time: 1300 Date: ic/z/16 New WQ: DJ Counts w2
Lab Water Constrol	5	7.67	8.16	7.8	6.5	307	25.1	0	0	~	10	0	0	13	0	14	10	Sol'n Prep: TV Old WQ: HR Time 1330 Date 93/16 New WQ: - Counts: We
Ē	6	_	8.08	-	6.9	325	25.4	16	14		15	16	רו	16	20	17	IS	Sol'n Prep: Old WQ: JBL Time: 1505 Date: New WQ: Counts:
	7									-								Sol'n Prep: Old WQ: Time
	8						• do :			1								Date: Old WQ: Counts Time
							Totai=	29	26	XIO	30	31	31	33	34	38	30	Mean Neonates/Female = 2.8.2
	Day	P	H	D	.0.	Cond. (µS/cm)						/ Reprod						Sample ID
		New	Old	New	Old	Cond. (proventry		A	В	С	D	E	F	G	н	<u> </u>	J	
	0	7.74		7.8		40)		٥	0	0	0	0	0	0	0	0	0	44180
	1	7.86	7.95	7.8	7.0	411		с_	C	0	0	0	G	0	0	0	0	44180
	2	7.62	7.56	8.2	7,8	402		0	0	0	Q	0	0	0	0	0	0	44190
	3	7.80	8.03	8.6	7,6	403		7	7	3	5	5	4	6	5	Ġ.	5	<u>ц4190</u>
6.25%	4	7.76	7.91	8.2	7.7	415		0	10	0	0	0	12	11	0	0	10	44195
6.2	5	7.56	7,99	7.9	6,6	401		14	0	11	15	10	0	0	13	13	0	44195
	6	-	8.01	-	7.0	416		21	13	14	19	71	17	רו	14	15	17	
	7																	
	8																	
							Total=	42	30	28	39	32	33	34	32	34	32	Mean Neonates/Female = 33.6

C	lient:		Lehigh Permanente 26327 Test ID:69788						aterial:	_	1	Pond 13	1			Tes	st Date:	9127/16
	ect #:		27		Test ID:	69788										Control	Water:	SRW
	Day	рН			.0.	Cond. (µS/cm)	Temp (°C)					rvival / R	<u> </u>				J	SIGN-OFF
		New	Old	New	Old			A	В	С	D	E	F	G	Н	I		
	0	7.68		3,1		481		0	0	0	0	0	0	0	0	0	0	
	1	7.79	7.88	7.9	7.0	500		D	0	0	0	0	0	a	9	0	0	
	2	7.60	7,50	8.4	7.9	484		Q	0	0	6	0	0	0	0	0	Ó	
	3	7.74	7.98	8.8	7.7	482		×⁄2	4	5	5	4	5	5	5	6	7	
12.5%	4	7,69	7.86	8,6	7.8	485			0	0	6	n	8	0	0	0	0	
12	5	7.51	7.96	8,0	6.8	481			15	П	4	0	0	11	15	11	14	
	6		7.95	-	7.0	497		-	15	13	17	17	14	14	17	18	13	
	7							~										
12	8		_					-										
							Total=	X/2	34	29	32	32		30	37	35	34	Mean Neonates/Female = 29.2
	Day	pH New	l Old	D New	.O. Old	Cond. (µS/cm)		A	В	С	Surviva D	I / Reproc	luction F	G	н	I	J	
	0	7,62		8.3		625		0	0	0	0	0	0	0	0	0	0	
	1		7.80	A .	6.8	634		0	0	0	0	0	0	0	0	0	0	
	2		7,44	8.5	7.9	618		0	0	0	0	0	0	0	0	0	0	
*	3	<u> </u>	7.94		7.6	619		4	5	6	6	5	4	6	6	5	4	
	4	7,62		815	7.7	619		6	7	0	9	5	8	0	0	0	S	
25%	5	7.46	7.89	8.0	7.0	623		0	0	14	0	0	0	13	12	13	0	
	6	-	7.89		7.1	648		13	13	16	15	16	18	16	15	18	14	
	7													. 			<u> </u>	
	8								-	+								
							Total=	23	25	36	30	26	30	35	33	36	23	Mean Neonates/Female = 29.7

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(Client:		Lehigh Permanente 26327 Test ID: 69788					N	Aaterial:			Pond 1	3			Te	st Date:	9/27/16
Pro	ject #:	263	327	•	Test ID:	69788		-								Contro	l Water:	SRW
	Day	<u> </u>	Н		.0.	Cond. (µS/cm)	Temp (°C)			F _	1	-	Reproduct	-	T	r		SIGN-OFF
	0	New	Old	New 8.8	Old	-898	(,,)	A O	B	c o	D	E	F O	G	н	і 0	0 I	
	1	7.64	7.72	8.4	7.0	928		σ	0	0	0	0	0	0	0	0	0	
	2	7.48		8.9	7.9	892		0	0	0	0	0	0	0	0	0	О	
	3	7,61	7.90	9.3	7.5	894		6	4	4	5	5	4	3	7	4	5	
50%	4	7.55	7.75	8.9	7.8	878		0	5	٥	0	8	10	D	0	0	6	
5	5	7.40	7.84	8.1	C.9	873		13	σ	13	15	0	0	11	13	13	0	
	6	i	7.81		7.2	912		0	13	1(13	15	12	11	17	15	ID	
	7	******		*******														
	8		0000000000		000000000								<u> </u>					
							Total=	19	22	23	33		1	25	37	32	21	Mean Neonates/Female = 27.1
	Day	P New	H Old	D. New	.O. Old	Cond. (µS/cm)		А	В	С	D	/ Reproc	fuction F	G	н	I	J	
	0	7,53		9,7		1377		0	0	Ð	0	0	0	0	0	0	0	
	1	7,63	7.96	8,9	7.3	1481		0	G	0	C	0	0	0	0	0	0	
	2	7.45	7.65	9.8	7.6	1382		0	0	Э	0	0	0	σ	0	0	0	
	3	7.56	8.1z	10.0	7.6	1380		5	3	4	6	4	5	5	4	3	3	
100° o	4	7.48		818	7.9	1393		6	7	×ю	0	0	0	0	S	0	8	
	5	7.33	7.93	8,2	7:1	1410		0	0	~	13	11	×/o	11	1	13	0	
	6	/	7.82		7.0	1453		12	14		14	16	-	14	11	14	9	
	7	17101010101010101010		000000000						~			-					
	8									-			-					
							Total=	23	24	x14	33	31	¥/5	30	21	30	20	Mean Neonates/Female = 22.1

Appendix E

Test Data and Summary of Statistics for the Evaluation of the Chronic Toxicity of Lehigh Pond 13 Site Water to *Ceriodaphnia dubia*: Analysis Including Outlier Data

CETIS Sum	nmary Repo	rt						eport Date	e: 0		12 (p 1 of 2) 7-2117-9824
Ceriodaphnia	Survival and Re	produc	ction Test							Paci	fic EcoRisk
Batch ID: Start Date: Ending Date: Duration:	10-2017-0884 27 Sep-16 11:45 03 Oct-16 15:05 6d 3h	5 ; ;	Test Type: Protocol: Species: Source:	Reproduction-S EPA-821-R-02 Ceriodaphnia c In-House Cultu	-013 (2002) Iubia		D	nalyst:)iluent: Brine: Ige:	Robert Gee Laboratory Wa Not Applicable		
	12-5390-1120 26 Sep-16 10:00 26 Sep-16 14:15 26h (2.1 °C)	D 1 5 1	Code: Material: Source: Station:	Pond 13 Influent Lehigh Permar Pond 13	ente			ilient: Project:	Lehigh Perma 26327	nente	
Batch Note:	Includes Outliers	s Ctrl C	, 12.5 A								
Comparison S	ummary										
Analysis ID	Endpoint		NOEL	LOEL	TOEL	PMSD	τu	Meth	od		
06-7593-3888 10-1075-1526	Reproduction Survival		100 100	>100 >100	NA NA	29.3% NA	1 1		l Many-One Ra er Exact/Bonfer		
Point Estimate	e Summary	-	•								
Analysis ID	Endpoint		Level	%	95% LCL	95% UCL	τu	Meth	od		
12-4850-9209	Reproduction		IC5 IC10 IC15 IC20	26 42.4 58.3 73.8	7.76 9.4 11 32.8	57.8 86.1 N/A N/A	3.845 2.356 1.714 1.355	Linea	ar Interpolation	(ICPIN)	
			IC25 IC40 IC50	89.3 >100 >100	48.2 N/A N/A	N/A N/A N/A	1.000 1.12 <1 <1				
Reproduction	Summary			1997 - 1997 - 1997 - 1998 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 -							
C-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std E	Err Std Dev	CV%	%Effect
0 6.25 12.5 25 50 100	Lab Water Contr	10 10 10 10 10 10	28.2 33.6 29.2 29.7 27.1 22.1	20.8 30.7 22 26 23 14.7	35.6 36.5 36.4 33.4 31.2 29.5	0 28 2 23 19 4	38 42 37 36 37 33	3.29 1.3 3.17 1.65 1.8 3.25	10.4 4.12 10 5.21 5.7 10.3	36.9% 12.2% 34.3% 17.5% 21.1% 46.6%	0.0% -19.1% -3.55% -5.32% 3.9% 21.6%
Survival Sumr	marv										
	Control Type	Count	Mean	95% LCL	95% UCL	Min	Мах	Std E	Err Std Dev	CV%	%Effect
0 6.25 12.5 25 50	Lab Water Contr	10 10 10 10 10	0.9 1 0.9 1 1	0.674 1. 0.674 1 1	1 1 1 1 1	0 1 0 1 1	1 1 1 1 1	0.1 0 0.1 0 0	0.316 0 0.316 0 0	35.1% 0.0% 35.1% 0.0% 0.0%	0.0% -11.1% 0.0% -11.1% -11.1%
100		10	0.8	0.498	1	0	1	0.133	0.422	52.7%	11.1%

Analyst: R6 QA: SD

CETIS Summary Report

CETIS	Summary Repo	rt					-	ort Date: t Code:	04 Oct-16 11:12 (p 2 of 2) 69788 17-2117-9824			
Ceriodap	hnia Survival and Re	productio	on Test							Paci	fic EcoRisk	
Reprodu	ction 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	26	0	30	31	31	33	34	38	30	
6.25		42	30	28	39	32	33	34	32	34	32	
12.5		2	34	29	32	32	27	30	37	35	34	
25		23	25	36	30	26	30	35	33	36	23	
50		19	22	28	33	28	26	25	37	32	21	
100		23	24	4	33	31	5	30	21	30	20	
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	0	1	1	1	1	1	1	1	
6.25		1	1	1	1	1	1	1	1	1	1	
12.5		0	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	0	1	1	0	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	0/1	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		0/1	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	0/1	1/1	1/1	0/1	1/1	1/1	1/1	1/1	

Analyst: Rb QA: SD

							Test	Code:		69788 1	7-2117-982
Ceriodaphnia	Survival and R	eproductio	on Test							Paci	fic EcoRis
Analysis ID: Analyzed:	06-7593-3888 04 Oct-16 11:1		•	production	Control vs	Freatments		IS Version: :ial Results:	CE TIS v1 Yes	.8.7	
Data Transform	m	Zeta	Alt Hyp	Trials	Seed		PMSD	NOEL	LOEL	TOEL	TU
Untransformed		NA	C > T	NA	NA		29.3%	100	>100	NA	1
Steel Many-On	ne Rank Sum Te	est		·······		<u></u>					
Control	vs C-%		Test Stat	Critical	Ties DF	P-Value	P-Type	Decision(a:5%)		
Lab Water Con			127	75		0.9983	Asymp		ficant Effect		
	12.5		114	75		0.9590	Asymp	•	ficant Effect		
	25		102	75		0.7570	Asymp	-	ficant Effect		
	50		88	75		0.2908	Asymp	-	ficant Effect		
	100		82.5	75		0.1507	Asymp	-	ficant Effect		
ANOVA Table					······						
Source	Sum Squ	ares	Mean Squ	iare	DF	F Stat	P-Value	Decision(α:5%)		
Between	707.4833		141.4967		5	2.17	0.0709		icant Effect		
Error	3519.5		65.17593		54		-				
Total	4226.983				59						
Distributional '	Tests										
Attribute	Test			Test Stat	Critical	P-Value	Decision	(a:1%)			
Variances	Bartlett E	quality of V	/ariance	12.9	15.1	0.0243	Equal Var				
Distribution		Vilk W Nor		0.844	0.946	< 0.0001	•	al Distributio	n		
Reproduction	Summary							·······			
	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Мах	Std Err	CV%	%Effect
	Lab Water Cont	r 10	28.2	20.8	35.6	30.5	0	38	3.29	36.9%	0.0%
6.25		10	33.6	30.7	36.5	32.5	28	42	1.3	12.2%	-19.1%
12.5		10	29.2	22	36.4	32	2	37	3.17	34.3%	-3.55%
25		10	29.7	26	33.4	30	23	36	1.65	17.5%	-5.32%
50		10	27.1	23	31.2	27	19	37	1.8	21.1%	3.9%
100		10	22.1	14.7	29.5	23.5	4	33	3.25	46.6%	21.6%
Graphics	·····										
45						15					
						10			000		
35	797			(5		1			
35	7 92	7			R	5		لمسيعهم			
35	79 2		•		enterred	5 0 					
35	7%	762	•		Centered	2 2 2	000000	a constant of	Part of the second s		
35	2%	7	•	14	Centered	2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	0 000000	a second second			
35 FD 30 PD 30 25 20	2% Z	762	•	14	Centured	10	0 00 mark	a warman a			
35 6000 20 75 25	2% Z	762		Lef.	Centured		0.000000	a marked			
35 50 30 25 20	2 %		-	I d	Centarred	10	0.000000	a warmen			
35 10 10 15 10	7% Z	7	- * -	Z _e z.	Centared	-10 -15 -20	e °	a contract			
35 FO 30 FO 25 E 20 15	2		*- -	Z _e z.	Centared	10		a constant			
35 Logical 25 20 15 10	N 6.25	12.5	25 50	100	Centared	-10 -15 -20	. •	-0.5 0.0	0.5 1.0	1.5 2.0	2.5

Analyst: R6 QA: SD

CETIS	S Ana	lytical Repo	ort					-	rt Date: Code:		16 11:12 (p 1 of 88 17-2117-982
Ceriod	aphnia	Survival and Re	productio	n Test							Pacific EcoRisi
Analys	-	12-4850-9209		point:	Reproduction		· · ·	CETI	S Version:	CETISv1.8.7	
Analyz		04 Oct-16 11:12		lysis:	Linear Interpola	tion (ICPIN)			ial Results:	Yes	
Linear	Interpo	lation Options									
X Tran	sform	Y Transform			Resamples	Exp 95% CL					
Linear		Linear	154	3623	200	Yes	Two	-Point Interpo	olation		
Point E	Estimate	es			<u> </u>				_		
Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL					
IC5	26	7.76	57.8	3.845	1.73	12.88					
IC10	42.4	9.4	86.1	2.356	1.161	10.63					
IC15	58.3	11	N/A	1.714	NA	9.107					
IC20	73.8	32.8	N/A	1.355		3.045					
IC25	89.3	48.2	N/A	1.12	NA	2.076					
IC40	>100	N/A	N/A	<1	NA	NA					
IC50	>100	N/A	N/A	<1	NA	NA					
Reproc	duction	Summary			······································	Calcul	ated Va	ariate	<u></u>	<u> </u>	
C-%		ontrol Type	Count	Mean	Min	Max S	d Err	Std Dev	CV%	%Effect	
0		ab Water Contr	10	28.2	0		29	10.4	36.9%	0.0%	
6.25			10	33.6	28	42 1.		4.12	12.2%	-19.1%	
12.5			10	29.2	2		17	10	34.3%	-3.55%	
25			10	29.7	23		65	5.21	17.5%	-5.32%	
50			10	27.1	19	37 1.		5.7	21.1%	3.9%	
100			10	22.1	4		25	10.3	46.6%	21.6%	
Graphi	35 30 25	•	•								
	0	20	40 C-%	50	80 100						

Appendix F

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

CETIS Sun	nmary Repo	rt				=		Report Dat Test Code				4 (p 1 of 2 -2079-796:
Ceriodaphnia	Survival and Re	produ	ction Test						<u> </u>		Pacific	c EcoRisk
Batch ID: Start Date: Ending Date: Duration:	07-2617-3516 27 Sep-16 11:3 03 Oct-16 15:02 6d 4h		Test Type: Protocol: Species: Source:	Reproduction-5 EPA-821-R-02 Ceriodaphnia c In-House Cultu	-013 (2002) Iubia			Analyst: Diluent: Brine: Age:	Robert Gee Laboratory V Not Applicat 1			a
Receive Date: Sample Age:	06-9986-9661 26 Sep-16 10:33 26 Sep-16 14:1 25h (2.1 °C)	5	Code: Material: Source: Station:	Pond 14 Influent Lehigh Permar Pond 14	nente			Client: Project:	Lehigh Perm 26327	nanente		
Batch Note:	Excludes Outlie	r 25 D										
Comparison S	Summary											
Analysis ID	Endpoint		NOEL		TOEL	PMSD	TU	Met				
01-3930-3964 02-0030-7518	Reproduction Survival		100 100	>100 >100	NA NA	28.2% NA	1 1		I Many-One R er Exact/Bonf			t
Point Estimat	e Summary											
Analysis ID	Endpoint		Level	%	95% LCL	95% UCL	τU	Met	nod			
15-7433-3217	Reproduction		IC5	3.03	1.67	89	33	Line	ar Interpolatio	n (ICPIN)	
			IC10	6.06	3.35	N/A	16.5				-	
			IC15	>100	N/A	N/A	<1					
			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						1					
	Control Type	Coun		95% LCL	95% UCL	Min	Max	Std	Err Std De	ev CV	%	%Effect
	Lab Water Contr		30.3	27.5	33.1	24	36	1.23	3.89	12.	8%	0.0%
6.25		10	20.9	11.2	30.6	0	32	4.27			.6%	31.0%
12.5		10	31.2	27.5	34.9	25	39	1.65			7%	-2.97%
25		9	30.3	27.1	33.5	25	37	1.39	4.18	13.	8%	-0.11%
50		10	29.3	26.5	32.1	22	36	1.25	3.95		5%	3.3%
100		10	25.8	19.7	31.9	13	40	2.68	8.47	32.	8%	14.9%
Survival Sum	-											
	Control Type	Coun		95% LCL			Max					%Effect
	Lab Water Contr		1	1	1	1	1	0	0	0.0		0.0%
6.25		10	0.8	0.498	1	0	1	0.13			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		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%

Analyst:_R6_QA:_SD

CETIS Summary Report

04 Oct-16	13:04	(p 2	of	2)
69789	19-2	2079-	-79	63

Report Date: Test Code:

Ceriodap	hnia Survival and Re	productio	on Test							Pacit	ic EcoRis
Reproduc	tion 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	36	36	31	27	33	28	24	31	28	29
6.25		0	0	5	29	32	30	30	30	24	29
12.5		37	39	33	32	27	30	26	37	26	25
25		37	33	33		26	32	25	33	28	26
50		30	36	29	32	32	29	25	31	22	27
100		40	30	29	26	31	19	28	13	29	13
Survival I	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		0	0	1	1	1	1	1	1	1	1
12.5		1	1	1	1	1	1	1	1	1	1
25		1	1	1	0	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 E	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		0/1	0/1	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	1/1	1/1	1/1	1/1	1/1	1/1
25		1/1	1/1	1/1	0/1	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

Analyst: R6 QA: SD

Analysis ID: Analyzed: Data Transform Untransformed Fisher Exact/B Control	Survival and Re 02-0030-7518 04 Oct-16 12:58 n onferroni-Holm	I	Endpoint: Sun Analysis: STF Alt Hyp							Pacif	fic EcoRisk
Analyzed: Data Transform Untransformed Fisher Exact/B Control	04 Oct-16 12:58 n	<u> </u>	Analysis: STF Alt Hyp								
Untransformed Fisher Exact/B Control		Zeta			ngency Tabl	es		S Version: al Results:	CETISv Yes	1.8.7	
Fisher Exact/B Control	onferroni-Holm			Trials	Seed			NOEL	LOEL	TOEL	TU
Control V	onferroni-Holm		C > T	NA	NA			100	>100	NA	1
		Test						<u></u>			
	vs C-%		Test Stat	P-Value	P-Type	Decision	(α:5%)				
Lab Water Cont	trol 6.25		0.237	1.0000	Exact	Non-Sign	ificant Effect				
	12.5		1	1.0000	Exact	Non-Sign	ificant Effect				
	25		0.5	1.0000	Exact		ificant Effect				
	50		1	1.0000	Exact		ificant Effect				
	100		1	1.0000	Exact	Non-Signi	ificant Effect				
Data Summary											
C-% (Control Type	NR	R	NR + R	Prop NR	Prop R	%Effect				
	ab 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											
1.0 🕲	•	•	•								
0.9											
0.9											
0.8	۰										
0.7											
-											
0.5											
0.4											
0.3											
1- 1-											
0.2											
0.1											
0.0				l							
0 L V	¥ 6.25	12.5 C-%	25 50	100							

R6 QA: SD Analyst:

CETIS Analytical Report

Report Date: 04 Oct-16 13:04 (p 1 of 1) 60789 | 10-2070-7063

CETIS Anal	lytical	Report					-	ort Date: Code:	04		04 (p 1 of 1 9-2079-796
Ceriodaphnia	Survival	and Reprod	luction Test							Paci	fic EcoRis
Analysis ID: Analyzed:	01-3930 04 Oct-1	-3964 16 12:58	Endpoint: Analysis:	Reproduction Nonparametric	-Control ve	s Treatments		IS Version		.8.7	······································
Data Transform	n	Zeta	a Alt H	lyp Trials	Seed		PMSD	NOEL	LOEL	TOEL	TU
Untransformed		NA	C > 1		NA		28.2%	100	>100	NA	1
Steel Many-On	e Rank S	Sum Test									
Control	vs C-	%	Test	Stat Critical	Ties [DF P-Value	P-Type	Decisio	n(α:5%)		
Lab Water Con	trol 6.2	25	86.5	75	2 1	18 0.2473	Asymp	Non-Sig	nificant Effect		
	12		109	75		18 0.9082	Asymp	-	nificant Effect		
	25		101	75		18 0.7129	Asymp	-	nificant Effect		
	50		101	75		18 0.7129	Asymp	-	nificant Effect		
<u></u>	10	0	89	75	3 1	18 0.3218	Asymp	Non-Sig	nificant Effect		
ANOVA Table											
Source		m Squares	Mear	Square	DF	F Stat	P-Value	Decisio	n(α:5%)		
Between		2.5333	142.5		5	2.04	0.0875	Non-Sig	nificant Effect		
Error		72.4	69.85	926	54						
Total	448	34.933			59						
Distributional	Tests										
Attribute	Те			Test Stat	Critical	P-Value	Decision	(α:1%)			
ariances Bartlett Equality of Var				22.1	15.1	0.0005	Unequal \	/ariances			
Distribution	Sh	apiro-Wilk W	/ Normality	0.909	0.946	0.0003	Non-norm	al Distribu	tion		
Reproduction	Summar	У									
	Control 1						Min	Max	Std Err	CV%	%Effect
	Lab Wate	er Contr 10	30.3	27.5	33.1	30	24	36	1.23	12.8%	0.0%
5.25		10	20.9	11.2	30.6	29	0	32	4.27	64.6%	31.0%
12.5 25		10	31.2	27.5	34.9	31	25	39	1.65	16.7%	-2.97%
25 50		10	27.3	19.9	34.7	30	0	37	3.28	38.0%	9.9%
100		10 10	29.3 25.8	26.5 19.7	32.1 31.9	29.5 28.5	22 13	36 40	1.25 2.68	13.5% 32.8%	3.3% 14.9%
Graphics					51.5	20.5	15	40	2.00	52.070	14.9%
40						15					•
35						10		i i			
						5		1	(SUB300		
30	- 7		TI			3		1000	and the second s		
25				61							
<u>ere</u>		2				tran		20°			
20	-					5	0000				
						-10		1			
15						-15	_ _	1			
10							•	1			
1.1						-20	0	1			
E						-25		1			
5						-23					
5					1	•	1 1		(I		1
5 0 LW	6.2	15 12.5	25	50 100	L	-30 -2.5 -2.1	0 -1.5 -1.0	-0.5 0.0	0.5 1.0	1.5 2.0	2.5

Analyst: _____ QA: ____

CETIS Analytical Report								port Date: st Code:		16 13:04 (p 1 of 1 789 19-2079-796	
Ceriod	laphnia	Survival and Re	eproduction	n Test						037	Pacific EcoRis
					Denseduction				710 1/	05710-4.0.7	
Analys Analyz		15-7433-3217 04 Oct-16 12:5		point: lysis:	Reproduction Linear Interpola	tion (ICPIN)			TIS Version icial Results		
Analyz	.cu.	04 00010 12.0		19313.					Icial Result		
Linear	Interpo	lation Options									
X Tran	sform	Y Transform	See	d	Resamples	Exp 95%	CL Me	ethod			
Linear		Linear	651	313	200	Yes	Tw	o-Point Inte	rpolation		·····
Point E	Estimate	S			· · · · ·					······································	
Levei	%	95% LCL	95% UCL	τυ	95% LCL	95% UCL					
IC5	3.03	1.67	89	33	1.123	59.78					
IC10	6.06	3.35	N/A	16.5	NA	29.89					
IC15	>100	N/A	N/A	<1	NA	NA					
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					
Reproc	duction	Summary				Cal	culated \	/ariate	-		
C-%	C	ontrol Type	Count	Mean	Min	Мах	Std Err	Std Dev	CV%	%Effect	
0	La	b Water Contr	10	30.3	24	36	1.23	3.89	12.8%	0.0%	
6.25			10	20.9	0	32	4.27	13.5	64.6%	31.0%	
12.5			10	31.2	25	39	1.65	5.2	16.7%	-2.97%	
25			10	27.3	0	37	3.28	10.4	38.0%	9.9%	
50			10	29.3	22	36	1.25	3.95	13.5%	3.3%	
100			10	25.8	13	40	2.68	8.47	32.8%	14.9%	
Graphi	cs								· · · · · · · · · · · · · · · · · · ·		
Restruction	30 2 25 1 15 1 10 1										

Analyst:______QA:___SD

C	Client: Lehigh Permanente Material: Pond 14							Te	st Date:	9/27/16								
Proj	ject #:	26	327		Test ID:	69789)	. 1	Random	ization:	10	5.7.	2		-	Contro	l Water:	SRW
	Day	<u> </u>	Н		.0.	Cond. (µS/cm)	Temp	_				rvival / R	·					- SIGN-OFF
		New	Old	New	Old		(°C)	A	В	С	D	E	F	G	н	1	1	Date: 91211/6 New WQ: Test Init.: JO
	0	7.89		7.3		313	25.3	0	0	0	0	0	0	0	0	0	0	Sol'n Prep: Jo JL Time: //30
	1	8.06	7.89	7.7	6,0	389320	25.3	0	6	0	0	0	0	0	0	Ø	\mathcal{O}	Date: 9/28/16 New WQ: 23 Counts: RG Sol'n Prep: DM Old WQ: 7 Time: 115
	2	7.62	7.93	8,1	7.8	313	25.1	0	0	6	0	0	0	0	0	0	0	Date 4/29/14 New WQ: RB Counts: DY Sol'n Prep: TK Old WQ: TC Time: 1410
rol	3	8.05	8.06	8,6	7.7	315	25.2	0	0	5	3	0	ч	3	6	4	0	Date: 913c/16 New WQ: TA Counts: DM Sol'n Prep: DM Old WQ: TJK Time: 1325
r Cont	4	8.18	7.89	8.3	7.1	324	25.3	6	7	0	0	6	0	8	0	0	5	Date: 1011116 New WQ: DM Counts: DM Sol'n Prep: DM Old WQ: DC Time: 1400
Lab Water Control	5	7.65	7.70	7.2	7.0	-	25.0	12	12	11	9	11	10	0	11	11	11	Date: 16 12/16 New WQ: 77 Counts: SH Sol'n Prep: TK Old WQ: 47 Time: 123
Γ	6		7.79	-	57	329	24.9	18	17	15	15	16	14	13	14	13	12	Date: 10/3/16 New WQ: Counts: EP Sol'n Prep: Old WQ: S1-1 Time: 1502
	7							-					//		1			Date: New WQ: Counts: Sol'n Prep: Old WO: Time:
	8																	Date: Old WQ: Counts Time:
							Total=	36	36	31	27	33	28	24	31	28	29	Mean Neonates/Female = 303
	Day	· · ·	H		.0.	Cond. (µS/cm)						/ Reproc		- <u>p-</u>				Sample ID
		New	Old	New	Old			A	В	С	D	E	F	G	Н	I	J	· · · · · · · · · · · · · · · · · · ·
	0	7,78		7,7		409		0	0	0	0	0	0	0	0	0	0	44181
	1	7.94	7.65	7.8	5,6	420		Ø	0	0	0	0	\bigcirc	0	0	0	0	44181
	2	7.55	7.83	8.2	7.B	414		×/o	×/o	0	0	0	0	0	0	0	0	44191
	3	7.97	7.93	8.8	7.7	412		-	-	0	ч	3	5	3	5	4	Ч	44191
6.25%	4	8.08	7:76	8.1	6.9	430			-	0	0	0	9	0	0	5	0	44196
6.2	5	7.54	7.65	72	69	408		-	-	5	10	10	0	10	IL	Ö	11	44196
	6	-	7.55		6.4	461		-	-	Ò	15	19	16	17	14	15	14	
	7							-	-									
	8																	
							Total=	X/O	X/O	5	29	32	30	30	30	24	29	Mean Neonates/Female = $20 \cdot 7$

C	lient:			N	laterial:]	Pond 14	1			Te	st Date:	9/27/16		
Proj	ect #:	26327	Test	ID: <u>69789</u>)	-										SRW
	Day	рН	D.O.	Cond. (µS/cm)	Temp					rvival / R	. <u> </u>	,	Ĩ			SIGN-OFF
		New Old	New Ol		(°C)	A	В	С	D	E	F	G	Н	I	J	
	0	7,72	7,8	496		0	0	0	0	0	0	0	0	0	0	
	1	7.85 7.59	7.9 5.	5 524		0	0	0	\mathcal{O}	0	0	0	C	C	0	
	2	7.52 7.75	8.3 7.2	502		0	0	0	0	0	0	0	0	0	0	
	3	7.92 7.72	8.87,4	500		ο	7	3	0	6	0	3	0	0	2	
5%	4	7.92 7.69	8.1 7.			6	0	0	6	8	ч	9	6	5	ο	
12.5%	5	7.46 7.01	7.3 1.0	416		12	n	11	10	0	12	0	13	9	g	
	6	- 7.72	- (0.			19	21	19	16	13	144	1		RE	14	
	7	I'LL	- 0.	1 309			-		(*	1-			10/3/11	2	10	
	8			_												
					Total=	22	39	23	32	22	20	76	37	26	25	Mean Neonates/Female = $3/\cdot 2$
	Day	рН	D.O.			<u> 77</u>				<u>6</u> / Reproc		64	21			
		New Old	New Ol	Cond. (µS/cm)		A	В	С	D	E	F	G	Н	I	J	
	0	7.65	<i>\$</i> ,0	669		0	0	0	0	\bigcirc	0	0	0	0	0	
	I	7.77 7.55	7,9 5.	5 699		0	0	0	0	Õ	0	0	0	\bigcirc	0	
	2	7.47 7.74	8.2 7.5	675		0	0	0	×/o	0	0	0	0	0	0	
	3	7.84 7.66	8.7 74	665		6	0	5		6	5	0	7	7	5	
%	4	7.82 7.64	8.1 7.	688		0	5	0		6	0	6	0	5	5	
25%	5	7.44 7.58	7.9 6.0	en al		13	11	13		0	11	8	11	ì	0	
	6	- 6.99				18	17	15	-	14	16	11	15	15	16	
	7														• Ţ	
R.	8															
					Totai=	37	33	33	X/o	26	32	25	33	28	26	Mean Neonates/Female = 27.3

C	lient:	Lehigh Permanente 26327 Test ID: 69789						Material: Pond 14								Test Date: 9/27/110			
	ect #:	2632	27		Test ID:	69789										Control	Water:	SRW	
	Day	pH		D.		Cond. (µS/cm)	Temp (°C)					vival / R	eproducti F	on G	н		J	SIGN-OFF	
		New	Old	New	Old			A	В	С	D	E	F	0	<u>п</u>				
	0	7,58		8,0		972		0	0	0	0	0	0	0	0	0	0		
	1	7.68	1.74	8.D	5.7	1008		0	0	0	0	0	0	0	0	0	0		
	2	7,43	7.75	8.1	7,5	985		6	0	0	0	Ö	0	0	0	0	0		
	3	7.76	7.65	8.8	7,5	984		6	5	0	6	6	5	4	4	0	0		
50%	4	7,70	7.74	8.0	6.8	1014		0	0	6	8	iO	9	6	0	4	5		
5	5	7.40	7.68	7,9	5.7	978		8	12	10	0	0	0	0	12	8	8		
	6		6.68	、 、	6.7	1045		16	19	3	18	16	15	15	15	10	14		
	7																		
	8		· · · · · · · · · · · · · · · · · · ·																
							Total=	30	36		32	32	29	25	3	22	24	Mean Neonates/Female = 29.3	
	Day	pF New	l Old	D. New	O. Old	Cond. (µS/cm)		A	В	С	Survival D	/ Reprod E	uction F	G	н	1	1		
	0	7,51		7.5		1504		0	0		0	6		0	0	0	\bigcirc		
	1	7.62	7.87	8.1	6.0	1557		0	Ê	0	0	0	\overline{O}	0	0	0	0		
	- 2		7.75	8.0	74	1557		0	0	0	0	0	0	0	0	0	0		
	3			8.7				4	S	3	4	5	<u>ч</u>	5	4	0	0		
	4		7.59		7.5	1541		0	0	0	8	0	0	-) 	0	6	3		
100%			7.70	7.2	7.5	1601			<u> </u>	11	0	11		Ŭ U	9	11	10		
	5		7.78	7.8	6,5	1597		12		15	14	15	10	11	0	12	0		
	6	~	6.52	-	6.8	1601		24	17_	12	17	12	\cup	16		10			
	7																		
	8		00000000						30	39	0(.71	19	17	12	79	13	Mean Neonates/Female = 25,8	
							Total=	40	30	\mathbb{Z}	26	3		20	12	2	13	Mean Neonates/Female = 19 · 0	

Appendix G

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

CETIS Summary Report

Report Date: Test Code:

04 Oct-16 12:59 (p 1 of 2) 69789 | 19-2079-7963

			_					Test coue.			09/09/18	-2019-190
Ceriodaphnia	a Survival and Re	production Te	st							<u> </u>	Pacif	ic EcoRis
Batch ID:	07-2617-3516	Test Ty	pe: R	eproduction-S	urvival (7d)			Analyst:	Robert	Gee		
Start Date:	27 Sep-16 11:30	D Protoco	ol: E	PA-821-R-02-	013 (2002)			Diluent:	Laborat	ory Wat	er	
Ending Date:	03 Oct-16 15:02	2 Species	:: C	eriodaphnia d	ubia			Brine:	Not App	olicable		
Duration:	6d 4h	Source	In	-House Cultur	e			Age:	1			
Sampie ID:	06-9986-9661	Code:	P	ond 14				Client:	Lehigh	Permane	ente	
-	: 26 Sep-16 10:33	3 Materia	l: In	nfluent				Project:	26327			
Receive Date	: 26 Sep-16 14:1	5 Source:	Le	ehigh Perman	ente			•				
Sample Age:	-	Station		ond 14								
Batch Note:	Includes Outlier	25 D										
Comparison	Summary	<u> </u>										
Analysis ID	Endpoint	N	DEL	LOEL	TOEL	PMSD	TU	Meth	nod			
01-3930-3964		10	0	>100	NA	28.2%	1	Stee	I Many-O	ne Rank	Sum Test	
02-0030-7518	Survival	10	0	>100	NA	NA	1	Fish	er Exact/	Bonferro	ni-Holm Te	st
Point Estimat	te Summary											
Analysis ID	Endpoint		vel	%	95% LCL	95% UCL	TU	Meth	nod			
15-7433-3217	Reproduction	IC		3.03	1.67	89	33	Linea	ar Interpo	lation (I	CPIN)	
		IC	10	6.06	3.35	N/A	16.5					
		IC		>100	N/A	N/A	<1					
		IC	20	>100	N/A	N/A	<1					
		IC	25	>100	N/A	N/A	<1					
		IC	40	>100	N/A	N/A	<1					
		IC	50	>100	N/A	N/A	<1					
Reproduction	n Summary			9								
C-%	Control Type		ean	95% LCL	95% UCL	Min	Max			td Dev	CV%	%Effec
0	Lab Water Contr			27.5	33.1	24	36	1.23		89	12.8%	0.0%
6.25		10 20		11.2	30.6	0	32	4.27		3.5	64.6%	31.0%
12.5		10 31		27.5	34.9	25	39	1.65	5.		16.7%	-2.97%
25		10 27		19.9	34.7	0	37	3.28).4	38.0%	9.9%
50		10 29		26.5	32.1	22	36	1.25		95	13.5%	3.3%
100		10 25	.8	19.7	31.9	13	40	2.68	8.	47	32.8%	14.9%
Survival Sum												
C-%	Control Type		ean	95% LCL		Min	Max			d Dev	CV%	%Effec
)	Lab Water Contr			1	1	1	1	0			0.0%	0.0%
6.25		10 0.8	3	0.498	1	0	1	0.133	30.	422	52.7%	20.0%
12.5		10 1		1	1	1	1	0	0		0.0%	0.0%
25		10 0.9	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									0.0%	0.0%

Analyst: R6 QA: SD

CETIS Summary Report

04 Oct-16 12:59 (p 2 of 2)

Report Date:

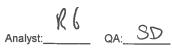
Test Code:

69789 | 19-2079-7963

Dacific	EcoDick
Pacific	ECORISK

								tooue.			3-2013-130
Ceriodap	hnia Survival and Re	producti	on Test							Pacit	ic EcoRisk
Reproduc	ction Detail							<u> </u>	· . · ·		
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	36	36	31	27	33	28	24	31	28	29
6.25		0	0	5	29	32	30	30	30	24	29
12.5		37	39	33	32	27	30	26	37	26	25
25		37	33	33	0	26	32	25	33	28	26
50		30	36	29	32	32	29	25	31	22	27
100		40	30	29	26	31	19	28	13	29	13
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		0	0	1	1	1	1	1	1	1	1
12.5		1	1	1	1	1	1	1	1	1	1
25		1	1	1	0	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 E	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		0/1	0/1	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	1/1	1/1	1/1	1/1	1/1	1/1
25		1/1	1/1	1/1	0/1	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

65/75 CETIS™ v1.8.7.16



CETIS Analytical Report

04 Oct-16 12:59 (p 1 of 1)

Report Date:

,, , ,	ainepuit						Test	Code:		69789 19	9-2079-796
Ceriodaphnia Surv	ival and Reprod	luction Test								Pacif	ic EcoRisk
•	930-3964 Dct-16 12:58	Endpoint: Analysis:			Control vs	Treatments		IS Version: cial Results:	CETISv1. Yes	8.7	
Data Transform	Zeta	a Alt H	lyp Tri	als	Seed		PMSD	NOEL	LOEL	TOEL	TU
Untransformed	NA	C > 1	Г NA	1	NA		28.2%	100	>100	NA	1
Steel Many-One Ra	nk Sum Test										
Control vs	C-%	Test	Stat Cr	itical	Ties DI	F P-Value	Р-Туре	Decision(
Lab Water Control	6.25	86.5	75		2 18	3 0.2473	Asymp		icant Effect		
	12.5	109	75			3 0.9082	Asymp	-	icant Effect		
	25	101	75			3 0.7129	Asymp	-	icant Effect		
	50	101	75			3 0.7129	Asymp		icant Effect		
	100	89	75		3 18	3 0.3218	Asymp	Non-Signif	icant Effect		
ANOVA Table											
Source	Sum Squares	Mea	n Square		DF	F Stat	P-Value	Decision(
Between	712.5333	142.			5	2.04	0.0875	Non-Signif	icant Effect		
Error	3772.4	69.8	5926		54						
Total	4484.933				59						
Distributional Test	5										
Attribute	Test			st Stat		P-Value	Decision				
Variances	Bartlett Equalit	•	e 22	.1	15.1	0.0005		Variances			
Distribution	Shapiro-Wilk V	V Normality	0.9	909	0.946	0.0003	Non-norm	nal Distributio	n 		
Reproduction Sum	mary										
	rol Type Cou		n 95	% LCL	95% UCL		Min	Max	Std Err	CV%	%Effect
	Nater Contr 10	30.3	27		33.1	30	24	36	1.23	12.8%	0.0%
6.25	10	20.9	11		30.6	29	0	32	4.27	64.6%	31.0%
12.5	10	31.2			34.9	31	25	39	1.65	16.7%	-2.97%
25	10	27.3			34.7	30	0	37	3.28	38.0%	9.9%
50	10	29.3	26		32.1	29.5	22	36	1.25	13.5%	3.3%
100	10	25.8	19	.7	31.9	28.5	13	40	2.68	32.8%	14.9%
Graphics											
40						15					•
35						10					
-									600 COO		
30		77.				5					
50 70 70 70 70 70 70 70 70 70 70 70 70 70		10				2 0					
-73 25 -14						tr Crents					
20	-61					5	000				
20						-10					
20		5				-15					
15							•				
15											
						-20					
15						-20	• •				
10							• •				
15	6.25 12.5	25	50	100	1	-25	•••	.0 -0.5 0.0	0.5 1.0	1.5 2.0	2.5

Analyst: R6 QA: SD

CETIS	6 Anal	ytical Repo	ort						-	ort Date: Code:		6 12:59 (p 1 of 1 89 19-2079-796
Ceriod	aphnia	Survival and Re	production	Test								Pacific EcoRis
Analys Analyz		15-7433-3217 04 Oct-16 12:59		point: ysis:	Reproduction Linear Interpola	tion (ICPIN)				S Version: ial Results:	CETISv1.8.7 Yes	
Linear	Interpol	ation Options										· · · · ·
X Tran	sform	Y Transform	See	ł	Resamples	Exp 95% (CL	Method				
Linear		Linear	6518	313	200	Yes		Two-Poi	nt Interp	olation		
Point E	Estimate	es										
Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL						
IC5	3.03	1.67	89	33	1.123	59.78						·
IC10	6.06	3.35	N/A	16.5	NA	29.89						
IC15	>100	N/A	N/A	<1	NA	NA						
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						
Reproc	duction	Summary				Calc	ulat	ed Variat	e			
C-%		ontrol Type	Count	Mean		Max	Std		td Dev	CV%	%Effect	
0	La	ab Water Contr	10	30.3	24	36	1.23		89	12.8%	0.0%	
6.25			10	20.9	0	32	4.27		3.5	64.6%	31.0%	
12.5			10	31.2	25	39	1.65			16.7%	-2.97%	
25			10	27.3	0	37	3.28).4	38.0%	9.9%	
50			10	29.3	22	36	1.25		95	13.5%	3.3%	
100			10	25.8	13	40	2.68	8 8.	47	32.8%	14.9%	
Graphi	30											

Analyst:_____ QA:____

Appendix H

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



CETIS Sur	mmary Repo	ort						Report Dat Test Code		4 Oct-16 09: 69790 0	48 (p 1 of 2 2-6694-908
Ceriodaphnia	a Survival and R	eprodu	ction Test							Paci	fic EcoRisk
Batch ID: Start Date: Ending Date: Duration:	15-1022-7721 27 Sep-16 12:5 03 Oct-16 14:0 6d 1h		Test Type: Protocol: Species: Source:	Reproduction- EPA-821-R-02 Ceriodaphnia o In-House Cultu	2-013 (2002) dubia			Analyst: Diluent: Brine: Age:	Robert Gee Laboratory W Not Applicable 1		
Receive Date	04-5687-9373 27 Sep-16 12:5 27 Sep-16 12:5 NA (25.6 °C)	0	Code: Material: Source: Station:	NaCl Sodium chloric Reference Tox In House		0		Client: Project:	Reference To: 26308	xicant	
Comparison	Summary										
Analysis ID 16-6965-0530 05-1926-9841			NOEL 500 2000	LOEL 1000 2500	TOEL 707.1 2236	PMSD 22.5% NA	TU		od oxon/Bonferroni er Exact/Bonfer	-	est
Point Estimat	e Summary		<u></u>		· · · · · · · · ·						
Analysis ID	Endpoint		Level	mg/L	95% LCL	95% UCL	TU	Meth	od		
01-8681-6691	Reproduction		IC5 IC10 IC15 IC20 IC25 IC40 IC50	335 541 620 700 780 1510 1620	177 353 523 606 678 849 959	574 882 1080 1140 1270 1580 1680		Linea	ar Interpolation	(ICPIN)	
03-6116-4434	Survival		EC50	1740	1460	2080		Spea	rman-Kärber		
Reproduction	Summary									•	
C-mg/L 0 500 1000 1500 2000 2500	Control Type Lab Water Contr	Count 10 9 10 10 10	Mean 33.5 31 20.3 20.7 5.3 0	95% LCL 31.7 28.5 9.21 17.5 1.16 0	95% UCL 35.3 33.5 31.5 23.9 9.44 0	Min 30 26 0 9 0 0	Max 38 38 33 24 18 0	Std E 0.778 1.09 4.82 1.43 1.83 0		CV% 7.35% 11.1% 71.1% 21.8% 109.0%	%Effect 0.0% 7.46% 39.3% 38.2% 84.2% 100.0%
Survival Sum	nary										
	Control Type	Count		95% LCL		Min	Max	Std E	rr Std Dev	CV%	%Effect
) 500 1000 1500 2000	Lab Water Contr	10 10 9 10 10	1 1 0.667 1 0.6	1 1 0.282 1	1 1 1 1	1 1 0 1	1 1 1 1	0 0 0.167 0	0	0.0% 0.0% 75.0% 0.0%	0.0% 0.0% 33.3% 0.0%
2500		10	0.6	0.231 0	0.969 0	0 0	1 0	0.163 0	0.516 0	86.1%	40.0% 100.0%

Analyst: Rb QA: SD

CETIS Summary Report

Report Date: Test Code:

04 Oct-16 09:48 (p 2 of 2) 69790 | 02-6694-9084

								n coue.		03/0010	2-0094-908
Ceriodaph	nia Survival and Re	producti	on Test							Paci	fic EcoRis
Reproduct	ion 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	34	31	31	38	30	36	34	35	33	33
500		33	38	28	32	26	32	27	31	32	31
1000		32	33	31	30	0	27	4	26	0	
1500		24	24	21	24	9	23	23	20	20	19
2000		0	0	0	7	9	4	18	8	0	7
2500		0	0	0	0	0	0	0	0	0	0
Survival De	etail							<u></u>			
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	0	1	0	1	0	
1500		1	1	1	1	1	1	1	1	1	1
2000		0	0	0	1	1	1	1	1	0	1
2500		0	0	0	0	0	0	0	0	0	0
Survival Bi	nomials										
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
)	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	0/1	1/1	0/1	1/1	0/1	
1500		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
2000		0/1	0/1	0/1	1/1	1/1	1/1	1/1	1/1	0/1	1/1
2500		0/1	0/1	0/1	0/1	0/1	0/1	0/1	0/1	0/1	0/1

Analyst: RE QA: SD

CETIS QC Plot

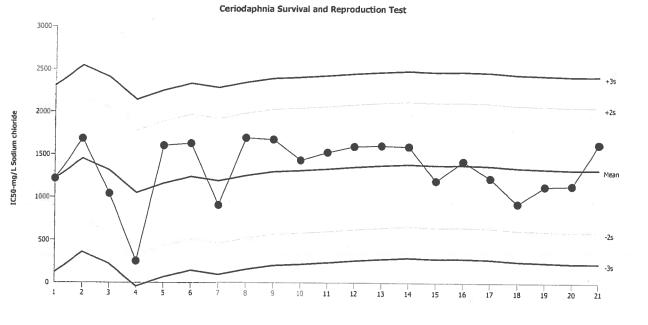
Ceriodaphi	nia Survival and Reproductior	n Test				Pacific EcoRisk
Test Type: Protocol:	Reproduction-Survival (7d) EPA-821-R-02-013 (2002)	Organism: Endpoint:	Ceriodaphnia dubia (Water Flea) Survival	Material: Source:	Sodium chloride Reference Toxica	nt-REF
	3500	Ceriod	aphnia Survival and Reproduction Test			
	3000-					+35
ej.	2500-					+25
EC50-mg/L Sodium chloride	2000-			•••	•	
i0-mg/t. Soc	1500					Mean
ECS	1000-				•	
	500-				¥	-25
		i i i 6 7 8	9 10 11 12 13 14	15 16	17 18 19 20	-35

			ean: gma:	1721 496.8		Count: CV:	20 28.90%	-2s Warning Limi +2s Warning Limi		-3s Action Limit: +3s Action Limit:	231 3212
Qualit	ty Con	itrol Dat	а								
Point	Year	Month	Day	Time	QC Dat	a Delta	Sigma	Warning Action	Test ID	Analysis ID	
1	2016	May	10	14:15	1594	-127.2	-0.2561	and a ship bar and a second a second a second a second a second p	04-1900-2071	02-7180-6176	
2			17	16:30	2117	396	0.7971		02-0217-2091	01-8095-6167	
3			24	14:40	1369	-352	-0.7085		12-4725-4616	17-8748-4211	
4		Jun	14	12:15	321.4	-1400	-2.817	(-)	06-1840-5245	14-8979-7423	
5			23	10:40	2125	403.7	0.8126		16-6250-9087	17-5652-1508	
6			23	13:25	2105	384.4	0.7738		07-7424-9431	12-9537-7598	
7			28	13:00	1933	212	0.4267		09-5722-1456	07-9253-0885	
8		Jul	6	13:00	2019	297.9	0.5996		09-9739-4449	17-8269-3326	
9			7	10:20	2064	343.2	0.6909		07-3590-7818	09-8307-4510	
10			12	13:45	1831	109.6	0.2207		19-4280-6480	04-6439-4868	
11		Aug	9	14:15	1918	197.4	0.3973		01-7078-3993	16-1640-2231	
12			11	15:25	1759	38.26	0.07701		05-4282-8788	09-4783-9953	
13			18	13:30	2050	328.9	0.662		09-3523-7380	14-1088-4073	
14			23	14:15	1870	149	0.2999		20-3175-3833	16-0364-9515	
15			25	14:35	1968	247	0.4972		08-0124-0684	18-2643-7985	
16			30	16:05	1913	191.7	0.3859		02-5260-5089	09-5069-0405	
17		Sep	8	13:40	1957	236.4	0.4759		18-2267-1225	05-8688-6279	
18			13	10:20	1198	-523	-1.053		15-9643-7614	12-2668-1557	
19			15	14:20	1718	-3.382	-0.00681		16-2243-5631	01-5480-0827	
20			20	15:00	597.9	-1123	-2.261		18-2996-3053	17-7702-4069	
21			27	12:50	1739	17.88	0.03599		02-6694-9084	03-6116-4434	

Analyst: RG QA SD

CETIS QC Plot

Ceriodaphnia Survival and Reproduction	n Test		Pacific EcoRisk
Test Type: Reproduction-Survival (7d)	Organism: Ceriodaphnia dubia (Water Flea)	Material:	
Protocol: EPA-821-R-02-013 (2002)	Endpoint: Reproduction	Source:	



		M	ean:	1326	С	ount:	20	-2s Warn	ing Limi	t: 598.4	-3s Action Limit:	234.4
		Si	gma:	364	С	V:	27.50%	+2s Warn	ing Limit	t: 2054	+3s Action Limit:	2418
Quali	ty Con	trol Dat	а									
Point	Year	Month	Day	Time	QC Data	Delta	Sigma	Warning	Action	Test ID	Analysis ID	
1	2016	May	10	14:15	1216	-110	-0.3021			04-1900-2071	20-3182-9235	
2			17	16:30	1684	358.4	0.9847			02-0217-2091	07-3645-9270	
3			24	14.40	1042	-284.3	-0.7811			12-4725-4616	17-2108-7232	
4		Jun	14	12:15	255	-1071	-2.942	(-)		06-1840-5245	10-0782-9712	
5			23	10:40	1603	277.2	0.7616			16-6250-9087	07-8286-1737	
6			23	13:25	1628	302.2	0.8303			07-7424-9431	14-5397-9899	
7			28	13:00	908.1	-417.9	-1.148			09-5722-1456	07-0717-9325	
8		Jul	6	13:00	1696	370.1	1.017			09-9739-4449	05-4282-8277	
9			7	10:20	1679	353	0.9699			07-3590-7818	02-2720-1850	
10			12	13:45	1435	109	0.2995			19-4280-6480	01-6291-6561	
11		Aug	9	14:15	1528	202.3	0.5558			01-7078-3993	16-5522-9106	
12			11	15:25	1598	271.5	0.746			05-4282-8788	20-6991-7970	
13			18	13:30	1607	281.3	0.7727			09-3523-7380	12-7959-5180	
14			23	14:15	1598	271.9	0.7469			20-3175-3833	12-9031-4120	
15			25	14:35	1196	-130.1	-0.3574			08-0124-0684	03-1672-5825	
16			30	16:05	1425	99	0.272			02-5260-5089	20-2491-5546	
17		Sep	8	13:40	1226	-100.1	-0.2749			18-2267-1225	12-1761-7946	
18			13	10:20	930.9	-395.1	-1.086			15-9643-7614	16-7658-0121	
19			15	14:20	1132	-193.7	-0.5323			16-2243-5631	01-2656-4408	
20			20	15:00	1140	-186.3	-0.5118			18-2996-3053	19-4443-0639	
21			27	12:50	1624	297.8	0.818		(02-6694-9084	01-8681-6691	

Analyst: RC QA SD

Environmental Consulting and Testing

	Client:			Refe	rence Tox	icant			N	- laterial:		Sodi	um Chl	oride		-	Те	st Date:	9/27/16	
Pro	ject #:	26	308		Test ID:		69790		. 1	Random	ization:	10	.6.1			-	Contro			
	Day	p	θΗ	D	0.0.	Conductiv	ity (µS/cm)			·····		Su	rvival / F	leproduc	tion				SIGN-OFF	
	L	New	Old	New	Old	New	Old	(°C)	A	В	С	D	E	F	G	н	I	J		
	0	8.01		8.6		321		25.6	0	0	0	0	0	0	0	0	0	0	Date: 9/21/1 New WQ: Test Init. UC Sol'n Prep: WC: THE Time: 1250	
	1	8.53	8.17	8.0		324	334	250	0	0	0	D	0	Ø	٥	0	0	0	Date: 9/10/ New WQ: Counts WDM Sol'n Prep (20 Old WQ: 22 Time 1310	1197116
	2	8.30	7.92	9.0	7.2	328	375	35.1	U	0	0	0	<u>৩</u>	J	0	0	\Box	0	Date: 4/29/16 New WQ: 50 Counts: 197	5-
trol	3	7.42	8.30	8.3	6.1	328		25:3	6	5	5	6	G	Ģ	6	0	5	0	Dater 1 2016 New WQ: RB Counts: TK Sol'n Prep: TK Old WQ: RB Time 1255	
Lab Water Control	4	7.86	7.92	82	7.3	329	369	254	Ø	0	0	Ð	0	Ð	Ù	7	0	6	Date: Counts: TK Counts: TK Sol'n Prep: TK Old WQ: D'T Time: LWC	
ab Wat	5	7,75	8,00	7.9	6,3	309	343	25.1	12	14	13	14	11	13	12	13	12	13	Date: 10/2/14 New WQ: 77 Counts 514 Sol'n Prep: SN Old WQ: 8 Time: 1405	S
	6	-	7.59		7.4	·	339	24.9	16	12	13	18	13	17	16	15	16	14	Date: 10/.3/16 New WQ: - Counts T Sol'n Prep: _ Old WQ: TV Time: 1405	
	7																		Date: New WQ: Counts: Sol'n Prep: Old WQ: Time:	
ľ	8																		Date: Old WQ: Counts: Time:	
								Total=	34	31	31	38	30	36	34	35	33	33	Mean Neonates/Female = 33,5	
	Day	· · · ·	Н		.0.	Conductivi	•••						I / Repro						RT BATCH NUMBER	
		New	Old	New	Old	New	Old		A	В	С	D	E	F	G	н	1	1		
	0	7.82		3. D		1310			0	0	C	0	0	0	0	0	0	0	230	
		7.56	8.04	8.3	7.0	1346	1391		0	0	Θ	Ð	0	0	0	0	0	0	230	
	2	3.10	7.74	9.0	8.0	1337	1453		0	0	0	0	0	0	0	0	0	S	230	
	3	7,87	8,19	8.5	6.5	1270	1427		5	5	4	G	ч	5	5	0	0	0	230	
500 mg/L	4	1.73	7.83	8.5	7.4	1333	1497		ΰ	\heartsuit	Ð	Ø	Ο	13	O	6	5	6	230	
50(5	7.67.	7.87	8.0	67	1355	1445		12	15	-t,t	12	٩	0	14	8	12	13	230	
	6	~	7.55	~	6.8		1459		16	18	13	14	13	14	8	17	15	R		
	7						1													
	8																			
								Total=	33	33	28	32	26	32	27	Зј	32	31	Mean Neonates/Female = 31 0	

(Client:		Reference Toxicant						N	/laterial:		Sodi	ium Ch	loride		Test Date: 9/27/16			::9/27/K
Pro	ject #:	26	308	-	Test ID:		69790		-								Contro	l Water	r:SRW
	Day		H		.0.		ity (µS/cm)			1			irvival / I	Reproduc	tion			· ···	
	0	New	Old	New	Old	New	Old	(°C)	A	В	C O	D	E G	F	G	Н	1	J	
		7-81	7.00	8.1		220'			0			0		0	0	0	0	0	_
		747		8.5		2196	1		0	0	0	0	0	0	0	Ð	0	0	
t		7-62		8.7		2274	2335		U U	0	C	0	0	0	0	0	0	0	_
	3	7.86	8.16	8.8	6.8	2184	2510		0	6	0	5	×/0	0	4	0	1/0	0	
1000 mg/L	4	7.69	7.86	8.6	7.4	2157	2624		6	0	6	0		5	Ò	5	-	7	
100	5	7,60	7.87	8.1	6.6	2186	2350		13	13	12	12	-	9	1/0	9	-	-/12	
	6	—	7.53		7.3	~	2512		13	14	13	13	-	13	-	12	-	_	
	7												-		-		-		
	8																_		
						\$		Total=	32	33	31	30	ت/*	য	×14	26	X/r	-/19	Mean Neonates/Female = $20,3$
	Day	· ·	Н		.O.	Conductiv	ity (µS/cm)					Surviva	I / Repro	duction	<u> </u>				
		New	Old	New	Old	New	Old		A	В	С	D	E	F	G	н	1	J	
	0	781		8-6		3164 300			٥	0	0	0	J	0	0	0	C	0	
	I	7.50	7,97	8.8	7.8	3130	3280		0	0	0	0	0	0	0	0	0	0	
	2	7.61	7,70	8.9	8,0	3/3 L			U	Q	0	0	0	0	0	0	0	0	
	3	7.85	8.13	9,1	6.6	3050			0	3	0	5	D	5	ч	4	0	0	
1500 mg/L	4	7.65	7.88	8:7	7.3	3020	25 3410		Ц	5	ч	0	14	0	0	0	4	4	
1500	5	7.61	7.87		4.7	3073	34-20		9	10	ι.	9	Û	10	7	S	9	7	
	6	-	7.55		7.1	-	3460		11	9	G	10	6	8	12	3	7	8	
	7		<u>, رر، </u>		1.1		0.00				-	•			Inc	0	/	<u> </u>	
	8																		
								Total=	24	ર્પ	21	24	9	23	23	20	20	19	Mean Neonates/Female = 20, 7

(Client:			Refer	ence Tox	icant			N	faterial:			um Chl	loride				st Date	Olali
Pro	ject #:	26	308		Test ID:		69790		-								Contro	l Water	SRW
	Day		Н	D.	.0.	Conductiv						Su	rvival / F	Reproduct	lion				
		New	Old	New	Old	New	Old	(°C)	A	В	С	D	E	F	G	Н	1	l	
	0	7.80		8.6		3910			0	0	0	0	0	0	0	0	0	0	
	1	7.50	7.97	9.0	7.7	4000	4120		S	0	0	0	0	0	0	0	0	0	
	2	7-64	7.71	9.1	85	3972	3901		*10	×%	×⁄o	Ü	0	Ü	ટ	0	×	0	
	3	7.84	3.12	9.0	6.9	3920	4300			-		0	0	0	C	0	1	0	
2000 mg/L	4	7.65	7.85	9.0	7.5	4070			-			2	6	0	2	0	-	0	
2000	5	7.62	7-83	8.5	6.6	7938	4470		~	-	-	5	3	0	6	3	-	4	
	6				-				-		_	0	6	4	10	5	-	3	
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	8										_						-	126 10 mil	
								Total=	+10	Y.	No.	7	9	4	18	Ŝ	×10		Mean Neonates/Female 50 5.3 Min/W
	Day	p	Н	D.	0.	Conductivi	ty (µS/cm)					Surviva	/ Repro	duction				<u> </u>	
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	U	777		9.1		4800			0	0	0	0	0	0	0	0	0	υ	
	1	7.52	7,95	9.3	7.7	4850	5060		0	0	0	0	0	0	0	0	0	0	
	2	7.61	7.67	9.5	8.7	4837	5091		4/6	×10	×/o	×/U	×10	×⁄	*/6	×′o	×10	*/0	
	3			·	·	_	-		-	-	~		-	-		-			
2500 mg/L	4					-				-		-		-		-		· (e	
250	5		_	-	_		-			-	-	_	_		-	-		-	
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	7	~			-	_			-	-	-	-		-	-	-	-	- I	
	8		-									-	-	-	-	-	-		
								Total=	×10	K/U	40	Yo	×10	40	r/U	No	40	×ю	Mean Neonates/Female = 🖸





Paul Bedore Robertson-Bryan, Inc. 9888 Kent Street Elk Grove, CA 95624 October 19, 2016

Paul:

I have enclosed our report "An Evaluation of the Chronic Toxicity of Lehigh Permanente Cement Plant Pilot Reverse-Osmosis (RO) Water Samples to *Ceriodaphnia dubia*" for the Biological Effluent and Permeate samples collected September 6, 2016.

Chronic Effects of Biological Effluent and Permeate on Ceriodaphnia dubia

There was a significant reduction in survival in the 40% effluent blend treatment; the survival EC25 was 29% effluent blend resulting in 3.4 TUc. There were significant reductions in reproduction down through the 12.5% effluent blend treatment; the reproduction IC25 was 10.7% effluent blend, resulting in 9.3 TUc.

There was no significant reduction to survival observed in the unfiltered 25% treatment; however, a significant reduction in reproduction was observed when compared to the Lab Water Control.

If you have any questions regarding the performance and interpretation of these tests, feel free to contact my colleague Chris Dudenhoeffer 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 26261.

An Evaluation of the Chronic Toxicity of Lehigh Permanente Cement Plant Pilot Reverse-Osmosis (RO) Water Samples to *Ceriodaphnia dubia*

Samples collected September 6, 2016

Prepared For:

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

Prepared By:

Pacific EcoRisk 2250 Cordelia Road Fairfield, CA 94534

October 2016



An Evaluation of the Chronic Toxicity of Lehigh Permanente Cement Plant Pilot Reverse-Osmosis (RO) Water Samples to *Ceriodaphnia dubia*

Samples collected September 6, 2016

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1. INTRODUCTION	1
2. CHRONIC TOXICITY TEST PROCEDURES	1
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Appendices

Appendix A	Chain-of-Custody Record for the Collection and Delivery of the Lehigh Biological Effluent and Permeate Samples
Appendix B	Test Data and Summary of Statistics for the Evaluation of the Chronic Toxicity of the Lehigh Permanente Cement Plant Biological Effluent and Permeate Samples to <i>Ceriodaphnia dubia</i> - Day 6
Appendix C	Test Data and Summary of Statistics for the Evaluation of the Chronic Toxicity of the Lehigh Permanente Cement Plant Biological Effluent and Permeate Samples to <i>Ceriodaphnia dubia</i> - Day 7
Appendix D	Test Data and Summary of Statistics for the Reference Toxicant Evaluation of the <i>Ceriodaphnia dubia</i>

1. INTRODUCTION

Under contract to the Robertson-Bryan, Pacific EcoRisk (PER) conducted an evaluation of the chronic toxicity of Lehigh Permanente Southwest Cement Company Reverse-Osmosis (RO) Biological Effluent and Permeate water samples. This evaluation consisted of performing the US EPA chronic 3-brood survival and reproduction test with the crustacean *Ceriodaphnia dubia*. This test was conducted on samples collected on September 6, 2016. In order to assess the sensitivity of the organisms to chemical stress, a monthly reference toxicant test was performed. This report describes the performance and results of these tests.

2. CHRONIC TOXICITY TEST PROCEDURES

This testing followed established guidelines in "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 Receipt and Handling of the Biological Effluent and Permeate Samples

On September 6th, samples of Lehigh Biological Effluent and Permeate were collected into appropriately cleaned sample containers. These samples were transported the day of collection, on ice and under chain-of-custody, to the PER laboratory in Fairfield, CA. 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. Based on client guidance, the Biological Effluent and Permeate samples were areared for 15 minutes upon receipt to address concerns about D.O. and sulfide concentrations. The postaeration sulfide concentrations were 0.090 mg/L and 0.001 mg/L for the Biological Effluent and Permeate samples, respectively. The chain-of-custody records for the collection and delivery of the samples are presented in Appendix A.

Tal	ole 1. Initial v	vater qu	uality cl	haracter	ristics of th	ne Biologi	cal Effluent a	and Perm	eate Samp	les.
Sample Receipt Date	Sample ID	Temp (°C)	рН	D.O. (mg/L)	Alkalinity (mg/L)	Hardness (mg/L)	('onductivity	Residual Chlorine (mg/L)	Total Ammonia (mg/L N)	Sulfide (mg/L)
9/6/16	Biological Effluent	7.1*	7.63	6.4	794	2570	3960	0.54	<1.00	0.80
9/6/16	Permeate	8.1*	7.79	8.5	3.7	1.2	19	0	<1.00	0.002

* The samples were received on ice the day of sample collection; the temperature of the temperature blank was <6°C.

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2.2 Survival and Reproduction Toxicity Testing with Ceriodaphnia dubia

The chronic toxicity test with *C. dubia* consists of exposing individual females to several Biological Effluent/Permeate mixtures for the length of time it takes for the Lab Control treatment females to produce three 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 test consisted of a synthetic reconstituted freshwater (SRW adjusted to EPA "moderately-hard" hardness), prepared by addition of reagent grade chemicals to Type 1 lab water. The Biological Effluent and Permeate samples were used to prepare daily test mixtures at concentrations of 6.25%, 12.5%, 18.75%, 25% and 40% Biological Effluent. Before sample preparation, both the Biological Effluent and Permeate samples were filtered using a 0.2μ m filter. A separate unfiltered 25% Biological Effluent treatment was tested in addition to the filtered dilution series; a filtration blank consisting of 0.2μ m-filtered control water was also tested. For each test treatment, 200 mL aliquots of test solution were amended with the alga *Selenastrum capricornutum* and Yeast-Cerophyll[®]-Trout Food (YCT) to provide food for the test organisms. "New" water quality characteristics (pH, D.O., and conductivity) were measured on these food-amended test solutions prior to use in this testing.

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

Each day of the test, fresh test solutions were prepared and characterized as before, and a "new" set of replicate cups was prepared. The test replicate cups containing the test organisms were examined, with surviving 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 parent organism was determined, after which the "old" water quality characteristics (pH, D.O., and conductivity) were measured for the old solution from one randomly-selected replicate at each treatment.

After it was determined that $\geq 60\%$ of the females in the Lab Water Control treatment had produced their third brood of offspring, the test was terminated. The resulting survival and reproduction (# of offspring) data were analyzed to evaluate any impairment(s) caused by the Biological Effluent/Permeate mixtures; all statistical analyses were performed using the CETIS[®] statistical software.

2.2.1 Reference Toxicant Testing of the Ceriodaphnia dubia

In order to assess the sensitivity of the test organisms to toxic stress, a monthly reference toxicant test was performed. The reference toxicant test was performed similarly to the effluent/permeate test except that test solutions consisted of modified Lab Control Water

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., EC50); 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 Biological Effluent/Permeate on Ceriodaphnia dubia

The results of this test are summarized below in Table 2. There was a significant reduction in survival in the 40% effluent blend treatment; the survival EC25 was 29% effluent blend, resulting in 3.4 TUc. There were significant reductions in reproduction down through the 12.5% effluent blend treatment; the reproduction IC25 was 10.7% effluent blend, resulting in 9.3 TUc.

There were no significant reductions to survival observed in the unfiltered 25% treatment; however, a significant reduction in reproduction was observed when compared to the Lab Water Control.

As some of the replicates did not produce a third brood upon test termination on Day 6, the test was evaluated the following day. There were only minor differences in the outcome of the Day 7 test when compared to the Day 6 data.

The test data and summary of statistical analyses for this test through Day 6 are presented in Appendix B. The test data and summary of statistical analyses for this test through Day 7 are presented in Appendix C.

Table 2. Effects of Biological Effluent	/Permeate blends on Cert	iodaphnia dubia.
Test Treatment	% Survival	Reproduction (mean # of offspring)
Lab Water Control	100	24.3
Filtered Lab Water Control	100	23.3
6.25% Filtered Effluent Blend	90	22.4
12.5% Filtered Effluent Blend	90	16.4*
18.75% Filtered Effluent Blend	100	16.8*
25% Filtered Effluent Blend	90	10.3*
40% Filtered Effluent Blend	10*	2.2
25% Unfiltered Effluent Blend	90	3.1*
Summary	y of Statistics	
NOEC =	25% Effluent Blend	6.25% Effluent Blend
TUc (where TUc = $100/NOEC$)	4 TUc	16 TUc
Survival EC25 or Reproduction IC25 =	29.2% Effluent Blend	10.7% Effluent Blend
TUc (where TUc = $100/EC25$ or $100/IC25$) =	3.4 TUc	9.3 TUc
Survival EC50 or Reproduction IC50 =	32.6% Effluent Blend	23.2% Effluent Blend
TUc (where TUc = 100/EC50 or 100/IC50) =	3.1 TUc	4.3 TUc
Test PMSD	N/A	25.8%

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

3.1.1 Reference Toxicant Toxicity to *Ceriodaphnia dubia*

The results of this test are summarized below in Table 3. The survival EC50 and reproduction IC50 for this test 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 D.

Table 3. Reference toxicant testin	ng: Effects of NaCl on C	eriodaphnia dubia.
NaCl Treatment (mg/L)	% Survival	Reproduction (# neonates/female)
Lab Water Control	100	25.6
500	100	20.9*
1000	60	11.5*
1500	20*	2.2
2000	30*	0.8
2500	0*	-
Summ	ary of Statistics	
Survival EC50 or Reproduction IC50 =	1200	931

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

4. SUMMARY & CONCLUSIONS

An chronic toxicity evaluation was performed on the Lehigh Permanente Cement Plant biological effluent and permeate water samples using *Ceriodaphnia dubia*. The results of this testing follow:

Effects of Biological Effluent/Permeate on Ceriodaphnia dubia

There was a significant reduction in survival in the 40% effluent blend treatment; the survival EC25 was 29% effluent blend, resulting in 3.4 TUc. There were significant reductions in reproduction down through the 12.5% effluent blend treatment; the reproduction IC25 was 10.7% effluent blend, resulting in 9.3 TUc.

There was no significant reduction to survival observed in the unfiltered 25% treatment; however, a significant reduction in reproduction was observed when compared to the Lab Water Control.

4.1 QA/QC Summary

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

Negative Control – The biological responses for the test organisms at the Lab Control treatments were within acceptable limits.

Positive Control – The reference toxicant test survival EC50 and reproduction IC50 were both 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.

Concentration Response Relationships – The concentration-response relationships for these tests were evaluated as per EPA guidelines (EPA-821-B-00-004), and were determined to be acceptable for this testing.

Appendix A

Chain-of-Custody Record for the Collection and Delivery of the Lehigh Permanente Cement Plant Biological Effluent and Permeate Samples



CHAIN-OF-CUSTODY RECORD

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

Results To:	Robertson	1-Bryan, l	Inc		Invoice To:	Same			REQ	UESTE) ANAL	YSIS.		
Address:	9888 Ken	t Street			Address:									
	Elk Grov	e, CA 95	624		1			and 0.0						
					1			002				1 1		
Phone:	(916) 405	-8918			Phone:			Sur Sur						
Attn:	Paul Bed	ore			Attn:	Sam.	Barket,	Dia EF						
E-mail:	paul@rob	ertson-b	ryan.com	L	E-mail:	Sam.B	arketta Lehiah	tion						
Project Name:	Lehigh T	RE Testi	ng				anson. Com	duc						
P.O.#/Ref:								ridapnia dubia Surival and Reproduction, EPA 1002.0						
		Sample	Sample	Sample	Grab/	1	Container							
Client San		Dațe	Time	Matrix*	Comp	Number	Туре							
1 Biological Efflu	ient	9610	9:40#	FW	Grab	2	2.5-gal LDPE Cube	x						
2 Permeate			9.'50AM	FW	Grab	2	2.5-gal LDPE Cube	x						
3		- per por												
4														
5														
6														
7														
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8												\vdash	-+	_
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Samples colle														
Comments/Sp	oecial Insti	ecial Instruction: f permeate and biological effluent spec					INSHED BY: COURTU	ey perm	_	EIVED	BY:			
1						Signatu	re: Coutherf	penj	Sign	ature:	2m	کے	n	
Test mixtures of	of permeate	e and biolo	gical efflu	ent specifie	d in	Print:	0	U	Print	tilic	nker	1 F	Ceen	5
Sept. 2016 tes	t plan provi	ided to PE	R by P Be	dore agains	st	Organiz	ation: Lehigh		Orga	nizatio	n:	3A		
shared lab wat	er control.					Date: 6	7/6/10	Time:	Date	: 9/10	16	Ti	ime:]	(α)
						RELIQU	INSHED BY:		REC	EIVED I	BY:			
						Signatu	re:		Sign	ature:				
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						Date:		Time:	Date			Ti	me:	

*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 the Lehigh Permanente Cement Plant Biological Effluent and Permeate Samples to *Ceriodaphnia dubia -* Day 6



CETIS Summary Report Report Date: 05 Oct-16 16:18 (p 1 of 2) **Test Code:** 69605 | 01-7872-3416 Ceriodaphnia Survival and Reproduction Test Pacific EcoRisk Batch ID: 11-3483-0410 Test Type: Reproduction-Survival (7d) Chris Dudenhoeffer Analyst: Start Date: 07 Sep-16 16:40 Protocol: EPA-821-R-02-013 (2002) **Diluent:** UFRO Permeate Ending Date: 13 Sep-16 16:00 Species: Ceriodaphnia dubia Brine: Not Applicable **Duration:** 5d 23h Source: In-House Culture Age: 1 Sample ID: 03-2813-4514 Code: Effluent Client: Lehigh Permanente Sample Date: 06 Sep-16 09:40 Effluent Material: **Project:** 26261 Receive Date: 06 Sep-16 11:00 Source: Lehigh Permanente Sample Age: 31h (7.1 °C) Station: 75:25% Permeate:Biological Effluent **Batch Note:** Stats include Day 6 Filtered Sample **Comparison Summary** Analysis ID Endpoint NOEL LOEL TOEL PMSD TU Method 06-8061-9818 Reproduction 0 >0 21.2% Equal Variance t Two-Sample Test 05-4862-5344 Reproduction 6.25 12.5 8.839 25.8% 16 Steel Many-One Rank Sum Test 07-6351-7444 Survival 0 >0 NA Fisher Exact Test 18-3405-8270 Survival 40 25 31.62 NA 4 Fisher Exact/Bonferroni-Holm Test Point Estimate Summary Analysis ID Endpoint Level % 95% LCL 95% UCL TU Method 06-6135-9619 Reproduction IC5 4 1.06 8.57 25.02 Linear Interpolation (ICPIN) IC10 6.82 2.12 11.2 14.66 **IC15** 8.13 3.18 14.5 12.3 **IC20** 9.44 4.24 19 10.59 IC25 10.7 5.3 20.1 9.303 IC40 20.8 11.5 23.1 4.818 23.2 IC50 20.3 25.9 4.317 05-8943-1489 Survival EC5 25 6.76 30.5 4.004 Linear Regression (MLE) **EC10** 26.5 8.73 31.8 3.774 **EC15** 27.6 10.4 32.7 3.627 EC20 28.5 11.9 33.5 3.514 EC25 29.2 13.3 34.3 3.42 **EC40** 31.3 17.6 36.6 3.194 EC50 32.6 20.6 38.4 3.065 **Reproduction Summary** C-% **Control Type** Count Mean 95% UCL 95% LCL Min Max Std Err Std Dev CV% %Effect 0 Lab Water Contr 10 24.3 19.2 29.4 7.15 14 32 2.26 29.4% 0.0% 0 Filtration Blank 10 23.3 18.9 27.7 14 31 1.93 6.09 26.1% 4.12% 6.25 10 22.4 16.3 28.5 34 3 2.72 8.59 38.4% 7.82% 12.5 10 16.4 10.5 22.3 0 29 2.6 8.21 50.1% 32.5% 18.75 10 16.8 14.1 19.5 13 23 12 3.79 22.6% 30.9% 25 10 9.9 7.95 11.9 5 14 0.862 2.73 27.5% 59.3% 40 10 2.2 -0.0571 4.46 0 10 0.998 143.0% 90.9% 3.16 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 Filtration Blank 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 0.9 0.674 0 1 1 0.1 0.316 35.1% 10.0% 18.75 10 1 1 1 0

10

10

0.9

0.1

25

40

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0

1

1

1

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0.1

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1

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0

Analyst: CDD QA: M

0.316

0.316

0.0%

35.1%

316.0%

0.0%

10.0%

90.0%

CETIS Summary Report

6.25

12.5

18.75

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Survival [Detail		<u> </u>								
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	Filtration Blank	1	1	1	1	1	1	1	1	1	1
6.25		1	0	1	1	1	1	1	1	1	1
12.5		1	1	1	0	1	1	1	1	1	1
18.75		1	1	1	1	1	1	1	1	1	1
25		1	1	1	1	1	1	1	1	1	0
40		0	0	0	0	0	1	0	0	0	0
Survival E	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	Filtration Blank	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
6.25		1/1	0/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
12.5		1/1	1/1	1/1	0/1	1/1	1/1	1/1	1/1	1/1	1/1
18.75		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	0/1

0/1

1/1

0/1

Rep 5

Ceriodap	hnia Survival and Re	producti	on Test		
Reproduc	tion Detail				
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Lab Water Contr	16	18	26	29
0	Filtration Blank	18	17	17	27

0/1

0/1

0/1

0/1

Rep 7

Rep 8

0/1

0/1

0/1

Report Date:

Test Code:

Rep 6

Rep 9

Pacific EcoRisk

Rep 10

Analyst: COD QA: M

CETIS Ana	alytical Repo	ort					-	ort Date: Code:		16 16:14 (p 1 of 2) 605 01-7872-3416
Ceriodaphnia	a Survival and Re	prod	uction Test							Pacific EcoRisk
Analysis ID: Analyzed:	07-6351-7444 20 Sep-16 10:4	1	Endpoint: Analysis:	Survival Single 2x2 Co	ntingency Ta	ible		S Version: ial Results:	CETISv1.8.7 Yes	
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Untransforme	d		C > T	NA	NA			Passes su	rvival	
Fisher Exact	Test		×							
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Data Summa	ry									
C-%	Control Type	NR	R	NR + R	Prop NR	Prop R	%Effect			
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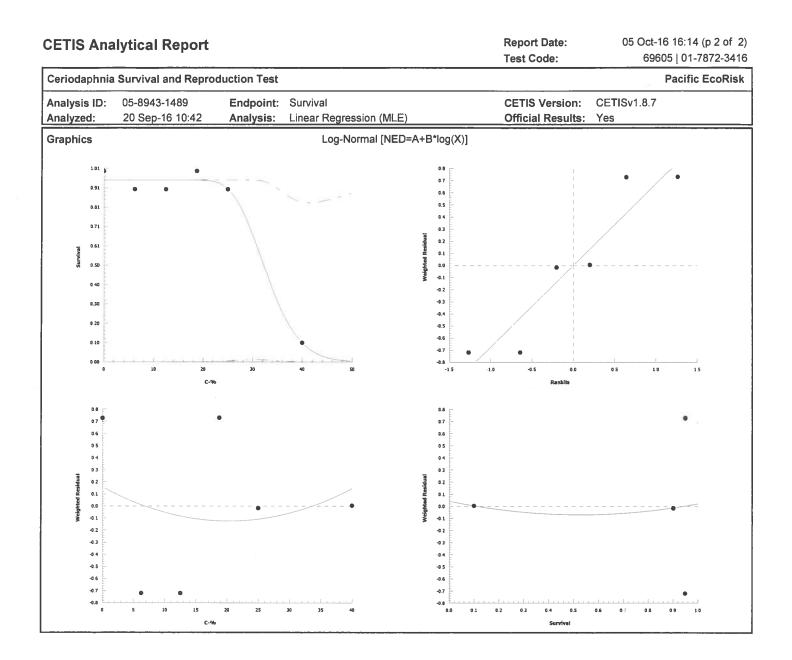
Analyst: CTD QA: M

CETIS Ana	alytical Repo	ort						ort Date: Code:	05		14 (p 1 of 2 1-7872-341(
Ceriodaphnia	a Survival and Re	productio	on Test							Paci	fic EcoRisk
Analysis ID: Analyzed:	06-8061-9818 20 Sep-16 10:4		•	production ametric-Two	Sample			IS Version: ial Results		.8.7	
Data Transfo	orm	Zeta	Alt Hyp	Trials	Seed		PMSD	Test Res	ult		
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Equal Varian	ice t Two-Sample	Test									
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Lab Water Co	ontrol Filtration I	Blank	0.337	1.73		0.3701	CDF		ificant Effect	t	
ANOVA Table	e										
Source	Sum Squa	ares	Mean Squ	lare	DF	F Stat	P-Value	Decision	(a:5%)		
Between	5		5		1	0.113	0.7403	Non-Sign	ificant Effect	ł	
Error	794.2		44.12222		18						
Total	799.2				19						
Distributiona	al Tests										
Attribute	Test			Test Stat	Critical	P-Value	Decision	(a:1%)			
Variances	Variance	Ratio F		1.38	6.54	0.6413	Equal Var				
Distribution	Shapiro-V	Vilk W Nor	mality	0.867	0.866	0.0105	Normal D				
Reproductio	n Summary			· · · · · · · · · · · · · · · · · · ·		···					
C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Water Contr	· 10	24.3	19.2	29.4	26	14	32	2.26	29.4%	0.0%
0	Filtration Blank	10	23.3	18.9	27.7	26.5	14	31	1.93	26.1%	4.12%
Graphics 30 25 20 15 10 5 0				Reject Null	Centered	-2 -4 -8 -10	•		••••	•••	•
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		pI	H	D.	0.	Cond.	Temp					ival / R		ction				SIGN-OFF	
	Day	New	Old	New	Old	(µS/cm)	(°C)	Α	В	С	D	Е	F	G	Н	Ι	J		
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	2	8.66	୫.(୫		7.7	315		0	0	0	0	0	0	0	0	0	0	Date: 1/1/6 New WQ: 4 Counts: BV Sol'n Prep: BN Old WQ: TL Time: 1/25	
01	3	8.78	8.39	9.0	٦.0	314		0	0	0	0	\mathcal{O}	0	0	0	0	0	Date: 1/10/16 New WQ: 92 Counts: 30 Sol'n Prep: JD Old WQ: DM Time: 1430	
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filtered	5	8.04	8.39	9.9	6.9	306		12	ii	10	10	((10	11	5	12	12	Date:9/12/LNew WQ: HR Counts: SH Sol'n Prep: SI+ Old WQ: HR Time: 1320	
I	6	7,80	8.08	9,2	7.6	317		0	0	1	12	10	10	12	91	13	9	Date: 9/12/16 New WQ: 50 Counts: 30 Sol'n Prep: JO Old WQ: DM Time: 1600	
	7																	Date: New WQ: Counts: Sol'n Prep: Old WQ: Time:	
	8																	Date: Old WQ: Counts: Time:	
							Total=	18	17	17	27	27	27	29	14	31	26	Mean Neonates/Female = 23.3	

CETIS	S An	alytic	al Repo	ort					ort Date: Code:	05 Oct-16 16:14 (p 2 of 2) 69605 01-7872-3416				
Ceriod	laphn	ia Survi	val and Re	eprodu	uction Test							Paci	fic EcoRisk	
Analys Analyz			405-8270 ep-16 10:4	2	Endpoint: Su Analysis: ST	rvival P 2x2 Conti	ngency Tabl	es		S Version: ial Results:	CETISv1.8.7 Yes			
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Untran	sform	ed			C > T	NA	NA			25	40	31.62	4	
Fisher	Exac	t/Bonfei	roni-Holm	n Test										
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Lab Wa	ater C		6.25		0.5	1.0000	Exact		ificant Effect					
			12.5		0.5	1.0000	Exact		ificant Effect					
			18.75		1	1.0000	Exact		ificant Effect					
			25		0.5	1.0000	Exact		ificant Effect					
			40		5.95E-05	0.0003	Exact	Significar						
Data S	umm	ary												
C-%		Contr	ol Type	NR	R	NR + R	Prop NR	Prop R	%Effect					
0		Lab W	/ater Cont	10	0	10	1	0	0.0%	·				
6.25				9	1	10	0.9	0.1	10.0%					
12.5				9	1	10	0.9	0.1	10.0%					
18.75				10	0	10	1	0	0.0%					
25				9	1	10	0.9	0.1	10.0%					
40				1	9	10	0.1	0.9	90.0%					
Graphi	cs													
	1.0 _				•									
	0.9		•		0									
	0.9		•											
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Survival	0.6													
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				C-%										

CETIS	S Analyti	cal Repo	ort					Repo Test	Code:		69605 0)1-7872-341
Ceriod	laphnia Sur	vival and R	eproduc	tion Test			· · · · · · · · ·				Pac	ific EcoRis
Analys	sis ID: 05	-8943-1489	E	Endpoint: S	Survival			CETI	S Version:	CETISv1	.8.7	
Analyz	ed: 20	Sep-16 10:4	12 A	Analysis: l	inear Regress	ion (MLE)		Offic	ial Results:	Yes		
Linear	Regressio	n Options						-				
Model	Function			Thresh	old Option	Threshold	Optimized	Pooled	Het Corr	Weighted	1	
Log-No	ormal [NED=	A+B*log(X)]		Control	Threshold	1E-07	Yes	Yes	No	Yes		
Regres	ssion Sumr	nary										
Iters	LL	AICc	BIC	Mu	Sigma	Adj R2	F Stat	Critical	P-Value	Decision	(α:5%)	
14	-14.4	46.9	34.3	1.51	0.0706	0.907				Lack of Fi	t Not Test	ed
Point E	Estimates			· · · · · · · · · ·							: "	
Level	%	95% LCL	95% U	CL TU	95% LCL	95% UCL						
EC5	25	6.76	30.5	4.004	3.276	14.8						
EC10	26.5	8.73	31.8	3.774	3.146	11.45						
EC15	27.6	10.4	32.7	3.627	3.056	9.649						
EC20	28.5	11.9	33.5	3.514	2.983	8.432						
EC25	29.2	13.3	34.3	3.42	2.917	7.521						
EC40	31.3	17.6	36.6	3.194	2.735	5.686						
EC50	32.6	20.6	38.4	3.065	2.606	4.853				_		
Regres	sion Paran	neters										
Parame	eter	Estimate	Std Er	ror 95% LC	L 95% UCL	t Stat	P-Value	Decision(α:5%)			
Thresh	old	0.0502	0.0347	-0.0178	0.118	1.45	0.2438	Non-Signi	ficant Param	eter		
Slope		14.2	5.61	3.17	25.2	2.53	0.0858	•	ficant Param			
Intercep	pt	-21.5	8.72	-38.5	-4.37	-2.46	0.0908	Non-Signif	ficant Param	eter		
ANOVA	A Table											
Source	•	Sum Squa	ares N	lean Square	DF	F Stat	P-Value	Decision(α:5%)			
Model		35.39943	3	5.39943	1	50.6	0.0057	Significant				
Residua	al	2.100573	0	.700191	3							
Residu	al Analysis											
	-	Method			Test Stat	Critical	P-Value	Decision(α:5%)			
Attribut	-		hi-Sq G	OF	Test Stat	Critical 7.81	P-Value 0.5518		α:5%) ficant Hetero	genity		
Attribut	te	Method	•					Non-Signif		• •		
Attribut Goodne	te ess-of-Fit	Method Pearson C	Ratio G	OF	2.1	7.81	0.5518	Non-Signif	ficant Hetero ficant Hetero	• •		
Attribut Goodne Distribu	te ess-of-Fit	Method Pearson C Likelihood Shapiro-W	Ratio G	OF	2.1 2.88	7.81 7.81 0.513	0.5518 0.4097	Non-Signif Non-Signif Normal Dis	ficant Hetero ficant Hetero	• •		
Attribut Goodne Distribu Surviva	te ess-of-Fit ution al Summary	Method Pearson C Likelihood Shapiro-W	Ratio G	OF	2.1 2.88	7.81 7.81 0.513	0.5518 0.4097 0.1761	Non-Signif Non-Signif Normal Dis	ficant Hetero ficant Hetero	• •	A	В
Attribut Goodne Distribu Surviva C-%	te ess-of-Fit ution al Summary Conte	Method Pearson C Likelihood Shapiro-W	Ratio G /ilk W No	OF prmality	2.1 2.88 0.856	7.81 7.81 0.513 Calcul	0.5518 0.4097 0.1761 ated Variate	Non-Signif Non-Signif Normal Dis e(A/B)	ficant Hetero ficant Hetero stribution	genity	A 10	B 10
Attribut Goodne Distribu Surviva C-%	te ess-of-Fit ution al Summary Conte	Method Pearson C Likelihood Shapiro-W	Ratio G /ilk W No Count	OF prmality Mean	2.1 2.88 0.856 Min	7.81 7.81 0.513 Calcul Max	0.5518 0.4097 0.1761 ated Variate Std Err	Non-Signif Non-Signif Normal Dis e(A/B) Std Dev 0	ficant Hetero ficant Hetero stribution CV% 0.0%	%Effect 0.0%		10
Attribut Goodne Distribu Surviva C-% D 5.25	te ess-of-Fit ution al Summary Conte	Method Pearson C Likelihood Shapiro-W	Ratio G /ilk W No Count 10	OF prmality Mean 1	2.1 2.88 0.856 Min 1	7.81 7.81 0.513 Calcul Max 1	0.5518 0.4097 0.1761 ated Variate Std Err 0	Non-Signif Non-Signif Normal Dis e(A/B) Std Dev 0 0.316	ficant Hetero ficant Hetero stribution	%Effect	10	
Attribut Goodne Distribu Surviva C-% 0 6.25 12.5	te ess-of-Fit ution al Summary Conte	Method Pearson C Likelihood Shapiro-W	Ratio Ge /ilk W No Count 10 10	OF prmality <u>Mean</u> 1 0.9	2.1 2.88 0.856 Min 1 0	7.81 7.81 0.513 Calcul Max 1	0.5518 0.4097 0.1761 ated Variate Std Err 0 0.1	Non-Signif Non-Signif Normal Dis e(A/B) Std Dev 0	icant Hetero ficant Hetero stribution CV% 0.0% 35.1% 35.1%	%Effect 0.0% 10.0%	10 9 9	10 10 10
Attribut Goodne Distribu	te ess-of-Fit ution al Summary Conte	Method Pearson C Likelihood Shapiro-W	Ratio Ge /ilk W No Count 10 10	OF prmality Mean 1 0.9 0.9	2.1 2.88 0.856 Min 1 0 0	7.81 7.81 0.513 Calcul Max 1 1 1	0.5518 0.4097 0.1761 ated Variate Std Err 0 0.1 0.1	Non-Signif Non-Signif Normal Dis e(A/B) Std Dev 0 0.316 0.316	ficant Hetero ficant Hetero stribution CV% 0.0% 35.1%	%Effect 0.0% 10.0% 10.0%	10 9	10 10



Analyst: CJD QA: M

	nalytical Rep	ort						-	ort Date: Code:	05		l4 (p 2 of 2 1-7872-3416
Ceriodaphr	nia Survival and f	Reproduc	tion Test								Pacif	ic EcoRisk
Analysis ID Analyzed:	: 05-4862-5344 20 Sep-16 10		•	production	Control v	/s T	reatments		S Version:	CETISv1 Yes	.8.7	
Data Transf	form	Zeta	Alt Hyp	Trials	Seed			PMSD	NOEL	LOEL	TOEL	TU
Untransform	ned	NA	C > T	NA	NA			25.8%	6.25	12.5	8.839	16
Steel Many-	-One Rank Sum 1	Гest										
Control	vs C-%		Test Stat	Critical	Ties	DF	P-Value	P-Type	Decision(1:5%)		
Lab Water C	Control 6.25		99	75	4	18	0.6654	Asymp	Non-Signif	icant Effect	t	
	12.5*		75	75	4	18	0.0461	Asymp	Significant	Effect		
	18.75*		73.5	75	2	18	0.0350	Asymp	Significant	Effect		
1	25*		55.5	75	1	18	0.0004	Asymp	Significant			
· · · · · · · · · · · · · · · · · · ·	40*		55	75	0	18	0.0004	Asymp	Significant	Effect		
ANOVA Tab	ble											
Source	Sum Sqi	uares	Mean Squ	lare	DF		F Stat	P-Value	Decision(a:5%)		
Between	3314.2		662.84		5		17.7	<0.0001	Significant	Effect		
Error	2024.2		37.48518		54							
Total	5338.4				59							
Distribution	nal Tests											
Attribute	Test			Test Stat	Critical		P-Value	Decision	α:1%)			
Variances	Bartlett	Equality o	f Variance	19.2	15.1		0.0018	Unequal \				
Distribution	Shapiro-	ormality	0.96	0.946 0.0482		0.0482	-	al Distribution				
Reproducti	on Summary											
C-%	Control Type	Count	Mean	95% LCL	95% UC	CL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Water Con	itr 10	24.3	19.2	29.4		26	14	32	2.26	29.4%	0.0%
6.25		10	22.4	16.3	28.5		25	3	34	2.72	38.4%	7.82%
12.5		10	16.4	10.5	22.3		15	0	29	2.6	50.1%	32.5%
18.75		10	16.8	14.1	19.5		16	13	23	1.2	22.6%	30.9%
25		10	10.3	8.25	12.4		10.5	5	14	0.907	27.9%	57.6%
			2.2	-0.0571	A 46			^				
40		10	2.2	0.0011	4.46		1.5	0	10	0.998	143.0%	90.9%
40 Graphics		10	<u> </u>		4.40		1.5		10	0.998	143.0%	90.9%
		10	18.75 25	40	1.40	Centered Untransformed	1.5 15 10 5 -10 -15 -20 -25 -24	0.000		0.998	143.0%	23

Analyst:______ QA:_____

CETIS	Anal	ytical Repo	ort							ort Date: Code:		16 16:14 (p 1 of 1 05 01-7872-341
Cerioda	phnia	Survival and Re	eproducti	on Test								Pacific EcoRisk
Analysis		06-6135-9619		dpoint:	Reproduction					S Version:	CETISv1.8.7	
Analyze	d:	20 Sep-16 10:4	2 An	alysis:	Linear Interpola	tion (ICPIN)			Offic	ial Results:	Yes	
Linear I	nterpol	lation Options										
X Trans	form	Y Transform	se Se	ed	Resamples	Exp 95%	CL	Method				
Linear		Linear	15	02066	200	Yes		Two-Poi	nt Interp	olation		
Point Es	stimate	S										
Level	%	95% LCL	95% UC	L TU	95% LCL	95% UCL						
IC5	4	1.06	8.57	25.02	11.67	94.31						
IC10	6.82	2.12	11.2	14.66		47.15						
IC15	8.13	3.18	14.5	12.3	6.915	31.44						
IC20	9.44	4.24	19	10.59		23.58						
IC25	10.7	5.3	20.1	9.303	4.98	18.86						
IC40	20.8	11.5	23.1	4.818	4.33	8.726						
IC50	23.2	20.3	25.9	4.317	3.864	4.936						
	uction	Summary				Cale	culate	ed Variat	е			
C-%		ontrol Type	Count	Mean		Max	Std		td Dev	CV%	%Effect	
0	La	b Water Contr	10	24.3	14	32	2.26		.15	29.4%	0.0%	
6.25			10	22.4	3	34	2.72		.59	38.4%	7.82%	
12.5			10	16.4	0	29	2.6		.21	50.1%	32.5%	
18.75			10	16.8	13	23	1.2		.79	22.6%	30.9%	
25			10	10.3	5	14	0.90		.87	27.9%	57.6%	
40			10	2.2	0	10	0.99	8 3.	.16	143.0%	90.9%	
under the second s	25	5 10 15		25	20 35 40							

Analyst: CJD QA: M

С	lient:		Lehigh Permanente Material: Lab Water Control								Tes	t Date:	9/1/16					
Proje	ect #:	262	261		Test ID:	6960)5	R	andomi	zation:	10	+	40.1	+ 10.	6.1/10	Control	Water:	SRW
	Day	pl	н	D.	0.	Cond.	Temp				Sur	vival / R	eproduct	tion				SIGN-OFF
		New	Old	New	Old	(µS/cm)	(°C)	Α	В	С	D	Е	F	G	Н	1	J	
	0	7.81		ר.ר		319	24.9	0	0	0	0	0	0	0	0	0	0	Date: 9/7/6 New WQ: COC Test Init: 5/7 Sol'n Prep: 6/ Time: 1640
	ı	7,46	8.00	8.0	6.7	3,22	25.1	0	\overline{O}	0	0	0	0	0	0	0	0	Date: 9/8//L New WQ: BB Counts: BV Sol'n Prep: BV Old WQ: WN Time: 1030
	2	7.85	7,45	8.5	7.8	314	25.7	υ	0	0	0	Õ	0	0	0	0	0	Date: 9/9/11 New WQ: JAn Counts: 16 Sol'n Prep: 3 Old WQ: JL Time: 11.25
trol	3	7.97	7.23	8.5	6.9	312	25.5	0	0	0	0	0	0	0	0	0	0	Dail@10116 New WQ: 92 Counts: JO Sol'n Prep: JO Old WQ: DM Time: 1430
r Control	4	7.44	7.80	8.4	7.1	311	25.7	5	6	6	6	7	7	5	6	5	6	Date: 9/11/14 New WQ:22 Counts: SH Sol'n Prep: SH Old WQ: The Time: 23
Water	5	:7.72	7.67	7.9	6.5	307	25.5	i(12	n	9	10	12	10	11-	9	12	Date: 9/12/16 New WQ: 4R Counts: SH Sol'n Prep: SH Old WQ: 4R Time: 1320
Lab	6	7,85	7.87	3,4	7.7	200	25.6	0	0	9	14	15	13	11	15	0	0	Date: 1/13/16 New WQ: 54 Counts: J5 Sol'n Prep: J0 Old WQ: DM Time: 1600
	7										-4 - 1							Date: New WQ: Counts:
1	Ľ									<u> </u>								Sol'n Prep: Old WQ: Time: Date: Old WO: Counts:
	8																	Time:
				Total= 16 18 26 29 32 32 2		26	32	14	18	Mean Neonates/Female = 24.3								

	Short-Term Chronic 3-Brood Ceriodaphnia dubia Survival & Reproduction Test Data Material: Biological Effluent 0.2 µm Filt, Test Date: $9/7/16$														Data			
C	ient:		L	ehigh Peri	nanente													
Proje	- ct #:	262	61		Test ID:	6960	5	Ra	andomi	zation:	10.	<u>i. /</u>	0.1.	1 10 0	-1/10	.z.1 D	iluent:	UFRO Permeate 0.2µm Filt.
	Day	pł	ł	D.	0.	Cond.	Temp				Sur	vival / Re	·					SIGN-OFF
		New	Old	New	Old	(µS/cm)	(°C)	A	В	С	D	E	F	G	Н	1	J	Date: 9/7/18New WQ: WC Test Init SH
	0	7.91		9.1		393	24.9	0	0	0	0	0	0	0	0	0	0	Sol'n Prep: Time: 1640
	1	7.8	7.91	9.0	6.7	401	25.1	0	0	0	0	0	0	0	0	Û	0	Date: 9/9/16New WQ: & Counts: BV Sol'n Prep: 13V Old WQ: W Time: 10:30
	2	7.87	7,35	9.5	7.4	391	25.7	Ð	0	0	0	0	0	0	0	0	0	Date 9/9/11 New WQ: JAn Counts: BV Sol'n Prep: BJ Old WQ: DV Time: 1/25
	3	7.84	7.18	9.0	7.0	394	25.5	0	0	0	0	0	0	0	0	0	\mathcal{O}	Date: 911 ≈ 14 New WQ: 92 Counts TO Sol'n Prep: Jo Old WQ: DH Time 1430
6.25%	4	7,49	7.67	9.5	6.1	200 SM 250 SM	25.7	6	*/3	6	5	6	6	6	6	6	5	Date:9/11/16 New WQ:92 Counts: SH Sol'n Prep: SH Old WQ: TH Time: 1215 Date:9/12/(blew WO: 14 Counts: SH
6.2	5	7.75	7.57	9.D	7.2	401 all	255	12		10	٩	12	12	10	9	u	11_	Sol'n Prep: SI+ Old WQ: AR Time: 1322
	6	7,55	४: भा र्याक्ष न.न.उ	9,2	7.6	395	25.10	3		11 540113	.11	16	0	13	10	10	0	Sol'n Prep: JO Old WQ: DM Time: 1600
	7								-									Date: New WQ: Counts: Sol'n Prep: Old WQ: Time:
	8																	Datc: Old WQ: Counts: Time:
	°						Total=	21	×/3	26	25	34	18	29	25	27	16	Mean Neonates/Female = 22,4
	Day	p	H	D	.0.	Cond.		1-1	15	20		/ Repro				<u></u>		
	<i>Duy</i>	New	Old	New	Old	(µS/cm)		A	В	С	D	Е	F	G	Н	1	1	EFF/PERMEATE
	0	ר8,ר		8.9		714		C	0	0	0	0	0	0	0	0	C	44017/44018
	1	7.65	7,83	9.4	7.7	725		0	0	0	0	0	0	0	0	0	0	44017/44018
	2	7.90	7.32	9.6	7,4	×1999111		0	0	0	*/6	0	Ò	0	Õ	0	0	44017 44018
	3	7,77	7.16	9.2	6.9	725		0	0	0		0_	0	0	0	0	0	44017/44018
12.5%	4	7.48	7.54	10.3	6.3	706		6	6	5	-	6	5	5	3	5	4	44017/44018
12	5	7.67	7.43	9.8	7.3	720 av		8	10	8	-	13	12	10	9	10	10	44017/44018
	6	739	7.55	9.3	6.6	715		0	0	0	-	10	0	8	0	14	0	44017/44018
	7										-							
	8												1~		1-		134	
							Total=	14	16	13	×(0	29	117	23	12	56	14	Mean Neonates/Female = 16,0

$ \begin{array}{c c c c c c c c c c c c c c c c c c c $					Short-	Term C	hronic 3-	BL00		_						rouud			0//
$\begin{array}{c c c c c c c c c c c c c c c c c c c $	С	lient:		I	ehigh Peri	nanente			. M	aterial:	Biolo	gical E	ffluent	0.2µm	Filt.				
$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$	Proje	ect #:	262	.61		Test ID:	6960	5	-								E	oiluent:	UFRO Permeate 0.2µm Filt.
$ \begin{array}{c c c c c c c c c c c c c c c c c c c $		Day	· · ·										······				T		SIGN-OFF
$ \begin{array}{c c c c c c c c c c c c c c c c c c c $				Old		Old	-						_						
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$		0	8.08		8.¢		1005		0	0	0		0	0	9	0	<u> </u>	0	
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$		1	7.64	7.88		7.4	1044		0	0	0	0	0	0	0	0	0	0	
$\frac{4}{172} - \frac{7}{163} 10.8 6.0 \frac{1010}{77} - \frac{5}{77} - \frac{5}{760} - \frac{7}{77} - \frac{7}{77} - \frac{5}{767} - \frac{1007}{77} - \frac{5}{77} - \frac{5}{767} - \frac{7}{77} - \frac{5}{77} - \frac{7}{77} - \frac{5}{77} - \frac{7}{77} - \frac{5}{77} $		2	8.13	7.62	9,7	7.3	1045		0	0	0	0	0	0	0	0	0	0	
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$		3	7.96	7.35	9.2	7.0	1007		0	0	0	0	0	0	0	0	0		
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$.75%	4	7.72	7163	10.9	6.0	9665		5	6	4	<u> </u>	5	5	5				
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	18	5	7.53		1	7.0	73-990		6	7	9	8	9	9	10	6	7	8	
$\begin{array}{c c c c c c c c c c c c c c c c c c c $		6	7.32		9,9	7.3	1007		6	0	8	0	7	0_	0	10_	10	0	
$\begin{array}{c c c c c c c c c c c c c c c c c c c $		7																	
$\begin{array}{ c c c c c c c c c c c c c c c c c c c$		8																	
$\begin{array}{c c c c c c c c c c c c c c c c c c c $								Total=	7	13	21				15	18	23	13	Mean Neonates/Female = 16.8
$\begin{array}{c c c c c c c c c c c c c c c c c c c $		Day		1			1		1	1 5 -									-
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$				Old		Old		1 888.98 1 8 8 8 9		<u> </u>	1	<u> </u>	<u> </u>						
$\frac{2}{8.15} \begin{array}{c ccccccccccccccccccccccccccccccccccc$		0										<u> </u>					<u> </u>		
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$		1	7,67	8.04		7.4			0				0	0	0	0			
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$		2	8.15	7.75	9.4	6.4	1301		0	0	0	0	0	0		0	0	0	
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$		3	8.08	7.47	9,1	6.8	1295		0	0	0	0	0	0	0	0			
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	5%	4	7,79	8.02	10.5	6:3			4	5	5	4	5	6	-	4	<u> </u>		
		5	7.50	7.77	9.9	65	1238		0	6	8	5	7	7	5	0	0	-	
		6	7.30	7.51	9,4	7.5	1279		3	0	0	0	0	_	0	6	ie	-	
		7																-	
		8											-						
$\frac{1}{1000} = 1000000000000000000000000000000000000$								Total=	17	11	13	9	12	114	9	10	13	1 /2	Mean Neonates/Female = 0-3-99
A cap alzo																	900	Ó	

С	lient:		1	Lehigh Per	manente			М	aterial:	Bio	logical l	Effluent	0.2µm I	ilt.		Tes	t Date:		9/71	16		
Proje	ect #:	262	261		Test ID:	6960)5									D	Diluent:	U	FRO Per	meate 0	.2µm Filt.	•
	Day	Р	Н	D	.0.	Cond.	Temp				Sur	vival / R	eproduc	tion								
		New	Old	New	Old	(µS/cm)	(°C)	A	В	С	D	E	F	G	Н	1	J					
	0	8.18		ר.8		1908		0	0	ο	C	0	0	0	0	0	0					
	1	7.66	8.17	9.6	7.6	1939		0	0	0	0	0	0	0	0	0	0					
	2	8.23	8,04	9,5	6,4	1840		0	0	0	6	0	0	0	0	٥	0					
	3	8,23	8.19	9.0	6.2	1885		0	To Alia	Ď	0	0	0	0	0	υ	X/o					
40%	4	7,90	8.18	10,7	6.1	1850		0	×0	*/2	×/o	2	5	0	3	N						
4	5	7.50	7.95	10,0	6.0	1826		×/2	_	-	<u>`</u>	0	5	0	0	0	-					
	6	7.24	7.57	9.5	7.5	1865		-	-	-	<u> </u>	×/o	0	×/b	×/2	$\frac{\times}{2}$	-					
	7							-	<u> </u>	-	-	-		~	-	-	_					
	8							~	-	-	-	-		_	-)	-					
							Total=	42	×/o	1/2	40	MZ	10	410	*15	X	*/0	Mean N	eonates/Fei	nale =	2.2	
																9/20/	16					

1120116 CJD

CETIS An	alytical Repo	ort					-	ort Date: Code:		16 11:12 (p 1 of 1) 605 01-7872-3416
Ceriodaphni	a Survival and Re	eprod	uction Test							Pacific EcoRisk
Analysis ID: Analyzed:	01-2831-4913 19 Sep-16 11:1	1	•	urvival ngle 2x2 Cor	ntingency Ta	ble		IS Version: cial Results:	CETISv1.8.7 Yes	
Data Transfo		Zeta		Trials	Seed			Test Resu		r J
Untransforme	d		C > T	NA	NA			Passes sur	rvival	
Fisher Exact	Test									
Control	vs C-%			t P-Value	P-Type	Decision				
Lab Water Co	ontrol 25		0.5	0.5000	Exact	Non-Sign	ificant Effec	t		
Data Summa	ry									
C-%	Control Type	NR	R	NR + R	Prop NR	Prop R	%Effect			
0	Lab Water Cont		0	10	1	0	0.0%			
25		9	1	10	0.9	0.1	10.0%			
Graphics										
1.0	9									
0.9			c	0						
.8.0										
0.7										
9.0 Survival										
0.5										
0.4										
0.3										
0.2										
0.1										
0.0										
	0 LW	C-%	25							

Analyst: CSD QA:

CETIS Ar	nalytical Rep	ort					-	ort Date: Code:	193	Sep-16 11:1 69605 01	l2 (p 1 of 1-7872-341
Ceriodaphr	ia Survival and R	eproduc	tion Test							Pacif	ic EcoRis
Analysis ID Analyzed:	: 12-1136-1135 19 Sep-16 11:		•	production	Sample	_		IS Version: cial Results		.8.7	
Data Transf	orm	Zeta	Alt Hyp	Trials	Seed		PMSD	Test Resi	ult		
Untransform	ed	NA	C > T	NA	NA		17.7%	Fails repre	oduction	· · · · · · · · · · · · · · · · · · ·	
Equal Varia	nce t Two-Sample	e Test									
Control	vs C-%		Test Stat	Critical	MSD DF	P-Value	P-Type	Decision	(α:5%)		
Lab Water C	control 25*		8.55	1.73	4.3 18	<0.0001	CDF	Significan	t Effect		
ANOVA Tab	le					· · · · · · · · · · · · · · · · · · ·					
Source	Sum Squ	ares	Mean Squ	lare	DF	F Stat	P-Value	Decision	(a:5%)		
Between	2247.2		2247.2		1	73.1	<0.0001	Significan			
Error	553		30.72222		18						
Total	2800.2				19						
Distribution	al Tests										
Attribute	Test			Test Stat	Critical	P-Value	Decision	(α:1%)			
Variances	Variance	Ratio F		4.95	6.54	0.0259	Equal Var	iances			
Distribution	Shapiro-	Wilk W N	ormality	0.955	0.866	0.4416	Normal D	istribution			
Reproductio	on Summary										
C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Water Cont	tr 10	24.3	19.2	29.4	26	14	32	2.26	29.4%	0.0%
25		10	3.1	0.802	5.4	3	0	9	1.02	104.0%	87.2%
Graphics											
35						8		L		• .• 3	
-		1				6			•		
30 -						-		L L	•/		
-	111111	7				•			••		
25 (1)	7//////				ت	2 -					
Reproduction					Centered	2 0		· ,	·		-
ß				Reject Null	0	-2		•			
						-	•				
15 -	L	-				-4	/				
15						-6	• •	E .			
15											
15						-8		1 1			
10			_			- /	•				
10 5						-10	•				
	0 I W		25		L	- /	-1.5 -1.0	-0.5 0.0	0.5 1.	0 1.5	2.0

Analyst: CJD QA:

С	lient:			Lehigh	Perma	nente			Ma	terial:]			ffluent	;	Test	Date:	9/7/16
Proje	ect #:	262	261		Fest ID:		59605		Ran	domiz	ation:	0.0	.1/10	1.2.1 1.1.1 u	Je Co	ntrol V	Water:	UFRO Permeate- Unfiltered
	Devi	pl	H	D.	0.	Cond.	Temp					ival / R						SIGN-OFF
	Day	New	Old	New	Old	(µS/cm)	(°C)	A	В	С	D	Е	F	G	Н	I	J	
	0	8,40		8.8		1297		S	Ο	0	0	G	0	0	Ο	0	S	Date: 9/7/16 New WQ{JY Test Init 5H Sol'n Prep: 6√ Time: [6-10
	1	7.78	8.40	9.8	7.9	1360		O	0	0	0	0	0	0	0	0	0	Date: 9/6/ New WQ: R. Counts: 6/ Sol'n Prep: 6 Old WQ: W Time: 63
	2		8,25	9.4	7.1	1292		0	0	C	0	0	0	0	O	Ø	D	Date: 9/4/16 New WQ: Jan Counts: & Sol'n Prep: By Old WQ: JL Time: 1/25
	3	8.31	7.97	9.0	·7.0	1258		0	0	0	D	0	0	*/0	0	0	0	Date: 9110/16New WQ: 92 Counts: JO Sol'n Prep: JO Old WQ: DM Time: 1430
ed 25%	4	8.00	8.33	10.4	7.4	1277		Ο	Q	Q	0	0	0	-	0	0	0	Date: 7/11/12New WQ:92 Counts S14 Sol'n Prep: S14 Old WQ: TA Time: 1 215
Unfiltered 25%	5	7.64	8.14	9,5	6.9	1242		J	0	S	Ч	6	2	-	6	0	Ö	Date: 9/17/16New WQ: HR Counts: SH Sol'n Prep: SH Old WQ: HR Time: 1321
	6	7,42		9.5	7.5	1274		0	0	6	0	0	0	-	0	0	4	Date: 913116New WQ: 52 Counts: Jo Sol'n Prep: JO Old WQ: DM Time: 600
	7													-				Date: New WQ: Counts: Sol'n Prep: Old WQ: Time:
	8													-				Date: Old WQ: Counts: Time:
					2		Total=	0	0	9	4	6	2	×/0	6	0	4	Mean Neonates/Female = 3.

Appendix C

Test Data and Summary of Statistics for the Evaluation of the Chronic Toxicity of the Lehigh Permanente Cement Plant Biological Effluent and Permeate Samples to *Ceriodaphnia dubia -* Day 7



CETIS Sun	nmary Repo	rt						port Date st Code:			37 (p 1 of 2) 4-3900-7115
Ceriodaphnia	Survival and Re	produ	tion Test						·····	Pacif	ic EcoRisk
Batch ID: Start Date: Ending Date: Duration:	19-0590-5450 07 Sep-16 16:40 14 Sep-16 15:30 6d 23h	0	Test Type: Protocol: Species: Source:	Reproduction-S EPA-821-R-02- Ceriodaphnia d In-House Cultu	013 (2002) ubia		Dil	ne:	Chris Dudenho UFRO Permeat Not Applicable 1		
	19-2655-6215 06 Sep-16 09:40 06 Sep-16 11:00 31h (7.1 °C)	0 I 0 :	Code: Material: Source: Station:	Effluent Effluent Lehigh Perman 75:25% Perme		al Effluent			Lehigh Perman 26261	ente	
Batch Note:	Stats include Da	ay 7 Filt	ered Sampl	e						· · · ·	
Comparison §	Summary							<u></u>			<u>~~</u>
Analysis ID 09-5523-7171 17-7394-8257 06-4236-4393 14-9642-5071	Survival		NOEL 6.25 0 0 25	LOEL 12.5 >0 >0 40	TOEL 8.839 31.62	20.5% 10.7% NA NA	TU 16 4	Wilco Fishe	od Many-One Ran xon Rank Sum r Exact Test r Exact/Bonferro	Two-Sampl	e Test
Point Estimat	e Summary										
Analysis ID	Endpoint		Level	%	95% LCL	95% UCL	TU	Meth	od		
17-3534-4086	Reproduction		IC5 IC10 IC15 IC20 IC25 IC40 IC50	2.03 4.06 6.09 10 14.6 22 25	1.11 2.22 3.34 4.45 5.56 19.6 22.9	7.71 12.9 15.1 17.7 19.8 24.2 27.4	49.23 24.62 16.41 10 6.843 4.539 4.008		r Interpolation (I		
04-6038-3951	Survival		EC5 EC10 EC15 EC20 EC25 EC40 EC50	22.4 24.1 25.3 26.3 27.2 29.5 31	9.99 12.3 14.2 15.8 17.3 21.4 24	27.3 28.8 29.9 30.9 31.9 34.9 37.5	4.464 4.154 3.957 3.807 3.683 3.388 3.222	Linea	r Regression (M	ILE)	
Reproduction	Summary										
C-% 0 6.25 12.5 18.75 25 40 Survival Sum	Control Type Lab Water Contr Filtration Blank	Count 10 10 10 10 10 10 10	Mean 29.9 27.2 25.3 23 21.3 14.9 2.4	95% LCL 27.8 23.6 19 16.6 18.4 11.8 -0.26	95% UCL 32 30.8 31.6 29.4 24.2 18 5.06	Min 26 14 3 0 14 5 0	Max 35 31 34 32 27 22 12	Std E 0.936 1.58 2.77 2.84 1.27 1.37 1.18		CV% 9.9% 18.4% 34.6% 39.1% 18.9% 29.1% 155.0%	%Effect 0.0% 9.03% 15.4% 23.1% 28.8% 50.2% 92.0%
C-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std E	rr Std Dev	CV%	%Effect
	Lab Water Contr Filtration Blank		1 1 0.9 0.9 1 0.8 0.1	1 1 0.674 0.674 1 0.498 0	1 1 1 1 1 1 1 0.326	1 1 0 0 1 0 0	1 1 1 1 1 1 1	0 0.1 0.1 0.133 0.1	0 0 0.316 0.316 0	0.0% 0.0% 35.1% 35.1% 0.0% 52.7% 316.0%	0.0% 0.0% 10.0% 10.0% 0.0% 20.0% 90.0%

CETIS Summary Report

69605b 04-3900-7115	19 Oct-16 13:37 (p 2 of 2)
	69605b 04-3900-7115

Report Date:

Test Code:

Ceriodap	hnia Survival and Re	productio	on Test							Pacif	fic EcoRisk
Reproduc	ction 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	28	31	26	29	32	32	26	32	28	35
0	Filtration Blank	29	31	31	27	27	27	29	14	31	26
6.25		21	3	26	25	34	33	29	25	27	30
12.5		27	32	27	0	29	17	23	24	26	25
18.75		17	23	21	23	21	14	27	18	23	26
25		13	22	17	16	17	14	16	16	13	5
40		2	0	2	0	2	12	0	5	1	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
0	Filtration Blank	1	1	1	1	1	1	1	1	1	1
6.25		1	0	1	1	1	1	1	1	1	1
12.5		1	1	1	0	1	1	1	1	1	1
18.75		1	1	1	1	1	1	1	1	1	1
25		1	1	0	1	1	1	1	1	1	0
40		0	0	0	0	0	1	0	0	0	0
Survival E	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	Filtration Blank	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
6.25		1/1	0/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
12.5		1/1	1/1	1/1	0/1	1/1	1/1	1/1	1/1	1/1	1/1
18.75		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	0/1	1/1	1/1	1/1	1/1	1/1	1/1	0/1
40		0/1	0/1	0/1	0/1	0/1	1/1	0/1	0/1	0/1	0/1



CETIS Ana	alytical Repo	ort					Report Test Co			16 16:49 (p 1 of 2) 05b 04-3900-7115
Ceriodaphni	a Survival and R	eprod	uction Test							Pacific EcoRisk
Analysis ID: Analyzed:	06-4236-4393 19 Sep-16 15:3	0	Endpoint: S Analysis: S	urvival ingle 2x2 Cor	ntingency Ta	ble		Version: Results:	CETISv1.8.7 Yes	
Data Transfo	rm	Zeta	Alt Hyp	Trials	Seed		1	Fest Resu	lt	
Untransforme	d		C > T	NA	NA		F	Passes sur	vival	
Fisher Exact	Test				-					
Control	vs Control		Test Sta	t P-Value	Р-Туре	Decision				
Lab Water Co	ontrol Filtration E	Blank	1	1.0000	Exact	Non-Signi	ificant Effect			
Data Summa	ry									
C-%	Control Type	NR	R	NR + R	Prop NR	Prop R	%Effect			
0	Lab Water Cont		0	10	1	0	0.0%			
0	Filtration Blank	10	0	10	1	0	0.0%			
Graphics										
1.0	•									
0.9										
0.8										
0.7										
9.0 Kirvival										
0.5										
0.4										
ε.0										
0.2				×						
0.1										
0.0	0 F		01	w	i					
	01	C-%								

Analyst: <u>CJ</u>) QA: M

CETIS An	alytic	al Repo	ort					-	ort Date: Code:			49 (p 1 of 2)4-3900-711
Ceriodaphn	ia Survi	val and Re	eproduc	tion Test							Paci	fic EcoRisk
Analysis ID: Analyzed:		394-8257 ep-16 15:3		•	eproduction onparametric-	Two Sample	e		IS Version: cial Results		1.8.7	
Data Transfe	orm		Zeta	Alt Hyp	Trials	Seed		PMSD	Test Res	ult		
Untransform	ed		NA	C > T	NA	NA		10.7%	Passes re	eproduction		
Wilcoxon Ra	ank Sun	ו Two-San	nple Tes	st	<u>.</u>							
Control	vs	Control		Test Sta	t Critical	Ties DF	P-Value	P-Type	Decision	(a:5%)		
Lab Water C	ontrol	Filtration I	Blank	87.5	NA		0.0962	Exact		ificant Effec	t	
ANOVA Tab	le									<u>.</u>		
Source		Sum Squa	ires	Mean So	uare	DF	F Stat	P-Value	Decision	(a:5%)		
Between		36.45		36.45	1	1	2.15	0.1594		ficant Effec	t	
Error		304.5		16.91667	7	18					-	
Total		340.95				19						
Distribution	al Tests										<u>.</u>	
Attribute		Test			Test Stat	Critical	P-Value	Decision	(a·1%)			
Variances		Variance	Ratio F		2.86	6.54	0.1335	Equal Var	·			
Distribution		Shapiro-W		ormality	0.837	0.866	0.0032	•	al Distributi	on		
Reproductio	n Sumr	narv	<u> </u>									
C-%		ol Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0		/ater Contr		29.9	27.8	32	30	26	35	0.936	9.9%	0.0%
D			10	27.2	23.6	30.8	28	14	31	1.58	18.4%	9.03%
Graphics 30 25 5 10 5		14/11				Cambered	5 4 2 2 	• •		• • • •	•••	•
0		OF		015		L	-14	-1.5 -1.0	-0.5 0.0	0.5 1.	0 1.5	2.0

Analyst:<u>COD</u>QA:<u>M</u>

C	lient:			Lehigh	Perma	nente			Ma	terial:						Test	Date:	9/7/16
Proje		262	261	. 7	fest ID:	(69605		Ran	domiz			-1/1°	0.1.1	Co	ntrol V	Water:	SRW 0.2µm Filt.
		pl	H	D.	0.	Cond.	Temp					ival / R		ction				SIGN-OFF
	Day	New	Old	New	Old	(µS/cm)	(°C)	Α	В	С	D	E	F	G	Н	Ι	J	
	0	7.87		7.5		330		0	0	Ο	0	0	С	C	0	O	0	Date: % 7/16 New WQ: 606 Test Init. 544 Sol'n Prep: 80 Time: 1640
	1	8.10	8.37	8.6	7.8	322		0	6	0	6	0	0	0	0	0	0	Date: 4/4/6 New WQ: RB Counts: BV Sol'n Prep: By Old WQ: WS Time: 1030
	2	8.66	8.(B	9.4	7.7	315		0	O	0	0	0	0	0	0	0	0	Date: 1/1/1/1/12 New WQ: JAC Counts: BV Sol'n Prep: BA Old WQ: JL Time: 1/25
	3	8.78	8.39	9.0	7.0	314		Δ	\cap	0	0	\mathcal{O}	0	0	0	0	0	Date: 9/10/16 New WQ: 92 Counts: 3'0 Sol'n Prep: Jo Old WQ: DM Time: 1430
Contro	4	8,32	8.44		6.8	300		6	6	6	5	6	6	6	Ő	6	S	Date: 9/11/16 New WQ: 92. Counts: SH Sol'n Prep: SH Old WQ: TA Time: 1215
Filtered Control	5	8.04	8.39	9.9	6.9	306		12	il	10	10	((10	11	5	12	12	Date:9/121/New WQ: R Counts: SH Sol'n Prep: SVA Old WQ: R Time: 1320
Ľ.	6	7,80		9,2	7.6	317		0	0	*	12	170	11	12	9	13	9	Date:9/13/16 New WQ:51 Counts: 35 Sol'n Prep: 50 Old WQ: DM Time: 1600
	7	-	8.18		7.0	337		11	14	14	0	0	0	0	Ø	0	0	Datery/M/L New WQ: - Counts: By Solid Hep:-3 - Old WQ: JBL Time: 153D
	8																	Date: Old WQ: Counts: Time:
							Total=	29	31	31	27	76	27	29	14	31	26	Mean Neonates/Female = 27.2

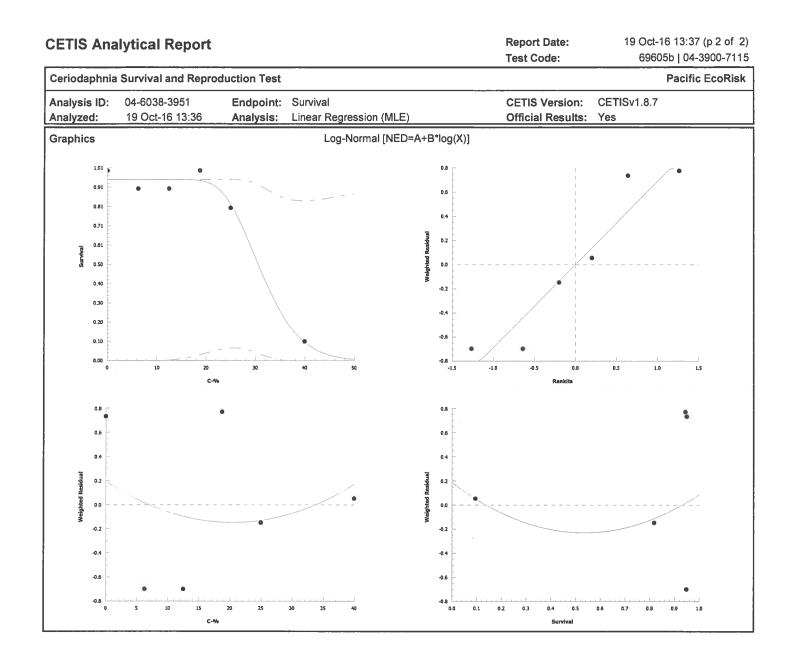
ESPLIT brood

CETIS	Analytical Repo	rt					•	rt Date: Code:	1	9 Oct-16 13:3 69605b 04	37 (p 1 of 1) 4-3900-7115
Ceriodap	hnia Survival and Re	prod	uction Test							Pacif	ic EcoRisk
Analysis Analyzed		6	Endpoint: Sur Analysis: STR		ngency Tabl	es		S Version: al Results:	CETIS Yes	v1.8.7	· · · · · · · · · · · · · · · · · · ·
Data Trai	nsform	Zeta	Alt Hyp	Trials	Seed			NOEL	LOEL	TOEL	TU
Untransfo	rmed		C > T	NA	NA			25	40	31.62	4
Fisher Ex	act/Bonferroni-Holm	Test									
Control	vs C-%		Test Stat	P-Value	P-Type	Decision	(α:5%)				
Lab Wate	r Control 6.25		0.5	1.0000	Exact	Non-Signi	ificant Effect				
	12.5		0.5	1.0000	Exact		ificant Effect				
	18.75		1	1.0000	Exact	-	ificant Effect				
	25		0.237	0.9474	Exact		ificant Effect				
	40		5.95E-05	0.0003	Exact	Significan	it Effect				
Data Sun	nmary										
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		9	1	10	0.9	0.1	10.0%				
18.75		10	0	10	1	0	0.0%				
25		8	2	10	0.8	0.2	20.0%				
40		1	9	10	0.1	0.9	90.0%				
Graphics	· · · · · 										
1.0	•		•								
0.9		•									
0.6			٠								
0.7											
PENINI 0.6											
3											
0.5											
0.4											
0.3											
0.2											
0.1				•							
0.0			1 E	1	1						
	0 LW 6.25	12.5	18.75 25	40							
		C-%									

Analyst: CJD QA: M

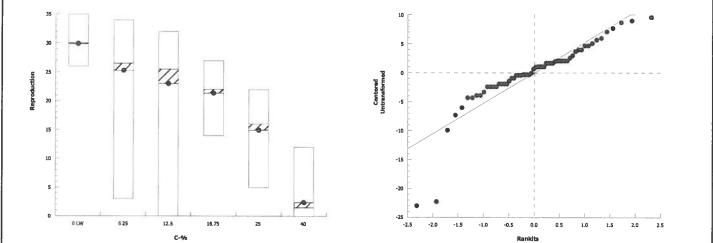
CETIS	S Analyti	ical Repo	ort					-	ort Date: Code:			36 (p 1 of 2)4-3900-711
Cerioda	aphnia Sur	vival and Re	eprodu	iction Test							Pac	ific EcoRisk
Analysi Analyze		-6038-3951 Oct-16 13:3	6	Endpoint: Analysis:	Survival Linear Regre	ssion (MLE)			S Version:	CETISv1 Yes	.8.7	
Linear	Regressio	n Options							·		-	**************************************
Model	Function			Thre	shold Option	Threshold	Optimized	Pooled	Het Corr	Weighted	1	
		A+B*log(X)]			rol Threshold	1E-07	Yes	Yes	No	Yes		
Regres	sion Sum	nary					* • • • • • • •		· ····	·. ··.	······.	
Iters	LL	AICc	BIC	Mu	Sigma	Adj R2	F Stat	Critical	P-Value	Decision	(α:5%)	
24	-16.3	50.5	37.9	1.49	0.0861	0.897				Lack of F		ed
Point E	stimates											<u></u>
Level	%	95% LCL	95%	UCL TU	95% LC	L 95% UCL						
EC5	22.4	9.99	27.3	4.46	4 3.667	10.01						
EC10	24 .1	12.3	28.8	4.15	4 3.476	8.109						
EC15	25.3	14.2	29.9	3.95	7 3.343	7.054						
EC20	26.3	15.8	30.9	3.80	7 3.235	6.328						
EC25	27.2	17.3	31.9	3.68	3 3.137	5.779						
EC40	29.5	21.4	34.9	3.38	8 2.862	4.664						
EC50	31	24	37.5	3.22	2 2.667	4.163						
Regres	sion Paran	neters	· ·									
Parame	eter	Estimate	Std E	Error 95%	LCL 95% UC	L t Stat	P-Value	Decision(α:5%)			
Thresho	old	0.0512	0.036	62 -0.01	97 0.122	1.41	0.2520		ficant Param	neter		
Slope		11.6	4	3.78	19.5	2.91	0.0622	-	ficant Param			
Intercep	ot	-17.3	6.02	-29 .1	-5.52	-2.88	0.0637	-	ficant Param			
ANOVA	Table											
Source	•	Sum Squa	ares	Mean Squ	are DF	F Stat	P-Value	Decision(α:5%)			
Model		32.5217		32.5217	1	45.5	0.0066	Significan	t			
Residua	al	2.142786		0.714262	3							
Residu	al Analysis											
Attribut	te	Method			Test Sta	t Critical	P-Value	Decision(a:5%)			
Goodne	ess-of-Fit	Pearson C	hi-Sq (GOF	2.14	7.81	0.5433		ficant Hetero	genity		
		Likelihood			3.01	7.81	0.3895	-	ficant Hetero			
Distribu	tion	Shapiro-W	/ilk W I	Vormality	0.873	0.513	0.2396	Normal Di		0		
Surviva	al Summary	/				Calcu	lated Variat	e(A/B)	· · · · · · · · · · · · · · · · · · ·			, · · ···, <u>-</u>
C-%	Cont	rol Type	Cour	nt Mea	n Min	Max	Std Err	Std Dev	CV%	%Effect	A	в
0		Vater Contr	10	1	1	1	0	0	0.0%	0.0%	10	10
6.25			10	0.9	0	1	0.1	0.316	35.1%	10.0%	9	10
12.5			10	0.9	0	1	0.1	0.316	35.1%	10.0%	9	10
18.75			10	1	1	1	0	0	0.0%	0.0%	10	10
25			10	0.8	0	1	0.133	0.422	52.7%	20.0%	8	10
40			10	0.1	0	1	0.1	0.316	316.0%	90.0%	1	10
				0.1		•	V.1	5.010	010.070		'	

Analyst: <u>LJD</u> QA: <u>M</u>



Analyst: CJD QA: M

		al Repo								ort Date: Code:			36 (p 1 of 1 1-3900-711
Ceriodaphnia	a Surv	ival and Re	produc	tion Test								Pacif	ic EcoRisl
Analysis ID: Analyzed:		523-7171 Dct-16 13:36		• •	production	Control	l vs T	reatments		S Version:		.8.7	
Data Transfo	rm		Zeta	Alt Hyp	Trials	Seed			PMSD	NOEL	LOEL	TOEL	TU
Untransforme	d		NA	C > T	NA	NA			20.5%	6.25	12.5	8.839	16
Steel Many-C	ne Ra	nk Sum Te	st										
Control	vs	C-%		Test Stat	Critical	Ties	DF	P-Value	P-Type	Decision	(α:5%)		
Lab Water Co	ntrol	6.25		85.5	75	2	18	0.2204	Asymp	Non-Sign	ificant Effect		
		12.5*		72	75	3		0.0261	Asymp	Significar	t Effect		
		18.75*		58	75	1	18	0.0009	Asymp	Significar	t Effect		
		25*		55	75	0		0.0004	Asymp	Significar			
		40*		55	75	0	18	0.0004	Asymp	Significar	t Effect		
ANOVA Table	•												
Source		Sum Squa	res	Mean Squ	lare	DF		F Stat	P-Value	Decision	(α:5%)		
Between		4708.533		941.7067		5		26.3	< 0.0001	Significan	t Effect		
Error		1936.4		35.85926		54							
Total		6644.933				59				-			
Distributiona	l Test	6											
Attribute		Test			Test Stat	Critic	al	P-Value	Decision(a:1%)			
Variances		Bartlett Ed	quality o	f Variance	19.2	15.1		0.0017	Unequal V	/ariances			
Distribution		Shapiro-V	Vilk W N	lormality	0.83	0.946		<0.0001	Non-norm	al Distributi	on		
Reproduction	n Sum	mary							<u> </u>				
C-%	Cont	rol Type	Count	Mean	95% LCL	95% l	JCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab \	Vater Contr	10	29.9	27.8	32		30	26	35	0.936	9.9%	0.0%
6.25			10	25.3	19	31.6		26.5	3	34	2.77	34.6%	15.4%
12.5			10	23	16.6	29.4		25.5	0	32	2.84	39.1%	23.1%
18.75			10	21.3	18.4	24.2		22	14	27	1.27	18.9%	28.8%
25			10	14.9	11.8	18		16	5	22	1.37	29.1%	50.2%
40			10	2.4	-0.26	5.06		1.5	0	12	1.18	155.0%	92.0%
Graphics													
35								10		I.			•
								5		1			



									Test	Code:	0900	5b 04-3900-711
		Survival and Re	productio	n Test								Pacific EcoRis
Analys		17-3534-4086		point:	Reproduction					S Version:	CETISv1.8.7	
Analyz	ed:	19 Oct-16 13:36	6 Ana	lysis:	Linear Interpola	tion (ICPIN)			Offici	al Results:	Yes	
Linear	Interpo	lation Options										
X Tran	sform	Y Transform	See	d	Resamples	Exp 95%	CL	Method				
Linear		Linear	949	693	200	Yes		Two-Point I	nterpo	lation		
Point E	Estimate	s										
Level	%	95% LCL	95% UCL	τu	95% LCL	95% UCL						
IC5	2.03	1.11	7.71	49.23	12.96	89.93						
IC10	4.06	2.22	12.9	24.62	7.73	44.97						
IC15	6.09	3.34	15.1	16.41	6.63	29.98						
IC20	10	4.45	17.7	10	5.645	22.48						
IC25	14.6	5.56	19.8	6.843	5.063	17.99						
IC40	22	19.6	24.2	4.539	4.14	5.106						
IC50	25	22.9	27.4	4.008	3.651	4.373						
Reproc	duction	Summary				Cal	culate	d Variate				
C-%		ontrol Type	Count	Mean		Max	Std E		Dev	CV%	%Effect	
0	La	ab Water Contr	10	29.9	26	35	0.936				0.0%	
6.25			10	25.3	3	34	2.77			34.6%	15.4%	
12.5			10	23	0	32	2.84	8.99			23.1%	
18.75			10	21.3	14	27	1.27	4.03			28.8%	
25			10	14.9	5	22	1.37	4.33		29.1%	50.2%	
40			10	2.4	0	12	1.18	3.72		155.0%	92.0%	
Graphi	cs								owe office			
Reproduction			•	•	•							



				Sh	ort-Tern	1 Chroni	с э-ы	.000 (serio	upnn	u uu	nu St	TT ATA		c.pr o			
C	lient		I	ehigh Perr	nanente			M	aterial:		Lab W	ater Co	ontrol			Test	Date:	9/1/10
	ject #:		261		Test ID:	6960	5	R	andomi	zation:	10	 +/	10.1.	+ 10.0	··1/10	ontrol	Water:	SRW
PIO		1		D.			Temp				Sur	vival / Re	eproduct	ion				SIGN-OFF
	Day	· · ·	H Old	D. New	O. Old	Cond. (µS/cm)	(°C)	A	В	С	D	Е	F	G	н	Ι	J	
	0	New				319	24.9	0	0	0	0	0	0	0	0	0	0	Date: 9/7/6 New WQ: CUC Test Init: 51 Sol'n Prep: 6/ Time: 1640
	$\left \right _{1}$	7,46	8.00	8.0	6,7		25.1	0	0	0	0	0	0	0	0	0	0	Date: 9/8// New WQ: AB Sol'n Prep: 2/ Old WQ: WD Time: 1030
	2	7.85	7,45	8.5	7.8	314	25.7	υ	0	0	0	0	0	0	0	\odot	0	Date: 9/9/16 New WQ: JAh Counts: 10 Sol'n Prep: 3 Old WQ: JL Time: 11.25
o	3	7.97	7.23	8.5	6.9	312	25.5	0	D	0	0	0	0	0	0	0	0	Date 10/16 New WQ: 92 Counts: JO Sol'n Prep: JO Old WQ: DM Time: 1430
Control	4	7.44	7.80	8.4		311	25.7	5	6	6	6	7	4	5	6	5	6	Date: 9/11/16 New WQ.92 Counts: SH Sol'n Prep: 314 Old WQ: The Time: [2]3
Water	5	:7.72	7.67	7.9	6.5	307	25.5	i(12	i1	9	10	12	10	11-	9	12	Date: 9/12/16 New WQ: AR Counts: SH Sol'n Prep: SIA Old WQ: AR Time: 1320
Lab	6	7,85	7.87	3.4	7.7	320	25.6	0	0	9	14	15	13	11	15	0	0	Date:/1/3/16 New WQ: 5 Counts: Jo Sol'n Prep: Jo Old WQ: DM Time: 1600 Date:: Diff New WO: - Counts: By
	7		8.10	1	6.2	364	25.8	12	13	0	0	C	0	0	0	14	17	Sol'n Prep: - Old WQ: JBL Time: 1530
	8																	Time:
							Total=	28	31	26	29	32	32	26	32	28	35	Mean Neonates/Female = 29.9

				Short-	Term Cl	hronic 3-	Brood	l Ceri	odaph	nia d	ubia	Survi	val &	Rep	roduc	tion 7	fest I	Data
C	lient		Т	ehigh Perr	nanente			Ma	terial:	Biolo	gical E	fluent	0.2µm	Filt.			Date:	9/7/16
	ject #		 261		Test ID:	6960	5	Ra	ndomiz	يت _ zation	10-	i <u>.1 /1</u>	0.1.	10.0	∝.I/10	.2.1 D	iluent:	UFRO Permeate 0.2µm Filt.
	Day		н	D.	D.	Cond.	Temp				Surv	vival / Re	producti	on				SIGN-OFF
	Day	New	Old	New	Old	(µS/cm)	(°C)	А	В	С	D	Е	F	G	н	I]	Date: 9/7/16New WQ: WC Test Init. 54
	0	7.91		9.1		393	24.9	0	C	0	0	0	0	0	0	0	0	Sol'n Prep: By/ Time: 1440 Date: 9/8/16/New WQ: & Counts: By
	1	7.8	7.91	9.0	6.7	401	25.1	0	0	0	0	0	0	0	0	0	Ø	Sol'n Prep: 13V Old WQ: MV Time: 10'30 Date 9/9/11 New WQ: JAN Counts: BV
	2		7,35	9.5	7.4	391	25.7	D	0	0	0	Ò	0	O	0	0	0	Sol'n Prep: BJ Old WQ: DV Time: 1125
	3	+	7.18	9.0	7.0	39.4	25.5	0	0	0	0	0	0	0	0	0	0	Sol'n Prep: Jo Old WQ: DM Time: 430
%	4	-	17.67	9.5	6.1	250 SM	25.7	6	*/3	6	5	6	6	6	6	6	5	Sol'n Prep: SH Old WQ: TH Time: 1215
6.25%	5		7.57	9.D	7.2	401 all 3755	255	12		10	٩	12	12	01	9_	11	11	Sol'n Prep: S + Old WQ: #R Time: 1320
	6		7.73	9,2	7.6	395	25.10	3		11 Jacina	. 11	16	0	13	10	10	0	Sol'n Prep: JO Old WQ: DM Time: 1600
	7		7.89		7.0	416	25.6	0	-	0	0	0	15	0	0	0	14	Dater 1/4/16 New WQ: - Counts: BV Sol'n Prep: - Old WQ: JBL Time: 1530
	8								-									Date: Old WQ: Counts: Time:
							Total=	21	2/3	26	25	34	33	29	25	27	30	Mean Neonates/Female = 25.3
	Da	.v	pH	D	.0.	Cond.		<u> </u>		······	Surviva	I / Repro						Sample ID
		New	Old	New	Old	(μS/cm)		A	В	С	D	E	F	G	н	1	J	EFF / PERMEATE
	C	T.87		8.9		714		C	0	0	0	0	0	0	0	0	C	44017/44018
		7.65	7,83	9.4	7.7	725		0_	0	0	0	0	0	0	0	0	0	44017/44018
	2	2 7.90	.7.32	9.6	7,4	1999		0	0	0	1/6	0	0	0	0	Ö	0	44017 44018
		3 7.77	7.16	9.2	6.9	725		0	0	C	-	0	0	0	0	0	0	44017/44018
%			7.54	10.3	6.3	706		6	6	5	-	6	5	5	3	5	4	44017/44018
12.5%				9.8	7.3	970 m		8	10	8	-	13	12	10	9	10	10	44017/44018
		6 7 39	7.55	9.3	6.6	715		0	0	0	-	10	0	8	0		0	44017/44018
		7	7.00	-	6.5	850		13	16	14	-	0	×/。	0	12	0	11	
	+	8																
c							Total	27	32	- 27	XIO	29	רו	23	24	26	25	Mean Neonates/Female = 23.0

С	lient:		1	ehigh Peri	nanente			М	aterial:	Biolo	gical E	ffluent	0.2µm	Filt.		Tes	t Date:	9/1/16
Proj	ect #:	262	261		Test ID:	6960	5	-				-				D	Diluent:	UFRO Permeate 0.2µm Filt.
	Day	p	Н	D.		Cond.	Temp						eproduct					SIGN-OFF
		New	Old	New	DId	(µS/cm)	(*C)	A	В	С	D	E	F	G	Н		1	
	0	8.08		8.6		1005		0	0	0	0	G	0	0	0	0	0	
	1	7.64	788	9.7	7.4	1044		0	0	0	0	0	0	0	0	0	0	
	2	8,13	7.62	9,7	7.3	1045		0	0	0	0_	0	0	Ø	0	0	0	
	3	7.96	7.35	9.2	7.0	1007		0	0	0	0	0	0	0	0	0	0	
18.75%	4	7.72	7163	10.8	6.0	1010		5	6	4	5	5	5	5	2	6	S	
18	5	7.53	7.60	9.6	7.0	5H 9/12 991		6	7	٩	8	9	٩	10	6	7	8	
	6	7.32	7.52	9,9	7.3	1007		6	0	8	0	7	0	0	10	10	0	
	7	_	7.59	-	6.5	1058		0	10	0	10_	O	×10	12	0	0	B	
	8												~					
							Total=	17	23	21	23	21	14	27	18	23	26	Mean Neonates/Female = 21.3
	Day	$\begin{array}{c c c c c c c c c c c c c c c c c c c $													J			
	0	New 8,22	Old		Old	1328		C A	0	0	0	0	0	0	C)	C.	0	
				8.6	7/1	(314								Č			~	
	1		8.04	9.6	7.4			0	0	0	0	0	0	0	0	0	0	
	2	8.15	7.75	9.4	6,4	1301		0	0	0	0	0	0	C	0	0	Ò	
	3	8.08	7.47	9,1	6.8	1295		0	0	0	0	0	0_	0	D	0	0	
25%	4	7,79	8.02	10.5	6:3	1255		4	5	5	4	5	6	4	4	3	×⁄s	
	5	7.50	7.77	9.9	65	1304		0	6	8	5	، ک	7	5	0	0	-	
	6	7.30	7.51	9,4	7.5	1279		3	0	0	0	0	1	0	4	10	~	
	7		7.64		6.3	1387		6	n	×/y	7	5	Ø	1	6	4	-	
	8									-							-	
L.							Total=	13	22	10	16	17	14	16	16	17	×/5	Mean Neonates/Female = 15.3 14.9 9/29/6 CSD
										17	/55				8/20	11613	\$	410-110 (1)

С	lient:		1	Lehigh Peri	manente			М	aterial:	Bio	logical I	Effluent	0.2µm I	Filt.	_	Tes	t Date:	9/7/16
Proje	-	262	261		Test ID:	6960	5									E)iluent:	: UFRO Permeate 0.2µm Filt.
	Day	p	н	D	.0.	Cond.	Temp				Sur	vival / R	eproduc	tion				
		New	Old	New	Old	(µS/cm)	(°C)	A	В	С	D	Е	F	G	н	I	J	
	0	8.18		ר.8		1908		0	0	0	0	0	0	0	0	0	0	
	1	7.66	8.17	9.6	7.6	1939		0	0	0	0	0	0	0	0	0	0	
	2	8.23	8,04	9,5	6.4	1840		0	0 50 माए।	0	в	Ô	0	0	0	٥	0	
	3	8.23	8.19	9.0	6.2	1885		0	*/0	Ō	0	0	0	0	O	υ	X/6	
40%	4	7,90	8:18	10.7	6.1	1850		0	70	*/2	×/o	2	5	0	3	۸	-	
4	5	7.50	7.95	10,0	6.0	1826		1/2	-	-	<u> </u>	0	5	0	0	0	-	
	6	7.24	7.57	9.5	7.5	1865			- (-	<u> </u>	×/_	0	46	×/2	Xo	-	
	7		7.64	-	6.3	1935		_		~	-	-	×/2	~	-	~	-	<i>ا</i> ر
	8							~	-	-	-	-	~	-	-			By 9/1/6 Dog 2.8
							Total=	42	×/o	F/2	7/0	N2	12_	40	*15		*/0	Mean Neonates/Fernale - 0-23 7.8
<u> </u>																Ning	uch to	

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

CETIS Ana	alytical Repo	ort					Repo Test (rt Date: Code:		16 15:24 (p 1 of 1) 5b 04-3900-7115
Ceriodaphnia	a Survival and Re	produ	uction Test							Pacific EcoRisk
Analysis ID: Analyzed:	06-8102-0427 19 Sep-16 15:2	3	•	rvival gle 2x2 Con	tingency Ta	ble		8 Version: al Results:	CETISv1.8.7 Yes	
Data Transfo	rm	Zeta	Alt Hyp	Trials	Seed			Test Resu	t	
Untransforme	d		C > T	NA	NA			Passes sur	vival	
Fisher Exact Control	Test vs C-%		Teet Stat	P-Value	Р-Туре	Decision(a:5%)			
Lab Water Co			0.5	0.5000	Exact		ficant Effect			
Data Summa	rv									
C-%	Control Type	NR	R	NR + R	Prop NR	Prop R	%Effect			
0	Lab Water Cont		0	10	1	0	0.0%			
25		9	1	10	0.9	0.1	10.0%		·······	
Graphics			6							
0.0	0 LW	C-%	25							

Analyst: CJD QA:

19	Sep-16	15:24	(p	1	of	1)
	69605b	04-3	390)0	-71	15

Report Date:

	alytical Re	port					•	Code:			4-3900-711
Ceriodaphnia	a Survival and	Reproduct	tion Test								fic EcoRisk
Analysis ID: Analyzed:	21-1333-962 19 Sep-16 1		ndpoint: Rep nalysis: Par	production ametric-Two	Sample	· · · · · ·		IS Version: cial Results:	CETI S v1 Yes	1.8.7	
Data Transfo		Zeta	Alt Hyp	Trials	Seed		PMSD	Test Resu	lt		
Untransforme	d	NA	C > T	NA	NA		9.69%	Fails repro	duction		
Equal Varian	ce t Two-Sam	ple Test								· · -·	
Control	vs C-%		Test Stat	Critical	MSD DF	P-Value	P-Type	Decision(α:5%)		
Lab Water Co	ntrol 25*		13.9	1.73	2.9 18	<0.0001	CDF	Significant	Effect		
ANOVA Table)				<u> </u>						
Source	Sum So	quares	Mean Squ	lare	DF	F Stat	P-Value	Decision(a:5%)		
Between	2714.45	5	2714.45		1	194	<0.0001	Significant	Effect		
Error	251.3	-	13.96111		18						
Total	2965.75) 			19						
Distributiona	l Tests										
Attribute	Test			Test Stat	Critical	P-Value	Decision	(α:1%)			
Variances		ce Ratio F		2.19	6.54	0.2598	Equal Var	riances			
Distribution	Shapir	o-Wilk W N	ormality	0.976	0.866	0.8723	Normal D	istribution			
Reproductior	n Summary										
C-%	Control Type		Mean	95% LCL		Median	Min	Max	Std Err	CV%	%Effect
D	Lab Water Co		29.9	27.8	32	30	26	35	0.936	9.9%	0.0%
25		10	6.6	3.47	9.73	6.5	0	15	1.38	66.3%	77.9%
Graphics		-									
35						10 -					
								1			•
30		_				8.		l t			
				Reject Null	_	6		l. F			
25 - 10 10					۲	4 -		8	,	_	
ucition Report 20					Center	4		• 		•	
č						5 -					
15						0 [
						-2	-				
10 -						-					
5						-	•				
						-6					
o										l	
	0 L W	C-%	25			-2.0	-1.5 -1.0	-0.5 0.0 Rankits	0.5 1.	0 1.5	2.0

Analyst: CJD QA:

C	lient:			Lehigh	Perma	nente			Mat	terial:	H			fluent		Test	Date:	9/7/15
	ect #:				est ID:		59605		Ran	domiz	ation:	10.2	.1/10	.2.1 .1.1 u	c Co	ntrol V	Vater:	UFRO Permeate- Unfiltered
		pl		D.	0.	Cond.	Temp						eproduc					SIGN-OFF
	Day	New	Old	New	Old	(µS/cm)	(°C)	Α	В	С	D	Е	F	G	Н	I	J	active work? Test Init all
		8,40		8.8		1297		C	0	0	0	S	0	0	0	0	S	Date: 9/7/16 New WQ1X Test Init 5H Sol'n Prep: 6V Time: 640
	$\left \right _{1}$		8.40	9,8	7.9	1360		U	0	0	0	0	0	O	0	0	0	Date: 9/5/ New WQ: RE Counts: EV Sol'n Prep: 4 Old WQ: WV Time: 1030
	<u> </u>	1.78		9.4		1292							0	0	Ö	σ		Date: 9/9/16 New WQ: Jan Counts: & Soi'n Prep: By Old WQ: TL Time://25
	2	8.35	8,25	(. ¢	7.1	1210		0	0	0_	Ò	0	0			0	0	Date: 9/10/16/New WQ: 92 Counts: JO
	3	8.31	7.97	9.0	·7.0	1258		0	0	0	D	0	0	1/0	0	0	0	Sof'n Prep: JO Old WQ: DM Time: 1430
Unfiltered 25%			G.33		7.1	1277		0	G	0	0	0	0	-	0	0	0	Date: "Athenew WQ:92 Counts: S14 Sol'n Prep: S14 Old WQ: TA Time: 1215
ered	<u> </u>	8.00	5.72	10.4	7.4	1041												Date: 9/17/16 New WQ: DR Counts: SH
Jnfilt	5	7.64	8.14	9,5	6.9	1242		S	0	S	4	6	2		6	0	0	Sol'n Prep: 54 Old WQ: 1 Time: 132
	6	7,42	7.57	9.5	7.5	1274		0	0	6	0	0	0	-	0	0	4	Date: 9/13/16New WQ: 5L Counts: Jo Sol'n Prep: JO Old WQ: DM Time: (6:00
		1.1~						-7	4	40			8			2	0	Date: 9/14/LNew WQ: - Counts gy Soi'n Prep: - Old WQ: Time: 103*
	7		7.59		64	1352		1 pap	and stape	14 mil	11	0	\vdash		6. Y. 14	Chi+	-0	Date: Old WQ: Counts:
	8													-		1		Time:
							Total=	7	4	9	15	6	10	*/0	9	Э	4	Mean Neonates/Female = 0-0-0-0-0-0-0-0-0-0-0-0-0-0-0-0-0-0-0

Appendix D

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



CETIS Summary Report

Report Date:23 SepTest Code:61

23 Sep-16 15:43 (p 1 of 2) 69779 | 15-9643-7614

				-				Test Code:	:	69779 1	5-9643-761
Ceriodaphnia	Survival and R	eprodu	ction Test							Paci	fic EcoRis
Batch ID:	15-1982-3998		Test Type:	Reproduction-	Survival (7d)		-	Analyst:	Robert Gee		
Start Date:	13 Sep-16 10:2	20	Protocol:	EPA-821-R-02	-013 (2002)			Diluent:	Laboratory Wa	ater	
Ending Date:	19 Sep-16 14:3	30	Species:	Ceriodaphnia d	dubia			Brine:	Not Applicable	•	
Duration:	6d 4h		Source:	In-House Cultu	Ire			Age:	1		
Sample ID:	20-9824-9753		Code:	NaCl				Client:	Reference To:	kicant	
Sample Date:	13 Sep-16 10:2	20	Material:	Sodium chlorid	le			Project:	26323		
Receive Date:	13 Sep-16 10:2	20	Source:	Reference Tox	icant						
Sample Age:	NA (25.6 °C)		Station:	In House							
Comparison S	Summary										
Analysis ID	Endpoint		NOEL	LOEL	TOEL	PMSD	τŲ	Meth	od		
00-2773-1212	Reproduction		<500	500	NA	18.2%		Dunr	nett Multiple Cor	mparison Te	st
07-0182-4671	Survival		1000	1500	1225	NA			er Exact/Bonfer	•	
Point Estimate	e Summary										
Analysis ID	Endpoint		Level	mg/L	95% LCL	95% UCL	TU	Meth	od		
16-7658-0121	Reproduction		IC5	136	78.7	513		Linea	ar Interpolation	(ICPIN)	
			IC10	272	157	560					
			IC15	409	236	612					
			IC20	522	315 -	667					
			IC25	590	393	730					
			IC40	795	662	987					
			IC50	931	765	1090					
12-2668-1557	Survival		EC5	568	247	790		Linea	ar Regression (N	/LE)	
			EC10	670	334	892					
			EC15	749	408	970					
			EC20	818	478	1040					
			EC25	882	547	1110					
			EC40	1070	756	1310					
			EC50	1200	904	1470					
Reproduction :	•										
	Control Type Lab Water Contr	Count 10	25.6	95% LCL 23	95% UCL 28.2	Min 17	Max 30			CV%	%Effect
, 500		10	20.9	17.1	20.2 24.7	17	30 27	1.17 1.67	3.69	14.4%	0.0%
000		10	11.5	6.99	24.7 16	0	27	1.67	5.28	25.3%	18.4%
500		10	2.2	0.359	4.04	0	20 9	2 0.814	6.31	54.9%	55.1%
2000		10	0.8	-0.256	1.86	0	9 4	0.814		117.0% 184.0%	91.4%
2500		10	0	0	0	0	0	0.467	1.40 0	104.070	96.9% 100.0%
Survival Summ	nary										
	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std E	rr Std Dev	CV%	%Effect
	ab Water Contr	10	1	1	1	1	1	0	0	0.0%	0.0%
00		10	1	1	1	1	1	0	0	0.0%	0.0%
000		10	0.6	0.231	0.969	0	1	0.163		86.1%	40.0%
500		10	0.2	= 0	0.502	0	1	0.133		211.0%	80.0%
000		10	0.3	0	0.646	0	1	0.153		161.0%	70.0%
500		10	0	0	0	0	0	0	0	-	100.0%

Analyst: Nb QA: M

CETIS Summary Report

1500

2000

2500

0/1

0/1

0/1

0/1

0/1

0/1

0/1

0/1

0/1

0/1

1/1

0/1

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	17	26	30	27	26	28	22	27	28	25
500		11	24	23	25	27	23	21	22	21	12
1000		5	6	0	19	13	16	20	13	11	12
1500		1	2	2	2	0	1	2	9	0	3
2000		0	0	0	1	0	0	3	4	0	0
2500		0	0	0	0	0	0	0	0	0	0
Survival De	etail										
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		0	1	0	1	1	0	1	1	0	1
1500		0	0	0	0	1	0	1	0	0	0
2000		0	0	0	1	0	0	1	1	0	0
2500		0	0	0	0	0	0	0	0	0	0
Survival Bi	inomials					_					
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		0/1	1/1	0/1	1/1	1/1	0/1	1/1	1/1	0/1	1/1

1/1

0/1

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0/1

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0/1

0/1

							100		
Ceriodaph	nia Survival and R	eproducti	on Test						
Reproduct	ion Detail								
C-mg/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	
0	Lab Water Cont	r 17	26	30	27	26	28	22	
500		11	24	23	25	27	23	21	:
1000		5	6	0	19	13	16	20	
1500		1	2	2	2	0	1	2	(
2000		0	0	0	1	0	0	3	

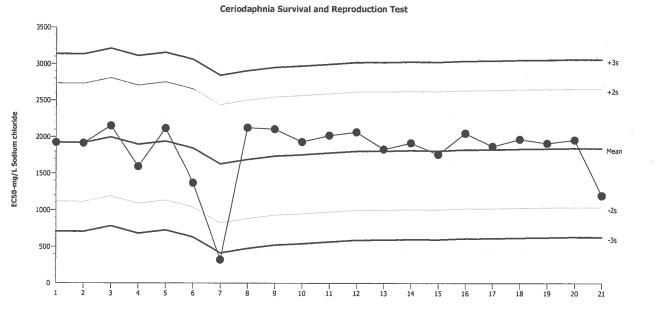
23 Sep-16 15:43 (p 2 of 2) 69779 | 15-9643-7614

Pacific EcoRisk

Analyst: Rb QA: M

Report Date: Test Code:

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



			ean: gma:	1845 404.6		ount: V:	20 21.90%	-2s Warn +2s Warn	-		-3s Action Limit: +3s Action Limit:	
Quali	ty Con	trol Dat	а									
Point	Year	Month	Day	Time	QC Data	Delta	Sigma	Warning	Action	Test ID	Analysis ID	
1	2016	May	3	13:20	1923	78.39	0.1938			07-0818-2319	14-2354-2617	
2			4	15:25	1914	69.28	0.1712			11-6927-8142	03-3221-2827	
3			5	14:50	2153	307.6	0.7601			07-9136-0638	09-1917-4017	
4			10	14:15	1594	-251.2	-0.6209			04-1900-2071	02-7180-6176	
5			17	16:30	2117	272	0.6722			02-0217-2091	01-8095-6167	
6			24	14:40	1369	-476	-1.176			12-4725-4616	17-8748-4211	
7		Jun	14	12:15	321.4	-1524	-3.766	(-)	(-)	06-1840-5245	14-8979-7423	
8			23	10:40	2125	279.7	0.6913			16-6250-9087	17-5652-1508	
9			23	13:25	2105	260.4	0.6437			07-7424-9431	12-9537-7598	
10			28	13:00	1933	88	0.2175			09-5722-1456	07-9253-0885	
11		Jul	6	13:00	2019	173.9	0.4298			09-9739-4449	17-8269-3326	
12			7	10:20	2064	219.2	0.5419			07-3590-7818	09-8307-4510	
13			12	13:45	1831	-14.35	-0.03547			19-4280-6480	04-6439-4868	
14		Aug	9	14:15	1918	73.36	0.1813			01-7078-3993	16-1640-2231	
15			11	15:25	1759	-85.74	-0.2119			05-4282-8788	09-4783-9953	
16			18	13:30	2050	204.9	0.5064			09-3523-7380	14-1088-4073	
17			23	14:15	1870	24.98	0.06175			20-3175-3833	16-0364-9515	
18			25	14:35	1968	123	0.304			08-0124-0684	18-2643-7985	

02-5260-5089

18-2267-1225

15-9643-7614

09-5069-0405

05-8688-6279

12-2668-1557

RG DA: M Analyst:

19

20

21

30

8

13

Sep

16:05

13:40

10:20

1913

1957

1198

67.72

112.4

-647

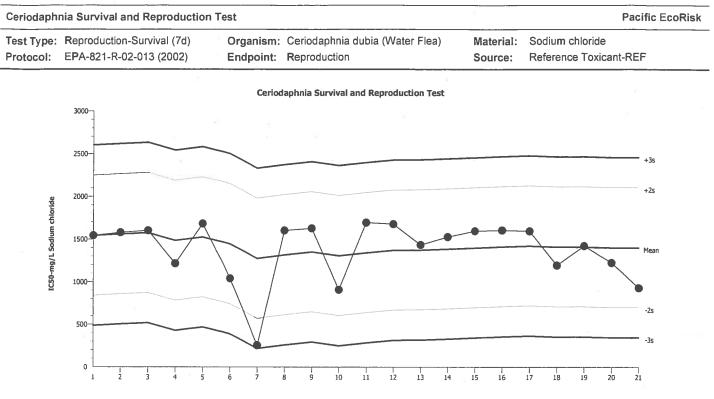
0.1674

0.2779

-1.599

CETIS QC Plot

CETIS QC Plot



Mean:	1403	Count:	20	-2s Warning Limit:	697.5	-3s Action Limit:	345
Sigma:	352.5	CV:	25.10%	+2s Warning Limit:	2108	+3s Action Limit:	2460

Quality Control Data

Point	Year	Month	Day	Time	QC Data	Delta	Sigma	Warning	Action	Test ID	Analysis ID
l	2016	May	3	13:20	1543	140.4	0.3984			07-0818-2319	01-7834-3632
2			4	15:25	1580	177.4	0.5031			11-6927-8142	19-5002-1552
3 🖂			5	14:50	1602	198.7	0.5638			07-9136-0638	05-4230-9164
ļ.			10	14:15	1216	-187	-0.5304			04-1900-2071	20-3182-9235
5			17	16:30	1684	281.4	0.7984			02-0217-2091	07-3645-9270
5			24	14:40	1042	-361.3	-1.025			12-4725-4616	17-2108-7232
,		Jun	14	12:15	255	-1148	-3.257	(-)	(-)	06-1840-5245	10-0782-9 7 12
3			23	10:40	1603	200.2	0.568			16-6250-9087	07-8286-1737
)			23	13:25	1628	225.2	0.6389			07-7424-9431	14-5397-9899
0			28	13:00	908.1	-494.9	-1.404			09-5722-1456	07-0717-9325
1		Jul	6	13:00	1696	293.1	0.8315			09-9739-4449	05-4282-8277
2			7	10:20	1679	276	0.7831			07-3590-7818	02-2720-1850
3			12	13:45	1435	32.03	0.09087			19-4280-6480	01-6291-6561
4		Aug	9 ·	14:15	1528	125.3	0.3555			01-7078-3993	16-5522-9106
5			11	15:25	1598	194.5	0.5519			05-4282-8788	20-6991-7970
6			18	13:30	1607	204.3	0.5795			09-3523-7380	12-7959-5180
7			23	14:15	1598	194.9	0.5528			20-3175-3833	12-9031-4120
8			25	14:35	1196	-207.1	-0.5875			08-0124-0684	03-1672-5825
9			30	16:05	1425	22	0.06241			02-5260-5089	20-2491-5546
0		Sep	8	13:40	1226	-177.1	-0.5023			18-2267-1225	12-1761-7946
1			13	10:20	930.9	-472.1	-1.339			15-9643-7614	16-7658-0121

R6 M Analyst: QA:_

C	lient:	Reference Toxicant et #: 26323 Test ID: 69779						Material: Sodium Chloride 79 Randomization: 10.7.5						loride	•				
Proj	ect #:	263	323		Fest ID:		69779		Rai	ndomiz	ation:	10).7.	5		Ce	ntrol \	Nater:	SRW
	Day	p	Н	D.	0.	onductivi	ty (µS/cr					Surv		eproduc					SIGN-OFF
	0	New	Old	New	Old	New 335	Old	(C)	A	В	C O	D	E	F	G	H		J	Date 7/ Set New WQ: 7C Test Init JBL
		7.96		7.9				25.6		0	0	0	0	0	0	0	0	0	Sol'n Prep: SF Time 1020 Date: 9/4/16 New WQ: BV Counts (NG
	L :	7:74	7.75	8-2		314	7-1	25.9	0	0	0	0	0	0	0	0	0	0	Sol'n Prep: 01 Old WQ: DM Time 110 Date: 15/11 New WQ: B Counts: 01
	2	7.82	8.80	7.8	7.6	327	335	25.4	0	0	0	0	0	0	0	0	0	0	Sol'n Prep ugy Old WQ: 1 Time 1305
Irol	3	7.23	8:10	7.8	7.5	320	410	25.6	ч	ч	5	0	4	5	ч	5	5	5	Date: 1/16/12/ew WQ: SD Counts DM Sol'n Prep: By Old WQ: SD Time: 1505
Lah Water Control	4	8.14	8.27	8.5	7.2	321	333	25.6	0	0	11	5	10	i (7	9	9	7	Sol'n Prep: 2 Old WQ: SD Time: 1505 Date: 917/12/ew WQ: SD Counts: 1300 Sol'n Prep: 12/FOId WQ: SD Time: 24 Date: 4/16/4 New WQ: TK Counts SF
h Wate	5		7.87		7.11	325			6	١١	0	8	0	12	0	13	в	2	Date 9/6/ New WQ: TK Counts SF Sol'n Prepuc Old WQ: TA Time 163
Lal	6		8.30	011	7.1	525		25.3		n	14	14		$\overline{\bigcirc}$	11	0	14	11	Date 9/17 (Siew WQ: Counts CJ) Sul'n Prep. C Old WQ: (A Time 143)
	7		6.20		7.1		0		/	<u> </u>	1	6 8	1-	$\underline{\frown}$	16		• (• /	Date: New WQ: Counts:
	\vdash																		Sol'n Prep: Old WQ: Time: Datc: Old WQ: Counts
	8									7/	20	27	71	711	27	77	() ()	20	
1000	Day		JH		.O.	onductiv			11	26		Le la				21	20	25	Mean Neonates/Female = 25.6
	Day	New	Old	New	Old	New	Old		A	В	С	D	E	F	G	Н	I	J	RT BATCH NUMBER
	0	1.13		8.2		j355			0	Θ	0	0	0	0	0	0	0	0	229
	1	7-69)	7.63	q.+	7.2	1393	1377		0	0	σ	0	Ο	0	0	0	0	υ	229
	2	1.69		7.9	7.5	1302 890	1468		0	0	0	0	0	0	0	0	0	0	229
	3	7.17			7.4	1328	1371		1	Ц	5	3	5	5	Ч	4	ų	3	229
500 mg/L	4	8.03	· ·		7.2	1399	1429		10	0	8	9	0	ଡ	9	B	6	0	2.24
500 1	5	7.88				1360			Ø	10	10	0	12	0	0	Ö	2	9	229
	6		<i>B.12</i>		7.0		1449		0	10	Õ	13	10	10	8	10	9	Ò	
	7										-			Ŭ			-		
	8																		
								Total=	11	24	23	25	27	23	51	22	21	12	Mean Neonates/Female = 20.9

	CI	lient:			Refere	ence To	xicant			Ma	terial:		Sodiu	m Ch	loride		-	Test	Date:	9/13/16	
I	Proje	ect #:	263	323	· · · ·	Fest ID:		69779		_	·		-				Co	ontrol V	Water:	SRW	
		Day	p	H	D.	.0.	onductivi	ty (µS/cr	Temp				Surv	ival / R	eproduc	tion					
			New	Old	New	Old	New	Old	(°C)	A	В	С	D	E	F	G	н	I	j		
		0	7.85		8.1		2284			0	0	0	0	0	0	0	0	0	0		
		I	7.69	7.61	8.6	7.2	2256	2406		0	0	*/0	0	0	0	0	0	6	0		
		2	7.67	8.17	6.0	75	านอา	1315		0	0	-	0	0	0	0	0	0	0		
		3	7.19	8.11	8.2	7.1	2264	2347		5	2	-	5	1	6	5	3	ц	i		
	1000 mg/L	4	8.01	8.16	8.9			2-127		0	0	-	ن	0	2_	8	0	0	7		
	1000	5	7.82	2,72	جرنو	8.6	2282	24,28		*/0	4	-	11	7	7/2	0	10	Xz	0		
		6	-	ننو.چ	-	6.9	-	2400			0	-	Š	5	-	7	\bigcirc	-	4		
		7								-		-		_			-	-			
		8								. 1		-			xī.			-			• 4
									Total=	7/5	6	×/J	19	13	110	20	13	X/II	12	Mean Neonates/Female = 1.0 1.5	9/29/14
0		Day	p	Н	D	.0.	onductivi	ity (μS/ct						· ·	oduction						
			New	Old	New	Old	New	Old		A	B	С	D	E	F	G	Н	1			
		0	7.10		8.4		306			0	0	0	0	0	0	0	0	0	0		
		<u> </u>		7.62		1	3129			0	0	0	0	0	0		0	0	0		
		2	7.69	8.09	8.5	1	3140			0	0	0	0	0	0	0	0	0	0		
	_	• 3	7.20	8.07	8.4	6.9	3140	3319		1	2	2	2	0	1	2	3	0	3		
	1500 mg/L	4	7.99	8.15	9.1	7.1	3177	3330		0	0	0	0	0	0	0	0	0	0		
	15	5	7.80	2.70	<i>q.</i> ₈	7.5	3190	3350		0	U	1/5	G	0	U	0	6	16	0		
		6	<u> </u>	P.03		6.8		3320		70	70	-	HO	\mathcal{O}	1/0	\mathcal{O}	×10	-	×10		
		7		<u> </u>							-	-	-								
		8									V	-	-	6		0	-		~ X/=	~ ~ ~	
L									Total=	41	XZ	Y1	M2	0	14	2	179	X/o	13	Mean Neonates/Female = Za Z	

С	Reference Toxicant oject #: 26323 Test ID: 69779								Ma	terial:		Sodiu	m Ch	loride			Test	Date:	9/13/16
Proje	ect#:	263	323	. 1	est ID:		69779		-							Co	ontrol	Water:	SRW
	Day	p	H	D.	0.	onductivi	ty (µS/cr	Temp	[Surv	ival / R	eprodu	ction				
	~	New	Old	New	Old	New	Old	(°C)	A	В	С	D	E	F	G	Н	I	J	
	0	7.80		8.5		4060			0	0	0	0	0	0	0	0	٥	6	
	1	7:72	7.62	9.3	7.4	3945	40.70		0	0	0	0	0	0	0	0	0	U	
	2	7.65	8.00	8.4	75	3996	4110		0	0	0	0	0	0	0	0	0	0	
	3	7.24	8.00	8.6	6.8	3980	411A		×/ _D	X/O	*10	0	×10	×lo	0	0	×/0	×lo	
0 mg/L	4	7,93	8.12	9.6	7.1	1152	1200		-	-	-	1	_	-	2	2	-	-	
2000	5	7.80	סקר	9.0	7:7	4060	4275		~	~	-	0	-	-	I	ı	-	-	
	6		Cal	-	6.0	-	4210		~	~	-	0	-		0	İ	-	-	
	7								-	-	-		_	-			-	_	
	8									-	-		-	-			-	-	
								Total=	×lo	410	40	1	HO	KIO	3	4	×10	NO	Mean Neonates/Female = 0.8
	Day		Н	D.		onductivi		-	1			urvival							
	0	New 7.78	Old	New 8.6	Old	New	Old		A	В	с О	D	E	F O	G	н О	1	L L	
e.		1.18		2.0		4956 709/1316			0	0	0	0	0	0	0	0	D	0	
		7.73	7.62	8.095	7.4		5020		0	0			Flo	×lo		×lo		Ho	
	2	7.65	797	8.5	1,>	4942	2010		×ю	10		170		~10	×lo	~(0		- 10	
Υ	3		-	-					<u> </u>		<u>``</u>	•							
2500 mg/l	4	<u> </u>		-	-	-	1			-	<u> </u>				-			_	
C1	5	-							$\left \right\rangle$				-		-	-	-		
	6	-	-						<u>ب</u>		~	-	-				-	-	
	7	-	-	-	-	-			-	-		-	-	-		-		-	
	8							Total=	- 710	- X10	- ×10		- x/n	- X/0	- ×10	- *l0	XID	XIN	Mean Nconates/Female = 0.0





Paul Bedore Robertson-Bryan, Inc. 9888 Kent Street Elk Grove, CA 95624 October 21, 2016

Paul:

I have enclosed our report "An Evaluation of the Chronic Toxicity Persistence of Lehigh Permanente Cement Plant Pilot Reverse-Osmosis (RO) Water Samples" for the Biological Effluent and Permeate samples collected September 6, 2016.

Chronic Effects of Biological Effluent and Permeate on Ceriodaphnia dubia

There was no significant reduction to survival observed in the filtered effluent blend treatment; the NOEC for survival was 100% filtered blend resulting in 1 TUc. There was a significant reduction to reproduction observed in the filtered effluent blend treatment; the NOEC for reproduction was <100% filtered blend resulting in >1 TUc.

There was no significant reduction to survival observed in the unfiltered effluent blend treatment; the NOEC for survival was 100% unfiltered blend resulting in 1 TUc. There was a significant reduction to reproduction observed in the unfiltered effluent blend treatment; the NOEC for reproduction was <100% unfiltered blend resulting in >1 TUc.

If you have any questions regarding the performance and interpretation of these tests, feel free to contact my colleague Chris Dudenhoeffer 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 26376.

An Evaluation of the Chronic Toxicity Persistence of Lehigh Permanente Cement Plant Pilot Reverse-Osmosis (RO) Water Samples to *Ceriodaphnia dubia*

Samples collected September 6, 2016

Prepared For:

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

Prepared By:

Pacific EcoRisk 2250 Cordelia Road Fairfield, CA 94534

October 2016



An Evaluation of the Chronic Persistence Toxicity of Lehigh Permanente Cement Plant Pilot Reverse-Osmosis (RO) Water Samples to *Ceriodaphnia dubia*

Samples collected September 6, 2016

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1. INTRODUCTION

Under contract to the Robertson-Bryan, Pacific EcoRisk (PER) conducted an evaluation of the chronic toxicity persistence of Lehigh Permanente Southwest Cement Company Reverse-Osmosis (RO) Biological Effluent and Permeate water samples. This evaluation consisted of performing the US EPA chronic 3-brood survival and reproduction test with the crustacean *Ceriodaphnia dubia*. This test was conducted as a follow-up test that identified toxicity for samples collected on September 6, 2016. In order to assess the sensitivity of the organisms to chemical stress, a monthly reference toxicant test was performed. This report describes the performance and results of these tests.

CHRONIC TOXICITY TEST PROCEDURES

This testing followed established guidelines in "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 Receipt and Handling of the Biological Effluent and Permeate Samples

On September 6th, samples of Lehigh Biological Effluent and Permeate were collected into appropriately cleaned sample containers. These samples were transported the day of collection, on ice and under chain-of-custody, to the PER laboratory in Fairfield, CA. 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 record for the collection and delivery of the samples is presented in Appendix A.

Ta	ble 1. Initial v	vater qu	uality cl	haracte	ristics of tl	he Biologi	cal Effluent	and Perm	eate Samp	les.
Sample Receipt Date	Sample ID	Temp (°C)	рН	D.O. (mg/L)	Alkalinity (mg/L)	Hardness (mg/L)	Conductivity (µS/cm)	Residual Chlorine (mg/L)	Total Ammonia (mg/L N)	Sulfide (mg/L)
9/6/16	Biological Effluent	2.0	7.63	6.4	794	2570	3960	0.54	<1.00	0.804
9/6/16	Permeate	2.0	7.79	8.5	3.7	1.2	19	0.0	<1.00	0.002

2.2 Survival and Reproduction Toxicity Testing with Ceriodaphnia dubia

The chronic persistence toxicity test with *C. dubia* consists of exposing individual females to a Biological Effluent/Permeate blend treatment for the length of time it takes for the Lab Control treatment females to produce three 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 test consisted of a synthetic reconstituted freshwater (SRW adjusted to EPA "moderately-hard" hardness), prepared by addition of reagent grade chemicals to Type 1 lab water. The Biological Effluent and Permeate was combined at a ratio of 25:75% respectively, and used to prepare a daily 0.2 μ m filtered and unfiltered treatment; a filtration blank consisting of 0.2 μ m-filtered control water was also tested. For each test treatment, 200 mL aliquots of test solution were amended with the alga *Selenastrum capricornutum* and Yeast-Cerophyll[®]-Trout Food (YCT) to provide food for the test organisms. "New" water quality characteristics (pH, D.O., and conductivity) were measured on these food-amended test solutions prior to use in this testing.

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

Each day of the test, fresh test solutions were prepared and characterized as before, and a "new" set of replicate cups was prepared. The test replicate cups containing the test organisms were examined, with surviving 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 parent organism was determined, after which the "old" water quality characteristics (pH, D.O., and conductivity) were measured for the old solution from one randomly-selected replicate at each treatment.

After it was determined that $\geq 60\%$ of the females in the Lab Water Control treatment had produced their third brood of offspring, the test was terminated. The resulting survival and reproduction (# of offspring) data were analyzed to evaluate any impairment(s) caused by the Biological Effluent/Permeate mixture; all statistical analyses were performed using the CETIS[®] statistical software.

2.2.1 Reference Toxicant Testing of the Ceriodaphnia dubia

In order to assess the sensitivity of the test organisms to toxic stress, a monthly reference toxicant test was performed. The reference toxicant test was performed similarly to the effluent test except that test solutions consisted of modified EPA moderately-hard water 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., EC50); 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 Biological Effluent/Permeate on Ceriodaphnia dubia

There was no significant reduction to survival observed in the filtered effluent blend treatment; the NOEC for survival was 100% filtered blend resulting in 1 TUc. There was a significant reduction to reproduction observed in the filtered effluent blend treatment; the NOEC for reproduction was <100% filtered blend resulting in >1 TUc.

There was no significant reduction to survival observed in the unfiltered effluent blend treatment; the NOEC for survival was 100% unfiltered blend resulting in 1 TUc. There was a significant reduction to reproduction observed in the unfiltered effluent blend treatment; the NOEC for reproduction was <100% unfiltered blend resulting in >1 TUc.

The test data and summary of statistical analyses including the outlier for this test are presented in Appendix B; the summary of statistical analysis excluding the outlier are presented in Appendix C.

Table 2. Effects of Biological Effluent/Permeate blend on Ceriodaphnia dubia.											
Test Treatment	% Survival	Reproduction (mean # of offspring)									
Lab Water Control	100	33.8									
100% Unfiltered Blend	90	11.0									
Filtered Lab Water Control	90	31.9ª/28.7									
100% Filtered Blend 100 16.2*											
Summar	y of Statistics										
NOEC =	100% Blend	<100% Blend									
TUc (where TUc = 100/NOEC)	1 TUc	>1 TUc									
Survival EC25 or Reproduction IC25 =	>100% Blend	<100% Blend									
TUc (where TUc = $100/EC25$ or $100/IC25$) =	<1 TUc	>1 TUc									
Survival EC50 or Reproduction IC50 =	>100% Blend	<100% Blend									
TUc (where TUc = $100/EC50$ or $100/IC50$) =	<1 TUc	>1 TUc									

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

a - There was an outlier replicate in the Filtered Lab Control treatment. The results presented here are those with the outlier excluded ("a" superscript). Per EPA guidance, the data are presented both excluding and including the outlier in Appendix B and Appendix C, respectively.

3.1.1 Reference Toxicant Toxicity to Ceriodaphnia dubia

The results of this test are summarized below in Table 3. The survival EC50 and reproduction IC50 for this test 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 D.

Table 3. Reference toxicant testin	ng: Effects of NaCl on Co	eriodaphnia dubia.										
NaCl Treatment (mg/L)	% Survival	Reproduction (# neonates/female)										
Lab Water Control	100	33.5										
500	100	31.0										
1000	66.7	20.3*										
1500	100	20.7*										
2000	60	5.3										
2500	0*	-										
Summary of Statistics												
Survival EC50 or Reproduction IC50 =	1740	1620										

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

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4. SUMMARY & CONCLUSIONS

An evaluation of the chronic toxicity persistence of a blend of Lehigh Permanente Cement Plant Biological Effluent and Permeate water samples to *Ceriodaphnia dubia* was performed. The results of this testing follow:

Effects of Biological Effluent/Permeate on Ceriodaphnia dubia

There was no significant reduction to survival observed in the filtered effluent blend treatment; the NOEC for survival was 100% filtered blend resulting in 1 TUc. There was a significant reduction to reproduction observed in the filtered effluent filtered blend treatment; the NOEC for reproduction was <100% blend resulting in >1 TUc.

There was no significant reduction to survival observed in the unfiltered effluent blend treatment; the NOEC for survival was 100% unfiltered blend resulting in 1 TUc. There was a significant reduction to reproduction observed in the unfiltered effluent blend treatment; the NOEC for reproduction was <100% unfiltered blend resulting in >1 TUc.

4.1 QA/QC Summary

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

Negative Control – The biological responses for the test organisms at the Lab Control treatments were within acceptable limits.

Positive Control – The reference toxicant test survival EC50 and reproduction IC50 were both 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.

Concentration Response Relationships – The concentration-response relationships for the reference toxicant test was evaluated as per EPA guidelines (EPA-821-B-00-004), and determined to be acceptable for this testing.

Appendix A

Chain-of-Custody Record for the Collection and Delivery of the Lehigh Permanente Cement Plant Biological Effluent and Permeate Samples







	2250 Co		, Fairfield	, CA 945: 207-7916			CHAIN-OI	C	US	τοε)YF	REC	ORI	D	C	DOF
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Project Name:					E-mail:	Same	arking lenger	lia c								
P.O.#/Ref:	Lengi I	KE Testi	пg			N	M15011. LOM1	eriodapnia dubia Surival an Reproduction EPA 1002 0								
		Sample	Sample	Sample	Grab/	l	Container	erio Rep								
Client Sam	nple ID	Dațe	Time	Matrix*	Comp	Number		0								
Biological Efflu	ent	9/6/10	9:40#	FW	Grab	2	2.5-gal LDPE Cube	×								
Permeate			9.'SDAM	FW	Grab	2	2.5-gal LDPE Cube	×								
		1.1.6/100														
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Samples colle	cted by:				la serie serie											
Comments/Sp	ecial Inst	ruction:				RELIQU	INSHED BY: COURT	VP	ern	REC	EIVED	BY:				
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*Example Matrix Codes: (EFF - Effluent) (FW = Freshwater); (SW = Saltwater); (WW = Wastewater); (STRMW = Stormwater); (SED = Sediment); or other

10/35

Appendix B

Test Data and Summary of Statistics for the Evaluation of the Chronic Toxicity Persistence of the Lehigh Permanente Cement Plant Filtered Biological Effluent/Permeate Treatment to *Ceriodaphnia dubia*: Excluding Outliers

CETIS Sur	nmary Repo	rt	_		Report Dat Fest Code:		12 Oct-16 11 69874-f	:00 (p 1 of 1 02-6262-8564			
Ceriodaphnia	Survival and Re	produ	ction Test							Pac	ific EcoRisk
Batch ID: Start Date: Ending Date: Duration:	01-2595-3828 27 Sep-16 12:1 03 Oct-16 15:30 6d 3h	5)	Test Type: Protocol: Species: Source:	Reproduction-S EPA-821-R-02 Ceriodaphnia c In-House Cultu	-013 (2002) Jubia		1	Analyst: Diluent: Brine: Age:	Simin Delija Not Applica Not Applica 1	ble	
Sample ID: Sample Date: Receive Date Sample Age:	•	D	Code: Material: Source: Station:	Effluent Effluent Lehigh Permar 75:25% Perme		al Effluent		Client: Project:	Lehigh Perr 26376	nanente	
Batch Note:	Stats Exclude d	ata for	Filtered Sar	nple; Stats inclu	ide outlier FE	3-G					
Comparison	Summary									474-20 B. A. 14	
Analysis ID 17-8785-6477 18-5869-1079 03-2686-4490 04-8842-9183	Reproduction Survival		NOEL <100 0 0 100	LOEL 100 >0 >0 >0 >100	NA NA	PMSD 8.52% 5.03% NA NA	TU >1	Equa Fishe	al Variance t		
Reproduction	Summary										······································
C-%	Control Type	Count	t Mean	95% LCL	95% UCL	Min	Max	Std I	Err Std D	ev CV%	%Effect
0	Lab Water Contr	10	33.8	32.5	35.1	31	36	0.57	3 1.81	5.37%	0.0%
0	Filtration Blank	9	31.9	30.2	33.6	29	35	0.73		6.91%	5.65%
100		10	16.2	13.2	19.2	10	22	1.32	4.18	25.8%	52.1%
Survival Sum	mary										
C-%	Control Type	Count	t Mean	95% LCL	95% UCL	Min	Max	Std I	Err Std D	ev CV%	%Effect
0	Lab Water Contr		1	1	1	1	1	0	0	0.0%	0.0%
0	Filtration Blank	10	0.9	0.674	1	0	1	0.1	0.316		10.0%
100		10	1	1	1	1	1	0	0	0.0%	0.0%
Reproduction	Detail										
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	i Rep	7 Rep 8	Rep 9	Rep 10
0	Lab Water Contr	36	34	34	31	33	35	31	36	33	35
0	Filtration Blank	29	33	30	29	33	33		31	34	35
100		17	21	12	15	17	17	20	10	11	22
Survival Detai	il										
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
0	Filtration Blank	1	1	1	1	1	1	0	1	1	1
100		1	1	1	1	1	1	1	1	1	1
Survival Bino	mials										
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	i 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	Filtration Blank	1/1	1/1	1/1	1/1	1/1	1/1	0/1	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™2/3-8.7.16

Analyst: SD QA: M

Ceriodaphnia Survival and Reproduction Test Pacific Ecol Analysis ID: 04-8842-9183 (05 Oct-16 15:33) Endpoint: Survival Analysis: CETIS Version: CETISVersion: CETISV18.7 Official Results: Data Transform Zeta Alt Hyp Trials Seed Test Result Untransformed C > T NA NA Passes survival Fisher Exact Test Control vs C-% Test Stat P-Value P-Type Decision(a:5%) Filtration Blank 100 1 1.0000 Exact Non-Significant Effect Data Summary C-% Control Type NR R NR + R Prop NR Prop R %Effect 0 Filtration Blank 9 1 10 0.9% 0.1 0.0% 100 10 0 10 0 -11.1%	CETIS Ana	alytical Repo	ort					Report I Test Co			-16 15:35 (p 1 of 2 74-f 02-6262-8564
Analyzet: 05 Oct.16 15:33 Analyzei: Single 2x2 Contingency Table Official Results: Yes Data Transform Zeta Alt Hyp Trials Seed Test Result Untransformed $C > T$ NA NA Passes survival Fisher Exact Test Test Stat P-Value P-Type Decision(a:5%) Filtration Blank 100 1 1.0000 Exact Non-Significant Effect Data Summary Control Type NR R NR + R Prop R %Effect 0 Filtration Blank 9 1 10 0.9 0.1 0.0% 100 0 10 1 0 -11.1% 0 Graphics * * * * * * ** * * * * * * * ** * * * * * * * * 0 10 0 10 0 - * * * * *	Ceriodaphnia	a Survival and R	eprod	uction Test						·	Pacific EcoRisk
Untransformed C > T NA NA Passes survival Fisher Exact Test Control vs C-% Test Stat P-Value P-Type Decision(cr:5%) Filtration Blank 100 1 1.0000 Exact Non-Significant Effect Data Summary C-% Control Type NR R NR + R Prop NR Prop R %Effect 0 Filtration Blank 9 1 10 0.9 0.1 0.0% 100 10 0 10 0 -11.1%	-		3			ntingency Ta	ble				
Fisher Exact Test Control vs C-% Test Stat P-Value P-Type Decision(c::5%) Filtration Blank 100 1 1.0000 Exact Non-Significant Effect Data Summary C-% Control Type NR R NR + R Prop NR Prop R %Effect 0 Filtration Blank 9 1 10 0.9 0.1 0.0% 100 10 0 10 0 -11.1% Graphics • • • • • 10 0 10 0 -11.1% • 0 10 0 1 0 -11.1% Graphics • • • • • 0 • • • • • 0 • • • • • • 0 • • • • • • 100 • • • • • • 0 •	Data Transfo	rm	Zeta	Alt Hyp	Trials	Seed		T	est Resul	it	
Control vs C-% Test Stat P-Value P-Type Decision(α:5%) Filtration Blank 100 1 1.0000 Exact Non-Significant Effect Data Summary C-% Control Type NR R NR + R Prop NR Prop R %Effect 0 Filtration Blank 9 1 10 0.9 0.1 0.0% 100 10 0 10 0 -11.1%	Untransforme	d		C > T	NA	NA		Р	asses sur	vival	
Filtration Blank 100 1 1.0000 Exact Non-Significant Effect Data Summary C-% Control Type NR R NR + R Prop NR Prop R %Effect 0 Filtration Blank 9 1 10 0.9 0.1 0.0% 100 10 0 10 0 -11.1% Graphics	Fisher Exact	Test									
Data Summary C-% Control Type NR R NR + R Prop NR Prop R %Effect 0 Filtration Blank 9 1 10 0.9 0.1 0.0% 100 10 0 10 1 0 -11.1% Graphics		*			_			<u> </u>			
Control Type NR R NR + R Prop NR Prop R %Effect 0 Filtration Blank 9 1 10 0.9 0.1 0.0% 100 10 0 10 1 0 -11.1% Graphics • • • • • • 100 0 10 1 0 -11.1%	Filtration Blan	k 100		1	1.0000	Exact	Non-Signi	ificant Effect			
0 Filtration Blank 9 1 10 0.9 0.1 0.0% 100 10 0 10 1 0 -11.1% Graphics	Data Summa	ry									
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Ceriodaphni	ia Survival and R	eproduc	tion Test							· · · · · ·	fic EcoRisk
Analysis ID: Analyzed:	17-8785-6477 05 Oct-16 15:3		•	Reproduction Parametric-Two	Sample			IS Version: cial Results:	CETISv ⁻ Yes	1.8.7	
Data Transfo	orm	Zeta	Alt Hy	o Trials	Seed		PMSD	Test Resu	ult		
Untransforme	ed	NA	C > T	NA	NA		8.52%	Fails repro			
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Control	vs C-%		Test St	at Critical	MSD DF	P-Value	P-Type	Decision(α:5%)		
Filtration Blar	nk 100*		10	1.74	2.72 17	<0.0001	CDF	Significant			
ANOVA Tabl	le							····			<u> </u>
Source	Sum Squa	ares	Mean S	quare	DF	F Stat	P-Value	Decision(α:5%)		
Between	1165.932		1165.93		1	101	< 0.0001	Significant			
Error	196.4889		11.5581	7	17			-			
Total	1362.421				18						
Distributiona	al Tests										
Attribute	Test			Test Stat	Critical	P-Value	Decision	(α:1%)			
Variances	Variance	Ratio F		3.6	7.34	0.0849	Equal Var				
Distribution	Shapiro-V	Vilk W N	ormality	0.973	0.861	0.8283	Normal D	istribution			
Reproductio	on Summary				·····						
C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Filtration Blank	9	31.9	30.2	33.6	33	29	35	0.735	6.91%	0.0%
100		10	16.2	13.2	19.2	17	10	22	1.32	25.8%	49.2%
375	.			Reject Nuil		6 5 4			•		•
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CETIS Ana	alytical Repo	ort					Repor Test C	t Date: ode:		16 15:35 (p 2 of 2) 74-f 02-6262-8564
Ceriodaphnia	a Survival and Re	produc	ction Test							Pacific EcoRisk
Analysis ID: Analyzed:	03-2686-4490 05 Oct-16 15:34		Endpoint: Sui Analysis: Sin		ntingency Ta	ble		Version: al Results:	CETISv1.8.7 Yes	
Data Transfo	rm	Zeta	Alt Hyp	Trials	Seed			Test Resul	t	
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Data Summa	ry									
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Ceriodaphnia	a Survival and Re	production	Test							Pac	ific EcoRis
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Data Transfo	rm	Zeta	Alt Hyp	Trials	Seed		PMSD	Test Res	ult		
Untransforme	d	NA	C > T	NA	NA		5.03%	Passes r	eproduction		
Equal Varian	ce t Two-Sample	Test				· · · · · · · ·					
Control	vs Control		Test Sta	t Critical	MSD DF	P-Value	P-Type	Decision	ı(α:5%)		
Filtration Blan	k Lab Water	r Control	-2.07	1.74	1.6 17	0.9731	CDF		ificant Effec	t	
ANOVA Table)										
Source	Sum Squa	res	Mean Sq	uare	DF	F Stat	P-Value	Decision	(α:5%)		
Between	17.30058		17.30058	}	1	4.29	0.0538		ificant Effec	t	
Error	68.48889		4.028758		17			5			
Total	85.78947				18						
Distributional	l Tests										
Attribute	Test			Test Stat	Critical	P-Value	Decision	(α:1%)			
Variances	Variance F	Ratio F		1.48	6.69	0.5713	Equal Var				
Distribution	Shapiro-W	/ilk W Norma	lity	0.915	0.861	0.0906	Normal D	istribution			
Reproduction	I Summary										
<u>C-%</u>	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Water Contr		33.8	32.5	35.1	34	31	36	0.573	5.37%	0.0%
)	Filtration Blank	9	31.9	30.2	33.6	33	29	35	0.735	6.91%	5.65%
Graphics											
40						4		1			1
35						3		I I			•
30	11.16111			Reject Null	-						
tion					The second se				•		
25					Centared	o .					
ຂຶ້ 20					0	5					
						0		•			
15						-					
10						-1		•••			
						-		1			
5						-2	•	е і Г			
								1			
D	0 F		0 LW			-3 -2.0 -	1.5 -1.0	-0.5 D.0	0.5 1.0	1.5	2.0

н.

Analyst:_____QA:____

Pacific EcoRisk

(Client:		Lehigh Permanente					M	laterial:		La	ub Wate	er Cont	rol		Те	st Date:	9	127/16	
Pro	ject #:	26	376		Test ID:	698	74		Randon	nization		10	. 4.1			Contro	Water:		SRW	
	Day	pH New	Old	D.O. New	Old	Cond. (µS/cm)	Temp (°C)	A	В	С	Su D	rvival / R E	eproduct F	tion G	Н	I	J		SIGN-OFF	
	0	770		7.4		319	25.3	0	0	0	0	0	D	0	0	0	0	Date: 9/27/16 Sol'n Prep: DM	New WQ:	Test Init : 'DH Time: 1215
	1	8.07	7.97	7.9	7.6	322	25.6	0	0	0	0	0	0	0	0	0	0	Sol'n Prep: DM	New WQ	Time: 1330
	2	7.92	7.82	8.4	6.3	316	25.1	0	0	0	0	0	0	0	0	õ	0	Sol'n Prep: TIL	New WQ: AP	F Time:1450
trol	3	8.27	7.89	8.7	7.6	313	25.6	5	5	5	5	(0	7	5	6	5	ý	Sol'n Prep: DM	New WQ: RB Old WQ: Dh	1 Time: 12/5
er Control	4	7.92	8.27	8.3	7.9	314	25.4	0	0	0	0	0	11	Ð	0	0	0	Date: 10/1/16 Sol'n Prep: DM	Old WQ: D	
Lab Water	5	7.68	7.88	7.9	5.7	310	25.4	14	11	12	10	11	0	11	12	11	12	Date:10/2/16 Sol'n Prep: TK	New WQ: 22 Old WQ:	Counts: TK Time: 1230
La l	6	-	8.00	_	6.6	347	25.4	17	18	17	16	16	17	15	18	17	17	Date: 10/3/16 Sol'n Prep:	New WQ: - Old WQ: JB	Counts: TK Time: 1538
	7					2												Date: Sol'n Prep:	New WQ: Old WQ:	Counts: Time:
	8																	Date:	Old WQ:	Counts: Time:
							Total=	36	34	34	31	33	35	31	31	33	35	Mean Neonates/Fen	nale = 33.	8

Pacific EcoRisk

(Client:		1	Lehigh Pe	ermanent	e		N	laterial:		um Filt		Biologic neate	al Efflu	ent/	Te	st Date:	9127/16
Pro	ject #:	263	376		Test ID:	698	74		Randon	nization		1	0.4-	1			Water:	
	Day	pH	014	D.O.		Cond.	Temp					rvival / R	Reproduc	-				Sample ID
ate		New 7.48	Old	New 9.4	Old	(µS/cm) 1293	(°C)	A 0	B O	0	D	E O	F 0	G	H U	D	0	Biological permeate 44017/44018
Biological Effluent /75% Permeate	1	7.72	7.90	8,9	7.4	1307		0	0	0	0	0	0	ο	0	0	0	44017 / 44018
t /75%	2	7.84	7.89	9.2	7.0	1271		0	0	0	0	0	0	0	0	0	8	44017 / 44018
ffluen	3	7,92	7.70	10.2	7.6	1277		0	0	0	3	0	2	0	0	0	5	44017 / 44018
gical E	4	7.65	8,02	9.5	7.7	1318		4	5	4	0	4	0	4	4	4	0	44017 / 44018
Biolo	5	7,44	7.94	9,1	6.7	1313		7	7	8	8	7	7	8	6	7	8	440171 44018
d) 25%	6		7.19	-	6.7	1377		6	9	0	4	6	8	8	0	0	9	_
Filtered)	7											l						
un un	8														8			
(0.2							Total=	17	21	12	15	17	17	20	10	11	22	Mean Neonates/Female = 16.2

Appendix C

Test Data and Summary of Statistics for the Evaluation of the Chronic Toxicity Persistence of the Lehigh Permanente Cement Plant Filtered Biological Effluent/Permeate Treatment to *Ceriodaphnia dubia*: Including Outliers

CETIS Sur	nmary Repo	rt			Report Dat Test Code:			41 (p 1 of 1) 2-6262-8564			
Ceriodaphnia	Survival and Re	produ	ction Test							Paci	fic EcoRisk
Batch ID: Start Date: Ending Date: Duration:	01-2595-3828 27 Sep-16 12:1 03 Oct-16 15:30 6d 3h		Test Type: Protocol: Species: Source:	Reproduction-S EPA-821-R-02 Ceriodaphnia d In-House Cultu	-013 (2002) Iubia			Analyst: Diluent: Brine: Age:	Simin Delijan Not Applicabl Not Applicabl 1	е	
Sample ID: Sample Date: Receive Date Sample Age:	08-8126-1146 06 Sep-16 09:40 : 06 Sep-16 11:00 21d 3h (8.1 °C)	D	Code: Material: Source: Station:	Effluent Effluent Lehigh Permar 75:25% Perme		al Effluent		Client: Project:	Lehigh Perma 26376	anente	
Batch Note:	Stats include da	ta for I	Filtered Sam	ple; Stats incluc	le outlier FB	-G					
Comparison	Summary										
Analysis ID 03-9745-4367 12-6869-0015 03-2686-4490 04-8842-9183			NOEL <100 0 0 100	LOEL 100 >0 >0 >0 >100	NA NA	PMSD 21.2% 20.0% NA NA	TU >1 1	Wilc Fishe	nod oxon Rank Sur oxon Rank Sun er Exact Test er Exact Test	•	
Reproduction	Summary						<u> </u>				
C-%	Control Type	Coun	t Mean	95% LCL	95% UCL	Min	Max	Std	Err Std Dev	/ CV%	%Effect
0 0 100	Lab Water Contr Filtration Blank	10 10 10	33.8 28.7 16.2	32.5 21.3 13.2	35.1 36.1	31 0	36 35	0.57	10.3	5.37% 35.9%	0.0% 15.1%
Survival Sum	many		10.2	15.2	19.2	10	22	1.32	4.18	25.8%	52.1%
C-%	Control Type	Coun	t Mean	95% LCL	95% UCL	Min	Мах	Std I	Err Std Dev	/ CV%	%Effect
0 0 100	Lab Water Contr Filtration Blank		1 0.9 1	1 0.674 1	1 1 1	1 0 1	1 1 1 1	0 0.1 0	0 0.316 0	0.0% 35.1% 0.0%	0.0% 10.0% 0.0%
Reproduction	Detail						· · · · · · · · · · · · · · · · · · ·				
C-% 0 0 100	Control Type Lab Water Contr Filtration Blank	Rep 1 36 29 17	Rep 2 34 33 21	Rep 3 34 30 12	Rep 4 31 29	Rep 5 33 33	Rep (35 33	31 0	36 31	Rep 9 33 34	Rep 10 35 35
			21	12	15	17	17	20	10	11	22
Survival Detai		Der 1	D A		Dent	D					_
0	Control Type Lab Water Contr	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep (6 Rep 1	7 Rep 8 1	Rep 9	Rep 10
0	Filtration Blank	1	1	1	1	1	1	0	1	1	1
100		1	1	1	1	1	1	1	1	1	1
Survival Bino	mials	-	· · · · · ·								
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	6 Rep	7 Rep 8	Rep 9	Rep 10
	Lab Water Contr		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
0	Filtration Blank	1/1	1/1	1/1	1/1	1/1	1/1	0/1	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 Ana	alytical Repo	ort			•	ort Date: Code:			:38 (p 1 of 2) 02-6262-8564			
Ceriodaphni	a Survival and Re	eproductio	n Test	-							Pac	ific EcoRisk
Analysis ID: Analyzed:	03-9745-4367 05 Oct-16 15:3		• •	production	•Two Sar	nple)		IS Version: al Results:	CETISv1 Yes	1.8.7	
Data Transfo		Zeta	Alt Hyp	Trials	Seed			PMSD	Test Resu	lt		
Untransforme	d	NA	С > Т	NA	NA			21.2%	Fails repro	duction		
Wilcoxon Ra	nk Sum Two-San	nple Test										
Control	vs C-%		Test Stat	Critical	Ties	DF	P-Value	P-Type	Decision(a:5%)		
Filtration Blan	ik 100*		65	NA	0	18	0.0007	Exact	Significant	Effect		
ANOVA Table	e											
Source	Sum Squa	ares	Mean Squ	ia re	DF		F Stat	P-Value	Decision(a:5%)		
Between	781.25		781.25		1		12.6	0.0023	Significant			
Error	1111.7		61.76111		18		_					
Total	1892.95				19	_						
Distributiona	I Tests											
Attribute	Test			Test Stat	Critica	I	P-Value	Decision	(α:1%)			
Variances	Variance			6.05	6.54		0.0131	Equal Var	iances			
Distribution	Shapiro-V	Vilk W Norn	nality	0.663	0.866		<0.0001	Non-norm	al Distributio	n		
Reproduction	n Summary											
C-%	Control Type	Count	Mean	95% LCL	95% U	CL	Median	Min	Max	Std Err	CV%	%Effect
0	Filtration Blank	10	28.7	21.3	36.1		32	0	35	3.26	35.9%	0.0%
100		10	16.2	13.2	19.2		17	10	22	1.32	25.8%	43.6%
Graphics 30 25 25 15 10 0		1	77767	77	L	Centered	-10	• • •		••••	•••	•
	0 F	C-%	100				-2.0	1.5 -1.0	-0.5 0.0 Rankits	0.5 i.	0 1.5	2.0

Analyst: SD QA:_____

CETIS Ana	alytical Repo	rt					-	ort Date: Code:			38 (p 2 of 2 2-6262-856
Ceriodaphnia	a Survival and Re	production	Test							Paci	fic EcoRis
Analysis ID: Analyzed:	12-6869-0015 05 Oct-16 15:38			production	Two Sampl	e		IS Version: al Results:		.8.7	
Data Transfor	rm	Zeta	Alt Hyp	Trials	Seed		PMSD	Test Res	ult		
Untransformed	d	NA	C > T	NA	NA		20.0%	Passes re	eproduction		
Nilcoxon Raı	nk Sum Two-Sam	ple Test		<u></u>				<u> </u>	<u> </u>		
Control	vs Control		Test Stat	Critical	Ties DF	P-Value	P-Type	Decision	(α:5%)		
Filtration Blan	k Lab Water	r Control	133	NA	4 18	0.9861	Exact		ificant Effec	t	
ANOVA Table)						<u> </u>	···		1	
Source	Sum Squa	res	Mean Squ	are	DF	F Stat	P-Value	Decision	(a:5%)		
Between	130.05		130.05		1	2.38	0.1403		ificant Effec	t	
Error	983.7		54.65		18			- 30			
Total	1113.75		_		19						
Distributional	l Tests								<u> </u>		
Attribute	Test			Test Stat	Critical	P-Value	Decision	(a:1%)			
/ariances	Variance F	Ratio F		32.2	6.54	<0.0001	Unequal \				
Distribution		/ilk W Norm	ality	0.565	0.866	< 0.0001	•	al Distributi	on		
Reproduction C-%)	Control Type Lab Water Contr	Count 10 10	Mean 33.8 28.7	95% LCL 32.5 21.3	95% UCL 35.1 36.1	Median 34 32	Min 31 0	Max 36 35	Std Err 0.573 3.26	CV% 5.37% 35.9%	%Effect 0.0% 15.1%
40 35 30 0000000000000000000000000000000	//////		•		Centiared	10 -10 -15 -25 -25	• •		seo 9 9	••	• •
0	0 F	C-%	0 LW		1	-30	-1.5 -1.0	-0.5 0.0 Rankits	0.5 1.	0 1.5	2.0

Appendix D

Test Data and Summary of Statistics for the Evaluation of the Chronic Toxicity Persistence of the Lehigh Permanente Cement Plant Unfiltered Biological Effluent/Permeate Treatment to *Ceriodaphnia dubia*



CETIS Sun	nmary Repo	rt						eport Date est Code:			26 (p 1 of 1 0-7857-724
Ceriodaphnia	Survival and Re	eprodu	ction Test							Paci	fic EcoRisk
Batch ID: Start Date: Ending Date: Duration:	04-2168-6698 27 Sep-16 12:1 03 Oct-16 15:30 6d 3h		Test Type: Protocol: Species: Source:	Reproduction-S EPA-821- R -02- Ceriodaphnia d In-House Cultu	-013 (2002) Iubia		D B	nalyst: iluent: rine: ge:	Simin Delijani Not Applicable Not Applicable 1		
•	11-8505-3717 06 Sep-16 09:4 : 06 Sep-16 11:0 21d 3h (8.1 °C)	0	Code: Material: Source: Station:	Effluent Effluent Lehigh Perman 75:25% Perme		al Effluent		lient: roject:	Lehigh Perman 26376	ente	
Batch Note:	Stats include da	ta for l	Jnfiltered Sa	ample							
Comparison S Analysis ID 06-2788-9967 04-4922-6902	Endpoint Reproduction		NOEL <100 100	LOEL 100 >100	TOEL NA NA	PMSD 12.5% NA	TU >1 1		od ual Variance t T r Exact Test	wo-Sample	Test
Reproduction	Summary			<u></u>	<u></u>						
C-% 0 100	Control Type Lab Water Contr	Coun 10 10	t Mean 33.8 11	95% LCL 32.5 5.89	95% UCL 35.1 16.1	Min 31 3	Max 36 24	Std E 0.573 2.26		CV% 5.37% 65.0%	%Effect 0.0% 67.5%
Survival Sum	m ary										
C-% 0 100	Control Type Lab Water Contr	Coun 10 10	t Mean 1 0.9	95% LCL 1 0.674	95% UCL 1 1	Min 1 0	Max 1 1	0 0.1	rr Std Dev 0 0.316	CV% 0.0% 35.1%	%Effect 0.0% 10.0%
Reproduction	Detail						· · · · · ·				·····
C-% 0 100	Control Type Lab Water Contr	Rep 1 36 24	Rep 2 34 3	2 Rep 3 34 3	Rep 4 31 9	Rep 5 33 4	Rep 6 35 13	Rep 7 31 12	7 Rep 8 36 12	Rep 9 33 9	Rep 10 35 21
Survival Detai	1										
C-% 0 100	Control Type Lab Water Contr	Rep 1 1 1	Rep 2 1 0	8 Rep 3	Rep 4 1 1	Rep 5 1 1	Rep 6 1 1	Rep 7 1 1	7 Rep 8 1 1 1	Rep 9 1 1	Rep 10 1 1
Survival Binor	mials										
	Control Type Lab Water Contr	Rep 1 1/1 1/1	Rep 2	Rep 3 1/1 1/1	Rep 4 1/1 1/1	Rep 5 1/1 1/1	Rep 6 1/1 1/1	Rep 7 1/1 1/1	7 Rep 8 1/1 1/1	Rep 9 1/1 1/1	Rep 10 1/1 1/1

CETIS[™]24/58.7.16

Analyst:_____QA:_____

CETIS An	alytical Repo	ort					Repor Test C	t Date: Code:		16 15:26 (p 1 of 1) I-uf 10-7857-7249
Ceriodaphni	a Survival and Re	produ	uction Test							Pacific EcoRisk
Analysis ID: Analyzed:	04-4922-6902 04 Oct-16 14:53	3	•	vival gle 2x2 Cor	ntingency Ta	ble		Version: al Results:	CETISv1.8.7 Yes	
Data Transfo	prm	Zeta	Alt Hyp	Trials	Seed			Test Resu	lt	
Untransforme	d		C > T	NA	NA			Passes sur	vival	
Fisher Exact Control	vs C-%			P-Value	P-Type	Decision				
Lab Water Co			0.5	0.5000	Exact	Non-Sign	ificant Effect			
Data Summa C-%	Control Type	NR	R	NR + R	Prop NR	Prop R	%Effect			
0 100	Lab Water Cont	10 9	0 1	10 10	1 0.9	0 0.1	0.0% 10.0%			
Graphics 1.0 0.9 0.7 0.7 0.5 0.5 0.4 0.3 0.2 0.1 0.0 0.0 0.5 0.4 0.3 0.2 0.1 0.0 0.5 0.4 0.3 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5	۰		•							
	0 LW	C-%	100							

Analyst:_____ QA:____

CETIS An	alytical Repo	ort					-	ort Date: Code:			26 (p 1 of 1 0-7857-724
Ceriodaphn	ia Survival and Re	eproductior	n Test							Paci	fic EcoRisk
Analysis ID: Analyzed:	06-2788-9967 04 Oct-16 15:0		•	Reproduction Parametric-Two	Sample			IS Version: al Results		1.8.7	
Data Transfe	orm	Zeta	Alt Hyp	Trials	Seed		PMSD	Test Resi	ılt		
Untransform	ed	NA	C > T	NA	NA		12.5%	Fails repro	oduction		
Unequal Va	riance t Two-Sam	ple Test									
Control	vs C-%		Test Sta	at Critical	MSD DF	P-Value	P-Type	Decision(a:5%)		
Lab Water C	ontrol 100*		9.78	1.81	4.23 10	<0.0001	CDF	Significan			
ANOVA Tab	le										
Source	Sum Squa	ares	Mean S	quare	DF	F Stat	P-Value	Decision(a:5%)		
Between	2599.2		2599.2		1	95.6	<0.0001	Significan			
Error	489.6		27.2		18			-			
Total	3088.8				19						
Distribution	al Tests										
Attribute	Test			Test Stat	Critical	P-Value	Decision	(α:1%)			
Variances	Variance	Ratio F		15.5	6.54	0.0004	Unequal V				
Distribution	Shapiro-V	Vilk W Norm	ality	0.891	0.866	0.0286	Normal D	istribution			
Reproductio	on Summary									·····	
C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Water Contr	10	33.8	32.5	35.1	34	31	36	0.573	5.37%	0.0%
100		10	11	5.89	16.1	10.5	3	24	2.26	65.0%	67.5%
Graphics 40 35 30 25 20 15 10 5			5	Reject Muli	Cantared	14	•••	90-		•	•
o 1	0 LW		10	90		-a -2.0	-1.5 -1.0	-0.5 0.0	0.5 14	0 1.5	2.0

CETIS 26/858.7.16

Analyst:_____ QA:_____

Pacific EcoRisk

	Client: Lehigh Permanente							M	laterial:	(Unfilt	ered) B	iologica	al Efflu	ent/ Pe	rmeate	Te	st Date:	9127116
Pro	ject #:	26	376	-	Test ID:	698	74		Random	ization		10.	4.1			Control	Water:	SRW
	Day	pH New	Old	D.O. New	Old	Cond. (µS/cm)	Temp (°C)	A	В	С	Su	vival / R E	eproduct F	ion G	н	1	F	Sample ID
	0	° 7.44 9.0 1264						0	0	0	Ö	Ö	6	U	0	0	6	Biological Permeate 44017/4408
meate	1	7.64	7,80	8.8	7.8	1289		0	0	0	0	Ø	0	ರಿ	ð	0	Ø	44017 / 44018
Biological Effluent /75% Permeate	2	7.59	7.83	9.1	7.0	í243		Ò	6	0	0	0	υ	0	0	ы	0	44017 / 44018
rent /7	3	7.93	7.78	16.1	7.8	1252		Ô	0	Q	0	Q	4	0	0	Ο	2	44017 / 44018
al Effli	4	7.62	7.96	9.9	7.9	1287		0	3	3	5	ä	0	3	4	3	0	44017/ 44018
ologic	5	7.38	7.88	9.2	6.2	1308		THE TIG	Ð	Θ	0	0	q	3	8	Y.	9	44017 /44018
25% Bi	6	TEL	1.79	-	6.3	1353		8	×/o	Ô	4	0	0	6	0	6	10	_
	7	1015							۱									
(Unfiltered)	8								-									
							Total=	24	×13	3	9	Ч	13	12	12	9	22	Mean Neonates/Female =
·												21						

Appendix E

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



CETIS Sun	nmary Repo	rt						Report Date Test Code:	e: 04	Oct-16 09:4 69790 0	48 (p 1 of 2 2-6694-908
Ceriodaphnia	Survival and Re	eprodu	ction Test							Pacif	ic EcoRisl
Batch ID: Start Date: Ending Date: Duration:	15-1022-7721 27 Sep-16 12:50 03 Oct-16 14:05 6d 1h	0 5 5	Test Type: Protocol: Species: Source:	Reproduction-S EPA-821-R-02 Ceriodaphnia c In-House Cultu	-013 (2002) Iubia			Analyst: Diluent: Brine: Age:	Robert Gee Laboratory Wa Not Applicable 1		
•	04-5687-9373 27 Sep-16 12:50 27 Sep-16 12:50 NA (25.6 °C)	0 i 0 i	Code: Material: Source: Station:	NaCl Sodium chlorid Reference Tox In House				Client: Project:	Reference Tox 26308	icant	.2 12.
Comparison \$	Summary										
Analysis ID	Endpoint		NOEL	LOEL	TOEL	PMSD	TU	Meth	od		
16-6965-0530	Reproduction		500	1000	707.1	22.5%		Wilco	xon/Bonferroni	Adj Test	
05-1926-9841	Survival		2000	2500	2236	NA			er Exact/Bonferr	•	est
Point Estimat	e Summary					ŝ.					
Analysis ID	Endpoint		Level	mg/L	95% LCL	95% UCL	TU	Meth	od		
01-8681-6691	Reproduction		1C5	335	177	574		Linea	r Interpolation (ICPIN)	
			IC10	541	353	882					
			IC15	620	523	1080					
			IC20	700	606	1140					
			IC25	780	678	1270					
			IC40	1510	849	1580					
			IC50	1620	959	1680					
03-6116-4434	Survival		EC50	1740	1460	2080		Spea	rman-Kärber		
Reproduction	Summary									•	
	Control Type	Count		95% LCL	95% UCL	Min	Max	Std E	Err Std Dev	CV%	%Effect
	Lab Water Contr		33.5	31.7	35.3	30	38	0.778	3 2.46	7.35%	0.0%
500		10	31	28.5	33.5	26	38	1.09	3.43	11.1%	7.46%
1000		9	20.3	9.21	31.5	0	33	4.82	14.5	71.1%	39.3%
1500		10	20.7	17.5	23.9	9	24	1.43	4.52	21.8%	38.2%
2000		10	5.3	1.16	9.44	0	18	1.83	5.79	109.0%	84.2%
2500		10	0	0	0	0	0	0	0		100.0%
Survival Sum	•										
	Control Type	Count		95% LCL		Min	Max			CV%	%Effect
	Lab Water Contr		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		9	0.667	0.282	1	0	1	0.167		75.0%	33.3%
1500		10	1	1	1	1	1	0	0	0.0%	0.0%
2000		10	0.6	0.231	0.969	0	1	0.163		86.1%	40.0%
2500		10	0	0	0	0	0	0	0		100.0%

Analyst: Rb QA: SD

CETIS Summary Report

of 2) 69790 | 02-6694-9084

04	Oct-16	09:48	(p 2	2 of
	69790	102-6	60.	4.0

Report Date:

Test Code:

		nî.					les	st Code:		69790 0	2-6694-908
Ceriodaph	nia Survival and Re	producti	on Test		11.5	05				Paci	fic EcoRisk
Reproduct	ion 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	34	31	31	38	30	36	34	35	33	33
500		33	38	28	32	26	32	27	31	32	31
1000		32	33	31	30	0	27	4	26	0	- /
1500		24	24	21	24	9	23	23	20	20	19
2000		0	0	0	7	9	4	18	8	0	7
2500		0	0	0	0	0	0	0	0	0	0
Survival De	etail										
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	0	1	0	1	0	
1500		1	1	1	1	1	1	1	1	1	1
2000		0	0	0	1	1	1	1	1	0	1
2500		0	0	0	0	0	0	0	0	0	0
Survival Bi	nomials	<u></u>									
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	0/1	1/1	0/1	1/1	0/1	
1500		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
2000	9	0/1	0/1	0/1	1/1	1/1	1/1	1/1	1/1	0/1	1/1
2500		0/1	0/1	0/1	0/1	0/1	0/1	0/1	0/1	0/1	0/1

Analyst: R6 QA: SD

CETIS QC Plot

Ceriodaphnia Survival and Reproduction	n Test		Pacific EcoRisk
Test Type: Reproduction-Survival (7d)	Organism: Ceriodaphnia dubia (Water Flea)	Material:	Sodium chloride
Protocol: EPA-821-R-02-013 (2002)	Endpoint: Survival	Source:	Reference Toxicant-REF

Ceriodaphnia Survival and Reproduction Test 3500-+3s 3000-+25 2500-EC50-mg/L Sodium chloride 2000 lean 1500 1000--2s 500 -35 0 11 3 10 12 z 9 7 8 13 14 15 16 17 18 1 6 19 20 21

			ean: gma:	1721 496.8		ount: V:	20 28.90%	-2s Warr +2s Warn	-		-3s Action Limit: +3s Action Limit:	
Quali	luality Control Data											
Point	Year	Month	Day	Time	QC Data	Delta	Sigma	Warning	Action	Test ID	Analysis ID	
1	2016	May	10	14:15	1594	-127.2	-0.2561			04-1900-2071	02-7180-6176	Constraints Constraints (1997) & Malandar (1997) & Radiana anno anno anno ann an 1997 & William Sanirana ann anno an 1998
2			17	16:30	2117	396	0.7971			02-0217-2091	01-8095-6167	
3			24	14:40	1369	-352	-0.7085			12-4725-4616	17-8748-4211	
4		Jun	14	12:15	321.4	-1400	-2.817	(-)		06-1840-5245	14-8979-7423	
5			23	10:40	2125	403.7	0.8126			16-6250-9087	17-5652-1508	
6			23	13:25	2105	384.4	0.7738			07-7424-9431	12-9537-7598	
7			28	13:00	1933	212	0.4267			09-5722-1456	07-9253-0885	
8		Jul	6	13:00	2019	297.9	0.5996			09-9739-4449	17-8269-3326	
9			7	10:20	2064	343.2	0.6909			07-3590-7818	09-8307-4510	
10			12	13:45	1831	109.6	0.2207			19-4280-6480	04-6439-4868	
11		Aug	9	14:15	1918	197.4	0.3973			01-7078-3993	16-1640-2231	
12			11	15:25	1759	38.26	0.07701			05-4282-8788	09-4783-9953	
13			18	13:30	2050	328.9	0.662			09-3523-7380	14-1088-4073	
14			23	14:15	1870	149	0.2999			20-3175-3833	16-0364-9515	
15			25	14:35	1968	247	0.4972			08-0124-0684	18-2643-7985	
16			30	16:05	1913	191.7	0.3859			02-5260-5089	09-5069-0405	
17		Sep	8	13:40	1957	236.4	0.4759			18-2267-1225	05-8688-6279	
18			13	10:20	1198	-523	-1.053			15-9643-7614	12-2668-1557	
19			15	14:20	1718	-3.382	-0.00681			16-2243-5631	01-5480-0827	
20			20	15:00	597.9	-1123	-2.261	(-)		18-2996-3053	17-7702-4069	
21			27	12:50	1739	17.88	0.03599			02-6694-9084	03-6116-4434	

Analyst: <u>RG</u> QA: <u>SD</u>

CETIS QC Plot

Ceriodaphr	nia Survival and Reproduction	Test				Pacific EcoRis
	Reproduction-Survival (7d) EPA-821-R-02-013 (2002)		Ceriodaphnia dubia (Water Flea) Reproduction	Material: Source:	Sodium chloride Reference Toxicar	nt-REF
	3000	Ceriod	aphnia Survival and Reproduction Test			2
	2500-				6	
ride	2000-					+35
IC50-mg/L Sodium chloride	1500-	- /				/
IC50-mg/I	1000-					Mean
	500-					-25
			3 9 10 11 12 13 14	15 16	17 18 19 20	-35

Mean: Sigma: 3	1326 364	Count: CV:	20 27.50%	-2s Warning Limit: +2s Warning Limit:		-3s Action Limit: +3s Action Limit:	
Quality Control Data							
Point Year Month Day Ti	me QC D	ata Delta	Sigma	Warning Action Te	est ID	Analysis ID	

Point	Year	Month	Day	Time	QC Data	Delta	Sigma	Warning	Action	Test ID	Analysis ID
1	2016	May	10	14:15	1216	-110	-0.3021			04-1900-2071	20-3182-9235
2			17	16:30	1684	358.4	0.9847			02-0217-2091	07-3645-9270
3			24	14:40	1042	-284.3	-0.7811			12-4725-4616	17-2108-7232
4		Jun	14	12:15	255	-1071	-2.942	(-)		06-1840-5245	10-0782-9712
5			23	10:40	1603	277.2	0.7616			16-6250-9087	07-8286-1737
6			23	13:25	1628	302.2	0.8303			07-7424-9431	14-5397-9899
7			28	13:00	908.1	-417.9	-1.148			09-5722-1456	07-0717-9325
8		Jul	6	13:00	1696	370.1	1.017			09-9739-4449	05-4282-8277
9			7	10:20	1679	353	0.9699			07-3590-7818	02-2720-1850
10			12	13:45	1435	109	0.2995			19-4280-6480	01-6291-6561
11		Aug	9	14:15	1528	202.3	0.5558			01-7078-3993	16-5522-9106
12			11	15:25	1598	271.5	0.746			05-4282-8788	20-6991-7970
13			18	13:30	1607	281.3	0.7727			09-3523-7380	12-7959-5180
14			23	14:15	1598	271.9	0.7469			20-3175-3833	12-9031-4120
15			25	14:35	1196	-130.1	-0.3574			08-0124-0684	03-1672-5825
16			30	16:05	1425	99	0.272			02-5260-5089	20-2491-5546
17		Sep	8	13:40	1226	-100.1	-0.2749			18-2267-1225	12-1761-7946
18			13	10:20	930.9	-395.1	-1.086			15-9643-7614	16-7658-0121
19			15	14:20	1132	-193.7	-0.5323			16-2243-5631	01-2656-4408
20			20	15:00	1140	-186.3	-0.5118			18-2996-3053	19-4443-0639
21			27	12:50	1624	297.8	0.818			02-6694-9084	01-8681-6691

Analyst: RG QA: SD

Client: Reference Toxicant						N	faterial:			um Chl				Te		9/27/16				
Pro	ject #:	263	308	-	Test ID:		69790		- 1	Random	ization:	10	.6.1			_	Control			
	Day	<u> </u>	Н		.0.		ity (µS/cm)	, i o i i p				Su	rvival / R	Reproduc	tion				SIGN-OFF	
	 	New	Old	New	Old	New	Old	("C)	A	В	С	D	E	F	G	н	1	1		
	0	8.01		8.6		321		25.6	0	0	0	0	0	0	0	0	0	0	Sol'n Prep We THE Time: 1250	
		8.53	8.17	8.0	1	324	334	25.0	0	0	0	0	0	Ø	0	0	б	0		413×116
	2	8.30	, ,	9.0	7.2	328	375	22.1	в	0	0	0	<u>ಲ</u>	J	0	0	\heartsuit	৩	Date: 4/29/16 New WQ: 10-Counts, 137 Sol'n Prep: 50 Old WQ: 22 Time: 1137	
ıtrol	3	7.42	8.30	8,3	6.1	328	335	25:3	6	5	5	6	6	4	6	0	5	0	Dater 132 16 New WQ: RB Counts TK Sol'n Prep: TK Old WQ: EB Time: 1235	
Lab Water Control	4	7.86	7.92	8.2	7.3	329	369 3000	25.4	0	0	0	0	0	0	Õ	7	0	6	Date: OIII New WQ: TE Counts TK Sol'n Prep: TK Old WQ: DT Time LACE	
Lab Wa	5	7,75	8,00	7.9	6,3	309	343	25.1	12	14	13	14	n	13	12	13	12	13	Date: 10/2/14 New WQ: 777 Counts Sit Sol'n Prep: SI(Old WQ: 8 Time: 1405)
	6	_	7.59	-	7.4	-	339	24.9	16	12	13	18	13	17	16	15	16	14	Date: 1013/16 New WQ: - Counts JL Sol'n Prep: Old WQ: TK Time 1405	
	7																		Date: New WQ: Counts: Sol'n Prep: Old WQ: Time:	
	8																		Date: Old WQ: Counts: Time:	
								Total=	34	31	31	38	30	36	34	35	33	33	Mean Neonates/Female = 33.5	
	Day	p New	H Old	D New	.O. Old	Conductivi New	ity (µS/cm) Old		A	в	С	Surviva D	I / Repro	duction F	G	н		1	RT BATCH NUMBER	
8101410	0	7.82		8. D	Ciu	1310			0	0	0	0	0	0	0	0	0	0	230	
	1	7.56		8.3	7,0	1346	1391		0	0	Ð	Ð	0	0	0	0	0	0	230	
	2	3.10	7,74	9.0	8.0	1337			6	0	0	0	0	0	0	0	0	S	230	
	3	7,87	8,19	8.5	6.5	1270	1427		5	5	5	6	ч	5	5	0	0	0	230	
500 mg/L	4	7.73	7.83	8.3	74	1333	1497		Ð	Ο	Ð	0	0	13	0	6	5	6	230	
500	5	7.67.	7.87	8.0	6.7	1355	1445		12	15	11	12	٩	0	14	8	12	13	230	
	6	-	7.55	-	6.8		1459		16	18	13	14	13	10	8	17	15	R		
	7																			
	8	8																		
	Total= 33 38 28 32 26 32 27 31 32 31 Mean Neonates/Female = 31 0					Mean Neonates/Female = 31 0														

C	Client: Reference Toxicant				N	laterial:		Sodi	um Chl	oride		-	Te	st Date:	9/27/6				
Pro	ect #:	263	308		Test ID:		69790		-								Control	l Water:	SRW
	Day		Н	D.	.0.	Conductiv	ity (µS/cm)	lb			1010	Su	rvival / F	Reproduct	tion				
		New	Old	New	Old	New	Old	(°C)	A	В	С	D	E	F	G	н	I	J	
	0	781		8.1		2208			0	0	0	0	0	0	0	0	0	0	
	1	747	7,99	8.5	7.6	2196	2358		0	0	0	0	0	0	0	Ð	0	0	
	2 .	7-62	7.70	8.7	7.9	2274	2335		Û	0	C	0	0	Q	C	0	C	0	
	3	7.86	8.16	8.8	6.8		2510		0	6	0	5	*/0	0	4	O	1/0	0	
1000 mg/L	4		7.86		-		2624		6	0	6	0		5	0	5	-	7	
1000	5	7,60	7.87	8.1		2186	2350		13	13	12	12	-	9	×/0	9	-	-/12	
	6		7.53	~	7.3				13	14	13	13	-	13	-	12	-	/12	
	7		1.20		1.5		2512		<u> </u>	1		13		10	-	100	-		
	8												-		~				
								Total=	32	33	31	30	- */0	য	×/4	26		-	
	Day	p	<u>1988</u> H	D.	0.	Conductiv	ity (μS/cm)	Total	32	-22	121		1 / Repro			26	r/5	-/19	Mean Neonates/Female = $20,3$
		New	Old	New	Old	New	Old		А	В	С	D	E	F	G	Н	I	J	
	0	781		8-6		316495 2965			٥	0	0	0	J	O	0	0	C	0	
	1	7.50	7,97	8-8	7.8	3130	3280		0	0	0	0	0	0	0	0	0	0	
	2	7.61	7,70	8.9	8,0	3/2 LF	1.3400		ů	Ö	0	0	o	0	0	0	0	0	
	3	7,85	8.13	91	6.6	3050			Θ	9	ΰ	5	0	5	ч	4	0	0	
1500 mg/L	4	7.68	7.88	8.7			D5 3410		4	5	ч	O	483	0	0	0	ч	4	
1500	5		7.87			3073	3420		9	10	ii	9	0	10	7	8	9	7	
	6	_	7.55		7.1	-	3460		11	9	G	10	6	8	12	8	7	8	
	7				1.1		5100				-		_		-	<u>,</u>	,		
	8																		
								Total=	24	ર્પ	21	24	9	23	23	20	૨૦	19	Mean Neonates/Female = 20,7

	Client: Reference Toxicant					N	laterial:		Sodi	um Chl	oride			Te	st Date:	9/27/16			
Pro	oject #:	26	308	-	Test ID:		69790									Contro	l Water:	SRW	
	Day	p	H	D.	.0.	Conductiv	ity (µS/cm)	Temp				Su	rvival / F	Reproduc	tion		· · · · · · · · · · · · · · · · · · ·		
		New	Old	New	Old	New	Old	(°C)	A	В	C	D	E	F	G	н	I	J	
	0	7-80		8.6		3910			0	0	0	0	0	0	0	0	0	0	
	1	7.50	7.97	9.0	7.7	4000	4120		0	0	0	0	0	0	0	0	0	0	
	2	764	7.71	9.1	8,5	3972	3901		*6	×%	×10	Ü	C	C	C	0	×	0	
	3	7.84	8.12	9.0	6.9	3920	4300		-	-		0	0	0	0	0	-	0	
2000 mg/L	4	7.65	7.85	910	7.5	4070	4360		-	-	-	2	6	0	2	0	`	0	
200(5	7.62	7.83	8.5	6.6	7938	4470		-	-	-	5	3	0	6	3	1	4	
	6								-	-	-	0	6	4	10	5	-	3	
	7								-	-							~		
- 	8																	126 101911	
								'Total=	+10	40	×10	7	9	4	18	રે	×10		Mean Neonates/Female 50 5.3
	Day	p	Н	D.	0.	Conductivi	ity (μS/cm)		4			Surviva	I / Repro	duction					
		New	Old	New	Old	New	Old		A	B	С	D	E	F	G	Н	1	J	
	U	777		9.1		4800			0	0	0	0	0	0	0	0	0	С С	
	1	7.52	7.95	9.3	7.7	4850	5060		0	0	0	0	0	0	0	0	0	0	
	2	7.61	7.67	9.5	8.7	4837	5091		410	×10	×/0	×/o	×10	×⁄	×10	×⁄o	×10	×10	
	3	-	—	-		-	-		-	-	1		-	-		-			
2500 mg/L	4			<u> </u>		-			-	-	ł	1	l	١	-	{	1	-	
2500	5		/	1	1	-	+		-	-	_	1	1	۱	-	+		-	
	6	-	-	-		~	-		-	1		-	-	-	-	-	1	~	
	7	~	-	-	-	-	-		-	-	1	-	-	-	-	-	1	-	
	8		-				-		-		-	-	_	-	-	·			
								Total=	×10	×,	Ho	XIU	×10	46	×10	Ho	¥0	×IO	Mean Neonates/Female = 0



TOXICITY REDUCTION EVALUATION: CERIODAPHNIA DUBIA

LEHIGH SOUTHWEST CEMENT CO.

9/7/16

SUBMITTED TO:

Robertson-Bryan, Inc. 9888 Kent St. Elk Grove, CA 95624 Attention: Paul Bedore

SUBMITTED BY:

AQUA-Science

630 Cantrill Drive Davis, CA 95618

September 28, 2016



EFFLUENT TOXICITY TESTS FOR ASSESSING COMPLIANCE WITH NPDES CHRONIC TOXICITY LIMITS

1.0 CLIENT INFORMATION

Client:	Robertson-Bryan, Inc.
	9888 Kent St.
	Elk Grove, CA 95624
Contact:	Paul Bedore
Phone:	(916) 405-8918
email:	paul@robertson-bryan.com

2.0 **BIOTOXICITY TESTING REQUIREMENTS**

Project:	Lehigh Southwest Cement Co.
NPDES No:	CA 0030210
Test Type:	Chronic 7-Day Ceriodaphnia dubia Survival and Reproduction
Test Protocol:	EPA 821-R-02-013 (see Attachment 1 for protocol summary)
Dilution Series:	Lab control, 6.25, 12.5. 18.75, 25 & 40% biologically-treated effluent diluted in permeate - filtered (0.22 um)
	Lab control & 25% biologically-treated effluent diluted in permeate - unfiltered

3.0 CURRENT TEST INFORMATION

Event:	Toxicity Reduction Evaluation (TRE)
Test Samples:	Biologically-treated Effluent diluted in Permeate
Sample Dates:	9/6/16 (grab samples)
Test Initiation:	9/7/16
Test Completion:	9/14/16

4.0 SUMMARY OF RESULTS

The purpose of this test was to determine the *C. dubia* chronic toxicity of varying ratios of filtered and unfiltered reverse-osmosis permeate mixed with biologically-treated effluent (see Attachment 2). The dilution series with filtered samples detected no dose-related mortality, but severe reproductive impairment was observed (90.0 TUc; 100/EC₂₅). The test with the 25% unfiltered biologically-treated effluent had 60% survival and severe reproductive impairment (0 neonates/female).



5.0 TEST RESULTS

5.1 Filtered Test Mixtures (0.22 um)

5.1.1 Current Effluent Test Data

Sample Concentration (%)	% Survival	Reproduction (neonates/female)		QA/QC Requirements Met:
Lab Control	100	17.0	•	≥80% survival in controls
6.25	90	3.5*		average neonates/female in controls
12.5	100	7.4*		≥15
18.75	100	2.8*		
25	100	9.9*	•	60% of surviving control females produced at least three broods
40	80	0.2*		

* Significantly different than control (p<0.05)

5.1.2 Current Effluent Test Results

Test End	pointª	NOEC (%)	LOEC (%)	EC ₂₅ (%)	EC₅₀ (%)	PMSD⁵ (%)
Suminal	% Effluent	40	> 40	> 40	> 40	с
Survival	TUc	2.5	n/a	< 2.5	< 2.5	
Reproduction	% Effluent	< 6.25	6	1.1	3.6	31.1
Reproduction	TUc	> 16.0	n/a	90.9	27.8	51.1

a Cetis™ v. 1.8.7.7 was used to calculate test endpoint

b PMSD = Percent Minimum Significant Difference

c Value could not be calculated due to statistical method used

5.1.3 Comments

Based on the EC_{25} (TUc = 100/ EC_{25}), the biologically-treated effluent/permeate mixtures produced significant reproductive toxicity (90.9 TUc) in the chronic *C. dubia* survival and reproduction test. There was no mortality detected at any test concentration.

5.2 Unfiltered Test Mixtures

5.2.1 Current Effluent Test Data

Sample Concentration (%)	Survival (%)	Survival (NOEC %)	PMSD⁵ (%)	Reproduction (neonates/ female)	Reproduction (NOEC %)	PMSD⁵ (%)	Toxic Units ^c
Lab Control	100	n/a		23.2	n/a		
25	60*	< 25	d	0*	< 25	9.0	> 4.0

* Significantly different than control (p<0.05)

a Cetis™ v. 1.8.7.7 was used to calculate test endpoint

b PMSD = percent minimum significant difference

c Toxic Units (TUc) = 100/NOEC; based on the most sensitive endpoint

d Value could not be calculated due to statistical method used

5.2.2 Comments

The unfiltered 25% biologically-treated effluent/permeate mixture produced significant mortality and reproductive effects in the chronic *C. dubia* toxicity test (NOEC < 25%).



6.0 QA/QC

All protocol and QA/QC requirements were met in these tests.

7.0 TESTING FACILITY

AQUA-Science 630 Cantrill Drive Davis, CA 95618 (530) 753-5456 California Department of Health Services ELAP Certification No. 2205 (1/31/17)

File Reference: _ Lehigh (2016-03 TRE)

Approved By/Issue Date:

Jeffrey L. Miller, Ph.D., DABT President ATTACHMENT 1

SUMMARY OF TEST CONDITIONS AND TEST ACCEPTABILITY CRITERIA

SUMMARY OF TEST CONDITIONS AND TEST ACCEPTABILITY CRITERIA FOR DAPHNID, *CERIODAPHNIA DUBIA*, SURVIVAL AND REPRODUCTION TOXICITY TESTS WITH EFFLUENTS AND RECEIVING WATERS (TEST METHOD 1002.0)¹

1.	Test type:	Static-renewal (required)
2.	Temperature:	25 ± 1 °C (recommended) Test temperatures should not deviate (i.e. maximum minus minimum temperature) by more than 3 °C during the test (required)
3.	Light quality:	Ambient laboratory illumination (recommended)
4.	Light intensity:	10-20 μ E/m ² /s, or 50-100 ft-c (ambient laboratory levels) (recommended)
5.	Photoperiod:	16 h light, 8 h dark (recommended)
6.	Test chamber size:	30 mL (recommended minimum)
7.	Test solution volume:	15 mL (recommended minimum)
8.	Renewal of test solutions:	Daily (required)
9.	Age of test organisms:	Less than 24 h; and all released within an 8-h period (required)
10.	No. neonates per test chamber:	1 Assigned using blocking by known parentage (required)
11.	No. replicate test chambers per concentration:	10 (required minimum)
12	. No. neonates per test	
	Concentration:	10 (required minimum)
13.	. Feeding regime:	Feed 0.1 mL each of YCT and algal suspension per test chamber daily (recommended)
14	. Cleaning:	Use freshly cleaned glass beakers or new plastic cups daily (recommended)
15	. Aeration:	None (recommended)
16	. Dilution water:	Uncontaminated source of receiving or other natural water, synthetic water prepared using MILLIPORE MILLI-Q® or equivalent deionized water and reagent grade chemicals or DMW (available

¹ For the purposes of reviewing WET test data submitted under NPDES permits, each test condition listed above is identified as required or recommended. Additional requirements may be provided in individual permits, such as specifying a given test condition where several options are given in the method.

options)

SUMMARY OF TEST CONDITIONS AND TEST ACCEPTABILITY CRITERIA FOR DAPHNID, *CERIODAPHNIA DUBIA*, SURVIVAL AND REPRODUCTION TOXICITY TESTS WITH EFFLUENTS AND RECEIVING WATERS (TEST METHOD 1002.0) (continued)

17. Test concentrations:	Effluents: minimum) Receiving water:	5 and a control (required 100% receiving water (or minimum of 5) and a control (recommended)
18. Dilution factor:	Effluents: Receiving water:	≥ 0.5 (recommended) None or ≥ 0.5 (recommended)
19. Test duration:		e surviving control females have kimum test duration 8 days)
20. Endpoints:	Survival and repr	oduction (required)
21. Test acceptability criteria:	an average of 15 female in the con	rvival of all control organisms and or more young per surviving trol solutions. 60% of surviving nust produce three broods
22. Sampling requirements:	within 24 h or the sampling device. three samples (e.g	samples collected daily and used time they are removed from the For off-site tests, a minimum of g., collected on days one, three, naximum holding time of 36 h equired)
23. Sample volume required:	1 L/day (recomm	ended)

ATTACHMENT 2

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LEHIGH PILOT RO SYSTEM STUDY PLAN

Lehigh Pilot RO System Testing

Test Event 2 – September 6, 2016

Testing of an ultra-filtration reverse osmosis (UFRO)/biological system is planned. Information provided to date indicates that the UFRO/biological system is producing a final, combined effluent consisting of 25% biologically treated concentrate (i.e., biological effluent) + 75% permeate. Different mixtures of varying ratios of permeate and biological effluent will be tested by the lab.

- Biological effluent and permeate will be collected separately by Lehigh staff.
 - Permeate 2 x 2.5 gallon grab samples. Equal volume aliquots from the two grab samples should be combined for use as the "permeate" in the test.
 - Biological effluent 2 x 2.5 gallon grab samples. Equal volume aliquots from the two grab samples should be combined for use as the "biological effluent" in the test.
 - No renewal samples will be collected for the test.
- Aeration Biological effluent will have <u>low DO</u> and <u>elevated sulfides</u> when received. Aerate the biological effluent to ≥ 6 mg/L DO and < 0.1 mg/L sulfide prior to making test mixtures.
- Mixtures listed in Table 1 will be used in chronic *C. dubia* testing against a shared lab water control – some mixtures will be tested after filtration, and one mixture tested without filtration.
 - o Mixtures requiring 0.2 μm filtration to remove pathogens 5 mixtures.
 - Mixture not requiring filtration 1 mixture (to evaluate whether pathogens are removed with filtration).

Table 1. Ratios of biological effluent to permeate for chronic C. dubia toxicity tests.

	Mixtures Receiving 0.20 µm filtration									
Biological Effluent	40%	25%	18.75%	12.5%	6.25%	25%				
Permeate	60%	75%	81.25%	87.5%	93.75%	75%				

- Sample pick-up:
 - Laboratory courier is needed. Sample will be ready for pick-up on September 6 at 11:00 a.m. at the Lehigh gate.
 - Expect two coolers labeled "Aqua Science"
 - Please bring two coolers to replace the coolers that Lehigh has on-hand.
 - o Lehigh address: 4001 Stevens Creek Blvd, Los Altos, CA 94024.

CERIODAPHNIA 7-DAY SURVIVAL AND REPRODUCTION TEST

Statistics and Raw Data

CETIS Sun	nmary Repo	ort						Report D Test Cod					9 (p 1 of 2) -0883-3410
Ceriodaphnia	7-d Survival and	d Reproducti	on Te	st								Aqu	a-Science
Batch ID: Start Date: Ending Date: Duration:	17-2397-0602 07 Sep-16 12:3 14 Sep-16 14:1 7d 2h	5 Protoc	col: es:	Reproduction-S EPA/821/R-02-0 Ceriodaphnia du In-House Cultur	013 (2002) ubia			Analyst: Diluent: Brine: Age:		/alker neate			
-	15-1922-4009 06 Sep-16 09:2 06 Sep-16 13:3 27h (14.2 °C)		al: e:	5A8D84C9 Industrial Effluer NPDES Permit : Biological Efflue	#CA003021	0 (Lehigh C	eme	Client: Project:		gh Ceme elerated N	nt Monitorin	g	
Sample Note:	0.22 µm Filtere	d											
Comparison S	Summary												
Analysis ID	Endpoint	1	NOEL	LOEL	TOEL	PMSD	τu	Me	thod				
15-4262-5064	7d Survival Rat	e 4	10	>40	NA	NA	2.5	7 Fis	her Exa	ct/Bonfe	rroni-Hol	m Tes	t
08-7949-9670	Reproduction		<6.25	6.25	NA	31.1%	>16'	/			ank Sum		•
Point Estimat	e Summary												
Analysis ID	Endpoint	l	_evel	%	95% LCL	95% UCL	τu	Me	ethod				
17-3269-1605	7d Survival Rat	E E E	EC5 EC10 EC15 EC20 EC25 EC40	26.75 30.6 35 40 >40 >40	1.693 26.35 28.14 30.6 N/A N/A	N/A N/A N/A N/A N/A	3.73 3.26 2.85 2.5 <2.5 <2.5	7 7	ear Inte	rpolation	(ICPIN)		
06-9195-8089	Reproduction	 	EC50 C5 C10 C15 C20 C25 C40 C50	>40 0.1638 0.3545 0.5763 0.8345 1.135 2.366 3.558	N/A 0.1398 0.2991 0.4806 0.6876 0.9234 1.848 2.7	N/A 0.2095 0.463 0.7695 1.14 1.589 3.581 5.701	<2.5 610. 282. 173. 119. 88.1 42.2 28.1	5 Lin 1 5 8 •	ear Inte	rpolation	(ICPIN)		
Test Acceptat	allity		000	0.000	2.1	0.701	20.1						
•	•		A +++;i	ito	Toot Stat	TAC Limi	**	0	orlan	Decisi			
Analysis ID	Endpoint		Attribu		Test Stat	TAC Limi	ts		erlap	Decisio		1.111	Daite ai a
15-4262-5064 17-3269-1605	7d Survival Rat 7d Survival Rat			Resp	1	0.8 - NL 0.8 - NL		Ye			Accepta		
06-9195-8089	Reproduction			l Resp l Resp	17	15 - NL		Ye Ye			Accepta Accepta	•	
08-7949-9670	Reproduction		PMSD		0.3109	0.13 - 0.47	7	Ye			Accepta	-	
7d Survival R	•								_				
C-%	Control Type	Count I	Mean	95% LCL	95% UCL	Min	Мах	St	d Err	Std De	v CV%	6	%Effect
0	Lab Water			1	1	1	1	0		0	0.09		0.0%
6.25			o.9	0.6738	1	0	1	0.1		0.3162	35.1		10.0%
12.5			1,/	1	1	1	1	0		0	0.0%		0.0%
18.75			1-	1	1	1	1	0		0	0.0%		0.0%
25			17,	1	1	1	1	0		0	0.0%		0.0%
40			0.8	0.4984	1	0	1		333	0.4216			20.0%
Reproduction	Summary												
C-%	Control Type	Count I	Meaņ	95% LCL	95% UCL	Min	Max	Ste	d Err	Std De	v CV%	6	%Effect
0	Lab Water	10	17 /	12.39	21.61	9	27	2.0)39	6.446	37.9	2%	0.0%
6.25			3.5 /	1.361	5.639	0	10		9458	2.991	85.4		79.41%
12.5			7.4	1.567	13.23	0	22		579	8.154	110		56.47%
18.75			2.8	0.9903	4.61	0	9	3.0		2.53	90.3		83.53%
25		10 9	9.9	5.602	14.2	0	- 19	1.9		6.008	60.6		41.76%
40		10 (0.2	-0.2524	0.6524	0	2	0.2		0.6325			98.82%

CETIS Summary Report

Ceriodaphnia 7-d Survival and Reproduction Test

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7d Survival Rate 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	1	1	1	1	1	1	1	1	1	1		
6.25		1	1	1	1	1	1	1	1	1	0		
12.5		1	1	1	1	1	1	1	1	1	1		
18.75		1	1	1	1	1	1	1	1	1	1		
25		1	1	1	1	1	1	1	1	1	1		
40		1	1	1	1	1	1	0	0	1	1		

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	15	27	13	22	25	11	21	9	10	17
6.25		3	0	0	6	2	10	3	5	4	2
12.5		3	0	0	22	4	11	0	4	10	20
18.75		3	2	2	4	3	0	9	3	2	0
25		13	17	11	8	10	13	19	0	4	4
40		0	0	2	0	0	0	0	0	0	0

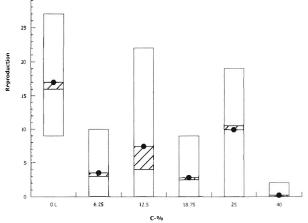
Report Date:

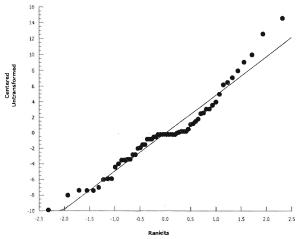
Test Code:

Aqua-Science

19 Sep-16 14:09 (p 2 of 2)

									lest	Code:	e4711603a 00-0883-3			
Ceriodaphnia	a 7-d Survival ar	d Repr	oduction Te	st								Aqı	ua-Scienc	
Analysis ID:	08-7949-9670		Endpoint:	Rep	roduction				CET	IS Version:	CETISv1.	8.7		
Analyzed:	19 Sep-16 14:)9	Analysis:	Non	parametric-	Control	vs T	reatments	Offic	ial Results:	Yes			
Data Transfo	rm	Zeta	Alt H	ур	Trials	Seed			PMSD	NOEL	LOEL	TOEL	τu	
Jntransforme	d	NA	C > T		NA	NA			31.1%	<6.25	6.25	NA	>16	
Steel Many-O	ne Rank Sum T	est												
Control	vs C-%		Test	Stat	Critical	Ties	DF	P-Value	P-Type	Decision(α:5%)			
Lab Water	6.25*		56.5		75	1	18	0.0006	Asymp	Significant	Effect			
	12.5*		72.5		75	3	18	0.0288	Asymp	Significant	Effect			
	18.75*		55.5		75	1	18	0.0004	Asymp	Significant	Effect			
	25		77.5		75	4	18	0.0711	Asymp	Non-Signif	ficant Effect			
	40*		55		75	0	18	0.0004	Asymp	Significant	Effect			
ANOVA Table	;													
Source	Sum Squ	ares	Mean	Squ	are	DF		F Stat	P-Value	Decision(α:5%)			
Between	1844.6		368.9	2		5		13.84	<0.0001	Significant	Effect			
Error	1439		26.64	815		54								
Total	3283.6					59								
Distributiona	l Tests													
Attribute	Test				Test Stat	Critic	al	P-Value	Decision	(α:1 <u>%)</u>				
Variances	Bartlett E	quality	of Variance		43.61	15.09		<0.0001	Unequal V	/ariances				
Distribution	Shapiro-	Wilk W	Normality		0.9537	0.945	9	0.0232	Normal D	istribution				
Reproduction	n Summary													
C-%	Control Type	Cour	nt Mean		95% LCL	95% l	JCL	Median	Min	Max	Std Err	CV%	%Effect	
C	Lab Water	10	17		12.39	21.61		16	9	27	2.039	37.92%	0.0%	
6.25		10	3.5		1.361	5.639		3	0	10	0.9458	85.45%	79.41%	
12.5		10	7.4		1.567	13.23		4	0	22	2.579	110.2%	56.47%	
18.75		10	2.8		0.9903	4.61		2.5	0	9	0.8	90.35%	83.53%	
25		10	9.9		5.602	14.2		10.5	0	19	1.9	60.69%	41.76%	
40		10	0.2		-0.2524	0.652	4	0	0	2	0.2	316.2%	98.82%	

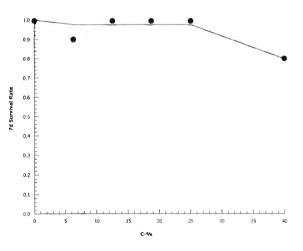




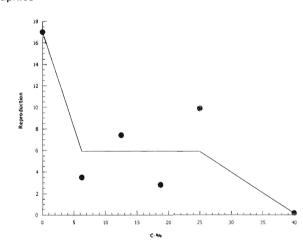
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CETIS	6 Ana	lytical Repo	ort							ort Date: t Code:		•	5 14:09 (p 1 of 2) 8a 00-0883-3410
Ceriod	aphnia	7-d Survival and	d Reprod	luction Te	est								Aqua-Science
Analys	is ID:	17-3269-1605	Er	ndpoint:	7d Survival Rat	e			CE	IS Version:	CETISv1	.8.7	
Analyz	ed:	19 Sep-16 14:0	9 A i	nalysis:	Linear Interpolation (ICPIN))		Offi	cial Results:	Yes		
Linear	Interpo	lation Options											
X Trans	sform	Y Transform	n Se	eed	Resamples	Exp 95%	CL	Method	ł				
Log(X+	1)	Linear	17	775267	200	Yes		Two-Po	oint Inter	polation			
Point E	stimate	es											
Level	%	95% LCL	95% UC	L TU	95% LCL	95% UCL							
EC5	26.75	1.693	N/A	3.739	NA	59.08							
EC10	30.6	26.35	N/A	3.267	NA	3.795							
EC15	35	28.14	N/A	2.857	NA	3.554							
EC20	40	30.6	N/A	2.5	NA	3.267							
EC25	>40	N/A	N/A	<2.5	NA	NA							
EC40	>40	N/A	N/A	<2.5	NA	NA							
EC50	>40	N/A	N/A	<2.5	NA	NA							
7d Sur	vival Ra	ate Summary				Calcu	lated	Variate((A/B)				
C-%	с	ontrol Type	Count	Mean	Min	Max	Std	Err S	Std Dev	CV%	%Effect	Α	В
0	La	ab Water	10	1	1	1	0	()	0.0%	0.0%	10	10
6.25			10	0.9	0	1	0.1	(0.3162	35.14%	10.0%	9	10
12.5			10	1	1	1	0	(C	0.0%	0.0%	10	10
18.75			10	1	1	1	0	(C	0.0%	0.0%	10	10
25			10	1	1	1	0	(C	0.0%	0.0%	10	10
40			10	0.8	0	1	0.13	33 (0.4216	52.7%	20.0%	8	10

Graphics



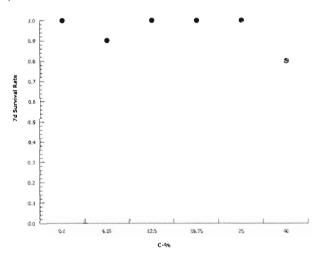
CETIS	S Ana	lytical Rep	ort						Report Da Test Code			16 14:09 (p 2 of 2) 3a 00-0883-3410
Ceriod	aphnia	7-d Survival ar	nd Reproduc	ction Te	est							Aqua-Science
Analys	is ID:	06-9195-8089	End	point:	Reproduction				CETIS Ve	rsion:	CETISv1.8.7	
Analyz	ed:	19 Sep-16 14:	09 Ana	lysis:	Linear Interpola	ition (ICPIN))		Official R	esults:	Yes	
Linear	Interpo	lation Options										
X Tran	sform	Y Transforr	n See	d	Resamples	Exp 95%	CL M	lethod				
Log(X+	1)) Linear 1077142		7142	200	Yes	٦	Two-Point Interpolation				
Point E	Estimate	s										
Level	%	95% LCL	95% UCL	τυ	95% LCL	95% UCL						
IC5	0.163	8 0.1398	0.2095	610.5	477.3	715.5	-					
IC10	0.354	5 0.2991	0.463	282.1	216	334.4						
IC15	0.576	3 0.4806	0.7695	173.5	130	208.1						
IC20	0.834	5 0.6876	1.14	119.8	87.7	145.4						
IC25	1.135	0.9234	1.589	88.1	62.95	108.3						
IC40	2.366	1.848	3.581	42.27	27.93	54.12						
IC50	3.558	2.7	5.701	28.1	17.54	37.04						
Reproc	duction	Summary				Cal	culated	d Variate				
C-%	С	ontrol Type	Count	Mean	Min	Max	Std E	rr Std	Dev CV	%	%Effect	
0	La	ab Water	10	17	9	27	2.039	6.44	6 37.9	92%	0.0%	
6.25			10	3.5	0	10	0.945	8 2.99	1 85.4	45%	79.41%	
12.5			10	7.4	0	22	2.579	8.15	4 110	.2%	56.47%	
18.75			10	2.8	0	9	0.8	2.53	90.3	35%	83.53%	
25			10	9.9	0	19	1.9	6.00	8 60.0	59%	41.76%	
40			10	0.2	0	2	0.2	0.63	25 316	.2%	98.82%	



 $\left(\right)$ Analyst:

CETIS An	alyti	ical Rep	ort						•	ort Date: t Code:		19 Sep-16 14:09 (p 1 of 1) e4711603a 00-0883-3410				
Ceriodaphn	ia 7-d	Survival an	d Rep	roduction Te	est							Α	qua-Science			
Analysis ID: Analyzed:		4262-5064 Sep-16 14:()9	Endpoint: Analysis:		Survi v al Ral 2 2x2 Contir	te ngency Tabl	es		IS Version: cial Results:	CETIS. Yes	1.8.7				
Data Transfe	orm		Zeta	Alt H	ур	Trials	Seed			NOEL	LOEL	TOEL	τU			
Untransform	ed			C > T		NA	NA			40	>40	NA	2.5			
Fisher Exac	t/Boni	ferroni-Holr	n Test													
Control	vs	C-%		Test	Stat	P-Value	P-Type	Decision	ı(α:5%)							
Lab Water		6.25		0.5		1.0000	Exact	Non-Sign	ificant Effec							
		12.5		1		1.0000	Exact	Non-Sign	ificant Effect	;t						
		18.75		1		1.0000	Exact	Non-Sign	ificant Effect	t						
		25		1		1.0000	Exact	Non-Sign	ificant Effect	rt						
		40		0.236	8	1.0000	Exact	Non-Sign	ificant Effect	st						
Data Summ	ary															
C-%	Cor	ntrol Type	NR	R		NR + R	Prop NR	Prop R	%Effect							
0	Lab	Water	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%							
18.75			10	0		10	1	0	0.0%							
25			10	0		10	1	0	0.0%							
40			8	2		10	0.8	0.2	20.0%							

Graphics





CETIS Sun	nmary Repo	rt						Report Date: Test Code:		9 Sep-16 14:1 4711603b 10	
Ceriodaphnia	7-d Survival and	d Repro	duction Te	est						Aqı	la-Science
Batch ID: Start Date: Ending Date:	20-6676-6038 07 Sep-16 12:50 14 Sep-16 14:40	о р	est Type: rotocol: pecies:	Reproduction-S EPA/821/R-02- Ceriodaphnia c	-013 (2002)				C. Walker Permeate		
Duration:	7d 2h	s	ource:	In-House Cultu	ire			Age: <	24h		
Sample ID:	15-1922-4009	C	ode:	5A8D84C9				Client: L	ehigh Ceme	nt	
Sample Date:	06 Sep-16 09:20	D N	laterial:	Industrial Efflue	ent			Project: A	Accelerated N	lonitoring	
Receive Date:	: 06 Sep-16 13:30	D S	ource:	NPDES Permit	t #CA003021	0 (Lehigh	Ceme				
Sample Age:	27h (14.2 °C)	S	station:	Biological Efflu	ient						
Sample Note:	UNFILTERED										
Comparison S	Summary										
Analysis ID	Endpoint		NOEL	L LOEL	TOEL	PMSD	TU	Metho	d		
03-3525-4794	7d Survival Rate	9	<25	25	NA	NA	>4	Fisher	Exact Test		
03-2619-8455	Reproduction		<25	25	NA	9.04%	>4	Wilcox	on Rank Sun	n Two-Sample	e ⊤est
Test Acceptal	bility										
Analysis ID	Endpoint		Attrib	oute	Test Stat	TAC Lin	nits	Overla	p Decisio	n	
03-3525-4794	7d Survival Rate	e	Contr	ol Resp	1	0.8 - NL		Yes	Passes	Acceptability	Criteria
03-2619-8455	Reproduction		PMS	D	0.09038	0.13 - 0.4	47	Yes	Below A	cceptability (Criteria
7d Survival R	ate Summary										
C-%	Control Type	Count	Mear	າ 95% LCL	95% UCL	Min	Max	Std Er	r Std Dev	/ CV%	%Effect
0	Lab Water	10	1	1	1	1	1	0	0	0.0%	0.0%
25		10	0.6	0.2306	0.9694	0	1	0.1633	0.5164	86.07%	40.0%
Reproduction	n Summary										
C-%	Control Type	Count	Mear	n 95% LCL	95% UCL	Min	Мах	Std Er	r Std Dev	v CV%	%Effect
0	Lab Water	10	23.2	20.46	25.94	16	28	1.209	3.824	16.48%	0.0%
25		10	0	0	0	0	0	0	0		100.0%
7d Survival R	ate 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	1	1	1	1	1	1	1	1	1	1
25		1	1	1	1	0	1	0	1	0	0
Reproduction	Detail										
C-%	Control Type	Rep 1	Rep 2	2 Rep 3	Rep 4	Rep 5	Rep	6 Rep 7	Rep 8	Rep 9	Rep 10
0	Lab Water	25	24	21	19	27	28	27	23	16	22
25		0	0	0	0	0	0	0	0	0	0

CETIS An	alytical Rep	ort					•	ort Date: Code:			15 (p 1 of 1) 0-9958-1716
Ceriodaphni	a 7-d Survival ar	nd Repro	duction Test					0000.			ua-Science
Analysis ID: Analyzed:	03-2619-8455 19 Sep-16 14:		Endpoint: Rep Analysis: Non		Two Sample	e		IS Version: cial Results		/1.8.7	
Data Transfo	orm —	Zeta	Alt Hyp	Trials	Seed		PMSD	Test Resu	ult		
Untransforme	ed	NA	C > T	NA	NA		9.04%	Fails repro	oduction		
Wilcoxon Ra	ink Sum Two-Sa	mple Te	st								
Control	vs C-%		Test Stat	Critical	Ties DF	P-Value	P-Type	Decision(α:5%)		
Lab Water	25*		55	NA	0 18	<0.0001	Exact	Significan	t Effect		
ANOVA Tabl	e										
Source	Sum Squ	ares	Mean Squ	are	DF	F Stat	P-Value	Decision(α:5%)		
Between	2691.2		2691.2		1	368.1	<0.0001	Significan	t Effect		
Error	131.6		7.311111		18						
Total	2822.8				19						
Distribution	al Tests										
Attribute	Test			Test Stat	Critical	P-Value	Decision	(α:1%)			
Variances			ality of Variance	19.06	8.285	0.0004	Unequal V	/ariances			
Variances	Levene E	Equality o	of Variance	19.47	8.285	0.0003	Unequal V	/ariances			
Distribution	Shapiro-	Wilk W N	formality	0.8509	0.866	0.0055	Non-norm	al Distributio	on		
Reproductio	n Summary										
C-%	Control ⊤ype	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Water	10	23.2	20.46	25.94	23.5	16	28	1.209	16.48%	0.0%
25		10	0	0	0	0	0	0	0		100.0%
Graphics											
30						5				••	٠
25 -		z				2					
Keproduction					Canterred	Untransformed	•		••••	-	

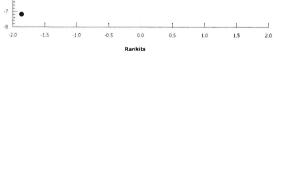
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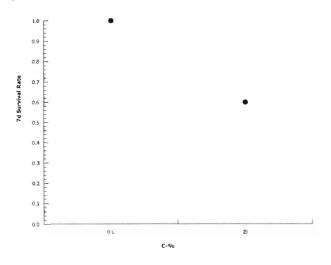
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C-%

alytical Rep	ort						•		6 14:15 (p 1 of 1) 3b 10-9958-1716
a 7-d Survival ar	nd Repr	oduction Test							Aqua-Science
03-3525-4794 19 Sep-16 14:	14				ble			CETISv1.8.7 Yes	
orm	Zeta	Alt Hyp	Trials	Seed			Test Resu	lt	
ed		C > T	NA	NA			Fails 7d su	rvival rate	
Test									
vs C-%		Test Stat	P-Value	P-Type	Decision	ı(α:5%)			
25		0.04334	0.0433	Exact	Significar	nt Effect			
ary									
Control Type	NR	R	NR + R	Prop NR	Prop R	%Effec	t		
Lab Water	10	0	10	1	0	0.0%			
	6	4	10	0.6	0.4	40.0%			
	a 7-d Survival ar 03-3525-4794 19 Sep-16 14: orm ed Test vs C-% 25 ary Control Type	03-3525-4794 19 Sep-16 14:14 prm Zeta ed Test vs C-% 25 iry Control Type NR Lab Water 10	a 7-d Survival and Reproduction Test 03-3525-4794 Endpoint: 7d 3 19 Sep-16 14:14 Analysis: Simpled orm Zeta Alt Hyp cd C > T : Test vs C-% 25 0.04334 ary Control Type NR Lab Water 10 0	03-3525-4794 Endpoint: 7d Survival Ra 19 Sep-16 14:14 Analysis: Single 2x2 Cor orm Zeta Alt Hyp Trials ed C > T NA Test vs C-% Test Stat P-Value 25 0.04334 0.0433 arry Control Type NR R NR + R Lab Water 10 0 10	a 7-d Survival and Reproduction Test 03-3525-4794 Endpoint: 7d Survival Rate 19 Sep-16 14:14 Analysis: Single 2x2 Contingency Ta orm Zeta Alt Hyp Trials Seed cd C > T NA NA it Test vs C-% Test Stat P-Value P-Type 25 0.04334 0.0433 Exact arry Control Type NR R NR + R Prop NR Lab Water 10 0 10 1	a 7-d Survival and Reproduction Test 03-3525-4794 19 Sep-16 14:14 Endpoint: 7d Survival Rate 19 Sep-16 14:14 Analysis: Single 2x2 Contingency Table orm Zeta Alt Hyp Trials Seed ed C > T NA NA ed C > T NA NA : Test	TermTendpoint: 7d Survival RateCI03-3525-4794Endpoint: 7d Survival RateCI19 Sep-16 14:14Analysis: Single 2x2 Contingency TableOforrmZetaAlt HypTrialsSeedC > TNANARedC > TNANATest StatP-ValueP-TypeDecision(α :5%)250.043340.0433ExactSignificant EffectarryControl TypeNRRNR + RProp NRProp R%EffectLab Water10010100.0%	Test Code:a 7-d Survival and Reproduction Test03-3525-4794Endpoint: 7d Survival RateCETIS Version:19 Sep-16 14:14Analysis:Single 2x2 Contingency TableOfficial Results:ormZetaAlt HypTrialsSeedTest Results:ormZetaAlt HypTrialsSeedTest Results:ormZetaAlt HypTrialsSeedTest Results:odC > TNANAFails 7d suedC > TNANAFails 7d sucotTest StatP-ValueP-TypeDecision(α :5%)250.043340.0433ExactSignificant EffectryControl TypeNRRNR + RProp NRProp R%EffectLab Water10010100.0%	Test Code:e4711603Test Code:e4711603a 7-d Survival and Reproduction TestTest Code:e4711603a 7-d Survival and Reproduction TestEndpoint:7d Survival RateCETIS Version:CETISV1.8.719 Sep-16 14:14Analysis:Single 2x2 Contingency TableOfficial Results:YesormZetaAlt HypTrialsSeedTest ResultaddC > TNANAFails 7d survival rateaddC > 0.043340.0433ExactSignificant EffectaddControl TypeNRRNR + RProp NRProp RAddValuer100100.0%

Graphics



Environmental Toxicology Specialists

CERIODAPHNIA SURVIVAL AND REPRODUCTION TEST

Test Number:	Lehigh 16-03 A	Study Director:		J.L. Miller				
Protocol No.:	EPA 821-R-02-013	Technicians:		Walker/McIntyre	/Pham/Davis			
Test Material:	Biological effluent (09/06/	16) in permeate (09/0	6/16) dilution wate	r + 0.22 µm Filtratior	۱			
Test Species:	Ceriodaphnia dubi	a Animal Lot I	No: A/S RO:	090716				
Initiation Date:	September 7, 201	6 Termination	Termination Date: September 1					

Effluent Concentration (%): Lab Control

ADULT SURVIVAL/MORTALITY RECORD

NEONATE REPRODUCTION RECORD

Day	,		F	REP	LICA	TE I	NUM	1BEF	2			Day	,		F	REP	LICA	TE	NUN	1BEF	۲			Tech	Obs.
No.	1	2	3	4	5	6	7	8	9	10	n	No.	1	2	3	4	5	6	7	8	9	10	n	Init.	Date
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6	Ø	Ø	0	Ø	0	Ø	0	Ø	0	B	0	6	Ø	Ø	ϕ	Ø	B	Ø	ч	Ø	Ø	ч	8	\$	3/3
7	Ø	0	Ø	Ø	φ	Ø	Ø	φ	Ø	φ	Ø	7	8	13	4	13	16	6	12	7	3	8	90	~	09/1
n	Ð	0	Φ	0	0	Ø	Ø	0	φ	Φ		n	15	27	13	12	15	11	21	9	10	17			
		- 1	1		1			-		,	-						10								

TOTAL NUMBER OF ADULTS AT STUDY TERMINATION DATE TOTAL NUMBER OF NEONATES PRODUCED MEAN NUMBER OF NEONATES PRODUCED PER ADULT STANDARD DEVIATION FOR THE ABOVE MEAN

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		Additic	onal Com	ments/Ol	bservatio	ns			
Test Initiated / Animals Fe	ed by	×~	@_123	35					
Test Terminated by <u>v~</u>	(@	<u>ပ</u>						
	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7	_	
Time of Observation / Feeding:	1330	1410	1345	1410	1330	1420	1410		

Environmental Toxicology Specialists

CERIODAPHNIA SURVIVAL AND REPRODUCTION TEST

Test Number:	Lehigh 16-03 A	Study Director:	J.L. Miller
Protocol No.:	EPA 821-R-02-013	Technicians:	Walker/McIntyre/Pham/Davis
Test Material:	Biological effluent (09/06/1	6) in permeate (09/06	6/16) dilution water + 0.22 µm Filtration
Test Species:	Ceriodaphnia dubia	Animal Lot N	lo: A/S RO: 090716
Initiation Date:	September 7, 2016	Termination I	Date: September 14, 2016

NEONATE REPRODUCTION RECORD

Effluent Concentration (%): 6.25

ADULT SURVIVAL/MORTALITY RECORD

REPLICATE NUMBER Day REPLICATE NUMBER Day Tech Obs. No. 2 3 4 5 6 7 8 9 10 No. 1 2 3 4 5 6 7 8 9 1 10 n n Date Init. 0 0 Ø 0 Ø 0 Ø 0 0 0 0 ϕ 0 Ø 0 Ø 0 ŝ Ø 0 Ø Ø 0 1 08 1 09/09 Ø Ø Ø 2 Ø $\langle \! \rangle$ Ŵ Ø Ø Ø Ø Ø 2 Ø Ó Ø Ø Ø Ø Ø Ø Ø Ø Ø SD 09 Ø Ø Ø Ø Ø Ø Ø Ø Ø Ø Æ Ø Ø Ø Ø Ø Ø Ø Ø Ø SD 3 Ø Ø 3 0:1 /\ 000 Ø 1 2 000 0 Ø t 3 Ø 0 4 2 4 3 2 4 4 4 αr, Ø 00 Ø Ø Ó Ø 0 Ø Ø Ø Ø Ø Ø 00 \bigcirc Ø Ø Ŵ 5 5 12 Ø 13 0 \oslash Ø Ø Ø 0 \oslash Ø Ø Ø 0 Ø Ø \mathcal{O} Ø 6 Ø Ø 0 6 6 5 09 Ø 00 00 Ø 2 00 0 Ø \mathcal{D} O Ø Ø Ø Ø 3 \mathcal{O} s-7 7 Ĝ 2 ¢ D 3 0 []] ff) 5 ١ n n

TOTAL NUMBER OF ADULTS AT STUDY TERMINATION DATE TOTAL NUMBER OF NEONATES PRODUCED MEAN NUMBER OF NEONATES PRODUCED PER ADULT STANDARD DEVIATION FOR THE ABOVE MEAN

Day 1 Day 2 Day 3 Day 4 Day 5 Day 6 Day 7								
1222 12 12 12 12		Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7
Time of Observation / Feeding: 1332 1413 1357 1415 1335 1422 1415	Time of Observation / Feeding:	1332	1413	1357	1415	1335	1422	1415

Environmental Toxicology Specialists

CERIODAPHNIA SURVIVAL AND REPRODUCTION TEST

Lehigh 16-03 A	Study Director:	J.L. Miller
EPA 821-R-02-013	Technicians:	Walker/McIntyre/Pham/Davis
Biological effluent (09/06/1	16) in permeate (09/06	6/16) dilution water + 0.22 µm Filtration
Ceriodaphnia dubia	Animal Lot N	lo: A/S RO: 090716
September 7, 2016	Termination I	Date: September 14, 2016
	EPA 821-R-02-013 Biological effluent (09/06/ Ceriodaphnia dubia	EPA 821-R-02-013Technicians:Biological effluent (09/06/16) in permeate (09/06/2000)Animal Lot No.Ceriodaphnia dubiaAnimal Lot No.

Effluent Concentration (%): 12.5

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ADULT SURVIVAL/MORTALITY RECORD

Day REPLICATE NUMBER REPLICATE NUMBER Tech Obs. 3 5 7 8 1 2 3 7 4 6 9 10 4 5 6 8 9 No. 10 n n Init. Date CA 0 0 0 Ø \mathcal{O} Ø Ø 0 0 0 \oslash Ø 0 0 Ø Ø Ø Ø \oslash Ø n Ø 1 68 09/09 Ø Ø Ø Ø Ø Ø Ø Ø Ø Ø 2 Ø Ø Ø Ø Ø Ø Ø Ø Ø Ø SD 0 09,0 Ø Ø Ø Ø Ø Ø Ø Ø Ø 03 Ø Ø Ø Ø Ø Ø Ø Ø 3 Ø Ø SO 2 OP Ø Ø O 5 S Ø Ø 0 Ø Ø O 3 \mathcal{O} 2 2 4 ч φ Ч deoa 0 Ø 00 QQ φ QQ 5 9

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NEONATE REPRODUCTION RECORD

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TOTAL NUMBER OF ADULTS AT STUDY TERMINATION DATE TOTAL NUMBER OF NEONATES PRODUCED MEAN NUMBER OF NEONATES PRODUCED PER ADULT STANDARD DEVIATION FOR THE ABOVE MEAN

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Day 1Day 2Day 3Day 4Day 5Day 6Day 7Time of Observation / Feeding:133414101401142013401420								
Time of Observation / Feeding: 1334 1410 1401 1400 1340 1340 1424 1420								
	Time of Observation / Feeding:	1334	1410	í40)	1420	1340	114124	1420

Environmental Toxicology Specialists

CERIODAPHNIA SURVIVAL AND REPRODUCTION TEST

Test Number:	Lehigh 16-03 A	Study Director:	J.L. Miller	
Protocol No.:	EPA 821-R-02-013	Technicians:	Walker/McIntyre/Pham/	Davis
Test Material:	Biological effluent (09/06/1	6) in permeate (09/06/	/16) dilution water + 0.22 µm Filtration	
Test Species:	Ceriodaphnia dubia	Animal Lot No	o: A/S RO: 090716	
Initiation Date:	September 7, 2016	Termination D	Date: September 14, 2016	

Effluent Concentration (%): 18.75

ADULT SURVIVAL/MORTALITY RECORD

Day	/		F	REP	LICA	TE	NUN	1BEF	۲			Day			F	REP	LICA	TE	NUN	1BEF	۲			Tech	Obs.
No.	1	2	3	4	5	6	7	8	9	10	n	No.	1	2	3	4	5	6	7	8	9	10	n	Init.	Date
1	0	Ø	0	0	Ø	0	0	0	0	Ø	0	1	0	0	0	0	0	0	Ø	Ø	Ø	0	0	~	5/2
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5	Ø	0	Ø	Ø	Ø	Ø	0	Ø	Ø	0	φ	5	Ø	0	0	Φ	Ø	Ø	0	Ø	0	\oslash	Φ	5	04/2
6	Ø	Ø	Ø	Ø	0	0	0	0	Ø	Ø	0	6	Ø	0	Ø	ϕ	Ø	Ø	7	Ø	2	Ø	9	~	CGR
7	Ø	Ø	Ø	Q	Ø	Ø	CO	0	Ø	Ø	\mathcal{O}	7	0	0	Ø	0	Ø	Ø	\oslash	Ø	\bigcirc	\bigcirc	Ф	~	09/1
n	Ø	Q	0	Ø	0	Ø	Q	Q	0	\mathbf{Q}		n	3	2	2	4	3	0	9	I D	2	Ф			

TOTAL NUMBER OF ADULTS AT STUDY TERMINATION DATE TOTAL NUMBER OF NEONATES PRODUCED MEAN NUMBER OF NEONATES PRODUCED PER ADULT STANDARD DEVIATION FOR THE ABOVE MEAN

	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7
Time of Observation / Feeding:	1336	1419	1405	1425	1345	1426	1425

Environmental Toxicology Specialists

CERIODAPHNIA SURVIVAL AND REPRODUCTION TEST

Test Number:	Lehigh 16-03 A	Study Director:	J.L. Miller
Protocol No.:	EPA 821-R-02-013	Technicians:	Walker/McIntyre/Pham/Davi
Test Material:	Biological effluent (09/06/1	16) in permeate (09/06/	/16) dilution water + 0.22 µm Filtration
Test Species:	Ceriodaphnia dubia	Animal Lot No	o: A/S RO: 090716
Initiation Date:	September 7, 2016	3 Termination [Date: September 14, 2016

Effluent Concentration (%): 25

ADULT SURVIVAL/MORTALITY RECORD

REPLICATE NUMBER Day Day **REPLICATE NUMBER** Tech Obs. 2 3 4 5 6 7 8 10 2 5 7 No. 1 9 No. 1 3 4 6 8 9 10 n n Init. Date 3 Ø 0 0 Ø Ø 0 Ø 0 0 0 Ø Ø Ø 0 Ø 0 0 Ø Ø ~ Ø Ø 1 1 09. 69 Ø Ó Ø Ø Ø Ø 2 Ø Ø Ø Ø Ø Ø Ø 2 Ø Ø Ø Ø Ø Ø Ø Ø Ø 50 ¢ 09 Ø Ø Ø Ø Ø Ø Ø Ø Ø Ø Ø Ø Ø Ø Ø Ø 3 3 Ø Ø Ø Ø Ć SD 3 1) 0 Ø Ø 00 Ø Z Ø 4 Ø Ø 0 0 2 Ø 4 2 Ч 0 Ø m 4 4 13 0% Ø Ø 00 Ø Co Ø Q Ø 6 Ø in Ø 0 \oslash Ø Ø ϕ 7 Ø φ Ø 5 5 42 09 /3 0 0 Ø O Ø 0 0 0 0 O Ø 9 9 Ø Ø 8 \mathcal{O} 4 ١ s Ø 6 6 11 13 09/1 0 Ø 0 0 Q Ø 0 0 Ø Ø Ø \mathcal{O} Ø s 6 6 0 0 Ø Ø 11 Ø 7 7 Ð 8 13 13 \mathbb{T} 10 4 7 11 (D)ľ n n

TOTAL NUMBER OF ADULTS AT STUDY TERMINATION DATE TOTAL NUMBER OF NEONATES PRODUCED MEAN NUMBER OF NEONATES PRODUCED PER ADULT STANDARD DEVIATION FOR THE ABOVE MEAN

NEONATE REPRODUCTION RECORD

Additional Comments/Observations Day 1 Day 2 Day 3 Day 4 Day 5 Day 6 Day 7 1338 1430 1424 1408 1350 1423 1430 Time of Observation / Feeding:

Environmental Toxicology Specialists

CERIODAPHNIA SURVIVAL AND REPRODUCTION TEST

Test Number:	Lehigh 16-03 A	Study Dire	ctor:		J.L. Miller	
Protocol No.:	EPA 821-R-02-013	Techniciar	าร:		Walker/McIntyr	e/Pham/Davis
Test Material:	Biological effluent (09/06/	16) in permeate	e (09/06/16) d	ilution water	+ 0.22 µm Filtratic	n
Test Species:	Ceriodaphnia dubia	a Anim	al Lot No:	A/S RO:	090716	
Initiation Date:	September 7, 2016	6 Term	ination Date:	5	September 14, 20 ⁻	16

Effluent Concentration (%): **40**

ADULT SURVIVAL/MORTALITY RECORD

REPLICATE NUMBER Day REPLICATE NUMBER Day Tech Obs. No. 2 3 4 5 6 7 8 9 10 No. 1 2 3 4 5 6 7 8 9 10 1 n n Init. Date OR. OO 0 Ø Ø Ø Ø Ø Ø 0 0 OO 0 0 Ø Ø Ø Ø Ø \oslash Ø ~ 1 1 68 og_{la} Ø Ø Ø Ø Ċ Ø Ø Ø Ø 0 Ø US Ø 2 Ø Ø Ø 2 Ø Ø Ø Ø 5D Ø Ø (1)Ø Ø 7/10 Ø Ø Ø Ø Ø Ø Ø 1 Ø Ø Ø Ø) 3 Ø Ø Ø Ø ø Ø 3 50 00 \mathcal{O} Ø \mathcal{O} Ø \emptyset Ø 000 00 00 Ø Ø 2 Ø \oslash 4 4 69 Ø Ċ Ø \mathcal{O} Ø Ø Φ 0 φ Ø Ø C φ \mathcal{Q} 0 Ø Ø Ø φ 5 5 12 02 Ø Ø 00 Ø Ø Ø Ø Ø Ø Ø Ł Ţ \mathcal{O} 0 \oslash Ø Ø 0 6 6 13 09 Ø Ø Ø Ø Ø 0 0 0 0 (C) Ø φ \oslash Ø $\boldsymbol{\varnothing}$ Ø \oslash 7 φ 7 Φ Ð 0 (1)Ø 2 W Ð n n

TOTAL NUMBER OF ADULTS AT STUDY TERMINATION DATE TOTAL NUMBER OF NEONATES PRODUCED MEAN NUMBER OF NEONATES PRODUCED PER ADULT STANDARD DEVIATION FOR THE ABOVE MEAN 0.2

NEONATE REPRODUCTION RECORD

Day 1 Day 2 Day 3 Day 4 Day 5 Day 6 Day 7 Time of Observation / Feeding: 1346 1430 1411 1435 1355 1430 1435								
Time of Observation / Feeding: 1346 1430 1411 1435 1355 1430 1435		Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7
	Time of Observation / Feeding:	1340	1430	1411	1435	1355	1430	1435

Environmental Toxicology Specialists

CERIODAPHNIA SURVIVAL AND REPRODUCTION TEST

Test Number:	Lehigh 16-03 B	Study Director:	J.L. Miller
Protocol No.:	EPA 821-R-02-013	Technicians:	Walker/McIntyre/Pham/Davis
Test Material:	Biological effluent (09/06/16	6) in permeate (09/06/16	5) dilution water
Test Species:	Ceriodaphnia dubia	Animal Lot No:	A/S RO: 090716
Initiation Date:	September 7, 2016	Termination Dat	te: September 14, 2016

Effluent Concentration (%): Lab Control

ADULT SURVIVAL/MORTALITY RECORD

REPLICATE NUMBER Day REPLICATE NUMBER Day Tech Obs. 2 5 7 8 9 10 No. 1 2 3 4 5 6 7 8 9 10 No. 1 3 4 6 n n Date Init. 00 0 C Ø Ø 0 0 Ø 0 00 Ø Ø 0 03 0 Ø 0 \mathcal{O} 0 CO Ø Ø 0 ~ 1 1 68 09/0G Ø Ø Ø Ø Ø Ø Ø Ø Ø Ø Ø Ø Ø 2 Ø Ø Ø Ø Ø Ø 2 Ø Ø Ø SD 09/10 Ø Ø Ø Ø Ø Ø Ø Ø Ø Ø Ø Ø Ø Ø 3 Ø 3 Ø Ø Ø Ø Ø Ø SD 02 8 Ц \mathcal{O} 0 0 Ø 0 6 6 5 5 5 6 5 6 in Ø 0 Ø Ч 0 0 Ø 0 4 4 \mathcal{O} 60 φ 00 Ø φ Ø \mathcal{Q} 6 8 6 6 Q \mathcal{O} B 7 10 9 10 11 6 5 5 03 Ø Ø Ø 0 Ø Ø 0 Ø ϕ \mathcal{O} 10 8 8 12 12 15 10 ٥í 10 O 10 6 6 13 00/14 Ø Ø Ø Φ Φ \sim 0 D \bigcirc 0 \oslash $\langle \hat{\omega} \rangle$ C Co Ø D a \emptyset Ø Ø \bigcirc Ø 7 7 9 C n n

TOTAL NUMBER OF ADULTS AT STUDY TERMINATION DATE TOTAL NUMBER OF NEONATES PRODUCED MEAN NUMBER OF NEONATES PRODUCED PER ADULT STANDARD DEVIATION FOR THE ABOVE MEAN 131 13.1 3.8

NEONATE REPRODUCTION RECORD

Test Initiated / Animals Fe	ed by	<u> </u>	<u></u>	50			
Test Terminated by	(@ <u>144</u>	<u>Ú</u>				
			Day 3				
Time of Observation / Feeding:	1342	1436	1417	1440	1400	1435	инно

Environmental Toxicology Specialists

CERIODAPHNIA SURVIVAL AND REPRODUCTION TEST

Test Number:	Lehigh 16-03 B	Study	y Director:	J.L. Miller				
Protocol No.:	EPA 821-R-02-013	Tech	nicians:	Walker/McIntyre/Pham/Da				
Test Material:	Biological effluent (09/06/10	6) in peri	meate (09/06/16) d	ilution water				
Test Species:	Ceriodaphnia dubia		Animal Lot No:	A/S RO:	090716			
Initiation Date:	September 7, 2016		Termination Date:		September 14, 2016			
	attraction (0())							
Effluent Concer	tration (%): 25							

ADULT SURVIVAL/MORTALITY RECORD

NEONATE REPRODUCTION RECORD

Day	/			REP	LICA	ΛTE	NUM	1BEF	۲			Day				REP	LICA	ΛTE	NUN	1BEF	2			Tech	Obs.
No.	1	2	3	4	5	6	7	8	9	10	n	No.	1	2	3	4	5	6	7	8	9	10	n	Init.	Date
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5	0	\bigcirc	\bigcirc	Ø	\bigvee	Ø	Ø	Ø	\square		\bigcirc	5	Ø	Ø	\bigcirc	Ø		Ø	Ø	Ø	\square		¢	~	09/12
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TOTAL NUMBER OF ADULTS AT STUDY TERMINATION DATE TOTAL NUMBER OF NEONATES PRODUCED MEAN NUMBER OF NEONATES PRODUCED PER ADULT STANDARD DEVIATION FOR THE ABOVE MEAN l n n a

Day 1 Day 2 Day 3 Day 4 Day 5 Day 6 Day 7 Time of Observation / Feeding: 1344 1440 1449 1445 1405 1438 1445								
Time of Observation / Feeding: 1344 1440 1419 1445 1405 1438 1445		Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7
	Time of Observation / Feeding:	1344	1440	1419	1445	1405	1438	1445

Environmental Toxicology Specialists

DOSE PREPARATION SHEET

09/07/16	LFARATION SHEL	-	Leł	nigh 16-03	3 A				
		7-da	iy static re	newal chr	onic bioas	say			
			Cerio	daphnia o	lubia	-		•	
Test conce	entrations:								
Lab Contro	ol and 6.25, 12.5, 18	8.75, 25 ai	nd 40% ef	fluent in p	ermeate o	dilution wa	ater + 0.22	2 µm Filtra	ation
Effluent =	Biological effluent (09/06/16)	in permea	ate (09/06	/16) dilutio	on water			
Lab Ctrl w	ater= 2X carbon filte	ered rever	se osmos	is well wat	ter at EPA	MH speci	fications	using EPA	salts.
All surface	e waters filtered thro	ugh 60 µn	n screen						
Biological	effluent was aerated	$to \ge 6 m$	g/L DO ar	nd < 0.1 m	g/L sulfide	e prior to s	solution p	reparation	
	20ml/Replicate: 1-	<24 hr ne	onate/Rep	blicate: 10	Replicate	s/Concen	tration		
C(oncentration	Amount	PP ⁻¹ (1)	Lab		Permeate		Total	
		fluent (m	L) V	Vater (mL		Vater (mL		(mL)*	
· ·	Lab Control	0	_, _	220	, .	0	-/	220	
	6.25	and the second se			0 QS to 220				
	12.5	28		0	(QS to 220)	220	
	18.75	41		0	(QS to 220)	220	
	25	55		0	(QS to 220)	220	
	40	88		0	(QS to 220)	220	
	·								
								*20 mL u	sed for
								pH meas	urement
								inoculate	200 mL
								for test.	
				-					
-									
	Test Day	Day 0	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	
-	Technician	รอ	50	The Day 2	TP	Day 4	Day J	v∽	
	Time	1130	1130	1140	1145	1130	1310	1408	
		09/07/16				0911516	09/12/16	09/13/10	
	Date	09/67/16	09/08/16	09/09/16	09/10/16	000 100 116	09/12/16	09113116	

Environmental Toxicology Specialists

WATER QUALITY REPORT FOR AQUATIC BIOASSAYS

Test Number:	Lehigh 16-03 A	Study Director:	J.L. Miller
Protocol No.:	EPA 821-R-02-013	Technicians:	Walker/McIntyre/Pham/Davis
Test Material:	Biological effluent (09/06/16) in	permeate (09/06/16) dilut	ion water + 0.22 µm Filtration
Test Species:	Ceriodaphnia dubia	Animal Lot No.:	A/S RO: 090716
Initiation Date:	September 7, 2016	Termination Date:	September 14, 2016

	OBSERVATI	ONS	Day (0)	Date:	09/07/16		24 Hour Obsv.			
Effluent Conc. (%)	Temperature (°C)	Dissolved Oxygen*	pH^^	Alkalinity	Conductivity	Water Hardness ~	Temp.	D.O.*	pH^^	
Lab Control	24	7.7	8-16	62	282	80	24	6.9	7.85	
6.25	24	7.5	8.08	© 50	404	0 170	24	67	7.65	
12.5	24	7,6	7.96	-	697	-	24	6,5	7.48	
18.75	24	7.6	7.91	^с 110	916	6 6 LO	24	6-3	7,40	
25	25	7.7	288	-	1161	-	24	5.7	7:35	
40	25	1.8	7.87	@ 290	1689	0 1050	24	5.4	7.43	
							50 0	09/08/	16	

UNIT INSTRUMENTATION LEGEND

*=Dissolved oxygen (mg/L): Meter ID O9

**Alkalinity (mg/L CaCO3); HACH Test Kit

^^= pH: Meter ID <u>03</u>

~=Water Hardness (mg/L CaCO3); HACH Test Kit

^=Conductivity/Salinity (μmohs): Meter ID <u>C/</u>ω

ADDITIONAL COMMENTS: O measurement taken in a 10 mL sample volume SD 09/07/16

Lab Control = 2x carbon filtered reverse osmosis water at EPA moderately hard level using EPA salts. Control water ID = R/O EPAmH #126+CNS

All surface waters filtered through a 60 µm screen daily

Technician:

Date: 09/07/16

Environmental Toxicology Specialists

WATER QUALITY REPORT FOR AQUATIC BIOASSAYS

Test Number:	Lehigh 16-03 A	Study Director:	J.L. Miller				
Protocol No.:	EPA 821-R-02-013	Technicians:	Walker/McIntyre/Pham/Davis				
Test Material:	Biological effluent (09/06/16) in permeate (09/06/16) dilution water + 0.22 µm Filtration						
Test Species:	Ceriodaphnia dubia	Animal Lot No.:	A/S RO: 090716				
Initiation Date:	September 7, 2016	Termination Date:	September 14, 2016				

	OBSERVATI	OBSERVATIONS D		Date:	09/08/16		24	Hour Ol	osv.
Effluent	Temperature	Dissolved		Alkalinity	Conductivity	Water			
Conc. (%)	(°C)	Oxygen*	pH^^	**	^	Hardness ~	Temp.	D.O.*	pH^^
Lab Control	24	7,8	3.07	62	281	80	24	7.1	7,78
6.25	25	7.9	8:00	9 40	386	C 180	24	6.7	7,82
12.5	25	29	7.88	-	691	-	24	6.4	7.63
18.75	25	7.9	7.84	0160	925	¢ 630	24	6.3	7.52
25	25	79	7.82	-	1176	-	24	57	7.46
40	25	7.9	7.79	° 280	1679	@ 1040	24	\$.3	7.52
							TP	09/0	19/10

UNIT INSTRUMENTATION LEGEND

*=Dissolved oxygen (mg/L): Meter ID 09

**Alkalinity (mg/L CaCO3); HACH Test Kit

^^= pH: Meter ID 🔿 🔒 🔜

~=Water Hardness (mg/L CaCO3); HACH Test Kit

------^=Conductivity/Salinity (µmohs): Meter ID <u>అక్రం</u>ల

ADDITIONAL COMMENTS: @ measurement taken in a 10 mL sample volume so 09/08/16 Dentry error 50 09/08/16

Lab Control = 2x carbon filtered reverse osmosis water at EPA moderately hard level using EPA salts. Control water ID = PIO ERAMH # 126+ CNS

All surface waters filtered through a 60 µm screen daily

Technician:

Date: 09/08/16

Environmental Toxicology Specialists

WATER QUALITY REPORT FOR AQUATIC BIOASSAYS

Test Number:	Lehigh 16-03 A	Study Director:	J.L. Miller					
Protocol No.:	EPA 821-R-02-013	Technicians:	Walker/McIntyre/Pham/Davis					
Test Material:	Biological effluent (09/06/16) in permeate (09/06/16) dilution water + 0.22 µm Filtration							
Test Species:	Ceriodaphnia dubia	Animal Lot No.:	A/S RO: 090716					
Initiation Date:	September 7, 2016	Termination Date:	September 14, 2016					

	OBSERVATI	ONS	Day (2)	Date:	09/09/16		24	Hour Ot	DSV.
Effluent Conc. (%)	Temperature (°C)	Dissolved Oxygen*	pH^^	Alkalinity	Conductivity	Water Hardness ~	Temp.	D.O.*	pH^^
Lab Control	24	7.6	811	62	285	80	24	6.9	7.84
6.25	24	7.7	8.07	050	388	0 180	24	74	7.65
12.5	24	7.8	7.97	-	600	-	24	614	7.59
18.75	24	8.0	7.85	0170	896	0 620	24	6.3	7.40
25	24	8.0	7.78	-	1140	-	24	6.1	7.31
40	24	8.0	7.68	0280	1663	0 1050	24	5.6	7.22
							TP	0914	0/16

UNIT INSTRUMENTATION LEGEND

*=Dissolved oxygen (mg/L): Meter ID _____ ____

**Alkalinity (mg/L CaCO3); HACH Test Kit

^^= pH: Meter ID ______

~=Water Hardness (mg/L CaCO3); HACH Test Kit

^=Conductivity/Salinity (µmohs): Meter ID _____

ADDITIONAL COMMENTS: Dimensurements taken in 10ml Sample volume TP 09/09/16

Lab Control = 2x carbon filtered reverse osmosis water at EPA moderately hard level using EPA salts. Control water ID = R/ E&AmH # 126 FONS

All surface waters filtered through a 60 µm screen daily

Technician:

Date: 09/09/16 Jacon

Environmental Toxicology Specialists

WATER QUALITY REPORT FOR AQUATIC BIOASSAYS

Test Number:	Lehigh 16-03 A	Study Director:	J.L. Miller				
Protocol No.:	EPA 821-R-02-013	Technicians:	Walker/McIntyre/Pham/Davis				
Test Material:	Biological effluent (09/06/16) in permeate (09/06/16) dilution water + 0.22 µm Filtration						
Test Species:	Ceriodaphnia dubia	Animal Lot No.:	A/S RO: 090716				
Initiation Date:	September 7, 2016	Termination Date:	September 14, 2016				

	OBSERVATI	ONS	Day (3)	Date:	09/10/16		24	Hour Ol	osv.
Effluent	Temperature	Dissolved		Alkalinity	Conductivity	Water			
Conc. (%)	(°C)	Oxygen*	pH^^	**	^	Hardness ~	Temp.	D.O.*	pH^^
Lab Control	24	7.6	8.23	62	279	80	24	7.2	8.23
6.25	24	7.8	8.13	© 50	363	6 180	24	6.9	7.98
12.5	24	7.8	7.95	-	653	-	24	6.4	7.75
18.75	24	7.9	7.80	0,70	889	(U 620	zη	6.2	7.65
25	24	S.O	7.75		1 141	-	24	6.0	7.60
40	24	G. 1	7.63	0 250	1638	0 1050	24	5.8	7.53
							~ 09/11/16		

UNIT INSTRUMENTATION LEGEND

*=Dissolved oxygen (mg/L): Meter ID $_^{OQ}$ ^^= pH: Meter ID <u>03</u>

**Alkalinity (mg/L CaCO3); HACH Test Kit

~=Water Hardness (mg/L CaCO3); HACH Test Kit

^=Conductivity/Salinity (µmohs): Meter ID _____

ADDITIONAL COMMENTS: (1) Measurements takes in Tome sample volume TP 09/10/16

Lab Control = 2x carbon filtered reverse osmosis water at EPA moderately hard level using EPA salts. Control water ID = RIO EPAMH# 126 +CNS

All surface waters filtered through a 60 µm screen daily

Technician:

Date: @9/10/16

Environmental Toxicology Specialists

WATER QUALITY REPORT FOR AQUATIC BIOASSAYS

Test Number:	Lehigh 16-03 A	Study Director:	J.L. Miller				
Protocol No.:	EPA 821-R-02-013	Technicians:	Walker/McIntyre/Pham/Davis				
Test Material:	Biological effluent (09/06/16) in permeate (09/06/16) dilution water + 0.22 µm Filtration						
Test Species:	Ceriodaphnia dubia	Animal Lot No.:	A/S RO: 090716				
Initiation Date:	September 7, 2016	Termination Date:	September 14, 2016				

	OBSERVATI	DBSERVATIONS D		Date:	09/11/16		24	Hour Ol	osv.
Effluent	Temperature	Dissolved		Alkalinity	Conductivity	Water			
Conc. (%)	(°C)	Oxygen*	pH^^	**	^	Hardness ~	Temp.	D.O.*	pH^^
Lab Control	24	7.9	7.91	62	277	80	24	6.5	8.07
6.25	24	8.0	7.77	0 60	351	0 180	24	6.5	793
12.5	24	8.0	7.62	-	645	-	24	6.2	7.71
18.75	24	8.0	7,50	0 170	885	0620	24	5.9	7.57
25	24	8.1	7.40	-	414	-	24	5.8	7.51
40	24	8.2	7.28	0 280	1631	0 1050	24	5.6	7.39
							v	04/12	116

UNIT INSTRUMENTATION LEGEND

*=Dissolved oxygen (mg/L): Meter ID __O ^

**Alkalinity (mg/L CaCO3); HACH Test Kit

^^= pH: Meter ID <u>03</u>

~=Water Hardness (mg/L CaCO3); HACH Test Kit

^=Conductivity/Salinity (µmohs): Meter ID _____

ADDITIONAL COMMENTS:

O Measurement rann in 10mi sample volume a on 11116

Lab Control = 2x carbon filtered reverse osmosis water at EPA moderately hard level using EPA salts. Control water ID = BIN CAMR BILC + C US

All surface waters filtered through a 60 µm screen daily

Technician:

20

Date: de 111/16

Environmental Toxicology Specialists

WATER QUALITY REPORT FOR AQUATIC BIOASSAYS

Test Number:	Lehigh 16-03 A	Study Director:	J.L. Miller					
Protocol No.:	EPA 821-R-02-013	Technicians:	Walker/McIntyre/Pham/Davis					
Test Material:	Biological effluent (09/06/16) in permeate (09/06/16) dilution water + 0.22 µm Filtration							
Test Species:	Ceriodaphnia dubia	Animal Lot No .:	A/S RO: 090716					
Initiation Date:	September 7, 2016	Termination Date:	September 14, 2016					

	OBSERVATI	ONS	Day (5)	Date:	09/12/16		24 Hour Obsv.		bsv.
Effluent	Temperature	Dissolved		Alkalinity	Conductivity	Water			
Conc. (%)	(°C)	Oxygen*	pH^^	**	^	Hardness ~	Temp.	D.O.*	pH^^
Lab Control	24	7.8	7.84	62	277	86	24	6.3	8-33
6.25	24	79	7.71	0 60	356	0 186	24	6.6	8.20
12.5	24	7.9	7.49	-	646	-	24	6.4	8.01
18.75	24	8.0	7.39	O 170	879	© 620	21	6.2	7.84
25	24	0.8	1.33	-	1098	-	રપ	6.1	7.76
40	24	8.1	7.21	0 280	1592	Diuso	zu	5.7	7.63
							Vin	04/13	3116

UNIT INSTRUMENTATION LEGEND

*=Dissolved oxygen (mg/L): Meter ID ___O

**Alkalinity (mg/L CaCO3); HACH Test Kit

^^≔ pH: Meter ID <u>03</u>

~=Water Hardness (mg/L CaCO3); HACH Test Kit

^=Conductivity/Salinity (µmohs): Meter ID ______

ADDITIONAL COMMENTS: O Measurement taken in 10ml sample volume and Oaliz/16

@ enory error un 09/12/16

1-

Lab Control = 2x carbon filtered reverse osmosis water at EPA moderately hard level using EPA salts. Control water ID = 20 - 128 - 1

All surface waters filtered through a 60 µm screen daily

Technician:

Date: 09/112/116

Environmental Toxicology Specialists

WATER QUALITY REPORT FOR AQUATIC BIOASSAYS

Test Number:	Lehigh 16-03 A	Study Director:	J.L. Miller				
Protocol No.:	EPA 821-R-02-013	Technicians:	Walker/McIntyre/Pham/Davis				
Test Material:	Biological effluent (09/06/16) in permeate (09/06/16) dilution water + 0.22 µm Filtration						
Test Species:	Ceriodaphnia dubia	Animal Lot No.:	A/S RO: 090716				
Initiation Date:	September 7, 2016	Termination Date:	September 14, 2016				

	OBSERVATI	ONS	Day (6)	Date:	09/13/16		24	Hour Ol	osv.
Effluent	Temperature	Dissolved	^^Hq	Alkalinity	Conductivity	Water	Tama		
Conc. (%)	(°C)	Oxygen*	pn			Hardness ~	Temp.	D.O.*	pH^^
Lab Control	24	7.6	8.32	62	279	80	25	6.1	8.11
6.25	24	8.0	8.20	\$ 60	356	© 180	25	6.0	290
12.5	24	8,0	8.02	-	629	-	25	5.9	17.71
18.75	24	6.0	7.91	0 170	378	0620	25	57	262
25	24	8.0	7.78	-	:112	_	25	5.6	7.50
40	24	S.O	7.62	C 280	1613	©.1050	25	5.5	2.39
							50 09/14/16		16
									_

UNIT INSTRUMENTATION LEGEND

*=Dissolved oxygen (mg/L): Meter ID ______

**Alkalinity (mg/L CaCO3); HACH Test Kit

^^= pH: Meter ID <u>೦೧</u>_

~=Water Hardness (mg/L CaCO3); HACH Test Kit

^=Conductivity/Salinity (µmohs): Meter ID ______

ADDITIONAL COMMENTS:

O Measurement taken in Iome sample volume in On/13/16

Lab Control = 2x carbon filtered reverse osmosis water at EPA moderately hard level using EPA salts. Control water ID = Right # 126+CNS

All surface waters filtered through a 60 µm screen daily

Technician:

Date: 09/13/16

AQUA-Science Environmental Toxicology Consultants

CERIODAPHNIA RANDOMIZATION FORM

Client: Lenign 16-03 A

TEMPLATE #1

		Loading Order									
Female No.	1	2	3	4	5	6	. 7	8	9	10	
1	1	3	10-	8	6	8	7	4	2	5	
2	10	_&	4	2	T	5	18	6	1	3	
3	X	2	ø	5	10	3	6	4	1	8	
4	2	4	18	9	_10	7	5.	6	1	3	
5	3	10	5	2	7	1	8	8	6	4	
6	7	6	1	10	18	3	4	2	8	5	
7	5	B	6	3	1	18	ß	2	4	7	
8	10	4	5	6	7	2	1	8	8	3	
9	3	4	ø	70	6.	2	5	. 7	8	1	
10	8	8	70	1	4	5	1	3	6	2	

	Female Description		Sample Description
1	09/01 WINTEP 1	1	Lab Control
2	ч	2	6.25
3	6_	3	12.5
4	09/01 Brood 9 3	4 · `	18,75
5	5	5	25
6	6	6	40
7	7	7	
8	S	8	
9	10	9	
10	V. 14	10	

Technician

0

Date 09/07/11

Environmental Toxicology Specialists

DOSE PREPARATION SHEET

	PARATION SHEE	: 1								
09/07/16				high 16-0						
		7-da	iy static re	enewal chr	onic bioa	ssay				
	Ceriodaphnia dubia									
	entrations: Lab Con	1978 - F								
· Contractor - Contractor	Biological effluent		-							
	ater= 2X carbon filt			is well wa	ter at EPA	AMH spec	ifications	using EPA	salts.	
All surface	waters filtered thro	ugh 60 µr	n screen	• .						
Biological e	effluent was aerate	d to ≥ 6 m	g/L DO ar	nd < 0.1 m	g/L sulfid	e prior to :	solution pi	reparation		
										
	20ml/Replicate: 1-	<24 hr ne	onate/Rep	olicate: 10	Replicate	es/Concen	tration			
		•				-				
Co	ncentration	Amount	1	Lab		Permeate		Total		
		ffluent (m	L) V	Vater (mL	.) v	Nater (ml	.)	(mL)*		
	ab Control	0		220		0 QS to 220		220	· · -·	
	25	55		0		QS 10 220)	220		
		- ·						- 14	-	
· ·										
	·									
• •								*20 mL u	sed for	
								pH meas		
								inoculate		
								for test.	200 mL	
									• ••	
	•									
*										
[Test Day	Day 0	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6		
	Technician	50	50	TP	-72	~	~	w.		
	Time	1200	1115	1115	1115	1120	1300	1400		
	Date	09/07/16	09/08/16	09/09/10	09/10/16	04/N/16	09/12/16	09/13/16	••	
					11.1.1.2					

Environmental Toxicology Specialists

WATER QUALITY REPORT FOR AQUATIC BIOASSAYS

Test Number:	Lehigh 16-03 B	Study Director:		J.L. Miller				
Protocol No.:	EPA 821-R-02-013 Technicians: Walker/		er/McIntyre/Pham/Da	avis				
Test Material:	Biological effluent (09/06/16) in permeate (09/06/16) dilution water							
Test Species:	Ceriodaphnia dubia	Animal Lot No.:	A/S RO:	090716				
Initiation Date:	September 7, 2016	Termination Date:	September 14, 2016					

	OBSERVATI	ONS	Day (0)	Date:	09/07/16		24	Hour Ob	osv.
Effluent	Temperature	Dissolved		Alkalinity	Conductivity				
Conc. (%)	(°C)	Oxygen*	pH^^	**	^	Hardness ~	Temp.	D.O.*	pH^^
Lab Control	24	7,9	8.11	62	280	80	24	6.0	8.20
25	25	8.2	7.95	6190	1191	010	24	59	7.83
							50 0	19/08	116

UNIT INSTRUMENTATION LEGEND

*=Dissolved oxygen (mg/L): Meter ID <u>0</u>9

**Alkalinity (mg/L CaCO3); HACH Test Kit

^^= pH: Meter ID <u>0</u>3____

~≃Water Hardness (mg/L CaCO3); HACH Test Kit

^=Conductivity/Salinity (μmohs): Meter ID <u>Ô</u>6

ADDITIONAL COMMENTS: @ measurement taken in a 10 mL sample volume so 09/07/16

Lab Control = 2x carbon filtered reverse osmosis water at EPA moderately hard level using EPA salts. Control water ID = P/C EPAMH # 126 + CNS

All surface waters filtered through a 60 µm screen daily

Technician:

502

Date: 09/07/16

Environmental Toxicology Specialists

WATER QUALITY REPORT FOR AQUATIC BIOASSAYS

Test Number:	Lehigh 16-03 B	Study Director:		J.L. Miller				
Protocol No.:	EPA 821-R-02-013	Technicians:	Walke	r/McIntyre/Pham/Dav				
Test Material:	Biological effluent (09/06/16) in permeate (09/06/16) dilution water							
Test Species:	Ceriodaphnia dubia	Animal Lot No.:	A/S RO:	090716				
Initiation Date:	September 7, 2016	Termination Date:	Sep	tember 14, 2016				

	OBSERVATI	ONS	Day (1)	Date:	09/08/16		24	Hour Ol	osv.
Effluent	Temperature	Dissolved		Alkalinity	Conductivity	Water			
Conc. (%)	(°C)	Oxygen*	pH^^	**	^	Hardness ~	Temp.	D.O.*	pH^^
Lab Control	24	7.7	7.97	58	278	80	24	6.0	8.61
25	25	8.1	7,53	0810	1153	600	24	5.6	7.51
							TP	0910	9/16

UNIT INSTRUMENTATION LEGEND

*≃Dissolved oxygen (mg/L): Meter ID <u>___</u>

**Alkalinity (mg/L CaCO3); HACH Test Kit

^^= pH: Meter ID <u>05</u>

~=Water Hardness (mg/L CaCO3); HACH Test Kit

^=Conductivity/Salinity (µmohs): Meter ID 😔 ℃ 🥝

ADDITIONAL COMMENTS: O measurement takes in a 10 mc sample volume SD 09/08/16 Dentry evior so 09/08/16

Lab Control = 2x carbon filtered reverse osmosis water at EPA moderately hard level using EPA salts. Control water ID = R_{10} EPAmH #127 + CNS

All surface waters filtered through a 60 µm screen daily

Technician:

5/22

Date: 09/08/16

Environmental Toxicology Specialists

WATER QUALITY REPORT FOR AQUATIC BIOASSAYS

Test Number:	Lehigh 16-03 B	Study Director:		J.L. Miller				
Protocol No.:	EPA 821-R-02-013	Technicians:	Walke	er/McIntyre/Pham/Dav				
Test Material:	Biological effluent (09/06/16) in permeate (09/06/16) dilution water							
Test Species:	Ceriodaphnia dubia	Animal Lot No.:	A/S RO:	090716				
Initiation Date:	September 7, 2016	Termination Date:	Sep	tember 14, 2016				

	OBSERVATI	ONS	Day (2)	Date:	09/09/16		24	Hour Ol	osv.
Effluent	Temperature	Dissolved		Alkalinity	Conductivity	Water			
Conc. (%)	(°C)	Oxygen*	р <u>Н^^</u>	**	^	Hardness ~	Temp.	D.O.*	pH^^
Lab Control	24	7.8	8.02	58	276	80	24	6.0	7.99
25	24	8.1	7.43	180	1124	0610	24	5.7	7.49
							TP	09/1	0116

UNIT INSTRUMENTATION LEGEND

*=Dissolved oxygen (mg/L): Meter ID ______

**Alkalinity (mg/L CaCO3); HACH Test Kit

^^= pH: Meter ID _____3___

~=Water Hardness (mg/L CaCO3); HACH Test Kit

^=Conductivity/Salinity (µmohs): Meter ID ______6

ADDITIONAL COMMENTS: U mensure ments taken in lower sample volume TP 09/09/14

Lab Control = 2x carbon filtered reverse osmosis water at EPA moderately hard level using EPA salts. Control water ID = RIO EPAmit # 127 + CNS

All surface waters filtered through a 60 µm screen daily

Technician:

Date: 09/09/16

Environmental Toxicology Specialists

WATER QUALITY REPORT FOR AQUATIC BIOASSAYS

Test Number:	Lehigh 16-03 B	Study Director:		J.L. Miller				
Protocol No.:	EPA 821-R-02-013	-013 Technicians: Walker/McIntyre/		er/McIntyre/Pham/Dav	vis			
Test Material:	Biological effluent (09/06/16) in permeate (09/06/16) dilution water							
Test Species:	Ceriodaphnia dubia	Animal Lot No.:	A/S RO:	090716				
Initiation Date:	September 7, 2016	Termination Date:	Sep	otember 14, 2016				

	OBSERVATI	ONS	Day (3)	Date:	09/10/16		24	Hour Ol	DSV.
Effluent	Temperature	Dissolved		Alkalinity	Conductivity	Water			
Conc. (%)	(°C)	Oxygen*	pH^^	**	^	Hardness ~	Temp.	D.O.*	pH^^
Lab Control	24	7.8	8.00	58	276	50	24	6.4	8,28
25	24	8.0	7.50	0180	1126	0 610	24	5.8	7.71
							ken	091	11/16
				-					
								_	

UNIT INSTRUMENTATION LEGEND

*=Dissolved oxygen (mg/L): Meter ID

**Alkalinity (mg/L CaCO3); HACH Test Kit

~=Water Hardness (mg/L CaCO3); HACH Test Kit

^=Conductivity/Salinity (µmohs): Meter ID

ADDITIONAL COMMENTS: @ measurements taken in lumb sayshe water TP 09/10/16

Lab Control = 2x carbon filtered reverse osmosis water at EPA moderately hard level using EPA salts. Control water ID = Rlo
All surface waters filtered through a 60 µm screen daily

Technician:

_____ Date: ____ 0 1 10 116

Environmental Toxicology Specialists

WATER QUALITY REPORT FOR AQUATIC BIOASSAYS

Test Number:	Lehigh 16-03 B	Study Director:	J.L. Miller					
Protocol No.:	EPA 821-R-02-013	Technicians:	Walker/McIntyre/Pham/Davis					
Test Material:	Biological effluent (09/06/16) in permeate (09/06/16) dilution water							
Test Species:	Ceriodaphnia dubia	Animal Lot No.:	A/S RO: 090716					
Initiation Date:	September 7, 2016	Termination Date:	September 14, 2016					

	OBSERVATIONS		Day (4)	Date: 09/11/16		24 Hour Obsv.			
Effluent	Temperature	Dissolved		Alkalinity	Conductivity	Water			
Conc. (%)	(°C)	Oxygen*	pH^^	**	^	Hardness ~	Temp.	D.O.*	pH^^
Lab Control	24	8.1	7.99	57	274	81	24	6.6	8.18
25	24	8.5 (981.)	7.52	0 190	1118	0) +60 610	24	62	7.62
							m	ca n	116

UNIT INSTRUMENTATION LEGEND

*=Dissolved oxygen (mg/L): Meter ID <u>0</u>~

**Alkalinity (mg/L CaCO3); HACH Test Kit

^^= pH: Meter ID ____03___

~=Water Hardness (mg/L CaCO3); HACH Test Kit

^=Conductivity/Salinity (μmohs): Meter ID _____

ADDITIONAL COMMENTS:

@ measurement take in some sample volume in da 11/16 Benny error in Oallill

Lab Control = 2x carbon filtered reverse osmosis water at EPA moderately hard level using EPA salts. Control water ID = RIP ERAMIN # 128 + CNS

All surface waters filtered through a 60 µm screen daily

Technician:

 \mathcal{O}

Date: 04 14 214

AQUA-Science

Environmental Toxicology Specialists

WATER QUALITY REPORT FOR AQUATIC BIOASSAYS

Test Number:	Lehigh 16-03 B	Study Director:		J.L. Miller		
Protocol No.:	EPA 821-R-02-013	Technicians:	Walke	r/McIntyre/Pham/Da	avis	
Test Material:	Biological effluent (09/06/16) in permeate (09/06/16) dilution water					
Test Species:	Ceriodaphnia dubia	Animal Lot No.:	A/S RO:	090716		
Initiation Date:	September 7, 2016	Termination Date:	Sep	September 14, 2016		

	OBSERVATI	ONS	Day (5)	Date:	09/12/16		24	Hour Ob	osv.
Effluent	Temperature	Dissolved		Alkalinity	Conductivity	Water			
Conc. (%)	(°C)	Oxygen*	pH^^	**	^	Hardness ~	Temp.	D.O.*	рН^^
Lab Control	24	7.9	7.94	51	279	81	24	6.5	8.34
25	24	8.3	741	@ 190	1121	0 160 610	24	6.2	7.82
							m	091	3/16

UNIT INSTRUMENTATION LEGEND

*=Dissolved oxygen (mg/L): Meter ID ______

**Alkalinity (mg/L CaCO3); HACH Test Kit

^^= pH: Meter ID ______

~=Water Hardness (mg/L CaCO3); HACH Test Kit

^=Conductivity/Salinity (µmohs): Meter ID _____

ADDITIONAL COMMENTS:

Omeasurement taken in 10ml sample volume ~ 09/12/16 Senryerror ~ Oanzille

Lab Control = 2x carbon filtered reverse osmosis water at EPA moderately hard level using EPA salts. Control water ID = RIO EPAMIN B 128 +CNS

All surface waters filtered through a 60 µm screen daily

Technician:

45

Date: 00/12/16

AQUA-Science

Environmental Toxicology Specialists

WATER QUALITY REPORT FOR AQUATIC BIOASSAYS

Pham/Davis					
Biological effluent (09/06/16) in permeate (09/06/16) dilution water					
2016					

	OBSERVATI	ONS	Day (6)	Date:	09/13/16		24	Hour Ob	osv.
Effluent Conc. (%)	Temperature (°C)	Dissolved Oxygen*	pH^^	Alkalinity	Conductivity	Water Hardness ~	Temp.	D.O.*	рН^^
Lab Control	25	ר.ר	8.35	57	271	84	25	ie 1	8.09
25	24	7.9	7:80	0 190	1122	0 620	25	6.3	7.62
							500	9/14/	16

UNIT INSTRUMENTATION LEGEND

*=Dissolved oxygen (mg/L): Meter ID <u>O</u>

^=Conductivity/Salinity (μmohs): Meter ID _____

**Alkalinity (mg/L CaCO3); HACH Test Kit

^^= pH: Meter ID ______

~=Water Hardness (mg/L CaCO3); HACH Test Kit

~-Water Hardness (flig/L CaCOS), HACH Tes

ADDITIONAL COMMENTS:

@ Measurement taken in 10ml sample voivme in 00/13/16

Lab Control = 2x carbon filtered reverse osmosis water at EPA moderately hard level using EPA salts. Control water ID = R/L EPAMH # 12.9 + C/S

All surface waters filtered through a 60 µm screen daily

Technician:

15

Date: 09/13/16

AQUA-Science Environmental Toxicology Consultants

CERIODAPHNIA RANDOMIZATION FORM

Client:	Lehigh 16-03B	
	Loading Order	TEMPLATE #2
Female No.	1 2 3 4 5 6 7 8 9 10	
1	× 4 2 × 7 8 1 × 5 10	
2	8 13 16 14 9 2 10 5 7 1	
3	4 1 8 7 5 8 9 8 10 2	
4	1 5 10 8 4 2 8 8 7	
5	8 8 2 1 5 4 7 8 10 3	
.6	8 1 10 4 2 7 8 9 3 5	
7	1 4 5 8 2 10 3 7 8	
8	8 5 7 8 8 4 2 3 1 10	
9	4 1 8 8 3 8 2 10 8 7	
10	2 5 8 8 1 7 10 8 8 4	х.
	Female Description Sample Descri	ption
1	09/01 CULTURE 9 1 1 Lab Control	
2	<u> </u>	
3	6 3 -	
4	09/01 Bragel 9 3 4.	
5	5 5 -	
6	6	
7		
8	<u> </u>	
9	9	
10	14 10 -	
Technician	Date 09/07/1	<u>y</u>

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Page___

AQUA-Science Environmental Toxicology Consultants

LABORATORY NOTES
Date: 09/06/16
Lenign 16-03
Combined For both the permease and effluent samples
Combined by commine permitting and efficient samples
@ the permeate used in the 16-03A dilution was 0.22 um filtered
the rest of the permeater remained unfiltered for 16-03B
3 Biological effluent had initial dissolved oxygen of 3.8 mg/L and initial sulfides at 593 mg/L 52-
and initial suifides at 593 TIL St
sample was placed under acration @ 1400 on 09/06/16 and
removed from aeration @ 0930 on 09/07/16
Einal Sulfides: 349/LSZ-
This REFLUENT Sample was then spit, some was reserved
For the 16-03 B dilution and the rest was 0.22 hm Filtered
Technician: Date: 09/06/16

.

CHAIN OF CUSTODY FORMS

Chain of Custody

AQUA-				Client:	RB	I, Paul Bedore				
Environmental Toxicology		Address:	Address: 9888 Kent St., Elk Grove, CA 95624							
630 Can	trill Dr.;	; Davis,	CA 95618	Billing Ad	dres	s: Same		P.O. No.:		
(530) 75	3-	aquasci	i@aol.com	Phone	916	6-405-8918	Fax No.: ()		
Project No			ame: Lehigh TRE		Sar	npler (Print Name): Courton (Sign Name): Courto	ey ferns wy fei	w		
Date Sampled	Time Sample	d Matrix	(Container Type/ Amt.	Preserv	ative	Sample Descr	0	Composite temp @ time of collection (°C)	Grab Comp	Comments
9/4/14	9:20A	MAg	2 2.5 gallon	1		Biological Effluent		180	Grab	See notes
9/6/10	9:30A	4 Ag	2 2.5 gallon			Permeate			Grab	See notes
						B.E. P				
					_	T: 14.2 C 11.2 C				
						DU- 3.8 "">/ 8.9 "3/				
					_	pH= 7,04 8,62				_
Notes: Test mixtures of permeate and biological effluent specified in test plan provided to Aqua Science by P Bedore against shared lab water control.										
Relinquished by: Date/ Time			ie:	Received by:			Date/ Tim	ne:		
Courtney peny glulide: Hard					9.6.16.11.30					
9	ack	E)	7.6.1	-0	1.20 502			09/06/	16 1330



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

October 24, 2016

Paul:

I have enclosed our Supplemental report "Evaluation of the Chronic Toxicity of Lehigh Permanente Cement Plant Pilot Reverse-Osmosis (RO) Water Samples" for the Biological Effluent and Permeate samples collected September 26, 2016. The test procedures section of the report was updated to correct the description of the hardness control preparation; the revision does not change the conclusions of the testing.

Chronic Effects of Biological Effluent and Permeate on Ceriodaphnia dubia

There were no significant reductions to survival or reproduction observed in the filtered effluent blend treatments when compared to the Hardness Blank; the NOEC for both endpoints was 100% filtered effluent blend resulting in 1 TUc. There were no significant reductions to survival observed in the filtered effluent blend treatments when compared to the Lab Water Control; the NOEC for survival was 100% filtered effluent, resulting in 1 TUc. There were significant reductions to reproduction in the filtered effluent blend treatments when compared to the Lab Water Control; the EC25 for reproduction was 57.1% filtered effluent blend, resulting in 1.8 TUc.

There were no significant reductions to survival or reproduction observed in the 100% unfiltered effluent blend treatment compared to both the Hardness Blank and Lab Water Control; the NOEC for both endpoints was 100% unfiltered effluent blend, resulting in 1 TUc.

If you have any questions regarding the performance and interpretation of these tests, feel free to contact my colleague Chris Dudenhoeffer 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 26377.

Supplemental Report

An Evaluation of the Chronic Toxicity of Lehigh Permanente Cement Plant Pilot Reverse-Osmosis (RO) Water Samples to *Ceriodaphnia dubia*

Samples collected September 26, 2016

Prepared For:

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

Prepared By:

Pacific EcoRisk 2250 Cordelia Road Fairfield, CA 94534

Original Report Submitted October 21, 2016 Revised Report Submitted October 24, 2016



Supplemental Report

An Evaluation of the Chronic Toxicity of Lehigh Permanente Cement Plant Pilot Reverse-Osmosis (RO) Water Samples to *Ceriodaphnia dubia*

Samples collected September 26, 2016

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Appendices

- Appendix A Chain-of-Custody Records for the Collection and Delivery of the Lehigh Biological Effluent and Permeate Samples
- Appendix B Test Data and Summary of Statistics for the Evaluation of the Chronic Toxicity of the Filtered Biological Effluent/Permeate Treatments to *Ceriodaphnia dubia*: Analysis vs. Hardness Blank and Excluding Outlier Data
- Appendix C Test Data and Summary of Statistics for the Evaluation of the Chronic Toxicity of the Filtered Biological Effluent/Permeate Treatments to *Ceriodaphnia dubia*: Analysis vs. Hardness Blank and Including Outlier Data
- Appendix D Test Data and Summary of Statistics for the Evaluation of the Chronic Toxicity of the Filtered Biological Effluent/Permeate Treatments to *Ceriodaphnia dubia*: Analysis vs. Lab Water Control
- Appendix E Test Data and Summary of Statistics for the Evaluation of the Chronic Toxicity of the Unfiltered Biological Effluent/Permeate treatment to *Ceriodaphnia dubia*: Analysis Excluding Outlier Data
- Appendix F Test Data and Summary of Statistics for the Evaluation of the Chronic Toxicity of the Unfiltered Biological Effluent/Permeate treatment to *Ceriodaphnia dubia*: Analysis Including Outlier Data
- Appendix G Test Data and Summary of Statistics for the Reference Toxicant Evaluation of *Ceriodaphnia dubia*

1. INTRODUCTION

Under contract to the Robertson-Bryan, Pacific EcoRisk (PER) conducted an evaluation of the chronic toxicity of Lehigh Permanente Southwest Cement Company Reverse-Osmosis (RO) Biological Effluent and Permeate water samples. This evaluation consisted of performing the US EPA chronic 3-brood survival and reproduction test with the crustacean *Ceriodaphnia dubia*. This test was conducted on samples collected on September 26, 2016. In order to assess the sensitivity of the organisms to chemical stress, a monthly reference toxicant test was performed. This report describes the performance and results of these tests.

CHRONIC TOXICITY TEST PROCEDURES

This testing followed established guidelines in "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 Receipt and Handling of the Biological Effluent and Permeate Samples

On September 26th, samples of Lehigh Biological Effluent and Permeate were collected into appropriately cleaned sample containers. These samples were transported the day of collection, on ice and under chain-of-custody, to the PER laboratory in Fairfield, CA. 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. Based on client guidance, the Biological Effluent and Permeate samples were areared for 15 minutes upon receipt to address concerns about D.O. and sulfide concentrations. The post-aeration sulfide concentrations were 0.090 mg/L and 0.001 mg/L for the Biological Effluent and Permeate samples, respectively. The chain-of-custody records for the collection and delivery of the samples are presented in Appendix A.

Ta	Table 1. Initial water quality characteristics of the Biological Effluent and Permeate Samples.									
Sample Receipt Date	Sample ID	Temp (°C)	pН	D.O. (mg/L)	Alkalinity (mg/L)	Hardness (mg/L)	Conductivity (µS/cm)	Residual Chlorine (mg/L)	Total Ammonia (mg/L N)	Sulfide (mg/L)
9/27/16	Biological Effluent	0.5	7.36	4.9	860	2850	3960	0.54**	1.28	0.41
9/27/16	Permeate	0.5	7.47	10.2*	4.9	2.1	20	0	<1.00	0.001

* Sample was received on ice the day of sample collection; the temperature of the temperature blank was <6°C.

** Chlorine reading is thought to have been caused by interference due to the turbidity of the sample.

2.2 Survival and Reproduction Toxicity Testing with Ceriodaphnia dubia

The chronic toxicity test with *C. dubia* consists of exposing individual females to several Biological Effluent/Permeate mixtures for the length of time it takes for the Lab Control treatment females to produce three 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 consisted of a synthetic reconstituted freshwater (SRW adjusted to EPA "moderately-hard" hardness), prepared by addition of reagent grade chemicals to Type 1 lab water. A second Lab Water Control medium was also prepared and consisted of Type 1 lab water adjusted to the hardness value of a routine compliance monitoring site for this project (Pond 4A); this hardness value was also relatively consistent with the hardness of the 25:75% Biological Effluent/Permeate mixture. The Biological Effluent and Permeate was combined at a ratio of 1:3 respectively, and used to prepare daily test mixtures at concentrations of 6.25%, 12.5%, 25%, 50% and 100% Biological Effluent/permeate, using the synthetic High-Hardness Control as the test diluent. Before sample preparation both the Biological Effluent and Permeate samples were filtered using a 0.2µm filter; a filtration blank consisting of 0.2 μ m-filtered control water was also tested. A separate unfiltered 100% (25:75%) Biological Effluent/Permeate), treatment was tested in addition to the filtered dilution series. For each test treatment, 200 mL aliquots of test solution were amended with the alga Selenastrum *capricornutum* and Yeast-Cerophyll[®]-Trout Food (YCT) to provide food for the test organisms. "New" water quality characteristics (pH, D.O., and conductivity) were measured on these foodamended test solutions prior to use in this testing.

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

Each day of the test, fresh test solutions were prepared and characterized as before, and a "new" set of replicate cups was prepared. The test replicate cups containing the test organisms were examined, with surviving 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 parent organism was determined, after which the "old" water quality characteristics (pH, D.O., and conductivity) were measured for the old solution from one randomly-selected replicate at each treatment.

After it was determined that $\geq 60\%$ of the females in the Lab Water Control treatment had produced their third brood of offspring, the test was terminated. The resulting survival and reproduction (# of offspring) data were analyzed to evaluate any impairment(s) caused by the Biological Effluent/Permeate mixtures; all statistical analyses were performed using the CETIS[®] statistical software.

2.2.1 Reference Toxicant Testing of the Ceriodaphnia dubia

In order to assess the sensitivity of the test organisms to toxic stress, a monthly reference toxicant test was performed. The reference toxicant test was performed similarly to the effluent test except that test solutions consisted of modified EPA moderately-hard water 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., EC50); 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 Filtered Biological Effluent/Permeate Blend on *Ceriodaphnia dubia* compared to the Hardness Blank

As there was a significant reduction in reproduction in the Hardness Blank compared to the Lab Control treatment and the Filtration Blank, the results of the effluent blend statistically compared to both the Hardness Blank are provided in Table 2. There were no significant reductions to survival or reproduction observed in the filtered effluent blend treatments compared to the Hardness Blank; the NOEC for both endpoints was 100% filtered effluent blend resulting in 1 TUc. As there was a statistical outlier in the Hardness Blank treatment, the data are presented both excluding and including the outlier. The test data and summary of statistical analyses compared to the Hardness Blank for this test excluding the outlier are presented in Appendix B; the statistical analyses compared to the Hardness Blank for this test including the outlier are presented in Appendix C.

Table 2. Effects of Filtered Biological Effluent/Permeate on Ceriodaphnia dubia:Comparison to the Hardness Blank.						
Test Treatment	% Survival	Reproduction (mean # of offspring)				
Lab Water Control	100	34.4				
Filtration Blank	100	33.3				
Hardness Blank	90	24.1 ^{a/} 22.6				
6.25% Filtered Effluent Blend	90	25.2				
12.5% Filtered Effluent Blend	80	26.7				
25% Filtered Effluent Blend	80	24.4				
50% Filtered Effluent Blend	100	28.1				
100% Filtered Effluent Blend	100	24.0				
Summar	y of Statistics					
NOEC =	100% Effluent Blend	100% Effluent Blend				
TUc (where TUc = 100/NOEC)	1 TUc	1 TUc				
Survival EC25 or Reproduction IC25 =	>100% Effluent Blend	>100% Effluent Blend				
TUc (where TUc = $100/EC25$ or $100/IC25$) =	<1 TUc	<1 TUc				
Survival EC50 or Reproduction IC50 =	>100% Effluent Blend	>100% Effluent Blend				
TUc (where TUc = $100/EC50$ or $100/IC50$) =	<1 TUc	<1 TUc				

a- There was an outlier replicate in the Hardness Blank treatment. The results presented here are those with the outlier excluded. Per EPA guidance, the data is presented both excluding and including the outlier in Appendix B and C, respectively.

3.2 Effects of Filtered Biological Effluent/Permeate Blend on *Ceriodaphnia dubia* compared to the Lab Water Control

The results of this test are summarized below in Table 3. There were no significant reductions to survival observed in the filtered effluent blend treatments when compared to the Lab Water Control; the NOEC for survival was 100% filtered effluent, resulting in 1 TUc. There were significant reductions to reproduction observed in the filtered effluent blend treatments when compared to the Lab Water Control; the EC25 for reproduction was 57.1% filtered effluent blend, resulting in 1.8 TUc. The test data and summary of statistical analyses for this test are presented in Appendix D.

Table 3. Effects of Filtered Biological Effluent/Permeate on Ceriodaphnia dubia:Comparison to the Lab Water Control.						
Test Treatment	% Survival	Reproduction (mean # of offspring)				
Hardness Blank	90	24.1*				
Lab Water Control	100	34.4				
6.25% Filtered Effluent Blend	90	25.2*				
12.5% Filtered Effluent Blend	80	26.7				
25% Filtered Effluent/ Blend	80	24.4*				
50% Filtered Effluent Blend	100	28.1*				
100% Filtered Effluent Blend	100	24.0*				
Summar	ry of Statistics					
NOEC =	100% Effluent Blend	12.5% Effluent Blend				
TUc (where TUc = 100/NOEC)	1 TUc	8 TUc				
Survival EC25 or Reproduction IC25 =	>100% Effluent Blend ^a	57.1% Effluent Blend				
TUc (where TUc = $100/EC25$ or $100/IC25$) =	<1 TUc	1.8 TUc				
Survival EC50 or Reproduction IC50 =	>100% Effluent Blend ^a	>100% Effluent Blend				
TUc (where TUc = 100/EC50 or 100/IC50) =	<1 TUc	<1 TUc				

* - 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 Unfiltered Biological Effluent/Permeate Blend on *Ceriodaphnia dubia* compared to the Lab Water Control

The results of this test are summarized below in Table 4. There were no significant reductions to survival or reproduction observed in the unfiltered 25% effluent blend treatment compared to either the Hardness Blank or Lab Water Control; the NOEC for both endpoints was 100% unfiltered effluent blend, resulting in 1 TUc. As there was a statistical outlier in the Hardness Blank treatment, the data are presented both excluding and including the outlier. The test data and summary of statistical analyses compared to the Hardness Blank for this test excluding the outlier are presented in Appendix D; the statistical analyses compared to the Hardness Blank for this test including the outlier are presented in Appendix E.

Table 4. Effects of Unfiltered Biological Effluent/Permeate on Ceriodaphnia dubia: Comparison to the Usedness Plank and Lab Control								
	Comparison to the Hardness Blank and Lab Control.							
Test Trestment	Of Survival	Reproduction						
Test Treatment	% Survival	(mean # of offspring)						
Lab Water Control	100	34.4						
Hardness Blank	90	24.1ª/22.6						
100% Unfiltered Effluent Blend	100	30.2 ^b						
Summar	y of Statistics							
NOEC =	100% Effluent Blend	100% Effluent Blend						
TUc (where TUc = 100/NOEC)	1 TUc	1 TUc						
Survival EC25 or Reproduction IC25 =	>100% Effluent Blend	>100% Effluent Blend						
TUc (where TUc = $100/EC25$ or $100/IC25$) =	<1 TUc	<1 TUc						
Survival EC50 or Reproduction IC50 =	>100% Effluent Blend	>100% Effluent Blend						
TUc (where TUc = 100/EC50 or 100/IC50) =	<1 TUc	<1 TUc						

a- There was an outlier replicate in the Hardness Blank treatment. The results presented here are those with the outlier excluded. Per EPA guidance, the data is presented both including and excluding the outlier in Appendix D and E, respectively.

b – Although there was 12.2% reduction in reproduction that was statistically less than the Lab Water Control, the sample is not considered toxic per EPA guidance since the reduction compared to the Control and the test PMSD (10.5%) were both less than the lower 10th percentile PMSD of 13% established for this method.

3.4 Reference Toxicant Toxicity to Ceriodaphnia dubia

The results of this test are summarized below in Table 5. The survival EC50 and reproduction IC50 for this test 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 F.

Table 5. Reference toxicant testin	ng: Effects of NaCl on Ce	eriodaphnia dubia.
NaCl Treatment (mg/L)	% Survival	Reproduction (# neonates/female)
Lab Water Control	100	33.5
500	100	31.0
1000	66.7	20.3*
1500	100	20.7*
2000	60	5.3
2500	0*	-
Survival EC50 or Reproduction IC50 =	1740	1620

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

4. SUMMARY & CONCLUSIONS

An evaluation of the chronic toxicity of Lehigh Permanente Cement Plant Biological Effluent and Permeate water samples to *Ceriodaphnia dubia* was performed. The results of this testing follow:

Effects of Biological Effluent/Permeate on Ceriodaphnia dubia

There were no significant reductions to survival or reproduction observed in the filtered effluent blend treatments when compared to the Hardness Blank; the NOEC for both endpoints was 100% filtered effluent blend resulting in 1 TUc. There were no significant reductions to survival observed in the filtered effluent blend treatments when compared to the Lab Water Control; the NOEC for survival was 100% filtered effluent, resulting in 1 TUc. There were significant reductions to reproduction in the filtered effluent blend treatments when compared to the Lab Water Control; the Water Control; the EC25 for reproduction was 57.1% filtered effluent blend, resulting in 1.8 TUc.

There were no significant reductions to survival or reproduction observed in the 100% unfiltered effluent blend treatment compared to both the Hardness Blank and Lab Water Control; the NOEC for both endpoints was 100% unfiltered effluent blend, resulting in 1 TUc.

4.1 QA/QC Summary

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

Negative Control – The biological responses for the test organisms at the Lab Control treatments were within acceptable limits.

Positive Control – The reference toxicant test survival EC50 and reproduction IC50 were both 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.

Concentration Response Relationships – The concentration-response relationships for these tests were evaluated as per EPA guidelines (EPA-821-B-00-004). There was an interrupted concentration response relationship for the Lab Water Control comparison to the filtered effluent blend. All concentration response treatments were determined to be acceptable for this testing.

Appendix A

Chain-of-Custody Record for the Collection and Delivery of the Lehigh Permanente Cement Plant Biological Effluent and Permeate Samples



CHAIN-OF-CUSTODY RECORD



Address: 9888 Kent Street Address: Elk Grove, CA 95624	Reproduction, EPA 1002.0 Hold
	EPA 1002.0
Phone: (916) 405-8918 Phone:	
Phone: (916) 405-8918 Phone:	
Attn: Paul Bedore Attn:	
E-mail: paul@robertson-bryan.com E-mail:	
Project Name: Lehigh TRE Testing	
P.O.#/Ref:	
Client Sample Sample Sample Grab/	ntainer
Client Sample ID Date Time Matrix* Comp Number	
1 Biological Effluent gp26116 1530 FW Grab 4	-gal LDPE Cube x
2 Permeate 7/26/16 1575 FW Grab 4	-gal LDPE Cube x
slofluent FW Grab 1	gal LDPE Cube
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6	╶───── ┟╶┼╶┼╌┼╌┼╌┼╌┼ ╌┼
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Samples collected by:	
Comments/Special Instruction: RELIQUIN	ED BY: RECEIVED BY:
Dilution series test of 25% biological effluent + 75% permeate using Signature	Signature: N.B.
high-hardness water as diluent. Dilution series tested on filtered samples.	INATH SHIVALINGAPPA Print: Sem Boylan
Organizat	LEHIGH HANSON Organization: PER
One-concentration test of 25% biological entuent + 75% permeate on Date: QIC	16 Time: 08 00 Date: 0, 27/16 Time: 1103
unfiltered samples.	
High hardness water made with Pond 4A recipe, adjusted to Signature	Signature:
hardness of 25% biological effluent + 75% permeate.	Print:
See Test Plan provided by P Bedore. Organizat	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 the Filtered Biological Effluent/ Permeate Treatments to *Ceriodaphnia dubia*: Analysis vs. Hardness Blank and Excluding Outlier Data

CETIS Sum	nmary Repo	rt						Report Dat Test Code:			02 (p 1 of 2) 2-2963-0781
Ceriodaphnia	Survival and Re	product	ion Test							Pacif	ic EcoRisk
Batch ID: Start Date: Ending Date: Duration:	19-5180-4571 27 Sep-16 17:20 03 Oct-16 15:15 5d 22h) Pi ; Si	est Type: rotocol: pecies: purce:	Reproduction-S EPA-821-R-02- Ceriodaphnia d In-House Cultur	013 (2002) ubia			Analyst: Diluent: Brine: Age:	Simin Delijani Hard Synthetic Not Applicable 1	Water	
· ·	01-7517-1601 26 Sep-16 15:30 27 Sep-16 11:03 26h (0.5 °C)	D Ma 3 So	ode: aterial: ource: ation:	Effluent Effluent Lehigh Perman 75:25% Permea		al Effluent		Client: Project:	Lehigh Perman 26377	ente	
Batch Note:	Stats include da	ta for Filt	ered Sam	ple. Stats exclud	le outlier Ha	rdness Ctl-	G				
Comparison S	Summary										
Analysis ID 01-8286-3784 15-8193-6253 20-1075-9519 15-8674-6369 21-3131-5098	Reproduction Reproduction Survival		0 0 100 0 0	LOEL >0 >0 >100 >0 >0 >0	NA	9.49% 8.24% 33.9% NA NA	TU 1	Equa Wilc Fishe	al Variance t Two al Variance t Two oxon/Bonferroni / er Exact Test er Exact Test	-Sample Te	
16-8839-4248	Survival		100	>100	NA	NA	1	Fish	er Exact/Bonferro	oni-Holm Te	est
Point Estimate	e Summary										
Analysis ID 14-4043-9818	Endpoint Reproduction		Levei IC5 IC10 IC15 IC20 IC25 IC40 IC50	% 87.7 >100 >100 >100 >100 >100 >100	95% LCL 12.1 N/A N/A N/A N/A N/A N/A	95% UCL N/A N/A N/A N/A N/A N/A N/A	TU 1.14 <1 <1 <1 <1 <1 <1 <1 <1	Meth Linea	nod ar Interpolation (I	CPIN)	
Reproduction	Summary										
	Control Type	Count	Mean 34.4	95% LCL 32.4	95% UCL	Min 30	Max 40	Std		CV% 8.13%	%Effect
0	Filtration Blank Hardness Contr	10 9 10 10 10 10 10	33.3 24.1 25.2 26.7 24.4 28.1 24	31.9 21.9 19.1 19.9 18 23.3 20.2	36.4 34.7 26.4 31.3 33.5 30.8 32.9 27.8	30 20 11 12 13 14 18	40 37 29 33 36 36 35 29	0.63 0.63 2.68 3.01 2.84 2.13 1.67	3 2 8 2.93	6.01% 12.2% 33.7% 35.7% 36.8% 24.0% 22.0%	3.2% 29.9% 26.7% 22.4% 29.1% 18.3% 30.2%
Survival Summ	nary										
	Control Type Lab Water Contr	Count 10	Mean 1	95% LCL 1	95% UCL	Min 1	Max 1	Std I	Err Std Dev 0	CV%	%Effect 0.0%
0 6.25 12.5 25	Filtration Blank Hardness Contr	10 10 10 10 10	1 0.9 0.9 0.8 0.8	1 0.674 0.674 0.498 0.498	1 1 1 1	1 0 0 0	1 1 1 1	0 0.1 0.13 0.13	3 0.422	0.0% 35.1% 35.1% 52.7% 52.7%	0.0% 10.0% 10.0% 20.0% 20.0%
50 100		10 10	1 1	1	1 1	1	1 1	0 0	0	0.0% 0.0%	0.0% 0.0%

CETIS Summary Report

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0	Insta Oursilius I ar d Da	man alu c 41								Deald	ic EcoRi
Ceriodap	hnia Survival and Re	productio								Facil	IC ECORIS
Reprodu	ction 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	37	32	30	35	34	35	34	40	35	32
0	Filtration Blank	30	33	34	32	33	31	35	34	37	34
0	Hardness Contr	26	25	29	21	23	24		27	20	22
6.25		15	30	33	30	31	33	11	14	26	29
12.5		13	35	32	28	32	36	12	15	34	30
25		29	33	26	32	36	30	13	13	17	15
50		27	28	33	29	35	32	14	19	30	34
100		28	18	18	29	28	25	29	18	29	18
Survival C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 1
0	Lab Water Contr	1	1	1	1	1	1	1	1	1	1
0	Filtration Blank	1	1	1	1	1	1	1	1	1	1
0	Hardness Contr	1	1	1	1	1	1	0	1	1	1
6.25		1	1	1	1	1	1	0	1	1	1
12.5		1	1	1	1	1	1	0	0	1	1
25		1	1	1	1	1	1	1	1	0	0
50		1	1	1	1	1	1	1	1	1	1
100		1	1	1	1	1	1	1	1	1	1
Survival	Binomials						<u></u>				
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 1
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	Filtration Blank	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
0	Hardness Contr	1/1	1/1	1/1	1/1	1/1	1/1	0/1	1/1	1/1	1/1
0	naraness conta	17.1		17.1			17.1	0/1	1/ 1		17.1

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Analyst:______QA:_____

05 Oct-16 16:02 (p 2 of 2)

Report Date:

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69875-f | 12-2963-0781

CETIS Ana	alytical Repo	ort					Report Date: Test Code:			6 14:40 (p 1 of 1) 5-f 12-2963-0781
Ceriodaphnia	a Survival and Re	eproductio	on Test				·			Pacific EcoRisk
Analysis ID: Analyzed:	02-7538-0358 21 Oct-16 14:3		dpoint: Sun alysis: Sing		tingency Tal	ble	CETIS Versio Official Resu		CETISv1.8.7 Yes	
Data Transfo	rm	Zeta	Alt Hyp	Trials	Seed		Test R	esult	1	
Untransforme	d		C > T	NA	NA		Passe	ssun	/ival	
Fisher Exact	Test		<u></u>							
Control	vs Control		Test Stat		P-Type	Decision				
Lab Water Co	ntrol Hardness	Control	0.5	0.5000	Exact	Non-Signi	ficant Effect			
Data Summa	ry									
C-%	Control Type	NR	R	NR + R	Prop NR	Prop R	%Effect			<u></u>
0	Lab Water Cont Hardness Contr		0	10	1	0	0.0%			
0	Hardness Contr	9	1	10	0.9	0.1	10.0%			······································
Graphics										
1.0			•							
0.9	•									
8.0										
0.7										
0.6										
0.5										
0.4										
0.3										
0.2										
0.1										
0.0	0 HC		0 LW	· · · · ·	_					
	UNC	C-%	o LW							

st:_SD_QA:_M_

CETIS An	alytic	al Repo	ort					-	ort Date: Code:			40 (p 1 of 2 2-2963-078
Ceriodaphni	a Survi	val and Re	eproductio	on Test							Paci	fic EcoRisk
Analysis ID: Analyzed:		708-1450 ct-16 14:3		•	production ametric-Two	o Sample			IS Version al Result		.8.7	
Data Transfo	orm		Zeta	Alt Hyp	Trials	Seed		PMSD	Test Res	ult		
Untransforme	ed		NA	C > T	NA	NA		6.65%	Fails rep	roduction		
Equal Varian	ice t Tw	o-Sample	Test									
Control	vs	Control		Test Stat	Critical	MSD DF	P-Value	P-Type	Decisior	n(α:5%)		
Lab Water Co	ontrol	Hardness	Control	7.82	1.74	2.29 17	<0.0001	CDF	Significa			
ANOVA Tabl	e											
Source		Sum Squa	ares	Mean Squ	are	DF	F Stat	P-Value	Decisior	ı(α:5%)		
Between		501.448		501.448		1	61.2	<0.0001	Significa	nt Effect		
Error		139.2889		8.193464		17						
Total		640.7369				18					·····	
Distributiona	al Tests											
Attribute		Test			Test Stat	Critical	P-Value	Decision	(α:1%)			
Variances		Variance	Ratio F		1.1	6.69	0.8811	Equal Var	iances			
Distribution		Shapiro-V	Vilk W Nor	mality	0.969	0.861	0.7620	Normal D	istribution			
Reproductio	n Sumn	nary					_					
C-%	Contr	оІ Туре	Count	Mean	95% LCL	95% UCL	Median	Min	Мах	Std Err	CV%	%Effect
0		ater Contr		34.4	32.4	36.4	34.5	30	40	0.884	8.13%	0.0%
0	Hardn	ess Contr	9	24.1	21.9	26.4	24	20	29	0.978	12.2%	29.9%
Graphics 40 35 30 525 20 15 10		•			Reject Null	Centered	6	• • •	•		•	%
5		0 HC	C-%	0 LW		J	-3 -4 -5 -2.0	-1.0	-0.5 0.0 Rankits	0.5 1.0	15	2.0

Analyst: SD QA: M

(Client:		I	ehigh Pe	rmanent	e		N	laterial:		Lab V	Vater C	ontrol			Te	st Date:	9/27/16
Pro	ject #:	26	377		Test ID:	698	75	. 1	Random	ization:	10:7	.3/1	a 2. 5	5	-	Control	Water:	SRW
	Day	рН		D.O.		Cond.	Тетр				Su	rvival / R	leproduci	tion				SIGN-OFF
		New	Old	New	Old	(µS/cm)	-("C)	А	В	С	D	Е	F	G	Н	I	J	Sign-Off
	0	7,91		8.4		322	25.1	0	0	0	0	0	0	Ο	0	0	0	Date: 9/27/16 New WQ: Test Init.: 1720 Sol'n Prep: DM J Time: DM
	1	7.70	7,81	7.8	7.2	314	25.0	0	0	0	0	0	0	0	0	0	0	Date: 9/28/11 New WQ: M Counts: DM Sol'n Prep: DM Old WQ: 72 Time: 1235
	2	8.14	8.15	7.7	7.3	322	25.3	Ö	0	0	0	6	0	0	0	0	0	Date: 4/29/// New WQ: 77 Counts: TK Sol'n Prep: TV Old WQ: SF Time: 1500
ontrol	3	7.77	7,88	8.6	7.2	316	25.4	5	0	0	0	0	0	5	7	о	0	Date: 9/30/16 New WQ: AB Counts: DM Sol'n Prep: DM Old WQ: AB Time: 1215
	4	7.76	7.60	8.7	8.0	315	25.2	0	6	ч	6	7	6	8	0	6	7	Date: iGhill New WQ: DM Counts: DM Sol'n Prep: DM Old WQ: QJ Time: 1215
o Water	5	7.74	8.13	8.4	6.8	311	25.4	12	10	11	11	12	11	O	13	13	10	Date: 16/2/11 New WQ: DJ Counts: TK Sol'n Prep: TIC Old WQ: SIA Time: 1415
Lab	6		7.53	~	ר.ר	327	25,4	10	16	15	18	15	18	21	20	16	15	Date: 10/3/16 New WQ: - Counts: NOM Sol'n Prep: - Old WQ: Coc Time: 1515
	7																	Date: New WQ: Counts: Sol'n Prep: Old WO: Time:
	8		:															Date: New WQ: Counts. Sol'n Prep: Old WQ: Time:
							Total=	37	32	70	35	34	75	34	40	35	32	Mcan Neonates/Female = 3434

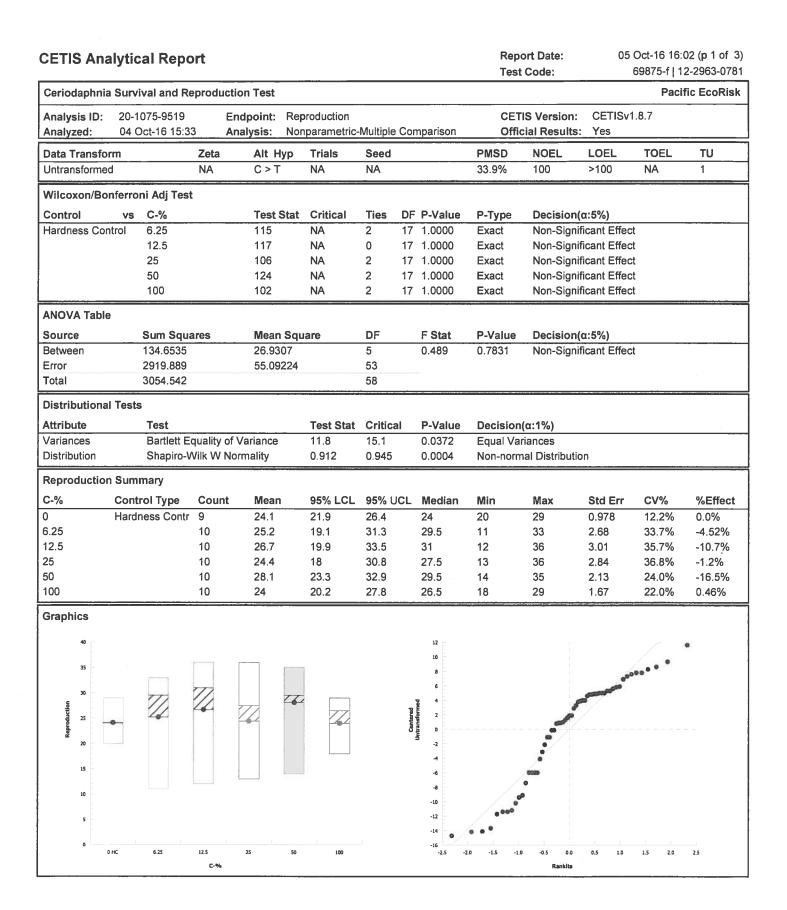
CETIS Ana	alytical Repo	ort					-	rt Date: Code:		16 15:02 (p 1 of 1) 5-f 12-2963-0781
Ceriodaphnia	a Survival and Re	productio	n Test							Pacific EcoRisk
Analysis ID: Analyzed:	16-5421-9636 21 Oct-16 14:59		lpoint: Sur Ilysis: Sing		tingency Ta	ble		S Version: ial Results:	CETISv1.8.7 Yes	
Data Transfo		Zeta	Alt Hyp	Trials	Seed			Test Resu		
Untransforme	d		C > T	NA	NA			Passes sur	vival	
Fisher Exact	Test									
Control	vs Control		Test Stat		P-Type	Decision	• •		<u> </u>	
Filtration Blan	k Hardness	Control	0.5	0.5000	Exact	Non-Signi	ficant Effect			
Data Summa	ry									
C-%	Control Type	NR	R	NR + R	Prop NR	Prop R	%Effect			
0 0	Filtration Blank Hardness Contr	10 9	0 1	10 10	1 0.9	0 0.1	0.0% 10.0%			
		<u> </u>		10	0.0	0.1	10.070			
Graphics										
1.0	8									
0.9			0							
8.0										
0.7										
a.0 Survival										
0.5										
0.4										
0.3										
0.2										
1.0										
0.0	0 F	1	0 HC							
		C-%								

CETIS Ana	alytical Repo	ort						ort Date: Code:			02 (p 2 of 2) 2-2963-0781
Ceriodaphnia	a Survival and Re	eproductio	n Test							Paci	fic EcoRisk
Analysis ID: Analyzed:	13-0601-2250 21 Oct-16 15:0		• •	production ametric-Two	o Sample			IS Version: cial Results		.8.7	
Data Transfo	rm	Zeta	Alt Hyp	Trials	Seed		PMSD	Test Res	ult		····
Untransforme	d	NA	С > Т	NA	NA		5.96%	Fails repr	oduction		······
Equal Varian	ce t Two-Sample	Test									
Control	vs Control		Test Stat	Critical	MSD DF	P-Value	P-Type	Decision	(α:5%)		
Filtration Blan	k Hardness	Control	8.05	1.74	1.99 17	<0.0001	CDF	Significan			
ANOVA Table	•										
Source	Sum Squa	ares	Mean Squ	are	DF	F Stat	P-Value	Decision	(α:5%)		
Between	399.9585		399.9585		1	64.8	< 0.0001	Significan			
Error	104.9889		6.175817		17						
Total	504.9474				18						
Distributiona	l Tests										
Attribute	Test			Test Stat	Critical	P-Value	Decision	(α:1%)			
Variances	Variance	Ratio F		2.15	6.69	0.2763	Equal Var	iances			
Distribution	Shapiro-V	Vilk W Norr	nality	0.982	0.861	0.9594	Normal D	istribution			
Reproduction	n Summary										
C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Hardness Contr	9	24.1	21.9	26.4	24	20	29	0.978	12.2%	0.0%
0	Filtration Blank	10	33.3	31.9	34.7	33.5	30	37	0.633	6.01%	-38.1%
Graphics ⁴⁰ [_				5		, 1			õ,
35						4		1		•	
30 -				Reject Null	_	3		l l		•	
-						2		l L			
5000 25 004					Centerred						
20					0. :	5					
-						-1		•••			
15						-1	,	•			
10						-2		P I			
-						-3	• •				
5						-4 -0	/	1			
0	0 F				L	-5		1		1	
	0 F		0 HC			-2.0	1.5 1.0	-0.5 0.0	0.5 1.0	1.5	2.0

Analyst: SD QA: M

(Client:			Lehigl	n Perman	ente			M	laterial:		Fil	ter Bla	nk		Te	st Date:	9127/16
Pro	ject #:	263	377		Test ID:		69875		. F	Random	ization:	10-7.	3/10	2.5		Control	Water:	SRW
	Day	р		D	.0.	Cond.	Temp				Su	rvival / R	eproduct	lion				SIGN-OFF
		New	Old	New	Old	(µS/cm)	(°C)	A	В	С	D	E	F	G	Н	I	J	
	0	7.87		8.4		315		0	σ	0	0	σ	0	0	0	0	0	Date: 9/27/16 New WQ: Test Init DM Sol'n Prep: DM Time 1720
	1	8.45	8.43	8.9	7.6	315		D	0	0	D	0	0	0	0	0	0	Date: 9128/16 New WQ. LLC Counts DM Sol'n Prep: DM Old WQ: J.J. Time 1235
	2	8,46	8.64	9.3	7.8	305		O	0	0	0	0	0	0	0	0	Õ	Date: 4/24/14 New WQ: ST Counts: TK Sol'n Prep: TX Old WQ: SF Time: 1500
	3	8.32	8.16	10.2	6.3	DH 913016		ц	6	0	ч	0	б	ц	0	0	0	Date: 9130 16 New WQ: AB Counts: DM Sol'n Prep: DM Old WQ: RB Time: 1215
r Blank	4	7.70	8.24	9.6	8.0	322		ο	0	S	0	6	6	0	5	6	5	Date: 10/1/16 New WQ: DM Counts: DM Sol'n Prep: DM Old WQ: D) Time: 1215
Filter	5	8.08	8.28	1.1	8.2	313		12	11	11	10	с	9	12	10	13	12	Date: 10/2/14 New WQ: DT Counts TK Sol'n Prep: TNL Old WQ: SH Time HUS
	6	1	٦.9٦	_	7.8	337		14	16	18	1g	18	16	19	19	18	17	Date: 10/3/16 New WQ: - Countsman Sol'n Prep: - Old WQ: CVC Time 1717
	7												1		1			Date: New WQ: Counts Sol'n Prep: Old WQ: Time
	8												10					Date: Old WQ: Counts Time
							Total=	30	33	34	32	33	31	35	34	37	34	Mean Neonates/Female = 33, 3

Analysis ID: Analyzed: Data Transfe Untransforme	04 Oct-16 15:31 orm ed t/Bonferroni-Holm vs C-% ontrol 6.25 12.5 25 50 100	Er Ar Zeta	ndpoint: Sun	Trials NA P-Value 1.0000	ngency Table Seed NA P-Type	es Decision	Offici	S Version: al Results: NOEL 100	CETISV Yes LOEL >100		ic EcoRisk TU 1
Analyzed: Data Transfo Untransform Fisher Exac Control	04 Oct-16 15:31 form ed t/Bonferroni-Holm vs C-% pontrol 6.25 12.5 25 50 100	Ar Zeta	Alt Hyp C > T Test Stat 0.763 0.5	2 2x2 Contin Trials NA P-Value 1.0000	Seed NA P-Type		Offici	al Results: NOEL	Yes LOEL	TOEL	
Untransform Fisher Exac Control	ed t/Bonferroni-Holm vs C-% pontrol 6.25 12.5 25 50 100		C > T Test Stat 0.763 0.5	NA P-Value 1.0000	NA P-Type	Decision					
Fisher Exac Control	t/Bonferroni-Holm vs C-% pontrol 6.25 12.5 25 50 100	Test	Test Stat 0.763 0.5	P-Value 1.0000	Р-Туре	Decision		100	>100	NA	1
Control	vs C-% ontrol 6.25 12.5 25 50 100	Test	0.763 0.5	1.0000		Decision					
	ontrol 6.25 12.5 25 50 100		0.763 0.5	1.0000		Decision					
Hardness Co	12.5 25 50 100		0.5								
	25 50 100			4 0 0 0 0	Exact		ificant Effect				
	50 100		0.5	1.0000	Exact		ificant Effect				
	100			1.0000	Exact		ificant Effect				
			1	1.0000	Exact		ificant Effect				
			1	1.0000	Exact	Non-Signi	ificant Effect				
Data Summa	ary										
C-%	Control Type	NR	R	NR + R	Prop NR	Prop R	%Effect				
0	Hardness Contr	9	1	10	0.9	0.1	0.0%				
6.25		9	1	10	0.9	0.1	0.0%				
12.5		8	2	10	0.8	0.2	11.1%				
25		8	2	10	0.8	0.2	11.1%				
50		10	0	10	1	0	-11.1%				
100		10	0	10	1	0	-11.1%				
Graphics											
1.0 -			•	•							
0.9											
0.9	•										
0.8		•	•								
0.7											
9.0 Survival											
0.5											
0.4											
0.3											
0.2											
0.2											
0.1											
0.0	0 HC 6 25		25 50	100							
	U MC 6.25	12.5 C-%	25 50	100							



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CETIS #5/60 VI.8.7.16

Analyst: SD QA: M

CETIS	6 Anal	ytical Repo	ort						ort Date: Code:		16 16:02 (p 1 of 1 '5-f 12-2963-078
Ceriod	aphnia	Survival and Re	eproduc	tion Test							Pacific EcoRisk
Analys Analyz		14-4043-9818 04 Oct-16 15:33		Indpoint: Analysis:	Reproduction Linear Interpola	ition (ICPIN))		IS Version: cial Results		
Linear	Interpo	lation Options							÷		
X Trans	sform	Y Transform	n s	Seed	Resamples	Exp 95%	CL Me	thod			
Linear		Linear	5	13337	200	Yes	Tw	o-Point Interp	olation		
Point E	stimate	S									
Level	%	95% LCL	95% U	CL TU	95% LCL	95% UCL					
IC5	87.7	12.1	N/A	1.14	NA	8.238					
IC10	>100	N/A	N/A	<1	NA	NA					
IC15	>100	N/A	N/A	<1	NA	NA					
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					
Reprod	luction	Summary				Cal	culated \	/ariate			
C-%	C	ontrol Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	
0	H	ardness Control	9	24.1	20	29	0.978	2.93	12.2%	0.0%	
6.25			10	25.2	11	33	2.68	8.48	33.7%	-4.52%	
12.5			10	26.7	12	36	3.01	9.53	35.7%	-10.7%	
25			10	24.4	13	36	2.84	8.97	36.8%	-1.2%	
50			10	28.1	14	35	2.13	6.74	24.0%	-16.5%	
100			10	24	18	29	1.67	5.29	22.0%	0.46%	
Graphi	cs							<u></u>			
	30	0	. •	104	9						
	25 - 0				0						
5	20										
epreduction											
Repri	15										
	-										
	10 -										
	5										
	0		1 1 1	1.1.2.2	<u>. 1 3 6 6 6 6</u>						
	0	20	40 C-96	60	80 100						
			- 10								

Client: Lehigh Permanente							М	laterial:	25%:75	% 0.2 um	Filt. Bio	9127116							
Pro	ject #:	26	377		698	75	F	Random	ization:	10.7.	3/1	Water:	Hardness Control						
	Day	pН		D.O.		Cond.	Temp				Su	rvival / R		SIGN-OFF					
		New	Old	New	Old	(µS/cm)	(°C)	A	В	С	D	Е	F	G	н	I	J		
	0	7.51		8,1		1712	25.1	0	0	0	0	0	0	0	0	0	0	Sol'n Prep: DM Time: 1700	
	I	7.39	7.76	8.3	7.0	1720	25.0	0	0	0	0	0	D	0	0	0	0	Date: 1/28/16 New WQ: 20 Counts: PM Sol'n Prep: DM Old WQ: 73 Time: 235 Date: 9/29/19 New WQ: 73 Counts: TK	
	2	271	7.82	9,5	7.4	1729	25.3	0	0	0	0	0	\odot	0	0	0	0	Sol'n Prep: TV Old WQ: SF Time: 1500	
Irol	3	7.50	7.68	8.9	7.1	1688	25.4	5	ч	0	0	0	0	3	0	0	0	Date: 4130 16 New WQ: RB Counts: DM Sol'n Prep: DM Old WQ: RB Time: 1215	
Cont	4	7.33	8.00	10.5	6.9	1732	25.2	٥	0	S	2	4	3	6	5	4	3	Date: 10/11/6 New WQ: DM Counts: DH Sol'n Prep: DM Old WQ: DT Time: 1215	
Hardness Control	5	7.86	7.62	9.1	8.9		254	٩	8	8	5	7	7	*/0	8	7	8	Date: to/L/14 New WQ: \$5 Counts: TK Sol'n Prep: TNL Old WQ: \$14 Time: 1415	
Har	6		7.24	-	7.5	1786		12	13	16	14	12	14	-	14	9	11	Date: 10/3/16 New WQ: Counts: 24999 Sol'n Prep: Old WQ:/JU Time: 1515	
	7													-				Date: New WQ: Counts: Sol'n Prep: Old WQ: Time:	
	8								,									Date: New WQ: Counts: Sol'n Prep: Old WQ: Time:	
							Total=	26	25	29	21	23	24	X/q	27	20	22	Mean Neonates/Female = 22.6	
	Day	р	H	D	.0.	Cond.			Survival / Reproduction									SAMPLE ID	
		New	Old	New	Old	(µS/cm)		A	В	С	D	E	F	G	н	1	j		
	0	7,47		8,4		1699		0	0	0	0	0	0	0	0	0	0	Permeate / Biologica.1 44185 44186	
	1	7.45	7,86	9.1	7,5	1713		0	0	0	0	0	0	0	0	0	0	44185 / 44186	
	- 2	7.73	7.84	9,8	7.3	172)		0	0	0	0	0	0	0	0	0	0	44185 / 44186	
	3	7.55	7.89	9.2	7.1	1702		S	5	υ	0	0	0	6	ч	0	0	44185 / 44186	
2%	4	7.36	7.39	10.6	7.7	1725		0	0	6	5	5	6	5	0	6	5	44185 / 44186	
6.25%	5		7.65	9.8	8.1	1666		10	9	10	10	11	11	×/6	10	9	7	44185 / 44186	
	6	-	7.25		7.3	1758		0	16	17	15	15	16	-	0	11	17		
	7													-					
	8													_					
							Total≖	15	30	23	30	31	33	×/11	14	26	29	Mean Neonates/Female = 25.2	

Client: Lehigh Permanente										25%:75			9127116					
Рго	ject #:	26	377	-	698	75	ļ	Random	ization:	10.7	13/1	Water:						
	Day	pН		D.O.		Cond.	Temp				Su	rvival / F		SIGN-OFF				
		New	Old	New	Old	(µS/cm)	(°C)	A	В	С	D	Е	F	G	Н	I	J	51010011
	0	7,50	and the second s	8,5		1688	25.1	0	0	0	0	0	0	0	0	0	0	
	1	762	7,93	8.6	7,7	1692	25.0	0	0	0	0	0	0	0	0	0	0	
	2	7,76	7.90	9,9	7.2	1705	253	0	0	0	0	0	0	0	0	0	0	
	3	7.63	7.97	18.0	6.6	1684	25.4	2	0	0	3	0	0	4	5	0	0	
12.5%	4	17.41	7,54	10.7	7.6.	1700	25.2	ο	6	5	0	7	8	8	0	8	8	
12.	5	7.52	7.70	9.3	7.9	1690	25.4	11	12	12	8	٩	10	X/G	10	9	10	
	6		7.35	_	ר.ר	1735	25.4	0	17	15	1	16	18	~	40	17	12	
	7													-	-			
	8													-	-			
							Total=	13	35	32	28	32	36	X/12_	4/15	34	30	Mean Neonates/Female = 26.7
	Day	р	H	D.	.0.	Cond.					Surviva	/ Repro	duction					
		New	Old	New	Old	(µS/cm)		A	В	С	D	E	F	G	Н	I	J	
	0	757		4.4		1640		0	0	0	0	0	0	0	0	0	0	
	1	7.70	8.00	9.0	7.8	1646		0	0	0	0	0	0	0	0	0	0	
	2	7,80	7.98	9.9	7.4	1659		0	0	0	Õ	Q	0	0	0	0	δ	
	3	7.71	8.12	10.0	6.8	1620		2	ч	ч	0	0	0	4	ц	6	0	
25%	4	7.51	7.68	10.6	7.4	1654		Ð	0	0	6	5	6	ð	0	0	6	
25	5	7.56		9.4	7.8	1644		10	11	10	9	12	10	9	9	11	٩	
	6	/	7.40	- <u>-</u>	7.6	1697		17	18	12	17	19	14	D	0	40	70	
	7									-						-	~	
	8															,	-	encu.
							Total=	29	33	26	32	36	30	13	13	1/17	7/15	Mean Neonates/Female = 247574

Client: Lehigh Permanente							N	laterial:	-		Filt. Bio	9/27/16							
Pro	ject #:	26	377	698	. 1	Random	ization:	10.7	31	Hardness Control									
	Day		рН		D.O.		Temp		_		Su	rvival / R	eproduc		- SIGN-OFF				
		New	Old	New	Old	(µS/cm)	(°C)	A	В	С	D	E	F	G	н	1	J		
	0	7.63		8,9		1532	25.1	0	0	0	0	0	0	0	0	0	0		
	1	7.94	8.07	3.1	7,6	1540	25.D	0	0	0	0	0	0	0	0	0	0		
	2	7,88	8.∞	9.8	7.2		25.3	0	0	0	0	0	0	0	0	0	0		
	3	7.83	8.01	10.1	8.0	1516	25.4	3	3	0	3	0	0	6	7	0	0		
50%	4	7.61	7.83	10.5	7.6	1547	25.2	٥	0	5	O PM	6	6	0	0	6	8		
5(5	7.62	7.83	9.4	7.9	1534	254	8	11	10	11	10	10	8	12	10	9		
	6		7.46		٦.5	1589	25.4	16	14	14	15	19	16	D	0	14	17		
	7							`											
	8																		
							Total=	27	24	33	29	35	32	14	19	30	34	Mean Neonates/Female = 28-1	
	Day	р	Н	D.	0.	Cond.					Survival								
		New	Old	New	Old	(µS/cm)		A	В	С	D	Е	F	G	Н	I	J		
	0	7,73		વ્દુ,ક		1297		0	0	0	Ο	0	0	0	0	0	0		
	1	8.02	8.15	8.9	6.9	1303		0	0	υ	0	0	0	0	0	0	0		
	2	8.04	8-13	9,6	8.2	1305		Ö	0	0	0	0	O	0	0	0	0		
	3	8.05	8,32	10.2	6.9	1278		0	0	0	0	0	0	0	0	0	0		
100%	4	7.81	7.96	10.5	7.7	1306		4	ч	0	4	7	5	Ŧ	ο	6	5		
10(5	7,74	7.92	9.3	7.7	1293		8	0	Ø	9	8	8	8	5	9	0		
	6	-	7.61	/		1348		16	14	18	16	13	12	14	13	14	13		
	7										-	<u>`</u>							
	8							0											
							Total=	28	18	14	29	28	25	29	14	29	14	Mean Neonates/Female = 24, 0	

Appendix C

Test Data and Summary of Statistics for the Evaluation of the Chronic Toxicity of the Filtered Biological Effluent/ Permeate Treatments to *Ceriodaphnia dubia*: Analysis vs. Hardness Blank and Including Outlier Data

CETIS Sum	nmary Repo	rt						Report Dat Test Code:)5 Oct-16 16:(69875-f 12	06 (p 1 of 2) 2-2963-0781
Ceriodaphnia	Survival and Re	production	Test							Pacif	ic EcoRisk
Batch ID: Start Date: Ending Date: Duration:	19-5180-4571 27 Sep-16 17:20 03 Oct-16 15:15 5d 22h) Proto	ocol: ies:	Reproduction-S EPA-821-R-02-0 Ceriodaphnia du In-House Cultur	013 (2002) ubia			Analyst: Diluent: Brine: Age:	Simin Delijan Hard Synthet Not Applicabl 1	ic Water	
Receive Date: Sample Age:	01-7517-1601 26 Sep-16 15:30 27 Sep-16 11:03 26h (0.5 °C)	3 Sour Statio	rial: ce: on:	Effluent Effluent Lehigh Permane 75:25% Permea	ate:Biologica			Client: Project:	Lehigh Perma 26377	anente	
Batch Note:	Stats include da		u Sam	pie. Stats include		idness Cli-C			<u> </u>		
Comparison S Analysis ID 16-3379-7479	Endpoint		NOEL 0	- LOEL >0	TOEL	PMSD 15.0%	τu	Meti			at
01-0336-3186 11-9836-8720 15-8674-6369 21-3131-5098 16-8839-4248	Reproduction Reproduction Survival Survival		100 0 0 0 100	>0 >100 >0 >0 >0 >100	NA	15.0% 34.5% 14.3% NA NA NA	1	Stee Wilc Fish Fish	al Variance t Tv I Many-One Ra oxon Rank Sur er Exact Test er Exact Test er Exact/Bonfe	ank Sum Test m Two-Sampl	e Test
Point Estimate	e Summary							<u> </u>			
Analysis ID 08-6315-4303	Endpoint Reproduction		Level IC5 IC10 IC15 IC20 IC25 IC40 IC50	% 95.4 >100 >100 >100 >100 >100 >100	95% LCL 18.4 N/A N/A N/A N/A N/A N/A	95% UCL N/A N/A N/A N/A N/A N/A N/A	TU 1.049 <1 <1 <1 <1 <1 <1 <1	Meti Line	nod ar Interpolation	(ICPIN)	
Reproduction	Summary										
0 0 6.25 12.5 25 50 100		Count 10 10 10 10 10 10 10 10 10	Mean 34.4 33.3 22.6 25.2 26.7 24.4 28.1 24	95% LCL 32.4 31.9 18.7 19.1 19.9 18 23.3 20.2	95% UCL 36.4 34.7 26.5 31.3 33.5 30.8 32.9 27.8	Min 30 30 9 11 12 13 14 18	Max 40 37 29 33 36 36 36 35 29	Std 0.88 0.63 1.75 2.68 3.01 2.84 2.13 1.67	4 2.8 3 2 5.52 8.48 9.53 8.97 6.74	v CV% 8.13% 6.01% 24.4% 33.7% 35.7% 36.8% 24.0% 22.0%	%Effect 0.0% 3.2% 34.3% 26.7% 22.4% 29.1% 18.3% 30.2%
Survival Sumr	nary Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Stal	Err Std Do	v CV%	% Effect
0 0	Lab Water Contr	10 10	1 1 0.9 0.9 0.8 0.8 1 1	1 1 0.674 0.674 0.498 0.498 1 1	1 1 1 1 1 1 1 1 1 1	1 1 0 0 0 0 1 1	1 1 1 1 1 1 1 1 1	Std 0 0.1 0.1 0.13 0.13 0 0 0	0 0 0.316 0.316 3 0.422	0.0% 0.0% 35.1% 35.1% 52.7% 52.7% 0.0% 0.0%	%Effect 0.0% 0.0% 10.0% 10.0% 20.0% 20.0% 0.0% 0.0%

CETIS 181/698.7.16

Analyst: SD QA: M

CETIS Summary Report

Report Date:	05
Test Code:	

05 Oct-16 16:06 (p 2 of 2) 69875-f | 12-2963-0781

Ceriodaphr	nia Survival and Re	productio	on Test							Pacif	ic EcoRis
Reproducti	on 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	37	32	30	35	34	35	34	40	35	32
0	Filtration Blank	30	33	34	32	33	31	35	34	37	34
0	Hardness Contr	26	25	29	21	23	24	9	27	20	22
6.25		15	30	33	30	31	33	11	14	26	29
12.5		13	35	32	28	32	36	12	15	34	30
25		29	33	26	32	36	30	13	13	17	15
50		27	28	33	29	35	32	14	19	30	34
100		28	18	18	29	28	25	29	18	29	18
Survival De	tail										
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 3
0	Filtration Blank	1	1	1	1	1	1	1	1	1	1
0	Hardness Contr	1	1	1	1	1	1	0	1	1	1
6.25		1	1	1	1	1	1	0	1	1	1
12.5		1	1	1	1	1	1	0	0	1	1
25		1	1	1	1	1	1	1	1	0	0
50		1	1	1	1	1	1	1	1	1	1
100		1	1	1	1	1	1	1	1	1	1
Survival Bi	nomials										
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	Filtration Blank	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
0	Hardness Contr	1/1	1/1	1/1	1/1	1/1	1/1	0/1	1/1	1/1	1/1
6.25		1/1	1/1	1/1	1/1	1/1	1/1	0/1	1/1	1/1	1/1
12.5		1/1	1/1	1/1	1/1	1/1	1/1	0/1	0/1	1/1	1/1
25		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	0/1	0/1
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

Analyst: SD QA: M

CETIS Ana	alytical Report						ort Date: Code:			40 (p 2 of 2) 2-2963-0781
Ceriodaphnia	a Survival and Reprod	uction Test							Paci	fic EcoRisk
Analysis ID: Analyzed:	00-1061-9004 21 Oct-16 14:40	•	production rametric-Two	Sample			IS Version		.8.7	
Data Transfo	rm Zeta	Alt Hyp	Trials	Seed		PMSD	Test Res	ult		
Untransforme	d NA	C > T	NA	NA		9.87%	Fails rep	roduction		
Equal Varian	ce t Two-Sample Test									
Control	vs Control	Test Stat	Critical	MSD DF	P-Value	P-Type	Decision	(α:5%)		
Lab Water Co	ntrol Hardness Cont	rol 6.03	1.73	3.39 18	<0.0001	CDF	Significa			
ANOVA Table)							·····		· · · · · · ·
Source	Sum Squares	Mean Sq	uare	DF	F Stat	P-Value	Decision	(a:5%)		
Between	696.2	696.2		1	36.3	<0.0001	Significal			
Error	344.8	19.15556		18						
Total	1041			19						
Distributiona	l Tests									
Attribute	Test		Test Stat	Critical	P-Value	Decision	(α:1%)			
Variances	Variance Ratio	F	3.9	6.54	0.0552	Equal Va	riances			
Distribution	Shapiro-Wilk W	Normality	0.876	0.866	0.0150	Normal D	istribution			
Reproduction	n Summary									
C-%	Control Type Cou	nt Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
)	Lab Water Contr 10	34.4	32.4	36.4	34.5	30	40	0.884	8.13%	0.0%
)	Hardness Contr 10	22.6	18.7	26.5	23.5	9	29	1.75	24.4%	34.3%
Graphics 40 35 30 5 20 15 10 5 0	27727777 0HC	0.00	Reject Null	Centered	8 6 4 2 2 0 0 -2 -2 -4 -6 -6 -8 -10 -12 -12 -20	•••		•••		•
	U PR	0 LW			-2.0	-1.5 -1.0	-0.5 0.0	0.5 1.	1.5	2.0

CETIS Ana	alytical Repo	ort						ort Date: Code:			:02 (p 1 of 2 2-2963-078
Ceriodaphnia	a Survival and Re	eproductio	on Test							Paci	ific EcoRisk
Analysis ID: Analyzed:	04-0638-3526 21 Oct-16 14:5		•	production nparametric-	-Two Samp	le		IS Version: cial Results		1.8.7	
Data Transfo	rm	Zeta	Alt Hyp	Trials	Seed		PMSD	Test Res	ult		
Untransforme	d	NA	C > T	NA	NA		9.67%	Fails repr	oduction		
Wilcoxon Ra	nk Sum Two-Sar	nple Test									
Control	vs Control		Test Stat	Critical	Ties D	F P-Value	P-Type	Decision	(α:5%)		
Filtration Blan	k Hardness	Control	55	NA	0 18	3 <0.0001	Exact	Significan			
ANOVA Table	9						<u></u>				
Source	Sum Squa	ares	Mean Sq	Jare	DF	F Stat	P-Value	Decision	(α:5%)		
Between	572.45		572.45		1	33.2	<0.0001	Significan	· · · ·		
Error	310.5		17.25		18			-			
Total	882.95				19						
Distributiona	I Tests										·····
Attribute	Test			Test Stat	Critical	P-Value	Decision	(α:1%)			
Variances	Variance	Ratio F		7.6	6.54	0.0058	Unequal			· ·	
Distribution	Shapiro-V	Vilk W Nor	mality	0.839	0.866	0.0035		al Distributi	on		
Reproduction	n Summary							····· ·· ·			······································
C-%	Control Type	Count	Mean	95% LCL	95% UCL	. Median	Min	Max	Std Err	CV%	%Effect
0	Hardness Contr	10	22.6	18.7	26.5	23.5	9	29	1.75	24.4%	0.0%
0	Filtration Blank	10	33.3	31.9	34.7	33.5	30	37	0.633	6.01%	-47.3%
Graphics 40 35 30 5 20 10 5			1716			8 6 4 4 2 2 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	0 0			••	•
0	0 F	- P.	0 HC			-14 -2.0	-1.5 -1.0	-0.5 0.0	0.5 1	LO 1,5	2.0
		C-%						Rankits			

		ort					-	ort Date: Code:			07 (p 1 of 3 2-2963-0781
Ceriodaphnia	Survival and R	eproduct	ion Test							Paci	fic EcoRisk
Analysis ID: Analyzed:	01-0336-3186 04 Oct-16 15:3		•	production	Control vs	Treatments		IS Versior		.8.7	
Data Transfor	'n	Zeta	Alt Hyp	Trials	Seed		PMSD	NOEL	LOEL	TOEL	TU
Untransformed	1	NA	C > T	NA	NA		34.5%	100	>100	NA	1
Steel Many-O	ne Rank Sum Te	est									
Control	vs C-%		Test Stat	Critical	Ties [OF P-Value	P-Type	Decisio	n(α:5%)		
Hardness Con	trol 6.25		125	75	2 1	8 0.9974	Asymp		nificant Effec	t	
	12.5		127	75	0 1	8 0.9986	Asymp	Non-Sig	nificant Effec	t	
	25		116	75	2 1	8 0.9754	Asymp	Non-Sig	nificant Effec	t	
	50		134	75	2 1	8 0.9999	Asymp	Non-Sig	nificant Effec	t	
	100		112	75	2 1	8 0.9455	Asymp	Non-Sig	nificant Effec	t	
ANOVA Table											
Source	Sum Squa	ares	Mean Squ	lare	DF	F Stat	P-Value	Decisio	n(α:5%)		
Between	194.9333		38.98667		5	0.674	0.6452	Non-Sig	nificant Effec	t	
Error	3125.4		57.87778		54						
Total	3320.333		•		59						
Distributional	Tests										
Attribute	Test			Test Stat	Critical	P-Value	Decision	(α:1%)			
Variances	Bartlett E	quality of	Variance	5.26	15.1	0.3844	Equal Va	riances			y *
Distribution	Shapiro-V	Wilk W No	ormality	0.896	0.946	<0.0001	Non-norm	nal Distribu	ition		
Reproduction	Summary										
C-%	Control Type	Count	Mean	95% LCL	95% UC	L Median	Min	Max	Std Err	CV%	%Effect
0	Hardness Contr	10	22.6	18.7	26.5	23.5	9	29	1.75	24.4%	0.0%
6.25		10	25.2	19.1	31.3	29.5	11	33	2.68	33.7%	-11.5%
12.5		10	26.7	19.9	33.5	31	12	36	3.01	35.7%	-18.1%
25		10	24.4	18	30.8	27.5	13	36	2.84	36.8%	-7.96%
50		10	28.1	23.3	32.9	29.5	14	35	2.13	24.0%	-24.3%
100		10	24	20.2	27.8	26.5	18	29	1.67	22.0%	-6.19%
Graphics						12 —				_	
						10		1			•
35]		8		1	- AL		
30		77				6		1	and the second sec		
цод		14				p 4			Ser la		
Logitum 25	24			61		z for ansfor					
20 -	9-Z					5		1/			
20						-4		•			
15						-6 -					
94 10-1			L			-8		•			
10						-10		P			
						-12					
5						-	/				
5						-14					
0		17.6	75	100	_	-16					
0	HC 6.25	12.5 C-%	25 50	100	1	-16	2.0 -1.5 -1.0) -0.5 0.1 Rankits		1.5 2.0	2.5

Analyst: SD QA: M

CETIS	S Anal	ytical Repo	ort							rt Date: Code:		l6 16:07 (p 1 of 1) 5-f 12-2963-0781
Ceriod	aphnia	Survival and Re	producti	on Test							· ·	Pacific EcoRisk
Analys Analyz		08-6315-4303 04 Oct-16 15:3		ndpoint: nalysis:	Reproduction Linear Interpola	tion (ICPIN)				S Version: ial Results:	CETISv1.8.7 Yes	
Linear	Interpol	ation Options	_									
X Tran	sform	Y Transform	Se	ed	Resamples	Exp 95% (CL	Method				
Linear		Linear	46	065	200	Yes		Two-Point	Interpo	olation		
Point E	Estimate	S										
Level	%	95% LCL	95% UC	LTU	95% LCL	95% UCL						
IC5	95.4	18.4	N/A	1.049	NA	5.448						
IC10	>100	N/A	N/A	<1	NA	NA						
IC15	>100	N/A	N/A	<1	NA	NA						
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						
Reproc	duction	Summary				Calc	ulate	d Variate				
C-%		ontrol Type	Count	Mean		Max	Std E		Dev	CV%	%Effect	
0	Ha	ardness Control		22.6	9	29	1.75	5.5		24.4%	0.0%	
6.25			10	25.2	11	33	2.68	8.4		33.7%	-11.5%	
12.5			10	26.7	12	36	3.01	9.5		35.7%	-18.1%	
25			10	24.4	13	36	2.84	8.9		36.8%	-7.96%	
50			10	28.1	14	35	2.13	6.7		24.0%	-24.3%	
100	-		10	24	18	29	1.67	5.2	9	22.0%	-6.19%	
Graphi												
	30	0										
	25	•										
	•											
	20											
Reproduction												
Repro	. 15											
	10											
	-											
	5											
	-											
	a	<u> </u>	47	£0								
	0	20	40 C-96	60	80 100							
		-										

Appendix D

Test Data and Summary of Statistics for the Evaluation of the Chronic Toxicity of the Filtered Biological Effluent/ Permeate Treatments to *Ceriodaphnia dubia*: Analysis vs. Lab Water Control

CETIS Summary Report

 Report Date:
 17 Oct-16 14:38 (p 1 of 2)

 Test Code:
 69875-f | 12-2963-0781

							Т	'est Code:		69875-t 1	2-2963-078
Ceriodaphnia	Survival and Re	produc	tion Test							Paci	fic EcoRis
Batch ID: Start Date: Ending Date: Duration:	19-5180-4571 27 Sep-16 17:20 03 Oct-16 15:15 5d 22h	0 F 5 S	est Type: Protocol: Species: Source:	Reproduction-S EPA-821-R-02- Ceriodaphnia d In-House Cultu	013 (2002) ubia	77	C 8	Analyst: Diluent: Brine: Age:	Simin Delijani Hard Synthetic Not Applicable 1	Water	
•	01-7517-1601 26 Sep-16 15:30 27 Sep-16 11:03 26h (0.5 °C)	0 N 3 S	Code: Naterial: Source: Station:	Effluent Effluent Lehigh Perman 75:25% Perme		al Effluent		Client: Project:	Lehigh Perman 26377	ente	
Batch Note:	Stats include da	ita for Fi	Itered Sam	ple vs. Lab Wat	er. Giningen						
Comparison S	Summary								······································		_
Analysis ID 01-5394-8405 02-4776-5248 07-3132-7549 17-6796-2189	Endpoint Reproduction Reproduction Survival Survival		NOEL <0 12.5 0 100	LOEL 0 25 >0 >100	TOEL 17.68 NA	PMSD 6.65% 22.3% NA NA	TU 8 1	Steel Fishe	l Variance t Two I Many-One Ran er Exact Test er Exact/Bonferro	k Sum Tes	t
Point Estimat	e Summary										
Analysis ID	Endpoint		Level	%	95% LCL	95% UCL	TU	Meth	od		
13-4352-7607	Reproduction		IC5	1.3	0.983	2.58	77.21	Linea	ar Interpolation (I	CPIN)	
			IC10	2.59	1.97	5.17	38.6				
			IC15	3.89	2.95	15	25.74				
			IC20	5.18	3.93	63.1	19.3				
			IC25	57.1	4.91	N/A	1.75				
			IC40 IC50	>100 >100	N/A N/A	N/A N/A	<1 <1				
Reproduction	Summary			<u></u>						·····	2
-	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std E	Err Std Dev	CV%	%Effect
	Lab Water Contr	10	34.4	32.4	36.4	30	40	0.884		8.13%	0.0%
0	Filtration Blank	10	33.3	31.9	34.7	30	37	0.633		6.01%	3.2%
0	Hardness Contr	9	24.1	21.9	26.4	20	29	0.978	3 2.93	12.2%	29.9%
6.25		10	25.2	19.1	31.3	11	33	2.68	8.48	33.7%	26.7%
12.5		10	26.7	19.9	33.5	12	36	3.01	9.53	35.7%	22.4%
25		10	24.4	18	30.8	13	36	2.84	8.97	36.8%	29.1%
50		10	28.1	23.3	32.9	14	35	2.13	6.74	24.0%	18.3%
100		10	24	20.2	27.8	18	29	1.67	5.29	22.0%	30.2%
Survival Sumr	-	-									
	Control Type	Count	Mean	95% LCL		Min	Max	Std E		CV%	%Effec
	Lab Water Contr		1	1	1	1	1	0	0	0.0%	0.0%
	Filtration Blank	10	1	1	1	1	1	0	0	0.0%	0.0%
	Hardness Contr	10	0.9	0.674	1	0	1	0.1	0.316	35.1%	10.0%
5.25		10	0.9	0.674	1	0	1	0.1	0.316	35.1%	10.0%
12.5		10	0.8	0.498	1	0	1	0.133		52.7%	20.0%
25		10	0.8	0.498	1	0	1	0.133		52.7%	20.0%
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%

CETIS Summary Report

Ceriodaphnia Survival and Reproduction Test

Reproduc	tion 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	37	32	30	35	34	35	34	40	35	32
0	Filtration Blank	30	33	34	32	33	31	35	34	37	34
0	Hardness Contr	26	25	29	21	23	24	9	27	20	22
6.25		15	30	33	30 `	31	33	11	14	26	29
12.5		13	35	32	28	32	36	12	15	34	30
25		29	33	26	32	36	30	13	13	17	15
50		27	28	33	29	35	32	14	19	30	34
100		28	18	18	29	28	25	29	18	29	18
Survival D	etail										
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	Filtration Blank	1	1	1	1	1	1	1	1	1	1
0	Hardness Contr	1	1	1	1	1	1	0	1	1	1
6.25		1	1	1	1	1	1	0	1	1	1
12.5		1	1	1	1	1	1	0	0	1	1
25		1	1	1	1	1	1	1	1	0	0
50		1	1	1	1	1	1	1	1	1	1
100		1	1	1	1	1	1	1	1	1	1
Survival B	inomials								<u></u>		
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	Filtration Blank	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
0	Hardness Contr	1/1	1/1	1/1	1/1	1/1	1/1	0/1	1/1	1/1	1/1
6.25		1/1	1/1	1/1	1/1	1/1	1/1	0/1	1/1	1/1	1/1
12.5		1/1	1/1	1/1	1/1	1/1	1/1	0/1	0/1	1/1	1/1
25		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	0/1	0/1
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^{739/60} V1.8.7.16 Report Date:12Test Code:12

12 Oct-16 15:17 (p 2 of 2) 69875-f | 12-2963-0781

Pacific EcoRisk

CETIS	S An	alytic	al Repo	ort						rt Date: Code:	1	2 Oct-16 14: 69875-f 1	50 (p 1 of 1) 2-2963-0781
Ceriod	aphni	a Survi	ival and Re	eprodu	uction Test		_ /_ ·		· · · · · · ·			Pacif	fic EcoRisk
Analys Analyz			796-2189 Dct-16 14:4	3	•	Survival STP 2x2 Co	ntingency Tab	les		S Version: al Results:		Sv1.8.7	
Data T	ransfo	orm		Zeta	Alt Hy	p Trials	Seed			NOEL	LOEL	TOEL	TU
Untran	sforme	ed			C > T	NA	NA			100	>100	NA	1
Fisher	Exact	/Bonfe	rroni-Holm	n Test									
Contro	ol	vs	C-%		Test S	at P-Value	e P-Type	Decision	a(α:5%)				
Lab Wa	ater Co	ontrol	6.25		0.5	1.0000	Exact	Non-Sign	ificant Effect				
			12.5		0.237	1.0000	Exact	-	ificant Effect				
			25		0.237	1.0000	Exact		ificant Effect				
			50		1	1.0000	Exact		ificant Effect				
			100		1	1.0000	Exact	Non-Sign	ificant Effect				
Data S	umma	iry											· · · · · · · · · · · · · · · · · · ·
C-%		Cont	rol Type	NR	R	NR + R	Prop NR	Prop R	%Effect				
0		Lab V	Vater Cont	10	0	10	1	0	0.0%				
6.25				9	1	10	0.9	0.1	10.0%				
12.5				8	2	10	0.8	0.2	20.0%				
25				8	2	10	0.8	0.2	20.0%				
50				10	0	10	1	0	0.0%				
100				10	0	10	1	0	0.0%				
Graphi	cs												
	1.0	•											
	0.9		•										
	0.9												
	0.8			۰	٠								
_	0.7												
Survival	0.6												
ŝ													
	0.5												
	0.4												
	0.3												
	E.												
	0.2												
	0.1												
	0.0				I. I.	I							
		0 LW	6.25	12.5	25	50 100							
				C-%									

Analyst: SD QA: M

CETIS Ana	alytical Re	port						-	ort Date: Code:			51 (p 1 of 2 2-2963-078
Ceriodaphnia	a Survival and	Reproduct	ion Test								Paci	fic EcoRisk
Analysis ID: Analyzed:	02-4776-524 12 Oct-16 14		• •	production	Control V	/s T	reatments		S Version		.8.7	
Data Transfo	orm	Zeta	Alt Hyp	Trials	Seed			PMSD	NOEL	LOEL	TOEL	TU
Untransforme	d	NA	C > T	NA	NA			22.3%	12.5	25	17.68	8
Steel Many-C	Dne Rank Sum	Test										
Control	vs C-%		Test Stat	Critical	Ties	DF	P-Value	P-Type	Decision	(α:5%)		
Lab Water Co	ontrol 6.25*		63	76	1	18	0.0028	Asymp	Significar			
	12.5		78	76	4	18	0.0654	Asymp	-	ificant Effect	ł	
	25*		68.5	76	2	18	0.0104	Asymp	Significar			
	50*		71	76	4	18	0.0177	Asymp	Significar			
ANOVA Table	9											
Source	Sum So	quares	Mean Squ	are	DF		F Stat	P-Value	Decision	(α:5%)		
Between	631.72		157.93		4		2.66	0.0446	Significar			
Error	2669.4		59.32		45				•			
Total	3301.12	2			49							
Distributiona	I Tests		·····									
Attribute	Test			Test Stat	Critica	I	P-Value	Decision(a:1%)			
Variances	Bartlet	Equality of	Variance	11.8	13.3		0.0190	Equal Var				
Distribution	Shapiro	o-Wilk W No	ormality	0.902	0.937		0.0006	Non-norm	al Distributi	on		
Reproduction	n Summary							······				
C-%	Control Type	Count	Mean	95% LCL	95% U(CL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Water Co	ntr 10	34.4	32.4	36.4		34.5	30	40	0.884	8.13%	0.0%
6.25		10	25.2	19.1	31.3		29.5	11	33	2.68	33.7%	26.7%
12.5		10	26.7	19.9	33.5		31	12	36	3.01	35.7%	22.4%
25		10	24.4	18	30.8		27.5	13	36	2.84	36.8%	29.1%
50		10	28.1	23.3	32.9		29.5	14	35	2.13	24.0%	18.3%
Graphics 40 35 30 5 20 15 10 5	•			Z 6 Z		Centered Latraceformed	12		•	an and a second second	•••	
0	0 LW 6.25	12.5	25	50	4)		-16 -2.5 -2.0	-1.5 -1.0	-0.5 0.0	<u> </u>	16 20	2.5
	0.00			•••			-6.0 -6.0	1.0 1.0	-0.5 0.0	0.5 1.0	1.5 2.0	2.5

CETIS 41 60.8.7.16

Analyst: SD QA: M

CETIS	S Anal	ytical Repo	ort						-	ort Date: Code:		16 15:02 (p 1 of 1 ′5-f 12-2963-078′
Cerioda	aphnia	Survival and Re	productio	n Test								Pacific EcoRisk
Analysi	is ID:	13-4352-7607	Enc	lpoint:	Reproduction				CET	IS Version:	CETISv1.8.7	
Analyze	ed:	12 Oct-16 15:0	1 <u>Ana</u>	lysis:	Linear Interpola	tion (ICPIN)			Offic	ial Results:	Yes	
Linear	Interpol	ation Options							-			
X Trans		Y Transform	See	d	Resamples	Exp 95%	CL	Method				
Linear		Linear	683		200	Yes		Two-Poi	nt Interp	olation	<u></u>	
Point E	stimate	S										
Level	%	95% LCL	95% UCL	ти	95% LCL	95% UCL						
IC5	1.3	0.983	2.58	77.21		101.8						
IC10	2.59	1.97	5.17	38.6	19.35	50.89						
IC15	3.89	2.95	15	25.74		33.93						
IC20	5.18	3.93	63.1	19.3	1.585	25.44						
IC25	57.1	4.91	N/A	1.75	NA	20.36						
IC40	>100	N/A	N/A	<1	NA	NA						
IC50	>100	N/A	N/A	<1	NA	NA						
Reprod	uction	Summary				Calc	ulate	ed Variate	9			
C-%	Co	ontrol Type	Count	Mean	Min	Max	Std	Err St	d Dev	CV%	%Effect	
0	La	b Water Contr	10	34.4	30	40	0.88	4 2.	8	8.13%	0.0%	
6.25			10	25.2	11	33	2.68	8.	48	33.7%	26.7%	
12.5			10	26.7	12	36	3.01		53	35.7%	22.4%	
25			10	24.4	13	36	2.84		97	36.8%	29.1%	
50			10	28.1	14	35	2.13		74	24.0%	18.3%	
100			10	24	18	29	1.67	5.	29	22.0%	30.2%	
Graphic	25 30 25 20 15 5 0	20		2	60 100							

Appendix E

Test Data and Summary of Statistics for the Evaluation of the Chronic Toxicity of the Unfiltered Biological Effluent/Permeate treatment to *Ceriodaphnia dubia*: Analysis Excluding Outlier Data

CETIS Sun	nmary Repo	rt						Report Da Test Code				46 (p 1 of 1) 5-1681-6180
Ceriodaphnia	Survival and Re	producti	on Test								Pacif	ic EcoRisk
Batch ID: Start Date: Ending Date: Duration:	18-3704-3903 27 Sep-16 17:20 03 Oct-16 15:15 5d 22h) Pr S Sp	est Type: otocol: pecies: purce:	Reproduction-S EPA-821-R-02 Ceriodaphnia o In-House Cultu	-013 (2002) Iubia		1	Analyst: Diluent: Brine: Age:	Simin E Not App Not App 1	olicable		
Sample ID: Sample Date: Receive Date: Sample Age:) Ma 3 So	ode: aterial: ource: ation:	Effluent Effluent Lehigh Permar 75:25% Perme		al Effluent		Client: Project:	Lehigh 26377	Permane	ente	
Batch Note:	Stats include da	ta for Un	filtered Sa	imple. Stats exc	lude outlier	Hardness	Ctl-G					
Comparison S Analysis ID 00-5972-6365	Summary Endpoint Reproduction		NOEL	. LOEL >0	TOEL	PMSD 9.49%	τU	Met		co t Two	-Sample Te	act
13-1577-8981 02-5474-4033 12-2568-4449	Reproduction Survival		100 100 0	>100 >100 >100 >0	NA NA	9.4976 15.9% NA NA	1 1	Equ Fish		ce t Two- Test	Sample Te	
Reproduction	Summary	·										
C-% 0 0 100	Control Type Lab Water Contr Hardness Contr	-	Mean 34.4 24.1 30.2	95% LCL 32.4 21.9 25.9	95% UCL 36.4 26.4 34.5	Min 30 20 18	Max 40 29 39	Std 0.88 0.97 1.89	4 2. 8 2.	td Dev .8 .93 .98	CV% 8.13% 12.2% 19.8%	%Effect 0.0% 29.9% 12.2%
Survival Sum	mary											
C-% 0 0 100	Control Type Lab Water Contr	Count 10 10 10	Mean 1 0.9 1	95% LCL 1 0.674 1	95% UCL 1 1 1	Min 1 0 1	Max 1 1 1	Std 0 0.1 0	0	td Dev .316	CV% 0.0% 35.1% 0.0%	%Effect 0.0% 10.0% 0.0%
Reproduction	Detail				11			<u></u>			1	
C-% 0 0 100	Control Type Lab Water Contr Hardness Contr		Rep 2 32 25 25	Rep 3 30 29 32	Rep 4 35 21 31	Rep 5 34 23 18	Rep 6 35 24 26	6 Rep 34 30	7 R 40 27 39	7	Rep 9 35 20 35	Rep 10 32 22 35
Survival Detai	il											
C-% 0 0 100	Control Type Lab Water Contr Hardness Contr		Rep 2 1 1 1	Rep 3	Rep 4 1 1 1 1	Rep 5 1 1 1 1	Rep 6 1 1 1	6 Rep 1 0 1	7 R 1 1 1	ep 8	Rep 9 1 1 1 1	Rep 10 1 1 1
Survival Bino	mials											
C-% 0 0 100	Control Type Lab Water Contr Hardness Contr		Rep 2 1/1 1/1 1/1	Rep 3 1/1 1/1 1/1	Rep 4 1/1 1/1 1/1	Rep 5 1/1 1/1 1/1	Rep 6 1/1 1/1 1/1	5 Rep 1/1 0/1 1/1	7 R 1/ 1/ 1/	'1	Rep 9 1/1 1/1 1/1	Rep 10 1/1 1/1 1/1

Analyst: SD QA: M

CETIS An	alytical Repo	ort						rt Date: Code:		16 15:49 (p 1 of 2) 5-uf 15-1681-6180
Ceriodaphn	ia Survival and R	eprod	uction Test							Pacific EcoRisk
Analysis ID: Analyzed:	02-5474-4033 04 Oct-16 15:4	1	Endpoint: Su Analysis: Sir		ntingency Ta	ble		S Version: al Results:	CETISv1.8.7 Yes	
Data Transfo	orm	Zeta	Alt Hyp	Trials	Seed			Test Resu	lt	
Untransforme	ed		C > T	NA	NA			Passes sur	vival	
Fisher Exac	t Test									
Control	vs C-%		Test Stat	P-Value	P-Type	Decision				
Hardness Co	ntrol 100		1	1.0000	Exact	Non-Sign	ificant Effect			
Data Summa	ary									
C-%	Control Type	NR	R	NR + R	Prop NR	Prop R	%Effect			
0 100	Hardness Contr	9 10	1 0	10 10	0.9 1	0.1 0	0.0% -11.1%			
<u></u>		10				0	-11.170			
Graphics										
1.0			0							
0.9	•									
8.0										
0.7										
5.0 Survival										
0.5										
0.4										
0.3										
0.2										
0.1										
	0 HC		100							
		C-%								

Analyst: SD QA: M

CETIS Analytical Report					-	ort Date: Code:			47 (p 1 of 2 5-1681-618
Ceriodaphnia Survival and Reproduc	tion Test							Paci	fic EcoRisk
-	•	production ametric-Two	o Sample			IS Version: ial Results:	CETISv1 Yes	.8.7	
Data Transform Zeta	Alt Hyp	Trials	Seed		PMSD	Test Resu	lt		
Untransformed NA	C > T	NA	NA		15.9%	Passes rep	production		
Equal Variance t Two-Sample Test								<u> </u>	
Control vs C-%	Test Stat	Critical	MSD DF	P-Value	P-Type	Decision(a:5%)		
Hardness Control 100	-2.77	1.74	3.83 17	0.9934	CDF	Non-Signif	icant Effec	t	* .
ANOVA Table									
Source Sum Squares	Mean Squ	are	DF	F Stat	P-Value	Decision(a:5%)		
Between 175.6164	175.6164		1	7.65	0.0132	Significant	Effect		
Error 390.4889	22.96993		17						
Total 566.1053			18						
Distributional Tests									
Attribute Test		Test Stat	Critical	P-Value	Decision	(α:1%)			
Variances Variance Ratio F		4.15	7.34	0.0575	Equal Var	iances			
Distribution Shapiro-Wilk W N	lormality	0.959	0.861	0.5566	Normal D	stribution			
Reproduction Summary									
C-% Control Type Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0 Hardness Contr 9	24.1	21.9	26.4	24	20	29	0.978	12.2%	0.0%
100 10	30.2	25.9	34.5	31	18	39	1.89	19.8%	-25.3%
Graphics 40 35 30 25 20 25 20 25 20 25 20 25 20 25 25 25 25 25 25 25 25 25 25	2710	Reject Null	Centered		• •		••••	• •	• -
онс С-%	100			-14 -2.0	-1.5 -1.0	-0.5 0.0 Rankits	0.5 1.0	0 1.5	2.0

000-034-187-1

Analyst:______ QA:_____

CETIS Ana	alytical Repo	ort					Report I Test Co			l6 15:35 (p 1 of 1 -uf 15-1681-618
Ceriodaphnia	a Survival and Re	eprodu	ction Test							Pacific EcoRisk
Analysis ID: Analyzed:	14-3417-0923 21 Oct-16 15:34			vival gle 2x2 Cor	itingency Ta	ble	CETIS V Official	/ersion: Results:	CETISv1.8.7 Yes	
Data Transfo		Zeta	Alt Hyp	Trials	Seed		Т	est Resul	t	
Untransforme	d		C > T	NA	NA		Р	asses sur	vival	
Fisher Exact Control	vs C-%		Test Stat		Р-Туре	Decision(
Lab Water Co			1	1.0000	Exact	Non-Signi	ficant Effect			
Data Summa C-%	ry Control Type	NR	R	NR + R	Prop NR	Prop R	%Effect			
0 100	Lab Water Cont	10 10	0	10 10	1	0 0	0.0% 0.0%			· · · · · · · · · · · · · · · · · · ·
Graphics										
1.0	٠		0							
0.7 0.5 0.4										
0.2	0 FM		.1 100							Se v
		C-%								

Analyst: <u>SP</u> QA: <u>M</u>

UntransformedNACEqual Variance t Two-Sample TestControlvsC-%Lab Water Control100*2ANOVA TableSourceSum SquaresMBetween88.28Error3922Total480.27Distributional TestsVariance Ratio FDistributionShapiro-Wilk W NormalReproduction SummaryC-%Control TypeCount0Lab Water Contr 103	oint: Reproduction	Sample Seed NA MSD DF P-Value	CETIS Version: Official Results: PMSD Test Resu 10.5% Fails repro	CETISv1.8.7 Yes	fic EcoRisk
Analyzed: 21 Oct-16 15:35 Analys Data Transform Zeta A Untransformed NA C Equal Variance t Two-Sample Test Control vs C-% Control vs C-% T Lab Water Control 100* 2 ANOVA Table Source Sum Squares M Between 88.2 8 Error 392 2 2 Total 480.2 Distributional Tests A Attribute Test Variances Variance Ratio F Distribution Shapiro-Wilk W Normal Normal Reproduction Summary C-% Control Type Count M 0 Lab Water Contr 10 3 3 3 100 10 3 3 3 3 2 2 2 2 2 3	sis: Parametric-Two Alt Hyp Trials C > T NA Test Stat Critical 2.01 1.73	Seed NA	Official Results: PMSD Test Resu	Yes Ilt	
Untransformed NA C Equal Variance t Two-Sample Test Control vs C-% T Lab Water Control 100* 2 ANOVA Table Source Sum Squares M Between 88.2 8 Error 392 2 Total 480.2 Distributional Tests Attribute Test Variances Variance Ratio F Distribution Shapiro-Wilk W Normal Reproduction Summary C-% Control Type Count M 0 Lab Water Contr 10 3 100 10 3 Graphics	C > T NA Test Stat Critical 2.01 1.73	NA			
Equal Variance t Two-Sample Test Control vs C-% T Lab Water Control 100* 2 ANOVA Table Source Sum Squares M Between 88.2 8 Error 392 2 Total 480.2 Distributional Tests Attribute Test Variances Variance Ratio F Distribution Shapiro-Wilk W Normal Reproduction Summary C-% Control Type Count M 0 Lab Water Contr 10 3 100 10 3 Graphics	Test Stat Critical 2.01 1.73	·	10.5% Fails repro	oduction	
Control vs C-% T Lab Water Control 100* 2 ANOVA Table Source Sum Squares M Between 88.2 8 Error 392 2 Total 480.2 1 Distributional Tests Attribute Test Variances Variance Ratio F 1 Distribution Shapiro-Wilk W Normal 1 Reproduction Summary C-% Control Type Count 0 Lab Water Contr 10 3 3 100 10 3 3 graphics 3 3 3 10 3 3 3 23 24 24 4	2.01 1.73	MSD DF P-Value			
Lab Water Control 100* 2 ANOVA Table Source Sum Squares M Between 88.2 8 Error 392 2 Total 480.2 Distributional Tests Attribute Test Variances Variance Ratio F Distribution Shapiro-Wilk W Normal Reproduction Summary C-% Control Type Count M 0 Lab Water Contr 10 3 100 3 Graphics 30 40 30 30 30 90 25 20 25 20 25 20	2.01 1.73	MSD DF P-Value			
ANOVA Table Source Sum Squares M Between 88.2 8 Error 392 2 Total 480.2 Distributional Tests Attribute Test Variances Variance Ratio F Distribution Shapiro-Wilk W Normal Reproduction Summary C-% Control Type Count M 0 Lab Water Contr 10 3 100 10 3 Graphics			P-Type Decision(α:5%)	
Source Sum Squares M Between 88.2 8 Error 392 2 Total 480.2 9 Distributional Tests Attribute Test Attribute Test Variance Ratio F Distribution Shapiro-Wilk W Normal Reproduction Summary C-% Control Type Count M 0 Lab Water Contr 10 3 100 10 3	Mean Square	3.62 18 0.0297	CDF Significant		
Between 88.2 8 Error 392 2 Total 480.2 Distributional Tests Attribute Test Variances Variance Ratio F Distribution Shapiro-Wilk W Normal Reproduction Summary C-% Control Type Count M 0 Lab Water Contr 10 3 100 10 3 Graphics	Mean Square			· · ·	
Error 392 2 Total 480.2 Distributional Tests Attribute Test Variances Variance Ratio F Distribution Shapiro-Wilk W Normal Reproduction Summary C-% Control Type Count M 0 Lab Water Contr 10 3 100 10 3 Graphics		DF F Stat	P-Value Decision(α:5%)	
Total 480.2 Distributional Tests Attribute Attribute Test Variances Variance Ratio F Distribution Shapiro-Wilk W Normal Reproduction Summary C-% C-% Control Type 0 Lab Water Contr 100 10 3 30	88.2	1 4.05	· · · · · · · · · · · · · · · · · · ·	icant Effect	<u> </u>
Distributional Tests Attribute Test Variances Variance Ratio F Distribution Shapiro-Wilk W Normal Reproduction Summary C-% C-% Control Type 0 Lab Water Contr 100 10 3 30	21.77778	18			
Attribute Test Variances Variance Ratio F Distribution Shapiro-Wilk W Normal Reproduction Summary Control Type C-% Control Type 0 Lab Water Contr 100 10 3		19			
Variances Variance Ratio F Distribution Shapiro-Wilk W Normal Reproduction Summary C-% Control Type Count M 0 Lab Water Contr 10 3 100 10 3 Graphics					
Distribution Shapiro-Wilk W Normal Reproduction Summary C-% Control Type Count N 0 Lab Water Contr 10 3 100 10 3 Graphics 40 40 52 20 20 20 20 20 20 20 20 20 2	Test Stat	Critical P-Value	Decision(a:1%)		
Reproduction Summary C-% Control Type Count N 0 Lab Water Contr 10 3 100 10 3 Graphics 40 40 40 40 52 20 20 20	4.57	6.54 0.0336	Equal Variances	······································	
C-% Control Type Count M 0 Lab Water Contr 10 3 100 10 3 Graphics 40 40 40 35 30 40 25 20 20	lity 0.949	0.866 0.3526	Normal Distribution		
0 Lab Water Contr 10 3 100 10 3 Graphics					
100 10 3 Graphics	Mean 95% LCL	95% UCL Median	Min Max	Std Err CV%	%Effect
Graphics	34.4 32.4	36.4 34.5	30 40	0.884 8.13%	0.0%
40 35 30 25 20	30.2 25.9	34.5 31	18 39	1.89 19.8%	12.2%
10 5 0 0	Reject Null	10 5 6 4 4 7 7 7 7 7 7 7 7 7 7 7 7 7	• • •	900	•

000-034-187-1

Analyst:______ QA:_____

Pacific EcoRisk

	Client:			ehigh Pe	rmanente			•	laterial:							-	st Date:	
Proj	ject #:	263	5//		Test ID:	698	/5		Random	nization	10,	1.3/1	0.2.3			Control	Water:	Hardness Control
	Day	pН		D.O.		Cond.	Temp				Su	rvival / R	eproduct	ion				Sample ID
		New	Old	New	Old	(µS/cm)	(°C)	A	В	С	D	E	F	G	н	I	J	
	0	7.90		8,8		1263		ð	0	0	0	0	0	0	0	0	0	44185 / 44186
	1	8.04	8.08	9.0	7.5	1281		0	0	0	0	Ο	0	0	0	0	0	44185 / 44186
	2	8,07	8.14	9,6	7.7	1272		0	0	0	0	0	0	0	0	0	\bigcirc	44185 / 44186
	3	8.04	8.40	10.3	7.1	1259		6	2	Ü	4	0	Ο	7	6	0	0	44185 / 44186
100%	4	7.89	7.99	10.3	8.1	1299		0	0	6	0	3	5	0	0	7	7	44185 / 44186
100	5	7.80	7.97	8.8	0.8	1269		9	7	10	10	0	8	8	13	12	11	44185 / 44186
	6	-	772	/	ר.ר	1328		16	16	16	17	15	13	15	20	16	17	
	7																1	
	8																	
							Total=	31	25	32	31	18	26	30	39	35	35	Mean Neonates/Female = 30-2

Appendix F

Test Data and Summary of Statistics for the Evaluation of the Chronic Toxicity of the Unfiltered Biological Effluent/Permeate treatment to *Ceriodaphnia dubia*: Analysis Including Outlier Data

CETIS Summary Report

Report Date: Test Code:

							Te	est Code:	6	9875-uf 1	5-1681-618
Ceriodaphnia	Survival and Re	product	tion Test							Pacif	ic EcoRis
Batch ID:	18-3704-3903	т	est Type:	Reproduction-S	Survival (7d)		A	nalyst:	Simin Delijani		Covers a
Start Date:	27 Sep-16 17:20	P	rotocol:	EPA-821-R-02	-013 (2002)		D	iluent:	Not Applicable		
Ending Date:	03 Oct-16 15:15	i s	pecies:	Ceriodaphnia d	lubia		В	rine:	Not Applicable		
Duration:	5d 22h	s	ource:	In-House Cultu	ire		A	ge:	1		
Sample ID:	16-3029-0970	C	ode:	Effluent			С	lient:	Lehigh Perman	ente	
Sample Date:	26 Sep-16 15:30	D N	laterial:	Effluent			P	roject:	26377		
Receive Date:	27 Sep-16 11:03	3 S	ource:	Lehigh Permar	nente						
Sample Age:	26h (0.5 °C)	S	station:	75:25% Perme	ate:Biologica	al Effluent					
Batch Note:	Stats include da	ta for U	nfiltered Sa	mple. Stats inc	lude outlier H	lardness C	Ctl-G				
Comparison S	Summary										
Analysis ID	Endpoint		NOEL		TOEL	PMSD	TU	Meth			
04-0759-1667			0	>0		15.0%			I Variance t Two		
13-1435-2613			100	>100	NA	19.7%	1		I Variance t Two	-Sample Te	est
02-5474-4033			100	>100	NA	NA	1		er Exact Test		
12-2568-4449	Survival		0	>0		NA		Fishe	er Exact Test		
Reproduction	Summary										
C-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std E		CV%	%Effec
0	Lab Water Contr		34.4	32.4	36.4	30	40	0.884		8.13%	0.0%
0	Hardness Contr	10	22.6	18.7	26.5	9	29	1.75	5.52	24.4%	34.3%
100		10	30.2	25.9	34.5	18	39	1.89	5.98	19.8%	12.2%
Survival Sumi	mary										
C-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std E		CV%	%Effec
-	Lab Water Contr		1	1	1	1	1	0	0	0.0%	0.0%
0	Hardness Contr	10	0.9	0.674	1	0	1	0.1	0.316	35.1%	10.0%
100		10	1	1	1	1	1	0	0	0.0%	0.0%
Reproduction											
C-%	Control Type	Rep 1	Rep 2	·····	Rep 4	Rep 5	Rep 6	Rep		Rep 9	Rep 10
0	Lab Water Contr	37	32	30	35	34	35	34	40	35	32
0	Hardness Contr	26	25	29	21	23	24	9	27	20	22
100		31	25	32	31	18	26	30	39	35	35
Survival Detai	I										
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 Contr	1	1	1	1	1	1	0	1	1	1
100		1	1	1	1	1	1	1	1	1	1
Survival Bino	mials										
	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 Contr	1/1	1/1	1/1	1/1	1/1	1/1	0/1	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™11/698.7.16

Analyst: SD QA: M

CETIS An	alytical Repo	ort					-	ort Date: Code:			57 (p 1 of 3 5-1681-618
Ceriodaphni	a Survival and Re	eproduci	tion Test				1051		0		fic EcoRis
Analysis ID:	13-1435-2613	E	ndpoint: Re	production			CET	IS Version:	CETISv1	.8.7	
Analyzed:	04 Oct-16 15:4		•	rametric-Two	Sample			ial Results			
Data Transfo	orm	Zeta	Alt Hyp	Trials	Seed		PMSD	Test Resu	alt		
Untransforme	ed	NA	C > T	NA	NA		19.7%	Passes re	production		
Equal Varian	nce t Two-Sample	Test									
Control	vs C-%		Test Stat	Critical	MSD DF	P-Value	Р-Туре	Decision	α:5%)		
Hardness Co	ntrol 100		-2.95	1.73	4.46 18	0.9957	CDF	Non-Signi	ficant Effect	t	
ANOVA Table	e							· · · · · · · · · · · · · · · · · · ·			
Source	Sum Squa	ares	Mean Sq	uare	DF	F Stat	P-Value	Decision(
Between	288.8		288.8		1	8.72	0.0085	Significan	tEffect		
Error Total	596 884.8		33.11111		18 19						
		<u>i i na supera por super</u>			19	- <u></u>	~				
Distributiona						_					
Attribute	Test			Test Stat		P-Value	Decision				
Variances Distribution	Variance Shapiro-V			1.17 0.915	6.54 0.866	0.8170 0.0806	Equal Va				
Reproductio							Normal D				:
C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Hardness Contr		22.6	18.7	26.5	23.5	9	29	1.75	24.4%	0.0%
100		10	30.2	25.9	34.5	31	18	39	1.89	19.8%	-33.6%
Graphics 40 35 30 5 40 40 35 20 15 10 5			1110	Z Z Z	Centared	10 [6 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	•••			•	•
0	0 HC	C-%	100		L	-12 -14 -2.0	-1.5 -1.0	-0.5 0.0 Rankits	0.5 1.0	0 1.5	2.0

Analyst: <u>SD</u> QA: <u>M</u>

Appendix G

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



CETIS Sur	nmary Repo		Report Date: Test Code:		04 Oct-16 09:48 (p 1 of 69790 02-6694-908						
Ceriodaphnia	a Survival and R	eprodu	ction Test							Paci	fic EcoRisk
Batch ID: Start Date: Ending Date: Duration:	15-1022-7721 27 Sep-16 12:5 03 Oct-16 14:0 6d 1h	60 5	Test Type: Protocol: Species: Source:	Reproduction-S EPA-821-R-02 Ceriodaphnia c In-House Cultu	-013 (2002) Iubia	2		Analyst: Diluent: Brine: Age:	Robert Gee Laboratory Wa Not Applicable 1		
Receive Date	04-5687-9373 27 Sep-16 12:5 27 Sep-16 12:5 NA (25.6 °C)	0	Code: Material: Source: Station:	NaCl Sodium chlorid Reference Tox In House				Client: Project:	Reference To: 26308	xicant	
Comparison	Summary										
Analysis ID 16-6965-0530 05-1926-9841			NOEL 500 2000	LOEL 1000 2500	TOEL 707.1 2236	PMSD 22.5% NA	TU		od oxon/Bonferroni er Exact/Bonfer		est
Point Estimat	e Summary										
Analysis ID	Endpoint		Level	mg/L	95% LCL	95% UCL	TU	Meth	od	2	
01-8681-6691 03-6116-4434	Reproduction		IC5 IC10 IC15 IC20 IC25 IC40 IC50 EC50	335 541 620 700 780 1510 1620 1740	177 353 523 606 678 849 959 1460	574 882 1080 1140 1270 1580 1680 2080			rrman-Kärber	(ICPIN)	-
Reproduction	Summary									•	
C-mg/L 0 500 1000 1500 2000 2500	Control Type Lab Water Contr	Count 10 9 10 10 10	Mean 33.5 31 20.3 20.7 5.3 0	95% LCL 31.7 28.5 9.21 17.5 1.16 0	95% UCL 35.3 33.5 31.5 23.9 9.44 0	Min 30 26 0 9 0 0	Max 38 38 33 24 18 0	Std E 0.778 1.09 4.82 1.43 1.83 0		CV% 7.35% 11.1% 71.1% 21.8% 109.0%	%Effect 0.0% 7.46% 39.3% 38.2% 84.2% 100.0%
Survival Sum	mary							, <u> </u>			
_	Control Type Lab Water Contr	Count 10 10 9	Mean 1 1 0.667	95% LCL 1 1 0.282	95% UCL 1 1 1	Min 1 1 0	Max 1 1	0 0	0 0	CV% 0.0% 0.0%	%Effect 0.0% 0.0%
1500 2000 2500		9 10 10 10	0.887 1 0.6 0	0.282 1 0.231 0	1 0.969 0	1 0 0	1 1 1 0	0.167 0 0.163 0	0	75.0% 0.0% 86.1%	33.3% 0.0% 40.0% 100.0%

Analyst: R6 QA: SD

CETIS S	ummary Repo	rt		-	oort Date: t Code:	04 Oct-16 09:48 (p 2 of 2 69790 02-6694-908					
Ceriodaph	nia Survival and Re	production	on Test			c				Paci	fic EcoRisk
Reproduct	ion 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	34	31	31	38	30	36	34	35	33	33
500		33	38	28	32	26	32	27	31	32	31
1000		32	33	31	30	0	27	4	26	0	
1500		24	24	21	24	9	23	23	20	20	19
2000		0	0	0	7	9	4	18	8	0	7
2500		0	0	0	0	0	0	0	0	0	0
Survival D	etail				-						
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	0	1	0	1	0	
1500		1	1	1	1	1	1	1	1	1	1
2000		0	0	0	1	1	1	1	1	0	1
2500		0	0	0	0	0	0	0	0	0	0
Survival Bi	nomials										
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	0/1	1/1	0/1	1/1	0/1	
1500		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
2000		0/1	0/1	0/1	1/1	1/1	1/1	1/1	1/1	0/1	1/1
2500		0/1	0/1	0/1	0/1	0/1	0/1	0/1	0/1	0/1	0/1

-3s Action Limit: 231

+3s Action Limit: 3212

CETIS QC Plot

Ceriodaph	nia Survival and Reproduction	n Test		Pacific EcoRis
Test Type: Protocol:	Reproduction-Survival (7d) EPA-821-R-02-013 (2002)	Organism: Ceriodaphnia dubia (Water Flea) Endpoint: Survival	Material: Source:	Sodium chloride Reference Toxicant-REF
	3500-	Ceriodaphnia Survival and Reproduction Test		
	3000-			+35
	2500			+25
m chłaride	2000-			•
EC50-mg/L. Sodium chłoride	1500			Mean
ECS0-	1000-			¥ \/
	500-			-25
		6 7 8 9 10 11 12 13 14	15 16	-3s 17 18 19 20 21

-2s Warning Limit: 727.8

+2s Warning Limit: 2715

	Sigma:	496.8
Quality Control	Data	

Mean:

1721

Count: 20

28.90%

CV:

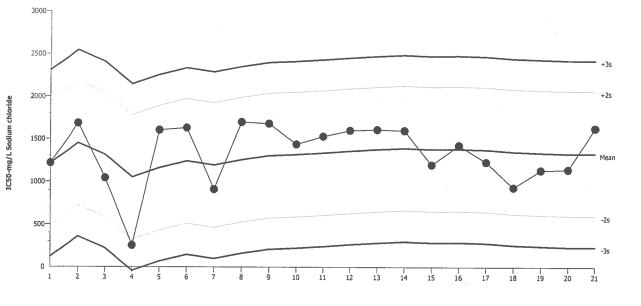
Point		Month	Day	Time	QC Data	Delta	Sigma	Warning	Action	Test ID	Analysis ID
	2016	May	10	14:15	1594	-127.2	-0.2561			04-1900-2071	02-7180-6176
2			17	16:30	2117	396	0.7971			02-0217-2091	01-8095-6167
1			24	14:40	1369	-352	-0.7085			12-4725-4616	17-8748-4211
		Jun	14	12:15	321.4	-1400	-2.817	(-)		06-1840-5245	14-8979-7423
i			23	10:40	2125	403.7	0.8126			16-6250-9087	17-5652-1508
i			23	13:25	2105	384.4	0.7738			07-7424-9431	12-9537-7598
			28	13:00	1933	212	0.4267			09-5722-1456	07-9253-0885
		Jul	6	13:00	2019	297.9	0.5996			09-9739-4449	17-8269-3326
			7	10:20	2064	343.2	0.6909			07-3590-7818	09-8307-4510
0			12	13:45	1831	109.6	0.2207			19-4280-6480	04-6439-4868
1		Aug	9	14:15	1918	197.4	0.3973			01-7078-3993	16-1640-2231
2			11	15:25	1759	38.26	0.07701			05-4282-8788	09-4783-9953
3			18	13:30	2050	328.9	0.662			09-3523-7380	14-1088-4073
4			23	14:15	1870	149	0.2999			20-3175-3833	16-0364-9515
5			25	14:35	1968	247	0.4972			08-0124-0684	18-2643-7985
6			30	16:05	1913	191.7	0.3859			02-5260-5089	09-5069-0405
7		Sep	8	13:40	1957	236.4	0.4759			18-2267-1225	05-8688-6279
8			13	10:20	1198	-523	-1.053			15-9643-7614	12-2668-1557
9			15	14:20	1718	-3.382	-0.00681			16-2243-5631	01-5480-0827
0			20	15:00	597.9	-1123	-2.261	(-)		18-2996-3053	17-7702-4069
1			27	12:50	1739	17.88	0.03599			02-6694-9084	03-6116-4434

Analyst: RG QA: SD

Ceriodaphr	nia Survival and Reproduction		Pacific EcoRis	
	Reproduction-Survival (7d)	Organism: Ceriodaphnia dubia (Water Flea)	Material:	Sodium chloride
	EPA-821-R-02-013 (2002)	Endpoint: Reproduction	Source:	Reference Toxicant-REF

Report Date:

04 Oct-16 09:51 (1 of 1)



Mean: Sigma:	1326 364	Count: CV:	20 27.50%	-2s Warning Limit: +2s Warning Limit:	-3s Action Limit: +3s Action Limit:	
Quality Control Data						

Point	Year	Month	Day	Time	QC Data	Delta	Sigma	Warning	Action	Test ID	Analysis ID
	2016	May	10	14:15	1216	-110	-0.3021			04-1900-2071	20-3182-9235
2			17	16:30	1684	358.4	0.9847			02-0217-2091	07-3645-9270
3			24	14:40	1042	-284.3	-0.7811			12-4725-4616	17-2108-7232
ļ		Jun	14	12:15	255	-1071	-2.942	(-)		06-1840-5245	10-0782-9712
;			23	10:40	1603	277.2	0.7616			16-6250-9087	07-8286-1737
j			23	13:25	1628	302.2	0.8303			07-7424-9431	14-5397-9899
,			28	13:00	908.1	-417.9	-1.148			09-5722-1456	07-0717-9325
}		Jul	6	13:00	1696	370.1	1.017			09-9739-4449	05-4282-8277
)			7	10:20	1679	353	0.9699			07-3590-7818	02-2720-1850
0			12	13:45	1435	109	0.2995			19-4280-6480	01-6291-6561
1		Aug	9	14:15	1528	202.3	0.5558			01-7078-3993	16-5522-9106
2			11	15:25	1598	271.5	0.746			05-4282-8788	20-6991-7970
3			18	13:30	1607	281.3	0.7727			09-3523-7380	12-7959-5180
4			23	14:15	1598	271.9	0.7469			20-3175-3833	12-9031-4120
5			25	14:35	1196	-130.1	-0.3574			08-0124-0684	03-1672-5825
6			30	16:05	1425	99	0.272			02-5260-5089	20-2491-5546
7		Sep	8	13:40	1226	-100.1	-0.2749			18-2267-1225	12-1761-7946
8			13	10:20	930.9	-395.1	-1.086			15-9643-7614	16-7658-0121
9			15	14:20	1132	-193.7	-0.5323			16-2243-5631	01-2656-4408
0			20	15:00	1140	-186.3	-0.5118			18-2996-3053	19-4443-0639
1			27	12:50	1624	297.8	0.818			02-6694-9084	01-8681-6691

CETIS QC Plot

Analyst: RG QA: SD

	Client:			Refe			faterial:		Sodi	um Chi		k				9/27/16						
Pro	ject #:	26	308	-	Test ID:		69790		. 1	Random	ization:	10	.6.1			-	Contro			_		
	Day	<u> </u>	H		.0.		ity (µS/cm)	Temp (°C)						Reproduc				1	SIGN-OFF	7		
	0	New	Old	New	Old	New	Oid		A	B	С	D O	E	F	G	H		L	ص ::Date: ٩/٢٦/۱۲ New WQ: Test Init	z –		
		8.01	6 1-	8.6		321		25.6	0	0	0		0	0	0	0	<u> </u>	0	Sol'n Prep Wc W Time: 125 Date: 9/28/ L New WQ: WC Counts WD.	0		
		8.53	8.17	8:0	1 .	324	334	25.0	0	0	0	D	0	0	0	0	0	0	Sol'n Prep: () Old WQ: 77 Time: 131	0 4182116		
	2	8.30	7.92	9.0	7.2	328	375	25.1	U	0	0	0	৩	J	0	0	\bigcirc	0	Date: 4/29/16 New WQ: Counts: 13 Sol'n Prep: 5- Old WQ: 5-7 Time: 11.3	137		
rol	3	7.92	8.30	8.3	6.1	328	335	25:3	6	5	5	6	6	Ģ	6.	0	5	0	Dater 3: 16 New WQ: RB Counts: TK Sol'n Prep: TK Old WQ: BB Time: 123			
tr Cont	4	7.86	7.92	82	7.3	329	369 32 14	254	0	0	0	0	0	0	\odot	7	0	6	Date: 0/1/14 New WQ: TE Counts: TIC Sol'n Prep: TIC Old WQ: DT Time: 140			
Lab Water Control	5	7,75	8,00	7.9	6,3	309	343	25.1	12	14	13	14	11	13	12	13	12	13	Date: 10 2/14 New WQ: 7 7 Counts: 514 Sol'n Prep: S1(Old WQ: 4 R Time: 14	1		
La	6		7.59		74		339	24.9	16	12	13	18	13	17	16	15	16	14	Date: 10/3/16 New WQ: - Counts JL			
	7		1.34	· ·	11		331	0(1(1		· 3		10	(13			Date: New WQ: Counts:	2		
																			Sol'n Prep: Old WQ: Time Date: Old WQ: Counts:	-		
	8				0000000									8.4					Time	_		
	Day	п	H	D	.0.	Conductivi	ity (uS/cm)	Total=	34	31	31	38 Surviva	30 I/Repro	36 duction	34	35	33	33	Mean Neonates/Female = 33.5			
		New	Old	New	Old	New	Old		А	В	С	D	E	F	G	н	1	J	RT BATCH NUMBER			
	0	7.82		8. D		1310			0	0	C	0	0	0	0	0	0	0	230			
	i	7.56	8.04	8.3	7.0	1346	1391		0	0	Ð	Ð	0	0	0	0	0	0	230			
	2	8.10	7.74	9.0	8.0	1337	i453		0	0	0	0	0	0	0	0	0	S	230			
	3	7,87	8,19	8.5	65	1270	1427		5	5	Ч	Ģ	ч	5	5	0	0	0	230			
500 mg/L	4	7.73	7.83	8.3	7.4	1333	1497		ð	G	G	0	0	13	O	6	5	Q	230			
500	5	7.62	7.87	8.0	6.7	1355	1445		12	15	11	12	9	0	14	8	12	13	230			
	6	1	7.55	/	6.8	-	1459		16	18	13	14	13	10	8	17	15	2		1		
	7																			1		
	8																					
								Total=	33	38	28	32	26	32	27	3j	32	31	Mean Neonates/Female = 31 O			

(Client: Reference Toxicant											Sodi	um Ch	loride	_		Te	st Date:	9/27/6
Pro	Project #: 26308 Test ID: 69790							_								Control	l Water:	SRW	
	Day	1	рН	D	.0.	Conductiv	ity (µS/cm)	Temp				Sı	urvival / F						
		New	Old	New	Old	New	Old	(*C)	A	В	C	D	Е	F	G	Н	I	J	
	0	7-81		8.1		2208			0	0	0	0	0	0	0	0	0	0	
	1	747		8.5		2196	2358		0	0	0	0	0	0	0	Ð	0	0	
	2	7-62	7.70	8.7	7.9	2274	2335		Û	0	0	0	0	C.	v	0	0	0	
	3	7.86	8.16	8.8	6.8	2184	2510		0	6	0	5	×/0	0	4	0	*/0	0	
1000 mg/L	4	7.69	7.86	8.6	7.4	2157	2624		6	0	6	0		5	Q	5	-	7	
1001	5	7,60	7.87	8.1	6.6	2186	2350		13	13	12	12	-	9	X/O	q	-	-/12	
	6	_	7.53)	7.3	~	2512		13	14	13	13	-	13	1	12	-	-	
	7												-		1		-	-	
	8												-		1		-	-	
								Total=	32	33	31	30	¥/0	য	×/4	26	X/6	-/19	Mean Neonates/Femate = 20.3
	Day	Ŀ	H	D.	0.	Conductiv	ity (µS/cm)					Surviva	l / Repro	duction					
		New	Old	New	Old	New	Old		A	В	С	D	E	F	G	Н	1	J	
	0	781		8-6		3164 276			٥	0	0	0	ల	0	0	0	ల	Ο	
	1	7.50		8-8	7.8	3130	3280		0	0	0	0	0	0	0	0	0	0	
	2	7.61	7,70	8.9	8,0	3/2 L	,,3400		ڻ ا	0	0	Ø	0	0	0	0	0	0	
	3	7.85	8.13	9,1	6.6	3050			0	ъ	Ø	5	0	5	4	4	0	0	
1500 mg/L	4	7.68		87	7.3	3020	DS 3410 2610/114		Ц	5	ч	0	433	0	0	0	ч	4	
150	5	7.61	7.87	8.3	4.7	3073	34-20		9	10	ù.	9	0	10	7	ઠે	٩	7	
	6	-	7.55		7.1	-	3460		11	9	G	10	6	8	12	8	7	8	
	7																		
	8																		
								Total=	24	24	21	24	9	23	23	20	20	19	Mean Neonates/Female = 20.7

(Client: Reference Toxicant								N	- laterial:		Sodi	um Chl	oride	-		Te	st Date:	9/27/16
Pro	ect #:	263	308		Test ID:		69790		_									l Water:	
	Day	pH D.O. Conductivity (µS/cm) Temp Survival / Reproduction Naw Old Naw Old Naw Old Image: Conductivity (µS/cm)																	
		New	Old	New	Old	New	Old	(°C)	A	В	C	D	E	F	G	Н	I	J	
	0	7-80		8.6		3910			0	0	0	0	0	0	0	0	0	C	
	I	7.50	7.97	9.0	7.7	4000	4120		0	0	0	0	0	0	0	0	0	0	
	2	764	7.71	9.1	8.5	3972	3901		*10	×%	×⁄0	Ö	0	Û	ट	0	×	0	
	3	7.84	8.12	9.0	6.9	3920	4300			-	-	0	0	0	0	Ô	-	0	
2000 mg/L	4	7.65	7.85	9.0	7,5	4070	4360		-	-	-	2	6	0	2	0	1	0	
200(5	7,62	7-83	8.5	66	7938	4470		-	-	-	5	3	0	0	S	1	4	
	6								-		-	0	6	4	10	5	-	3	
	7								-	-							/		
	8								—	-								126 WIMIN	
								Total=	410	140	×10	7	9	4	18	જ	K/G		Mean Neonates/Female = 50 5.3 11/14
	Day	p	Н	D.O.		Conductivity (µS/cm)					Surviva	I / Reproduction							
		New	Old	New	Old	New	Old		A	В	С	D	Ē	F	G	н	I	J	
	0	777		9.1		4300			0	0	0	0	0	0	0	٥	0	ပ	
	1	7.52	7.95	9.3	7.7	4850	5060		0	0	0	0	0	0	0	0	0	0	
	2	761	7.67	9.5	8.7	4837	5091		410	×10	×10	×′o	×10	×⁄	×16	×′o	×10	×	
	3	-		-			-		-	-	1		-	-		-	1	-	
2500 mg/L	4	-		ļ	ļ	(ļ			-		-	-	-				-	
2500	5	-	/	Ţ.	-	 `	-		-	-	-	-	-		-	-	-	1	
	6		-	~		~			-	^		-	-	-	~	-	-		
	7	1	-	1	-	<u> </u>	-		-	-	-	-	_	-		-	-	-	
	8		-		,				-		-	-	-	-	-		~		
								Total=	710	K	Ho	XIU	*10	40	×10	Ho	¥0	×IO	Mean Neonates/Female = ()