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

October 10, 2013

Brant:

I have enclosed our report "Evaluation of the Chronic Toxicity of Lehigh Permanente Cement Plant Sediment Samples" for the samples collected September 4, 2013. A summary of the results of this testing follows:

Effects of the Lehigh Sediment on *Hyalella azteca*
The *H. azteca* survival in the Lehigh Pond 22 sediment sample "failed" the test of significant toxicity (TST) analysis. The survival in the Pond 13 or Pond 14 sediment samples "passed" the TST analysis.

Please note that the NPDES Compliance Summary is attached to this cover letter.

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

Regards,

Digitally signed by Stephen L. Clark
Date: 2013.10.21 13:31:48 -08'00'

Stephen L. Clark
Vice President & Special Projects Director

This testing was performed under Lab Order 21442b. The test results reported herein conform to the most current NELAC standards, where applicable, unless otherwise narrated in the body of the report, and only relate to the sample(s) tested. This report shall not be reproduced, except in full, without the written consent of Pacific EcoRisk.

NPDES Compliance Summary

Lehigh Southwest Cement Company
Permanente Facility
Chronic Toxicity for SFBRWQCB Reporting

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

Acute Toxicity Test Species:	*Hyalella azteca*	Sampling Date: September 4, 2013
Test Protocol:	EPA/600/R-99/064	Test Date: September 15, 2013
Test Endpoint:	Survival, Growth	

Current Pond 13 Sediment Test Data.				
Treatment	Mean % Survival	Survival % Effect	Mean Dry Weight (mg)	Mean Dry Weight % Effect
Lab Control	97.5	N/A	0.087	N/A
Pond 13 (100%)	82.5	15.4%	0.097	-12.2%

Current Pond 13 Sediment Test Endpoints.	
Endpoint	TST
Survival	Pass

Current Pond 14 Sediment Test Data.				
Treatment	Mean % Survival	Survival % Effect	Mean Dry Weight (mg)	Mean Dry Weight % Effect
Lab Control	97.5	N/A	0.087	N/A
Pond 14 (100%)	93.8	3.9%	0.105	-21.3%

Current Pond 14 Sediment Test Endpoints.	
Endpoint	TST
Survival	Pass

Current Pond 22 Sediment Test Data.				
Treatment	Mean % Survival	Survival % Effect	Mean Dry Weight (mg)	Mean Dry Weight % Effect
Lab Control	97.5	N/A	0.087	N/A
Pond 22 (100%)	55	43.6%	0.095	-9.93%

Current Pond 22 Sediment Test Endpoints.	
Endpoint	TST
Survival	Fail

Evaluation of the Chronic Toxicity of Lehigh Permanente Cement Plant Sediment Samples

Samples collected September 4, 2013

Prepared For

Lehigh Southwest Cement Company
24001 Stevens Creek Boulevard
Cupertino, CA 95014

Prepared By

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

October 2013

PACIFIC ECORISK
ENVIRONMENTAL CONSULTING & TESTING

Evaluation of the Chronic Toxicity of Lehigh Permanente Cement Plant Sediment Samples

Samples collected September 4, 2013

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Appendix C Test Data and Summary of Statistics for the Reference Toxicant Evaluation of the *Hyalella azteca*

1. INTRODUCTION

Under contract to the Lehigh Southwest Cement Company, Pacific EcoRisk (PER) conducted an evaluation of the chronic toxicity of Lehigh Southwest Cement Company Permanente Facility (Lehigh) sediment samples. This evaluation consist of performing the following US EPA toxicity test:

- 10-day acute sediment toxicity test with the amphipod *Hyalella azteca*.

These toxicity tests were conducted on sediment samples collected from Pond 13, Pond 14, and Pond 22 on September 4, 2013. In order to assess the sensitivity of the organisms to chemical stress, a reference toxicant test was performed concurrently with each test. This report describes the performance and results of these tests.

2. CHRONIC TOXICITY TEST PROCEDURES

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

- "Methods for Measuring the Toxicity and Bioaccumulation of Sediment-associated Contaminants with Freshwater Invertebrates, Second Edition" (EPA/600/R-99/064).

2.1 Sample Receipt and Handling

On September 4, samples of Lehigh Permanente sediment were collected from 3 sites into appropriately cleaned sample containers. Sediment samples (designated A, B, and C) were collected from three locations at each sampling site. These samples were transported, on ice and under chain-of-custody, to the PER testing laboratory in Fairfield, CA. Upon receipt at the testing laboratory, the A, B, and C aliquots from each site were composited and stored at 0-6°C, and were used to initiate testing within 14 days of collection.

The chain-of-custody record for the collection and delivery of the sediment samples is provided as Appendix A.

Table 1. Collection of the Lehigh sediment samples.

Sample ID	Sediment Sample Collection Date	Sample Receipt Date
Pond 13	9/4/13	9/4/13
Pond 14	9/4/13	9/4/13
Pond 22	9/4/13	9/4/13

2.2 Survival and Growth Toxicity Testing of Ambient Sediment with *Hyalella azteca*

The freshwater sediment toxicity test with *Hyalella azteca* consists of exposing the amphipods to the sediment for 10 days, after which effects on survival and growth are evaluated. The specific procedures used in this test are described below.

The *Hyalella azteca* used in this test were obtained from a commercial supplier (Aquatic Biosystems, Fort Collins, CO). Upon receipt at the laboratory, the amphipods were placed into HDPE tanks containing SAM-5S water at 23°C, and were fed the alga *Selenastrum capricornutum* and Yeast-Cerophyll®-Trout (YCT) food amended with *Spirulina*.

The sediment sample was tested at the 100% concentration only. The Control treatment sediment consisted of a composite of reference site sediments that has been maintained under culture at the PER lab for >3 months. There were 8 replicates for each test treatment. Each replicate container consisted of a 300 mL tall-form glass beaker with a 3 cm ribbon of 540 μm mesh NITEX attached to the top of the beaker with silicone sealant. The sediment sample was homogenized immediately prior to introduction of the sediment into the test replicates. Approximately 100 mL of sediment was then loaded into each of the test replicate containers. Each of the test replicates was carefully filled with clean overlying SAM-5S water. The test replicates with sediment and clean overlying water were established 24 hrs prior to the introduction of the amphipods.

After this initial 24 hr period, the overlying water in each replicate was flushed with one volume of fresh control water (approximately 150 mL). For each test treatment, a small aliquot of the renewed overlying water was then collected from each of the 8 replicates and composited for measurement of "initial" water quality characteristics (pH, dissolved oxygen [D.O.], conductivity, alkalinity, hardness, and total ammonia). Then, ten 9 day-old amphipods were randomly allocated into each replicate, followed by the addition of 1.0 mL of YCT food. The test replicates were then returned to the temperature-controlled room. At the time of test initiation for each set of tests, 8 replicates of 10 randomly-selected organisms were collected, dried, and weighed (described below) to determine the mean dry weight of the test organisms at test initiation.

Each day, for the following 9 days, each test replicate was examined for the presence of any dead amphipods. A small aliquot of the overlying water in each of the 8 replicates was then collected and composited as before for measurement of "old" D.O., after which each replicate was flushed with one volume of fresh water. Another small aliquot of the overlying water in each of the 8 replicates was then collected and composited as before for measurement of "new" D.O., after which each replicate was fed 1.0 mL of YCT, and then replaced within the temperature-controlled room. The D.O. dropped below 2.5 mg/L in all three sediment samples during testing. As per EPA guidelines, the samples were aerated.

After 10 days exposure, an aliquot of overlying water was collected from each replicate and composited for analysis of the "final" water quality characteristics. The sediments in each replicate container were then carefully sorted and sieved and the number of surviving amphipods determined. The surviving organisms were euthanized in methanol and transferred to small pre-tared weighing pans, which were placed into a drying oven at 100˚C. After drying for ~24 hrs, the pans were transferred to a desiccator to cool, and then weighed to the nearest 0.01 mg to determine the mean dry weight per surviving organism for each replicate. The resulting survival and growth (mean dry weight) data were then analyzed to evaluate any impairment due to the sediment; all statistical analyses were performed using the CETIS® statistical package (TidePool Scientific, McKinleyville, CA).

2.2.1 Reference Toxicant Testing of the *Hyalella azteca*

In order to assess the sensitivity of the *H. azteca* test organisms to toxic stress, a concurrent reference toxicant test was performed. The reference toxicant test was performed as a 96-hr exposure to Control water spiked with KCl at test concentrations of 0, 0.1, 0.2, 0.4, 0.8 and 1.6 g/L. The resulting survival data were statistically analyzed to determine key dose-response point estimates (e.g., EC_{50}); all statistical analyses were made using the CETIS® software. This response endpoint was then compared to the 'typical response' range established by the mean ± 2 SD of the point estimates generated by the 20 most recent previous reference toxicant tests performed by this lab.

3. RESULTS

3.1 Effects of the Lehigh Sediment on *Hyalella azteca*

The results for these tests are presented in Tables 2a, 2b, and 2c. There was 97.5% survival and a mean dry weight of 0.087 mg at the Lab Control treatment. The *H. azteca* survival in the Lehigh Pond 22 sediment sample "failed" the test of significant toxicity (TST) analysis. The survival in the Pond 13 or Pond 14 sediment samples "passed" the TST analysis.

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

Table 2a. Effects of Lehigh Pond 13 sediment on *Hyalella azteca* survival and growth.

Treatment/Sample ID	Mean % Survival	Survival % Effect	Mean Dry Weight (mg)	Mean Dry Weight % Effect
Lab Control	97.5	N/A	0.087	N/A
Pond 13 (100%)	82.5	15.4%	0.097	-12.2%
Summary of Key Statistics				
Endpoint	TST			
Survival	Pass			

Table 2b. Effects of Lehigh Pond 14 sediment on *Hyalella azteca* survival and growth.

Treatment/Sample ID	Mean % Survival	Survival % Effect	Mean Dry Weight (mg)	Mean Dry Weight % Effect
Lab Control	97.5	N/A	0.087	N/A
Pond 14 (100%)	93.8	3.9%	0.105	-21.3%
Summary of Key Statistics				
Endpoint	TST			
Survival	Pass			

Table 2c. Effects of Lehigh Pond 22 sediment on *Hyalella azteca* survival and growth.				
Treatment/Sample ID	Mean % Survival	Survival % Effect	Mean Dry Weight (mg)	Mean Dry Weight % Effect
Lab Control	97.5	N/A	0.087	N/A
Pond 22 (100%)	**55***	43.6%	0.095	-9.93%
Summary of Key Statistics				
Endpoint	TST			
Survival	Fail			

* The response at this test treatment failed the TST.

4. AQUATIC TOXICITY DATA QUALITY CONTROL

Four QC measures were assessed during the toxicity testing:

- Maintenance of acceptable test conditions;
- Negative Control testing;
- Positive Control (reference toxicant) testing; and
- Concentration Response Relationship assessment.

4.1 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.

4.2 Negative Control Testing

The responses at the Lab Control treatments were acceptable.

4.3 Positive Control Testing

4.3.1 Reference Toxicant Toxicity to *Hyalella azteca*

The results of this test are presented in Table 3. There was 100% survival in the Control treatment; the EC_{50} was 0.39 g/L KCl. These reference toxicant test results are 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 C.

Table 3. Reference toxicant testing: Effects of KCl on *Hyalella azteca*.

KCl Treatment (g/L)	Mean % Survival
Control	100
0.1	90
0.2	100
0.4	**50***
0.8	**0***
1.6	**0***
Summary of Statistics	
Survival EC_{50} =	0.39 g/L KCl

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

4.4 Concentration Response Relationships

There was a valid concentration-response relationship for the reference toxicant test (EPA821-B-00-004).

5. SUMMARY AND CONCLUSIONS

Effects of the Lehigh Sediment on *Hyalella azteca*

The *H. azteca* survival in the Lehigh Pond 22 sediment sample "failed" the test of significant toxicity (TST) analysis. The survival in the Pond 13 or Pond 14 sediment samples "passed" the TST analysis.

Effects of Lehigh Permanente sediment on *Hyalella azteca* survival and growth.			
Test Initiation Date	Treatment/Sample ID	Mean % Survival	Mean Dry Weight (mg)
9/15/13	Lab Control	97.5	0.087
	Pond 13	82.5	0.097
	Pond 14	93.8	0.105
	Pond 22	**55.0***	0.095

* The response at this test treatment failed the TST.

Appendix A

Chain-of-Custody Record for the Collection and Delivery of the Lehigh Sediment Samples

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

CHAIN-OF-CUSTODY RECORD

Results To:	Robertson-Bryan, Inc	**Invoice To:**	Lehigh Southwest Cement Co.
Address:	9888 Kent Street Elk Grove, CA 95624	**Address:**	P.O. Box 660140 Dallas, TX 75266
Phone:	916 405-8911	**Phone:**	(925) 244-6570
Attn:	Brant Jorgenson	**Attn:**	Greg Knapp
E-mail:	brant@robertson-bryan.com	**E-mail:**	Greg.Knapp@hanson.biz
Project Name:	Lehigh Southwest Cement - Permanente Creek		
P.O.#/Ref:			

REQUESTED ANALYSIS

	Client Sample ID	Sample Date	Sample Time	Sample Matrix*	Grab/ Comp	Container Number	Container Type	10-Day *Hyalalla azteca* sediment test, EPA 100.1 Test on Pond Composite (see Instructions)
1	Pond 13-A	9/4/13	10:50	SED	Grab	1	2L Glass Jar	X
2	Pond 13-B	9/4/13	10:58	SED	Grab	1	2L Glass Jar	
3	Pond 13-C	9/4/13	11:05	SED	Grab	1	2L Glass Jar	
4	Pond 14-A	9/4/13	12:02	SED	Grab	1	2L Glass Jar	X
5	Pond 14-B	9/4/13	1210	SED	Grab	1	2L Glass Jar	
6	Pond 14-C	9/4/13	1213	SED	Grab	1	2L Glass Jar	
7	Pond 22-A	9/4/13	1200	SED	Grab	1	2L Glass Jar	X
8	Pond 22-B	9/4/13	1209	SED	Grab	1	2L Glass Jar	
9	Pond 22-C	9/4/13	1220	SED	Grab	1	2L Glass Jar	
10								

~~Caution! Pond 13B Jar is cracked BJ~~

Samples collected by: B. Jorgenson & P. Bedore

Comments/Special Instruction:

Prepare equal volume composite of 13-A, 13-B, 13-C for testing.
Prepare equal volume composite of 14-A, 14-B, 14-C for testing.
Prepare equal volume composite of 22-A, 22-B, 22-C for testing.

Perform 10-Day H azteca sediment test (EPA 100.1) on each composite - Pond 13 Composite, Pond 14 Composite, Pond 22 Composite.
Save remaining sediment composites.
Perform concurent reference toxicant test.

RELIQUINSHED BY:	RECEIVED BY:
Signature: [signature]	Signature: [signature]
Print: Brant Jorgenson	Print: Alison Briden
Organization: RBI	Organization: PER
Date: 9/4/13 Time: 1900	Date: 9-4-13 Time: 1900
RELIQUINSHED BY:	**RECEIVED BY:**
Signature:	Signature:
Print:	Print:
Organization:	Organization:
Date: Time:	Date: Time:

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

Sediment Sample Log-In

Client: **Lehigh Permanente** Project #: **21442**

Project Description: NPDES Sample Description: **Pond 13**

Sediment Sample Log-In	
Sample ID #	**32657**
Client Sample ID:	Pond 13 - A, B, C
Date and Time of Sample Collection:	9/4/13 1050 - 1105
Sample Collected By:	Lehigh
Date and Time of Sample Receipt:	9/4/13 1900
Sample Received By:	Alison Briden
Chain of Custody present:	Y
Chain of Custody Seal Present / Intact:	-
Sample Logged in By:	DH
Temperature Blank (°C):	-
If No Temp Blank, Cooler Temp (°C):	0.1
Sample Temp (°C):	-
Sample Shipped on Ice (Y/N):	Y
Ice Present (Y/N):	Y
Type of Container:	2L glass jar
Sample Volume:	3 x 2L jars

Comments: _____

This Sample Log-In has been reviewed for completeness, consistency with Chain-of-Custody information, and identification of any water quality measures or other issues of concern	Sign-off:	Date:	Time:
	[illegible]	9/5/13	0935

Sediment Sample Log-In

Client: **Lehigh Permanente** Project #: **21442**

Project Description: NPDES Sample Description: **Pond 14**

Sediment Sample Log-In	
Sample ID #	**32658**
Client Sample ID:	Pond 14 - A, B, C
Date and Time of Sample Collection:	9/4/13 1202-1213
Sample Collected By:	Lehigh
Date and Time of Sample Receipt:	9/4/13 1900
Sample Received By:	Alison Briden
Chain of Custody present:	Y
Chain of Custody Seal Present / Intact:	-
Sample Logged in By:	DH
Temperature Blank (°C):	-
If No Temp Blank, Cooler Temp (°C):	0.1
Sample Temp (°C):	-
Sample Shipped on Ice (Y/N):	Y
Ice Present (Y/N):	Y
Type of Container:	2L glass jar
Sample Volume:	3 x 2L jars

Comments:

This Sample Log-In has been reviewed for completeness, consistency with Chain-of-Custody information, and identification of any water quality measures or other issues of concern	Sign-off:	Date:	Time:
	MG	9/5/13	0935

Sediment Sample Log-In

Client: **Lehigh Permanente** Project #: **21442**

Project Description: NPDES Sample Description: **Pond 22**

Sediment Sample Log-In	
Sample ID #	**32659**
Client Sample ID:	Pond 22 - A, B, C
Date and Time of Sample Collection:	9/4/13 1200-1220
Sample Collected By:	Lehigh
Date and Time of Sample Receipt:	9/4/13 1900
Sample Received By:	Alison Beiden
Chain of Custody present:	Y
Chain of Custody Seal Present / Intact:	-
Sample Logged in By:	DH
Temperature Blank (°C):	-
If No Temp Blank, Cooler Temp (°C):	0.1
Sample Temp (°C):	-
Sample Shipped on Ice (Y/N):	Y
Ice Present (Y/N):	Y
Type of Container:	2L glass jar
Sample Volume:	3 x 2L jars

Comments: _____

This Sample Log-In has been reviewed for completeness, consistency with Chain-of-Custody information, and identification of any water quality measures or other issues of concern	Sign-off:	Date:	Time:
	[illegible]	9/5/13	0935

Appendix B

Test Data and Summary of Statistics for the Evaluation of the Acute Toxicity of Lehigh Sediment to *Hyalella azteca*

CETIS Summary Report

Report Date:	01 Oct-13 09:34 (p 1 of 1)
Test Code:	53346-48 | 18-9648-1135

Hyalella Survival and Growth Test — **Pacific EcoRisk**

Batch ID:	11-0794-2575	**Test Type:**	Survival-Growth (10 day)	**Analyst:**	Padrick Anderson
Start Date:	15 Sep-13 14:30	**Protocol:**	EPA-821-R-02-012 (2002)	**Diluent:**	Not Applicable
Ending Date:	25 Sep-13	**Species:**	Hyalella azteca	**Brine:**	Not Applicable
Duration:	9d 10h	**Source:**	Aquatic Biosystems, CO	**Age:**	9

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
Control Sed	12-1838-6645	15 Sep-13 14:30	15 Sep-13 14:30	NA (23.2 °C)	Lehigh Permanente	21442
Pond 13	17-5747-2027	04 Sep-13 10:50	04 Sep-13 19:00	11d 4h (0.1 °C)		
Pond 14	15-2176-8190	04 Sep-13 12:02	04 Sep-13 19:00	11d 2h (0.1 °C)		
Pond 22	03-2250-5553	04 Sep-13 12:00	04 Sep-13 19:00	11d 2h (0.1 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
Control Sed	Control Sediment	Lehigh Permanente	LABQA		
Pond 13	Sediment	Lehigh Permanente	Pond 13		
Pond 14	Sediment	Lehigh Permanente	Pond 14		
Pond 22	Sediment	Lehigh Permanente	Pond 22		

Mean Dry Weight-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
Control Sed	8	0.0867	0.0787	0.0948	0.052	0.12	0.00761	0.0215	24.8%	0.0%
Pond 13	8	0.0973	0.0867	0.108	0.0329	0.126	0.0101	0.0285	29.3%	-12.2%
Pond 14	8	0.105	0.098	0.112	0.079	0.13	0.00677	0.0192	18.2%	-21.3%
Pond 22	8	0.0953	0.0876	0.103	0.0686	0.128	0.00733	0.0207	21.7%	-9.93%

Survival Rate Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
Control Sed	8	0.975	0.949	1	0.8	1	0.025	0.0707	7.25%	0.0%
Pond 13	8	0.825	0.763	0.887	0.6	1	0.059	0.167	20.2%	15.4%
Pond 14	8	0.938	0.91	0.965	0.8	1	0.0263	0.0744	7.94%	3.85%
Pond 22	8	0.55	0.505	0.595	0.4	0.7	0.0423	0.12	21.7%	43.6%

Mean Dry Weight-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
Control Sed	0.075	0.106	0.052	0.0678	0.12	0.093	0.089	0.091
Pond 13	0.093	0.099	0.1	0.113	0.0329	0.126	0.118	0.0967
Pond 14	0.13	0.103	0.107	0.0911	0.079	0.122	0.085	0.124
Pond 22	0.094	0.102	0.0975	0.118	0.0814	0.0733	0.0686	0.128

Survival Rate Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
Control Sed	1	1	1	1	0.8	1	1	1
Pond 13	1	1	0.6	0.9	0.7	0.9	0.6	0.9
Pond 14	0.8	1	0.9	0.9	1	1	1	0.9
Pond 22	0.5	0.5	0.4	0.6	0.7	0.6	0.7	0.4

Survival Rate Binomials

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
Control Sed	10/10	10/10	10/10	10/10	8/10	10/10	10/10	10/10
Pond 13	10/10	10/10	6/10	9/10	7/10	9/10	6/10	9/10
Pond 14	8/10	10/10	9/10	9/10	10/10	10/10	10/10	9/10
Pond 22	5/10	5/10	4/10	6/10	7/10	6/10	7/10	4/10

Hyalella Survival and Growth Test — **Pacific EcoRisk**

Analysis ID:	19-5225-6202	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.8.5
Analyzed:	30 Sep-13 9:57	**Analysis:**	Parametric Bioequivalence-Two Sample	**Official Results:**	Yes

Data Transform	Zeta	Alt Hyp	Trials	Seed	TST b	Test Result
Angular (Corrected)	NA	C*b < T	NA	NA	0.75	

TST-Welch's t Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:25%)
Control Sed		Pond 13	1.67	0.706		8	0.0670	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.1715577	0.1715577	1	5.85	0.0297	Significant Effect
Error	0.4103424	0.02931017	14			
Total	0.5819001		15			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	4.05	8.89	0.0852	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.829	0.841	0.0068	Non-normal Distribution

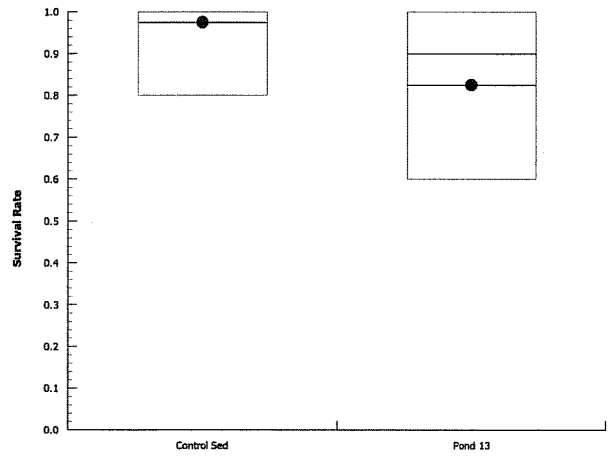
Survival Rate Summary

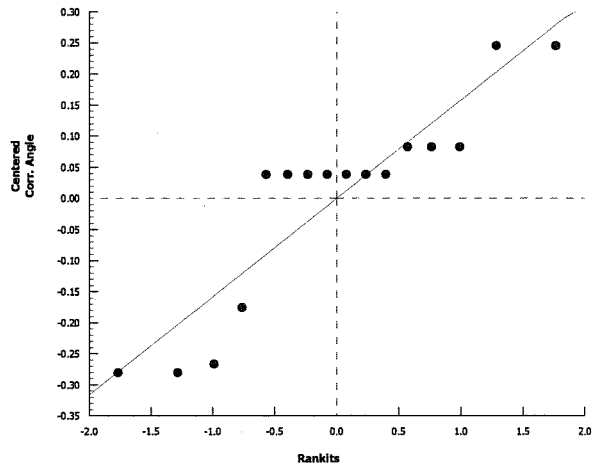
C-%	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Control Sed	8	0.975	0.916	1	1	0.8	1	0.025	7.25%	0.0%
Pond 13	8	0.825	0.685	0.965	0.9	0.6	1	0.059	20.2%	15.4%

Angular (Corrected) Transformed Summary

C-%	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Control Sed	8	1.37	1.28	1.46	1.41	1.11	1.41	0.0381	7.85%	0.0%
Pond 13	8	1.17	0.986	1.35	1.25	0.886	1.41	0.0767	18.6%	15.1%

Graphics





10-Day Freshwater Sediment Toxicity Test Data

Client: **Lehigh Permanente** Project #: 21442 Organism Supplier/Log Number: ABS/7537

Species: *Hyalella azteca* Test ID#: 53346 Organism Age/Size: 9days

Control Water: SAM-5

Treatment =	Control				Pond 13				Sign-offs:
Day 0			New D.O. 7.6				New D.O. 5.3		Initiation Time: 1430
Date: 9/15/13			Meter ID RD05						WQ: FOUR
Temp. (°C) = 23.2	A 10	B 10	C 10	D 10	A 10	B 10	C 10	D 10	Initiation Counts: 1430
Feed: FOUR	E 10	F 10	G 10	H 10	E 10	F 10	G 10	H 10	Confirmation Counts:
Day 1	Old D.O. 7.6		New D.O. 7.0		Old D.O. 7.5		New D.O. 7.0		AM Change: CP
Date: 9/16/13	Meter ID RD05		Meter ID RD05						WQ: CP
Temp. (°C) = 23.4	A 0	B 0	C 0	D 0	A 0	B 0	C 0	D 0	PM Change: CP
Feed: CP	E 0	F 0	G 0	H 0	E 0	F 0	G 0	H 0	Mortality Counts: CP
Day 2	Old D.O. 5.3		New D.O. 6.7		Old D.O. 7.2		New D.O. 7.1		AM Change: GG
Date: 9/17/13	Meter ID RD06		Meter ID RD07						WQ: GG
Temp. (°C) = 23.4	A 0	B 0	C 0	D 0	A 0	B 0	C 0	D 0	PM Change: GG
Feed: GG	E 0	F 0	G 0	H 0	E 0	F 0	G 0	H 0	Mortality Counts: GG
Day 3	Old D.O. 8.0		New D.O. 7.6		Old D.O. 7.3		New D.O. 6.9		AM Change: CP
Date: 9/18/13	Meter ID RD07		Meter ID RD07						WQ: CP
Temp. (°C) = 23.3	A 0	B 0	C 0	D 0	A 0	B 0	C 0	D 0	PM Change: GG
Feed: VB	E 0	F 0	G 0	H 0	E 0	F 0	G 0	H 0	Mortality Counts: CP
Day 4	Old D.O. 7.3		New D.O. 7.7		Old D.O. 6.7		New D.O. 7.4		AM Change: CE
Date: 9/19/13	Meter ID RD05		Meter ID RD06						WQ: CE
Temp. (°C) = 23.3	A 0	B 0	C 0	D 0	A 0	B 0	C 0	D 0	PM Change: AF
Feed: AF	E 0	F 0	G 0	H 0	E 0	F 0	G 0	H 0	Mortality Counts: CE
Day 5	Old D.O. 8.1		New D.O. 8.5		Old D.O. 7.9		New D.O. 8.2		AM Change: DH
Date: 9/20/13	Meter ID RD06		Meter ID RD06						WQ: DH
Temp. (°C) = 23.4	A 0	B 0	C 0	D 0	A 0	B 0	C 0	D 0	PM Change: DH
Feed: DH	E 0	F 0	G 0	H 0	E 0	F 0	G 0	H 0	Mortality Counts: DH
Day 6	Old D.O. 7.8		New D.O. 8.0		Old D.O. 7.5		New D.O. 7.7		AM Change: AF
Date: 9/21/13	Meter ID RD07		Meter ID RD07						WQ: AF
Temp. (°C) = 23.3	A 0	B 0	C 0	D 0	A 0	B 0	C 0	D 0	PM Change: DH
Feed: DH	E 0	F 0	G 0	H 0	E 0	F 0	G 0	H 0	Mortality Counts: AF
Day 7	Old D.O. 7.5		New D.O. 7.6		Old D.O. 7.6		New D.O. 7.9		AM Change: CA
Date: 9/22/13	Meter ID RD07		Meter ID RD07						WQ: CA
Temp. (°C) = 23.6	A 0	B 0	C 0	D 0	A 0	B 0	C 0	D 0	PM Change: CA
Feed: CA	E 0	F 0	G 0	H 0	E 0	F 0	G 0	H 0	Mortality Counts: CA
Day 8	Old D.O. 8.4		New D.O. 8.6		Old D.O. 7.8		New D.O. 8.1		AM Change: CE
Date: 9/23/13	Meter ID RD07		Meter ID RD05						WQ: CE GG
Temp. (°C) = 23.3	A 0	B 0	C 0	D 0	A 0	B 0	C 0	D 0	PM Change: GG
Feed: GG	E 0	F 0	G 0	H 0	E 0	F 0	G 0	H 0	Mortality Counts: CE
Day 9	Old D.O. 7.6		New D.O. 7.8		Old D.O. 7.6		New D.O. 7.9		AM Change: GG
Date: 9/24/13	Meter ID RD05		Meter ID RD05						WQ: GG
Temp. (°C) = 23.4	A 0	B 0	C 0	D 0	A 0	B 0	C 0	D 0	PM Change: MO
Feed: MO	E 0	F 0	G 0	H 0	E 0	F 0	G 0	H 0	Mortality Counts: GG
Day 10	Old D.O. 8.2				Old D.O. 7.5				Termination Counts: MK
Date: 9/25/13	Meter ID RD07								
Temp. (°C) = 23.8	# Alive/Replicate				# Alive/Replicate				WQ: NZ
	A ~~10~~ 8	B 10	C 10	D ~~10~~ 8	A 10	B 10	C 6	D 9	
	E ~~10~~ 8	F 10	G 10	H 10	E ~~10~~ 7	F ~~10~~ 9	G 6	H ~~10~~ 9	

Hyalella azteca Weight Data Sheets

Client: **Lehigh Permanente** Project #: 21442 Balance ID: BAL01

Sample ID: **Pond 13** Tare Wt Date: 9/24/13 Sign-Off: JLA

Test ID #: 53346 Final Wt Date: 9/26/13 Sign-Off: CA

Pan	Concentration Replicate		Initial Weight. (mg)	Final Weight. (mg)	# organisms	Ave Weight (mg)
1	Control	A	67.17	67.77	MK ~~10~~ 8	0.075
2	Sediment	B	61.96	63.02	10	0.106
3		C	60.50	61.02	10	0.052
4		D	62.37	62.98	MK ~~10~~ 9	0.068
5		E	65.23	66.19	8	0.120
6		F	67.61	68.54	10	0.093
7		G	62.63	63.52	10	0.089
8		H	67.37	~~68.23~~ 68.28	10	0.098 MK
9	100%	A	62.61	63.54	10	0.093
10		B	64.38	65.37	10	0.099
11		C	65.60	66.20	6	0.100
12		D	61.36	62.38	9	0.113
13		E	63.12	63.35	7	0.033
14		F	66.03	67.16	9	0.126
15		G	69.31	70.02	6	0.118
16		H	60.97	61.84	9	0.097
QA1			64.22	64.22		—

Hyalella Survival and Growth Test — **Pacific EcoRisk**

Analysis ID:	11-3437-6912	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.8.5
Analyzed:	30 Sep-13 9:57	**Analysis:**	Parametric Bioequivalence-Two Sample	**Official Results:**	Yes

Data Transform	Zeta	Alt Hyp	Trials	Seed	TST b	Test Result
Angular (Corrected)	NA	C*b < T	NA	NA	0.75	

TST-Welch's t Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:25%)
Control Sed		Pond 14	5.66	0.695		12	<0.0001	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.01493962	0.01493962	1	1.19	0.2930	Non-Significant Effect
Error	0.1751877	0.01251341	14			
Total	0.1901273		15			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	1.15	8.89	0.8549	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.793	0.841	0.0022	Non-normal Distribution

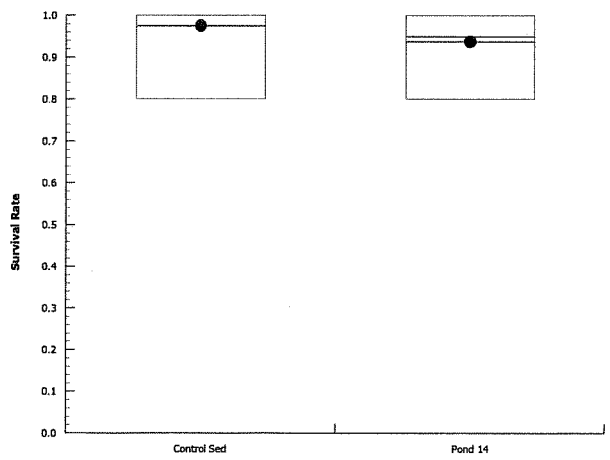
Survival Rate Summary

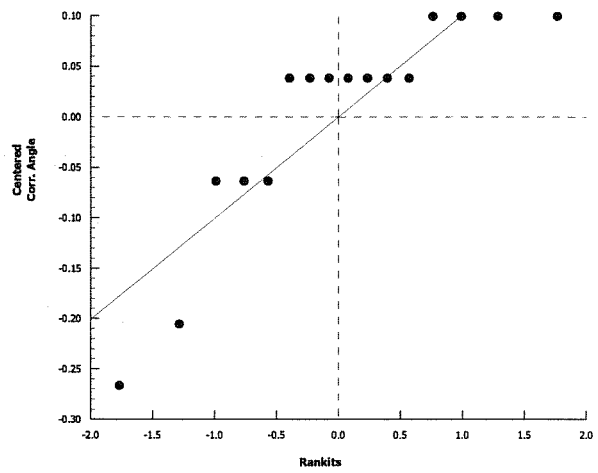
C-%	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Control Sed	8	0.975	0.916	1	1	0.8	1	0.025	7.25%	0.0%
Pond 14	8	0.937	0.875	1	0.95	0.8	1	0.0263	7.94%	3.85%

Angular (Corrected) Transformed Summary

C-%	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Control Sed	8	1.37	1.28	1.46	1.41	1.11	1.41	0.0381	7.85%	0.0%
Pond 14	8	1.31	1.22	1.41	1.33	1.11	1.41	0.0409	8.82%	4.45%

Graphics





10-Day Freshwater Sediment Toxicity Test Data

Client: **Lehigh Permanente** Project #: 21442 Organism Supplier/Log Number: ABS/7537

Species: *Hyalella azteca* Test ID#: 53347 Organism Age/Size: 9days

Control Water: SAM-S

Treatment =	Control				Pond 14				Sign-offs:
Day 0			New D.O. 7.6				New D.O. 6.5		Initiation Time: 1430
Date: 9/15/13			Meter ID RD05						WQ: FOUS
Temp. (°C) = 23.2	A 10	B 10	C 10	D 10	A 10	B 10	C 10	D 10	Initiation Counts:
Feed: FOUS	E 10	F 10	G 10	H 10	E 10	F 10	G 10	H 10	Confirmation Counts:
Day 1	Old D.O. 7.6		New D.O. 7.0		Old D.O. 7.4		New D.O. 6.9		AM Change: CP
Date: 9/16/13	Meter ID RD05		Meter ID RD05						WQ: CP
Temp. (°C) = 23.4	A 0	B 0	C 0	D 0	A 0	B 0	C 0	D 0	PM Change: CP
Feed: CP	E 0	F 0	G 0	H 0	E 0	F 0	G 0	H 0	Mortality Counts: CP
Day 2	Old D.O. ~~6.7~~ 5.3		New D.O. 6.7		Old D.O. 7.8		New D.O. 5.7		AM Change: GG
Date: 9/17/13	Meter ID RD06		Meter ID RD07						WQ: GG
Temp. (°C) = 23.4	A 0	B 0	C 0	D 0	A 0	B 0	C 0	D 0	PM Change: GG
Feed: GG	E 0	F 0	G 0	H 0	E 0	F 0	G 0	H 0	Mortality Counts: GG
Day 3	Old D.O. 8.0		New D.O. 7.6		Old D.O. 7.6		New D.O. 7.4		AM Change: CP
Date: 9/18/13	Meter ID RD07		Meter ID RD07						WQ: CP
Temp. (°C) = 23.3	A 0	B 0	C 0	D 0	A 0	B 0	C 0	D 0	PM Change: GG
Feed: FOS	E 0	F 0	G 0	H 0	E 0	F 0	G 0	H 0	Mortality Counts: CP
Day 4	Old D.O. 7.3		New D.O. 7.7		Old D.O. 7.2		New D.O. 7.7		AM Change: CE
Date: 9/19/13	Meter ID RD05		Meter ID RD06						WQ: CE
Temp. (°C) = 23.3	A 0	B 0	C 0	D 0	A 0	B 0	C 0	D 0	PM Change: AF
Feed: AF	E 0	F 0	G 0	H 0	E 0	F 0	G 0	H 0	Mortality Counts: CE
Day 5	Old D.O. 8.1		New D.O. 8.5		Old D.O. 7.9		New D.O. 8.3		AM Change: DH
Date: 9/20/13	Meter ID RD06		Meter ID RD06						WQ: DH
Temp. (°C) = 23.4	A 0	B 0	C 0	D 0	A 0	B 0	C 0	D 0	PM Change: DH
Feed: DH	E 0	F 0	G 0	H 0	E 0	F 0	G 0	H 0	Mortality Counts: DH
Day 6	Old D.O. 7.8		New D.O. 8.0		Old D.O. 7.7		New D.O. 7.9		AM Change: AF
Date: 9/21/13	Meter ID RD07		Meter ID RD07						WQ: AF
Temp. (°C) = 23.3	A 0	B 0	C 0	D 0	A 0	B 0	C 0	D 0	PM Change: DH
Feed: DH	E 0	F 0	G 0	H 0	E 0	F 0	G 0	H 0	Mortality Counts: AF
Day 7	Old D.O. 7.5		New D.O. 7.6		Old D.O. 8.0		New D.O. 7.9		AM Change: CA
Date: 9/22/13	Meter ID RD07		Meter ID RD07						WQ: CA
Temp. (°C) = 23.6	A 0	B 0	C 0	D 0	A 0	B 0	C 0	D 0	PM Change: CA
Feed: CA	E 0	F 0	G 0	H 0	E 0	F 0	G 0	H 0	Mortality Counts: CA
Day 8	Old D.O. 8.4		New D.O. 8.6		Old D.O. 8.4		New D.O. 8.3		AM Change: CE
Date: 9/23/13	Meter ID RD07		Meter ID RD05						WQ: CE GG
Temp. (°C) = 23.3	A 0	B 0	C 0	D 0	A 0	B 0	C 0	D 0	PM Change: GG
Feed: GG	E 0	F 0	G 0	H 0	E 0	F 0	G 0	H 0	Mortality Counts: CE
Day 9	Old D.O. 7.6		New D.O. 7.8		Old D.O. 7.5		New D.O. 7.4		AM Change: GG
Date: 9/24/13	Meter ID RD05		Meter ID RD05						WQ: GG
Temp. (°C) = 23.4	A 0	B 0	C 0	D 0	A 0	B 0	C 0	D 0	PM Change: MO
Feed: MO	E 0	F 0	G 0	H 0	E 0	F 0	G 0	H 0	Mortality Counts: GG
Day 10	Old D.O. 8.2				Old D.O. 7.5				Termination Counts: MK
Date: 9/25/13	Meter ID RD07								
Temp. (°C) = 23.8	# Alive/Replicate			9	# Alive/Replicate				WQ: NT
	A MK ~~10~~ 8	B 10	C 10	D MK ~~8~~ 10	A MK ~~10~~ 8	B 10	C MK ~~10~~ 9	D 9	
	E MK ~~10~~ 8	F 10	G 10	H 10	E 10	F 10	G 10	H MK ~~10~~ 9	

Hyalella azteca Weight Data Sheets

Client:	**Lehigh Permanente**	Project #:	21442	Balance ID:	BAL01
Sample ID:	**Pond 14**	Tare Wt Date:	9/24/13	Sign-Off:	JLA
Test ID #:	53347	Final Wt Date:	9/26/13	Sign-Off:	CA

Pan	Concentration Replicate		Initial Weight. (mg)	Final Weight. (mg)	# organisms	Ave Weight (mg)
1	Control	A	67.17	67.77	MK ~~10~~ 8	0.075
2	Sediment	B	61.96	63.02	10	0.106
3		C	60.50	61.02	10	0.052
4		D	62.37	62.98	MK ~~10~~ 9	0.068
5		E	65.23	66.19	8	0.120
6		F	67.61	68.54	10	0.093
7		G	62.63	63.52	10	0.089
8		H	67.37	68.28	10	0.091
17	100%	A	66.63	67.67	8	0.130
18		B	63.69	64.72	10	0.103
19		C	64.26	65.22	9	0.107
20		D	69.96	70.78	9	0.091
21		E	62.71	63.50	10	0.079
22		F	58.55	59.77	10	0.122
23		G	63.41	64.26	10	0.085
24		H	65.48	66.60	9	0.124
QA2			63.81	63.82		—

Hyalella Survival and Growth Test — **Pacific EcoRisk**

Analysis ID:	12-2560-1612	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.8.5
Analyzed:	30 Sep-13 9:57	**Analysis:**	Parametric Bioequivalence-Two Sample	**Official Results:**	Yes

Data Transform	Zeta	Alt Hyp	Trials	Seed	TST b	Test Result
Angular (Corrected)	NA	C*b < T	NA	NA	0.75	

TST-Welch's t Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:25%)
Control Sed		Pond 22	-3.74	0.695		12	0.9986	CDF	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.153776	1.153776	1	87.1	<0.0001	Significant Effect
Error	0.1853759	0.01324114	14			
Total	1.339152		15			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	1.28	8.89	0.7534	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.85	0.841	0.0137	Normal Distribution

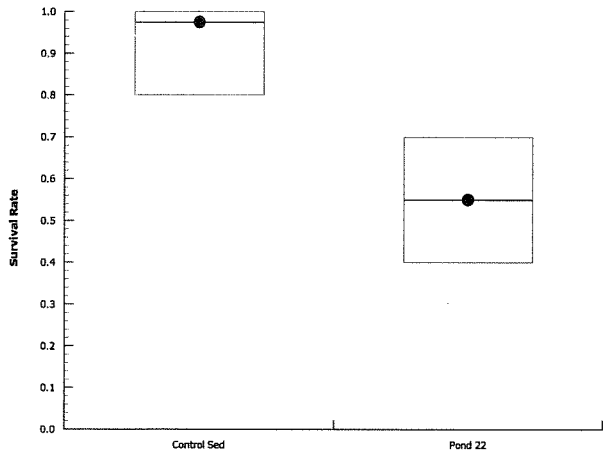
Survival Rate Summary

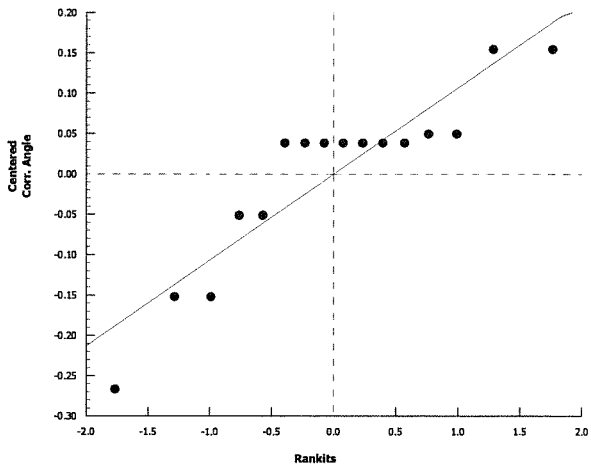
C-%	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Control Sed	8	0.975	0.916	1	1	0.8	1	0.025	7.25%	0.0%
Pond 22	8	0.55	0.45	0.65	0.55	0.4	0.7	0.0423	21.7%	43.6%

Angular (Corrected) Transformed Summary

C-%	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Control Sed	8	1.37	1.28	1.46	1.41	1.11	1.41	0.0381	7.85%	0.0%
Pond 22	8	0.837	0.735	0.939	0.836	0.685	0.991	0.0431	14.6%	39.1%

Graphics





10-Day Freshwater Sediment Toxicity Test Data

Client: **Lehigh Permanente** Project #: 21442 Organism Supplier/Log Number: ABS / 7537

Species: *Hyalella azteca* Test ID#: 53348 Organism Age/Size: 9 days

Control Water: SAM-S

Treatment =	Control				Pond 22				Sign-offs:
Day 0			New D.O. 7.6				New D.O. 6.3		Initiation Time: 1430
Date: 9/15/13			Meter ID RD05						WQ: FOUB
Temp. (°C) = 23.2	A 10	B 10	C 10	D 10	A 10	B 10	C 10	D 10	Initiation Counts: [illegible]
Feed: FOUB	E 10	F 10	G 10	H 10	E 10	F 10	G 10	H 10	Confirmation Counts: KB
Day 1	Old D.O. 7.6		New D.O. 7.0		Old D.O. 7.4		New D.O. 7.0		AM Change: CP
Date: 9/16/13	Meter ID RD05		Meter ID RD05						WQ: CP
Temp. (°C) = 23.4	A 0	B 0	C 0	D 0	A 0	B 0	C 0	D 0	PM Change: CP
Feed: CP	E 0	F 0	G 0	H 0	E 0	F 0	G 0	H 0	Mortality Counts: CP
Day 2	Old D.O. 5.3		New D.O. 6.7		Old D.O. 8.1		New D.O. 6.1		AM Change: GG
Date: 9/17/13	Meter ID RD06		Meter ID RD07						WQ: GG
Temp. (°C) = 23.4	A 0	B 0	C 0	D 0	A 0	B 0	C 0	D 0	PM Change: GG
Feed: GG	E 0	F 0	G 0	H 0	E 0	F 0	G 0	H 0	Mortality Counts: GG
Day 3	Old D.O. 8.0		New D.O. 7.6		Old D.O. 7.7		New D.O. 7.4		AM Change: CP
Date: 9/18/13	Meter ID RD07		Meter ID RD07						WQ: CP
Temp. (°C) = 23.3	A 0	B 0	C 0	D 0	A 0	B 0	C 0	D 0	PM Change: CG
Feed: KB	E 0	F 0	G 0	H 0	E 0	F 0	G 0	H 0	Mortality Counts: CP
Day 4	Old D.O. 7.3		New D.O. 7.7		Old D.O. 7.2		New D.O. 7.7		AM Change: CE
Date: 9/19/13	Meter ID RD05		Meter ID RD07						WQ: CE
Temp. (°C) = 23.3	A 0	B 0	C 0	D 0	A 0	B 0	C 0	D 0	PM Change: AF
Feed: AF	E 0	F 0	G 0	H 0	E 0	F 0	G 0	H 0	Mortality Counts: CE
Day 5	Old D.O. 8.1		New D.O. 8.5		Old D.O. 8.0		New D.O. 8.3		AM Change: DH
Date: 9/20/13	Meter ID RD06		Meter ID RD06						WQ: DH
Temp. (°C) = 23.4	A 0	B 0	C 0	D 0	A 0	B 0	C 0	D 0	PM Change: DH
Feed: DH	E 0	F 0	G 0	H 0	E 0	F 0	G 0	H 0	Mortality Counts: DH
Day 6	Old D.O. 7.8		New D.O. 8.0		Old D.O. 7.6		New D.O. 7.9		AM Change: AF
Date: 9/21/13	Meter ID RD07		Meter ID RD07						WQ: AF
Temp. (°C) = 23.3	A 0	B 0	C 0	D 0	A 0	B 0	C 0	D 0	PM Change: DH
Feed: DH	E 0	F 0	G 0	H 0	E 0	F 0	G 0	H 0	Mortality Counts: AF
Day 7	Old D.O. 7.5		New D.O. 7.6		Old D.O. 7.8		New D.O. 7.9		AM Change: CA
Date: 9/22/13	Meter ID RD07		Meter ID RD07						WQ: CA
Temp. (°C) = 23.6	A 0	B 0	C 0	D 0	A 0	B 0	C 0	D 0	PM Change: CA
Feed: CA	E 0	F 0	G 0	H 0	E 0	F 0	G 0	H 0	Mortality Counts: CA
Day 8	Old D.O. 8.4		New D.O. 8.6		Old D.O. 8.4		New D.O. 8.2		AM Change: CE
Date: 9/23/13	Meter ID RD07		Meter ID RD05						WQ: CE/GG
Temp. (°C) = 23.6	A 0	B 0	C 0	D 0	A 0	B 0	C 0	D 0	PM Change: GG
Feed: GG	E 0	F 0	G 0	H 0	E 0	F 0	G 0	H 0	Mortality Counts: CE
Day 9	Old D.O. 7.6		New D.O. 7.8		Old D.O. 7.5		New D.O. 7.5		AM Change: GG
Date: 9/24/13	Meter ID RD05		Meter ID RD05						WQ: GG
Temp. (°C) = 23.4	A 0	B 0	C 0	D 0	A 0	B 0	C 0	D 0	PM Change: NO
Feed: NO	E 0	F 0	G 0	H 0	E 0	F 0	G 0	H 0	Mortality Counts: GG
Day 10	Old D.O. 8.2				Old D.O. 7.6				Termination Counts: MK
Date: 9/25/13	Meter ID RD07								
Temp. (°C) = 23.8	# Alive/Replicate				# Alive/Replicate				WQ: NF
	A ~~0~~ 8	B 10	C 10	D ~~0~~ 9	A ~~0~~ 5	B ~~0~~ 5	C ~~0~~ 4	D 6	
	E 8	F 10	G 10	H 10	E ~~0~~ 7	F ~~0~~ 6	G ~~0~~ 7	H ~~0~~ 4	

Hyalella azteca Weight Data Sheets

Client: **Lehigh Permanente** Project #: 21442 Balance ID: BAL01

Sample ID: **Pond 22** Tare Wt Date: 9/24/13 Sign-Off: JLA

Test ID #: 53348 Final Wt Date: 9/26/13 Sign-Off: CA

Pan	Concentration Replicate		Initial Weight. (mg)	Final Weight. (mg)	# organisms	Ave Weight (mg)
1	Control	A	67.17	67.77	10	0.075
2	Sediment	B	61.96	63.02	10	0.106
3		C	60.50	61.02	10	0.052
4		D	62.37	62.98	10	0.068
5		E	65.23	66.19	8	0.120
6		F	67.61	68.54	10	0.093
7		G	62.63	63.52	10	0.089
8		H	67.37	68.28	10	0.091
25	100%	A	67.73	68.20	5	0.094
26		B	65.30	65.81	5	0.102
27		C	62.93	63.32	4	0.098
28		D	60.62	61.33	6	0.118
29		E	62.99	63.56	7	0.081
30		F	63.90	64.34	6	0.073
31		G	67.51	67.99	7	0.069
32		H	61.46	61.97	4	0.128
QA3			62.97	62.98		—

Freshwater Sediment Test Water Quality Characteristics

Client: Lehigh Permanente **Species:** *Hyallela azteca*

Test ID: 53346-53348 **Project #:** 21442

Initial Water Quality Characteristics for Overlying Water

Date: 9/15/13

Site	pH	D.O. (mg/L)	Conductivity (µS/cm)	Alkalinity	Hardness	Total Ammonia	
Control Sediment	7.93	7.6	501	62	137	<1.00	
Pond 13	7.57	~~6.5~~ FOUB 5.3	675	93	276	<1.00	53346
Pond 14	7.69	6.5	553	94	193	<1.00	53347
Pond 22	7.79	6.3	626	93	219	<1.00	53348
Meter ID	pH15	RD05	EC06	pH19	-	DR3800	
Sign-off	FOUB	FOUB	FOUB	CE	CA	FOUB	

Final Water Quality Characteristics for Overlying Water

Date: 9/25/13

Site	pH	D.O. (mg/L)	Conductivity (µS/cm)	Alkalinity	Hardness	Total Ammonia	
Control Sediment	8.10	8.2	461	59	136	<1.00	
Pond 13	8.03	7.5	553	104	135	1.42	
Pond 14	8.13	7.5	508	91	134	<1.00	
Pond 22	8.15	7.6	550	116	306	<1.00	
Meter ID	PH19	RD07	EC07	PH16	-	DR3000	
Sign-off	NZ	NZ	NZ	~~NB~~ FOUB	DH	NZ	

Appendix C

Test Data and Summary of Statistics for the Reference Toxicant Evaluation of the *Hyalella azteca*

CETIS Summary Report

Report Date: 21 Sep-13 08:22 (p 1 of 1)
Test Code: 53061 | 20-8032-4728

Hyalella 96-h Acute Survival Test — **Pacific EcoRisk**

Batch ID:	04-9942-9832	**Test Type:**	Survival (96h)	**Analyst:**	Cassy Glover
Start Date:	15 Sep-13 16:05	**Protocol:**	GCML	**Diluent:**	SAM-5S
Ending Date:	19 Sep-13 15:15	**Species:**	Hyalella azteca	**Brine:**	Not Applicable
Duration:	95h	**Source:**	Aquatic Biosystems, CO	**Age:**	9

Sample ID:	12-4989-1543	**Code:**	KCl	**Client:**	Reference Toxicant
Sample Date:	15 Sep-13 16:05	**Material:**	Potassium chloride	**Project:**	21469
Receive Date:	15 Sep-13 16:05	**Source:**	Reference Toxicant		
Sample Age:	NA (23.6 °C)	**Station:**	In House		

Comparison Summary

Analysis ID	Endpoint	NOEL	LOEL	TOEL	PMSD	TU	Method
09-4721-4062	96h Survival Rate	0.2	0.4	0.2828	NA		Fisher Exact/Bonferroni-Holm Test

Point Estimate Summary

Analysis ID	Endpoint	Level	g/L	95% LCL	95% UCL	TU	Method
11-2664-4219	96h Survival Rate	EC50	0.393	0.307	0.504		Trimmed Spearman-Kärber

96h Survival Rate Summary

C-g/L	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Lab Water Contr	10	1	1	1	1	1	0	0	0.0%	0.0%
0.1		10	0.9	0.782	1	0	1	0.1	0.316	35.1%	10.0%
0.2		10	1	1	1	1	1	0	0	0.0%	0.0%
0.4		10	0.5	0.303	0.697	0	1	0.167	0.527	105.0%	50.0%
0.8		10	0	0	0	0	0	0	0		100.0%
1.6		10	0	0	0	0	0	0	0		100.0%

96h Survival Rate Detail

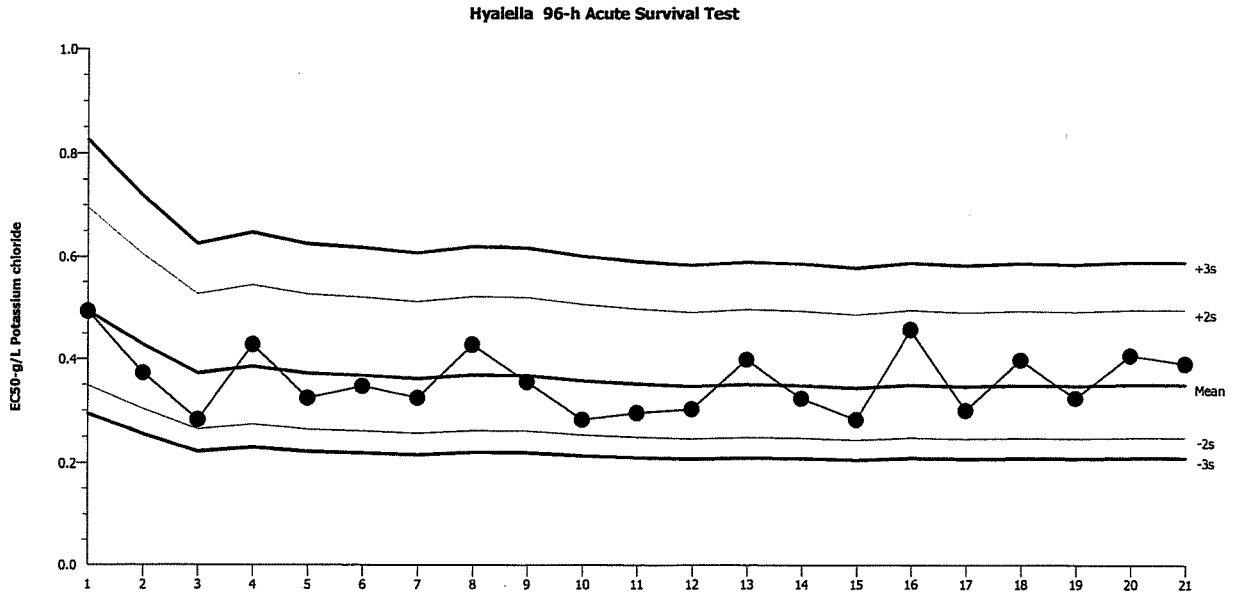
C-g/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Lab Water Contr	1	1	1	1	1	1	1	1	1	1
0.1		1	1	1	1	1	1	1	1	1	0
0.2		1	1	1	1	1	1	1	1	1	1
0.4		0	1	0	1	1	1	1	0	0	0
0.8		0	0	0	0	0	0	0	0	0	0
1.6		0	0	0	0	0	0	0	0	0	0

96h Survival Rate Binomials

C-g/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
0.1		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	0/1
0.2		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
0.4		0/1	1/1	0/1	1/1	1/1	1/1	1/1	0/1	0/1	0/1
0.8		0/1	0/1	0/1	0/1	0/1	0/1	0/1	0/1	0/1	0/1
1.6		0/1	0/1	0/1	0/1	0/1	0/1	0/1	0/1	0/1	0/1

Hyalella 96-h Acute Survival Test **Pacific EcoRisk**

Test Type:	Survival (96h)	**Organism:**	Hyalella azteca (Freshwater Amphip	**Material:**	Potassium chloride
Protocol:	GCML	**Endpoint:**	96h Survival Rate	**Source:**	Reference Toxicant-REF



Mean:	0.352	**Count:**	20	**-2s Warning Limit:**	0.2492	**-3s Action Limit:**	0.2097
Sigma:	NA	**CV:**	18.80%	**+2s Warning Limit:**	0.4971	**+3s Action Limit:**	0.5908

Quality Control Data

Point	Year	Month	Day	Time	QC Data	Delta	Sigma	Warning	Action	Test ID	Analysis ID
1	2013	Apr	5	18:27	0.4925	0.1404	1.945			07-8819-9429	08-6191-8448
2			8	15:15	0.3732	0.02117	0.3383			06-6151-9692	16-3428-1899
3			11	15:30	0.2828	-0.0692	-1.268			09-6859-9040	08-7203-4970
4			21	15:20	0.4287	0.07667	1.142			02-0863-0718	00-5467-2393
5		May	9	15:50	0.3249	-0.02714	-0.4649			17-1771-8081	20-9675-8612
6			13	14:45	0.3482	-0.00382	-0.06327			20-3770-9549	08-7265-8112
7			23	16:15	0.3249	-0.02714	-0.4649			01-9230-8051	15-7405-5053
8			24	16:15	0.4287	0.07667	1.142			13-9174-0419	09-1017-8817
9		Jun	6	17:20	0.3564	0.004316	0.0706			15-2402-8450	19-3750-7463
10			13	16:05	0.2828	-0.0692	-1.268			07-2645-7244	16-6778-6608
11			20	16:15	0.2957	-0.05637	-1.011			09-6035-9908	21-0551-7800
12			29	16:50	0.3031	-0.0489	-0.8665			12-3977-7162	19-6748-4890
13		Jul	10	16:50	0.4	0.04796	0.7399			17-8216-1608	11-9506-8268
14			11	16:20	0.324	-0.02806	-0.4812			17-0847-5190	02-0998-5068
15			25	16:30	0.2828	-0.0692	-1.268			00-1823-9671	20-7751-0916
16			26	14:30	0.4583	0.1063	1.529			11-2447-7250	10-1665-7756
17		Aug	15	16:50	0.3009	-0.05118	-0.9103			00-1985-9655	15-6499-7663
18			22	15:50	0.4	0.04796	0.7399			03-4648-2331	16-3196-9760
19			23	15:30	0.3249	-0.02714	-0.4649			15-2391-2292	08-1418-9228
20		Sep	12	16:00	0.4092	0.05713	0.8712			15-4907-0534	08-4072-9838
21			15	16:05	0.3931	0.04108	0.6395			20-8032-4728	11-2664-4219

96 Hour *Hyalella azteca* Reference Toxicant Test Data

Client: **Reference Toxicant**
Test Material: Potassium Chloride
Test ID#: 53061 Project # 21469
Test Date: 9/15/13 Randomization: 10.6.3
Feeding T0 Time: 0930 Initials: MF

Organism Log #: 7537 Age: 9 days
Organism Supplier: ABS
Control/Diluent: SAM-5
Control Water Batch: 20
Feeding T46 Time: 1055 Initials: Le

Treatment (g/L)	Temp (°C)	pH	D.O. (mg/L)	Conductivity (µS/cm)	# Live Animals A	B	C	D	E	F	G	H	I	J	Sign-Off
Control	23.6	7.78	8.6	414	1	1	1	1	1	1	1	1	1	1	Test Solution Prep: FA
0.1	23.6	7.88	8.8	617	1	1	1	1	1	1	1	1	1	1	New WQ: CP
0.2	23.6	7.90	8.9	810	1	1	1	1	1	1	1	1	1	1	Initiation Date: 9/15/13
0.4	23.6	7.89	9.1	1157	1	1	1	1	1	1	1	1	1	1	Initiation Time: 1605
0.8	23.6	7.86	9.5	1901	1	1	1	1	1	1	1	1	1	1	Initiation Signoff: KB
1.6	23.6	7.79	10.2	3290	1	1	1	1	1	1	1	1	1	1	RT Batch #: 13
Meter ID	43A	pH19	RD07	EC07											
Control	23.6				1	1	1	1	1	1	1	1	1	1	Count Date: 09/16/13
0.1	23.6				1	1	1	1	1	1	1	1	1	1	Count Time: 0913
0.2	23.6				1	1	1	1	1	1	1	1	1	1	Count Signoff: LE
0.4	23.6				1	1	0	1	1	1	1	1	0	1	
0.8	23.6				0	0	0	0	0	0	0	0	0	0	
1.6	23.6				0	0	0	0	0	0	0	0	0	0	
Meter ID	43A														
Control	23.5				1	1	1	1	1	1	1	1	1	1	Count Date: 9/17/13
0.1	23.5				1	1	1	1	1	1	1	1	1	0	Count Time: 1045
0.2	23.5				1	1	1	1	1	1	1	1	1	1	Count Signoff: Le
0.4	23.5				0	1	–	1	1	1	1	1	–	1	
0.8	–				–	–	–	–	–	–	–	–	–	–	
1.6	–				–	–	–	–	–	–	–	–	–	–	
Meter ID	43A														
Control	23.3				1	1	1	1	1	1	1	1	1	1	Count Date: 9/18/13
0.1	23.3				1	1	1	1	1	1	1	1	1	–	Count Time: 0930
0.2	23.3				1	1	1	1	1	1	1	1	1	1	Count Signoff: LE
0.4	23.3				–	1	–	1	1	1	1	0	–	0	
0.8	23.3				–	–	–	–	–	–	–	–	–	–	
1.6	23.3				–	–	–	–	–	–	–	–	–	–	
Meter ID	43A														
Control	23.3	7.60	7.7	482	1	1	1	1	1	1	1	1	1	1	Termination Date: 9/19/13
0.1	23.3	7.62	5.6	702	1	1	1	1	1	1	1	1	1	–	Termination Time: 1515
0.2	23.3	7.69	6.2	~~7.72~~	1	1	1	1	1	1	1	1	1	1	Termination Signoff: SVV
0.4	23.3	7.70	6.3	1234	–	1	–	1	1	1	1	–	–	–	Old WQ: MM
0.8	23.3	7.71	6.8	2060	–	–	–	–	–	–	–	–	–	–	
1.6	23.3	7.72	6.4	3460	–	–	–	–	–	–	–	–	–	–	
Meter ID	43A	pH15	RD06	EC04											