aquatic bioassay & consulting laboratories, inc

October 21, 2013

Mr. Ray Hiemstra
Orange County Coastkeeper
3151 Airway Ave. Suite F-110
Costa Mesa, CA 92626

Dear Mr. Hiemstra:

We are pleased to present the enclosed bioassay report. The test was conducted under guidelines prescribed in *Methods for Assessing the Toxicity of Sediment-associated Contaminants with Estuarine and Marine Amphipods*, EPA/600/R-94/025. Results were as follows:

CLIENT:	Orange County Coastkeeper
SAMPLE I.D.:	HM1
DATE RECEIVED:	8/22/2013
ABC LAB. NO.:	OCC0813.263

Eohaustorius estuarius 10 Day Survival Sediment Bioassay

Percent Survival = 96.00% Survival

Yours very truly,

R. Scott Johnson
Laboratory Director

CETIS Summary Report

Report Date: 21 Oct-13 11:18 (p 1 of 1)
Test Code: OCC0813.263eoh | 07-5777-1000

Eohaustorius 10-d Survival and Reburial Sediment Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Batch ID:	00-5519-5087	**Test Type:**	Survival-Reburial	**Analyst:**	
Start Date:	03 Sep-13 11:10	**Protocol:**	EPA/600/R-94/025 (1994)	**Diluent:**	Laboratory Seawater
Ending Date:	13 Sep-13 12:00	**Species:**	Eohaustorius estuarius	**Brine:**	Not Applicable
Duration:	10d 1h	**Source:**	Northwestern Aquatic Science, OR	**Age:**	

Sample ID:	07-1186-1923	**Code:**	OCC0813.263e	**Client:**	Orange County CoastKeeper
Sample Date:	21 Aug-13 13:10	**Material:**	Sediment	**Project:**	Newport Bay Sediment
Receive Date:	21 Aug-13 18:00	**Source:**	Bioassay Report		
Sample Age:	12d 22h	**Station:**	HM1		

Comparison Summary

Analysis ID	Endpoint	NOEL	LOEL	TOEL	PMSD	TU	Method
18-9265-0426	Survival Rate	100	>100	NA	6.89%	1	Equal Variance t Two-Sample Test

Point Estimate Summary

Analysis ID	Endpoint	Level	%	95% LCL	95% UCL	TU	Method
12-3350-2379	Survival Rate	EC5	>100	N/A	N/A	<1	Linear Interpolation (ICPIN)
		EC10	>100	N/A	N/A	<1	
		EC15	>100	N/A	N/A	<1	
		EC20	>100	N/A	N/A	<1	
		EC25	>100	N/A	N/A	<1	
		EC40	>100	N/A	N/A	<1	
		EC50	>100	N/A	N/A	<1	

Test Acceptability

Analysis ID	Endpoint	Attribute	Test Stat	TAC Limits	Overlap	Decision
12-3350-2379	Survival Rate	Control Resp	0.94	0.9 - NL	Yes	Passes Acceptability Criteria
18-9265-0426	Survival Rate	Control Resp	0.94	0.9 - NL	Yes	Passes Acceptability Criteria

Survival Rate Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Contro	5	0.94	0.8881	0.9919	0.9	1	0.01871	0.04183	4.45%	0.0%
100		5	0.96	0.892	1	0.9	1	0.02449	0.05477	5.71%	-2.13%

Survival Rate Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Negative Contro	0.9	1	0.95	0.95	0.9
100		1	0.9	0.9	1	1

Survival Rate Binomials

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Negative Contro	18/20	20/20	19/20	19/20	18/20
100		20/20	18/20	18/20	20/20	20/20

CETIS Analytical Report

Report Date: 21 Oct-13 11:17 (p 1 of 2)
Test Code: OCC0813.263eoh | 07-5777-1000

Eohaustorius 10-d Survival and Reburial Sediment Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Analysis ID:	18-9265-0426	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	21 Oct-13 11:15	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	00-5519-5087	**Test Type:**	Survival-Reburial	**Analyst:**	
Start Date:	03 Sep-13 11:10	**Protocol:**	EPA/600/R-94/025 (1994)	**Diluent:**	Laboratory Seawater
Ending Date:	13 Sep-13 12:00	**Species:**	Eohaustorius estuarius	**Brine:**	Not Applicable
Duration:	10d 1h	**Source:**	Northwestern Aquatic Science, OR	**Age:**	

Sample ID:	07-1186-1923	**Code:**	OCC0813.263e	**Client:**	Orange County CoastKeeper
Sample Date:	21 Aug-13 13:10	**Material:**	Sediment	**Project:**	Newport Bay Sediment
Receive Date:	21 Aug-13 18:00	**Source:**	Bioassay Report		
Sample Age:	12d 22h	**Station:**	HM1		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Angular (Corrected)	NA	C > T	NA	NA	6.89%	Passes survival rate

Equal Variance t Two-Sample Test

Control	vs	C-%	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Negative Control		100	-0.7049	1.86	0.12	8	0.7496	CDF	Non-Significant Effect

Test Acceptability Criteria

Attribute	Test Stat	TAC Limits	Overlap	Decision
Control Resp	0.94	0.9 - NL	Yes	Passes Acceptability Criteria

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0051507	0.0051507	1	0.4969	0.5009	Non-Significant Effect
Error	0.08292718	0.0103659	8			
Total	0.08807788		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	1.75	23.15	0.6009	Equal Variances
Variances	Mod Levene Equality of Variance	0.1858	13.75	0.6815	Equal Variances
Variances	Levene Equality of Variance	2.282	11.26	0.1694	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.8839	0.7411	0.1448	Normal Distribution
Distribution	Kolmogorov-Smirnov D	0.2089	0.3025	0.2672	Normal Distribution
Distribution	D'Agostino Skewness	0.2572	2.576	0.7970	Normal Distribution
Distribution	Anderson-Darling A2 Normality	0.5951	3.878	0.1239	Normal Distribution

Survival Rate Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Negative Control	5	0.94	0.8881	0.9919	0.95	0.9	1	0.01871	4.45%	0.0%
100		5	0.96	0.892	1	1	0.9	1	0.02449	5.71%	-2.13%

Angular (Corrected) Transformed Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Negative Contr	5	1.329	1.222	1.437	1.345	1.249	1.459	0.03883	6.53%	0.0%
100		5	1.375	1.232	1.517	1.459	1.249	1.459	0.05137	8.36%	-3.41%

Survival Rate Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Negative Control	0.9	1	0.95	0.95	0.9
100		1	0.9	0.9	1	1

Angular (Corrected) Transformed Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Negative Control	1.249	1.459	1.345	1.345	1.249
100		1.459	1.249	1.249	1.459	1.459

Eohaustorius 10-d Survival and Reburial Sediment Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Analysis ID:	18-9265-0426	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	21 Oct-13 11:15	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Survival Rate Binomials

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Negative Contro	18/20	20/20	19/20	19/20	18/20
100		20/20	18/20	18/20	20/20	20/20

CETIS Analytical Report

Eohaustorius 10-d Survival and Reburial Sediment Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Analysis ID:	12-3350-2379	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	21 Oct-13 11:15	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Batch ID:	00-5519-5087	**Test Type:**	Survival-Reburial	**Analyst:**	
Start Date:	03 Sep-13 11:10	**Protocol:**	EPA/600/R-94/025 (1994)	**Diluent:**	Laboratory Seawater
Ending Date:	13 Sep-13 12:00	**Species:**	Eohaustorius estuarius	**Brine:**	Not Applicable
Duration:	10d 1h	**Source:**	Northwestern Aquatic Science, OR	**Age:**	

Sample ID:	07-1186-1923	**Code:**	OCC0813.263e	**Client:**	Orange County CoastKeeper
Sample Date:	21 Aug-13 13:10	**Material:**	Sediment	**Project:**	Newport Bay Sediment
Receive Date:	21 Aug-13 18:00	**Source:**	Bioassay Report		
Sample Age:	12d 22h	**Station:**	HM1		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Linear	Linear	0	280	Yes	Two-Point Interpolation

Test Acceptability Criteria

Attribute	Test Stat	TAC Limits	Overlap	Decision
Control Resp	0.94	0.9 - NL	Yes	Passes Acceptability Criteria

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC5	>100	N/A	N/A	<1	NA	NA
EC10	>100	N/A	N/A	<1	NA	NA
EC15	>100	N/A	N/A	<1	NA	NA
EC20	>100	N/A	N/A	<1	NA	NA
EC25	>100	N/A	N/A	<1	NA	NA
EC40	>100	N/A	N/A	<1	NA	NA
EC50	>100	N/A	N/A	<1	NA	NA

Survival Rate Summary

			Calculated Variate(A/B)								
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	A	B
0	Negative Control	5	0.94	0.9	1	0.01871	0.04183	4.45%	0.0%	94	100
100		5	0.96	0.9	1	0.02449	0.05477	5.71%	-2.13%	96	100

Survival Rate Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Negative Control	0.9	1	0.95	0.95	0.9
100		1	0.9	0.9	1	1

Survival Rate Binomials

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Negative Contro	18/20	20/20	19/20	19/20	18/20
100		20/20	18/20	18/20	20/20	20/20

Analysis ID:	12-3350-2379	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	21 Oct-13 11:15	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

CETIS Measurement Report

Eohaustorius 10-d Survival and Reburial Sediment Test — Aquatic Bioassay & Consulting Labs, Inc.

Batch ID:	00-5519-5087	**Test Type:**	Survival-Reburial	**Analyst:**	
Start Date:	03 Sep-13 11:10	**Protocol:**	EPA/600/R-94/025 (1994)	**Diluent:**	Laboratory Seawater
Ending Date:	13 Sep-13 12:00	**Species:**	Eohaustorius estuarius	**Brine:**	Not Applicable
Duration:	10d 1h	**Source:**	Northwestern Aquatic Science, OR	**Age:**	

Sample ID:	07-1186-1923	**Code:**	OCC0813.263e	**Client:**	Orange County CoastKeeper
Sample Date:	21 Aug-13 13:10	**Material:**	Sediment	**Project:**	Newport Bay Sediment
Receive Date:	21 Aug-13 18:00	**Source:**	Bioassay Report		
Sample Age:	12d 22h	**Station:**	HM1		

Dissolved Oxygen-mg/L

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	Negative Contr	2	10.05	9.415	10.69	10	10.1	0.05001	0.07073	0.7%	0
100		2	10.15	9.515	10.79	10.1	10.2	0.05	0.0707	0.7%	0
Overall		4	10.1			10	10.2				0 (0%)

Total Ammonia (N)-mg/L

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	Negative Contr	1	0			0	0	0	0		0
100		1	0			0	0	0	0		0
Overall		2	0			0	0				0 (0%)

pH-Units

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	Negative Contr	2	7.8	7.787	7.813	7.8	7.8	0	0	0.0%	0
100		2	7.9	7.884	7.916	7.9	7.9	0	0	0.0%	0
Overall		4	7.85			7.8	7.9				0 (0%)

Salinity-ppt

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	Negative Contr	2	20	20	20	20	20	0	0	0.0%	0
100		2	20	20	20	20	20	0	0	0.0%	0
Overall		4	20			20	20				0 (0%)

Temperature-°C

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	Negative Contr	2	14.85	14.21	15.49	14.8	14.9	0.05004	0.07077	0.48%	0
100		2	14.8	14.78	14.82	14.8	14.8	0	0	0.0%	0
Overall		4	14.83			14.8	14.9				0 (0%)

Eohaustorius 10-d Survival and Reburial Sediment Test — Aquatic Bioassay & Consulting Labs, Inc.

Dissolved Oxygen-mg/L

C-%	Control Type	1	2
0	Negative Contr	10.1	10
100		10.1	10.2

Total Ammonia (N)-mg/L

C-%	Control Type	1
0	Negative Contr	0
100		0

pH-Units

C-%	Control Type	1	2
0	Negative Contr	7.8	7.8
100		7.9	7.9

Salinity-ppt

C-%	Control Type	1	2
0	Negative Contr	20	20
100		20	20

Temperature-°C

C-%	Control Type	1	2
0	Negative Contr	14.8	14.9
100		14.8	14.8

aquatic bioassay & consulting laboratories, inc

October 21, 2013

Mr. Ray Hiemstra
Orange County Coastkeeper
3151 Airway Ave. Suite F-110
Costa Mesa, CA 92626

Dear Mr. Hiemstra:

We are pleased to present the enclosed bioassay report. The test was conducted under guidelines prescribed in *Methods for Assessing the Toxicity of Sediment-associated Contaminants with Estuarine and Marine Amphipods*, EPA/600/R-94/025. Results were as follows:

CLIENT:	Orange County Coastkeeper
SAMPLE I.D.:	LV1
DATE RECEIVED:	8/22/2013
ABC LAB. NO.:	OCC0813.264

***Eohaustorius estuarius* 10 Day Survival Sediment Bioassay**

Percent Survival = 97.00% Survival

Yours very truly,

Scott Johnson
Laboratory Director

29 north olive ventura, ca 93001 (805) 643 5621 www.aquabio.org

CETIS Summary Report

Report Date:	21 Oct-13 11:17 (p 1 of 1)
Test Code:	OCC0813.264eoh | 10-0216-9438

Eohaustorius 10-d Survival and Reburial Sediment Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Batch ID:	18-9133-9478	**Test Type:**	Survival-Reburial	**Analyst:**	
Start Date:	03 Sep-13 11:11	**Protocol:**	EPA/600/R-94/025 (1994)	**Diluent:**	Laboratory Seawater
Ending Date:	13 Sep-13 12:00	**Species:**	Eohaustorius estuarius	**Brine:**	Not Applicable
Duration:	10d 1h	**Source:**	Northwestern Aquatic Science, OR	**Age:**	

Sample ID:	05-8727-3905	**Code:**	OCC0813.264e	**Client:**	Orange County CoastKeeper
Sample Date:	21 Aug-13 13:20	**Material:**	Sediment	**Project:**	Newport Bay Sediment
Receive Date:	21 Aug-13 18:00	**Source:**	Bioassay Report		
Sample Age:	12d 22h	**Station:**	LV1		

Comparison Summary

Analysis ID	Endpoint	NOEL	LOEL	TOEL	PMSD	TU	Method
05-3240-4384	Survival Rate	100	>100	NA	6.0%	1	Equal Variance t Two-Sample Test

Point Estimate Summary

Analysis ID	Endpoint	Level	%	95% LCL	95% UCL	TU	Method
00-6629-5480	Survival Rate	EC5	>100	N/A	N/A	<1	Linear Interpolation (ICPIN)
		EC10	>100	N/A	N/A	<1	
		EC15	>100	N/A	N/A	<1	
		EC20	>100	N/A	N/A	<1	
		EC25	>100	N/A	N/A	<1	
		EC40	>100	N/A	N/A	<1	
		EC50	>100	N/A	N/A	<1	

Test Acceptability

Analysis ID	Endpoint	Attribute	Test Stat	TAC Limits	Overlap	Decision
00-6629-5480	Survival Rate	Control Resp	0.94	0.9 - NL	Yes	Passes Acceptability Criteria
05-3240-4384	Survival Rate	Control Resp	0.94	0.9 - NL	Yes	Passes Acceptability Criteria

Survival Rate Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Contro	5	0.94	0.8881	0.9919	0.9	1	0.01871	0.04183	4.45%	0.0%
100		5	0.97	0.9145	1	0.9	1	0.02	0.04472	4.61%	-3.19%

Survival Rate Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Negative Contro	0.9	1	0.95	0.95	0.9
100		0.95	1	1	1	0.9

Survival Rate Binomials

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Negative Contro	18/20	20/20	19/20	19/20	18/20
100		19/20	20/20	20/20	20/20	18/20

CETIS Analytical Report

Report Date: 21 Oct-13 11:17 (p 1 of 2)
Test Code: OCC0813.264eoh | 10-0216-9438

Eohaustorius 10-d Survival and Reburial Sediment Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Analysis ID:	05-3240-4384	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	21 Oct-13 11:15	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	18-9133-9478	**Test Type:**	Survival-Reburial	**Analyst:**	
Start Date:	03 Sep-13 11:11	**Protocol:**	EPA/600/R-94/025 (1994)	**Diluent:**	Laboratory Seawater
Ending Date:	13 Sep-13 12:00	**Species:**	Eohaustorius estuarius	**Brine:**	Not Applicable
Duration:	10d 1h	**Source:**	Northwestern Aquatic Science, OR	**Age:**	

Sample ID:	05-8727-3905	**Code:**	OCC0813.264e	**Client:**	Orange County CoastKeeper
Sample Date:	21 Aug-13 13:20	**Material:**	Sediment	**Project:**	Newport Bay Sediment
Receive Date:	21 Aug-13 18:00	**Source:**	Bioassay Report		
Sample Age:	12d 22h	**Station:**	LV1		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Angular (Corrected)	NA	C > T	NA	NA	6.0%	Passes survival rate

Equal Variance t Two-Sample Test

Control	vs	C-%	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Negative Control		100	-1.124	1.86	0.107	8	0.8532	CDF	Non-Significant Effect

Test Acceptability Criteria

Attribute	Test Stat	TAC Limits	Overlap	Decision
Control Resp	0.94	0.9 - NL	Yes	Passes Acceptability Criteria

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.01044509	0.01044509	1	1.264	0.2935	Non-Significant Effect
Error	0.06611785	0.008264731	8			
Total	0.07656294		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	1.193	23.15	0.8684	Equal Variances
Variances	Mod Levene Equality of Variance	0.005753	13.75	0.9420	Equal Variances
Variances	Levene Equality of Variance	0.2278	11.26	0.6459	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9465	0.7411	0.6268	Normal Distribution
Distribution	Kolmogorov-Smirnov D	0.1746	0.3025	0.6015	Normal Distribution
Distribution	D'Agostino Skewness	0.4094	2.576	0.6822	Normal Distribution
Distribution	Anderson-Darling A2 Normality	0.3735	3.878	0.4221	Normal Distribution

Survival Rate Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Negative Control	5	0.94	0.8881	0.9919	0.95	0.9	1	0.01871	4.45%	0.0%
100		5	0.97	0.9145	1	1	0.9	1	0.02	4.61%	-3.19%

Angular (Corrected) Transformed Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Negative Contr	5	1.329	1.222	1.437	1.345	1.249	1.459	0.03883	6.53%	0.0%
100		5	1.394	1.276	1.512	1.459	1.249	1.459	0.04241	6.8%	-4.86%

Survival Rate Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Negative Control	0.9	1	0.95	0.95	0.9
100		0.95	1	1	1	0.9

Angular (Corrected) Transformed Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Negative Control	1.249	1.459	1.345	1.345	1.249
100		1.345	1.459	1.459	1.459	1.249

Eohaustorius 10-d Survival and Reburial Sediment Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Analysis ID:	05-3240-4384	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	21 Oct-13 11:15	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Survival Rate Binomials

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Negative Contro	18/20	20/20	19/20	19/20	18/20
100		19/20	20/20	20/20	20/20	18/20

CETIS Analytical Report

Test Code: OCC0813.264eoh | 10-0216-9438

Eohaustorius 10-d Survival and Reburial Sediment Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Analysis ID:	00-6629-5480	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	21 Oct-13 11:15	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Batch ID:	18-9133-9478	**Test Type:**	Survival-Reburial	**Analyst:**	
Start Date:	03 Sep-13 11:11	**Protocol:**	EPA/600/R-94/025 (1994)	**Diluent:**	Laboratory Seawater
Ending Date:	13 Sep-13 12:00	**Species:**	Eohaustorius estuarius	**Brine:**	Not Applicable
Duration:	10d 1h	**Source:**	Northwestern Aquatic Science, OR	**Age:**	

Sample ID:	05-8727-3905	**Code:**	OCC0813.264e	**Client:**	Orange County CoastKeeper
Sample Date:	21 Aug-13 13:20	**Material:**	Sediment	**Project:**	Newport Bay Sediment
Receive Date:	21 Aug-13 18:00	**Source:**	Bioassay Report		
Sample Age:	12d 22h	**Station:**	LV1		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Linear	Linear	0	280	Yes	Two-Point Interpolation

Test Acceptability Criteria

Attribute	Test Stat	TAC Limits	Overlap	Decision
Control Resp	0.94	0.9 - NL	Yes	Passes Acceptability Criteria

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC5	>100	N/A	N/A	<1	NA	NA
EC10	>100	N/A	N/A	<1	NA	NA
EC15	>100	N/A	N/A	<1	NA	NA
EC20	>100	N/A	N/A	<1	NA	NA
EC25	>100	N/A	N/A	<1	NA	NA
EC40	>100	N/A	N/A	<1	NA	NA
EC50	>100	N/A	N/A	<1	NA	NA

Survival Rate Summary

			Calculated Variate(A/B)								
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	A	B
0	Negative Control	5	0.94	0.9	1	0.01871	0.04183	4.45%	0.0%	94	100
100		5	0.97	0.9	1	0.02	0.04472	4.61%	-3.19%	97	100

Survival Rate Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Negative Control	0.9	1	0.95	0.95	0.9
100		0.95	1	1	1	0.9

Survival Rate Binomials

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Negative Contro	18/20	20/20	19/20	19/20	18/20
100		19/20	20/20	20/20	20/20	18/20

Eohaustorius 10-d Survival and Reburial Sediment Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Analysis ID:	00-6629-5480	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	21 Oct-13 11:15	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

CETIS Measurement Report

Eohaustorius 10-d Survival and Reburial Sediment Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Batch ID:	18-9133-9478	**Test Type:**	Survival-Reburial	**Analyst:**	
Start Date:	03 Sep-13 11:11	**Protocol:**	EPA/600/R-94/025 (1994)	**Diluent:**	Laboratory Seawater
Ending Date:	13 Sep-13 12:00	**Species:**	Eohaustorius estuarius	**Brine:**	Not Applicable
Duration:	10d 1h	**Source:**	Northwestern Aquatic Science, OR	**Age:**	

Sample ID:	05-8727-3905	**Code:**	OCC0813.264e	**Client:**	Orange County CoastKeeper
Sample Date:	21 Aug-13 13:20	**Material:**	Sediment	**Project:**	Newport Bay Sediment
Receive Date:	21 Aug-13 18:00	**Source:**	Bioassay Report		
Sample Age:	12d 22h	**Station:**	LV1		

Dissolved Oxygen-mg/L

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	Negative Contr	2	10.05	9.415	10.69	10	10.1	0.05001	0.07073	0.7%	0
100		2	10.15	9.515	10.79	10.1	10.2	0.05	0.0707	0.7%	0
Overall		4	10.1			10	10.2				0 (0%)

Total Ammonia (N)-mg/L

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	Negative Contr	1	0			0	0	0	0		0
100		1	0			0	0	0	0		0
Overall		2	0			0	0				0 (0%)

pH-Units

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	Negative Contr	2	7.9	7.884	7.916	7.9	7.9	0	0	0.0%	0
100		2	7.9	7.884	7.916	7.9	7.9	0	0	0.0%	0
Overall		4	7.9			7.9	7.9				0 (0%)

Salinity-ppt

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	Negative Contr	2	20	20	20	20	20	0	0	0.0%	0
100		2	20	20	20	20	20	0	0	0.0%	0
Overall		4	20			20	20				0 (0%)

Temperature-°C

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	Negative Contr	2	14.9	14.87	14.93	14.9	14.9	0	0	0.0%	0
100		2	14.85	14.21	15.49	14.8	14.9	0.05004	0.07077	0.48%	0
Overall		4	14.88			14.8	14.9				0 (0%)

Eohaustorius 10-d Survival and Reburial Sediment Test — Aquatic Bioassay & Consulting Labs, Inc.

Dissolved Oxygen-mg/L

C-%	Control Type	1	2
0	Negative Contr	10.1	10
100		10.2	10.1

Total Ammonia (N)-mg/L

C-%	Control Type	1
0	Negative Contr	0
100		0

pH-Units

C-%	Control Type	1	2
0	Negative Contr	7.9	7.9
100		7.9	7.9

Salinity-ppt

C-%	Control Type	1	2
0	Negative Contr	20	20
100		20	20

Temperature-°C

C-%	Control Type	1	2
0	Negative Contr	14.9	14.9
100		14.8	14.9

aquatic bioassay & consulting laboratories, inc

October 21, 2013

Mr. Ray Hiemstra
Orange County Coastkeeper
3151 Airway Ave. Suite F-110
Costa Mesa, CA 92626

Dear Mr. Hiemstra:

We are pleased to present the enclosed bioassay report. The test was conducted under guidelines prescribed in *Methods for Assessing the Toxicity of Sediment-associated Contaminants with Estuarine and Marine Amphipods*, EPA/600/R-94/025. Results were as follows:

CLIENT:	Orange County Coastkeeper
SAMPLE I.D.:	LYA1
DATE RECEIVED:	8/22/2013
ABC LAB. NO.:	OCC0813.265

***Eohaustorius estuarius* 10 Day Survival Sediment Bioassay**

Percent Survival = 95.00% Survival

Yours very truly,

Scott Johnson
Laboratory Director

29 north olive ventura, ca 93001 (805) 643 5621 www.aquabio.org

CETIS Summary Report

Report Date: 21 Oct-13 11:17 (p 1 of 1)
Test Code: OCC0813.265eoh | 20-0453-9129

Eohaustorius 10-d Survival and Reburial Sediment Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Batch ID:	03-6133-0885	**Test Type:**	Survival-Reburial	**Analyst:**	
Start Date:	03 Sep-13 11:12	**Protocol:**	EPA/600/R-94/025 (1994)	**Diluent:**	Laboratory Seawater
Ending Date:	13 Sep-13 12:00	**Species:**	Eohaustorius estuarius	**Brine:**	Not Applicable
Duration:	10d 1h	**Source:**	Northwestern Aquatic Science, OR	**Age:**	

Sample ID:	20-0446-7790	**Code:**	OCC0813.265e	**Client:**	Orange County CoastKeeper
Sample Date:	21 Aug-13 14:20	**Material:**	Sediment	**Project:**	Newport Bay Sediment
Receive Date:	21 Aug-13 18:00	**Source:**	Bioassay Report		
Sample Age:	12d 21h	**Station:**	LYA1		

Comparison Summary

Analysis ID	Endpoint	NOEL	LOEL	TOEL	PMSD	TU	Method
09-1648-6400	Survival Rate	100	>100	NA	6.44%	1	Equal Variance t Two-Sample Test

Point Estimate Summary

Analysis ID	Endpoint	Level	%	95% LCL	95% UCL	TU	Method
05-9009-6540	Survival Rate	EC5	>100	N/A	N/A	<1	Linear Interpolation (ICPIN)
		EC10	>100	N/A	N/A	<1	
		EC15	>100	N/A	N/A	<1	
		EC20	>100	N/A	N/A	<1	
		EC25	>100	N/A	N/A	<1	
		EC40	>100	N/A	N/A	<1	
		EC50	>100	N/A	N/A	<1	

Test Acceptability

Analysis ID	Endpoint	Attribute	Test Stat	TAC Limits	Overlap	Decision
05-9009-6540	Survival Rate	Control Resp	0.94	0.9 - NL	Yes	Passes Acceptability Criteria
09-1648-6400	Survival Rate	Control Resp	0.94	0.9 - NL	Yes	Passes Acceptability Criteria

Survival Rate Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Contro	5	0.94	0.8881	0.9919	0.9	1	0.01871	0.04183	4.45%	0.0%
100		5	0.95	0.8879	1	0.9	1	0.02236	0.05	5.26%	-1.06%

Survival Rate Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Negative Contro	0.9	1	0.95	0.95	0.9
100		1	0.9	0.9	0.95	1

Survival Rate Binomials

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Negative Contro	18/20	20/20	19/20	19/20	18/20
100		20/20	18/20	18/20	19/20	20/20

CETIS Analytical Report

Report Date: 21 Oct-13 11:17 (p 1 of 2)
Test Code: OCC0813.265eoh | 20-0453-9129

Eohaustorius 10-d Survival and Reburial Sediment Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Analysis ID:	09-1648-6400	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	21 Oct-13 11:15	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	03-6133-0885	**Test Type:**	Survival-Reburial	**Analyst:**	
Start Date:	03 Sep-13 11:12	**Protocol:**	EPA/600/R-94/025 (1994)	**Diluent:**	Laboratory Seawater
Ending Date:	13 Sep-13 12:00	**Species:**	Eohaustorius estuarius	**Brine:**	Not Applicable
Duration:	10d 1h	**Source:**	Northwestern Aquatic Science, OR	**Age:**	

Sample ID:	20-0446-7790	**Code:**	OCC0813.265e	**Client:**	Orange County CoastKeeper
Sample Date:	21 Aug-13 14:20	**Material:**	Sediment	**Project:**	Newport Bay Sediment
Receive Date:	21 Aug-13 18:00	**Source:**	Bioassay Report		
Sample Age:	12d 21h	**Station:**	LYA1		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Angular (Corrected)	NA	C > T	NA	NA	6.44%	Passes survival rate

Equal Variance t Two-Sample Test

Control	vs	C-%	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Negative Control		100	-0.3726	1.86	0.113	8	0.6404	CDF	Non-Significant Effect

Test Acceptability Criteria

Attribute	Test Stat	TAC Limits	Overlap	Decision
Control Resp	0.94	0.9 - NL	Yes	Passes Acceptability Criteria

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.001287675	0.001287675	1	0.1389	0.7191	Non-Significant Effect
Error	0.07419071	0.009273839	8			
Total	0.07547839		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	1.461	23.15	0.7225	Equal Variances
Variances	Mod Levene Equality of Variance	1.164	13.75	0.3221	Equal Variances
Variances	Levene Equality of Variance	0.5105	11.26	0.4952	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.8774	0.7411	0.1219	Normal Distribution
Distribution	Kolmogorov-Smirnov D	0.2122	0.3025	0.2446	Normal Distribution
Distribution	D'Agostino Skewness	0.3788	2.576	0.7049	Normal Distribution
Distribution	Anderson-Darling A2 Normality	0.5701	3.878	0.1430	Normal Distribution

Survival Rate Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Negative Control	5	0.94	0.8881	0.9919	0.95	0.9	1	0.01871	4.45%	0.0%
100		5	0.95	0.8879	1	0.95	0.9	1	0.02236	5.26%	-1.06%

Angular (Corrected) Transformed Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Negative Contr	5	1.329	1.222	1.437	1.345	1.249	1.459	0.03883	6.53%	0.0%
100		5	1.352	1.222	1.482	1.345	1.249	1.459	0.04692	7.76%	-1.71%

Survival Rate Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Negative Control	0.9	1	0.95	0.95	0.9
100		1	0.9	0.9	0.95	1

Angular (Corrected) Transformed Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Negative Control	1.249	1.459	1.345	1.345	1.249
100		1.459	1.249	1.249	1.345	1.459

Eohaustorius 10-d Survival and Reburial Sediment Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Analysis ID:	09-1648-6400	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	21 Oct-13 11:15	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Survival Rate Binomials

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Negative Contro	18/20	20/20	19/20	19/20	18/20
100		20/20	18/20	18/20	19/20	20/20

CETIS Analytical Report

Eohaustorius 10-d Survival and Reburial Sediment Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Analysis ID:	05-9009-6540	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	21 Oct-13 11:15	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Batch ID:	03-6133-0885	**Test Type:**	Survival-Reburial	**Analyst:**	
Start Date:	03 Sep-13 11:12	**Protocol:**	EPA/600/R-94/025 (1994)	**Diluent:**	Laboratory Seawater
Ending Date:	13 Sep-13 12:00	**Species:**	Eohaustorius estuarius	**Brine:**	Not Applicable
Duration:	10d 1h	**Source:**	Northwestern Aquatic Science, OR	**Age:**	

Sample ID:	20-0446-7790	**Code:**	OCC0813.265e	**Client:**	Orange County CoastKeeper
Sample Date:	21 Aug-13 14:20	**Material:**	Sediment	**Project:**	Newport Bay Sediment
Receive Date:	21 Aug-13 18:00	**Source:**	Bioassay Report		
Sample Age:	12d 21h	**Station:**	LYA1		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Linear	Linear	0	280	Yes	Two-Point Interpolation

Test Acceptability Criteria

Attribute	Test Stat	TAC Limits	Overlap	Decision
Control Resp	0.94	0.9 - NL	Yes	Passes Acceptability Criteria

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC5	>100	N/A	N/A	<1	NA	NA
EC10	>100	N/A	N/A	<1	NA	NA
EC15	>100	N/A	N/A	<1	NA	NA
EC20	>100	N/A	N/A	<1	NA	NA
EC25	>100	N/A	N/A	<1	NA	NA
EC40	>100	N/A	N/A	<1	NA	NA
EC50	>100	N/A	N/A	<1	NA	NA

Survival Rate Summary

			Calculated Variate(A/B)								
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	A	B
0	Negative Control	5	0.94	0.9	1	0.01871	0.04183	4.45%	0.0%	94	100
100		5	0.95	0.9	1	0.02236	0.05	5.26%	-1.06%	95	100

Survival Rate Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Negative Control	0.9	1	0.95	0.95	0.9
100		1	0.9	0.9	0.95	1

Survival Rate Binomials

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Negative Contro	18/20	20/20	19/20	19/20	18/20
100		20/20	18/20	18/20	19/20	20/20

Analysis ID:	05-9009-6540	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	21 Oct-13 11:15	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

CETIS Measurement Report

Eohaustorius 10-d Survival and Reburial Sediment Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Batch ID:	03-6133-0885	**Test Type:**	Survival-Reburial	**Analyst:**	
Start Date:	03 Sep-13 11:12	**Protocol:**	EPA/600/R-94/025 (1994)	**Diluent:**	Laboratory Seawater
Ending Date:	13 Sep-13 12:00	**Species:**	Eohaustorius estuarius	**Brine:**	Not Applicable
Duration:	10d 1h	**Source:**	Northwestern Aquatic Science, OR	**Age:**	

Sample ID:	20-0446-7790	**Code:**	OCC0813.265e	**Client:**	Orange County CoastKeeper
Sample Date:	21 Aug-13 14:20	**Material:**	Sediment	**Project:**	Newport Bay Sediment
Receive Date:	21 Aug-13 18:00	**Source:**	Bioassay Report		
Sample Age:	12d 21h	**Station:**	LYA1		

Dissolved Oxygen-mg/L

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	Negative Contr	2	10.15	9.515	10.79	10.1	10.2	0.05	0.0707	0.7%	0
100		2	10.05	9.415	10.69	10	10.1	0.05001	0.07073	0.7%	0
Overall		4	10.1			10	10.2				0 (0%)

Total Ammonia (N)-mg/L

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	Negative Contr	1	0			0	0	0	0		0
100		1	0			0	0	0	0		0
Overall		2	0			0	0				0 (0%)

pH-Units

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	Negative Contr	2	7.9	7.884	7.916	7.9	7.9	0	0	0.0%	0
100		2	7.8	6.529	9.071	7.7	7.9	0.1	0.1414	1.81%	0
Overall		4	7.85			7.7	7.9				0 (0%)

Salinity-ppt

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	Negative Contr	2	20	20	20	20	20	0	0	0.0%	0
100		2	20	20	20	20	20	0	0	0.0%	0
Overall		4	20			20	20				0 (0%)

Temperature-°C

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	Negative Contr	2	14.85	14.21	15.49	14.8	14.9	0.05004	0.07077	0.48%	0
100		2	14.85	14.21	15.49	14.8	14.9	0.05004	0.07077	0.48%	0
Overall		4	14.85			14.8	14.9				0 (0%)

Eohaustorius 10-d Survival and Reburial Sediment Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Dissolved Oxygen-mg/L

C-%	Control Type	1	2
0	Negative Contr	10.1	10.2
100		10.1	10

Total Ammonia (N)-mg/L

C-%	Control Type	1
0	Negative Contr	0
100		0

pH-Units

C-%	Control Type	1	2
0	Negative Contr	7.9	7.9
100		7.9	7.7

Salinity-ppt

C-%	Control Type	1	2
0	Negative Contr	20	20
100		20	20

Temperature-°C

C-%	Control Type	1	2
0	Negative Contr	14.8	14.9
100		14.8	14.9

aquatic bioassay & consulting laboratories, inc

October 21, 2013

Mr. Ray Hiemstra
Orange County Coastkeeper
3151 Airway Ave. Suite F-110
Costa Mesa, CA 92626

Dear Mr. Hiemstra:

We are pleased to present the enclosed bioassay report. The test was conducted under guidelines prescribed in *Methods for Assessing the Toxicity of Sediment-associated Contaminants with Estuarine and Marine Amphipods*, EPA/600/R-94/025. Results were as follows:

CLIENT:	Orange County Coastkeeper
SAMPLE I.D.:	BC2
DATE RECEIVED:	8/22/2013
ABC LAB. NO.:	OCC0813.266

***Eohaustorius estuarius* 10 Day Survival Sediment Bioassay**

Percent Survival = 97.00% Survival

Yours very truly,

Scott Johnson
Laboratory Director

29 north olive ventura, ca 93001 (805) 643 5621 www.aquabio.org

CETIS Summary Report

Report Date: 21 Oct-13 11:17 (p 1 of 1)
Test Code: OCC0813.266eoh | 17-5965-7366

Eohaustorius 10-d Survival and Reburial Sediment Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Batch ID:	00-6424-8920	**Test Type:**	Survival-Reburial	**Analyst:**	
Start Date:	03 Sep-13 11:13	**Protocol:**	EPA/600/R-94/025 (1994)	**Diluent:**	Laboratory Seawater
Ending Date:	13 Sep-13 12:00	**Species:**	Eohaustorius estuarius	**Brine:**	Not Applicable
Duration:	10d 1h	**Source:**	Northwestern Aquatic Science, OR	**Age:**	

Sample ID:	18-3291-8054	**Code:**	OCC0813.266e	**Client:**	Orange County CoastKeeper
Sample Date:	21 Aug-13 10:30	**Material:**	Sediment	**Project:**	Newport Bay Sediment
Receive Date:	21 Aug-13 18:00	**Source:**	Bioassay Report		
Sample Age:	13d 1h	**Station:**	BC2		

Comparison Summary

Analysis ID	Endpoint	NOEL	LOEL	TOEL	PMSD	TU	Method
01-9280-8012	Survival Rate	100	>100	NA	6.0%	1	Equal Variance t Two-Sample Test

Point Estimate Summary

Analysis ID	Endpoint	Level	%	95% LCL	95% UCL	TU	Method
13-9631-0136	Survival Rate	EC5	>100	N/A	N/A	<1	Linear Interpolation (ICPIN)
		EC10	>100	N/A	N/A	<1	
		EC15	>100	N/A	N/A	<1	
		EC20	>100	N/A	N/A	<1	
		EC25	>100	N/A	N/A	<1	
		EC40	>100	N/A	N/A	<1	
		EC50	>100	N/A	N/A	<1	

Test Acceptability

Analysis ID	Endpoint	Attribute	Test Stat	TAC Limits	Overlap	Decision
01-9280-8012	Survival Rate	Control Resp	0.94	0.9 - NL	Yes	Passes Acceptability Criteria
13-9631-0136	Survival Rate	Control Resp	0.94	0.9 - NL	Yes	Passes Acceptability Criteria

Survival Rate Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Contro	5	0.94	0.8881	0.9919	0.9	1	0.01871	0.04183	4.45%	0.0%
100		5	0.97	0.9145	1	0.9	1	0.02	0.04472	4.61%	-3.19%

Survival Rate Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Negative Contro	0.9	1	0.95	0.95	0.9
100		1	0.9	1	1	0.95

Survival Rate Binomials

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Negative Contro	18/20	20/20	19/20	19/20	18/20
100		20/20	18/20	20/20	20/20	19/20

CETIS Analytical Report

Eohaustorius 10-d Survival and Reburial Sediment Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Analysis ID:	01-9280-8012	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	21 Oct-13 11:15	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	00-6424-8920	**Test Type:**	Survival-Reburial	**Analyst:**	
Start Date:	03 Sep-13 11:13	**Protocol:**	EPA/600/R-94/025 (1994)	**Diluent:**	Laboratory Seawater
Ending Date:	13 Sep-13 12:00	**Species:**	Eohaustorius estuarius	**Brine:**	Not Applicable
Duration:	10d 1h	**Source:**	Northwestern Aquatic Science, OR	**Age:**	

Sample ID:	18-3291-8054	**Code:**	OCC0813.266e	**Client:**	Orange County CoastKeeper
Sample Date:	21 Aug-13 10:30	**Material:**	Sediment	**Project:**	Newport Bay Sediment
Receive Date:	21 Aug-13 18:00	**Source:**	Bioassay Report		
Sample Age:	13d 1h	**Station:**	BC2		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Angular (Corrected)	NA	C > T	NA	NA	6.0%	Passes survival rate

Equal Variance t Two-Sample Test

Control	vs	C-%	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Negative Control		100	-1.124	1.86	0.107	8	0.8532	CDF	Non-Significant Effect

Test Acceptability Criteria

Attribute	Test Stat	TAC Limits	Overlap	Decision
Control Resp	0.94	0.9 - NL	Yes	Passes Acceptability Criteria

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.01044509	0.01044509	1	1.264	0.2935	Non-Significant Effect
Error	0.06611785	0.008264731	8			
Total	0.07656294		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	1.193	23.15	0.8684	Equal Variances
Variances	Mod Levene Equality of Variance	0.005753	13.75	0.9420	Equal Variances
Variances	Levene Equality of Variance	0.2278	11.26	0.6459	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9465	0.7411	0.6268	Normal Distribution
Distribution	Kolmogorov-Smirnov D	0.1746	0.3025	0.6015	Normal Distribution
Distribution	D'Agostino Skewness	0.4094	2.576	0.6822	Normal Distribution
Distribution	Anderson-Darling A2 Normality	0.3735	3.878	0.4221	Normal Distribution

Survival Rate Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Negative Control	5	0.94	0.8881	0.9919	0.95	0.9	1	0.01871	4.45%	0.0%
100		5	0.97	0.9145	1	1	0.9	1	0.02	4.61%	-3.19%

Angular (Corrected) Transformed Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Negative Contr	5	1.329	1.222	1.437	1.345	1.249	1.459	0.03883	6.53%	0.0%
100		5	1.394	1.276	1.512	1.459	1.249	1.459	0.04241	6.8%	-4.86%

Survival Rate Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Negative Control	0.9	1	0.95	0.95	0.9
100		1	0.9	1	1	0.95

Angular (Corrected) Transformed Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Negative Control	1.249	1.459	1.345	1.345	1.249
100		1.459	1.249	1.459	1.459	1.345

Eohaustorius 10-d Survival and Reburial Sediment Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Analysis ID:	01-9280-8012	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	21 Oct-13 11:15	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Survival Rate Binomials

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Negative Contro	18/20	20/20	19/20	19/20	18/20
100		20/20	18/20	20/20	20/20	19/20

CETIS Analytical Report

Eohaustorius 10-d Survival and Reburial Sediment Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Analysis ID:	13-9631-0136	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	21 Oct-13 11:15	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Batch ID:	00-6424-8920	**Test Type:**	Survival-Reburial	**Analyst:**	
Start Date:	03 Sep-13 11:13	**Protocol:**	EPA/600/R-94/025 (1994)	**Diluent:**	Laboratory Seawater
Ending Date:	13 Sep-13 12:00	**Species:**	Eohaustorius estuarius	**Brine:**	Not Applicable
Duration:	10d 1h	**Source:**	Northwestern Aquatic Science, OR	**Age:**	

Sample ID:	18-3291-8054	**Code:**	OCC0813.266e	**Client:**	Orange County CoastKeeper
Sample Date:	21 Aug-13 10:30	**Material:**	Sediment	**Project:**	Newport Bay Sediment
Receive Date:	21 Aug-13 18:00	**Source:**	Bioassay Report		
Sample Age:	13d 1h	**Station:**	BC2		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Linear	Linear	0	280	Yes	Two-Point Interpolation

Test Acceptability Criteria

Attribute	Test Stat	TAC Limits	Overlap	Decision
Control Resp	0.94	0.9 - NL	Yes	Passes Acceptability Criteria

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC5	>100	N/A	N/A	<1	NA	NA
EC10	>100	N/A	N/A	<1	NA	NA
EC15	>100	N/A	N/A	<1	NA	NA
EC20	>100	N/A	N/A	<1	NA	NA
EC25	>100	N/A	N/A	<1	NA	NA
EC40	>100	N/A	N/A	<1	NA	NA
EC50	>100	N/A	N/A	<1	NA	NA

Survival Rate Summary

			Calculated Variate(A/B)								
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	A	B
0	Negative Control	5	0.94	0.9	1	0.01871	0.04183	4.45%	0.0%	94	100
100		5	0.97	0.9	1	0.02	0.04472	4.61%	-3.19%	97	100

Survival Rate Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Negative Control	0.9	1	0.95	0.95	0.9
100		1	0.9	1	1	0.95

Survival Rate Binomials

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Negative Contro	18/20	20/20	19/20	19/20	18/20
100		20/20	18/20	20/20	20/20	19/20

Analysis ID:	13-9631-0136	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	21 Oct-13 11:15	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Eohaustorius 10-d Survival and Reburial Sediment Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Batch ID:	00-6424-8920	**Test Type:**	Survival-Reburial	**Analyst:**	
Start Date:	03 Sep-13 11:13	**Protocol:**	EPA/600/R-94/025 (1994)	**Diluent:**	Laboratory Seawater
Ending Date:	13 Sep-13 12:00	**Species:**	Eohaustorius estuarius	**Brine:**	Not Applicable
Duration:	10d 1h	**Source:**	Northwestern Aquatic Science, OR	**Age:**	

Sample ID:	18-3291-8054	**Code:**	OCC0813.266e	**Client:**	Orange County CoastKeeper
Sample Date:	21 Aug-13 10:30	**Material:**	Sediment	**Project:**	Newport Bay Sediment
Receive Date:	21 Aug-13 18:00	**Source:**	Bioassay Report		
Sample Age:	13d 1h	**Station:**	BC2		

Dissolved Oxygen-mg/L

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	Negative Contr	2	10.15	9.515	10.79	10.1	10.2	0.05	0.0707	0.7%	0
100		2	10.25	9.615	10.89	10.2	10.3	0.04999	0.07069	0.69%	0
Overall		4	10.2			10.1	10.3				0 (0%)

Total Ammonia (N)-mg/L

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	Negative Contr	1	0			0	0	0	0		0
100		1	0			0	0	0	0		0
Overall		2	0			0	0				0 (0%)

pH-Units

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	Negative Contr	2	7.9	7.884	7.916	7.9	7.9	0	0	0.0%	0
100		2	7.75	7.115	8.385	7.7	7.8	0.05001	0.07072	0.91%	0
Overall		4	7.825			7.7	7.9				0 (0%)

Salinity-ppt

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	Negative Contr	2	20	20	20	20	20	0	0	0.0%	0
100		2	20	20	20	20	20	0	0	0.0%	0
Overall		4	20			20	20				0 (0%)

Temperature-°C

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	Negative Contr	2	14.85	14.21	15.49	14.8	14.9	0.05004	0.07077	0.48%	0
100		2	14.8	14.78	14.82	14.8	14.8	0	0	0.0%	0
Overall		4	14.83			14.8	14.9				0 (0%)

Eohaustorius 10-d Survival and Reburial Sediment Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Dissolved Oxygen-mg/L

C-%	Control Type	1	2
0	Negative Contr	10.2	10.1
100		10.2	10.3

Total Ammonia (N)-mg/L

C-%	Control Type	1
0	Negative Contr	0
100		0

pH-Units

C-%	Control Type	1	2
0	Negative Contr	7.9	7.9
100		7.7	7.8

Salinity-ppt

C-%	Control Type	1	2
0	Negative Contr	20	20
100		20	20

Temperature-°C

C-%	Control Type	1	2
0	Negative Contr	14.8	14.9
100		14.8	14.8

aquatic bioassay & consulting laboratories, inc

October 21, 2013

Mr. Ray Hiemstra
Orange County Coastkeeper
3151 Airway Ave. Suite F-110
Costa Mesa, CA 92626

Dear Mr. Hiemstra:

We are pleased to present the enclosed bioassay report. The test was conducted under guidelines prescribed in *Methods for Assessing the Toxicity of Sediment-associated Contaminants with Estuarine and Marine Amphipods*, EPA/600/R-94/025. Results were as follows:

CLIENT:	Orange County Coastkeeper
SAMPLE I.D.:	LE
DATE RECEIVED:	8/22/2013
ABC LAB. NO.:	OCC0813.267

***Eohaustorius estuarius* 10 Day Survival Sediment Bioassay**

Percent Survival = 98.00% Survival

Yours very truly,

Scott Johnson
Laboratory Director

29 north olive st. ventura, ca 93001 (805) 643 5621 www.aquabio.org

CETIS Summary Report

Report Date: 21 Oct-13 11:17 (p 1 of 1)
Test Code: OCC0813.267eoh | 07-6280-8651

Eohaustorius 10-d Survival and Reburial Sediment Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Batch ID:	13-5774-7102	**Test Type:**	Survival-Reburial	**Analyst:**	
Start Date:	03 Sep-13 11:14	**Protocol:**	EPA/600/R-94/025 (1994)	**Diluent:**	Laboratory Seawater
Ending Date:	13 Sep-13 12:00	**Species:**	Eohaustorius estuarius	**Brine:**	Not Applicable
Duration:	10d 1h	**Source:**	Northwestern Aquatic Science, OR	**Age:**	

Sample ID:	11-4419-0716	**Code:**	OCC0813.267e	**Client:**	Orange County CoastKeeper
Sample Date:	21 Aug-13 12:10	**Material:**	Sediment	**Project:**	Newport Bay Sediment
Receive Date:	21 Aug-13 18:00	**Source:**	Bioassay Report		
Sample Age:	12d 23h	**Station:**	LE		

Comparison Summary

Analysis ID	Endpoint	NOEL	LOEL	TOEL	PMSD	TU	Method
01-7475-7691	Survival Rate	100	>100	NA	5.96%	1	Equal Variance t Two-Sample Test

Point Estimate Summary

Analysis ID	Endpoint	Level	%	95% LCL	95% UCL	TU	Method
03-4000-6220	Survival Rate	EC5	>100	N/A	N/A	<1	Linear Interpolation (ICPIN)
		EC10	>100	N/A	N/A	<1	
		EC15	>100	N/A	N/A	<1	
		EC20	>100	N/A	N/A	<1	
		EC25	>100	N/A	N/A	<1	
		EC40	>100	N/A	N/A	<1	
		EC50	>100	N/A	N/A	<1	

Test Acceptability

Analysis ID	Endpoint	Attribute	Test Stat	TAC Limits	Overlap	Decision
01-7475-7691	Survival Rate	Control Resp	0.94	0.9 - NL	Yes	Passes Acceptability Criteria
03-4000-6220	Survival Rate	Control Resp	0.94	0.9 - NL	Yes	Passes Acceptability Criteria

Survival Rate Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Contro	5	0.94	0.8881	0.9919	0.9	1	0.01871	0.04183	4.45%	0.0%
100		5	0.98	0.9245	1	0.9	1	0.02	0.04472	4.56%	-4.26%

Survival Rate Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Negative Contro	0.9	1	0.95	0.95	0.9
100		1	1	0.9	1	1

Survival Rate Binomials

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Negative Contro	18/20	20/20	19/20	19/20	18/20
100		20/20	20/20	18/20	20/20	20/20

CETIS Analytical Report

Report Date: 21 Oct-13 11:17 (p 1 of 2)
Test Code: OCC0813.267eoh | 07-6280-8651

Eohaustorius 10-d Survival and Reburial Sediment Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Analysis ID:	01-7475-7691	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	21 Oct-13 11:15	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	13-5774-7102	**Test Type:**	Survival-Reburial	**Analyst:**	
Start Date:	03 Sep-13 11:14	**Protocol:**	EPA/600/R-94/025 (1994)	**Diluent:**	Laboratory Seawater
Ending Date:	13 Sep-13 12:00	**Species:**	Eohaustorius estuarius	**Brine:**	Not Applicable
Duration:	10d 1h	**Source:**	Northwestern Aquatic Science, OR	**Age:**	

Sample ID:	11-4419-0716	**Code:**	OCC0813.267e	**Client:**	Orange County CoastKeeper
Sample Date:	21 Aug-13 12:10	**Material:**	Sediment	**Project:**	Newport Bay Sediment
Receive Date:	21 Aug-13 18:00	**Source:**	Bioassay Report		
Sample Age:	12d 23h	**Station:**	LE		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Angular (Corrected)	NA	C > T	NA	NA	5.96%	Passes survival rate

Equal Variance t Two-Sample Test

Control	vs	C-%	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Negative Control		100	-1.528	1.86	0.106	8	0.9175	CDF	Non-Significant Effect

Test Acceptability Criteria

Attribute	Test Stat	TAC Limits	Overlap	Decision
Control Resp	0.94	0.9 - NL	Yes	Passes Acceptability Criteria

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.01906758	0.01906758	1	2.335	0.1650	Non-Significant Effect
Error	0.06533538	0.008166922	8			
Total	0.08440296		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	1.167	23.15	0.8847	Equal Variances
Variances	Mod Levene Equality of Variance	0.1695	13.75	0.6949	Equal Variances
Variances	Levene Equality of Variance	0.006881	11.26	0.9359	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.8902	0.7411	0.1705	Normal Distribution
Distribution	Kolmogorov-Smirnov D	0.2736	0.3025	0.0326	Normal Distribution
Distribution	D'Agostino Skewness	1.102	2.576	0.2704	Normal Distribution
Distribution	Anderson-Darling A2 Normality	0.7531	3.878	0.0497	Normal Distribution

Survival Rate Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Negative Control	5	0.94	0.8881	0.9919	0.95	0.9	1	0.01871	4.45%	0.0%
100		5	0.98	0.9245	1	1	0.9	1	0.02	4.56%	-4.26%

Angular (Corrected) Transformed Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Negative Contr	5	1.329	1.222	1.437	1.345	1.249	1.459	0.03883	6.53%	0.0%
100		5	1.417	1.3	1.533	1.459	1.249	1.459	0.04194	6.62%	-6.57%

Survival Rate Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Negative Control	0.9	1	0.95	0.95	0.9
100		1	1	0.9	1	1

Angular (Corrected) Transformed Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Negative Control	1.249	1.459	1.345	1.345	1.249
100		1.459	1.459	1.249	1.459	1.459

Eohaustorius 10-d Survival and Reburial Sediment Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Analysis ID:	01-7475-7691	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	21 Oct-13 11:15	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Survival Rate Binomials

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Negative Contro	18/20	20/20	19/20	19/20	18/20
100		20/20	20/20	18/20	20/20	20/20

CETIS Analytical Report

Eohaustorius 10-d Survival and Reburial Sediment Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Analysis ID:	03-4000-6220	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	21 Oct-13 11:15	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Batch ID:	13-5774-7102	**Test Type:**	Survival-Reburial	**Analyst:**	
Start Date:	03 Sep-13 11:14	**Protocol:**	EPA/600/R-94/025 (1994)	**Diluent:**	Laboratory Seawater
Ending Date:	13 Sep-13 12:00	**Species:**	Eohaustorius estuarius	**Brine:**	Not Applicable
Duration:	10d 1h	**Source:**	Northwestern Aquatic Science, OR	**Age:**	

Sample ID:	11-4419-0716	**Code:**	OCC0813.267e	**Client:**	Orange County CoastKeeper
Sample Date:	21 Aug-13 12:10	**Material:**	Sediment	**Project:**	Newport Bay Sediment
Receive Date:	21 Aug-13 18:00	**Source:**	Bioassay Report		
Sample Age:	12d 23h	**Station:**	LE		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Linear	Linear	0	280	Yes	Two-Point Interpolation

Test Acceptability Criteria

Attribute	Test Stat	TAC Limits	Overlap	Decision
Control Resp	0.94	0.9 - NL	Yes	Passes Acceptability Criteria

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC5	>100	N/A	N/A	<1	NA	NA
EC10	>100	N/A	N/A	<1	NA	NA
EC15	>100	N/A	N/A	<1	NA	NA
EC20	>100	N/A	N/A	<1	NA	NA
EC25	>100	N/A	N/A	<1	NA	NA
EC40	>100	N/A	N/A	<1	NA	NA
EC50	>100	N/A	N/A	<1	NA	NA

Survival Rate Summary

			Calculated Variate(A/B)								
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	A	B
0	Negative Control	5	0.94	0.9	1	0.01871	0.04183	4.45%	0.0%	94	100
100		5	0.98	0.9	1	0.02	0.04472	4.56%	-4.26%	98	100

Survival Rate Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Negative Control	0.9	1	0.95	0.95	0.9
100		1	1	0.9	1	1

Survival Rate Binomials

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Negative Contro	18/20	20/20	19/20	19/20	18/20
100		20/20	20/20	18/20	20/20	20/20

Eohaustorius 10-d Survival and Reburial Sediment Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Analysis ID:	03-4000-6220	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	21 Oct-13 11:15	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Eohaustorius 10-d Survival and Reburial Sediment Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Batch ID:	13-5774-7102	**Test Type:**	Survival-Reburial	**Analyst:**	
Start Date:	03 Sep-13 11:14	**Protocol:**	EPA/600/R-94/025 (1994)	**Diluent:**	Laboratory Seawater
Ending Date:	13 Sep-13 12:00	**Species:**	Eohaustorius estuarius	**Brine:**	Not Applicable
Duration:	10d 1h	**Source:**	Northwestern Aquatic Science, OR	**Age:**	

Sample ID:	11-4419-0716	**Code:**	OCC0813.267e	**Client:**	Orange County CoastKeeper
Sample Date:	21 Aug-13 12:10	**Material:**	Sediment	**Project:**	Newport Bay Sediment
Receive Date:	21 Aug-13 18:00	**Source:**	Bioassay Report		
Sample Age:	12d 23h	**Station:**	LE		

Dissolved Oxygen-mg/L

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	Negative Contr	2	10.15	9.515	10.79	10.1	10.2	0.05	0.0707	0.7%	0
100		2	9.9	8.629	11.17	9.8	10	0.09999	0.1414	1.43%	0
Overall		4	10.03			9.8	10.2				0 (0%)

Total Ammonia (N)-mg/L

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	Negative Contr	1	0			0	0	0	0		0
100		1	0			0	0	0	0		0
Overall		2	0			0	0				0 (0%)

pH-Units

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	Negative Contr	2	7.9	7.884	7.916	7.9	7.9	0	0	0.0%	0
100		2	7.95	7.315	8.585	7.9	8	0.04999	0.0707	0.89%	0
Overall		4	7.925			7.9	8				0 (0%)

Salinity-ppt

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	Negative Contr	2	20	20	20	20	20	0	0	0.0%	0
100		2	20	20	20	20	20	0	0	0.0%	0
Overall		4	20			20	20				0 (0%)

Temperature-°C

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	Negative Contr	2	14.85	14.21	15.49	14.8	14.9	0.05004	0.07077	0.48%	0
100		2	14.85	14.21	15.49	14.8	14.9	0.05004	0.07077	0.48%	0
Overall		4	14.85			14.8	14.9				0 (0%)

Eohaustorius 10-d Survival and Reburial Sediment Test — Aquatic Bioassay & Consulting Labs, Inc.

Dissolved Oxygen-mg/L

C-%	Control Type	1	2
0	Negative Contr	10.1	10.2
100		10	9.8

Total Ammonia (N)-mg/L

C-%	Control Type	1
0	Negative Contr	0
100		0

pH-Units

C-%	Control Type	1	2
0	Negative Contr	7.9	7.9
100		7.9	8

Salinity-ppt

C-%	Control Type	1	2
0	Negative Contr	20	20
100		20	20

Temperature-°C

C-%	Control Type	1	2
0	Negative Contr	14.8	14.9
100		14.8	14.9

aquatic bioassay & consulting laboratories, inc

October 21, 2013

Mr. Ray Hiemstra
Orange County Coastkeeper
3151 Airway Ave. Suite F-110
Costa Mesa, CA 92626

Dear Mr. Hiemstra:

We are pleased to present the enclosed bioassay report. The test was conducted under guidelines prescribed in *Methods for Assessing the Toxicity of Sediment-associated Contaminants with Estuarine and Marine Amphipods*, EPA/600/R-94/025. Results were as follows:

CLIENT:	Orange County Coastkeeper
SAMPLE I.D.:	WLB
DATE RECEIVED:	8/22/2013
ABC LAB. NO.:	OCC0813.268

***Eohaustorius estuarius* 10 Day Survival Sediment Bioassay**

Percent Survival = 95.00% Survival

Yours very truly,

Scott Johnson
Laboratory Director

CETIS Summary Report

Report Date: 21 Oct-13 11:16 (p 1 of 1)
Test Code: OCC0813.268eoh | 09-3412-0756

Eohaustorius 10-d Survival and Reburial Sediment Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Batch ID:	13-0145-5162	**Test Type:**	Survival-Reburial	**Analyst:**	
Start Date:	03 Sep-13 11:15	**Protocol:**	EPA/600/R-94/025 (1994)	**Diluent:**	Laboratory Seawater
Ending Date:	13 Sep-13 12:00	**Species:**	Eohaustorius estuarius	**Brine:**	Not Applicable
Duration:	10d 1h	**Source:**	Northwestern Aquatic Science, OR	**Age:**	

Sample ID:	06-8856-5670	**Code:**	OCC0813.268e	**Client:**	Orange County CoastKeeper
Sample Date:	21 Aug-13 14:45	**Material:**	Sediment	**Project:**	Newport Bay Sediment
Receive Date:	21 Aug-13 18:00	**Source:**	Bioassay Report		
Sample Age:	12d 20h	**Station:**	WLB		

Comparison Summary

Analysis ID	Endpoint	NOEL	LOEL	TOEL	PMSD	TU	Method
15-5927-0574	Survival Rate	100	>100	NA	5.76%	1	Equal Variance t Two-Sample Test

Point Estimate Summary

Analysis ID	Endpoint	Level	%	95% LCL	95% UCL	TU	Method
15-3041-8205	Survival Rate	EC5	>100	N/A	N/A	<1	Linear Interpolation (ICPIN)
		EC10	>100	N/A	N/A	<1	
		EC15	>100	N/A	N/A	<1	
		EC20	>100	N/A	N/A	<1	
		EC25	>100	N/A	N/A	<1	
		EC40	>100	N/A	N/A	<1	
		EC50	>100	N/A	N/A	<1	

Test Acceptability

Analysis ID	Endpoint	Attribute	Test Stat	TAC Limits	Overlap	Decision
15-3041-8205	Survival Rate	Control Resp	0.94	0.9 - NL	Yes	Passes Acceptability Criteria
15-5927-0574	Survival Rate	Control Resp	0.94	0.9 - NL	Yes	Passes Acceptability Criteria

Survival Rate Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Contro	5	0.94	0.8881	0.9919	0.9	1	0.01871	0.04183	4.45%	0.0%
100		5	0.96	0.9081	1	0.9	1	0.01871	0.04183	4.36%	-2.13%

Survival Rate Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Negative Contro	0.9	1	0.95	0.95	0.9
100		0.95	0.95	1	0.9	1

Survival Rate Binomials

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Negative Contro	18/20	20/20	19/20	19/20	18/20
100		19/20	19/20	20/20	18/20	20/20

Eohaustorius 10-d Survival and Reburial Sediment Test — Aquatic Bioassay & Consulting Labs, Inc.

Analysis ID:	15-5927-0574	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	21 Oct-13 11:14	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	13-0145-5162	**Test Type:**	Survival-Reburial	**Analyst:**	
Start Date:	03 Sep-13 11:15	**Protocol:**	EPA/600/R-94/025 (1994)	**Diluent:**	Laboratory Seawater
Ending Date:	13 Sep-13 12:00	**Species:**	Eohaustorius estuarius	**Brine:**	Not Applicable
Duration:	10d 1h	**Source:**	Northwestern Aquatic Science, OR	**Age:**	

Sample ID:	06-8856-5670	**Code:**	OCC0813.268e	**Client:**	Orange County CoastKeeper
Sample Date:	21 Aug-13 14:45	**Material:**	Sediment	**Project:**	Newport Bay Sediment
Receive Date:	21 Aug-13 18:00	**Source:**	Bioassay Report		
Sample Age:	12d 20h	**Station:**	WLB		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Angular (Corrected)	NA	C > T	NA	NA	5.76%	Passes survival rate

Equal Variance t Two-Sample Test

Control	vs	C-%	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Negative Control		100	-0.7548	1.86	0.103	8	0.7640	CDF	Non-Significant Effect

Test Acceptability Criteria

Attribute	Test Stat	TAC Limits	Overlap	Decision
Control Resp	0.94	0.9 - NL	Yes	Passes Acceptability Criteria

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.004397951	0.004397951	1	0.5698	0.4720	Non-Significant Effect
Error	0.06174961	0.007718701	8			
Total	0.06614756		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	1.048	23.15	0.9649	Equal Variances
Variances	Mod Levene Equality of Variance	0.01319	13.75	0.9123	Equal Variances
Variances	Levene Equality of Variance	0.03658	11.26	0.8531	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9513	0.7411	0.6834	Normal Distribution
Distribution	Kolmogorov-Smirnov D	0.1541	0.3025	0.8831	Normal Distribution
Distribution	D'Agostino Skewness	0.2179	2.576	0.8275	Normal Distribution
Distribution	Anderson-Darling A2 Normality	0.2972	3.878	0.6204	Normal Distribution

Survival Rate Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Negative Control	5	0.94	0.8881	0.9919	0.95	0.9	1	0.01871	4.45%	0.0%
100		5	0.96	0.9081	1	0.95	0.9	1	0.01871	4.36%	-2.13%

Angular (Corrected) Transformed Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Negative Contr	5	1.329	1.222	1.437	1.345	1.249	1.459	0.03883	6.53%	0.0%
100		5	1.371	1.261	1.482	1.345	1.249	1.459	0.03975	6.48%	-3.16%

Survival Rate Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Negative Control	0.9	1	0.95	0.95	0.9
100		0.95	0.95	1	0.9	1

Angular (Corrected) Transformed Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Negative Control	1.249	1.459	1.345	1.345	1.249
100		1.345	1.345	1.459	1.249	1.459

Eohaustorius 10-d Survival and Reburial Sediment Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Analysis ID:	15-5927-0574	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	21 Oct-13 11:14	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Survival Rate Binomials

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Negative Contro	18/20	20/20	19/20	19/20	18/20
100		19/20	19/20	20/20	18/20	20/20

CETIS Analytical Report

Eohaustorius 10-d Survival and Reburial Sediment Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Analysis ID:	15-3041-8205	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	21 Oct-13 11:14	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Batch ID:	13-0145-5162	**Test Type:**	Survival-Reburial	**Analyst:**	
Start Date:	03 Sep-13 11:15	**Protocol:**	EPA/600/R-94/025 (1994)	**Diluent:**	Laboratory Seawater
Ending Date:	13 Sep-13 12:00	**Species:**	Eohaustorius estuarius	**Brine:**	Not Applicable
Duration:	10d 1h	**Source:**	Northwestern Aquatic Science, OR	**Age:**	

Sample ID:	06-8856-5670	**Code:**	OCC0813.268e	**Client:**	Orange County CoastKeeper
Sample Date:	21 Aug-13 14:45	**Material:**	Sediment	**Project:**	Newport Bay Sediment
Receive Date:	21 Aug-13 18:00	**Source:**	Bioassay Report		
Sample Age:	12d 20h	**Station:**	WLB		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Linear	Linear	0	280	Yes	Two-Point Interpolation

Test Acceptability Criteria

Attribute	Test Stat	TAC Limits	Overlap	Decision
Control Resp	0.94	0.9 - NL	Yes	Passes Acceptability Criteria

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC5	>100	N/A	N/A	<1	NA	NA
EC10	>100	N/A	N/A	<1	NA	NA
EC15	>100	N/A	N/A	<1	NA	NA
EC20	>100	N/A	N/A	<1	NA	NA
EC25	>100	N/A	N/A	<1	NA	NA
EC40	>100	N/A	N/A	<1	NA	NA
EC50	>100	N/A	N/A	<1	NA	NA

Survival Rate Summary

			Calculated Variate(A/B)								
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	A	B
0	Negative Control	5	0.94	0.9	1	0.01871	0.04183	4.45%	0.0%	94	100
100		5	0.96	0.9	1	0.01871	0.04183	4.36%	-2.13%	96	100

Survival Rate Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Negative Control	0.9	1	0.95	0.95	0.9
100		0.95	0.95	1	0.9	1

Survival Rate Binomials

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Negative Contro	18/20	20/20	19/20	19/20	18/20
100		19/20	19/20	20/20	18/20	20/20

Eohaustorius 10-d Survival and Reburial Sediment Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Analysis ID:	15-3041-8205	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	21 Oct-13 11:14	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

CETIS Measurement Report

Eohaustorius 10-d Survival and Reburial Sediment Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Batch ID:	13-0145-5162	**Test Type:**	Survival-Reburial	**Analyst:**	
Start Date:	03 Sep-13 11:15	**Protocol:**	EPA/600/R-94/025 (1994)	**Diluent:**	Laboratory Seawater
Ending Date:	13 Sep-13 12:00	**Species:**	Eohaustorius estuarius	**Brine:**	Not Applicable
Duration:	10d 1h	**Source:**	Northwestern Aquatic Science, OR	**Age:**	

Sample ID:	06-8856-5670	**Code:**	OCC0813.268e	**Client:**	Orange County CoastKeeper
Sample Date:	21 Aug-13 14:45	**Material:**	Sediment	**Project:**	Newport Bay Sediment
Receive Date:	21 Aug-13 18:00	**Source:**	Bioassay Report		
Sample Age:	12d 20h	**Station:**	WLB		

Dissolved Oxygen-mg/L

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	Negative Contr	2	10.15	9.515	10.79	10.1	10.2	0.05	0.0707	0.7%	0
100		2	10.1	8.829	11.37	10	10.2	0.09999	0.1414	1.4%	0
Overall		4	10.13			10	10.2				0 (0%)

Total Ammonia (N)-mg/L

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	Negative Contr	1	0			0	0	0	0		0
100		1	0			0	0	0	0		0
Overall		2	0			0	0				0 (0%)

pH-Units

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	Negative Contr	2	7.9	7.884	7.916	7.9	7.9	0	0	0.0%	0
100		2	7.7	7.698	7.702	7.7	7.7	0	0	0.0%	0
Overall		4	7.8			7.7	7.9				0 (0%)

Salinity-ppt

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	Negative Contr	2	20	20	20	20	20	0	0	0.0%	0
100		2	20	20	20	20	20	0	0	0.0%	0
Overall		4	20			20	20				0 (0%)

Temperature-°C

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	Negative Contr	2	14.85	14.21	15.49	14.8	14.9	0.05004	0.07077	0.48%	0
100		2	14.85	14.21	15.49	14.8	14.9	0.05004	0.07077	0.48%	0
Overall		4	14.85			14.8	14.9				0 (0%)

Eohaustorius 10-d Survival and Reburial Sediment Test — Aquatic Bioassay & Consulting Labs, Inc.

Dissolved Oxygen-mg/L

C-%	Control Type	1	2
0	Negative Contr	10.1	10.2
100		10	10.2

Total Ammonia (N)-mg/L

C-%	Control Type	1
0	Negative Contr	0
100		0

pH-Units

C-%	Control Type	1	2
0	Negative Contr	7.9	7.9
100		7.7	7.7

Salinity-ppt

C-%	Control Type	1	2
0	Negative Contr	20	20
100		20	20

Temperature-°C

C-%	Control Type	1	2
0	Negative Contr	14.8	14.9
100		14.8	14.9

CHAIN OF CUSTODY RECORD

Client:	Project Name/Number:
Orange County Coastkeeper	Newport Bay Sediment Project
Address: 3151 Airway Ave Suite F-110 Costa Mesa, CA 92626	Project Mgr. Ray Hiemstra
	P.O. #
Phone Number: (714) 850-1592	Sampled By (signature)

Date	Time	Comp.	Grab	Matrix	Sample ID	Volume/ Number	Analysis: Echinostorius	Comments
8/21/13	1:10pm		X	Sediments	HM1	2-1L	X	263 10
" "	1:20pm		X	" "	LV1	" "		264 11
" "	2:20pm		X	" "	LYA1	" "		265 12
" "	10:30am		X	" "	BC2	" "		266 13
" "	12:10pm		X	" "	LE	" "		267 14
" "	2:45pm		X	" "	WLB	" "		268 15

Relinquished By: (signature)	Date: Time:
	8-21-13 18:00
Received By: (signature)	Date: Time:
	8/21/13 18:00

Relinquished By: (signature)	Date: Time:
	8/22/13 10:45
Received By: (signature)	Date: Time:
08-22-13	1045
Temp. upon sample receipt: ____ °C	

Aquatic Bioassay and Consulting Laboratories
29 N. Olive Street Ventura, CA 93001 Phone: (805) 643-5621 Fax: (805) 643-2930