Ventura Countywide Stormwater Quality Management Program

2016-2017 Permit Year

Ventura Countywide Stormwater Quality Management Program Annual Report

Attachment D1 Monitoring Appendices H - L

December 15, 2017

Camarillo
County of Ventura
Fillmore
Moorpark
Ojai
Oxnard
Port Hueneme
Santa Paula
Simi Valley
Thousand Oaks
Ventura
Ventura County Watershed Protection District

Appendix H. RWQCB Permission of Toxicity Species Substitution

California Regional Water Quality Control Board

Los Angeles Region

Recipient of the 2001 *Environmental Leadership Award* from Keep California Beautiful

Linda S. Adams
Agency Secretary

320 W. 4th Street, Suite 200, Los Angeles, California 90013
Phone (213) 576-6600 FAX (213) 576-6640 - Internet Address: http://www.waterboards.ca.gov/losangeles

Arnold Schwarzenegger
Governor

October 28, 2009

Ms. Norma Camacho, Director
Ventura County Watershed Protection District
800 South Victoria Ave., L#1600
Ventura, CA 93009-1600

Certified Mail
Return Receipt Requested
Claim No. 7009 0820 0001 6811 7509

SUBJECT: TOXICITY TEST SPECIES SUBSTITUTION, VENTURA COUNTY MUNICIPAL SEPARATE STORM SEWER SYSTEM DISCHARGE (MS4) PERMIT (BOARD ORDER No. 09-0057; NPDES No. CAS004002)

Dear Ms. Camacho:

On October 14, 2009, the Regional Board staff received a request from the Ventura County Watershed Protection District (County) to substitute topsmelt, *Atherinops affinis*, with the inland silverside, *Menidia beryllina*, due to the unavailability of topsmelt from the supplier. After consultation with US EPA staff, Regional Board staff denied the request. On October 15, 2009, the Regional Board received an e-mail from the County, titled "Notification of toxicity exception - (species unavailable) Ventura County MS4 NPDES Permit Order No. 09-0057 (Monitoring Program)". The County's e-mail communication was submitted pursuant to requirements in subparts D.5 and D.8(b) of the Ventura County MS4 Permit's Monitoring Program (Monitoring Program), which requires an explanation of the circumstance with documentation when toxicity tests cannot be performed to comply with the requirements of this permit, and written authorization from the Regional Board Executive Officer to substitute test species.

In order to evaluate the appropriateness of substituting topsmelt, *Atherinops affinis*, with the inland silverside, *Menidia beryllina*, in toxicity testing at mass emissions stations in the future, the Regional Board requires the County to conduct comparative static renewal toxicity tests on both species as follows. During the next storm event of this permit year (2009-10) and the first storm event of next permit year (2010-11), the County shall conduct toxicity tests on both topsmelt, *Atherinops affinis*, and the inland silverside, *Menidia beryllina*, along with giant kelp, *Macrocystis pyrifera*, and the purple sea urchin, *Strongylocentrotus purpuratus*, pursuant to subpart D.8(a) of the Monitoring Program. The County shall submit the results of the comparative toxicity tests as part of its reporting requirements.

RECEIVED
NOV 5 2009
WATERSHED PROTECTION DIST.

In the event that topsmelt, *Atherinops affinis*, is unavailable for testing during future sampling events conducted under the Monitoring Program, the County shall follow the protocol set forth in subpart D.5 of the Monitoring Program. The County shall notify the Regional Board by phone and e-mail as soon as possible if a test species is unavailable. Notification shall be sent directly to me as well as Tracy Woods, Stormwater Permitting Unit, with a copy to Renee Purdy, Chief, Regional Programs Section. The County shall submit to the Regional Board documentation of species unavailability from both the County's contract lab and the contract lab's supplier at least 48 hours prior to the planned sampling event to provide adequate time for my staff to evaluate any request for species substitution. Any approval or denial of a request for species substitution must be authorized pursuant to subpart D.8(b) of the Monitoring Program.

If you have any questions, please contact me at (213) 576-6605, or Renee Purdy at (213) 576-6783.

Sincerely,

Tracy J. Egoscue,
Executive Officer

cc: Mr. Bruce Fujimoto, Division of Water Quality, State Water Resources Control Board
Mr. Gerhardt Hubner, Ventura County Watershed Protection District
Mr. Arne Anselm, Ventura County Watershed Protection District

Appendix I. Aquatic Toxicity Testing Lab Results

aquatic bioassay & consulting laboratories, inc

December 6, 2016

Mr. Arne Anselm
Ventura County Watershed Protection District
800 South Victoria Ave
Ventura, CA 93009

Dear Mr. Anselm:

We are pleased to present the enclosed bioassay report. The test was conducted under guidelines prescribed in *Short-Term Methods for Measuring the Chronic Toxicity of Effluents and Receving Waters to West Coast Estuarine Organisms, EPA/821/R-02-014.* Results were as follows:

CLIENT:	Ventura County Flood Control
SAMPLE I.D.:	ME-VR2
DATE RECEIVED:	10/28/2016
ABC LAB. NO.:	VCF1016.344

CHRONIC TOPSMELT SURVIVAL AND GROWTH BIOASSAY

Survival	NOEC	=	100.00
	TUc	=	1.00
	IC25	=	>100.00 %
	IC50	=	>100.00 %
Biomass	NOEC	=	100.00 %
	TUc	=	1.00
	IC25	=	>100.00 %
	IC50	=	>100.00 %

Yours very truly,

Scott Johnson
Laboratory Director

Pacific Topsmelt 7-d Survival and Growth Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Batch ID:	09-9580-3918	**Test Type:**	Growth-Survival (7d)	**Analyst:**	Joe Freas
Start Date:	28 Oct-16 13:58	**Protocol:**	EPA/600/R-95/136 (1995)	**Diluent:**	Laboratory Seawater
Ending Date:	04 Nov-16 12:00	**Species:**	Atherinops affinis	**Brine:**	Not Applicable
Duration:	6d 22h	**Source:**	Aquatic Biosystems, CO	**Age:**	
Sample ID:	18-0695-0563	**Code:**	VCF1016.344	**Client:**	VCWPD
Sample Date:	28 Oct-16 07:20	**Material:**	Sample Water	**Project:**	2016/17-1 (Wet)
Receipt Date:	28 Oct-16 09:47	**Source:**	Bioassay Report		
Sample Age:	7h	**Station:**	ME-VR2		

Multiple Comparison Summary

Analysis ID	Endpoint	Comparison Method	NOEL	LOEL	TOEL	TU	PMSD	✓
06-5968-5653	7d Survival Rate	Steel Many-One Rank Sum Test	100	> 100	n/a	1	8.2%	
00-7729-3231	Mean Dry Biomass-mg	Dunnett Multiple Comparison Test	100	> 100	n/a	1	14.9%	

Point Estimate Summary

Analysis ID	Endpoint	Point Estimate Method	Level	%	95% LCL	95% UCL	TU	✓
10-9246-6424	7d Survival Rate	Linear Interpolation (ICPIN)	EC5	>100	n/a	n/a	<1	✓
			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	✓
19-8021-9560	Mean Dry Biomass-mg	Linear Interpolation (ICPIN)	IC5	>100	n/a	n/a	<1	✓
			IC10	>100	n/a	n/a	<1	✓
			IC15	>100	n/a	n/a	<1	✓
			IC20	>100	n/a	n/a	<1	✓
			IC25	>100	n/a	n/a	<1	✓
			IC40	>100	n/a	n/a	<1	✓
			IC50	>100	n/a	n/a	<1	✓

Test Acceptability

				TAC Limits			
Analysis ID	**Endpoint**	**Attribute**	**Test Stat**	**Lower**	**Upper**	**Overlap**	**Decision**
06-5968-5653	7d Survival Rate	Control Resp	1	0.8	>>	Yes	Passes Acceptibility Criteria
10-9246-6424	7d Survival Rate	Control Resp	1	0.8	>>	Yes	Passes Acceptibility Criteria
00-7729-3231	Mean Dry Biomass-mg	Control Resp	2.023	0.85	>>	Yes	Passes Acceptibility Criteria
19-8021-9560	Mean Dry Biomass-mg	Control Resp	2.023	0.85	>>	Yes	Passes Acceptibility Criteria

7d Survival Rate Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	N	5	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
6.25		5	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
12.5		5	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
25		5	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
50		5	0.9600	0.8489	1.0000	0.8000	1.0000	0.0400	0.0894	9.32%	4.00%
100		5	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%

Mean Dry Biomass-mg Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	N	5	2.023	1.815	2.23	1.792	2.26	0.07478	0.1672	8.27%	0.00%
6.25		5	1.966	1.925	2.007	1.932	2.02	0.01464	0.03274	1.67%	2.81%
12.5		5	2.215	1.97	2.46	2.034	2.494	0.08826	0.1973	8.91%	-9.49%
25		5	2.371	2.103	2.638	2.056	2.594	0.09629	0.2153	9.08%	-17.20%
50		5	2.32	2.049	2.591	2.07	2.546	0.09762	0.2183	9.41%	-14.69%
100		5	2.491	2.135	2.847	2.022	2.796	0.1282	0.2867	11.51%	-23.14%

Pacific Topsmelt 7-d Survival and Growth Test — **Aquatic Bioassay & Consulting Labs, Inc.**

7d Survival Rate Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	N	1.0000	1.0000	1.0000	1.0000	1.0000
6.25		1.0000	1.0000	1.0000	1.0000	1.0000
12.5		1.0000	1.0000	1.0000	1.0000	1.0000
25		1.0000	1.0000	1.0000	1.0000	1.0000
50		1.0000	1.0000	1.0000	0.8000	1.0000
100		1.0000	1.0000	1.0000	1.0000	1.0000

Mean Dry Biomass-mg Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	N	2.012	1.792	1.992	2.26	2.058
6.25		1.932	1.962	2.02	1.964	1.952
12.5		2.338	2.494	2.034	2.156	2.052
25		2.594	2.31	2.55	2.056	2.344
50		2.296	2.546	2.538	2.15	2.07
100		2.796	2.56	2.596	2.48	2.022

7d Survival Rate Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	N	5/5	5/5	5/5	5/5	5/5
6.25		5/5	5/5	5/5	5/5	5/5
12.5		5/5	5/5	5/5	5/5	5/5
25		5/5	5/5	5/5	5/5	5/5
50		5/5	5/5	5/5	4/5	5/5
100		5/5	5/5	5/5	5/5	5/5

CETIS Analytical Report

Pacific Topsmelt 7-d Survival and Growth Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Analysis ID:	06-5968-5653	**Endpoint:**	7d Survival Rate	**CETIS Version:**	CETISv1.9.2
Analyzed:	02 Dec-16 10:04	**Analysis:**	Nonparametric-Control vs Treatments	**Official Results:**	Yes
Batch ID:	09-9580-3918	**Test Type:**	Growth-Survival (7d)	**Analyst:**	Joe Freas
Start Date:	28 Oct-16 13:58	**Protocol:**	EPA/600/R-95/136 (1995)	**Diluent:**	Laboratory Seawater
Ending Date:	04 Nov-16 12:00	**Species:**	Atherinops affinis	**Brine:**	Not Applicable
Duration:	6d 22h	**Source:**	Aquatic Biosystems, CO	**Age:**	
Sample ID:	18-0695-0563	**Code:**	VCF1016.344	**Client:**	VCWPD
Sample Date:	28 Oct-16 07:20	**Material:**	Sample Water	**Project:**	2016/17-1 (Wet)
Receipt Date:	28 Oct-16 09:47	**Source:**	Bioassay Report		
Sample Age:	7h	**Station:**	ME-VR2		

Data Transform	Alt Hyp	NOEL	LOEL	TOEL	TU	PMSD
Angular (Corrected)	C > T	100	> 100	n/a	1	8.20%

Steel Many-One Rank Sum Test

Control	vs	Conc-%	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Negative Control		6.25	27.5	16	1	8	Asymp	0.8333	Non-Significant Effect
		12.5	27.5	16	1	8	Asymp	0.8333	Non-Significant Effect
		25	27.5	16	1	8	Asymp	0.8333	Non-Significant Effect
		50	25	16	1	8	Asymp	0.6353	Non-Significant Effect
		100	27.5	16	1	8	Asymp	0.8333	Non-Significant Effect

Test Acceptability Criteria

		TAC Limits			
Attribute	**Test Stat**	**Lower**	**Upper**	**Overlap**	**Decision**
Control Resp	1	0.8	>>	Yes	Passes Acceptibility Criteria

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0094513	0.0018903	5	1	0.4389	Non-Significant Effect
Error	0.0453663	0.0018903	24			
Total	0.0548176		29			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Levene Equality of Variance Test	7.111	3.895	3.3E-04	Unequal Variances
Variances	Mod Levene Equality of Variance Test	1	4.248	0.4457	Equal Variances
Distribution	Anderson-Darling A2 Normality Test	7.95	3.878	<1.0E-37	Non-Normal Distribution
Distribution	D'Agostino Kurtosis Test	4.912	2.576	9.0E-07	Non-Normal Distribution
Distribution	D'Agostino Skewness Test	5.58	2.576	<1.0E-37	Non-Normal Distribution
Distribution	D'Agostino-Pearson K2 Omnibus Test	55.27	9.21	<1.0E-37	Non-Normal Distribution
Distribution	Kolmogorov-Smirnov D Test	0.4667	0.1853	6.1E-19	Non-Normal Distribution
Distribution	Shapiro-Wilk W Normality Test	0.4063	0.9031	6.2E-10	Non-Normal Distribution

7d Survival Rate Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	N	5	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	0.00%
6.25		5	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	0.00%
12.5		5	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	0.00%
25		5	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	0.00%
50		5	0.9600	0.8489	1.0000	1.0000	0.8000	1.0000	0.0400	9.32%	4.00%
100		5	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	0.00%

Pacific Topsmelt 7-d Survival and Growth Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Analysis ID: 06-5968-5653 **Endpoint:** 7d Survival Rate **CETIS Version:** CETISv1.9.2
Analyzed: 02 Dec-16 10:04 **Analysis:** Nonparametric-Control vs Treatments **Official Results:** Yes

Angular (Corrected) Transformed Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	N	5	1.345	1.345	1.346	1.345	1.345	1.345	0	0.00%	0.00%
6.25		5	1.345	1.345	1.346	1.345	1.345	1.345	0	0.00%	0.00%
12.5		5	1.345	1.345	1.346	1.345	1.345	1.345	0	0.00%	0.00%
25		5	1.345	1.345	1.346	1.345	1.345	1.345	0	0.00%	0.00%
50		5	1.298	1.165	1.43	1.345	1.107	1.345	0.04763	8.21%	3.54%
100		5	1.345	1.345	1.346	1.345	1.345	1.345	0	0.00%	0.00%

7d Survival Rate Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	N	1.0000	1.0000	1.0000	1.0000	1.0000
6.25		1.0000	1.0000	1.0000	1.0000	1.0000
12.5		1.0000	1.0000	1.0000	1.0000	1.0000
25		1.0000	1.0000	1.0000	1.0000	1.0000
50		1.0000	1.0000	1.0000	0.8000	1.0000
100		1.0000	1.0000	1.0000	1.0000	1.0000

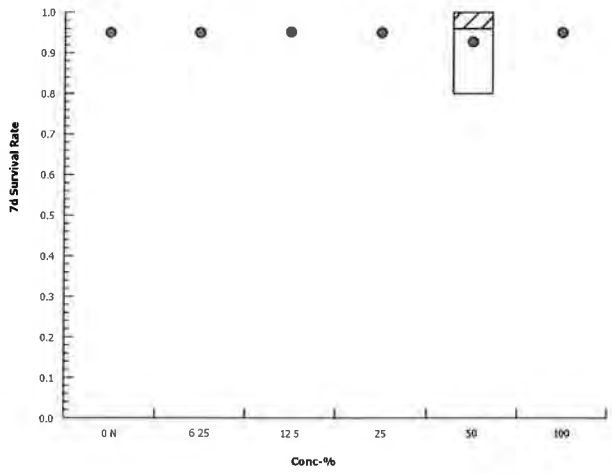
Angular (Corrected) Transformed Detail

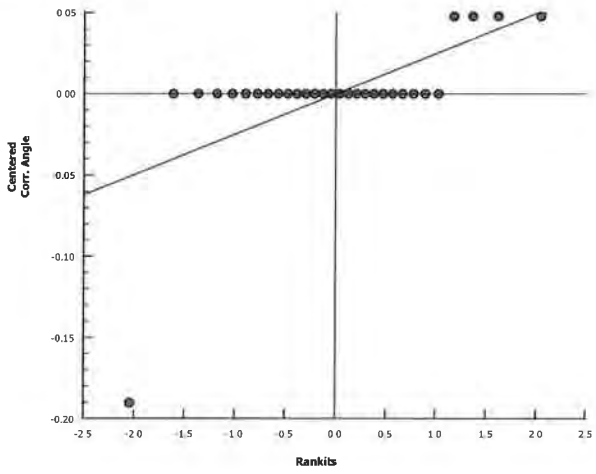
Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	N	1.345	1.345	1.345	1.345	1.345
6.25		1.345	1.345	1.345	1.345	1.345
12.5		1.345	1.345	1.345	1.345	1.345
25		1.345	1.345	1.345	1.345	1.345
50		1.345	1.345	1.345	1.107	1.345
100		1.345	1.345	1.345	1.345	1.345

7d Survival Rate Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	N	5/5	5/5	5/5	5/5	5/5
6.25		5/5	5/5	5/5	5/5	5/5
12.5		5/5	5/5	5/5	5/5	5/5
25		5/5	5/5	5/5	5/5	5/5
50		5/5	5/5	5/5	4/5	5/5
100		5/5	5/5	5/5	5/5	5/5

Graphics





Pacific Topsmelt 7-d Survival and Growth Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Analysis ID:	00-7729-3231	**Endpoint:**	Mean Dry Biomass-mg	**CETIS Version:**	CETISv1.9.2
Analyzed:	02 Dec-16 10:03	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes
Batch ID:	09-9580-3918	**Test Type:**	Growth-Survival (7d)	**Analyst:**	Joe Freas
Start Date:	28 Oct-16 13:58	**Protocol:**	EPA/600/R-95/136 (1995)	**Diluent:**	Laboratory Seawater
Ending Date:	04 Nov-16 12:00	**Species:**	Atherinops affinis	**Brine:**	Not Applicable
Duration:	6d 22h	**Source:**	Aquatic Biosystems, CO	**Age:**	
Sample ID:	18-0695-0563	**Code:**	VCF1016.344	**Client:**	VCWPD
Sample Date:	28 Oct-16 07:20	**Material:**	Sample Water	**Project:**	2016/17-1 (Wet)
Receipt Date:	28 Oct-16 09:47	**Source:**	Bioassay Report		
Sample Age:	7h	**Station:**	ME-VR2		

Data Transform	Alt Hyp	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	C > T	100	> 100	n/a	1	14.90%

Dunnett Multiple Comparison Test

Control	vs	Conc-%	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Negative Control		6.25	0.4452	2.362	0.301	8	CDF	0.6706	Non-Significant Effect
		12.5	-1.505	2.362	0.301	8	CDF	0.9963	Non-Significant Effect
		25	-2.727	2.362	0.301	8	CDF	0.9999	Non-Significant Effect
		50	-2.329	2.362	0.301	8	CDF	0.9998	Non-Significant Effect
		100	-3.668	2.362	0.301	8	CDF	1.0000	Non-Significant Effect

Test Acceptability Criteria

		TAC Limits			
Attribute	**Test Stat**	**Lower**	**Upper**	**Overlap**	**Decision**
Control Resp	2.023	0.85	>>	Yes	Passes Acceptibility Criteria

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.04398	0.208796	5	5.13	0.0024	Significant Effect
Error	0.976819	0.0407008	24			
Total	2.0208		29			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance Test	11.18	15.09	0.0480	Equal Variances
Variances	Levene Equality of Variance Test	1.52	3.895	0.2209	Equal Variances
Variances	Mod Levene Equality of Variance Test	1.449	4.248	0.2548	Equal Variances
Distribution	Anderson-Darling A2 Normality Test	0.4769	3.878	0.2418	Normal Distribution
Distribution	D'Agostino Kurtosis Test	0.4603	2.576	0.6453	Normal Distribution
Distribution	D'Agostino Skewness Test	1.046	2.576	0.2954	Normal Distribution
Distribution	D'Agostino-Pearson K2 Omnibus Test	1.307	9.21	0.5203	Normal Distribution
Distribution	Kolmogorov-Smirnov D Test	0.1369	0.1853	0.1576	Normal Distribution
Distribution	Shapiro-Wilk W Normality Test	0.9629	0.9031	0.3657	Normal Distribution

Mean Dry Biomass-mg Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	N	5	2.023	1.815	2.23	2.012	1.792	2.26	0.07478	8.27%	0.00%
6.25		5	1.966	1.925	2.007	1.962	1.932	2.02	0.01464	1.67%	2.81%
12.5		5	2.215	1.97	2.46	2.156	2.034	2.494	0.08826	8.91%	-9.49%
25		5	2.371	2.103	2.638	2.344	2.056	2.594	0.09629	9.08%	-17.20%
50		5	2.32	2.049	2.591	2.296	2.07	2.546	0.09762	9.41%	-14.69%
100		5	2.491	2.135	2.847	2.56	2.022	2.796	0.1282	11.51%	-23.14%

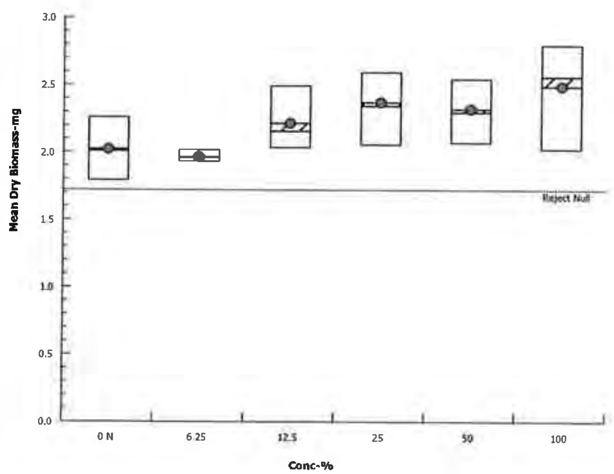
Pacific Topsmelt 7-d Survival and Growth Test — **Aquatic Bioassay & Consulting Labs, Inc.**

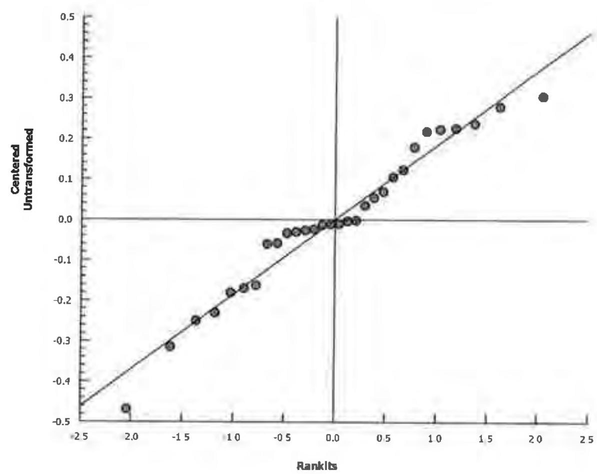
Analysis ID:	00-7729-3231	**Endpoint:**	Mean Dry Biomass-mg	**CETIS Version:**	CETISv1.9.2
Analyzed:	02 Dec-16 10:03	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes

Mean Dry Biomass-mg Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	N	2.012	1.792	1.992	2.26	2.058
6.25		1.932	1.962	2.02	1.964	1.952
12.5		2.338	2.494	2.034	2.156	2.052
25		2.594	2.31	2.55	2.056	2.344
50		2.296	2.546	2.538	2.15	2.07
100		2.796	2.56	2.596	2.48	2.022

Graphics





CETIS Analytical Report

Pacific Topsmelt 7-d Survival and Growth Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Analysis ID:	10-9246-6424	**Endpoint:**	7d Survival Rate	**CETIS Version:**	CETISv1.9.2
Analyzed:	02 Dec-16 10:04	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	09-9580-3918	**Test Type:**	Growth-Survival (7d)	**Analyst:**	Joe Freas
Start Date:	28 Oct-16 13:58	**Protocol:**	EPA/600/R-95/136 (1995)	**Diluent:**	Laboratory Seawater
Ending Date:	04 Nov-16 12:00	**Species:**	Atherinops affinis	**Brine:**	Not Applicable
Duration:	6d 22h	**Source:**	Aquatic Biosystems, CO	**Age:**	
Sample ID:	18-0695-0563	**Code:**	VCF1016.344	**Client:**	VCWPD
Sample Date:	28 Oct-16 07:20	**Material:**	Sample Water	**Project:**	2016/17-1 (Wet)
Receipt Date:	28 Oct-16 09:47	**Source:**	Bioassay Report		
Sample Age:	7h	**Station:**	ME-VR2		

Linear Interpolation Options

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

Test Acceptability Criteria

		TAC Limits			
Attribute	**Test Stat**	**Lower**	**Upper**	**Overlap**	**Decision**
Control Resp	1	0.8	>>	Yes	Passes Acceptibility Criteria

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC5	>100	n/a	n/a	<1	n/a	n/a
EC10	>100	n/a	n/a	<1	n/a	n/a
EC15	>100	n/a	n/a	<1	n/a	n/a
EC20	>100	n/a	n/a	<1	n/a	n/a
EC25	>100	n/a	n/a	<1	n/a	n/a
EC40	>100	n/a	n/a	<1	n/a	n/a
EC50	>100	n/a	n/a	<1	n/a	n/a

7d Survival Rate Summary

			Calculated Variate(A/B)								
Conc-%	**Code**	**Count**	**Mean**	**Min**	**Max**	**Std Err**	**Std Dev**	**CV%**	**%Effect**	**A**	**B**
0	N	5	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.0%	25	25
6.25		5	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.0%	25	25
12.5		5	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.0%	25	25
25		5	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.0%	25	25
50		5	0.9600	0.8000	1.0000	0.0400	0.0894	9.32%	4.0%	24	25
100		5	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.0%	25	25

7d Survival Rate Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	N	1.0000	1.0000	1.0000	1.0000	1.0000
6.25		1.0000	1.0000	1.0000	1.0000	1.0000
12.5		1.0000	1.0000	1.0000	1.0000	1.0000
25		1.0000	1.0000	1.0000	1.0000	1.0000
50		1.0000	1.0000	1.0000	0.8000	1.0000
100		1.0000	1.0000	1.0000	1.0000	1.0000

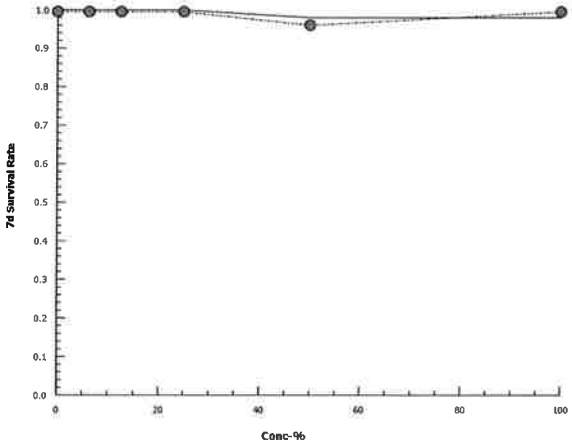
7d Survival Rate Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	N	5/5	5/5	5/5	5/5	5/5
6.25		5/5	5/5	5/5	5/5	5/5
12.5		5/5	5/5	5/5	5/5	5/5
25		5/5	5/5	5/5	5/5	5/5
50		5/5	5/5	5/5	4/5	5/5
100		5/5	5/5	5/5	5/5	5/5

Pacific Topsmelt 7-d Survival and Growth Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Analysis ID:	10-9246-6424	**Endpoint:**	7d Survival Rate	**CETIS Version:**	CETISv1.9.2
Analyzed:	02 Dec-16 10:04	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



Pacific Topsmelt 7-d Survival and Growth Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Analysis ID:	19-8021-9560	**Endpoint:**	Mean Dry Biomass-mg	**CETIS Version:**	CETISv1.9.2
Analyzed:	02 Dec-16 10:04	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	09-9580-3918	**Test Type:**	Growth-Survival (7d)	**Analyst:**	Joe Freas
Start Date:	28 Oct-16 13:58	**Protocol:**	EPA/600/R-95/136 (1995)	**Diluent:**	Laboratory Seawater
Ending Date:	04 Nov-16 12:00	**Species:**	Atherinops affinis	**Brine:**	Not Applicable
Duration:	6d 22h	**Source:**	Aquatic Biosystems, CO	**Age:**	
Sample ID:	18-0695-0563	**Code:**	VCF1016.344	**Client:**	VCWPD
Sample Date:	28 Oct-16 07:20	**Material:**	Sample Water	**Project:**	2016/17-1 (Wet)
Receipt Date:	28 Oct-16 09:47	**Source:**	Bioassay Report		
Sample Age:	7h	**Station:**	ME-VR2		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Linear	Linear	1686824	280	Yes	Two-Point Interpolation

Test Acceptability Criteria

		TAC Limits			
Attribute	**Test Stat**	**Lower**	**Upper**	**Overlap**	**Decision**
Control Resp	2.023	0.85	>>	Yes	Passes Acceptibility Criteria

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	>100	n/a	n/a	<1	n/a	n/a
IC10	>100	n/a	n/a	<1	n/a	n/a
IC15	>100	n/a	n/a	<1	n/a	n/a
IC20	>100	n/a	n/a	<1	n/a	n/a
IC25	>100	n/a	n/a	<1	n/a	n/a
IC40	>100	n/a	n/a	<1	n/a	n/a
IC50	>100	n/a	n/a	<1	n/a	n/a

Mean Dry Biomass-mg Summary

			Calculated Variate						
Conc-%	**Code**	**Count**	**Mean**	**Min**	**Max**	**Std Err**	**Std Dev**	**CV%**	**%Effect**
0	N	5	2.023	1.792	2.26	0.07478	0.1672	8.27%	0.0%
6.25		5	1.966	1.932	2.02	0.01464	0.03274	1.67%	2.81%
12.5		5	2.215	2.034	2.494	0.08826	0.1973	8.91%	-9.49%
25		5	2.371	2.056	2.594	0.09629	0.2153	9.08%	-17.2%
50		5	2.32	2.07	2.546	0.09762	0.2183	9.41%	-14.69%
100		5	2.491	2.022	2.796	0.1282	0.2867	11.51%	-23.14%

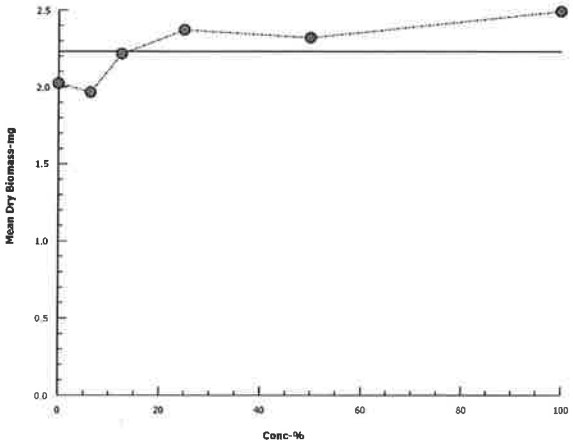
Mean Dry Biomass-mg Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	N	2.012	1.792	1.992	2.26	2.058
6.25		1.932	1.962	2.02	1.964	1.952
12.5		2.338	2.494	2.034	2.156	2.052
25		2.594	2.31	2.55	2.056	2.344
50		2.296	2.546	2.538	2.15	2.07
100		2.796	2.56	2.596	2.48	2.022

Pacific Topsmelt 7-d Survival and Growth Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Analysis ID:	19-8021-9560	**Endpoint:**	Mean Dry Biomass-mg	**CETIS Version:**	CETISv1.9.2
Analyzed:	02 Dec-16 10:04	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



Pacific Topsmelt 7-d Survival and Growth Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Batch ID:	09-9580-3918	**Test Type:**	Growth-Survival (7d)	**Analyst:**	Joe Freas
Start Date:	28 Oct-16 13:58	**Protocol:**	EPA/600/R-95/136 (1995)	**Diluent:**	Laboratory Seawater
Ending Date:	04 Nov-16 12:00	**Species:**	Atherinops affinis	**Brine:**	Not Applicable
Duration:	6d 22h	**Source:**	Aquatic Biosystems, CO	**Age:**	
Sample ID:	18-0695-0563	**Code:**	VCF1016.344	**Client:**	VCWPD
Sample Date:	28 Oct-16 07:20	**Material:**	Sample Water	**Project:**	2016/17-1 (Wet)
Receipt Date:	28 Oct-16 09:47	**Source:**	Bioassay Report		
Sample Age:	7h	**Station:**	ME-VR2		

Dissolved Oxygen-mg/L

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	8	7.1	6.797	7.403	6.7	7.6	0.1282	0.3625	5.11%	0
6.25		8	6.888	6.774	7.001	6.7	7.1	0.04795	0.1356	1.97%	0
12.5		8	6.875	6.535	7.215	6.3	7.6	0.1436	0.4062	5.91%	0
25		8	6.775	6.479	7.071	6.3	7.3	0.125	0.3536	5.22%	0
50		8	6.7	6.295	7.105	6.3	7.6	0.1711	0.484	7.22%	0
100		8	6.275	5.582	6.968	5.2	7.2	0.2932	0.8294	13.22%	0
Overall		48	6.769	6.618	6.919	5.2	7.6	0.07474	0.5178	7.65%	0 (0%)

pH-Units

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	8	7.3	7.191	7.409	7	7.4	0.04629	0.1309	1.79%	0
6.25		8	7.625	7.501	7.749	7.4	7.8	0.05261	0.1488	1.95%	0
12.5		8	7.625	7.493	7.757	7.4	7.8	0.0559	0.1581	2.07%	0
25		8	7.7	7.566	7.834	7.5	7.9	0.05669	0.1604	2.08%	0
50		8	7.738	7.604	7.871	7.5	7.9	0.0565	0.1598	2.07%	0
100		8	7.763	7.637	7.888	7.5	7.9	0.05324	0.1506	1.94%	0
Overall		48	7.625	7.563	7.687	7	7.9	0.03058	0.2119	2.78%	0 (0%)

Salinity-ppt

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	8	25	25	25	25	25	0	0	0.0%	0
6.25		8	25	25	25	25	25	0	0	0.0%	0
12.5		8	25	25	25	25	25	0	0	0.0%	0
25		8	25	25	25	25	25	0	0	0.0%	0
50		8	25	25	25	25	25	0	0	0.0%	0
100		8	25	25	25	25	25	0	0	0.0%	0
Overall		48	25	25	25	25	25	0	0	0.00%	0 (0%)

Temperature-°C

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	8	21	21	21	21	21	0	0	0.0%	0
6.25		8	21	21	21	21	21	0	0	0.0%	0
12.5		8	21	21	21	21	21	0	0	0.0%	0
25		8	21	21	21	21	21	0	0	0.0%	0
50		8	21	21	21	21	21	0	0	0.0%	0
100		8	21	21	21	21	21	0	0	0.0%	0
Overall		48	21	21	21	21	21	0	0	0.00%	0 (0%)

Pacific Topsmelt 7-d Survival and Growth Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Dissolved Oxygen-mg/L

Conc-%	Code	1	2	3	4	5	6	7	8
0	N	6.7	6.8	7.2	7.6	7.1	6.7	7.1	7.6
6.25		7	6.8	6.9	7.1	6.8	6.8	6.7	7
12.5		7	6.9	6.5	7.6	6.8	6.7	7.2	6.3
25		7.1	6.8	6.4	7.3	6.8	6.5	7	6.3
50		7.2	6.8	6.3	7.6	6.7	6.3	6.4	6.3
100		7.1	6.4	5.8	7.2	7.2	5.2	5.3	6

pH-Units

Conc-%	Code	1	2	3	4	5	6	7	8
0	N	7.3	7.3	7.4	7.4	7	7.3	7.3	7.4
6.25		7.7	7.8	7.7	7.4	7.5	7.6	7.5	7.8
12.5		7.8	7.8	7.7	7.4	7.7	7.6	7.4	7.6
25		7.8	7.9	7.7	7.5	7.7	7.6	7.5	7.9
50		7.8	7.9	7.8	7.9	7.5	7.8	7.7	7.5
100		7.9	7.9	7.8	7.5	7.9	7.8	7.7	7.6

Salinity-ppt

Conc-%	Code	1	2	3	4	5	6	7	8
0	N	25	25	25	25	25	25	25	25
6.25		25	25	25	25	25	25	25	25
12.5		25	25	25	25	25	25	25	25
25		25	25	25	25	25	25	25	25
50		25	25	25	25	25	25	25	25
100		25	25	25	25	25	25	25	25

Temperature-°C

Conc-%	Code	1	2	3	4	5	6	7	8
0	N	21	21	21	21	21	21	21	21
6.25		21	21	21	21	21	21	21	21
12.5		21	21	21	21	21	21	21	21
25		21	21	21	21	21	21	21	21
50		21	21	21	21	21	21	21	21
100		21	21	21	21	21	21	21	21

aquatic bioassay & consulting laboratories, inc

December 6, 2016

Mr. Arne Anselm
Ventura County Watershed Protection District
800 South Victoria Ave
Ventura, CA 93009

Dear Mr. Anselm:

We are pleased to present the enclosed bioassay report. The test was conducted under guidelines prescribed in *Short-Term Methods for Measuring the Chronic Toxicity of Effluents and Receving Waters to West Coast Estuarine Organisms, EPA/821/R-02-014.* Results were as follows:

CLIENT:	Ventura County Flood Control
SAMPLE I.D.:	ME-CC
DATE RECEIVED:	10/28/2016
ABC LAB. NO.:	VCF1016.352

CHRONIC TOPSMELT SURVIVAL AND GROWTH BIOASSAY

Survival	NOEC	=	100.00
	TUc	=	1.00
	IC25	=	>100.00 %
	IC50	=	>100.00 %
Biomass	NOEC	=	100.00 %
	TUc	=	1.00
	IC25	=	>100.00 %
	IC50	=	>100.00 %

Yours very truly,

Scott Johnson
Laboratory Director

Pacific Topsmelt 7-d Survival and Growth Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Batch ID:	11-9003-1853	**Test Type:**	Growth-Survival (7d)	**Analyst:**	Joe Freas
Start Date:	28 Oct-16 14:14	**Protocol:**	EPA/600/R-95/136 (1995)	**Diluent:**	Laboratory Seawater
Ending Date:	04 Nov-16 13:15	**Species:**	Atherinops affinis	**Brine:**	Not Applicable
Duration:	6d 23h	**Source:**	Aquatic Biosystems, CO	**Age:**	
Sample ID:	18-0481-5018	**Code:**	VCF1016.352	**Client:**	VCWPD
Sample Date:	28 Oct-16 09:00	**Material:**	Sample Water	**Project:**	2016/17-1 (Wet)
Receipt Date:	28 Oct-16 10:05	**Source:**	Bioassay Report		
Sample Age:	5h	**Station:**	ME-CC		

Multiple Comparison Summary

Analysis ID	Endpoint	Comparison Method	NOEL	LOEL	TOEL	TU	PMSD	✓
19-4489-1575	7d Survival Rate	Steel Many-One Rank Sum Test	100	> 100	n/a	1	8.2%	
19-5200-9131	Mean Dry Biomass-mg	Dunnett Multiple Comparison Test	100	> 100	n/a	1	16.5%	

Point Estimate Summary

Analysis ID	Endpoint	Point Estimate Method	Level	%	95% LCL	95% UCL	TU	✓
05-3617-7006	7d Survival Rate	Linear Interpolation (ICPIN)	EC5	>100	n/a	n/a	<1	
			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	✓
03-1527-6458	Mean Dry Biomass-mg	Linear Interpolation (ICPIN)	IC5	37.58	24.53	n/a	2.661	✓
			IC10	>100	n/a	n/a	<1	✓
			IC15	>100	n/a	n/a	<1	✓
			IC20	>100	n/a	n/a	<1	✓
			IC25	>100	n/a	n/a	<1	✓
			IC40	>100	n/a	n/a	<1	✓
			IC50	>100	n/a	n/a	<1	✓

Test Acceptability

				TAC Limits			
Analysis ID	**Endpoint**	**Attribute**	**Test Stat**	**Lower**	**Upper**	**Overlap**	**Decision**
05-3617-7006	7d Survival Rate	Control Resp	1	0.8	>>	Yes	Passes Acceptibility Criteria
19-4489-1575	7d Survival Rate	Control Resp	1	0.8	>>	Yes	Passes Acceptibility Criteria
03-1527-6458	Mean Dry Biomass-mg	Control Resp	2.104	0.85	>>	Yes	Passes Acceptibility Criteria
19-5200-9131	Mean Dry Biomass-mg	Control Resp	2.104	0.85	>>	Yes	Passes Acceptibility Criteria

7d Survival Rate Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	N	5	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
6.25		5	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
12.5		5	0.9600	0.8489	1.0000	0.8000	1.0000	0.0400	0.0894	9.32%	4.00%
25		5	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
50		5	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
100		5	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%

Mean Dry Biomass-mg Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	N	5	2.104	1.894	2.313	1.808	2.224	0.0754	0.1686	8.02%	0.00%
6.25		5	2.294	1.941	2.646	1.946	2.608	0.1269	0.2837	12.37%	-9.03%
12.5		5	2.173	1.995	2.351	1.978	2.322	0.06404	0.1432	6.59%	-3.29%
25		5	2.39	2.018	2.763	2.15	2.896	0.1343	0.3002	12.56%	-13.63%
50		5	1.98	1.743	2.217	1.698	2.172	0.08522	0.1906	9.62%	5.88%
100		5	2.055	1.735	2.376	1.63	2.282	0.1154	0.2582	12.56%	2.30%

Analyst: _____ QA: _____

Pacific Topsmelt 7-d Survival and Growth Test — **Aquatic Bioassay & Consulting Labs, Inc.**

7d Survival Rate Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	N	1.0000	1.0000	1.0000	1.0000	1.0000
6.25		1.0000	1.0000	1.0000	1.0000	1.0000
12.5		1.0000	1.0000	1.0000	1.0000	0.8000
25		1.0000	1.0000	1.0000	1.0000	1.0000
50		1.0000	1.0000	1.0000	1.0000	1.0000
100		1.0000	1.0000	1.0000	1.0000	1.0000

Mean Dry Biomass-mg Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	N	1.808	2.152	2.194	2.224	2.14
6.25		1.946	2.608	2.562	2.14	2.212
12.5		2.322	2.236	2.258	1.978	2.07
25		2.426	2.896	2.222	2.15	2.258
50		2.08	1.878	2.172	2.072	1.698
100		2.282	2.098	2.032	2.234	1.63

7d Survival Rate Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	N	5/5	5/5	5/5	5/5	5/5
6.25		5/5	5/5	5/5	5/5	5/5
12.5		5/5	5/5	5/5	5/5	4/5
25		5/5	5/5	5/5	5/5	5/5
50		5/5	5/5	5/5	5/5	5/5
100		5/5	5/5	5/5	5/5	5/5

CETIS Analytical Report

Pacific Topsmelt 7-d Survival and Growth Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Analysis ID:	19-4489-1575	**Endpoint:**	7d Survival Rate	**CETIS Version:**	CETISv1.9.2
Analyzed:	02 Dec-16 11:13	**Analysis:**	Nonparametric-Control vs Treatments	**Official Results:**	Yes
Batch ID:	11-9003-1853	**Test Type:**	Growth-Survival (7d)	**Analyst:**	Joe Freas
Start Date:	28 Oct-16 14:14	**Protocol:**	EPA/600/R-95/136 (1995)	**Diluent:**	Laboratory Seawater
Ending Date:	04 Nov-16 13:15	**Species:**	Atherinops affinis	**Brine:**	Not Applicable
Duration:	6d 23h	**Source:**	Aquatic Biosystems, CO	**Age:**	
Sample ID:	18-0481-5018	**Code:**	VCF1016.352	**Client:**	VCWPD
Sample Date:	28 Oct-16 09:00	**Material:**	Sample Water	**Project:**	2016/17-1 (Wet)
Receipt Date:	28 Oct-16 10:05	**Source:**	Bioassay Report		
Sample Age:	5h	**Station:**	ME-CC		

Data Transform	Alt Hyp	NOEL	LOEL	TOEL	TU	PMSD
Angular (Corrected)	C > T	100	> 100	n/a	1	8.20%

Steel Many-One Rank Sum Test

Control	vs	Conc-%	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Negative Control		6.25	27.5	16	1	8	Asymp	0.8333	Non-Significant Effect
		12.5	25	16	1	8	Asymp	0.6353	Non-Significant Effect
		25	27.5	16	1	8	Asymp	0.8333	Non-Significant Effect
		50	27.5	16	1	8	Asymp	0.8333	Non-Significant Effect
		100	27.5	16	1	8	Asymp	0.8333	Non-Significant Effect

Test Acceptability Criteria

		TAC Limits			
Attribute	**Test Stat**	**Lower**	**Upper**	**Overlap**	**Decision**
Control Resp	1	0.8	>>	Yes	Passes Acceptibility Criteria

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0094513	0.0018903	5	1	0.4389	Non-Significant Effect
Error	0.0453663	0.0018903	24			
Total	0.0548176		29			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Levene Equality of Variance Test	7.111	3.895	3.3E-04	Unequal Variances
Variances	Mod Levene Equality of Variance Test	1	4.248	0.4457	Equal Variances
Distribution	Anderson-Darling A2 Normality Test	7.95	3.878	<1.0E-37	Non-Normal Distribution
Distribution	D'Agostino Kurtosis Test	4.912	2.576	9.0E-07	Non-Normal Distribution
Distribution	D'Agostino Skewness Test	5.58	2.576	<1.0E-37	Non-Normal Distribution
Distribution	D'Agostino-Pearson K2 Omnibus Test	55.27	9.21	<1.0E-37	Non-Normal Distribution
Distribution	Kolmogorov-Smirnov D Test	0.4667	0.1853	6.1E-19	Non-Normal Distribution
Distribution	Shapiro-Wilk W Normality Test	0.4063	0.9031	6.2E-10	Non-Normal Distribution

7d Survival Rate Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	N	5	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	0.00%
6.25		5	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	0.00%
12.5		5	0.9600	0.8489	1.0000	1.0000	0.8000	1.0000	0.0400	9.32%	4.00%
25		5	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	0.00%
50		5	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	0.00%
100		5	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	0.00%

Pacific Topsmelt 7-d Survival and Growth Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Analysis ID:	19-4489-1575	**Endpoint:**	7d Survival Rate	**CETIS Version:**	CETISv1.9.2
Analyzed:	02 Dec-16 11:13	**Analysis:**	Nonparametric-Control vs Treatments	**Official Results:**	Yes

Angular (Corrected) Transformed Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	N	5	1.345	1.345	1.346	1.345	1.345	1.345	0	0.00%	0.00%
6.25		5	1.345	1.345	1.346	1.345	1.345	1.345	0	0.00%	0.00%
12.5		5	1.298	1.165	1.43	1.345	1.107	1.345	0.04763	8.21%	3.54%
25		5	1.345	1.345	1.346	1.345	1.345	1.345	0	0.00%	0.00%
50		5	1.345	1.345	1.346	1.345	1.345	1.345	0	0.00%	0.00%
100		5	1.345	1.345	1.346	1.345	1.345	1.345	0	0.00%	0.00%

7d Survival Rate Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	N	1.0000	1.0000	1.0000	1.0000	1.0000
6.25		1.0000	1.0000	1.0000	1.0000	1.0000
12.5		1.0000	1.0000	1.0000	1.0000	0.8000
25		1.0000	1.0000	1.0000	1.0000	1.0000
50		1.0000	1.0000	1.0000	1.0000	1.0000
100		1.0000	1.0000	1.0000	1.0000	1.0000

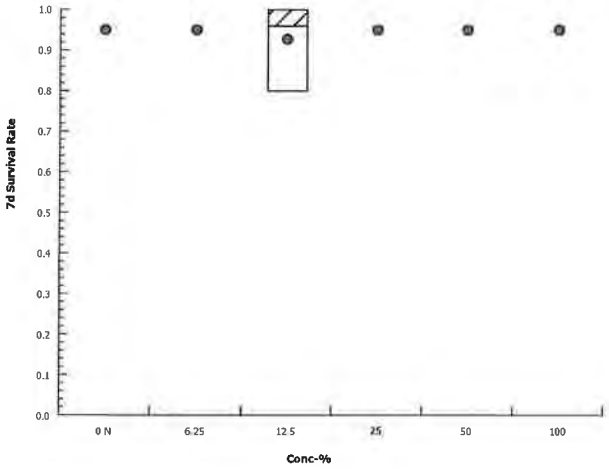
Angular (Corrected) Transformed Detail

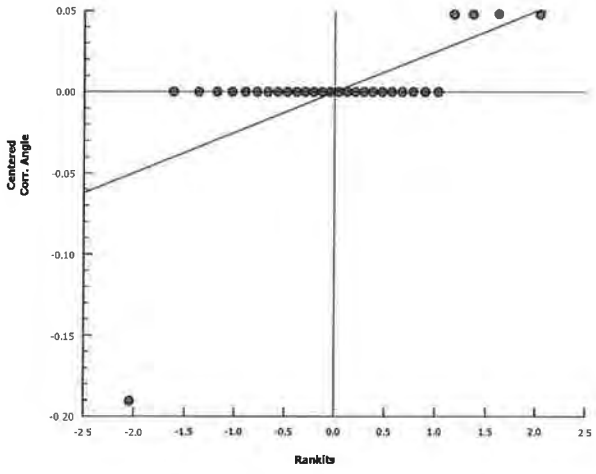
Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	N	1.345	1.345	1.345	1.345	1.345
6.25		1.345	1.345	1.345	1.345	1.345
12.5		1.345	1.345	1.345	1.345	1.107
25		1.345	1.345	1.345	1.345	1.345
50		1.345	1.345	1.345	1.345	1.345
100		1.345	1.345	1.345	1.345	1.345

7d Survival Rate Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	N	5/5	5/5	5/5	5/5	5/5
6.25		5/5	5/5	5/5	5/5	5/5
12.5		5/5	5/5	5/5	5/5	4/5
25		5/5	5/5	5/5	5/5	5/5
50		5/5	5/5	5/5	5/5	5/5
100		5/5	5/5	5/5	5/5	5/5

Graphics





CETIS Analytical Report

Pacific Topsmelt 7-d Survival and Growth Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Analysis ID:	19-5200-9131	**Endpoint:**	Mean Dry Biomass-mg	**CETIS Version:**	CETISv1.9.2
Analyzed:	02 Dec-16 11:13	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes
Batch ID:	11-9003-1853	**Test Type:**	Growth-Survival (7d)	**Analyst:**	Joe Freas
Start Date:	28 Oct-16 14:14	**Protocol:**	EPA/600/R-95/136 (1995)	**Diluent:**	Laboratory Seawater
Ending Date:	04 Nov-16 13:15	**Species:**	Atherinops affinis	**Brine:**	Not Applicable
Duration:	6d 23h	**Source:**	Aquatic Biosystems, CO	**Age:**	
Sample ID:	18-0481-5018	**Code:**	VCF1016.352	**Client:**	VCWPD
Sample Date:	28 Oct-16 09:00	**Material:**	Sample Water	**Project:**	2016/17-1 (Wet)
Receipt Date:	28 Oct-16 10:05	**Source:**	Bioassay Report		
Sample Age:	5h	**Station:**	ME-CC		

Data Transform	Alt Hyp	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	C > T	100	> 100	n/a	1	16.46%

Dunnett Multiple Comparison Test

Control vs	Conc-%	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Negative Control	6.25	-1.296	2.362	0.346	8	CDF	0.9929	Non-Significant Effect
	12.5	-0.4719	2.362	0.346	8	CDF	0.9361	Non-Significant Effect
	25	-1.956	2.362	0.346	8	CDF	0.9992	Non-Significant Effect
	50	0.8429	2.362	0.346	8	CDF	0.4912	Non-Significant Effect
	100	0.3301	2.362	0.346	8	CDF	0.7181	Non-Significant Effect

Test Acceptability Criteria

Attribute	Test Stat	TAC Limits Lower	Upper	Overlap	Decision
Control Resp	2.104	0.85	>>	Yes	Passes Acceptibility Criteria

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.587249	0.11745	5	2.185	0.0895	Non-Significant Effect
Error	1.29012	0.0537548	24			
Total	1.87736		29			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance Test	3.125	15.09	0.6807	Equal Variances
Variances	Levene Equality of Variance Test	0.7754	3.895	0.5770	Equal Variances
Variances	Mod Levene Equality of Variance Test	0.4776	4.248	0.7883	Equal Variances
Distribution	Anderson-Darling A2 Normality Test	0.2563	3.878	0.7502	Normal Distribution
Distribution	D'Agostino Kurtosis Test	0.1932	2.576	0.8468	Normal Distribution
Distribution	D'Agostino Skewness Test	0.1079	2.576	0.9141	Normal Distribution
Distribution	D'Agostino-Pearson K2 Omnibus Test	0.04895	9.21	0.9758	Normal Distribution
Distribution	Kolmogorov-Smirnov D Test	0.1337	0.1853	0.1821	Normal Distribution
Distribution	Shapiro-Wilk W Normality Test	0.9856	0.9031	0.9463	Normal Distribution

Mean Dry Biomass-mg Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	N	5	2.104	1.894	2.313	2.152	1.808	2.224	0.0754	8.02%	0.00%
6.25		5	2.294	1.941	2.646	2.212	1.946	2.608	0.1269	12.37%	-9.03%
12.5		5	2.173	1.995	2.351	2.236	1.978	2.322	0.06404	6.59%	-3.29%
25		5	2.39	2.018	2.763	2.258	2.15	2.896	0.1343	12.56%	-13.63%
50		5	1.98	1.743	2.217	2.072	1.698	2.172	0.08522	9.62%	5.88%
100		5	2.055	1.735	2.376	2.098	1.63	2.282	0.1154	12.56%	2.30%

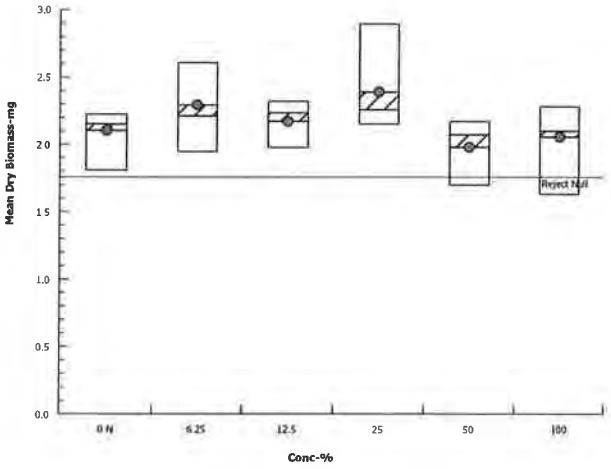
Pacific Topsmelt 7-d Survival and Growth Test — **Aquatic Bioassay & Consulting Labs, Inc.**

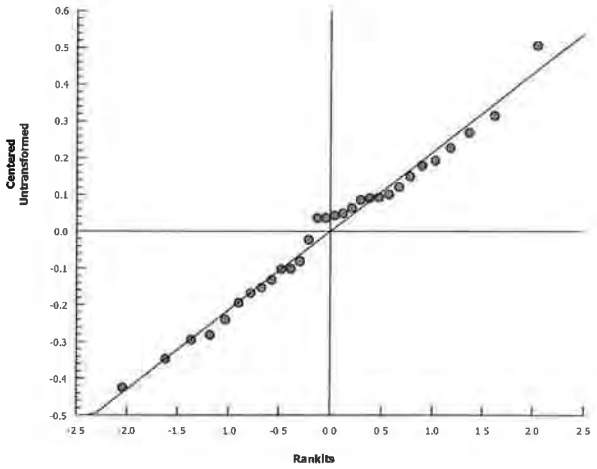
Analysis ID:	19-5200-9131	**Endpoint:**	Mean Dry Biomass-mg	**CETIS Version:**	CETISv1.9.2
Analyzed:	02 Dec-16 11:13	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes

Mean Dry Biomass-mg Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	N	1.808	2.152	2.194	2.224	2.14
6.25		1.946	2.608	2.562	2.14	2.212
12.5		2.322	2.236	2.258	1.978	2.07
25		2.426	2.896	2.222	2.15	2.258
50		2.08	1.878	2.172	2.072	1.698
100		2.282	2.098	2.032	2.234	1.63

Graphics





Pacific Topsmelt 7-d Survival and Growth Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Analysis ID:	05-3617-7006	**Endpoint:**	7d Survival Rate	**CETIS Version:**	CETISv1.9.2
Analyzed:	02 Dec-16 11:13	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	11-9003-1853	**Test Type:**	Growth-Survival (7d)	**Analyst:**	Joe Freas
Start Date:	28 Oct-16 14:14	**Protocol:**	EPA/600/R-95/136 (1995)	**Diluent:**	Laboratory Seawater
Ending Date:	04 Nov-16 13:15	**Species:**	Atherinops affinis	**Brine:**	Not Applicable
Duration:	6d 23h	**Source:**	Aquatic Biosystems, CO	**Age:**	
Sample ID:	18-0481-5018	**Code:**	VCF1016.352	**Client:**	VCWPD
Sample Date:	28 Oct-16 09:00	**Material:**	Sample Water	**Project:**	2016/17-1 (Wet)
Receipt Date:	28 Oct-16 10:05	**Source:**	Bioassay Report		
Sample Age:	5h	**Station:**	ME-CC		

Linear Interpolation Options

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

Test Acceptability Criteria

		TAC Limits			
Attribute	**Test Stat**	**Lower**	**Upper**	**Overlap**	**Decision**
Control Resp	1	0.8	>>	Yes	Passes Acceptibility Criteria

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC5	>100	n/a	n/a	<1	n/a	n/a
EC10	>100	n/a	n/a	<1	n/a	n/a
EC15	>100	n/a	n/a	<1	n/a	n/a
EC20	>100	n/a	n/a	<1	n/a	n/a
EC25	>100	n/a	n/a	<1	n/a	n/a
EC40	>100	n/a	n/a	<1	n/a	n/a
EC50	>100	n/a	n/a	<1	n/a	n/a

7d Survival Rate Summary — **Calculated Variate(A/B)**

Conc-%	Code	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	A	B
0	N	5	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.0%	25	25
6.25		5	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.0%	25	25
12.5		5	0.9600	0.8000	1.0000	0.0400	0.0894	9.32%	4.0%	24	25
25		5	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.0%	25	25
50		5	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.0%	25	25
100		5	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.0%	25	25

7d Survival Rate Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	N	1.0000	1.0000	1.0000	1.0000	1.0000
6.25		1.0000	1.0000	1.0000	1.0000	1.0000
12.5		1.0000	1.0000	1.0000	1.0000	0.8000
25		1.0000	1.0000	1.0000	1.0000	1.0000
50		1.0000	1.0000	1.0000	1.0000	1.0000
100		1.0000	1.0000	1.0000	1.0000	1.0000

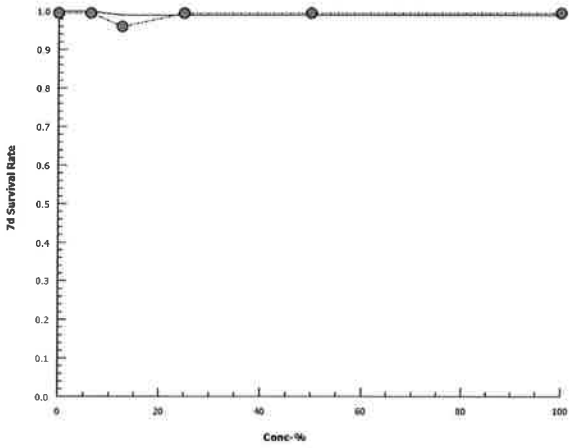
7d Survival Rate Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	N	5/5	5/5	5/5	5/5	5/5
6.25		5/5	5/5	5/5	5/5	5/5
12.5		5/5	5/5	5/5	5/5	4/5
25		5/5	5/5	5/5	5/5	5/5
50		5/5	5/5	5/5	5/5	5/5
100		5/5	5/5	5/5	5/5	5/5

Pacific Topsmelt 7-d Survival and Growth Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Analysis ID:	05-3617-7006	**Endpoint:**	7d Survival Rate	**CETIS Version:**	CETISv1.9.2
Analyzed:	02 Dec-16 11:13	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



Pacific Topsmelt 7-d Survival and Growth Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Analysis ID:	03-1527-6458	**Endpoint:**	Mean Dry Biomass-mg	**CETIS Version:**	CETISv1.9.2
Analyzed:	02 Dec-16 11:13	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	11-9003-1853	**Test Type:**	Growth-Survival (7d)	**Analyst:**	Joe Freas
Start Date:	28 Oct-16 14:14	**Protocol:**	EPA/600/R-95/136 (1995)	**Diluent:**	Laboratory Seawater
Ending Date:	04 Nov-16 13:15	**Species:**	Atherinops affinis	**Brine:**	Not Applicable
Duration:	6d 23h	**Source:**	Aquatic Biosystems, CO	**Age:**	
Sample ID:	18-0481-5018	**Code:**	VCF1016.352	**Client:**	VCWPD
Sample Date:	28 Oct-16 09:00	**Material:**	Sample Water	**Project:**	2016/17-1 (Wet)
Receipt Date:	28 Oct-16 10:05	**Source:**	Bioassay Report		
Sample Age:	5h	**Station:**	ME-CC		

Linear Interpolation Options

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

Test Acceptability Criteria

		TAC Limits			
Attribute	**Test Stat**	**Lower**	**Upper**	**Overlap**	**Decision**
Control Resp	2.104	0.85	>>	Yes	Passes Acceptibility Criteria

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	37.58	24.53	n/a	2.661	n/a	4.076
IC10	>100	n/a	n/a	<1	n/a	n/a
IC15	>100	n/a	n/a	<1	n/a	n/a
IC20	>100	n/a	n/a	<1	n/a	n/a
IC25	>100	n/a	n/a	<1	n/a	n/a
IC40	>100	n/a	n/a	<1	n/a	n/a
IC50	>100	n/a	n/a	<1	n/a	n/a

Mean Dry Biomass-mg Summary

			Calculated Variate						
Conc-%	**Code**	**Count**	**Mean**	**Min**	**Max**	**Std Err**	**Std Dev**	**CV%**	**%Effect**
0	N	5	2.104	1.808	2.224	0.0754	0.1686	8.02%	0.0%
6.25		5	2.294	1.946	2.608	0.1269	0.2837	12.37%	-9.03%
12.5		5	2.173	1.978	2.322	0.06404	0.1432	6.59%	-3.29%
25		5	2.39	2.15	2.896	0.1343	0.3002	12.56%	-13.63%
50		5	1.98	1.698	2.172	0.08522	0.1906	9.62%	5.88%
100		5	2.055	1.63	2.282	0.1154	0.2582	12.56%	2.3%

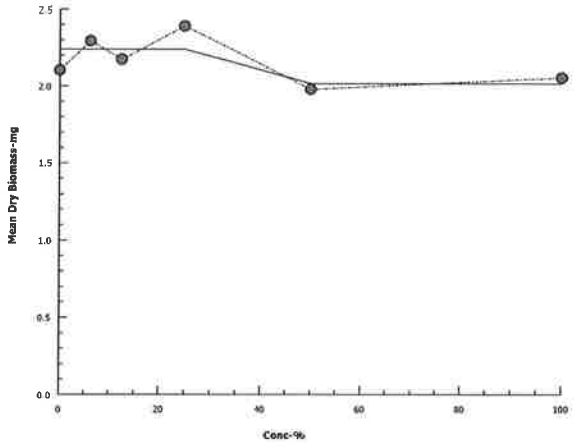
Mean Dry Biomass-mg Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	N	1.808	2.152	2.194	2.224	2.14
6.25		1.946	2.608	2.562	2.14	2.212
12.5		2.322	2.236	2.258	1.978	2.07
25		2.426	2.896	2.222	2.15	2.258
50		2.08	1.878	2.172	2.072	1.698
100		2.282	2.098	2.032	2.234	1.63

Pacific Topsmelt 7-d Survival and Growth Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Analysis ID:	03-1527-6458	**Endpoint:**	Mean Dry Biomass-mg	**CETIS Version:**	CETISv1.9.2
Analyzed:	02 Dec-16 11:13	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



Pacific Topsmelt 7-d Survival and Growth Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Batch ID:	11-9003-1853	**Test Type:**	Growth-Survival (7d)	**Analyst:**	Joe Freas
Start Date:	28 Oct-16 14:14	**Protocol:**	EPA/600/R-95/136 (1995)	**Diluent:**	Laboratory Seawater
Ending Date:	04 Nov-16 13:15	**Species:**	Atherinops affinis	**Brine:**	Not Applicable
Duration:	6d 23h	**Source:**	Aquatic Biosystems, CO	**Age:**	
Sample ID:	18-0481-5018	**Code:**	VCF1016.352	**Client:**	VCWPD
Sample Date:	28 Oct-16 09:00	**Material:**	Sample Water	**Project:**	2016/17-1 (Wet)
Receipt Date:	28 Oct-16 10:05	**Source:**	Bioassay Report		
Sample Age:	5h	**Station:**	ME-CC		

Dissolved Oxygen-mg/L

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	8	6.975	6.615	7.335	6.2	7.6	0.1521	0.4301	6.17%	0
6.25		8	6.3	5.682	6.918	5.2	7.1	0.2612	0.7387	11.73%	0
12.5		8	6.525	5.857	7.193	5.4	7.8	0.2827	0.7996	12.25%	0
25		8	6.512	5.889	7.136	5.4	7.5	0.2635	0.7453	11.44%	0
50		8	6.5	6.008	6.992	5.7	7.3	0.2079	0.588	9.05%	0
100		8	6.213	5.566	6.859	5.4	7.3	0.2735	0.7736	12.45%	0
Overall		48	6.504	6.302	6.707	5.2	7.8	0.1007	0.6977	10.73%	0 (0%)

pH-Units

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	8	7.3	7.191	7.409	7	7.4	0.04629	0.1309	1.79%	0
6.25		8	7.75	7.602	7.898	7.5	8	0.06268	0.1773	2.29%	0
12.5		8	7.763	7.637	7.888	7.5	7.9	0.05324	0.1506	1.94%	0
25		8	7.763	7.637	7.888	7.5	7.9	0.05324	0.1506	1.94%	0
50		8	7.788	7.683	7.892	7.6	7.9	0.04407	0.1246	1.6%	0
100		8	7.813	7.691	7.934	7.6	8	0.05154	0.1458	1.87%	0
Overall		48	7.696	7.63	7.762	7	8	0.03288	0.2278	2.96%	0 (0%)

Salinity-ppt

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	8	25	25	25	25	25	0	0	0.0%	0
6.25		8	25	25	25	25	25	0	0	0.0%	0
12.5		8	25	25	25	25	25	0	0	0.0%	0
25		8	25	25	25	25	25	0	0	0.0%	0
50		8	25	25	25	25	25	0	0	0.0%	0
100		8	25	25	25	25	25	0	0	0.0%	0
Overall		48	25	25	25	25	25	0	0	0.00%	0 (0%)

Temperature-°C

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	8	21	21	21	21	21	0	0	0.0%	0
6.25		8	21	21	21	21	21	0	0	0.0%	0
12.5		8	21	21	21	21	21	0	0	0.0%	0
25		8	21	21	21	21	21	0	0	0.0%	0
50		8	21	21	21	21	21	0	0	0.0%	0
100		8	21	21	21	21	21	0	0	0.0%	0
Overall		48	21	21	21	21	21	0	0	0.00%	0 (0%)

Pacific Topsmelt 7-d Survival and Growth Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Dissolved Oxygen-mg/L

Conc-%	Code	1	2	3	4	5	6	7	8
0	N	6.2	6.8	7.2	7.6	7.1	7.2	7.1	6.6
6.25		7.1	6.8	6.5	6.9	6.7	5.9	5.3	5.2
12.5		7	6.8	6.6	7.8	6.6	6.6	5.4	5.4
25		7	6.9	6.6	7.5	6.6	6.7	5.4	5.4
50		7.1	6.3	6.6	7.3	6.8	6.5	5.7	5.7
100		7.1	5.5	6.2	7.3	6.8	6	5.4	5.4

pH-Units

Conc-%	Code	1	2	3	4	5	6	7	8
0	N	7.3	7.3	7.4	7.4	7	7.3	7.3	7.4
6.25		7.8	7.9	7.8	7.5	7.8	7.7	7.5	8
12.5		7.9	7.9	7.8	7.6	7.8	7.7	7.5	7.9
25		7.9	7.9	7.8	7.6	7.8	7.7	7.5	7.9
50		7.9	7.9	7.8	7.6	7.8	7.8	7.6	7.9
100		7.9	7.9	7.8	7.6	7.9	7.8	7.6	8

Salinity-ppt

Conc-%	Code	1	2	3	4	5	6	7	8
0	N	25	25	25	25	25	25	25	25
6.25		25	25	25	25	25	25	25	25
12.5		25	25	25	25	25	25	25	25
25		25	25	25	25	25	25	25	25
50		25	25	25	25	25	25	25	25
100		25	25	25	25	25	25	25	25

Temperature-°C

Conc-%	Code	1	2	3	4	5	6	7	8
0	N	21	21	21	21	21	21	21	21
6.25		21	21	21	21	21	21	21	21
12.5		21	21	21	21	21	21	21	21
25		21	21	21	21	21	21	21	21
50		21	21	21	21	21	21	21	21
100		21	21	21	21	21	21	21	21

aquatic bioassay & consulting laboratories, inc

December 6, 2016

Mr. Arne Anselm
Ventura County Watershed Protection District
800 South Victoria Ave
Ventura, CA 93009

Dear Mr. Anselm:

We are pleased to present the enclosed revised bioassay report. The test was conducted under guidelines prescribed in *Short-Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms" EPA-821-R-02-013.* "All acceptability criteria were met and the concentration-response was normal. This is a valid test." Results were as follows:

CLIENT:	Ventura County Flood Control
SAMPLE I.D.:	MO-OJA
DATE RECEIVED:	10/28/2016
ABC LAB. NO.:	VCF1016.345

CHRONIC FATHEAD MINNOW SURVIVAL & GROWTH BIOASSAY

SURVIVAL	NOEC =	100.00 %
	TUc =	1.00
	EC25 =	>100.00 %
	EC50 =	>100.00 %
BIOMASS	NOEC =	100.00 %
	TUc =	1.00
	IC25 =	>100.00 %
	IC50 =	>100.00 %

Yours very truly,

Scott Johnson
Laboratory Director

CETIS Summary Report

Fathead Minnow 7-d Larval Survival and Growth Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Batch ID:	16-1889-4412	**Test Type:**	Growth-Survival (7d)	**Analyst:**	Joe Freas
Start Date:	28 Oct-16 14:30	**Protocol:**	EPA/821/R-02-013 (2002)	**Diluent:**	Laboratory Water
Ending Date:	04 Nov-16 12:30	**Species:**	Pimephales promelas	**Brine:**	Not Applicable
Duration:	6d 22h	**Source:**	Aquatic Biosystems, CO	**Age:**	
Sample ID:	19-4412-3607	**Code:**	VCF1016.345	**Client:**	VCWPD
Sample Date:	28 Oct-16 04:20	**Material:**	Sample Water	**Project:**	2016/17-1 (Wet)
Receipt Date:	28 Oct-16 09:47	**Source:**	Bioassay Report		
Sample Age:	10h	**Station:**	MO-OJA		

Multiple Comparison Summary

Analysis ID	Endpoint	Comparison Method	NOEL	LOEL	TOEL	TU	PMSD	✓
18-8012-0424	7d Survival Rate	Dunnett Multiple Comparison Test	100	> 100	n/a	1	7.72%	
09-4359-6039	Mean Dry Biomass-mg	Dunnett Multiple Comparison Test	100	> 100	n/a	1	12.1%	

Point Estimate Summary

Analysis ID	Endpoint	Point Estimate Method	Level	%	95% LCL	95% UCL	TU	✓
09-2414-2240	7d Survival Rate	Linear Interpolation (ICPIN)	EC5	>100	n/a	n/a	<1	
			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	✓
05-8228-9073	Mean Dry Biomass-mg	Linear Interpolation (ICPIN)	IC5	54.88	31.32	74.69	1.822	✓
			IC10	73.74	49.45	94.35	1.356	✓
			IC15	92.59	72.31	n/a	1.08	✓
			IC20	>100	n/a	n/a	<1	✓
			IC25	>100	n/a	n/a	<1	✓
			IC40	>100	n/a	n/a	<1	✓
			IC50	>100	n/a	n/a	<1	✓

Test Acceptability

				TAC Limits			
Analysis ID	Endpoint	Attribute	Test Stat	Lower	Upper	Overlap	Decision
09-2414-2240	7d Survival Rate	Control Resp	1	0.8	>>	Yes	Passes Acceptibility Criteria
18-8012-0424	7d Survival Rate	Control Resp	1	0.8	>>	Yes	Passes Acceptibility Criteria
05-8228-9073	Mean Dry Biomass-mg	Control Resp	0.377	0.25	>>	Yes	Passes Acceptibility Criteria
09-4359-6039	Mean Dry Biomass-mg	Control Resp	0.377	0.25	>>	Yes	Passes Acceptibility Criteria

7d Survival Rate Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	N	4	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
6.25		4	0.9500	0.8484	1.0000	0.8667	1.0000	0.0319	0.0638	6.72%	5.00%
12.5		4	0.9333	0.8467	1.0000	0.8667	1.0000	0.0272	0.0544	5.83%	6.67%
25		4	0.9833	0.9303	1.0000	0.9333	1.0000	0.0167	0.0333	3.39%	1.67%
50		4	0.9500	0.8484	1.0000	0.8667	1.0000	0.0319	0.0638	6.72%	5.00%
100		4	0.9667	0.9054	1.0000	0.9333	1.0000	0.0193	0.0385	3.98%	3.33%

Mean Dry Biomass-mg Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	N	4	0.377	0.3157	0.4383	0.334	0.4247	0.01926	0.03853	10.22%	0.00%
6.25		4	0.4392	0.396	0.4824	0.4067	0.4653	0.01357	0.02715	6.18%	-16.49%
12.5		4	0.4392	0.4006	0.4778	0.4127	0.468	0.01212	0.02425	5.52%	-16.49%
25		4	0.454	0.4057	0.5023	0.426	0.4873	0.01518	0.03035	6.69%	-20.42%
50		4	0.4115	0.3826	0.4404	0.3913	0.4347	0.00909	0.01818	4.42%	-9.15%
100		4	0.3548	0.3282	0.3815	0.34	0.3787	0.008364	0.01673	4.71%	5.88%

Fathead Minnow 7-d Larval Survival and Growth Test **Aquatic Bioassay & Consulting Labs, Inc.**

7d Survival Rate Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	N	1.0000	1.0000	1.0000	1.0000
6.25		0.8667	0.9333	1.0000	1.0000
12.5		1.0000	0.8667	0.9333	0.9333
25		1.0000	1.0000	0.9333	1.0000
50		0.9333	0.8667	1.0000	1.0000
100		0.9333	1.0000	1.0000	0.9333

Mean Dry Biomass-mg Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	N	0.334	0.362	0.4247	0.3873
6.25		0.4067	0.4653	0.4273	0.4573
12.5		0.468	0.4273	0.4127	0.4487
25		0.426	0.472	0.4873	0.4307
50		0.4147	0.3913	0.4347	0.4053
100		0.3527	0.34	0.3787	0.348

7d Survival Rate Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	N	15/15	15/15	15/15	15/15
6.25		13/15	14/15	15/15	15/15
12.5		15/15	13/15	14/15	14/15
25		15/15	15/15	14/15	15/15
50		14/15	13/15	15/15	15/15
100		14/15	15/15	15/15	14/15

Fathead Minnow 7-d Larval Survival and Growth Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Analysis ID:	18-8012-0424	**Endpoint:**	7d Survival Rate	**CETIS Version:**	CETISv1.9.2
Analyzed:	02 Dec-16 11:45	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes

Batch ID:	16-1889-4412	**Test Type:**	Growth-Survival (7d)	**Analyst:**	Joe Freas
Start Date:	28 Oct-16 14:30	**Protocol:**	EPA/821/R-02-013 (2002)	**Diluent:**	Laboratory Water
Ending Date:	04 Nov-16 12:30	**Species:**	Pimephales promelas	**Brine:**	Not Applicable
Duration:	6d 22h	**Source:**	Aquatic Biosystems, CO	**Age:**	

Sample ID:	19-4412-3607	**Code:**	VCF1016.345	**Client:**	VCWPD
Sample Date:	28 Oct-16 04:20	**Material:**	Sample Water	**Project:**	2016/17-1 (Wet)
Receipt Date:	28 Oct-16 09:47	**Source:**	Bioassay Report		
Sample Age:	10h	**Station:**	MO-OJA		

Data Transform	Alt Hyp	NOEL	LOEL	TOEL	TU	PMSD
Angular (Corrected)	C > T	100	> 100	n/a	1	7.72%

Dunnett Multiple Comparison Test

Control vs	Conc-%	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Negative Control	6.25	1.488	2.407	0.152	6	CDF	0.2318	Non-Significant Effect
	12.5	2.009	2.407	0.152	6	CDF	0.1026	Non-Significant Effect
	25	0.5212	2.407	0.152	6	CDF	0.6383	Non-Significant Effect
	50	1.488	2.407	0.152	6	CDF	0.2318	Non-Significant Effect
	100	1.042	2.407	0.152	6	CDF	0.4033	Non-Significant Effect

Test Acceptability Criteria

Attribute	Test Stat	TAC Limits Lower	Upper	Overlap	Decision
Control Resp	1	0.8	>>	Yes	Passes Acceptibility Criteria

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0427164	0.0085433	5	1.07	0.4091	Non-Significant Effect
Error	0.143677	0.0079821	18			
Total	0.186393		23			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Levene Equality of Variance Test	2.934	4.248	0.0415	Equal Variances
Variances	Mod Levene Equality of Variance Test	2.033	4.248	0.1222	Equal Variances
Distribution	Anderson-Darling A2 Normality Test	0.4534	3.878	0.2753	Normal Distribution
Distribution	D'Agostino Kurtosis Test	0.6178	2.576	0.5367	Normal Distribution
Distribution	D'Agostino Skewness Test	0.8542	2.576	0.3930	Normal Distribution
Distribution	D'Agostino-Pearson K2 Omnibus Test	1.111	9.21	0.5737	Normal Distribution
Distribution	Kolmogorov-Smirnov D Test	0.1426	0.2056	0.2317	Normal Distribution
Distribution	Shapiro-Wilk W Normality Test	0.9497	0.884	0.2675	Normal Distribution

7d Survival Rate Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	N	4	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	0.00%
6.25		4	0.9500	0.8484	1.0000	0.9667	0.8667	1.0000	0.0319	6.72%	5.00%
12.5		4	0.9333	0.8467	1.0000	0.9333	0.8667	1.0000	0.0272	5.83%	6.67%
25		4	0.9833	0.9303	1.0000	1.0000	0.9333	1.0000	0.0167	3.39%	1.67%
50		4	0.9500	0.8484	1.0000	0.9667	0.8667	1.0000	0.0319	6.72%	5.00%
100		4	0.9667	0.9054	1.0000	0.9667	0.9333	1.0000	0.0192	3.98%	3.33%

Fathead Minnow 7-d Larval Survival and Growth Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Analysis ID:	18-8012-0424	**Endpoint:**	7d Survival Rate	**CETIS Version:**	CETISv1.9.2
Analyzed:	02 Dec-16 11:45	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes

Angular (Corrected) Transformed Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	N	4	1.441	1.441	1.442	1.441	1.441	1.441	0	0.00%	0.00%
6.25		4	1.347	1.16	1.535	1.375	1.197	1.441	0.05894	8.75%	6.52%
12.5		4	1.314	1.155	1.473	1.31	1.197	1.441	0.04995	7.60%	8.81%
25		4	1.408	1.304	1.513	1.441	1.31	1.441	0.03292	4.68%	2.28%
50		4	1.347	1.16	1.535	1.375	1.197	1.441	0.05894	8.75%	6.52%
100		4	1.375	1.254	1.496	1.375	1.31	1.441	0.03802	5.53%	4.57%

7d Survival Rate Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	N	1.0000	1.0000	1.0000	1.0000
6.25		0.8667	0.9333	1.0000	1.0000
12.5		1.0000	0.8667	0.9333	0.9333
25		1.0000	1.0000	0.9333	1.0000
50		0.9333	0.8667	1.0000	1.0000
100		0.9333	1.0000	1.0000	0.9333

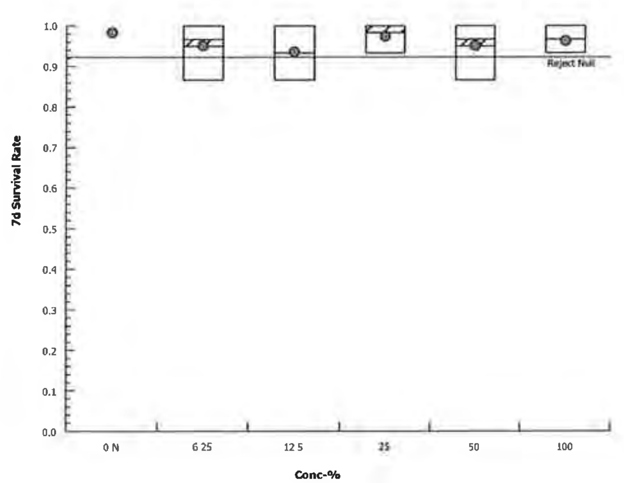
Angular (Corrected) Transformed Detail

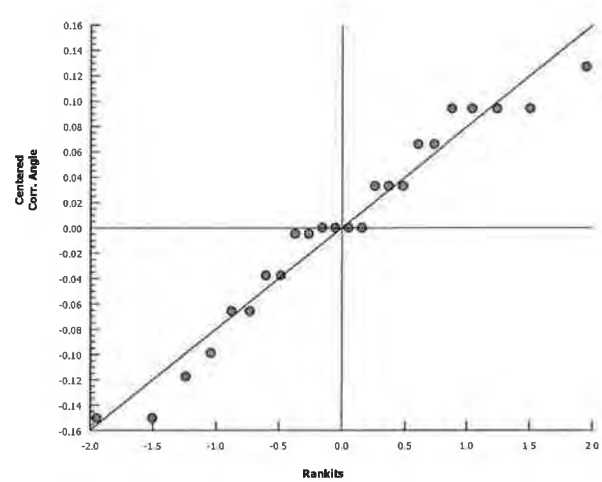
Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	N	1.441	1.441	1.441	1.441
6.25		1.197	1.31	1.441	1.441
12.5		1.441	1.197	1.31	1.31
25		1.441	1.441	1.31	1.441
50		1.31	1.197	1.441	1.441
100		1.31	1.441	1.441	1.31

7d Survival Rate Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	N	15/15	15/15	15/15	15/15
6.25		13/15	14/15	15/15	15/15
12.5		15/15	13/15	14/15	14/15
25		15/15	15/15	14/15	15/15
50		14/15	13/15	15/15	15/15
100		14/15	15/15	15/15	14/15

Graphics





Fathead Minnow 7-d Larval Survival and Growth Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Analysis ID:	09-4359-6039	**Endpoint:**	Mean Dry Biomass-mg	**CETIS Version:**	CETISv1.9.2
Analyzed:	02 Dec-16 11:45	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes
Batch ID:	16-1889-4412	**Test Type:**	Growth-Survival (7d)	**Analyst:**	Joe Freas
Start Date:	28 Oct-16 14:30	**Protocol:**	EPA/821/R-02-013 (2002)	**Diluent:**	Laboratory Water
Ending Date:	04 Nov-16 12:30	**Species:**	Pimephales promelas	**Brine:**	Not Applicable
Duration:	6d 22h	**Source:**	Aquatic Biosystems, CO	**Age:**	
Sample ID:	19-4412-3607	**Code:**	VCF1016.345	**Client:**	VCWPD
Sample Date:	28 Oct-16 04:20	**Material:**	Sample Water	**Project:**	2016/17-1 (Wet)
Receipt Date:	28 Oct-16 09:47	**Source:**	Bioassay Report		
Sample Age:	10h	**Station:**	MO-OJA		

Data Transform	Alt Hyp	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	C > T	100	> 100	n/a	1	12.14%

Dunnett Multiple Comparison Test

Control vs	Conc-%	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Negative Control	6.25	-3.269	2.407	0.046	6	CDF	1.0000	Non-Significant Effect
	12.5	-3.269	2.407	0.046	6	CDF	1.0000	Non-Significant Effect
	25	-4.049	2.407	0.046	6	CDF	1.0000	Non-Significant Effect
	50	-1.814	2.407	0.046	6	CDF	0.9984	Non-Significant Effect
	100	1.165	2.407	0.046	6	CDF	0.3512	Non-Significant Effect

Test Acceptability Criteria

Attribute	Test Stat	TAC Limits Lower	TAC Limits Upper	Overlap	Decision
Control Resp	0.377	0.25	>>	Yes	Passes Acceptibility Criteria

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0309244	0.0061849	5	8.549	2.7E-04	Significant Effect
Error	0.0130222	0.0007235	18			
Total	0.0439466		23			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance Test	2.555	15.09	0.7682	Equal Variances
Variances	Levene Equality of Variance Test	1.426	4.248	0.2626	Equal Variances
Variances	Mod Levene Equality of Variance Test	1.374	4.248	0.2801	Equal Variances
Distribution	Anderson-Darling A2 Normality Test	0.3123	3.878	0.5763	Normal Distribution
Distribution	D'Agostino Kurtosis Test	1.109	2.576	0.2676	Normal Distribution
Distribution	D'Agostino Skewness Test	0.3259	2.576	0.7445	Normal Distribution
Distribution	D'Agostino-Pearson K2 Omnibus Test	1.335	9.21	0.5129	Normal Distribution
Distribution	Kolmogorov-Smirnov D Test	0.1087	0.2056	0.6800	Normal Distribution
Distribution	Shapiro-Wilk W Normality Test	0.9743	0.884	0.7729	Normal Distribution

Mean Dry Biomass-mg Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	N	4	0.377	0.3157	0.4383	0.3747	0.334	0.4247	0.01926	10.22%	0.00%
6.25		4	0.4392	0.396	0.4824	0.4423	0.4067	0.4653	0.01357	6.18%	-16.49%
12.5		4	0.4392	0.4006	0.4778	0.438	0.4127	0.468	0.01212	5.52%	-16.49%
25		4	0.454	0.4057	0.5023	0.4513	0.426	0.4873	0.01518	6.69%	-20.42%
50		4	0.4115	0.3826	0.4404	0.41	0.3913	0.4347	0.00909	4.42%	-9.15%
100		4	0.3548	0.3282	0.3815	0.3503	0.34	0.3787	0.008364	4.71%	5.88%

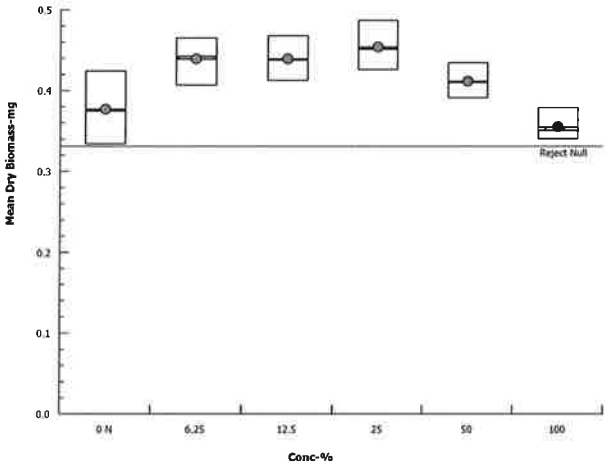
Fathead Minnow 7-d Larval Survival and Growth Test — **Aquatic Bioassay & Consulting Labs, Inc.**

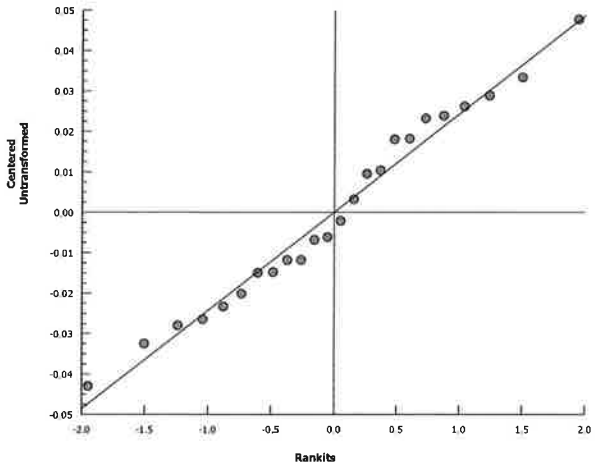
Analysis ID:	09-4359-6039	**Endpoint:**	Mean Dry Biomass-mg	**CETIS Version:**	CETISv1.9.2
Analyzed:	02 Dec-16 11:45	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes

Mean Dry Biomass-mg Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	N	0.334	0.362	0.4247	0.3873
6.25		0.4067	0.4653	0.4273	0.4573
12.5		0.468	0.4273	0.4127	0.4487
25		0.426	0.472	0.4873	0.4307
50		0.4147	0.3913	0.4347	0.4053
100		0.3527	0.34	0.3787	0.348

Graphics





CETIS Analytical Report

Fathead Minnow 7-d Larval Survival and Growth Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Analysis ID:	09-2414-2240	**Endpoint:**	7d Survival Rate	**CETIS Version:**	CETISv1.9.2
Analyzed:	02 Dec-16 11:45	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	16-1889-4412	**Test Type:**	Growth-Survival (7d)	**Analyst:**	Joe Freas
Start Date:	28 Oct-16 14:30	**Protocol:**	EPA/821/R-02-013 (2002)	**Diluent:**	Laboratory Water
Ending Date:	04 Nov-16 12:30	**Species:**	Pimephales promelas	**Brine:**	Not Applicable
Duration:	6d 22h	**Source:**	Aquatic Biosystems, CO	**Age:**	
Sample ID:	19-4412-3607	**Code:**	VCF1016.345	**Client:**	VCWPD
Sample Date:	28 Oct-16 04:20	**Material:**	Sample Water	**Project:**	2016/17-1 (Wet)
Receipt Date:	28 Oct-16 09:47	**Source:**	Bioassay Report		
Sample Age:	10h	**Station:**	MO-OJA		

Linear Interpolation Options

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

Test Acceptability Criteria

		TAC Limits			
Attribute	**Test Stat**	**Lower**	**Upper**	**Overlap**	**Decision**
Control Resp	1	0.8	>>	Yes	Passes Acceptibility Criteria

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC5	>100	n/a	n/a	<1	n/a	n/a
EC10	>100	n/a	n/a	<1	n/a	n/a
EC15	>100	n/a	n/a	<1	n/a	n/a
EC20	>100	n/a	n/a	<1	n/a	n/a
EC25	>100	n/a	n/a	<1	n/a	n/a
EC40	>100	n/a	n/a	<1	n/a	n/a
EC50	>100	n/a	n/a	<1	n/a	n/a

7d Survival Rate Summary

			Calculated Variate(A/B)								
Conc-%	**Code**	**Count**	**Mean**	**Min**	**Max**	**Std Err**	**Std Dev**	**CV%**	**%Effect**	**A**	**B**
0	N	4	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.0%	60	60
6.25		4	0.9500	0.8667	1.0000	0.0319	0.0638	6.72%	5.0%	57	60
12.5		4	0.9333	0.8667	1.0000	0.0272	0.0544	5.83%	6.67%	56	60
25		4	0.9833	0.9333	1.0000	0.0167	0.0333	3.39%	1.67%	59	60
50		4	0.9500	0.8667	1.0000	0.0319	0.0638	6.72%	5.0%	57	60
100		4	0.9667	0.9333	1.0000	0.0192	0.0385	3.98%	3.33%	58	60

7d Survival Rate Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	N	1.0000	1.0000	1.0000	1.0000
6.25		0.8667	0.9333	1.0000	1.0000
12.5		1.0000	0.8667	0.9333	0.9333
25		1.0000	1.0000	0.9333	1.0000
50		0.9333	0.8667	1.0000	1.0000
100		0.9333	1.0000	1.0000	0.9333

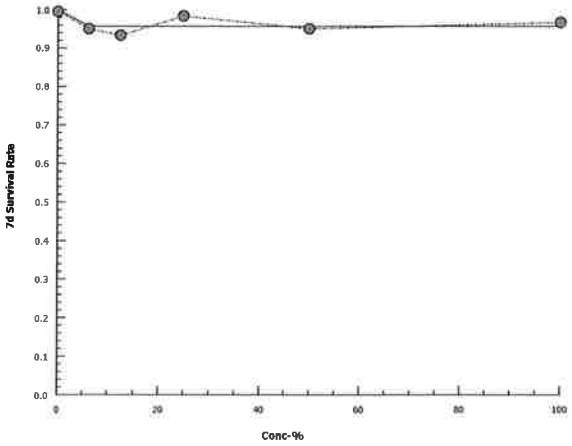
7d Survival Rate Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	N	15/15	15/15	15/15	15/15
6.25		13/15	14/15	15/15	15/15
12.5		15/15	13/15	14/15	14/15
25		15/15	15/15	14/15	15/15
50		14/15	13/15	15/15	15/15
100		14/15	15/15	15/15	14/15

Fathead Minnow 7-d Larval Survival and Growth Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Analysis ID:	09-2414-2240	**Endpoint:**	7d Survival Rate	**CETIS Version:**	CETISv1.9.2
Analyzed:	02 Dec-16 11:45	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



Fathead Minnow 7-d Larval Survival and Growth Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Analysis ID:	05-8228-9073	**Endpoint:**	Mean Dry Biomass-mg	**CETIS Version:**	CETISv1.9.2
Analyzed:	02 Dec-16 11:45	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	16-1889-4412	**Test Type:**	Growth-Survival (7d)	**Analyst:**	Joe Freas
Start Date:	28 Oct-16 14:30	**Protocol:**	EPA/821/R-02-013 (2002)	**Diluent:**	Laboratory Water
Ending Date:	04 Nov-16 12:30	**Species:**	Pimephales promelas	**Brine:**	Not Applicable
Duration:	6d 22h	**Source:**	Aquatic Biosystems, CO	**Age:**	
Sample ID:	19-4412-3607	**Code:**	VCF1016.345	**Client:**	VCWPD
Sample Date:	28 Oct-16 04:20	**Material:**	Sample Water	**Project:**	2016/17-1 (Wet)
Receipt Date:	28 Oct-16 09:47	**Source:**	Bioassay Report		
Sample Age:	10h	**Station:**	MO-OJA		

Linear Interpolation Options

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

Test Acceptability Criteria

		TAC Limits			
Attribute	**Test Stat**	**Lower**	**Upper**	**Overlap**	**Decision**
Control Resp	0.377	0.25	>>	Yes	Passes Acceptibility Criteria

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	54.88	31.32	74.69	1.822	1.339	3.193
IC10	73.74	49.45	94.35	1.356	1.06	2.022
IC15	92.59	72.31	n/a	1.08	n/a	1.383
IC20	>100	n/a	n/a	<1	n/a	n/a
IC25	>100	n/a	n/a	<1	n/a	n/a
IC40	>100	n/a	n/a	<1	n/a	n/a
IC50	>100	n/a	n/a	<1	n/a	n/a

Mean Dry Biomass-mg Summary — Calculated Variate

Conc-%	Code	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	N	4	0.377	0.334	0.4247	0.01926	0.03853	10.22%	0.0%
6.25		4	0.4392	0.4067	0.4653	0.01357	0.02715	6.18%	-16.49%
12.5		4	0.4392	0.4127	0.468	0.01212	0.02425	5.52%	-16.49%
25		4	0.454	0.426	0.4873	0.01518	0.03035	6.69%	-20.42%
50		4	0.4115	0.3913	0.4347	0.00909	0.01818	4.42%	-9.15%
100		4	0.3548	0.34	0.3787	0.008364	0.01673	4.71%	5.88%

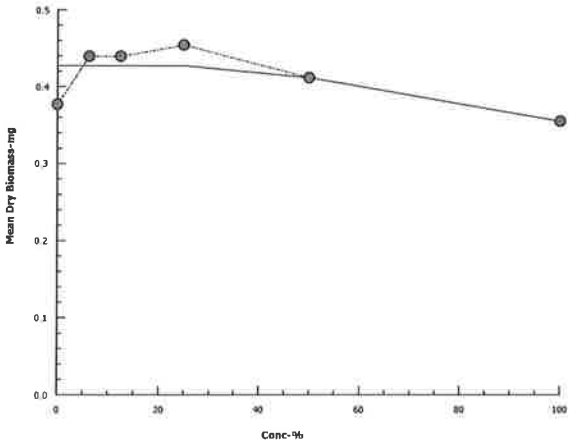
Mean Dry Biomass-mg Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	N	0.334	0.362	0.4247	0.3873
6.25		0.4067	0.4653	0.4273	0.4573
12.5		0.468	0.4273	0.4127	0.4487
25		0.426	0.472	0.4873	0.4307
50		0.4147	0.3913	0.4347	0.4053
100		0.3527	0.34	0.3787	0.348

Fathead Minnow 7-d Larval Survival and Growth Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Analysis ID:	05-8228-9073	**Endpoint:**	Mean Dry Biomass-mg	**CETIS Version:**	CETISv1.9.2
Analyzed:	02 Dec-16 11:45	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



Fathead Minnow 7-d Larval Survival and Growth Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Batch ID:	16-1889-4412	**Test Type:**	Growth-Survival (7d)	**Analyst:**	Joe Freas
Start Date:	28 Oct-16 14:30	**Protocol:**	EPA/821/R-02-013 (2002)	**Diluent:**	Laboratory Water
Ending Date:	04 Nov-16 12:30	**Species:**	Pimephales promelas	**Brine:**	Not Applicable
Duration:	6d 22h	**Source:**	Aquatic Biosystems, CO	**Age:**	
Sample ID:	19-4412-3607	**Code:**	VCF1016.345	**Client:**	VCWPD
Sample Date:	28 Oct-16 04:20	**Material:**	Sample Water	**Project:**	2016/17-1 (Wet)
Receipt Date:	28 Oct-16 09:47	**Source:**	Bioassay Report		
Sample Age:	10h	**Station:**	MO-OJA		

Alkalinity (CaCO3)-mg/L

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	8	62.25	60.72	63.78	61	65	0.6478	1.832	2.94%	0
100		8	103	103	103	103	103	0	0	0.0%	0
Overall		16	82.62	71.39	93.86	61	103	5.27	21.08	25.51%	0 (0%)

Conductivity-µmhos

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	8	329.2	321	337.5	319	348	3.509	9.925	3.01%	0
6.25		8	322	310.1	333.9	312	347	5.043	14.26	4.43%	0
12.5		8	314.9	308.7	321	308	326	2.594	7.338	2.33%	0
25		8	305.6	299.7	311.5	300	318	2.485	7.029	2.3%	0
50		8	281.5	270.8	292.2	253	297	4.543	12.85	4.57%	0
100		8	250.6	246	255.2	242	258	1.945	5.502	2.2%	0
Overall		48	300.6	292.3	309	242	348	4.167	28.87	9.60%	0 (0%)

Dissolved Oxygen-mg/L

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	8	7.738	7.571	7.904	7.5	8.1	0.07055	0.1996	2.58%	0
6.25		8	6.962	6.581	7.344	6.3	7.6	0.1614	0.4565	6.56%	0
12.5		8	7.425	7.221	7.629	7.1	7.8	0.08609	0.2435	3.28%	0
25		8	6.75	6.116	7.384	5.3	7.5	0.2679	0.7578	11.23%	0
50		8	5.812	4.91	6.715	4.6	7.5	0.3815	1.079	18.56%	0
100		8	6.588	5.292	7.883	4.9	9.8	0.5479	1.55	23.52%	0
Overall		48	6.879	6.582	7.177	4.6	9.8	0.1479	1.025	14.90%	0 (0%)

Hardness (CaCO3)-mg/L

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	8	89.75	85.42	94.08	86	96	1.83	5.175	5.77%	0
100		8	105	105	105	105	105	0	0	0.0%	0
Overall		16	97.38	92.78	102	86	105	2.158	8.632	8.87%	0 (0%)

pH-Units

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	8	7.825	7.685	7.965	7.5	8	0.05901	0.1669	2.13%	0
6.25		8	7.762	7.622	7.903	7.6	8.1	0.05957	0.1685	2.17%	0
12.5		8	7.7	7.574	7.826	7.5	8	0.05345	0.1512	1.96%	0
25		8	7.587	7.45	7.725	7.4	7.9	0.05806	0.1642	2.16%	0
50		8	7.413	7.268	7.557	7.2	7.7	0.06105	0.1727	2.33%	0
100		8	7.175	6.987	7.363	6.9	7.6	0.07962	0.2252	3.14%	0
Overall		48	7.577	7.496	7.659	6.9	8.1	0.04052	0.2808	3.71%	0 (0%)

Fathead Minnow 7-d Larval Survival and Growth Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Temperature-°C

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	8	24	24	24	24	24	0	0	0.0%	0
6.25		8	24	24	24	24	24	0	0	0.0%	0
12.5		8	24	24	24	24	24	0	0	0.0%	0
25		8	24	24	24	24	24	0	0	0.0%	0
50		8	24	24	24	24	24	0	0	0.0%	0
100		8	24	24	24	24	24	0	0	0.0%	0
Overall		48	24	24	24	24	24	0	0	0.00%	0 (0%)

Alkalinity (CaCO3)-mg/L

Conc-%	Code	1	2	3	4	5	6	7	8
0	N	63	61	61	61	61	61	65	65
100		103	103	103	103	103	103	103	103

Conductivity-µmhos

Conc-%	Code	1	2	3	4	5	6	7	8
0	N	336	320	319	326	324	325	336	348
6.25		321	312	313	312	313	316	342	347
12.5		321	316	308	309	308	309	322	326
25		311	303	300	300	300	301	312	318
50		283	280	283	281	284	291	297	253
100		247	242	249	248	253	250	258	258

Dissolved Oxygen-mg/L

Conc-%	Code	1	2	3	4	5	6	7	8
0	N	7.6	7.6	7.8	7.9	7.6	7.8	7.5	8.1
6.25		7.6	6.5	6.3	7.1	7.1	7.5	6.9	6.7
12.5		7.6	7.1	7.5	7.6	7.2	7.8	7.4	7.2
25		7.5	5.3	6.8	7.4	6.8	7.5	6.5	6.2
50		7.5	4.8	5.7	7.2	6	5.8	4.9	4.6
100		7.4	9.8	6.1	4.9	6.7	5.6	6.9	5.3

Hardness (CaCO3)-mg/L

Conc-%	Code	1	2	3	4	5	6	7	8
0	N	96	86	86	86	86	86	96	96
100		105	105	105	105	105	105	105	105

pH-Units

Conc-%	Code	1	2	3	4	5	6	7	8
0	N	8	7.9	7.8	7.9	7.7	7.8	7.5	8
6.25		7.6	7.9	7.8	7.7	7.7	7.7	8.1	7.6
12.5		7.5	7.8	7.7	7.7	7.6	7.7	8	7.6
25		7.4	7.7	7.6	7.6	7.5	7.6	7.9	7.4
50		7.3	7.3	7.5	7.6	7.3	7.4	7.7	7.2
100		6.9	7.6	7	7.3	7.2	7.3	7.1	7

Temperature-°C

Conc-%	Code	1	2	3	4	5	6	7	8
0	N	24	24	24	24	24	24	24	24
6.25		24	24	24	24	24	24	24	24
12.5		24	24	24	24	24	24	24	24
25		24	24	24	24	24	24	24	24
50		24	24	24	24	24	24	24	24
100		24	24	24	24	24	24	24	24

aquatic bioassay & consulting laboratories, inc

December 6, 2016

Mr. Arne Anselm
Ventura County Watershed Protection District
800 South Victoria Ave
Ventura, CA 93009

Dear Mr. Anselm:

We are pleased to present the enclosed revised bioassay report. The test was conducted under guidelines prescribed in *Short-Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms" EPA-821-R-02-013.* "All acceptability criteria were met and the concentration-response was normal. This is a valid test." Results were as follows:

CLIENT:	Ventura County Flood Control
SAMPLE I.D.:	MO-MEI
DATE RECEIVED:	10/28/2016
ABC LAB. NO.:	VCF1016.346

CHRONIC FATHEAD MINNOW SURVIVAL & GROWTH BIOASSAY

SURVIVAL	NOEC =	100.00 %
	TUc =	1.00
	EC25 =	>100.00 %
	EC50 =	>100.00 %
BIOMASS	NOEC =	100.00 %
	TUc =	1.00
	IC25 =	>100.00 %
	IC50 =	>100.00 %

Yours very truly,

Scott Johnson
Laboratory Director

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

Fathead Minnow 7-d Larval Survival and Growth Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Batch ID:	04-2638-6326	**Test Type:**	Growth-Survival (7d)	**Analyst:**	Joe Freas
Start Date:	28 Oct-16 14:48	**Protocol:**	EPA/821/R-02-013 (2002)	**Diluent:**	Laboratory Water
Ending Date:	04 Nov-16 12:53	**Species:**	Pimephales promelas	**Brine:**	Not Applicable
Duration:	6d 22h	**Source:**	Aquatic Biosystems, CO	**Age:**	
Sample ID:	16-6561-3735	**Code:**	VCF1016.346	**Client:**	VCWPD
Sample Date:	28 Oct-16 05:55	**Material:**	Sample Water	**Project:**	2016/17-1 (Wet)
Receipt Date:	28 Oct-16 09:47	**Source:**	Bioassay Report		
Sample Age:	9h	**Station:**	MO-MEI		

Multiple Comparison Summary

Analysis ID	Endpoint	Comparison Method	NOEL	LOEL	TOEL	TU	PMSD	✓
13-9578-2049	7d Survival Rate	Steel Many-One Rank Sum Test	100	> 100	n/a	1	10.9%	
05-7252-2639	Mean Dry Biomass-mg	Dunnett Multiple Comparison Test	100	> 100	n/a	1	19.8%	

Point Estimate Summary

Analysis ID	Endpoint	Point Estimate Method	Level	%	95% LCL	95% UCL	TU	✓
01-3322-5108	7d Survival Rate	Linear Interpolation (ICPIN)	EC5	98	n/a	n/a	1.02	
			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	✓
17-3306-9037	Mean Dry Biomass-mg	Linear Interpolation (ICPIN)	IC5	80.72	51.13	n/a	1.239	✓
			IC10	>100	n/a	n/a	<1	✓
			IC15	>100	n/a	n/a	<1	✓
			IC20	>100	n/a	n/a	<1	✓
			IC25	>100	n/a	n/a	<1	✓
			IC40	>100	n/a	n/a	<1	✓
			IC50	>100	n/a	n/a	<1	✓

Test Acceptability

				TAC Limits			
Analysis ID	**Endpoint**	**Attribute**	**Test Stat**	**Lower**	**Upper**	**Overlap**	**Decision**
01-3322-5108	7d Survival Rate	Control Resp	0.9667	0.8	>>	Yes	Passes Acceptibility Criteria
13-9578-2049	7d Survival Rate	Control Resp	0.9667	0.8	>>	Yes	Passes Acceptibility Criteria
05-7252-2639	Mean Dry Biomass-mg	Control Resp	0.3555	0.25	>>	Yes	Passes Acceptibility Criteria
17-3306-9037	Mean Dry Biomass-mg	Control Resp	0.3555	0.25	>>	Yes	Passes Acceptibility Criteria

7d Survival Rate Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	N	4	0.9667	0.8606	1.0000	0.8667	1.0000	0.0333	0.0667	6.90%	0.00%
6.25		4	0.9333	0.7212	1.0000	0.7333	1.0000	0.0667	0.1333	14.29%	3.45%
12.5		4	0.9833	0.9303	1.0000	0.9333	1.0000	0.0167	0.0333	3.39%	-1.72%
25		4	0.9500	0.8970	1.0000	0.9333	1.0000	0.0167	0.0333	3.51%	1.72%
50		4	0.9667	0.9054	1.0000	0.9333	1.0000	0.0193	0.0385	3.98%	0.00%
100		4	0.9167	0.8636	0.9697	0.8667	0.9333	0.0167	0.0333	3.64%	5.17%

Mean Dry Biomass-mg Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	N	4	0.3555	0.2874	0.4236	0.33	0.4193	0.0214	0.04281	12.04%	0.00%
6.25		4	0.435	0.3334	0.5366	0.354	0.5	0.03193	0.06385	14.68%	-22.36%
12.5		4	0.4557	0.3854	0.5259	0.4153	0.5093	0.02207	0.04414	9.69%	-28.18%
25		4	0.4367	0.4167	0.4567	0.4193	0.448	0.006283	0.01257	2.88%	-22.83%
50		4	0.4408	0.3897	0.4919	0.4133	0.4853	0.01606	0.03212	7.29%	-24.00%
100		4	0.3902	0.3341	0.4462	0.3407	0.4233	0.01761	0.03522	9.03%	-9.75%

Fathead Minnow 7-d Larval Survival and Growth Test — **Aquatic Bioassay & Consulting Labs, Inc.**

7d Survival Rate Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	N	1.0000	1.0000	0.8667	1.0000
6.25		0.7333	1.0000	1.0000	1.0000
12.5		1.0000	1.0000	1.0000	0.9333
25		1.0000	0.9333	0.9333	0.9333
50		0.9333	1.0000	1.0000	0.9333
100		0.9333	0.9333	0.8667	0.9333

Mean Dry Biomass-mg Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	N	0.332	0.33	0.3407	0.4193
6.25		0.354	0.4687	0.5	0.4173
12.5		0.424	0.474	0.5093	0.4153
25		0.4193	0.4433	0.436	0.448
50		0.422	0.4427	0.4853	0.4133
100		0.3407	0.4233	0.4027	0.394

7d Survival Rate Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	N	15/15	15/15	13/15	15/15
6.25		11/15	15/15	15/15	15/15
12.5		15/15	15/15	15/15	14/15
25		15/15	14/15	14/15	14/15
50		14/15	15/15	15/15	14/15
100		14/15	14/15	13/15	14/15

CETIS Analytical Report

Fathead Minnow 7-d Larval Survival and Growth Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Analysis ID:	13-9578-2049	**Endpoint:**	7d Survival Rate	**CETIS Version:**	CETISv1.9.2
Analyzed:	02 Dec-16 13:29	**Analysis:**	Nonparametric-Control vs Treatments	**Official Results:**	Yes
Batch ID:	04-2638-6326	**Test Type:**	Growth-Survival (7d)	**Analyst:**	Joe Freas
Start Date:	28 Oct-16 14:48	**Protocol:**	EPA/821/R-02-013 (2002)	**Diluent:**	Laboratory Water
Ending Date:	04 Nov-16 12:53	**Species:**	Pimephales promelas	**Brine:**	Not Applicable
Duration:	6d 22h	**Source:**	Aquatic Biosystems, CO	**Age:**	
Sample ID:	16-6561-3735	**Code:**	VCF1016.346	**Client:**	VCWPD
Sample Date:	28 Oct-16 05:55	**Material:**	Sample Water	**Project:**	2016/17-1 (Wet)
Receipt Date:	28 Oct-16 09:47	**Source:**	Bioassay Report		
Sample Age:	9h	**Station:**	MO-MEI		

Data Transform	Alt Hyp	NOEL	LOEL	TOEL	TU	PMSD
Angular (Corrected)	C > T	100	> 100	n/a	1	10.87%

Steel Many-One Rank Sum Test

Control	vs	Conc-%	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Negative Control		6.25	17.5	10	1	6	Asymp	0.7867	Non-Significant Effect
		12.5	18.5	10	1	6	Asymp	0.8729	Non-Significant Effect
		25	15.5	10	1	6	Asymp	0.5438	Non-Significant Effect
		50	17	10	1	6	Asymp	0.7334	Non-Significant Effect
		100	13.5	10	1	6	Asymp	0.2853	Non-Significant Effect

Test Acceptability Criteria

		TAC Limits			
Attribute	**Test Stat**	**Lower**	**Upper**	**Overlap**	**Decision**
Control Resp	0.9667	0.8	>>	Yes	Passes Acceptibility Criteria

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0390211	0.0078042	5	0.6224	0.6846	Non-Significant Effect
Error	0.225686	0.0125381	18			
Total	0.264707		23			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance Test	7.63	15.09	0.1778	Equal Variances
Variances	Levene Equality of Variance Test	2.525	4.248	0.0670	Equal Variances
Variances	Mod Levene Equality of Variance Test	0.2887	4.248	0.9131	Equal Variances
Distribution	Anderson-Darling A2 Normality Test	1.231	3.878	0.0031	Non-Normal Distribution
Distribution	D'Agostino Kurtosis Test	2.293	2.576	0.0219	Normal Distribution
Distribution	D'Agostino Skewness Test	2.997	2.576	0.0027	Non-Normal Distribution
Distribution	D'Agostino-Pearson K2 Omnibus Test	14.24	9.21	8.1E-04	Non-Normal Distribution
Distribution	Kolmogorov-Smirnov D Test	0.2369	0.2056	0.0012	Non-Normal Distribution
Distribution	Shapiro-Wilk W Normality Test	0.8493	0.884	0.0021	Non-Normal Distribution

7d Survival Rate Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	N	4	0.9667	0.8606	1.0000	1.0000	0.8667	1.0000	0.0333	6.90%	0.00%
6.25		4	0.9333	0.7212	1.0000	1.0000	0.7333	1.0000	0.0667	14.29%	3.45%
12.5		4	0.9833	0.9303	1.0000	1.0000	0.9333	1.0000	0.0167	3.39%	-1.72%
25		4	0.9500	0.8970	1.0000	0.9333	0.9333	1.0000	0.0167	3.51%	1.72%
50		4	0.9667	0.9054	1.0000	0.9667	0.9333	1.0000	0.0192	3.98%	0.00%
100		4	0.9167	0.8636	0.9697	0.9333	0.8667	0.9333	0.0167	3.64%	5.17%

Fathead Minnow 7-d Larval Survival and Growth Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Analysis ID:	13-9578-2049	**Endpoint:**	7d Survival Rate	**CETIS Version:**	CETISv1.9.2
Analyzed:	02 Dec-16 13:29	**Analysis:**	Nonparametric-Control vs Treatments	**Official Results:**	Yes

Angular (Corrected) Transformed Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	N	4	1.38	1.186	1.575	1.441	1.197	1.441	0.06108	8.85%	0.00%
6.25		4	1.338	1.009	1.667	1.441	1.028	1.441	0.1033	15.44%	3.06%
12.5		4	1.408	1.304	1.513	1.441	1.31	1.441	0.03292	4.68%	-2.04%
25		4	1.343	1.238	1.447	1.31	1.31	1.441	0.03292	4.90%	2.73%
50		4	1.375	1.254	1.496	1.375	1.31	1.441	0.03802	5.53%	0.35%
100		4	1.281	1.192	1.371	1.31	1.197	1.31	0.02816	4.39%	7.16%

7d Survival Rate Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	N	1.0000	1.0000	0.8667	1.0000
6.25		0.7333	1.0000	1.0000	1.0000
12.5		1.0000	1.0000	1.0000	0.9333
25		1.0000	0.9333	0.9333	0.9333
50		0.9333	1.0000	1.0000	0.9333
100		0.9333	0.9333	0.8667	0.9333

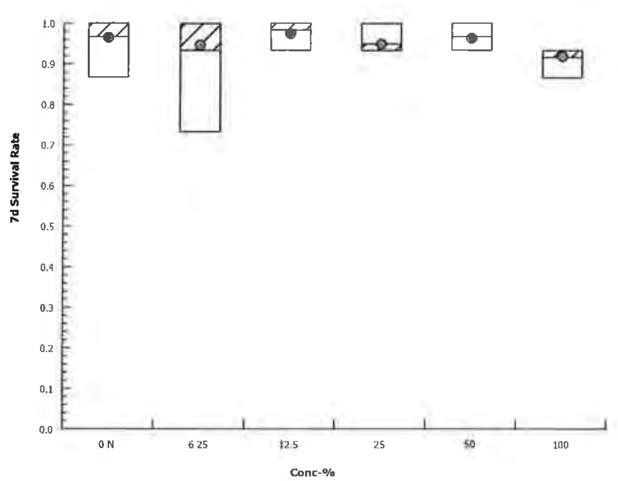
Angular (Corrected) Transformed Detail

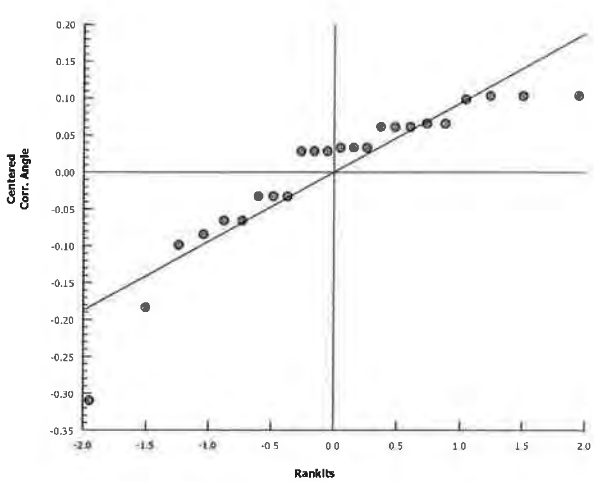
Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	N	1.441	1.441	1.197	1.441
6.25		1.028	1.441	1.441	1.441
12.5		1.441	1.441	1.441	1.31
25		1.441	1.31	1.31	1.31
50		1.31	1.441	1.441	1.31
100		1.31	1.31	1.197	1.31

7d Survival Rate Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	N	15/15	15/15	13/15	15/15
6.25		11/15	15/15	15/15	15/15
12.5		15/15	15/15	15/15	14/15
25		15/15	14/15	14/15	14/15
50		14/15	15/15	15/15	14/15
100		14/15	14/15	13/15	14/15

Graphics





Fathead Minnow 7-d Larval Survival and Growth Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Analysis ID:	05-7252-2639	**Endpoint:**	Mean Dry Biomass-mg	**CETIS Version:**	CETISv1.9.2
Analyzed:	02 Dec-16 13:29	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes
Batch ID:	04-2638-6326	**Test Type:**	Growth-Survival (7d)	**Analyst:**	Joe Freas
Start Date:	28 Oct-16 14:48	**Protocol:**	EPA/821/R-02-013 (2002)	**Diluent:**	Laboratory Water
Ending Date:	04 Nov-16 12:53	**Species:**	Pimephales promelas	**Brine:**	Not Applicable
Duration:	6d 22h	**Source:**	Aquatic Biosystems, CO	**Age:**	
Sample ID:	16-6561-3735	**Code:**	VCF1016.346	**Client:**	VCWPD
Sample Date:	28 Oct-16 05:55	**Material:**	Sample Water	**Project:**	2016/17-1 (Wet)
Receipt Date:	28 Oct-16 09:47	**Source:**	Bioassay Report		
Sample Age:	9h	**Station:**	MO-MEI		

Data Transform	Alt Hyp	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	C > T	100	> 100	n/a	1	19.83%

Dunnett Multiple Comparison Test

Control	vs	Conc-%	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Negative Control		6.25	-2.715	2.407	0.070	6	CDF	0.9999	Non-Significant Effect
		12.5	-3.421	2.407	0.070	6	CDF	1.0000	Non-Significant Effect
		25	-2.772	2.407	0.070	6	CDF	0.9999	Non-Significant Effect
		50	-2.914	2.407	0.070	6	CDF	0.9999	Non-Significant Effect
		100	-1.184	2.407	0.070	6	CDF	0.9896	Non-Significant Effect

Test Acceptability Criteria

		TAC Limits			
Attribute	**Test Stat**	**Lower**	**Upper**	**Overlap**	**Decision**
Control Resp	0.3555	0.25	>>	Yes	Passes Acceptibility Criteria

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0290114	0.0058023	5	3.384	0.0249	Significant Effect
Error	0.0308641	0.0017147	18			
Total	0.0598755		23			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance Test	5.727	15.09	0.3337	Equal Variances
Variances	Levene Equality of Variance Test	1.913	4.248	0.1421	Equal Variances
Variances	Mod Levene Equality of Variance Test	1.18	4.248	0.3574	Equal Variances
Distribution	Anderson-Darling A2 Normality Test	0.2768	3.878	0.6835	Normal Distribution
Distribution	D'Agostino Kurtosis Test	0.004255	2.576	0.9966	Normal Distribution
Distribution	D'Agostino Skewness Test	0.08876	2.576	0.9293	Normal Distribution
Distribution	D'Agostino-Pearson K2 Omnibus Test	0.007897	9.21	0.9961	Normal Distribution
Distribution	Kolmogorov-Smirnov D Test	0.1156	0.2056	0.5657	Normal Distribution
Distribution	Shapiro-Wilk W Normality Test	0.9752	0.884	0.7935	Normal Distribution

Mean Dry Biomass-mg Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	N	4	0.3555	0.2874	0.4236	0.3363	0.33	0.4193	0.0214	12.04%	0.00%
6.25		4	0.435	0.3334	0.5366	0.443	0.354	0.5	0.03193	14.68%	-22.36%
12.5		4	0.4557	0.3854	0.5259	0.449	0.4153	0.5093	0.02207	9.69%	-28.18%
25		4	0.4367	0.4167	0.4567	0.4397	0.4193	0.448	0.006283	2.88%	-22.83%
50		4	0.4408	0.3897	0.4919	0.4323	0.4133	0.4853	0.01606	7.29%	-24.00%
100		4	0.3902	0.3341	0.4462	0.3983	0.3407	0.4233	0.01761	9.03%	-9.75%

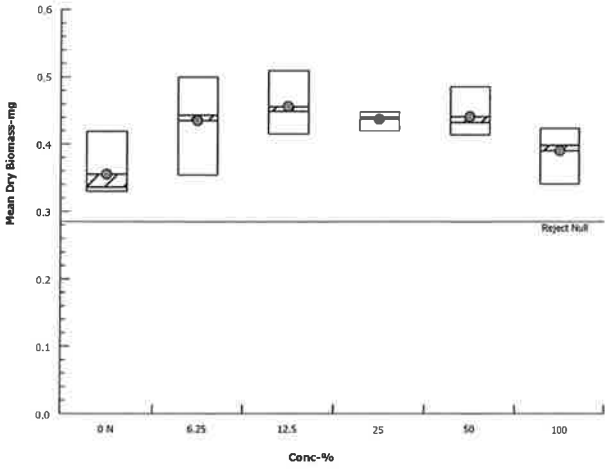
Fathead Minnow 7-d Larval Survival and Growth Test — **Aquatic Bioassay & Consulting Labs, Inc.**

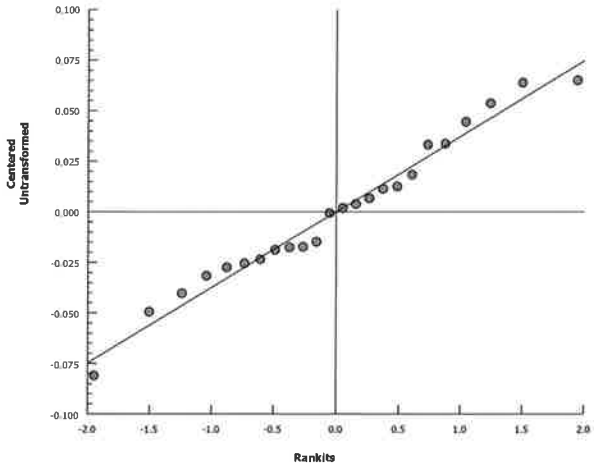
Analysis ID:	05-7252-2639	**Endpoint:**	Mean Dry Biomass-mg	**CETIS Version:**	CETISv1.9.2
Analyzed:	02 Dec-16 13:29	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes

Mean Dry Biomass-mg Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	N	0.332	0.33	0.3407	0.4193
6.25		0.354	0.4687	0.5	0.4173
12.5		0.424	0.474	0.5093	0.4153
25		0.4193	0.4433	0.436	0.448
50		0.422	0.4427	0.4853	0.4133
100		0.3407	0.4233	0.4027	0.394

Graphics





CETIS Analytical Report

Fathead Minnow 7-d Larval Survival and Growth Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Analysis ID:	01-3322-5108	**Endpoint:**	7d Survival Rate	**CETIS Version:**	CETISv1.9.2
Analyzed:	02 Dec-16 13:29	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	04-2638-6326	**Test Type:**	Growth-Survival (7d)	**Analyst:**	Joe Freas
Start Date:	28 Oct-16 14:48	**Protocol:**	EPA/821/R-02-013 (2002)	**Diluent:**	Laboratory Water
Ending Date:	04 Nov-16 12:53	**Species:**	Pimephales promelas	**Brine:**	Not Applicable
Duration:	6d 22h	**Source:**	Aquatic Biosystems, CO	**Age:**	
Sample ID:	16-6561-3735	**Code:**	VCF1016.346	**Client:**	VCWPD
Sample Date:	28 Oct-16 05:55	**Material:**	Sample Water	**Project:**	2016/17-1 (Wet)
Receipt Date:	28 Oct-16 09:47	**Source:**	Bioassay Report		
Sample Age:	9h	**Station:**	MO-MEI		

Linear Interpolation Options

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

Test Acceptability Criteria

		TAC Limits			
Attribute	**Test Stat**	**Lower**	**Upper**	**Overlap**	**Decision**
Control Resp	0.9667	0.8	>>	Yes	Passes Acceptibility Criteria

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC5	98	n/a	n/a	1.02	n/a	n/a
EC10	>100	n/a	n/a	<1	n/a	n/a
EC15	>100	n/a	n/a	<1	n/a	n/a
EC20	>100	n/a	n/a	<1	n/a	n/a
EC25	>100	n/a	n/a	<1	n/a	n/a
EC40	>100	n/a	n/a	<1	n/a	n/a
EC50	>100	n/a	n/a	<1	n/a	n/a

7d Survival Rate Summary

			Calculated Variate(A/B)								
Conc-%	**Code**	**Count**	**Mean**	**Min**	**Max**	**Std Err**	**Std Dev**	**CV%**	**%Effect**	**A**	**B**
0	N	4	0.9667	0.8667	1.0000	0.0333	0.0667	6.90%	0.0%	58	60
6.25		4	0.9333	0.7333	1.0000	0.0667	0.1333	14.29%	3.45%	56	60
12.5		4	0.9833	0.9333	1.0000	0.0167	0.0333	3.39%	-1.72%	59	60
25		4	0.9500	0.9333	1.0000	0.0167	0.0333	3.51%	1.72%	57	60
50		4	0.9667	0.9333	1.0000	0.0192	0.0385	3.98%	0.0%	58	60
100		4	0.9167	0.8667	0.9333	0.0167	0.0333	3.64%	5.17%	55	60

7d Survival Rate Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	N	1.0000	1.0000	0.8667	1.0000
6.25		0.7333	1.0000	1.0000	1.0000
12.5		1.0000	1.0000	1.0000	0.9333
25		1.0000	0.9333	0.9333	0.9333
50		0.9333	1.0000	1.0000	0.9333
100		0.9333	0.9333	0.8667	0.9333

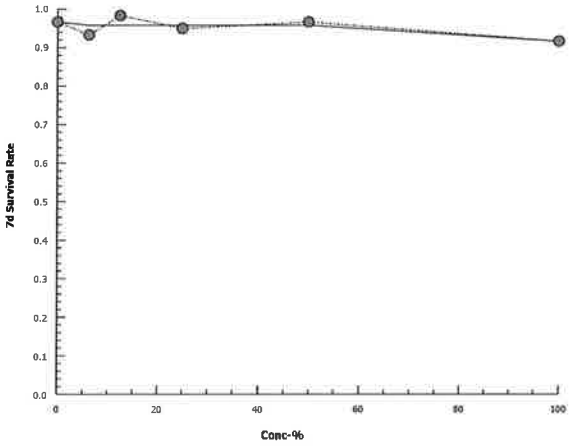
7d Survival Rate Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	N	15/15	15/15	13/15	15/15
6.25		11/15	15/15	15/15	15/15
12.5		15/15	15/15	15/15	14/15
25		15/15	14/15	14/15	14/15
50		14/15	15/15	15/15	14/15
100		14/15	14/15	13/15	14/15

Fathead Minnow 7-d Larval Survival and Growth Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Analysis ID:	01-3322-5108	**Endpoint:**	7d Survival Rate	**CETIS Version:**	CETISv1.9.2
Analyzed:	02 Dec-16 13:29	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



Fathead Minnow 7-d Larval Survival and Growth Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Analysis ID:	17-3306-9037	**Endpoint:**	Mean Dry Biomass-mg	**CETIS Version:**	CETISv1.9.2
Analyzed:	02 Dec-16 13:29	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	04-2638-6326	**Test Type:**	Growth-Survival (7d)	**Analyst:**	Joe Freas
Start Date:	28 Oct-16 14:48	**Protocol:**	EPA/821/R-02-013 (2002)	**Diluent:**	Laboratory Water
Ending Date:	04 Nov-16 12:53	**Species:**	Pimephales promelas	**Brine:**	Not Applicable
Duration:	6d 22h	**Source:**	Aquatic Biosystems, CO	**Age:**	
Sample ID:	16-6561-3735	**Code:**	VCF1016.346	**Client:**	VCWPD
Sample Date:	28 Oct-16 05:55	**Material:**	Sample Water	**Project:**	2016/17-1 (Wet)
Receipt Date:	28 Oct-16 09:47	**Source:**	Bioassay Report		
Sample Age:	9h	**Station:**	MO-MEI		

Linear Interpolation Options

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

Test Acceptability Criteria

		TAC Limits			
Attribute	**Test Stat**	**Lower**	**Upper**	**Overlap**	**Decision**
Control Resp	0.3555	0.25	>>	Yes	Passes Acceptibility Criteria

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	80.72	51.13	n/a	1.239	n/a	1.956
IC10	>100	n/a	n/a	<1	n/a	n/a
IC15	>100	n/a	n/a	<1	n/a	n/a
IC20	>100	n/a	n/a	<1	n/a	n/a
IC25	>100	n/a	n/a	<1	n/a	n/a
IC40	>100	n/a	n/a	<1	n/a	n/a
IC50	>100	n/a	n/a	<1	n/a	n/a

Mean Dry Biomass-mg Summary

			Calculated Variate						
Conc-%	**Code**	**Count**	**Mean**	**Min**	**Max**	**Std Err**	**Std Dev**	**CV%**	**%Effect**
0	N	4	0.3555	0.33	0.4193	0.0214	0.04281	12.04%	0.0%
6.25		4	0.435	0.354	0.5	0.03193	0.06385	14.68%	-22.36%
12.5		4	0.4557	0.4153	0.5093	0.02207	0.04414	9.69%	-28.18%
25		4	0.4367	0.4193	0.448	0.006283	0.01257	2.88%	-22.83%
50		4	0.4408	0.4133	0.4853	0.01606	0.03212	7.29%	-24.0%
100		4	0.3902	0.3407	0.4233	0.01761	0.03522	9.03%	-9.75%

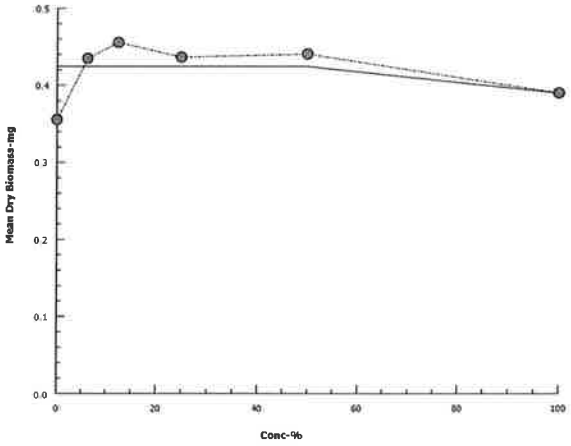
Mean Dry Biomass-mg Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	N	0.332	0.33	0.3407	0.4193
6.25		0.354	0.4687	0.5	0.4173
12.5		0.424	0.474	0.5093	0.4153
25		0.4193	0.4433	0.436	0.448
50		0.422	0.4427	0.4853	0.4133
100		0.3407	0.4233	0.4027	0.394

Fathead Minnow 7-d Larval Survival and Growth Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Analysis ID:	17-3306-9037	**Endpoint:**	Mean Dry Biomass-mg	**CETIS Version:**	CETISv1.9.2
Analyzed:	02 Dec-16 13:29	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



Fathead Minnow 7-d Larval Survival and Growth Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Batch ID:	04-2638-6326	**Test Type:**	Growth-Survival (7d)	**Analyst:**	Joe Freas
Start Date:	28 Oct-16 14:48	**Protocol:**	EPA/821/R-02-013 (2002)	**Diluent:**	Laboratory Water
Ending Date:	04 Nov-16 12:53	**Species:**	Pimephales promelas	**Brine:**	Not Applicable
Duration:	6d 22h	**Source:**	Aquatic Biosystems, CO	**Age:**	
Sample ID:	16-6561-3735	**Code:**	VCF1016.346	**Client:**	VCWPD
Sample Date:	28 Oct-16 05:55	**Material:**	Sample Water	**Project:**	2016/17-1 (Wet)
Receipt Date:	28 Oct-16 09:47	**Source:**	Bioassay Report		
Sample Age:	9h	**Station:**	MO-MEI		

Alkalinity (CaCO3)-mg/L

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	8	73.5	59.49	87.51	61	95	5.925	16.76	22.8%	0
100		8	80	80	80	80	80	0	0	0.0%	0
Overall		16	76.75	70.39	83.11	61	95	2.983	11.93	15.54%	0 (0%)

Conductivity-µmhos

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	8	329.2	321	337.5	319	348	3.509	9.925	3.01%	0
6.25		8	314	307	321	304	328	2.964	8.384	2.67%	0
12.5		8	308.8	302.8	314.7	302	321	2.505	7.086	2.3%	0
25		8	291.2	286.2	296.3	286	301	2.153	6.089	2.09%	0
50		8	259.2	255.5	263	254	266	1.601	4.528	1.75%	0
100		8	192.5	189.6	195.4	186	198	1.239	3.505	1.82%	0
Overall		48	282.5	268.9	296.1	186	348	6.747	46.74	16.55%	0 (0%)

Dissolved Oxygen-mg/L

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	8	7.738	7.571	7.904	7.5	8.1	0.07055	0.1996	2.58%	0
6.25		8	7.562	7.348	7.777	7.2	7.9	0.09051	0.256	3.39%	0
12.5		8	7.488	7.271	7.704	7.2	7.9	0.09149	0.2588	3.46%	0
25		8	7.425	7.1	7.75	6.7	7.9	0.1373	0.3882	5.23%	0
50		8	6.95	6.587	7.313	6.2	7.4	0.1535	0.4342	6.25%	0
100		8	6.9	5.884	7.916	4.3	8	0.4297	1.215	17.61%	0
Overall		48	7.344	7.161	7.526	4.3	8.1	0.09075	0.6287	8.56%	0 (0%)

Hardness (CaCO3)-mg/L

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	8	89.75	85.42	94.08	86	96	1.83	5.175	5.77%	0
100		8	90	90	90	90	90	0	0	0.0%	0
Overall		16	89.88	87.99	91.76	86	96	0.8845	3.538	3.94%	0 (0%)

pH-Units

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	8	7.8	7.633	7.967	7.5	8	0.07071	0.2	2.56%	0
6.25		8	7.387	7.185	7.59	7	7.7	0.08543	0.2416	3.27%	0
12.5		8	7.45	7.332	7.568	7.2	7.6	0.05	0.1414	1.9%	0
25		8	7.438	7.329	7.546	7.2	7.6	0.04605	0.1302	1.75%	0
50		8	7.363	7.237	7.488	7.1	7.5	0.05324	0.1506	2.05%	0
100		8	7.188	7.043	7.332	7	7.4	0.06105	0.1727	2.4%	0
Overall		48	7.438	7.365	7.51	7	8	0.03605	0.2498	3.36%	0 (0%)

Fathead Minnow 7-d Larval Survival and Growth Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Temperature-°C

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	8	24.01	23.98	24.04	24	24.1	0.01249	0.03531	0.15%	0
6.25		8	24	24	24	24	24	0	0	0.0%	0
12.5		8	24.06	23.91	24.21	24	24.5	0.0625	0.1768	0.73%	0
25		8	24.04	23.95	24.13	24	24.3	0.03751	0.1061	0.44%	0
50		8	24	24	24	24	24	0	0	0.0%	0
100		8	24	24	24	24	24	0	0	0.0%	0
Overall		48	24.02	23.99	24.04	24	24.5	0.01215	0.08419	0.35%	0 (0%)

Alkalinity (CaCO3)-mg/L

Conc-%	Code	1	2	3	4	5	6	7	8
0	N	63	61	61	61	61	91	95	95
100		80	80	80	80	80	80	80	80

Conductivity-µmhos

Conc-%	Code	1	2	3	4	5	6	7	8
0	N	336	320	319	326	324	325	336	348
6.25		321	313	309	308	308	304	321	328
12.5		313	306	302	302	302	309	315	321
25		296	289	286	287	286	287	298	301
50		263	257	254	256	255	259	264	266
100		195	191	186	192	191	194	193	198

Dissolved Oxygen-mg/L

Conc-%	Code	1	2	3	4	5	6	7	8
0	N	7.6	7.6	7.8	7.9	7.6	7.8	7.5	8.1
6.25		7.7	7.5	7.9	7.8	7.6	7.6	7.2	7.2
12.5		7.6	7.3	7.3	7.9	7.5	7.8	7.2	7.3
25		7.5	6.7	7.5	7.9	7.3	7.8	7.1	7.6
50		7.3	7	6.5	6.2	7.4	6.8	7	7.4
100		6.7	4.3	8	7.3	7.7	7.1	7.9	6.2

Hardness (CaCO3)-mg/L

Conc-%	Code	1	2	3	4	5	6	7	8
0	N	96	86	86	86	86	86	96	96
100		90	90	90	90	90	90	90	90

pH-Units

Conc-%	Code	1	2	3	4	5	6	7	8
0	N	8	7.9	7.8	7.9	7.5	7.8	7.5	8
6.25		7.4	7.3	7.6	7	7.5	7.5	7.7	7.1
12.5		7.4	7.3	7.6	7.5	7.5	7.5	7.6	7.2
25		7.4	7.3	7.5	7.5	7.5	7.5	7.6	7.2
50		7.3	7.2	7.4	7.5	7.5	7.4	7.5	7.1
100		7	7	7.4	7.4	7	7.2	7.3	7.2

Temperature-°C

Conc-%	Code	1	2	3	4	5	6	7	8
0	N	24	24	24.1	24	24	24	24	24
6.25		24	24	24	24	24	24	24	24
12.5		24	24	24	24	24	24	24	24.5
25		24	24	24	24	24.3	24	24	24
50		24	24	24	24	24	24	24	24
100		24	24	24	24	24	24	24	24

aquatic bioassay & consulting laboratories, inc

December 6, 2016

Mr. Arne Anselm
Ventura County Watershed Protection District
800 South Victoria Ave
Ventura, CA 93009

Dear Mr. Anselm:

We are pleased to present the enclosed revised bioassay report. The test was conducted under guidelines prescribed in *Short-Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms" EPA-821-R-02-013.* "All acceptability criteria were met and the concentration-response was normal. This is a valid test." Results were as follows:

CLIENT:	Ventura County Flood Control
SAMPLE I.D.:	MO-OXN
DATE RECEIVED:	10/28/2016
ABC LAB. NO.:	VCF1016.354

CHRONIC FATHEAD MINNOW SURVIVAL & GROWTH BIOASSAY

SURVIVAL	NOEC =	100.00 %
	TUc =	1.00
	EC25 =	>100.00 %
	EC50 =	>100.00 %
BIOMASS	NOEC =	100.00 %
	TUc =	1.00
	IC25 =	>100.00 %
	IC50 =	>100.00 %

Yours very truly,

Scott Johnson
Laboratory Director

CETIS Summary Report

Fathead Minnow 7-d Larval Survival and Growth Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Batch ID:	10-5334-5667	**Test Type:**	Growth-Survival (7d)	**Analyst:**	Joe Freas
Start Date:	28 Oct-16 15:00	**Protocol:**	EPA/821/R-02-013 (2002)	**Diluent:**	Laboratory Water
Ending Date:	04 Nov-16 13:00	**Species:**	Pimephales promelas	**Brine:**	Not Applicable
Duration:	6d 22h	**Source:**	Aquatic Biosystems, CO	**Age:**	
Sample ID:	00-1380-6250	**Code:**	VCF1016.354	**Client:**	VCWPD
Sample Date:	28 Oct-16 07:15	**Material:**	Sample Water	**Project:**	2016/17-1 (Wet)
Receipt Date:	28 Oct-16 10:05	**Source:**	Bioassay Report		
Sample Age:	8h	**Station:**	MO-OXN		

Multiple Comparison Summary

Analysis ID	Endpoint	Comparison Method	NOEL	LOEL	TOEL	TU	PMSD	✓
20-2673-0564	7d Survival Rate	Steel Many-One Rank Sum Test	100	> 100	n/a	1	9.53%	
15-4019-8941	Mean Dry Biomass-mg	Dunnett Multiple Comparison Test	100	> 100	n/a	1	16.7%	

Point Estimate Summary

Analysis ID	Endpoint	Point Estimate Method	Level	%	95% LCL	95% UCL	TU	✓
00-2725-5678	7d Survival Rate	Linear Interpolation (ICPIN)	EC5	>100	n/a	n/a	<1	
			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	✓
13-4338-2798	Mean Dry Biomass-mg	Linear Interpolation (ICPIN)	IC5	74.95	17.49	88.28	1.334	✓
			IC10	99.9	41.35	n/a	1.001	✓
			IC15	>100	n/a	n/a	<1	✓
			IC20	>100	n/a	n/a	<1	✓
			IC25	>100	n/a	n/a	<1	✓
			IC40	>100	n/a	n/a	<1	✓
			IC50	>100	n/a	n/a	<1	✓

Test Acceptability

				TAC Limits			
Analysis ID	**Endpoint**	**Attribute**	**Test Stat**	**Lower**	**Upper**	**Overlap**	**Decision**
00-2725-5678	7d Survival Rate	Control Resp	0.9667	0.8	>>	Yes	Passes Acceptibility Criteria
20-2673-0564	7d Survival Rate	Control Resp	0.9667	0.8	>>	Yes	Passes Acceptibility Criteria
13-4338-2798	Mean Dry Biomass-mg	Control Resp	0.3443	0.25	>>	Yes	Passes Acceptibility Criteria
15-4019-8941	Mean Dry Biomass-mg	Control Resp	0.3443	0.25	>>	Yes	Passes Acceptibility Criteria

7d Survival Rate Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	N	4	0.9667	0.9054	1.0000	0.9333	1.0000	0.0193	0.0385	3.98%	0.00%
6.25		4	0.9833	0.9303	1.0000	0.9333	1.0000	0.0167	0.0333	3.39%	-1.72%
12.5		4	0.9500	0.8484	1.0000	0.8667	1.0000	0.0319	0.0638	6.72%	1.72%
25		4	0.9500	0.8484	1.0000	0.8667	1.0000	0.0319	0.0638	6.72%	1.72%
50		4	0.9667	0.9054	1.0000	0.9333	1.0000	0.0193	0.0385	3.98%	0.00%
100		4	0.9500	0.8484	1.0000	0.8667	1.0000	0.0319	0.0638	6.72%	1.72%

Mean Dry Biomass-mg Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	N	4	0.3443	0.3103	0.3784	0.318	0.37	0.0107	0.02141	6.22%	0.00%
6.25		4	0.4227	0.3878	0.4575	0.404	0.454	0.01094	0.02189	5.18%	-22.75%
12.5		4	0.4348	0.3582	0.5114	0.3647	0.4693	0.02407	0.04813	11.07%	-26.28%
25		4	0.421	0.3633	0.4787	0.374	0.458	0.01814	0.03628	8.62%	-22.27%
50		4	0.4082	0.3329	0.4834	0.36	0.4713	0.02365	0.0473	11.59%	-18.54%
100		4	0.3655	0.3519	0.3791	0.3533	0.3733	0.004272	0.008544	2.34%	-6.15%

Fathead Minnow 7-d Larval Survival and Growth Test **Aquatic Bioassay & Consulting Labs, Inc.**

7d Survival Rate Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	N	0.9333	1.0000	0.9333	1.0000
6.25		1.0000	1.0000	0.9333	1.0000
12.5		1.0000	0.8667	0.9333	1.0000
25		1.0000	0.8667	1.0000	0.9333
50		1.0000	0.9333	1.0000	0.9333
100		1.0000	0.9333	0.8667	1.0000

Mean Dry Biomass-mg Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	N	0.3413	0.37	0.318	0.348
6.25		0.454	0.4127	0.404	0.42
12.5		0.4427	0.3647	0.4627	0.4693
25		0.4387	0.374	0.458	0.4133
50		0.36	0.3887	0.4713	0.4127
100		0.3673	0.3733	0.3533	0.368

7d Survival Rate Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	N	14/15	15/15	14/15	15/15
6.25		15/15	15/15	14/15	15/15
12.5		15/15	13/15	14/15	15/15
25		15/15	13/15	15/15	14/15
50		15/15	14/15	15/15	14/15
100		15/15	14/15	13/15	15/15

CETIS Analytical Report

Fathead Minnow 7-d Larval Survival and Growth Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Analysis ID:	20-2673-0564	**Endpoint:**	7d Survival Rate	**CETIS Version:**	CETISv1.9.2
Analyzed:	02 Dec-16 14:06	**Analysis:**	Nonparametric-Control vs Treatments	**Official Results:**	Yes
Batch ID:	10-5334-5667	**Test Type:**	Growth-Survival (7d)	**Analyst:**	Joe Freas
Start Date:	28 Oct-16 15:00	**Protocol:**	EPA/821/R-02-013 (2002)	**Diluent:**	Laboratory Water
Ending Date:	04 Nov-16 13:00	**Species:**	Pimephales promelas	**Brine:**	Not Applicable
Duration:	6d 22h	**Source:**	Aquatic Biosystems, CO	**Age:**	
Sample ID:	00-1380-6250	**Code:**	VCF1016.354	**Client:**	VCWPD
Sample Date:	28 Oct-16 07:15	**Material:**	Sample Water	**Project:**	2016/17-1 (Wet)
Receipt Date:	28 Oct-16 10:05	**Source:**	Bioassay Report		
Sample Age:	8h	**Station:**	MO-OXN		

Data Transform	Alt Hyp	NOEL	LOEL	TOEL	TU	PMSD
Angular (Corrected)	C > T	100	> 100	n/a	1	9.53%

Steel Many-One Rank Sum Test

Control	vs	Conc-%	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Negative Control		6.25	20	10	3	6	Asymp	0.9516	Non-Significant Effect
		12.5	17	10	3	6	Asymp	0.7334	Non-Significant Effect
		25	17	10	3	6	Asymp	0.7334	Non-Significant Effect
		50	18	10	3	6	Asymp	0.8333	Non-Significant Effect
		100	17	10	3	6	Asymp	0.7334	Non-Significant Effect

Test Acceptability Criteria

		TAC Limits			
Attribute	**Test Stat**	**Lower**	**Upper**	**Overlap**	**Decision**
Control Resp	0.9667	0.8	>>	Yes	Passes Acceptibility Criteria

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0120792	0.0024158	5	0.2517	0.9335	Non-Significant Effect
Error	0.172774	0.0095985	18			
Total	0.184853		23			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance Test	1.855	15.09	0.8689	Equal Variances
Variances	Levene Equality of Variance Test	1.214	4.248	0.3424	Equal Variances
Variances	Mod Levene Equality of Variance Test	1.047	4.248	0.4212	Equal Variances
Distribution	Anderson-Darling A2 Normality Test	1.229	3.878	0.0031	Non-Normal Distribution
Distribution	D'Agostino Kurtosis Test	1.899	2.576	0.0576	Normal Distribution
Distribution	D'Agostino Skewness Test	1.001	2.576	0.3171	Normal Distribution
Distribution	D'Agostino-Pearson K2 Omnibus Test	4.606	9.21	0.1000	Normal Distribution
Distribution	Kolmogorov-Smirnov D Test	0.193	0.2056	0.0212	Normal Distribution
Distribution	Shapiro-Wilk W Normality Test	0.8703	0.884	0.0053	Non-Normal Distribution

7d Survival Rate Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	N	4	0.9667	0.9054	1.0000	0.9667	0.9333	1.0000	0.0192	3.98%	0.00%
6.25		4	0.9833	0.9303	1.0000	1.0000	0.9333	1.0000	0.0167	3.39%	-1.72%
12.5		4	0.9500	0.8484	1.0000	0.9667	0.8667	1.0000	0.0319	6.72%	1.72%
25		4	0.9500	0.8484	1.0000	0.9667	0.8667	1.0000	0.0319	6.72%	1.72%
50		4	0.9667	0.9054	1.0000	0.9667	0.9333	1.0000	0.0192	3.98%	0.00%
100		4	0.9500	0.8484	1.0000	0.9667	0.8667	1.0000	0.0319	6.72%	1.72%

Fathead Minnow 7-d Larval Survival and Growth Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Analysis ID: 20-2673-0564 **Endpoint:** 7d Survival Rate **CETIS Version:** CETISv1.9.2
Analyzed: 02 Dec-16 14:06 **Analysis:** Nonparametric-Control vs Treatments **Official Results:** Yes

Angular (Corrected) Transformed Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	N	4	1.375	1.254	1.496	1.375	1.31	1.441	0.03802	5.53%	0.00%
6.25		4	1.408	1.304	1.513	1.441	1.31	1.441	0.03292	4.68%	-2.39%
12.5		4	1.347	1.16	1.535	1.375	1.197	1.441	0.05894	8.75%	2.05%
25		4	1.347	1.16	1.535	1.375	1.197	1.441	0.05894	8.75%	2.05%
50		4	1.375	1.254	1.496	1.375	1.31	1.441	0.03802	5.53%	0.00%
100		4	1.347	1.16	1.535	1.375	1.197	1.441	0.05894	8.75%	2.05%

7d Survival Rate Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	N	0.9333	1.0000	0.9333	1.0000
6.25		1.0000	1.0000	0.9333	1.0000
12.5		1.0000	0.8667	0.9333	1.0000
25		1.0000	0.8667	1.0000	0.9333
50		1.0000	0.9333	1.0000	0.9333
100		1.0000	0.9333	0.8667	1.0000

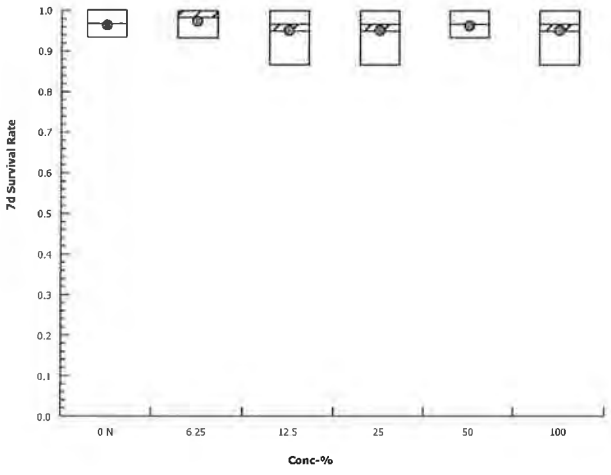
Angular (Corrected) Transformed Detail

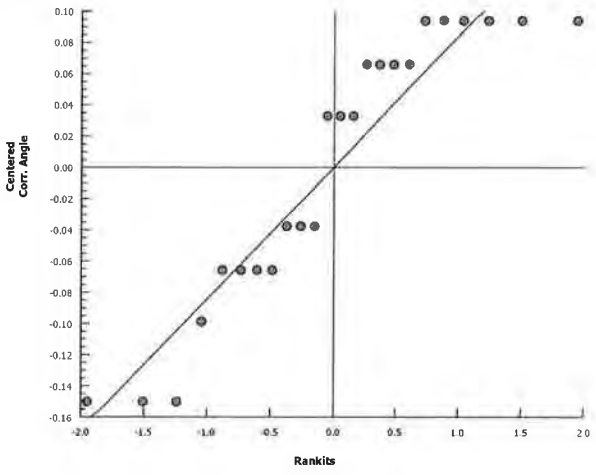
Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	N	1.31	1.441	1.31	1.441
6.25		1.441	1.441	1.31	1.441
12.5		1.441	1.197	1.31	1.441
25		1.441	1.197	1.441	1.31
50		1.441	1.31	1.441	1.31
100		1.441	1.31	1.197	1.441

7d Survival Rate Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	N	14/15	15/15	14/15	15/15
6.25		15/15	15/15	14/15	15/15
12.5		15/15	13/15	14/15	15/15
25		15/15	13/15	15/15	14/15
50		15/15	14/15	15/15	14/15
100		15/15	14/15	13/15	15/15

Graphics





Fathead Minnow 7-d Larval Survival and Growth Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Analysis ID:	15-4019-8941	**Endpoint:**	Mean Dry Biomass-mg	**CETIS Version:**	CETISv1.9.2
Analyzed:	02 Dec-16 14:07	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes
Batch ID:	10-5334-5667	**Test Type:**	Growth-Survival (7d)	**Analyst:**	Joe Freas
Start Date:	28 Oct-16 15:00	**Protocol:**	EPA/821/R-02-013 (2002)	**Diluent:**	Laboratory Water
Ending Date:	04 Nov-16 13:00	**Species:**	Pimephales promelas	**Brine:**	Not Applicable
Duration:	6d 22h	**Source:**	Aquatic Biosystems, CO	**Age:**	
Sample ID:	00-1380-6250	**Code:**	VCF1016.354	**Client:**	VCWPD
Sample Date:	28 Oct-16 07:15	**Material:**	Sample Water	**Project:**	2016/17-1 (Wet)
Receipt Date:	28 Oct-16 10:05	**Source:**	Bioassay Report		
Sample Age:	8h	**Station:**	MO-OXN		

Data Transform	Alt Hyp	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	C > T	100	> 100	n/a	1	16.74%

Dunnett Multiple Comparison Test

Control	vs	Conc-%	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Negative Control		6.25	-3.271	2.407	0.058	6	CDF	1.0000	Non-Significant Effect
		12.5	-3.78	2.407	0.058	6	CDF	1.0000	Non-Significant Effect
		25	-3.202	2.407	0.058	6	CDF	1.0000	Non-Significant Effect
		50	-2.666	2.407	0.058	6	CDF	0.9999	Non-Significant Effect
		100	-0.884	2.407	0.058	6	CDF	0.9765	Non-Significant Effect

Test Acceptability Criteria

		TAC Limits			
Attribute	**Test Stat**	**Lower**	**Upper**	**Overlap**	**Decision**
Control Resp	0.3443	0.25	>>	Yes	Passes Acceptibility Criteria

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0260873	0.0052175	5	4.55	0.0074	Significant Effect
Error	0.0206401	0.0011467	18			
Total	0.0467274		23			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance Test	8.059	15.09	0.1530	Equal Variances
Variances	Levene Equality of Variance Test	1.606	4.248	0.2091	Equal Variances
Variances	Mod Levene Equality of Variance Test	1.01	4.248	0.4405	Equal Variances
Distribution	Anderson-Darling A2 Normality Test	0.3245	3.878	0.5425	Normal Distribution
Distribution	D'Agostino Kurtosis Test	0.7882	2.576	0.4306	Normal Distribution
Distribution	D'Agostino Skewness Test	0.6958	2.576	0.4865	Normal Distribution
Distribution	D'Agostino-Pearson K2 Omnibus Test	1.105	9.21	0.5754	Normal Distribution
Distribution	Kolmogorov-Smirnov D Test	0.1052	0.2056	0.7406	Normal Distribution
Distribution	Shapiro-Wilk W Normality Test	0.9771	0.884	0.8363	Normal Distribution

Mean Dry Biomass-mg Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	N	4	0.3443	0.3103	0.3784	0.3447	0.318	0.37	0.0107	6.22%	0.00%
6.25		4	0.4227	0.3878	0.4575	0.4163	0.404	0.454	0.01094	5.18%	-22.75%
12.5		4	0.4348	0.3582	0.5114	0.4527	0.3647	0.4693	0.02407	11.07%	-26.28%
25		4	0.421	0.3633	0.4787	0.426	0.374	0.458	0.01814	8.62%	-22.27%
50		4	0.4082	0.3329	0.4834	0.4007	0.36	0.4713	0.02365	11.59%	-18.54%
100		4	0.3655	0.3519	0.3791	0.3677	0.3533	0.3733	0.004272	2.34%	-6.15%

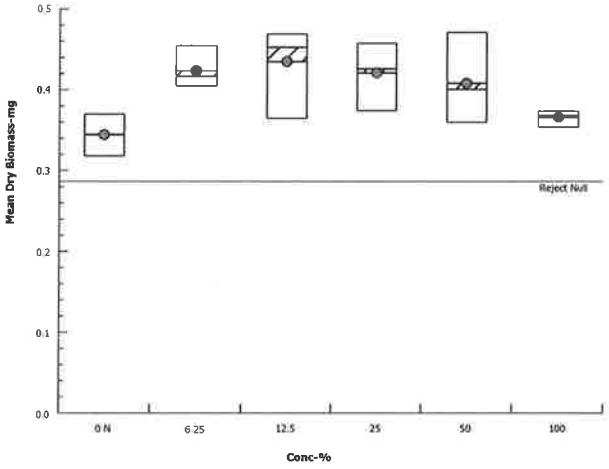
Fathead Minnow 7-d Larval Survival and Growth Test — **Aquatic Bioassay & Consulting Labs, Inc.**

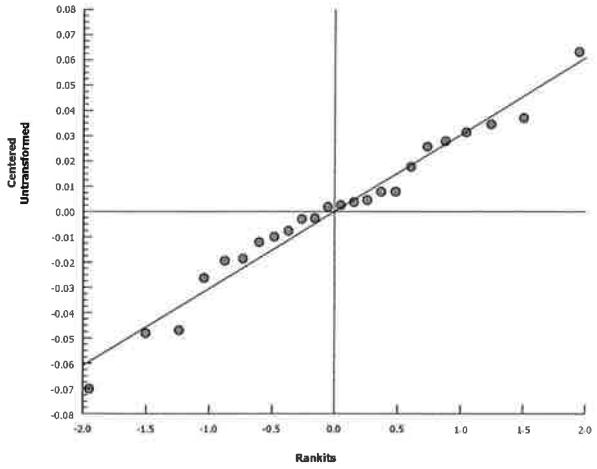
Analysis ID:	15-4019-8941	**Endpoint:**	Mean Dry Biomass-mg	**CETIS Version:**	CETISv1.9.2
Analyzed:	02 Dec-16 14:07	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes

Mean Dry Biomass-mg Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	N	0.3413	0.37	0.318	0.348
6.25		0.454	0.4127	0.404	0.42
12.5		0.4427	0.3647	0.4627	0.4693
25		0.4387	0.374	0.458	0.4133
50		0.36	0.3887	0.4713	0.4127
100		0.3673	0.3733	0.3533	0.368

Graphics





CETIS Analytical Report

Fathead Minnow 7-d Larval Survival and Growth Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Analysis ID:	00-2725-5678	**Endpoint:**	7d Survival Rate	**CETIS Version:**	CETISv1.9.2
Analyzed:	02 Dec-16 14:07	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	10-5334-5667	**Test Type:**	Growth-Survival (7d)	**Analyst:**	Joe Freas
Start Date:	28 Oct-16 15:00	**Protocol:**	EPA/821/R-02-013 (2002)	**Diluent:**	Laboratory Water
Ending Date:	04 Nov-16 13:00	**Species:**	Pimephales promelas	**Brine:**	Not Applicable
Duration:	6d 22h	**Source:**	Aquatic Biosystems, CO	**Age:**	
Sample ID:	00-1380-6250	**Code:**	VCF1016.354	**Client:**	VCWPD
Sample Date:	28 Oct-16 07:15	**Material:**	Sample Water	**Project:**	2016/17-1 (Wet)
Receipt Date:	28 Oct-16 10:05	**Source:**	Bioassay Report		
Sample Age:	8h	**Station:**	MO-OXN		

Linear Interpolation Options

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

Test Acceptability Criteria

		TAC Limits			
Attribute	**Test Stat**	**Lower**	**Upper**	**Overlap**	**Decision**
Control Resp	0.9667	0.8	>>	Yes	Passes Acceptibility Criteria

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC5	>100	n/a	n/a	<1	n/a	n/a
EC10	>100	n/a	n/a	<1	n/a	n/a
EC15	>100	n/a	n/a	<1	n/a	n/a
EC20	>100	n/a	n/a	<1	n/a	n/a
EC25	>100	n/a	n/a	<1	n/a	n/a
EC40	>100	n/a	n/a	<1	n/a	n/a
EC50	>100	n/a	n/a	<1	n/a	n/a

7d Survival Rate Summary — Calculated Variate(A/B)

Conc-%	Code	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	A	B
0	N	4	0.9667	0.9333	1.0000	0.0192	0.0385	3.98%	0.0%	58	60
6.25		4	0.9833	0.9333	1.0000	0.0167	0.0333	3.39%	-1.72%	59	60
12.5		4	0.9500	0.8667	1.0000	0.0319	0.0638	6.72%	1.72%	57	60
25		4	0.9500	0.8667	1.0000	0.0319	0.0638	6.72%	1.72%	57	60
50		4	0.9667	0.9333	1.0000	0.0192	0.0385	3.98%	0.0%	58	60
100		4	0.9500	0.8667	1.0000	0.0319	0.0638	6.72%	1.72%	57	60

7d Survival Rate Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	N	0.9333	1.0000	0.9333	1.0000
6.25		1.0000	1.0000	0.9333	1.0000
12.5		1.0000	0.8667	0.9333	1.0000
25		1.0000	0.8667	1.0000	0.9333
50		1.0000	0.9333	1.0000	0.9333
100		1.0000	0.9333	0.8667	1.0000

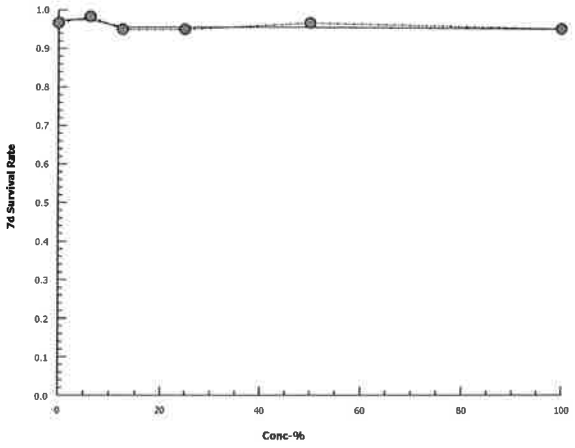
7d Survival Rate Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	N	14/15	15/15	14/15	15/15
6.25		15/15	15/15	14/15	15/15
12.5		15/15	13/15	14/15	15/15
25		15/15	13/15	15/15	14/15
50		15/15	14/15	15/15	14/15
100		15/15	14/15	13/15	15/15

Fathead Minnow 7-d Larval Survival and Growth Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Analysis ID:	00-2725-5678	**Endpoint:**	7d Survival Rate	**CETIS Version:**	CETISv1.9.2
Analyzed:	02 Dec-16 14:07	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



Fathead Minnow 7-d Larval Survival and Growth Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Analysis ID:	13-4338-2798	**Endpoint:**	Mean Dry Biomass-mg	**CETIS Version:**	CETISv1.9.2
Analyzed:	02 Dec-16 14:07	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	10-5334-5667	**Test Type:**	Growth-Survival (7d)	**Analyst:**	Joe Freas
Start Date:	28 Oct-16 15:00	**Protocol:**	EPA/821/R-02-013 (2002)	**Diluent:**	Laboratory Water
Ending Date:	04 Nov-16 13:00	**Species:**	Pimephales promelas	**Brine:**	Not Applicable
Duration:	6d 22h	**Source:**	Aquatic Biosystems, CO	**Age:**	
Sample ID:	00-1380-6250	**Code:**	VCF1016.354	**Client:**	VCWPD
Sample Date:	28 Oct-16 07:15	**Material:**	Sample Water	**Project:**	2016/17-1 (Wet)
Receipt Date:	28 Oct-16 10:05	**Source:**	Bioassay Report		
Sample Age:	8h	**Station:**	MO-OXN		

Linear Interpolation Options

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

Test Acceptability Criteria

		TAC Limits			
Attribute	**Test Stat**	**Lower**	**Upper**	**Overlap**	**Decision**
Control Resp	0.3443	0.25	>>	Yes	Passes Acceptibility Criteria

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	74.95	17.49	88.28	1.334	1.133	5.717
IC10	99.9	41.35	n/a	1.001	n/a	2.418
IC15	>100	n/a	n/a	<1	n/a	n/a
IC20	>100	n/a	n/a	<1	n/a	n/a
IC25	>100	n/a	n/a	<1	n/a	n/a
IC40	>100	n/a	n/a	<1	n/a	n/a
IC50	>100	n/a	n/a	<1	n/a	n/a

Mean Dry Biomass-mg Summary

			Calculated Variate						
Conc-%	**Code**	**Count**	**Mean**	**Min**	**Max**	**Std Err**	**Std Dev**	**CV%**	**%Effect**
0	N	4	0.3443	0.318	0.37	0.0107	0.02141	6.22%	0.0%
6.25		4	0.4227	0.404	0.454	0.01094	0.02189	5.18%	-22.75%
12.5		4	0.4348	0.3647	0.4693	0.02407	0.04813	11.07%	-26.28%
25		4	0.421	0.374	0.458	0.01814	0.03628	8.62%	-22.27%
50		4	0.4082	0.36	0.4713	0.02365	0.0473	11.59%	-18.54%
100		4	0.3655	0.3533	0.3733	0.004272	0.008544	2.34%	-6.15%

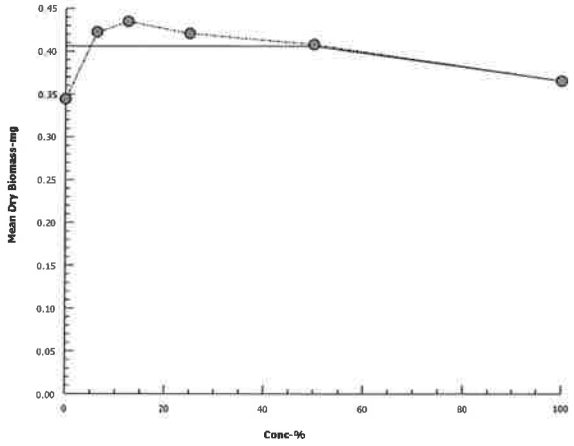
Mean Dry Biomass-mg Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	N	0.3413	0.37	0.318	0.348
6.25		0.454	0.4127	0.404	0.42
12.5		0.4427	0.3647	0.4627	0.4693
25		0.4387	0.374	0.458	0.4133
50		0.36	0.3887	0.4713	0.4127
100		0.3673	0.3733	0.3533	0.368

Fathead Minnow 7-d Larval Survival and Growth Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Analysis ID:	13-4338-2798	**Endpoint:**	Mean Dry Biomass-mg	**CETIS Version:**	CETISv1.9.2
Analyzed:	02 Dec-16 14:07	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



Fathead Minnow 7-d Larval Survival and Growth Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Batch ID:	10-5334-5667	**Test Type:**	Growth-Survival (7d)	**Analyst:**	Joe Freas
Start Date:	28 Oct-16 15:00	**Protocol:**	EPA/821/R-02-013 (2002)	**Diluent:**	Laboratory Water
Ending Date:	04 Nov-16 13:00	**Species:**	Pimephales promelas	**Brine:**	Not Applicable
Duration:	6d 22h	**Source:**	Aquatic Biosystems, CO	**Age:**	
Sample ID:	00-1380-6250	**Code:**	VCF1016.354	**Client:**	VCWPD
Sample Date:	28 Oct-16 07:15	**Material:**	Sample Water	**Project:**	2016/17-1 (Wet)
Receipt Date:	28 Oct-16 10:05	**Source:**	Bioassay Report		
Sample Age:	8h	**Station:**	MO-OXN		

Alkalinity (CaCO3)-mg/L

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	8	62.25	60.72	63.78	61	65	0.6478	1.832	2.94%	0
100		1	38			38	38	0	0	0.0%	0
Overall		9	59.56	53.2	65.91	38	65	2.754	8.263	13.87%	0 (0%)

Conductivity-µmhos

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	8	329.2	321	337.5	319	348	3.509	9.925	3.01%	0
6.25		8	314	306.7	321.3	305	324	3.094	8.751	2.79%	0
12.5		8	313.2	287.8	338.7	297	387	10.78	30.48	9.73%	0
25		8	282	275.4	288.6	274	293	2.797	7.91	2.81%	0
50		8	235.9	229.6	242.1	226	249	2.635	7.453	3.16%	0
100		8	148.1	141.7	154.6	139	160	2.728	7.717	5.21%	0
Overall		48	270.4	251.6	289.2	139	387	9.34	64.71	23.93%	0 (0%)

Dissolved Oxygen-mg/L

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	8	7.738	7.571	7.904	7.5	8.1	0.07055	0.1996	2.58%	0
6.25		8	7.637	7.423	7.852	7.2	8	0.09051	0.256	3.35%	0
12.5		8	7.5	7.352	7.648	7.2	7.8	0.06268	0.1773	2.36%	0
25		8	7.613	7.392	7.833	7.3	8	0.09342	0.2642	3.47%	0
50		8	15.2	-3.99	34.39	6.4	72	8.115	22.95	151.0%	0
100		8	6.525	5.257	7.793	4	7.9	0.5361	1.516	23.24%	0
Overall		48	8.702	5.984	11.42	4	72	1.351	9.361	107.60%	0 (0%)

Hardness (CaCO3)-mg/L

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	8	89.75	85.42	94.08	86	96	1.83	5.175	5.77%	0
100		1	60			60	60	0	0	0.0%	0
Overall		9	86.44	77.96	94.93	60	96	3.678	11.04	12.77%	0 (0%)

pH-Units

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	8	7.763	7.608	7.917	7.5	8	0.06529	0.1847	2.38%	0
6.25		8	7.512	7.408	7.617	7.3	7.7	0.04407	0.1246	1.66%	0
12.5		8	7.513	7.399	7.626	7.4	7.8	0.04795	0.1356	1.81%	0
25		8	7.475	7.388	7.562	7.3	7.6	0.0366	0.1035	1.39%	0
50		8	7.475	7.401	7.549	7.3	7.6	0.03134	0.08864	1.19%	0
100		8	7.325	7.142	7.508	7	7.6	0.07734	0.2188	2.99%	0
Overall		48	7.51	7.454	7.566	7	8	0.02781	0.1927	2.57%	0 (0%)

Fathead Minnow 7-d Larval Survival and Growth Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Temperature-°C

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	8	24.25	23.8	24.7	24	25.5	0.189	0.5345	2.2%	0
6.25		8	24.1	23.86	24.34	24	24.8	0.1	0.2828	1.17%	0
12.5		8	24.24	23.74	24.73	24	25.7	0.2104	0.5951	2.46%	0
25		8	24.01	23.98	24.04	24	24.1	0.01249	0.03531	0.15%	0
50		8	21.6	15.65	27.55	4	24.8	2.516	7.117	32.95%	0
100		8	24.08	23.95	24.2	24	24.4	0.05261	0.1488	0.62%	0
Overall		48	23.71	22.86	24.56	4	25.7	0.4226	2.928	12.35%	0 (0%)

Alkalinity (CaCO3)-mg/L

Conc-%	Code	1	2	3	4	5	6	7	8
0	N	63	61	61	61	61	61	65	65
100		38							

Conductivity-µmhos

Conc-%	Code	1	2	3	4	5	6	7	8
0	N	336	320	319	326	324	325	336	348
6.25		321	308	305	305	306	319	324	324
12.5		387	300	300	298	297	299	310	315
25		292	278	276	276	274	278	289	293
50		226	233	232	233	234	235	245	249
100		139	142	143	148	145	149	159	160

Dissolved Oxygen-mg/L

Conc-%	Code	1	2	3	4	5	6	7	8
0	N	7.6	7.6	7.8	7.9	7.6	7.8	7.5	8.1
6.25		7.6	7.5	7.9	8	7.5	7.8	7.2	7.6
12.5		7.6	7.6	7.8	7.2	7.4	7.4	7.5	7.5
25		7.6	7.3	7.8	8	7.3	7.9	7.5	7.5
50		7.4	7.3	7.4	7.2	6.7	6.4	72	7.2
100		7.5	6.9	4.3	7.7	4	7.1	6.8	7.9

Hardness (CaCO3)-mg/L

Conc-%	Code	1	2	3	4	5	6	7	8
0	N	96	86	86	86	86	86	96	96
100		60							

pH-Units

Conc-%	Code	1	2	3	4	5	6	7	8
0	N	8	7.9	7.8	7.9	7.5	7.8	7.5	7.7
6.25		7.5	7.6	7.6	7.5	7.4	7.5	7.3	7.7
12.5		7.4	7.6	7.5	7.5	7.4	7.5	7.4	7.8
25		7.5	7.6	7.5	7.5	7.4	7.6	7.3	7.4
50		7.5	7.5	7.5	7.5	7.5	7.4	7.6	7.3
100		7.2	7.2	7.5	7.3	7.6	7	7.6	7.2

Temperature-°C

Conc-%	Code	1	2	3	4	5	6	7	8
0	N	24	24	24.5	25.5	24	24	24	24
6.25		24	24.8	24	24	24	24	24	24
12.5		24	24	24	24	24	24	24.2	25.7
25		24	24	24	24.1	24	24	24	24
50		24	24.8	24	24	24	24	24	4
100		24	24	24.4	24	24	24	24.2	24

aquatic bioassay & consulting laboratories, inc

December 6, 2016

Mr. Arne Anselm
Ventura County Watershed Protection District
800 South Victoria Ave
Ventura, CA 93009

Dear Mr. Anselm:

We are pleased to present the enclosed revised bioassay report. The test was conducted under guidelines prescribed in *Short-Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms" EPA-821-R-02-013.* "All acceptability criteria were met and the concentration-response was normal. This is a valid test." Results were as follows:

CLIENT:	Ventura County Flood Control
SAMPLE I.D.:	MO-SPA
DATE RECEIVED:	10/28/2016
ABC LAB. NO.:	VCF1016.360

CHRONIC FATHEAD MINNOW SURVIVAL & GROWTH BIOASSAY

SURVIVAL	NOEC =	100.00 %
	TUc =	1.00
	EC25 =	>100.00 %
	EC50 =	>100.00 %
BIOMASS	NOEC =	100.00 %
	TUc =	1.00
	IC25 =	>100.00 %
	IC50 =	>100.00 %

Yours very truly,

Scott Johnson
Laboratory Director

CETIS Summary Report

Fathead Minnow 7-d Larval Survival and Growth Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Batch ID:	10-7564-6951	**Test Type:**	Growth-Survival (7d)	**Analyst:**	Joe Freas
Start Date:	28 Oct-16 15:17	**Protocol:**	EPA/821/R-02-013 (2002)	**Diluent:**	Laboratory Water
Ending Date:	04 Nov-16 13:20	**Species:**	Pimephales promelas	**Brine:**	Not Applicable
Duration:	6d 22h	**Source:**	Aquatic Biosystems, CO	**Age:**	
Sample ID:	19-4634-1801	**Code:**	VCF1016.360	**Client:**	VCWPD
Sample Date:	28 Oct-16 06:15	**Material:**	Sample Water	**Project:**	2016/17-1 (Wet)
Receipt Date:	28 Oct-16 12:10	**Source:**	Bioassay Report		
Sample Age:	9h	**Station:**	MO-SPA		

Multiple Comparison Summary

Analysis ID	Endpoint	Comparison Method	NOEL	LOEL	TOEL	TU	PMSD	✓
07-3151-8235	7d Survival Rate	Dunnett Multiple Comparison Test	100	> 100	n/a	1	9.84%	
05-4536-6022	Mean Dry Biomass-mg	Steel Many-One Rank Sum Test	100	> 100	n/a	1	39.3%	

Point Estimate Summary

Analysis ID	Endpoint	Point Estimate Method	Level	%	95% LCL	95% UCL	TU	✓
14-8867-4415	7d Survival Rate	Linear Interpolation (ICPIN)	EC5	>100	n/a	n/a	<1	
			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	✓
08-3259-7460	Mean Dry Biomass-mg	Linear Interpolation (ICPIN)	IC5	39.1	13.91	n/a	2.557	✓
			IC10	>100	n/a	n/a	<1	✓
			IC15	>100	n/a	n/a	<1	✓
			IC20	>100	n/a	n/a	<1	✓
			IC25	>100	n/a	n/a	<1	✓
			IC40	>100	n/a	n/a	<1	✓
			IC50	>100	n/a	n/a	<1	✓

Test Acceptability

				TAC Limits			
Analysis ID	Endpoint	Attribute	Test Stat	Lower	Upper	Overlap	Decision
07-3151-8235	7d Survival Rate	Control Resp	0.9667	0.8	>>	Yes	Passes Acceptibility Criteria
14-8867-4415	7d Survival Rate	Control Resp	0.9667	0.8	>>	Yes	Passes Acceptibility Criteria
05-4536-6022	Mean Dry Biomass-mg	Control Resp	0.3443	0.25	>>	Yes	Passes Acceptibility Criteria
08-3259-7460	Mean Dry Biomass-mg	Control Resp	0.3443	0.25	>>	Yes	Passes Acceptibility Criteria

7d Survival Rate Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	N	4	0.9667	0.9054	1.0000	0.9333	1.0000	0.0193	0.0385	3.98%	0.00%
6.25		4	0.9833	0.9303	1.0000	0.9333	1.0000	0.0167	0.0333	3.39%	-1.72%
12.5		4	0.9667	0.9054	1.0000	0.9333	1.0000	0.0193	0.0385	3.98%	0.00%
25		4	0.9333	0.8467	1.0000	0.8667	1.0000	0.0272	0.0544	5.83%	3.45%
50		4	0.9333	0.8467	1.0000	0.8667	1.0000	0.0272	0.0544	5.83%	3.45%
100		4	0.9333	0.7833	1.0000	0.8000	1.0000	0.0471	0.0943	10.10%	3.45%

Mean Dry Biomass-mg Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	N	4	0.3443	0.3103	0.3784	0.318	0.37	0.0107	0.02141	6.22%	0.00%
6.25		4	0.432	0.3658	0.4982	0.3953	0.4687	0.02079	0.04158	9.62%	-25.46%
12.5		4	0.4208	0.3789	0.4628	0.3987	0.4573	0.01319	0.02638	6.27%	-22.22%
25		4	0.3993	0.3589	0.4398	0.3673	0.422	0.0127	0.02541	6.36%	-15.97%
50		4	0.3528	0.2919	0.4137	0.3153	0.3987	0.01914	0.03828	10.85%	-2.47%
100		4	0.3747	0.08601	0.6633	0.2327	0.636	0.0907	0.1814	48.42%	-8.81%

Fathead Minnow 7-d Larval Survival and Growth Test — **Aquatic Bioassay & Consulting Labs, Inc.**

7d Survival Rate Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	N	0.9333	1.0000	0.9333	1.0000
6.25		1.0000	0.9333	1.0000	1.0000
12.5		1.0000	0.9333	0.9333	1.0000
25		0.8667	0.9333	0.9333	1.0000
50		0.8667	1.0000	0.9333	0.9333
100		0.9333	0.8000	1.0000	1.0000

Mean Dry Biomass-mg Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	N	0.3413	0.37	0.318	0.348
6.25		0.3953	0.3967	0.4687	0.4673
12.5		0.4047	0.3987	0.4227	0.4573
25		0.3673	0.3907	0.4173	0.422
50		0.3153	0.3693	0.328	0.3987
100		0.2753	0.2327	0.3547	0.636

7d Survival Rate Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	N	14/15	15/15	14/15	15/15
6.25		15/15	14/15	15/15	15/15
12.5		15/15	14/15	14/15	15/15
25		13/15	14/15	14/15	15/15
50		13/15	15/15	14/15	14/15
100		14/15	12/15	15/15	15/15

CETIS Analytical Report

Fathead Minnow 7-d Larval Survival and Growth Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Analysis ID:	07-3151-8235	**Endpoint:**	7d Survival Rate	**CETIS Version:**	CETISv1.9.2
Analyzed:	02 Dec-16 14:27	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes
Batch ID:	10-7564-6951	**Test Type:**	Growth-Survival (7d)	**Analyst:**	Joe Freas
Start Date:	28 Oct-16 15:17	**Protocol:**	EPA/821/R-02-013 (2002)	**Diluent:**	Laboratory Water
Ending Date:	04 Nov-16 13:20	**Species:**	Pimephales promelas	**Brine:**	Not Applicable
Duration:	6d 22h	**Source:**	Aquatic Biosystems, CO	**Age:**	
Sample ID:	19-4634-1801	**Code:**	VCF1016.360	**Client:**	VCWPD
Sample Date:	28 Oct-16 06:15	**Material:**	Sample Water	**Project:**	2016/17-1 (Wet)
Receipt Date:	28 Oct-16 12:10	**Source:**	Bioassay Report		
Sample Age:	9h	**Station:**	MO-SPA		

Data Transform	Alt Hyp	NOEL	LOEL	TOEL	TU	PMSD
Angular (Corrected)	C > T	100	> 100	n/a	1	9.84%

Dunnett Multiple Comparison Test

Control	vs	Conc-%	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Negative Control		6.25	-0.4626	2.407	0.171	6	CDF	0.9343	Non-Significant Effect
		12.5	0	2.407	0.171	6	CDF	0.8333	Non-Significant Effect
		25	0.8583	2.407	0.171	6	CDF	0.4856	Non-Significant Effect
		50	0.8583	2.407	0.171	6	CDF	0.4856	Non-Significant Effect
		100	0.7113	2.407	0.171	6	CDF	0.5528	Non-Significant Effect

Test Acceptability Criteria

		TAC Limits			
Attribute	**Test Stat**	**Lower**	**Upper**	**Overlap**	**Decision**
Control Resp	0.9667	0.8	>>	Yes	Passes Acceptibility Criteria

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0313942	0.0062788	5	0.6198	0.6865	Non-Significant Effect
Error	0.182339	0.0101299	18			
Total	0.213733		23			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance Test	2.921	15.09	0.7122	Equal Variances
Variances	Levene Equality of Variance Test	0.7566	4.248	0.5924	Equal Variances
Variances	Mod Levene Equality of Variance Test	0.7166	4.248	0.6192	Equal Variances
Distribution	Anderson-Darling A2 Normality Test	0.4211	3.878	0.3280	Normal Distribution
Distribution	D'Agostino Kurtosis Test	0.1687	2.576	0.8660	Normal Distribution
Distribution	D'Agostino Skewness Test	1.06	2.576	0.2891	Normal Distribution
Distribution	D'Agostino-Pearson K2 Omnibus Test	1.152	9.21	0.5621	Normal Distribution
Distribution	Kolmogorov-Smirnov D Test	0.1037	0.2056	0.7680	Normal Distribution
Distribution	Shapiro-Wilk W Normality Test	0.9519	0.884	0.2982	Normal Distribution

7d Survival Rate Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	N	4	0.9667	0.9054	1.0000	0.9667	0.9333	1.0000	0.0192	3.98%	0.00%
6.25		4	0.9833	0.9303	1.0000	1.0000	0.9333	1.0000	0.0167	3.39%	-1.72%
12.5		4	0.9667	0.9054	1.0000	0.9667	0.9333	1.0000	0.0192	3.98%	0.00%
25		4	0.9333	0.8467	1.0000	0.9333	0.8667	1.0000	0.0272	5.83%	3.45%
50		4	0.9333	0.8467	1.0000	0.9333	0.8667	1.0000	0.0272	5.83%	3.45%
100		4	0.9333	0.7833	1.0000	0.9667	0.8000	1.0000	0.0471	10.10%	3.45%

Fathead Minnow 7-d Larval Survival and Growth Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Analysis ID: 07-3151-8235 **Endpoint:** 7d Survival Rate **CETIS Version:** CETISv1.9.2
Analyzed: 02 Dec-16 14:27 **Analysis:** Parametric-Control vs Treatments **Official Results:** Yes

Angular (Corrected) Transformed Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	N	4	1.375	1.254	1.496	1.375	1.31	1.441	0.03802	5.53%	0.00%
6.25		4	1.408	1.304	1.513	1.441	1.31	1.441	0.03292	4.68%	-2.39%
12.5		4	1.375	1.254	1.496	1.375	1.31	1.441	0.03802	5.53%	0.00%
25		4	1.314	1.155	1.473	1.31	1.197	1.441	0.04995	7.60%	4.44%
50		4	1.314	1.155	1.473	1.31	1.197	1.441	0.04995	7.60%	4.44%
100		4	1.325	1.074	1.576	1.375	1.107	1.441	0.07893	11.92%	3.68%

7d Survival Rate Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	N	0.9333	1.0000	0.9333	1.0000
6.25		1.0000	0.9333	1.0000	1.0000
12.5		1.0000	0.9333	0.9333	1.0000
25		0.8667	0.9333	0.9333	1.0000
50		0.8667	1.0000	0.9333	0.9333
100		0.9333	0.8000	1.0000	1.0000

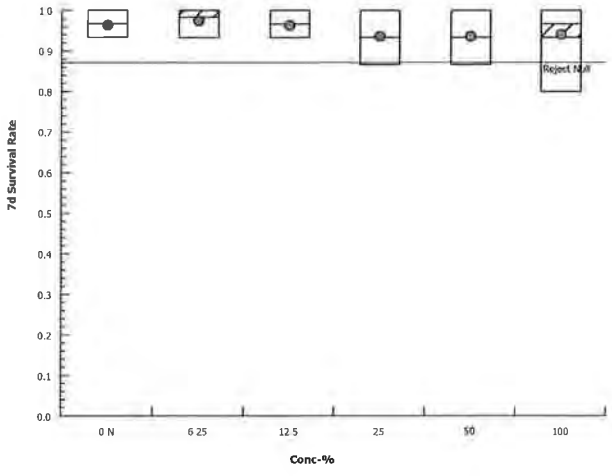
Angular (Corrected) Transformed Detail

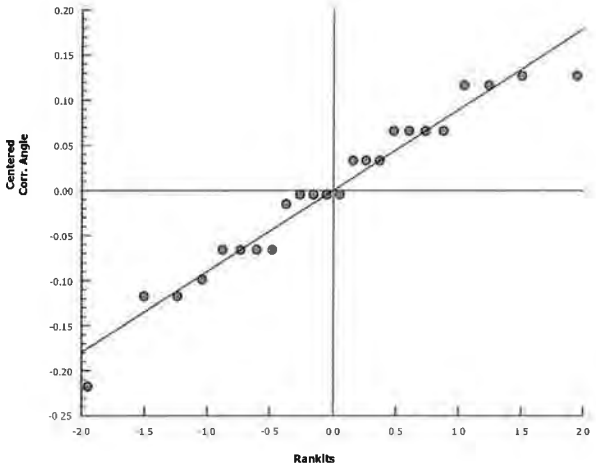
Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	N	1.31	1.441	1.31	1.441
6.25		1.441	1.31	1.441	1.441
12.5		1.441	1.31	1.31	1.441
25		1.197	1.31	1.31	1.441
50		1.197	1.441	1.31	1.31
100		1.31	1.107	1.441	1.441

7d Survival Rate Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	N	14/15	15/15	14/15	15/15
6.25		15/15	14/15	15/15	15/15
12.5		15/15	14/15	14/15	15/15
25		13/15	14/15	14/15	15/15
50		13/15	15/15	14/15	14/15
100		14/15	12/15	15/15	15/15

Graphics





Fathead Minnow 7-d Larval Survival and Growth Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Analysis ID:	05-4536-6022	**Endpoint:**	Mean Dry Biomass-mg	**CETIS Version:**	CETISv1.9.2
Analyzed:	02 Dec-16 14:27	**Analysis:**	Nonparametric-Control vs Treatments	**Official Results:**	Yes
Batch ID:	10-7564-6951	**Test Type:**	Growth-Survival (7d)	**Analyst:**	Joe Freas
Start Date:	28 Oct-16 15:17	**Protocol:**	EPA/821/R-02-013 (2002)	**Diluent:**	Laboratory Water
Ending Date:	04 Nov-16 13:20	**Species:**	Pimephales promelas	**Brine:**	Not Applicable
Duration:	6d 22h	**Source:**	Aquatic Biosystems, CO	**Age:**	
Sample ID:	19-4634-1801	**Code:**	VCF1016.360	**Client:**	VCWPD
Sample Date:	28 Oct-16 06:15	**Material:**	Sample Water	**Project:**	2016/17-1 (Wet)
Receipt Date:	28 Oct-16 12:10	**Source:**	Bioassay Report		
Sample Age:	9h	**Station:**	MO-SPA		

Data Transform	Alt Hyp	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	C > T	100	> 100	n/a	1	39.29%

Steel Many-One Rank Sum Test

Control	vs	Conc-%	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Negative Control		6.25	26	10	0	6	Asymp	0.9999	Non-Significant Effect
		12.5	26	10	0	6	Asymp	0.9999	Non-Significant Effect
		25	25	10	0	6	Asymp	0.9997	Non-Significant Effect
		50	18	10	0	6	Asymp	0.8333	Non-Significant Effect
		100	17	10	0	6	Asymp	0.7334	Non-Significant Effect

Test Acceptability Criteria

		TAC Limits			
Attribute	**Test Stat**	**Lower**	**Upper**	**Overlap**	**Decision**
Control Resp	0.3443	0.25	>>	Yes	Passes Acceptibility Criteria

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0258442	0.0051688	5	0.8182	0.5524	Non-Significant Effect
Error	0.113708	0.0063171	18			
Total	0.139552		23			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance Test	21.82	15.09	5.7E-04	Unequal Variances
Variances	Levene Equality of Variance Test	4.34	4.248	0.0091	Unequal Variances
Variances	Mod Levene Equality of Variance Test	2.036	4.248	0.1218	Equal Variances
Distribution	Anderson-Darling A2 Normality Test	1.845	3.878	<1.0E-37	Non-Normal Distribution
Distribution	D'Agostino Kurtosis Test	3.664	2.576	2.5E-04	Non-Normal Distribution
Distribution	D'Agostino Skewness Test	3.44	2.576	5.8E-04	Non-Normal Distribution
Distribution	D'Agostino-Pearson K2 Omnibus Test	25.25	9.21	3.3E-06	Non-Normal Distribution
Distribution	Kolmogorov-Smirnov D Test	0.2177	0.2056	0.0046	Non-Normal Distribution
Distribution	Shapiro-Wilk W Normality Test	0.7771	0.884	1.3E-04	Non-Normal Distribution

Mean Dry Biomass-mg Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	N	4	0.3443	0.3103	0.3784	0.3447	0.318	0.37	0.0107	6.22%	0.00%
6.25		4	0.432	0.3658	0.4982	0.432	0.3953	0.4687	0.02079	9.62%	-25.46%
12.5		4	0.4208	0.3789	0.4628	0.4137	0.3987	0.4573	0.01319	6.27%	-22.22%
25		4	0.3993	0.3589	0.4398	0.404	0.3673	0.422	0.0127	6.36%	-15.97%
50		4	0.3528	0.2919	0.4137	0.3487	0.3153	0.3987	0.01914	10.85%	-2.47%
100		4	0.3747	0.08601	0.6633	0.315	0.2327	0.636	0.0907	48.42%	-8.81%

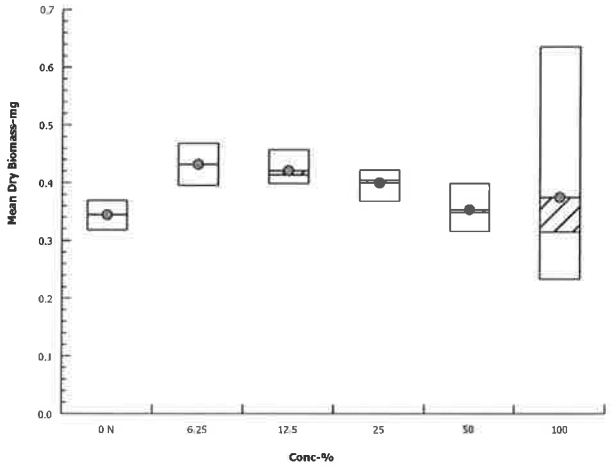
Fathead Minnow 7-d Larval Survival and Growth Test — **Aquatic Bioassay & Consulting Labs, Inc.**

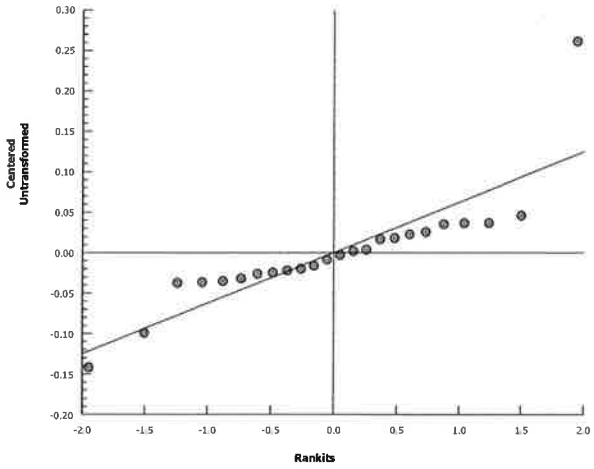
Analysis ID:	05-4536-6022	**Endpoint:**	Mean Dry Biomass-mg	**CETIS Version:**	CETISv1.9.2
Analyzed:	02 Dec-16 14:27	**Analysis:**	Nonparametric-Control vs Treatments	**Official Results:**	Yes

Mean Dry Biomass-mg Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	N	0.3413	0.37	0.318	0.348
6.25		0.3953	0.3967	0.4687	0.4673
12.5		0.4047	0.3987	0.4227	0.4573
25		0.3673	0.3907	0.4173	0.422
50		0.3153	0.3693	0.328	0.3987
100		0.2753	0.2327	0.3547	0.636

Graphics





CETIS Analytical Report

Fathead Minnow 7-d Larval Survival and Growth Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Analysis ID:	14-8867-4415	**Endpoint:**	7d Survival Rate	**CETIS Version:**	CETISv1.9.2
Analyzed:	02 Dec-16 14:27	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	10-7564-6951	**Test Type:**	Growth-Survival (7d)	**Analyst:**	Joe Freas
Start Date:	28 Oct-16 15:17	**Protocol:**	EPA/821/R-02-013 (2002)	**Diluent:**	Laboratory Water
Ending Date:	04 Nov-16 13:20	**Species:**	Pimephales promelas	**Brine:**	Not Applicable
Duration:	6d 22h	**Source:**	Aquatic Biosystems, CO	**Age:**	
Sample ID:	19-4634-1801	**Code:**	VCF1016.360	**Client:**	VCWPD
Sample Date:	28 Oct-16 06:15	**Material:**	Sample Water	**Project:**	2016/17-1 (Wet)
Receipt Date:	28 Oct-16 12:10	**Source:**	Bioassay Report		
Sample Age:	9h	**Station:**	MO-SPA		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Linear	Linear	1416828	280	Yes	Two-Point Interpolation

Test Acceptability Criteria

		TAC Limits			
Attribute	**Test Stat**	**Lower**	**Upper**	**Overlap**	**Decision**
Control Resp	0.9667	0.8	>>	Yes	Passes Acceptibility Criteria

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC5	>100	n/a	n/a	<1	n/a	n/a
EC10	>100	n/a	n/a	<1	n/a	n/a
EC15	>100	n/a	n/a	<1	n/a	n/a
EC20	>100	n/a	n/a	<1	n/a	n/a
EC25	>100	n/a	n/a	<1	n/a	n/a
EC40	>100	n/a	n/a	<1	n/a	n/a
EC50	>100	n/a	n/a	<1	n/a	n/a

7d Survival Rate Summary

			Calculated Variate(A/B)								
Conc-%	**Code**	**Count**	**Mean**	**Min**	**Max**	**Std Err**	**Std Dev**	**CV%**	**%Effect**	**A**	**B**
0	N	4	0.9667	0.9333	1.0000	0.0192	0.0385	3.98%	0.0%	58	60
6.25		4	0.9833	0.9333	1.0000	0.0167	0.0333	3.39%	-1.72%	59	60
12.5		4	0.9667	0.9333	1.0000	0.0192	0.0385	3.98%	0.0%	58	60
25		4	0.9333	0.8667	1.0000	0.0272	0.0544	5.83%	3.45%	56	60
50		4	0.9333	0.8667	1.0000	0.0272	0.0544	5.83%	3.45%	56	60
100		4	0.9333	0.8000	1.0000	0.0471	0.0943	10.10%	3.45%	56	60

7d Survival Rate Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	N	0.9333	1.0000	0.9333	1.0000
6.25		1.0000	0.9333	1.0000	1.0000
12.5		1.0000	0.9333	0.9333	1.0000
25		0.8667	0.9333	0.9333	1.0000
50		0.8667	1.0000	0.9333	0.9333
100		0.9333	0.8000	1.0000	1.0000

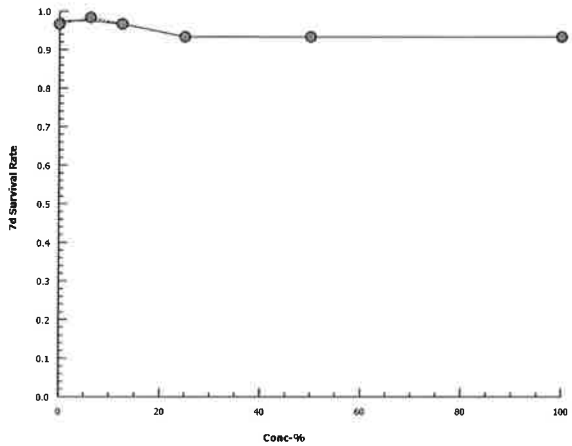
7d Survival Rate Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	N	14/15	15/15	14/15	15/15
6.25		15/15	14/15	15/15	15/15
12.5		15/15	14/15	14/15	15/15
25		13/15	14/15	14/15	15/15
50		13/15	15/15	14/15	14/15
100		14/15	12/15	15/15	15/15

Fathead Minnow 7-d Larval Survival and Growth Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Analysis ID:	14-8867-4415	**Endpoint:**	7d Survival Rate	**CETIS Version:**	CETISv1.9.2
Analyzed:	02 Dec-16 14:27	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



Fathead Minnow 7-d Larval Survival and Growth Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Analysis ID:	08-3259-7460	**Endpoint:**	Mean Dry Biomass-mg	**CETIS Version:**	CETISv1.9.2
Analyzed:	02 Dec-16 14:27	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	10-7564-6951	**Test Type:**	Growth-Survival (7d)	**Analyst:**	Joe Freas
Start Date:	28 Oct-16 15:17	**Protocol:**	EPA/821/R-02-013 (2002)	**Diluent:**	Laboratory Water
Ending Date:	04 Nov-16 13:20	**Species:**	Pimephales promelas	**Brine:**	Not Applicable
Duration:	6d 22h	**Source:**	Aquatic Biosystems, CO	**Age:**	
Sample ID:	19-4634-1801	**Code:**	VCF1016.360	**Client:**	VCWPD
Sample Date:	28 Oct-16 06:15	**Material:**	Sample Water	**Project:**	2016/17-1 (Wet)
Receipt Date:	28 Oct-16 12:10	**Source:**	Bioassay Report		
Sample Age:	9h	**Station:**	MO-SPA		

Linear Interpolation Options

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

Test Acceptability Criteria

		TAC Limits			
Attribute	**Test Stat**	**Lower**	**Upper**	**Overlap**	**Decision**
Control Resp	0.3443	0.25	>>	Yes	Passes Acceptibility Criteria

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	39.1	13.91	n/a	2.557	n/a	7.19
IC10	>100	n/a	n/a	<1	n/a	n/a
IC15	>100	n/a	n/a	<1	n/a	n/a
IC20	>100	n/a	n/a	<1	n/a	n/a
IC25	>100	n/a	n/a	<1	n/a	n/a
IC40	>100	n/a	n/a	<1	n/a	n/a
IC50	>100	n/a	n/a	<1	n/a	n/a

Mean Dry Biomass-mg Summary

			Calculated Variate						
Conc-%	**Code**	**Count**	**Mean**	**Min**	**Max**	**Std Err**	**Std Dev**	**CV%**	**%Effect**
0	N	4	0.3443	0.318	0.37	0.0107	0.02141	6.22%	0.0%
6.25		4	0.432	0.3953	0.4687	0.02079	0.04158	9.62%	-25.46%
12.5		4	0.4208	0.3987	0.4573	0.01319	0.02638	6.27%	-22.22%
25		4	0.3993	0.3673	0.422	0.0127	0.02541	6.36%	-15.97%
50		4	0.3528	0.3153	0.3987	0.01914	0.03828	10.85%	-2.47%
100		4	0.3747	0.2327	0.636	0.0907	0.1814	48.42%	-8.81%

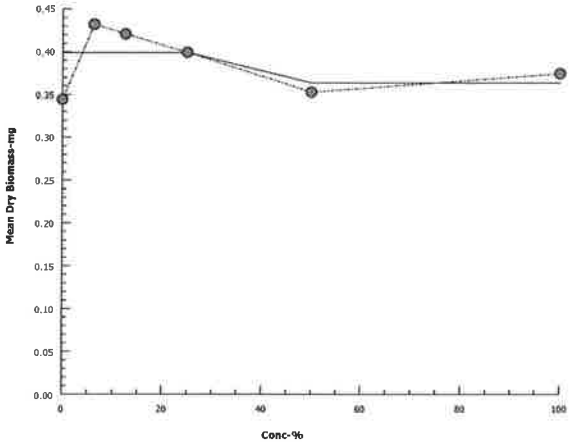
Mean Dry Biomass-mg Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	N	0.3413	0.37	0.318	0.348
6.25		0.3953	0.3967	0.4687	0.4673
12.5		0.4047	0.3987	0.4227	0.4573
25		0.3673	0.3907	0.4173	0.422
50		0.3153	0.3693	0.328	0.3987
100		0.2753	0.2327	0.3547	0.636

Fathead Minnow 7-d Larval Survival and Growth Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Analysis ID:	08-3259-7460	**Endpoint:**	Mean Dry Biomass-mg	**CETIS Version:**	CETISv1.9.2
Analyzed:	02 Dec-16 14:27	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



Fathead Minnow 7-d Larval Survival and Growth Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Batch ID:	10-7564-6951	**Test Type:**	Growth-Survival (7d)	**Analyst:**	Joe Freas
Start Date:	28 Oct-16 15:17	**Protocol:**	EPA/821/R-02-013 (2002)	**Diluent:**	Laboratory Water
Ending Date:	04 Nov-16 13:20	**Species:**	Pimephales promelas	**Brine:**	Not Applicable
Duration:	6d 22h	**Source:**	Aquatic Biosystems, CO	**Age:**	
Sample ID:	19-4634-1801	**Code:**	VCF1016.360	**Client:**	VCWPD
Sample Date:	28 Oct-16 06:15	**Material:**	Sample Water	**Project:**	2016/17-1 (Wet)
Receipt Date:	28 Oct-16 12:10	**Source:**	Bioassay Report		
Sample Age:	9h	**Station:**	MO-SPA		

Alkalinity (CaCO3)-mg/L

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	8	62.25	60.72	63.78	61	65	0.6478	1.832	2.94%	0
100		1	135			135	135	0	0	0.0%	0
Overall		9	70.33	51.65	89.02	61	135	8.103	24.31	34.56%	0 (0%)

Conductivity-µmhos

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	8	366.8	279.1	454.4	319	625	37.05	104.8	28.58%	0
6.25		8	342.1	333.8	350.4	335	360	3.512	9.935	2.9%	0
12.5		8	369	361.6	376.4	360	381	3.14	8.88	2.41%	0
25		8	413.5	408.9	418.1	407	425	1.955	5.529	1.34%	0
50		8	505.9	502.6	509.2	501	512	1.394	3.944	0.78%	0
100		8	689.1	682.3	696	675	699	2.906	8.219	1.19%	0
Overall		48	447.7	410.5	485	319	699	18.51	128.2	28.64%	0 (0%)

Dissolved Oxygen-mg/L

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	8	7.738	7.571	7.904	7.5	8.1	0.07055	0.1996	2.58%	0
6.25		8	7.512	7.198	7.827	6.8	7.9	0.1329	0.3758	5.0%	0
12.5		8	6.587	5.968	7.207	5.4	7.6	0.2622	0.7415	11.26%	0
25		8	7.075	6.62	7.53	6	7.5	0.1925	0.5445	7.7%	0
50		8	6.513	5.909	7.116	5.1	7.4	0.2553	0.722	11.09%	0
100		8	6.025	4.843	7.207	4.3	7.5	0.4999	1.414	23.47%	0
Overall		48	6.908	6.635	7.182	4.3	8.1	0.1361	0.943	13.65%	0 (0%)

Hardness (CaCO3)-mg/L

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	8	89.75	85.42	94.08	86	96	1.83	5.175	5.77%	0
100		1	232			232	232	0	0	0.0%	0
Overall		9	105.6	68.92	142.2	86	232	15.89	47.66	45.15%	0 (0%)

pH-Units

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	8	7.95	7.745	8.155	7.5	8.3	0.0866	0.2449	3.08%	0
6.25		8	7.425	7.154	7.696	7	8.1	0.1146	0.324	4.36%	0
12.5		8	7.35	7.183	7.517	7.2	7.8	0.07071	0.2	2.72%	0
25		8	7.4	7.3	7.5	7.2	7.6	0.04226	0.1195	1.62%	0
50		8	7.275	7.178	7.372	7.1	7.4	0.04119	0.1165	1.6%	0
100		8	7.125	7.066	7.184	7	7.2	0.025	0.07071	0.99%	0
Overall		48	7.421	7.328	7.514	7	8.3	0.04622	0.3202	4.32%	0 (0%)

Fathead Minnow 7-d Larval Survival and Growth Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Temperature-°C

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	8	24.1	23.86	24.34	24	24.8	0.1	0.2828	1.17%	0
6.25		8	24.09	23.91	24.26	24	24.6	0.07425	0.21	0.87%	0
12.5		8	24.08	23.9	24.25	24	24.6	0.075	0.2121	0.88%	0
25		8	24.06	23.91	24.21	24	24.5	0.0625	0.1768	0.73%	0
50		8	24.05	23.93	24.17	24	24.4	0.05	0.1414	0.59%	0
100		8	24.04	23.95	24.13	24	24.3	0.03751	0.1061	0.44%	0
Overall		48	24.07	24.01	24.12	24	24.8	0.02699	0.187	0.78%	0 (0%)

Alkalinity (CaCO3)-mg/L

Conc-%	Code	1	2	3	4	5	6	7	8
0	N	63	61	61	61	61	61	65	65
100		135							

Conductivity-µmhos

Conc-%	Code	1	2	3	4	5	6	7	8
0	N	336	320	319	326	324	625	336	348
6.25		360	337	336	335	339	336	338	356
12.5		376	381	363	366	360	364	361	381
25		417	413	410	407	410	414	412	425
50		512	506	503	504	501	507	503	511
100		691	685	681	697	675	694	691	699

Dissolved Oxygen-mg/L

Conc-%	Code	1	2	3	4	5	6	7	8
0	N	7.6	7.6	7.8	7.9	7.6	7.8	7.5	8.1
6.25		7.7	7.5	7.9	7.8	7.6	7.7	7.1	6.8
12.5		7.6	5.4	6	7.4	6.1	6.6	6.6	7
25		7.5	7.1	7.4	7.5	7.4	7.2	6.5	6
50		7.3	6.6	6.4	6.2	7.4	6.3	6.8	5.1
100		7.2	5	7.4	5.4	7.1	4.3	7.5	4.3

Hardness (CaCO3)-mg/L

Conc-%	Code	1	2	3	4	5	6	7	8
0	N	96	86	86	86	86	86	96	96
100		232							

pH-Units

Conc-%	Code	1	2	3	4	5	6	7	8
0	N	8	7.9	7.8	7.9	8.2	8.3	7.5	8
6.25		8.1	7.5	7.5	7.5	7	7.3	7.3	7.2
12.5		7.8	7.4	7.4	7.2	7.2	7.3	7.3	7.2
25		7.6	7.4	7.5	7.4	7.4	7.3	7.4	7.2
50		7.4	7.4	7.3	7.2	7.4	7.2	7.2	7.1
100		7.2	7.2	7.2	7.1	7.1	7.1	7.1	7

Temperature-°C

Conc-%	Code	1	2	3	4	5	6	7	8
0	N	24	24	24	24	24.8	24	24	24
6.25		24	24	24	24	24	24.6	24	24.1
12.5		24	24.6	24	24	24	24	24	24
25		24	24	24	24	24.5	24	24	24
50		24	24	24	24	24	24.4	24	24
100		24	24	24	24	24.3	24	24	24

aquatic bioassay & consulting laboratories, inc

December 6, 2016

Mr. Arne Anselm
Ventura County Watershed Protection District
800 South Victoria Ave
Ventura, CA 93009

Dear Mr. Anselm:

We are pleased to present the enclosed revised bioassay report. The test was conducted under guidelines prescribed in *Short-Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms" EPA-821-R-02-013.* Results were as follows:

CLIENT:	Ventura County Flood Control
SAMPLE I.D.:	MO-VEN
DATE RECEIVED:	10/28/2016
ABC LAB. NO.:	VCF1016.353

CHRONIC CERIODAPHNIA SURVIVAL & REPRODUCTION BIOASSAY

SURVIVAL	NOEC =	100.00 %
	TUc =	1.00
	IC25 =	>100.00 %
	IC50 =	>100.00 %
REPRODUCTION	NOEC =	100.00 %
	TUc =	1.00
	IC25 =	>100.00 %
	IC50 =	>100.00 %

Yours very truly,

Scott Johnson
Laboratory Director

Ceriodaphnia 7-d Survival and Reproduction Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Batch ID:	02-0625-1802	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Joe Freas
Start Date:	28 Oct-16 15:10	**Protocol:**	EPA/821/R-02-013 (2002)	**Diluent:**	Laboratory Water
Ending Date:	04 Nov-16 14:15	**Species:**	Ceriodaphnia dubia	**Brine:**	Not Applicable
Duration:	6d 23h	**Source:**	Aquatic Biosystems, CO	**Age:**	
Sample ID:	16-5076-3879	**Code:**	VCF1016.353	**Client:**	VCWPD
Sample Date:	28 Oct-16 07:55	**Material:**	Sample Water	**Project:**	2016/17-1 (Wet)
Receipt Date:	28 Oct-16 10:05	**Source:**	Bioassay Report		
Sample Age:	7h	**Station:**	MO-VEN		

Multiple Comparison Summary

Analysis ID	Endpoint	Comparison Method	NOEL	LOEL	TOEL	TU	PMSD	✓
00-3139-5123	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	100	> 100	n/a	1	n/a	
10-2424-9105	Reproduction	Dunnett Multiple Comparison Test	100	> 100	n/a	1	33.7%	

Point Estimate Summary

Analysis ID	Endpoint	Point Estimate Method	Level	%	95% LCL	95% UCL	TU	✓
14-2990-4533	7d Survival Rate	Linear Interpolation (ICPIN)	EC5	>100	n/a	n/a	<1	
			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	✓
07-9639-3459	Reproduction	Linear Interpolation (ICPIN)	IC5	34.82	4.077	n/a	2.872	✓
			IC10	44.63	10.81	n/a	2.241	✓
			IC15	>100	n/a	n/a	<1	✓
			IC20	>100	n/a	n/a	<1	✓
			IC25	>100	n/a	n/a	<1	✓
			IC40	>100	n/a	n/a	<1	✓
			IC50	>100	n/a	n/a	<1	✓

Test Acceptability

				TAC Limits			
Analysis ID	**Endpoint**	**Attribute**	**Test Stat**	**Lower**	**Upper**	**Overlap**	**Decision**
00-3139-5123	7d Survival Rate	Control Resp	1	0.8	>>	Yes	Passes Acceptibility Criteria
14-2990-4533	7d Survival Rate	Control Resp	1	0.8	>>	Yes	Passes Acceptibility Criteria
07-9639-3459	Reproduction	Control Resp	33.1	15	>>	Yes	Passes Acceptibility Criteria
10-2424-9105	Reproduction	Control Resp	33.1	15	>>	Yes	Passes Acceptibility Criteria

7d Survival Rate Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	N	10	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
6.25		10	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
12.5		10	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
25		10	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
50		10	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
100		10	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%

Reproduction Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	N	10	33.1	25.66	40.54	13	48	3.288	10.4	31.41%	0.00%
6.25		10	37.2	29.26	45.14	23	55	3.511	11.1	29.85%	-12.39%
12.5		10	37.2	28.36	46.04	9	47	3.907	12.35	33.21%	-12.39%
25		10	36.2	27.08	45.32	19	57	4.033	12.75	35.23%	-9.37%
50		10	24.8	17.73	31.87	5	41	3.126	9.886	39.86%	25.08%
100		10	37.9	32.05	43.75	23	49	2.588	8.185	21.60%	-14.50%

Ceriodaphnia 7-d Survival and Reproduction Test — **Aquatic Bioassay & Consulting Labs, Inc.**

7d Survival Rate Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	N	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
6.25		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
12.5		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
25		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
50		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
100		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000

Reproduction Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	N	48	31	13	41	41	22	36	34	26	39
6.25		46	38	27	26	43	23	40	55	48	26
12.5		43	46	29	25	43	47	41	9	44	45
25		34	38	35	40	19	21	22	48	48	57
50		41	22	26	26	5	28	24	16	24	36
100		26	23	41	41	33	45	42	40	39	49

7d Survival Rate Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	N	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
6.25		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
12.5		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
25		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
50		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
100		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1

CETIS Analytical Report

Ceriodaphnia 7-d Survival and Reproduction Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Analysis ID:	10-2424-9105	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.9.2
Analyzed:	02 Dec-16 15:14	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes
Batch ID:	02-0625-1802	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Joe Freas
Start Date:	28 Oct-16 15:10	**Protocol:**	EPA/821/R-02-013 (2002)	**Diluent:**	Laboratory Water
Ending Date:	04 Nov-16 14:15	**Species:**	Ceriodaphnia dubia	**Brine:**	Not Applicable
Duration:	6d 23h	**Source:**	Aquatic Biosystems, CO	**Age:**	
Sample ID:	16-5076-3879	**Code:**	VCF1016.353	**Client:**	VCWPD
Sample Date:	28 Oct-16 07:55	**Material:**	Sample Water	**Project:**	2016/17-1 (Wet)
Receipt Date:	28 Oct-16 10:05	**Source:**	Bioassay Report		
Sample Age:	7h	**Station:**	MO-VEN		

Data Transform	Alt Hyp	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	C > T	100	> 100	n/a	1	33.68%

Dunnett Multiple Comparison Test

Control	vs	Conc-%	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Negative Control		6.25	-0.842	2.289	11.15	18	CDF	0.9754	Non-Significant Effect
		12.5	-0.842	2.289	11.15	18	CDF	0.9754	Non-Significant Effect
		25	-0.6366	2.289	11.15	18	CDF	0.9576	Non-Significant Effect
		50	1.704	2.289	11.15	18	CDF	0.1562	Non-Significant Effect
		100	-0.9857	2.289	11.15	18	CDF	0.9836	Non-Significant Effect

Test Acceptability Criteria

		TAC Limits			
Attribute	**Test Stat**	**Lower**	**Upper**	**Overlap**	**Decision**
Control Resp	33.1	15	>>	Yes	Passes Acceptibility Criteria

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1250.2	250.04	5	2.109	0.0783	Non-Significant Effect
Error	6402.2	118.559	54			
Total	7652.4		59			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance Test	2.146	15.09	0.8286	Equal Variances
Variances	Levene Equality of Variance Test	0.6609	3.377	0.6546	Equal Variances
Variances	Mod Levene Equality of Variance Test	0.4493	3.377	0.8119	Equal Variances
Distribution	Anderson-Darling A2 Normality Test	0.865	3.878	0.0263	Normal Distribution
Distribution	D'Agostino Kurtosis Test	0.1373	2.576	0.8908	Normal Distribution
Distribution	D'Agostino Skewness Test	1.588	2.576	0.1123	Normal Distribution
Distribution	D'Agostino-Pearson K2 Omnibus Test	2.541	9.21	0.2807	Normal Distribution
Distribution	Kolmogorov-Smirnov D Test	0.1306	0.1331	0.0126	Normal Distribution
Distribution	Shapiro-Wilk W Normality Test	0.9691	0.9459	0.1323	Normal Distribution

Reproduction Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	N	10	33.1	25.66	40.54	35	13	48	3.288	31.41%	0.00%
6.25		10	37.2	29.26	45.14	39	23	55	3.511	29.85%	-12.39%
12.5		10	37.2	28.36	46.04	43	9	47	3.907	33.21%	-12.39%
25		10	36.2	27.08	45.32	36.5	19	57	4.033	35.23%	-9.37%
50		10	24.8	17.73	31.87	25	5	41	3.126	39.86%	25.08%
100		10	37.9	32.05	43.75	40.5	23	49	2.588	21.60%	-14.50%

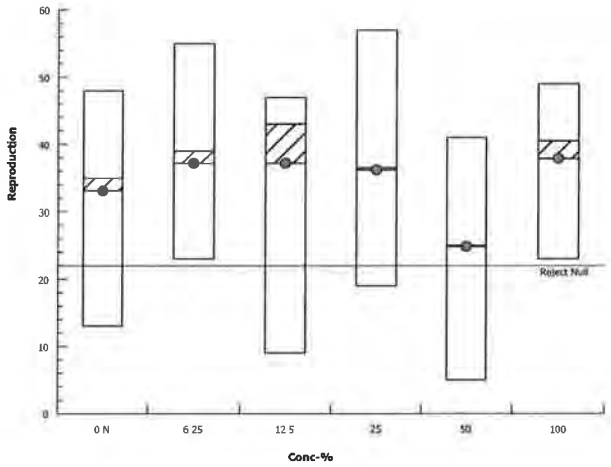
Ceriodaphnia 7-d Survival and Reproduction Test — **Aquatic Bioassay & Consulting Labs, Inc.**

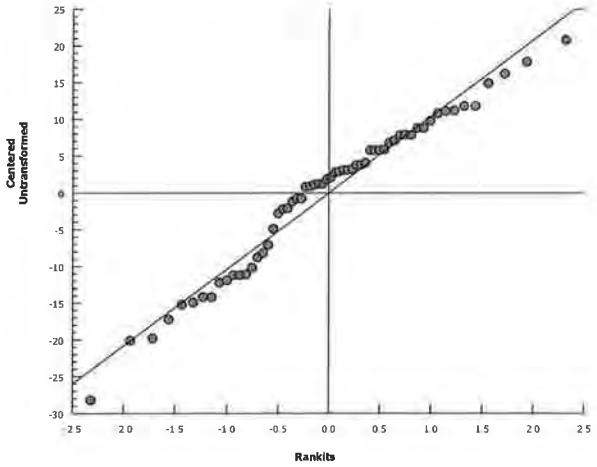
Analysis ID:	10-2424-9105	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.9.2
Analyzed:	02 Dec-16 15:14	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes

Reproduction Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	N	48	31	13	41	41	22	36	34	26	39
6.25		46	38	27	26	43	23	40	55	48	26
12.5		43	46	29	25	43	47	41	9	44	45
25		34	38	35	40	19	21	22	48	48	57
50		41	22	26	26	5	28	24	16	24	36
100		26	23	41	41	33	45	42	40	39	49

Graphics





CETIS Analytical Report

Ceriodaphnia 7-d Survival and Reproduction Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Analysis ID:	14-2990-4533	**Endpoint:**	7d Survival Rate	**CETIS Version:**	CETISv1.9.2
Analyzed:	02 Dec-16 15:14	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	02-0625-1802	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Joe Freas
Start Date:	28 Oct-16 15:10	**Protocol:**	EPA/821/R-02-013 (2002)	**Diluent:**	Laboratory Water
Ending Date:	04 Nov-16 14:15	**Species:**	Ceriodaphnia dubia	**Brine:**	Not Applicable
Duration:	6d 23h	**Source:**	Aquatic Biosystems, CO	**Age:**	
Sample ID:	16-5076-3879	**Code:**	VCF1016.353	**Client:**	VCWPD
Sample Date:	28 Oct-16 07:55	**Material:**	Sample Water	**Project:**	2016/17-1 (Wet)
Receipt Date:	28 Oct-16 10:05	**Source:**	Bioassay Report		
Sample Age:	7h	**Station:**	MO-VEN		

Linear Interpolation Options

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

Test Acceptability Criteria

		TAC Limits			
Attribute	**Test Stat**	**Lower**	**Upper**	**Overlap**	**Decision**
Control Resp	1	0.8	>>	Yes	Passes Acceptibility Criteria

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC5	>100	n/a	n/a	<1	n/a	n/a
EC10	>100	n/a	n/a	<1	n/a	n/a
EC15	>100	n/a	n/a	<1	n/a	n/a
EC20	>100	n/a	n/a	<1	n/a	n/a
EC25	>100	n/a	n/a	<1	n/a	n/a
EC40	>100	n/a	n/a	<1	n/a	n/a
EC50	>100	n/a	n/a	<1	n/a	n/a

7d Survival Rate Summary

			Calculated Variate(A/B)								
Conc-%	**Code**	**Count**	**Mean**	**Min**	**Max**	**Std Err**	**Std Dev**	**CV%**	**%Effect**	**A**	**B**
0	N	10	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.0%	10	10
6.25		10	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.0%	10	10
12.5		10	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.0%	10	10
25		10	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.0%	10	10
50		10	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.0%	10	10
100		10	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.0%	10	10

7d Survival Rate Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	N	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
6.25		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
12.5		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
25		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
50		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
100		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000

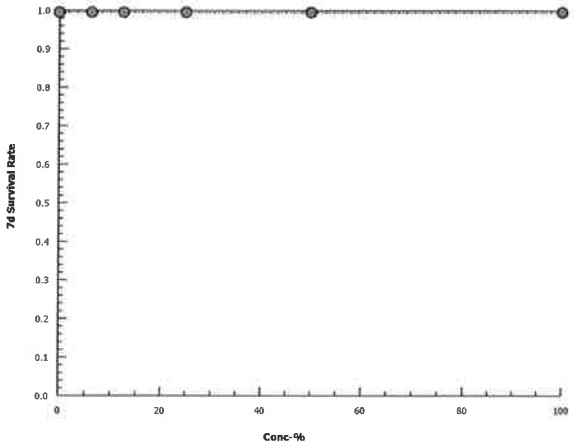
7d Survival Rate Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	N	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
6.25		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
12.5		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
25		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
50		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
100		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1

Ceriodaphnia 7-d Survival and Reproduction Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Analysis ID:	14-2990-4533	**Endpoint:**	7d Survival Rate	**CETIS Version:**	CETISv1.9.2
Analyzed:	02 Dec-16 15:14	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



Ceriodaphnia 7-d Survival and Reproduction Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Analysis ID:	07-9639-3459	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.9.2
Analyzed:	02 Dec-16 15:14	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Batch ID:	02-0625-1802	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Joe Freas
Start Date:	28 Oct-16 15:10	**Protocol:**	EPA/821/R-02-013 (2002)	**Diluent:**	Laboratory Water
Ending Date:	04 Nov-16 14:15	**Species:**	Ceriodaphnia dubia	**Brine:**	Not Applicable
Duration:	6d 23h	**Source:**	Aquatic Biosystems, CO	**Age:**	

Sample ID:	16-5076-3879	**Code:**	VCF1016.353	**Client:**	VCWPD
Sample Date:	28 Oct-16 07:55	**Material:**	Sample Water	**Project:**	2016/17-1 (Wet)
Receipt Date:	28 Oct-16 10:05	**Source:**	Bioassay Report		
Sample Age:	7h	**Station:**	MO-VEN		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Linear	Linear	596589	280	Yes	Two-Point Interpolation

Test Acceptability Criteria

Attribute	Test Stat	TAC Limits Lower	TAC Limits Upper	Overlap	Decision
Control Resp	33.1	15	>>	Yes	Passes Acceptibility Criteria

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	34.82	4.077	n/a	2.872	n/a	24.53
IC10	44.63	10.81	n/a	2.241	n/a	9.253
IC15	>100	n/a	n/a	<1	n/a	n/a
IC20	>100	n/a	n/a	<1	n/a	n/a
IC25	>100	n/a	n/a	<1	n/a	n/a
IC40	>100	n/a	n/a	<1	n/a	n/a
IC50	>100	n/a	n/a	<1	n/a	n/a

Reproduction Summary

Conc-%	Code	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
			Calculated Variate						
0	N	10	33.1	13	48	3.288	10.4	31.41%	0.0%
6.25		10	37.2	23	55	3.511	11.1	29.85%	-12.39%
12.5		10	37.2	9	47	3.907	12.35	33.21%	-12.39%
25		10	36.2	19	57	4.033	12.75	35.23%	-9.37%
50		10	24.8	5	41	3.126	9.886	39.86%	25.08%
100		10	37.9	23	49	2.588	8.185	21.60%	-14.5%

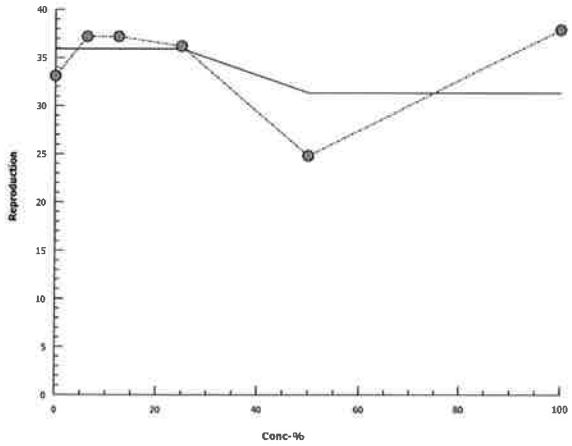
Reproduction Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	N	48	31	13	41	41	22	36	34	26	39
6.25		46	38	27	26	43	23	40	55	48	26
12.5		43	46	29	25	43	47	41	9	44	45
25		34	38	35	40	19	21	22	48	48	57
50		41	22	26	26	5	28	24	16	24	36
100		26	23	41	41	33	45	42	40	39	49

Ceriodaphnia 7-d Survival and Reproduction Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Analysis ID:	07-9639-3459	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.9.2
Analyzed:	02 Dec-16 15:14	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



CETIS Analytical Report

Ceriodaphnia 7-d Survival and Reproduction Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Analysis ID:	00-3139-5123	**Endpoint:**	7d Survival Rate	**CETIS Version:**	CETISv1.9.2
Analyzed:	02 Dec-16 15:14	**Analysis:**	STP 2xK Contingency Tables	**Official Results:**	Yes
Batch ID:	02-0625-1802	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Joe Freas
Start Date:	28 Oct-16 15:10	**Protocol:**	EPA/821/R-02-013 (2002)	**Diluent:**	Laboratory Water
Ending Date:	04 Nov-16 14:15	**Species:**	Ceriodaphnia dubia	**Brine:**	Not Applicable
Duration:	6d 23h	**Source:**	Aquatic Biosystems, CO	**Age:**	
Sample ID:	16-5076-3879	**Code:**	VCF1016.353	**Client:**	VCWPD
Sample Date:	28 Oct-16 07:55	**Material:**	Sample Water	**Project:**	2016/17-1 (Wet)
Receipt Date:	28 Oct-16 10:05	**Source:**	Bioassay Report		
Sample Age:	7h	**Station:**	MO-VEN		

Data Transform	Alt Hyp	NOEL	LOEL	TOEL	TU
Untransformed	C > T	100	> 100	n/a	1

Fisher Exact/Bonferroni-Holm Test

Control	vs	Group	Test Stat	P-Type	P-Value	Decision(α:5%)
Negative Control		6.25	1.0000	Exact	1.0000	Non-Significant Effect
		12.5	1.0000	Exact	1.0000	Non-Significant Effect
		25	1.0000	Exact	1.0000	Non-Significant Effect
		50	1.0000	Exact	1.0000	Non-Significant Effect
		100	1.0000	Exact	1.0000	Non-Significant Effect

Test Acceptability Criteria

		TAC Limits			
Attribute	**Test Stat**	**Lower**	**Upper**	**Overlap**	**Decision**
Control Resp	1	0.8	>>	Yes	Passes Acceptibility Criteria

Data Summary

Conc-%	Code	NR	R	NR + R	Prop NR	Prop R	%Effect
0	N	10	0	10	1	0	0.0%
6.25		10	0	10	1	0	0.0%
12.5		10	0	10	1	0	0.0%
25		10	0	10	1	0	0.0%
50		10	0	10	1	0	0.0%
100		10	0	10	1	0	0.0%

7d Survival Rate Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	N	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
6.25		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
12.5		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
25		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
50		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
100		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000

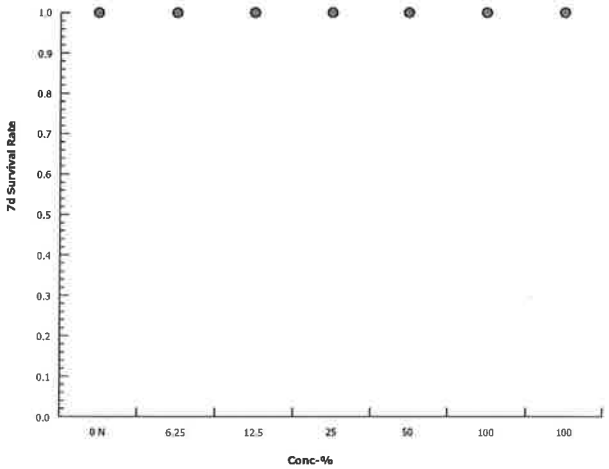
7d Survival Rate Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	N	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
6.25		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
12.5		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
25		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
50		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
100		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1

Ceriodaphnia 7-d Survival and Reproduction Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Analysis ID:	00-3139-5123	**Endpoint:**	7d Survival Rate	**CETIS Version:**	CETISv1.9.2
Analyzed:	02 Dec-16 15:14	**Analysis:**	STP 2xK Contingency Tables	**Official Results:**	Yes

Graphics



Ceriodaphnia 7-d Survival and Reproduction Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Batch ID:	02-0625-1802	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Joe Freas
Start Date:	28 Oct-16 15:10	**Protocol:**	EPA/821/R-02-013 (2002)	**Diluent:**	Laboratory Water
Ending Date:	04 Nov-16 14:15	**Species:**	Ceriodaphnia dubia	**Brine:**	Not Applicable
Duration:	6d 23h	**Source:**	Aquatic Biosystems, CO	**Age:**	
Sample ID:	16-5076-3879	**Code:**	VCF1016.353	**Client:**	VCWPD
Sample Date:	28 Oct-16 07:55	**Material:**	Sample Water	**Project:**	2016/17-1 (Wet)
Receipt Date:	28 Oct-16 10:05	**Source:**	Bioassay Report		
Sample Age:	7h	**Station:**	MO-VEN		

Alkalinity (CaCO3)-mg/L

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	8	62.25	60.72	63.78	61	65	0.6478	1.832	2.94%	0
100		1	63			63	63	0	0	0.0%	0
Overall		9	62.33	61	63.66	61	65	0.5774	1.732	2.78%	0 (0%)

Conductivity-µmhos

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	8	329.2	321	337.5	319	348	3.509	9.925	3.01%	0
6.25		8	334.6	324.8	344.5	321	359	4.174	11.81	3.53%	0
12.5		8	330.4	326.8	334	326	340	1.523	4.307	1.3%	0
25		8	336.5	330.3	342.7	326	350	2.632	7.445	2.21%	0
50		8	366.1	337.1	395.1	327	446	12.27	34.7	9.48%	0
100		8	447.6	306.4	588.9	325	860	59.73	168.9	37.74%	0
Overall		48	357.4	334.4	380.5	319	860	11.45	79.35	22.20%	0 (0%)

Dissolved Oxygen-mg/L

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	8	7.863	7.525	8.2	7.3	8.6	0.1426	0.4033	5.13%	0
6.25		8	7.388	7.093	7.682	6.8	7.8	0.1246	0.3523	4.77%	0
12.5		8	7.237	6.883	7.592	6.7	7.7	0.1499	0.4241	5.86%	0
25		8	6.6	5.877	7.323	4.8	7.6	0.3059	0.8652	13.11%	0
50		8	6.25	5.342	7.158	4.1	7.6	0.3841	1.086	17.38%	0
100		8	5.188	4.246	6.129	4.1	7.4	0.398	1.126	21.7%	0
Overall		48	6.754	6.42	7.089	4.1	8.6	0.1663	1.152	17.06%	0 (0%)

Hardness (CaCO3)-mg/L

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	8	89.75	85.42	94.08	86	96	1.83	5.175	5.77%	0
100		1	121			121	121	0	0	0.0%	0
Overall		9	93.22	84.39	102.1	86	121	3.829	11.49	12.32%	0 (0%)

pH-Units

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	8	7.8	7.633	7.967	7.5	8	0.07071	0.2	2.56%	0
6.25		8	7.925	7.765	8.085	7.6	8.2	0.06748	0.1909	2.41%	0
12.5		8	7.825	7.678	7.972	7.6	8.1	0.06196	0.1753	2.24%	0
25		8	7.75	7.609	7.891	7.5	8	0.05976	0.169	2.18%	0
50		8	7.65	7.436	7.864	7.3	8.2	0.09063	0.2563	3.35%	0
100		8	7.387	7.167	7.608	7.1	7.8	0.09342	0.2642	3.58%	0
Overall		48	7.723	7.646	7.8	7.1	8.2	0.03827	0.2652	3.43%	0 (0%)

Ceriodaphnia 7-d Survival and Reproduction Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Temperature-°C

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	8	24.22	23.69	24.76	24	25.8	0.225	0.6364	2.63%	0
6.25		8	24.24	23.68	24.8	24	25.9	0.2375	0.6718	2.77%	0
12.5		8	24.14	23.84	24.43	24	25	0.1238	0.3503	1.45%	0
25		8	24.12	23.86	24.39	24	24.9	0.1114	0.3151	1.31%	0
50		8	24.16	23.81	24.51	24	25.2	0.1487	0.4207	1.74%	0
100		8	24.19	23.9	24.48	24	25	0.1231	0.3482	1.44%	0
Overall		48	24.18	24.05	24.31	24	25.9	0.06564	0.4547	1.88%	0 (0%)

Alkalinity (CaCO3)-mg/L

Conc-%	Code	1	2	3	4	5	6	7	8
0	N	63	61	61	61	61	61	65	65
100		63							

Conductivity-µmhos

Conc-%	Code	1	2	3	4	5	6	7	8
0	N	336	320	319	326	324	325	336	348
6.25		336	321	324	332	331	332	342	359
12.5		329	326	328	328	329	331	332	340
25		328	336	335	326	338	339	340	350
50		327	352	352	446	358	361	363	370
100		325	384	387	860	399	404	408	414

Dissolved Oxygen-mg/L

Conc-%	Code	1	2	3	4	5	6	7	8
0	N	7.3	7.6	7.9	7.9	8.6	8	7.5	8.1
6.25		7.6	7.6	7.7	7.8	6.8	7.3	7	7.3
12.5		7.6	7.6	7.7	7.6	6.8	6.7	7	6.9
25		7.2	4.8	6.7	7.6	7.3	6.5	6.4	6.3
50		7.6	4.1	5.7	7.3	6.4	6.1	6.8	6
100		7.4	5.9	4.1	5.6	4.5	4.2	4.4	5.4

Hardness (CaCO3)-mg/L

Conc-%	Code	1	2	3	4	5	6	7	8
0	N	96	86	86	86	86	86	96	96
100		121							

pH-Units

Conc-%	Code	1	2	3	4	5	6	7	8
0	N	8	7.9	7.8	7.9	7.5	7.8	7.5	8
6.25		7.7	8	7.6	7.9	8	8	8	8.2
12.5		7.7	7.9	7.9	7.6	7.9	7.6	7.9	8.1
25		7.7	7.9	7.6	7.7	7.5	8	7.9	7.7
50		8.2	7.7	7.3	7.5	7.6	7.6	7.7	7.6
100		7.8	7.5	7.1	7.1	7.2	7.3	7.7	7.4

Temperature-°C

Conc-%	Code	1	2	3	4	5	6	7	8
0	N	24	24	25.8	24	24	24	24	24
6.25		24	24	25.9	24	24	24	24	24
12.5		24	24	25	24	24	24.1	24	24
25		24	24.1	24	24	24.9	24	24	24
50		24.1	24	24	24	24	25.2	24	24
100		24	24	25	24	24	24.2	24	24.3

aquatic bioassay & consulting laboratories, inc

December 6, 2016

Mr. Arne Anselm
Ventura County Watershed Protection District
800 South Victoria Ave
Ventura, CA 93009

Dear Mr. Anselm:

We are pleased to present the enclosed revised bioassay report. The test was conducted under guidelines prescribed in *Short-Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms" EPA-821-R-02-013*. Results were as follows:

CLIENT:	Ventura County Flood Control
SAMPLE I.D.:	MO-THO
DATE RECEIVED:	10/28/2016
ABC LAB. NO.:	VCF1016.356

CHRONIC CERIODAPHNIA SURVIVAL & REPRODUCTION BIOASSAY

SURVIVAL	NOEC =	100.00 %
	TUc =	1.00
	IC25 =	>100.00 %
	IC50 =	>100.00 %
REPRODUCTION	NOEC =	100.00 %
	TUc =	1.00
	IC25 =	>100.00 %
	IC50 =	>100.00 %

Yours very truly,

Scott Johnson
Laboratory Director

CETIS Summary Report

Ceriodaphnia 7-d Survival and Reproduction Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Batch ID:	09-2817-1817	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Joe Freas
Start Date:	28 Oct-16 15:27	**Protocol:**	EPA/821/R-02-013 (2002)	**Diluent:**	Laboratory Water
Ending Date:	04 Nov-16 14:30	**Species:**	Ceriodaphnia dubia	**Brine:**	Not Applicable
Duration:	6d 23h	**Source:**	Aquatic Biosystems, CO	**Age:**	
Sample ID:	07-6762-5136	**Code:**	VCF1016.356	**Client:**	VCWPD
Sample Date:	28 Oct-16 10:10	**Material:**	Sample Water	**Project:**	2016/17-1 (Wet)
Receipt Date:	28 Oct-16 12:10	**Source:**	Bioassay Report		
Sample Age:	5h	**Station:**	MO-THO		

Multiple Comparison Summary

Analysis ID	Endpoint	Comparison Method	NOEL	LOEL	TOEL	TU	PMSD	✓
19-5439-5624	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	100	> 100	n/a	1	n/a	
01-8139-4964	Reproduction	Dunnett Multiple Comparison Test	100	> 100	n/a	1	36.2%	

Point Estimate Summary

Analysis ID	Endpoint	Point Estimate Method	Level	%	95% LCL	95% UCL	TU	✓
02-7699-0054	7d Survival Rate	Linear Interpolation (ICPIN)	EC5	21.88	16.25	n/a	4.571	✓
			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	✓
14-7729-5804	Reproduction	Linear Interpolation (ICPIN)	IC5	>100	n/a	n/a	<1	
			IC10	>100	n/a	n/a	<1	✓
			IC15	>100	n/a	n/a	<1	✓
			IC20	>100	n/a	n/a	<1	✓
			IC25	>100	n/a	n/a	<1	✓
			IC40	>100	n/a	n/a	<1	✓
			IC50	>100	n/a	n/a	<1	✓

Test Acceptability

				TAC Limits			
Analysis ID	**Endpoint**	**Attribute**	**Test Stat**	**Lower**	**Upper**	**Overlap**	**Decision**
02-7699-0054	7d Survival Rate	Control Resp	1	0.8	>>	Yes	Passes Acceptibility Criteria
19-5439-5624	7d Survival Rate	Control Resp	1	0.8	>>	Yes	Passes Acceptibility Criteria
01-8139-4964	Reproduction	Control Resp	28.3	15	>>	Yes	Passes Acceptibility Criteria
14-7729-5804	Reproduction	Control Resp	28.3	15	>>	Yes	Passes Acceptibility Criteria

7d Survival Rate Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	N	10	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
6.25		10	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
12.5		10	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
25		10	0.8000	0.4984	1.0000	0.0000	1.0000	0.1333	0.4216	52.70%	20.00%
50		10	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
100		10	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%

Reproduction Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	N	10	28.3	22.38	34.22	12	37	2.616	8.274	29.24%	0.00%
6.25		10	35	27.3	42.7	21	55	3.406	10.77	30.77%	-23.67%
12.5		10	29.8	23.64	35.96	21	47	2.724	8.613	28.90%	-5.30%
25		10	36.5	26.17	46.83	8	51	4.569	14.45	39.58%	-28.98%
50		10	39.1	33.65	44.55	27	50	2.41	7.622	19.49%	-38.16%
100		10	39.5	33.28	45.72	21	48	2.75	8.695	22.01%	-39.58%

Ceriodaphnia 7-d Survival and Reproduction Test — **Aquatic Bioassay & Consulting Labs, Inc.**

7d Survival Rate Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	N	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
6.25		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
12.5		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
25		0.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000
50		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
100		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000

Reproduction Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	N	35	12	33	26	35	20	30	34	37	21
6.25		25	30	28	55	21	48	37	29	34	43
12.5		43	21	26	28	30	27	22	30	47	24
25		47	29	41	45	21	51	27	49	47	8
50		39	40	36	35	31	49	27	47	37	50
100		43	43	46	48	42	21	36	28	42	46

7d Survival Rate Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	N	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
6.25		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
12.5		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
25		0/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	0/1
50		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
100		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1

CETIS Analytical Report

Ceriodaphnia 7-d Survival and Reproduction Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Analysis ID:	01-8139-4964	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.9.2
Analyzed:	02 Dec-16 15:30	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes
Batch ID:	09-2817-1817	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Joe Freas
Start Date:	28 Oct-16 15:27	**Protocol:**	EPA/821/R-02-013 (2002)	**Diluent:**	Laboratory Water
Ending Date:	04 Nov-16 14:30	**Species:**	Ceriodaphnia dubia	**Brine:**	Not Applicable
Duration:	6d 23h	**Source:**	Aquatic Biosystems, CO	**Age:**	
Sample ID:	07-6762-5136	**Code:**	VCF1016.356	**Client:**	VCWPD
Sample Date:	28 Oct-16 10:10	**Material:**	Sample Water	**Project:**	2016/17-1 (Wet)
Receipt Date:	28 Oct-16 12:10	**Source:**	Bioassay Report		
Sample Age:	5h	**Station:**	MO-THO		

Data Transform	Alt Hyp	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	C > T	100	> 100	n/a	1	36.21%

Dunnett Multiple Comparison Test

Control vs	Conc-%	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Negative Control	6.25	-1.497	2.289	10.25	18	CDF	0.9968	Non-Significant Effect
	12.5	-0.3351	2.289	10.25	18	CDF	0.9141	Non-Significant Effect
	25	-1.832	2.289	10.25	18	CDF	0.9990	Non-Significant Effect
	50	-2.413	2.289	10.25	18	CDF	0.9999	Non-Significant Effect
	100	-2.502	2.289	10.25	18	CDF	0.9999	Non-Significant Effect

Test Acceptability Criteria

		TAC Limits			
Attribute	**Test Stat**	**Lower**	**Upper**	**Overlap**	**Decision**
Control Resp	28.3	15	>>	Yes	Passes Acceptibility Criteria

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1107	221.4	5	2.21	0.0665	Non-Significant Effect
Error	5409.6	100.178	54			
Total	6516.6		59			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance Test	5.406	15.09	0.3683	Equal Variances
Variances	Levene Equality of Variance Test	1.993	3.377	0.0943	Equal Variances
Variances	Mod Levene Equality of Variance Test	0.9614	3.377	0.4497	Equal Variances
Distribution	Anderson-Darling A2 Normality Test	0.2009	3.878	0.9253	Normal Distribution
Distribution	D'Agostino Kurtosis Test	0.485	2.576	0.6277	Normal Distribution
Distribution	D'Agostino Skewness Test	1.187	2.576	0.2353	Normal Distribution
Distribution	D'Agostino-Pearson K2 Omnibus Test	1.644	9.21	0.4397	Normal Distribution
Distribution	Kolmogorov-Smirnov D Test	0.06804	0.1331	0.6761	Normal Distribution
Distribution	Shapiro-Wilk W Normality Test	0.9878	0.9459	0.8102	Normal Distribution

Reproduction Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	N	10	28.3	22.38	34.22	31.5	12	37	2.616	29.24%	0.00%
6.25		10	35	27.3	42.7	32	21	55	3.406	30.77%	-23.67%
12.5		10	29.8	23.64	35.96	27.5	21	47	2.724	28.90%	-5.30%
25		10	36.5	26.17	46.83	43	8	51	4.569	39.58%	-28.98%
50		10	39.1	33.65	44.55	38	27	50	2.41	19.49%	-38.16%
100		10	39.5	33.28	45.72	42.5	21	48	2.75	22.01%	-39.58%

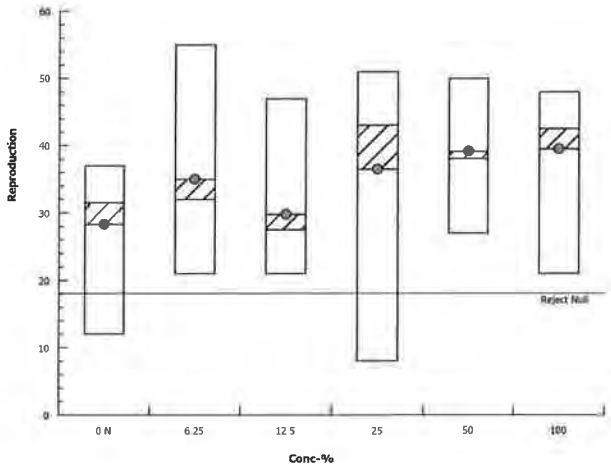
Ceriodaphnia 7-d Survival and Reproduction Test — **Aquatic Bioassay & Consulting Labs, Inc.**

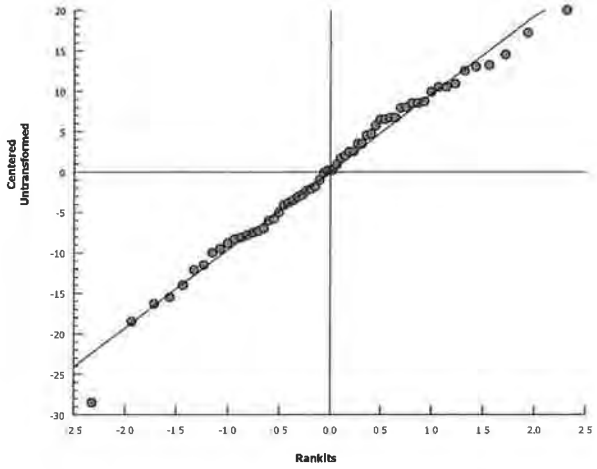
Analysis ID:	01-8139-4964	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.9.2
Analyzed:	02 Dec-16 15:30	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes

Reproduction Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	N	35	12	33	26	35	20	30	34	37	21
6.25		25	30	28	55	21	48	37	29	34	43
12.5		43	21	26	28	30	27	22	30	47	24
25		47	29	41	45	21	51	27	49	47	8
50		39	40	36	35	31	49	27	47	37	50
100		43	43	46	48	42	21	36	28	42	46

Graphics





CETIS Analytical Report

Ceriodaphnia 7-d Survival and Reproduction Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Analysis ID:	02-7699-0054	**Endpoint:**	7d Survival Rate	**CETIS Version:**	CETISv1.9.2
Analyzed:	02 Dec-16 15:30	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	09-2817-1817	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Joe Freas
Start Date:	28 Oct-16 15:27	**Protocol:**	EPA/821/R-02-013 (2002)	**Diluent:**	Laboratory Water
Ending Date:	04 Nov-16 14:30	**Species:**	Ceriodaphnia dubia	**Brine:**	Not Applicable
Duration:	6d 23h	**Source:**	Aquatic Biosystems, CO	**Age:**	
Sample ID:	07-6762-5136	**Code:**	VCF1016.356	**Client:**	VCWPD
Sample Date:	28 Oct-16 10:10	**Material:**	Sample Water	**Project:**	2016/17-1 (Wet)
Receipt Date:	28 Oct-16 12:10	**Source:**	Bioassay Report		
Sample Age:	5h	**Station:**	MO-THO		

Linear Interpolation Options

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

Test Acceptability Criteria

		TAC Limits			
Attribute	**Test Stat**	**Lower**	**Upper**	**Overlap**	**Decision**
Control Resp	1	0.8	>>	Yes	Passes Acceptibility Criteria

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC5	21.88	16.25	n/a	4.571	n/a	6.154
EC10	>100	n/a	n/a	<1	n/a	n/a
EC15	>100	n/a	n/a	<1	n/a	n/a
EC20	>100	n/a	n/a	<1	n/a	n/a
EC25	>100	n/a	n/a	<1	n/a	n/a
EC40	>100	n/a	n/a	<1	n/a	n/a
EC50	>100	n/a	n/a	<1	n/a	n/a

7d Survival Rate Summary

			Calculated Variate(A/B)								
Conc-%	**Code**	**Count**	**Mean**	**Min**	**Max**	**Std Err**	**Std Dev**	**CV%**	**%Effect**	**A**	**B**
0	N	10	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.0%	10	10
6.25		10	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.0%	10	10
12.5		10	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.0%	10	10
25		10	0.8000	0.0000	1.0000	0.1333	0.4216	52.70%	20.0%	8	10
50		10	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.0%	10	10
100		10	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.0%	10	10

7d Survival Rate Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	N	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
6.25		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
12.5		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
25		0.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000
50		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
100		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000

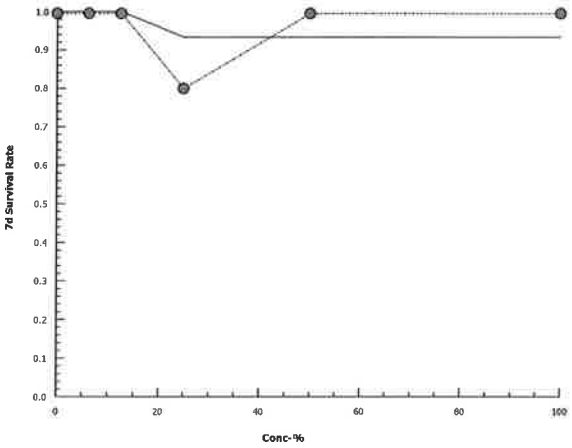
7d Survival Rate Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	N	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
6.25		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
12.5		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
25		0/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	0/1
50		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
100		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1

Ceriodaphnia 7-d Survival and Reproduction Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Analysis ID:	02-7699-0054	**Endpoint:**	7d Survival Rate	**CETIS Version:**	CETISv1.9.2
Analyzed:	02 Dec-16 15:30	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



Ceriodaphnia 7-d Survival and Reproduction Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Analysis ID:	14-7729-5804	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.9.2
Analyzed:	02 Dec-16 15:30	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	09-2817-1817	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Joe Freas
Start Date:	28 Oct-16 15:27	**Protocol:**	EPA/821/R-02-013 (2002)	**Diluent:**	Laboratory Water
Ending Date:	04 Nov-16 14:30	**Species:**	Ceriodaphnia dubia	**Brine:**	Not Applicable
Duration:	6d 23h	**Source:**	Aquatic Biosystems, CO	**Age:**	
Sample ID:	07-6762-5136	**Code:**	VCF1016.356	**Client:**	VCWPD
Sample Date:	28 Oct-16 10:10	**Material:**	Sample Water	**Project:**	2016/17-1 (Wet)
Receipt Date:	28 Oct-16 12:10	**Source:**	Bioassay Report		
Sample Age:	5h	**Station:**	MO-THO		

Linear Interpolation Options

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

Test Acceptability Criteria

		TAC Limits			
Attribute	**Test Stat**	**Lower**	**Upper**	**Overlap**	**Decision**
Control Resp	28.3	15	>>	Yes	Passes Acceptibility Criteria

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	>100	n/a	n/a	<1	n/a	n/a
IC10	>100	n/a	n/a	<1	n/a	n/a
IC15	>100	n/a	n/a	<1	n/a	n/a
IC20	>100	n/a	n/a	<1	n/a	n/a
IC25	>100	n/a	n/a	<1	n/a	n/a
IC40	>100	n/a	n/a	<1	n/a	n/a
IC50	>100	n/a	n/a	<1	n/a	n/a

Reproduction Summary

			Calculated Variate						
Conc-%	**Code**	**Count**	**Mean**	**Min**	**Max**	**Std Err**	**Std Dev**	**CV%**	**%Effect**
0	N	10	28.3	12	37	2.616	8.274	29.24%	0.0%
6.25		10	35	21	55	3.406	10.77	30.77%	-23.67%
12.5		10	29.8	21	47	2.724	8.613	28.90%	-5.3%
25		10	36.5	8	51	4.569	14.45	39.58%	-28.98%
50		10	39.1	27	50	2.41	7.622	19.49%	-38.16%
100		10	39.5	21	48	2.75	8.695	22.01%	-39.58%

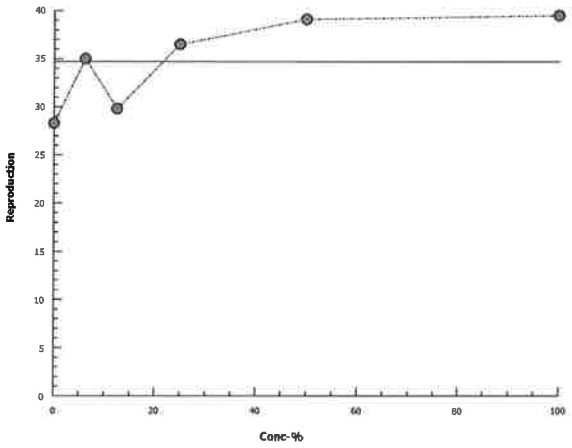
Reproduction Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	N	35	12	33	26	35	20	30	34	37	21
6.25		25	30	28	55	21	48	37	29	34	43
12.5		43	21	26	28	30	27	22	30	47	24
25		47	29	41	45	21	51	27	49	47	8
50		39	40	36	35	31	49	27	47	37	50
100		43	43	46	48	42	21	36	28	42	46

Ceriodaphnia 7-d Survival and Reproduction Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Analysis ID:	14-7729-5804	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.9.2
Analyzed:	02 Dec-16 15:30	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



CETIS Analytical Report

Ceriodaphnia 7-d Survival and Reproduction Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Analysis ID:	19-5439-5624	**Endpoint:**	7d Survival Rate	**CETIS Version:**	CETISv1.9.2
Analyzed:	02 Dec-16 15:30	**Analysis:**	STP 2xK Contingency Tables	**Official Results:**	Yes
Batch ID:	09-2817-1817	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Joe Freas
Start Date:	28 Oct-16 15:27	**Protocol:**	EPA/821/R-02-013 (2002)	**Diluent:**	Laboratory Water
Ending Date:	04 Nov-16 14:30	**Species:**	Ceriodaphnia dubia	**Brine:**	Not Applicable
Duration:	6d 23h	**Source:**	Aquatic Biosystems, CO	**Age:**	
Sample ID:	07-6762-5136	**Code:**	VCF1016.356	**Client:**	VCWPD
Sample Date:	28 Oct-16 10:10	**Material:**	Sample Water	**Project:**	2016/17-1 (Wet)
Receipt Date:	28 Oct-16 12:10	**Source:**	Bioassay Report		
Sample Age:	5h	**Station:**	MO-THO		

Data Transform	Alt Hyp	NOEL	LOEL	TOEL	TU
Untransformed	C > T	100	> 100	n/a	1

Fisher Exact/Bonferroni-Holm Test

Control	vs	Group	Test Stat	P-Type	P-Value	Decision(α:5%)
Negative Control		6.25	1.0000	Exact	1.0000	Non-Significant Effect
		12.5	1.0000	Exact	1.0000	Non-Significant Effect
		25	0.2368	Exact	1.0000	Non-Significant Effect
		50	1.0000	Exact	1.0000	Non-Significant Effect
		100	1.0000	Exact	1.0000	Non-Significant Effect

Test Acceptability Criteria

		TAC Limits			
Attribute	**Test Stat**	**Lower**	**Upper**	**Overlap**	**Decision**
Control Resp	1	0.8	>>	Yes	Passes Acceptibility Criteria

Data Summary

Conc-%	Code	NR	R	NR + R	Prop NR	Prop R	%Effect
0	N	10	0	10	1	0	0.0%
6.25		10	0	10	1	0	0.0%
12.5		10	0	10	1	0	0.0%
25		8	2	10	0.8	0.2	20.0%
50		10	0	10	1	0	0.0%
100		10	0	10	1	0	0.0%

7d Survival Rate Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	N	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
6.25		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
12.5		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
25		0.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000
50		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
100		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000

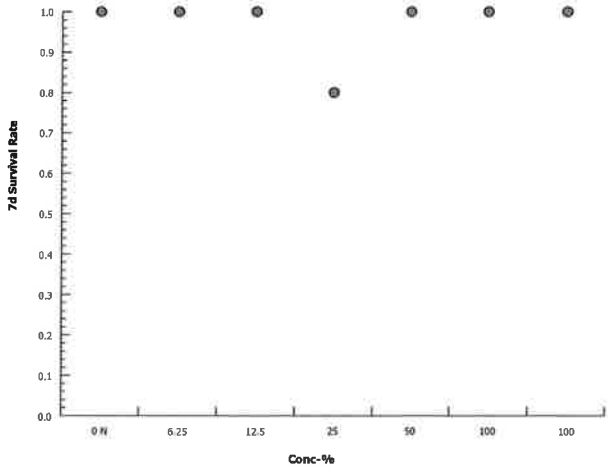
7d Survival Rate Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	N	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
6.25		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
12.5		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
25		0/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	0/1
50		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
100		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1

Ceriodaphnia 7-d Survival and Reproduction Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Analysis ID:	19-5439-5624	**Endpoint:**	7d Survival Rate	**CETIS Version:**	CETISv1.9.2
Analyzed:	02 Dec-16 15:30	**Analysis:**	STP 2xK Contingency Tables	**Official Results:**	Yes

Graphics



Ceriodaphnia 7-d Survival and Reproduction Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Batch ID:	09-2817-1817	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Joe Freas
Start Date:	28 Oct-16 15:27	**Protocol:**	EPA/821/R-02-013 (2002)	**Diluent:**	Laboratory Water
Ending Date:	04 Nov-16 14:30	**Species:**	Ceriodaphnia dubia	**Brine:**	Not Applicable
Duration:	6d 23h	**Source:**	Aquatic Biosystems, CO	**Age:**	

Sample ID:	07-6762-5136	**Code:**	VCF1016.356	**Client:**	VCWPD
Sample Date:	28 Oct-16 10:10	**Material:**	Sample Water	**Project:**	2016/17-1 (Wet)
Receipt Date:	28 Oct-16 12:10	**Source:**	Bioassay Report		
Sample Age:	5h	**Station:**	MO-THO		

Alkalinity (CaCO3)-mg/L

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	8	62.25	60.72	63.78	61	65	0.6478	1.832	2.94%	0
100		1	383			383	383	0	0	0.0%	0
Overall		9	97.89	15.69	180.1	61	383	35.64	106.9	109.20%	0 (0%)

Conductivity-µmhos

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	8	329.2	321	337.5	319	348	3.509	9.925	3.01%	0
6.25		8	453	436.7	469.3	441	499	6.889	19.49	4.3%	0
12.5		8	575.5	552.5	598.5	559	643	9.723	27.5	4.78%	0
25		8	828.1	822	834.2	817	841	2.587	7.318	0.88%	0
50		8	1306	1292	1319	1282	1332	5.58	15.78	1.21%	0
100		8	2216	2191	2241	2149	2247	10.54	29.82	1.35%	0
Overall		48	951.3	761.2	1141	319	2247	94.53	654.9	68.84%	0 (0%)

Dissolved Oxygen-mg/L

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	8	7.7	7.351	8.049	7	8.5	0.1476	0.4175	5.42%	0
6.25		8	7.425	7.181	7.669	7	7.7	0.1031	0.2915	3.93%	0
12.5		8	7.412	7.174	7.651	7.1	7.8	0.1008	0.285	3.85%	0
25		8	7.463	7.191	7.734	7	7.9	0.1149	0.3249	4.35%	0
50		8	7.275	6.856	7.694	6.4	7.8	0.177	0.5007	6.88%	0
100		8	6.725	6.061	7.389	4.9	7.5	0.2808	0.7942	11.81%	0
Overall		48	7.333	7.177	7.49	4.9	8.5	0.07766	0.5381	7.34%	0 (0%)

Hardness (CaCO3)-mg/L

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	8	91	86.53	95.47	86	96	1.89	5.345	5.87%	0
100		1	235			235	235	0	0	0.0%	0
Overall		9	107	69.9	144.1	86	235	16.09	48.26	45.10%	0 (0%)

pH-Units

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	8	7.838	7.601	8.074	7.5	8.3	0.09989	0.2825	3.61%	0
6.25		8	7.675	7.492	7.858	7.4	8	0.07734	0.2188	2.85%	0
12.5		8	7.675	7.515	7.835	7.5	7.9	0.06748	0.1909	2.49%	0
25		8	7.65	7.483	7.817	7.5	8	0.07071	0.2	2.61%	0
50		8	7.737	7.59	7.885	7.5	8	0.0625	0.1768	2.29%	0
100		8	7.712	7.51	7.915	7.5	8	0.08543	0.2416	3.13%	0
Overall		48	7.715	7.651	7.778	7.4	8.3	0.03151	0.2183	2.83%	0 (0%)

Ceriodaphnia 7-d Survival and Reproduction Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Temperature-°C

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	8	24.19	23.74	24.63	24	25.5	0.1875	0.5303	2.19%	0
6.25		8	24.19	23.74	24.63	24	25.5	0.1875	0.5303	2.19%	0
12.5		8	24.12	23.83	24.42	24	25	0.125	0.3536	1.47%	0
25		8	24.1	23.86	24.34	24	24.8	0.1	0.2828	1.17%	0
50		8	24.1	23.86	24.34	24	24.8	0.1	0.2828	1.17%	0
100		8	24.1	23.86	24.34	24	24.8	0.1	0.2828	1.17%	0
Overall		48	24.13	24.02	24.24	24	25.5	0.05395	0.3738	1.55%	0 (0%)

Alkalinity (CaCO3)-mg/L

Conc-%	Code	1	2	3	4	5	6	7	8
0	N	63	61	61	61	61	61	65	65
100		383							

Conductivity-µmhos

Conc-%	Code	1	2	3	4	5	6	7	8
0	N	336	320	319	326	324	325	336	348
6.25		444	442	441	453	499	441	447	457
12.5		643	568	563	566	569	559	570	566
25		831	828	833	829	823	817	823	841
50		1308	1294	1320	1299	1312	1282	1298	1332
100		2229	2217	2230	2204	2227	2149	2228	2247

Dissolved Oxygen-mg/L

Conc-%	Code	1	2	3	4	5	6	7	8
0	N	7.6	7.6	7.8	8.5	7.8	7.8	7	7.5
6.25		7.6	7.7	7.7	7.5	7	7.3	7.6	7
12.5		7.4	7.5	7.6	7.7	7.8	7.1	7.1	7.1
25		7.3	7.5	7.7	7.1	7.4	7.9	7.8	7
50		7.5	7.5	7.3	7.5	7.6	6.6	6.4	7.8
100		6.8	7.2	7.1	6.5	6.9	7.5	4.9	6.9

Hardness (CaCO3)-mg/L

Conc-%	Code	1	2	3	4	5	6	7	8
0	N	96	96	96	86	86	86	86	96
100		235							

pH-Units

Conc-%	Code	1	2	3	4	5	6	7	8
0	N	8	8.3	8.1	7.8	7.7	7.5	7.8	7.5
6.25		8	8	7.6	7.7	7.6	7.4	7.5	7.6
12.5		7.5	7.9	7.5	7.9	7.9	7.5	7.6	7.6
25		8	7.9	7.5	7.5	7.5	7.5	7.6	7.7
50		8	7.9	7.9	7.7	7.7	7.5	7.6	7.6
100		8	8	7.5	7.5	7.6	7.5	7.6	8

Temperature-°C

Conc-%	Code	1	2	3	4	5	6	7	8
0	N	24	25.5	24	24	24	24	24	24
6.25		24	25.5	24	24	24	24	24	24
12.5		24	24	25	24	24	24	24	24
25		24	24.8	24	24	24	24	24	24
50		24	24.8	24	24	24	24	24	24
100		24	24.8	24	24	24	24	24	24

aquatic bioassay & consulting laboratories, inc

December 6, 2016

Mr. Arne Anselm
Ventura County Watershed Protection District
800 South Victoria Ave
Ventura, CA 93009

Dear Mr. Anselm:

We are pleased to present the enclosed revised bioassay report. The test was conducted under guidelines prescribed in *Short-Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms" EPA-821-R-02-013.* Results were as follows:

CLIENT:	Ventura County Flood Control
SAMPLE I.D.:	MO-SIM
DATE RECEIVED:	10/28/2016
ABC LAB. NO.:	VCF1016.358

CHRONIC CERIODAPHNIA SURVIVAL & REPRODUCTION BIOASSAY

SURVIVAL	NOEC =	100.00 %
	TUc =	1.00
	IC25 =	>100.00 %
	IC50 =	>100.00 %
REPRODUCTION	NOEC =	100.00 %
	TUc =	1.00
	IC25 =	>100.00 %
	IC50 =	>100.00 %

Yours very truly,

Scott Johnson
Laboratory Director

CETIS Summary Report

Ceriodaphnia 7-d Survival and Reproduction Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Batch ID:	18-9751-6973	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Joe Freas
Start Date:	28 Oct-16 15:42	**Protocol:**	EPA/821/R-02-013 (2002)	**Diluent:**	Laboratory Water
Ending Date:	04 Nov-16 14:50	**Species:**	Ceriodaphnia dubia	**Brine:**	Not Applicable
Duration:	6d 23h	**Source:**	Aquatic Biosystems, CO	**Age:**	
Sample ID:	05-6824-5735	**Code:**	VCF1016.358	**Client:**	VCWPD
Sample Date:	28 Oct-16 09:10	**Material:**	Sample Water	**Project:**	2016/17-1 (Wet)
Receipt Date:	28 Oct-16 12:10	**Source:**	Bioassay Report		
Sample Age:	7h	**Station:**	MO-SIM		

Multiple Comparison Summary

Analysis ID	Endpoint	Comparison Method	NOEL	LOEL	TOEL	TU	PMSD	✓
21-0084-7307	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	100	> 100	n/a	1	n/a	
19-4416-0542	Reproduction	Dunnett Multiple Comparison Test	100	> 100	n/a	1	45.4%	

Point Estimate Summary

Analysis ID	Endpoint	Point Estimate Method	Level	%	95% LCL	95% UCL	TU	✓
11-6865-9956	7d Survival Rate	Linear Interpolation (ICPIN)	EC5	5.208	2.232	n/a	19.2	✓
			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	✓
07-0048-3056	Reproduction	Linear Interpolation (ICPIN)	IC5	>100	n/a	n/a	<1	
			IC10	>100	n/a	n/a	<1	✓
			IC15	>100	n/a	n/a	<1	✓
			IC20	>100	n/a	n/a	<1	✓
			IC25	>100	n/a	n/a	<1	✓
			IC40	>100	n/a	n/a	<1	✓
			IC50	>100	n/a	n/a	<1	✓

Test Acceptability

				TAC Limits			
Analysis ID	**Endpoint**	**Attribute**	**Test Stat**	**Lower**	**Upper**	**Overlap**	**Decision**
11-6865-9956	7d Survival Rate	Control Resp	1	0.8	>>	Yes	Passes Acceptibility Criteria
21-0084-7307	7d Survival Rate	Control Resp	1	0.8	>>	Yes	Passes Acceptibility Criteria
07-0048-3056	Reproduction	Control Resp	28.1	15	>>	Yes	Passes Acceptibility Criteria
19-4416-0542	Reproduction	Control Resp	28.1	15	>>	Yes	Passes Acceptibility Criteria

7d Survival Rate Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	N	10	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
6.25		10	0.9000	0.6738	1.0000	0.0000	1.0000	0.1000	0.3162	35.14%	10.00%
12.5		10	0.8000	0.4984	1.0000	0.0000	1.0000	0.1333	0.4216	52.70%	20.00%
25		10	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
50		10	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
100		10	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%

Reproduction Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	N	10	28.1	19.52	36.68	7	41	3.793	11.99	42.69%	0.00%
6.25		10	26.7	16	37.4	0	52	4.731	14.96	56.03%	4.98%
12.5		10	21	10.49	31.51	0	49	4.645	14.69	69.95%	25.27%
25		10	41.9	34.94	48.86	21	54	3.075	9.723	23.21%	-49.11%
50		10	33.9	25.39	42.41	16	54	3.764	11.9	35.11%	-20.64%
100		10	35.6	28.09	43.11	18	49	3.321	10.5	29.50%	-26.69%

Ceriodaphnia 7-d Survival and Reproduction Test **Aquatic Bioassay & Consulting Labs, Inc.**

7d Survival Rate Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	N	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
6.25		0.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
12.5		0.0000	1.0000	1.0000	1.0000	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000
25		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
50		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
100		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000

Reproduction Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	N	39	38	26	36	33	9	7	27	25	41
6.25		0	24	22	41	16	52	18	25	27	42
12.5		0	21	10	34	8	13	49	33	16	26
25		39	43	47	48	53	42	35	21	37	54
50		28	16	37	46	43	26	40	54	24	25
100		43	49	34	31	28	23	18	45	46	39

7d Survival Rate Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	N	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
6.25		0/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
12.5		0/1	1/1	1/1	1/1	0/1	1/1	1/1	1/1	1/1	1/1
25		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
50		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
100		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1

CETIS Analytical Report

Ceriodaphnia 7-d Survival and Reproduction Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Analysis ID:	19-4416-0542	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.9.2
Analyzed:	02 Dec-16 15:40	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes
Batch ID:	18-9751-6973	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Joe Freas
Start Date:	28 Oct-16 15:42	**Protocol:**	EPA/821/R-02-013 (2002)	**Diluent:**	Laboratory Water
Ending Date:	04 Nov-16 14:50	**Species:**	Ceriodaphnia dubia	**Brine:**	Not Applicable
Duration:	6d 23h	**Source:**	Aquatic Biosystems, CO	**Age:**	
Sample ID:	05-6824-5735	**Code:**	VCF1016.358	**Client:**	VCWPD
Sample Date:	28 Oct-16 09:10	**Material:**	Sample Water	**Project:**	2016/17-1 (Wet)
Receipt Date:	28 Oct-16 12:10	**Source:**	Bioassay Report		
Sample Age:	7h	**Station:**	MO-SIM		

Data Transform	Alt Hyp	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	C > T	100	> 100	n/a	1	45.36%

Dunnett Multiple Comparison Test

Control	vs	Conc-%	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Negative Control		6.25	0.2515	2.289	12.75	18	CDF	0.7481	Non-Significant Effect
		12.5	1.275	2.289	12.75	18	CDF	0.2991	Non-Significant Effect
		25	-2.479	2.289	12.75	18	CDF	0.9999	Non-Significant Effect
		50	-1.042	2.289	12.75	18	CDF	0.9861	Non-Significant Effect
		100	-1.347	2.289	12.75	18	CDF	0.9947	Non-Significant Effect

Test Acceptability Criteria

		TAC Limits			
Attribute	**Test Stat**	**Lower**	**Upper**	**Overlap**	**Decision**
Control Resp	28.1	15	>>	Yes	Passes Acceptibility Criteria

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	2750.4	550.08	5	3.549	0.0076	Significant Effect
Error	8369.2	154.985	54			
Total	11119.6		59			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance Test	2.594	15.09	0.7623	Equal Variances
Variances	Levene Equality of Variance Test	0.5396	3.377	0.7454	Equal Variances
Variances	Mod Levene Equality of Variance Test	0.4643	3.377	0.8011	Equal Variances
Distribution	Anderson-Darling A2 Normality Test	0.2864	3.878	0.6533	Normal Distribution
Distribution	D'Agostino Kurtosis Test	0.4016	2.576	0.6880	Normal Distribution
Distribution	D'Agostino Skewness Test	0.1281	2.576	0.8981	Normal Distribution
Distribution	D'Agostino-Pearson K2 Omnibus Test	0.1777	9.21	0.9150	Normal Distribution
Distribution	Kolmogorov-Smirnov D Test	0.06092	0.1331	0.8556	Normal Distribution
Distribution	Shapiro-Wilk W Normality Test	0.9869	0.9459	0.7657	Normal Distribution

Reproduction Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	N	10	28.1	19.52	36.68	30	7	41	3.793	42.69%	0.00%
6.25		10	26.7	16	37.4	24.5	0	52	4.731	56.03%	4.98%
12.5		10	21	10.49	31.51	18.5	0	49	4.645	69.95%	25.27%
25		10	41.9	34.94	48.86	42.5	21	54	3.075	23.21%	-49.11%
50		10	33.9	25.39	42.41	32.5	16	54	3.764	35.11%	-20.64%
100		10	35.6	28.09	43.11	36.5	18	49	3.321	29.50%	-26.69%

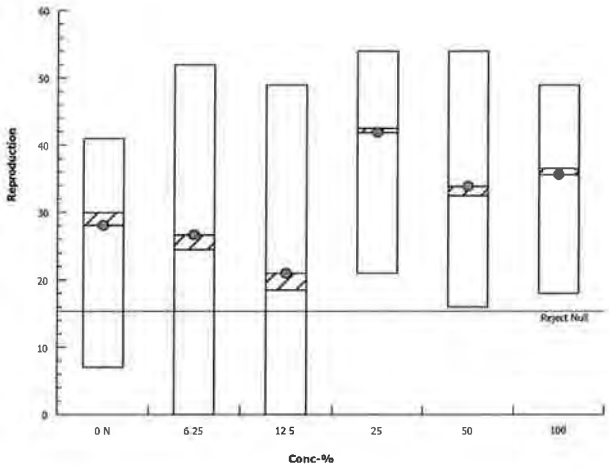
Ceriodaphnia 7-d Survival and Reproduction Test — **Aquatic Bioassay & Consulting Labs, Inc.**

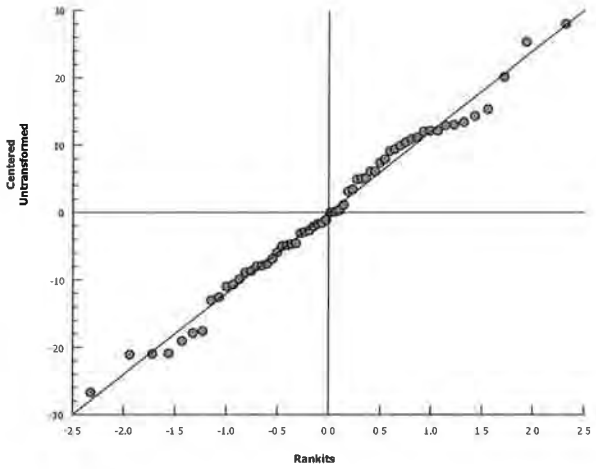
Analysis ID:	19-4416-0542	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.9.2
Analyzed:	02 Dec-16 15:40	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes

Reproduction Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	N	39	38	26	36	33	9	7	27	25	41
6.25		0	24	22	41	16	52	18	25	27	42
12.5		0	21	10	34	8	13	49	33	16	26
25		39	43	47	48	53	42	35	21	37	54
50		28	16	37	46	43	26	40	54	24	25
100		43	49	34	31	28	23	18	45	46	39

Graphics





CETIS Analytical Report

Ceriodaphnia 7-d Survival and Reproduction Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Analysis ID:	11-6865-9956	**Endpoint:**	7d Survival Rate	**CETIS Version:**	CETISv1.9.2
Analyzed:	02 Dec-16 15:40	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	18-9751-6973	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Joe Freas
Start Date:	28 Oct-16 15:42	**Protocol:**	EPA/821/R-02-013 (2002)	**Diluent:**	Laboratory Water
Ending Date:	04 Nov-16 14:50	**Species:**	Ceriodaphnia dubia	**Brine:**	Not Applicable
Duration:	6d 23h	**Source:**	Aquatic Biosystems, CO	**Age:**	
Sample ID:	05-6824-5735	**Code:**	VCF1016.358	**Client:**	VCWPD
Sample Date:	28 Oct-16 09:10	**Material:**	Sample Water	**Project:**	2016/17-1 (Wet)
Receipt Date:	28 Oct-16 12:10	**Source:**	Bioassay Report		
Sample Age:	7h	**Station:**	MO-SIM		

Linear Interpolation Options

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

Test Acceptability Criteria

		TAC Limits			
Attribute	**Test Stat**	**Lower**	**Upper**	**Overlap**	**Decision**
Control Resp	1	0.8	>>	Yes	Passes Acceptibility Criteria

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC5	5.208	2.232	n/a	19.2	n/a	44.8
EC10	>100	n/a	n/a	<1	n/a	n/a
EC15	>100	n/a	n/a	<1	n/a	n/a
EC20	>100	n/a	n/a	<1	n/a	n/a
EC25	>100	n/a	n/a	<1	n/a	n/a
EC40	>100	n/a	n/a	<1	n/a	n/a
EC50	>100	n/a	n/a	<1	n/a	n/a

7d Survival Rate Summary

			Calculated Variate(A/B)								
Conc-%	**Code**	**Count**	**Mean**	**Min**	**Max**	**Std Err**	**Std Dev**	**CV%**	**%Effect**	**A**	**B**
0	N	10	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.0%	10	10
6.25		10	0.9000	0.0000	1.0000	0.1000	0.3162	35.14%	10.0%	9	10
12.5		10	0.8000	0.0000	1.0000	0.1333	0.4216	52.70%	20.0%	8	10
25		10	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.0%	10	10
50		10	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.0%	10	10
100		10	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.0%	10	10

7d Survival Rate Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	N	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
6.25		0.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
12.5		0.0000	1.0000	1.0000	1.0000	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000
25		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
50		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
100		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000

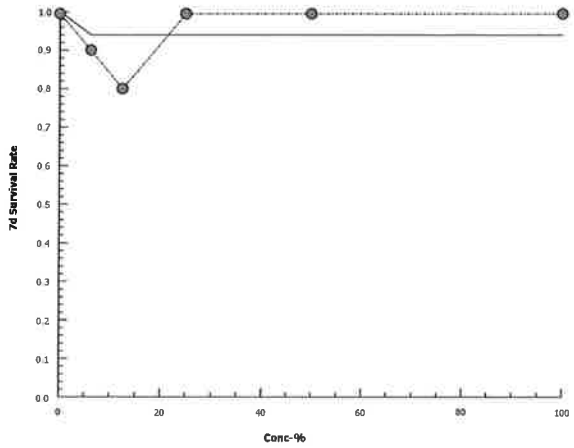
7d Survival Rate Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	N	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
6.25		0/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
12.5		0/1	1/1	1/1	1/1	0/1	1/1	1/1	1/1	1/1	1/1
25		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
50		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
100		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1

Ceriodaphnia 7-d Survival and Reproduction Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Analysis ID:	11-6865-9956	**Endpoint:**	7d Survival Rate	**CETIS Version:**	CETISv1.9.2
Analyzed:	02 Dec-16 15:40	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



Ceriodaphnia 7-d Survival and Reproduction Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Analysis ID:	07-0048-3056	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.9.2
Analyzed:	02 Dec-16 15:40	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	18-9751-6973	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Joe Freas
Start Date:	28 Oct-16 15:42	**Protocol:**	EPA/821/R-02-013 (2002)	**Diluent:**	Laboratory Water
Ending Date:	04 Nov-16 14:50	**Species:**	Ceriodaphnia dubia	**Brine:**	Not Applicable
Duration:	6d 23h	**Source:**	Aquatic Biosystems, CO	**Age:**	
Sample ID:	05-6824-5735	**Code:**	VCF1016.358	**Client:**	VCWPD
Sample Date:	28 Oct-16 09:10	**Material:**	Sample Water	**Project:**	2016/17-1 (Wet)
Receipt Date:	28 Oct-16 12:10	**Source:**	Bioassay Report		
Sample Age:	7h	**Station:**	MO-SIM		

Linear Interpolation Options

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

Test Acceptability Criteria

		TAC Limits			
Attribute	**Test Stat**	**Lower**	**Upper**	**Overlap**	**Decision**
Control Resp	28.1	15	>>	Yes	Passes Acceptibility Criteria

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	>100	n/a	n/a	<1	n/a	n/a
IC10	>100	n/a	n/a	<1	n/a	n/a
IC15	>100	n/a	n/a	<1	n/a	n/a
IC20	>100	n/a	n/a	<1	n/a	n/a
IC25	>100	n/a	n/a	<1	n/a	n/a
IC40	>100	n/a	n/a	<1	n/a	n/a
IC50	>100	n/a	n/a	<1	n/a	n/a

Reproduction Summary

			Calculated Variate						
Conc-%	**Code**	**Count**	**Mean**	**Min**	**Max**	**Std Err**	**Std Dev**	**CV%**	**%Effect**
0	N	10	28.1	7	41	3.793	11.99	42.69%	0.0%
6.25		10	26.7	0	52	4.731	14.96	56.03%	4.98%
12.5		10	21	0	49	4.645	14.69	69.95%	25.27%
25		10	41.9	21	54	3.075	9.723	23.21%	-49.11%
50		10	33.9	16	54	3.764	11.9	35.11%	-20.64%
100		10	35.6	18	49	3.321	10.5	29.50%	-26.69%

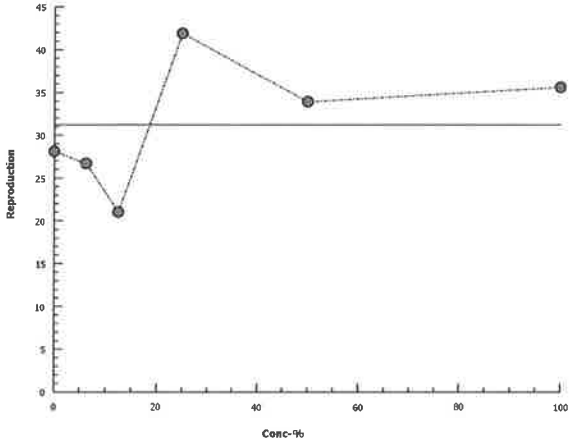
Reproduction Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	N	39	38	26	36	33	9	7	27	25	41
6.25		0	24	22	41	16	52	18	25	27	42
12.5		0	21	10	34	8	13	49	33	16	26
25		39	43	47	48	53	42	35	21	37	54
50		28	16	37	46	43	26	40	54	24	25
100		43	49	34	31	28	23	18	45	46	39

Ceriodaphnia 7-d Survival and Reproduction Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Analysis ID:	07-0048-3056	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.9.2
Analyzed:	02 Dec-16 15:40	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



CETIS Analytical Report

Ceriodaphnia 7-d Survival and Reproduction Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Analysis ID:	21-0084-7307	**Endpoint:**	7d Survival Rate	**CETIS Version:**	CETISv1.9.2
Analyzed:	02 Dec-16 15:40	**Analysis:**	STP 2xK Contingency Tables	**Official Results:**	Yes
Batch ID:	18-9751-6973	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Joe Freas
Start Date:	28 Oct-16 15:42	**Protocol:**	EPA/821/R-02-013 (2002)	**Diluent:**	Laboratory Water
Ending Date:	04 Nov-16 14:50	**Species:**	Ceriodaphnia dubia	**Brine:**	Not Applicable
Duration:	6d 23h	**Source:**	Aquatic Biosystems, CO	**Age:**	
Sample ID:	05-6824-5735	**Code:**	VCF1016.358	**Client:**	VCWPD
Sample Date:	28 Oct-16 09:10	**Material:**	Sample Water	**Project:**	2016/17-1 (Wet)
Receipt Date:	28 Oct-16 12:10	**Source:**	Bioassay Report		
Sample Age:	7h	**Station:**	MO-SIM		

Data Transform	Alt Hyp	NOEL	LOEL	TOEL	TU
Untransformed	C > T	100	> 100	n/a	1

Fisher Exact/Bonferroni-Holm Test

Control	vs	Group	Test Stat	P-Type	P-Value	Decision(α:5%)
Negative Control		6.25	0.5000	Exact	1.0000	Non-Significant Effect
		12.5	0.2368	Exact	1.0000	Non-Significant Effect
		25	1.0000	Exact	1.0000	Non-Significant Effect
		50	1.0000	Exact	1.0000	Non-Significant Effect
		100	1.0000	Exact	1.0000	Non-Significant Effect

Test Acceptability Criteria

		TAC Limits			
Attribute	**Test Stat**	**Lower**	**Upper**	**Overlap**	**Decision**
Control Resp	1	0.8	>>	Yes	Passes Acceptibility Criteria

Data Summary

Conc-%	Code	NR	R	NR + R	Prop NR	Prop R	%Effect
0	N	10	0	10	1	0	0.0%
6.25		9	1	10	0.9	0.1	10.0%
12.5		8	2	10	0.8	0.2	20.0%
25		10	0	10	1	0	0.0%
50		10	0	10	1	0	0.0%
100		10	0	10	1	0	0.0%

7d Survival Rate Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	N	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
6.25		0.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
12.5		0.0000	1.0000	1.0000	1.0000	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000
25		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
50		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
100		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000

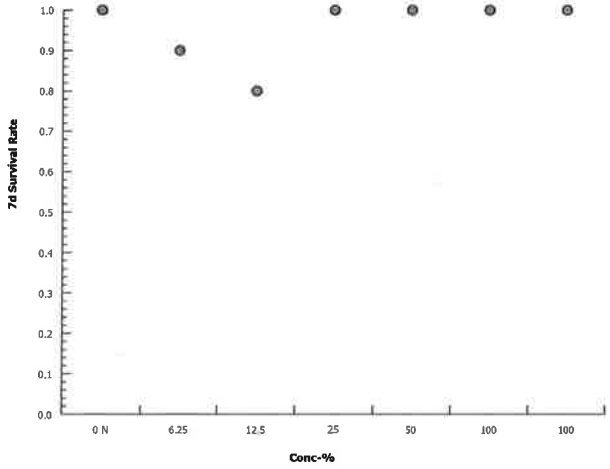
7d Survival Rate Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	N	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
6.25		0/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
12.5		0/1	1/1	1/1	1/1	0/1	1/1	1/1	1/1	1/1	1/1
25		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
50		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
100		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1

Ceriodaphnia 7-d Survival and Reproduction Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Analysis ID:	21-0084-7307	**Endpoint:**	7d Survival Rate	**CETIS Version:**	CETISv1.9.2
Analyzed:	02 Dec-16 15:40	**Analysis:**	STP 2xK Contingency Tables	**Official Results:**	Yes

Graphics



Ceriodaphnia 7-d Survival and Reproduction Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Batch ID:	18-9751-6973	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Joe Freas
Start Date:	28 Oct-16 15:42	**Protocol:**	EPA/821/R-02-013 (2002)	**Diluent:**	Laboratory Water
Ending Date:	04 Nov-16 14:50	**Species:**	Ceriodaphnia dubia	**Brine:**	Not Applicable
Duration:	6d 23h	**Source:**	Aquatic Biosystems, CO	**Age:**	
Sample ID:	05-6824-5735	**Code:**	VCF1016.358	**Client:**	VCWPD
Sample Date:	28 Oct-16 09:10	**Material:**	Sample Water	**Project:**	2016/17-1 (Wet)
Receipt Date:	28 Oct-16 12:10	**Source:**	Bioassay Report		
Sample Age:	7h	**Station:**	MO-SIM		

Alkalinity (CaCO3)-mg/L

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	8	62.25	60.72	63.78	61	65	0.6478	1.832	2.94%	0
100		1	75			75	75	0	0	0.0%	0
Overall		9	63.67	60.14	67.19	61	75	1.528	4.583	7.20%	0 (0%)

Conductivity-µmhos

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	8	329.2	321	337.5	319	348	3.509	9.925	3.01%	0
6.25		8	385.2	366.6	403.9	361	428	7.892	22.32	5.79%	0
12.5		8	372.2	366	378.5	360	385	2.664	7.536	2.02%	0
25		8	421.6	415.5	427.8	415	436	2.598	7.347	1.74%	0
50		8	481.5	391.8	571.2	217	536	37.95	107.3	22.29%	0
100		8	708.8	700.5	717	694	725	3.468	9.809	1.38%	0
Overall		48	449.8	411.1	488.5	217	725	19.24	133.3	29.63%	0 (0%)

Dissolved Oxygen-mg/L

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	8	7.738	7.571	7.904	7.5	8.1	0.07055	0.1996	2.58%	0
6.25		8	7.388	7.096	7.679	6.9	7.8	0.1231	0.3482	4.71%	0
12.5		8	7.4	7.1	7.7	7	7.8	0.1268	0.3586	4.85%	0
25		8	7.05	6.621	7.479	6.3	7.8	0.1813	0.5127	7.27%	0
50		8	6.6	5.655	7.545	4.4	8	0.3996	1.13	17.12%	0
100		8	6.263	5.147	7.378	4.1	8.6	0.4717	1.334	21.3%	0
Overall		48	7.073	6.814	7.332	4.1	8.6	0.1289	0.8932	12.63%	0 (0%)

Hardness (CaCO3)-mg/L

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	8	89.75	85.42	94.08	86	96	1.83	5.175	5.77%	0
100		1	213			213	213	0	0	0.0%	0
Overall		9	103.4	71.65	135.2	86	213	13.79	41.37	39.99%	0 (0%)

pH-Units

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	8	7.863	7.722	8.003	7.5	8	0.05957	0.1685	2.14%	0
6.25		8	8.212	8.13	8.295	8.1	8.4	0.03504	0.0991	1.21%	0
12.5		8	8.075	7.898	8.252	7.8	8.4	0.075	0.2121	2.63%	0
25		8	7.95	7.841	8.059	7.7	8.1	0.04629	0.1309	1.65%	0
50		8	7.8	7.633	7.967	7.4	8	0.07071	0.2	2.56%	0
100		8	7.55	7.395	7.705	7.2	7.8	0.06547	0.1852	2.45%	0
Overall		48	7.908	7.831	7.986	7.2	8.4	0.03846	0.2664	3.37%	0 (0%)

Ceriodaphnia 7-d Survival and Reproduction Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Temperature-°C

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	8	24.29	23.82	24.76	24	25.5	0.1995	0.5643	2.32%	0
6.25		8	24.28	23.84	24.71	24	25.4	0.182	0.5148	2.12%	0
12.5		8	24.3	23.83	24.77	24	25.6	0.1991	0.5632	2.32%	0
25		8	24.25	23.88	24.62	24	25.3	0.1581	0.4472	1.84%	0
50		8	24.18	23.86	24.49	24	25.1	0.1346	0.3808	1.58%	0
100		8	24.16	23.84	24.48	24	25.1	0.1362	0.3852	1.59%	0
Overall		48	24.24	24.11	24.37	24	25.6	0.06623	0.4589	1.89%	0 (0%)

Alkalinity (CaCO3)-mg/L

Conc-%	Code	1	2	3	4	5	6	7	8
0	N	63	61	61	61	61	61	65	65
100		75							

Conductivity-µmhos

Conc-%	Code	1	2	3	4	5	6	7	8
0	N	336	320	319	326	324	325	336	348
6.25		361	390	365	393	363	388	394	428
12.5		375	368	360	369	371	371	379	385
25		422	416	419	416	420	415	429	436
50		514	512	507	514	217	532	520	536
100		699	694	709	703	713	714	713	725

Dissolved Oxygen-mg/L

Conc-%	Code	1	2	3	4	5	6	7	8
0	N	7.6	7.6	7.8	7.9	7.6	7.8	7.5	8.1
6.25		7.7	7.3	7.8	7.8	7.3	7	6.9	7.3
12.5		7.7	7.6	7.8	7.8	7.1	7	7.2	7
25		7.8	7.2	7.7	7	6.3	6.6	6.8	7
50		8	4.4	6.9	7.4	6.5	5.6	7.2	6.8
100		8.6	6.8	6.9	4.1	5	6.1	6.3	6.3

Hardness (CaCO3)-mg/L

Conc-%	Code	1	2	3	4	5	6	7	8
0	N	96	86	86	86	86	86	96	96
100		213							

pH-Units

Conc-%	Code	1	2	3	4	5	6	7	8
0	N	8	7.9	7.8	7.9	7.8	7.5	8	8
6.25		8.2	8.4	8.1	8.3	8.2	8.2	8.1	8.2
12.5		8.4	7.9	8.1	8	8.2	8.3	7.8	7.9
25		8	8.1	8.1	8	7.9	7.9	7.7	7.9
50		8	7.9	7.9	7.8	7.9	7.6	7.4	7.9
100		7.7	7.8	7.4	7.6	7.2	7.5	7.6	7.6

Temperature-°C

Conc-%	Code	1	2	3	4	5	6	7	8
0	N	24	24.8	24	24	24	24	25.5	24
6.25		24	24	24.7	24	24	24.1	25.4	24
12.5		24	24	24.6	24	24.1	24.1	25.6	24
25		24.2	24.1	24	24.4	24	24	25.3	24
50		24	24.2	24	24	24	24.1	25.1	24
100		24	24	24	24	24	24.2	25.1	24

aquatic bioassay & consulting laboratories, inc

December 6, 2016

Mr. Arne Anselm
Ventura County Watershed Protection District
800 South Victoria Ave
Ventura, CA 93009

Dear Mr. Anselm:

We are pleased to present the enclosed revised bioassay report. The test was conducted under guidelines prescribed in *Short-Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms" EPA-821-R-02-013.* Results were as follows:

CLIENT:	Ventura County Flood Control
SAMPLE I.D.:	MO-FIL
DATE RECEIVED:	10/28/2016
ABC LAB. NO.:	VCF1016.359

CHRONIC CERIODAPHNIA SURVIVAL & REPRODUCTION BIOASSAY

SURVIVAL	NOEC =	100.00 %
	TUc =	1.00
	IC25 =	>100.00 %
	IC50 =	>100.00 %
REPRODUCTION	NOEC =	100.00 %
	TUc =	1.00
	IC25 =	>100.00 %
	IC50 =	>100.00 %

Yours very truly,

Scott Johnson
Laboratory Director

CETIS Summary Report

Ceriodaphnia 7-d Survival and Reproduction Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Batch ID:	03-7860-2979	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Joe Freas
Start Date:	28 Oct-16 14:55	**Protocol:**	EPA/821/R-02-013 (2002)	**Diluent:**	Laboratory Water
Ending Date:	04 Nov-16 15:15	**Species:**	Ceriodaphnia dubia	**Brine:**	Not Applicable
Duration:	7d 0h	**Source:**	Aquatic Biosystems, CO	**Age:**	
Sample ID:	16-2920-7886	**Code:**	VCF1016.359	**Client:**	VCWPD
Sample Date:	28 Oct-16 07:00	**Material:**	Sample Water	**Project:**	2016/17-1 (Wet)
Receipt Date:	28 Oct-16 12:10	**Source:**	Bioassay Report		
Sample Age:	8h	**Station:**	MO-FIL		

Multiple Comparison Summary

Analysis ID	Endpoint	Comparison Method	NOEL	LOEL	TOEL	TU	PMSD	✓
10-7654-8429	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	100	> 100	n/a	1	n/a	
08-7371-7914	Reproduction	Dunnett Multiple Comparison Test	100	> 100	n/a	1	30.4%	

Point Estimate Summary

Analysis ID	Endpoint	Point Estimate Method	Level	%	95% LCL	95% UCL	TU	✓
02-6445-4257	7d Survival Rate	Linear Interpolation (ICPIN)	EC5	10.42	8.333	n/a	9.6	
			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	✓
02-9158-3674	Reproduction	Linear Interpolation (ICPIN)	IC5	8.274	2.379	n/a	12.09	✓
			IC10	10.3	4.759	n/a	9.711	✓
			IC15	12.32	7.858	n/a	8.116	✓
			IC20	>100	n/a	n/a	<1	✓
			IC25	>100	n/a	n/a	<1	✓
			IC40	>100	n/a	n/a	<1	✓
			IC50	>100	n/a	n/a	<1	✓

Test Acceptability

				TAC Limits			
Analysis ID	Endpoint	Attribute	Test Stat	Lower	Upper	Overlap	Decision
02-6445-4257	7d Survival Rate	Control Resp	1	0.8	>>	Yes	Passes Acceptibility Criteria
10-7654-8429	7d Survival Rate	Control Resp	1	0.8	>>	Yes	Passes Acceptibility Criteria
02-9158-3674	Reproduction	Control Resp	39.7	15	>>	Yes	Passes Acceptibility Criteria
08-7371-7914	Reproduction	Control Resp	39.7	15	>>	Yes	Passes Acceptibility Criteria

7d Survival Rate Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	N	10	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
6.25		10	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
12.5		10	0.7000	0.3544	1.0000	0.0000	1.0000	0.1528	0.4830	69.01%	30.00%
25		10	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
50		10	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
100		10	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%

Reproduction Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	N	10	39.7	31.44	47.96	20	55	3.652	11.55	29.09%	0.00%
6.25		10	41.9	35.25	48.55	26	53	2.942	9.303	22.20%	-5.54%
12.5		10	17.5	7.789	27.21	5	43	4.293	13.57	77.57%	55.92%
25		10	38.3	30.06	46.54	23	59	3.642	11.52	30.07%	3.53%
50		10	39.8	31.67	47.93	26	55	3.593	11.36	28.54%	-0.25%
100		10	42.4	33.12	51.68	14	64	4.102	12.97	30.59%	-6.80%

Ceriodaphnia 7-d Survival and Reproduction Test — **Aquatic Bioassay & Consulting Labs, Inc.**

7d Survival Rate Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	N	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
6.25		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
12.5		1.0000	0.0000	1.0000	1.0000	0.0000	1.0000	0.0000	1.0000	1.0000	1.0000
25		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
50		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
100		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000

Reproduction Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	N	43	35	55	20	20	44	41	48	46	45
6.25		26	44	29	44	34	48	47	52	53	42
12.5		11	9	36	17	11	5	7	29	7	43
25		49	33	32	52	59	32	33	29	23	41
50		27	31	26	31	33	46	46	55	48	55
100		14	36	39	50	42	50	43	37	49	64

7d Survival Rate Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	N	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
6.25		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
12.5		1/1	0/1	1/1	1/1	0/1	1/1	0/1	1/1	1/1	1/1
25		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
50		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
100		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1

CETIS Analytical Report

Ceriodaphnia 7-d Survival and Reproduction Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Analysis ID:	08-7371-7914	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.9.2
Analyzed:	02 Dec-16 15:50	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes
Batch ID:	03-7860-2979	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Joe Freas
Start Date:	28 Oct-16 14:55	**Protocol:**	EPA/821/R-02-013 (2002)	**Diluent:**	Laboratory Water
Ending Date:	04 Nov-16 15:15	**Species:**	Ceriodaphnia dubia	**Brine:**	Not Applicable
Duration:	7d 0h	**Source:**	Aquatic Biosystems, CO	**Age:**	
Sample ID:	16-2920-7886	**Code:**	VCF1016.359	**Client:**	VCWPD
Sample Date:	28 Oct-16 07:00	**Material:**	Sample Water	**Project:**	2016/17-1 (Wet)
Receipt Date:	28 Oct-16 12:10	**Source:**	Bioassay Report		
Sample Age:	8h	**Station:**	MO-FIL		

Data Transform	Alt Hyp	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	C > T	100	> 100	n/a	1	30.41%

Dunnett Multiple Comparison Test

Control	vs	Conc-%	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Negative Control		6.25	-0.4172	2.289	12.07	18	CDF	0.9284	Non-Significant Effect
		12.5*	4.21	2.289	12.07	18	CDF	2.3E-04	Significant Effect
		25	0.2655	2.289	12.07	18	CDF	0.7428	Non-Significant Effect
		50	-0.01896	2.289	12.07	18	CDF	0.8389	Non-Significant Effect
		100	-0.512	2.289	12.07	18	CDF	0.9425	Non-Significant Effect

Test Acceptability Criteria

		TAC Limits			
Attribute	**Test Stat**	**Lower**	**Upper**	**Overlap**	**Decision**
Control Resp	39.7	15	>>	Yes	Passes Acceptibility Criteria

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	4492.8	898.56	5	6.463	8.9E-05	Significant Effect
Error	7507.6	139.03	54			
Total	12000.4		59			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance Test	1.417	15.09	0.9224	Equal Variances
Variances	Levene Equality of Variance Test	0.4087	3.377	0.8407	Equal Variances
Variances	Mod Levene Equality of Variance Test	0.2027	3.377	0.9600	Equal Variances
Distribution	Anderson-Darling A2 Normality Test	0.311	3.878	0.5800	Normal Distribution
Distribution	D'Agostino Kurtosis Test	0.3701	2.576	0.7113	Normal Distribution
Distribution	D'Agostino Skewness Test	0.0589	2.576	0.9530	Normal Distribution
Distribution	D'Agostino-Pearson K2 Omnibus Test	0.1404	9.21	0.9322	Normal Distribution
Distribution	Kolmogorov-Smirnov D Test	0.09743	0.1331	0.1596	Normal Distribution
Distribution	Shapiro-Wilk W Normality Test	0.9897	0.9459	0.8931	Normal Distribution

Reproduction Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	N	10	39.7	31.44	47.96	43.5	20	55	3.652	29.09%	0.00%
6.25		10	41.9	35.25	48.55	44	26	53	2.942	22.20%	-5.54%
12.5		10	17.5	7.789	27.21	11	5	43	4.293	77.57%	55.92%
25		10	38.3	30.06	46.54	33	23	59	3.642	30.07%	3.53%
50		10	39.8	31.67	47.93	39.5	26	55	3.593	28.54%	-0.25%
100		10	42.4	33.12	51.68	42.5	14	64	4.102	30.59%	-6.80%

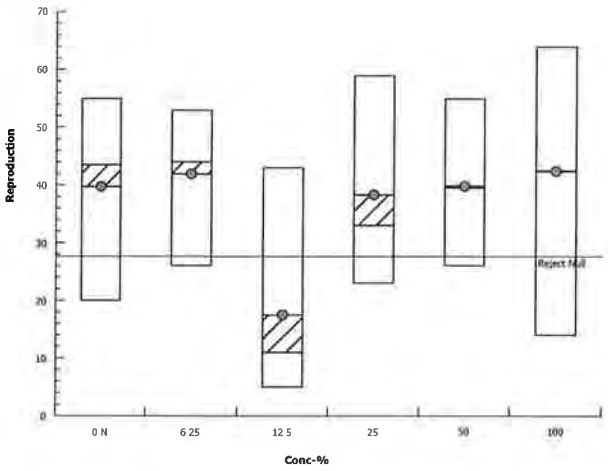
Ceriodaphnia 7-d Survival and Reproduction Test — **Aquatic Bioassay & Consulting Labs, Inc.**

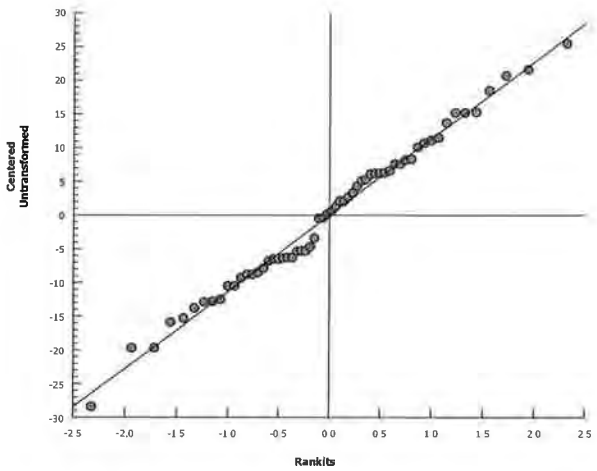
Analysis ID:	08-7371-7914	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.9.2
Analyzed:	02 Dec-16 15:50	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes

Reproduction Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	N	43	35	55	20	20	44	41	48	46	45
6.25		26	44	29	44	34	48	47	52	53	42
12.5		11	9	36	17	11	5	7	29	7	43
25		49	33	32	52	59	32	33	29	23	41
50		27	31	26	31	33	46	46	55	48	55
100		14	36	39	50	42	50	43	37	49	64

Graphics





CETIS Analytical Report

Ceriodaphnia 7-d Survival and Reproduction Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Analysis ID:	02-6445-4257	**Endpoint:**	7d Survival Rate	**CETIS Version:**	CETISv1.9.2
Analyzed:	02 Dec-16 15:50	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	03-7860-2979	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Joe Freas
Start Date:	28 Oct-16 14:55	**Protocol:**	EPA/821/R-02-013 (2002)	**Diluent:**	Laboratory Water
Ending Date:	04 Nov-16 15:15	**Species:**	Ceriodaphnia dubia	**Brine:**	Not Applicable
Duration:	7d 0h	**Source:**	Aquatic Biosystems, CO	**Age:**	
Sample ID:	16-2920-7886	**Code:**	VCF1016.359	**Client:**	VCWPD
Sample Date:	28 Oct-16 07:00	**Material:**	Sample Water	**Project:**	2016/17-1 (Wet)
Receipt Date:	28 Oct-16 12:10	**Source:**	Bioassay Report		
Sample Age:	8h	**Station:**	MO-FIL		

Linear Interpolation Options

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

Test Acceptability Criteria

		TAC Limits			
Attribute	**Test Stat**	**Lower**	**Upper**	**Overlap**	**Decision**
Control Resp	1	0.8	>>	Yes	Passes Acceptibility Criteria

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC5	10.42	8.333	n/a	9.6	n/a	12
EC10	>100	n/a	n/a	<1	n/a	n/a
EC15	>100	n/a	n/a	<1	n/a	n/a
EC20	>100	n/a	n/a	<1	n/a	n/a
EC25	>100	n/a	n/a	<1	n/a	n/a
EC40	>100	n/a	n/a	<1	n/a	n/a
EC50	>100	n/a	n/a	<1	n/a	n/a

7d Survival Rate Summary — **Calculated Variate(A/B)**

Conc-%	Code	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	A	B
0	N	10	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.0%	10	10
6.25		10	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.0%	10	10
12.5		10	0.7000	0.0000	1.0000	0.1528	0.4830	69.01%	30.0%	7	10
25		10	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.0%	10	10
50		10	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.0%	10	10
100		10	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.0%	10	10

7d Survival Rate Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	N	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
6.25		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
12.5		1.0000	0.0000	1.0000	1.0000	0.0000	1.0000	0.0000	1.0000	1.0000	1.0000
25		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
50		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
100		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000

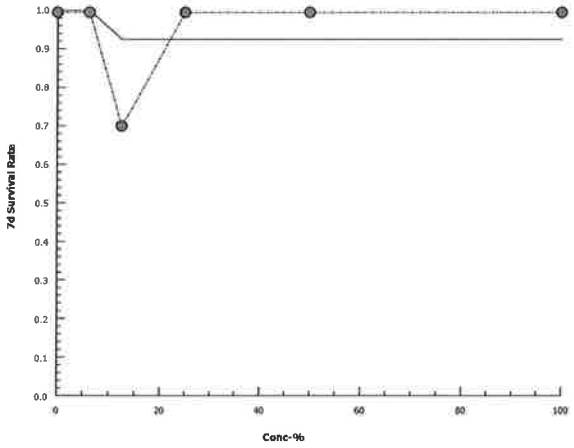
7d Survival Rate Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	N	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
6.25		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
12.5		1/1	0/1	1/1	1/1	0/1	1/1	0/1	1/1	1/1	1/1
25		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
50		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
100		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1

Ceriodaphnia 7-d Survival and Reproduction Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Analysis ID:	02-6445-4257	**Endpoint:**	7d Survival Rate	**CETIS Version:**	CETISv1.9.2
Analyzed:	02 Dec-16 15:50	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



Ceriodaphnia 7-d Survival and Reproduction Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Analysis ID:	02-9158-3674	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.9.2
Analyzed:	02 Dec-16 15:50	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	03-7860-2979	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Joe Freas
Start Date:	28 Oct-16 14:55	**Protocol:**	EPA/821/R-02-013 (2002)	**Diluent:**	Laboratory Water
Ending Date:	04 Nov-16 15:15	**Species:**	Ceriodaphnia dubia	**Brine:**	Not Applicable
Duration:	7d 0h	**Source:**	Aquatic Biosystems, CO	**Age:**	
Sample ID:	16-2920-7886	**Code:**	VCF1016.359	**Client:**	VCWPD
Sample Date:	28 Oct-16 07:00	**Material:**	Sample Water	**Project:**	2016/17-1 (Wet)
Receipt Date:	28 Oct-16 12:10	**Source:**	Bioassay Report		
Sample Age:	8h	**Station:**	MO-FIL		

Linear Interpolation Options

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

Test Acceptability Criteria

		TAC Limits			
Attribute	**Test Stat**	**Lower**	**Upper**	**Overlap**	**Decision**
Control Resp	39.7	15	>>	Yes	Passes Acceptibility Criteria

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	8.274	2.379	n/a	12.09	n/a	42.03
IC10	10.3	4.759	n/a	9.711	n/a	21.01
IC15	12.32	7.858	n/a	8.116	n/a	12.73
IC20	>100	n/a	n/a	<1	n/a	n/a
IC25	>100	n/a	n/a	<1	n/a	n/a
IC40	>100	n/a	n/a	<1	n/a	n/a
IC50	>100	n/a	n/a	<1	n/a	n/a

Reproduction Summary

			Calculated Variate						
Conc-%	**Code**	**Count**	**Mean**	**Min**	**Max**	**Std Err**	**Std Dev**	**CV%**	**%Effect**
0	N	10	39.7	20	55	3.652	11.55	29.09%	0.0%
6.25		10	41.9	26	53	2.942	9.303	22.20%	-5.54%
12.5		10	17.5	5	43	4.293	13.57	77.57%	55.92%
25		10	38.3	23	59	3.642	11.52	30.07%	3.53%
50		10	39.8	26	55	3.593	11.36	28.54%	-0.25%
100		10	42.4	14	64	4.102	12.97	30.59%	-6.8%

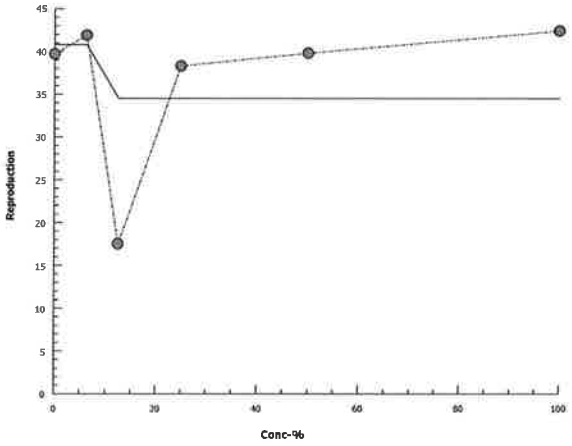
Reproduction Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	N	43	35	55	20	20	44	41	48	46	45
6.25		26	44	29	44	34	48	47	52	53	42
12.5		11	9	36	17	11	5	7	29	7	43
25		49	33	32	52	59	32	33	29	23	41
50		27	31	26	31	33	46	46	55	48	55
100		14	36	39	50	42	50	43	37	49	64

Ceriodaphnia 7-d Survival and Reproduction Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Analysis ID:	02-9158-3674	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.9.2
Analyzed:	02 Dec-16 15:50	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



CETIS Analytical Report

Ceriodaphnia 7-d Survival and Reproduction Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Analysis ID:	10-7654-8429	**Endpoint:**	7d Survival Rate	**CETIS Version:**	CETISv1.9.2
Analyzed:	02 Dec-16 15:50	**Analysis:**	STP 2xK Contingency Tables	**Official Results:**	Yes
Batch ID:	03-7860-2979	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Joe Freas
Start Date:	28 Oct-16 14:55	**Protocol:**	EPA/821/R-02-013 (2002)	**Diluent:**	Laboratory Water
Ending Date:	04 Nov-16 15:15	**Species:**	Ceriodaphnia dubia	**Brine:**	Not Applicable
Duration:	7d 0h	**Source:**	Aquatic Biosystems, CO	**Age:**	
Sample ID:	16-2920-7886	**Code:**	VCF1016.359	**Client:**	VCWPD
Sample Date:	28 Oct-16 07:00	**Material:**	Sample Water	**Project:**	2016/17-1 (Wet)
Receipt Date:	28 Oct-16 12:10	**Source:**	Bioassay Report		
Sample Age:	8h	**Station:**	MO-FIL		

Data Transform	Alt Hyp	NOEL	LOEL	TOEL	TU
Untransformed	C > T	100	> 100	n/a	1

Fisher Exact/Bonferroni-Holm Test

Control	vs	Group	Test Stat	P-Type	P-Value	Decision(α:5%)
Negative Control		6.25	1.0000	Exact	1.0000	Non-Significant Effect
		12.5	0.1053	Exact	0.5263	Non-Significant Effect
		25	1.0000	Exact	1.0000	Non-Significant Effect
		50	1.0000	Exact	1.0000	Non-Significant Effect
		100	1.0000	Exact	1.0000	Non-Significant Effect

Test Acceptability Criteria

		TAC Limits			
Attribute	**Test Stat**	**Lower**	**Upper**	**Overlap**	**Decision**
Control Resp	1	0.8	>>	Yes	Passes Acceptibility Criteria

Data Summary

Conc-%	Code	NR	R	NR + R	Prop NR	Prop R	%Effect
0	N	10	0	10	1	0	0.0%
6.25		10	0	10	1	0	0.0%
12.5		7	3	10	0.7	0.3	30.0%
25		10	0	10	1	0	0.0%
50		10	0	10	1	0	0.0%
100		10	0	10	1	0	0.0%

7d Survival Rate Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	N	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
6.25		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
12.5		1.0000	0.0000	1.0000	1.0000	0.0000	1.0000	0.0000	1.0000	1.0000	1.0000
25		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
50		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
100		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000

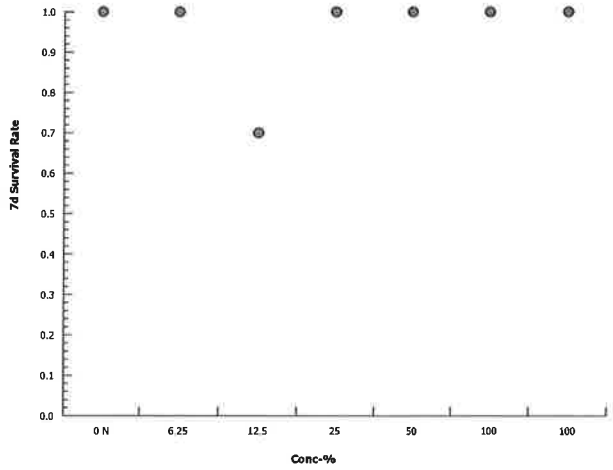
7d Survival Rate Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	N	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
6.25		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
12.5		1/1	0/1	1/1	1/1	0/1	1/1	0/1	1/1	1/1	1/1
25		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
50		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
100		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1

Ceriodaphnia 7-d Survival and Reproduction Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Analysis ID:	10-7654-8429	**Endpoint:**	7d Survival Rate	**CETIS Version:**	CETISv1.9.2
Analyzed:	02 Dec-16 15:50	**Analysis:**	STP 2xK Contingency Tables	**Official Results:**	Yes

Graphics



Ceriodaphnia 7-d Survival and Reproduction Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Batch ID:	03-7860-2979	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Joe Freas
Start Date:	28 Oct-16 14:55	**Protocol:**	EPA/821/R-02-013 (2002)	**Diluent:**	Laboratory Water
Ending Date:	04 Nov-16 15:15	**Species:**	Ceriodaphnia dubia	**Brine:**	Not Applicable
Duration:	7d 0h	**Source:**	Aquatic Biosystems, CO	**Age:**	

Sample ID:	16-2920-7886	**Code:**	VCF1016.359	**Client:**	VCWPD
Sample Date:	28 Oct-16 07:00	**Material:**	Sample Water	**Project:**	2016/17-1 (Wet)
Receipt Date:	28 Oct-16 12:10	**Source:**	Bioassay Report		
Sample Age:	8h	**Station:**	MO-FIL		

Alkalinity (CaCO3)-mg/L

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	8	62.25	60.72	63.78	61	65	0.6478	1.832	2.94%	0
100		1	108			108	108	0	0	0.0%	0
Overall		9	67.33	55.54	79.13	61	108	5.115	15.35	22.79%	0 (0%)

Conductivity-µmhos

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	8	329.2	321	337.5	319	348	3.509	9.925	3.01%	0
6.25		8	385.2	366.6	403.9	361	428	7.892	22.32	5.79%	0
12.5		8	372.2	366	378.5	360	385	2.664	7.536	2.02%	0
25		8	421.6	415.5	427.8	415	436	2.598	7.347	1.74%	0
50		8	481.5	391.8	571.2	217	536	37.95	107.3	22.29%	0
100		8	708.8	700.5	717	694	725	3.468	9.809	1.38%	0
Overall		48	449.8	411.1	488.5	217	725	19.24	133.3	29.63%	0 (0%)

Dissolved Oxygen-mg/L

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	8	7.738	7.571	7.904	7.5	8.1	0.07055	0.1996	2.58%	0
6.25		8	7.388	7.096	7.679	6.9	7.8	0.1231	0.3482	4.71%	0
12.5		8	7.4	7.1	7.7	7	7.8	0.1268	0.3586	4.85%	0
25		8	7.05	6.621	7.479	6.3	7.8	0.1813	0.5127	7.27%	0
50		8	6.6	5.655	7.545	4.4	8	0.3996	1.13	17.12%	0
100		8	6.263	5.147	7.378	4.1	8.6	0.4717	1.334	21.3%	0
Overall		48	7.073	6.814	7.332	4.1	8.6	0.1289	0.8932	12.63%	0 (0%)

Hardness (CaCO3)-mg/L

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	8	89.75	85.42	94.08	86	96	1.83	5.175	5.77%	0
100		1	250			250	250	0	0	0.0%	0
Overall		9	107.6	66.33	148.8	86	250	17.88	53.64	49.87%	0 (0%)

pH-Units

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	8	7.863	7.722	8.003	7.5	8	0.05957	0.1685	2.14%	0
6.25		8	8.212	8.13	8.295	8.1	8.4	0.03504	0.0991	1.21%	0
12.5		8	8.075	7.898	8.252	7.8	8.4	0.075	0.2121	2.63%	0
25		8	7.95	7.841	8.059	7.7	8.1	0.04629	0.1309	1.65%	0
50		8	7.8	7.633	7.967	7.4	8	0.07071	0.2	2.56%	0
100		8	7.55	7.395	7.705	7.2	7.8	0.06547	0.1852	2.45%	0
Overall		48	7.908	7.831	7.986	7.2	8.4	0.03846	0.2664	3.37%	0 (0%)

Ceriodaphnia 7-d Survival and Reproduction Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Temperature-°C

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	8	24.29	23.82	24.76	24	25.5	0.1995	0.5643	2.32%	0
6.25		8	24.28	23.84	24.71	24	25.4	0.182	0.5148	2.12%	0
12.5		8	24.3	23.83	24.77	24	25.6	0.1991	0.5632	2.32%	0
25		8	24.25	23.88	24.62	24	25.3	0.1581	0.4472	1.84%	0
50		8	24.18	23.86	24.49	24	25.1	0.1346	0.3808	1.58%	0
100		8	24.16	23.84	24.48	24	25.1	0.1362	0.3852	1.59%	0
Overall		48	24.24	24.11	24.37	24	25.6	0.06623	0.4589	1.89%	0 (0%)

Alkalinity (CaCO3)-mg/L

Conc-%	Code	1	2	3	4	5	6	7	8
0	N	63	61	61	61	61	61	65	65
100		108							

Conductivity-µmhos

Conc-%	Code	1	2	3	4	5	6	7	8
0	N	336	320	319	326	324	325	336	348
6.25		361	390	365	393	363	388	394	428
12.5		375	368	360	369	371	371	379	385
25		422	416	419	416	420	415	429	436
50		514	512	507	514	217	532	520	536
100		699	694	709	703	713	714	713	725

Dissolved Oxygen-mg/L

Conc-%	Code	1	2	3	4	5	6	7	8
0	N	7.6	7.6	7.8	7.9	7.6	7.8	7.5	8.1
6.25		7.7	7.3	7.8	7.8	7.3	7	6.9	7.3
12.5		7.7	7.6	7.8	7.8	7.1	7	7.2	7
25		7.8	7.2	7.7	7	6.3	6.6	6.8	7
50		8	4.4	6.9	7.4	6.5	5.6	7.2	6.8
100		8.6	6.8	6.9	4.1	5	6.1	6.3	6.3

Hardness (CaCO3)-mg/L

Conc-%	Code	1	2	3	4	5	6	7	8
0	N	96	86	86	86	86	86	96	96
100		250							

pH-Units

Conc-%	Code	1	2	3	4	5	6	7	8
0	N	8	7.9	7.8	7.9	7.8	7.5	8	8
6.25		8.2	8.4	8.1	8.3	8.2	8.2	8.1	8.2
12.5		8.4	7.9	8.1	8	8.2	8.3	7.8	7.9
25		8	8.1	8.1	8	7.9	7.9	7.7	7.9
50		8	7.9	7.9	7.8	7.9	7.6	7.4	7.9
100		7.7	7.8	7.4	7.6	7.2	7.5	7.6	7.6

Temperature-°C

Conc-%	Code	1	2	3	4	5	6	7	8
0	N	24	24.8	24	24	24	24	25.5	24
6.25		24	24	24.7	24	24	24.1	25.4	24
12.5		24	24	24.6	24	24.1	24.1	25.6	24
25		24.2	24.1	24	24.4	24	24	25.3	24
50		24	24.2	24	24	24	24.1	25.1	24
100		24	24	24	24	24	24.2	25.1	24

aquatic bioassay & consulting laboratories, inc

December 6, 2016

Mr. Arne Anselm
Ventura County Watershed Protection District
800 South Victoria Ave
Ventura, CA 93009

Dear Mr. Anselm:

We are pleased to present the enclosed bioassay report. The test was conducted under guidelines prescribed in *Short-Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms EPA-821-R-02-013*
Results were as follows:

CLIENT:	Ventura County Flood Control
SAMPLE I.D.:	MO-MPK
DATE RECEIVED:	10/28/2016
ABC LAB. NO.:	VCF1016.357

CHRONIC SELENASTRUM ALGAE GROWTH BIOASSAY

NOEC = 100.00 %
TUc = 1.00

IC25 = >100.00 %
IC50 = >100.00 %

Yours very truly,

Scott Johnson
Laboratory Director

CETIS Summary Report

Selenastrum Growth Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Batch ID:	16-5632-5481	**Test Type:**	Cell Growth	**Analyst:**	Joe Freas
Start Date:	28 Oct-16 14:30	**Protocol:**	EPA/821/R-02-013 (2002)	**Diluent:**	Laboratory Water
Ending Date:	01 Nov-16 13:00	**Species:**	Selenastrum capricornutum	**Brine:**	Not Applicable
Duration:	94h	**Source:**	Aquatic Biosystems, CO	**Age:**	
Sample ID:	14-3192-1290	**Code:**	VCF1016.357	**Client:**	VCWPD
Sample Date:	28 Oct-16 08:15	**Material:**	Sample Water	**Project:**	2016/17-1 (Wet)
Receipt Date:	28 Oct-16 12:10	**Source:**	Bioassay Report		
Sample Age:	6h	**Station:**	MO-MPK		

Multiple Comparison Summary

Analysis ID	Endpoint	Comparison Method	NOEL	LOEL	TOEL	TU	PMSD ✓
12-2257-0377	Cell Density	Dunnett Multiple Comparison Test	100	> 100	n/a	1	15.0%

Point Estimate Summary

Analysis ID	Endpoint	Point Estimate Method	Level	%	95% LCL	95% UCL	TU ✓
19-0962-5998	Cell Density	Linear Interpolation (ICPIN)	IC5	>100	n/a	n/a	<1
			IC10	>100	n/a	n/a	<1
			IC15	>100	n/a	n/a	<1
			IC20	>100	n/a	n/a	<1
			IC25	>100	n/a	n/a	<1
			IC40	>100	n/a	n/a	<1
			IC50	>100	n/a	n/a	<1

Test Acceptability

				TAC Limits			
Analysis ID	**Endpoint**	**Attribute**	**Test Stat**	**Lower**	**Upper**	**Overlap**	**Decision**
12-2257-0377	Cell Density	Control CV	0.07076	<<	0.2	Yes	Passes Acceptibility Criteria
19-0962-5998	Cell Density	Control CV	0.07076	<<	0.2	Yes	Passes Acceptibility Criteria
12-2257-0377	Cell Density	Control Resp	1.12E+6	1000000	>>	Yes	Passes Acceptibility Criteria
19-0962-5998	Cell Density	Control Resp	1.12E+6	1000000	>>	Yes	Passes Acceptibility Criteria

Cell Density Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	N	4	1.122E+6	9.952E+5	1.248E+6	1.036E+6	1.192E+6	3.968E+4	7.935E+4	7.08%	0.00%
6.25		4	1.370E+6	1.233E+6	1.508E+6	1.267E+6	1.451E+6	4.314E+4	8.628E+4	6.30%	-22.18%
12.5		4	1.316E+6	1.122E+6	1.511E+6	1.189E+6	1.439E+6	6.116E+4	1.223E+5	9.29%	-17.37%
25		4	1.396E+6	1.192E+6	1.600E+6	1.265E+6	1.512E+6	6.413E+4	1.283E+5	9.19%	-24.48%
50		4	1.426E+6	1.243E+6	1.610E+6	1.288E+6	1.565E+6	5.781E+4	1.156E+5	8.11%	-27.20%
100		4	1.591E+6	1.557E+6	1.625E+6	1.561E+6	1.607E+6	1.062E+4	2.123E+4	1.33%	-41.84%

Cell Density Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	N	1.186E+6	1.192E+6	1.072E+6	1.036E+6
6.25		1.451E+6	1.332E+6	1.431E+6	1.267E+6
12.5		1.236E+6	1.189E+6	1.439E+6	1.401E+6
25		1.512E+6	1.500E+6	1.307E+6	1.265E+6
50		1.456E+6	1.565E+6	1.288E+6	1.397E+6
100		1.607E+6	1.561E+6	1.605E+6	1.590E+6

CETIS Analytical Report

Selenastrum Growth Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Analysis ID:	12-2257-0377	**Endpoint:**	Cell Density	**CETIS Version:**	CETISv1.9.2
Analyzed:	02 Dec-16 16:01	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes
Batch ID:	16-5632-5481	**Test Type:**	Cell Growth	**Analyst:**	Joe Freas
Start Date:	28 Oct-16 14:30	**Protocol:**	EPA/821/R-02-013 (2002)	**Diluent:**	Laboratory Water
Ending Date:	01 Nov-16 13:00	**Species:**	Selenastrum capricornutum	**Brine:**	Not Applicable
Duration:	94h	**Source:**	Aquatic Biosystems, CO	**Age:**	
Sample ID:	14-3192-1290	**Code:**	VCF1016.357	**Client:**	VCWPD
Sample Date:	28 Oct-16 08:15	**Material:**	Sample Water	**Project:**	2016/17-1 (Wet)
Receipt Date:	28 Oct-16 12:10	**Source:**	Bioassay Report		
Sample Age:	6h	**Station:**	MO-MPK		

Data Transform	Alt Hyp	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	C > T	100	> 100	n/a	1	15.05%

Dunnett Multiple Comparison Test

Control	vs	Conc-%	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Negative Control		6.25	-3.548	2.407	2E+05	6	CDF	1.0000	Non-Significant Effect
		12.5	-2.778	2.407	2E+05	6	CDF	0.9999	Non-Significant Effect
		25	-3.916	2.407	2E+05	6	CDF	1.0000	Non-Significant Effect
		50	-4.351	2.407	2E+05	6	CDF	1.0000	Non-Significant Effect
		100	-6.694	2.407	2E+05	6	CDF	1.0000	Non-Significant Effect

Test Acceptability Criteria

		TAC Limits			
Attribute	**Test Stat**	**Lower**	**Upper**	**Overlap**	**Decision**
Control CV	0.07076	<<	0.2	Yes	Passes Acceptibility Criteria
Control Resp	1.12E+6	1000000	>>	Yes	Passes Acceptibility Criteria

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	4.69E+11	9.379E+10	5	9.542	1.4E-04	Significant Effect
Error	1.769E+11	9.829E+09	18			
Total	6.459E+11		23			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance Test	6.804	15.09	0.2356	Equal Variances
Variances	Levene Equality of Variance Test	4.605	4.248	0.0070	Unequal Variances
Variances	Mod Levene Equality of Variance Test	4.328	4.248	0.0092	Unequal Variances
Distribution	Anderson-Darling A2 Normality Test	0.4447	3.878	0.2886	Normal Distribution
Distribution	D'Agostino Kurtosis Test	2.234	2.576	0.0255	Normal Distribution
Distribution	D'Agostino Skewness Test	0.1486	2.576	0.8819	Normal Distribution
Distribution	D'Agostino-Pearson K2 Omnibus Test	5.013	9.21	0.0816	Normal Distribution
Distribution	Kolmogorov-Smirnov D Test	0.1307	0.2056	0.3548	Normal Distribution
Distribution	Shapiro-Wilk W Normality Test	0.9449	0.884	0.2094	Normal Distribution

Cell Density Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	N	4	1.122E+6	9.952E+5	1.248E+6	1.129E+6	1.036E+6	1.192E+6	3.968E+4	7.08%	0.00%
6.25		4	1.370E+6	1.233E+6	1.508E+6	1.382E+6	1.267E+6	1.451E+6	4.314E+4	6.30%	-22.18%
12.5		4	1.316E+6	1.122E+6	1.511E+6	1.318E+6	1.189E+6	1.439E+6	6.116E+4	9.29%	-17.37%
25		4	1.396E+6	1.192E+6	1.600E+6	1.404E+6	1.265E+6	1.512E+6	6.413E+4	9.19%	-24.48%
50		4	1.426E+6	1.243E+6	1.610E+6	1.426E+6	1.288E+6	1.565E+6	5.781E+4	8.11%	-27.20%
100		4	1.591E+6	1.557E+6	1.625E+6	1.598E+6	1.561E+6	1.607E+6	1.062E+4	1.33%	-41.84%

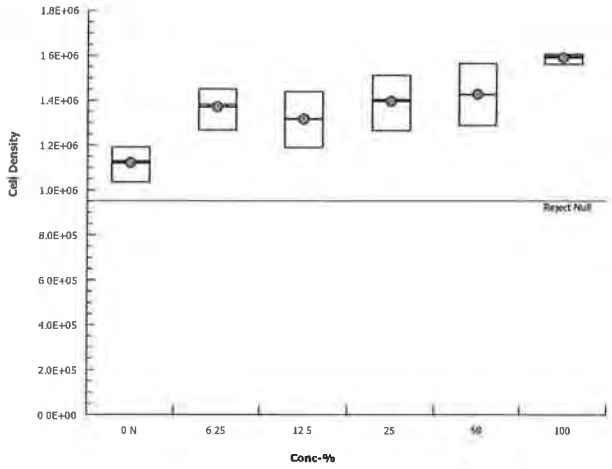
Selenastrum Growth Test — **Aquatic Bioassay & Consulting Labs, Inc.**

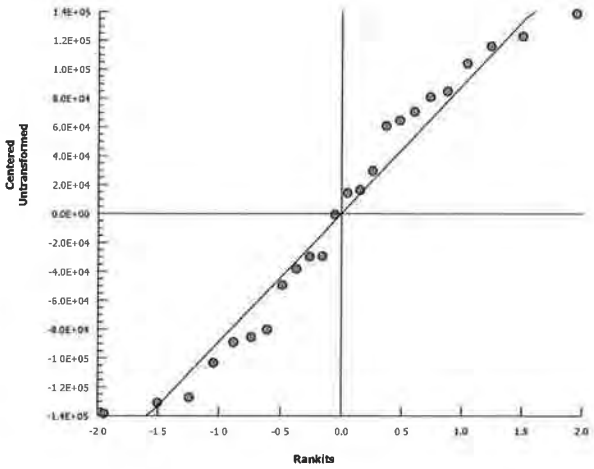
Analysis ID:	12-2257-0377	**Endpoint:**	Cell Density	**CETIS Version:**	CETISv1.9.2
Analyzed:	02 Dec-16 16:01	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes

Cell Density Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	N	1.186E+6	1.192E+6	1.072E+6	1.036E+6
6.25		1.451E+6	1.332E+6	1.431E+6	1.267E+6
12.5		1.236E+6	1.189E+6	1.439E+6	1.401E+6
25		1.512E+6	1.500E+6	1.307E+6	1.265E+6
50		1.456E+6	1.565E+6	1.288E+6	1.397E+6
100		1.607E+6	1.561E+6	1.605E+6	1.590E+6

Graphics





CETIS Analytical Report

Selenastrum Growth Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Analysis ID:	19-0962-5998	**Endpoint:**	Cell Density	**CETIS Version:**	CETISv1.9.2
Analyzed:	02 Dec-16 16:02	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	16-5632-5481	**Test Type:**	Cell Growth	**Analyst:**	Joe Freas
Start Date:	28 Oct-16 14:30	**Protocol:**	EPA/821/R-02-013 (2002)	**Diluent:**	Laboratory Water
Ending Date:	01 Nov-16 13:00	**Species:**	Selenastrum capricornutum	**Brine:**	Not Applicable
Duration:	94h	**Source:**	Aquatic Biosystems, CO	**Age:**	
Sample ID:	14-3192-1290	**Code:**	VCF1016.357	**Client:**	VCWPD
Sample Date:	28 Oct-16 08:15	**Material:**	Sample Water	**Project:**	2016/17-1 (Wet)
Receipt Date:	28 Oct-16 12:10	**Source:**	Bioassay Report		
Sample Age:	6h	**Station:**	MO-MPK		

Linear Interpolation Options

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

Test Acceptability Criteria

		TAC Limits			
Attribute	**Test Stat**	**Lower**	**Upper**	**Overlap**	**Decision**
Control CV	0.07076	<<	0.2	Yes	Passes Acceptibility Criteria
Control Resp	1.12E+6	1000000	>>	Yes	Passes Acceptibility Criteria

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	>100	n/a	n/a	<1	n/a	n/a
IC10	>100	n/a	n/a	<1	n/a	n/a
IC15	>100	n/a	n/a	<1	n/a	n/a
IC20	>100	n/a	n/a	<1	n/a	n/a
IC25	>100	n/a	n/a	<1	n/a	n/a
IC40	>100	n/a	n/a	<1	n/a	n/a
IC50	>100	n/a	n/a	<1	n/a	n/a

Cell Density Summary — **Calculated Variate**

Conc-%	Code	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	N	4	1.122E+6	1.036E+6	1.192E+6	3.968E+4	7.935E+4	7.08%	0.0%
6.25		4	1.370E+6	1.267E+6	1.451E+6	4.314E+4	8.628E+4	6.30%	-22.18%
12.5		4	1.316E+6	1.189E+6	1.439E+6	6.116E+4	1.223E+5	9.29%	-17.37%
25		4	1.396E+6	1.265E+6	1.512E+6	6.413E+4	1.283E+5	9.19%	-24.48%
50		4	1.426E+6	1.288E+6	1.565E+6	5.781E+4	1.156E+5	8.11%	-27.2%
100		4	1.591E+6	1.561E+6	1.607E+6	1.062E+4	2.124E+4	1.34%	-41.84%

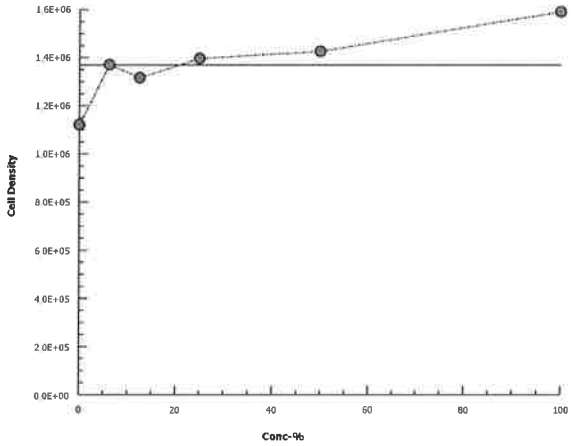
Cell Density Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	N	1.186E+6	1.192E+6	1.072E+6	1.036E+6
6.25		1.451E+6	1.332E+6	1.431E+6	1.267E+6
12.5		1.236E+6	1.189E+6	1.439E+6	1.401E+6
25		1.512E+6	1.500E+6	1.307E+6	1.265E+6
50		1.456E+6	1.565E+6	1.288E+6	1.397E+6
100		1.607E+6	1.561E+6	1.605E+6	1.590E+6

Selenastrum Growth Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Analysis ID:	19-0962-5998	**Endpoint:**	Cell Density	**CETIS Version:**	CETISv1.9.2
Analyzed:	02 Dec-16 16:02	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



Selenastrum Growth Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Batch ID:	16-5632-5481	**Test Type:**	Cell Growth	**Analyst:**	Joe Freas
Start Date:	28 Oct-16 14:30	**Protocol:**	EPA/821/R-02-013 (2002)	**Diluent:**	Laboratory Water
Ending Date:	01 Nov-16 13:00	**Species:**	Selenastrum capricornutum	**Brine:**	Not Applicable
Duration:	94h	**Source:**	Aquatic Biosystems, CO	**Age:**	
Sample ID:	14-3192-1290	**Code:**	VCF1016.357	**Client:**	VCWPD
Sample Date:	28 Oct-16 08:15	**Material:**	Sample Water	**Project:**	2016/17-1 (Wet)
Receipt Date:	28 Oct-16 12:10	**Source:**	Bioassay Report		
Sample Age:	6h	**Station:**	MO-MPK		

Alkalinity (CaCO3)-mg/L

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	1	69			69	69	0	0	0.0%	0
100		1	69			69	69	0	0	0.0%	0
Overall		2	69	69	69	69	69	0	0	0.00%	0 (0%)

Conductivity-µmhos

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	5	450	432.2	467.8	427	463	6.419	14.35	3.19%	0
6.25		5	408.2	397.3	419.1	393	415	3.917	8.758	2.15%	0
12.5		5	403.2	401.6	404.8	402	405	0.5831	1.304	0.32%	0
25		5	380.6	376.9	384.3	377	384	1.327	2.966	0.78%	0
50		5	335	332.5	337.5	333	338	0.8944	2	0.6%	0
100		5	242.2	235.8	248.6	237	249	2.311	5.167	2.13%	0
Overall		30	369.9	344.4	395.3	237	463	12.43	68.09	18.41%	0 (0%)

Hardness (CaCO3)-mg/L

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	1	99			99	99	0	0	0.0%	0
100		1	75			75	75	0	0	0.0%	0
Overall		2	87	-65.47	239.5	75	99	12	16.97	19.51%	0 (0%)

pH-Units

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	5	7.62	7.416	7.824	7.4	7.8	0.07349	0.1643	2.16%	0
6.25		5	7.7	7.524	7.876	7.5	7.8	0.06325	0.1414	1.84%	0
12.5		5	7.7	7.504	7.896	7.5	7.9	0.07071	0.1581	2.05%	0
25		5	7.7	7.468	7.932	7.5	8	0.08367	0.1871	2.43%	0
50		5	7.76	7.371	8.149	7.5	8.3	0.14	0.313	4.03%	0
100		5	23.66	-21	68.32	7.4	88	16.09	35.97	152.0%	0
Overall		30	10.36	4.88	15.83	7.4	88	2.678	14.67	141.60%	0 (0%)

Temperature-°C

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	5	24.04	23.97	24.11	24	24.1	0.02445	0.05468	0.23%	0
6.25		5	24.04	23.97	24.11	24	24.1	0.02445	0.05468	0.23%	0
12.5		5	24.04	23.97	24.11	24	24.1	0.02445	0.05468	0.23%	0
25		5	24.04	23.97	24.11	24	24.1	0.02445	0.05468	0.23%	0
50		5	24.04	23.97	24.11	24	24.1	0.02445	0.05468	0.23%	0
100		5	24.04	23.97	24.11	24	24.1	0.02445	0.05468	0.23%	0
Overall		30	24.04	24.02	24.06	24	24.1	0.009097	0.04983	0.21%	0 (0%)

Selenastrum Growth Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Alkalinity (CaCO3)-mg/L

Conc-%	Code	1	2	3	4	5
0	N	69				
100		69				

Conductivity-µmhos

Conc-%	Code	1	2	3	4	5
0	N	427	448	451	461	463
6.25		393	409	412	412	415
12.5		405	402	402	403	404
25		382	377	378	382	384
50		334	333	334	338	336
100		238	237	241	246	249

Dissolved Oxygen-mg/L

Conc-%	Code	1	2	3	4	5
0	N					
6.25						
12.5						
25						
50						
100						

Hardness (CaCO3)-mg/L

Conc-%	Code	1	2	3	4	5
0	N	99				
100		75				

pH-Units

Conc-%	Code	1	2	3	4	5
0	N	7.7	7.7	7.5	7.8	7.4
6.25		7.8	7.6	7.8	7.8	7.5
12.5		7.9	7.6	7.8	7.7	7.5
25		8	7.6	7.7	7.7	7.5
50		8.3	7.6	7.7	7.7	7.5
100		88	7.4	7.7	7.7	7.5

Temperature-°C

Conc-%	Code	1	2	3	4	5
0	N	24.1	24	24.1	24	24
6.25		24.1	24	24.1	24	24
12.5		24.1	24	24.1	24	24
25		24.1	24	24.1	24	24
50		24.1	24	24	24.1	24
100		24.1	24	24	24.1	24

Chain of Custody Record

Ventura County Watershed Protection District
NPDES Stormwater Monitoring Program
Project: NPDES Stormwater Wet Season
Toxicity - ABC Laboratories

Side 1 of 2

Sampling Date: 10/28/16 Project Number: 2016/17-1 (Wet)

Sampling Team: T. LIDDELL, D. WILKINSON

SAMPLE ID	DATE/TIME COLLECTED	Chronic toxicity - topsmelt (*Atherinops affinis*)	Chronic toxicity - inland silverside (*Menidia beryllina*)	Chronic toxicity - giant kelp (*Macrocystis pyrifera*)	Chronic toxicity - purple sea urchin (*Strongylocentrotus purpuratus*)	Chronic toxicity - fathead minnow (*Pimephales promelas*)	Chronic toxicity - daphnid (*Ceriodaphnia dubia*)	Chronic toxicity - green alga (*Raphidocelis subcapitata*)	Number of 5-Gallon Buckets	NOTES Temp @ Ammonia = NH
ME-CC	10/28/16 0900	X							2	Note 1, Note 2, Note 3 13.8° @ 20.1 = 2.0
ME-SCR					X				1	Note 1, Note 2, Note 3
ME-VR2		X							2	Note 1, Note 2, Note 3
MO-CAM						X			2	Note 1, Note 2, Note 3
MO-OJA						X			2	Note 1, Note 2, Note 3
MO-MEI						X			2	Note 1, Note 2, Note 3
MO-VEN	10/28/16 ~~0655~~ 0755			[illegible]			X		2	Note 1, Note 2, Note 3 7.2° @ 20.1 = 3.1

Relinquished

Printed Name: TOMMY LIDDELL

Signature: Tommy Liddell

Affiliation: VCWPD Date/Time: 10/28/16 1055 PDT

Received

Printed Name: E. MARTIN

Signature: [illegible]

Affiliation: ABC LABS. Date/Time: 10-28-16 | 1055

Other Notes: Note 1: Dilutions - 6.25%, 12.5%, 25%, 50%, 100% Note 2: Please execute TIE if mortality > 50%

Note 3: Notify District within 24 hours if significant toxicity is observed.

Chain of Custody Record

Ventura County Watershed Protection District

NPDES Stormwater Monitoring Program

Project: NPDES Stormwater Wet Season

Toxicity - ABC Laboratories

Side 2 of 2

Sampling Date: _____ Project Number: 2016/17-1 (Wet)

Sampling Team: _____

SAMPLE ID	DATE/TIME COLLECTED	Chronic toxicity - topsmelt (*Atherinops affinis*)	Chronic toxicity - inland silverside (*Menidia beryllina*)	Chronic toxicity - giant kelp (*Macrocystis pyrifera*)	Chronic toxicity - purple sea urchin (*Strongylocentrotus purpuratus*)	Chronic toxicity - fathead minnow (*Pimephales promelas*)	Chronic toxicity - daphnid (*Ceriodaphnia dubia*)	Chronic toxicity - green alga (*Raphidocelis subcapitata*)	Number of 5-Gallon Buckets	NOTES
MO-OXN	10/28/16 ~~0815~~	0715				X			2	Note 1, Note 2, Note 3
MO-HUE							X		3	Note 1, Note 2, Note 3,Note 4
MO-THO							X		2	Note 1, Note 2, Note 3
MO-MPK								X	2	Note 1, Note 2, Note 3
MO-SIM							X		2	Note 1, Note 2, Note 3
MO-FIL							X		2	Note 1, Note 2, Note 3
MO-SPA						X			2	Note 1, Note 2, Note 3

6.8°C

Lot

3.1

Relinquished Printed Name _____

Signature _____

Affiliation _____ Date/Tim _____

Received Printed Name _____

Signature _____

Affiliation _____ Date/Tim _____

Other Notes: Note 1: Dilutions - 6.25%, 12.5%, 25%, 50%, 100% Note 2: Please execute TIE if mortality > 50%

Note 3: Notify District within 24 hours if significant toxicity is observed.

Note 4: If salinity >2 ppt then also run topsmelt for comparison. If topsmelt unavailable, use *Hyalella*

Chain of Custody Record

Ventura County Watershed Protection District
NPDES Stormwater Monitoring Program
Project: NPDES Stormwater Wet Season
Toxicity - ABC Laboratories

Sampling Date: 10-28-16 Project Number: 2016/17-1 (Wet)

Sampling Team: Lara Meeker & Scott Greer

SAMPLE ID	DATE/TIME COLLECTED	Chronic toxicity - topsmelt (*Atherinops affinis*)	Chronic toxicity - inland silverside (*Menidia beryllina*)	Chronic toxicity - giant kelp (*Macrocystis pyrifera*)	Chronic toxicity - purple sea urchin (*Strongylocentrotus purpuratus*)	Chronic toxicity - fathead minnow (*Pimephales promelas*)	Chronic toxicity - daphnid (*Ceriodaphnia dubia*)	Chronic toxicity - green alga (*Raphidocelis subcapitata*)	Number of 5-Gallon Buckets	NOTES [illegible]
~~ME-CC~~		~~X~~							~~2~~	~~Note 1, Note 2, Note 3~~
~~ME-SCR~~					~~X~~				~~1~~	~~Note 1, Note 2, Note 3~~
ME-VR2	10/28/16 0720	X	.344						2	Note 1, Note 2, Note 3 8.8°C <0.1 = 0.7
~~MO-CAM~~						~~X~~			~~2~~	~~Note 1, Note 2, Note 3~~
MO-OJA	10/28/16 0420					X			2	Note 1, Note 2, Note 3 17.3°C <0.1 = 6.0
MO-MEI	10/28/16 0555					X			2	Note 1, Note 2, Note 3 8.5°C <0.1 = 4.0
~~MO-VEN~~							~~X~~		~~2~~	~~Note 1, Note 2, Note 3~~

Relinquished
Printed Name: Lara Meeker
Signature: Lara Meeker
Affiliation: VCWPD Date/Time: 10-28-16 9:47

Received
Printed Name: Karin Wisenbaker
Signature: Karin J. Wisenbaker
Affiliation: ABC Date/Time: 10-28-16 9:47

Other Notes: Note 1: Dilutions - 6.25%, 12.5%, 25%, 50%, 100% Note 2: Please execute TIE if mortality > 50%

Note 3: Notify District within 24 hours if significant toxicity is observed.

Chain of Custody Record

Ventura County Watershed Protection District

NPDES Stormwater Monitoring Program

Project: NPDES Stormwater Wet Season

Toxicity - ABC Laboratories

Side 2 of 2

Sampling Date: 10/28/16 Project Number: 2016/17-1 (Wet)

Sampling Team: WBC, SC

SAMPLE ID	DATE/TIME COLLECTED	Chronic toxicity - topsmelt (*Atherinops affinis*)	Chronic toxicity - inland silverside (*Menidia beryllina*)	Chronic toxicity - giant kelp (*Macrocystis pyrifera*)	Chronic toxicity - purple sea urchin (*Strongylocentrotus purpuratus*)	Chronic toxicity - fathead minnow (*Pimephales promelas*)	Chronic toxicity - daphnid (*Ceriodaphnia dubia*)	Chronic toxicity - green alga (*Raphidocelis subcapitata*)	Number of 5-Gallon Buckets	NOTES
~~MO-OXN~~						X			2	Note 1, Note 2, Note 3
~~MO-HUE~~							X		3	Note 1, Note 2, Note 3, Note 4
MO-THO	10/28/16 10:10						X		2	Note 1, Note 2, Note 3
MO-MPK	10/28/16 08:15							X	2	Note 1, Note 2, Note 3
MO-SIM	10/28/16 09:10						X		2	Note 1, Note 2, Note 3
MO-FIL	10/28/16 07:00						X		2	Note 1, Note 2, Note 3
MO-SPA	10/28/16 06:15					X			2	Note 1, Note 2, Note 3

Relinquished Printed Name SEAN CASEY

Signature

Affiliation VCWPD Date/Time 10/28/16 10:50

Received Printed Name E-MAILED

Signature

Affiliation ABC LABS Date/Time 10-28-16 1210

Other Notes: Note 1: Dilutions - 6.25%, 12.5%, 25%, 50%, 100% Note 2: Please execute TIE if mortality > 50%

Note 3: Notify District within 24 hours if significant toxicity is observed.

Note 4: If salinity >2 ppt then also run topsmelt for comparison. If topsmelt unavailable, use *Hyalella*

aquatic bioassay & consulting laboratories, inc

January 6, 2017

Mr. Arne Anselm
Ventura County Watershed Protection District
800 South Victoria Ave
Ventura, CA 93009

Dear Mr. Anselm:

We are pleased to present the enclosed revised bioassay report. The test was conducted under guidelines prescribed in *Short-Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms" EPA-821-R-02-013*. "All acceptability criteria were met and the concentration-response was normal. This is a valid test." Results were as follows:

CLIENT:	Ventura County Flood Control
SAMPLE I.D.:	MO-CAM
DATE RECEIVED:	11/21/2016
ABC LAB. NO.:	VCF1116.215

CHRONIC FATHEAD MINNOW SURVIVAL & GROWTH BIOASSAY

SURVIVAL	NOEC =	12.50 %
	TUc =	8.00
	EC25 =	28.12 %
	EC50 =	60.00 %
BIOMASS	NOEC =	25.00 %
	TUc =	4.00
	IC25 =	31.76 %
	IC50 =	>100.00 %

*NOTE:TIE Initiated due to <50.00% survival.

Yours very truly,

for Scott Johnson
Laboratory Director

CETIS Summary Report

Fathead Minnow 7-d Larval Survival and Growth Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Batch ID:	08-2433-2088	**Test Type:**	Growth-Survival (7d)	**Analyst:**	
Start Date:	22 Nov-16 11:23	**Protocol:**	EPA/821/R-02-013 (2002)	**Diluent:**	Laboratory Water
Ending Date:	29 Nov-16 09:25	**Species:**	Pimephales promelas	**Brine:**	Not Applicable
Duration:	6d 22h	**Source:**	Aquatic Biosystems, CO	**Age:**	
Sample ID:	11-9291-7102	**Code:**	VCF1116.215	**Client:**	VCWPD
Sample Date:	20 Nov-16 21:45	**Material:**	Sample Water	**Project:**	
Receipt Date:	21 Nov-16 08:42	**Source:**	Bioassay Report		
Sample Age:	38h (7.5 °C)	**Station:**	MO-CAM		

Multiple Comparison Summary

Analysis ID	Endpoint	Comparison Method	NOEL	LOEL	TOEL	TU	PMSD	✓
07-8855-2784	7d Survival Rate	Dunnett Multiple Comparison Test	12.5	25	17.68	8	12.5%	✓
05-0069-9083	Mean Dry Biomass-mg	Dunnett Multiple Comparison Test	25	50	35.36	4	18.5%	

Point Estimate Summary

Analysis ID	Endpoint	Point Estimate Method	Level	%	95% LCL	95% UCL	TU	✓
19-5284-0586	7d Survival Rate	Linear Interpolation (ICPIN)	EC5	9.375	4.375	20.09	10.67	
			EC10	15.28	7.5	33.91	6.545	
			EC15	19.44	10.83	36.03	5.143	
			EC20	23.61	15.06	38.44	4.235	✓
			EC25	28.12	17.79	40.72	3.556	✓
			EC40	42.19	30.69	73.51	2.37	✓
			EC50	60	34.59	n/a	1.667	✓
04-3780-5913	Mean Dry Biomass-mg	Linear Interpolation (ICPIN)	IC5	8.515	7.169	15.14	11.74	✓
			IC10	10.78	8.087	22.19	9.277	✓
			IC15	14.72	7.998	39.67	6.792	✓
			IC20	23.99	4.717	49.46	4.169	
			IC25	31.76	13.56	73.83	3.149	
			IC40	65.91	27.2	n/a	1.517	
			IC50	>100	n/a	n/a	<1	

Test Acceptability

				TAC Limits			
Analysis ID	**Endpoint**	**Attribute**	**Test Stat**	**Lower**	**Upper**	**Overlap**	**Decision**
07-8855-2784	7d Survival Rate	Control Resp	1	0.8	>>	Yes	Passes Criteria
19-5284-0586	7d Survival Rate	Control Resp	1	0.8	>>	Yes	Passes Criteria
04-3780-5913	Mean Dry Biomass-mg	Control Resp	0.2653	0.25	>>	Yes	Passes Criteria
05-0069-9083	Mean Dry Biomass-mg	Control Resp	0.2653	0.25	>>	Yes	Passes Criteria
05-0069-9083	Mean Dry Biomass-mg	PMSD	0.185	0.12	0.3	Yes	Passes Criteria

7d Survival Rate Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	N	4	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
6.25		4	0.9667	0.9054	1.0000	0.9333	1.0000	0.0193	0.0385	3.98%	3.33%
12.5		4	0.9333	0.8108	1.0000	0.8667	1.0000	0.0385	0.0770	8.25%	6.67%
25		4	0.7833	0.5481	1.0000	0.6667	1.0000	0.0739	0.1478	18.87%	21.67%
50		4	0.5167	0.2814	0.7519	0.4000	0.7333	0.0739	0.1478	28.61%	48.33%
100		4	0.4333	0.2496	0.6171	0.3333	0.6000	0.0577	0.1155	26.65%	56.67%

Mean Dry Biomass-mg Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	N	4	0.2653	0.2452	0.2854	0.25	0.2767	0.006319	0.01264	4.76%	0.00%
6.25		4	0.283	0.2733	0.2927	0.2767	0.29	0.003049	0.006098	2.15%	-6.66%
12.5		4	0.2363	0.1847	0.288	0.2007	0.268	0.01624	0.03248	13.74%	10.93%
25		4	0.2178	0.1616	0.274	0.1813	0.266	0.01766	0.03532	16.21%	17.90%
50		4	0.1727	0.1021	0.2433	0.1427	0.2387	0.02219	0.04438	25.70%	34.92%
100		4	0.147	0.1106	0.1834	0.1273	0.18	0.01143	0.02285	15.55%	44.60%

CETIS Summary Report

Report Date: 06 Jan-17 09:58 (p 2 of 2)
Test Code: VCF1116.215cf | 02-0862-2814

Fathead Minnow 7-d Larval Survival and Growth Test — **Aquatic Bioassay & Consulting Labs, Inc.**

7d Survival Rate Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	N	1.0000	1.0000	1.0000	1.0000
6.25		1.0000	1.0000	0.9333	0.9333
12.5		0.8667	1.0000	0.8667	1.0000
25		0.6667	1.0000	0.7333	0.7333
50		0.4667	0.4667	0.4000	0.7333
100		0.4000	0.4000	0.3333	0.6000

Mean Dry Biomass-mg Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	N	0.26	0.25	0.2747	0.2767
6.25		0.2767	0.2793	0.286	0.29
12.5		0.2173	0.268	0.2007	0.2593
25		0.1813	0.266	0.2087	0.2153
50		0.156	0.1533	0.1427	0.2387
100		0.1393	0.1413	0.1273	0.18

7d Survival Rate Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	N	15/15	15/15	15/15	15/15
6.25		15/15	15/15	14/15	14/15
12.5		13/15	15/15	13/15	15/15
25		10/15	15/15	11/15	11/15
50		7/15	7/15	6/15	11/15
100		6/15	6/15	5/15	9/15

CETIS Analytical Report

Test Code: VCF1116.215cf | 02-0862-2814

Fathead Minnow 7-d Larval Survival and Growth Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Analysis ID:	07-8855-2784	**Endpoint:**	7d Survival Rate	**CETIS Version:**	CETISv1.9.2
Analyzed:	29 Nov-16 10:10	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes
Batch ID:	08-2433-2088	**Test Type:**	Growth-Survival (7d)	**Analyst:**	
Start Date:	22 Nov-16 11:23	**Protocol:**	EPA/821/R-02-013 (2002)	**Diluent:**	Laboratory Water
Ending Date:	29 Nov-16 09:25	**Species:**	Pimephales promelas	**Brine:**	Not Applicable
Duration:	6d 22h	**Source:**	Aquatic Biosystems, CO	**Age:**	
Sample ID:	11-9291-7102	**Code:**	VCF1116.215	**Client:**	VCWPD
Sample Date:	20 Nov-16 21:45	**Material:**	Sample Water	**Project:**	
Receipt Date:	21 Nov-16 08:42	**Source:**	Bioassay Report		
Sample Age:	38h (7.5 °C)	**Station:**	MO-CAM		

Data Transform	Alt Hyp	NOEL	LOEL	TOEL	TU	PMSD
Angular (Corrected)	C > T	12.5	25	17.68	8	12.52%

Dunnett Multiple Comparison Test

Control	vs	Conc-%	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Negative Control		6.25	0.6827	2.407	0.232	6	CDF	0.5659	Non-Significant Effect
		12.5	1.267	2.407	0.232	6	CDF	0.3108	Non-Significant Effect
		25*	3.401	2.407	0.232	6	CDF	0.0066	Significant Effect
		50*	6.605	2.407	0.232	6	CDF	3.4E-05	Significant Effect
		100*	7.502	2.407	0.232	6	CDF	2.8E-05	Significant Effect

Test Acceptability Criteria

		TAC Limits			
Attribute	**Test Stat**	**Lower**	**Upper**	**Overlap**	**Decision**
Control Resp	1	0.8	>>	Yes	Passes Criteria

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.87727	0.375455	5	20.18	8.3E-07	Significant Effect
Error	0.334956	0.0186086	18			
Total	2.21223		23			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Levene Equality of Variance Test	3.15	4.248	0.0324	Equal Variances
Variances	Mod Levene Equality of Variance Test	0.7551	4.248	0.5934	Equal Variances
Distribution	Anderson-Darling A2 Normality Test	0.9198	3.878	0.0194	Normal Distribution
Distribution	D'Agostino Kurtosis Test	1.227	2.576	0.2197	Normal Distribution
Distribution	D'Agostino Skewness Test	2.346	2.576	0.0190	Normal Distribution
Distribution	D'Agostino-Pearson K2 Omnibus Test	7.01	9.21	0.0301	Normal Distribution
Distribution	Kolmogorov-Smirnov D Test	0.2083	0.2056	0.0084	Non-Normal Distribution
Distribution	Shapiro-Wilk W Normality Test	0.9029	0.884	0.0248	Normal Distribution

7d Survival Rate Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	N	4	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	0.00%
6.25		4	0.9667	0.9054	1.0000	0.9667	0.9333	1.0000	0.0192	3.98%	3.33%
12.5		4	0.9333	0.8108	1.0000	0.9333	0.8667	1.0000	0.0385	8.25%	6.67%
25		4	0.7833	0.5481	1.0000	0.7333	0.6667	1.0000	0.0739	18.87%	21.67%
50		4	0.5167	0.2814	0.7519	0.4667	0.4000	0.7333	0.0739	28.61%	48.33%
100		4	0.4333	0.2496	0.6171	0.4000	0.3333	0.6000	0.0577	26.65%	56.67%

Fathead Minnow 7-d Larval Survival and Growth Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Analysis ID:	07-8855-2784	**Endpoint:**	7d Survival Rate	**CETIS Version:**	CETISv1.9.2
Analyzed:	29 Nov-16 10:10	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes

Angular (Corrected) Transformed Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	N	4	1.441	1.441	1.442	1.441	1.441	1.441	0	0.00%	0.00%
6.25		4	1.375	1.254	1.496	1.375	1.31	1.441	0.03802	5.53%	4.57%
12.5		4	1.319	1.095	1.544	1.319	1.197	1.441	0.07053	10.69%	8.48%
25		4	1.113	0.7609	1.466	1.028	0.9553	1.441	0.1107	19.89%	22.76%
50		4	0.8042	0.5614	1.047	0.752	0.6847	1.028	0.07631	18.98%	44.20%
100		4	0.7177	0.5318	0.9037	0.6847	0.6155	0.8861	0.05843	16.28%	50.20%

7d Survival Rate Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	N	1.0000	1.0000	1.0000	1.0000
6.25		1.0000	1.0000	0.9333	0.9333
12.5		0.8667	1.0000	0.8667	1.0000
25		0.6667	1.0000	0.7333	0.7333
50		0.4667	0.4667	0.4000	0.7333
100		0.4000	0.4000	0.3333	0.6000

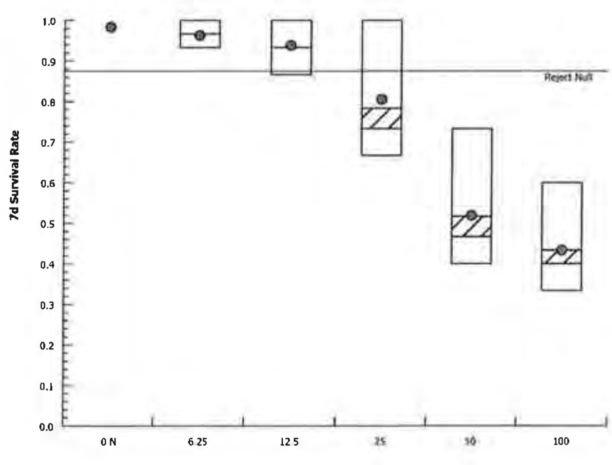
Angular (Corrected) Transformed Detail

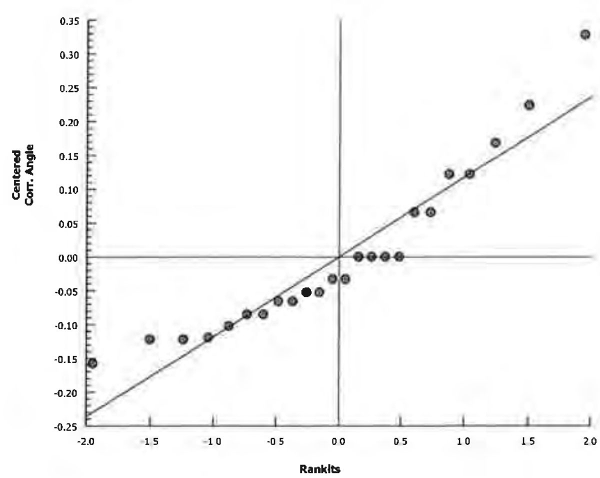
Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	N	1.441	1.441	1.441	1.441
6.25		1.441	1.441	1.31	1.31
12.5		1.197	1.441	1.197	1.441
25		0.9553	1.441	1.028	1.028
50		0.752	0.752	0.6847	1.028
100		0.6847	0.6847	0.6155	0.8861

7d Survival Rate Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	N	15/15	15/15	15/15	15/15
6.25		15/15	15/15	14/15	14/15
12.5		13/15	15/15	13/15	15/15
25		10/15	15/15	11/15	11/15
50		7/15	7/15	6/15	11/15
100		6/15	6/15	5/15	9/15

Graphics





Fathead Minnow 7-d Larval Survival and Growth Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Analysis ID:	05-0069-9083	**Endpoint:**	Mean Dry Biomass-mg	**CETIS Version:**	CETISv1.9.2
Analyzed:	05 Jan-17 11:10	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes
Batch ID:	08-2433-2088	**Test Type:**	Growth-Survival (7d)	**Analyst:**	
Start Date:	22 Nov-16 11:23	**Protocol:**	EPA/821/R-02-013 (2002)	**Diluent:**	Laboratory Water
Ending Date:	29 Nov-16 09:25	**Species:**	Pimephales promelas	**Brine:**	Not Applicable
Duration:	6d 22h	**Source:**	Aquatic Biosystems, CO	**Age:**	
Sample ID:	11-9291-7102	**Code:**	VCF1116.215	**Client:**	VCWPD
Sample Date:	20 Nov-16 21:45	**Material:**	Sample Water	**Project:**	
Receipt Date:	21 Nov-16 08:42	**Source:**	Bioassay Report		
Sample Age:	38h (7.5 °C)	**Station:**	MO-CAM		

Data Transform	Alt Hyp	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	C > T	25	50	35.36	4	18.50%

Dunnett Multiple Comparison Test

Control	vs	Conc-%	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Negative Control		6.25	-0.8663	2.407	0.049	6	CDF	0.9754	Non-Significant Effect
		12.5	1.422	2.407	0.049	6	CDF	0.2539	Non-Significant Effect
		25	2.329	2.407	0.049	6	CDF	0.0579	Non-Significant Effect
		50*	4.544	2.407	0.049	6	CDF	5.8E-04	Significant Effect
		100*	5.802	2.407	0.049	6	CDF	6.5E-05	Significant Effect

Test Acceptability Criteria

		TAC Limits			
Attribute	**Test Stat**	**Lower**	**Upper**	**Overlap**	**Decision**
Control Resp	0.2653	0.25	>>	Yes	Passes Criteria
PMSD	0.185	0.12	0.3	Yes	Passes Criteria

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.055457	0.0110914	5	13.33	1.6E-05	Significant Effect
Error	0.0149723	0.0008318	18			
Total	0.0704293		23			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance Test	9.876	15.09	0.0788	Equal Variances
Variances	Levene Equality of Variance Test	2.215	4.248	0.0977	Equal Variances
Variances	Mod Levene Equality of Variance Test	0.7328	4.248	0.6083	Equal Variances
Distribution	Anderson-Darling A2 Normality Test	0.6596	3.878	0.0854	Normal Distribution
Distribution	D'Agostino Kurtosis Test	1	2.576	0.3171	Normal Distribution
Distribution	D'Agostino Skewness Test	1.96	2.576	0.0499	Normal Distribution
Distribution	D'Agostino-Pearson K2 Omnibus Test	4.844	9.21	0.0887	Normal Distribution
Distribution	Kolmogorov-Smirnov D Test	0.164	0.2056	0.0941	Normal Distribution
Distribution	Shapiro-Wilk W Normality Test	0.9327	0.884	0.1118	Normal Distribution

Mean Dry Biomass-mg Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	N	4	0.2653	0.2452	0.2854	0.2673	0.25	0.2767	0.006319	4.76%	0.00%
6.25		4	0.283	0.2733	0.2927	0.2827	0.2767	0.29	0.003049	2.15%	-6.66%
12.5		4	0.2363	0.1847	0.288	0.2383	0.2007	0.268	0.01624	13.74%	10.93%
25		4	0.2178	0.1616	0.274	0.212	0.1813	0.266	0.01766	16.21%	17.90%
50		4	0.1727	0.1021	0.2433	0.1547	0.1427	0.2387	0.02219	25.70%	34.92%
100		4	0.147	0.1106	0.1834	0.1403	0.1273	0.18	0.01143	15.55%	44.60%

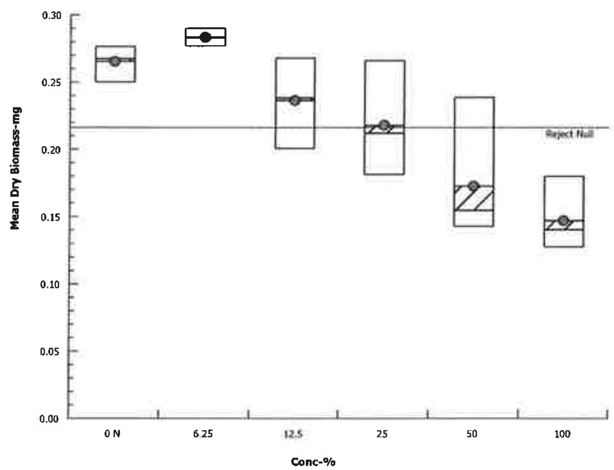
Fathead Minnow 7-d Larval Survival and Growth Test — **Aquatic Bioassay & Consulting Labs, Inc.**

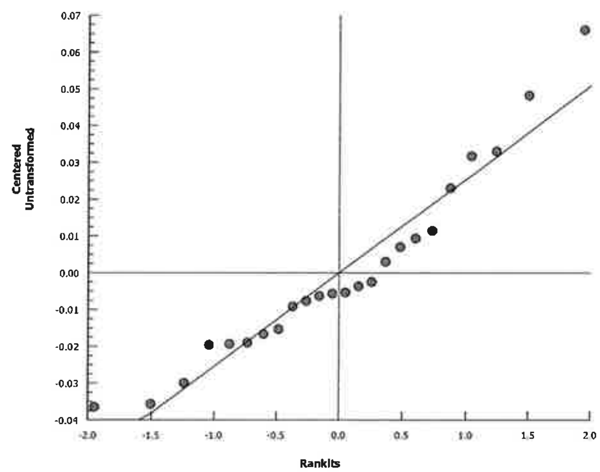
Analysis ID:	05-0069-9083	**Endpoint:**	Mean Dry Biomass-mg	**CETIS Version:**	CETISv1.9.2
Analyzed:	05 Jan-17 11:10	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes

Mean Dry Biomass-mg Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	N	0.26	0.25	0.2747	0.2767
6.25		0.2767	0.2793	0.286	0.29
12.5		0.2173	0.268	0.2007	0.2593
25		0.1813	0.266	0.2087	0.2153
50		0.156	0.1533	0.1427	0.2387
100		0.1393	0.1413	0.1273	0.18

Graphics





CETIS Analytical Report

Fathead Minnow 7-d Larval Survival and Growth Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Analysis ID:	19-5284-0586	**Endpoint:**	7d Survival Rate	**CETIS Version:**	CETISv1.9.2
Analyzed:	29 Nov-16 10:11	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	08-2433-2088	**Test Type:**	Growth-Survival (7d)	**Analyst:**	
Start Date:	22 Nov-16 11:23	**Protocol:**	EPA/821/R-02-013 (2002)	**Diluent:**	Laboratory Water
Ending Date:	29 Nov-16 09:25	**Species:**	Pimephales promelas	**Brine:**	Not Applicable
Duration:	6d 22h	**Source:**	Aquatic Biosystems, CO	**Age:**	
Sample ID:	11-9291-7102	**Code:**	VCF1116.215	**Client:**	VCWPD
Sample Date:	20 Nov-16 21:45	**Material:**	Sample Water	**Project:**	
Receipt Date:	21 Nov-16 08:42	**Source:**	Bioassay Report		
Sample Age:	38h (7.5 °C)	**Station:**	MO-CAM		

Linear Interpolation Options

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

Test Acceptability Criteria

		TAC Limits			
Attribute	**Test Stat**	**Lower**	**Upper**	**Overlap**	**Decision**
Control Resp	1	0.8	>>	Yes	Passes Criteria

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC5	9.375	4.375	20.09	10.67	4.978	22.86
EC10	15.28	7.5	33.91	6.545	2.949	13.33
EC15	19.44	10.83	36.03	5.143	2.776	9.231
EC20	23.61	15.06	38.44	4.235	2.601	6.638
EC25	28.12	17.79	40.72	3.556	2.455	5.621
EC40	42.19	30.69	73.51	2.37	1.36	3.259
EC50	60	34.59	n/a	1.667	n/a	2.891

7d Survival Rate Summary

			Calculated Variate(A/B)								
Conc-%	**Code**	**Count**	**Mean**	**Min**	**Max**	**Std Err**	**Std Dev**	**CV%**	**%Effect**	**A**	**B**
0	N	4	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.0%	60	60
6.25		4	0.9667	0.9333	1.0000	0.0192	0.0385	3.98%	3.33%	58	60
12.5		4	0.9333	0.8667	1.0000	0.0385	0.0770	8.25%	6.67%	56	60
25		4	0.7833	0.6667	1.0000	0.0739	0.1478	18.87%	21.67%	47	60
50		4	0.5167	0.4000	0.7333	0.0739	0.1478	28.61%	48.33%	31	60
100		4	0.4333	0.3333	0.6000	0.0577	0.1155	26.65%	56.67%	26	60

7d Survival Rate Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	N	1.0000	1.0000	1.0000	1.0000
6.25		1.0000	1.0000	0.9333	0.9333
12.5		0.8667	1.0000	0.8667	1.0000
25		0.6667	1.0000	0.7333	0.7333
50		0.4667	0.4667	0.4000	0.7333
100		0.4000	0.4000	0.3333	0.6000

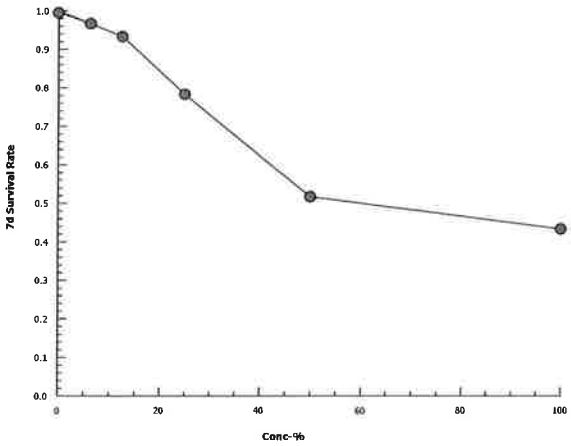
7d Survival Rate Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	N	15/15	15/15	15/15	15/15
6.25		15/15	15/15	14/15	14/15
12.5		13/15	15/15	13/15	15/15
25		10/15	15/15	11/15	11/15
50		7/15	7/15	6/15	11/15
100		6/15	6/15	5/15	9/15

Fathead Minnow 7-d Larval Survival and Growth Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Analysis ID:	19-5284-0586	**Endpoint:**	7d Survival Rate	**CETIS Version:**	CETISv1.9.2
Analyzed:	29 Nov-16 10:11	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



Fathead Minnow 7-d Larval Survival and Growth Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Analysis ID:	04-3780-5913	**Endpoint:**	Mean Dry Biomass-mg	**CETIS Version:**	CETISv1.9.2
Analyzed:	05 Jan-17 11:10	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	08-2433-2088	**Test Type:**	Growth-Survival (7d)	**Analyst:**	
Start Date:	22 Nov-16 11:23	**Protocol:**	EPA/821/R-02-013 (2002)	**Diluent:**	Laboratory Water
Ending Date:	29 Nov-16 09:25	**Species:**	Pimephales promelas	**Brine:**	Not Applicable
Duration:	6d 22h	**Source:**	Aquatic Biosystems, CO	**Age:**	
Sample ID:	11-9291-7102	**Code:**	VCF1116.215	**Client:**	VCWPD
Sample Date:	20 Nov-16 21:45	**Material:**	Sample Water	**Project:**	
Receipt Date:	21 Nov-16 08:42	**Source:**	Bioassay Report		
Sample Age:	38h (7.5 °C)	**Station:**	MO-CAM		

Linear Interpolation Options

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

Test Acceptability Criteria

		TAC Limits			
Attribute	**Test Stat**	**Lower**	**Upper**	**Overlap**	**Decision**
Control Resp	0.2653	0.25	>>	Yes	Passes Criteria

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	8.515	7.169	15.14	11.74	6.604	13.95
IC10	10.78	8.087	22.19	9.277	4.506	12.37
IC15	14.72	7.998	39.67	6.792	2.521	12.5
IC20	23.99	4.717	49.46	4.169	2.022	21.2
IC25	31.76	13.56	73.83	3.149	1.354	7.374
IC40	65.91	27.2	n/a	1.517	n/a	3.676
IC50	>100	n/a	n/a	<1	n/a	n/a

Mean Dry Biomass-mg Summary — **Calculated Variate**

Conc-%	Code	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	N	4	0.2653	0.25	0.2767	0.006319	0.01264	4.76%	0.0%
6.25		4	0.283	0.2767	0.29	0.003049	0.006098	2.16%	-6.66%
12.5		4	0.2363	0.2007	0.268	0.01624	0.03248	13.74%	10.93%
25		4	0.2178	0.1813	0.266	0.01766	0.03532	16.21%	17.9%
50		4	0.1727	0.1427	0.2387	0.02219	0.04438	25.70%	34.92%
100		4	0.147	0.1273	0.18	0.01143	0.02285	15.55%	44.6%

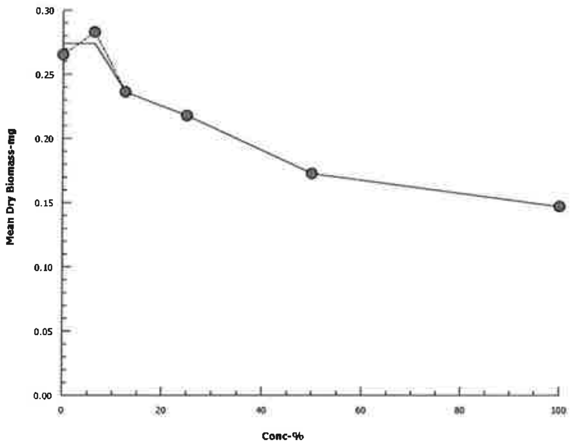
Mean Dry Biomass-mg Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	N	0.26	0.25	0.2747	0.2767
6.25		0.2767	0.2793	0.286	0.29
12.5		0.2173	0.268	0.2007	0.2593
25		0.1813	0.266	0.2087	0.2153
50		0.156	0.1533	0.1427	0.2387
100		0.1393	0.1413	0.1273	0.18

Fathead Minnow 7-d Larval Survival and Growth Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Analysis ID:	04-3780-5913	**Endpoint:**	Mean Dry Biomass-mg	**CETIS Version:**	CETISv1.9.2
Analyzed:	05 Jan-17 11:10	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



Fathead Minnow 7-d Larval Survival and Growth Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Batch ID:	08-2433-2088	**Test Type:**	Growth-Survival (7d)	**Analyst:**	
Start Date:	22 Nov-16 11:23	**Protocol:**	EPA/821/R-02-013 (2002)	**Diluent:**	Laboratory Water
Ending Date:	29 Nov-16 09:25	**Species:**	Pimephales promelas	**Brine:**	Not Applicable
Duration:	6d 22h	**Source:**	Aquatic Biosystems, CO	**Age:**	
Sample ID:	11-9291-7102	**Code:**	VCF1116.215	**Client:**	VCWPD
Sample Date:	20 Nov-16 21:45	**Material:**	Sample Water	**Project:**	
Receipt Date:	21 Nov-16 08:42	**Source:**	Bioassay Report		
Sample Age:	38h (7.5 °C)	**Station:**	MO-CAM		

Alkalinity (CaCO3)-mg/L

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	8	62.25	60.72	63.78	61	65	0.6478	1.832	2.94%	0
100		1	75			75	75	0	0	0.0%	0
Overall		9	63.67	60.14	67.19	61	75	1.528	4.583	7.20%	0 (0%)

Conductivity-µmhos

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	8	329.2	321	337.5	319	348	3.509	9.925	3.01%	0
6.25		8	385.2	366.6	403.9	361	428	7.892	22.32	5.79%	0
12.5		8	372.2	366	378.5	360	385	2.664	7.536	2.02%	0
25		8	421.6	415.5	427.8	415	436	2.598	7.347	1.74%	0
50		8	481.5	391.8	571.2	217	536	37.95	107.3	22.29%	0
100		8	708.8	700.5	717	694	725	3.468	9.809	1.38%	0
Overall		48	449.8	411.1	488.5	217	725	19.24	133.3	29.63%	0 (0%)

Dissolved Oxygen-mg/L

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	8	7.738	7.571	7.904	7.5	8.1	0.07055	0.1996	2.58%	0
6.25		8	7.388	7.096	7.679	6.9	7.8	0.1231	0.3482	4.71%	0
12.5		8	7.4	7.1	7.7	7	7.8	0.1268	0.3586	4.85%	0
25		8	7.05	6.621	7.479	6.3	7.8	0.1813	0.5127	7.27%	0
50		8	6.6	5.655	7.545	4.4	8	0.3996	1.13	17.12%	0
100		8	6.263	5.147	7.378	4.1	8.6	0.4717	1.334	21.3%	0
Overall		48	7.073	6.814	7.332	4.1	8.6	0.1289	0.8932	12.63%	0 (0%)

Hardness (CaCO3)-mg/L

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	8	89.75	85.42	94.08	86	96	1.83	5.175	5.77%	0
100		1	213			213	213	0	0	0.0%	0
Overall		9	103.4	71.65	135.2	86	213	13.79	41.37	39.99%	0 (0%)

pH-Units

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	8	7.863	7.722	8.003	7.5	8	0.05957	0.1685	2.14%	0
6.25		8	8.212	8.13	8.295	8.1	8.4	0.03504	0.0991	1.21%	0
12.5		8	8.075	7.898	8.252	7.8	8.4	0.075	0.2121	2.63%	0
25		8	7.95	7.841	8.059	7.7	8.1	0.04629	0.1309	1.65%	0
50		8	7.8	7.633	7.967	7.4	8	0.07071	0.2	2.56%	0
100		8	7.55	7.395	7.705	7.2	7.8	0.06547	0.1852	2.45%	0
Overall		48	7.908	7.831	7.986	7.2	8.4	0.03846	0.2664	3.37%	0 (0%)

Fathead Minnow 7-d Larval Survival and Growth Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Temperature-°C

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	8	24.29	23.82	24.76	24	25.5	0.1995	0.5643	2.32%	0
6.25		8	24.28	23.84	24.71	24	25.4	0.182	0.5148	2.12%	0
12.5		8	24.3	23.83	24.77	24	25.6	0.1991	0.5632	2.32%	0
25		8	24.25	23.88	24.62	24	25.3	0.1581	0.4472	1.84%	0
50		8	24.18	23.86	24.49	24	25.1	0.1346	0.3808	1.58%	0
100		8	24.16	23.84	24.48	24	25.1	0.1362	0.3852	1.59%	0
Overall		48	24.24	24.11	24.37	24	25.6	0.06623	0.4589	1.89%	0 (0%)

Alkalinity (CaCO3)-mg/L

Conc-%	Code	1	2	3	4	5	6	7	8
0	N	63	61	61	61	61	61	65	65
100		75							

Conductivity-µmhos

Conc-%	Code	1	2	3	4	5	6	7	8
0	N	336	320	319	326	324	325	336	348
6.25		361	390	365	393	363	388	394	428
12.5		375	368	360	369	371	371	379	385
25		422	416	419	416	420	415	429	436
50		514	512	507	514	217	532	520	536
100		699	694	709	703	713	714	713	725

Dissolved Oxygen-mg/L

Conc-%	Code	1	2	3	4	5	6	7	8
0	N	7.6	7.6	7.8	7.9	7.6	7.8	7.5	8.1
6.25		7.7	7.3	7.8	7.8	7.3	7	6.9	7.3
12.5		7.7	7.6	7.8	7.8	7.1	7	7.2	7
25		7.8	7.2	7.7	7	6.3	6.6	6.8	7
50		8	4.4	6.9	7.4	6.5	5.6	7.2	6.8
100		8.6	6.8	6.9	4.1	5	6.1	6.3	6.3

Hardness (CaCO3)-mg/L

Conc-%	Code	1	2	3	4	5	6	7	8
0	N	96	86	86	86	86	86	96	96
100		213							

pH-Units

Conc-%	Code	1	2	3	4	5	6	7	8
0	N	8	7.9	7.8	7.9	7.8	7.5	8	8
6.25		8.2	8.4	8.1	8.3	8.2	8.2	8.1	8.2
12.5		8.4	7.9	8.1	8	8.2	8.3	7.8	7.9
25		8	8.1	8.1	8	7.9	7.9	7.7	7.9
50		8	7.9	7.9	7.8	7.9	7.6	7.4	7.9
100		7.7	7.8	7.4	7.6	7.2	7.5	7.6	7.6

Temperature-°C

Conc-%	Code	1	2	3	4	5	6	7	8
0	N	24	24.8	24	24	24	24	25.5	24
6.25		24	24	24.7	24	24	24.1	25.4	24
12.5		24	24	24.6	24	24.1	24.1	25.6	24
25		24.2	24.1	24	24.4	24	24	25.3	24
50		24	24.2	24	24	24	24.1	25.1	24
100		24	24	24	24	24	24.2	25.1	24

aquatic bioassay & consulting laboratories, inc

January 7, 2017

Mr. Arne Anselm
Ventura County Watershed Protection District
800 South Victoria Ave
Ventura, CA 93009

Dear Mr. Anselm:

We are pleased to present the enclosed revised bioassay report. The test was conducted under guidelines prescribed in *Short-Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms" EPA-821-R-02-013*. Results were as follows:

CLIENT:	Ventura County Flood Control
SAMPLE I.D.:	MO-HUE
DATE RECEIVED:	11/21/2016
ABC LAB. NO.:	VCF1116.216

CHRONIC CERIODAPHNIA SURVIVAL & REPRODUCTION BIOASSAY

SURVIVAL	NOEC =	50.00 %
	TUc =	2.00
	IC25 =	60.53 %
	IC50 =	73.68 %
REPRODUCTION	NOEC =	25.00 %
	TUc =	4.00
	IC25 =	37.80 %
	IC50 =	55.77 %

*NOTE: Salinity is 5g/L which is above the acceptable range for *Ceriodaphnia*.

Yours very truly,

Scott Johnson
Laboratory Director

Ceriodaphnia 7-d Survival and Reproduction Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Batch ID:	00-8587-1102	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Joe Freas
Start Date:	22 Nov-16 13:45	**Protocol:**	EPA/821/R-02-013 (2002)	**Diluent:**	Laboratory Water
Ending Date:	29 Nov-16 11:45	**Species:**	Ceriodaphnia dubia	**Brine:**	Not Applicable
Duration:	6d 22h	**Source:**	Aquatic Biosystems, CO	**Age:**	
Sample ID:	08-8553-6642	**Code:**	VCF1116.216	**Client:**	VCWPD
Sample Date:	20 Nov-16 21:45	**Material:**	Sample Water	**Project:**	2016/17-2 (Wet)
Receipt Date:	21 Nov-16 08:42	**Source:**	Bioassay Report		
Sample Age:	40h	**Station:**	MO-HUE		

Comments:
High Salinity 5ppt

Multiple Comparison Summary

Analysis ID	Endpoint	Comparison Method	NOEL	LOEL	TOEL	TU	PMSD	✓
13-1843-3425	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	50	100	70.71	2	n/a	
09-6562-2405	Reproduction	Steel Many-One Rank Sum Test	25	50	35.36	4	27.0%	✓

Point Estimate Summary

Analysis ID	Endpoint	Point Estimate Method	Level	%	95% LCL	95% UCL	TU	✓
08-0439-4297	7d Survival Rate	Linear Interpolation (ICPIN)	EC5	50	2.5	52.5	2	
			EC10	52.63	5	55	1.9	
			EC15	55.26	50	57.5	1.81	
			EC20	57.89	52.94	60	1.727	
			EC25	60.53	55.88	62.5	1.652	
			EC40	68.42	64.71	70	1.462	
			EC50	73.68	70.59	75	1.357	
19-2008-7359	Reproduction	Linear Interpolation (ICPIN)	IC5	23.75	2.72	28.53	4.211	✓
			IC10	27.93	5.439	32.07	3.581	✓
			IC15	31.22	12.8	35.61	3.203	✓
			IC20	34.51	18.6	39.43	2.898	✓
			IC25	37.8	23.16	43.22	2.645	✓
			IC40	47.68	38.68	55.39	2.097	✓
			IC50	55.77	47.31	62.82	1.793	✓

Test Acceptability

				TAC Limits			
Analysis ID	**Endpoint**	**Attribute**	**Test Stat**	**Lower**	**Upper**	**Overlap**	**Decision**
08-0439-4297	7d Survival Rate	Control Resp	1	0.8	>>	Yes	Passes Criteria
13-1843-3425	7d Survival Rate	Control Resp	1	0.8	>>	Yes	Passes Criteria
09-6562-2405	Reproduction	Control Resp	31.4	15	>>	Yes	Passes Criteria
19-2008-7359	Reproduction	Control Resp	31.4	15	>>	Yes	Passes Criteria
09-6562-2405	Reproduction	PMSD	0.2703	0.13	0.47	Yes	Passes Criteria

Ceriodaphnia 7-d Survival and Reproduction Test — **Aquatic Bioassay & Consulting Labs, Inc.**

7d Survival Rate Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	N	10	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
6.25		10	0.9000	0.6738	1.0000	0.0000	1.0000	0.1000	0.3162	35.14%	10.00%
12.5		10	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
25		10	0.9000	0.6738	1.0000	0.0000	1.0000	0.1000	0.3162	35.14%	10.00%
50		10	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
100		10	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		100.00%

Reproduction Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	N	10	31.4	26.64	36.16	23	39	2.104	6.653	21.19%	0.00%
6.25		10	31.5	24.86	38.14	12	42	2.937	9.289	29.49%	-0.32%
12.5		10	34.3	27.04	41.56	12	47	3.211	10.15	29.61%	-9.24%
25		10	30.6	22.05	39.15	0	43	3.778	11.95	39.04%	2.55%
50		10	18.3	14.02	22.58	8	26	1.892	5.982	32.69%	41.72%
100		10	0.1	-0.1262	0.3262	0	1	0.1	0.3162	316.23%	99.68%

7d Survival Rate Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	N	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
6.25		1.0000	1.0000	1.0000	1.0000	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000
12.5		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
25		0.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
50		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
100		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Reproduction Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	N	39	29	37	25	26	34	24	38	23	39
6.25		33	30	34	28	12	29	42	41	42	24
12.5		36	28	35	29	30	12	43	47	42	41
25		0	29	41	35	33	33	25	35	43	32
50		19	18	26	21	10	8	25	14	22	20
100		0	0	0	0	1	0	0	0	0	0

7d Survival Rate Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	N	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
6.25		1/1	1/1	1/1	1/1	0/1	1/1	1/1	1/1	1/1	1/1
12.5		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
25		0/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
50		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
100		0/1	0/1	0/1	0/1	0/1	0/1	0/1	0/1	0/1	0/1

CETIS Analytical Report

Ceriodaphnia 7-d Survival and Reproduction Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Analysis ID:	09-6562-2405	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.9.2
Analyzed:	06 Jan-17 9:45	**Analysis:**	Nonparametric-Control vs Treatments	**Official Results:**	Yes
Batch ID:	00-8587-1102	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Joe Freas
Start Date:	22 Nov-16 13:45	**Protocol:**	EPA/821/R-02-013 (2002)	**Diluent:**	Laboratory Water
Ending Date:	29 Nov-16 11:45	**Species:**	Ceriodaphnia dubia	**Brine:**	Not Applicable
Duration:	6d 22h	**Source:**	Aquatic Biosystems, CO	**Age:**	
Sample ID:	08-8553-6642	**Code:**	VCF1116.216	**Client:**	VCWPD
Sample Date:	20 Nov-16 21:45	**Material:**	Sample Water	**Project:**	2016/17-2 (Wet)
Receipt Date:	21 Nov-16 08:42	**Source:**	Bioassay Report		
Sample Age:	40h	**Station:**	MO-HUE		

Comments:
High Salinity 5ppt

Data Transform	Alt Hyp	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	C > T	25	50	35.36	4	27.03%

Steel Many-One Rank Sum Test

Control	vs	Conc-%	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Negative Control		6.25	110.5	75	3	18	Asymp	0.9287	Non-Significant Effect
		12.5	120.5	75	1	18	Asymp	0.9913	Non-Significant Effect
		25	109	75	2	18	Asymp	0.9082	Non-Significant Effect
		50*	61	75	2	18	Asymp	0.0021	Significant Effect
		100*	55	75	0	18	Asymp	3.8E-04	Significant Effect

Test Acceptability Criteria

		TAC Limits			
Attribute	**Test Stat**	**Lower**	**Upper**	**Overlap**	**Decision**
Control Resp	31.4	15	>>	Yes	Passes Criteria
PMSD	0.2703	0.13	0.47	Yes	Passes Criteria

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	8635.53	1727.11	5	25.14	<1.0E-37	Significant Effect
Error	3710.4	68.7111	54			
Total	12345.9		59			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance Test	54.01	15.09	<1.0E-37	Unequal Variances
Variances	Levene Equality of Variance Test	2.879	3.377	0.0224	Equal Variances
Variances	Mod Levene Equality of Variance Test	2.356	3.377	0.0525	Equal Variances
Distribution	Anderson-Darling A2 Normality Test	1.361	3.878	0.0010	Non-Normal Distribution
Distribution	D'Agostino Kurtosis Test	3.14	2.576	0.0017	Non-Normal Distribution
Distribution	D'Agostino Skewness Test	3.817	2.576	1.4E-04	Non-Normal Distribution
Distribution	D'Agostino-Pearson K2 Omnibus Test	24.43	9.21	5.0E-06	Non-Normal Distribution
Distribution	Kolmogorov-Smirnov D Test	0.1516	0.1331	0.0015	Non-Normal Distribution
Distribution	Shapiro-Wilk W Normality Test	0.9015	0.9459	1.5E-04	Non-Normal Distribution

Reproduction Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	N	10	31.4	26.64	36.16		23	39	2.104	21.19%	0.00%
6.25		10	31.5	24.86	38.14		12	42	2.937	29.49%	-0.32%
12.5		10	34.3	27.04	41.56		12	47	3.211	29.61%	-9.24%
25		10	30.6	22.05	39.15		0	43	3.778	39.04%	2.55%
50		10	18.3	14.02	22.58		8	26	1.892	32.69%	41.72%
100		10	0.1	-0.1262	0.3262		0	1	0.1	316.23%	99.68%

Ceriodaphnia 7-d Survival and Reproduction Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Analysis ID:	09-6562-2405	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.9.2
Analyzed:	06 Jan-17 9:45	**Analysis:**	Nonparametric-Control vs Treatments	**Official Results:**	Yes

Reproduction Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	N	39	29	37	25	26	34	24	38	23	39
6.25		33	30	34	28	12	29	42	41	42	24
12.5		36	28	35	29	30	12	43	47	42	41
25		0	29	41	35	33	33	25	35	43	32
50		19	18	26	21	10	8	25	14	22	20
100		0	0	0	0	1	0	0	0	0	0

CETIS Analytical Report

Ceriodaphnia 7-d Survival and Reproduction Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Analysis ID:	08-0439-4297	**Endpoint:**	7d Survival Rate	**CETIS Version:**	CETISv1.9.2
Analyzed:	06 Jan-17 9:45	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	00-8587-1102	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Joe Freas
Start Date:	22 Nov-16 13:45	**Protocol:**	EPA/821/R-02-013 (2002)	**Diluent:**	Laboratory Water
Ending Date:	29 Nov-16 11:45	**Species:**	Ceriodaphnia dubia	**Brine:**	Not Applicable
Duration:	6d 22h	**Source:**	Aquatic Biosystems, CO	**Age:**	
Sample ID:	08-8553-6642	**Code:**	VCF1116.216	**Client:**	VCWPD
Sample Date:	20 Nov-16 21:45	**Material:**	Sample Water	**Project:**	2016/17-2 (Wet)
Receipt Date:	21 Nov-16 08:42	**Source:**	Bioassay Report		
Sample Age:	40h	**Station:**	MO-HUE		

Comments:
High Salinity 5ppt

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 Lower	TAC Limits Upper	Overlap	Decision
Control Resp	1	0.8	>>	Yes	Passes Criteria

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC5	50	2.5	52.5	2	1.905	40
EC10	52.63	5	55	1.9	1.818	20
EC15	55.26	50	57.5	1.81	1.739	2
EC20	57.89	52.94	60	1.727	1.667	1.889
EC25	60.53	55.88	62.5	1.652	1.6	1.789
EC40	68.42	64.71	70	1.462	1.429	1.545
EC50	73.68	70.59	75	1.357	1.333	1.417

7d Survival Rate Summary

Conc-%	Code	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	Calculated Variate(A/B) A	B
0	N	10	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.0%	10	10
6.25		10	0.9000	0.0000	1.0000	0.1000	0.3162	35.14%	10.0%	9	10
12.5		10	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.0%	10	10
25		10	0.9000	0.0000	1.0000	0.1000	0.3162	35.14%	10.0%	9	10
50		10	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.0%	10	10
100		10	0.0000	0.0000	0.0000	0.0000	0.0000		100.0%	0	10

7d Survival Rate Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	N	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
6.25		1.0000	1.0000	1.0000	1.0000	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000
12.5		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
25		0.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
50		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
100		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

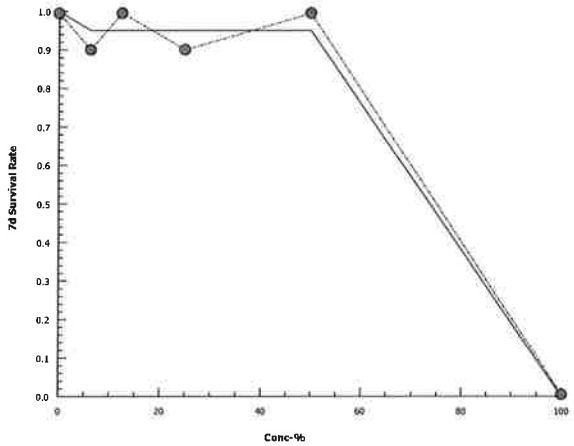
Ceriodaphnia 7-d Survival and Reproduction Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Analysis ID:	08-0439-4297	**Endpoint:**	7d Survival Rate	**CETIS Version:**	CETISv1.9.2
Analyzed:	06 Jan-17 9:45	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

7d Survival Rate Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	N	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
6.25		1/1	1/1	1/1	1/1	0/1	1/1	1/1	1/1	1/1	1/1
12.5		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
25		0/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
50		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
100		0/1	0/1	0/1	0/1	0/1	0/1	0/1	0/1	0/1	0/1

Graphics



Analyst: _____ QA: _____

Ceriodaphnia 7-d Survival and Reproduction Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Analysis ID:	19-2008-7359	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.9.2
Analyzed:	06 Jan-17 9:45	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	00-8587-1102	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Joe Freas
Start Date:	22 Nov-16 13:45	**Protocol:**	EPA/821/R-02-013 (2002)	**Diluent:**	Laboratory Water
Ending Date:	29 Nov-16 11:45	**Species:**	Ceriodaphnia dubia	**Brine:**	Not Applicable
Duration:	6d 22h	**Source:**	Aquatic Biosystems, CO	**Age:**	
Sample ID:	08-8553-6642	**Code:**	VCF1116.216	**Client:**	VCWPD
Sample Date:	20 Nov-16 21:45	**Material:**	Sample Water	**Project:**	2016/17-2 (Wet)
Receipt Date:	21 Nov-16 08:42	**Source:**	Bioassay Report		
Sample Age:	40h	**Station:**	MO-HUE		

Comments:
High Salinity 5ppt

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Linear	Linear	947960	280	Yes	Two-Point Interpolation

Test Acceptability Criteria

		TAC Limits			
Attribute	**Test Stat**	**Lower**	**Upper**	**Overlap**	**Decision**
Control Resp	31.4	15	>>	Yes	Passes Criteria

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	23.75	2.72	28.53	4.211	3.505	36.77
IC10	27.93	5.439	32.07	3.581	3.118	18.39
IC15	31.22	12.8	35.61	3.203	2.808	7.815
IC20	34.51	18.6	39.43	2.898	2.536	5.375
IC25	37.8	23.16	43.22	2.645	2.314	4.318
IC40	47.68	38.68	55.39	2.097	1.805	2.585
IC50	55.77	47.31	62.82	1.793	1.592	2.114

Reproduction Summary — **Calculated Variate**

Conc-%	Code	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	N	10	31.4	23	39	2.104	6.653	21.19%	0.0%
6.25		10	31.5	12	42	2.937	9.289	29.49%	-0.32%
12.5		10	34.3	12	47	3.211	10.15	29.61%	-9.24%
25		10	30.6	0	43	3.778	11.95	39.04%	2.55%
50		10	18.3	8	26	1.892	5.982	32.69%	41.72%
100		10	0.1	0	1	0.1	0.3162	316.20%	99.68%

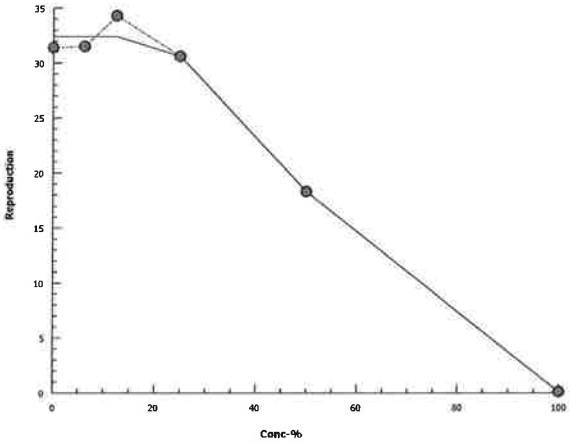
Reproduction Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	N	39	29	37	25	26	34	24	38	23	39
6.25		33	30	34	28	12	29	42	41	42	24
12.5		36	28	35	29	30	12	43	47	42	41
25		0	29	41	35	33	33	25	35	43	32
50		19	18	26	21	10	8	25	14	22	20
100		0	0	0	0	1	0	0	0	0	0

Ceriodaphnia 7-d Survival and Reproduction Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Analysis ID:	19-2008-7359	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.9.2
Analyzed:	06 Jan-17 9:45	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



CETIS Analytical Report

Ceriodaphnia 7-d Survival and Reproduction Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Analysis ID:	13-1843-3425	**Endpoint:**	7d Survival Rate	**CETIS Version:**	CETISv1.9.2
Analyzed:	06 Jan-17 9:45	**Analysis:**	STP 2xK Contingency Tables	**Official Results:**	Yes
Batch ID:	00-8587-1102	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Joe Freas
Start Date:	22 Nov-16 13:45	**Protocol:**	EPA/821/R-02-013 (2002)	**Diluent:**	Laboratory Water
Ending Date:	29 Nov-16 11:45	**Species:**	Ceriodaphnia dubia	**Brine:**	Not Applicable
Duration:	6d 22h	**Source:**	Aquatic Biosystems, CO	**Age:**	
Sample ID:	08-8553-6642	**Code:**	VCF1116.216	**Client:**	VCWPD
Sample Date:	20 Nov-16 21:45	**Material:**	Sample Water	**Project:**	2016/17-2 (Wet)
Receipt Date:	21 Nov-16 08:42	**Source:**	Bioassay Report		
Sample Age:	40h	**Station:**	MO-HUE		

Comments:
High Salinity 5ppt

Data Transform	Alt Hyp	NOEL	LOEL	TOEL	TU
Untransformed	C > T	50	100	70.71	2

Fisher Exact/Bonferroni-Holm Test

Control	vs	Group	Test Stat	P-Type	P-Value	Decision(α:5%)
Negative Control		6.25	0.5000	Exact	1.0000	Non-Significant Effect
		12.5	1.0000	Exact	1.0000	Non-Significant Effect
		25	0.5000	Exact	1.0000	Non-Significant Effect
		50	1.0000	Exact	1.0000	Non-Significant Effect
		100*	0.0000	Exact	2.7E-05	Significant Effect

Test Acceptability Criteria

		TAC Limits			
Attribute	**Test Stat**	**Lower**	**Upper**	**Overlap**	**Decision**
Control Resp	1	0.8	>>	Yes	Passes Criteria

Data Summary

Conc-%	Code	NR	R	NR + R	Prop NR	Prop R	%Effect
0	N	10	0	10	1	0	0.0%
6.25		9	1	10	0.9	0.1	10.0%
12.5		10	0	10	1	0	0.0%
25		9	1	10	0.9	0.1	10.0%
50		10	0	10	1	0	0.0%
100		0	10	10	0	1	100.0%

7d Survival Rate Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	N	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
6.25		1.0000	1.0000	1.0000	1.0000	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000
12.5		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
25		0.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
50		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
100		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

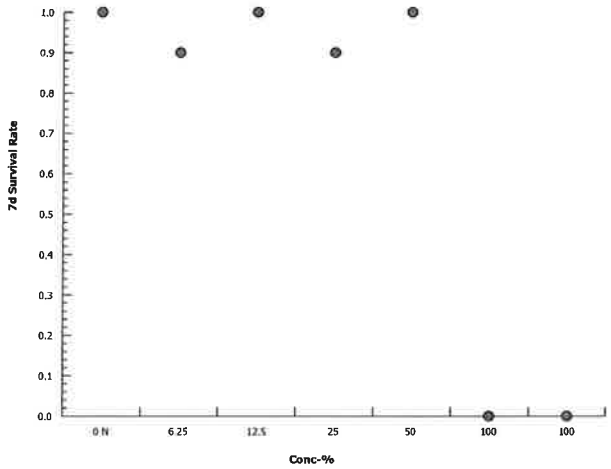
7d Survival Rate Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	N	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
6.25		1/1	1/1	1/1	1/1	0/1	1/1	1/1	1/1	1/1	1/1
12.5		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
25		0/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
50		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
100		0/1	0/1	0/1	0/1	0/1	0/1	0/1	0/1	0/1	0/1

Ceriodaphnia 7-d Survival and Reproduction Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Analysis ID:	13-1843-3425	**Endpoint:**	7d Survival Rate	**CETIS Version:**	CETISv1.9.2
Analyzed:	06 Jan-17 9:45	**Analysis:**	STP 2xK Contingency Tables	**Official Results:**	Yes

Graphics



Ceriodaphnia 7-d Survival and Reproduction Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Batch ID:	00-8587-1102	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Joe Freas
Start Date:	22 Nov-16 13:45	**Protocol:**	EPA/821/R-02-013 (2002)	**Diluent:**	Laboratory Water
Ending Date:	29 Nov-16 11:45	**Species:**	Ceriodaphnia dubia	**Brine:**	Not Applicable
Duration:	6d 22h	**Source:**	Aquatic Biosystems, CO	**Age:**	
Sample ID:	08-8553-6642	**Code:**	VCF1116.216	**Client:**	VCWPD
Sample Date:	20 Nov-16 21:45	**Material:**	Sample Water	**Project:**	2016/17-2 (Wet)
Receipt Date:	21 Nov-16 08:42	**Source:**	Bioassay Report		
Sample Age:	40h	**Station:**	MO-HUE		

Comments:
High Salinity 5ppt

Alkalinity (CaCO3)-mg/L

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	8	61.38	60.94	61.81	61	62	0.183	0.5175	0.84%	0
100		8	224	224	224	224	224	0	0	0.0%	0
Overall		16	142.7	97.94	187.4	61	224	20.99	83.98	58.86%	0 (0%)

Conductivity-µmhos

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	8	333.4	329.1	337.6	327	343	1.802	5.097	1.53%	0
6.25		8	820	799.5	840.5	794	864	8.689	24.58	3.0%	0
12.5		8	1320	1302	1337	1284	1340	7.557	21.37	1.62%	0
25		8	2306	2148	2464	1996	2445	66.8	188.9	8.19%	0
50		8	4762	3884	5640	4352	7359	371.2	1050	22.05%	0
100		6	8216	8139	8294	8122	8280	30.01	73.5	0.89%	0
Overall		46	2731	1946	3516	327	8280	389.6	2642	96.74%	0 (0%)

Dissolved Oxygen-mg/L

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	8	7.925	7.554	8.296	7.6	9	0.1567	0.4432	5.59%	0
6.25		8	8	7.725	8.275	7.7	8.6	0.1165	0.3295	4.12%	0
12.5		8	7.988	7.696	8.279	7.6	8.6	0.1231	0.3482	4.36%	0
25		8	7.975	7.599	8.351	7.6	8.7	0.159	0.4496	5.64%	0
50		8	7.788	7.44	8.135	7.3	8.5	0.1469	0.4155	5.34%	0
100		6	7.433	6.801	8.065	6.5	8.4	0.2459	0.6022	8.1%	0
Overall		46	7.87	7.737	8.002	6.5	9	0.06586	0.4467	5.68%	0 (0%)

Hardness (CaCO3)-mg/L

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	8	89.88	87.71	92.04	88	93	0.9149	2.588	2.88%	0
100		8	230	230	230	230	230	0	0	0.0%	0
Overall		16	159.9	121.4	198.5	88	230	18.1	72.38	45.26%	0 (0%)

pH-Units

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	8	7.925	7.654	8.196	7.3	8.3	0.1146	0.324	4.09%	0
6.25		8	7.363	7.135	7.59	7	7.8	0.09625	0.2722	3.7%	0
12.5		8	7.363	7.179	7.546	7	7.7	0.07778	0.22	2.99%	0
25		8	7.275	7.151	7.399	7	7.5	0.05261	0.1488	2.05%	0
50		8	7.225	7.065	7.385	7	7.6	0.06748	0.1909	2.64%	0
100		6	7.15	7.062	7.238	7	7.2	0.03416	0.08366	1.17%	0
Overall		46	7.393	7.294	7.493	7	8.3	0.04919	0.3336	4.51%	0 (0%)

Ceriodaphnia 7-d Survival and Reproduction Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Temperature-°C

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	8	24	24	24	24	24	0	0	0.0%	0
6.25		8	24.01	23.98	24.04	24	24.1	0.01249	0.03531	0.15%	0
12.5		8	24.03	23.97	24.08	24	24.2	0.02499	0.07069	0.29%	0
25		8	24.05	23.96	24.14	24	24.3	0.0378	0.1069	0.44%	0
50		8	24.06	23.96	24.16	24	24.3	0.04199	0.1188	0.49%	0
100		8	24.09	23.95	24.22	24	24.4	0.05806	0.1642	0.68%	0
Overall		48	24.04	24.01	24.07	24	24.4	0.0142	0.09837	0.41%	0 (0%)

Alkalinity (CaCO3)-mg/L

Conc-%	Code	1	2	3	4	5	6	7	8
0	N	62	62	62	61	61	61	61	61
100		224	224	224	224	224	224	224	224

Conductivity-µmhos

Conc-%	Code	1	2	3	4	5	6	7	8
0	N	329	335	334	334	336	343	329	327
6.25		812	815	794	799	810	815	851	864
12.5		1323	1330	1284	1288	1328	1340	1329	1335
25		2445	2445	2404	2415	1996	2012	2354	2376
50		4352	4356	4379	4380	4375	7359	4425	4472
100		8280	8220	8130	8122	8279	8268		

Dissolved Oxygen-mg/L

Conc-%	Code	1	2	3	4	5	6	7	8
0	N	7.6	7.8	7.8	7.8	7.9	7.7	7.8	9
6.25		7.8	7.7	7.7	7.7	8.2	8.6	8.2	8.1
12.5		7.8	7.6	7.8	7.6	8.2	8.6	8.2	8.1
25		7.6	7.7	7.6	7.6	8	8.6	8.7	8
50		7.3	7.5	7.5	7.5	7.8	8.5	8.2	8
100		6.5	7.4	7.4	7.5	7.4	8.4		

Hardness (CaCO3)-mg/L

Conc-%	Code	1	2	3	4	5	6	7	8
0	N	93	93	93	88	88	88	88	88
100		230	230	230	230	230	230	230	230

pH-Units

Conc-%	Code	1	2	3	4	5	6	7	8
0	N	7.3	7.8	8.1	8.1	7.9	8.2	7.7	8.3
6.25		7	7.5	7.8	7.5	7	7.3	7.3	7.5
12.5		7	7.2	7.4	7.7	7.3	7.6	7.3	7.4
25		7	7.2	7.3	7.3	7.2	7.3	7.4	7.5
50		7	7.1	7.1	7.2	7.2	7.2	7.4	7.6
100		7	7.1	7.2	7.2	7.2	7.2		

Temperature-°C

Conc-%	Code	1	2	3	4	5	6	7	8
0	N	24	24	24	24	24	24	24	24
6.25		24	24	24	24.1	24	24	24	24
12.5		24	24	24	24.2	24	24	24	24
25		24	24.1	24	24	24.3	24	24	24
50		24	24.2	24	24.3	24	24	24	24
100		24	24.3	24	24	24.4	24	24	24

aquatic bioassay & consulting laboratories, inc

January 6, 2017

Mr. Arne Anselm
Ventura County Watershed Protection District
800 South Victoria Ave
Ventura, CA 93009

Dear Mr. Anselm:

We are pleased to present the enclosed bioassay report. The test was conducted under guidelines prescribed in *Short-Term Methods for Measuring the Chronic Toxicity of Effluents and Receving Waters to West Coast Estuarine Organisms, EPA/821/R-02-014.* Results were as follows:

CLIENT:	Ventura County Flood Control
SAMPLE I.D.:	MO-HUE
DATE RECEIVED:	11/21/2016
ABC LAB. NO.:	VCF1116.216

CHRONIC TOPSMELT SURVIVAL AND GROWTH BIOASSAY

Survival	NOEC	=	100.00
	TUc	=	1.00
	IC25	=	>100.00 %
	IC50	=	>100.00 %
Biomass	NOEC	=	100.00 %
	TUc	=	1.00
	IC25	=	>100.00 %
	IC50	=	>100.00 %

*NOTE: Topsmelt run because salinity was 5g/L.

Yours very truly,

F.: Scott Johnson
Laboratory Director

CETIS Summary Report

Pacific Topsmelt 7-d Survival and Growth Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Batch ID:	15-8612-2226	**Test Type:**	Growth-Survival (7d)	**Analyst:**	Joe Freas
Start Date:	22 Nov-16 14:49	**Protocol:**	EPA/600/R-95/136 (1995)	**Diluent:**	Laboratory Seawater
Ending Date:	29 Nov-16 12:50	**Species:**	Atherinops affinis	**Brine:**	Not Applicable
Duration:	6d 22h	**Source:**	Aquatic Biosystems, CO	**Age:**	
Sample ID:	06-6695-0374	**Code:**	VCF1116.216	**Client:**	VCWPD
Sample Date:	20 Nov-16 22:40	**Material:**	Sample Water	**Project:**	2016/17-2 (Wet)
Receipt Date:	21 Nov-16 08:42	**Source:**	Bioassay Report		
Sample Age:	40h	**Station:**	MO-HUE		

Multiple Comparison Summary

Analysis ID	Endpoint	Comparison Method	NOEL	LOEL	TOEL	TU	PMSD	✓
04-0448-8084	7d Survival Rate	Steel Many-One Rank Sum Test	100	> 100	n/a	1	9.1%	
09-7666-2120	Mean Dry Biomass-mg	Dunnett Multiple Comparison Test	100	> 100	n/a	1	41.9%	

Point Estimate Summary

Analysis ID	Endpoint	Point Estimate Method	Level	%	95% LCL	95% UCL	TU	✓
20-1446-6951	7d Survival Rate	Linear Interpolation (ICPIN)	EC5	>100	n/a	n/a	<1	✓
			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	✓
03-1453-1675	Mean Dry Biomass-mg	Linear Interpolation (ICPIN)	IC5	>100	n/a	n/a	<1	✓
			IC10	>100	n/a	n/a	<1	✓
			IC15	>100	n/a	n/a	<1	✓
			IC20	>100	n/a	n/a	<1	✓
			IC25	>100	n/a	n/a	<1	✓
			IC40	>100	n/a	n/a	<1	✓
			IC50	>100	n/a	n/a	<1	✓

Test Acceptability

				TAC Limits			
Analysis ID	**Endpoint**	**Attribute**	**Test Stat**	**Lower**	**Upper**	**Overlap**	**Decision**
04-0448-8084	7d Survival Rate	Control Resp	0.96	0.8	>>	Yes	Passes Criteria
20-1446-6951	7d Survival Rate	Control Resp	0.96	0.8	>>	Yes	Passes Criteria
03-1453-1675	Mean Dry Biomass-mg	Control Resp	0.9976	0.85	>>	Yes	Passes Criteria
09-7666-2120	Mean Dry Biomass-mg	Control Resp	0.9976	0.85	>>	Yes	Passes Criteria

7d Survival Rate Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	N	5	0.9600	0.8489	1.0000	0.8000	1.0000	0.0400	0.0894	9.32%	0.00%
6.25		5	0.9600	0.8489	1.0000	0.8000	1.0000	0.0400	0.0894	9.32%	0.00%
12.5		5	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	-4.17%
25		5	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	-4.17%
50		5	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	-4.17%
100		5	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	-4.17%

Mean Dry Biomass-mg Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	N	5	0.9976	0.7987	1.196	0.82	1.2	0.07164	0.1602	16.06%	0.00%
6.25		5	1.22	0.8366	1.603	0.922	1.722	0.1381	0.3088	25.31%	-22.29%
12.5		5	1.501	1.136	1.866	1.234	1.976	0.1315	0.294	19.59%	-50.48%
25		5	1.652	1.136	2.168	1.224	2.138	0.1858	0.4155	25.15%	-65.64%
50		5	1.359	1.011	1.707	1.07	1.798	0.1254	0.2804	20.63%	-36.25%
100		5	1.32	1.184	1.457	1.124	1.38	0.0492	0.11	8.33%	-32.36%

Pacific Topsmelt 7-d Survival and Growth Test — **Aquatic Bioassay & Consulting Labs, Inc.**

7d Survival Rate Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	N	0.8000	1.0000	1.0000	1.0000	1.0000
6.25		1.0000	1.0000	1.0000	0.8000	1.0000
12.5		1.0000	1.0000	1.0000	1.0000	1.0000
25		1.0000	1.0000	1.0000	1.0000	1.0000
50		1.0000	1.0000	1.0000	1.0000	1.0000
100		1.0000	1.0000	1.0000	1.0000	1.0000

Mean Dry Biomass-mg Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	N	0.82	1.1	1.2	1.01	0.858
6.25		1.044	1.138	1.722	0.922	1.274
12.5		1.418	1.976	1.234	1.57	1.308
25		1.224	1.24	1.968	2.138	1.692
50		1.38	1.382	1.798	1.07	1.166
100		1.124	1.364	1.362	1.372	1.38

7d Survival Rate Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	N	4/5	5/5	5/5	5/5	5/5
6.25		5/5	5/5	5/5	4/5	5/5
12.5		5/5	5/5	5/5	5/5	5/5
25		5/5	5/5	5/5	5/5	5/5
50		5/5	5/5	5/5	5/5	5/5
100		5/5	5/5	5/5	5/5	5/5

CETIS Analytical Report

Pacific Topsmelt 7-d Survival and Growth Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Analysis ID:	04-0448-8084	**Endpoint:**	7d Survival Rate	**CETIS Version:**	CETISv1.9.2
Analyzed:	06 Jan-17 9:55	**Analysis:**	Nonparametric-Control vs Treatments	**Official Results:**	Yes

Batch ID:	15-8612-2226	**Test Type:**	Growth-Survival (7d)	**Analyst:**	Joe Freas
Start Date:	22 Nov-16 14:49	**Protocol:**	EPA/600/R-95/136 (1995)	**Diluent:**	Laboratory Seawater
Ending Date:	29 Nov-16 12:50	**Species:**	Atherinops affinis	**Brine:**	Not Applicable
Duration:	6d 22h	**Source:**	Aquatic Biosystems, CO	**Age:**	

Sample ID:	06-6695-0374	**Code:**	VCF1116.216	**Client:**	VCWPD
Sample Date:	20 Nov-16 22:40	**Material:**	Sample Water	**Project:**	2016/17-2 (Wet)
Receipt Date:	21 Nov-16 08:42	**Source:**	Bioassay Report		
Sample Age:	40h	**Station:**	MO-HUE		

Data Transform	Alt Hyp	NOEL	LOEL	TOEL	TU	PMSD
Angular (Corrected)	C > T	100	> 100	n/a	1	9.10%

Steel Many-One Rank Sum Test

Control vs	Conc-%	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Negative Control	6.25	27.5	16	2	8	Asymp	0.8333	Non-Significant Effect
	12.5	30	16	1	8	Asymp	0.9446	Non-Significant Effect
	25	30	16	1	8	Asymp	0.9446	Non-Significant Effect
	50	30	16	1	8	Asymp	0.9446	Non-Significant Effect
	100	30	16	1	8	Asymp	0.9446	Non-Significant Effect

Test Acceptability Criteria

Attribute	Test Stat	TAC Limits Lower	TAC Limits Upper	Overlap	Decision
Control Resp	0.96	0.8	>>	Yes	Passes Criteria

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0151221	0.0030244	5	0.8	0.5606	Non-Significant Effect
Error	0.0907326	0.0037805	24			
Total	0.105855		29			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Levene Equality of Variance Test	5.689	3.895	0.0013	Unequal Variances
Variances	Mod Levene Equality of Variance Test	0.8	4.248	0.5640	Equal Variances
Distribution	Anderson-Darling A2 Normality Test	5.866	3.878	<1.0E-37	Non-Normal Distribution
Distribution	D'Agostino Kurtosis Test	3.762	2.576	1.7E-04	Non-Normal Distribution
Distribution	D'Agostino Skewness Test	4.626	2.576	3.7E-06	Non-Normal Distribution
Distribution	D'Agostino-Pearson K2 Omnibus Test	35.55	9.21	<1.0E-37	Non-Normal Distribution
Distribution	Kolmogorov-Smirnov D Test	0.4333	0.1853	3.4E-16	Non-Normal Distribution
Distribution	Shapiro-Wilk W Normality Test	0.5454	0.9031	1.7E-08	Non-Normal Distribution

7d Survival Rate Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	N	5	0.9600	0.8489	1.0000	1.0000	0.8000	1.0000	0.0400	9.32%	0.00%
6.25		5	0.9600	0.8489	1.0000	1.0000	0.8000	1.0000	0.0400	9.32%	0.00%
12.5		5	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	-4.17%
25		5	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	-4.17%
50		5	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	-4.17%
100		5	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	-4.17%

Pacific Topsmelt 7-d Survival and Growth Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Analysis ID: 04-0448-8084 **Endpoint:** 7d Survival Rate **CETIS Version:** CETISv1.9.2
Analyzed: 06 Jan-17 9:55 **Analysis:** Nonparametric-Control vs Treatments **Official Results:** Yes

Angular (Corrected) Transformed Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	N	5	1.298	1.165	1.43	1.345	1.107	1.345	0.04763	8.21%	0.00%
6.25		5	1.298	1.165	1.43	1.345	1.107	1.345	0.04763	8.21%	0.00%
12.5		5	1.345	1.345	1.346	1.345	1.345	1.345	0	0.00%	-3.67%
25		5	1.345	1.345	1.346	1.345	1.345	1.345	0	0.00%	-3.67%
50		5	1.345	1.345	1.346	1.345	1.345	1.345	0	0.00%	-3.67%
100		5	1.345	1.345	1.346	1.345	1.345	1.345	0	0.00%	-3.67%

7d Survival Rate Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	N	0.8000	1.0000	1.0000	1.0000	1.0000
6.25		1.0000	1.0000	1.0000	0.8000	1.0000
12.5		1.0000	1.0000	1.0000	1.0000	1.0000
25		1.0000	1.0000	1.0000	1.0000	1.0000
50		1.0000	1.0000	1.0000	1.0000	1.0000
100		1.0000	1.0000	1.0000	1.0000	1.0000

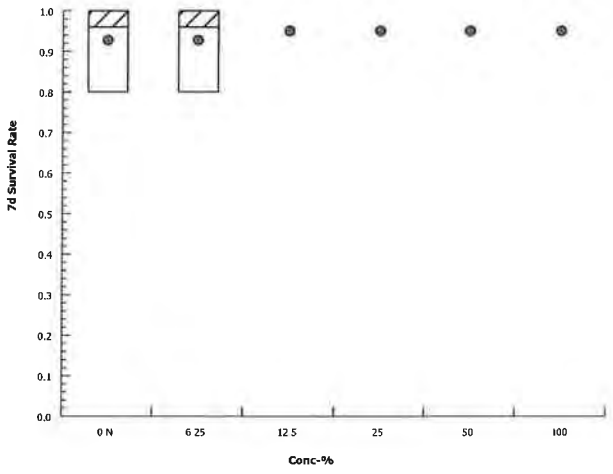
Angular (Corrected) Transformed Detail

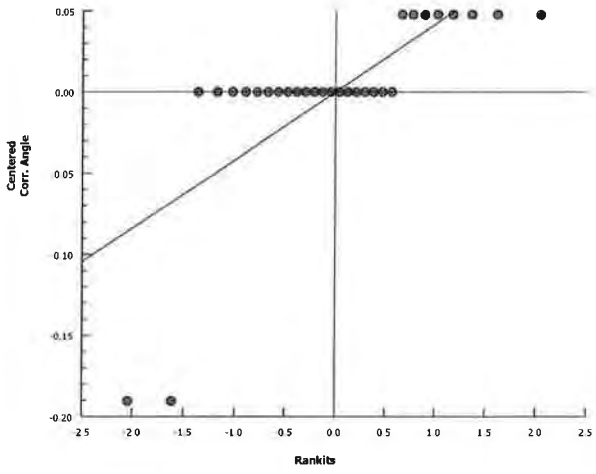
Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	N	1.107	1.345	1.345	1.345	1.345
6.25		1.345	1.345	1.345	1.107	1.345
12.5		1.345	1.345	1.345	1.345	1.345
25		1.345	1.345	1.345	1.345	1.345
50		1.345	1.345	1.345	1.345	1.345
100		1.345	1.345	1.345	1.345	1.345

7d Survival Rate Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	N	4/5	5/5	5/5	5/5	5/5
6.25		5/5	5/5	5/5	4/5	5/5
12.5		5/5	5/5	5/5	5/5	5/5
25		5/5	5/5	5/5	5/5	5/5
50		5/5	5/5	5/5	5/5	5/5
100		5/5	5/5	5/5	5/5	5/5

Graphics





Pacific Topsmelt 7-d Survival and Growth Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Analysis ID:	09-7666-2120	**Endpoint:**	Mean Dry Biomass-mg	**CETIS Version:**	CETISv1.9.2
Analyzed:	06 Jan-17 9:55	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes
Batch ID:	15-8612-2226	**Test Type:**	Growth-Survival (7d)	**Analyst:**	Joe Freas
Start Date:	22 Nov-16 14:49	**Protocol:**	EPA/600/R-95/136 (1995)	**Diluent:**	Laboratory Seawater
Ending Date:	29 Nov-16 12:50	**Species:**	Atherinops affinis	**Brine:**	Not Applicable
Duration:	6d 22h	**Source:**	Aquatic Biosystems, CO	**Age:**	
Sample ID:	06-6695-0374	**Code:**	VCF1116.216	**Client:**	VCWPD
Sample Date:	20 Nov-16 22:40	**Material:**	Sample Water	**Project:**	2016/17-2 (Wet)
Receipt Date:	21 Nov-16 08:42	**Source:**	Bioassay Report		
Sample Age:	40h	**Station:**	MO-HUE		

Data Transform	Alt Hyp	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	C > T	100	> 100	n/a	1	41.94%

Dunnett Multiple Comparison Test

Control vs	Conc-%	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Negative Control	6.25	-1.255	2.362	0.418	8	CDF	0.9920	Non-Significant Effect
	12.5	-2.842	2.362	0.418	8	CDF	1.0000	Non-Significant Effect
	25	-3.696	2.362	0.418	8	CDF	1.0000	Non-Significant Effect
	50	-2.041	2.362	0.418	8	CDF	0.9994	Non-Significant Effect
	100	-1.822	2.362	0.418	8	CDF	0.9987	Non-Significant Effect

Test Acceptability Criteria

Attribute	Test Stat	TAC Limits Lower	TAC Limits Upper	Overlap	Decision
Control Resp	0.9976	0.85	>>	Yes	Passes Criteria

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.27975	0.25595	5	3.262	0.0218	Significant Effect
Error	1.88333	0.0784721	24			
Total	3.16308		29			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance Test	6.945	15.09	0.2248	Equal Variances
Variances	Levene Equality of Variance Test	1.763	3.895	0.1587	Equal Variances
Variances	Mod Levene Equality of Variance Test	2.147	4.248	0.1062	Equal Variances
Distribution	Anderson-Darling A2 Normality Test	0.7524	3.878	0.0499	Normal Distribution
Distribution	D'Agostino Kurtosis Test	0.1039	2.576	0.9172	Normal Distribution
Distribution	D'Agostino Skewness Test	1.183	2.576	0.2368	Normal Distribution
Distribution	D'Agostino-Pearson K2 Omnibus Test	1.41	9.21	0.4940	Normal Distribution
Distribution	Kolmogorov-Smirnov D Test	0.1603	0.1853	0.0477	Normal Distribution
Distribution	Shapiro-Wilk W Normality Test	0.9378	0.9031	0.0795	Normal Distribution

Mean Dry Biomass-mg Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	N	5	0.9976	0.7987	1.196	1.01	0.82	1.2	0.07164	16.06%	0.00%
6.25		5	1.22	0.8366	1.603	1.138	0.922	1.722	0.1381	25.31%	-22.29%
12.5		5	1.501	1.136	1.866	1.418	1.234	1.976	0.1315	19.59%	-50.48%
25		5	1.652	1.136	2.168	1.692	1.224	2.138	0.1858	25.15%	-65.64%
50		5	1.359	1.011	1.707	1.38	1.07	1.798	0.1254	20.63%	-36.25%
100		5	1.32	1.184	1.457	1.364	1.124	1.38	0.0492	8.33%	-32.36%

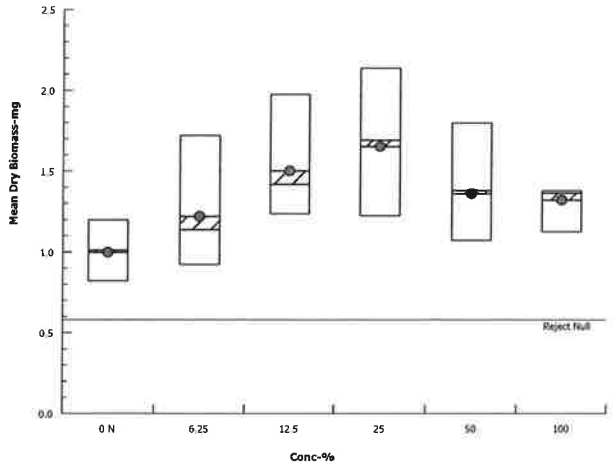
Pacific Topsmelt 7-d Survival and Growth Test — **Aquatic Bioassay & Consulting Labs, Inc.**

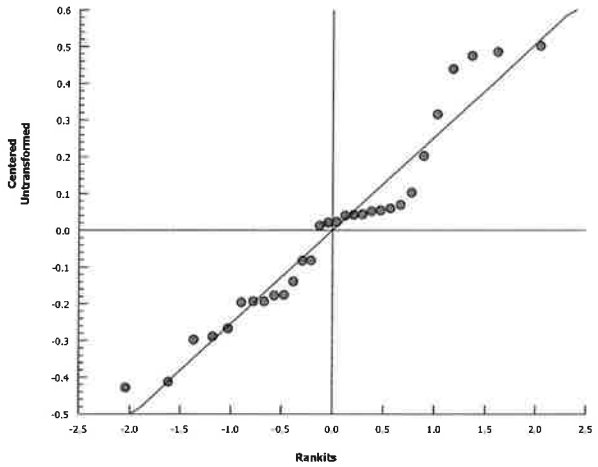
Analysis ID:	09-7666-2120	**Endpoint:**	Mean Dry Biomass-mg	**CETIS Version:**	CETISv1.9.2
Analyzed:	06 Jan-17 9:55	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes

Mean Dry Biomass-mg Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	N	0.82	1.1	1.2	1.01	0.858
6.25		1.044	1.138	1.722	0.922	1.274
12.5		1.418	1.976	1.234	1.57	1.308
25		1.224	1.24	1.968	2.138	1.692
50		1.38	1.382	1.798	1.07	1.166
100		1.124	1.364	1.362	1.372	1.38

Graphics





CETIS Analytical Report

Pacific Topsmelt 7-d Survival and Growth Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Analysis ID:	20-1446-6951	**Endpoint:**	7d Survival Rate	**CETIS Version:**	CETISv1.9.2
Analyzed:	06 Jan-17 9:56	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	15-8612-2226	**Test Type:**	Growth-Survival (7d)	**Analyst:**	Joe Freas
Start Date:	22 Nov-16 14:49	**Protocol:**	EPA/600/R-95/136 (1995)	**Diluent:**	Laboratory Seawater
Ending Date:	29 Nov-16 12:50	**Species:**	Atherinops affinis	**Brine:**	Not Applicable
Duration:	6d 22h	**Source:**	Aquatic Biosystems, CO	**Age:**	
Sample ID:	06-6695-0374	**Code:**	VCF1116.216	**Client:**	VCWPD
Sample Date:	20 Nov-16 22:40	**Material:**	Sample Water	**Project:**	2016/17-2 (Wet)
Receipt Date:	21 Nov-16 08:42	**Source:**	Bioassay Report		
Sample Age:	40h	**Station:**	MO-HUE		

Linear Interpolation Options

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

Test Acceptability Criteria

		TAC Limits			
Attribute	**Test Stat**	**Lower**	**Upper**	**Overlap**	**Decision**
Control Resp	0.96	0.8	>>	Yes	Passes Criteria

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC5	>100	n/a	n/a	<1	n/a	n/a
EC10	>100	n/a	n/a	<1	n/a	n/a
EC15	>100	n/a	n/a	<1	n/a	n/a
EC20	>100	n/a	n/a	<1	n/a	n/a
EC25	>100	n/a	n/a	<1	n/a	n/a
EC40	>100	n/a	n/a	<1	n/a	n/a
EC50	>100	n/a	n/a	<1	n/a	n/a

7d Survival Rate Summary — Calculated Variate(A/B)

Conc-%	Code	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	A	B
0	N	5	0.9600	0.8000	1.0000	0.0400	0.0894	9.32%	0.0%	24	25
6.25		5	0.9600	0.8000	1.0000	0.0400	0.0894	9.32%	0.0%	24	25
12.5		5	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	-4.17%	25	25
25		5	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	-4.17%	25	25
50		5	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	-4.17%	25	25
100		5	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	-4.17%	25	25

7d Survival Rate Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	N	0.8000	1.0000	1.0000	1.0000	1.0000
6.25		1.0000	1.0000	1.0000	0.8000	1.0000
12.5		1.0000	1.0000	1.0000	1.0000	1.0000
25		1.0000	1.0000	1.0000	1.0000	1.0000
50		1.0000	1.0000	1.0000	1.0000	1.0000
100		1.0000	1.0000	1.0000	1.0000	1.0000

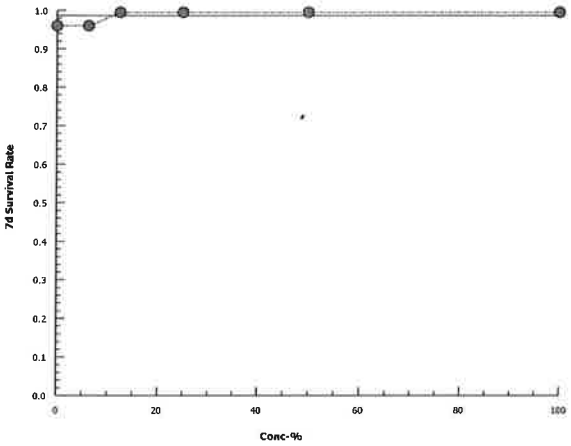
7d Survival Rate Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	N	4/5	5/5	5/5	5/5	5/5
6.25		5/5	5/5	5/5	4/5	5/5
12.5		5/5	5/5	5/5	5/5	5/5
25		5/5	5/5	5/5	5/5	5/5
50		5/5	5/5	5/5	5/5	5/5
100		5/5	5/5	5/5	5/5	5/5

Pacific Topsmelt 7-d Survival and Growth Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Analysis ID:	20-1446-6951	**Endpoint:**	7d Survival Rate	**CETIS Version:**	CETISv1.9.2
Analyzed:	06 Jan-17 9:56	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



Pacific Topsmelt 7-d Survival and Growth Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Analysis ID:	03-1453-1675	**Endpoint:**	Mean Dry Biomass-mg	**CETIS Version:**	CETISv1.9.2
Analyzed:	06 Jan-17 9:56	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	15-8612-2226	**Test Type:**	Growth-Survival (7d)	**Analyst:**	Joe Freas
Start Date:	22 Nov-16 14:49	**Protocol:**	EPA/600/R-95/136 (1995)	**Diluent:**	Laboratory Seawater
Ending Date:	29 Nov-16 12:50	**Species:**	Atherinops affinis	**Brine:**	Not Applicable
Duration:	6d 22h	**Source:**	Aquatic Biosystems, CO	**Age:**	
Sample ID:	06-6695-0374	**Code:**	VCF1116.216	**Client:**	VCWPD
Sample Date:	20 Nov-16 22:40	**Material:**	Sample Water	**Project:**	2016/17-2 (Wet)
Receipt Date:	21 Nov-16 08:42	**Source:**	Bioassay Report		
Sample Age:	40h	**Station:**	MO-HUE		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Linear	Linear	269459	280	Yes	Two-Point Interpolation

Test Acceptability Criteria

		TAC Limits			
Attribute	**Test Stat**	**Lower**	**Upper**	**Overlap**	**Decision**
Control Resp	0.9976	0.85	>>	Yes	Passes Criteria

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	>100	n/a	n/a	<1	n/a	n/a
IC10	>100	n/a	n/a	<1	n/a	n/a
IC15	>100	n/a	n/a	<1	n/a	n/a
IC20	>100	n/a	n/a	<1	n/a	n/a
IC25	>100	n/a	n/a	<1	n/a	n/a
IC40	>100	n/a	n/a	<1	n/a	n/a
IC50	>100	n/a	n/a	<1	n/a	n/a

Mean Dry Biomass-mg Summary

			Calculated Variate						
Conc-%	**Code**	**Count**	**Mean**	**Min**	**Max**	**Std Err**	**Std Dev**	**CV%**	**%Effect**
0	N	5	0.9976	0.82	1.2	0.07164	0.1602	16.06%	0.0%
6.25		5	1.22	0.922	1.722	0.1381	0.3088	25.31%	-22.29%
12.5		5	1.501	1.234	1.976	0.1315	0.294	19.59%	-50.48%
25		5	1.652	1.224	2.138	0.1858	0.4155	25.15%	-65.64%
50		5	1.359	1.07	1.798	0.1254	0.2804	20.63%	-36.25%
100		5	1.32	1.124	1.38	0.0492	0.11	8.33%	-32.36%

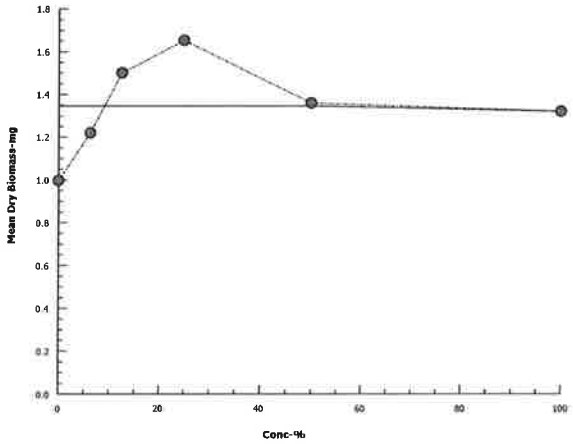
Mean Dry Biomass-mg Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	N	0.82	1.1	1.2	1.01	0.858
6.25		1.044	1.138	1.722	0.922	1.274
12.5		1.418	1.976	1.234	1.57	1.308
25		1.224	1.24	1.968	2.138	1.692
50		1.38	1.382	1.798	1.07	1.166
100		1.124	1.364	1.362	1.372	1.38

Pacific Topsmelt 7-d Survival and Growth Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Analysis ID:	03-1453-1675	**Endpoint:**	Mean Dry Biomass-mg	**CETIS Version:**	CETISv1.9.2
Analyzed:	06 Jan-17 9:56	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



Analyst: _____ QA: _____

Pacific Topsmelt 7-d Survival and Growth Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Batch ID:	15-8612-2226	**Test Type:**	Growth-Survival (7d)	**Analyst:**	Joe Freas
Start Date:	22 Nov-16 14:49	**Protocol:**	EPA/600/R-95/136 (1995)	**Diluent:**	Laboratory Seawater
Ending Date:	29 Nov-16 12:50	**Species:**	Atherinops affinis	**Brine:**	Not Applicable
Duration:	6d 22h	**Source:**	Aquatic Biosystems, CO	**Age:**	

Sample ID:	06-6695-0374	**Code:**	VCF1116.216	**Client:**	VCWPD
Sample Date:	20 Nov-16 22:40	**Material:**	Sample Water	**Project:**	2016/17-2 (Wet)
Receipt Date:	21 Nov-16 08:42	**Source:**	Bioassay Report		
Sample Age:	40h	**Station:**	MO-HUE		

Dissolved Oxygen-mg/L

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	8	7.363	7	7.725	6.9	7.9	0.1535	0.434	5.9%	0
6.25		8	7.238	6.928	7.547	6.8	7.8	0.1308	0.3701	5.11%	0
12.5		8	7.237	6.9	7.575	6.7	7.8	0.1426	0.4033	5.57%	0
25		8	7.2	6.875	7.525	6.7	7.7	0.1376	0.3891	5.41%	0
50		8	7.125	6.823	7.427	6.7	7.7	0.1278	0.3615	5.07%	0
100		8	6.863	6.537	7.188	6.1	7.5	0.1375	0.3889	5.67%	0
Overall		48	7.171	7.054	7.288	6.1	7.9	0.05804	0.4021	5.61%	0 (0%)

pH-Units

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	8	7.213	6.962	7.463	6.8	7.6	0.106	0.2997	4.16%	0
6.25		8	7.612	7.508	7.717	7.4	7.8	0.04407	0.1246	1.64%	0
12.5		8	7.65	7.573	7.727	7.5	7.8	0.03273	0.09258	1.21%	0
25		8	7.675	7.568	7.782	7.5	7.9	0.04532	0.1282	1.67%	0
50		8	7.712	7.659	7.766	7.6	7.8	0.02266	0.06409	0.83%	0
100		8	7.762	7.674	7.851	7.6	7.9	0.0375	0.1061	1.37%	0
Overall		48	7.604	7.536	7.672	6.8	7.9	0.03394	0.2352	3.09%	0 (0%)

Salinity-ppt

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	8	25	25	25	25	25	0	0	0.0%	0
6.25		8	25	25	25	25	25	0	0	0.0%	0
12.5		8	25	25	25	25	25	0	0	0.0%	0
25		8	25	25	25	25	25	0	0	0.0%	0
50		8	25	25	25	25	25	0	0	0.0%	0
100		8	25	25	25	25	25	0	0	0.0%	0
Overall		48	25	25	25	25	25	0	0	0.00%	0 (0%)

Temperature-°C

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	8	21	21	21	21	21	0	0	0.0%	0
6.25		8	21	21	21	21	21	0	0	0.0%	0
12.5		8	21	21	21	21	21	0	0	0.0%	0
25		8	21	21	21	21	21	0	0	0.0%	0
50		8	21	21	21	21	21	0	0	0.0%	0
100		8	21	21	21	21	21	0	0	0.0%	0
Overall		48	21	21	21	21	21	0	0	0.00%	0 (0%)

Pacific Topsmelt 7-d Survival and Growth Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Dissolved Oxygen-mg/L

Conc-%	Code	1	2	3	4	5	6	7	8
0	N	7.1	7	6.9	6.9	7.9	7.6	7.6	7.9
6.25		7.2	7	6.8	6.8	7.8	7.5	7.6	7.2
12.5		7.2	7	6.7	6.8	7.8	7.5	7.7	7.2
25		7.1	7.1	6.7	6.8	7.7	7.5	7.7	7
50		7	7	6.7	6.8	7.5	7.4	7.7	6.9
100		6.1	7	6.7	6.8	7	6.9	7.5	6.9

pH-Units

Conc-%	Code	1	2	3	4	5	6	7	8
0	N	7	7.4	7.5	7.6	6.8	7.4	7.1	6.9
6.25		7.8	7.7	7.6	7.7	7.4	7.6	7.6	7.5
12.5		7.8	7.7	7.6	7.7	7.5	7.7	7.6	7.6
25		7.9	7.8	7.6	7.7	7.5	7.7	7.6	7.6
50		7.7	7.8	7.7	7.7	7.6	7.8	7.7	7.7
100		7.7	7.8	7.7	7.7	7.6	7.9	7.8	7.9

Salinity-ppt

Conc-%	Code	1	2	3	4	5	6	7	8
0	N	25	25	25	25	25	25	25	25
6.25		25	25	25	25	25	25	25	25
12.5		25	25	25	25	25	25	25	25
25		25	25	25	25	25	25	25	25
50		25	25	25	25	25	25	25	25
100		25	25	25	25	25	25	25	25

Temperature-°C

Conc-%	Code	1	2	3	4	5	6	7	8
0	N	21	21	21	21	21	21	21	21
6.25		21	21	21	21	21	21	21	21
12.5		21	21	21	21	21	21	21	21
25		21	21	21	21	21	21	21	21
50		21	21	21	21	21	21	21	21
100		21	21	21	21	21	21	21	21

Chain of Custody Record

Ventura County Watershed Protection District

NPDES Stormwater Monitoring Program

Project: NPDES Stormwater Wet Season

Toxicity - ABC Laboratories

Side 1 of 1

Sampling Date: 11/20/2016 Project Number: 2016/17-2 (Wet)

Sampling Team: Anne A., Dean W., Steven G.

SAMPLE ID	DATE/TIME COLLECTED	Chronic toxicity - topsmelt (*Atherinops affinis*)	Chronic toxicity - inland silverside (*Menidia beryllina*)	Chronic toxicity - giant kelp (*Macrocystis pyrifera*)	Chronic toxicity - purple sea urchin (*Strongylocentrotus purpuratus*)	Chronic toxicity - fathead minnow (*Pimephales promelas*)	Chronic toxicity - daphnid (*Ceriodaphnia dubia*)	Chronic toxicity - green alga (*Raphidocelis subcapitata*)	Number of 5-Gallon Buckets	NOTES
~~ME-SCR~~					X				2	Note 1, Note 2, Note 3
MO-CAM	11-20-16 21145					X			2	Note 1, Note 2, Note 3
MO-HUE	11-20-16 22140						X		2	Note 1, Note 2, Note 3,Note 4

CAM = HUE
7.52 = 5.02
20.1 = 20.1
3.0 = 1.0

Relinquished Printed Name Steven S. Greene

Signature Steven S. Greene

Affiliation VCWPD Date/Tim 11/21/2016 0842

Received Printed Name ELIZABETH MAYMUD

Signature

Affiliation ABC LABS. Date/Tim 11-21-16 0842

Other Notes: Note 1: Dilutions - 6.25%, 12.5%, 25%, 50%, 100% Note 2: Please execute TIE if mortality > 50%

Note 3: Notify District within 24 hours if significant toxicity is observed.

Note 4: If salinity >2 ppt then also run topsmelt for comparison. If topsmelt unavailable, use *Hyalella*

aquatic bioassay & consulting laboratories, inc

January 25, 2017

Mr. Arne Anselm
Ventura County Watershed Protection District
800 South Victoria Ave
Ventura, CA 93009

Dear Mr. Anselm:

We are pleased to present the enclosed revised bioassay report. The test was conducted under guidelines prescribed in *Short-Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms" EPA-821-R-02-013.* "All acceptability criteria were met and the concentration-response was normal. This is a valid test." Results were as follows:

CLIENT:	Ventura County Flood Control
SAMPLE I.D.:	MO-CAM TIE 45µm Filtration
DATE RECEIVED:	11/21/2016
ABC LAB. NO.:	VCF1116.215

CHRONIC FATHEAD MINNOW SURVIVAL & GROWTH BIOASSAY

SURVIVAL	PERCENT EFFECT = 0.00%
BIOMASS	PERCENT EFFECT = 3.51%

***NOTE:TIE 45µm Filtration**. Toxicity was reduced from 31.67% effect in the undiluted sample to 0.00% effect in the 45µm filtered sample. It is our opinion that the toxicity in this sample was caused by a species of freshwater algae. The dissolved oxygen in primary testing declined during the incubation periods which led us to believe algae could be the culprit. Upon filtering the sample it was noted the filter appeared to turn green during the process. Once filtered the sample did not experience a drop in dissolved oxygen. Due to these lines of evidence we suspect toxicity exhibited by this sample to be caused by freshwater algae present in solution.

Yours very truly,

R. Scott Johnson
Laboratory Director

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

CETIS Summary Report

Fathead Minnow 7-d Larval Survival and Growth Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Batch ID:	08-8081-5329	**Test Type:**	Growth-Survival (7d)	**Analyst:**	Joe Freas
Start Date:	13 Dec-16 15:30	**Protocol:**	EPA/821/R-02-013 (2002)	**Diluent:**	Laboratory Water
Ending Date:	20 Dec-16 13:30	**Species:**	Pimephales promelas	**Brine:**	Not Applicable
Duration:	6d 22h	**Source:**	Aquatic Biosystems, CO	**Age:**	
Sample ID:	10-4066-7227	**Code:**	VCF1116.215TIE	**Client:**	VCWPD
Sample Date:	20 Nov-16 11:45	**Material:**	Sample Water	**Project:**	TIE
Receipt Date:	21 Nov-16 08:42	**Source:**	Bioassay Report		
Sample Age:	23d 4h	**Station:**	MO-CAM		

Comments:
TIE 45um Filtration

SIngle Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result
15-8818-1635	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	0.7857	100% passed 7d survival rate
14-2337-4423	Mean Dry Biomass-mg	Equal Variance t Two-Sample Test	0.2719	100% passed mean dry biomass-mg

Test Acceptability

				TAC Limits			
Analysis ID	**Endpoint**	**Attribute**	**Test Stat**	**Lower**	**Upper**	**Overlap**	**Decision**
15-8818-1635	7d Survival Rate	Control Resp	0.9833	0.8	>>	Yes	Passes Criteria
14-2337-4423	Mean Dry Biomass-mg	Control Resp	0.2988	0.25	>>	Yes	Passes Criteria

7d Survival Rate Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	N	4	0.9833	0.9303	1.0000	0.9333	1.0000	0.0167	0.0333	3.39%	0.00%
100		4	0.9833	0.9303	1.0000	0.9333	1.0000	0.0167	0.0333	3.39%	0.00%

Mean Dry Biomass-mg Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	N	4	0.2988	0.2675	0.3302	0.2787	0.3233	0.00986	0.01972	6.60%	0.00%
100		4	0.2883	0.2469	0.3297	0.274	0.3273	0.01301	0.02602	9.03%	3.51%

7d Survival Rate Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	N	0.9333	1.0000	1.0000	1.0000
100		0.9333	1.0000	1.0000	1.0000

Mean Dry Biomass-mg Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	N	0.3053	0.2787	0.3233	0.288
100		0.2753	0.2767	0.274	0.3273

7d Survival Rate Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	N	14/15	15/15	15/15	15/15
100		14/15	15/15	15/15	15/15

CETIS Analytical Report

Fathead Minnow 7-d Larval Survival and Growth Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Analysis ID:	15-8818-1635	**Endpoint:**	7d Survival Rate	**CETIS Version:**	CETISv1.9.2
Analyzed:	25 Jan-17 11:40	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes
Batch ID:	08-8081-5329	**Test Type:**	Growth-Survival (7d)	**Analyst:**	Joe Freas
Start Date:	13 Dec-16 15:30	**Protocol:**	EPA/821/R-02-013 (2002)	**Diluent:**	Laboratory Water
Ending Date:	20 Dec-16 13:30	**Species:**	Pimephales promelas	**Brine:**	Not Applicable
Duration:	6d 22h	**Source:**	Aquatic Biosystems, CO	**Age:**	
Sample ID:	10-4066-7227	**Code:**	VCF1116.215TIE	**Client:**	VCWPD
Sample Date:	20 Nov-16 11:45	**Material:**	Sample Water	**Project:**	TIE
Receipt Date:	21 Nov-16 08:42	**Source:**	Bioassay Report		
Sample Age:	23d 4h	**Station:**	MO-CAM		

Comments:
TIE 45um Filtration

Data Transform	Alt Hyp	Comparison Result	PMSD
Angular (Corrected)	C > T	100% passed 7d survival rate	4.67%

Wilcoxon Rank Sum Two-Sample Test

Control	vs	Conc-%	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Negative Control		100	18	n/a	2	6	Exact	0.7857	Non-Significant Effect

Test Acceptability Criteria

		TAC Limits			
Attribute	**Test Stat**	**Lower**	**Upper**	**Overlap**	**Decision**
Control Resp	0.9833	0.8	>>	Yes	Passes Criteria

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0	0	1	0	1.0000	Non-Significant Effect
Error	0.026016	0.004336	6			
Total	0.026016		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Levene Equality of Variance Test	0	13.75	1.0000	Equal Variances
Variances	Mod Levene Equality of Variance Test	0	13.75	1.0000	Equal Variances
Variances	Variance Ratio F Test	1	47.47	1.0000	Equal Variances
Distribution	Anderson-Darling A2 Normality Test	1.973	3.878	<1.0E-37	Non-Normal Distribution
Distribution	Kolmogorov-Smirnov D Test	0.4554	0.3313	2.1E-05	Non-Normal Distribution
Distribution	Shapiro-Wilk W Normality Test	0.5659	0.6451	6.3E-05	Non-Normal Distribution

7d Survival Rate Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	N	4	0.9833	0.9303	1.0000	1.0000	0.9333	1.0000	0.0167	3.39%	0.00%
100		4	0.9833	0.9303	1.0000	1.0000	0.9333	1.0000	0.0167	3.39%	0.00%

Angular (Corrected) Transformed Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	N	4	1.408	1.304	1.513	1.441	1.31	1.441	0.03292	4.68%	0.00%
100		4	1.408	1.304	1.513	1.441	1.31	1.441	0.03292	4.68%	0.00%

7d Survival Rate Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	N	0.9333	1.0000	1.0000	1.0000
100		0.9333	1.0000	1.0000	1.0000

Fathead Minnow 7-d Larval Survival and Growth Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Analysis ID: 15-8818-1635	**Endpoint:** 7d Survival Rate	**CETIS Version:** CETISv1.9.2	
Analyzed: 25 Jan-17 11:40	**Analysis:** Nonparametric-Two Sample	**Official Results:** Yes	

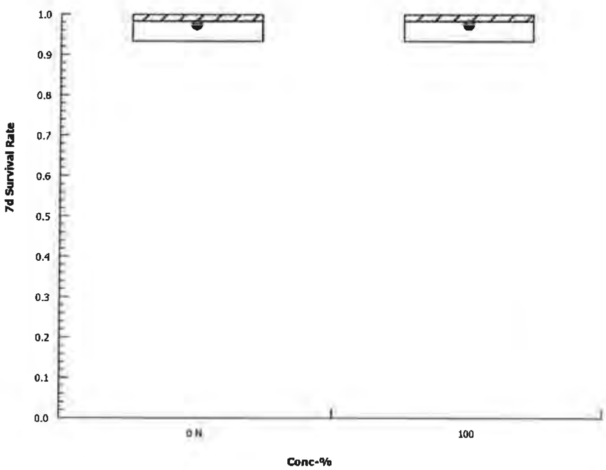
Angular (Corrected) Transformed Detail

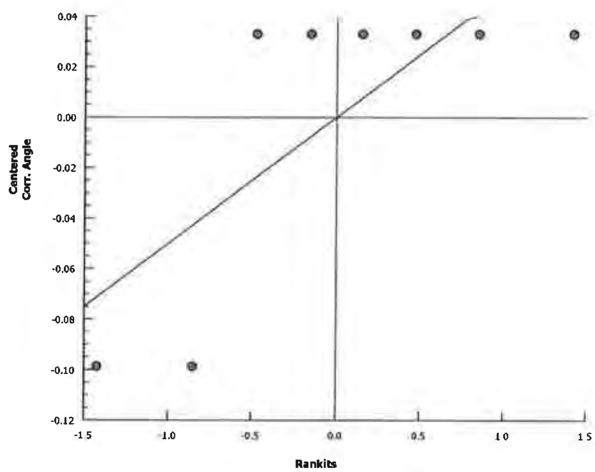
Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	N	1.31	1.441	1.441	1.441
100		1.31	1.441	1.441	1.441

7d Survival Rate Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	N	14/15	15/15	15/15	15/15
100		14/15	15/15	15/15	15/15

Graphics





Fathead Minnow 7-d Larval Survival and Growth Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Analysis ID:	14-2337-4423	**Endpoint:**	Mean Dry Biomass-mg	**CETIS Version:**	CETISv1.9.2
Analyzed:	25 Jan-17 11:39	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes
Batch ID:	08-8081-5329	**Test Type:**	Growth-Survival (7d)	**Analyst:**	Joe Freas
Start Date:	13 Dec-16 15:30	**Protocol:**	EPA/821/R-02-013 (2002)	**Diluent:**	Laboratory Water
Ending Date:	20 Dec-16 13:30	**Species:**	Pimephales promelas	**Brine:**	Not Applicable
Duration:	6d 22h	**Source:**	Aquatic Biosystems, CO	**Age:**	
Sample ID:	10-4066-7227	**Code:**	VCF1116.215TIE	**Client:**	VCWPD
Sample Date:	20 Nov-16 11:45	**Material:**	Sample Water	**Project:**	TIE
Receipt Date:	21 Nov-16 08:42	**Source:**	Bioassay Report		
Sample Age:	23d 4h	**Station:**	MO-CAM		

Comments:
TIE 45um Filtration

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	100% passed mean dry biomass-mg	10.62%

Equal Variance t Two-Sample Test

Control	vs	Conc-%	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Negative Control		100	0.6432	1.943	0.032	6	CDF	0.2719	Non-Significant Effect

Test Acceptability Criteria

		TAC Limits			
Attribute	**Test Stat**	**Lower**	**Upper**	**Overlap**	**Decision**
Control Resp	0.2988	0.25	>>	Yes	Passes Criteria

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0002205	0.0002205	1	0.4137	0.5439	Non-Significant Effect
Error	0.0031981	0.0005330	6			
Total	0.0034186		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Levene Equality of Variance Test	0.2681	13.75	0.6231	Equal Variances
Variances	Mod Levene Equality of Variance Test	0.01905	13.75	0.8947	Equal Variances
Variances	Variance Ratio F Test	1.741	47.47	0.6599	Equal Variances
Distribution	Anderson-Darling A2 Normality Test	0.7494	3.878	0.0508	Normal Distribution
Distribution	Kolmogorov-Smirnov D Test	0.3189	0.3313	0.0163	Normal Distribution
Distribution	Shapiro-Wilk W Normality Test	0.8307	0.6451	0.0604	Normal Distribution

Mean Dry Biomass-mg Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	N	4	0.2988	0.2675	0.3302	0.2967	0.2787	0.3233	0.00986	6.60%	0.00%
100		4	0.2883	0.2469	0.3297	0.276	0.274	0.3273	0.01301	9.03%	3.51%

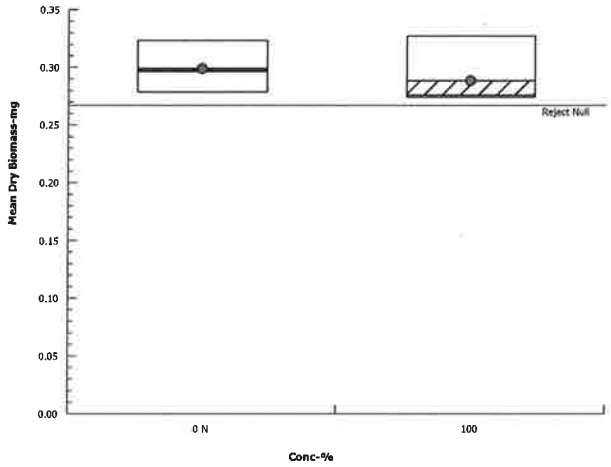
Mean Dry Biomass-mg Detail

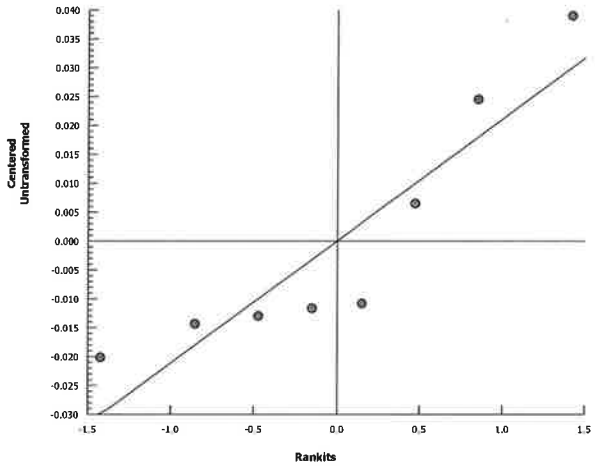
Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	N	0.3053	0.2787	0.3233	0.288
100		0.2753	0.2767	0.274	0.3273

Fathead Minnow 7-d Larval Survival and Growth Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Analysis ID:	14-2337-4423	**Endpoint:**	Mean Dry Biomass-mg	**CETIS Version:**	CETISv1.9.2
Analyzed:	25 Jan-17 11:39	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Graphics





Fathead Minnow 7-d Larval Survival and Growth Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Batch ID:	08-8081-5329	**Test Type:**	Growth-Survival (7d)	**Analyst:**	Joe Freas
Start Date:	13 Dec-16 15:30	**Protocol:**	EPA/821/R-02-013 (2002)	**Diluent:**	Laboratory Water
Ending Date:	20 Dec-16 13:30	**Species:**	Pimephales promelas	**Brine:**	Not Applicable
Duration:	6d 22h	**Source:**	Aquatic Biosystems, CO	**Age:**	
Sample ID:	10-4066-7227	**Code:**	VCF1116.215TIE	**Client:**	VCWPD
Sample Date:	20 Nov-16 11:45	**Material:**	Sample Water	**Project:**	TIE
Receipt Date:	21 Nov-16 08:42	**Source:**	Bioassay Report		
Sample Age:	23d 4h	**Station:**	MO-CAM		

Comments:
TIE 45um Filtration

Alkalinity (CaCO3)-mg/L

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	1	61			61	61	0	0	0.0%	0
100		1	69			69	69	0	0	0.0%	0
Overall		2	65	14.18	115.8	61	69	4	5.657	8.70%	0 (0%)

Dissolved Oxygen-mg/L

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	8	7.863	7.336	8.389	7.3	9.3	0.2228	0.6301	8.01%	0
100		8	7.85	7.732	7.968	7.7	8.1	0.05	0.1414	1.8%	0
Overall		16	7.856	7.621	8.091	7.3	9.3	0.1103	0.4412	5.62%	0 (0%)

Hardness (CaCO3)-mg/L

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	1	84			84	84	0	0	0.0%	0
100		1	138			138	138	0	0	0.0%	0
Overall		2	111	-232.1	454.1	84	138	27	38.18	34.40%	0 (0%)

pH-Units

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	8	8.038	7.904	8.171	7.8	8.2	0.0565	0.1598	1.99%	0
100		8	7.85	7.724	7.976	7.6	8	0.05345	0.1512	1.93%	0
Overall		16	7.944	7.848	8.039	7.6	8.2	0.04469	0.1788	2.25%	0 (0%)

Salinity-ppt

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	8	0	0	0	0	0	0	0		0
100		8	0	0	0	0	0	0	0		0
Overall		16	0	0	0	0	0	0	0	#Num!	0 (0%)

Temperature-°C

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	8	24	24	24	24	24	0	0	0.0%	0
100		8	24.05	23.93	24.17	24	24.4	0.05	0.1414	0.59%	0
Overall		16	24.02	23.97	24.08	24	24.4	0.025	0.1	0.42%	0 (0%)

Fathead Minnow 7-d Larval Survival and Growth Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Alkalinity (CaCO3)-mg/L

Conc-%	Code	1
0	N	61
100		69

Dissolved Oxygen-mg/L

Conc-%	Code	1	2	3	4	5	6	7	8
0	N	8	7.5	7.9	7.8	7.7	7.4	7.3	9.3
100		7.8	7.9	7.8	7.7	7.7	8	8.1	7.8

Hardness (CaCO3)-mg/L

Conc-%	Code	1
0	N	84
100		138

pH-Units

Conc-%	Code	1	2	3	4	5	6	7	8
0	N	8.1	7.8	8	7.8	8.1	8.2	8.1	8.2
100		7.6	7.7	7.8	7.8	8	8	7.9	8

Salinity-ppt

Conc-%	Code	1	2	3	4	5	6	7	8
0	N	0	0	0	0	0	0	0	0
100		0	0	0	0	0	0	0	0

Temperature-°C

Conc-%	Code	1	2	3	4	5	6	7	8
0	N	24	24	24	24	24	24	24	24
100		24	24	24	24	24.4	24	24	24

aquatic bioassay & consulting laboratories, inc

January 25, 2017

Mr. Arne Anselm
Ventura County Watershed Protection District
800 South Victoria Ave
Ventura, CA 93009

Dear Mr. Anselm:

We are pleased to present the enclosed revised bioassay report. The test was conducted under guidelines prescribed in *Short-Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms" EPA-821-R-02-013.* "All acceptability criteria were met and the concentration-response was normal. This is a valid test." Results were as follows:

CLIENT:	Ventura County Flood Control
SAMPLE I.D.:	MO-CAM TIE BASELINE
DATE RECEIVED:	11/21/2016
ABC LAB. NO.:	VCF1116.215

CHRONIC FATHEAD MINNOW SURVIVAL & GROWTH BIOASSAY

SURVIVAL	PERCENT EFFECT = 31.67%
BIOMASS	PERCENT EFFECT = 21.91%

*NOTE:TIE Initiated due to 56.67% effect in initial test and client approval. .

Yours very truly,

Scott Johnson
Laboratory Director

CETIS Summary Report

Fathead Minnow 7-d Larval Survival and Growth Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Batch ID:	15-9137-5191	**Test Type:**	Growth-Survival (7d)	**Analyst:**	Joe Freas
Start Date:	29 Nov-16 13:55	**Protocol:**	EPA/821/R-02-013 (2002)	**Diluent:**	Laboratory Water
Ending Date:	06 Dec-16 11:55	**Species:**	Pimephales promelas	**Brine:**	Not Applicable
Duration:	6d 22h	**Source:**	Aquatic Biosystems, CO	**Age:**	
Sample ID:	18-0627-8157	**Code:**	VCF1116.215Bas	**Client:**	VCWPD
Sample Date:	20 Nov-16	**Material:**	Sample Water	**Project:**	TIE
Receipt Date:	22 Nov-16	**Source:**	Bioassay Report		
Sample Age:	9d 14h	**Station:**	MO-CAM		

Comments:
TIE BASELINE

Multiple Comparison Summary

Analysis ID	Endpoint	Comparison Method	NOEL	LOEL	TOEL	TU	PMSD	✓
03-1954-1442	7d Survival Rate	Dunnett Multiple Comparison Test	< 30	30	n/a	>3.333	8.92%	✓
08-7119-2691	Mean Dry Biomass-mg	Dunnett Multiple Comparison Test	60	100	77.46	1.667	18.6%	

Point Estimate Summary

Analysis ID	Endpoint	Point Estimate Method	Level	%	95% LCL	95% UCL	TU	✓
16-8846-0853	7d Survival Rate	Linear Interpolation (ICPIN)	EC5	12.86	6.686	28.29	7.778	✓
			EC10	25.71	13.37	48.57	3.889	✓
			EC15	40	19.2	76.92	2.5	✓
			EC20	55	28.71	95	1.818	✓
			EC25	73.33	34.55	n/a	1.364	✓
			EC40	>100	n/a	n/a	<1	✓
			EC50	>100	n/a	n/a	<1	✓
05-0696-1533	Mean Dry Biomass-mg	Linear Interpolation (ICPIN)	IC5	60.06	n/a	89.07	1.665	
			IC10	71.58	n/a	111.3	1.397	
			IC15	83.09	14.58	n/a	1.204	
			IC20	94.6	51.32	n/a	1.057	
			IC25	>100	n/a	n/a	<1	
			IC40	>100	n/a	n/a	<1	✓
			IC50	>100	n/a	n/a	<1	✓

Test Acceptability

				TAC Limits			
Analysis ID	**Endpoint**	**Attribute**	**Test Stat**	**Lower**	**Upper**	**Overlap**	**Decision**
03-1954-1442	7d Survival Rate	Control Resp	1	0.8	>>	Yes	Passes Criteria
16-8846-0853	7d Survival Rate	Control Resp	1	0.8	>>	Yes	Passes Criteria
05-0696-1533	Mean Dry Biomass-mg	Control Resp	0.3233	0.25	>>	Yes	Passes Criteria
08-7119-2691	Mean Dry Biomass-mg	Control Resp	0.3233	0.25	>>	Yes	Passes Criteria
08-7119-2691	Mean Dry Biomass-mg	PMSD	0.1859	0.12	0.3	Yes	Passes Criteria

7d Survival Rate Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	N	4	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
30		4	0.8833	0.7818	0.9849	0.8000	0.9333	0.0319	0.0638	7.23%	11.67%
60		4	0.7833	0.5825	0.9841	0.6000	0.8667	0.0631	0.1262	16.11%	21.67%
100		4	0.6833	0.5022	0.8645	0.5333	0.8000	0.0569	0.1139	16.66%	31.67%

Mean Dry Biomass-mg Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	N	4	0.3233	0.2397	0.407	0.2667	0.3927	0.02628	0.05255	16.25%	0.00%
30		4	0.327	0.2847	0.3693	0.2967	0.3607	0.01328	0.02656	8.12%	-1.13%
60		4	0.309	0.2624	0.3556	0.2807	0.3413	0.01466	0.02932	9.49%	4.43%
100		4	0.2525	0.1975	0.3075	0.21	0.2947	0.01728	0.03457	13.69%	21.91%

Fathead Minnow 7-d Larval Survival and Growth Test — **Aquatic Bioassay & Consulting Labs, Inc.**

7d Survival Rate Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	N	1.0000	1.0000	1.0000	1.0000
30		0.9333	0.8000	0.9333	0.8667
60		0.8667	0.8000	0.8667	0.6000
100		0.6667	0.7333	0.8000	0.5333

Mean Dry Biomass-mg Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	N	0.2667	0.3073	0.3927	0.3267
30		0.32	0.2967	0.3307	0.3607
60		0.3413	0.288	0.326	0.2807
100		0.252	0.2947	0.2533	0.21

7d Survival Rate Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	N	15/15	15/15	15/15	15/15
30		14/15	12/15	14/15	13/15
60		13/15	12/15	13/15	9/15
100		10/15	11/15	12/15	8/15

CETIS Analytical Report

Test Code: VCF1116.215BI | 00-5536-4847

Fathead Minnow 7-d Larval Survival and Growth Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Analysis ID:	03-1954-1442	**Endpoint:**	7d Survival Rate	**CETIS Version:**	CETISv1.9.2
Analyzed:	25 Jan-17 11:31	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes
Batch ID:	15-9137-5191	**Test Type:**	Growth-Survival (7d)	**Analyst:**	Joe Freas
Start Date:	29 Nov-16 13:55	**Protocol:**	EPA/821/R-02-013 (2002)	**Diluent:**	Laboratory Water
Ending Date:	06 Dec-16 11:55	**Species:**	Pimephales promelas	**Brine:**	Not Applicable
Duration:	6d 22h	**Source:**	Aquatic Biosystems, CO	**Age:**	
Sample ID:	18-0627-8157	**Code:**	VCF1116.215Bas	**Client:**	VCWPD
Sample Date:	20 Nov-16	**Material:**	Sample Water	**Project:**	TIE
Receipt Date:	22 Nov-16	**Source:**	Bioassay Report		
Sample Age:	9d 14h	**Station:**	MO-CAM		

Comments:
TIE BASELINE

Data Transform	Alt Hyp	NOEL	LOEL	TOEL	TU	PMSD
Angular (Corrected)	C > T	< 30	30	n/a	>3.333	8.92%

Dunnett Multiple Comparison Test

Control vs	Control II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Negative Control	30*	2.77	2.287	0.174	6	CDF	0.0214	Significant Effect
	60*	4.535	2.287	0.174	6	CDF	9.3E-04	Significant Effect
	100*	6.107	2.287	0.174	6	CDF	7.4E-05	Significant Effect

Test Acceptability Criteria

		TAC Limits			
Attribute	**Test Stat**	**Lower**	**Upper**	**Overlap**	**Decision**
Control Resp	1	0.8	>>	Yes	Passes Criteria

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.474797	0.158266	3	13.71	3.5E-04	Significant Effect
Error	0.138522	0.0115435	12			
Total	0.613319		15			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Levene Equality of Variance Test	2.894	5.953	0.0791	Equal Variances
Variances	Mod Levene Equality of Variance Test	1.793	5.953	0.2021	Equal Variances
Distribution	Anderson-Darling A2 Normality Test	0.6644	3.878	0.0830	Normal Distribution
Distribution	D'Agostino Skewness Test	1.539	2.576	0.1238	Normal Distribution
Distribution	Kolmogorov-Smirnov D Test	0.1875	0.2471	0.1396	Normal Distribution
Distribution	Shapiro-Wilk W Normality Test	0.9144	0.8408	0.1369	Normal Distribution

7d Survival Rate Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	N	4	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	0.00%
30		4	0.8833	0.7818	0.9849	0.9000	0.8000	0.9333	0.0319	7.23%	11.67%
60		4	0.7833	0.5825	0.9841	0.8333	0.6000	0.8667	0.0631	16.11%	21.67%
100		4	0.6833	0.5022	0.8645	0.7000	0.5333	0.8000	0.0569	16.66%	31.67%

Angular (Corrected) Transformed Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	N	4	1.441	1.441	1.442	1.441	1.441	1.441	0	0.00%	0.00%
30		4	1.231	1.075	1.387	1.253	1.107	1.31	0.04904	7.97%	14.60%
60		4	1.097	0.8633	1.33	1.152	0.8861	1.197	0.07337	13.38%	23.90%
100		4	0.9773	0.7823	1.172	0.9917	0.8188	1.107	0.06128	12.54%	32.19%

Fathead Minnow 7-d Larval Survival and Growth Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Analysis ID: 03-1954-1442 **Endpoint:** 7d Survival Rate **CETIS Version:** CETISv1.9.2
Analyzed: 25 Jan-17 11:31 **Analysis:** Parametric-Control vs Treatments **Official Results:** Yes

7d Survival Rate Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	N	1.0000	1.0000	1.0000	1.0000
30		0.9333	0.8000	0.9333	0.8667
60		0.8667	0.8000	0.8667	0.6000
100		0.6667	0.7333	0.8000	0.5333

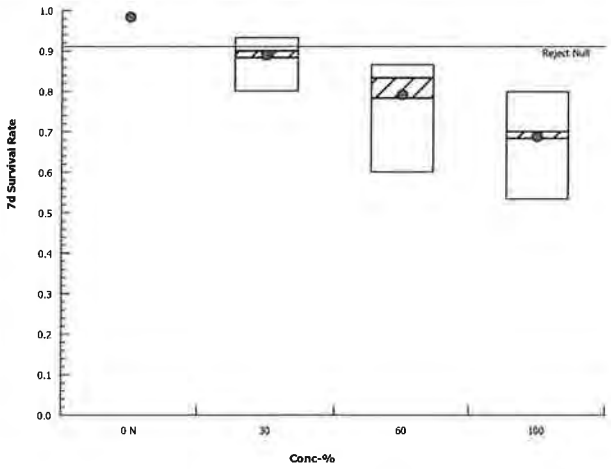
Angular (Corrected) Transformed Detail

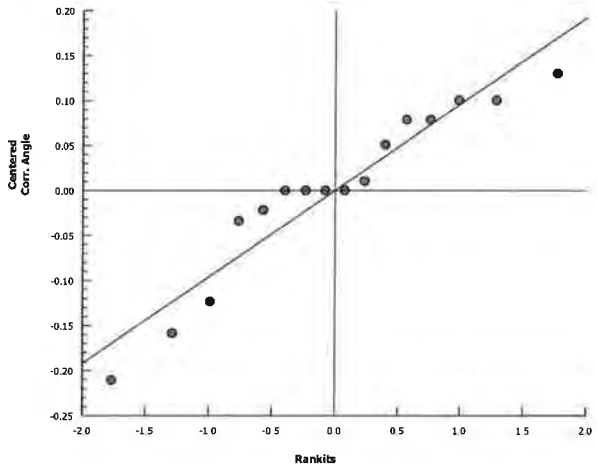
Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	N	1.441	1.441	1.441	1.441
30		1.31	1.107	1.31	1.197
60		1.197	1.107	1.197	0.8861
100		0.9553	1.028	1.107	0.8188

7d Survival Rate Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	N	15/15	15/15	15/15	15/15
30		14/15	12/15	14/15	13/15
60		13/15	12/15	13/15	9/15
100		10/15	11/15	12/15	8/15

Graphics





Fathead Minnow 7-d Larval Survival and Growth Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Analysis ID:	08-7119-2691	**Endpoint:**	Mean Dry Biomass-mg	**CETIS Version:**	CETISv1.9.2
Analyzed:	25 Jan-17 11:31	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes
Batch ID:	15-9137-5191	**Test Type:**	Growth-Survival (7d)	**Analyst:**	Joe Freas
Start Date:	29 Nov-16 13:55	**Protocol:**	EPA/821/R-02-013 (2002)	**Diluent:**	Laboratory Water
Ending Date:	06 Dec-16 11:55	**Species:**	Pimephales promelas	**Brine:**	Not Applicable
Duration:	6d 22h	**Source:**	Aquatic Biosystems, CO	**Age:**	
Sample ID:	18-0627-8157	**Code:**	VCF1116.215Bas	**Client:**	VCWPD
Sample Date:	20 Nov-16	**Material:**	Sample Water	**Project:**	TIE
Receipt Date:	22 Nov-16	**Source:**	Bioassay Report		
Sample Age:	9d 14h	**Station:**	MO-CAM		

Comments:
TIE BASELINE

Data Transform	Alt Hyp	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	C > T	60	100	77.46	1.667	18.59%

Dunnett Multiple Comparison Test

Control	vs	Conc-%	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Negative Control		30	-0.1396	2.287	0.060	6	CDF	0.7969	Non-Significant Effect
		60	0.5456	2.287	0.060	6	CDF	0.5258	Non-Significant Effect
		100*	2.696	2.287	0.060	6	CDF	0.0244	Significant Effect

Test Acceptability Criteria

		TAC Limits			
Attribute	**Test Stat**	**Lower**	**Upper**	**Overlap**	**Decision**
Control Resp	0.3233	0.25	>>	Yes	Passes Criteria
PMSD	0.1859	0.12	0.3	Yes	Passes Criteria

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0143028	0.0047676	3	3.454	0.0514	Non-Significant Effect
Error	0.0165648	0.0013804	12			
Total	0.0308675		15			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance Test	1.57	11.34	0.6662	Equal Variances
Variances	Levene Equality of Variance Test	0.5152	5.953	0.6795	Equal Variances
Variances	Mod Levene Equality of Variance Test	0.4985	5.953	0.6902	Equal Variances
Distribution	Anderson-Darling A2 Normality Test	0.1943	3.878	0.9422	Normal Distribution
Distribution	D'Agostino Skewness Test	0.6274	2.576	0.5304	Normal Distribution
Distribution	Kolmogorov-Smirnov D Test	0.1436	0.2471	0.5357	Normal Distribution
Distribution	Shapiro-Wilk W Normality Test	0.9825	0.8408	0.9805	Normal Distribution

Mean Dry Biomass-mg Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	N	4	0.3233	0.2397	0.407	0.317	0.2667	0.3927	0.02628	16.25%	0.00%
30		4	0.327	0.2847	0.3693	0.3253	0.2967	0.3607	0.01328	8.12%	-1.13%
60		4	0.309	0.2624	0.3556	0.307	0.2807	0.3413	0.01466	9.49%	4.43%
100		4	0.2525	0.1975	0.3075	0.2527	0.21	0.2947	0.01728	13.69%	21.91%

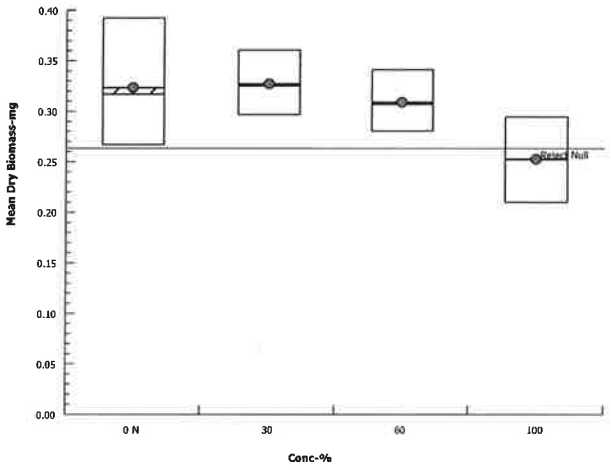
Mean Dry Biomass-mg Detail

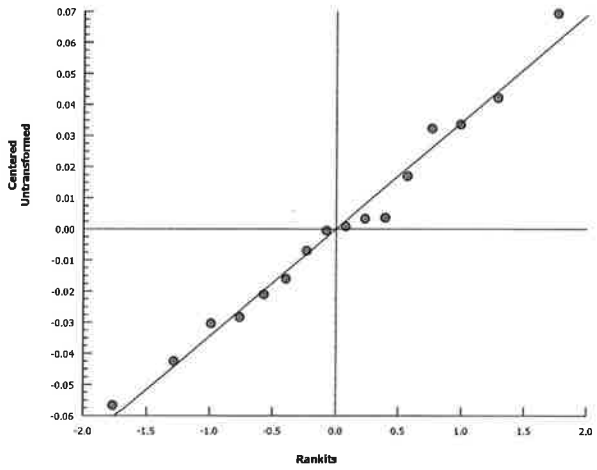
Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	N	0.2667	0.3073	0.3927	0.3267
30		0.32	0.2967	0.3307	0.3607
60		0.3413	0.288	0.326	0.2807
100		0.252	0.2947	0.2533	0.21

Fathead Minnow 7-d Larval Survival and Growth Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Analysis ID:	08-7119-2691	**Endpoint:**	Mean Dry Biomass-mg	**CETIS Version:**	CETISv1.9.2
Analyzed:	25 Jan-17 11:31	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes

Graphics





CETIS Analytical Report

Fathead Minnow 7-d Larval Survival and Growth Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Analysis ID:	16-8846-0853	**Endpoint:**	7d Survival Rate	**CETIS Version:**	CETISv1.9.2
Analyzed:	25 Jan-17 11:31	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Batch ID:	15-9137-5191	**Test Type:**	Growth-Survival (7d)	**Analyst:**	Joe Freas
Start Date:	29 Nov-16 13:55	**Protocol:**	EPA/821/R-02-013 (2002)	**Diluent:**	Laboratory Water
Ending Date:	06 Dec-16 11:55	**Species:**	Pimephales promelas	**Brine:**	Not Applicable
Duration:	6d 22h	**Source:**	Aquatic Biosystems, CO	**Age:**	

Sample ID:	18-0627-8157	**Code:**	VCF1116.215Bas	**Client:**	VCWPD
Sample Date:	20 Nov-16	**Material:**	Sample Water	**Project:**	TIE
Receipt Date:	22 Nov-16	**Source:**	Bioassay Report		
Sample Age:	9d 14h	**Station:**	MO-CAM		

Comments:
TIE BASELINE

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 Lower	TAC Limits Upper	Overlap	Decision
Control Resp	1	0.8	>>	Yes	Passes Criteria

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC5	12.86	6.686	28.29	7.778	3.535	14.96
EC10	25.71	13.37	48.57	3.889	2.059	7.479
EC15	40	19.2	76.92	2.5	1.3	5.208
EC20	55	28.71	95	1.818	1.053	3.483
EC25	73.33	34.55	n/a	1.364	n/a	2.895
EC40	>100	n/a	n/a	<1	n/a	n/a
EC50	>100	n/a	n/a	<1	n/a	n/a

7d Survival Rate Summary

			Calculated Variate(A/B)								
Conc-%	**Code**	**Count**	**Mean**	**Min**	**Max**	**Std Err**	**Std Dev**	**CV%**	**%Effect**	**A**	**B**
0	N	4	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.0%	60	60
30		4	0.8833	0.8000	0.9333	0.0319	0.0638	7.23%	11.67%	53	60
60		4	0.7833	0.6000	0.8667	0.0631	0.1262	16.11%	21.67%	47	60
100		4	0.6833	0.5333	0.8000	0.0569	0.1139	16.66%	31.67%	41	60

7d Survival Rate Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	N	1.0000	1.0000	1.0000	1.0000
30		0.9333	0.8000	0.9333	0.8667
60		0.8667	0.8000	0.8667	0.6000
100		0.6667	0.7333	0.8000	0.5333

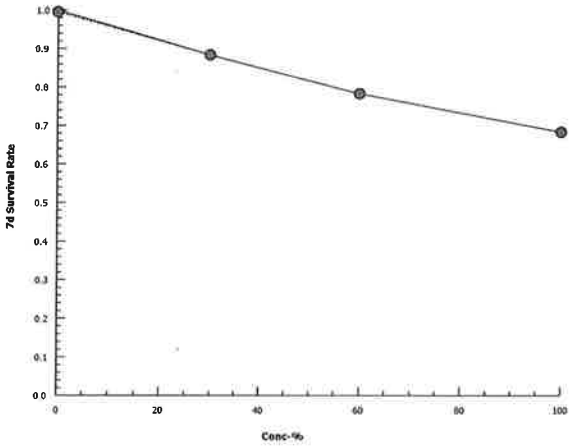
7d Survival Rate Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	N	15/15	15/15	15/15	15/15
30		14/15	12/15	14/15	13/15
60		13/15	12/15	13/15	9/15
100		10/15	11/15	12/15	8/15

Fathead Minnow 7-d Larval Survival and Growth Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Analysis ID:	16-8846-0853	**Endpoint:**	7d Survival Rate	**CETIS Version:**	CETISv1.9.2
Analyzed:	25 Jan-17 11:31	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



Fathead Minnow 7-d Larval Survival and Growth Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Analysis ID:	05-0696-1533	**Endpoint:**	Mean Dry Biomass-mg	**CETIS Version:**	CETISv1.9.2
Analyzed:	25 Jan-17 11:31	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	15-9137-5191	**Test Type:**	Growth-Survival (7d)	**Analyst:**	Joe Freas
Start Date:	29 Nov-16 13:55	**Protocol:**	EPA/821/R-02-013 (2002)	**Diluent:**	Laboratory Water
Ending Date:	06 Dec-16 11:55	**Species:**	Pimephales promelas	**Brine:**	Not Applicable
Duration:	6d 22h	**Source:**	Aquatic Biosystems, CO	**Age:**	
Sample ID:	18-0627-8157	**Code:**	VCF1116.215Bas	**Client:**	VCWPD
Sample Date:	20 Nov-16	**Material:**	Sample Water	**Project:**	TIE
Receipt Date:	22 Nov-16	**Source:**	Bioassay Report		
Sample Age:	9d 14h	**Station:**	MO-CAM		

Comments:
TIE BASELINE

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Linear	Linear	207559	280	Yes	Two-Point Interpolation

Test Acceptability Criteria

		TAC Limits			
Attribute	**Test Stat**	**Lower**	**Upper**	**Overlap**	**Decision**
Control Resp	0.3233	0.25	>>	Yes	Passes Criteria

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	60.06	n/a	89.07	1.665	1.123	n/a
IC10	71.58	n/a	111.3	1.397	0.8986	n/a
IC15	83.09	14.58	n/a	1.204	n/a	6.858
IC20	94.6	51.32	n/a	1.057	n/a	1.949
IC25	>100	n/a	n/a	<1	n/a	n/a
IC40	>100	n/a	n/a	<1	n/a	n/a
IC50	>100	n/a	n/a	<1	n/a	n/a

Mean Dry Biomass-mg Summary

			Calculated Variate						
Conc-%	**Code**	**Count**	**Mean**	**Min**	**Max**	**Std Err**	**Std Dev**	**CV%**	**%Effect**
0	N	4	0.3233	0.2667	0.3927	0.02628	0.05255	16.25%	0.0%
30		4	0.327	0.2967	0.3607	0.01328	0.02656	8.12%	-1.13%
60		4	0.309	0.2807	0.3413	0.01466	0.02932	9.49%	4.43%
100		4	0.2525	0.21	0.2947	0.01728	0.03457	13.69%	21.91%

Mean Dry Biomass-mg Detail

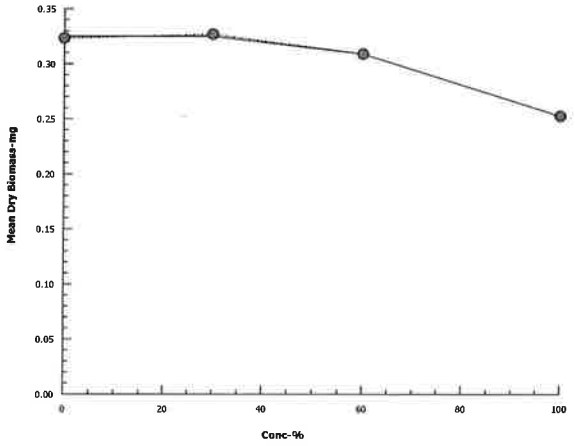
Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	N	0.2667	0.3073	0.3927	0.3267
30		0.32	0.2967	0.3307	0.3607
60		0.3413	0.288	0.326	0.2807
100		0.252	0.2947	0.2533	0.21

Analyst: ____ QA: ____

Fathead Minnow 7-d Larval Survival and Growth Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Analysis ID:	05-0696-1533	**Endpoint:**	Mean Dry Biomass-mg	**CETIS Version:**	CETISv1.9.2
Analyzed:	25 Jan-17 11:31	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



Fathead Minnow 7-d Larval Survival and Growth Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Batch ID:	15-9137-5191	**Test Type:**	Growth-Survival (7d)	**Analyst:**	Joe Freas
Start Date:	29 Nov-16 13:55	**Protocol:**	EPA/821/R-02-013 (2002)	**Diluent:**	Laboratory Water
Ending Date:	06 Dec-16 11:55	**Species:**	Pimephales promelas	**Brine:**	Not Applicable
Duration:	6d 22h	**Source:**	Aquatic Biosystems, CO	**Age:**	
Sample ID:	18-0627-8157	**Code:**	VCF1116.215Bas	**Client:**	VCWPD
Sample Date:	20 Nov-16	**Material:**	Sample Water	**Project:**	TIE
Receipt Date:	22 Nov-16	**Source:**	Bioassay Report		
Sample Age:	9d 14h	**Station:**	MO-CAM		

Comments:
TIE BASELINE

Alkalinity (CaCO3)-mg/L

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	1	61			61	61	0	0	0.0%	0
100		1	57			57	57	0	0	0.0%	0
Overall		2	59	33.59	84.41	57	61	2	2.828	4.79%	0 (0%)

Conductivity-µmhos

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	8	328.6	324	333.3	323	339	1.972	5.579	1.7%	0
30		8	309	205.1	412.8	4.9	395	43.91	124.2	40.2%	0
60		8	352.4	349.7	355	349	357	1.117	3.159	0.9%	0
100		8	373	369.6	376.4	368	380	1.427	4.036	1.08%	0
Overall		32	340.7	317.7	363.8	4.9	395	11.32	64.02	18.79%	0 (0%)

Dissolved Oxygen-mg/L

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	8	7.988	7.745	8.23	7.7	8.6	0.1025	0.29	3.63%	0
30		8	15.31	-3.854	34.48	5.8	72	8.105	22.93	149.7%	0
60		8	7.187	6.33	8.045	5.8	8.9	0.3627	1.026	14.27%	0
100		8	6.575	5.469	7.681	4.7	8.1	0.4678	1.323	20.12%	0
Overall		32	9.266	5.121	13.41	4.7	72	2.032	11.5	124.10%	0 (0%)

Hardness (CaCO3)-mg/L

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	1	88			88	88	0	0	0.0%	0
100		1	145			145	145	0	0	0.0%	0
Overall		2	116.5	-245.6	478.6	88	145	28.5	40.31	34.60%	0 (0%)

pH-Units

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	8	7.838	7.729	7.946	7.7	8.1	0.04605	0.1302	1.66%	0
30		8	7.863	7.8	7.925	7.7	7.9	0.0263	0.07439	0.95%	0
60		8	7.7	7.611	7.789	7.5	7.8	0.0378	0.1069	1.39%	0
100		8	7.525	7.312	7.738	7.1	7.9	0.09014	0.255	3.39%	0
Overall		32	7.731	7.658	7.804	7.1	8.1	0.03576	0.2023	2.62%	0 (0%)

Temperature-°C

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	8	24	24	24	24	24	0	0	0.0%	0
30		8	24.01	23.98	24.04	24	24.1	0.01249	0.03531	0.15%	0
60		8	24.01	23.98	24.04	24	24.1	0.01249	0.03531	0.15%	0
100		8	24.01	23.98	24.04	24	24.1	0.01249	0.03531	0.15%	0
Overall		32	24.01	24	24.02	24	24.1	0.005235	0.02961	0.12%	0 (0%)

Fathead Minnow 7-d Larval Survival and Growth Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Alkalinity (CaCO3)-mg/L

Conc-%	Code	1
0	N	61
100		57

Conductivity-µmhos

Conc-%	Code	1	2	3	4	5	6	7	8
0	N	327	339	324	323	333	330	323	330
30		4.9	354	395	341	340	339	347	351
60		357	355	352	350	350	349	350	356
100		370	376	373	371	370	368	376	380

Dissolved Oxygen-mg/L

Conc-%	Code	1	2	3	4	5	6	7	8
0	N	8.2	8	7.7	7.9	7.8	7.9	7.8	8.6
30		5.8	6.6	6.3	72	7.7	7.7	7.5	8.9
60		5.8	6.6	6.3	7.9	7.7	7.7	8.9	6.6
100		8.1	5.3	5.5	4.7	7.8	7.6	7.5	6.1

Hardness (CaCO3)-mg/L

Conc-%	Code	1
0	N	88
30		
60		
100		145

pH-Units

Conc-%	Code	1	2	3	4	5	6	7	8
0	N	7.8	7.8	7.7	7.7	7.8	7.9	7.9	8.1
30		7.7	7.9	7.9	7.8	7.9	7.9	7.9	7.9
60		7.6	7.7	7.7	7.7	7.8	7.8	7.5	7.8
100		7.9	7.4	7.1	7.6	7.8	7.4	7.4	7.6

Temperature-°C

Conc-%	Code	1	2	3	4	5	6	7	8
0	N	24	24	24	24	24	24	24	24
30		24	24	24	24	24	24	24.1	24
60		24	24	24	24.1	24	24	24	24
100		24	24.1	24	24	24	24	24	24

Chain of Custody Record

Ventura County Watershed Protection District

NPDES Stormwater Monitoring Program

Project: NPDES Stormwater Wet Season

Toxicity - ABC Laboratories

Side 1 of 1

Sampling Date: 11/20/2016 Project Number: 2016/17-2 (Wet)

Sampling Team: Arne A., Dean W., Steven G.

SAMPLE ID	DATE/TIME COLLECTED	Chronic toxicity - topsmelt (*Atherinops affinis*)	Chronic toxicity - inland silverside (*Menidia beryllina*)	Chronic toxicity - giant kelp (*Macrocystis pyrifera*)	Chronic toxicity - purple sea urchin (*Strongylocentrotus purpuratus*)	Chronic toxicity - fathead minnow (*Pimephales promelas*)	Chronic toxicity - daphnid (*Ceriodaphnia dubia*)	Chronic toxicity - green alga (*Raphidocelis subcapitata*)	Number of 5-Gallon Buckets	NOTES
~~ME-SCR~~					X				2	Note 1, Note 2, Note 3
MO-CAM	11-20-16 21145					X			2	Note 1, Note 2, Note 3
MO-HUE	11-20-16 22140						X		2	Note 1, Note 2, Note 3, Note 4

CAM = HUE
7.52 = 5.02
20.1 = 20.1
3.0 < 1.0

Relinquished
Printed Name: Steven S. Greer
Signature: Steven S. Greer
Affiliation: VCWPD Date/Tim: 11/21/2016 0842

Received
Printed Name: ELIZABETH MAYMUNI
Signature:
Affiliation: ABC LABS. Date/Tim: 11-21-16 0842

Other Notes:
Note 1: Dilutions - 6.25%, 12.5%, 25%, 50%, 100% Note 2: Please execute TIE if mortality > 50%
Note 3: Notify District within 24 hours if significant toxicity is observed.
Note 4: If salinity >2 ppt then also run topsmelt for comparison. If topsmelt unavailable, use *Hyalella*

aquatic bioassay & consulting laboratories, inc

January 25, 2017

Mr. Arnie Anselm
Ventura County Watershed Protection District
800 South Victoria Ave
Ventura, CA 93009

Dear Mr. Anselm:

We are pleased to present the enclosed revised bioassay report. The test was conducted under guidelines prescribed in *Short-Term Methods for Measuring the Chronic Toxicity of Effluents and Receiving Waters to West Coast Marine and Estuarine Organisms, EPA-600/R95/136, 1995*. Results were as follows:

CLIENT:	County of Ventura
SAMPLE I.D.:	ME-SCR
DATE RECEIVED:	1/5/2017
ABC LAB. NO.:	VCF0117.015

CHRONIC SEA URCHIN FERTILIZATION BIOASSAY

NOEC	=	100.00 %
TUc	=	1.00
IC25	=	>100.00 %
IC50	=	>100.00 %

Yours very truly,

Fe/s Scott Johnson
Laboratory Director

CETIS Summary Report

Test Code: VCF0117.015uf | 07-1639-0130

Purple Sea Urchin Sperm Cell Fertilization Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Batch ID:	14-2366-3156	**Test Type:**	Fertilization	**Analyst:**	Joe Freas
Start Date:	05 Jan-17 13:36	**Protocol:**	EPA/600/R-95/136 (1995)	**Diluent:**	Laboratory Seawater
Ending Date:	05 Jan-17 14:16	**Species:**	Strongylocentrotus purpuratus	**Brine:**	Not Applicable
Duration:	40m	**Source:**	David Gutoff	**Age:**	
Sample ID:	01-0109-3223	**Code:**	VCF0117.015u	**Client:**	VCWPD
Sample Date:	05 Jan-17 09:30	**Material:**	Sample Water	**Project:**	2016/17-4(Wet)
Receipt Date:	05 Jan-17 11:11	**Source:**	Bioassay Report		
Sample Age:	4h (12.6 °C)	**Station:**	ME-SCR		

Multiple Comparison Summary

Analysis ID	Endpoint	Comparison Method	NOEL	LOEL	TOEL	TU	PMSD ✓
10-0945-8890	Fertilization Rate	Dunnett Multiple Comparison Test	100	> 100	n/a	1	9.61%

Point Estimate Summary

Analysis ID	Endpoint	Point Estimate Method	Level	%	95% LCL	95% UCL	TU ✓
17-9579-2574	Fertilization Rate	Linear Interpolation (ICPIN)	EC5	65.99	n/a	n/a	1.515
			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

				TAC Limits			
Analysis ID	Endpoint	Attribute	Test Stat	Lower	Upper	Overlap	Decision
10-0945-8890	Fertilization Rate	Control Resp	0.9425	0.7	>>	Yes	Passes Criteria
17-9579-2574	Fertilization Rate	Control Resp	0.9425	0.7	>>	Yes	Passes Criteria

Fertilization Rate Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	N	4	0.9425	0.9186	0.9664	0.9300	0.9600	0.0075	0.0150	1.59%	0.00%
6.25		4	0.9450	0.8687	1.0000	0.8900	0.9900	0.0240	0.0480	5.07%	-0.27%
12.5		4	0.9750	0.9371	1.0000	0.9500	1.0000	0.0119	0.0238	2.44%	-3.45%
25		4	0.9200	0.8202	1.0000	0.8400	0.9700	0.0314	0.0627	6.82%	2.39%
50		4	0.9225	0.8597	0.9853	0.8900	0.9800	0.0197	0.0395	4.28%	2.12%
100		4	0.8750	0.7864	0.9636	0.8000	0.9300	0.0278	0.0557	6.36%	7.16%

Fertilization Rate Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	N	0.9300	0.9500	0.9300	0.9600
6.25		0.9900	0.8900	0.9800	0.9200
12.5		0.9600	0.9900	0.9500	1.0000
25		0.9700	0.9000	0.8400	0.9700
50		0.9100	0.9800	0.9100	0.8900
100		0.8700	0.9000	0.9300	0.8000

Fertilization Rate Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	N	93/100	95/100	93/100	96/100
6.25		99/100	89/100	98/100	92/100
12.5		96/100	99/100	95/100	100/100
25		97/100	90/100	84/100	97/100
50		91/100	98/100	91/100	89/100
100		87/100	90/100	93/100	80/100

Purple Sea Urchin Sperm Cell Fertilization Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Analysis ID:	10-0945-8890	**Endpoint:**	Fertilization Rate	**CETIS Version:**	CETISv1.9.2
Analyzed:	25 Jan-17 15:08	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes
Batch ID:	14-2366-3156	**Test Type:**	Fertilization	**Analyst:**	Joe Freas
Start Date:	05 Jan-17 13:36	**Protocol:**	EPA/600/R-95/136 (1995)	**Diluent:**	Laboratory Seawater
Ending Date:	05 Jan-17 14:16	**Species:**	Strongylocentrotus purpuratus	**Brine:**	Not Applicable
Duration:	40m	**Source:**	David Gutoff	**Age:**	
Sample ID:	01-0109-3223	**Code:**	VCF0117.015u	**Client:**	VCWPD
Sample Date:	05 Jan-17 09:30	**Material:**	Sample Water	**Project:**	2016/17-4(Wet)
Receipt Date:	05 Jan-17 11:11	**Source:**	Bioassay Report		
Sample Age:	4h (12.6 °C)	**Station:**	ME-SCR		

Data Transform	Alt Hyp	NOEL	LOEL	TOEL	TU	PMSD
Angular (Corrected)	C > T	100	> 100	n/a	1	9.61%

Dunnett Multiple Comparison Test

Control vs	Conc-%	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Negative Control	6.25	-0.3724	2.407	0.154	6	CDF	0.9198	Non-Significant Effect
	12.5	-1.503	2.407	0.154	6	CDF	0.9959	Non-Significant Effect
	25	0.4641	2.407	0.154	6	CDF	0.6630	Non-Significant Effect
	50	0.495	2.407	0.154	6	CDF	0.6497	Non-Significant Effect
	100	1.792	2.407	0.154	6	CDF	0.1469	Non-Significant Effect

Test Acceptability Criteria

		TAC Limits			
Attribute	**Test Stat**	**Lower**	**Upper**	**Overlap**	**Decision**
Control Resp	0.9425	0.7	>>	Yes	Passes Criteria

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0976827	0.0195365	5	2.376	0.0802	Non-Significant Effect
Error	0.147988	0.0082216	18			
Total	0.245671		23			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance Test	3.895	15.09	0.5646	Equal Variances
Variances	Levene Equality of Variance Test	2.319	4.248	0.0860	Equal Variances
Variances	Mod Levene Equality of Variance Test	1.504	4.248	0.2379	Equal Variances
Distribution	Anderson-Darling A2 Normality Test	0.4583	3.878	0.2680	Normal Distribution
Distribution	D'Agostino Kurtosis Test	1.8	2.576	0.0718	Normal Distribution
Distribution	D'Agostino Skewness Test	0.05113	2.576	0.9592	Normal Distribution
Distribution	D'Agostino-Pearson K2 Omnibus Test	3.243	9.21	0.1976	Normal Distribution
Distribution	Kolmogorov-Smirnov D Test	0.1326	0.2056	0.3335	Normal Distribution
Distribution	Shapiro-Wilk W Normality Test	0.9529	0.884	0.3133	Normal Distribution

Fertilization Rate Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	N	4	0.9425	0.9186	0.9664	0.9400	0.9300	0.9600	0.0075	1.59%	0.00%
6.25		4	0.9450	0.8687	1.0000	0.9500	0.8900	0.9900	0.0240	5.07%	-0.27%
12.5		4	0.9750	0.9371	1.0000	0.9750	0.9500	1.0000	0.0119	2.44%	-3.45%
25		4	0.9200	0.8202	1.0000	0.9350	0.8400	0.9700	0.0314	6.82%	2.39%
50		4	0.9225	0.8597	0.9853	0.9100	0.8900	0.9800	0.0197	4.28%	2.12%
100		4	0.8750	0.7864	0.9636	0.8850	0.8000	0.9300	0.0278	6.36%	7.16%

Purple Sea Urchin Sperm Cell Fertilization Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Analysis ID: 10-0945-8890 **Endpoint:** Fertilization Rate **CETIS Version:** CETISv1.9.2
Analyzed: 25 Jan-17 15:08 **Analysis:** Parametric-Control vs Treatments **Official Results:** Yes

Angular (Corrected) Transformed Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	N	4	1.33	1.278	1.383	1.324	1.303	1.369	0.01644	2.47%	0.00%
6.25		4	1.354	1.173	1.535	1.356	1.233	1.471	0.05687	8.40%	-1.80%
12.5		4	1.427	1.294	1.559	1.42	1.345	1.521	0.04152	5.82%	-7.24%
25		4	1.3	1.114	1.487	1.323	1.159	1.397	0.05853	9.00%	2.24%
50		4	1.298	1.158	1.439	1.266	1.233	1.429	0.04419	6.81%	2.39%
100		4	1.215	1.083	1.348	1.225	1.107	1.303	0.04154	6.84%	8.64%

Fertilization Rate Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	N	0.9300	0.9500	0.9300	0.9600
6.25		0.9900	0.8900	0.9800	0.9200
12.5		0.9600	0.9900	0.9500	1.0000
25		0.9700	0.9000	0.8400	0.9700
50		0.9100	0.9800	0.9100	0.8900
100		0.8700	0.9000	0.9300	0.8000

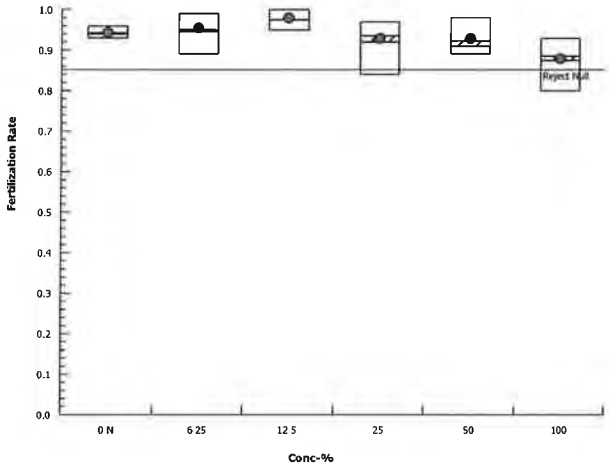
Angular (Corrected) Transformed Detail

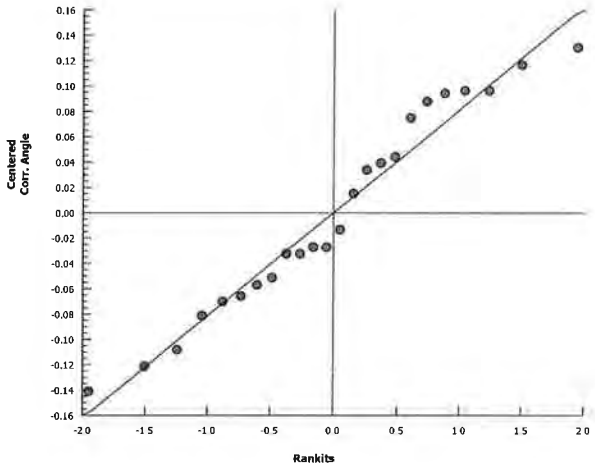
Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	N	1.303	1.345	1.303	1.369
6.25		1.471	1.233	1.429	1.284
12.5		1.369	1.471	1.345	1.521
25		1.397	1.249	1.159	1.397
50		1.266	1.429	1.266	1.233
100		1.202	1.249	1.303	1.107

Fertilization Rate Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	N	93/100	95/100	93/100	96/100
6.25		99/100	89/100	98/100	92/100
12.5		96/100	99/100	95/100	100/100
25		97/100	90/100	84/100	97/100
50		91/100	98/100	91/100	89/100
100		87/100	90/100	93/100	80/100

Graphics





CETIS Analytical Report

Test Code: VCF0117.015uf | 07-1639-0130

Purple Sea Urchin Sperm Cell Fertilization Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Analysis ID:	17-9579-2574	**Endpoint:**	Fertilization Rate	**CETIS Version:**	CETISv1.9.2
Analyzed:	25 Jan-17 15:09	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	14-2366-3156	**Test Type:**	Fertilization	**Analyst:**	Joe Freas
Start Date:	05 Jan-17 13:36	**Protocol:**	EPA/600/R-95/136 (1995)	**Diluent:**	Laboratory Seawater
Ending Date:	05 Jan-17 14:16	**Species:**	Strongylocentrotus purpuratus	**Brine:**	Not Applicable
Duration:	40m	**Source:**	David Gutoff	**Age:**	
Sample ID:	01-0109-3223	**Code:**	VCF0117.015u	**Client:**	VCWPD
Sample Date:	05 Jan-17 09:30	**Material:**	Sample Water	**Project:**	2016/17-4(Wet)
Receipt Date:	05 Jan-17 11:11	**Source:**	Bioassay Report		
Sample Age:	4h (12.6 °C)	**Station:**	ME-SCR		

Linear Interpolation Options

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

Test Acceptability Criteria

		TAC Limits			
Attribute	**Test Stat**	**Lower**	**Upper**	**Overlap**	**Decision**
Control Resp	0.9425	0.7	>>	Yes	Passes Criteria

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC5	65.99	n/a	n/a	1.515	n/a	n/a
EC10	>100	n/a	n/a	<1	n/a	n/a
EC15	>100	n/a	n/a	<1	n/a	n/a
EC20	>100	n/a	n/a	<1	n/a	n/a
EC25	>100	n/a	n/a	<1	n/a	n/a
EC40	>100	n/a	n/a	<1	n/a	n/a
EC50	>100	n/a	n/a	<1	n/a	n/a

Fertilization Rate Summary

			Calculated Variate(A/B)								
Conc-%	**Code**	**Count**	**Mean**	**Min**	**Max**	**Std Err**	**Std Dev**	**CV%**	**%Effect**	**A**	**B**
0	N	4	0.9425	0.9300	0.9600	0.0075	0.0150	1.59%	0.0%	377	400
6.25		4	0.9450	0.8900	0.9900	0.0240	0.0480	5.08%	-0.27%	378	400
12.5		4	0.9750	0.9500	1.0000	0.0119	0.0238	2.44%	-3.45%	390	400
25		4	0.9200	0.8400	0.9700	0.0314	0.0627	6.82%	2.39%	368	400
50		4	0.9225	0.8900	0.9800	0.0197	0.0395	4.28%	2.12%	369	400
100		4	0.8750	0.8000	0.9300	0.0278	0.0557	6.36%	7.16%	350	400

Fertilization Rate Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	N	0.9300	0.9500	0.9300	0.9600
6.25		0.9900	0.8900	0.9800	0.9200
12.5		0.9600	0.9900	0.9500	1.0000
25		0.9700	0.9000	0.8400	0.9700
50		0.9100	0.9800	0.9100	0.8900
100		0.8700	0.9000	0.9300	0.8000

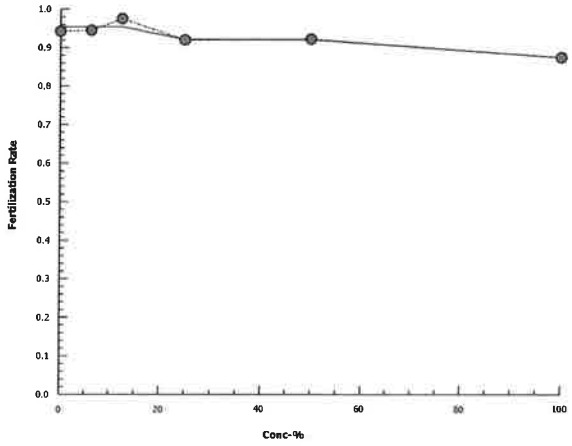
Fertilization Rate Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	N	93/100	95/100	93/100	96/100
6.25		99/100	89/100	98/100	92/100
12.5		96/100	99/100	95/100	100/100
25		97/100	90/100	84/100	97/100
50		91/100	98/100	91/100	89/100
100		87/100	90/100	93/100	80/100

Purple Sea Urchin Sperm Cell Fertilization Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Analysis ID:	17-9579-2574	**Endpoint:**	Fertilization Rate	**CETIS Version:**	CETISv1.9.2
Analyzed:	25 Jan-17 15:09	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



Purple Sea Urchin Sperm Cell Fertilization Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Batch ID:	14-2366-3156	**Test Type:**	Fertilization	**Analyst:**	Joe Freas
Start Date:	05 Jan-17 13:36	**Protocol:**	EPA/600/R-95/136 (1995)	**Diluent:**	Laboratory Seawater
Ending Date:	05 Jan-17 14:16	**Species:**	Strongylocentrotus purpuratus	**Brine:**	Not Applicable
Duration:	40m	**Source:**	David Gutoff	**Age:**	
Sample ID:	01-0109-3223	**Code:**	VCF0117.015u	**Client:**	VCWPD
Sample Date:	05 Jan-17 09:30	**Material:**	Sample Water	**Project:**	2016/17-4(Wet)
Receipt Date:	05 Jan-17 11:11	**Source:**	Bioassay Report		
Sample Age:	4h (12.6 °C)	**Station:**	ME-SCR		

Parameter Acceptability Criteria

			TAC Limits			
Parameter	**Min**	**Max**	**Lower**	**Upper**	**Overlap**	**Decision**
Salinity	34	34	32	36	Yes	Passes Criteria
Temperature	14.8	14.9	11	13	Yes	Above Criteria

Dissolved Oxygen-mg/L

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	2	6.4	1.318	11.48	6	6.8	0.4	0.5657	8.84%	0
6.25		2	6.5	3.959	9.041	6.3	6.7	0.2	0.2828	4.35%	0
12.5		2	6.45	2.003	10.9	6.1	6.8	0.35	0.495	7.67%	0
25		2	6.7	4.159	9.241	6.5	6.9	0.2	0.2828	4.22%	0
50		2	6.4	3.859	8.941	6.2	6.6	0.2	0.2828	4.42%	0
100		2	6.55	4.644	8.456	6.4	6.7	0.15	0.2121	3.24%	0
Overall		12	6.5	6.31	6.69	6	6.9	0.08616	0.2985	4.59%	0 (0%)

pH-Units

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	2	7.9	7.884	7.916	7.9	7.9	0	0	0.0%	0
6.25		2	7.9	7.884	7.916	7.9	7.9	0	0	0.0%	0
12.5		2	7.9	7.884	7.916	7.9	7.9	0	0	0.0%	0
25		2	7.85	7.215	8.485	7.8	7.9	0.05	0.07071	0.9%	0
50		2	7.8	7.787	7.813	7.8	7.8	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		12	7.85	7.807	7.893	7.7	7.9	0.01946	0.06742	0.86%	0 (0%)

Salinity-ppt

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	2	34	34	34	34	34	0	0	0.0%	0
6.25		2	34	34	34	34	34	0	0	0.0%	0
12.5		2	34	34	34	34	34	0	0	0.0%	0
25		2	34	34	34	34	34	0	0	0.0%	0
50		2	34	34	34	34	34	0	0	0.0%	0
100		2	34	34	34	34	34	0	0	0.0%	0
Overall		12	34	34	34	34	34	0	0	0.00%	0 (0%)

Temperature-°C

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	2	14.85	14.21	15.49	14.8	14.9	0.05004	0.07077	0.48%	0
6.25		2	14.85	14.21	15.49	14.8	14.9	0.05004	0.07077	0.48%	0
12.5		2	14.85	14.21	15.49	14.8	14.9	0.05004	0.07077	0.48%	0
25		2	14.85	14.21	15.49	14.8	14.9	0.05004	0.07077	0.48%	0
50		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		12	14.85	14.82	14.88	14.8	14.9	0.01508	0.05222	0.35%	0 (0%)

Purple Sea Urchin Sperm Cell Fertilization Test — **Aquatic Bioassay & Consulting Labs, Inc.**

Dissolved Oxygen-mg/L

Conc-%	Code	1	2
0	N	6.8	6
6.25		6.7	6.3
12.5		6.8	6.1
25		6.9	6.5
50		6.6	6.2
100		6.7	6.4

pH-Units

Conc-%	Code	1	2
0	N	7.9	7.9
6.25		7.9	7.9
12.5		7.9	7.9
25		7.8	7.9
50		7.8	7.8
100		7.8	7.7

Salinity-ppt

Conc-%	Code	1	2
0	N	34	34
6.25		34	34
12.5		34	34
25		34	34
50		34	34
100		34	34

Temperature-°C

Conc-%	Code	1	2
0	N	14.9	14.8
6.25		14.9	14.8
12.5		14.9	14.8
25		14.9	14.8
50		14.9	14.8
100		14.9	14.8

Chain of Custody Record

Ventura County Watershed Protection District

NPDES Stormwater Monitoring Program

Project: NPDES Stormwater Wet Season

Toxicity - ABC Laboratories

Side 1 of 1

Sampling Date: 1-5-17 Project Number: 2016/17-4 (Wet)

Sampling Team: W.B. CAREY & L. MEEKER

SAMPLE ID	DATE/TIME COLLECTED	Chronic toxicity - topsmelt (*Atherinops affinis*)	Chronic toxicity - inland silverside (*Menidia beryllina*)	Chronic toxicity - giant kelp (*Macrocystis pyrifera*)	Chronic toxicity - purple sea urchin (*Strongylocentrotus purpuratus*)	Chronic toxicity - fathead minnow (*Pimephales promelas*)	Chronic toxicity - daphnid (*Ceriodaphnia dubia*)	Chronic toxicity - green alga (*Raphidocelis subcapitata*)	Number of 5-Gallon Buckets	NOTES
ME-SCR	1/5/17 9:30				X				2	Note 1, Note 2, Note 3
										12.6 °C
										<0.1
										0.1

Relinquished Printed Name Lora Meeker

Signature

Affiliation WPD Date/Tim 1/5/17 11:11

Received Printed Name Wendy Willis

Signature

Affiliation ABC Labs Date/Tim 01/05/17 1111

Other Notes: Note 1: Dilutions - 6.25%, 12.5%, 25%, 50%, 100% Note 2: Please execute TIE if mortality > 50%

Note 3: Notify District within 24 hours if significant toxicity is observed.

Note 4: If salinity >2 ppt then also run topsmelt for comparison. If topsmelt unavailable, use *Hyalella*

Appendix J. Dry-Weather Analytical Monitoring Results

	Site ID	Port Hueneme-3	Unincorporated-2	Camarillo-4	Fillmore-1
		DRY-HUE3	DRY-UNI2	DRY-CAM4	MO-FIL
	At Major Outfall?	No	No	No	Yes
	Location	Bubbling Springs @ RR xing	MCW-12 Medea Creek @ Tamarind	West Tributary Somis Drain	North Fillmore Drain
	Date	08/03/17	08/03/17	08/03/17	08/02/17
	Time	14:20	12:40	9:15	9:45
Site Description	Conveyence Type	Natural channel	Natural channel	Trapezoidal channel	Box culvert
	Dimensions	N/A	N/A	N/A	N/A
	Dominant Land Use	Commercial & residential	Residential & rural	Residential, industrial & commercial	Residential
	Site Elevation	10	1000	150	430
Weather	Weather	Partly cloudy	Partly cloudy	Partly cloudy	Partly cloudy
	Wind Condtion	Slight breeze	Slight breeze	Calm	Calm
	Air Temp. (C)	31.1	35.6	28	27.2
Trash	Trash (general area)	None	Light	None	Light
	Trash (stream banks)	Light	None	High	Light
Observations	Water Clarity	Clear	Clear	Clear	Clear
	Water Color	Green	Clear	Clear	Clear
	Odors	None	None	None	None
	Floatables	Garbage	Sheen	None	None
	Foam	None	None	1% sparse, thin, white, <0.01' high	None
	Stains/ deposits	None	White (mineralization?) above water line	Pink/orange	None
	Structural condition	Natural channel	Rip-rap with natural bottom	Concrete channel	Rip rap with concrete bottom to natural bottom
	Vegetation Condition	Maintained grass/park	Somw new willow growth on edges	Some reeds and grasses in channel seams	Recently cleared, sparse herbaceous plants
	Biology	>100 ducks in/near water, 100s of <1" long fish	Louisiana crayfish*	Aquatic snails	Aquatic snails
	Algae (suspended)	microalgae	Greenish-brown 70%	Green 5%	None
	Algae (substrate)	None	Greenish-brown 100%	Green 70%	Green 5%
Water Chemistry (Field)	Dissolved Oxygen (%)	83.6	64.6	153.4	163.1
	Dissolved Oxygen (mg/L)	6.72	4.93	12.04	13.69
	Conductivity (µS)	9010	3698	2873	1120
	Specific Conductance (µS)	8380	3382	2726	1104
	Salinity (ppt)	4.6	1.8	1.4	0.5
	Water Temp. (C)	27.5	29.5	26.9	24.7
	Water Temp. (F)	81.5	85.1	80.4	76.5
	pH	7.42	7.26	8.26	8.34
	Turbidity (NTU)	47.10	4.95	2.82	1.52
Water Chemistry (Lab)	Total Organic Carbon (mg/L) [1]	7.9	8.6	20	4.1
	Total Hardness as $CaCO_3$ (mg/L)	1,540	1,150	653	540
	Total Calcium (mg/L)	291	216	181	147
	Total Magnesium (mg/L)	197	149	49.0	42.3
	Dissolved Copper (µg/L)	<0.13	0.25 (DNQ)	7.9	7.0
	Dissolved Lead (µg/L)	<0.031	<0.031	0.12 (DNQ)	0.070 (DNQ)
	Dissolved Zinc (µg/L)	<0.94	1.1 (DNQ)	4.3 (DNQ)	23
	Total Coliform (MPN/100 mL)	129,970	12,997	461,100	74
	E. coli (MPN/100 mL)	14,136	<10	4,884	<10
Estimated Flow	Flow Status	Ponded	Flowing	Flowing	Flowing
	Water Width (ft.)	20.0	3.0	6.0	2.0
	Water Depth (ft.)	1-2	0.30	0.01	0.10
	Flow Velocity (ft/s)	<0.001	<0.01	0.50	0.30
	Flow Rate (ft^3/s)	~ 0	<0.01	0.03	0.06
	Comments		MRCA[2] staff/volunteers catching ~1000/day, 5-6 days/wk for the last few years. Use traps with dog food or crayfish food (more recent) as bait.		

	Site ID	Moorpark-1	Ojai-6	Oxnard-2	Santa Paula-4
		MO-MPK	DRY-OJA6	DRY-OXN2	DRY-SPA4
	At Major Outfall?	Yes	No	No	No
	Location	Walnut Canyon	Tributary to Fox Barranca	Stroube Drain	Richmond Rd Drain
	Date	08/03/17	08/02/17	08/03/17	08/02/17
	Time	10:20	11:20	8:00	8:50
Site Description	Conveyence Type	Box culvert	Natural channel	Natural channel	Epoxy coated metal pipe
	Dimensions	5' x 12'	N/A	N/A	1'6"
	Dominant Land Use	Commercial & residential	Residential	Commercial & residential	Residential
	Site Elevation	460	730	70	343
Weather	Weather	Partly cloudy	Overcast	Partly cloudy	Overcast
	Wind Condtion	Slight breeze	Calm	Calm	Calm
	Air Temp. (C)	30.5	24.4	23.6	27.3
Trash	Trash (general area)	None	None	Light	None
	Trash (stream banks)	Light	Light	Light	None
Observations	Water Clarity	Clear	Clear	Clear	Clear
	Water Color	Yellow	Clear	Clear	Clear
	Odors	None	None	None	None
	Floatables	None	None	None	None
	Foam	None	None	<1% sparse, thin, white, <0.01' high	None
	Stains/ deposits	None	None	None	None
	Structural condition	Concrete channel	Natural channel	Concrete channel to rip rap	Pipe to concreted rip rap
	Vegetation Condition	None	Some vines including blackberry, poison oak	Dense herbaceous - watercress	Herbaceous growth and mulefat
	Biology	None	Water striders	Snails on streambed. Flies on algae	None
	Algae (suspended)	None	None	Green 40%	None
	Algae (substrate)	None	Green <1%	Green 40%	Green 40%
Water Chemistry (Field)	Dissolved Oxygen (%)	119.5	83.8	63.5	94.7
	Dissolved Oxygen (mg/L)	9.21	7.25	5.60	8.26
	Conductivity (µS)	2202	1369	1051	1680
	Specific Conductance (µS)	2062	1180	1132	1774
	Salinity (ppt)	1.0	0.5	0.6	0.9
	Water Temp. (C)	28.3	22.2	21.3	22.7
	Water Temp. (F)	82.9	72.0	70.3	72.9
	pH	8.80	7.8	8.01	7.77
	Turbidity (NTU)	3.62	1.09	1.64	0.09
Water Chemistry (Lab)	Total Organic Carbon (mg/L) [1]	30	3.2	9.3	1.6
	Total Hardness as $CaCO_3$ (mg/L)	281	634	466	771
	Total Calcium (mg/L)	74.8	174	122	212
	Total Magnesium (mg/L)	22.9	48.3	39.3	58.6
	Dissolved Copper (µg/L)	7.8	0.32 (DNQ)	3.4	0.30 (DNQ)
	Dissolved Lead (µg/L)	0.070 (DNQ)	<0.031	<0.031	<0.031
	Dissolved Zinc (µg/L)	2.8 (DNQ)	<0.94	6.6	<0.94
	Total Coliform (MPN/100 mL)	579,400	1,720	198,630	2,382
	E. coli (MPN/100 mL)	11,199	122	422	<10
Estimated Flow	Flow Status	Flowing	Flowing	Flowing	Flowing
	Water Width (ft.)	3.5	4.0	8.0	1.0
	Water Depth (ft.)	0.03	0.30	0.10	0.10
	Flow Velocity (ft/s)	1.00	0.10	0.10	3.00
	Flow Rate (ft^3/s)	0.10	0.12	0.08	0.30
	Comments	pH#1 8.78, pH#2 8.81			

	Site ID	Simi Valley-1	Thousand Oaks-1	Ventura-5
		MO-SIM	MO-THO	DRY-VEN5
	At Major Outfall?	Yes	Yes	No
	Location	Bus Canyon Drain	North Fork Arroyo Conejo at Hill Canyon WWTP	Dent Drain
	Date	08/03/17	08/03/17	08/02/17
	Time	10:55	11:40	13:15
Site Description	Conveyence Type	Box culvert	Natural channel	Natural channel
	Dimensions	7' x 16'	N/A	7.5' x 20'(toe) x 35'(top)
	Dominant Land Use	Commercial & residential	Commercial, residential & rural	Residential & rural
	Site Elevation	760	280	60
Weather	Weather	Partly cloudy	Partly cloudy	Partly cloudy
	Wind Condtion	Calm	Calm	Slight breeze
	Air Temp. (C)	31.7	31.4	32
Trash	Trash (general area)	High	None	Light
	Trash (stream banks)	High	None	None
Observations	Water Clarity	Clear	Clear	Clear
	Water Color	Clear	Clear	Clear
	Odors	None	None	None
	Floatables	None	None	Oily sheen
	Foam	None	None	None
	Stains/ deposits	None	None	None
	Structural condition	Concrete channel	Rip-rap with natural bottom	Flap gate RCP to natural channel
	Vegetation Condition	Small number grasses/reads in sediment	Willows and herbaceous growth at water's edge	Abundant river primrose
	Biology	None	None	None
	Algae (suspended)	Green 20%	None	None
	Algae (substrate)	Green 70%	None	None
Water Chemistry (Field)	Dissolved Oxygen (%)	187.4	98.2	6.5
	Dissolved Oxygen (mg/L)	15.34	7.75	0.69
	Conductivity (µS)	1636	1432	979
	Specific Conductance (µS)	1628	1707	1060
	Salinity (ppt)	0.8	0.9	0.5
	Water Temp. (C)	25.3	24.7	21.8
	Water Temp. (F)	77.5	76.5	71.2
	pH	8.17	8.05	7.25
	Turbidity (NTU)	1.75	0.81	14.63
Water Chemistry (Lab)	Total Organic Carbon (mg/L) [1]	3.3	6.7	18
	Total Hardness as $CaCO_3$ (mg/L)	1,090	261	349
	Total Calcium (mg/L)	273	47.3	88.0
	Total Magnesium (mg/L)	98.8	34.6	31.4
	Dissolved Copper (µg/L)	0.56	1.5	5.0
	Dissolved Lead (µg/L)	<0.031	0.040 (DNQ)	0.12 (DNQ)
	Dissolved Zinc (µg/L)	<0.94	32	15
	Total Coliform (MPN/100 mL)	141,360	48,840	>2,419,600
	E. coli (MPN/100 mL)	181	31	5,475
Estimated Flow	Flow Status	Flowing	Flowing	Ponded
	Water Width (ft.)	5.0	15.0	15.0
	Water Depth (ft.)	0.05	1.00	1.00
	Flow Velocity (ft/s)	2.00	<0.01	~0
	Flow Rate (ft^3/s)	0.50	~0	<0.01
	Comments			Ventura drains very dry. Collected from mostly ponded area below flapgate

Appendix K. Formulas for WQO determination

BASIN PLAN and CALIFORNIA TOXICS RULE OBJECTIVES: FORMULAS

AMMONIA (BASIN PLAN)

Basin Plan Ammonia Objective formula selection is based on wet or dry event, COLD/MIGR designation status, early life stages (ELS) status, and salinity.
See the flow charts below to determine which formula to use:

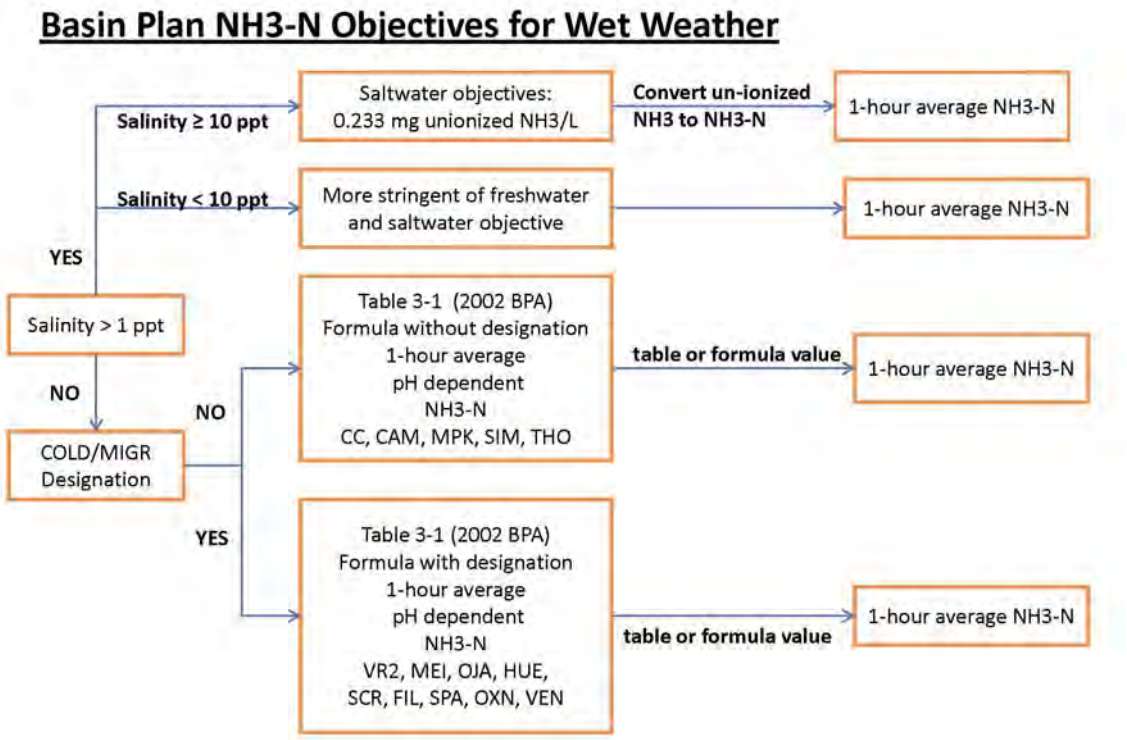


Table 3-1: One hour Average Objective for Ammonia-N for Freshwaters (mg N/L)

COLD and/or MIGR:

$$= \frac{0.275}{1 + 10^{7.204-pH}} + \frac{39.0}{1 + 10^{pH-7.204}}$$

NOT COLD and/or MIGR:

$$= \frac{0.411}{1 + 10^{7.204-pH}} + \frac{58.4}{1 + 10^{pH-7.204}}$$

Saltwater 1-hour objective for Ammonia-N

$$= 0.233 * (1 + 10^{\left[\left(9.245+0.116*\frac{19.9273*S}{1000-1.005109*S}\right)+0.0324(298-T)+\frac{(0.0415)P}{T}-pH\right]})$$

Where T= temperature expressed in °K (Note: Kelvin = Celsius + 273)
S = salinity (ppt)
P = pressure (assumed to be 1 atm)

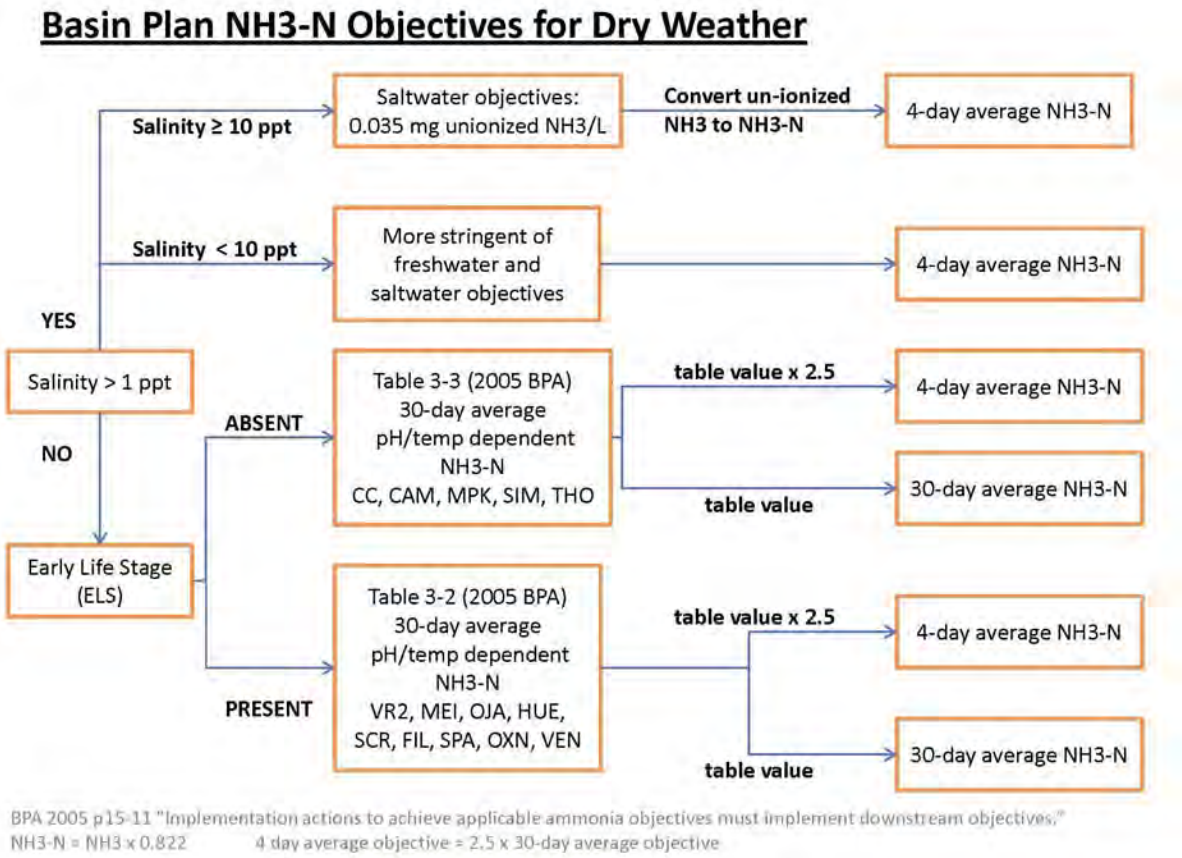


Table 3-2: 30-Day Average Objective for Ammonia-N for Freshwaters Applicable to Waters Subject to the "Early Life Stage Present" Condition (mg N/L)

$$= \left(\frac{0.0577}{1+10^{7.688-pH}} + \frac{2.487}{1+10^{pH-7.688}}\right) * MIN\left(2.85, 1.45 * 10^{0.028*(25-T)}\right)$$

Where T= temperature expressed in °C.
Highest four-day average within the 30-day period shall not exceed 2.5 times the 30-day average objective as calculated above.

Table 3-3: 30-Day Average Objective for Ammonia-N for Freshwaters Applicable to Waters Subject to the "Early Life Stage Absent" Condition (mg N/L)

$$= \left(\frac{0.0577}{1+10^{7.688-pH}} + \frac{2.487}{1+10^{pH-7.688}}\right) * 1.45 * 10^{0.028*(25-MAX(T,7))}$$

Where T= temperature expressed in °C.
Highest four-day average within the 30-day period shall not exceed 2.5 times the 30-day average objective as calculated above.

Saltwater 4-day objective for Ammonia-N

$$= 0.035 * (1 + 10^{\left[\left(9.245+0.116*\frac{19.9273*S}{1000-1.005109*S}\right)+0.0324(298-T)+\frac{(0.0415)P}{T}-pH\right]})$$

Where T= temperature expressed in °K (Note: Kelvin = Celsius + 273)
S = salinity (ppt)
P = pressure (assumed to be 1 atm)

PENTACHLOROPHENOL (CTR)

$$CMC = \exp(1.005(pH) - 4.869)$$
$$CCC = \exp(1.005(pH) - 5.134)$$

METALS (CTR)

[cadmium, chromium, copper, lead, nickel, silver, zinc]

$$CMC = WER * (Acute\ Conversion\ Factor) * (\exp\{m_A[1n(hardness)] + b_A\})$$
$$CCC = WER * (Chronic\ Conversion\ Factor) * (\exp\{m_C[1n(hardness)] + b_C\})$$

Note1: CCC formula contains error in CTR (says “Acute” not “Chronic” for Conversion Factor).
Note2: see note to Table 2 of Paragraph (b)(2) in the CTR, “The term conversion factor represents the recommended conversion factor for converting a metal criterion expressed as the total recoverable fraction in the water column to a criterion expressed as the dissolved fraction in the water column.”
Note3: Conversion factors (CF) are provided as values in a table for chromium, copper, nickel, silver, and zinc. CF for cadmium and lead are calculated based on hardness, i.e.

$$Cadmium\ Acute\ CF = 1.136672 - [(\ln\{hardness\})\ (0.041838)]$$
$$Cadmium\ Chronic\ CF = 1.101672 - [(\ln\{hardness\})\ (0.041838)]$$
$$Lead\ Acute\ and\ Chronic\ CF = 1.46203 - [(\ln\{hardness\})\ (0.145712)]$$

Note4: Only two WER in Ventura County and no stations discharge within the applicable reaches - Lower Calleguas Creek (Reach 2 which is Portrero Rd south to Mugu Lagoon) has a WER for copper of 3.69 and Mugu Lagoon copper WER is 1.51.

Appendix L - Fecal Coliform Reporting Correction Data

Site ID	Event ID	Event Type	Sample Date	Sign	Result (MPN/100 mL)
ME-CC	2010/11-1	Wet	10/6/2010	=	16000
ME-CC	2010/11-2	Wet	10/30/2010	=	24000
ME-CC	2010/11-4	Wet	2/16/2011	=	5000
ME-CC	2011/12-1	Wet	10/5/2011	=	9000
ME-CC	2011/12-2	Wet	1/21/2012	=	5000
ME-CC	2012/13-2	Wet	11/17/2012	=	16000
ME-CC	2012/13-3	Wet	2/19/2013	=	2400
ME-CC	2013/14-2	Wet	2/6/2014	=	8000
ME-CC	2013/14-3	Wet	2/27/2014	=	5000
ME-CC	2014/15-1	Wet	11/1/2014	=	130000
ME-CC	2014/15-3	Wet	12/12/2014	=	540000
ME-CC	2014/15-6	Dry	7/7/2015	=	8000
ME-CC	2015/16-1	Wet	9/15/2015	=	160000
ME-CC	2015/16-2	Wet	1/5/2016	=	14000
ME-CC	2015/16-3	Wet	1/31/2016	>	16000
ME-CC	2016/17-1	Wet	10/28/2016	=	790
ME-CC	2016/17-2	Wet	11/20/2016	=	24000
ME-CC	2016/17-3	Wet	12/15/2016	>	16000
ME-SCR	2010/11-2	Wet	10/30/2010	=	500
ME-SCR	2010/11-4	Wet	2/16/2011	=	1700
ME-SCR	2011/12-1	Wet	10/5/2011	=	2400
ME-SCR	2012/13-2	Wet	11/17/2012	=	700
ME-SCR	2013/14-2	Wet	2/6/2014	=	1700
ME-SCR	2013/14-3	Wet	2/27/2014	=	5000
ME-SCR	2014/15-3	Wet	12/12/2014	=	110000
ME-SCR	2014/15-4	Wet	4/7/2015	>	1600000
ME-SCR	2014/15-6	Dry	7/1/2015	=	13000
ME-SCR	2015/16-2	Wet	1/6/2016	>	1600000
ME-SCR	2015/16-4	Wet	3/6/2016	=	1600
ME-SCR	2016/17-4	Wet	1/5/2017	=	1400
ME-SCR	2016/17-5	Wet	1/19/2017	=	3000
ME-VR2	2010/11-1	Wet	10/6/2010	=	500
ME-VR2	2010/11-2	Wet	10/30/2010	=	5000
ME-VR2	2010/11-4	Wet	2/16/2011	=	900
ME-VR2	2011/12-1	Wet	10/5/2011	=	2400
ME-VR2	2011/12-2	Wet	1/21/2012	=	500
ME-VR2	2011/12-3	Wet	3/17/2012	=	5000
ME-VR2	2012/13-2	Wet	11/17/2012	=	1600
ME-VR2	2012/13-4	Wet	3/8/2013	=	900
ME-VR2	2013/14-2	Wet	2/6/2014	=	800
ME-VR2	2013/14-3	Wet	2/27/2014	=	90000
ME-VR2	2014/15-1	Wet	11/1/2014	=	13000
ME-VR2	2014/15-2	Wet	12/2/2014	=	1400
ME-VR2	2014/15-3	Wet	12/12/2014	=	79000
ME-VR2	2014/15-4	Wet	4/7/2015	>	1600000
ME-VR2	2014/15-6	Dry	6/23/2015	=	1600
ME-VR2	2015/16-1	Wet	9/15/2015	=	8000
ME-VR2	2015/16-2	Wet	1/5/2016	=	13000
ME-VR2	2015/16-3	Wet	1/31/2016	>	16000
ME-VR2	2015/16-4	Wet	3/6/2016	=	17000
ME-VR2	2016/17-1	Wet	10/28/2016	=	140000
ME-VR2	2016/17-2	Wet	11/20/2016	=	790
ME-VR2	2016/17-3	Wet	12/15/2016	=	2400
ME-VR2	2016/17-5	Wet	1/19/2017	=	17000
MO-CAM	2010/11-1	Wet	10/6/2010	=	46000
MO-CAM	2010/11-2	Wet	10/30/2010	=	30000
MO-CAM	2010/11-4	Wet	2/16/2011	=	5000
MO-CAM	2010/11-5	Dry	4/28/2011	=	460
MO-CAM	2011/12-1	Wet	10/5/2011	=	24000
MO-CAM	2011/12-2	Wet	1/21/2012	=	16000
MO-CAM	2011/12-3	Wet	3/17/2012	=	90000
MO-CAM	2012/13-2	Wet	11/17/2012	=	17000
MO-CAM	2012/13-4	Wet	3/7/2013	=	9000
MO-CAM	2012/13-5	Dry	5/23/2013	=	1100
MO-CAM	2013/14-1	Wet	12/7/2013	=	24000
MO-CAM	2013/14-2	Wet	2/6/2014	=	50000
MO-CAM	2013/14-3	Wet	2/27/2014	=	50000
MO-CAM	2013/14-4	Dry	4/25/2014	=	3000
MO-CAM	2014/15-1	Wet	11/1/2014	=	13000
MO-CAM	2014/15-3	Wet	12/12/2014	=	350000
MO-CAM	2014/15-6	Dry	7/7/2015	=	50000
MO-CAM	2015/16-1	Wet	9/15/2015	=	50000
MO-CAM	2015/16-2	Wet	1/5/2016	=	11000
MO-CAM	2015/16-3	Wet	1/31/2016	=	4300
MO-CAM	2016/17-2	Wet	11/20/2016	=	210000
MO-CAM	2016/17-3	Wet	12/15/2016	=	16000
MO-CAM	2016/17-5	Wet	1/19/2017	=	3000
MO-FIL	2010/11-1	Wet	10/6/2010	=	30000
MO-FIL	2010/11-2	Wet	10/30/2010	=	24000
MO-FIL	2010/11-4	Wet	2/16/2011	=	3000
MO-FIL	2010/11-5	Dry	4/28/2011	=	3000
MO-FIL	2011/12-1	Wet	10/5/2011	=	17000
MO-FIL	2011/12-3	Wet	3/17/2012	=	5000
MO-FIL	2011/12-4	Dry	5/22/2012	=	500
MO-FIL	2012/13-2	Wet	11/17/2012	=	30000
MO-FIL	2012/13-4	Wet	3/7/2013	=	30000
MO-FIL	2013/14-1	Wet	12/7/2013	=	17000
MO-FIL	2013/14-2	Wet	2/6/2014	=	50000
MO-FIL	2013/14-3	Wet	2/27/2014	=	17000
MO-FIL	2013/14-4	Dry	4/23/2014	=	2200
MO-FIL	2014/15-1	Wet	10/31/2014	=	110000
MO-FIL	2014/15-2	Wet	12/2/2014	=	33000
MO-FIL	2014/15-3	Wet	12/12/2014	=	280000
MO-FIL	2015/16-1	Wet	9/15/2015	=	50000
MO-FIL	2015/16-2	Wet	1/5/2016	=	3000
MO-FIL	2015/16-3	Wet	1/31/2016	=	9200
MO-FIL	2015/16-5	Dry	6/21/2016	=	17000
MO-FIL	2016/17-1	Wet	10/28/2016	=	540000
MO-FIL	2016/17-2	Wet	11/20/2016	=	92000
MO-FIL	2016/17-3	Wet	12/15/2016	=	92000
MO-FIL	2016/17-6	Dry	5/4/2017	=	4600
MO-HUE	2010/11-1	Wet	10/6/2010	=	24000
MO-HUE	2010/11-2	Wet	10/30/2010	=	9000
MO-HUE	2010/11-4	Wet	2/16/2011	=	2400
MO-HUE	2010/11-5	Dry	4/19/2011	=	500
MO-HUE	2011/12-1	Wet	10/5/2011	=	5200

Site ID	Event ID	Event Type	Sample Date	Sign	Result (MPN/100 mL)
MO-HUE	2011/12-2	Wet	1/21/2012	=	9000
MO-HUE	2011/12-3	Wet	3/17/2012	=	16000
MO-HUE	2011/12-4	Dry	5/24/2012	=	3000
MO-HUE	2012/13-2	Wet	11/17/2012	=	35000
MO-HUE	2012/13-3	Wet	2/19/2013	=	11000
MO-HUE	2012/13-4	Wet	3/7/2013	=	2800
MO-HUE	2012/13-5	Dry	4/30/2013	=	9000
MO-HUE	2013/14-1	Wet	12/7/2013	=	9000
MO-HUE	2013/14-2	Wet	2/6/2014	=	16000
MO-HUE	2013/14-3	Wet	2/27/2014	=	11000
MO-HUE	2013/14-4	Dry	4/30/2014	=	500000
MO-HUE	2014/15-1	Wet	11/1/2014	>	1600000
MO-HUE	2014/15-3	Wet	12/12/2014	=	350000
MO-HUE	2014/15-6	Dry	7/1/2015	>	1600000
MO-HUE	2015/16-1	Wet	9/15/2015	=	280000
MO-HUE	2015/16-2	Wet	1/5/2016	=	22000
MO-HUE	2015/16-3	Wet	1/31/2016	>	16000
MO-HUE	2015/16-4	Wet	3/6/2016	=	54000
MO-HUE	2015/16-5	Dry	6/15/2016	=	1400
MO-HUE	2016/17-2	Wet	11/20/2016	=	17000
MO-HUE	2016/17-3	Wet	12/15/2016	=	3500
MO-HUE	2016/17-5	Wet	1/19/2017	=	7000
MO-HUE	2016/17-6	Dry	5/23/2017	=	1700
MO-MEI	2010/11-1	Wet	10/6/2010	=	110000
MO-MEI	2010/11-3	Wet	11/20/2010	=	9000
MO-MEI	2010/11-4	Wet	2/16/2011	=	9000
MO-MEI	2010/11-5	Dry	4/19/2011	=	3000
MO-MEI	2011/12-1	Wet	10/5/2011	=	500000
MO-MEI	2011/12-2	Wet	1/21/2012	=	90000
MO-MEI	2011/12-3	Wet	3/17/2012	=	50000
MO-MEI	2011/12-4	Dry	4/24/2012	=	1400
MO-MEI	2012/13-2	Wet	11/17/2012	=	22000
MO-MEI	2012/13-4	Wet	3/8/2013	=	16000
MO-MEI	2013/14-1	Wet	12/7/2013	=	11000
MO-MEI	2013/14-2	Wet	2/6/2014	=	70000
MO-MEI	2013/14-3	Wet	2/27/2014	=	14000
MO-MEI	2014/15-1	Wet	11/1/2014	=	79000
MO-MEI	2014/15-2	Wet	12/2/2014	=	33000
MO-MEI	2014/15-3	Wet	12/12/2014	=	240000
MO-MEI	2014/15-4	Wet	4/7/2015	=	50000
MO-MEI	2015/16-2	Wet	1/5/2016	=	11000
MO-MEI	2015/16-3	Wet	1/31/2016	=	9200
MO-MEI	2015/16-4	Wet	3/6/2016	=	35000
MO-MEI	2016/17-1	Wet	10/28/2016	>	1600000
MO-MEI	2016/17-2	Wet	11/20/2016	=	24000
MO-MEI	2016/17-3	Wet	12/15/2016	=	35000
MO-MEI	2016/17-5	Wet	1/19/2017	=	170000
MO-MPK	2010/11-1	Wet	10/6/2010	=	30000
MO-MPK	2010/11-2	Wet	10/30/2010	=	5000
MO-MPK	2010/11-4	Wet	2/16/2011	=	3000
MO-MPK	2010/11-5	Dry	4/28/2011	=	30000
MO-MPK	2011/12-1	Wet	10/5/2011	=	900000

Site ID	Event ID	Event Type	Sample Date	Sign	Result (MPN/100 mL)
MO-MPK	2011/12-2	Wet	1/21/2012	=	50000
MO-MPK	2011/12-3	Wet	3/17/2012	=	90000
MO-MPK	2012/13-2	Wet	11/17/2012	=	16000
MO-MPK	2012/13-4	Wet	3/8/2013	=	24000
MO-MPK	2013/14-1	Wet	12/7/2013	=	7000
MO-MPK	2013/14-2	Wet	2/6/2014	=	500000
MO-MPK	2013/14-3	Wet	2/27/2014	=	17000
MO-MPK	2014/15-1	Wet	11/1/2014	=	79000
MO-MPK	2014/15-3	Wet	12/12/2014	=	7900
MO-MPK	2015/16-1	Wet	9/15/2015	=	900000
MO-MPK	2015/16-2	Wet	1/5/2016	=	50000
MO-MPK	2015/16-3	Wet	1/31/2016	=	9200
MO-MPK	2015/16-4	Wet	3/6/2016	>	16000
MO-MPK	2016/17-1	Wet	10/28/2016	=	35000
MO-MPK	2016/17-2	Wet	11/20/2016	=	160000
MO-MPK	2016/17-3	Wet	12/15/2016	>	16000
MO-MPK	2016/17-6	Dry	5/18/2017	=	35000
MO-OJA	2010/11-1	Wet	10/6/2010	=	50000
MO-OJA	2010/11-3	Wet	11/20/2010	=	17000
MO-OJA	2010/11-4	Wet	2/16/2011	=	5000
MO-OJA	2011/12-1	Wet	10/5/2011	=	160000
MO-OJA	2011/12-2	Wet	1/21/2012	=	24000
MO-OJA	2011/12-3	Wet	3/17/2012	=	30000
MO-OJA	2011/12-4	Dry	4/24/2012	=	30000
MO-OJA	2012/13-1	Wet	10/11/2012	=	9000
MO-OJA	2012/13-2	Wet	11/17/2012	=	28000
MO-OJA	2012/13-4	Wet	3/7/2013	=	170000
MO-OJA	2012/13-5	Dry	4/30/2013	=	5000
MO-OJA	2013/14-1	Wet	12/7/2013	=	50000
MO-OJA	2013/14-2	Wet	2/6/2014	=	800
MO-OJA	2013/14-3	Wet	2/27/2014	=	17000
MO-OJA	2013/14-4	Dry	4/16/2014	=	1300
MO-OJA	2014/15-1	Wet	11/1/2014	=	1600000
MO-OJA	2014/15-2	Wet	12/2/2014	=	94000
MO-OJA	2014/15-3	Wet	12/12/2014	=	920000
MO-OJA	2014/15-4	Wet	4/7/2015	>	1600000
MO-OJA	2015/16-2	Wet	1/5/2016	=	13000
MO-OJA	2015/16-3	Wet	1/31/2016	>	16000
MO-OJA	2015/16-4	Wet	3/6/2016	=	14000
MO-OJA	2016/17-1	Wet	10/28/2016	=	540000
MO-OJA	2016/17-2	Wet	11/20/2016	=	54000
MO-OJA	2016/17-3	Wet	12/15/2016	=	540000
MO-OJA	2016/17-5	Wet	1/19/2017	=	5000
MO-OJA	2016/17-6	Dry	5/23/2017	=	3500
MO-OXN	2010/11-1	Wet	10/6/2010	=	24000
MO-OXN	2010/11-2	Wet	10/30/2010	=	11000
MO-OXN	2010/11-4	Wet	2/16/2011	=	3000
MO-OXN	2011/12-1	Wet	10/5/2011	=	22000
MO-OXN	2011/12-2	Wet	1/21/2012	=	1700
MO-OXN	2011/12-3	Wet	3/17/2012	=	3000
MO-OXN	2012/13-2	Wet	11/17/2012	=	24000
MO-OXN	2012/13-4	Wet	3/7/2013	=	9000

Site ID	Event ID	Event Type	Sample Date	Sign	Result (MPN/100 mL)
MO-OXN	2013/14-1	Wet	12/7/2013	=	2400
MO-OXN	2013/14-2	Wet	2/6/2014	=	460
MO-OXN	2013/14-3	Wet	2/27/2014	=	30000
MO-OXN	2014/15-1	Wet	10/31/2014	=	33000
MO-OXN	2014/15-2	Wet	12/2/2014	=	130000
MO-OXN	2014/15-3	Wet	12/12/2014	=	240000
MO-OXN	2015/16-1	Wet	9/15/2015	=	1600000
MO-OXN	2015/16-2	Wet	1/5/2016	=	3000
MO-OXN	2015/16-3	Wet	1/31/2016	=	5400
MO-OXN	2016/17-1	Wet	10/28/2016	=	24000
MO-OXN	2016/17-3	Wet	12/15/2016	=	92000
MO-OXN	2016/17-6	Dry	5/4/2017	=	540000
MO-SIM	2010/11-1	Wet	10/6/2010	=	90000
MO-SIM	2010/11-2	Wet	10/30/2010	=	30000
MO-SIM	2010/11-4	Wet	2/16/2011	=	2400
MO-SIM	2010/11-5	Dry	4/28/2011	=	500
MO-SIM	2011/12-1	Wet	10/5/2011	=	50000
MO-SIM	2011/12-2	Wet	1/21/2012	=	60000
MO-SIM	2011/12-3	Wet	3/17/2012	=	50000
MO-SIM	2011/12-4	Dry	5/24/2012	=	3000
MO-SIM	2012/13-2	Wet	11/17/2012	=	28000
MO-SIM	2012/13-3	Wet	2/19/2013	=	28000
MO-SIM	2012/13-4	Wet	3/8/2013	=	9000
MO-SIM	2012/13-5	Dry	5/23/2013	=	900
MO-SIM	2013/14-1	Wet	12/7/2013	=	11000
MO-SIM	2013/14-2	Wet	2/6/2014	=	110000
MO-SIM	2013/14-3	Wet	2/27/2014	=	5000
MO-SIM	2014/15-1	Wet	11/1/2014	=	1600000
MO-SIM	2014/15-3	Wet	12/12/2014	=	22000
MO-SIM	2014/15-6	Dry	7/7/2015	=	110000
MO-SIM	2015/16-1	Wet	9/15/2015	=	50000
MO-SIM	2015/16-2	Wet	1/5/2016	=	5000
MO-SIM	2015/16-3	Wet	1/31/2016	=	16000
MO-SIM	2015/16-5	Dry	6/23/2016	=	2300
MO-SIM	2016/17-1	Wet	10/28/2016	=	35000
MO-SIM	2016/17-2	Wet	11/20/2016	=	4900
MO-SIM	2016/17-3	Wet	12/15/2016	=	17000
MO-SIM	2016/17-6	Dry	5/18/2017	=	2200
MO-SPA	2010/11-1	Wet	10/6/2010	=	50000
MO-SPA	2010/11-2	Wet	10/30/2010	=	50000
MO-SPA	2010/11-4	Wet	2/16/2011	=	900
MO-SPA	2010/11-5	Dry	4/28/2011	=	2400
MO-SPA	2011/12-1	Wet	10/5/2011	=	50000
MO-SPA	2011/12-2	Wet	1/21/2012	=	1600
MO-SPA	2011/12-3	Wet	3/17/2012	=	9000
MO-SPA	2012/13-2	Wet	11/17/2012	=	30000
MO-SPA	2012/13-4	Wet	3/7/2013	=	16000
MO-SPA	2013/14-1	Wet	12/7/2013	=	3000
MO-SPA	2013/14-2	Wet	2/6/2014	=	170000
MO-SPA	2013/14-3	Wet	2/27/2014	=	30000
MO-SPA	2014/15-2	Wet	12/2/2014	=	49000
MO-SPA	2014/15-3	Wet	12/11/2014	=	1600000
MO-SPA	2015/16-1	Wet	9/15/2015	=	350000
MO-SPA	2015/16-2	Wet	1/5/2016	=	3000
MO-SPA	2015/16-3	Wet	1/31/2016	>	16000
MO-SPA	2016/17-1	Wet	10/28/2016	=	54000
MO-SPA	2016/17-2	Wet	11/20/2016	=	110000
MO-SPA	2016/17-3	Wet	12/15/2016	=	35000
MO-THO	2010/11-1	Wet	10/6/2010	=	90000
MO-THO	2010/11-2	Wet	10/30/2010	=	24000
MO-THO	2010/11-4	Wet	2/16/2011	=	17000
MO-THO	2011/12-1	Wet	10/5/2011	=	16000
MO-THO	2011/12-2	Wet	1/21/2012	=	16000
MO-THO	2011/12-3	Wet	3/17/2012	=	9000
MO-THO	2011/12-4	Dry	5/24/2012	=	2400
MO-THO	2012/13-2	Wet	11/17/2012	=	28000
MO-THO	2012/13-3	Wet	2/19/2013	=	3000
MO-THO	2012/13-4	Wet	3/7/2013	=	460
MO-THO	2013/14-2	Wet	2/6/2014	=	160000
MO-THO	2013/14-3	Wet	2/27/2014	=	7000
MO-THO	2014/15-1	Wet	11/1/2014	=	4700
MO-THO	2014/15-3	Wet	12/12/2014	=	240000
MO-THO	2014/15-6	Dry	7/7/2015	=	1100
MO-THO	2015/16-1	Wet	9/15/2015	=	50000
MO-THO	2015/16-2	Wet	1/5/2016	=	3000
MO-THO	2015/16-3	Wet	1/31/2016	=	16000
MO-THO	2016/17-1	Wet	10/28/2016	=	47000
MO-THO	2016/17-2	Wet	11/21/2016	=	17000
MO-THO	2016/17-3	Wet	12/15/2016	=	16000
MO-VEN	2010/11-1	Wet	10/6/2010	=	30000
MO-VEN	2010/11-2	Wet	10/30/2010	=	24000
MO-VEN	2010/11-4	Wet	2/16/2011	=	1100
MO-VEN	2011/12-1	Wet	10/5/2011	=	2400
MO-VEN	2011/12-2	Wet	1/21/2012	=	16000
MO-VEN	2011/12-3	Wet	3/17/2012	=	14000
MO-VEN	2012/13-2	Wet	11/17/2012	=	24000
MO-VEN	2012/13-4	Wet	3/7/2013	=	9000
MO-VEN	2013/14-1	Wet	12/7/2013	=	30000
MO-VEN	2013/14-2	Wet	2/6/2014	=	170000
MO-VEN	2013/14-3	Wet	2/27/2014	=	3000
MO-VEN	2013/14-4	Dry	4/23/2014	=	5000
MO-VEN	2014/15-1	Wet	10/31/2014	=	7900
MO-VEN	2014/15-2	Wet	12/2/2014	=	46000
MO-VEN	2014/15-3	Wet	12/12/2014	>	1600000
MO-VEN	2015/16-1	Wet	9/15/2015	=	170000
MO-VEN	2015/16-2	Wet	1/5/2016	=	46000
MO-VEN	2015/16-3	Wet	1/31/2016	>	16000
MO-VEN	2016/17-1	Wet	10/28/2016	=	170000
MO-VEN	2016/17-2	Wet	11/21/2016	>	2300
MO-VEN	2016/17-3	Wet	12/15/2016	=	92000
MO-VEN	2016/17-5	Wet	1/19/2017	=	8000
MO-VEN	2016/17-6	Dry	5/4/2017	>	1600