Chronic Toxicity Testing of the Chevron/Cawelo Water District "Inlet to Reservoir B" and "Valley Waste" Effluents

Sample collected September 3, 2010

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PACIFIC ECORISK
ENVIRONMENTAL CONSULTING & TESTING

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1. INTRODUCTION

Chevron USA Inc. and Cawelo Water District (Chevron/Cawelo) has contracted Pacific EcoRisk (PER) to perform an evaluation of the chronic toxicity of "Inlet to Reservoir B" and "Valley Waste" effluents. Previous testing of these effluents has indicated the presence of toxicity to both survival and growth/reproduction of the test species used. Follow-up Toxicity Identification & Evaluations (TIEs) further indicated that naphthenic acids were a likely cause of the toxicity in these effluents.

TIE testing previously performed by PER for other refinery-related effluents has similarly indicated naphthenic acids as commonly-observed causes of effluent toxicity, and follow-up Toxicity Reduction Evaluation (TRE) testing indicated that treatment of the toxic effluents with granulated activated carbon (GAC) was successful in removing the observed toxicity. With that in mind, the current testing of (untreated) effluent side-by-side with GAC-treated effluent was performed to assess the efficacy of GAC treatment in the removal of toxicity from the Chevron/Cawelo effluents.

The current chronic toxicity evaluation consisted of performing the US EPA 7-day survival & growth test with larval fathead minnows (*Pimephales promelas*) using "Inlet to Reservoir B" and "Valley Waste" effluent samples that were collected on September 3, 2010. In order to assess the sensitivity of the test organisms to chronic toxic stress, a concurrent reference toxicant tests was also performed. This report describes the performance and results of these tests.

2. TOXICITY TEST PROCEDURES

The methods used in conducting this chronic toxicity testing followed EPA testing manual "Short-Term Methods for Estimating the Chronic Effects of Effluents and Receiving Waters to Freshwater Organisms, Fourth Edition" (EPA-821-R-02-013).

2.1 Sample Receipt and Handling

On September 3, samples of the 'Inlet to Reservoir B' and 'Valley Waste' effluents were collected into appropriately cleaned sample containers. These samples were transported that same day, on ice and under chain-of-custody, to the PER laboratory in Fairfield. Upon receipt at the testing laboratory, aliquots of the samples were collected for analysis of initial water quality characteristics (Table 1), with the remainder of the samples being stored at 0-6°C except when being used to prepare test solutions. The chain-of-custody record for the collection and delivery of these samples is provided in Appendix A.

Table 1. Initial water quality characteristics of the Chevron/Cawelo effluent samples.

Sample ID	Temp (°C)	pH	D.O. (mg/L)	Alkalinity (mg/L)	Hardness (mg/L)	Conductivity (µS/cm)	Total Ammonia (mg/L N)
Inlet to Reservoir B (T001A)	1.4	6.72	2.5	214	87	783	<1.0
Valley Waste (VW001A)	1.3	7.58	4.1	330	39	875	<1.0

2.2 Preparation of GAC-Treated Effluent

To prepare the GAC-treated effluents, separatory funnels were loaded with rinsed GAC. Using a peristaltic pump, effluent was pumped up into the bottom of the funnel and passed through the entire column of GAC at a rate of 12 mL/L before flowing out the top (the overall loading rate was 1-L of GAC per treatment of 8-L of effluent). A 'GAC-Treatment Blank' was prepared in a similar fashion using Lab Water instead of the effluent. The GAC-treated effluents (and method blank) were tested identically to the untreated effluent, as described below.

2.3 Survival and Growth Toxicity Testing with Larval Fathead Minnows

The chronic fathead minnow test consists of exposing larval fish to effluent for 7 days, after which effects on survival and growth are evaluated. The specific procedures used in this testing are described below.

The Lab Water Control for this test consisted of USEPA synthetic moderately-hard water (prepared by addition of ACS-reagent grade chemicals to Type 1 lab water [reverse-osmosis, de-ionized water]). The Lab Water Control and effluent samples were used to prepare test solutions at the 12.5, 25, 50, 75, and 100% effluent concentrations for each of the untreated effluents and the GAC-treated effluents. Fresh test solutions were prepared daily. "New" water quality characteristics (pH, D.O., and conductivity) were measured on these test solutions prior to use in the tests.

There were 4 replicates at each test treatment, each replicate consisting of 300 mL of test media in a 600-mL glass beaker. These tests were initiated by randomly allocating 10 larval fathead minnows (<48 hrs old) into each replicate. The replicate beakers were placed in a temperature-controlled room at 25°C, under cool-white fluorescent lighting on a 16L:8D photoperiod. The test fish were fed brine shrimp nauplii twice daily.

Each replicate was examined daily, with any dead animals, uneaten food, wastes, and other detritus being removed. The number of live fish in each replicate was determined and then approximately 80% of the test media in each beaker was carefully poured out and replaced with

fresh test solution. "Old" water quality characteristics (pH, D.O., and conductivity) were measured on the old test water that had been discarded from one randomly-selected replicate at each treatment.

After 7 days exposure, the number of live fish in each replicate beaker was recorded. The fish from each replicate were then carefully euthanized in methanol, rinsed in de-ionized water, and transferred to a pre-dried and pre-tared weighing pan. These fish were then dried at 100°C for >24 hrs and re-weighed to determine the total weight of fish in each replicate; the total weight was then divided by the initial number of fish per replicate (n=10) to determine the "biomass value". The resulting survival and growth ("biomass value") data were analyzed to evaluate any impairment(s) caused by the effluents and GAC-treated effluents; all statistical analyses were performed using the CETIS® statistical software.

2.3.1 Reference Toxicant Testing of the Larval Fathead Minnows

In order to assess the sensitivity of the fish to toxic stress, a concurrent reference toxicant test was performed. The reference toxicant test was performed similarly to the effluent test, except that test solutions consisted of Lab Water Control media spiked with NaCl at test concentrations of 0.75, 1.5, 3, 6, and 9 gm/L. The resulting test response data were analyzed to determine key dose-response point estimates (e.g., EC_{50}); all statistical analyses were made using the CETIS® software. These response endpoints were then compared to the "typical response" ranges established by the mean ± 2 SD of the point estimates generated by the most recent previous reference toxicant tests performed by this lab.

3. TOXICITY TESTING RESULTS

3.1 Effects of 'Inlet to Reservoir B' Effluent on Fathead Minnows

The results of this test are summarized below in Table 2. There was 100% survival at the Lab Water Control treatment. There were significant reductions in survival at the 25% effluent concentrations; the NOEC was 12.5% effluent, resulting in 8 TUc (where TUc =100/NOEC).

There was a mean 'biomass value' of 0.38 mg at the Lab Water Control treatment. There were significant reductions in growth at the 12.5% effluent concentration; the growth NOEC was <12.5% effluent, resulting in >8 TUc.

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

Table 2. Effects of 'Inlet to Reservoir B' effluent on fathead minnows.

Effluent Treatment	% Survival	Mean Fish Biomass Value (mg)
Lab Water Control	100	0.38
12.5%	92.5	**0.32***
25%	**37.5***	**0.10**
50%	**0***	-
75%	**0***	-
100%	**0***	-
Summary of Statistics		
No Observable Effect Concentration (NOEC) =	12.5% effluent	<12.5% effluent
TUc (where TUc = 100/NOEC) =	8	>8
Survival EC_{25} or Growth IC_{25} =	17% effluent	14.5% effluent
Survival EC_{50} or Growth IC_{50} =	21.6% effluent	19.7% effluent

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

3.2 Effects of GAC-Treated 'Inlet to Reservoir B' Effluent on Fathead Minnows

The results of this test are summarized below in Table 3. There was 97.5% survival at the Lab Water Control treatment. There were ***no*** significant reductions in survival in the GAC-treated effluent; the NOEC was 100% effluent, resulting in 1 TUc (where TUc =100/NOEC).

There was a mean 'biomass value' of 0.36 mg at the Lab Water Control treatment. There were ***no*** significant reductions in growth in the GAC-treated effluent; the growth NOEC was 100% effluent, resulting in 1 TUc.

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

Table 3. Effects of GAC-treated 'Inlet to Reservoir B' effluent on fathead minnows.

Effluent Treatment	% Survival	Mean Fish Biomass Value (mg)
GAC-Treatment Blank	100	0.40
Lab Water Control	97.5	0.36
12.5%	97.5	0.35
25%	100	0.36
50%	97.5	0.34
75%	97.5	0.33
100%	95	0.34
Summary of Statistics		
No Observable Effect Concentration (NOEC) =	100% effluent	100% effluent
TUc (where TUc = 100/NOEC) =	1	1
Survival EC_{25} or Growth IC_{25} =	>100% effluent	>100% effluent
Survival EC_{50} or Growth IC_{50} =	>100% effluent	>100% effluent

3.3 Effects of 'Valley Waste' Effluent on Fathead Minnows

The results of this test are summarized below in Table 4. There was 100% survival at the Lab Water Control treatment. There were significant reductions in survival at the ≥25% effluent concentrations; the NOEC was 12.5% effluent, resulting in 8 TUc (where TUc =100/NOEC).

There was a mean 'biomass value' of 0.41 mg at the Lab Water Control treatment. There were significant reductions in growth at the 12.5% effluent concentration; the growth NOEC was <12.5% effluent, resulting in >8 TUc.

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

Table 4. Effects of 'Valley Waste' effluent on fathead minnows.

Effluent Treatment	% Survival	Mean Fish Biomass Value (mg)
Lab Water Control	100	0.41
12.5%	87.5	**0.33***
25%	**62.5***	**0.22***
50%	**10***	**0.03***
75%	**0***	-
100%	**0***	-
Summary of Statistics		
No Observable Effect Concentration (NOEC) =	12.5% effluent	<12.5% effluent
TUc (where TUc = 100/NOEC) =	8	>8
Survival EC_{25} or Growth IC_{25} =	18.4% effluent	14.8% effluent
Survival EC_{50} or Growth IC_{50} =	25.9% effluent	26.2% effluent

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

3.4 Effects of GAC-Treated 'Valley Waste' Effluent on Fathead Minnows

The results of this test are summarized below in Table 5. There was 100% survival at the Lab Water Control treatment. There were ***no*** significant reductions in survival in the GAC-treated 'Valley Waste' effluent; the NOEC was 100% effluent, resulting in 1 TUc (where TUc =100/NOEC).

There was a mean 'biomass value' of 0.43 mg at the Lab Water Control treatment. There were numerical reductions in growth in the GAC-treated 'Valley Waste' effluent that the CETIS software indicated were significant; however, EPA guidance (see page 6-8 of EPA 833-R-00-003 and pages 51-52 of EPA 821-R-02-013) states that these slight reductions in growth should ***not*** be considered significant. EPA guidance indicates that treatments with a very small relative difference from the Control treatment (i.e., smaller than the lower PMSD limit) are treated as though they do not differ significantly from the Lab Control (even if they do so statistically). The relative difference between the growth responses in the GAC-treated effluent and the Lab Control are less than the 'Lower PMSD Bound' of 12% established for the chronic fathead minnow test growth response. The EPA established this approach to avoid false positives that might otherwise result due to the high degree of precision achieved by the testing lab.

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

Table 5. Effects of GAC-treated 'Valley Waste' effluent on fathead minnows.

Effluent Treatment	% Survival	Mean Fish Biomass Value (mg)
GAC Blank	100	0.40
Lab Water Control	100	0.43
12.5%	97.5	0.38
25%	100	0.38
50%	100	0.38
75%	100	0.40
100%	100	0.38
Summary of Statistics		
No Observable Effect Concentration (NOEC) =	100% effluent	100% effluent
TUc (where TUc = 100/NOEC) =	1	1
Survival EC_{25} or Growth IC_{25} =	>100% effluent	>100% effluent
Survival EC_{50} or Growth IC_{50} =	>100% effluent	>100% effluent

3.5 Reference Toxicant Toxicity to Fathead Minnows

The results of this test are summarized below in Table 6. There was 85% survival and a mean biomass value of 0.36 mg at the Lab Control treatment. The survival EC_{50} was 2.9 gm/L NaCl and the growth IC_{50} was 2.4 gm/L NaCl.

These reference toxicant test results are consistent with the "typical response" ranges established by previous fathead minnow reference toxicant tests performed in this laboratory, indicating that these organisms were responding to toxic stress in a typical fashion.

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

Table 6. Reference toxicant testing: effects of NaCl on fathead minnows.

NaCl Treatment (gm/L)	% Survival	Mean Fish Biomass Value (mg)
Lab Control	85	0.36
0.75	85	0.35
1.5	90	0.32
3	35	**0.07***
6	**5***	**0.02**
9	**0***	-
Summary of Statistics		
Survival EC_{50} or Growth IC_{50} =	2.9 gm/L NaCl	2.4 gm/L NaCl

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

Note - It was observed during test initiation that the test organisms received from the vendor were not of uniform high quality. The highest quality organisms were used to load the A and B replicates of the reference toxicant test, with the remaining organisms used to load the C and D replicates. Anomalous mortalities were observed in the C and D replicates, and data from these replicates were therefore excluded from the statistics. The results described above are from the A and B replicates only.

4. SUMMARY AND CONCLUSIONS

Effects of "Inlet to Reservoir B" Effluent on Fathead Minnows
There were significant reductions in survival at the ≥25% effluent concentrations; the survival NOEC was 12.5% effluent, resulting in 8 TUc (where TUc =100/NOEC). There were significant reductions in growth at the 12.5% effluent concentration; the growth NOEC was <12.5% effluent, resulting in >8 TUc.

Effects of GAC-Treated "Inlet to Reservoir B" Effluent on Fathead Minnows
There were ***no*** significant reductions in survival or growth in the GAC-treated "Inlet to Reservoir B" effluent; the NOEC was 100% effluent, resulting in 1 TUc (where TUc =100/NOEC) for both test endpoints.

Effects of "Valley Waste" Effluent on Fathead Minnows
There were significant reductions in survival at the ≥25% effluent concentrations; the survival NOEC was 12.5% effluent, resulting in 8 TUc (where TUc =100/NOEC). There were significant reductions in growth at the 12.5% effluent concentration; the growth NOEC was <12.5% effluent, resulting in >8 TUc.

Effects of GAC-Treated "Valley Waste" Effluent on Fathead Minnows
There were ***no*** significant reductions in survival or growth in the GAC-treated "Valley Waste" effluent; the NOEC was 100% effluent, resulting in 1 TUc (where TUc =100/NOEC) for both test endpoints.

Conclusion: The GAC treatment effectively removed the toxicity from both of the effluent samples.

4.1 QA/QC Summary

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

Negative Lab Control – The biological responses in the Lab Water Control treatments for these tests were within acceptable limits.

Positive Control – The results of the concurrent reference toxicant test were consistent with the "typical response" ranges established by previous reference toxicant tests performed in our lab, indicating that the test organisms used in the current tests were responding to toxic stress in a typical and consistent fashion.

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

Appendix A

Chain-of-Custody Record for the Collection and Delivery of the Chevron/Cawelo "Inlet to Reservoir B" and "Valley Waste" Effluent Samples

CHAIN OF CUSTODY RECORD

PACIFIC ECORISK
2250 Cordelia Rd
Fairfield, CA 94534
Ph: (707) 207-7760
Fax: (707) 207-7916
www.pacificecorisk.com

RESULTS TO:
PRECISION ANALYTICAL
321 19TH ST
BAKERSFIELD CA 93301
Attn: STEPHEN HARRIS
Phone:
Email:

BILL TO:
Attn:
Phone:
Email:

PROJECT:

ANALYSES REQUESTED

SAMPLE IDENTIFICATION	DATE	TIME	SAMPLE MATRIX	GRAB/ COMP.	# CONTAINERS/TYPE									REMARKS
T001A	9-3-10	9:10	AQ		4 /									
VW001A	9-3-10	8:40	AQ		4 /									
					/									
					/									
					/									
					/									
					/									
					/									

METHOD OF SHIPMENT: FedEx:_____ UPS:_____ HAND:_____ OTHER:_____

COMMENTS:

CODES:

RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)	DATE	TIME	PAGE #
	9/3/10	11:15		9-3-10	1115	OF
	9-3-10	16:30		9/3/10	16:20	

WHITE - RETURN W/ SAMPLE YELLOW - KEEP FOR YOUR RECORDS

Appendix B

Test Data and Summary of Statistics for the Evaluation of the Chronic Toxicity of "Inlet to Reservoir B" Effluent to Fathead Minnows

CETIS Summary Report

Inlet to Res. B

Report Date: 21 Sep-10 12:10 (p 1 of 2)
Test Code: 04-1384-9927/40045

Chronic Larval Fish Survival and Growth Test — Pacific EcoRisk

Batch ID:	16-6570-9896	**Test Type:**	Growth-Survival (7d)	**Analyst:**	Padrick Anderson
Start Date:	04 Sep-10 11:45	**Protocol:**	EPA-821-R-02-013 (2002)	**Diluent:**	Laboratory Water
Ending Date:	11 Sep-10 09:40	**Species:**	Pimephales promelas	**Brine:**	Not Applicable
Duration:	6d 22h	**Source:**	Aquatic Biosystems, CO	**Age:**	1

Sample ID:	08-7998-2318	**Code:**	Eff	**Client:**	Precision Analytical
Sample Date:	03 Sep-10 09:10	**Material:**	Effluent	**Project:**	17262
Receive Date:	03 Sep-10 16:45	**Source:**	Precision Analytical		
Sample Age:	27h (1.4 °C)	**Station:**	TOO1A		

Comparison Summary

Analysis ID	Endpoint	NOEL	LOEL	TOEL	PMSD	TU	Method
07-4227-8379	7d Survival Rate	12.5	25	17.7	9.89%	8	Steel Many-One Rank Test
09-8592-3652	Mean Dry Biomass-mg	<12.5	12.5	N/A	11.8%	>8	Steel Many-One Rank Test
09-1438-4958	Mean Dry Weight-mg	12.5	25	17.7	20.2%	8	Dunnett's Multiple Comparison Test

Point Estimate Summary

Analysis ID	Endpoint	Level	%	95% LCL	95% UCL	TU	Method
16-6368-6833	7d Survival Rate	EC1	9.43	6.51	11.7	10.6	Linear Regression (MLE)
		EC5	12	9.09	14.2	8.31	
		EC10	13.7	10.8	15.9	7.3	
		EC15	14.9	12.2	17.1	6.69	
		EC20	16	13.3	18.2	6.24	
		EC25	17	14.4	19.2	5.88	
		EC40	19.8	17.3	22.2	5.06	
		EC50	21.6	19.2	24.4	4.62	
18-8488-2731	Mean Dry Biomass-mg	IC5	4.06	1.92	9.85	24.6	Linear Interpolation (ICPIN)
		IC10	8.13	3.83	15.7	12.3	
		IC15	12.2	5.75	14.7	8.2	
		IC20	13.5	9.34	15.7	7.43	
		IC25	14.5	12.1	16.7	6.89	
		IC40	17.7	15.6	20	5.67	
		IC50	19.7	17.5	22.6	5.07	
16-1486-0457	Mean Dry Weight-mg	IC5	8.15	0.59	18.4	12.3	Linear Interpolation (ICPIN)
		IC10	13.6	2.79	18.6	7.35	
		IC15	16	6.85	21.7	6.26	
		IC20	18.3	10.8	25.2	5.45	
		IC25	20.7	14.4	N/A	4.83	
		IC40	>25	N/A	N/A	<4	
		IC50	>25	N/A	N/A	<4	

7d Survival Rate Summary

Conc-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
0	Lab Water Contr	4	1	1	1	1	1	0	0	0.0%	0.0%
12.5		4	0.925	0.889	0.961	0.8	1	0.0175	0.0957	10.4%	7.5%
25		4	0.375	0.311	0.439	0.2	0.6	0.0312	0.171	45.5%	62.5%
50		4	0	0	0	0	0	0	0		100.0%
75		4	0	0	0	0	0	0	0		100.0%
100		4	0	0	0	0	0	0	0		100.0%

Mean Dry Biomass-mg Summary

Conc-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
0	Lab Water Contr	4	0.382	0.374	0.39	0.359	0.409	0.00416	0.0228	5.96%	0.0%
12.5		4	0.323	0.312	0.335	0.279	0.347	0.00557	0.0305	9.44%	15.4%
25		4	0.095	0.0753	0.115	0.049	0.166	0.00961	0.0526	55.4%	75.1%
50		4	0	0	0	0	0	0	0		100.0%
75		4	0	0	0	0	0	0	0		100.0%
100		4	0	0	0	0	0	0	0		100.0%

Chronic Larval Fish Survival and Growth Test — Pacific EcoRisk

Mean Dry Weight-mg Summary

Conc-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
0	Lab Water Contr	4	0.382	0.374	0.39	0.359	0.409	0.00416	0.0228	5.96%	0.0%
12.5		4	0.353	0.332	0.373	0.31	0.434	0.0101	0.0553	15.7%	7.67%
25		4	0.252	0.228	0.275	0.163	0.31	0.0115	0.0629	25.0%	34.1%

7d Survival Rate Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Lab Water Contr	1	1	1	1
12.5		0.9	0.8	1	1
25		0.6	0.3	0.4	0.2
50		0	0	0	0
75		0	0	0	0
100		0	0	0	0

Mean Dry Biomass-mg Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Lab Water Contr	0.409	0.392	0.368	0.359
12.5		0.279	0.347	0.339	0.328
25		0.166	0.049	0.103	0.062
50		0	0	0	0
75		0	0	0	0
100		0	0	0	0

Mean Dry Weight-mg Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Lab Water Contr	0.409	0.392	0.368	0.359
12.5		0.31	0.434	0.339	0.328
25		0.277	0.163	0.257	0.31

Chronic Larval Fish Survival and Growth Test — Pacific EcoRisk

Analysis ID:	07-4227-8379	**Endpoint:**	7d Survival Rate	**CETIS Version:**	CETISv1.7.0
Analyzed:	13 Sep-10 16:01	**Analysis:**	Nonparametric-Control vs Treatments	**Official Results:**	Yes

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Angular (Corrected)	0	C > T	Not Run	12.5	25	17.7	8	9.89%

Steel Many-One Rank Test

Control vs	Conc-%	Test Stat	Critical	Ties	P-Value	Decision(5%)
Lab Water Control	12.5	14	10	1	0.3451	Non-Significant Effect
	25*	10	10	0	0.0417	Significant Effect
	50*	10	10	0	0.0417	Significant Effect
	75*	10	10	0	0.0417	Significant Effect
	100*	10	10	0	0.0417	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	6.880027	1.376005	5	154	<0.0001	Significant Effect
Error	0.1613514	0.00896397	18			
Total	7.041379	1.384969	23			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Mod Levene Equality of Variance	6.8	4.25	0.0010	Unequal Variances
Distribution	Shapiro-Wilk Normality	0.758		<0.0001	Non-normal Distribution

7d Survival Rate Summary

Conc-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
0	Lab Water Contr	4	1	1	1	1	1	0	0	0.0%	0.0%
12.5		4	0.925	0.889	0.961	0.8	1	0.0178	0.0957	10.4%	7.5%
25		4	0.375	0.31	0.44	0.2	0.6	0.0317	0.171	45.5%	62.5%
50		4	0	0	0	0	0	0	0		100.0%
75		4	0	0	0	0	0	0	0		100.0%
100		4	0	0	0	0	0	0	0		100.0%

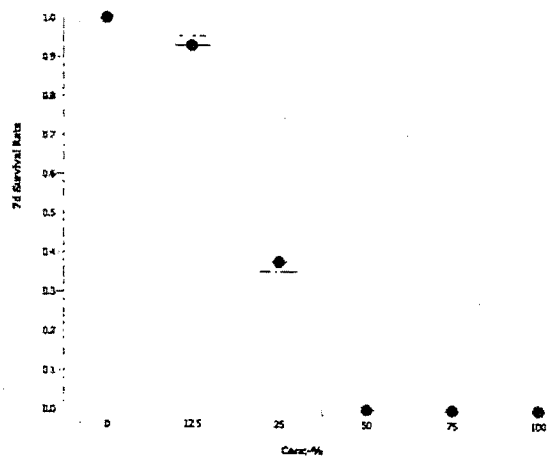
Angular (Corrected) Transformed Summary

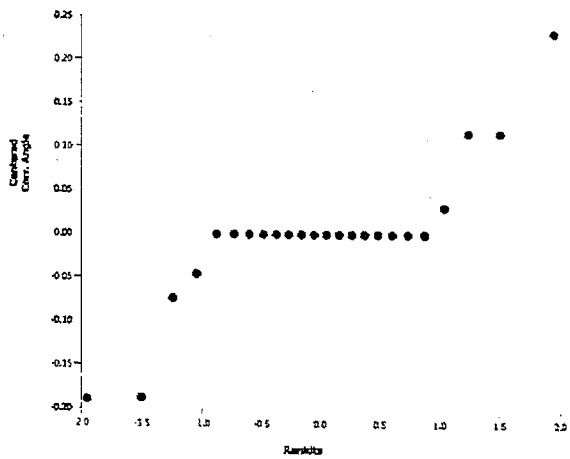
Conc-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
0	Lab Water Cont	4	1.41	1.41	1.41	1.41	1.41	0	0	0.0%	0.0%
12.5		4	1.3	1.24	1.35	1.11	1.41	0.0273	0.147	11.3%	8.28%
25		4	0.654	0.585	0.722	0.464	0.886	0.0333	0.179	27.5%	53.7%
50		4	0.159	0.159	0.159	0.159	0.159	0	0	0.0%	88.8%
75		4	0.159	0.159	0.159	0.159	0.159	0	0	0.0%	88.8%
100		4	0.159	0.159	0.159	0.159	0.159	0	0	0.0%	88.8%

Chronic Larval Fish Survival and Growth Test — Pacific EcoRisk

Analysis ID:	07-4227-8379	**Endpoint:**	7d Survival Rate	**CETIS Version:**	CETISv1.7.0
Analyzed:	13 Sep-10 16:01	**Analysis:**	Nonparametric-Control vs Treatments	**Official Results:**	Yes

Graphics





CETIS Analytical Report

Report Date: 13 Sep-10 16:02 (p 1 of 2)
Test Code: 04-1384-9927/40045

Chronic Larval Fish Survival and Growth Test — Pacific EcoRisk

Analysis ID:	16-6368-6833	Endpoint:	7d Survival Rate	CETIS Version:	CETISv1.7.0
Analyzed:	13 Sep-10 16:01	Analysis:	Linear Regression (MLE)	Official Results:	Yes

Linear Regression Options

Model Function	Threshold Option	Threshold	Optimized	Pooled	Het Corr	Weighted
Log-Normal [NED=A+B*log(X)]	Control Threshold	0	Yes	No	No	Yes

Regression Summary

Iters	LL	AICc	Mu	Sigma	G Stat	Chi-Sq	Critical	P-Value	Decision(5%)
5	-37.7	80	-0.56	0.155	0.0851	9.3	28.9	0.9520	Non-Significant Heterogeneity

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC1	9.43	6.51	11.7	10.6	8.55	15.4
EC5	12	9.09	14.2	8.31	7.02	11
EC10	13.7	10.8	15.9	7.3	6.3	9.23
EC15	14.9	12.2	17.1	6.69	5.85	8.22
EC20	16	13.3	18.2	6.24	5.5	7.5
EC25	17	14.4	19.2	5.88	5.21	6.95
EC40	19.8	17.3	22.2	5.06	4.51	5.78
EC50	21.6	19.2	24.4	4.62	4.1	5.22

Regression Parameters

Parameter	Estimate	Std Error	95% LCL	95% UCL	t Stat	P-Value	Decision(5%)
Slope	6.46	0.961	4.57	8.34	6.72	<0.0001	Significant Parameter
Intercept	-3.62	1.3	-6.16	-1.08	-2.79	0.0121	Significant Parameter

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(5%)
Variances	Mod Levene Equality of Variance	5.98	3.06	0.0044	Unequal Variances
Distribution	Shapiro-Wilk Normality	0.863		0.0204	Non-normal Distribution

7d Survival Rate Summary

			Calculated Variate(A/B)								
Conc-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	Diff%	A	B
0	Lab Water Contr	4	1	1	1	0	0	0.0%	0.0%	40	40
12.5		4	0.925	0.8	1	0.0175	0.0957	10.4%	7.5%	37	40
25		4	0.375	0.2	0.6	0.0312	0.171	45.5%	62.5%	15	40
50		4	0	0	0	0	0		100.0%	0	40
75		4	0	0	0	0	0		100.0%	0	40
100		4	0	0	0	0	0		100.0%	0	40

7d Survival Rate Detail

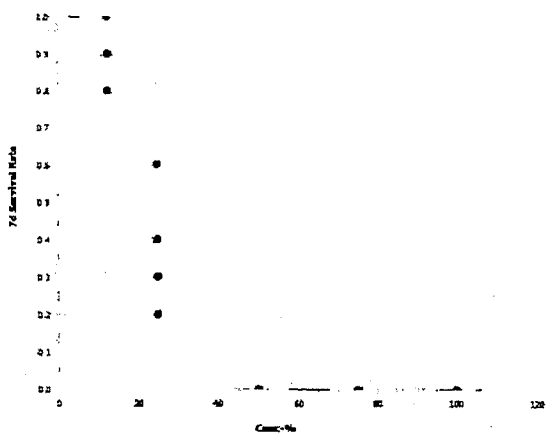
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Lab Water Control	1	1	1	1
12.5		0.9	0.8	1	1
25		0.6	0.3	0.4	0.2
50		0	0	0	0
75		0	0	0	0
100		0	0	0	0

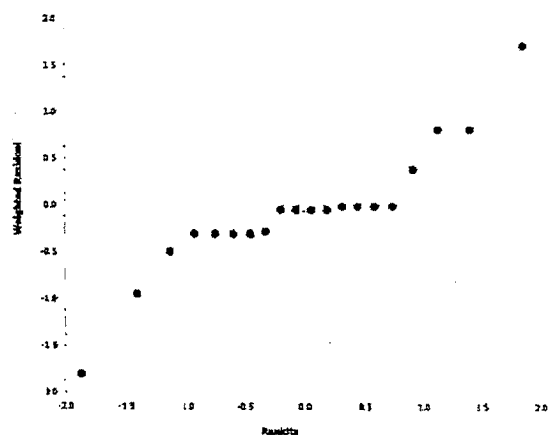
CETIS Analytical Report

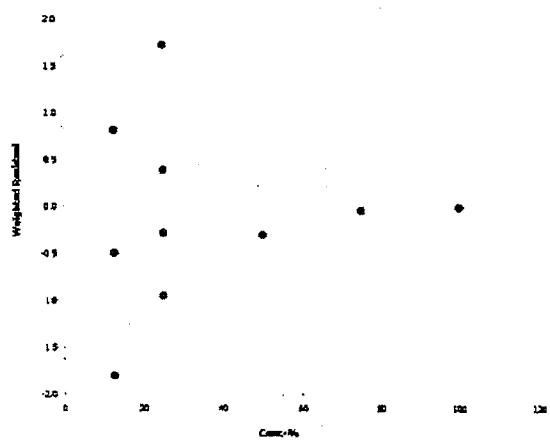
Report Date: 13 Sep-10 16:02 (p 2 of 2)
Test Code: 04-1384-9927/40045

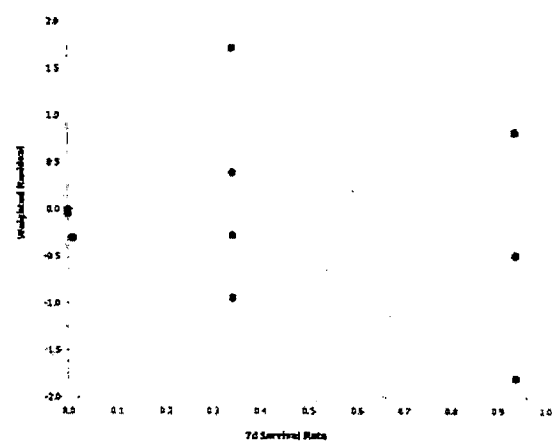
Chronic Larval Fish Survival and Growth Test					Pacific EcoRisk
Analysis ID:	16-6368-6833	Endpoint:	7d Survival Rate	CETIS Version:	CETISv1.7.0
Analyzed:	13 Sep-10 16:01	Analysis:	Linear Regression (MLE)	Official Results:	Yes

Graphics









CETIS Analytical Report

Report Date: 13 Sep-10 16:01 (p 1 of 3)
Test Code: 04-1384-9927/40045

Chronic Larval Fish Survival and Growth Test — Pacific EcoRisk

Analysis ID:	09-8592-3652	**Endpoint:**	Mean Dry Biomass-mg	**CETIS Version:**	CETISv1.7.0
Analyzed:	13 Sep-10 16:01	**Analysis:**	Nonparametric-Control vs Treatments	**Official Results:**	Yes

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	0	C > T	Not Run	<12.5	12.5	N/A	>8	11.8%

Steel Many-One Rank Test

Control	vs	Conc-%	Test Stat	Critical	Ties	P-Value	Decision(5%)
Lab Water Control		12.5*	10	10	0	0.0417	Significant Effect
		25*	10	10	0	0.0417	Significant Effect
		50*	10	10	0	0.0417	Significant Effect
		75*	10	10	0	0.0417	Significant Effect
		100*	10	10	0	0.0417	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.6108243	0.1221649	5	174	<0.0001	Significant Effect
Error	0.01265676	0.0007031534	18			
Total	0.6234811	0.122868	23			

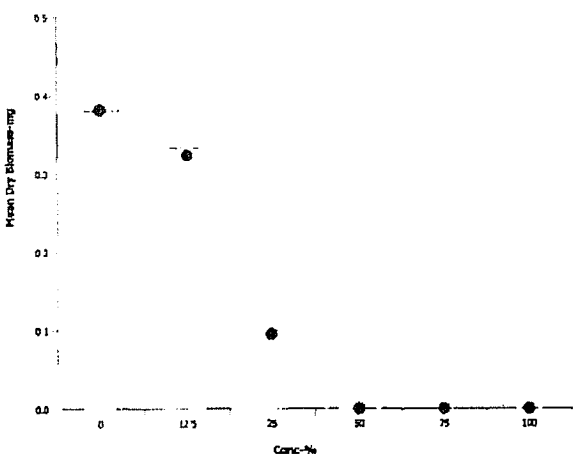
ANOVA Assumptions

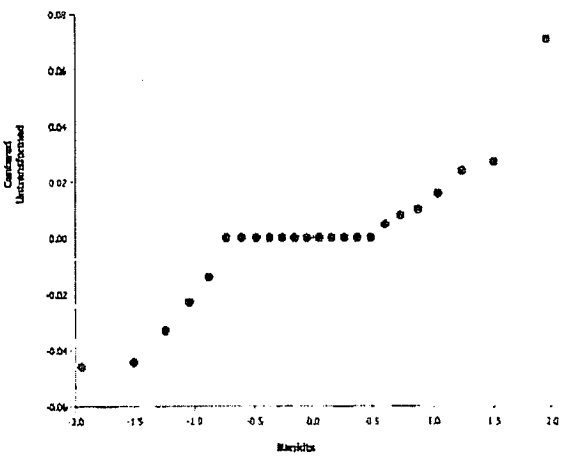
Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Mod Levene Equality of Variance	4.07	4.25	0.0120	Equal Variances
Distribution	Shapiro-Wilk Normality	0.848		0.0020	Non-normal Distribution

Mean Dry Biomass-mg Summary

Conc-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
0	Lab Water Contr	4	0.382	0.373	0.391	0.359	0.409	0.00423	0.0228	5.96%	0.0%
12.5		4	0.323	0.312	0.335	0.279	0.347	0.00567	0.0305	9.44%	15.4%
25		4	0.095	0.075	0.115	0.049	0.166	0.00977	0.0526	55.4%	75.1%
50		4	0	0	0	0	0	0	0		100.0%
75		4	0	0	0	0	0	0	0		100.0%
100		4	0	0	0	0	0	0	0		100.0%

Graphics





CETIS Analytical Report

Report Date: 13 Sep-10 16:02 (p 1 of 1)
Test Code: 04-1384-9927/40045

Chronic Larval Fish Survival and Growth Test — Pacific EcoRisk

Analysis ID:	18-8488-2731	Endpoint:	Mean Dry Biomass-mg	CETIS Version:	CETISv1.7.0
Analyzed:	13 Sep-10 16:01	Analysis:	Linear Interpolation (ICPIN)	Official Results:	Yes

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Linear	Linear	57951	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	4.06	1.92	9.85	24.6	10.2	52.2
IC10	8.13	3.83	15.7	12.3	6.37	26.1
IC15	12.2	5.75	14.7	8.2	6.79	17.4
IC20	13.5	9.34	15.7	7.43	6 39	10.7
IC25	14.5	12.1	16.7	6.89	5.99	8.24
IC40	17.7	15.6	20	5.67	4.99	6.41
IC50	19.7	17.5	22.6	5.07	4.43	5.72

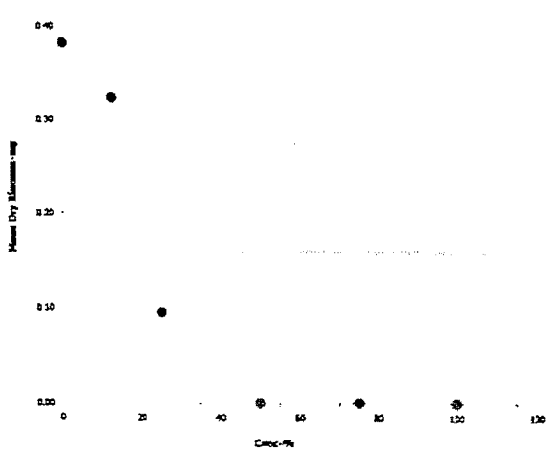
Mean Dry Biomass-mg Summary

			Calculated Variate						
Conc-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	Diff%
0	Lab Water Contr	4	0.382	0.359	0.409	0.00416	0.0228	5.96%	0.0%
12.5		4	0.323	0.279	0.347	0.00557	0.0305	9.44%	15.4%
25		4	0.095	0.049	0.166	0.00961	0.0526	55.4%	75.1%
50		4	0	0	0	0	0		100.0%
75		4	0	0	0	0	0		100.0%
100		4	0	0	0	0	0		100.0%

Mean Dry Biomass-mg Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Lab Water Control	0.409	0.392	0.368	0.359
12.5		0.279	0.347	0.339	0.328
25		0.166	0.049	0.103	0.062
50		0	0	0	0
75		0	0	0	0
100		0	0	0	0

Graphics



7 Day Chronic Fathead Minnow Toxicity Test Data

Client: Precision Analytical - Chevron Cawelo
Test Material: Inlet to Res B
Test ID#: 40045 Project #: 17262
Test Date: 9/4/10 Randomization: 4.6.10

Organism Log#: 5389 Age: <48hrs
Organism Supplier: ABS
Control/Diluent: EPAMH
Control Water Batch: 1324

Treatment (% Effluent)	Temp (°C)	pH new	pH old	D.O. (mg/L) new	D.O. (mg/L) old	Conductivity (µs/cm)	# Live Organisms A	B	C	D	SIGN-OFF
Lab Water Control	25.0	8.66		8.3		313	10	10	10	10	Date: 9/4/10
12.5%	25.0	7.93		7.8		378	10	10	10	10	Sample ID: 24869
25%	25.0	7.58		7.5		432	10	10	10	10	Test Solution Prep: SH
50%	25.0	7.10		6.8		540	10	10	10	10	New WQ: [illegible]
75%	25.0	6.99		6.4		641	10	10	10	10	Initiation Time: 11:45
100%	25.0	6.81		4.5		757	10	10	10	10	Initiation Signoff: RFB
Meter ID	30A	PH09		RD04		EC05					
Lab Water Control	25.1	7.95	8.43	8.3	7.6	318	10	10	10	10	Date: 9/5/10
12.5%	25.1	7.50	8.13	8.3	7.6	395	10	10	10	10	Sample ID: 24869
25%	25.1	7.32	8.14	8.2	7.3	446	10	10	10	9	Test Solution Prep: SH
50%	25.1	7.15	8.17	8.2	7.4	552	4	8	6	7	New WQ: SH
75%	25.1	7.09	8.19	8.2	7.4	666.7	0	0	0	3	Renewal Time: 1100
100%	25.1	6.98	8.14	7.6	6.6	783	0	0	0	0	Renewal Signoff: [illegible]
Meter ID	30A	PH14	PH03	RD05	RD03	EC03					Old WQ: [illegible]
Lab Water Control	25.1	8.10	8.07	8.8	7.2	318	10	10	10	10	Date: 9/6/10
12.5%	25.1	7.90	7.99	8.6	7.4	388	10	10	10	10	Sample ID: 24869
25%	25.1	7.60	8.02	8.6	7.4	436	10	10	8	9	Test Solution Prep: SH
50%	25.1	7.40	8.07	8.9	7.4	537	4	5	6	5	New WQ: UM
75%	25.1	7.30	8.03	9.4	7.2	655	–	–	–	1	Renewal Time: 0940
100%	–	–	–	–	–	–	–	–	–	–	Renewal Signoff: [illegible]
Meter ID	30A	pH09	PH09	RD05	RD05	EC05					Old WQ: [illegible]
Lab Water Control	25.1	8.02	8.12	8.6	7.4	316	10	10	10	10	Date: 9/7/10
12.5%	25.1	~~8.00~~ 7.80	8.09	8.5	7.3	385	10	10	10	10	Sample ID: 24869
25%	25.1	~~8.04~~ 7.77	8.12	8.6	7.2	464	9	9	8	8	Test Solution Prep: SH
50%	25.1	~~8.09~~ 7.61	8.21	9.3	7.5	~~592~~ 549	3	3	3	4	New WQ: [illegible]
75%	25.1	~~8.07~~ 7.52	8.26	9.2	7.5	~~715~~ 653	–	–	–	1	Renewal Time: 1120
100%	–	–	–	–	–	–	–	–	–	–	Renewal Signoff: [illegible]
Meter ID	30A	PH12	PH03	RD04	RD05	EC05					Old WQ: [illegible]

7 Day Chronic Fathead Minnow Toxicity Test Data

Client: Precision Analytical - Chevron Cawelo
Test Material: Inlet to Res B
Test ID#: 40045 Project #: 17262
Test Date: 9/4/10 Randomization: A.6.10

Organism Log#: 5384
Organism Supplier: ABI
Control/Diluent: EPAMH
Control Water Batch: B324
Age: ~~1 day~~ <48hrs

Treatment (% Effluent)	Temp (°C)	pH new	pH old	D.O. (mg/L) new	D.O. (mg/L) old	Conductivity (µs/cm)	# Live Organisms A	B	C	D	SIGN-OFF
Lab Water Control	25.3	7.82	7.62	8.3	7.4	323	10	10	10	10	Date: 9/8/10
12.5%	25.3	7.63	7.66	8.3	7.3	386	10	9	10	10	Sample ID 24869
25%	25.3	7.45	7.68	8.5	7.3	447	7	5	5	2	Test Solution Prep JAW
50%	25.3	7.28	8.08	9.0	7.2	563	0	0	1	0	New WQ DJ
75%	25.3	7.21	8.13	9.5	7.2	685	—	—	—	0	Renewal Time 1400
100%	—	—	—	—	—	—	—	—	—	—	Renewal Signoff SA
Meter ID	30A	pH12	pH14	RD05	RD04	EC04					Old WQ MU
Lab Water Control	25.2	8.07	7.87	8.6	7.8	324	10	10	10	10	Date: 9/9/10
12.5%	25.2	7.38	7.83	8.5	7.6	393	10	9	10	10	Sample ID 24869
25%	25.2	7.18	7.92	8.4	7.6	445	6	4	5	2	Test Solution Prep JW
50%	25.2	7.04	7.92	8.5	7.6	555	—	—	0	—	New WQ MO
75%	—	—	—	—	—	—	—	—	—	—	Renewal Time 1055
100%	—	—	—	—	—	—	—	—	—	—	Renewal Signoff [illegible]
Meter ID	30A	pH03	pH09	RD05	RD03	EC04					Old WQ [illegible]
Lab Water Control	25.0	8.21	8.37	8.6	8.1	318	10	10	10	10	Date: 9/10/10
12.5%	25.0	7.99	8.15	8.7	8.2	381	10	9	10	10	Sample ID 24869
25%	25.0	7.85	8.10	8.9	8.0	429	6	3	5	2	Test Solution Prep JM
50%	—	—	—	—	—	—	—	—	—	—	New WQ [illegible]
75%	—	—	—	—	—	—	—	—	—	—	Renewal Time 1115
100%	—	—	—	—	—	—	—	—	—	—	Renewal Signoff JM
Meter ID	30A	pH03	pH03	RD04	RD04	EC05					Old WQ DJ
Lab Water Control	25.2		7.85		7.6	332	10	10	10	10	Date 9/11/10
12.5%	25.2		8.05		7.5	398	9	8	10	10	Termination Time 0940
25%	25.2		8.13		7.5	459	6	3	4	2	Termination Signoff JM
50%	—		—		—	—	—	—	—	—	Old WQ [illegible]
75%	—		—		—	—	—	—	—	—	
100%	—		—		—	—	—	—	—	—	
Meter ID	30A		pH12		RD03	EC04					

Fathead Minnow Dry Weight Data Sheet

Client: Precision Analytical - Chevron Cawelo Test ID #: 40045 Project # 17262
Sample: Inlet to Res B Tare Weight Date: 9/6/10 Sign-off: CG
Test Date: 9.4.10 Final Weight Date: 9/13/10 Sign-off: YM

Pan ID	Concentration	Replicate	Initial Pan Weight (mg)	Final Pan Weight (mg)	Initial # of Organisms	Biomass Value (mg)
1	Lab Water	A	179.94	184.03	10	0.409
2		B	175.82	179.74	10	0.392
3		C	177.11	180.79	10	0.368
4		D	172.66	176.25	10	0.359
5	12.5	A	191.56	194.35	10	0.279
6		B	195.60	199.07	10	0.347
7		C	176.76	180.15	10	0.339
8		D	168.88	172.16	10	0.328
9	25	A	164.34	166.00	10	0.166
10		B	168.52	169.01	10	0.049
11		C	186.32	187.35	10	0.103
12		D	173.90	174.52	10	0.062
13	50	A	172.86	—	10	—
14		B	169.68	—	10	—
15		C	176.86	—	10	—
16		D	177.48	—	10	—
17	75	A	188.01	—	10	—
18		B	178.10	—	10	—
19		C	174.55	—	10	—
20		D	175.52	—	10	—
21	100	A	177.71	—	10	—
22		B	165.40	—	10	—
23		C	172.63	—	10	—
24		D	175.78	—	10	—
QA 1			175.06	175.01		
QA 2			173.23	173.24		
Balance ID			#1	#1		

Appendix C

Test Data and Summary of Statistics for the Evaluation of the Chronic Toxicity of GAC-Treated "Inlet to Reservoir B" Effluent to Fathead Minnows

Chronic Larval Fish Survival and Growth Test — Pacific EcoRisk

Batch ID:	15-9540-3341	**Test Type:**	Growth-Survival (7d)	**Analyst:**	Padrick Anderson
Start Date:	04 Sep-10 16:00	**Protocol:**	EPA-821-R-02-013 (2002)	**Diluent:**	Laboratory Water
Ending Date:	11 Sep-10 09:00	**Species:**	Pimephales promelas	**Brine:**	Not Applicable
Duration:	6d 17h	**Source:**	Aquatic Biosystems, CO	**Age:**	1

Sample ID:	07-2114-0490	**Code:**	Eff	**Client:**	Precision Analytical
Sample Date:	03 Sep-10 09:10	**Material:**	Effluent	**Project:**	17262
Receive Date:	03 Sep-10 16:45	**Source:**	Precision Analytical		
Sample Age:	31h (1.4 °C)	**Station:**	TOO1A - GAC		

Comparison Summary

Analysis ID	Endpoint	NOEL	LOEL	TOEL	PMSD	TU	Method
07-6241-7868	7d Survival Rate	100	>100	N/A	8.22%	1	Steel Many-One Rank Test
04-6128-7282	Mean Dry Biomass-mg	100	>100	N/A	13.4%	1	Dunnett's Multiple Comparison Test

Point Estimate Summary

Analysis ID	Endpoint	Level	%	95% LCL	95% UCL	TU	Method
05-4778-5954	Mean Dry Biomass-mg	IC5	48.3	N/A	N/A	2.07	Linear Interpolation (ICPIN)
		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	
09-8477-0589	Mean Dry Weight-mg	IC5	49.5	N/A	N/A	2.02	Linear Interpolation (ICPIN)
		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	

7d Survival Rate Summary

Conc-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
0	Column Blank	4	1	1	1	1	1	0	0	0.0%	0.0%
0	Lab Water Contr	4	0.975	0.956	0.994	0.9	1	0.00913	0.05	5.13%	2.5%
12.5		4	0.975	0.956	0.994	0.9	1	0.00913	0.05	5.13%	2.5%
25		4	1	1	1	1	1	0	0	0.0%	0.0%
50		4	0.975	0.956	0.994	0.9	1	0.00913	0.05	5.13%	2.5%
75		4	0.975	0.956	0.994	0.9	1	0.00913	0.05	5.13%	2.5%
100		4	0.95	0.928	0.972	0.9	1	0.0105	0.0577	6.08%	5.0%

Mean Dry Biomass-mg Summary

Conc-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
0	Column Blank	4	0.398	0.391	0.404	0.383	0.419	0.00309	0.0169	4.26%	0.0%
0	Lab Water Contr	4	0.359	0.352	0.366	0.334	0.38	0.00348	0.0191	5.31%	9.59%
12.5		4	0.352	0.346	0.359	0.335	0.374	0.00318	0.0174	4.94%	11.4%
25		4	0.363	0.359	0.366	0.353	0.371	0.00147	0.00806	2.22%	8.81%
50		4	0.34	0.33	0.351	0.312	0.37	0.00505	0.0277	8.13%	14.4%
75		4	0.333	0.322	0.343	0.294	0.357	0.0052	0.0285	8.56%	16.3%
100		4	0.343	0.325	0.362	0.291	0.391	0.00907	0.0497	14.5%	13.6%

CETIS Summary Report GAC-Treated 'Inlet to Res B' Report Date: 21 Sep-10 17:10 (p 2 of 2)
Test Code: 05-2219-9788/40046

Chronic Larval Fish Survival and Growth Test — Pacific EcoRisk

Mean Dry Weight-mg Summary

Conc-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
0	Column Blank	4	0.398	0.391	0.404	0.383	0.419	0.00309	0.0169	4.26%	0.0%
0	Lab Water Contr	4	0.369	0.358	0.381	0.334	0.404	0.00547	0.03	8.11%	7.05%
12.5		4	0.362	0.351	0.373	0.335	0.398	0.00533	0.0292	8.05%	8.88%
25		4	0.363	0.359	0.366	0.353	0.371	0.00147	0.00806	2.22%	8.81%
50		4	0.349	0.34	0.359	0.312	0.37	0.00466	0.0255	7.3%	12.2%
75		4	0.341	0.335	0.347	0.327	0.357	0.0028	0.0153	4.5%	14.2%
100		4	0.362	0.341	0.383	0.311	0.434	0.0104	0.0568	15.7%	8.88%

7d Survival Rate Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Column Blank	1	1	1	1
0	Lab Water Contr	1	0.9	1	1
12.5		1	1	1	0.9
25		1	1	1	1
50		1	0.9	1	1
75		1	1	1	0.9
100		1	0.9	0.9	1

Mean Dry Biomass-mg Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Column Blank	0.383	0.419	0.403	0.385
0	Lab Water Contr	0.334	0.364	0.38	0.36
12.5		0.335	0.342	0.374	0.358
25		0.359	0.371	0.367	0.353
50		0.357	0.322	0.312	0.37
75		0.351	0.329	0.357	0.294
100		0.38	0.291	0.391	0.311

Mean Dry Weight-mg Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Column Blank	0.383	0.419	0.403	0.385
0	Lab Water Contr	0.334	0.404	0.38	0.36
12.5		0.335	0.342	0.374	0.398
25		0.359	0.371	0.367	0.353
50		0.357	0.358	0.312	0.37
75		0.351	0.329	0.357	0.327
100		0.38	0.323	0.434	0.311

CETIS Analytical Report GAC-Treated 'Inlet to Res B' Report Date: 21 Sep-10 17:10 (p 2 of 3)
Test Code: 05-2219-9788/40046

Chronic Larval Fish Survival and Growth Test — **Pacific EcoRisk**

Analysis ID:	07-6241-7868	**Endpoint:**	7d Survival Rate	**CETIS Version:**	CETISv1.7.0
Analyzed:	21 Sep-10 17:08	**Analysis:**	Nonparametric-Control vs Treatments	**Official Results:**	Yes

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Angular (Corrected)	0	C > T	Not Run	100	>100	N/A	1	8.22%

Steel Many-One Rank Test

Control vs	Conc-%	Test Stat	Critical	Ties	P-Value	Decision(5%)
Lab Water Control	12.5	18	10	2	0.8333	Non-Significant Effect
	25	20	10	1	0.9516	Non-Significant Effect
	50	18	10	2	0.8333	Non-Significant Effect
	75	18	10	2	0.8333	Non-Significant Effect
	100	16	10	2	0.6105	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.01327967	0.002655933	5	0.45	0.8078	Non-Significant Effect
Error	0.1062373	0.005902074	18			
Total	0.119517	0.008558007	23			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Mod Levene Equality of Variance	0.6	4.25	0.7006	Equal Variances
Distribution	Shapiro-Wilk Normality	0.772		0.0001	Non-normal Distribution

7d Survival Rate Summary

Conc-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
0	Lab Water Contr	4	0.975	0.956	0.994	0.9	1	0.00928	0.05	5.13%	0.0%
12.5		4	0.975	0.956	0.994	0.9	1	0.00928	0.05	5.13%	0.0%
25		4	1	1	1	1	1	0	0	0.0%	-2.56%
50		4	0.975	0.956	0.994	0.9	1	0.00928	0.05	5.13%	0.0%
75		4	0.975	0.956	0.994	0.9	1	0.00928	0.05	5.13%	0.0%
100		4	0.95	0.928	0.972	0.9	1	0.0107	0.0577	6.08%	2.56%

Angular (Corrected) Transformed Summary

Conc-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
0	Lab Water Cont	4	1.37	1.34	1.4	1.25	1.41	0.0151	0.0815	5.94%	0.0%
12.5		4	1.37	1.34	1.4	1.25	1.41	0.0151	0.0815	5.94%	0.0%
25		4	1.41	1.41	1.41	1.41	1.41	0	0	0.0%	-2.97%
50		4	1.37	1.34	1.4	1.25	1.41	0.0151	0.0815	5.94%	0.0%
75		4	1.37	1.34	1.4	1.25	1.41	0.0151	0.0815	5.94%	0.0%
100		4	1.33	1.29	1.37	1.25	1.41	0.0175	0.0941	7.07%	2.97%

CETIS Analytical Report

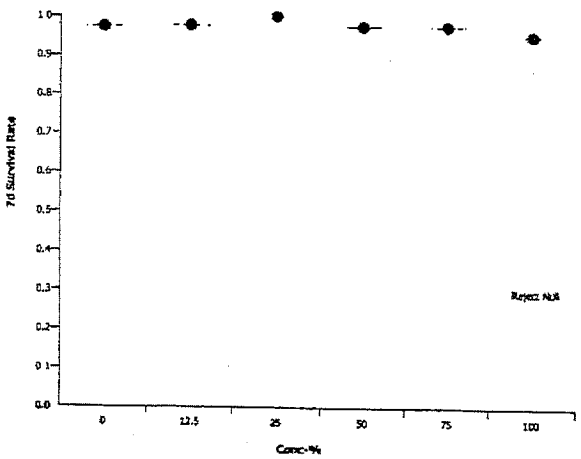
GAC-Treated 'Inlet to Res. B'

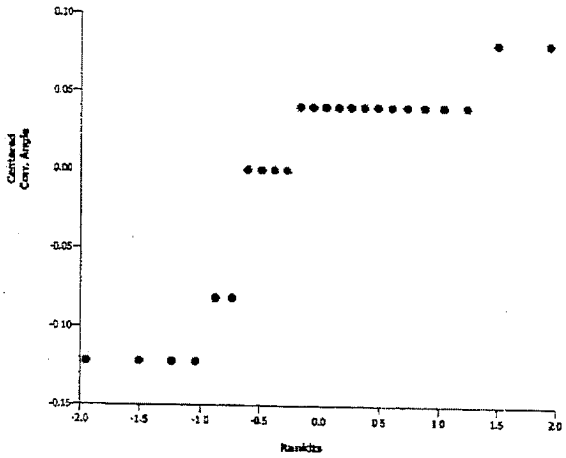
Report Date: 21 Sep-10 17:10 (p 3 of 3)
Test Code: 05-2219-9788/40046

Chronic Larval Fish Survival and Growth Test — Pacific EcoRisk

Analysis ID:	07-6241-7868	**Endpoint:**	7d Survival Rate	**CETIS Version:**	CETISv1.7.0
Analyzed:	21 Sep-10 17:08	**Analysis:**	Nonparametric-Control vs Treatments	**Official Results:**	Yes

Graphics





CETIS Analytical Report

GAC-Treated 'Inlet to Res. B'

Report Date: 21 Sep-10 17:10 (p 1 of 3)
Test Code: 05-2219-9788/40046

Chronic Larval Fish Survival and Growth Test — Pacific EcoRisk

Analysis ID:	04-6128-7282	**Endpoint:**	Mean Dry Biomass-mg	**CETIS Version:**	CETISv1.7.0
Analyzed:	21 Sep-10 17:08	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	0	C > T	Not Run	100	>100	N/A	1	13.4%

Dunnett's Multiple Comparison Test

Control	vs	Conc-%	Test Stat	Critical	MSD	P-Value	Decision(5%)
Lab Water Control		12.5	0.357	2.41	0.048	0.7076	Non-Significant Effect
		25	-0.157	2.41	0.048	0.8753	Non-Significant Effect
		50	0.959	2.41	0.048	0.4402	Non-Significant Effect
		75	1.33	2.41	0.048	0.2851	Non-Significant Effect
		100	0.808	2.41	0.048	0.5084	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.002687883	0.0005375766	5	0.675	0.6475	Non-Significant Effect
Error	0.01432845	0.0007960248	18			
Total	0.01701633	0.001333601	23			

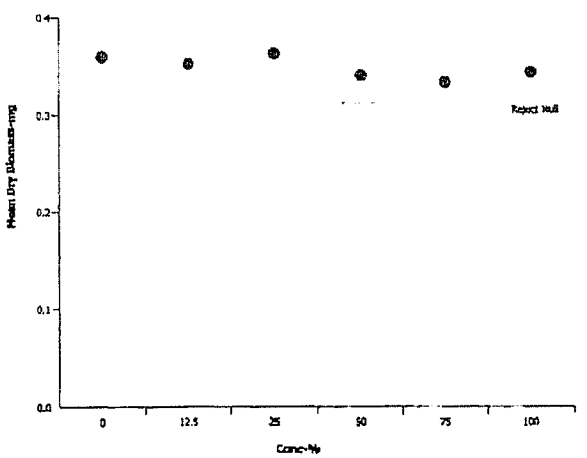
ANOVA Assumptions

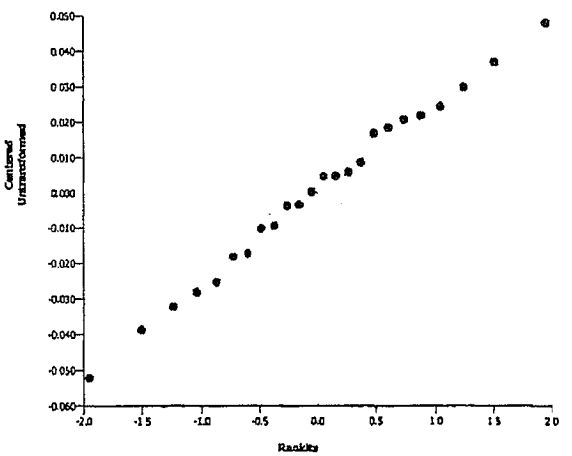
Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Bartlett Equality of Variance	8.35	15.1	0.1381	Equal Variances
Distribution	Shapiro-Wilk Normality	0.991		0.9974	Normal Distribution

Mean Dry Biomass-mg Summary

Conc-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
0	Lab Water Contr	4	0.359	0.352	0.367	0.334	0.38	0.00354	0.0191	5.31%	0.0%
12.5		4	0.352	0.346	0.359	0.335	0.374	0.00323	0.0174	4.94%	1.98%
25		4	0.363	0.359	0.366	0.353	0.371	0.0015	0.00806	2.22%	-0.87%
50		4	0.34	0.33	0.351	0.312	0.37	0.00514	0.0277	8.13%	5.32%
75		4	0.333	0.322	0.344	0.294	0.357	0.00529	0.0285	8.56%	7.41%
100		4	0.343	0.324	0.362	0.291	0.391	0.00922	0.0497	14.5%	4.49%

Graphics





Chronic Larval Fish Survival and Growth Test — Pacific EcoRisk

Analysis ID:	05-4778-5954	Endpoint:	Mean Dry Biomass-mg	CETIS Version:	CETISv1.7.0
Analyzed:	21 Sep-10 17:08	Analysis:	Linear Interpolation (ICPIN)	Official Results:	Yes

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Linear	Linear	57951	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	48.3	N/A	N/A	2.07	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

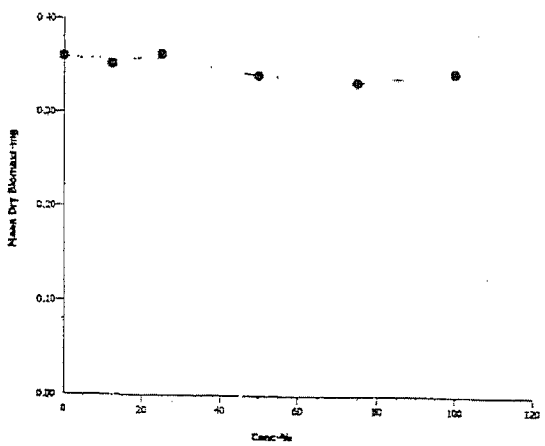
Mean Dry Biomass-mg Summary

			Calculated Variate						
Conc-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	Diff%
0	Lab Water Contro	4	0.359	0.334	0.38	0.00348	0.0191	5.31%	0.0%
12.5		4	0.352	0.335	0.374	0.00318	0.0174	4.94%	1.98%
25		4	0.363	0.353	0.371	0.00147	0.00806	2.22%	-0.87%
50		4	0.34	0.312	0.37	0.00505	0.0277	8.13%	5.32%
75		4	0.333	0.294	0.357	0.0052	0.0285	8.56%	7.41%
100		4	0.343	0.291	0.391	0.00907	0.0497	14.5%	4.49%

Mean Dry Biomass-mg Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Lab Water Control	0.334	0.364	0.38	0.36
12.5		0.335	0.342	0.374	0.358
25		0.359	0.371	0.367	0.353
50		0.357	0.322	0.312	0.37
75		0.351	0.329	0.357	0.294
100		0.38	0.291	0.391	0.311

Graphics



CETIS Analytical Report GAC-Treated Inlet to Res. B'

Report Date: 21 Sep-10 17:10 (p 1 of 2)
Test Code: 05-2219-9788/40046

Chronic Larval Fish Survival and Growth Test — Pacific EcoRisk

Analysis ID:	09-8477-0589	Endpoint:	Mean Dry Weight-mg	CETIS Version:	CETISv1.7.0
Analyzed:	21 Sep-10 17:09	Analysis:	Linear Interpolation (ICPIN)	Official Results:	Yes

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Linear	Linear	57951	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	49.5	N/A	N/A	2.02	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

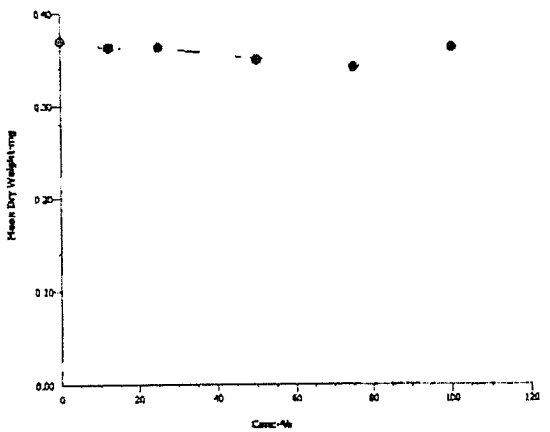
Mean Dry Weight-mg Summary

			Calculated Variate						
Conc-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	Diff%
0	Lab Water Contro	4	0.369	0.334	0.404	0.00547	0.03	8.11%	0.0%
12.5		4	0.362	0.335	0.398	0.00533	0.0292	8.05%	1.97%
25		4	0.363	0.353	0.371	0.00147	0.00806	2.22%	1.89%
50		4	0.349	0.312	0.37	0.00466	0.0255	7.3%	5.49%
75		4	0.341	0.327	0.357	0.0028	0.0153	4.5%	7.73%
100		4	0.362	0.311	0.434	0.0104	0.0568	15.7%	1.97%

Mean Dry Weight-mg Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Lab Water Control	0.334	0.404	0.38	0.36
12.5		0.335	0.342	0.374	0.398
25		0.359	0.371	0.367	0.353
50		0.357	0.358	0.312	0.37
75		0.351	0.329	0.357	0.327
100		0.38	0.323	0.434	0.311

Graphics



7 Day Chronic Fathead Minnow Toxicity Test Data

Client: Precision Analytical - Chevron Cawelo
Test Material: Inlet to Res B - GAC Treatment
Test ID#: 40046 Project #: 17262
Test Date: 9/4/10 Randomization: 4.77

Organism Log#: 5389 Age: 48hrs
Organism Supplier: ABS
Control/Diluent: EPAMH
Control Water Batch: 1324

Treatment (% Effluent)	Temp (°C)	pH new	pH old	D.O. (mg/L) new	D.O. (mg/L) old	Conductivity (µs/cm)	# Live Organisms A	B	C	D	SIGN-OFF
Lab Water Control	25.2	8.25		8.4		308	10	10	10	10	Date: 9/4/10
12.5%	25.2	7.55		8.5		376	10	10	10	10	Sample ID 24869 ~~24872~~
25%	25.2	7.40		8.2		430	10	10	10	10	Test Solution Prep SH
50%	25.2	7.31		8.1		539	10	10	10	10	New WQ SH
75%	25.2	7.18		8.0		651	10	10	10	10	Initiation Time 1600
100%	25.2	7.08		7.9		762	10	10	10	10	Initiation Signoff JH
Meter ID	30A	PH12		RD05		EC03					
Lab Water Control	25.2	7.98	7.92	8.4	6.9	325	10	9	10	10	Date: 9/5/10
12.5%	25.2	7.78	7.94	8.4	7.1	379	10	10	10	9	Sample ID 24869
25%	25.2	7.62	7.97	8.4	6.6	443	10	10	10	10	Test Solution Prep SH
50%	25.2	7.46	8.01	8.5	6.9	556	10	10	10	10	New WQ SH
75%	25.2	7.37	7.93	8.7	7.0	659	10	10	10	10	Renewal Time 1115
100%	25.2	7.26	7.94	8.7	6.9	771	10	10	10	10	Renewal Signoff SH
Meter ID	30A	PH14	PH14	RD05	RD05	EC03					Old WQ FMB
Lab Water Control	25.1	8.16	7.96	8.1	7.3	318	10	9	10	10	Date: 9/6/10
12.5%	25.1	7.95	7.95	8.2	7.4	405	10	10	10	9	Sample ID 24869
25%	25.1	7.75	7.95	8.3	7.4	437	10	10	10	10	Test Solution Prep SH
50%	25.1	7.56	8.03	8.5	7.4	549	10	10	10	10	New WQ UM
75%	25.1	7.43	8.05	8.7	7.4	634	10	10	10	10	Renewal Time 1030
100%	25.1	7.32	8.01	8.6	7.3	759	10	10	10	10	Renewal Signoff PA
Meter ID	30A	PH09	PH09	RD05	RD04	EC05					Old WQ UM
Lab Water Control	24.8	7.68	8.06	8.5	7.3	317	10	9	10	10	Date: 9/7/10
12.5%	24.8	7.69	7.98	8.5	8.1	369	10	10	10	9	Sample ID 24869
25%	24.8	7.61	7.98	8.5	7.5	434	10	10	10	10	Test Solution Prep. SH
50%	24.8	7.50	8.04	8.4	7.3	539	10	10	10	10	New WQ UM
75%	24.8	7.46	8.07	8.6	7.3	633	10	10	10	10	Renewal Time 1130
100%	24.8	7.26	8.09	8.3	7.3	746	10	10	10	10	Renewal Signoff JM
Meter ID	30A	PH12	PH12	RD04	RD04	EC05					Old WQ UM

7 Day Chronic Fathead Minnow Toxicity Test Data

Client: Precision Analytical - Chevron Cawelo
Test Material: Inlet to Res B - GAC Treatment
Test ID#: 40046 Project #: 17262
Test Date: 9/4/10 Randomization: 4.7.7

Organism Log#: 5389 Age: <48hrs
Organism Supplier: ABS
Control/Diluent: EPAMH
Control Water Batch: 1324

Treatment (% Effluent)	Temp (°C)	pH new	pH old	D.O. (mg/L) new	D.O. (mg/L) old	Conductivity (µs/cm)	# Live Organisms A	B	C	D	SIGN-OFF
Lab Water Control	25.3	7.84	8.17	8.2	7.2	325	10	9	10	10	Date: 9/8/10
12.5%	25.3	7.75	8.10	8.4	7.4	387	10	10	10	9	Sample ID 24869
25%	25.3	7.60	8.06	8.5	7.5	446	10	10	10	10	Test Solution Prep JT
50%	25.3	7.45	8.07	8.9	7.4	562	10	10	10	10	New WQ DS
75%	25.3	7.38	8.09	9.3	7.4	678	10	10	10	10	Renewal Time 1215
100%	25.3	7.41	8.12	9.2	7.4	778	10	10	10	10	Renewal Signoff SH
Meter ID	30A	PH12	PH09	RD05	RD03	EC04					Old WQ YK
Lab Water Control	24.8	8.11	8.02	8.9	7.9	317	10	9	10	10	Date: 9/9/10
12.5%	24.8	7.94	7.96	8.8	7.8	379	10	10	10	9	Sample ID 24869
25%	24.8	7.79	7.98	8.9	8.0	437	10	10 JM	10	10	Test Solution Prep JT
50%	24.8	7.68	7.92	9.1	7.6	546	10	9	10	10	New WQ DS
75%	24.8	7.59	7.96	9.8	7.6	650	10	10	10	10	Renewal Time 1200
100%	24.8	7.47	8.04	10.4	7.5	766	10	9	10	10	Renewal Signoff JM
Meter ID	30A	PH14	PH03	RD04	RD03	EC03					Old WQ YK
Lab Water Control	24.9	8.02	7.88	8.8	7.8	314	10	9	10	10	Date: 9/10/10
12.5%	24.9	7.93	7.91	9.8	7.9	377	10	10	10	9	Sample ID 24869
25%	24.9	7.78	7.95	9.0	7.8	433	10	10	10	10	Test Solution Prep JM
50%	24.9	7.70	8.05	9.3	7.8	537	10	9	10	10	New WQ [illegible]
75%	24.9	7.63	8.16	9.7	7.7	649	10	10	10	9	Renewal Time 1215
100%	24.9	7.51	8.24	10.2	7.6	758	10	9	9	10	Renewal Signoff JM
Meter ID	30A	PH03	PH03	RD04	RD04	EC05					Old WQ DS
Lab Water Control	25.6		7.97		7.8	335	10	9	10	10	Date 9/11/10
12.5%	25.6		7.98		7.6	396	10	10	10	9	Termination Time 0900
25%	25.6		8.02		7.8	468	10	10	10	10	Termination Signoff SH
50%	25.6		8.12		7.7	578	10	9	10	10	Old WQ SG
75%	25.6		8.25		7.5	713	10	10	10	9	
100%	25.6		8.26		7.7	809	10	9	9	10	
Meter ID	30A		PH12		RD03	EC04					

Fathead Minnow Dry Weight Data Sheet

Client: Precision Analytical - Chevron Cawelo Test ID #: 40046 Project # 17262
Sample: Inlet to Res B - GAC Treatment Tare Weight Date: 9/6/10 Sign-off: CB
Test Date: 9.4.10 Final Weight Date: 9/13/10 Sign-off: UL

Pan ID	Concentration	Replicate	Initial Pan Weight (mg)	Final Pan Weight (mg)	Initial # of Organisms	Biomass Value (mg)
1	Lab Water	A	170.58	173.92	10	0.334
2		B	175.46	179.10	10	0.364
3		C	177.00	180.80	10	0.380
4		D	177.75	181.34	10	0.359
5	12.5	A	162.95	166.30	10	0.335
6		B	163.81	167.23	10	0.342
7		C	187.79	191.53	10	0.374
8		D	171.32	~~175~~ 174.90	10	0.358
9	25	A	169.72	173.31	10	0.359
10		B	172.10	175.81	10	0.371
11		C	181.97	185.64	10	0.367
12		D	161.18	164.71	10	0.353
13	50	A	182.07	185.64	10	0.357
14		B	179.86	183.08	10	0.322
15		C	166.80	169.92	10	0.312
16		D	167.60	171.30	10	0.370
17	75	A	162.14	165.65	10	0.351
18		B	168.74	172.03	10	0.329
19		C	176.21	179.78	10	0.357
20		D	176.78	179.72	10	0.294
21	100	A	171.84	175.64	10	0.380
22		B	171.08	173.96	10	0.291
23		C	172.52	176.43	10	0.391
24		D	175.16	178.27	10	0.311
QA 1			163.47	163.47		
QA 2			171.24	171.15		
Balance ID			#1	#1		

7 Day Chronic Fathead Minnow Toxicity Test Data

Client: Precision Analytical - Chevron Cawelo
Test Material: GAC Blank
Test ID#: -
Project #: 17262
Test Date: 9/4/10
Randomization: 4.7.7

Organism Log#: 5389
Age: <48hrs
Organism Supplier: ABS
Control/Diluent: EPA MW → GAC
Control Water Batch: 1324

Test Treatment	Temp (°C)	pH new	pH old	D.O. (mg/L) new	D.O. (mg/L) old	Conductivity (µS/cm)	# Live Organisms A	B	C	D	SIGN-OFF
GAC Blank	25.2	7.27 ~~8.35~~ SH		8.4		308	10	10	10	10	Date 9/4/10; Test Solution Prep SH; Initiation Time 1600
Meter ID	30A	PH12		RD05		EC03	New WQ: SH				Initiation Signoff: SH
GAC Blank	25.2	7.54	7.97	9.2	6.6	312	10	10	10	10	Date: 9/5/10; Test Solution Prep SH; Renewal Time 1115
Meter ID	30A	PH14	PH14	RD05	RD05	EC03	New WQ: SH		Old WQ: JOVB		Renewal Signoff: SH
GAC Blank	25.1	8.15	8.09	8.7	7.3	306	10	10	10	10	Date: 9/6/10; Test Solution Prep SH; Renewal Time 1030
Meter ID	30A	PH09	PH09	RD05	RD04	EC05	New WQ: UM		Old WQ: UM		Renewal Signoff: PA
GAC Blank	24.8	7.68	8.18	9.6	7.3	316	10	10	10	10	Date: 9/7/10; Test Solution Prep: SH; Renewal Time 1130
Meter ID	30A	PH12	PH12	RD04	RD04	EC05	New WQ: UM		Old WQ:	UM	Renewal Signoff: JM
GAC Blank	25.3	7.82	8.32	9.9	7.5	320	10	10	10	10	Date: 9/8/10; Test Solution Prep: JM; Renewal Time: 1215
Meter ID	30A	PH12	PH09	RD05	RD03	EC04	New WQ: DJ		Old WQ: UM		Renewal Signoff: SH
GAC Blank	24.8	8.60	8.10	10.7	7.9	313	10	10	10	10	Date: 9/9/10; Test Solution Prep: [illegible]; Renewal Time: 1200
Meter ID	30A	PH14	PH03	RD04	RD03	EC03	New WQ: DJ		Old WQ: UM		Renewal Signoff: JM
GAC Blank	25.1	7.89	8.07	10.4	8.2	319	10	10	10	10	Date: 9/10/10; Test Solution Prep: JM; Renewal Time: 1215
Meter ID	30A	PH03	PH03	RD04	RD04	EC05	New WQ: UM		Old WQ: DJ		Renewal Signoff: JM
GAC Blank	25.6		7.76		7.9	333	10	10	10	10	Date: 9/11/10; Termination Time: 0900
Meter ID	30A		PH12		RD03	EC04			Old WQ SH		Termination Signoff: SH

Fathead Minnow Dry Weight Data Sheet

Client: **recision Analytical - Chevron Cawe** Test ID #: - Project # 17262

Sample ID: GAC Blank Tare Weight Date: 9/6/10 Sign-off: CG

Test Date: 9.4.10 Final Weight Date: 9/13/10 Sign-off: [illegible]

Pan ID	Concentration	Replicate	Initial Pan Weight (mg)	Final Pan Weight (mg)	Initial # of Organisms	Biomass Value (mg)
25	GAC Blank	A	189.26	189.09	10	0.383
26		B	179.53	183.72	10	0.419
27		C	179.92	183.95	10	0.403
28		D	158.86	157.71	10	0.385
QA 3			CG ~~166~~ 165.91	165.99		

Appendix D

Test Data and Summary of Statistics for the Evaluation of the Chronic Toxicity of "Valley Waste" Effluent to Fathead Minnows

CETIS Summary Report

Valley Waste

Report Date: 21 Sep-10 12:16 (p 1 of 2)
Test Code: 20-9807-1694/40047

Chronic Larval Fish Survival and Growth Test — Pacific EcoRisk

Batch ID:	14-8489-6579	**Test Type:**	Growth-Survival (7d)	**Analyst:**	Padrick Anderson
Start Date:	04 Sep-10 12:00	**Protocol:**	EPA-821-R-02-013 (2002)	**Diluent:**	Laboratory Water
Ending Date:	11 Sep-10 08:15	**Species:**	Pimephales promelas	**Brine:**	Not Applicable
Duration:	6d 20h	**Source:**	Aquatic Biosystems, CO	**Age:**	1

Sample ID:	13-0696-1137	**Code:**	Eff	**Client:**	Precision Analytical
Sample Date:	03 Sep-10 08:40	**Material:**	Effluent	**Project:**	17262
Receive Date:	03 Sep-10 16:45	**Source:**	Precision Analytical		
Sample Age:	27h (1.3 °C)	**Station:**	VWOO1A		

Comparison Summary

Analysis ID	Endpoint	NOEL	LOEL	TOEL	PMSD	TU	Method
17-1723-5088	7d Survival Rate	12.5	25	17.7	10.6%	8	Steel Many-One Rank Test
03-4917-3804	Mean Dry Biomass-mg	<12.5	12.5	N/A	13.5%	>8	Steel Many-One Rank Test
17-4801-8486	Mean Dry Weight-mg	25	50	35.4	19.1%	4	Bonferroni Adj t Test

Point Estimate Summary

Analysis ID	Endpoint	Level	%	95% LCL	95% UCL	TU	Method
10-9767-6322	7d Survival Rate	EC1	7.88	5.22	10.3	12.7	Linear Regression (MLE)
		EC5	11.2	8.12	13.8	8.95	
		EC10	13.5	10.3	16.2	7.43	
		EC15	15.2	12	18.1	6.56	
		EC20	16.8	13.5	19.8	5.94	
		EC25	18.4	15	21.3	5.45	
		EC40	22.8	19.4	26.1	4.39	
		EC50	25.9	22.4	29.6	3.86	
19-4974-7240	Mean Dry Biomass-mg	IC5	3.16	2.01	6.33	31.7	Linear Interpolation (ICPIN)
		IC10	6.32	4.01	12.7	15.8	
		IC15	9.47	6.02	16.3	10.6	
		IC20	12.6	8.05	18.6	7.94	
		IC25	14.8	10.6	21.2	6.74	
		IC40	21.6	15.7	32.2	4.64	
		IC50	26.2	17.6	35.6	3.81	

7d Survival Rate Summary

Conc-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
0	Lab Water Contr	4	1	1	1	1	1	0	0	0.0%	0.0%
12.5		4	0.875	0.839	0.911	0.8	1	0.0175	0.0957	10.9%	12.5%
25		4	0.625	0.569	0.681	0.5	0.8	0.0274	0.15	24.0%	37.5%
50		4	0.1	0.0695	0.13	0	0.2	0.0149	0.0816	81.6%	90.0%
75		4	0	0	0	0	0	0	0		100.0%
100		4	0	0	0	0	0	0	0		100.0%

Mean Dry Biomass-mg Summary

Conc-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
0	Lab Water Contr	4	0.413	0.401	0.425	0.367	0.431	0.00564	0.0309	7.48%	0.0%
12.5		4	0.331	0.323	0.339	0.312	0.361	0.004	0.0219	6.61%	19.8%
25		4	0.216	0.191	0.241	0.147	0.3	0.0124	0.0681	31.5%	47.7%
50		4	0.025	0.0176	0.0324	0	0.048	0.00361	0.0198	79.1%	93.9%
75		4	0	0	0	0	0	0	0		100.0%
100		4	0	0	0	0	0	0	0		100.0%

Mean Dry Weight-mg Summary

Conc-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
0	Lab Water Contr	4	0.413	0.401	0.425	0.367	0.431	0.00564	0.0309	7.48%	0.0%
12.5		4	0.381	0.369	0.393	0.347	0.417	0.00595	0.0326	8.56%	7.83%
25		4	0.344	0.321	0.367	0.294	0.429	0.0114	0.0624	18.1%	16.7%
50		3	0.253	0.241	0.265	0.23	0.29	0.00587	0.0321	12.7%	38.7%

Chronic Larval Fish Survival and Growth Test — Pacific EcoRisk

7d Survival Rate Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Lab Water Contr	1	1	1	1
12.5		0.8	1	0.8	0.9
25		0.8	0.7	0.5	0.5
50		0	0.1	0.1	0.2
75		0	0	0	0
100		0	0	0	0

Mean Dry Biomass-mg Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Lab Water Contr	0.431	0.367	0.431	0.423
12.5		0.334	0.361	0.318	0.312
25		0.24	0.3	0.177	0.147
50		0	0.023	0.029	0.048
75		0	0	0	0
100		0	0	0	0

Mean Dry Weight-mg Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Lab Water Contr	0.431	0.367	0.431	0.423
12.5		0.417	0.361	0.397	0.347
25		0.3	0.429	0.354	0.294
50		0.23	0.29	0.24	

Chronic Larval Fish Survival and Growth Test — Pacific EcoRisk

Analysis ID:	17-1723-5088	**Endpoint:**	7d Survival Rate	**CETIS Version:**	CETISv1.7.0
Analyzed:	21 Sep-10 12:14	**Analysis:**	Nonparametric-Control vs Treatments	**Official Results:**	Yes

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Angular (Corrected)	0	C > T	Not Run	12.5	25	17.7	8	10.6%

Steel Many-One Rank Test

Control vs	Conc-%	Test Stat	Critical	Ties	P-Value	Decision(5%)
Lab Water Control	12.5	12	10	1	0.1424	Non-Significant Effect
	25*	10	10	0	0.0417	Significant Effect
	50*	10	10	0	0.0417	Significant Effect
	75*	10	10	0	0.0417	Significant Effect
	100*	10	10	0	0.0417	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	6.224964	1.244993	5	120	<0.0001	Significant Effect
Error	0.1860559	0.01033644	18			
Total	6.411019	1.255329	23			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Mod Levene Equality of Variance	5.02	4.25	0.0047	Unequal Variances
Distribution	Shapiro-Wilk Normality	0.842		0.0015	Non-normal Distribution

7d Survival Rate Summary

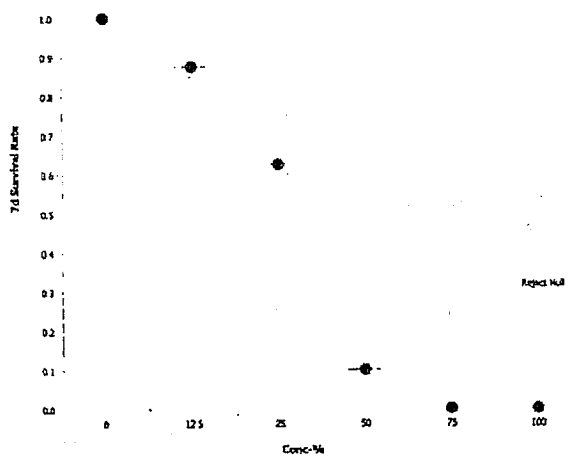
Conc-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
0	Lab Water Contr	4	1	1	1	1	1	0	0	0.0%	0.0%
12.5		4	0.875	0.839	0.911	0.8	1	0.0178	0.0957	10.9%	12.5%
25		4	0.625	0.568	0.682	0.5	0.8	0.0279	0.15	24.0%	37.5%
50		4	0.1	0.0689	0.131	0	0.2	0.0152	0.0816	81.6%	90.0%
75		4	0	0	0	0	0	0	0		100.0%
100		4	0	0	0	0	0	0	0		100.0%

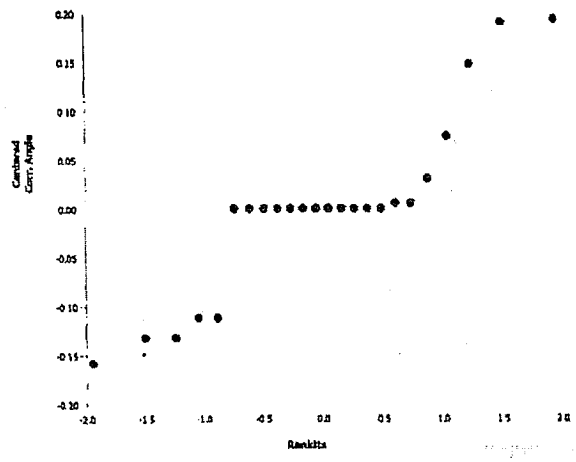
Angular (Corrected) Transformed Summary

Conc-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
0	Lab Water Cont	4	1.41	1.41	1.41	1.41	1.41	0	0	0.0%	0.0%
12.5		4	1.22	1.16	1.27	1.11	1.41	0.0259	0.145	11.9%	13.7%
25		4	0.917	0.857	0.978	0.785	1.11	0.0296	0.159	17.4%	35.0%
50		4	0.316	0.269	0.364	0.159	0.464	0.0231	0.125	39.4%	77.6%
75		4	0.159	0.159	0.159	0.159	0.159	0	0	0.0%	88.8%
100		4	0.159	0.159	0.159	0.159	0.159	0	0	0.0%	88.8%

Chronic Larval Fish Survival and Growth Test					Pacific EcoRisk
Analysis ID:	17-1723-5088	Endpoint:	7d Survival Rate	CETIS Version:	CETISv1.7.0
Analyzed:	21 Sep-10 12:14	Analysis:	Nonparametric-Control vs Treatments	Official Results:	Yes

Graphics





CETIS Analytical Report

Report Date: 21 Sep-10 12:15 (p 1 of 2)
Test Code: 20-9807-1694/40047

Chronic Larval Fish Survival and Growth Test — Pacific EcoRisk

Analysis ID:	10-9767-6322	Endpoint:	7d Survival Rate	CETIS Version:	CETISv1.7.0
Analyzed:	21 Sep-10 12:14	Analysis:	Linear Regression (MLE)	Official Results:	Yes

Linear Regression Options

Model Function	Threshold Option	Threshold	Optimized	Pooled	Het Corr	Weighted
Log-Normal [NED=A+B*log(X)]	Control Threshold	0	Yes	No	No	Yes

Regression Summary

Iters	LL	AICc	Mu	Sigma	G Stat	Chi-Sq	Critical	P-Value	Decision(5%)
5	-56.8	118	-0.303	0.222	0.0521	12.6	28.9	0.8170	Non-Significant Heterogeneity

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC1	7.88	5.22	10.3	12.7	9.68	19.2
EC5	11.2	8.12	13.8	8.95	7.22	12.3
EC10	13.5	10.3	16.2	7.43	6.16	9.76
EC15	15.2	12	18.1	6.56	5.53	8.35
EC20	16.8	13.5	19.8	5.94	5.06	7.39
EC25	18.4	15	21.3	5.45	4.69	6.66
EC40	22.8	19.4	26.1	4.39	3.84	5.16
EC50	25.9	22.4	29.6	3.86	3.38	4.46

Regression Parameters

Parameter	Estimate	Std Error	95% LCL	95% UCL	t Stat	P-Value	Decision(5%)
Slope	4.5	0.524	3.47	5.53	8.59	<0.0001	Significant Parameter
Intercept	-1.36	0.778	-2.89	0.161	-1.75	0.0966	Non-Significant Parameter

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(5%)
Variances	Mod Levene Equality of Variance	4.37	3.06	0.0153	Unequal Variances
Distribution	Shapiro-Wilk Normality	0.896		0.0345	Non-normal Distribution

7d Survival Rate Summary

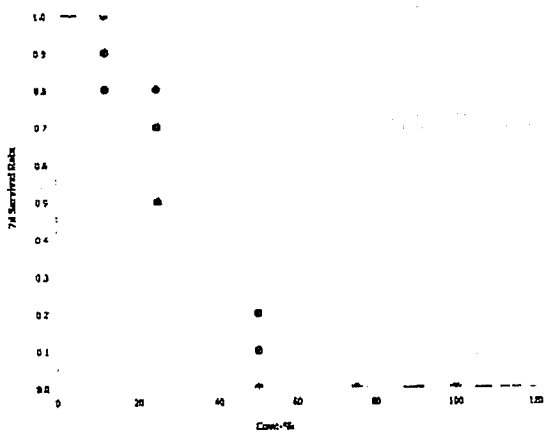
			Calculated Variate(A/B)								
Conc-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	Diff%	A	B
0	Lab Water Contr	4	1	1	1	0	0	0.0%	0.0%	40	40
12.5		4	0.875	0.8	1	0.0175	0.0957	10.9%	12.5%	35	40
25		4	0.625	0.5	0.8	0.0274	0.15	24.0%	37.5%	25	40
50		4	0.1	0	0.2	0.0149	0.0816	81.6%	90.0%	4	40
75		4	0	0	0	0	0		100.0%	0	40
100		4	0	0	0	0	0		100.0%	0	40

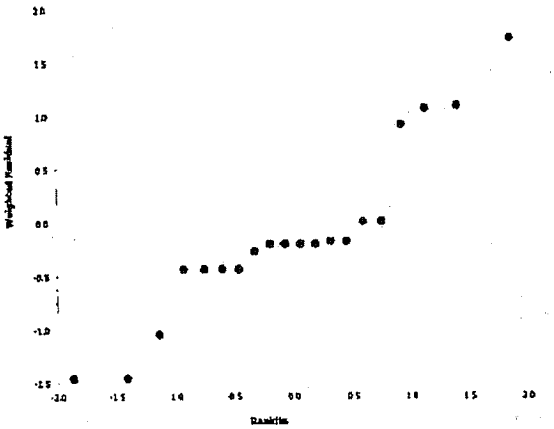
7d Survival Rate Detail

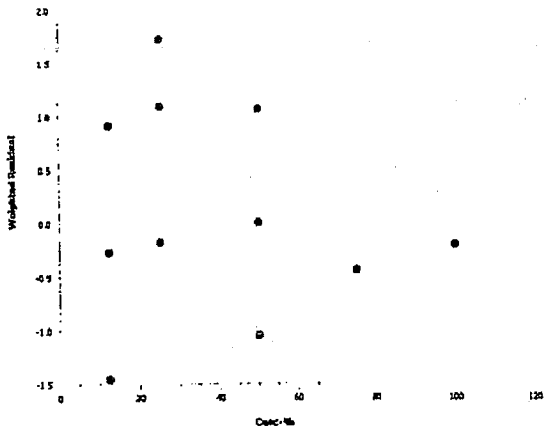
Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Lab Water Control	1	1	1	1
12.5		0.8	1	0.8	0.9
25		0.8	0.7	0.5	0.5
50		0	0.1	0.1	0.2
75		0	0	0	0
100		0	0	0	0

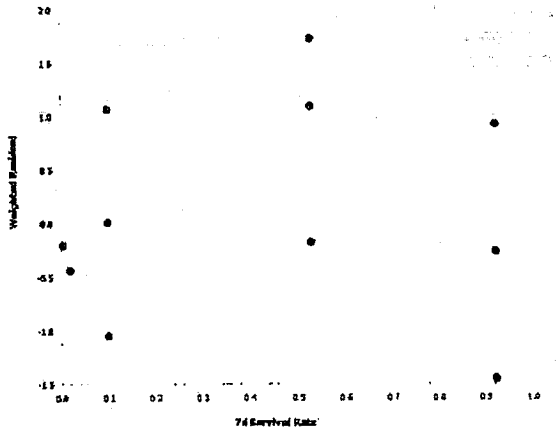
Chronic Larval Fish Survival and Growth Test					Pacific EcoRisk
Analysis ID:	10-9767-6322	Endpoint:	7d Survival Rate	CETIS Version:	CETISv1.7.0
Analyzed:	21 Sep-10 12:14	Analysis:	Linear Regression (MLE)	Official Results:	Yes

Graphics









CETIS Analytical Report

Report Date: 21 Sep-10 12:15 (p 2 of 4)
Test Code: 20-9807-1694/40047

Chronic Larval Fish Survival and Growth Test — Pacific EcoRisk

Analysis ID:	03-4917-3804	**Endpoint:**	Mean Dry Biomass-mg	**CETIS Version:**	CETISv1.7.0
Analyzed:	21 Sep-10 12:14	**Analysis:**	Nonparametric-Control vs Treatments	**Official Results:**	Yes

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	0	C > T	Not Run	<12.5	12.5	N/A	>8	13.5%

Steel Many-One Rank Test

Control vs	Conc-%	Test Stat	Critical	Ties	P-Value	Decision(5%)
Lab Water Control	12.5*	10	10	0	0.0417	Significant Effect
	25*	10	10	0	0.0417	Significant Effect
	50*	10	10	0	0.0417	Significant Effect
	75*	10	10	0	0.0417	Significant Effect
	100*	10	10	0	0.0417	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.6631612	0.1326322	5	123	<0.0001	Significant Effect
Error	0.01939069	0.001077261	18			
Total	0.6825519	0.1337095	23			

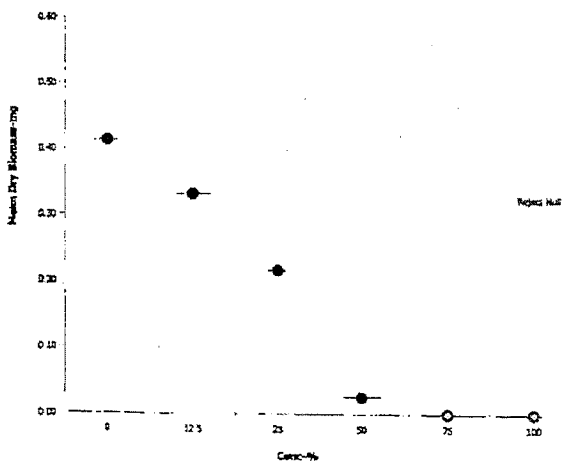
ANOVA Assumptions

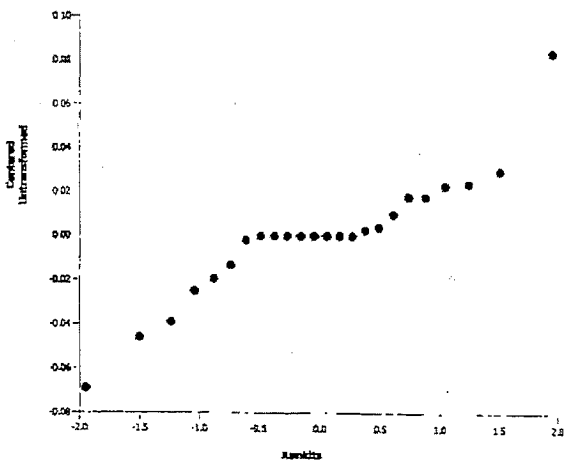
Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Mod Levene Equality of Variance	4.89	4.25	0.0053	Unequal Variances
Distribution	Shapiro-Wilk Normality	0.9		0.0213	Normal Distribution

Mean Dry Biomass-mg Summary

Conc-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
0	Lab Water Contr	4	0.413	0.401	0.425	0.367	0.431	0.00574	0.0309	7.48%	0.0%
12.5		4	0.331	0.323	0.34	0.312	0.361	0.00407	0.0219	6.61%	19.8%
25		4	0.216	0.19	0.242	0.147	0.3	0.0126	0.0681	31.5%	47.7%
50		4	0.025	0.0175	0.0325	0	0.048	0.00367	0.0198	79.1%	93.9%
75		4	0	0	0	0	0	0	0		100.0%
100		4	0	0	0	0	0	0	0		100.0%

Graphics





CETIS Analytical Report

Report Date: 21 Sep-10 12:15 (p 1 of 1)
Test Code: 20-9807-1694/40047

Chronic Larval Fish Survival and Growth Test — Pacific EcoRisk

Analysis ID:	19-4974-7240	Endpoint:	Mean Dry Biomass-mg	CETIS Version:	CETISv1.7.0
Analyzed:	21 Sep-10 12:14	Analysis:	Linear Interpolation (ICPIN)	Official Results:	Yes

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Linear	Linear	57951	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	3.16	2.01	6.33	31.7	15.8	49.9
IC10	6.32	4.01	12.7	15.8	7.89	24.9
IC15	9.47	6.02	16.3	10.6	6.12	16.6
IC20	12.6	8.05	18.6	7.94	5.38	12.4
IC25	14.8	10.6	21.2	6.74	4.72	9.43
IC40	21.6	15.7	32.2	4.64	3.1	6.38
IC50	26.2	17.6	35.6	3.81	2.81	5.68

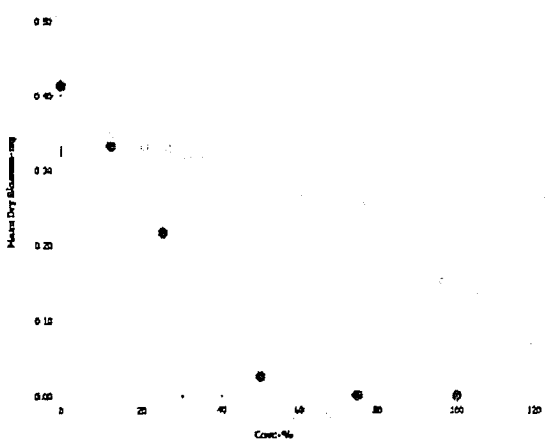
Mean Dry Biomass-mg Summary

			Calculated Variate						
Conc-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	Diff%
0	Lab Water Contr	4	0.413	0.367	0.431	0.00564	0.0309	7.48%	0.0%
12.5		4	0.331	0.312	0.361	0.004	0.0219	6.61%	19.8%
25		4	0.216	0.147	0.3	0.0124	0.0681	31.5%	47.7%
50		4	0.025	0	0.048	0.00361	0.0198	79.1%	93.9%
75		4	0	0	0	0	0		100.0%
100		4	0	0	0	0	0		100.0%

Mean Dry Biomass-mg Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Lab Water Control	0.431	0.367	0.431	0.423
12.5		0.334	0.361	0.318	0.312
25		0.24	0.3	0.177	0.147
50		0	0.023	0.029	0.048
75		0	0	0	0
100		0	0	0	0

Graphics



CETIS Analytical Report

Report Date: 21 Sep-10 12:15 (p 1 of 4)
Test Code: 20-9807-1694/40047

Chronic Larval Fish Survival and Growth Test — Pacific EcoRisk

Analysis ID:	17-4801-8486	**Endpoint:**	Mean Dry Weight-mg	**CETIS Version:**	CETISv1.7.0
Analyzed:	21 Sep-10 12:14	**Analysis:**	Parametric-Multiple Comparison	**Official Results:**	Yes

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	0	C > T	Not Run	25	50	35.4	4	19.1%

Bonferroni Adj t Test

Control	vs	Conc-%	Test Stat	Critical	MSD	P-Value	Decision(5%)
Lab Water Control		12.5	1.08	2.43	0.0729	0.4563	Non-Significant Effect
		25	2.3	2.43	0.0729	0.0636	Non-Significant Effect
		50*	4.93	2.43	0.0788	0.0007	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.04756079	0.01585359	3	8.81	0.0029	Significant Effect
Error	0.01980125	0.001800113	11			
Total	0.06736204	0.01765371	14			

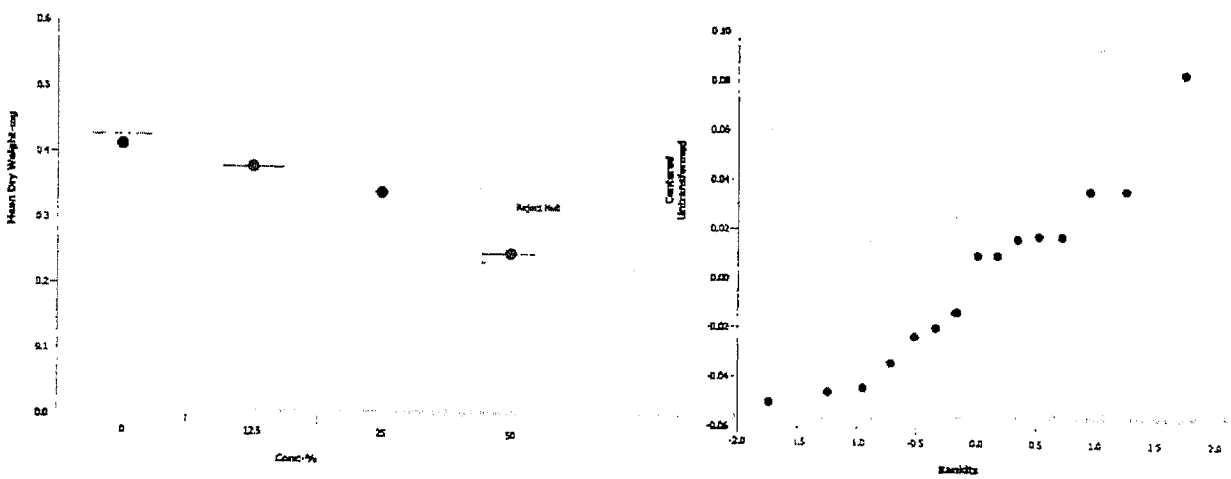
ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Bartlett Equality of Variance	1.97	11.3	0.5778	Equal Variances
Distribution	Shapiro-Wilk Normality	0.94		0.3824	Normal Distribution

Mean Dry Weight-mg Summary

Conc-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
0	Lab Water Contr	4	0.413	0.401	0.425	0.367	0.431	0.00574	0.0309	7.48%	0.0%
12.5		4	0.381	0.368	0.393	0.347	0.417	0.00605	0.0326	8.56%	7.83%
25		4	0.344	0.32	0.368	0.294	0.429	0.0116	0.0624	18.1%	16.7%
50		3	0.253	0.241	0.266	0.23	0.29	0.00597	0.0321	12.7%	38.7%

Graphics



7 Day Chronic Fathead Minnow Toxicity Test Data

Client: Precision Analytical - Chevron Cawelo
Test Material: Valley Waste
Test ID#: 40047 Project #: 17262
Test Date: 9/4/10 Randomization: 4-6-8

Organism Log#: 5389 Age: <48 hr
Organism Supplier: ABS
Control/Diluent: EPAMH
Control Water Batch: 1324

Treatment (% Effluent)	Temp (°C)	pH new	pH old	D.O. mg/L new	D.O. mg/L old	Conductivity (µs/cm)	# Live Organisms A	B	C	D	SIGN-OFF
Lab Water Control	25.3	8.63		8.2		312	10	10	10	10	Date: 9/4/10
12.5%	25.3	8.19		8.0		390	10	10	10	10	Sample ID 24870
25%	25.3	7.99		7.8		456	10	10	10	10	Test Solution Prep SH
50%	25.3	7.90		7.3		587	10	10	10	10	New WQ [illegible]
75%	25.3	7.84		7.1		712	10	10	10	10	Initiation Time 1200
100%	25.3	7.79		5.9		855	10	10	10	10	Initiation Signoff SH
Meter ID	30A	pH09		RD04		EC05					
Lab Water Control	25.4	8.00	8.21	8.6	7.3	319	10	10	10	10	Date: 9/5/10
12.5%	25.4	8.02	8.16	8.4	7.2	402	10	10	10	9	Sample ID 24870
25%	25.4	8.00	8.28	8.4	7.4	464	~~9~~ 10	~~8~~ 10	10	10	Test Solution Prep SH
50%	25.4	7.99	8.45	8.6	6.7	604	9	10	10	10	New WQ SH
75%	25.4	8.02	8.48	8.9	6.9	745	9	8	4	10	Renewal Time 1040
100%	25.4	7.99	8.53	8.9	6.7	889	5	7	6	6	Renewal Signoff [illegible]
Meter ID	30A	pH14	pH14	RD05	RD05	EC03					Old WQ FOB
Lab Water Control	25.0	7.71	8.00	8.3	7.5	313	10	10	10	10	Date: 9/6/10
12.5%	25.0	7.88	8.05	8.3	7.5	392	10	10	10	9	Sample ID 24870
25%	25.0	7.93	8.18	8.4	7.4	455	10	10	10	10	Test Solution Prep SH
50%	25.0	7.96	8.33	8.5	7.4	585	9	10	10	10	New WQ UM
75%	25.0	7.96	8.40	9.2	7.3	733	7	8	4	9	Renewal Time 0940
100%	25.0	7.93	8.52	8.8	7.1	854	3	5	3	5	Renewal Signoff DW
Meter ID	30A	pH09	pH14	RD05	RD04	EC05					Old WQ UM
Lab Water Control	25.0	8.31	8.28	8.8	7.3	319	10	10	10	10	Date: 9/7/10
12.5%	25.0	~~8.00~~ 8.14	8.18	8.8	7.3	392	10	10	10	9	Sample ID 24870
25%	25.0	~~7.74~~ 8.04	8.19	8.9	7.3	~~425~~ 456	10	10	9	9	Test Solution Prep SH
50%	25.0	~~7.56~~ 8.04	8.31	8.7	7.1	597	8	6	9	6	New WQ [illegible]
75%	25.0	~~7.28~~ 8.04	8.46	8.8	6.8	~~657~~ 721	4	4	1	3	Renewal Time 1030
100%	25.0	7.91	8.48	9.1	6.7	869	1	2	0	0	Renewal Signoff SH
Meter ID	30A	pH12	pH12	RD04	RD04	EC05					Old WQ [illegible]

7 Day Chronic Fathead Minnow Toxicity Test Data

Client: Precision Analytical - Chevron Cawelo
Test Material: Valley Waste
Test ID#: 40047 Project #: 17262
Test Date: 9/4/10 Randomization: 4-6-8

Organism Log#: 5389 Age: <48hrs
Organism Supplier: ABS
Control/Diluent: EPAMH
Control Water Batch: 1324

Treatment (% Effluent)	Temp (°C)	pH new	pH old	D.O. (mg/L) new	D.O. (mg/L) old	Conductivity (µs/cm)	# Live Organisms A	B	C	D	SIGN-OFF
Lab Water Control	25.3	8.62	8.55	8.1	7.5	323	10	10	10	10	Date: 9/8/10
12.5%	25.3	8.33	8.40	8.0	7.5	398	9	10	9	9	Sample ID 24870
25%	25.3	8.08	8.36	7.8	7.5	466	10	9	6	8	Test Solution Prep
50%	25.3	7.93	8.43	7.4	7.5	593	1	3	3	4	New WQ
75%	25.3	7.86	8.53	7.1	7.5	715	1	1	0	1	Renewal Time 1200
100%	25.3	7.76	8.54	5.7	7.4	848	0	0	—	—	Renewal Signoff
Meter ID	30A	PH14	PH09	RD04	RD03	EC03					Old WQ
Lab Water Control	25.2	7.98	7.96	8.8	8.1	320	10	10	10	10	Date: 9/9/10
12.5%	25.2	8.12	7.94	8.9	7.4	391	10	10	8	9	Sample ID 24870
25%	25.2	8.14	8.11	9.1	7.3	462	9	7	6	7	Test Solution Prep
50%	25.2	8.17	8.30	9.7	7.3	605	0	1	2	3	New WQ
75%	25.2	8.21	8.43	10.1	7.3	743	1	1	—	0	Renewal Time 1120
100%	—	—	—	—	—	—	—	—	—	—	Renewal Signoff
Meter ID	30A	PH14	PH09	RD04	RD03	EC03					Old WQ
Lab Water Control	25.2	8.68	8.23	8.7	7.5	341	10	10	10	10	Date: 9/10/10
12.5%	25.2	8.31	8.13	8.6	7.2	398	8	10	8	9	Sample ID 24870
25%	25.2	8.15	8.28	8.5	7.3	471	10	7	6	5	Test Solution Prep
50%	25.2	8.01	8.45	8.8	7.2	618	—	1	1	2	New WQ
75%	25.2	—	8.55	—	7.0	755	0	0	—	—	Renewal Time 1130
100%	—	—	—	—	—	—	—	—	—	—	Renewal Signoff
Meter ID	30A	PH14	PH03	RD05	RD04	EC03					Old WQ
Lab Water Control	25.1		7.95		7.8	333	10	10	10	10	Date 9/11/10
12.5%	25.1		8.08		7.6	410	8	10	8	9	Termination Time 0815
25%	25.1		8.31		7.7	490	8	7	5	5	Termination Signoff
50%	25.1		8.51		7.6	646	—	1	1	2	Old WQ
75%	—		—		—	—	—	—	—	—	
100%	—		—		—	—	—	—	—	—	
Meter ID	30A		PH12		RD03	EC04					

Fathead Minnow Dry Weight Data Sheet

Client: Precision Analytical - Chevron Cawelo Test ID #: 40047 Project # 17262
Sample: Valley Waste Tare Weight Date: 9/6/10 Sign-off: CH
Test Date: 9.4.10 Final Weight Date: 9/13/10 Sign-off: YK

Pan ID	Concentration	Replicate	Initial Pan Weight (mg)	Final Pan Weight (mg)	Initial # of Organisms	Biomass Value (mg)
1	Lab Water	A	169.69	174.00	10	0.431
2		B	172.24	175.91	10	0.367
3		C	176.61	180.92	10	0.431
4		D	174.33	178.56	10	0.423
5	12.5	A	185.66	189.00	10	0.334
6		B	186.27	189.88	10	0.361
7		C	166.96	170.14	10	0.318
8		D	185.62	188.74	10	0.312
9	25	A	181.70	184.10	10	0.240
10		B	164.83	167.83	10	~~0.305~~ 0.300
11		C	171.78	173.55	10	0.177
12		D	172.88	174.35	10	0.147
13	50	A	173.27	—	10	—
14		B	174.31	174.54	10	~~0.023~~ 0.023
15		C	174.75	175.04	10	~~0.029~~ 0.029
16		D	169.92	170.40	10	0.048
17	75	A	174.59	—	10	—
18		B	176.61	—	10	—
19		C	185.10	—	10	—
20		D	169.09	—	10	—
21	100	A	166.85	—	10	—
22		B	173.79	—	10	—
23		C	182.81	—	10	—
24		D	169.57	—	10	—
QA 1			188.01	187.95		
QA 2			~~175~~ 174.99	175.10		
Balance ID			#1	#1		

Appendix E

Test Data and Summary of Statistics for the Evaluation of the Chronic Toxicity of GAC-Treated "Valley Waste" Effluent to Fathead Minnows

Chronic Larval Fish Survival and Growth Test — Pacific EcoRisk

Batch ID:	19-8799-4479	**Test Type:**	Growth-Survival (7d)	**Analyst:**	Padrick Anderson
Start Date:	04 Sep-10 16:25	**Protocol:**	EPA-821-R-02-013 (2002)	**Diluent:**	Laboratory Water
Ending Date:	10 Sep-10 09:00	**Species:**	Pimephales promelas	**Brine:**	Not Applicable
Duration:	5d 17h	**Source:**	Aquatic Biosystems, CO	**Age:**	1

Sample ID:	12-5089-7686	**Code:**	Eff	**Client:**	Precision Analytical
Sample Date:	03 Sep-10 08:40	**Material:**	Effluent	**Project:**	17262
Receive Date:	03 Sep-10 15:45	**Source:**	Precision Analytical		
Sample Age:	32h (1.3 °C)	**Station:**	Valley Waste - GAC		

Comparison Summary

Analysis ID	Endpoint	NOEL	LOEL	TOEL	PMSD	TU	Method
15-4688-4428	7d Survival Rate	100	>100	N/A	4.57%	1	Steel Many-One Rank Test
19-5784-1674	Mean Dry Biomass-mg	75	100	86.6	9.91%	1.33	Dunnett's Multiple Comparison Test
18-5692-2925	Mean Dry Weight-mg	100	>100	N/A	10.8%	1	Dunnett's Multiple Comparison Test

Point Estimate Summary

Analysis ID	Endpoint	Level	%	95% LCL	95% UCL	TU	Method
00-6658-6791	Mean Dry Biomass-mg	IC5	6.29	4.08	120	15.9	Linear Interpolation (ICPIN)
		IC10	77.6	N/A	N/A	1.29	
		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	
20-9696-1552	Mean Dry Weight-mg	IC5	7.68	3.53	119	13	Linear Interpolation (ICPIN)
		IC10	84	N/A	N/A	1.19	
		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	

7d Survival Rate Summary

Conc-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
0	Lab Water Contr	4	1	1	1	1	1	0	0	0.0%	0.0%
12.5		4	0.975	0.956	0.994	0.9	1	0.00913	0.05	5.13%	2.5%
25		4	1	1	1	1	1	0	0	0.0%	0.0%
50		4	1	1	1	1	1	0	0	0.0%	0.0%
75		4	1	1	1	1	1	0	0	0.0%	0.0%
100		4	1	1	1	1	1	0	0	0.0%	0.0%

Mean Dry Biomass-mg Summary

Conc-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
0	Lab Water Contr	4	0.426	0.42	0.433	0.404	0.441	0.00309	0.0169	3.97%	0.0%
12.5		4	0.381	0.376	0.386	0.364	0.394	0.00244	0.0134	3.51%	10.7%
25		4	0.375	0.366	0.384	0.35	0.402	0.00416	0.0228	6.07%	12.1%
50		4	0.379	0.373	0.386	0.358	0.4	0.00322	0.0176	4.65%	11.0%
75		4	0.401	0.39	0.412	0.356	0.419	0.00549	0.0301	7.5%	5.98%
100		4	0.381	0.367	0.396	0.354	0.438	0.00707	0.0387	10.1%	10.6%

Chronic Larval Fish Survival and Growth Test — Pacific EcoRisk

Mean Dry Weight-mg Summary

Conc-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
0	Lab Water Contr	4	0.426	0.42	0.433	0.404	0.441	0.00309	0.0169	3.97%	0.0%
12.5		4	0.392	0.381	0.403	0.364	0.432	0.00541	0.0296	7.56%	8.13%
25		4	0.375	0.366	0.384	0.35	0.402	0.00416	0.0228	6.07%	12.1%
50		4	0.379	0.373	0.386	0.358	0.4	0.00322	0.0176	4.65%	11.0%
75		4	0.401	0.39	0.412	0.356	0.419	0.00549	0.0301	7.5%	5.98%
100		4	0.381	0.367	0.396	0.354	0.438	0.00707	0.0387	10.1%	10.6%

7d Survival Rate Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Lab Water Contr	1	1	1	1
12.5		1	0.9	1	1
25		1	1	1	1
50		1	1	1	1
75		1	1	1	1
100		1	1	1	1

Mean Dry Biomass-mg Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Lab Water Contr	0.404	0.441	0.438	0.423
12.5		0.377	0.389	0.394	0.364
25		0.402	0.35	0.364	0.384
50		0.385	0.358	0.4	0.375
75		0.415	0.414	0.419	0.356
100		0.438	0.359	0.354	0.375

Mean Dry Weight-mg Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Lab Water Contr	0.404	0.441	0.438	0.423
12.5		0.377	0.432	0.394	0.364
25		0.402	0.35	0.364	0.384
50		0.385	0.358	0.4	0.375
75		0.415	0.414	0.419	0.356
100		0.438	0.359	0.354	0.375

Chronic Larval Fish Survival and Growth Test — Pacific EcoRisk

Analysis ID:	15-4688-4428	**Endpoint:**	7d Survival Rate	**CETIS Version:**	CETISv1.7.0
Analyzed:	13 Sep-10 15:31	**Analysis:**	Nonparametric-Control vs Treatments	**Official Results:**	Yes

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Angular (Corrected)	0	C > T	Not Run	100	>100	N/A	1	4.57%

Steel Many-One Rank Test

Control vs	Conc-%	Test Stat	Critical	Ties	P-Value	Decision(5%)
Lab Water Control	12.5	16	10	1	0.6105	Non-Significant Effect
	25	18	10	1	0.8333	Non-Significant Effect
	50	18	10	1	0.8333	Non-Significant Effect
	75	18	10	1	0.8333	Non-Significant Effect
	100	18	10	1	0.8333	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.005533194	0.001106639	5	1	0.4457	Non-Significant Effect
Error	0.0199195	0.001106639	18			
Total	0.02545269	0.002213278	23			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Mod Levene Equality of Variance	1	4.25	0.4457	Equal Variances
Distribution	Shapiro-Wilk Normality	0.463		<0.0001	Non-normal Distribution

7d Survival Rate Summary

Conc-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
0	Lab Water Contr	4	1	1	1	1	1	0	0	0.0%	0.0%
12.5		4	0.975	0.956	0.994	0.9	1	0.00928	0.05	5.13%	2.5%
25		4	1	1	1	1	1	0	0	0.0%	0.0%
50		4	1	1	1	1	1	0	0	0.0%	0.0%
75		4	1	1	1	1	1	0	0	0.0%	0.0%
100		4	1	1	1	1	1	0	0	0.0%	0.0%

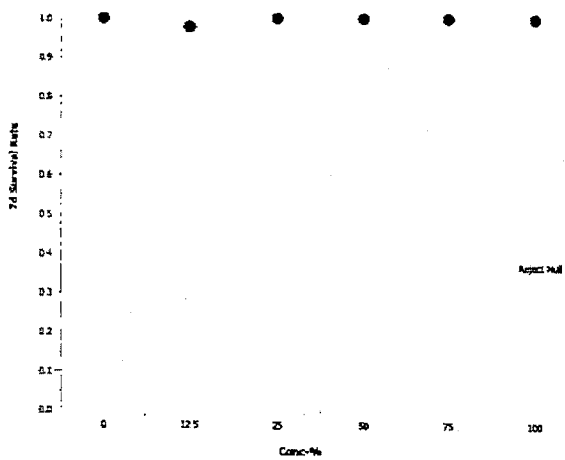
Angular (Corrected) Transformed Summary

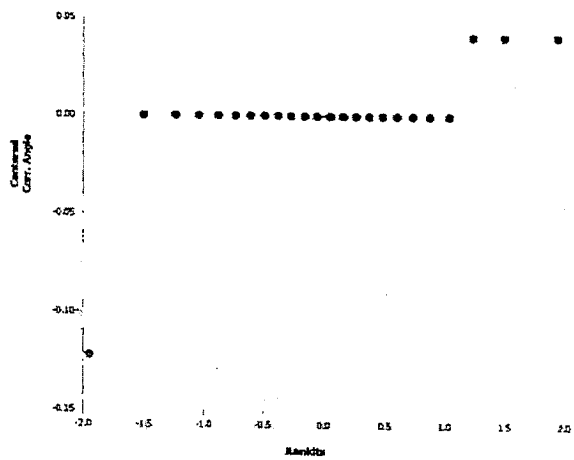
Conc-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
0	Lab Water Cont	4	1.41	1.41	1.41	1.41	1.41	0	0	0.0%	0.0%
12.5		4	1.37	1.34	1.4	1.25	1.41	0.0151	0.0815	5.94%	2.89%
25		4	1.41	1.41	1.41	1.41	1.41	0	0	0.0%	0.0%
50		4	1.41	1.41	1.41	1.41	1.41	0	0	0.0%	0.0%
75		4	1.41	1.41	1.41	1.41	1.41	0	0	0.0%	0.0%
100		4	1.41	1.41	1.41	1.41	1.41	0	0	0.0%	0.0%

Chronic Larval Fish Survival and Growth Test — Pacific EcoRisk

Analysis ID:	15-4688-4428	Endpoint:	7d Survival Rate	CETIS Version:	CETISv1.7.0
Analyzed:	13 Sep-10 15:31	Analysis:	Nonparametric-Control vs Treatments	Official Results:	Yes

Graphics





Chronic Larval Fish Survival and Growth Test — Pacific EcoRisk

Analysis ID:	19-5784-1674	**Endpoint:**	Mean Dry Biomass-mg	**CETIS Version:**	CETISv1.7.0
Analyzed:	13 Sep-10 15:35	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	0	C > T	Not Run	75	100	86.6	1.33	9.91%

Dunnett's Multiple Comparison Test

Control	vs	Conc-%	Test Stat	Critical	MSD	P-Value	Decision(5%)
Lab Water Control		12.5*	2.59	2.41	0.0423	0.0351	Significant Effect
		25*	2.93	2.41	0.0423	0.0177	Significant Effect
		50*	2.68	2.41	0.0423	0.0297	Significant Effect
		75	1.45	2.41	0.0423	0.2436	Non-Significant Effect
		100*	2.56	2.41	0.0423	0.0371	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.007753483	0.001550697	5	2.51	0.0679	Non-Significant Effect
Error	0.01109882	0.000616601	18			
Total	0.0188523	0.002167298	23			

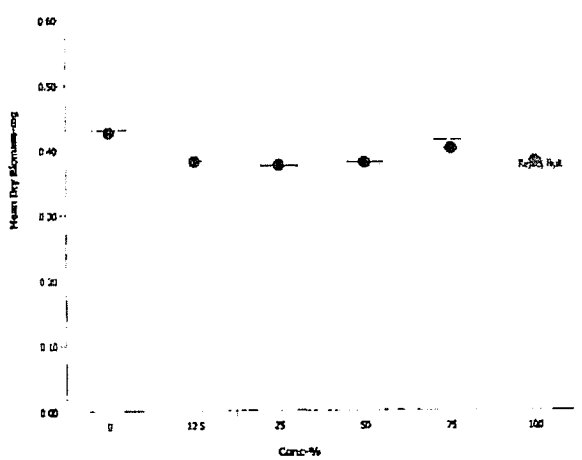
ANOVA Assumptions

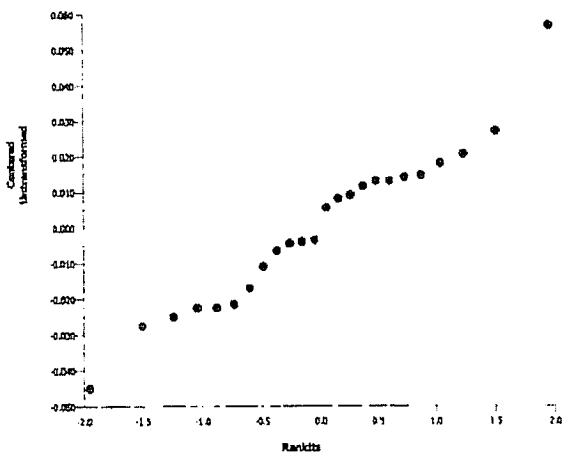
Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Bartlett Equality of Variance	4.21	15.1	0.5195	Equal Variances
Distribution	Shapiro-Wilk Normality	0.966		0.5610	Normal Distribution

Mean Dry Biomass-mg Summary

Conc-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
0	Lab Water Contr	4	0.426	0.42	0.433	0.404	0.441	0.00315	0.0169	3.97%	0.0%
12.5		4	0.381	0.376	0.386	0.364	0.394	0.00249	0.0134	3.51%	10.7%
25		4	0.375	0.366	0.384	0.35	0.402	0.00423	0.0228	6.07%	12.1%
50		4	0.379	0.373	0.386	0.358	0.4	0.00327	0.0176	4.65%	11.0%
75		4	0.401	0.39	0.412	0.356	0.419	0.00559	0.0301	7.5%	5.98%
100		4	0.381	0.367	0.396	0.354	0.438	0.00719	0.0387	10.1%	10.6%

Graphics





Chronic Larval Fish Survival and Growth Test — Pacific EcoRisk

Analysis ID:	00-6658-6791	Endpoint:	Mean Dry Biomass-mg	CETIS Version:	CETISv1.7.0
Analyzed:	13 Sep-10 15:35	Analysis:	Linear Interpolation (ICPIN)	Official Results:	Yes

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Linear	Linear	57951	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	6.29	4.08	120	15.9	0.833	24.5
IC10	77.6	N/A	N/A	1.29	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

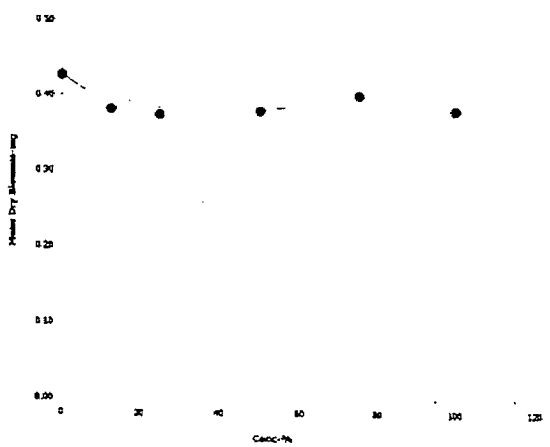
Mean Dry Biomass-mg Summary

			Calculated Variate						
Conc-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	Diff%
0	Lab Water Contr	4	0.426	0.404	0.441	0.00309	0.0169	3.97%	0.0%
12.5		4	0.381	0.364	0.394	0.00244	0.0134	3.51%	10.7%
25		4	0.375	0.35	0.402	0.00416	0.0228	6.07%	12.1%
50		4	0.379	0.358	0.4	0.00322	0.0176	4.65%	11.0%
75		4	0.401	0.356	0.419	0.00549	0.0301	7.5%	5.98%
100		4	0.381	0.354	0.438	0.00707	0.0387	10.1%	10.6%

Mean Dry Biomass-mg Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Lab Water Control	0.404	0.441	0.438	0.423
12.5		0.377	0.389	0.394	0.364
25		0.402	0.35	0.364	0.384
50		0.385	0.358	0.4	0.375
75		0.415	0.414	0.419	0.356
100		0.438	0.359	0.354	0.375

Graphics



CETIS Analytical Report

GAC-Treated 'Valley Waste'

Report Date: 13 Sep-10 15:54 (p 1 of 4)
Test Code: 10-6481-8394/40048

Chronic Larval Fish Survival and Growth Test — Pacific EcoRisk

Analysis ID:	18-5692-2925	Endpoint:	Mean Dry Weight-mg	CETIS Version:	CETISv1.7.0
Analyzed:	13 Sep-10 15:35	Analysis:	Parametric-Control vs Treatments	Official Results:	Yes

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	0	C > T	Not Run	100	>100	N/A	1	10.8%

Dunnett's Multiple Comparison Test

Control vs	Conc-%	Test Stat	Critical	MSD	P-Value	Decision(5%)
Lab Water Control	12.5	1.81	2.41	0.0461	0.1423	Non-Significant Effect
	25*	2.69	2.41	0.0461	0.0289	Significant Effect
	50*	2.46	2.41	0.0461	0.0456	Significant Effect
	75	1.33	2.41	0.0461	0.2860	Non-Significant Effect
	100	2.35	2.41	0.0461	0.0556	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.007299867	0.001459973	5	1.99	0.1287	Non-Significant Effect
Error	0.01319148	0.0007328598	18			
Total	0.02049134	0.002192833	23			

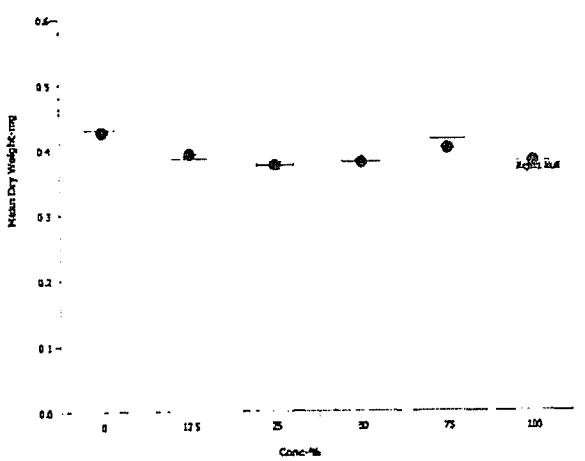
ANOVA Assumptions

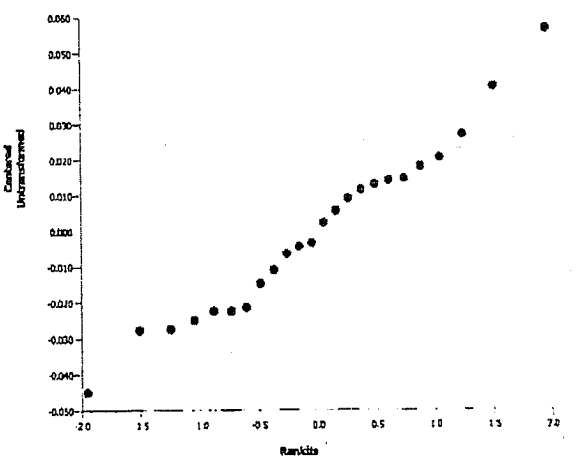
Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Bartlett Equality of Variance	2.75	15.1	0.7388	Equal Variances
Distribution	Shapiro-Wilk Normality	0.976		0.8097	Normal Distribution

Mean Dry Weight-mg Summary

Conc-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
0	Lab Water Contr	4	0.426	0.42	0.433	0.404	0.441	0.00315	0.0169	3.97%	0.0%
12.5		4	0.392	0.381	0.403	0.364	0.432	0.0055	0.0296	7.56%	8.13%
25		4	0.375	0.366	0.384	0.35	0.402	0.00423	0.0228	6.07%	12.1%
50		4	0.379	0.373	0.386	0.358	0.4	0.00327	0.0176	4.65%	11.0%
75		4	0.401	0.39	0.412	0.356	0.419	0.00559	0.0301	7.5%	5.98%
100		4	0.381	0.367	0.396	0.354	0.438	0.00719	0.0387	10.1%	10.6%

Graphics





CETIS Analytical Report GAC-Treated 'Valley Waste' Report Date: 13 Sep-10 15:35 (p 1 of 2)
Test Code: 10-6481-8394/40048

Chronic Larval Fish Survival and Growth Test — Pacific EcoRisk

Analysis ID:	20-9696-1552	**Endpoint:**	Mean Dry Weight-mg	**CETIS Version:**	CETISv1.7.0
Analyzed:	13 Sep-10 15:35	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Linear	Linear	57951	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	7.68	3.53	119	13	0.839	28.3
IC10	84	N/A	N/A	1.19	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

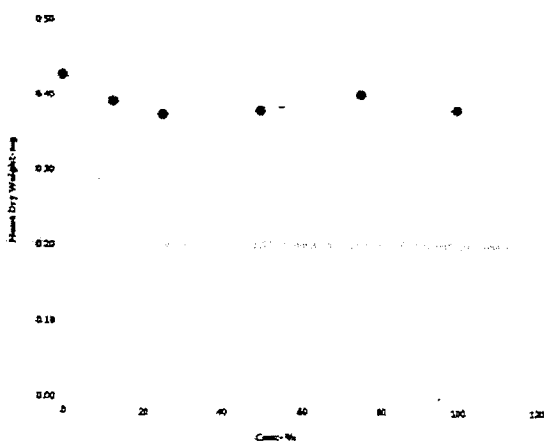
Mean Dry Weight-mg Summary

			Calculated Variate						
Conc-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	Diff%
0	Lab Water Contr	4	0.426	0.404	0.441	0.00309	0.0169	3.97%	0.0%
12.5		4	0.392	0.364	0.432	0.00541	0.0296	7.56%	8.13%
25		4	0.375	0.35	0.402	0.00416	0.0228	6.07%	12.1%
50		4	0.379	0.358	0.4	0.00322	0.0176	4.65%	11.0%
75		4	0.401	0.356	0.419	0.00549	0.0301	7.5%	5.98%
100		4	0.381	0.354	0.438	0.00707	0.0387	10.1%	10.6%

Mean Dry Weight-mg Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Lab Water Control	0.404	0.441	0.438	0.423
12.5		0.377	0.432	0.394	0.364
25		0.402	0.35	0.364	0.384
50		0.385	0.358	0.4	0.375
75		0.415	0.414	0.419	0.356
100		0.438	0.359	0.354	0.375

Graphics



7 Day Chronic Fathead Minnow Toxicity Test Data

Client: Precision Analytical - Chevron Cawelo
Test Material: Valley Waste - GAC Treatment
Test ID#: 40048 Project #: 17262
Test Date: 9/4/10 Randomization: 4.6.7

Organism Log#: 5389 Age: <48hrs
Organism Supplier: ARS
Control/Diluent: EPAMH
Control Water Batch: 1324

Treatment (% Effluent)	Temp (°C)	pH new	pH old	D.O. (mg/L) new	D.O. (mg/L) old	Conductivity (µs/cm)	# Live Organisms A	B	C	D	SIGN-OFF
Lab Water Control	25.2	7.91		8.1		317	10	10	10	10	Date: 9/4/10
12.5%	25.2	7.72		8.4		390	10	10	10	10	Sample ID 24870 ~~24869~~
25%	25.2	7.63		8.2		460	10	10	10	10	Test Solution Prep JT
50%	25.2	7.50		8.2		600	10	10	10	10	New WQ SH
75%	25.2	7.47		8.2		735	10	10	10	10	Initiation Time 1625
100%	25.2	7.37		8.2		881	10	10	10	10	Initiation Signoff JT
Meter ID	30A	pH12		RD05		EC03					
Lab Water Control	25.4	8.12	8.15	8.4	7.3	316	10	10	10	10	Date: 9/5/10
12.5%	25.4	7.95	8.12	8.6	7.4	403	10	10	10	10	Sample ID 24870
25%	25.4	7.79	8.06	8.5	7.5	466	10	10	10	10	Test Solution Prep SH
50%	25.4	7.65	8.10	8.3	7.4	607	10	10	10	10	New WQ SH
75%	25.4	7.57	8.12	8.8	7.5	774	10	10	10	10	Renewal Time 0945
100%	25.4	7.48	8.27	8.7	6.9	891	10	10	10	10	Renewal Signoff [illegible]
Meter ID	30A	pH12	pH14	RD05	RD05	EC03					Old WQ FOLB
Lab Water Control	25.2	8.38	8.54	8.3	7.5	315	10	10	10	10	Date: 9/6/10
12.5%	25.2	8.17	8.35	8.1	7.8	384	10	10	10	10	Sample ID 24870
25%	25.2	8.00	8.23	8.2	7.5	456	10	10	10	10	Test Solution Prep SH
50%	25.2	7.84	8.24	8.4	7.7	591	10	10	10	10	New WQ UM
75%	25.2	7.75	8.19	8.3	7.7	721	10	10	10	10	Renewal Time 0930
100%	25.2	7.62	8.33	8.6	7.5	851	10	10	10	10	Renewal Signoff [illegible]
Meter ID	30A	pH09	pH09	RD05	RD05	EC05					Old WQ UM
Lab Water Control	25.2	8.52	7.88	8.6	7.3	312	10	10	10	10	Date: 9/7/10
12.5%	25.2	8.27	7.89	8.3	7.4	391	10	9	10	10	Sample ID 24870
25%	25.2	8.12	7.93	8.4	7.3	465	10	10	10	10	Test Solution Prep SH
50%	25.2	7.98	8.17	8.4	7.5	591	10	10	10	10	New WQ [illegible]
75%	25.2	7.86	8.16	8.4	7.3	713	10	10	10	10	Renewal Time 1100
100%	25.2	7.77	8.25	8.0	7.4	849	10	10	10	10	Renewal Signoff SH
Meter ID	30A	pH12	pH12	RD04	RD04	EC05					Old WQ [illegible]

7 Day Chronic Fathead Minnow Toxicity Test Data

Client: Precision Analytical - Chevron Cawelo
Test Material: Valley Waste - GAC Treatment
Test ID#: 40048 Project #: 17262
Test Date: 9/4/10 Randomization: 4.6.7

Organism Log#: 5389 Age: <48hrs
Organism Supplier: ABS
Control/Diluent: EPAMH
Control Water Batch: 1324

Treatment (% Effluent)	Temp (°C)	pH new	pH old	D.O. (mg/L) new	D.O. (mg/L) old	Conductivity (µs/cm)	# Live Organisms A	B	C	D	SIGN-OFF
Lab Water Control	25.3	8.29	7.93	8.4	7.1	328	10	10	10	10	Date: 9/8/10
12.5%	25.3	8.09	7.89	8.4	7.1	405	10	9	10	10	Sample ID: 24870
25%	25.3	7.84	7.93	8.6	7.3	482	10	10	10	10	Test Solution Prep: JM
50%	25.3	7.75	8.06	8.7	7.2	617	10	10	10	10	New WQ: DS
75%	25.3	7.68	8.15	8.9	7.2	761	10	10	10	10	Renewal Time: 1330
100%	25.3	7.61	8.26	9.4	7.1	900	10	10	10	10	Renewal Signoff: SH
Meter ID	30A	PH12	PH14	RD05	RD04	EC04					Old WQ: YH
Lab Water Control	25.0	8.10	8.40	8.6	8.0	317	10	10	10	10	Date: 9/9/10
12.5%	25.0	7.94	8.19	8.7	7.8	390	10	9	10	10	Sample ID: 24870
25%	25.0	7.82	8.17	9.0	7.7	466	10	10	10	10	Test Solution Prep: DW
50%	25.0	7.74	8.20	9.5	7.6	609	10	10	10	10	New WQ: DS
75%	25.0	7.72	8.22	10.1	7.5	741	10	10	10	10	Renewal Time: 1110
100%	25.0	7.64	8.27	10.7	7.4	884	10	10	10	10	Renewal Signoff: DW
Meter ID	30A	PH14	PH03	RD04	RD05	EC03					Old WQ: DEB
Lab Water Control	25.1	8.07	8.17	8.7	8.4	314	10	10	10	10	Date: 9/10/10
12.5%	25.1	7.96	8.08	8.8	8.1	387	10	9	10	10	Sample ID: 24870
25%	25.1	7.90	8.09	9.0	8.1	465	10	10	10	10	Test Solution Prep: JM
50%	25.1	7.80	8.22	9.4	8.2	602	10	10	10	10	New WQ: CG
75%	25.1	7.77	8.30	9.9	8.0	731	10	10	10	10	Renewal Time: 1145
100%	25.1	7.76	8.39	10.1	8.0	870	10	10	10	10	Renewal Signoff: JM
Meter ID	30A	PH03	PH03	RD04	RD04	EC05					Old WQ: DS
Lab Water Control	25.2		8.16		7.8	343	10	10	10	10	Date: 9/10/10
12.5%	25.2		8.01		7.6	408	10	9	10	10	Termination Time: 0900
25%	25.2		8.16		7.7	493	10	10	10	10	Termination Signoff: BM
50%	25.2		8.27		7.6	640	10	10	10	10	Old WQ: SG
75%	25.2		8.38		7.6	780	10	10	10	10	
100%	25.2		8.47		7.6	935	10	10	10	10	
Meter ID	30A		PH12		RD03	EC04					

Fathead Minnow Dry Weight Data Sheet

Client: Precision Analytical - Chevron Cawelo Test ID #: 40048 Project # 17262
Sample: Valley Waste - GAC Treatment Tare Weight Date: 9/6/10 Sign-off: CB
Test Date: 9/4/10 Final Weight Date: 9/13/10 Sign-off: YK

Pan ID	Concentration	Replicate	Initial Pan Weight (mg)	Final Pan Weight (mg)	Initial # of Organisms	Biomass Value (mg)
1	Lab Water	A	169.03	173.07	10	0.404
2		B	166.26	170.67	10	0.441
3		C	176.35	180.73	10	0.438
4		D	172.55	176.78	10	0.423
5	12.5	A	182.23	186.00	10	0.377
6		B	166.21	170.10	10	0.389
7		C	176.66	180.60	10	0.394
8		D	175.89	179.53	10	0.364
9	25	A	~~180.0~~ 179.99	184.00	10	0.402
10		B	189.62	193.12	10	0.350
11		C	184.42	188.06	10	0.364
12		D	174.00	177.84	10	0.384
13	50	A	176.55	180.40	10	0.385
14		B	178.42	182.00	10	0.358
15		C	185.03	189.03	10	0.403
16		D	178.84	182.59	10	0.375
17	75	A	183.36	187.51	10	0.415
18		B	188.93	192.97	10	0.414
19		C	169.12	173.31	10	0.419
20		D	170.56	174.12	10	0.356
21	100	A	169.13	173.51	10	0.438
22		B	184.88	188.47	10	0.359
23		C	173.40	176.94	10	0.354
24		D	188.35	192.10	10	0.375
QA 1			176.86	176.85		
QA 2			175.69	175.70		
Balance ID			#1	#1		

Appendix F

Test Data and Summary of Statistics for the Reference Toxicant Evaluation of the Fathead Minnows

CETIS Summary Report

Report Date: 07 Oct-10 19:14 (p 1 of 2)
Test Code: 08-2336-0553/40049b

Chronic Larval Fish Survival and Growth Test — Pacific EcoRisk

Batch ID:	02-5374-5934	**Test Type:**	Growth-Survival (7d)	**Analyst:**	Padrick Anderson
Start Date:	04 Sep-10 17:30	**Protocol:**	EPA-821-R-02-013 (2002)	**Diluent:**	Laboratory Water
Ending Date:	11 Sep-10 10:20	**Species:**	Pimephales promelas	**Brine:**	Not Applicable
Duration:	6d 17h	**Source:**	Aquatic Biosystems, CO	**Age:**	1

Sample ID:	06-8361-1106	**Code:**	NaCl	**Client:**	Pacific Ecorisk
Sample Date:	04 Sep-10 17:30	**Material:**	Sodium chloride	**Project:**	17263
Receive Date:	04 Sep-10 17:30	**Source:**	Reference Toxicant		
Sample Age:	N/A (25.2 °C)	**Station:**	In House		

Comparison Summary

Analysis ID	Endpoint	NOEL	LOEL	TOEL	PMSD	TU	Method
09-3814-0303	7d Survival Rate	3	6	4.24	80.0%		Dunnett's Multiple Comparison Test
20-0330-4906	Mean Dry Biomass-mg	1.5	3	2.12	44.8%		Dunnett's Multiple Comparison Test
00-1505-2651	Mean Dry Weight-mg	6	>6	N/A	33.0%		Bonferroni Adj t Test

Point Estimate Summary

Analysis ID	Endpoint	Level	g/L	95% LCL	95% UCL	TU	Method
19-4291-7822	7d Survival Rate	EC1	1.17	0.272	1.8		Linear Regression (MLE)
		EC5	1.53	0.496	2.16		
		EC10	1.76	0.681	2.39		
		EC15	1.94	0.841	2.56		
		EC20	2.09	0.994	2.72		
		EC25	2.23	1.14	2.86		
		EC40	2.64	1.62	3.28		
		EC50	2.91	1.96	3.61		
00-6399-4472	Mean Dry Biomass-mg	IC5	0.978	N/A	3.57		Linear Interpolation (ICPIN)
		IC10	1.51	N/A	2.49		
		IC15	1.61	N/A	2.68		
		IC20	1.72	N/A	2.86		
		IC25	1.83	0.29	3.05		
		IC40	2.15	0.715	3.6		
		IC50	2.37	0.93	3.96		
09-7313-9325	Mean Dry Weight-mg	IC5	0.856	N/A	3.04		Linear Interpolation (ICPIN)
		IC10	1.16	N/A	4.01		
		IC15	1.46	N/A	4.85		
		IC20	2.12	N/A	4.62		
		IC25	2.83	N/A	N/A		
		IC40	>6	N/A	N/A		
		IC50	>6	N/A	N/A		

7d Survival Rate Summary

Conc-g/L	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
0	Lab Water Contr	2	0.85	0.824	0.876	0.8	0.9	0.0129	0.0707	8.32%	0.0%
0.75		2	0.85	0.824	0.876	0.8	0.9	0.0129	0.0707	8.32%	0.0%
1.5		2	0.9	0.847	0.953	0.8	1	0.0258	0.141	15.7%	-5.88%
3		2	0.35	0.165	0.535	0	0.7	0.0904	0.495	141.0%	58.8%
6		2	0.05	0.0236	0.0764	0	0.1	0.0129	0.0707	141.0%	94.1%
9		2	0	0	0	0	0	0	0		100.0%

Mean Dry Biomass-mg Summary

Conc-g/L	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
0	Lab Water Contr	2	0.356	0.355	0.357	0.354	0.358	0.000517	0.00283	0.8%	0.0%
0.75		2	0.346	0.335	0.356	0.325	0.366	0.00529	0.029	8.39%	2.95%
1.5		2	0.321	0.291	0.352	0.264	0.379	0.0148	0.0813	25.3%	9.69%
3		2	0.0735	0.0347	0.112	0	0.147	0.019	0.104	141.0%	79.4%
6		2	0.0205	0.00967	0.0313	0	0.041	0.00529	0.029	141.0%	94.2%
9		2	0	0	0	0	0	0	0		100.0%

CETIS Summary Report

Report Date: 07 Oct-10 19:14 (p 2 of 2)
Test Code: 08-2336-0553/40049b

Chronic Larval Fish Survival and Growth Test — Pacific EcoRisk

Mean Dry Weight-mg Summary

Conc-g/L	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
0	Lab Water Contr	2	0.42	0.408	0.432	0.398	0.442	0.00577	0.0316	7.53%	0.0%
0.75		2	0.406	0.406	0.407	0.406	0.407	5.38E-05	0.000295	0.07%	3.26%
1.5		2	0.354	0.342	0.367	0.33	0.379	0.00633	0.0346	9.77%	15.6%
3		1	0.21			0.21	0.21	0	0	0.0%	50.0%
6		1	0.41			0.41	0.41	0	0	0.0%	2.41%

7d Survival Rate Detail

Conc-g/L	Control Type	Rep 1	Rep 2
0	Lab Water Contr	0.9	0.8
0.75		0.8	0.9
1.5		1	0.8
3		0.7	0
6		0	0.1
9		0	0

Mean Dry Biomass-mg Detail

Conc-g/L	Control Type	Rep 1	Rep 2
0	Lab Water Contr	0.358	0.354
0.75		0.325	0.366
1.5		0.379	0.264
3		0.147	0
6		0	0.041
9		0	0

Mean Dry Weight-mg Detail

Conc-g/L	Control Type	Rep 1	Rep 2
0	Lab Water Contr	0.398	0.442
0.75		0.406	0.407
1.5		0.379	0.33
3		0.21	
6		0.41	

7 Day Chronic Fathead Minnow Reference Toxicant Test Data

Client: Reference Toxicant
Test Material: Sodium Chloride
Test ID#: 40049 Project #: 17263
Test Date: 9/4/10 Randomization: 4.6.5

Organism Log#: 5389 Age: <48hrs
Organism Supplier: ABS
Control/Diluent: EPAMH
Control Water Batch: 1324

Treatment (g/L)	Temp (°C)	pH New	pH Old	D.O. (mg/L) New	D.O. (mg/L) Old	Conductivity (µs/cm)	# Live Organisms A	B	C	D	SIGN-OFF
Control	25.2	8.78		8.1		313	10	10	10	10	Date: 9/4/10
0.75	25.2	8.48		8.2		1734	10	10	10	10	Test Solution Prep: SH
1.5	25.2	8.32		8.3		3560	10	10	10	10	New WQ: [illegible]
3	25.2	8.21		8.5		6090	10	10	10	10	Initiation Time: 1730
6	25.2	8.12		8.9		11330	10	10	10	10	Initiation Signoff: RPD
9	25.2	8.04		9.5		16300	10	10	10	0	RT Stock Batch #: 61
Meter ID	30A	pH09		RD04		EC05					
Control	25.2	7.97	8.21	8.6	7.1	317	10	8	6	7	Date: 9/5/10
0.75	25.2	7.98	8.01	8.5	7.1	1827	8	10	10	8	Test Solution Prep: [illegible]
1.5	25.2	7.96	7.95	8.5	7.0	3270	10	10	7	8	New WQ: SH
3	25.2	7.92	7.84	8.7	7.3	5810	10	10	9	6	Renewal Time: 1030
6	25.2	7.84	7.80	9.2	7.2	11330	7	6	5	8	Renewal Signoff: SH
9	25.2	7.80	7.76	9.7	7.4	16230	0	0	0	0	Old WQ: FOVB
Meter ID	30A	pH14	pH14	RD05	RD05	EC03					RT Stock Batch #: 61
Control	25.2	8.46	8.01	8.2	7.4	326	10	8	6	7	Date: 9/6/10
0.75	25.2	8.32	7.93	8.3	7.6	1971	8	10	10	7	Test Solution Prep: [illegible]
1.5	25.2	8.26	7.90	8.4	7.5	3260	10	10	7	7	New WQ: UM
3	25.2	8.17	7.87	8.6	7.6	6110	9	9	8	3	Renewal Time: 1015
6	25.2	8.08	7.82	9.1	7.5	11540	4	4	5	5	Renewal Signoff: [illegible]
9	—	—	—	—	—	—	—	—	—	—	Old WQ: [illegible]
Meter ID	30A	pH14	pH09	RD04	RD05	EC04					RT Stock Batch #: 61
Control	24.9	7.92	8.45	8.3	7.4	312	10	8	6	7	Date: 9/7/10
0.75	24.9	7.90	8.24	8.3	7.3	1801	8	9	10	7	Test Solution Prep: [illegible]
1.5	24.9	7.91	8.12	8.5	7.4	3210	10	10	7	7	New WQ: [illegible]
3	24.9	7.88	8.06	8.6	7.4	5930	9	5	8	3	Renewal Time: 1100
6	24.9	7.83	7.99	9.5	7.5	11220	2	3	2	3	Renewal Signoff: JM
9	—	—	—	—	—	—	—	—	—	—	Old WQ: [illegible]
Meter ID	30A	pH12	pH03	RD04	RD05	EC05					RT Stock Batch #: 61

7 Day Chronic Fathead Minnow Reference Toxicant Test Data

Client: Reference Toxicant
Test Material: Sodium Chloride
Test ID#: 40049 Project #: 17263
Test Date: 9/4/10 Randomization: 4.6.5

Organism Log#: 5399 Age: 48hrs
Organism Supplier: ABS
Control/Diluent: EPAMH
Control Water Batch: 1324

Treatment (g/L)	Temp (°C)	pH new	pH old	DO (mg/L) new	DO (mg/L) old	Conductivity (µs/cm)	# Live Organisms A	B	C	D	SIGN-OFF
Control	25.2	8.58	8.14	7.9	7.2	317	10	8	6	7	Date: 9/8/10
0.75	25.2	8.35	7.96	8.3	7.1	1951	8	9	10	6	Test Solution Prep: JT
1.5	25.2	8.22	7.93	8.5	7.2	3320	10	9	7	7	New WQ: JT
3	25.2	8.11	7.92	8.7	7.2	5990	9	3	8	3	Renewal Time: 1325
6	25.2	8.01	7.88	9.5	7.2	11330	1	1	2	1	Renewal Signoff: [illegible]
9	—	—	—	—	—	—	—	—	—	—	Old WQ: [illegible]
Meter ID	30A	pH14	pH14	RDO4	RDO3	EC03					RT Stock Batch #: 61
Control	25.2	8.32	8.17	8.5	8.2	320	10	8	6	7	Date: 9/9/10
0.75	25.2	8.21	8.06	8.7	7.8	1984	8	9	10	6	Test Solution Prep: JT
1.5	25.2	8.14	7.92	8.8	7.8	3280	10	9	7	7	New WQ: [illegible]
3	25.2	8.03	7.87	9.0	7.9	5980	8	0	6	3	Renewal Time: 1100
6	25.2	8.03	7.81	9.5	8.0	11150	0	1	1	0	Renewal Signoff: [illegible]
9	—	—	—	—	—	—	—	—	—	—	Old WQ: [illegible]
Meter ID	30A	pH14	pH09	RDO4	RDO3	EC03					RT Stock Batch #: 61
Control	25.0	7.81	8.06	8.9	7.5	317	9	8	6	6	Date: 9/10/10
0.75	25.0	7.90	7.94	8.8	7.4	1669	8	9	10	6	Test Solution Prep: [illegible]
1.5	25.0	7.92	7.91	8.8	7.5	3130	10	9	7	7	New WQ: JT
3	25.0	7.90	7.83	8.8	7.4	6070	7	—	4	2	Renewal Time: 1430
6	25.0	7.85	7.86	8.9	7.7	11220	—	1	1	—	Renewal Signoff: [illegible]
9	—	—	—	—	—	—	—	—	—	—	Old WQ: NVS
Meter ID	30A	pH13		RDO4		EC05					RT Stock Batch #: 61/62
Control	25.2		8.51		8.0	324	9	8	6	6	Date: 9/11/10
0.75	25.2		8.21		7.9	1769	8	9	10	6	Termination Time: 1020
1.5	25.2		8.11		8.0	3260	10	8	7	2	Termination Signoff: [illegible]
3	25.2		8.06		8.0	6280	7	—	4	2	Old WQ: [illegible]
6	25.2		8.03		8.2	11510	—	1	0	—	
9	—		—		—	—	—	—	—	—	
Meter ID	30A		pH09		RDO3	EC03					

Fathead Minnow Dry Weight Data Sheet

Client: **Reference Toxicant** Test ID #: 40049 Project # 17263

Sample: Sodium Chloride Tare Weight Date: 9/6/10 Sign-off: CG

Test Date: 9.4.10 Final Weight Date: 9/15/10 Sign-off: DJ

Pan ID	Concentration	Replicate	Initial Pan Weight (mg)	Final Pan Weight (mg)	Initial # of Organisms	Biomass Value (mg)
1	Control	A	179.02	182.60	10	0.358
2		B	163.82	167.36	10	0.354
3		C	178.71	181.63	10	0.292
4		D	169.01	172.~~19~~ 19	10	0.318
5	0.75	A	171.01	174.26	10	0.325
6		B	168.54	172.20	10	0.366
7		C	172.46	176.08	10	0.362
8		D	176.00	179.33	10	0.333
9	1.5	A	184.44	188.23	10	0.379
10		B	171.58	174.22	10	0.264
11		C	165.14	168.43	10	0.329
12		D	188.00	190.50	10	0.250
13	3	A	188.85	190.32	10	0.147
14		B	167.33	—	10	—
15		C	190.39	191.~~46~~ 46	10	0.071
16		D	175.18	176.24	10	0.106
17	6	A	160.01	—	10	—
18		B	177.65	178.06	10	0.041
19		C	165.83	—	10	—
20		D	177.94	—	10	—
21	9	A	179.26	—	10	—
22		B	172.76	—	10	—
23		C	165.67	—	10	—
24		D	159.08	—	10	—
QA1			173.67	173.67		
QA2			179.04	179.04		
QA3			169.50	169.50		
Balance ID:			#1	#1		