Rainier ENVIRONMENTAL

Whole Effluent Toxicity Test Report: Shell Seattle Terminal; Harbor Island

December 2013

Report date: December 21, 2013

Submitted to:

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1.0 INTRODUCTION

Acute and chronic whole effluent toxicity tests were conducted using effluent samples collected from Shell Harbor Island Oil Refinery in December 2013. Acute bioassay tests were conducted using test organisms *Ceriodaphnia dubia* (*Ceriodaphnia*) and *Pimephales promelas* (Fathead Minnow). Chronic testing was conducted using *Atherinops affinis* (Pacific topsmelt) and *Americamysis bahia* (mysid shrimp). Testing was performed at Rainier Environmental Laboratory located in Tacoma, Washington.

2.0 METHODS

2.1 Sample Collection and Transport

Effluent samples were collected into LDPE cubitainers by PES Environmental personnel. The cubitainers were packed into coolers containing ice and transported to Rainier Environmental the same day as collection. Appropriate chain-of-custody procedures were employed during collection and transport.

2.2 Sample Receipt

Upon arrival at Rainier Environmental, the coolers were opened; sample inspected, and the contents verified against information provided on the chain-of-custody forms. Receipt temperature was measured and recorded on the chain-of-custody form. Standard water quality parameters were measured and recorded on a sample check-in sheet provided in Appendix F. The sample was stored at 4°C in the dark until used for testing.

2.3 Test Methods

Acute toxicity tests were conducted using *Ceriodaphnia* and Fathead minnow according to procedures presented by USEPA (2002a), and summarized in Table 1 and 2, respectively. Chronic toxicity tests were conducted according to USEPA (2002b) procedures for mysid shrimp and USEPA (2005) for Pacific topsmelt. These methods are summarized in Tables 3 and 4, respectively.

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Table 1. Summary of methods for the 48h *Ceriodaphnia* acute survival test.

Test initiation date and time	12/2/2013; 1400h
Test termination date and time	12/4/2013; 1425h
Test organism	*Ceriodaphnia dubia*
Test organism source	In-house cultures
Test organism age	< 24 hours
Test duration	48 hours
Feeding	50:50 mixture YTC:algal suspension during organism holding time. No feeding during test.
Test chamber	30 mL plastic cup
Test solution volume	15 mL
Test temperature	20 ± 1°C
Dilution water	Moderately Hard Synthetic Water
Test concentrations (% sample)	100, 50.0, 25.0, 12.5, 6.25, laboratory control
Number of organisms/chamber	5
Number of replicates	4
Photoperiod	16 hours light/8 hours dark
Aeration	None
Test protocol	EPA-821-R-02-012
Test acceptability criterion for controls	≥ 90% survival
Reference toxicant	Copper sulfate

Table 2. Summary of conditions for the 96h fathead minnow acute survival test.

Test initiation date and time	12/4/2013; 1640h
Test termination date and time	12/8/2013; 1600h
Test organism	*Pimephales promelas*
Test organism source	Aquatic BioSystems; Fort Collins, CO
Test organism age	5 days post hatch
Test duration	96 hours with solution renewal at 48 hours
Feeding	*Artemia* nauplii during holding time and 2 hours prior to solution renewal
Test chamber	250 mL plastic cup
Test solution volume	200 mL
Test temperature	20 ± 1°C
Dilution water	Moderately Hard Synthetic Water
Test concentrations (% sample)	100, 50.0, 25.0, 12.5, 6.25, control
Number of organisms/chamber	10
Number of replicates	4
Photoperiod	16 hours light/8 hours dark
Aeration	None
Test protocol	EPA-821-R-02-012
Test acceptability criterion for controls	≥ 90% survival
Reference toxicant	Sodium chloride

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Table 3. Summary of methods for the mysid shrimp 7-day survival and growth test.

Test initiation date and time	12/4/2013; 1500h
Test termination date and time	12/11/2013; 1430h
Test Type	Static renewal
Endpoint	Survival and growth at 7 days
Test organism	*Americamysis bahia*
Test organism source	Aquatic BioSystems; Fort Collins, CO
Test organism age	7 days post-hatch
Feeding	*Artemia* nauplii, twice daily
Test chamber and solution volume	250 mL plastic cup
Test solution volume	200 mL
Test temperature	26 ± 1°C
Dilution water	Crystal Sea Marine Mix artificial seawater
Salinity	30 ± 2 ppt
Test concentrations (% sample)	100, 50.0, 25.0, 12.5, 6.25, laboratory control
Number of organisms/chamber	5
Number of replicates	8
Photoperiod	16 hours light/8 hours dark
Aeration	None
Test protocol	EPA-821-R-02-014
Test acceptability criteria for controls	≥ 80% survival; average dry weight ≥ 0.20 mg
Reference toxicant	Copper chloride

Table 4. Summary of methods for the Pacific topsmelt 7-day survival and growth test.

Test initiation date and time	12/4/2013; 1330h
Test termination date and time	12/11/2013; 1300h
Test Type	Static renewal
Endpoint	Survival and growth at 7 days
Test organism	*Atherinops affinis*
Test organism source	Aquatic BioSystems; Fort Collins, CO
Test organism age	10 days post-hatch
Feeding	*Artemia* nauplii, twice daily
Test chamber	1-liter plastic cup
Test solution volume	500 mL
Test temperature	20 ± 1°C
Dilution water	Crystal Sea Marine Mix artificial seawater
Salinity	30 ± 2 ppt
Test concentrations (% sample)	100, 50.0, 25.0, 12.5, 6.25, laboratory control
Number of organisms/chamber	5
Number of replicates	5
Photoperiod	16 hours light/8 hours dark
Aeration	None
Test protocol	EPA-600-R-95-136
Test acceptability criteria for controls	≥ 80% survival; average dry weight ≥ 0.85 mg
Reference toxicant	Copper chloride

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3.0 RESULTS

Details of standard water quality measurements conducted upon receipt of the samples are provided in Table 5.

Table 5. Sample information.

Sample ID	WET-1-120213	WET-2-120413	WET-3-120613	WET-4-120913
Rainier log in ID	13-145	13-148	13-153	13-154
Collection date and time	12/2/2013; 1030h	12/4/2013; 0945h	12/6/2013; 0945h	12/9/2013; 1000
Receipt date and time	12/2/2013; 1125h	12/4/2013; 1205h	12/6/2013; 1100h	12/9/2013; 1045
Receipt temperature (°C)	5.9	5.5	3.5	4.5
Dissolved oxygen (mg/L)	9.2	8.5	8.6	8.7
pH	6.74	6.89	6.61	6.96
Conductivity (µS/cm)	823	372	367	364
Salinity	0.4	0.0	0.0	0.0
Hardness (mg/L $CaCO_3$)	104	76	80	80
Alkalinity (mg/L $CaCO_3$)	76	60	56	56
Total chlorine (mg/L)	<0.03	<0.03	<0.03	<0.03
Total ammonia (mg/L)	<1.0	<1.0	<1.0	<1.0

3.1 Acute Tests

Survival was evaluated in the acute toxicity tests after 48 and 96 hours of exposure for *Ceriodaphnia* and fathead minnows, respectively. Results are summarized in Table 6. Mean survival in 100 percent effluent was 100 percent for both *Ceriodaphnia* and fathead minnows.

Table 6. Summary of results for the acute toxicity tests.

Species	Concentration (%)	Percent Survival	NOEC[a] (% effluent)	LOEC[b] (% effluent)	LC_{50}[c] (% effluent)
Ceriodaphnia	0.0	100	100	>100	>100
	6.25	100			
	12.5	100			
	25	100			
	50	100			
	100	100			
Fathead minnows	0.0	97.5	100	>100	>100
	6.25	100			
	12.5	97.5			
	25	97.5			
	50	100			
	100	100			

[a]No Observed Effect Concentration, [b]Lowest Observed Effect Concentration, [c] Predicted lethal concentration for 50% of test organisms

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3.2 Chronic Tests

Results for the chronic toxicity tests are summarized in Table 7. The mysid shrimp and Pacific Topsmelt tests involved a 7-day static-renewal exposure to the effluent. The endpoints for these tests were survival and growth (evaluated on the basis of dry weight divided by initial count for biomass and final count for dry weight) at the end of the 7-day exposure. In the mysid shrimp test the highest concentration with no observed effect (NOEC) was 100 percent for survival, dry weight and biomass. In The Pacific Topsmelt test the (NOEC) was 100 percent for survival, dry weight and biomass

Table 7. Summary of results for the chronic toxicity tests.

Test Species	Endpoint	NOEC[a] (% effluent)	LOEC[b] (% effluent)
Mysid Shrimp	7-Day Survival	100	>100
	7-Day Dry Weight	100	>100
	7-Day Biomass	100	>100
Pacific Topsmelt	7-Day Survival	100	>100
	7-Day Dry Weight	100	>100
	7-Day Biomass	100	>100

[a]No Observed Effect Concentration, [b] Lowest Observed Effect Concentration

Individual statistical summaries for all tests, copies of the laboratory bench sheets, a copy of the sample check-in form, and chain-of-custody forms are provided in Appendices A through G.

4.0 QA/QC

The samples were received in good condition and within the temperature range specified by WDOE (2008). The toxicity tests met all acceptability criteria for performance of control organisms. There were no deviations from the protocols and water quality parameters remained within the ranges specified in the corresponding test methods throughout the tests. Control mean and control CV for sub-lethal endpoints were within two deviations from the historical mean (Appendix E).

Results for the reference toxicant tests used to monitor laboratory performance and test organism sensitivity are summarized in Table 8. Reference toxicant test results fell within the

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acceptable range of mean ± two standard deviations of historical test results, indicating that the tests organisms were of an appropriate degree of sensitivity. The coefficients of variation (CV) for the tests are also shown in the table.

Table 8. Reference toxicant test results.

Species	Date initiated	Endpoint	LC_{50}/EC_{50}	Acceptable Range	CV (%)
Ceriodaphnia dubia	12/12/2013	48h Survival	9.81µg/L copper	4.94-10.24µg/L	20.0
Fathead minnow	12/5/2013	96h Survival	7.34 g/L NaCl	5.84–7.99 g/L	7.34
Mysid Shrimp	11/19/2013	7d Survival	254 µg/L copper	151-552µg/L	38.2
	11/19/2013	Growth	225 µg/L copper	131-379µg/L	30.6
Pacific Topsmelt	11/19/2013	7d Survival	167 µg/L copper	62.1-218µg/L	37.0
	11/19/2013	Growth	150 µg/L copper	58.6-189µg/L	34.0

5.0 REFERENCES

Tidepool Scientific Software. 20001-2011. CETIS Comprehensive Environmental Toxicity Information System Software, Version 1.8.4.6.

USEPA. 2002a. Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms, Fifth Edition. EPA-821-R-02-012. pp. 51-52, 55-56

USEPA. 2002b. Short-term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Marine and Estuarine Organisms, Third Edition. EPA-821-R-02-014. pp. 214-292

USEPA. 1995. Short-Term Method for Estimating the Chronic Toxicity of Effluents and Receiving Waters to the West Coast Marine and Estuarine Organisms. EPA-600-R-95-136. pp. 71-140

WDOE. 2008. Laboratory Guidance and Whole Effluent Toxicity Test Review Criteria. Washington State Department of Ecology. Water Quality Program. Publication number: WQ-R-95-80, Revised December 2008.

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Appendix A

Ceriodaphnia dubia Acute Toxicity Test

Statistical Summaries and Raw Bench Sheets

CETIS Summary Report

Report Date: 21 Dec-13 09:26 (p 1 of 1)
Test Code: 1312-006 | 14-0910-5091

Ceriodaphnia 48-h Acute Survival Test — **Rainier Environmental Laboratory**

Batch ID:	12-2883-1214	**Test Type:**	Survival (48h)	**Analyst:**	Eric Tollefson
Start Date:	02 Dec-13 14:00	**Protocol:**	EPA/821/R-02-012 (2002)	**Diluent:**	Mod-Hard Synthetic Water
Ending Date:	04 Dec-13 14:25	**Species:**	Ceriodaphnia dubia	**Brine:**	
Duration:	48h	**Source:**	In-House Culture	**Age:**	<24h

Sample ID:	08-8220-1427	**Code:**	13-145	**Client:**	Shell Oil Products
Sample Date:	02 Dec-13 10:30	**Material:**	POTW Effluent	**Project:**	
Receive Date:	02 Dec-13 11:25	**Source:**	Shell Oil Products (WA0001791)		
Sample Age:	4h (5.9 °C)	**Station:**			

Comparison Summary

Analysis ID	Endpoint	NOEL	LOEL	TOEL	PMSD	TU	Method
06-4706-7765	48h Survival Rate	100	>100	NA	5.0%	1	Steel Many-One Rank Sum Test

Test Acceptability

Analysis ID	Endpoint	Attribute	Test Stat	TAC Limits	Overlap	Decision
06-4706-7765	48h Survival Rate	Control Resp	1	0.9 - NL	Yes	Passes Acceptability Criteria

48h Survival Rate Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Dilution Water	4	1	1	1	1	1	0	0	0.0%	0.0%
6.25		4	1	1	1	1	1	0	0	0.0%	0.0%
12.5		4	1	1	1	1	1	0	0	0.0%	0.0%
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%
100		4	1	1	1	1	1	0	0	0.0%	0.0%

48h Survival Rate Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Dilution Water	1	1	1	1
6.25		1	1	1	1
12.5		1	1	1	1
25		1	1	1	1
50		1	1	1	1
100		1	1	1	1

48h Survival Rate Binomials

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Dilution Water	5/5	5/5	5/5	5/5
6.25		5/5	5/5	5/5	5/5
12.5		5/5	5/5	5/5	5/5
25		5/5	5/5	5/5	5/5
50		5/5	5/5	5/5	5/5
100		5/5	5/5	5/5	5/5

Freshwater Acute
48 Hour Toxicity Test Data Sheet

Client: PES Environmental / SHELL
Sample ID: WET-1-120213
Test #: 1312-006
Log-In #: 13-145

Start Date & Time: 12/2/13 1400
End Date & Time: 12/4/13 1425
Test Organism: Ceriodaphnia dubia

Rep. #	Conc. or %	Cont. #	Number of Live Organisms 0	24	48	Dissolved Oxygen (mg/L) 0	24	48	pH (units) 0	24	48	Cond (uhom-cm) 0	24	48	Temperature (°C) 0	24	48	Mean Percent Survival
1	CON	6	5	5	5	8.9	8.7	8.6	7.28	7.41	7.37	297	295	297	19.8	19.3	19.2	
2		14	5	5	5													
3		18	5	5	5													
4		22	5	5	5													
1	6.25	19	5	5	5	8.6	8.6	8.6	7.26	7.35	7.38	313	~~7.4~~ 329	317	19.9	19.3	19.2	
2		7	5	5	5													
3		15	5	5	5													
4		9	5	5	5													
1	12.5	12	5	5	5	8.6	8.6	8.5	7.24	7.30	7.32	324	361	328	19.9	19.6	19.2	
2		2	5	5	5													
3		20	5	5	5													
4		24	5	5	5													
1	25	10	5	5	5	8.6	8.8	8.6	7.21	7.29	7.28	425	428	428	20.0	19.5	19.2	
2		16	5	5	5													
3		3	5	5	5													
4		13	5	5	5													
1	50	5	5	5	5	8.6	8.6	8.7	7.15	7.26	7.27	559	559	561	20.2	19.5	19.2	
2		17	5	5	5													
3		11	5	5	5													
4		1	5	5	5													
1	100	8	5	5	5	8.5	8.7	8.7	6.87	7.21	7.25	822	816	820	20.5	19.5	19.2	
2		23	5	5	5													
3		4	5	5	5													
4		21	5	5	5													
Technician Initials			RT	RT	RT	RT	RT	RT										

Sample Description: Tan

Dilution Water Batch #: MHSW 033
Test Chamber: Room 2
Animal Source: In House Culture
Date Received: —
QA Check: RT

Comments: 0 hrs:
24 hrs.
48 hrs.

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Appendix B
Fathead Minnow Acute Toxicity Test
Statistical Summaries and Raw Bench Sheets

CETIS Summary Report

Report Date: 21 Dec-13 10:30 (p 1 of 1)
Test Code: 1312-007 | 16-0156-4065

Fathead Minnow 96-h Acute Survival Test — **Rainier Environmental Laboratory**

Batch ID:	20-7945-4158	**Test Type:**	Survival (96h)	**Analyst:**	Eric Tollefson
Start Date:	04 Dec-13 16:40	**Protocol:**	EPA/821/R-02-012 (2002)	**Diluent:**	Mod-Hard Synthetic Water
Ending Date:	08 Dec-13 16:00	**Species:**	Pimephales promelas	**Brine:**	
Duration:	95h	**Source:**	Aquatic Biosystems, CO	**Age:**	5d

Sample ID:	09-5895-2886	**Code:**	13-148	**Client:**	Shell Oil Products
Sample Date:	04 Dec-13 09:45	**Material:**	POTW Effluent	**Project:**	
Receive Date:	04 Dec-13 12:05	**Source:**	Shell Oil Products (WA0001791)		
Sample Age:	7h (5.5 °C)	**Station:**			

Comparison Summary

Analysis ID	Endpoint	NOEL	LOEL	TOEL	PMSD	TU	Method
07-6565-9959	96h Survival Rate	100	>100	NA	6.25%	1	Steel Many-One Rank Sum Test

Test Acceptability

Analysis ID	Endpoint	Attribute	Test Stat	TAC Limits	Overlap	Decision
07-6565-9959	96h Survival Rate	Control Resp	0.975	0.9 - NL	Yes	Passes Acceptability Criteria

96h Survival Rate Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Dilution Water	4	0.975	0.9563	0.9937	0.9	1	0.025	0.05	5.13%	0.0%
6.25		4	1	1	1	1	1	0	0	0.0%	-2.56%
12.5		4	0.975	0.9563	0.9937	0.9	1	0.025	0.05	5.13%	0.0%
25		4	0.975	0.9563	0.9937	0.9	1	0.025	0.05	5.13%	0.0%
50		4	1	1	1	1	1	0	0	0.0%	-2.56%
100		4	1	1	1	1	1	0	0	0.0%	-2.56%

96h Survival Rate Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Dilution Water	0.9	1	1	1
6.25		1	1	1	1
12.5		1	0.9	1	1
25		1	0.9	1	1
50		1	1	1	1
100		1	1	1	1

96h Survival Rate Binomials

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Dilution Water	9/10	10/10	10/10	10/10
6.25		10/10	10/10	10/10	10/10
12.5		10/10	9/10	10/10	10/10
25		10/10	9/10	10/10	10/10
50		10/10	10/10	10/10	10/10
100		10/10	10/10	10/10	10/10

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96 Hour Toxicity Test Data Sheet
Freshwater 96-hr Acute with Renewal

Client: PES Environmental/Shell
Sample ID: WET-2-120413
Test # 1312-007
Rainier Check-In #: 13-148

Start Date & Time: 12/4/13 1640
End Date & Time: 12/8/13 1600
Test Organism: *Pimephales promelas*

Sample Conc. or %	D.O. (mg/L) Init. 0	24	Fin. 48	Init. 48	72	Fin. 96	pH (mg/L) Init. 0	24	Fin. 48	Init. 48	72	Fin. 96
CON	8.9	8.4	8.1	8.9	8.7	8.7	7.31	7.43	7.39	7.26	7.44	7.39
6.25	8.8	8.5	8.7	8.8	8.8	8.6	7.28	7.44	7.41	7.27	7.41	7.39
12.5	8.8	8.5	8.5	8.8	8.5	8.5	7.22	7.38	7.42	7.25	7.40	7.40
25	8.6	8.4	8.5	8.7	8.4	8.2	7.18	7.34	7.39	7.17	7.32	7.38
50	8.6	8.2	8.2	8.8	8.4	8.1	7.14	7.27	7.25	7.12	7.22	7.30
100	8.6	8.3	8.2	8.7	8.5	8.2	6.91	7.15	7.18	6.98	7.17	7.21

Sample Conc. or %	Conductivity µS/cm Init. 0	24	Fin. 48	Init. 48	72	Fin. 96	Test Temperature (°C) Init. 0	24	Fin. 48	Init. 48	72	Fin. 96
CON	295	298	300	295	292	301	19.2	19.3	19.2	20.1	20.7	20.8
6.25	304	307	305	302	301	300	19.2	19.3	19.2	20.3	20.7	20.3
12.5	321	324	325	319	311	312	19.5	19.4	19.4	20.3	20.5	20.5
25	342	348	347	341	335	337	19.6	19.4	19.3	20.1	20.4	20.8
50	357	364	361	349	347	349	19.9	19.4	19.2	20.0	20.5	20.2
100	384	391	394	381	385	382	20.3	19.4	19.2	19.4	20.5	20.4
Tech. Initials	ut	ut	ut	ut	ut	ut						
Sample Used:	13-148			13-148								

Sample Conc. or %	Rep #	Cont #	Number of Live Organisms 0	24	48	72	96
CON	1	9	10	10	9	9	9
	2	17	10	10	10	10	10
	3	6	10	10	10	10	10
	4	19	10	10	10	10	10
6.25	1	11	10	10	10	10	10
	2	1	10	10	10	10	10
	3	23	10	10	10	10	10
	4	12	10	10	10	10	10
12.5	1	24	10	10	10	10	10
	2	13	10	9	9	9	9
	3	18	10	10	10	10	10
	4	3	10	10	10	10	10
25	1	22	10	10	10	10	10
	2	8	10	10	10	10	9
	3	2	10	10	10	10	10
	4	4	10	10	10	10	10
50	1	10	10	10	10	10	10
	2	7	10	10	10	10	10
	3	20	10	10	10	10	10
	4	15	10	10	10	10	10
100	1	16	10	10	10	10	10
	2	21	10	10	10	10	10
	3	5	10	10	10	10	10
	4	14	10	10	10	10	10
Tech. Initials			ut	ut	ut	ut	ut

Dilution Water Batch #: MHSW 034
Test Chamber: Room 2

Comments:

Animal Source: ABS
Date Received: 12/4/13
Date of Hatch: 11/29/13

48-Hr, Feeding: ✓

QA Check: ut

Appendix C

***Americamysis bahia* (mysid shrimp) Chronic Test**

Statistical Summaries and Raw Bench Sheets

CETIS Summary Report

Mysidopsis 7-d Survival, Growth and Fecundity Test — **Rainier Environmental Laboratory**

Batch ID:	04-8903-5132	**Test Type:**	Growth-Survival (7d)	**Analyst:**	Eric Tollefson
Start Date:	04 Dec-13 15:00	**Protocol:**	EPA/821/R-02-014 (2002)	**Diluent:**	Laboratory Seawater
Ending Date:	11 Dec-13 14:30	**Species:**	Mysidopsis bahia	**Brine:**	
Duration:	6d 23h	**Source:**	Aquatic Biosystems, CO	**Age:**	7d

Sample ID:	09-5895-2886	**Code:**	13-148	**Client:**	Shell Oil Products
Sample Date:	04 Dec-13 09:45	**Material:**	POTW Effluent	**Project:**	
Receive Date:	04 Dec-13 12:05	**Source:**	Shell Oil Products (WA0001791)		
Sample Age:	5h (5.5 °C)	**Station:**			

Comparison Summary

Analysis ID	Endpoint	NOEL	LOEL	TOEL	PMSD	TU	Method
12-9119-4297	7d Survival Rate	100	>100	NA	6.24%	1	Steel Many-One Rank Sum Test
10-3259-0026	Mean Dry Biomass-mg	100	>100	NA	16.2%	1	Dunnett Multiple Comparison Test
12-9683-9782	Mean Dry Weight-mg	100	>100	NA	15.3%	1	Dunnett Multiple Comparison Test

7d Survival Rate Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Dilution Water	8	0.95	0.9154	0.9846	0.8	1	0.03273	0.09258	9.75%	0.0%
6.25		8	1	1	1	1	1	0	0	0.0%	-5.26%
12.5		8	1	1	1	1	1	0	0	0.0%	-5.26%
25		8	1	1	1	1	1	0	0	0.0%	-5.26%
50		8	1	1	1	1	1	0	0	0.0%	-5.26%
100		8	1	1	1	1	1	0	0	0.0%	-5.26%

Mean Dry Biomass-mg Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Dilution Water	8	0.3062	0.2944	0.3181	0.27	0.344	0.01125	0.03183	10.39%	0.0%
6.25		8	0.3305	0.3139	0.3471	0.256	0.412	0.01574	0.04453	13.47%	-7.92%
12.5		8	0.3525	0.3365	0.3685	0.296	0.422	0.01515	0.04284	12.15%	-15.1%
25		8	0.353	0.3301	0.3759	0.276	0.474	0.02173	0.06146	17.41%	-15.27%
50		8	0.3375	0.3263	0.3487	0.292	0.378	0.01059	0.02995	8.87%	-10.2%
100		8	0.3337	0.3187	0.3488	0.28	0.39	0.01427	0.04038	12.1%	-8.98%

Mean Dry Weight-mg Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Dilution Water	8	0.3237	0.3119	0.3356	0.27	0.35	0.01125	0.03183	9.83%	0.0%
6.25		8	0.3305	0.3139	0.3471	0.256	0.412	0.01574	0.04453	13.47%	-2.09%
12.5		8	0.3525	0.3365	0.3685	0.296	0.422	0.01515	0.04284	12.15%	-8.88%
25		8	0.353	0.3301	0.3759	0.276	0.474	0.02173	0.06146	17.41%	-9.04%
50		8	0.3375	0.3263	0.3487	0.292	0.378	0.01059	0.02995	8.87%	-4.25%
100		8	0.3337	0.3187	0.3488	0.28	0.39	0.01427	0.04038	12.1%	-3.09%

HI-SHELL001981

7d Survival Rate Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
0	Dilution Water	1	0.8	1	1	1	0.8	1	1
6.25		1	1	1	1	1	1	1	1
12.5		1	1	1	1	1	1	1	1
25		1	1	1	1	1	1	1	1
50		1	1	1	1	1	1	1	1
100		1	1	1	1	1	1	1	1

Mean Dry Biomass-mg Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
0	Dilution Water	0.338	0.28	0.27	0.28	0.34	0.28	0.344	0.318
6.25		0.328	0.412	0.256	0.312	0.312	0.332	0.362	0.33
12.5		0.318	0.37	0.316	0.296	0.374	0.422	0.388	0.336
25		0.276	0.362	0.382	0.34	0.376	0.304	0.31	0.474
50		0.328	0.328	0.348	0.356	0.292	0.366	0.304	0.378
100		0.384	0.314	0.39	0.28	0.298	0.36	0.312	0.332

Mean Dry Weight-mg Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
0	Dilution Water	0.338	0.35	0.27	0.28	0.34	0.35	0.344	0.318
6.25		0.328	0.412	0.256	0.312	0.312	0.332	0.362	0.33
12.5		0.318	0.37	0.316	0.296	0.374	0.422	0.388	0.336
25		0.276	0.362	0.382	0.34	0.376	0.304	0.31	0.474
50		0.328	0.328	0.348	0.356	0.292	0.366	0.304	0.378
100		0.384	0.314	0.39	0.28	0.298	0.36	0.312	0.332

7d Survival Rate Binomials

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
0	Dilution Water	5/5	4/5	5/5	5/5	5/5	4/5	5/5	5/5
6.25		5/5	5/5	5/5	5/5	5/5	5/5	5/5	5/5
12.5		5/5	5/5	5/5	5/5	5/5	5/5	5/5	5/5
25		5/5	5/5	5/5	5/5	5/5	5/5	5/5	5/5
50		5/5	5/5	5/5	5/5	5/5	5/5	5/5	5/5
100		5/5	5/5	5/5	5/5	5/5	5/5	5/5	5/5

Initial and Final Chemistries | **Seven Day Chronic Saltwater Bioassay**

Client: PES Environmental/Shell
Sample ID: WET-2-120413
Test No: 1312-009
Rainier Check-In #: ~~1312-008~~ 13-148 13-153

Start Date & Time: 12/4/13 1500
Stop Date & Time: 12/11/13 1430
Test species: Americamysis Bahia 13-154

Conc. or %	Days													
	0		1		2		3		4		5		6	
CON	init.	final	init.	final	init.	final	init.	final	init.	final	init.	final	init.	final
pH	8.22	8.05	8.37	8.10	8.24	8.20	8.34	8.17	8.51	8.10	8.35	8.08	8.38	8.11
DO (mg/l)	6.7	5.3	6.6	5.7	6.5	5.5	6.7	5.2	6.6	5.1	6.7	5.2	6.6	5.9
Salinity (ppt)	28.9	28.6	28.9	29.3	29.0	29.2	29.3	29.5	29.3	29.5	29.3	29.4	29.3	29.7
Temperature (°C)	25.2	25.4	25.1	25.5	25.2	25.4	25.1	25.4	25.1	25.5	25.0	25.4	25.1	25.3

6.25	Days													
	0		1		2		3		4		5		6	
	init.	final	init.	final	init.	final	init.	final	init.	final	init.	final	init.	final
pH	8.24	8.06	8.39	8.08	8.25	8.18	8.34	8.15	8.50	8.15	8.36	8.09	8.37	8.12
DO (mg/l)	6.7	5.3	6.7	5.4	6.7	5.2	6.7	5.0	6.6	5.0	6.7	5.2	6.6	6.0
Salinity (ppt)	28.9	28.9	29.9	29.4	29.0	29.2	29.3	29.4	29.3	29.7	29.2	29.7	29.3	29.8
Temperature (°C)	25.1	25.5	25.0	25.5	25.1	25.4	25.1	25.4	25.4	25.5	25.1	25.4	25.1	25.5

12.5	Days													
	0		1		2		3		4		5		6	
	init.	final	init.	final	init.	final	init.	final	init.	final	init.	final	init.	final
pH	8.25	8.07	8.37	8.07	8.26	8.17	8.35	8.15	8.47	8.14	8.33	8.11	8.38	8.05
DO (mg/l)	6.6	6.0	6.8	5.4	6.7	5.2	6.6	5.7	6.7	5.1	6.7	5.4	6.7	5.8
Salinity (ppt)	29.0	29.1	29.0	29.3	29.1	29.4	29.4	29.6	29.3	29.8	29.2	29.9	29.3	29.5
Temperature (°C)	25.1	25.5	25.0	25.6	25.1	25.5	25.2	25.5	25.4	25.4	25.2	25.6	25.2	25.5

25	Days													
	0		1		2		3		4		5		6	
	init.	final	init.	final	init.	final	init.	final	init.	final	init.	final	init.	final
pH	8.27	8.07	8.35	8.07	8.31	8.17	8.36	8.14	8.43	8.16	8.33	8.05	8.32	8.09
DO (mg/l)	6.6	5.5	6.7	5.8	6.7	5.4	6.6	5.6	6.6	5.4	6.6	5.2	6.6	5.8
Salinity (ppt)	29.2	29.3	29.1	29.7	29.0	29.2	29.7	30.1	29.0	29.3	29.1	29.7	29.4	29.7
Temperature (°C)	25.2	25.5	25.1	25.6	25.4	25.5	25.4	25.5	25.2	25.7	25.2	25.6	25.2	25.5

50	Days													
	0		1		2		3		4		5		6	
	init.	final	init.	final	init.	final	init.	final	init.	final	init.	final	init.	final
pH	8.33	8.05	8.34	8.08	8.34	8.10	8.36	8.16	8.38	8.15	8.31	8.04	8.34	8.03
DO (mg/l)	6.6	5.8	6.7	5.2	6.6	5.1	6.6	5.2	6.7	5.4	6.6	5.5	6.6	6.0
Salinity (ppt)	29.5	29.7	29.3	29.5	29.1	29.3	30.0	30.4	29.1	29.4	29.0	29.3	29.3	29.9
Temperature (°C)	25.4	25.5	25.2	25.6	25.5	25.5	25.2	25.5	25.5	25.4	25.1	25.6	25.2	25.6

100	Days													
	0		1		2		3		4		5		6	
	init.	final	init.	final	init.	final	init.	final	init.	final	init.	final	init.	final
pH	8.35	8.05	8.32	8.04	8.37	8.12	8.36	8.10	8.32	8.12	8.32	8.02	8.32	8.14
DO (mg/l)	6.5	5.7	6.8	5.3	6.6	5.0	6.6	5.2	6.6	5.3	6.7	5.4	6.7	6.1
Salinity (ppt)	30.4	30.6	29.7	30.2	29.2	29.3	30.4	30.8	28.9	29.1	28.7	29.1	29.5	30.2
Temperature (°C)	25.8	25.5	25.2	25.6	25.2	25.5	25.2	25.4	25.6	25.4	25.3	25.5	25.4	25.5
Tech Initials:	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

Rainier Environmental
Washington Laboratory
5013 Pacific Hwy. E., Suite 20
Tacoma, WA 98424

Test Chamber: VWR
Dilution Water Batch #: ASW018

QA Check: [illegible]

Sample Description:
Organism Source: ABS
Date Received: 12/4/13
Date of Hatch: 11/27/13

Comments:

Rainier Environmental
Washington Laboratory
5013 Pacific Hwy. E., Suite 20
Tacoma, WA 98424

Raw Data Sheet
Mysid Shrimp
(Americamysis bahia)
Mysid Survival

Client: PES Environmental/Shell **Test Number:** 1312-009

Sample ID: WET-2-120413

Conc. or %	Cont.	Rep.	Days 0	1	2	3	4	5	6	7	Mean % Survival
CON	33	1	5	5	5	5	5	5	5	5	
	20	2	5	5	5	5	5	5	5	4	
	47	3	5	5	5	5	5	5	5	5	
	1	4	5	5	5	5	5	5	5	5	
	25	5	5	5	5	5	5	5	5	5	
	22	6	5	5	5	5	5	5	4	4	
	23	7	5	5	5	5	5	5	5	5	
	5	8	5	5	5	5	5	5	5	5	
6.25	14	1	5	5	5	5	5	5	5	5	
	10	2	5	5	5	5	5	5	5	5	
	3	3	5	5	5	5	5	5	5	5	
	13	4	5	5	5	5	5	5	5	5	
	40	5	5	5	5	5	5	5	5	5	
	29	6	5	5	5	5	5	5	5	5	
	7	7	5	5	5	5	5	5	5	5	
	4	8	5	5	5	5	5	5	5	5	
12.5	31	1	5	5	5	5	5	5	5	5	
	38	2	5	5	5	5	5	5	5	5	
	46	3	5	5	5	5	5	5	5	5	
	11	4	5	5	5	5	5	5	5	5	
	8	5	5	5	5	5	5	5	5	5	
	44	6	5	5	5	5	5	5	5	5	
	39	7	5	5	5	5	5	5	5	5	
	37	8	5	5	5	5	5	5	5	5	
Technician Initials			RT	RT	RT	RT	RT	RT	RT	RT	

Feeding Times: 0 1630 1 730/1600 2 745/1615 3 745/1600 4 800/1530 5 745/1500 6 815/1600

QA check RT

Comments:

Rainier Environmental
Washington Laboratory
5013 Pacific Hwy. E., Suite 20
Tacoma, WA 98424

Raw Data Sheet
Mysid Shrimp
(Americamysis bahia)
Mysid Survival

Client: PES Environmental/Shell **Test Number:** 1312-009

Sample ID: WET-2-120413

Conc. or %	Cont.	Rep.	Days 0	1	2	3	4	5	6	7	Mean % Survival
25	30	1	5	5	5	5	5	5	5	5	
	17	2	5	5	5	5	5	5	5	5	
	41	3	5	5	5	5	5	5	5	5	
	48	4	5	5	5	5	5	5	5	5	
	28	5	5	5	5	5	5	5	5	5	
	43	6	5	5	5	5	5	5	5	5	
	32	7	5	5	5	5	5	5	5	5	
	18	8	5	5	5	5	5	5	5	5	
50	34	1	5	5	5	5	5	5	5	5	
	24	2	5	5	5	5	5	5	5	5	
	6	3	5	5	5	5	5	5	5	5	
	35	4	5	5	5	5	5	5	5	5	
	21	5	5	5	5	5	5	5	5	5	
	15	6	5	5	5	5	5	5	5	5	
	45	7	5	5	5	5	5	5	5	5	
	16	8	5	5	5	5	5	5	5	5	
100	36	1	5	5	5	5	5	5	5	5	
	27	2	5	5	5	5	5	5	5	5	
	26	3	5	5	5	5	5	5	5	5	
	19	4	5	5	5	5	5	5	5	5	
	2	5	5	5	5	5	5	5	5	5	
	42	6	5	5	5	5	5	5	5	5	
	12	7	5	5	5	5	5	5	5	5	
	9	8	5	5	5	5	5	5	5	5	
Technician Initials			RT	RT	RT	RT	RT	RT	RT	RT	

Feeding Times: 0 1630 1 730/1600 2 745/1615 3 745/1600 4 800/1530 5 745/1500 6 815/1600

QA check RT

Comments:

Rainier Environmental
Washington Laboratory
5013 Pacific Hwy. E., Suite 20
Tacoma, WA 98424

Raw Data Sheet
Mysid Weights
Seven Day Chronic Bioassay

Client: PES Environmental/Shell

Species: *Americamysis bahia*

Sample ID: WET-2-120413

Test Number: 1312-009

Conc. or %	Cont.	Rep.	pan wt. (gm)	pan + mysid (gm)	mysid wt. (mg)	# mysids	avg. per mysid (mg)	avg. per conc.
CON	33	1	0.03854	0.04023		5		
	20	2	0.03924	0.04064		4		
	47	3	0.04108	0.04243		5		
	1	4	0.03864	0.04004		5		
	25	5	0.03874	0.04044		5		
	22	6	0.03932	0.04072		4		
	23	7	0.03768	0.03940		5		
	5	8	0.03855	0.04014		5		
6.25	14	1	0.03684	0.03848		5		
	10	2	0.03943	0.04149		5		
	3	3	0.03905	0.04033		5		
	13	4	0.03951	0.04107		5		
	40	5	0.03938	0.04094		5		
	29	6	0.04015	0.04181		5		
	7	7	0.03904	0.04085		5		
	4	8	0.03912	0.04077		5		
12.5	31	1	0.03905	0.04064		5		
	38	2	0.03861	0.04046		5		
	46	3	0.03908	0.04066		5		
	11	4	0.03818	0.03966		5		
	8	5	0.03912	0.04099		5		
	44	6	0.04103	0.04314		5		
	39	7	0.04233	0.04427		5		
	37	8	0.03996	0.04164		5		
	Tech Initials:		[illegible]	[illegible]				

Date/Time in: 12/11/13 1430 Oven temp. (°C): 63.0 QA Check: [illegible]

Date/Time out: 12/15/13 1230 Oven temp. (°C): 63.5

Rainier Environmental
Washington Laboratory
5013 Pacific Hwy. E., Suite 20
Tacoma, WA 98424

Raw Data Sheet
Mysid Weights
Seven Day Chronic Bioassay

Client: PES Environmental/Shell

Species: *Americamysis bahia*

Sample ID: WET-2-120413

Test Number: 1312-009

Conc. or %	Cont.	Rep.	pan wt. (gm)	pan + mysid (gm)	mysid wt. (mg)	# mysids	avg. per mysid (mg)	avg. per conc.
25	30	1	0.03602	0.03740		5		
	17	2	0.03818	0.03999		5		
	41	3	0.03962	0.04153		5		
	48	4	0.04331	0.04501		5		
	28	5	0.03795	0.03983		5		
	43	6	0.03920	0.04072		5		
	32	7	0.03964	0.04119		5		
	18	8	0.03916	0.04153		5		
50	34	1	0.03800	0.03964		5		
	24	2	0.03883	0.04047		5		
	6	3	0.03969	0.04143		5		
	35	4	0.03869	0.04047		5		
	21	5	0.03836	0.03982		5		
	15	6	0.03906	0.04089		5		
	45	7	0.04085	0.04237		5		
	16	8	0.04001	0.04190		5		
100	36	1	0.03922	0.04114		5		
	27	2	0.03790	0.03947		5		
	26	3	0.03997	0.04192		5		
	19	4	0.03718	0.03858		5		
	2	5	0.03827	0.03976		5		
	42	6	0.04057	0.04237		5		
	12	7	0.04025	0.04181		5		
	9	8	0.03824	0.03990		5		
	Tech Initials:		ut	ut				

Date/Time in: 12/11/13 1430 **Oven temp. (°C):** 63.0 **QA Check:** ut

Date/Time out: 12/15/13 1230 **Oven temp. (°C):** 63.5

Appendix D

Atherinops affinis (Pacific topsmelt) Chronic Test

Statistical Summaries and Raw Bench Sheets

CETIS Summary Report

Pacific Topsmelt 7-d Survival and Growth Test — **Rainier Environmental Laboratory**

Batch ID:	06-8495-8072	**Test Type:**	Growth-Survival (7d)	**Analyst:**	Eric Tollefson
Start Date:	04 Dec-13 13:30	**Protocol:**	EPA/600/R-95/136 (1995)	**Diluent:**	Laboratory Seawater
Ending Date:	11 Dec-13 13:00	**Species:**	Atherinops affinis	**Brine:**	
Duration:	6d 23h	**Source:**	Aquatic Biosystems, CO	**Age:**	10d

Sample ID:	09-5895-2886	**Code:**	13-148	**Client:**	Shell Oil Products
Sample Date:	04 Dec-13 09:45	**Material:**	POTW Effluent	**Project:**	
Receive Date:	04 Dec-13 12:05	**Source:**	Shell Oil Products (WA0001791)		
Sample Age:	4h (5.5 °C)	**Station:**			

Comparison Summary

Analysis ID	Endpoint	NOEL	LOEL	TOEL	PMSD	TU	Method
08-1730-8962	7d Survival Rate	100	>100	NA	5.0%	1	Steel Many-One Rank Sum Test
17-2460-7415	Mean Dry Biomass-mg	100	>100	NA	23.1%	1	Dunnett Multiple Comparison Test
05-7412-3793	Mean Dry Weight-mg	100	>100	NA	23.1%	1	Dunnett Multiple Comparison Test

Test Acceptability

Analysis ID	Endpoint	Attribute	Test Stat	TAC Limits	Overlap	Decision
08-1730-8962	7d Survival Rate	Control Resp	1	0.8 - NL	Yes	Passes Acceptability Criteria
17-2460-7415	Mean Dry Biomass-mg	Control Resp	1.282	0.85 - NL	Yes	Passes Acceptability Criteria
08-1730-8962	7d Survival Rate	PMSD	0.05	NL - 0.25	No	Passes Acceptability Criteria
17-2460-7415	Mean Dry Biomass-mg	PMSD	0.231	NL - 0.5	No	Passes Acceptability Criteria

7d Survival Rate Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Dilution Water	5	1	1	1	1	1	0	0	0.0%	0.0%
6.25		5	1	1	1	1	1	0	0	0.0%	0.0%
12.5		5	1	1	1	1	1	0	0	0.0%	0.0%
25		5	1	1	1	1	1	0	0	0.0%	0.0%
50		5	1	1	1	1	1	0	0	0.0%	0.0%
100		5	1	1	1	1	1	0	0	0.0%	0.0%

Mean Dry Biomass-mg Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Dilution Water	5	1.282	1.204	1.359	1.066	1.512	0.09289	0.2077	16.21%	0.0%
6.25		5	1.244	1.166	1.321	1.04	1.472	0.09278	0.2075	16.68%	2.97%
12.5		5	1.426	1.4	1.452	1.374	1.55	0.03152	0.07047	4.94%	-11.27%
25		5	1.389	1.292	1.486	1.112	1.668	0.1163	0.26	18.71%	-8.4%
50		5	1.417	1.377	1.456	1.242	1.506	0.0475	0.1062	7.5%	-10.55%
100		5	1.19	1.094	1.285	0.866	1.518	0.1146	0.2562	21.54%	7.18%

Mean Dry Weight-mg Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Dilution Water	5	1.282	1.204	1.359	1.066	1.512	0.09289	0.2077	16.21%	0.0%
6.25		5	1.244	1.166	1.321	1.04	1.472	0.09278	0.2075	16.68%	2.97%
12.5		5	1.426	1.4	1.452	1.374	1.55	0.03152	0.07047	4.94%	-11.27%
25		5	1.389	1.292	1.486	1.112	1.668	0.1163	0.26	18.71%	-8.4%
50		5	1.417	1.377	1.456	1.242	1.506	0.0475	0.1062	7.5%	-10.55%
100		5	1.19	1.094	1.285	0.866	1.518	0.1146	0.2562	21.54%	7.18%

HI-SHELL001989

7d Survival Rate Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Dilution Water	1	1	1	1	1
6.25		1	1	1	1	1
12.5		1	1	1	1	1
25		1	1	1	1	1
50		1	1	1	1	1
100		1	1	1	1	1

Mean Dry Biomass-mg Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Dilution Water	1.066	1.072	1.45	1.512	1.308
6.25		1.19	1.064	1.472	1.04	1.452
12.5		1.374	1.398	1.4	1.408	1.55
25		1.264	1.112	1.236	1.668	1.666
50		1.506	1.498	1.242	1.42	1.418
100		0.866	1.37	1.11	1.518	1.084

Mean Dry Weight-mg Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Dilution Water	1.066	1.072	1.45	1.512	1.308
6.25		1.19	1.064	1.472	1.04	1.452
12.5		1.374	1.398	1.4	1.408	1.55
25		1.264	1.112	1.236	1.668	1.666
50		1.506	1.498	1.242	1.42	1.418
100		0.866	1.37	1.11	1.518	1.084

7d Survival Rate Binomials

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Dilution Water	5/5	5/5	5/5	5/5	5/5
6.25		5/5	5/5	5/5	5/5	5/5
12.5		5/5	5/5	5/5	5/5	5/5
25		5/5	5/5	5/5	5/5	5/5
50		5/5	5/5	5/5	5/5	5/5
100		5/5	5/5	5/5	5/5	5/5

Initial and Final Chemistries | **Seven Day Chronic Saltwater Bioassay**

Client: PES Environmental/Shell
Sample ID: WET-2-120413
Test No: 1312-008
Rainier Check-In #: 13-148 13-153 13-154

Start Date & Time: 12/4/13 1330
Stop Date & Time: 12/11/13 1300
Test species: Atherinops affinis

Conc. or %	Days													
	0		1		2		3		4		5		6	
CON	init.	final	init.	final	init.	final	init.	final	init.	final	init.	final	init.	final
pH	8.37	8.02	8.25	8.11	8.41	8.15	8.35	8.11	8.27	8.13	8.34	8.05	8.37	8.15
DO (mg/l)	7.4	6.8	7.2	7.1	7.0	6.8	7.0	6.9	7.0	6.8	7.0	6.5	6.9	6.7
Salinity (ppt)	28.8	28.8	28.8	28.6	28.9	28.7	29.3	29.2	29.3	29.4	29.3	29.2	29.3	29.4
Temperature (°C)	19.7	19.5	19.3	19.7	19.1	20.4	19.2	20.8	19.1	20.7	19.3	20.5	19.3	20.7

6.25	Days													
	0		1		2		3		4		5		6	
	init.	final	init.	final	init.	final	init.	final	init.	final	init.	final	init.	final
pH	8.37	8.03	8.26	8.08	8.41	8.12	8.34	8.08	8.25	8.08	8.34	8.07	8.36	8.13
DO (mg/l)	7.2	6.8	7.1	6.6	7.1	6.7	7.0	6.8	7.1	7.0	6.9	6.7	7.0	6.7
Salinity (ppt)	28.9	29.0	28.9	29.1	28.9	28.7	29.4	29.5	29.3	29.5	29.3	29.1	29.4	29.3
Temperature (°C)	19.7	19.5	19.4	19.7	19.2	20.2	19.4	20.7	19.2	20.6	19.3	20.5	19.3	20.7

12.5	Days													
	0		1		2		3		4		5		6	
	init.	final	init.	final	init.	final	init.	final	init.	final	init.	final	init.	final
pH	8.34	8.04	8.27	8.10	8.38	8.13	8.34	8.06	8.25	8.07	8.34	8.08	8.32	8.12
DO (mg/l)	7.2	6.7	6.8	6.7	7.0	6.7	6.9	6.8	7.0	6.9	7.0	6.8	7.0	6.8
Salinity (ppt)	28.9	29.0	28.9	29.1	29.4	29.1	29.4	29.3	29.1	29.1	29.1	29.0	29.4	29.2
Temperature (°C)	19.8	19.2	19.5	19.7	19.2	20.2	19.3	20.7	19.2	20.6	19.4	20.7	19.2	20.8

25	Days													
	0		1		2		3		4		5		6	
	init.	final	init.	final	init.	final	init.	final	init.	final	init.	final	init.	final
pH	8.36	8.03	8.28	8.05	8.35	8.08	8.33	8.09	8.26	8.08	8.34	8.11	8.28	8.14
DO (mg/l)	7.3	6.9	7.0	6.5	7.1	6.8	7.1	6.9	7.1	6.6	7.1	6.8	7.1	7.0
Salinity (ppt)	29.2	29.1	28.9	29.2	29.3	29.4	29.6	29.6	28.8	28.9	29.0	28.9	29.5	29.7
Temperature (°C)	19.8	19.4	19.4	19.6	19.5	20.4	19.5	20.7	19.2	20.6	19.2	20.7	19.4	20.8

50	Days													
	0		1		2		3		4		5		6	
	init.	final	init.	final	init.	final	init.	final	init.	final	init.	final	init.	final
pH	8.35	8.02	8.31	8.05	8.36	8.11	8.31	8.10	8.26	8.07	8.32	8.07	8.28	8.15
DO (mg/l)	7.4	6.4	7.2	6.7	7.0	6.7	7.1	6.9	7.0	6.5	7.1	6.9	7.0	6.8
Salinity (ppt)	29.3	29.1	29.1	29.0	29.6	29.7	29.9	29.8	28.7	28.7	29.0	28.8	29.7	29.8
Temperature (°C)	19.9	19.5	19.4	19.5	19.9	20.5	19.8	20.5	19.2	20.6	19.4	20.6	19.6	20.8

100	Days													
	0		1		2		3		4		5		6	
	init.	final	init.	final	init.	final	init.	final	init.	final	init.	final	init.	final
pH	8.31	8.01	8.33	8.00	8.30	8.10	8.25	8.11	8.28	8.04	8.31	8.04	8.31	8.16
DO (mg/l)	7.2	6.6	7.2	6.6	6.9	6.7	7.1	6.7	7.0	6.8	7.1	6.9	7.0	6.5
Salinity (ppt)	29.6	29.5	29.4	29.5	29.8	30.2	30.4	30.2	28.4	28.6	28.9	28.7	30.1	30.0
Temperature (°C)	20.3	19.5	19.5	19.5	20.6	20.5	20.4	20.7	19.2	20.5	19.5	20.4	19.9	20.8
Tech Initials:	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

Rainier Environmental
Washington Laboratory
5013 Pacific Hwy. E., Suite 20
Tacoma, WA 98424

Test Chamber: Room 2
Dilution Water Batch #: ASW 018

QA Check: [illegible]

Sample Description:
Organism Source: ABS
Date Received: 12/4/13
Date of Hatch: 11/27/13

Comments:

Rainier Environmental
Washington Laboratory
5013 Pacific Hwy. E., Suite 20
Tacoma, WA 98424

Raw Data Sheet
Pacific Topsmelt
(Atherinops affinis)
Larval Survival

Client Name: PES Environmental/SHELL **Test No.:** 1312-008

Sample ID: WET-2-120413

Conc. or %	Cont.	Rep.	Days 0	1	2	3	4	5	6	7	Mean % Survival
CON	26	1	5	5	5	5	5	5	5	5	
	21	2	5	5	5	5	5	5	5	5	
	18	3	5	5	5	5	5	5	5	5	
	6	4	5	5	5	5	5	5	5	5	
	16	5	5	5	5	5	5	5	5	5	
6.25	14	1	5	5	5	5	5	5	5	5	
	27	2	5	5	5	5	5	5	5	5	
	12	3	5	5	5	5	5	5	5	5	
	8	4	5	5	5	5	5	5	5	5	
	25	5	5	5	5	5	5	5	5	5	
12.5	11	1	5	5	5	5	5	5	5	5	
	22	2	5	5	5	5	5	5	5	5	
	2	3	5	5	5	5	5	5	5	5	
	3	4	5	5	5	5	5	5	5	5	
	23	5	5	5	5	5	5	5	5	5	
25	1	1	5	5	5	5	5	5	5	5	
	20	2	5	5	5	5	5	5	5	5	
	28	3	5	5	5	5	5	5	5	5	
	4	4	5	5	5	5	5	5	5	5	
	19	5	5	5	5	5	5	5	5	5	
50	29	1	5	5	5	5	5	5	5	5	
	24	2	5	5	5	5	5	5	5	5	
	5	3	5	5	5	5	5	5	5	5	
	30	4	5	5	5	5	5	5	5	5	
	13	5	5	5	5	5	5	5	5	5	
100	9	1	5	5	5	5	5	5	5	5	
	15	2	5	5	5	5	5	5	5	5	
	17	3	5	5	5	5	5	5	5	5	
	10	4	5	5	5	5	5	5	5	5	
	7	5	5	5	5	5	5	5	5	5	
Tech Initials			CT	CT	CT	CT	CT	CT	CT	CT	

Feeding Times: 0 ___/1630 1 730/1600 2 745/1615 3 745/1600 4 800/1530 5 745/1500 6 815/1600

Comments: _____ **QA Check** CT

Rainier Environmental
Washington Laboratory
5013 Pacific Hwy., E. Suite 20
Tacoma, WA 98424

Fish Weights
Seven Day Chronic Bioassay

Client: PES Environmental/Shell

Species: *A. affinis*

Sample ID: WET-2-120413

Test No: 1312-008

Conc. or %	cont. #	rep.	pan wt. (gm)	pan + fish (gm)	fish wt. (mg)	# fish	avg. per fish (mg)	avg. per conc. (mg)
CON	26	1	0.03925	0.04458		5		
	21	2	0.03764	0.04300		5		
	18	3	0.03687	0.04412		5		
	6	4	0.03708	0.04464		5		
	16	5	0.03687	0.04341		5		
6.25	14	1	0.03572	0.04167		5		
	27	2	0.03987	0.04519		5		
	12	3	0.03923	0.04659		5		
	8	4	0.03833	0.04353		5		
	25	5	0.04161	0.04887		5		
12.5	11	1	0.03666	0.04353		5		
	22	2	0.03652	0.04351		5		
	2	3	0.03714	0.04414		5		
	3	4	0.03908	0.04612		5		
	23	5	0.03916	0.04691		5		
25	1	1	0.03774	0.04406		5		
	20	2	0.03900	0.04456		5		
	28	3	0.03826	0.04444		5		
	4	4	0.04042	0.04876		5		
	19	5	0.03790	0.04623		5		
50	29	1	0.04028	0.04781		5		
	24	2	0.03990	0.04739		5		
	5	3	0.03824	0.04445		5		
	30	4	0.03773	0.04483		5		
	13	5	0.03857	0.04566		5		
100	9	1	0.03676	0.04109		5		
	15	2	0.03746	0.04431		5		
	17	3	0.04033	0.04588		5		
	10	4	0.03895	0.04654		5		
	7	5	0.03966	0.04508		5		
	Tech Initials:		JT	JT				

Date/Time in: 12/11/13 1300 **Oven temp. (°C):** 62.0 **QA check** JT

Date/Time out: 12/15/13 1230 **Oven temp. (°C):** 63.5

Appendix E
Control QC Plots

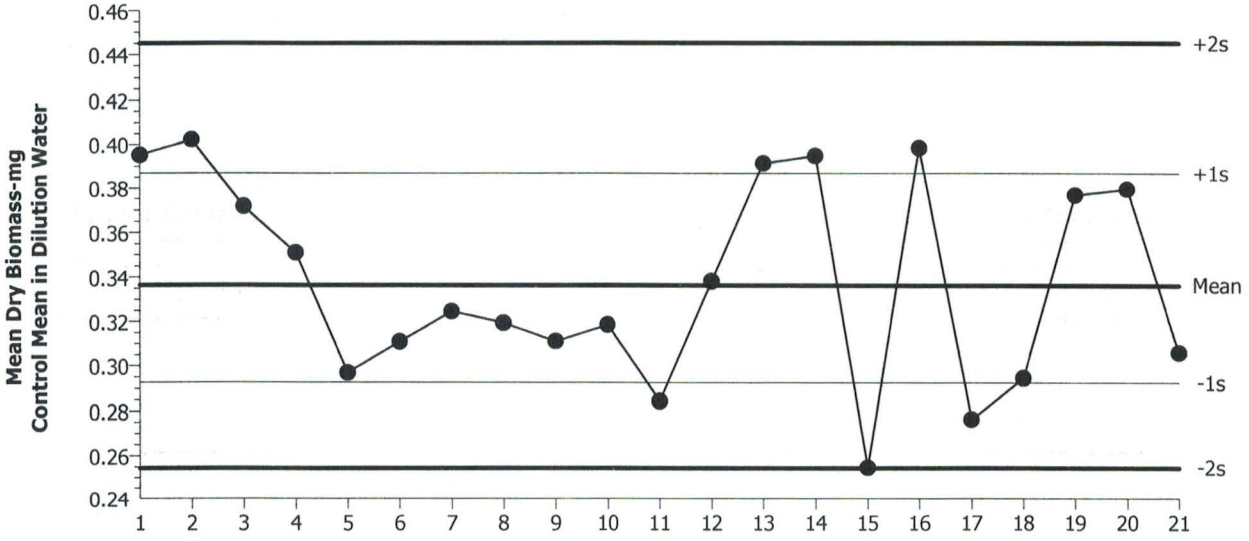
CETIS QC Plot

Report Date: 21 Dec-13 10:23 (1 of 1)

Mysidopsis 7-d Survival, Growth and Fecundity Test — **Rainier Environmental Laboratory**

Test Type:	Growth-Survival (7d)	**Organism:**	Mysidopsis bahia (Atlantic Mysid)	**Material:**	All Materials
Protocol:	EPA/821/R-02-014 (2002)	**Endpoint:**	Mean Dry Biomass-mg	**Source:**	All SampleID Sources

Mysidopsis 7-d Survival, Growth and Fecundity Test



Mean:	0.3366	**Count:**	20	**-1s Warning Limit:**	0.2927	**-2s Action Limit:**	0.2545
Sigma:	NA	**CV:**	15.00%	**+1s Warning Limit:**	0.387	**+2s Action Limit:**	0.445

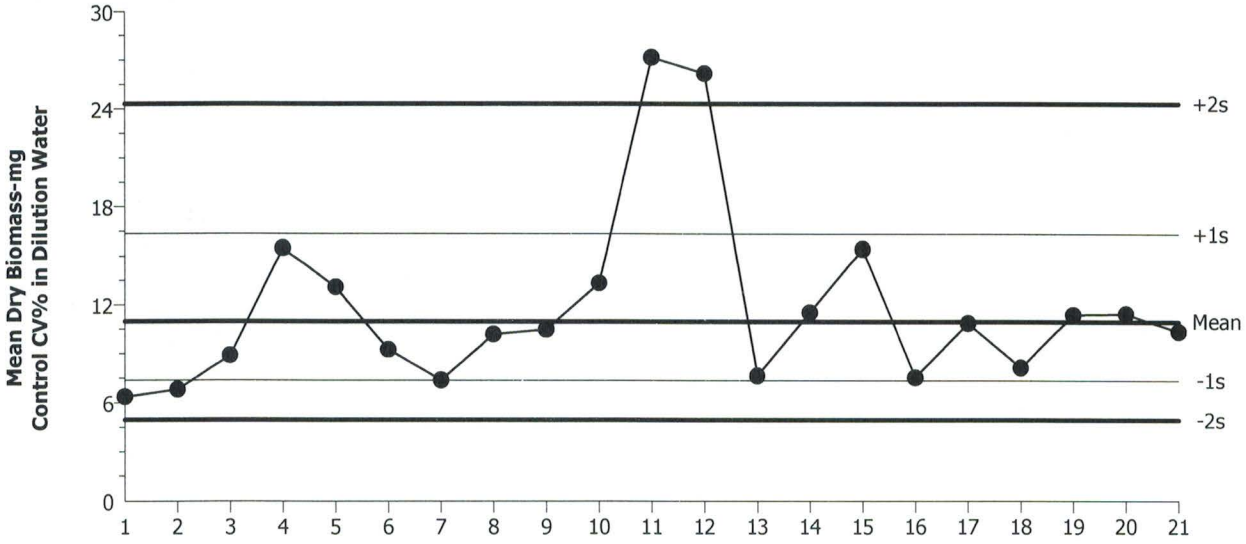
Quality Control Data

Point	Year	Month	Day	QC Data	Delta	Sigma	Warning	Action	Test ID	Analysis ID
1	2013	Apr	23	0.3953	0.05875	1.152	(+)		12-8433-9283	
2			23	0.4023	0.06575	1.277	(+)		09-6500-5228	
3		May	21	0.3718	0.03525	0.713			13-0807-8147	
4			22	0.351	0.01445	0.3009			10-9153-5156	
5		Jun	18	0.297	-0.03955	-0.8949			04-6491-6443	
6			18	0.311	-0.02555	-0.5652			02-1737-8772	
7			20	0.3247	-0.01185	-0.2566			13-3165-0040	
8			25	0.3195	-0.01705	-0.3722			11-1815-1942	
9		Jul	23	0.3112	-0.02535	-0.5606			19-0551-8482	
10			30	0.3187	-0.01785	-0.3902			02-0600-9561	
11			30	0.2845	-0.05205	-1.203	(-)		11-3766-2473	
12		Aug	13	0.3383	0.001747	0.03706			19-2808-3522	
13			27	0.3915	0.05495	1.083	(+)		07-5285-2891	
14			27	0.395	0.05845	1.146	(+)		05-1675-9882	
15		Sep	10	0.2547	-0.08185	-1.995	(-)		13-8318-5444	
16		Oct	15	0.3985	0.06195	1.209	(+)		00-7500-4642	
17			29	0.2765	-0.06005	-1.407	(-)		11-2154-8676	
18			29	0.2947	-0.04185	-0.9506			19-1205-6482	
19		Nov	19	0.377	0.04045	0.8124			10-3792-1461	
20			19	0.3797	0.04315	0.8635			17-7787-6187	
21		Dec	4	0.3062	-0.03035	-0.6766			00-0890-5098	

Mysidopsis 7-d Survival, Growth and Fecundity Test — **Rainier Environmental Laboratory**

Test Type:	Growth-Survival (7d)	**Organism:**	Mysidopsis bahia (Atlantic Mysid)	**Material:**	All Materials
Protocol:	EPA/821/R-02-014 (2002)	**Endpoint:**	Mean Dry Biomass-mg	**Source:**	All SampleID Sources

Mysidopsis 7-d Survival, Growth and Fecundity Test



Mean:	10.99	**Count:**	20	**-1s Warning Limit:**	7.386	**-2s Action Limit:**	4.964
Sigma:	NA	**CV:**	48.80%	**+1s Warning Limit:**	16.35	**+2s Action Limit:**	24.33

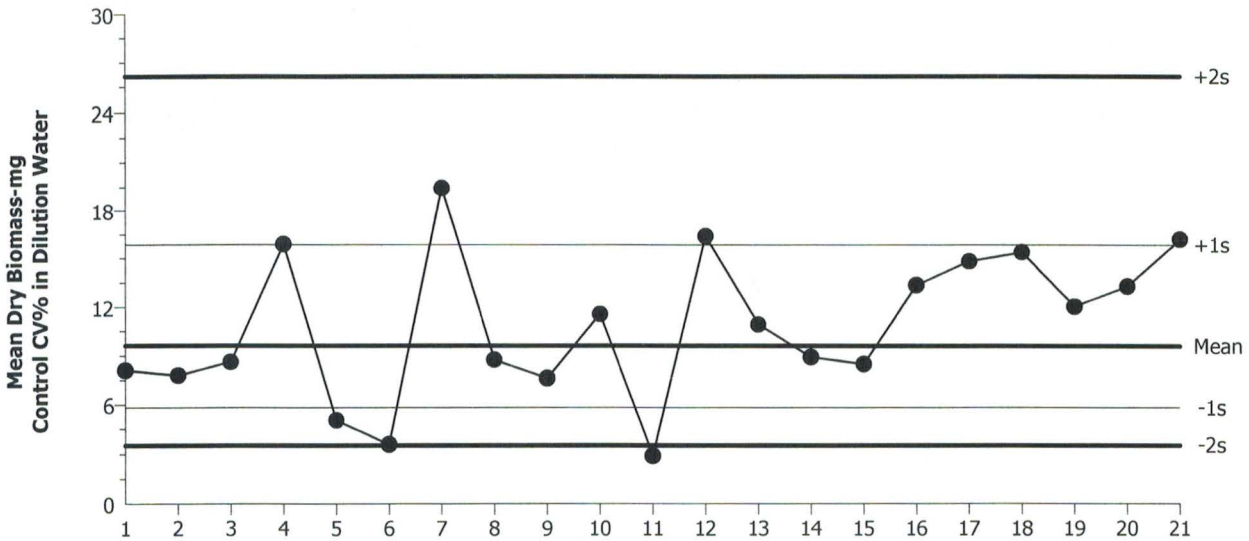
Quality Control Data

Point	Year	Month	Day	QC Data	Delta	Sigma	Warning	Action	Test ID	Analysis ID
1	2013	Apr	23	6.372	-4.618	-1.372	(-)		12-8433-9283	
2			23	6.82	-4.17	-1.201	(-)		09-6500-5228	
3		May	21	8.912	-2.078	-0.5274			13-0807-8147	
4			22	15.52	4.53	0.8685			10-9153-5156	
5		Jun	18	13.1	2.11	0.4419			04-6491-6443	
6			18	9.262	-1.728	-0.4305			02-1737-8772	
7			20	7.39	-3.6	-0.9987			13-3165-0040	
8			25	10.21	-0.7802	-0.1853			11-1815-1942	
9		Jul	23	10.5	-0.4902	-0.1148			19-0551-8482	
10			30	13.35	2.36	0.4895			02-0600-9561	
11			30	27.16	16.17	2.277	(+)	(+)	11-3766-2473	
12		Aug	13	26.17	15.18	2.183	(+)	(+)	19-2808-3522	
13			27	7.669	-3.321	-0.9054			07-5285-2891	
14			27	11.55	0.5598	0.125			05-1675-9882	
15		Sep	10	15.47	4.48	0.8603			13-8318-5444	
16		Oct	15	7.568	-3.422	-0.9388			00-7500-4642	
17			29	10.89	-0.1002	-0.02304			11-2154-8676	
18			29	8.174	-2.816	-0.7449			19-1205-6482	
19		Nov	19	11.41	0.4198	0.09434			10-3792-1461	
20			19	11.46	0.4698	0.1053			17-7787-6187	
21		Dec	4	10.39	-0.6002	-0.1413			00-0890-5098	

Pacific Topsmelt 7-d Survival and Growth Test **Rainier Environmental Laboratory**

Test Type:	Growth-Survival (7d)	**Organism:**	Atherinops affinis (Topsmelt)	**Material:**	All Materials
Protocol:	EPA/600/R-95/136 (1995)	**Endpoint:**	Mean Dry Biomass-mg	**Source:**	All SampleID Sources

Pacific Topsmelt 7-d Survival and Growth Test



Mean:	9.612	**Count:**	20	**-1s Warning Limit:**	5.828	**-2s Action Limit:**	3.533
Sigma:	NA	**CV:**	64.90%	**+1s Warning Limit:**	15.85	**+2s Action Limit:**	26.15

Quality Control Data

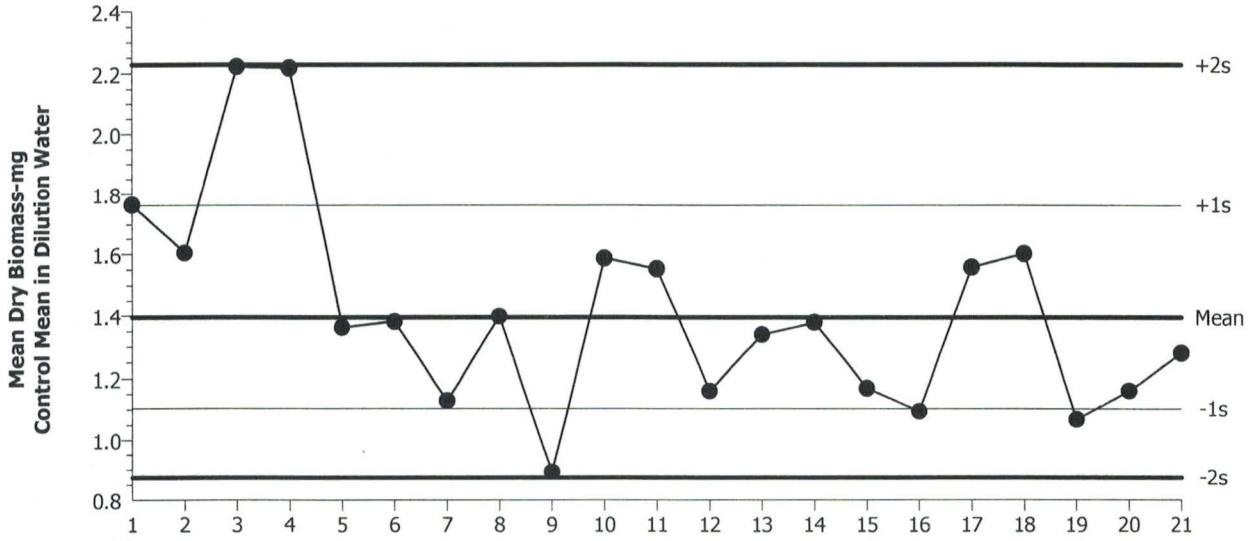
Point	Year	Month	Day	QC Data	Delta	Sigma	Warning	Action	Test ID	Analysis ID
1	2013	Apr	23	8.101	-1.511	-0.3418			15-0493-4028	
2			23	7.786	-1.826	-0.421			09-1416-9558	
3		May	21	8.62	-0.9919	-0.2177			04-4543-5244	
4			22	15.9	6.288	1.006	(+)		15-4410-2664	
5		Jun	18	5.045	-4.567	-1.288	(-)		18-6172-1421	
6			18	3.576	-6.036	-1.976	(-)		03-8338-5118	
7			20	19.44	9.828	1.408	(+)		10-4713-3402	
8			25	8.748	-0.8639	-0.1882			02-8517-6437	
9		Jul	23	7.619	-1.993	-0.4643			05-1993-7135	
10			30	11.57	1.958	0.3705			03-9646-3306	
11			30	2.902	-6.71	-2.393	(-)	(-)	21-1225-8728	
12		Aug	13	16.4	6.788	1.068	(+)		10-4926-2223	
13			27	10.93	1.318	0.2568			01-8894-6502	
14		Sep	10	8.922	-0.6899	-0.1488			12-2557-9704	
15			10	8.489	-1.123	-0.2483			15-4704-7664	
16		Oct	15	13.36	3.748	0.658			11-8344-3056	
17			29	14.84	5.228	0.868			01-3915-5466	
18			29	15.41	5.798	0.9433			13-2647-9306	
19		Nov	19	12.05	2.438	0.4518			00-4617-7055	
20			19	13.29	3.678	0.6475			17-2025-8492	
21		Dec	4	16.21	6.598	1.044	(+)		04-1046-6844	

HI-SHELL001997

Pacific Topsmelt 7-d Survival and Growth Test — **Rainier Environmental Laboratory**

Test Type:	Growth-Survival (7d)	**Organism:**	Atherinops affinis (Topsmelt)	**Material:**	All Materials
Protocol:	EPA/600/R-95/136 (1995)	**Endpoint:**	Mean Dry Biomass-mg	**Source:**	All SampleID Sources

Pacific Topsmelt 7-d Survival and Growth Test



Mean:	1.396	**Count:**	20	**-1s Warning Limit:**	1.105	**-2s Action Limit:**	0.8747
Sigma:	NA	**CV:**	26.30%	**+1s Warning Limit:**	1.763	**+2s Action Limit:**	2.228

Quality Control Data

Point	Year	Month	Day	QC Data	Delta	Sigma	Warning	Action	Test ID	Analysis ID
1	2013	Apr	23	1.764	0.3682	1.002	(+)		15-0493-4028	
2			23	1.605	0.2092	0.5974			09-1416-9558	
3		May	21	2.222	0.8262	1.989	(+)		04-4543-5244	
4			22	2.218	0.8222	1.982	(+)		15-4410-2664	
5		Jun	18	1.364	-0.03185	-0.09875			18-6172-1421	
6			18	1.383	-0.01285	-0.03956			03-8338-5118	
7			20	1.13	-0.2658	-0.9041			10-4713-3402	
8			25	1.4	0.004155	0.01272			02-8517-6437	
9		Jul	23	0.8936	-0.5022	-1.908	(-)		05-1993-7135	
10			30	1.588	0.1922	0.5519			03-9646-3306	
11			30	1.554	0.1582	0.4593			21-1225-8728	
12		Aug	13	1.162	-0.2338	-0.7846			10-4926-2223	
13			27	1.341	-0.05485	-0.1715			01-8894-6502	
14		Sep	10	1.38	-0.01585	-0.04885			12-2557-9704	
15			10	1.171	-0.2248	-0.7516			15-4704-7664	
16		Oct	15	1.096	-0.2998	-1.035	(-)		11-8344-3056	
17			29	1.56	0.1642	0.4758			01-3915-5466	
18			29	1.603	0.2072	0.5921			13-2647-9306	
19		Nov	19	1.07	-0.3258	-1.138	(-)		00-4617-7055	
20			19	1.163	-0.2328	-0.7809			17-2025-8492	
21		Dec	4	1.282	-0.1138	-0.3641			04-1046-6844	

Appendix F
Sample Check-In Sheet

Rainier Environmental
5013 Pacific Hwy East, Ste. 20
Tacoma, WA 98424

Sample Check-In Information

Client: PES Environmental / SHELL

Tests Performed: cd-a, MT-c, AA-c, PP-a

Test ID No(s).: 1312-006, 1312-007, 1312-008, 1312-009

Sample Description: Tan

Sample ID:	WET-1-120213	WET-2-120413	WET-3-120613	WET-4-120913
Log-in No. (10-xxxx):	13-145	13-148	13-153	13-154
Sample Collection Date & Time:	12/2/13 1030	12/4/13 945	12/6/13 945	12/9/13 1000
Sample Receipt Date & Time:	12/2/13 1125	12/4/13 1205	12/6/13 1100	12/9/13 1045
Check-in Temperature (°C)	5.9	5.5	3.5	4.5
Temperature OK?	(Y) N	(Y) N	(Y) N	(Y) N
DO (mg/L)	9.2	8.5	8.6	8.7
pH (units)	6.74	6.89	6.61	6.96
Conductivity (µS/cm)	823	372	367	364
Salinity (ppt)	0.4	—	—	—
Tit. Vol / Sam. Vol. / Alkalinity (mg/L)*	1.9 / 25 / 76	1.5 / 25 / 60	1.4 / 25 / 56	1.4 / 25 / 56
Tit. Vol. / Sam. Vol. / Hardness (mg/L)* [a]	2.6 / 25 / 104	1.9 / 25 / 76	2.0 / 25 / 80	2.0 / 25 / 80
Total Chlorine (mg/L)	<0.03	<0.03	<0.03	<0.03
Total Ammonia (mg/L)	<1.0	<1.0	<1.0	~~<0.03~~ ~~<0.01~~ <1.0
Technician Initials	ET	ET	ET	ET

* = mg/L as $CaCO_3$, [a] = Measured for freshwater samples only, NA = Not Applicable, NM = Not Measured

COC Complete? Y or N
1 Y 2 Y 3 Y 4 Y

Filtration? Y (N)
Pore Size: _____
Organisms or Debris

Aeration? Y (N)
Length of Time: _____
Final DO: _____
Final pH: _____

Freshwater Tests:

Control/Dilution Water Source: test type: cd-a 8:2 (DMW) (MHW) -033 Other: _____ Alkalinity: 64 Hardness: 84

Control/Dilution Water Source: test type: PP-a 8:2 (DMW) (MHW) -034 Other: _____ Alkalinity: 60 Hardness: 80

Additional Control? Y N = _____ Alkalinity: _____ Hardness: _____

Hardness Adjustment? Y (N)
If adjusted, please see worksheet for details.

Marine Tests:

Control/Dilution Water Source: test type: MT-c AA-c (ART SW) -018 NAT SW Alkalinity: 84 Salinity: 28.9

Control/Dilution Water Source: test type: _____ ART SW NAT SW Alkalinity: _____ Salinity: _____

Additional Control? Y N = _____ Alkalinity: _____ Salinity: _____

Sample Salted w/ artificial salt? Y N If yes, what ppt? _____ test type: _____

Sample salted w/brine? Y N If yes, what ppt? _____ test type: _____

Sub-samples for additional chemistry:

Comments: Temperature for grab sample must be 0-20°C if received within 1 hour of collection time, 0-12°C if effluent received within 4 hours of collection time, and 0-6°C for all other samples.

QC Check: ET

Appendix G
Chain-of-Custody Forms

Chain of Custody

Rainier ENVIRONMENTAL

Washington
5013 Pacific Highway East, Suite 20 Fife,
WA 98424
Phone253.922.8898

Date 12/2/13 Page 1 of 1

Sample Collection By:

Report to:

Company	PES Environmental
Address	1215 4th Ave. #1350
City/State/Zip	Seattle WA 98161
Contact	Bill Haldeman
Phone	(206) 529-3980
Email	bhaldeman@pesenv.com

Invoice To:

Company	Same
Address	
City/State/Zip	
Contact	
Phone	
Email	

ANALYSES REQUIRED

	SAMPLE ID	DATE	TIME	MATRIX	CONTAINER TYPE	NO. OF CONTAINERS	COMMENTS	Shell Wet Test analyses										Receipt Temperature (°C)
1	Wet-1-120213	12/2/13	1030	Water	cubitainer	1		X										5.9
2																		
3																		
4																		
5																		
6																		
7																		
8																		
9																		
10																		

PROJECT INFORMATION		SAMPLE RECEIPT	
Client:		Total No. of Containers	1
PO No.:		Received Good Condition?	Y
Shipped Via:	Client	Matches Test Schedule?	Y

SPECIAL INSTRUCTIONS/COMMENTS:

RELINQUISHED BY (CLIENT)

(Signature) (Time) 1125
(Printed Name) Russell Stolen (Date)
(Company) PES Environmental

RELINQUISHED BY (COURIER)

(Signature) (Time)
(Printed Name) (Date)
(Company)

RECEIVED BY (COURIER)

(Signature) (Time)
(Printed Name) (Date)
(Company)

RECEIVED BY (LABORATORY)

(Signature) Eric Tallefson (Time) 1125
(Printed Name) ERIC TOLLEFSON (Date) ~~11/2/13~~ 12/2/13
(Log in #) 13-145

Chain of Custody

Rainier ENVIRONMENTAL

Washington
5013 Pacific Highway East, Suite 20 Fife,
WA 98424
Phone253.922.8898

Date 12/4/13 Page 1 of 1

Sample Collection By:

Report to:

Company	PES Environmental
Address	1215 4th Ave #1350
City/State/Zip	Seattle WA 98161
Contact	Bill Haldeman
Phone	206 529-3980
Email	bhaldeman@pesenv.com

Invoice To:

Company	Same
Address	
City/State/Zip	
Contact	
Phone	
Email	

ANALYSES REQUIRED

	SAMPLE ID	DATE	TIME	MATRIX	CONTAINER TYPE	NO. OF CONTAINERS	COMMENTS	Shell Wet Test Analyses										Receipt Temperature (°C)
1	wet-2-120413	12/4/13	0945	water	Cubitainer	1		X										5.5
2																		
3																		
4																		
5																		
6																		
7																		
8																		
9																		
10																		

PROJECT INFORMATION

Client:	
PO No.:	
Shipped Via:	Client

SAMPLE RECEIPT

Total No. of Containers	1
Received Good Condition?	Y
Matches Test Schedule?	Y

SPECIAL INSTRUCTIONS/COMMENTS:

RELINQUISHED BY (CLIENT)

(Signature) (Time) 1205
(Printed Name) (Date) Russell Stolsen
(Company) PES Environmental

RELINQUISHED BY (COURIER)

(Signature) (Time)
(Printed Name) (Date)
(Company)

RECEIVED BY (COURIER)

(Signature) (Time)
(Printed Name) (Date)
(Company)

RECEIVED BY (LABORATORY)

(Signature) Eric Tollefson (Time) 1205
(Printed Name) ERIC TOLLEFSON (Date) 12/4/13
(Log in #) 13-448

HI-SHELL002003

Chain of Custody

Rainier ENVIRONMENTAL

Washington
5013 Pacific Highway East, Suite 20 Fife,
WA 98424
Phone253.922.8898

Date_____Page___of___

Sample Collection By:

Report to:

Company	PES Environmental
Address	1215 4th Ave #1350
City/State/Zip	Seattle WA 98161
Contact	Bill Haldeman
Phone	206 529 3980
Email	bhaldeman@pesenv.com

Invoice To:

Company	Same
Address	
City/State/Zip	
Contact	
Phone	
Email	

ANALYSES REQUIRED

	SAMPLE ID	DATE	TIME	MATRIX	CONTAINER TYPE	NO. OF CONTAINERS	COMMENTS	Shell wetter analyses										Receipt Temperature (°C)
1	Wet-3-120613	12/6/13	0945	water	cubitainer	1		X										3.5
2																		
3																		
4																		
5																		
6																		
7																		
8																		
9																		
10																		

PROJECT INFORMATION		SAMPLE RECEIPT	
Client:		Total No. of Containers	1
PO No.:		Received Good Condition?	Y
Shipped Via:	Client	Matches Test Schedule?	Y

SPECIAL INSTRUCTIONS/COMMENTS:

RELINQUISHED BY (CLIENT)

(Signature) (Time) 1100
(Printed Name) Russell Stolz (Date) 12/6/13
(Company) PES Environmental

RELINQUISHED BY (COURIER)

(Signature) (Time)
(Printed Name) (Date)
(Company)

RECEIVED BY (COURIER)

(Signature) (Time)
(Printed Name) (Date)
(Company)

RECEIVED BY (LABORATORY)

(Signature) Eric Tollefson (Time) 1100
(Printed Name) ERIC TOLLEFSON (Date) 12/6/13
(Log in #) 13-153

Chain of Custody

Rainier ENVIRONMENTAL

Washington
5013 Pacific Highway East, Suite 20 Fife,
WA 98424
Phone253.922.8898

Date_____Page___of___

Sample Collection By:

Report to:		Invoice To:	
Company	PES Environmental	Company	
Address	1215 4th Ave #1350	Address	
City/State/Zip	Seattle WA 98161	City/State/Zip	
Contact	Bill Haldeman	Contact	
Phone	(206) 529-3980	Phone	
Email	bhaldeman@pesenv.com	Email	

ANALYSES REQUIRED

	SAMPLE ID	DATE	TIME	MATRIX	CONTAINER TYPE	NO. OF CONTAINERS	COMMENTS	Shell Wet Test analyses										Receipt Temperature (°C)
1	Shell-Wet-4-120913	12/9/13	1000	Water	Cubitainer	1		X										4.5
2																		
3																		
4																		
5																		
6																		
7																		
8																		
9																		
10																		

PROJECT INFORMATION		SAMPLE RECEIPT	
Client:		Total No. of Containers	1
PO No.:		Received Good Condition?	Y
Shipped Via:	Client	Matches Test Schedule?	Y

SPECIAL INSTRUCTIONS/COMMENTS:

RELINQUISHED BY (CLIENT)	RELINQUISHED BY (COURIER)
(Signature) (Time) 1045	(Signature) (Time)
(Printed Name) Russell Stolse (Date) 12/9/13	(Printed Name) (Date)
(Company) PES Environmental	(Company)

RECEIVED BY (COURIER)	RECEIVED BY (LABORATORY)
(Signature) (Time)	(Signature) Eric Tollefson (Time) 1045
(Printed Name) (Date)	(Printed Name) ERIC TOLLEFSON (Date) 12/9/13
(Company)	(Log in #) 13-154