Nautilus Environmental, LLC

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

April 2008

Report date: May 7, 2008

Submitted to:

PES Environmental
9 Lake Bellevue Drive, Suite 108
Bellevue, WA 98005

Washington Laboratory
5009 Pacific Hwy East
Suite 2
Tacoma, WA 98424

1.0 INTRODUCTION

Acute and chronic whole effluent toxicity tests were conducted using effluent samples collected from Shell Harbor Island Oil Refinery in April 2008. Acute bioassays were conducted using the test organisms *Menidia beryllina* (inland silverside) and *Americamysis bahia* (a mysid shrimp and formerly known as *Mysidopsis bahia*). Chronic testing was conducted using *A. bahia* and *Atherinops affinis* (Pacific topsmelt). Testing was performed at Nautilus Environmental's Washington Laboratory located in Tacoma, Washington.

2.0 METHODS

2.1 Sample Collection and Transport

Effluent samples were collected into HDPE cubitainers by PES Environmental personnel. The samples were packed in coolers containing ice and transported to Nautilus the days of collection. Appropriate chain-of-custody procedures were employed during collection and transport.

2.2 Sample Receipt

Nautilus staff checked the samples immediately after arrival at the laboratory and verified they were in good condition and matched information provided on the chain-of-custody forms. Receipt temperatures were measured and recorded on the chain-of-custody form for each sample. Standard water quality parameters consisting of dissolved oxygen (DO), pH, conductivity, alkalinity, hardness, total chlorine, and total ammonia were measured and recorded on a sample check-in sheet provided in Appendix F. Samples were stored at 4°C in the dark until used for testing.

2.3 Test Methods

Acute toxicity tests were conducted using *M. beryllina* and *A. bahia* according to procedures presented by USEPA (2002a). Chronic toxicity tests were conducted according to USEPA (2002b) procedures for *A. bahia* and USEPA (1995) procedures for *A. affinis*. Test methods are summarized in Tables 1 through 4. The methods are the most recently published EPA methods.

HI-SHELL001092

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

Test initiation date and time	4/15/2008; 1430h
Test termination date and time	4/17/2008; 1400h
Test organism	*Americamysis Bahia*
Test organism source	Aquatic BioSystems; Fort Collins, CO
Test organism age	4 days post hatch
Test duration	48 hours with solution renewal at 24 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	25 ± 1°C
Dilution water	Crystal Sea Marine Mix artificial seawater
Salinity	30 ± 2 ppt
Test concentrations (% sample)	100, 50, 25, 12.5, 6.25, laboratory 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	Copper chloride

Table 2. Summary of methods for the 96h *Menidia beryllina* acute survival test.

Test initiation date and time	4/15/2008; 1340h
Test termination date and time	4/19/2008; 1330h
Test organism	*Menidia beryllina*
Test organism source	Aquatic BioSystems; Fort Collins, CO
Test organism age	10 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	1 L glass jar
Test solution volume	250 mL
Test temperature	20 ± 1°C
Dilution water	Crystal Sea Marine Mix artificial seawater
Salinity	30 ± 2 ppt
Test concentrations (% sample)	100, 50, 25, 12.5, 6.25, laboratory 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	Copper chloride

HI-SHELL001093

Table 3. Summary of methods for the *Americamysis bahia* 7-day survival and growth test.

Test initiation date and time	4/15/2008; 1500h
Test termination date and time	4/22/2008; 1530h
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, 25, 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 *Atherinops affinis* 7-day survival and growth test.

Test initiation date and time	4/15/2008; 1530h
Test termination date and time	4/22/2008; 1545h
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 L plastic cups
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, 25, 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

HI-SHELL001094

3.0 RESULTS

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

Table 5. Sample information.

Sample ID	WetTest-1-041408	WetTest-2-041608	WetTest-3-041808
Nautilus Log-In Number	08-115	08-120	08-124
Collection date and time	4/14/2008; 0830h	4/16/2008; 0730h	4/18/2008; 0845h
Receipt date and time	4/14/2008; 0940h	4/16/2008; 0840h	4/18/2008; 1115h
Receipt temperature (°C)	9.5	8.0	8.7
Dissolved oxygen (mg/L)	6.5	7.6	9.1
pH	7.00	7.00	7.00
Conductivity (µS/cm)	71	50	53
Hardness (mg/L $CaCO_3$)	36	24	36
Alkalinity (mg/L $CaCO_3$)	28	20	24
Total Chlorine (mg/L)	0.05	<0.03	<0.03
Total Ammonia (mg/L)	<1.0	<1.0	<1.0

Survival was evaluated in the acute toxicity tests after 48 and 96 hours of exposure for *A. bahia* and *M. beryllina*, respectively. Results are summarized in Table 6. There was no toxicity in any of the test concentrations for either of the acute tests.

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

Species	Concentration (%)	Percent Survival	NOEC[a] (% effluent)	LOEC[b] (% effluent)	LC_{50} (% effluent)
A. bahia (mysid shrimp)	0.0	92.5	100	>100	>100
	6.25	100			
	12.5	97.5			
	25	97.5			
	50	100			
	100	97.5			
M. beryllina (silverside minnows)	0.0	100	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

HI-SHELL001095

Results for the chronic toxicity tests are summarized in Table 7. The *A.bahia* and *A. affinis* 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) at the end of the 7-day exposure.

No statistically significant difference in response occurred in any concentration relative to control data for either survival or growth, including the acute and chronic critical effluent concentrations (ACEC and CCEC) of 100 percent sample.

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

Test Species	Endpoint	NOEC[a] (% effluent)	LOEC[b] (% effluent)
A. bahia (mysid shrimp)	Survival	100	>100
	Growth	100	>100
A. affinis (topsmelt)	Survival	100	>100
	Growth	100	>100

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

4.0 QA/QC

The samples were received in good condition and within the temperature range specified by WDOE (2005). The toxicity tests met all acceptability criteria for performance of control organisms. There were no deviations from the protocols and all water quality parameters remained within the ranges specified in the corresponding test methods throughout the tests.

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

HI-SHELL001096

Table 8. Reference toxicant test results.

Species	Date initiated	Endpoint	EC_{50} (µg/L copper)	Acceptable Range (µg/L copper)	CV (%)
A. bahia	4/8/2008	48h Survival	535	31.2-817	46.3
M. beryllina	4/15/2008	96h Survival	203	35.8-428	42.3
A. bahia	4/15/2008	7d Survival	371	130-467	28.3
A. bahia	4/15/2008	Growth	269	143-376	22.5
A. affinis	4/23/2008	7d Survival	61.9	36.0-144	30.0
A. affinis	4/23/2008	Growth	63.2	33.2-154	32.3

REFERENCES

Tidepool Scientific Software. 2000-2007. CETIS Comprehensive Environmental Toxicity Information System Software, Version 1.6.3revG.

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.

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.

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.

WDOE. 2005. Laboratory Guidance and Whole Effluent Toxicity Test Review Criteria. Washington State Department of Ecology. Water Quality Program. Publication number: WQ-R-95-80, Revised June 2005.

HI-SHELL001097

Appendix A

Americamysis bahia (Mysid Shrimp) Acute Toxicity Test

Statistical Summaries and Raw Bench Sheets

CETIS Summary Report

Report Date: 24 Apr-08 16:38 (p 1 of 1)
Link/Link Code: 13-7821-8532/0804-T022

Mysid Acute — **Nautilus Environmental WA**

Test Run No:	17-6435-3823	**Test Type:**	Survival (48h)	**Analyst:**	Mary Ann Rempel-Hester
Start Date:	15 Apr-08 14:30	**Protocol:**	EPA/821/R-02-012 (2002)	**Diluent:**	Artificial Saltwater
Ending Date:	17 Apr-08 14:00	**Species:**	Americamysis bahia	**Brine:**	Crystal Sea Marine Mix
Duration:	48h	**Source:**	Aquatic Biosystems, CO	**Age:**	4d

Sample No:	16-4889-0766	**Code:**	08-115	**Client:**	
Sample Date:	14 Apr-08 08:30	**Material:**	Oil Refinery Effluent	**Project:**	
Receive Date:	14 Apr-08 09:40	**Source:**	Shell Seattle Terminal (WA0001791)		
Sample Age:	30h (9.5 °C)	**Station:**			

Comparison Summary

Analysis No	Endpoint	NOEL	LOEL	TOEL	PMSD	Method
18-8933-1854	48h Survival Rate	100	> 100	N/A	7.84%	Steel Many-One Rank Test

48h Survival Rate Summary

Conc-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
0	Dilution Water	4	0.925	0.906	0.944	0.9	1	0.00913	0.05	5.41%	0.0%
6.25		4	1	1	1	1	1	0	0	0.0%	-8.11%
12.5		4	0.975	0.956	0.994	0.9	1	0.00913	0.05	5.13%	-5.41%
25		4	0.975	0.956	0.994	0.9	1	0.00913	0.05	5.13%	-5.41%
50		4	1	1	1	1	1	0	0	0.0%	-8.11%
100		4	0.975	0.956	0.994	0.9	1	0.00913	0.05	5.13%	-5.41%

48h Survival Rate Detail

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

HI-SHELL001099

Saltwater Acute
48 Hour Toxicity Test Data Sheet
Nautilus Environmental

Client: Shell - Harbor Island
Sample ID: WetTest-1-041408
Test #: 0804-T022

Start Date & Time: 4/15/08 1430
End Date & Time: 4-17-08 1400
Test Organisms: Americamysis bahia

Conc. or %	Rep #	Cont. #	Number of Live Organisms 0	24	48	Dissolved Oxygen (mg/L) 0	Fin. 24	Init. 24	48	pH (units) 0	Fin. 24	Init. 24	48	Salinity (ppt) 0	Fin. 24	Init. 24	48	Temperature (°C) 0	Fin. 24	Init. 24	48	Mean Percent Survival
CON	1	24	10	10	10	6.8	6.0	6.8	6.1	8.21	8.02	8.21	8.08	30.3	30.8	30.4	31.2	25.3	~~25.0~~ 24.8	25.0	25.2	
	2	14	10	9	9																	
	3	15	10	9	9																	
	4	17	10	9	9																	
6.25	1	2	10	10	~~9~~ 10	6.6	6.0	6.8	5.9	8.21	8.00	8.22	8.11	30.2	30.5	30.4	30.8	25.4	24.9	24.9	25.3	
	2	10	10	10	10																	
	3	3	10	10	10																	
	4	9	10	10	10																	
12.5	1	5	10	10	10	6.6	5.7	6.8	6.2	8.21	8.01	8.23	8.12	30.1	30.5	30.4	30.9	25.5	25.1	25.0	25.2	
	2	4	10	10	10																	
	3	20	10	9	9																	
	4	19	10	10	10																	
25	1	22	10	10	10	6.7	5.8	6.6	6.2	8.19	8.03	8.25	8.13	30.1	30.6	30.4	30.9	25.3	25.0	25.0	25.1	
	2	7	10	10	10																	
	3	1	10	9	9																	
	4	18	10	10	10																	
50	1	21	10	10	10	6.7	5.6	6.8	6.2	8.22	8.05	8.27	8.15	29.7	30.2	30.2	30.8	25.2	25.0	25.1	25.2	
	2	8	10	10	10																	
	3	11	10	10	10																	
	4	6	10	10	10																	
100	1	23	10	10	10	6.5	5.5	6.7	6.2	8.23	8.08	8.33	8.18	29.5	29.7	29.6	30.1	25.3	25.9	25.1	25.2	
	2	12	10	10	10																	
	3	16	10	10	9																	
	4	13	10	10	10																	
Technician Initials			st	les	CC	st	les	les	CC													

Dilution Water Batch #: ASW 023

Sample Description:

Comments: 0 hrs:
24 hrs.
48 hrs.

Organism source: ABS
Date Received: 4/15/08
Date of Hatch: 4/11/08

QA check: les

Nautilus Environmental
5009 Pacific Hwy. E. Suite 2
Tacoma, WA 98424
(253) 922-4296

Appendix B

Menidia beryllina (Silverside Minnows) Acute Toxicity Test

Statistical Summaries and Raw Bench Sheets

CETIS Summary Report

Report Date: 24 Apr-08 16:45 (p 1 of 1)
Link/Link Code: 01-2011-1304/0804-T021

Inland Silverside 96-h Acute Survival Test — **Nautilus Environmental WA**

Test Run No:	14-3472-2709	**Test Type:**	Survival (96h)	**Analyst:**	Mary Ann Rempel-Hester
Start Date:	15 Apr-08 13:40	**Protocol:**	EPA/821/R-02-012 (2002)	**Diluent:**	Artificial Saltwater
Ending Date:	19 Apr-08 13:30	**Species:**	Menidia beryllina	**Brine:**	Crystal Sea Marine Mix
Duration:	96h	**Source:**	Aquatic Biosystems, CO	**Age:**	10d

Sample No:	16-4889-0766	**Code:**	08-115	**Client:**	
Sample Date:	14 Apr-08 08:30	**Material:**	Oil Refinery Effluent	**Project:**	
Receive Date:	14 Apr-08 09:40	**Source:**	Shell Seattle Terminal (WA0001791)		
Sample Age:	29h (9.5 °C)	**Station:**			

Sample Renewals

Renewal	Sample Code	Sample Date	Receive Date	Renewal Date	Temp °C
1	08-120	16 Apr-08 07:30	16 Apr-08 08:40	17 Apr-08 12:00	8

Comparison Summary

Analysis No	Endpoint	NOEL	LOEL	TOEL	PMSD	Method
20-9210-5213	96h Survival Rate	100	> 100	N/A	5.6%	Steel Many-One Rank Test

Test Acceptability

Analysis No	Endpoint	Attribute	Test Stat	Acceptabilty Limits	Overlap	Decision
20-9210-5213	96h Survival Rate	Control Resp	1	0.9 - NL	Yes	Passes acceptability criteria

96h Survival Rate Summary

Conc-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
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	0.975	0.956	0.994	0.9	1	0.00913	0.05	5.13%	2.5%
25		4	0.975	0.956	0.994	0.9	1	0.00913	0.05	5.13%	2.5%
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%

96h Survival Rate Detail

Conc-%	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	0.9	1	1
25		1	1	0.9	1
50		1	1	1	1
100		1	1	1	1

HI-SHELL001102

Nautilus Environmental
Washington Laboratory
5009 Pacific Hwy. E., Suite 2
Tacoma, WA 98424

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

Client: Shell - Harbor Island
Sample ID: WET Test - 1-4/15/41408
Test # 0804-T021
Nautilus Check-In #: 08-115

Start Date & Time: 4/15/08 1340
End Date & Time: 4/19/08 1330
Test Organism: Menidia beryllina.

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
~~LON~~												
LON	7.2	7.4	7.1	7.3	6.8	6.6	8.23	8.12	7.99	8.34	8.23	7.99
6.25	7.2	7.2	6.7	7.3	7.0	6.5	8.24	8.17	7.98	8.36	8.21	8.04
12.5	7.1	7.1	7.0	7.2	7.0	6.4	8.25	8.19	7.99	8.36	8.25	8.06
25	7.1	7.1	6.8	7.3	6.8	6.4	8.26	8.20	7.98	8.37	8.26	8.07
50	7.2	7.0	6.9	7.2	6.8	6.3	8.27	8.20	7.98	8.38	8.27	8.06
100	7.3	7.0	7.0	7.0	6.7	6.4	8.27	8.23	8.02	8.40	8.28	8.08

Sample Conc. or %	Salinity (ppt) Init. 0	24	Fin. 48	Init. 48	72	Fin. 96	Test Temperature (°C) Init. 0	24	Fin. 48	Init. 48	72	Fin. 96
LON	30.0	29.9	30.8	29.7	29.8	30.1	20.7	20.3	19.8	19.9	20.3	20.8
6.25	30.2	30.5	30.0	29.6	29.9	30.0	20.3	20.2	20.1	19.7	20.2	20.9
12.5	30.2	30.4	30.8	29.8	30.0	30.5	20.3	20.2	20.0	19.7	20.1	20.8
25	30.1	29.8	29.9	29.7	29.8	30.0	20.1	20.6	19.9	19.7	20.1	20.8
50	29.8	29.7	30.2	29.5	29.7	29.8	20.0	20.3	20.0	19.7	20.2	20.7
100	29.3	29.2	29.4	29.2	29.3	29.2	19.8	20.3	20.0	20.0	20.1	20.7
Tech. Initials	LCS	[illegible]	[illegible]	[illegible]	MM	BP						
Sample Used:	08-115			08-120								

30.2

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

Dilution Water Batch #: 023 ASW

Sample Description:
Comments:
QA Check: LCS

Organism Source: ABS
Date Received: 4/15/08
Date of Hatch: 4/5/08

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 — **Nautilus Environmental WA**

Test Run No:	09-1196-4196	**Test Type:**	Growth-Survival-Fec (7d)	**Analyst:**	Mary Ann Rempel-Hester
Start Date:	15 Apr-08 15:00	**Protocol:**	EPA/821/R-02-014 (2002)	**Diluent:**	Artificial Saltwater
Ending Date:	22 Apr-08 15:30	**Species:**	Americamysis bahia	**Brine:**	Crystal Sea Marine Mix
Duration:	7d 1h	**Source:**	Aquatic Biosystems, CO	**Age:**	7d

Sample No:	16-4889-0766	**Code:**	08-115	**Client:**	
Sample Date:	14 Apr-08 08:30	**Material:**	Oil Refinery Effluent	**Project:**	
Receive Date:	14 Apr-08 09:40	**Source:**	Shell Seattle Terminal (WA0001791)		
Sample Age:	31h (9.5 °C)	**Station:**			

Sample Renewals

Renewal	Sample Code	Sample Date	Receive Date	Renewal Date	Temp °C
1	08-120	16 Apr-08 07:30	16 Apr-08 08:40	17 Apr-08 12:00	8
2	08-124	18 Apr-08 08:45	18 Apr-08 11:45	19 Apr-08 12:00	8.7

Comparison Summary

Analysis No	Endpoint	NOEL	LOEL	TOEL	PMSD	Method
11-5199-8580	7d Survival Rate	100	> 100	N/A	9.77%	Steel Many-One Rank Test
06-4799-0208	Mean Dry Biomass-mg	100	> 100	N/A	20.1%	Steel Many-One Rank Test

Test Acceptability

Analysis No	Endpoint	Attribute	Test Stat	Acceptabilty Limits	Overlap	Decision
11-5199-8580	7d Survival Rate	Control Resp	1	0.8 - NL	Yes	Passes acceptability criteria
06-4799-0208	Mean Dry Biomass-mg	Control Resp	0.306	0.2 - NL	Yes	Passes acceptability criteria
06-4799-0208	Mean Dry Biomass-mg	PMSD	0.201	0.11 - 0.37	Yes	Passes acceptability criteria

7d Survival Rate Summary

Conc-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
0	Dilution Water	8	1	1	1	1	1	0	0	0.0%	0.0%
6.25		8	0.95	0.915	0.985	0.8	1	0.0169	0.0926	9.75%	5.0%
12.5		8	1	1	1	1	1	0	0	0.0%	0.0%
25		8	0.975	0.949	1	0.8	1	0.0129	0.0707	7.25%	2.5%
50		8	0.975	0.949	1	0.8	1	0.0129	0.0707	7.25%	2.5%
100		8	0.95	0.915	0.985	0.8	1	0.0169	0.0926	9.75%	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	Dilution Water	8	0.306	0.283	0.329	0.23	0.44	0.0114	0.0623	20.3%	0.0%
6.25		8	0.286	0.269	0.302	0.232	0.338	0.00804	0.044	15.4%	6.69%
12.5		8	0.326	0.31	0.341	0.276	0.388	0.00735	0.0402	12.4%	-6.29%
25		8	0.342	0.326	0.359	0.242	0.384	0.00801	0.0438	12.8%	-11.8%
50		8	0.376	0.344	0.408	0.284	0.536	0.0158	0.0867	23.1%	-22.8%
100		8	0.3	0.294	0.306	0.272	0.322	0.003	0.0164	5.47%	2.04%

Mysidopsis 7-d Survival, Growth and Fecundity Test — **Nautilus Environmental WA**

7d Survival Rate Detail

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

Mean Dry Biomass-mg Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
0	Dilution Water	0.294	0.23	0.336	0.278	0.284	0.274	0.314	0.44
6.25		0.338	0.232	0.268	0.264	0.284	0.336	0.33	0.234
12.5		0.278	0.372	0.34	0.388	0.322	0.32	0.308	0.276
25		0.372	0.338	0.358	0.336	0.364	0.344	0.242	0.384
50		0.318	0.378	0.536	0.292	0.42	0.284	0.336	0.444
100		0.294	0.316	0.296	0.322	0.29	0.272	0.296	0.314

HI-SHELL001106

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

Client: Shell - Harbor Island
Sample ID: Wet Test-1-041408
Test No: 0804-T023
Nautilus Check-In #: 08-115 08-120

Start Date & Time: 4/15/08 1500
Stop Date & Time: 4/22/08 1530
Test species: Americamysis bahia 08-124

Conc. or % 100N	Days 0		1		2		3		4		5		6	
	init.	final	init.	final	init.	final	init.	final	init.	final	init.	final	init.	final
pH	8.19	8.10	8.20	7.97	8.30	7.95	8.25	8.03	8.24	7.97	8.20	7.98	8.32	7.91
DO (mg/l)	6.5	6.1	6.6	6.3	6.6	6.0	6.8	6.4	6.8	6.5	6.7	5.9	6.8	6.3
Salinity (ppt)	30.4	30.7	30.9	31.7	30.6	30.6	31.1	31.7	30.0	30.3	30.1	31.2	29.4	30.2
Temperature (°C)	25.8	25.5	25.8	25.4	25.5	25.6	26.2	25.0	25.3	25.2	25.6	25.8	25.3	25.0

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	8.21	8.07	8.20	7.98	8.30	7.98	8.24	8.04	8.24	8.00	8.23	8.03	8.31	7.97
DO (mg/l)	6.6	5.9	6.6	6.1	6.6	5.8	6.8	6.2	6.6	6.3	6.7	6.0	6.6	6.3
Salinity (ppt)	30.8	31.0	30.8	31.4	30.0	30.8	31.4	31.9	30.3	30.7	30.2	31.9	30.1	30.5
Temperature (°C)	25.5	25.4	25.5	25.4	25.5	25.5	26.4	25.1	25.4	25.4	25.6	25.8	25.7	25.1

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	8.21	8.08	8.21	7.98	8.31	7.97	8.24	8.06	8.24	8.01	8.24	8.03	8.31	7.98
DO (mg/l)	6.6	6.1	6.6	6.1	6.5	5.3	6.6	6.1	6.6	6.2	6.8	5.8	6.7	6.4
Salinity (ppt)	30.8	31.0	30.9	31.4	30.0	30.8	31.4	31.8	30.5	30.8	30.2	32.0	29.6	30.4
Temperature (°C)	25.4	25.2	25.9	25.3	25.4	25.6	26.1	25.2	25.7	25.4	25.8	25.7	25.7	25.1

25	Days 0		1		2		3		4		5		6	
	init.	final	init.	final	init.	final	init.	final	init.	final	init.	final	init.	final
pH	8.20	8.07	8.23	7.99	8.32	7.94	8.23	8.04	8.23	8.01	8.23	8.13	8.28	7.98
DO (mg/l)	6.6	5.8	6.4	6.1	6.4	5.2	6.6	6.0	6.6	6.3	6.6	6.2	6.6	6.3
Salinity (ppt)	30.4	30.7	30.6	31.7	30.0	30.9	31.2	32.0	30.3	30.9	30.1	32.0	30.2	30.9
Temperature (°C)	26.1	25.1	25.5	25.3	25.5	25.5	26.2	25.4	26.1	25.3	25.3	25.7	25.5	25.0

50	Days 0		1		2		3		4		5		6	
	init.	final	init.	final	init.	final	init.	final	init.	final	init.	final	init.	final
pH	8.20	8.27	8.26	8.00	8.33	7.95	8.22	8.08	8.22	8.07	8.22	8.08	8.25	8.04
DO (mg/l)	6.5	6.6	6.6	6.0	6.5	5.3	6.4	5.9	6.7	6.2	6.6	6.2	6.7	6.5
Salinity (ppt)	30.0	30.7	30.2	30.8	30.1	30.8	31.1	31.7	30.0	30.7	30.0	31.5	30.2	31.0
Temperature (°C)	25.6	25.3	25.4	25.4	25.8	25.3	26.4	25.3	26.1	25.4	25.4	25.8	25.5	25.0

100	Days 0		1		2		3		4		5		6	
	init.	final	init.	final	init.	final	init.	final	init.	final	init.	final	init.	final
pH	8.20	8.08	8.32	8.05	8.36	7.96	8.24	8.10	8.18	8.03	8.20	8.08	8.18	8.08
DO (mg/l)	6.6	6.0	6.4	6.1	6.5	5.4	6.6	5.9	6.6	5.9	6.7	6.0	6.7	6.3
Salinity (ppt)	29.5	29.7	29.6	30.3	30.5	30.9	~~30.2~~ 31.2	31.2	30.0	30.9	30.1	30.9	~~30.9~~ 31.3	
Temperature (°C)	25.3	25.1	25.5	25.2	25.5	25.3	25.9	25.0	26.1	25.4	25.4	25.8	25.6	25.1
Tech Initials:	(N)	(N)	(N)	[illegible]	MM	RT	YS	KS	KS	[illegible]	[illegible]	[illegible]	[illegible]	BP

0309

Nautilus Environmental
Washington Laboratory
5009 Pacific Hwy. E., Suite 2
Tacoma, WA 98424

Dilution Water Batch #: ASW 023

QA Check: KS

Sample Description:
Organism Source: ABS
Date Received: 4/15/08
Date of Hatch: 4/8/08

Comments:

HI-SHELL001107

Nautilus Environmental
Washington Laboratory
5009 Pacific Hwy. E., Suite 2
Tacoma, WA 98424

Raw Data Sheet
Mysid Weights
Seven Day Chronic Bioassay

Client: Shell- Harbor Island

Species: *Americamysis bahia*

Sample ID: WetTest-1-041408

Test Number: 0804-T023

Conc. or (%)	Cont.	Rep.	pan wt. (gm)	pan + mysid (gm)	mysid wt. (mg)	# mysids	avg. per mysid (mg)	avg. per conc.
CON	19	1	.04235	0.04382		5		
	3	2	.04208	0.04323		5		
	5	3	.03928	0.04096		5		
	25	4	.04077	0.04216		5		
	17	5	.04050	0.04192		5		
	21	6	.04473	0.04610		5		
	45	7	.04473	0.04630		5		
	36	8	.04264	0.04484		5		
6.25	9	1	.03396	0.03565		5		
	48	2	.04778	0.04894		4		
	41	3	.04310	0.04444		5		
	43	4	.04748	0.04880		4		
	23	5	.04370	0.04512		5		
	12	6	.03772	0.03940		5		
	15	7	.04329	0.04494		5		
	37	8	.04292	0.04409		5		
12.5	24	1	.04087	0.04226		5		
	39	2	.04047	0.04233		5		
	14	3	.03943	0.04113		5		
	47	4	.04800	0.04994		5		
	11	5	.04125	0.04286		5		
	29	6	.04049	0.04209		5		
	6	7	.04123	0.04277		5		
	31	8	.03830	0.03968		5		
	Tech Initials:		BP	MSR				

Date/Time in: 4/22/08 1600
Oven temp. (°C): 60.5
QA Check: LS

Date/Time out: 4/24/08 1200
Oven temp. (°C): 60.5

Nautilus Environmental
Washington Laboratory
5009 Pacific Hwy. E., Suite 2
Tacoma, WA 98424

Raw Data Sheet
Mysid Weights
Seven Day Chronic Bioassay

Client: Shell- Harbor Island

Species: *Americamysis bahia*

Sample ID: WetTest-1-041408

Test Number: 0804-TD23

Conc. or (%)	Cont.	Rep.	pan wt. (gm)	pan + mysid (gm)	mysid wt. (mg)	# mysids	avg. per mysid (mg)	avg. per conc.
25	33	1	.03833	0.04019		5		
	40	2	.04239	0.04408		5		
	13	3	.04282	0.04461		5		
	16	4	.04394	0.04562		5		
	8	5	.04096	0.04278		5		
	30	6	.03966	0.04138		5		
	7	7	.04427	0.04548		4		
	27	8	.04031	0.04223		5		
50	42	1	.04264	0.04423		5		
	10	2	.04317	0.04506		5		
	32	3	.03809	0.04077		5		
	34	4	.04355	0.04501		5		
	18	5	.04115	0.04325		5		
	46	6	.04704	0.04846		4		
	26	7	.04256	0.04424		5		
	2	8	.04271	0.04493		5		
100	1	1	.04035	0.04182		5		
	38	2	.04005	0.04163		5		
	20	3	.04260	0.04408		5		
	22	4	.04286	0.04447		5		
	44	5	.04463	0.04608		5		
	4	6	.03910	0.04046		4		
	35	7	.04068	0.04216		4		
	28	8	.03963	0.04120		5		
	Tech Initials:		BP	MAR				

Date/Time in: 4/22/08 1600 Oven temp. (°C): 60.5 QA Check: yes

Date/Time out: 4/24/08 1200 Oven temp. (°C): 61.5

Nautilus Environmental
Washington Laboratory
5009 Pacific Hwy. E., Suite 2
Tacoma, WA 98424

Raw Data Sheet
Mysid Shrimp
(Americamysis bahia)
Mysid Survival

Client: Shell - Harbor Island **Test Number:** 0804-T023

Sample ID: WetTest-1-041408

Conc. or %	Cont.	Rep.	Days 0	1	2	3	4	5	6	7	Mean % Survival
CON	19	1	5	5	5	5	5	5	5	5	
	3	2	5	5	5	5	5	5	5	5	
	5	3	5	5	5	5	5	5	5	5	
	25	4	5	5	5	5	5	5	5	5	
	17	5	5	5	5	5	5	5	5	5	
	21	6	5	5	5	5	5	5	5	5	
	45	7	5	5	5	~~4~~ 5	5	5	5	5	
	36	8	5	5	5	5	5	5	5	5	
6.25	9	1	5	5	5	5	5	5	5	5	
	48	2	5	4	~~5~~ 4	4	4	4	4	4	
	41	3	5	5	~~4~~ 5	5	5	5	5	5	
	43	4	5	5	~~4~~ 5	5	~~5~~ 5 ies	4	4	4	
	23	5	5	5	5	5	5	5	5	5	
	12	6	5	5	~~4~~ 5	5	5	5	5	5	
	15	7	5	5	5	5	5	5	5	5	
	37	8	5	5	~~2~~ 5	5	5	5	5	5	
12.5	24	1	5	5	5	5	5	5	5	5	
	39	2	5	5	5	5	5	5	5	5	
	14	3	5	5	5	5	5	5	5	5	
	47	4	5	5	5	5	5	5	5	5	
	11	5	5	5	5	5	5	5	5	5	
	29	6	5	5	5	5	5	5	5	5	
	6	7	5	5	5	5	5	5	5	5	
	31	8	5	5	5	5	5	5	5	5	
Technician Initials			[illegible]	[illegible]	MM	PT	ies	[illegible]	[illegible]	BP	

Feeding Times: 0 ___ 1 815 2 815 3 805 4 745 5 745 6 805
BP ~~1540~~ 1615 1545 1600 1530 1700 1545 1600

QA check ies

Comments:

Nautilus Environmental
Washington Laboratory
5009 Pacific Hwy. E., Suite 2
Tacoma, WA 98424

Raw Data Sheet
Mysid Shrimp
(Americamysis bahia)
Mysid Survival

Client: Shell- Harbor Island **Test Number:** 0804-T023

Sample ID: WetTest-1-041408

Conc. or %	Cont.	Rep.	Days 0	1	2	3	4	5	6	7	Mean % Survival
25	33	1	5	5	5	5	5	5	5	5	
	40	2	5	5	5	5	5	5	5	5	
	13	3	5	5	5	5	5	5	5	5	
	16	4	5	5	5	5	5	5	5	5	
	8	5	5	5	5	5	5	5	5	5	
	30	6	5	5	5	5	5	5	5	5	
	7	7	5	5	5	5	5	5	5	4	
	27	8	5	5	5	5	5	5	5	5	
50	42	1	5	5	5	5	5	5	5	5	
	10	2	5	5	5	5	5	5	5	5	
	32	3	5	5	5	5	5	5	5	5	
	34	4	5	5	5	5	5	5	5	5	
	18	5	5	5	5	5	5	5	5	5	
	46	6	5	5	5	4	4	4	4	4	
	26	7	5	5	5	5	5	5	5	5	
	2	8	5	5	5	5	5	5	5	5	
100	1	1	5	5	5	5	5	5	5	5	
	38	2	5	5	5	5	5	5	5	5	
	20	3	5	5	5	5	5	5	5	5	
	22	4	5	5	5	~~4~~ 5 ies	5	5	5	5	
	44	5	5	5	5	5	5	5	5	5	
	4	6	5	5	5	4	4	4	4	4	
	35	7	5	5	5	4	4	4	4	4	
	28	8	5	5	5	5	5	5	5	5	
Technician Initials			[illegible]	[illegible]	[illegible]	[illegible]	ies	[illegible]	[illegible]	BP	

Feeding Times: 0 1615 1 815 1545 2 815 1600 3 805 1530 4 745 1700 5 745 1545 6 805 1600

QA check ies

Comments:

Appendix D

Atherinops affinis **(Pacific Topsmelt) Chronic Test**

Statistical Summaries and Raw Bench Sheets

CETIS Summary Report

Report Date: 24 Apr-08 16:59 (p 1 of 2)
Link/Link Code: 04-0586-1731/0804-T024

Pacific Topsmelt 7-d Survival and Growth Test — **Nautilus Environmental WA**

Test Run No:	15-3755-8493	**Test Type:**	Growth-Survival (7d)	**Analyst:**	Mary Ann Rempel-Hester
Start Date:	15 Apr-08 15:30	**Protocol:**	EPA/600/R-95/136 (1995)	**Diluent:**	Artificial Saltwater
Ending Date:	22 Apr-08 15:45	**Species:**	Atherinops affinis	**Brine:**	Crystal Sea Marine Mix
Duration:	7d 0h	**Source:**	Aquatic Biosystems, CO	**Age:**	10d

Sample No:	16-4889-0766	**Code:**	08-115	**Client:**	
Sample Date:	14 Apr-08 08:30	**Material:**	Oil Refinery Effluent	**Project:**	
Receive Date:	14 Apr-08 09:40	**Source:**	Shell Seattle Terminal (WA0001791)		
Sample Age:	31h (9.5 °C)	**Station:**			

Sample Renewals

Renewal	Sample Code	Sample Date	Receive Date	Renewal Date	Temp °C
1	08-120	16 Apr-08 07:30	16 Apr-08 08:40	17 Apr-08 12:00	8
2	08-124	18 Apr-08 08:45	18 Apr-08 11:45	19 Apr-08 12:00	8.7

Comparison Summary

Analysis No	Endpoint		NOEL	LOEL	TOEL	PMSD	Method
08-7055-8066	7d Survival Rate		100	> 100	N/A	8.2%	Steel Many-One Rank Test
07-2954-7394	Mean Dry Biomass-mg	α 0.05	50	100	70.7	13.0%	Dunnett's Multiple Comparison Test
17-1395-5656		α 0.01	100	> 100	N/A	17.2%	Dunnett's Multiple Comparison Test

Point Estimate Summary

Analysis No	Endpoint	Effect-%	Conc-%	95% LCL	95% UCL	Method
09-1191-4273	Mean Dry Biomass-mg	25	> 100	N/A	N/A	Linear Interpolation (ICPIN)
		50	> 100	N/A	N/A	

Test Acceptability

Analysis No	Endpoint	Attribute	Test Stat	Acceptabilty Limits	Overlap	Decision
08-7055-8066	7d Survival Rate	Control Resp	1	0.8 - NL	Yes	Passes acceptability criteria
07-2954-7394	Mean Dry Biomass-mg	Control Resp	1.91	0.85 - NL	Yes	Passes acceptability criteria
09-1191-4273	Mean Dry Biomass-mg	Control Resp	1.91	0.85 - NL	Yes	Passes acceptability criteria
17-1395-5656	Mean Dry Biomass-mg	Control Resp	1.91	0.85 - NL	Yes	Passes acceptability criteria
08-7055-8066	7d Survival Rate	PMSD	0.082	NL - 0.25	No	Passes acceptability criteria
07-2954-7394	Mean Dry Biomass-mg	PMSD	0.13	NL - 0.5	No	Passes acceptability criteria
17-1395-5656	Mean Dry Biomass-mg	PMSD	0.172	NL - 0.5	No	Passes acceptability criteria

7d Survival Rate Summary

Conc-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
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	0.96	0.927	0.993	0.8	1	0.0163	0.0894	9.32%	4.0%
100		5	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	Dilution Water	5	1.91	1.87	1.94	1.79	2	0.0171	0.0936	4.91%	0.0%
6.25		5	1.89	1.84	1.94	1.7	2.03	0.0254	0.139	7.36%	0.82%
12.5		5	1.95	1.91	1.98	1.8	2.02	0.0171	0.0934	4.8%	-1.99%
25		5	1.85	1.79	1.9	1.73	2.08	0.025	0.137	7.42%	3.23%
50		5	1.79	1.71	1.86	1.49	1.95	0.0373	0.204	11.4%	6.25%
100		5	1.63	1.53	1.73	1.31	1.99	0.048	0.263	16.2%	14.7%

HI-SHELL001113

Pacific Topsmelt 7-d Survival and Growth Test — Nautilus Environmental WA

7d Survival Rate Detail

Conc-%	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	0.8	1
100		1	1	1	1	1

Mean Dry Biomass-mg Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Dilution Water	2	1.83	1.95	1.79	1.97
6.25		1.79	2.03	1.7	2	1.93
12.5		1.97	2.02	2.02	1.8	1.92
25		2.08	1.8	1.85	1.73	1.78
50		1.9	1.95	1.94	1.49	1.66
100		1.46	1.99	1.73	1.31	1.65

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

Client: Shell - Harbor Island
Sample ID: WET Test-1-041408
Test No: 0804-T0224 125
Nautilus Check-In #: 08-115 08-120

Start Date & Time: 4/15/08 1530 (KS)
Stop Date & Time: 4/22/08 1545
Test species: Atherinops affinis 08-124

Conc. or % CON	Days													
	0		1		2		3		4		5		6	
	init.	final	init.	final	init.	final	init.	final	init.	final	init.	final	init.	final
pH	8.21	8.07	8.19	8.04	8.34	8.06	8.30	8.04	8.25	8.04	8.27	7.98	8.38	7.89
DO (mg/l)	7.3	6.0	7.1	7.1	7.4	7.1	7.5	6.7	7.1	6.8	7.3	6.6	7.4	7.2
Salinity (ppt)	30.1	30.5	29.4	30.6	29.3	30.0	29.7	30.0	29.9	29.4	29.8	30.1	28.7	29.7
Temperature (°C)	20.0	20.8	20.3	20.7	19.5	20.4	20.1	20.0	20.9	20.7	20.4	20.2	20.9	20.2

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	8.23	8.09	8.23	8.05	8.36	8.06	8.31	8.05	8.28	8.07	8.27	8.00	8.36	7.90
DO (mg/l)	7.2	6.3	7.2	7.1	7.3	6.9	7.3	6.6	7.0	6.6	7.1	6.5	7.3	7.1
Salinity (ppt)	30.3	30.6	30.2	30.5	29.6	30.2	29.9	30.1	30.0	29.7	29.8	30.4	29.0	29.5
Temperature (°C)	19.3	20.9	20.1	20.6	19.2	20.1	20.1	19.9	20.9	20.7	20.6	20.1	20.8	20.3

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	8.24	8.08	8.24		8.36	8.08	8.30	8.06	8.28	8.07	8.27	7.99	8.35	7.95
DO (mg/l)	7.1	6.3	7.0		7.1	6.9	7.3	6.5	7.0	6.5	7.2	6.3	7.2	6.8
Salinity (ppt)	30.3	30.5	29.9		29.6	30.2	29.8	30.0	29.9	29.7	29.8	30.6	29.1	29.8
Temperature (°C)	19.2	20.9	19.7		19.4	20.0	19.8	20.1	20.9	20.7	20.4	20.2	20.8	20.3

25	Days													
	0		1		2		3		4		5		6	
	init.	final	init.	final	init.	final	init.	final	init.	final	init.	final	init.	final
pH	8.25	8.07	8.26		8.37	8.08	8.29	8.06	8.28	8.07	8.27	8.02	8.33	7.93
DO (mg/l)	7.1	6.2	7.1		7.0	6.8	7.3	6.5	7.0	6.4	7.2	6.3	6.9	6.9
Salinity (ppt)	30.0	30.3	29.9		29.4	30.1	29.6	30.0	29.9	29.6	29.8	30.9	29.5	29.6
Temperature (°C)	19.1	20.8	19.8		19.4	20.1	19.5	20.1	20.9	20.8	20.6	20.1	20.8	20.4

50	Days													
	0		1		2		3		4		5		6	
	init.	final	init.	final	init.	final	init.	final	init.	final	init.	final	init.	final
pH	8.25	8.09	8.28		8.38	8.07	8.26	8.06	8.26	8.07	8.25	8.03	8.30	7.95
DO (mg/l)	7.0	6.1	7.0		7.1	6.8	7.2	6.5	6.9	6.5	7.2	6.6	7.0	7.0
Salinity (ppt)	29.4	29.9	29.6		29.3	29.6	29.4	29.5	29.8	29.4	29.7	30.7	29.5	30.5
Temperature (°C)	19.4	20.7	19.5		19.3	20.0	19.4	20.1	21.0	20.7	20.5	20.3	20.6	20.4

100	Days													
	0		1		2		3		4		5		6	
	init.	final	init.	final	init.	final	init.	final	init.	final	init.	final	init.	final
pH	8.26	8.11	8.30	8.11	8.42	8.12	8.20	8.07	8.22	8.06	8.22	8.03	8.24	8.03
DO (mg/l)	6.8	6.2	6.9	6.9	7.2	6.7	7.3	6.4	6.8	6.5	7.1	6.3	7.0	7.0
Salinity (ppt)	29.0	29.4	29.0	29.2	29.3	29.2	29.0	29.0	29.7	29.4	29.8	30.2	30.2	30.8
Temperature (°C)	19.0	20.9	19.7	20.4	19.6	19.8	19.1	20.0	20.9	20.7	20.5	20.3	20.8	20.3
Tech Initials:	RT	(N)	(N)	BP	BP	RT	RT	BP	BP	BP	BP	(N)	(N)	RT

Nautilus Environmental
Washington Laboratory
5009 Pacific Hwy. E., Suite 2
Tacoma, WA 98424

Dilution Water Batch #: ASW 024

QA Check: KS

Sample Description:
Organism Source: ABS
Date Received: 4/15/08
Date of Hatch: 4/8/08 6 pm

Comments:

* Did not pull final water for 12.5, 25 and 50 Concentrations for day 1

Nautilus Environmental
Washington Laboratory
5009 Pacific Hwy. E., Suite 2
Tacoma, WA 98424

Raw Data Sheet
Pacific Topsmelt
(Atherinops affinis)
Larval Survival

Client Name: Shell- Harbor Island **Test No.:** 0804-T024

Sample ID: WET Test-1-041408

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

Feeding Times: 0 1615 1 815 1545 2 815 1600 3 805 1530 4 745 1700 5 745 1545 6 805 1600

Comments: _____ **QA Check** KB

Nautilus Environmental
Washington Laboratory
5009 Pacific Hwy., E. Suite 2
Tacoma, WA 98424

Fish Weights
Seven Day Chronic Bioassay

Client: Shell- Harbor Island

Species: *A. affinis*

Sample ID: WET Test-1-041408

Test No: 0804-T024

Conc or %	cont. #	rep.	pan wt. (gm)	pan + fish (gm)	fish wt. (mg)	# fish	avg. per fish (mg)	avg. per conc. (mg)
CON	30	1	.03896	0.04895		5		
	21	2	.03603	0.04518		5		
	11	3	.04910	0.05884		5		
	9	4	.03792	0.04685		5		
	16	5	.04250	0.05237		5		
6.25	5	1	.04264	0.05161		5		
	23	2	.03693	0.04707		5		
	17	3	.03507	0.04358		5		
	22	4	.03467	0.04467		5		
	26	5	.04438	0.05405		5		
12.5	20	1	.04162	0.05146		5		
	27	2	.04275	0.05284		5		
	8	3	*~~.03814~~ .04427	0.05439		5		
	7	4	.04198	0.05096		5		
	25	5	.03842	0.04802		5		
25	2	1	.04074	0.05113		5		
	3	2	.03821	0.04721		5		
	10	3	.04222	0.05145		5		
	19	4	.04308	0.05171		5		
	18	5	.04100	0.04989		5		
50	12	1	.03782	0.04730		5		
	28	2	.03568	0.04542		5		
	1	3	.04224	0.05196		5		
	14	4	.04341	0.05085		4		
	6	5	.04419	0.05251		5		
100	24	1	.03830	0.04560		5		
	29	2	.03933	0.04930		5		
	13	3	.03944	0.04809		5		
	15	4	.03821	0.04474		5		
	4	5	.04085	0.04908		5		
	Tech Initials:		BP	MAR				

Date/Time in: 4/22/08 1545 Oven temp. (°C): 63.0 QA check LES

Date/Time out: 4/24/08 1215 Oven temp. (°C): 61.5

*.04427

Appendix E
Bioassay Testing Checklists

WET TESTING BIOASSAY CHECKLIST

MARINE ACUTE TOXICITY - 48-HOUR STATIC-RENEWAL TEST USING *AMERICAMYSIS BAHIA*

Sample ID Number: WetTest-1-041408
Project Name: Shell Harbor Island NPDES WET Tests
EPA Test Method: EPA-821-R-02-012 (Circle method to verify)

Date: 4-15-08
Laboratory: Nautilus Environmental, Washington
Personnel: Indira Santiago, Cat Curran

CHAIN-OF-CUSTODY	Yes	No	Comment
Are all Chain-of-Custody (COC) forms included with the sample(s)?	✓		
Correct number of water samples received?	✓		
Is the COC form completely filled out, signed, and dated?	✓		
Was the sample container temperature recorded and within the control limits (4°C)?	✓		
TEST PROCEDURES			
Equipment was calibrated?	✓		
Test salinity is set to project specific salinity?	✓		
Water samples kept at 4°C?	✓		
Testing initiated within 36 hours of sample collection?	✓		
Mysids are 1-5 days old, within 24 hours of same age?	✓		
Mysids acclimated to 25 ± 1°C?	✓		
Randomization sheets prepared?	✓		
Control prepared?	✓		
Dilution concentrations prepared to correct specifications?	✓		
Test chambers randomized?	✓		
pH, DO, salinity and temperature measured, recorded, and within acceptable parameters?	✓		
Ten mysids added to test chamber?	✓		
Environmental chamber at 25 ± 1°C with 16 hours light/8 hours dark photoperiod?	✓		

HI-SHELL001119

	YES	NO	COMMENT
DAILY MONITORING			
Test chambers rearranged according to concentration each day?	✓		
pH, DO, salinity and temperature measured and within acceptable parameters?	✓		
Mysids fed once daily	✓		
Surviving mysids counted?	✓		
Tanks cleaned?	✓		Excess food removed w/ pipette
Effluent renewal at 24 hours?	✓		
Test ended within 48 ± 2 hours of start time?	✓		
DATA REVIEW			
Test acceptability criteria met? • Mean control survival ≥ 90%	✓		
Records are complete with no missing data?	✓		

Comments:

HI-SHELL001120

WET TESTING BIOASSAY CHECKLIST

MARINE ACUTE TOXICITY - 96-HOUR STATIC-RENEWAL TEST USING *MENIDIA BERYLLINA*

Sample ID Number: Wet Test-1-041408
Project Name: Shell Harbor Island NPDES WET Tests
EPA Test Method: EPA-821-R-02-012 (Circle method to verify)

Date: 4/15/08
Laboratory: Nautilus Environmental
Personnel: Indira Santiago, Maria Brayfield, Eric Tollepson, Meghan Murphy, Barbara Parsons

CHAIN-OF-CUSTODY	Yes	No	Comment
Are all Chain-of-Custody (COC) forms included with the sample(s)?	✓		
Correct number of water samples received?	✓		
Is the COC form completely filled out, signed, and dated?	✓		
Was the sample container temperature recorded and within the control limits (4°C)?	✓		
TEST PROCEDURES			
Equipment was calibrated?	✓		
Test salinity is set to project specific salinity?	✓		
Water samples kept at 4°C?	✓		
Testing initiated within 36 hours of sample collection?	✓		
Fish are 9-14 days old, within 24 hours of same age?	✓		
Fish acclimated to 25 ± 1°C?		✓	* 20±1°C
Randomization sheets prepared?	✓		
Control prepared?	✓		
Dilution concentrations prepared to correct specifications?	✓		
Test chambers randomized?	✓		
pH, DO, salinity and temperature measured, recorded, and within acceptable parameters?	✓		
Ten fish added to test chamber?	✓		
Environmental chamber at 25 ± 1°C with 16 hours light/8 hours dark photoperiod?	BP ✓	✓	* 20±1°C

* As per WDOE protocol, this test can be performed at either 20°C or 25°C

	YES	NO	COMMENT
DAILY MONITORING			
Fed animals once prior to 48 hour renewal?	✓		
Test chambers rearranged according to concentration each day?	✓		
pH, DO, salinity and temperature measured and within acceptable parameters?	✓		
80% of test solution renewed at 48 hours?	✓		
Surviving fish counted?	✓		
Tanks cleaned?	✓		
Test ended within 96 ± 2 hours of start time?	✓		
DATA REVIEW			
Test acceptability criteria met? • Mean control survival ≥ 90%	✓		
Records are complete with no missing data?	✓		

Comments:

HI-SHELL001122

WET TESTING BIOASSAY CHECKLIST

MARINE CHRONIC TOXICITY - 7 DAY STATIC-RENEWAL TEST WITH *AMERICAMYSIS BAHIA*

Sample ID Number: Wet Test-1-041408
Project Name: Shell Harbor Island NPDES WET Tests
EPA Test Method: EPA-821-R-02-014, method 1007.0
(Circle method to verify)

Date: 4/15/08
Laboratory: Nautilus Environmental
Personnel: Maria Brayfield, Laura Shanks, Meghan Murphy, Liz Tobin, Indira Santiago, Eric Tolkson, Barbara Parsons, Mary Ann Rempel-Hester

CHAIN-OF-CUSTODY	Yes	No	Comment
Are all Chain-of-Custody (COC) forms included with the sample(s)?	✓		
Correct number of water samples received?	✓		
Is the COC form completely filled out, signed, and dated?	✓		
Was the sample container temperature recorded and within the control limits (4°C)?	✓		
TEST PROCEDURES			
Equipment was calibrated?	✓		
Test salinity is 30 ± 2ppt?	✓		
Water samples kept at 4°C?	✓		
Testing initiated within 36 hours of sample collection?	✓		
Test animals are 7 days old, within 24 hours of same age?	✓		
Randomization sheets prepared?	✓		
Control prepared?	✓		
Dilution concentrations prepared to correct specifications?	✓		
Test chambers randomized?	✓		
pH, DO, salinity and temperature measured, recorded, and within acceptable parameters?	✓		
Mysids added to test chambers?	✓		
Environmental chamber set to 26°C with 16 hours light/8 hours dark photoperiod?	✓		

	YES	NO	COMMENT
DAILY MONITORING			
Test chambers rearranged according to concentration each day?	✓		
pH, DO, salinity and temperature measured prior to water change and after water change during the 7 day period? Are the measurements within acceptable parameters?	✓		
Tanks cleaned?	✓		
90% test solution renewals conducted?	✓		
Surviving mysids counted daily?	✓		
Mysids fed twice a day on Days 1-6?	✓		
Mysids dried on Day 7?	✓		
Mysid weights measured?	✓		
DATA REVIEW			
Test acceptability criteria met? • Mean control survival ≥ 80% • Average dry weight ≥ 0.20 mg per surviving mysid in control	✓		
Records are complete with no missing data?	✓		

Comments:

HI-SHELL001124

WET TESTING BIOASSAY CHECKLIST

MARINE CHRONIC TOXICITY - 7 DAY STATIC-RENEWAL TEST WITH *ATHERINOPS AFFINIS*

Sample ID Number: WetTest-1-041408 Date: 4/15/08
Project Name: Shell Harbor Island NPDES WET Tests Laboratory: Nautilus Environmental
EPA Test Method: EPA / 600 / R-95 / 136 (Circle method to verify) Personnel: Liz Tobin, Barbara Larsons, Eric Tollefson, Maria Brayfield, Mary Ann Rempel-Hester

CHAIN-OF-CUSTODY	Yes	No	comment
Are all Chain-of-Custody (COC) forms included with the sample(s)?	✓		
Correct number of water samples received?	✓		
Is the COC form completely filled out, signed, and dated?	✓		
Was the sample container temperature recorded and within the control limits (4°C)?	✓		
TEST PROCEDURES			
Equipment was calibrated?	✓		
Test salinity is 30 ± 1ppt or 34 ± 2 ppt?	✓		
Water samples kept at 4°C?	✓		
Testing initiated within 36 hours of sample collection?	✓		
Test animals are 9-15 days old?	✓		
Fish acclimated to 20 ± 1°C?	✓		
Randomization sheets prepared?	✓		
Control prepared?	✓		
Dilution concentrations prepared to correct specifications?	✓		
Test chambers randomized?	✓		
pH, DO, salinity and temperature measured, recorded, and within acceptable parameters?	✓		
Fish added to test chamber?	✓		
Environmental chamber at 20 ± 1°C with 16 hours light/8 hours dark photoperiod?	✓		

	YES	NO	COMMENT
DAILY MONITORING			
Test chambers rearranged according to concentration each day?	✓		
pH, DO, salinity and temperature measured prior to water change and after water change during the 7 day period? Are the measurements within acceptable parameters?	✓		
Tanks cleaned?	✓		
~~90~~% test solution renewals conducted? 80	✓		
Surviving ~~mysids~~ Topsmelt counted daily?	✓		
~~Mysids~~ Topsmelt fed twice a day on Days 1-6?	✓		
~~Mysids~~ Topsmelt dried on Day 7?	✓		
~~Mysid~~ Topsmelt weights measured?	✓		
DATA REVIEW			
Test acceptability criteria met? • Mean control survival ≥ 80% • Average dry weight ≥ ~~0.20~~ 0.85 mg per surviving ~~mysid~~ topsmelt in control	✓		
Records are complete with no missing data?	✓		

Comments:

HI-SHELL001126

Appendix F
Sample Check-In Sheet

Nautilus Environmental
5009 Pacific Hwy East, Ste. 2
Tacoma, WA 98424

Sample Check-In Information

Client: PES Environmental Shell Harbor Island Tests Performed: my-c, Aa-c, mb-a, my-a Sample Description:

Sample ID: Wet Test -1-041408 Test ID No(s).:

Sample ID:	Wet Test -1 -041408	Wet Test -2 -041608	Wet Test 3 041808	
Log-in No. (07-xxxx):	08-115	08-120	08-124	
Sample Collection Date & Time:	4/14/08 0830	4/16/08 0830	4/18/08 0845	
Sample Receipt Date & Time:	4/14/08 0940	4/16/08 0840	4/18/08 1145	
Check-in Temperature (°C)	9.5	8.0	8.7	
Temperature OK?	(Y) N	(Y) N	(Y) N	Y N
DO (mg/L)	6.54 RES	7.82 (PP)	9.1	
pH (units)	7.00	(PP) 7.700	7.00	
Conductivity (µS/cm)	71	50	53	
Salinity (ppt)	—	—	—	
Tit. Vol / Sam. Vol. / Alkalinity (mg/L)*	0.7 / 25 / 28	0.5 / 25 / 20	0.6 / 25 / 24	/ /
Tit. Vol. / Sam. Vol. / Hardness (mg/L)**	0.9 / 25 / 36	0.6 / 25 / 24	0.9 / 25 / 36	/ /
Total Chlorine (mg/L)	0.05	~~0.02~~ <0.03 RES	<0.03	
Total Ammonia (mg/L)	<1.0	<1.0	<1.0	
Technician Initials	BP	BP	BP	

* = mg/L as $CaCO_3$, ² = Measured for freshwater samples only NA = Not Applicable, NM = Not Measured

COC Complete? (Y) or N
1 Y 2 Y 3 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: ~~mb-a~~ BP 8:2 (DMW) (MHW) Other: _____ Alkalinity: ~~28~~ BP Hardness: ~~36~~ BP

Control/Dilution Water Source: test type: _____ 8:2 (DMW) MHW Other: _____ Alkalinity: _____ Hardness: _____

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: Aa, my (ART SW) NAT SW Alkalinity: ~~28~~ BP 124 Salinity: ~~36~~ BP 29.4

Control/Dilution Water Source: test type: mb-a (ART SW) NAT SW Alkalinity: 124 Salinity: 29.4

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: RS

HI-SHELL001128

Appendix G
Chain-of-Custody Forms

Nautilus Environmental

TESTING LOCATION (Please Circle)

California
5550 Morehouse Drive, Suite 150
San Diego, CA 92121
Phone 858.587.7333
Fax 858.587.3961

Washington
5009 Pacific Highway East, Suite 2
Tacoma, WA 98424
Phone 253.922.4296
Fax 253.922.5814

British Columbia
8664 Commerce Court
Burnaby, British Columbia, Canada V5A 4N3
Phone 604.420.8773
Fax 604.357.1361

Chain of Custody

Date 4/14/08 Page 1 of 1

Sample Collection By:

Report to:

Company	PES Environmental, Inc.
Address	1215 Fourth Avenue, Suite 1350
City/State/Zip	Seattle, WA 98161
Contact	Bill Haldeman
Phone	206-529-3980, ext. 107
Email	bhaldeman@pesenv.com

Invoice To:

Company	PES Environmental, Inc.
Address	1215 Fourth Avenue, Suite 1350
City/State/Zip	Seattle, WA 98161
Contact	Bill Haldeman
Phone	206-529-3980, ext. 107
Email	bhaldeman@pesenv.com

ANALYSES REQUIRED

	SAMPLE ID	DATE	TIME	MATRIX	CONTAINER TYPE	NO. OF CONTAINERS	COMMENTS	Shell Permit WET Test Analyses	Topsmelt + mysid chronic (yes) Menidia + mysid acute									Receipt Temperature (°C)
1	~~Wet Test~~			Water	Cubitainer			~~X~~										9.5
2	Wet Test - 1-04/14/08	4/14/08	0830	↓	"	1		X										
3																		
4																		
5																		
6																		
7																		
8																		
9																		
10																		

PROJECT INFORMATION		SAMPLE RECEIPT	
Client:	**PES Environmental**	**Total No. of Containers**	1
PO No.:	**828.001.04**	**Received Good Condition?**	Y
Shipped Via:	**Delivery by PES**	**Matches Test Schedule?**	Y

SPECIAL INSTRUCTIONS/COMMENTS:

RELINQUISHED BY (CLIENT)
(Signature) (Time)
(Printed Name) (Date) J. Russell Stolsen 4/14/08
(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) (Time) Barbara Parsons 09:40
(Printed Name) (Date) Barbara Parsons 4/14/08
(Company) 08-115

Additional costs may be required for sample disposal or storage. Payment net 30 unless otherwise contracted.

Nautilus Environmental

TESTING LOCATION (Please Circle)

California
5550 Morehouse Drive, Suite 150
San Diego, CA 92121
Phone 858.587.7333
Fax 858.587.3961

Washington
5009 Pacific Highway East, Suite 2
Tacoma, WA 98424
Phone 253.922.4296
Fax 253.922.5814

British Columbia
8664 Commerce Court
Burnaby, British Columbia, Canada V5A 4N3
Phone 604.420.8773
Fax 604.357.1361

Chain of Custody

Date_____Page__1_of_1__

Sample Collection By:

Report to:		**Invoice To:**	
Company	PES Environmental, Inc.	**Company**	PES Environmental, Inc.
Address	1215 Fourth Avenue, Suite 1350	**Address**	1215 Fourth Avenue, Suite 1350
City/State/Zip	Seattle, WA 98161	**City/State/Zip**	Seattle, WA 98161
Contact	Bill Haldeman	**Contact**	Bill Haldeman
Phone	206-529-3980, ext. 107	**Phone**	206-529-3980, ext. 107
Email	bhaldeman@pesenv.com	**Email**	bhaldeman@pesenv.com

ANALYSES REQUIRED

	SAMPLE ID	DATE	TIME	MATRIX	CONTAINER TYPE	NO. OF CONTAINERS	COMMENTS	Shell Permit WET Test Analyses	Mysid + Topsmelt chronic (96) Menidia and mysid acute									Receipt Temperature (°C)
1	wet Test-2-041608	4/16/08	0730	Water	Cubitainer	1		X	X									8.0
2																		
3																		
4																		
5																		
6																		
7																		
8																		
9																		
10																		

PROJECT INFORMATION		**SAMPLE RECEIPT**	
Client:	**PES Environmental**	**Total No. of Containers**	1
PO No.:	**828.001.04**	**Received Good Condition?**	✓
Shipped Via:	**Delivery by PES**	**Matches Test Schedule?**	✓

SPECIAL INSTRUCTIONS/COMMENTS:

RELINQUISHED BY (CLIENT)	**RELINQUISHED BY (COURIER)**
(Signature) (Time)	(Signature) (Time)
(Printed Name) (Date) J. Russell Stolsen 4/16/08	(Printed Name) (Date)
(Company)	(Company)

RECEIVED BY (COURIER)	**RECEIVED BY (LABORATORY)**
(Signature) (Time)	(Signature) (Time) 0840
(Printed Name) (Date)	(Printed Name) (Date) Elizabeth Tobin 4/16/08
(Company)	(Company) Nautilus Environmental

Additional costs may be required for sample disposal or storage. Payment net 30 unless otherwise contracted.

08-120

HI-SHELL001131

Nautilus Environmental

Chain of Custody

☐ **CALIFORNIA**
5550 Morehouse Drive • Suite 150
San Diego, California 92121
Phone 858.587.7333
Fax 858.587.3961

☒ **WASHINGTON**
5009 Pacific Highway East • Suite 2
Tacoma, Washington 98424
Phone 253.922.4296
Fax 253.922.5814

☐ **BRITISH COLUMBIA**
8664 Commerce Court
Burnaby British Columbia Canada V5A 4N7
Phone 604.420.8773
Fax 604.357.1361

Date 4/18/08 Page 1 of 1

Sample Collection by: PES Environmental

Report to:
Company PES Environmental
Address 1215 Fourth Ave Suite 1350
City Seattle State WA Zip 98161
Contact Bill Haldeman
Phone/Email (206) 529-3980

Invoice to:
Company PES Environmental
Address Same
City State Zip
Contact
Phone/Email

ANALYSES REQUIRED

SAMPLE ID	DATE	TIME	MATRIX	CONTAINER TYPE	NUMBER OF CONTAINERS	COMMENTS	Shell Permit Wet Test Analyses (PES)	Topsmelt + Mysid Chronic (PES)	Menidia & Mysid acute (PES)									RECEIPT TEMPERATURE (°C)
Wet Test-3-041808	4/18/08	0845	W	cube	1		X	X	X									8.7

PROJECT INFORMATION	SAMPLE RECEIPT	
CLIENT PES Environmental	TOTAL NO. OF CONTAINERS	1
P.O. NO. 828.001.04	REC'D GOOD CONDITION	4
SHIPPED VIA: Delivered by PES	MATCHES TEST SCHEDULE	4

SPECIAL INSTRUCTIONS/COMMENTS:

RELINQUISHED BY (CLIENT)
(Signature) J R Stolsen (Time) 1045
(Printed Name) J. Russell Stolsen (Date) 4/18/08
(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) 1145
(Printed Name) ERIC TOLLEFSON (Date) 4/18/08
Nautilus Environmental Log-in No. 08-124

Additional costs may be required for sample disposal or storage. Net 30 unless otherwise contracted.

DISTRIBUTION: WHITE - Nautilus Environmental, COLOR - Originator

HI-SHELL001132