Rainier ENVIRONMENTAL

Whole Effluent Toxicity Test Report: NAVFAC

September 2017

Report date: October 2, 2017

Submitted to:

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1.0 INTRODUCTION

Acute and chronic whole effluent toxicity tests were conducted using effluent samples collected from the NAVFAC in September 2017. Acute and chronic bioassay tests were conducted using test organisms *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 Kane 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 E. The sample was stored at 4°C in the dark until used for testing.

2.3 Test Methods

Acute toxicity tests were conducted using mysid shrimp and Pacific topsmelt 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.

Table 1. Summary of methods for the 96h Mysid shrimp acute survival test.

Test initiation date and time	9/8/2017; 1615h
Test termination date and time	9/12/2017; 1600h
Test organism	*Americamysis bahia*
Test organism source	Aquatic BioSystems; Fort Collins, CO
Test organism age	3 days post hatch
Test duration	96 hours with solution renewal at 24, 48 and 72 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
Test concentrations (% sample)	100, 50.0, 25.0, 11.1, 6.25, 3.125, 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 conditions for the 96h Pacific topsmelt acute survival test.

Test initiation date and time	9/8/2017; 1520h
Test termination date and time	9/12/2017; 1515h
Test organism	*Atherinops affinis*
Test organism source	Aquatic BioSystems; Fort Collins, CO
Test organism age	9 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-liter plastic cup
Test solution volume	500 mL
Test temperature	20 ± 1°C
Dilution water	Crystal Sea Marine Mix artificial seawater
Test concentrations (% sample)	100, 50.0, 25.0, 11.1, 6.25, 3.125, 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 chloride

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

Test initiation date and time	9/8/2017; 1555h
Test termination date and time	9/15/2017; 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, 50.0, 25.0, 11.1, 6.25, 3.125, 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	9/8/2017; 1455h
Test termination date and time	9/15/2017; 1430h
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	9 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, 11.1, 6.25, 3.125, 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

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	WW-1-090817
Rainier log in ID	17-124
Collection date and time	9/8/2017; 1030
Receipt date and time	9/8/2017; 1240
Receipt temperature (°C)	7.0
Dissolved oxygen (mg/L)	11.4
pH	7.64
Conductivity (µS/cm)	29110
Salinity	26.5
Hardness (mg/L $CaCO_3$)	NA Salt Water
Alkalinity (mg/L $CaCO_3$)	272
Total chlorine (mg/L)	<0.03
Total ammonia (N) (mg/L)	<1.0

3.1 Acute Tests

Survival was evaluated in the acute toxicity tests after 96 hours of exposure for Mysid shrimp and Pacific topsmelt. Results are summarized in Table 6. Mean survival in 100 percent effluent was 100 percent for Mysid shrimp and Pacific topsmelt.

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

Species	Concentration (%)	Percent Survival	NOEC[a] (% effluent)	LOEC[b] (% effluent)	LC_{50}[c] (% effluent)
Mysid shrimp	0.0	100	100	>100	>100
	3.125	97.5			
	6.25	100			
	11.1	97.5			
	25	100			
	50	97.5			
	100	100			
Pacific topsmelt	0.0	95.0	100	>100	>100
	3.125	95.0			
	6.25	100			
	11.1	100			
	25	100			
	50	100			
	100	100			

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

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.

No toxicity was detected for survival or growth in either the mysid shrimp or the pacific topsmelt tests. The associated chronic toxicity unit (TU_c, defined as 100 divided by the NOEC for survival and 100 divided by the IC_{25} for all other endpoints) was 1.0 TU_c for survival and <1.0 for growth endpoints in both tests

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

Test Species	Endpoint	NOEC[a] (% effluent)	LOEC[b] (% effluent)	Toxicity Unit[c] (TUc)
Mysid Shrimp	7-Day Survival	100	>100	1.0
	7-Day Dry Weight	100	>100	<1.0
	7-Day Biomass	100	>100	<1.0
Pacific Topsmelt	7-Day Survival	100	>100	1.0
	7-Day Dry Weight	50	100	1.4
	7-Day Biomass	50	100	1.4

[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 F.

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.

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 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 (%)
Mysid Shrimp	9/6/2017	48h Survival	525 µg/L copper	303-556µg/L	16.4
Pacific Topsmelt	9/6/2017	96h Survival	84.2 µg /L copper	65.4-306µg/L	47.1
Mysid Shrimp	9/6/2017	7d Survival	209 µg/L copper	144-529µg/L	38.4
	9/6/2017	Growth	123 µg/L copper	123-341µg/L	29.1
Pacific Topsmelt	9/6/2017	7d Survival	156 µg/L copper	82.9-199µg/L	24.4
	9/6/2017	Growth	127 µg/L copper	85.7-148µg/L	14.6

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.

Appendix A
Mysid shrimp Acute Toxicity Test
Statistical Summaries and Raw Bench Sheets

CETIS Summary Report

Report Date: 27 Sep-17 15:53 (p 1 of 1)
Test Code: 1709-023 | 02-7950-4686

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

Batch ID:	00-2243-8892	**Test Type:**	Survival (96h)	**Analyst:**	Eric Tollefson
Start Date:	08 Sep-17 16:15	**Protocol:**	EPA/821/R-02-012 (2002)	**Diluent:**	Laboratory Seawater
Ending Date:	12 Sep-17 16:00	**Species:**	Mysidopsis bahia	**Brine:**	
Duration:	96h	**Source:**	Aquatic Biosystems, CO	**Age:**	3d

Sample ID:	20-4218-0742	**Code:**	17-124	**Client:**	NAVFAC
Sample Date:	08 Sep-17 10:30	**Material:**	Industrial Effluent	**Project:**	
Receive Date:	08 Sep-17 12:40	**Source:**	NAVFAC (WA0002780)		
Sample Age:	6h (7 °C)	**Station:**			

Comparison Summary

Analysis ID	Endpoint	NOEL	LOEL	TOEL	PMSD	TU	Method
18-6796-7209	96h Survival Rate	100	>100	NA	6.17%	1	Steel Many-One Rank Sum Test

Test Acceptability

Analysis ID	Endpoint	Attribute	Test Stat	TAC Limits	Overlap	Decision
18-6796-7209	96h Survival Rate	Control Resp	1	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	1	1	1	1	1	0	0	0.0%	0.0%
3.125		4	0.975	0.9563	0.9937	0.9	1	0.025	0.05	5.13%	2.5%
6.25		4	1	1	1	1	1	0	0	0.0%	0.0%
11.1		4	0.975	0.9563	0.9937	0.9	1	0.025	0.05	5.13%	2.5%
25		4	1	1	1	1	1	0	0	0.0%	0.0%
50		4	0.975	0.9563	0.9937	0.9	1	0.025	0.05	5.13%	2.5%
100		4	1	1	1	1	1	0	0	0.0%	0.0%

96h Survival Rate Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Dilution Water	1	1	1	1
3.125		1	1	1	0.9
6.25		1	1	1	1
11.1		1	0.9	1	1
25		1	1	1	1
50		1	1	1	0.9
100		1	1	1	1

96h Survival Rate Binomials

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Dilution Water	10/10	10/10	10/10	10/10
3.125		10/10	10/10	10/10	9/10
6.25		10/10	10/10	10/10	10/10
11.1		10/10	9/10	10/10	10/10
25		10/10	10/10	10/10	10/10
50		10/10	10/10	10/10	9/10
100		10/10	10/10	10/10	10/10

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

96 Hour Toxicity Test Data Sheet
Saltwater 96-hr Acute Daily Renewals

Client: NAVFAC / KANE ENVIRONMENTAL
Sample ID: WW-1-090817
Test # 1709-023
Rainier Check-In #: 17-124

Start Date & Time: 9/8/17 1615
End Date & Time: 9/12/17 1600
Test Organism: *Americamysis bahia*

Sample Conc. or (%)	D.O. (mg/L) Init. 0	24	48	72	Fin. 96	pH (mg/L) Init. 0	24	48	72	Fin. 96
CON	6.6	6.4	6.4	6.1	5.8	8.51	8.31	8.47	8.31	8.27
3.125	6.7	6.3	6.5	6.1	5.9	8.40	8.22	8.41	8.27	8.21
6.25	6.7	6.3	6.1	6.0	5.9	8.48	8.07	8.37	8.23	8.24
11.1	6.6	6.6	6.2	5.8	5.7	8.47	7.98	8.27	8.18	8.11
25	6.5	6.6	6.2	6.1	6.2	8.46	7.95	8.21	8.15	8.05
50	6.6	6.4	6.0	5.8	5.7	8.41	7.91	8.17	8.13	8.00
100	6.5	6.3	5.8	5.7	5.6	8.08	7.78	7.95	7.98	7.93

Sample Conc. or (%)	Salinity ppt Init. 0	24	48	72	Fin. 96	Test Temperature (°C) Init. 0	24	48	72	Fin. 96
CON	28.7	28.9	29.0	28.8	29.1	24.8	25.1	25.4	25.1	25.3
3.125	29.1	29.0	28.9	28.9	29.0	24.9	25.2	25.4	25.2	25.4
6.25	29.1	29.4	29.5	29.1	29.3	25.1	25.1	25.3	25.2	25.4
11.1	29.0	29.2	29.4	29.3	29.3	25.1	25.3	25.3	25.3	25.4
25	29.3	29.5	29.4	29.4	29.4	25.3	25.4	25.2	25.3	25.4
50	29.5	29.7	29.8	29.6	29.8	25.1	25.5	25.2	25.0	25.4
100	30.2	30.1	30.2	29.8	30.1	25.4	25.5	25.2	25.2	25.4
Tech. Initials	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]					

Sample Conc. or (%)	Rep #	Cont #	Number of Live Organisms 0	24	48	72	96
CON	1	24	10	10	10	10	10
	2	2	10	10	10	10	10
	3	10	10	10	10	10	10
	4	4	10	10	10	10	10
3.125	1	7	10	10	10	10	10
	2	6	10	10	10	10	10
	3	12	10	10	10	10	10
	4	20	10	10	10	9	9
6.25	1	22	10	10	10	10	10
	2	28	10	10	10	10	10
	3	14	10	10	10	10	10
	4	26	10	10	10	10	10
11.1	1	11	10	10	10	10	10
	2	27	10	9	9	9	9
	3	1	10	10	10	10	10
	4	9	10	10	10	10	10
25	1	13	10	10	10	10	10
	2	3	10	10	10	10	10
	3	23	10	10	10	10	10
	4	19	10	10	10	10	10
50	1	5	10	10	10	10	10
	2	8	10	10	10	10	10
	3	25	10	10	10	10	10
	4	19	10	10	9	9	9
100	1	16	10	10	10	10	10
	2	21	10	10	10	10	10
	3	15	10	10	10	10	10
	4	17	10	10	10	10	10
Tech. Initials			[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

Feeding Times: 1 0715 2 0700 3 0730
Renewal Times: 1 1200 2 1330 3 1420

Dilution Water Batch #: ASW #013
Test Chamber: ROOM 2
Animal Source: ABS
Date of Hatch: 9/5/17
Test Volume: 200ML
QA Check: [illegible]

Appendix B
Pacific Topsmelt Acute Toxicity Test
Statistical Summaries and Raw Bench Sheets

CETIS Summary Report

Report Date:	30 Sep-17 12:13 (p 1 of 1)
Test Code:	1709-021 | 11-8437-2054

Pacific Topsmelt 96-h Acute Survival Test — **Rainier Environmental Laboratory**

Batch ID:	06-3052-1896	**Test Type:**	Survival (96h)	**Analyst:**	Eric Tollefson
Start Date:	08 Sep-17 15:20	**Protocol:**	EPA/821/R-02-012 (2002)	**Diluent:**	Laboratory Seawater
Ending Date:	12 Sep-17 15:15	**Species:**	Atherinops affinis	**Brine:**	
Duration:	96h	**Source:**	Aquatic Biosystems, CO	**Age:**	9d

Sample ID:	20-4218-0742	**Code:**	17-124	**Client:**	NAVFAC
Sample Date:	08 Sep-17 10:30	**Material:**	Industrial Effluent	**Project:**	
Receive Date:	08 Sep-17 12:40	**Source:**	NAVFAC (WA0002780)		
Sample Age:	5h (7 °C)	**Station:**			

Comparison Summary

Analysis ID	Endpoint	NOEL	LOEL	TOEL	PMSD	TU	Method
16-5895-3318	96h Survival Rate	100	>100	NA	10.3%	1	Steel Many-One Rank Sum Test

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	0.95	0.9127	0.9873	0.8	1	0.05	0.1	10.53%	0.0%
3.125		4	0.95	0.9127	0.9873	0.8	1	0.05	0.1	10.53%	0.0%
6.25		4	1	1	1	1	1	0	0	0.0%	-5.26%
11.1		4	1	1	1	1	1	0	0	0.0%	-5.26%
25		4	1	1	1	1	1	0	0	0.0%	-5.26%
50		4	1	1	1	1	1	0	0	0.0%	-5.26%
100		4	1	1	1	1	1	0	0	0.0%	-5.26%

96h Survival Rate Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Dilution Water	1	1	0.8	1
3.125		0.8	1	1	1
6.25		1	1	1	1
11.1		1	1	1	1
25		1	1	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	5/5	5/5	4/5	5/5
3.125		4/5	5/5	5/5	5/5
6.25		5/5	5/5	5/5	5/5
11.1		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

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

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

Client: NAVFAC / Kane Environmental
Sample ID: WW-1-090817
Test # 1709-021
Log-In #: 17-124

Start Date & Time: 9/8/17 1520
End Date & Time: 9/12/17 1515
Test Organism: Atherinops affinis

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	7.2	6.8	6.9	7.2	6.9	6.8	8.55	8.31	8.11	8.45	8.21	8.11
3.125	7.0	6.7	6.6	7.2	7.0	7.1	8.54	8.21	8.13	8.24	8.25	8.05
6.25	7.1	6.8	6.8	7.3	7.1	6.8	8.51	8.18	8.08	8.29	8.22	8.04
11.1	7.1	6.8	6.7	7.3	7.0	6.7	8.52	8.03	7.99	8.18	8.21	8.01
25	7.2	7.0	6.9	7.4	6.8	6.5	8.50	7.95	7.92	8.15	8.11	7.98
50	7.1	6.9	6.8	7.4	7.2	7.0	8.39	7.98	7.86	8.07	8.03	7.94

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
CON	28.7	29.1	29.3	29.1	29.1	29.3	19.5	20.1	19.7	19.1	19.5	19.8
3.125	28.8	28.9	29.0	29.0	29.1	29.1	19.5	20.2	19.8	19.5	19.5	19.6
6.25	28.8	28.8	28.9	29.0	29.1	29.2	19.7	20.2	19.8	19.4	19.6	19.8
11.1	29.0	29.2	29.0	29.9	29.3	29.2	19.6	20.1	19.6	19.4	19.6	19.8
25	29.1	29.2	29.3	29.2	29.4	29.5	19.9	20.1	19.7	19.7	19.6	19.8
50	29.3	29.4	29.5	29.2	29.5	29.7	20.1	20.0	19.6	19.8	19.7	19.8
Tech. Initials	ut	ut	ut	ut	ut	ut						
Sample Used:	17-124			17-124								

Sample Conc. or %	Rep #	Cont #	Number of Live Organisms 0	24	48	72	96
CON	1	20	5	5	5	5	5
	2	20	5	5	5	5	5
	3	11	5	4	4	4	4
	4	2	5	5	5	5	5
3.125	1	13	5	4	4	4	4
	2	15	5	5	5	5	5
	3	24	5	5	5	5	5
	4	23	5	5	5	5	5
6.25	1	18	5	5	5	5	5
	2	8	5	5	5	5	5
	3	6	5	5	5	5	5
	4	28	5	5	5	5	5
11.1	1	9	5	5	5	5	5
	2	10	5	5	5	5	5
	3	19	5	5	5	5	5
	4	7	5	5	5	5	5
25	1	5	5	5	5	5	5
	2	3	5	5	5	5	5
	3	14	5	5	5	5	5
	4	4	5	5	5	5	5
50	1	16	5	5	5	5	5
	2	25	5	5	5	5	5
	3	27	5	5	5	5	5
	4	1	5	5	5	5	5
Tech. Initials			ut	ut	ut	ut	ut

Dilution Water Batch #: ASW#013
Test Chamber: VWR

Comments:

Animal Source: ABS
Date Received: 9/8/17
Date of Hatch: 8/30/17

48-Hr, Feeding: ✓

QA Check: ut

Sample 1 of 2

Rainier Environmental
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Tacoma, WA 98424

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

Client: NAVFAC / Kane Env.
Sample ID: WW-1-090817
Test # 1709-021
Log-In #: 17-124

Start Date & Time: 9/8/17 1520
End Date & Time: 9/12/17 1515
Test Organism: Atherinops affinis

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
100	7.3	6.9	6.6	7.4	7.2	6.8	7.95	7.84	7.65	7.95	~~7.94~~ 7.91	7.79

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
100	29.5	29.6	29.7	29.4	29.9	30.1	20.4	20.0	19.6	19.9	19.9	19.8
Tech. Initials	RT	RT	RT	RT	RT	RT						
Sample Used:	17-124			17-124								

Dilution Water Batch #: ASW # 013
Test Chamber: VWR

Sample Conc. or %	Rep #	Cont #	Number of Live Organisms 0	24	48	72	96
100	1	12	5	5	5	5	5
	2	17	5	5	5	5	5
	3	22	5	5	5	5	5
	4	21	5	5	5	5	5
	1						
	2						
	3						
	4						
	1						
	2						
	3						
	4						
	1						
	2						
	3						
	4						
	1						
	2						
	3						
	4						
	1						
	2						
	3						
	4						
Tech. Initials			RT	RT	RT	RT	RT

Comments:

Animal Source: ABS
Date Received: 9/8/17
Date of Hatch: 8/30/17

48-Hr, Feeding: ✓

QA Check: RT

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:	05-2021-8028	**Test Type:**	Growth-Survival (7d)	**Analyst:**	Eric Tollefson
Start Date:	08 Sep-17 15:55	**Protocol:**	EPA/821/R-02-014 (2002)	**Diluent:**	Laboratory Seawater
Ending Date:	15 Sep-17 15:30	**Species:**	Mysidopsis bahia	**Brine:**	
Duration:	7d	**Source:**	Aquatic Biosystems, CO	**Age:**	7d

Sample ID:	20-4218-0742	**Code:**	17-124	**Client:**	NAVFAC
Sample Date:	08 Sep-17 10:30	**Material:**	Industrial Effluent	**Project:**	
Receive Date:	08 Sep-17 12:40	**Source:**	NAVFAC (WA0002780)		
Sample Age:	5h (7 °C)	**Station:**			

Comparison Summary

Analysis ID	Endpoint	NOEL	LOEL	TOEL	PMSD	TU	Method
04-5196-4742	7d Survival Rate	100	>100	NA	18.2%	1	Steel Many-One Rank Sum Test
04-2424-9401	Mean Dry Biomass-mg	100	>100	NA	23.2%	1	Dunnett Multiple Comparison Test
04-4134-5359	Mean Dry Weight-mg	100	>100	NA	18.4%	1	Dunnett Multiple Comparison Test

Point Estimate Summary

Analysis ID	Endpoint	Level	%	95% LCL	95% UCL	TU	Method
08-0332-5001	Mean Dry Biomass-mg	IC5	10.27	7.548	N/A	9.74	Linear Interpolation (ICPIN)
		IC10	67.92	9.144	N/A	1.472	
		IC15	97.69	50.52	N/A	1.024	
		IC20	>100	N/A	N/A	<1	
		IC25	>100	N/A	N/A	<1	
		IC40	>100	N/A	N/A	<1	
		IC50	>100	N/A	N/A	<1	
21-1557-1218	Mean Dry Weight-mg	IC5	55.13	2.295	86.98	1.814	Linear Interpolation (ICPIN)
		IC10	71.93	9.999	N/A	1.39	
		IC15	93.76	59.91	N/A	1.067	
		IC20	>100	N/A	N/A	<1	
		IC25	>100	N/A	N/A	<1	
		IC40	>100	N/A	N/A	<1	
		IC50	>100	N/A	N/A	<1	

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

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	0.875	0.8194	0.9306	0.6	1	0.05261	0.1488	17.01%	0.0%
3.125		8	0.925	0.8863	0.9637	0.8	1	0.0366	0.1035	11.19%	-5.71%
6.25		8	0.925	0.8863	0.9637	0.8	1	0.0366	0.1035	11.19%	-5.71%
11.1		8	0.9	0.8435	0.9565	0.6	1	0.05345	0.1512	16.8%	-2.86%
25		8	0.875	0.8066	0.9434	0.6	1	0.06478	0.1832	20.94%	0.0%
50		8	0.875	0.8194	0.9306	0.6	1	0.05261	0.1488	17.01%	0.0%
100		8	0.9	0.8601	0.9399	0.8	1	0.0378	0.1069	11.88%	-2.86%

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	0.2458	0.2269	0.2646	0.138	0.292	0.01785	0.05048	20.54%	0.0%
3.125		8	0.2553	0.2352	0.2753	0.182	0.344	0.01895	0.05361	21.0%	-3.87%
6.25		8	0.2953	0.2794	0.3111	0.232	0.358	0.01505	0.04257	14.42%	-20.14%
11.1		8	0.2335	0.2163	0.2507	0.176	0.316	0.01627	0.04602	19.71%	4.99%
25		8	0.248	0.2305	0.2655	0.172	0.308	0.01656	0.04684	18.89%	-0.92%
50		8	0.2685	0.2527	0.2843	0.202	0.342	0.01496	0.04232	15.76%	-9.26%
100		8	0.2248	0.2041	0.2454	0.12	0.286	0.01951	0.05519	24.56%	8.55%

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	0.2825	0.2628	0.3022	0.212	0.365	0.01867	0.05281	18.69%	0.0%
3.125		8	0.2748	0.2598	0.2898	0.226	0.344	0.01421	0.0402	14.63%	2.72%
6.25		8	0.3303	0.313	0.3475	0.232	0.38	0.01634	0.04623	14.0%	-16.9%
11.1		8	0.2608	0.248	0.2736	0.218	0.316	0.01213	0.03431	13.16%	7.68%
25		8	0.2877	0.2724	0.303	0.22	0.3467	0.01448	0.04096	14.24%	-1.83%
50		8	0.311	0.2935	0.3284	0.238	0.3825	0.0165	0.04666	15.0%	-10.07%
100		8	0.2479	0.2308	0.2649	0.15	0.286	0.01616	0.04571	18.44%	12.26%

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	0.6	0.8	1	1	1	0.8	0.8
3.125		1	0.8	0.8	1	0.8	1	1	1
6.25		0.8	1	1	1	0.8	1	0.8	1
11.1		0.6	1	1	0.8	1	0.8	1	1
25		1	1	0.6	1	0.8	1	0.6	1
50		0.8	0.6	1	0.8	1	1	0.8	1
100		1	1	0.8	1	0.8	1	0.8	0.8

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	0.212	0.138	0.242	0.286	0.266	0.256	0.292	0.274
3.125		0.226	0.23	0.182	0.266	0.214	0.344	0.266	0.314
6.25		0.256	0.232	0.298	0.334	0.262	0.318	0.304	0.358
11.1		0.176	0.218	0.316	0.22	0.252	0.184	0.23	0.272
25		0.22	0.268	0.208	0.304	0.256	0.308	0.172	0.248
50		0.254	0.202	0.278	0.26	0.238	0.268	0.306	0.342
100		0.286	0.28	0.182	0.264	0.226	0.228	0.12	0.212

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	0.212	0.23	0.3025	0.286	0.266	0.256	0.365	0.3425
3.125		0.226	0.2875	0.2275	0.266	0.2675	0.344	0.266	0.314
6.25		0.32	0.232	0.3725	0.334	0.3275	0.318	0.38	0.358
11.1		0.2933	0.218	0.316	0.275	0.252	0.23	0.23	0.272
25		0.22	0.268	0.3467	0.304	0.32	0.308	0.2867	0.248
50		0.3175	0.3367	0.278	0.325	0.238	0.268	0.3825	0.342
100		0.286	0.28	0.2275	0.264	0.2825	0.228	0.15	0.265

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	3/5	4/5	5/5	5/5	5/5	4/5	4/5
3.125		5/5	4/5	4/5	5/5	4/5	5/5	5/5	5/5
6.25		4/5	5/5	5/5	5/5	4/5	5/5	4/5	5/5
11.1		3/5	5/5	5/5	4/5	5/5	4/5	5/5	5/5
25		5/5	5/5	3/5	5/5	4/5	5/5	3/5	5/5
50		4/5	3/5	5/5	4/5	5/5	5/5	4/5	5/5
100		5/5	5/5	4/5	5/5	4/5	5/5	4/5	4/5

Initial and Final Chemistries

Seven Day Chronic Saltwater Bioassay

Client: NAVFAC / Kane Env.
Sample ID: WW-1-090817
Test No: 1709-024
Rainier Check-In #: 17-124 17-124

Start Date & Time: 9/8/17 1555
Stop Date & Time: 9/15/17 1530
Test species: Americamysis bahia
17-124

Conc. or % CON	Days 0 init.	0 final	1 init.	1 final	2 init.	2 final	3 init.	3 final	4 init.	4 final	5 init.	5 final	6 init.	6 final
pH	8.65	8.31	8.62	7.98	8.51	8.12	8.47	8.18	8.44	8.10	8.41	8.09	8.38	8.05
DO (mg/l)	6.5	5.2	6.6	5.1	6.5	5.7	6.6	5.5	6.6	5.3	6.5	5.1	6.7	5.2
Salinity (ppt)	28.0	28.5	29.4	29.1	29.1	29.5	29.1	29.3	29.2	29.5	29.1	29.5	29.1	29.7
Temperature (°C)	25.0	25.2	25.1	25.5	25.0	25.2	25.1	25.2	25.0	25.2	25.1	25.2	25.0	25.4

3.125	Days 0 init.	0 final	1 init.	1 final	2 init.	2 final	3 init.	3 final	4 init.	4 final	5 init.	5 final	6 init.	6 final
pH	8.62	8.28	8.61	8.05	8.48	8.10	8.48	8.15	8.47	8.08	8.42	8.00	8.39	8.10
DO (mg/l)	6.3	5.1	6.7	5.3	6.6	5.8	6.7	5.2	6.7	5.1	6.6	5.2	6.7	5.4
Salinity (ppt)	28.3	29.7	28.4	28.8	28.8	29.1	29.1	28.4	29.3	29.7	29.1	29.6	29.0	30.0
Temperature (°C)	25.0	25.2	25.2	25.4	25.1	25.2	25.2	25.1	25.3	25.2	25.1	25.1	25.2	25.4

6.25	Days 0 init.	0 final	1 init.	1 final	2 init.	2 final	3 init.	3 final	4 init.	4 final	5 init.	5 final	6 init.	6 final
pH	8.60	8.21	8.54	8.01	8.49	8.05	8.45	8.15	8.40	8.05	8.42	7.98	8.37	8.07
DO (mg/l)	6.5	5.1	6.6	5.3	6.7	5.5	6.7	5.4	6.6	5.1	6.6	5.3	6.6	5.2
Salinity (ppt)	28.5	29.9	28.5	28.7	28.8	29.6	29.0	29.2	29.3	29.8	29.1	29.8	29.0	29.5
Temperature (°C)	25.1	25.2	25.2	25.4	25.1	25.3	25.2	25.2	25.2	25.2	25.2	25.1	25.1	25.2

11.1	Days 0 init.	0 final	1 init.	1 final	2 init.	2 final	3 init.	3 final	4 init.	4 final	5 init.	5 final	6 init.	6 final
pH	8.55	8.18	8.52	7.97	8.45	8.01	8.41	8.10	8.35	8.01	8.33	7.97	8.31	7.98
DO (mg/l)	6.8	5.2	6.7	5.5	6.7	5.4	6.7	5.1	6.6	5.0	6.7	5.4	6.6	5.5
Salinity (ppt)	28.3	28.4	28.9	29.1	28.9	29.5	29.0	29.2	29.1	29.5	29.2	29.6	29.1	29.7
Temperature (°C)	25.2	25.3	25.3	25.5	25.1	25.4	25.2	25.2	25.2	25.2	25.2	25.2	25.1	25.2

25	Days 0 init.	0 final	1 init.	1 final	2 init.	2 final	3 init.	3 final	4 init.	4 final	5 init.	5 final	6 init.	6 final
pH	8.43	8.01	8.42	7.92	8.38	7.98	8.31	8.03	8.27	7.98	8.31	7.95	8.28	7.99
DO (mg/l)	6.8	5.3	6.6	5.7	6.7	5.1	6.6	5.2	6.5	5.2	6.7	5.5	6.6	5.7
Salinity (ppt)	28.3	29.5	29.1	29.5	29.0	29.5	29.0	29.3	29.1	29.5	29.3	30.1	29.4	29.5
Temperature (°C)	25.3	25.4	25.5	25.4	25.4	25.2	25.4	25.3	25.2	25.1	25.3	25.2	25.2	25.1

50	Days 0 init.	0 final	1 init.	1 final	2 init.	2 final	3 init.	3 final	4 init.	4 final	5 init.	5 final	6 init.	6 final
pH	8.21	7.99	8.15	7.91	8.11	7.95	8.08	7.94	8.11	7.95	8.20	7.92	8.18	7.95
DO (mg/l)	6.8	5.0	6.6	5.2	6.6	5.3	6.7	5.4	6.6	5.2	6.5	5.1	6.6	5.4
Salinity (ppt)	28.3	28.6	29.2	29.5	29.1	25.7	28.8	29.0	29.0	29.2	29.4	30.1	29.6	29.9
Temperature (°C)	25.3	25.2	25.4	25.4	25.2	25.2	25.6	25.1	25.1	25.2	25.5	25.2	25.2	25.3
Tech Initials:	VM	[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: Rm.2
Dilution Water Batch #: ASW #013

QA Check: [illegible]

Sample Description:
Organism Source: ABS
Date Received: 9/8/17
Date of Hatch: ~~9/8/17~~ 9/1/17

Comments:

Initial and Final Chemistries

Seven Day Chronic Saltwater Bioassay

Client: NAVFAC / Kane Env.
Sample ID: WW-1-090817
Test No: 1709-024
Rainier Check-In #: 17-124 17-124

Start Date & Time: 9/8/17 1555
Stop Date & Time: 9/15/17 1530
Test species: Americamysis bahia
17-124

Conc. or (%) 100	Days													
	0		1		2		3		4		5		6	
	init.	final	init.	final	init.	final	init.	final	init.	final	init.	final	init.	final
pH	7.93	7.87	7.86	7.68	7.87	7.82	7.95	7.97	7.90	7.91	8.05	7.81	7.97	7.89
DO (mg/l)	6.8	5.5	6.7	5.1	6.6	5.0	6.7	5.3	6.7	5.2	6.7	5.0	6.6	5.2
Salinity (ppt)	28.1	28.4	29.5	29.8	29.3	30.1	28.5	28.7	28.8	29.3	29.9	30.6	30.2	30.6
Temperature (°C)	25.3	25.2	25.8	25.4	25.6	25.5	25.9	25.1	25.1	25.3	25.4	25.2	25.4	25.3

	Days													
	0		1		2		3		4		5		6	
	init.	final	init.	final	init.	final	init.	final	init.	final	init.	final	init.	final
pH														
DO (mg/l)														
Salinity (ppt)														
Temperature (°C)														

	Days													
	0		1		2		3		4		5		6	
	init.	final	init.	final	init.	final	init.	final	init.	final	init.	final	init.	final
pH														
DO (mg/l)														
Salinity (ppt)														
Temperature (°C)														

	Days													
	0		1		2		3		4		5		6	
	init.	final	init.	final	init.	final	init.	final	init.	final	init.	final	init.	final
pH														
DO (mg/l)														
Salinity (ppt)														
Temperature (°C)														

	Days													
	0		1		2		3		4		5		6	
	init.	final	init.	final	init.	final	init.	final	init.	final	init.	final	init.	final
pH														
DO (mg/l)														
Salinity (ppt)														
Temperature (°C)														

	Days													
	0		1		2		3		4		5		6	
	init.	final	init.	final	init.	final	init.	final	init.	final	init.	final	init.	final
pH														
DO (mg/l)														
Salinity (ppt)														
Temperature (°C)														
Tech Initials:	(m)	[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: Rm. 2
Dilution Water Batch #: ASW #013

QA Check: [illegible]

Sample Description:
Organism Source: ABS
Date Received: 9/8/17
Date of Hatch: 9/2/17

Comments:

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

Raw Data Sheet
Mysid Shrimp
(Americamysis bahia)
Mysid Survival

Client: NAVFAC/Kane Env.

Test Number: 1709-024

Sample ID: WW-1-090817

Conc. or %	Cont.	Rep.	Days 0	1	2	3	4	5	6	7	Mean % Survival
100	29	1	5	5	5	5	5	5	5	5	
	27	2	5	5	5	5	5	5	5	5	
	48	3	5	5	5	5	5	5	5	4	
	49	4	5	5	5	5	5	5	5	5	
	30	5	5	5	5	5	5	4	4	4	
	22	6	5	5	5	5	5	5	5	5	
	15	7	5	5	5	5	5	5	5	4	
	55	8	5	5	5	5	5	5	5	~~5~~ 4 @	
		1	5								
		2	5								
		3	5								
		4	5								
		5	5								
		6	5								
		7	5								
		8	5								
		1	5								
		2	5								
		3	5								
		4	5								
		5	5								
		6	5								
		7	5								
		8	5								
Technician Initials			RT	RT	RT	RT	RT	RT	RT	RT	

Feeding Times: 0 1615 | 1 0715 1630 | 2 0700 1615 | 3 0700 1630 | 4 0715 1600 | 5 0715 1600 | 6 0715 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: NAVFAC / Kane Env.

Test Number: 1709-024

Sample ID: WW-1-090817

Conc. or %	Cont.	Rep.	Days 0	1	2	3	4	5	6	7	Mean % Survival
11.1	40	1	5	5	5	5	5	5	5	3	
	12	2	5	5	5	5	5	5	5	5	
	33	3	5	5	5	5	5	5	5	5	
	42	4	5	5	5	5	5	4	4	4	
	21	5	5	5	5	5	5	5	5	5	
	9	6	5	5	5	5	5	4	4	4	
	37	7	5	5	5	5	5	5	5	5	
	14	8	5	5	5	5	5	5	5	5	
25	20	1	5	5	5	5	5	5	5	5	
	53	2	5	5	5	5	5	5	5	5	
	17	3	5	5	5	4	4	4	4	3	
	32	4	5	5	5	5	5	5	5	5	
	56	5	5	5	5	5	5	5	5	4	
	25	6	5	5	5	5	5	5	5	5	
	8	7	5	5	5	4	4	4	3	3	
	51	8	5	5	5	5	5	5	5	5	
50	31	1	5	5	5	4	4	4	4	4	
	24	2	5	5	4	4	4	4	4	3	
	16	3	5	5	5	5	5	5	5	5	
	50	4	5	5	5	5	4	4	4	4	
	11	5	5	5	5	5	5	5	5	5	
	6	6	5	5	5	5	5	5	5	5	
	54	7	5	5	5	5	5	4	4	4	
	28	8	5	5	5	5	5	5	5	5	
Technician Initials			[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	

Feeding Times: 0 1615 1 0715 1630 2 0715 1615 3 0715 1630 4 0715 1600 5 0715 1600 6 0715 1600

QA check [illegible]

Comments:

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

Raw Data Sheet
Mysid Shrimp
(Americamysis bahia)
Mysid Survival

Client: NAVFAC/Kane Env.

Test Number: 1709-024

Sample ID: WW-1-090817

Conc. or (%)	Cont.	Rep.	Days 0	1	2	3	4	5	6	7	Mean % Survival
CON	52	1	5	5	5	5	5	5	5	5	
	47	2	5	5	4	4	4	3	3	3	
	7	3	5	5	5	5	5	5	5	4	
	18	4	5	5	5	5	5	5	5	5	
	45	5	5	5	5	5	5	5	5	5	
	46	6	5	5	5	5	5	5	5	5	
	34	7	5	5	5	5	5	4	4	4	
	10	8	5	5	5	5	4	4	4	4	
3.125	39	1	5	5	5	5	5	5	5	5	
	44	2	5	5	5	5	4	4	4	4	
	41	3	5	5	5	5	4	4	4	4	
	23	4	5	5	5	5	5	5	5	5	
	36	5	5	5	5	5	5	5	4	4	
	26	6	5	5	5	5	5	5	5	5	
	35	7	5	5	5	5	5	5	5	5	
	5	8	5	5	5	5	5	5	5	5	
6.25	43	1	5	5	5	5	5	5	5	4	
	13	2	5	5	5	5	5	5	5	5	
	38	3	5	5	5	5	5	5	5	5	
	3	4	5	5	5	5	5	5	5	5	
	2	5	5	5	5	5	5	5	4	4	
	19	6	5	5	5	5	5	5	5	5	
	1	7	5	5	5	5	5	5	4	4	
	4	8	5	5	5	5	5	5	5	5	
Technician Initials			[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	

Feeding Times: 0 1615 1 0715 1630 2 0720 1615 3 0720 1630 4 0715 1600 5 0715 1600 6 0715 1600

QA check [illegible]

Comments:

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

Raw Data Sheet
Mysid Weights
Seven Day Chronic Bioassay

Client: NAVFAC / Kane Env.

Species: *Americamysis bahia*

Sample ID: WW-1-090817

Test Number: 1709-024

Conc. or %	Cont.	Rep.	pan wt. (gm)	pan + mysid (gm)	mysid wt. (mg)	# mysids	avg. per mysid (mg)	avg. per conc.
CON	52	1	0.05769	0.05875		5		
	47	2	0.05995	0.06064		3		
	7	3	0.05306	0.05427		4		
	18	4	0.05975	0.06118		5		
	45	5	0.05737	0.05870		5		
	46	6	0.05713	0.05841		5		
	34	7	0.05787	0.05933		4		
	10	8	0.06018	0.06155		4		
3.125	39	1	0.06084	0.06197		5		
	44	2	0.06308	0.06423		4		
	41	3	0.06396	0.06487		4		
	23	4	0.05897	0.06030		5		
	36	5	0.05989	0.06096		4		
	26	6	0.06076	0.06248		5		
	35	7	0.05966	0.06099		5		
	5	8	0.06231	0.06388		5		
6.25	43	1	0.06094	0.06222		4		
	13	2	0.05741	0.05857		5		
	38	3	0.05840	0.05989*		4 *		
	3	4	0.06307	0.06474		5		
	2	5	0.06034	0.06165		4		
	19	6	0.05893	0.06052		5		
	1	7	0.06073	0.06225		4		
	4	8	0.06290	0.06469		5		
	Tech Initials:		m	m				

Date/Time in: 9/15/17 1530
Date/Time out: 9/17/17 1230

Oven temp. (°C): 65.0
Oven temp. (°C): 62.0

QA Check: gt

* foil missing 1 mysid

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

Raw Data Sheet
Mysid Weights
Seven Day Chronic Bioassay

Client: NAVFAC / Kane Env.

Species: *Americamysis bahia*

Sample ID: WW-1-090817

Test Number: 1709-024

Conc. or %	Cont.	Rep.	pan wt. (gm)	pan + mysid (gm)	mysid wt. (mg)	# mysids	avg. per mysid (mg)	avg. per conc.
11.1	40	1	0.060092	0.06180		3		
	12	2	0.05710	0.05819		5		
	33	3	0.060222	0.060380		5		
	42	4	0.059606	0.060776		4		
	21	5	0.060030	0.061576		5		
	9	6	0.060348	0.06440		4		
	37	7	0.06101	0.062116		5		
	14	8	0.058576	0.05992		5		
25	20	1	0.062776	0.063876		5		
	53	2	0.060776	0.06210		5		
	17	3	0.06188	0.06292		3		
	32	4	0.05769	0.05921		5		
	56	5	0.05424	0.05552		4		
	25	6	0.058376	0.05990		5		
	8	7	0.06041	0.06127		3		
	51	8	0.06012	0.06136		5		
50	31	1	0.063365	0.06492		4		
	24	2	0.05700	0.05801		3		
	16	3	0.06074	0.06213		5		
	50	4	0.06120	0.06250		4		
	11	5	0.05632	0.05751		5		
	6	6	0.063166	0.06450		5		
	54	7	0.06020	0.06173		4		
	28	8	0.06027	0.06198		5		
	Tech Initials:		(m)	(m)				

Date/Time in: 9/15/17 1530 **Oven temp. (°C):** 65.0 **QA Check:** ✓

Date/Time out: 9/17/17 1230 **Oven temp. (°C):** 62.0

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

Raw Data Sheet
Mysid Weights
Seven Day Chronic Bioassay

Client: NAVFAC / Kane Env.

Species: *Americamysis bahia*

Sample ID: WW-1-090817

Test Number: 1709-024

Conc. or (%)	Cont.	Rep.	pan wt. (gm)	pan + mysid (gm)	mysid wt. (mg)	# mysids	avg. per mysid (mg)	avg. per conc.
100	29	1	0.05739	0.05882		5		
	27	2	0.05980	0.06120		5		
	48	3	0.06070	0.06161		4		
	49	4	0.06348	0.06480		5		
	30	5	0.06319	0.06432		4		
	22	6	0.05594	0.05708		5		
	15	7	0.05900	0.05960		4		
	55	8	0.05958	0.06064		4		
		1						
		2						
		3						
		4						
		5						
		6						
		7						
		8						
		1						
		2						
		3						
		4						
		5						
		6						
		7						
		8						
	Tech Initials:		m	m				

Date/Time in: 9/15/17 1530 **Oven temp. (°C):** 65.0 **QA Check:** [illegible]

Date/Time out: 9/17/17 1230 **Oven temp. (°C):** 62.0

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:	19-8246-9908	**Test Type:**	Growth-Survival (7d)	**Analyst:**	Eric Tollefson
Start Date:	18 Sep-17 14:55	**Protocol:**	EPA/600/R-95/136 (1995)	**Diluent:**	Laboratory Seawater
Ending Date:	15 Sep-17 14:30	**Species:**	Atherinops affinis	**Brine:**	Crystal Sea
Duration:	NA	**Source:**	Aquatic Biosystems, CO	**Age:**	9d

Sample ID:	20-4218-0742	**Code:**	17-124	**Client:**	NAVFAC
Sample Date:	08 Sep-17 10:30	**Material:**	Industrial Effluent	**Project:**	
Receive Date:	08 Sep-17 12:40	**Source:**	NAVFAC (WA0002780)		
Sample Age:	10d 4h (7 °C)	**Station:**			

Comparison Summary

Analysis ID	Endpoint	NOEL	LOEL	TOEL	PMSD	TU	Method
05-3749-3229	7d Survival Rate	100	>100	NA	10.1%	1	Steel Many-One Rank Sum Test
04-2073-3420	Mean Dry Biomass-mg	50	100	70.71	27.0%	2	Dunnett Multiple Comparison Test
21-3792-5258	Mean Dry Weight-mg	50	100	70.71	24.1%	2	Dunnett Multiple Comparison Test

Point Estimate Summary

Analysis ID	Endpoint	Level	%	95% LCL	95% UCL	TU	Method
02-0289-0217	Mean Dry Biomass-mg	IC5	1.508	N/A	61.86	66.32	Linear Interpolation (ICPIN)
		IC10	28.5	N/A	75.4	3.509	
		IC15	37.85	N/A	114.6	2.642	
		IC20	50.21	N/A	N/A	1.992	
		IC25	71.22	7.11	N/A	1.404	
		IC40	>100	N/A	N/A	<1	
		IC50	>100	N/A	N/A	<1	
12-1198-7379	Mean Dry Weight-mg	IC5	1.039	0.08237	57.74	96.28	Linear Interpolation (ICPIN)
		IC10	25.11	N/A	75.73	3.983	
		IC15	37.41	N/A	93.51	2.673	
		IC20	53.57	N/A	N/A	1.867	
		IC25	69.36	19.71	N/A	1.442	
		IC40	>100	N/A	N/A	<1	
		IC50	>100	N/A	N/A	<1	

Test Acceptability

Analysis ID	Endpoint	Attribute	Test Stat	TAC Limits	Overlap	Decision
05-3749-3229	7d Survival Rate	Control Resp	0.96	0.8 - NL	Yes	Passes Acceptability Criteria
02-0289-0217	Mean Dry Biomass-mg	Control Resp	1.095	0.85 - NL	Yes	Passes Acceptability Criteria
04-2073-3420	Mean Dry Biomass-mg	Control Resp	1.095	0.85 - NL	Yes	Passes Acceptability Criteria
05-3749-3229	7d Survival Rate	PMSD	0.1011	NL - 0.25	No	Passes Acceptability Criteria
04-2073-3420	Mean Dry Biomass-mg	PMSD	0.2701	NL - 0.5	No	Passes Acceptability Criteria

Pacific Topsmelt 7-d Survival and Growth Test

Rainier Environmental Laboratory

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	0.96	0.9266	0.9934	0.8	1	0.04	0.08944	9.32%	0.0%
3.125		5	1	1	1	1	1	0	0	0.0%	-4.17%
6.25		5	0.96	0.9266	0.9934	0.8	1	0.04	0.08944	9.32%	0.0%
11.1		5	1	1	1	1	1	0	0	0.0%	-4.17%
25		5	1	1	1	1	1	0	0	0.0%	-4.17%
50		5	0.96	0.9266	0.9934	0.8	1	0.04	0.08944	9.32%	0.0%
100		5	1	1	1	1	1	0	0	0.0%	-4.17%

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	1.095	1.003	1.188	0.72	1.308	0.1108	0.2477	22.61%	0.0%
3.125		5	1	0.9042	1.097	0.718	1.372	0.1153	0.2577	25.76%	8.66%
6.25		5	0.9444	0.8658	1.023	0.63	1.134	0.09409	0.2104	22.28%	13.77%
11.1		5	1.07	0.9889	1.151	0.87	1.404	0.09713	0.2172	20.3%	2.3%
25		5	1.028	0.9878	1.069	0.872	1.16	0.04861	0.1087	10.57%	6.1%
50		5	0.8768	0.835	0.9186	0.746	1.054	0.0501	0.112	12.78%	19.94%
100		5	0.768	0.7144	0.8216	0.63	0.93	0.06422	0.1436	18.7%	29.88%

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	1.131	1.062	1.2	0.9	1.308	0.08251	0.1845	16.31%	0.0%
3.125		5	1	0.9042	1.097	0.718	1.372	0.1153	0.2577	25.76%	11.56%
6.25		5	0.9759	0.9175	1.034	0.7875	1.134	0.06996	0.1564	16.03%	13.73%
11.1		5	1.07	0.9889	1.151	0.87	1.404	0.09713	0.2172	20.3%	5.41%
25		5	1.028	0.9878	1.069	0.872	1.16	0.04861	0.1087	10.57%	9.09%
50		5	0.92	0.8665	0.9735	0.746	1.08	0.06403	0.1432	15.56%	18.67%
100		5	0.768	0.7144	0.8216	0.63	0.93	0.06422	0.1436	18.7%	32.11%

7d Survival Rate Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Dilution Water	1	1	1	1	0.8
3.125		1	1	1	1	1
6.25		1	0.8	1	1	1
11.1		1	1	1	1	1
25		1	1	1	1	1
50		1	1	1	1	0.8
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	0.968	1.264	1.216	1.308	0.72
3.125		1.144	0.892	0.876	1.372	0.718
6.25		1.134	0.63	0.846	0.994	1.118
11.1		1.11	1.404	1.084	0.882	0.87
25		1.008	1.096	1.006	1.16	0.872
50		0.882	0.838	1.054	0.746	0.864
100		0.93	0.916	0.698	0.63	0.666

Mean Dry Weight-mg Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Dilution Water	0.968	1.264	1.216	1.308	0.9
3.125		1.144	0.892	0.876	1.372	0.718
6.25		1.134	0.7875	0.846	0.994	1.118
11.1		1.11	1.404	1.084	0.882	0.87
25		1.008	1.096	1.006	1.16	0.872
50		0.882	0.838	1.054	0.746	1.08
100		0.93	0.916	0.698	0.63	0.666

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	4/5
3.125		5/5	5/5	5/5	5/5	5/5
6.25		5/5	4/5	5/5	5/5	5/5
11.1		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	4/5
100		5/5	5/5	5/5	5/5	5/5

Initial and Final Chemistries

Seven Day Chronic Saltwater Bioassay

Client: NAVFAC / Kane Environmental
Sample ID: WW-1-090817
Test No: 1709-022
Rainier Check-In #: 17-124 17-124

Start Date & Time: 9/8/17 1455
Stop Date & Time: 9/15/17 1430
Test species: Atherinops affinis 17-124

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	8.66	8.21	8.62	8.18	8.54	8.15	8.49	8.11	8.45	8.13	8.41	8.05	8.47	8.11
DO (mg/l)	7.0	6.8	7.0	6.5	6.9	6.7	7.0	6.8	6.8	6.9	6.7	6.8	7.0	6.8
Salinity (ppt)	28.3	28.5	28.4	29.0	29.7	29.1	29.1	29.3	29.1	29.4	29.2	29.5	29.1	29.7
Temperature (°C)	19.9	19.3	20.7	19.9	20.1	20.3	20.6	19.8	20.6	19.8	20.8	19.9	20.5	19.7

3.125	Days													
	0		1		2		3		4		5		6	
	init.	final	init.	final	init.	final	init.	final	init.	final	init.	final	init.	final
pH	8.64	8.18	8.61	8.17	8.52	8.13	8.45	8.12	8.43	8.13	8.40	7.98	8.45	8.05
DO (mg/l)	7.1	6.7	7.1	6.6	6.8	6.8	7.1	6.8	7.0	6.5	6.8	6.6	7.1	6.7
Salinity (ppt)	28.3	28.7	28.4	28.6	28.7	29.2	29.1	29.6	29.1	29.5	29.1	29.6	29.1	29.4
Temperature (°C)	20.3	19.4	20.6	19.8	20.6	20.2	20.5	19.8	20.7	20.1	20.8	19.8	20.6	19.8

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	8.61	8.17	8.58	8.15	8.51	8.11	8.47	8.08	8.44	8.10	8.38	7.95	8.44	7.98
DO (mg/l)	7.1	6.7	7.1	6.8	6.8	6.7	7.1	6.9	7.0	6.8	6.8	6.5	7.2	6.8
Salinity (ppt)	28.4	28.8	28.4	28.7	28.8	29.2	29.2	29.3	29.2	29.7	29.1	29.4	29.0	29.1
Temperature (°C)	20.4	19.5	20.7	19.8	20.5	20.2	20.5	19.7	20.7	20.1	20.9	19.8	20.6	19.8

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	8.53	8.14	8.52	8.14	8.50	8.07	8.38	8.05	8.35	8.06	8.37	7.95	8.40	7.93
DO (mg/l)	7.2	6.6	7.2	6.8	7.0	6.7	7.0	6.8	7.1	6.9	6.7	6.6	7.2	6.8
Salinity (ppt)	28.4	28.9	28.5	28.9	28.9	29.4	29.4	29.3	29.3	29.6	29.0	29.2	29.0	29.1
Temperature (°C)	20.4	19.5	20.8	19.9	20.4	20.3	20.2	19.7	20.4	20.0	20.8	19.8	20.6	19.8

25	Days													
	0		1		2		3		4		5		6	
	init.	final	init.	final	init.	final	init.	final	init.	final	init.	final	init.	final
pH	8.44	8.08	8.47	8.11	8.44	8.02	8.21	8.01	8.27	8.04	8.29	7.92	8.28	7.91
DO (mg/l)	7.1	6.8	7.2	6.9	7.1	6.6	7.1	6.7	7.0	6.8	6.6	6.7	7.2	6.9
Salinity (ppt)	28.4	28.5	28.5	28.7	29.0	29.5	29.2	29.3	29.3	29.7	29.0	29.5	29.1	29.1
Temperature (°C)	20.4	19.4	20.7	19.9	20.5	20.3	20.1	19.8	20.5	20.1	20.6	19.9	20.5	19.8

50	Days													
	0		1		2		3		4		5		6	
	init.	final	init.	final	init.	final	init.	final	init.	final	init.	final	init.	final
pH	8.18	7.95	8.23	8.01	8.24	7.98	8.17	7.99	8.15	8.02	8.22	7.81	8.27	7.93
DO (mg/l)	7.0	6.8	7.3	7.0	7.2	6.8	7.2	6.8	7.1	6.8	6.6	6.5	7.2	7.0
Salinity (ppt)	28.5	28.7	28.7	29.0	29.3	29.7	29.4	29.7	29.4	29.8	28.7	29.1	29.3	29.5
Temperature (°C)	20.5	19.5	20.7	19.9	20.3	20.3	19.8	19.8	20.5	20.1	20.4	19.7	20.5	19.8
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: VWR
Dilution Water Batch #: ASW#13

QA Check: [illegible]

Sample Description:
Organism Source: ABS
Date Received: 9/8/17
Date of Hatch: 8/30/17

Comments:

Initial and Final Chemistries

Seven Day Chronic Saltwater Bioassay

Client: NAVFAC / Kane Env.
Sample ID: WW-1-090817
Test No: 1709-022
Rainier Check-In #: 17-124 17-124

Start Date & Time: 9/8/17 1455
Stop Date & Time: 9/15/17 1430
Test species: Atherinops affinis
17-124

Conc. or %v/v 100	Days													
	0		1		2		3		4		5		6	
	init.	final	init.	final	init.	final	init.	final	init.	final	init.	final	init.	final
pH	7.87	7.91	7.90	7.97	7.85	7.92	7.92	7.92	7.95	7.98	8.05	7.93	8.10	7.91
DO (mg/l)	7.4	6.7	7.4	7.2	7.3	7.0	7.2	7.1	7.2	7.0	7.0	6.8	7.4	7.1
Salinity (ppt)	28.7	29.1	29.0	29.3	29.7	30.2	29.6	29.8	29.7	30.3	29.4	29.0	29.6	29.8
Temperature (°C)	20.1	19.5	20.3	19.9	20.0	20.3	19.4	19.8	20.3	20.4	20.2	19.7	20.3	19.8

	Days													
	0		1		2		3		4		5		6	
	init.	final	init.	final	init.	final	init.	final	init.	final	init.	final	init.	final
pH														
DO (mg/l)														
Salinity (ppt)														
Temperature (°C)														

	Days													
	0		1		2		3		4		5		6	
	init.	final	init.	final	init.	final	init.	final	init.	final	init.	final	init.	final
pH														
DO (mg/l)														
Salinity (ppt)														
Temperature (°C)														

	Days													
	0		1		2		3		4		5		6	
	init.	final	init.	final	init.	final	init.	final	init.	final	init.	final	init.	final
pH														
DO (mg/l)														
Salinity (ppt)														
Temperature (°C)														

	Days													
	0		1		2		3		4		5		6	
	init.	final	init.	final	init.	final	init.	final	init.	final	init.	final	init.	final
pH														
DO (mg/l)														
Salinity (ppt)														
Temperature (°C)														

	Days													
	0		1		2		3		4		5		6	
	init.	final	init.	final	init.	final	init.	final	init.	final	init.	final	init.	final
pH														
DO (mg/l)														
Salinity (ppt)														
Temperature (°C)														
Tech Initials:	ct	ct	ct	ct	ct	ct	ct	ct	ct	ct	ct	ct	ct	ct

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

Test Chamber: VWR
Dilution Water Batch #: ASW #13

QA Check: ct

Sample Description:
Organism Source: ABS
Date Received: 9/8/17
Date of Hatch: 8/30/17

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: NAVFAC / Kane Env. **Test No.:** 1709-022

Sample ID: WW1-090817

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	
	1	2	5	5	5	5	5	5	5	5	
	24	3	5	5	5	5	5	5	5	5	
	2	4	5	5	5	5	5	5	5	5	
	17	5	5	5	4	4	4	4	4	4	
3.125	22	1	5	5	5	5	5	5	5	5	
	18	2	5	5	5	5	5	5	5	5	
	31	3	5	5	5	5	5	5	5	5	
	27	4	5	5	5	5	5	5	5	5	
	21	5	5	5	5	5	5	5	5	5	
6.25	3	1	5	5	5	5	5	5	5	5	
	25	2	5	5	4	4	4	4	4	4	
	4	3	5	5	5	5	5	5	5	5	
	28	4	5	5	5	5	5	5	5	5	
	33	5	5	5	5	5	5	5	5	5	
11.1	26	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	
	11	4	5	5	5	5	5	5	5	5	
	12	5	5	5	5	5	5	5	5	5	
25	14	1	5	5	5	5	5	5	5	5	
	7	2	5	5	5	5	5	5	5	5	
	9	3	5	5	5	5	5	5	5	5	
	30	4	5	5	5	5	5	5	5	5	
	5	5	5	5	5	5	5	5	5	5	
SD	29	1	5	5	5	5	5	5	5	5	
	20	2	5	5	5	5	5	5	5	5	
	35	3	5	5	5	5	5	5	5	5	
	6	4	5	5	5	5	5	5	5	5	
	34	5	5	4	4	4	4	4	4	4	
Tech Initials			CT	CT	CT	CT	CT	CT	CT	CT	

Feeding Times: 0 1615 1 0715/1630 2 0720/1615 3 0720/1630 4 0715/1600 5 0715/1600 6 0715/1600

Comments: _____ **QA Check** CT

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

Raw Data Sheet
Pacific Topsmelt
(Atherinops affinis)
Larval Survival

Client Name: NAVFAC / Kane Env. **Test No.:** 1709-022

Sample ID: WW-1-090817

Conc. or %	Cont.	Rep.	Days 0	1	2	3	4	5	6	7	Mean % Survival
100	16	1	5	5	5	5	5	5	5	5	
	23	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	
	8	5	5	5	5	5	5	5	5	5	
		1	5								
		2	5								
		3	5								
		4	5								
		5	5								
		1	5								
		2	5								
		3	5								
		4	5								
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		4	5								
		5	5								
		1	5								
		2	5								
		3	5								
		4	5								
		5	5								
		1	5								
		2	5								
		3	5								
		4	5								
		5	5								
Tech Initials			ut	ut	ut	ut	ut	ut	ut	ut	

Feeding Times: 0 1615 1 0715 1630 2 0730 1615 3 0730 1630 4 0715 1600 5 0715 1600 6 0715 1600

Comments: _____ **QA Check** ut

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

Fish Weights
Seven Day Chronic Bioassay

Client: NAVFAC / Kane Env.

Species: *A. affinis*

Sample ID: WW-1-090817

Test No: 1709-022

Conc. or %	cont. #	rep.	pan wt. (gm)	pan + fish (gm)	fish wt. (mg)	# fish	avg. per fish (mg)	avg. per conc. (mg)
CON	19	1	0.05773	0.06257		5		
	1	2	0.06185	0.06817		5		
	24	3	0.05990	0.06598		5		
	2	4	0.05643	0.06297		5		
	17	5	0.05921	0.06281		4		
3.125	22	1	0.05689	0.06261		5		
	18	2	0.05798	0.06244		5		
	31	3	0.06124	~~0.06790~~ (m)	0.06562	5		
	27	4	0.05984	0.06670		5		
	21	5	0.06109	0.06468		5		
6.25	3	1	0.06113	0.06680		5		
	25	2	0.05864	0.06179		4		
	4	3	0.06129	0.06552		5		
	28	4	0.06103	0.06600		5		
	33	5	0.05583	0.06142		5		
11.1	26	1	0.05981	0.06536		5		
	10	2	0.06022	0.06724		5		
	32	3	0.05857	0.06399		5		
	11	4	0.06391	0.06832		5		
	12	5	0.06195	0.06630		5		
25	14	1	0.06094	0.06598		5		
	7	2	0.05859	0.06407		5		
	9	3	0.05542	0.06045		5		
	30	4	0.06324	0.06904		5		
	5	5	0.06054	0.06490		5		
50	29	1	0.06393	0.06834		5		
	20	2	0.05816	0.06235		5		
	35	3	0.06221	0.06748		5		
	6	4	0.05633	0.06006		5		
	34	5	0.06324	0.06756		4		
	Tech Initials:		[illegible]	(m)				

Date/Time in: 9/15/17 1455
Date/Time out: 9/17/17 1230

Oven temp. (°C): 65.0
Oven temp. (°C): 62.0

QA check [illegible]

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

Fish Weights
Seven Day Chronic Bioassay

Client: NAVFAC / Kane Env.

Species: *A. affinis*

Sample ID: WW-1-090817

Test No: 1709-022

Conc. or %	cont. #	rep.	pan wt. (gm)	pan + fish (gm)	fish wt. (mg)	# fish	avg. per fish (mg)	avg. per conc. (mg)
100	16	1	0.05979	0.06444		5		
	23	2	0.05744	0.06202		5		
	13	3	0.06441	0.06790		5		
	15	4	0.06293	0.06608		5		
	8	5	0.06182	0.06515		5		
		1						
		2						
		3						
		4						
		5						
		1						
		2						
		3						
		4						
		5						
		1						
		2						
		3						
		4						
		5						
		1						
		2						
		3						
		4						
		5						
		1						
		2						
		3						
		4						
		5						
	Tech Initials:		YL	TW				

Date/Time in: 9/15/17 1455
Date/Time out: 9/17/17 1230

Oven temp. (°C): 65.0
Oven temp. (°C): 62.0

QA check YL

Appendix E
Sample Check-In Sheet

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

Sample Check-In Information

Client: NAVFAC / Kane Environmental

Tests Performed: Aa-a,c My-a-c

Test ID No(s).: 1709-021; 1709-022; 1709-023; 1709-024

Sample ID:	WW-1-090817			
Log-in No. (10-xxxx):	17-124			
Sample Collection Date & Time:	09/8/17 1030			
Sample Receipt Date & Time:	9/8/17 1240			
Check-in Temperature (°C)	7.0			
Temperature OK?	(Y) N	Y N	Y N	Y N
DO (mg/L)	11.4			
pH (units)	7.64			
Conductivity (µS/cm)	29,110			
Salinity (ppt)	26.5			
Tit. Vol / Sam. Vol. / Alkalinity (mg/L)*	6.8 / 25 / 272	/ /	/ /	/ /
Tit. Vol. / Sam. Vol. / Hardness (mg/L)* [a]	NA SW	/ /	/ /	/ /
Total Chlorine (mg/L)	<0.03			
Total Ammonia Nitrogen (mg/L)	<1.0			
Technician Initials	(m)			

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

NM = Not Measured

Freshwater Tests:

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

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

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

Marine Tests:

Control/Dilution Water Source: test type: ~~My-a,c~~ Aa-a,c ART SW NAT SW #013 Alkalinity: 106 Salinity: 28.7

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? 28.7 test type: ~~28.7~~ Aa,a-c My-a,c

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

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.

Sample Description:

COC Complete? (Y) or N

1 ✓ 2 ___ 3 ___

Filtration? Y (N)

Pore Size: _____

Organisms or Debris

Aeration? Y (N)

Length of Time: _____

Final DO: _____

Final pH: _____

Hardness Adjustment? Y (N)

If adjusted, please see worksheet for details.

Sub-samples for additional chemistry:

QC Check: ✓

Appendix F
Chain-of-Custody Forms

Chain of Custody

Rainier ENVIRONMENTAL

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

Date 9/8/17 Page___of___

Sample Collection By:

Report to:
Company: Kane Environmental
Address: 3815 Woodland Park Ave N
City/State/Zip: Seattle WA 98103
Contact: Nate Evenson
Phone: (206) 691-0476 x4
Email: nevenson@kane-enviro.com

Invoice To:
Company: Kane Environmental
Address: PO Box 31936
City/State/Zip: Seattle WA 98103
Contact: Accounts Payable
Phone: 206-691-0476
Email: ap@kane-environmental.com

	SAMPLE ID	DATE	TIME	MATRIX	CONTAINER TYPE	NO. OF CONTAINERS	COMMENTS	Acute 96-hr mysid shrimp	Acute 96-hr Pacific topsmelt	Chronic 7-day mysid shrimp	Chronic 7-day Pacific top smelt							Receipt Temperature (°C)
1	WW-1-090817	9/8/17	1030	W	20-L	3	Dilutions: 100, 50, 25, 12.5, 6.25, 3.125, 0	X	X	X	X							7.0
2																		
3																		
4																		
5																		
6																		
7																		
8																		
9																		
10																		

PROJECT INFORMATION

Client:	NAVFAC
PO No.:	75007
Shipped Via:	Hand delivery

SAMPLE RECEIPT

Total No. of Containers	3
Received Good Condition?	✓
Matches Test Schedule?	✓

SPECIAL INSTRUCTIONS/COMMENTS:
Run Chronic & acute as separate tests.
Report to Nate Evenson via email.
Bill to accounts payable.

RELINQUISHED BY (CLIENT)
(Signature) (Time) 1240
(Printed Name) Brianna Hunt (Date) 9/8/17
(Company) Kane Environmental

RECEIVED BY (COURIER)
(Signature) (Time)
(Printed Name) (Date)
(Company)

RELINQUISHED BY (COURIER)
(Signature) (Time)
(Printed Name) (Date)
(Company)

RECEIVED BY (LABORATORY)
(Signature) (Time) 1240
(Printed Name) Maria E. Bunn (Date) 9/8/17
(Log in #) 17-124