Rainier ENVIRONMENTAL

Whole Effluent Toxicity Test Report: NAVFAC

September 2017

Report date: September 28, 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	9/1/2017; 1535h
Test termination date and time	9/5/2017; 1500h
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	9/1/2017; 1415h
Test termination date and time	9/5/2017; 1400h
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	9/1/2017; 1520h
Test termination date and time	9/8/2017; 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	9/1/2017; 1500h
Test termination date and time	9/8/2017; 1500h
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-1-090117
Rainier log in ID	17-122
Collection date and time	9/1/2017; 1045
Receipt date and time	9/1/2017; 1300
Receipt temperature (°C)	5.5
Dissolved oxygen (mg/L)	7.3
pH	8.55
Conductivity (µS/cm)	21,465
Salinity	20.8
Hardness (mg/L $CaCO_3$)	NA Salt Water
Alkalinity (mg/L $CaCO_3$)	232
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 97.5 percent for Mysid shrimp and 90.0 percent for 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	97.5	100	>100	>100
	3.125	95.0			
	6.25	97.5			
	11.1	97.5			
	25	100			
	50	95.0			
	100	97.5			
Pacific topsmelt	0.0	95.0	100	>100	>100
	3.125	95.0			
	6.25	95.0			
	11.1	95.0			
	25	95.0			
	50	100			
	100	90.0			

[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	100	>100	<1.0
	7-Day Biomass	100	>100	<1.0

[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	8/31/2017	48h Survival	337µg/L copper	309-558µg/L	15.9
Pacific Topsmelt	8/30/2017	96h Survival	144 µg /L copper	63.8-314µg/L	49.0
Mysid Shrimp	8/31/2017	7d Survival	303 µg/L copper	143-524µg/L	38.4
	8/31/2017	Growth	226 µg/L copper	123-341µg/L	29.1
Pacific Topsmelt	8/30/2017	7d Survival	117 µg/L copper	82.9-207µg/L	25.7
	8/30/2017	Growth	106 µg/L copper	84.1-157µg/L	16.9

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: 26 Sep-17 14:26 (p 1 of 1)
Test Code: 1709-007 | 01-6889-1991

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

Batch ID:	02-3443-9496	**Test Type:**	Survival (96h)	**Analyst:**	Eric Tollefson
Start Date:	01 Sep-17 15:35	**Protocol:**	EPA/821/R-02-012 (2002)	**Diluent:**	Laboratory Seawater
Ending Date:	05 Sep-17 15:00	**Species:**	Mysidopsis bahia	**Brine:**	
Duration:	95h	**Source:**	Aquatic Biosystems, CO	**Age:**	3d

Sample ID:	04-0195-9590	**Code:**	17-122	**Client:**	NAVFAC
Sample Date:	01 Sep-17 10:45	**Material:**	Industrial Effluent	**Project:**	
Receive Date:	01 Sep-17 13:00	**Source:**	NAVFAC (WA0002780)		
Sample Age:	5h (5.5 °C)	**Station:**			

Comparison Summary

Analysis ID	Endpoint	NOEL	LOEL	TOEL	PMSD	TU	Method
20-5556-9744	96h Survival Rate	100	>100	NA	8.66%	1	Steel Many-One Rank Sum Test

Test Acceptability

Analysis ID	Endpoint	Attribute	Test Stat	TAC Limits	Overlap	Decision
20-5556-9744	96h Survival Rate	Control Resp	0.975	0.9 - NL	Yes	Passes Acceptability Criteria

96h Survival Rate Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Dilution Water	4	0.975	0.9563	0.9937	0.9	1	0.025	0.05	5.13%	0.0%
3.125		4	0.95	0.9284	0.9716	0.9	1	0.02887	0.05774	6.08%	2.56%
6.25		4	0.975	0.9563	0.9937	0.9	1	0.025	0.05	5.13%	0.0%
11.1		4	0.975	0.9563	0.9937	0.9	1	0.025	0.05	5.13%	0.0%
25		4	1	1	1	1	1	0	0	0.0%	-2.56%
50		4	0.95	0.9284	0.9716	0.9	1	0.02887	0.05774	6.08%	2.56%
100		4	0.975	0.9563	0.9937	0.9	1	0.025	0.05	5.13%	0.0%

96h Survival Rate Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Dilution Water	1	1	0.9	1
3.125		1	0.9	0.9	1
6.25		0.9	1	1	1
11.1		1	0.9	1	1
25		1	1	1	1
50		0.9	0.9	1	1
100		0.9	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	9/10	10/10
3.125		10/10	9/10	9/10	10/10
6.25		9/10	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		9/10	9/10	10/10	10/10
100		9/10	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-1-090117
Test # 1709-007
Rainier Check-In #: 17-122

Start Date & Time: 9/1/17 1535
End Date & Time: 9/5/17 1500
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	6.7	6.2	6.4	6.2	6.0	8.65	8.38	8.21	8.15	8.11
3.125	6.6	6.4	6.3	6.1	5.8	8.66	8.36	8.22	8.15	8.05
6.25	6.5	6.1	6.3	6.1	5.7	8.64	8.31	8.18	8.11	8.04
11.1	6.5	6.2	6.0	5.8	5.6	8.58	8.22	8.16	8.07	8.07
25	6.6	6.5	6.4	6.3	5.5	8.47	8.24	8.14	8.01	8.02
50	6.7	6.4	6.2	6.3	5.8	8.35	8.10	8.10	7.98	7.99
100	6.6	6.4	6.1	6.1	6.0	8.13	7.98	8.04	7.95	7.92

Sample Conc. or %	Salinity (ppt) Init. 0	24	48	72	Fin. 96	Test Temperature (°C) Init. 0	24	48	72	Fin. 96
CON	29.0	29.4	29.1	29.4	29.7	25.1	25.4	25.3	25.4	25.1
3.125	28.9	29.1	29.3	29.3	29.5	25.0	25.3	25.2	25.4	25.3
6.25	28.9	29.0	29.1	29.2	29.5	25.0	25.3	25.3	25.4	25.2
11.1	29.1	29.0	28.9	29.0	29.2	24.9	25.3	25.4	25.3	25.4
25	29.1	29.4	29.7	29.6	29.8	24.9	25.1	25.4	25.4	25.4
50	29.3	29.5	29.6	29.6	29.9	25.2	25.4	25.3	25.4	25.5
100	29.6	30.1	30.1	30.0	30.1	25.4	25.4	25.1	25.3	25.4
Tech. Initials										

Sample Conc. or %	Rep #	Cont #	Number of Live Organisms 0	24	48	72	96
CON	1	16	10	10	10	10	10
	2	19	10	10	10	10	10
	3	5	10	10	9	9	9
	4	17	10	10	10	10	10
3.125	1	6	10	10	10	10	10
	2	4	10	10	9	9	9
	3	20	10	10	9	9	9
	4	18	10	10	10	10	10
6.25	1	15	10	10	10	10	9
	2	7	10	10	10	10	10
	3	3	10	10	10	10	10
	4	23	10	10	10	10	10
11.1	1	8	10	10	10	10	10
	2	24	10	10	9	9	9
	3	2	10	10	10	10	10
	4	10	10	10	10	10	10
25	1	9	10	10	10	10	10
	2	22	10	10	10	10	10
	3	14	10	10	10	10	10
	4	28	10	10	10	10	10
50	1	12	10	10	9	9	9
	2	11	10	10	9	9	9
	3	1	10	10	10	10	10
	4	21	10	10	10	10	10
100	1	26	10	10	9	9	9
	2	13	10	10	10	10	10
	3	25	10	10	10	10	10
	4	27	10	10	10	10	10
Tech. Initials							

Feeding Times: 1 0745 2 0745 3 0815
Renewal Times: 1 1400 2 1415 3 1450

Dilution Water Batch #: ASW# 011
Test Chamber: Rm.2
Animal Source: ABS
Date of Hatch: 8/29/17
Test Volume: 200ML
QA Check:

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

CETIS Summary Report

Report Date: 26 Sep-17 14:22 (p 1 of 1)
Test Code: 1709-005 | 19-9586-5431

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

Batch ID:	09-2024-5135	**Test Type:**	Survival (96h)	**Analyst:**	Eric Tollefson
Start Date:	01 Sep-17 14:15	**Protocol:**	EPA/821/R-02-012 (2002)	**Diluent:**	Laboratory Seawater
Ending Date:	05 Sep-17 14:00	**Species:**	Atherinops affinis	**Brine:**	
Duration:	96h	**Source:**	Aquatic Biosystems, CO	**Age:**	9d

Sample ID:	04-0195-9590	**Code:**	17-122	**Client:**	NAVFAC
Sample Date:	01 Sep-17 10:45	**Material:**	Industrial Effluent	**Project:**	
Receive Date:	01 Sep-17 13:00	**Source:**	NAVFAC (WA0002780)		
Sample Age:	4h (5.5 °C)	**Station:**			

Comparison Summary

Analysis ID	Endpoint	NOEL	LOEL	TOEL	PMSD	TU	Method
11-3514-3643	96h Survival Rate	100	>100	NA	17.3%	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	0.95	0.9127	0.9873	0.8	1	0.05	0.1	10.53%	0.0%
11.1		4	0.95	0.9127	0.9873	0.8	1	0.05	0.1	10.53%	0.0%
25		4	0.95	0.9127	0.9873	0.8	1	0.05	0.1	10.53%	0.0%
50		4	1	1	1	1	1	0	0	0.0%	-5.26%
100		4	0.9	0.8569	0.9431	0.8	1	0.05774	0.1155	12.83%	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		1	1	0.8	1
6.25		0.8	1	1	1
11.1		1	0.8	1	1
25		1	0.8	1	1
50		1	1	1	1
100		0.8	1	1	0.8

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

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-1-090117
Test # 1709-805
Log-In #: 17-122

Start Date & Time: 9/1/17 1415
End Date & Time: 9/5/17 1400
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	7.1	6.8	6.5	7.4	7.1	7.0	8.67	8.52	8.31	8.63	8.41	8.33
3.125	7.1	6.9	6.8	7.2	7.0	6.8	8.67	8.35	8.37	8.61	8.40	8.28
6.25	7.2	7.3	6.9	7.4	7.2	7.0	8.64	8.33	8.30	8.60	8.40	8.26
11.1	7.2	6.8	6.9	7.3	7.2	7.1	8.62	8.37	8.24	8.57	8.37	8.25
25	7.2	6.9	6.7	7.3	7.1	7.2	8.39	8.27	8.17	8.55	8.35	8.21
50	7.1	7.0	6.6	7.3	7.4	7.3	8.31	8.25	8.15	8.41	8.31	8.18

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	28.9	29.1	29.5	28.9	29.0	29.4	19.8	20.1	19.3	20.6	19.8	20.1
3.125	28.9	29.0	29.1	28.7	28.8	29.1	19.8	20.1	19.4	20.1	19.8	19.8
6.25	29.0	29.0	29.2	28.7	28.9	29.0	19.7	19.9	19.4	20.3	20.1	19.7
11.1	29.1	29.2	29.4	28.9	28.9	29.0	19.8	19.9	19.4	20.2	20.0	19.7
25	29.1	29.0	29.5	29.1	29.3	29.2	19.5	19.8	19.2	20.0	20.0	19.7
50	29.3	29.2	29.5	29.4	29.4	29.3	19.4	19.9	19.4	19.8	20.0	19.8
Tech. Initials	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]						
Sample Used:	17-122			17-122								

Sample Conc. or %	Rep #	Cont #	Number of Live Organisms 0	24	48	72	96
CON	1	15	5	5	5	5	5
	2	2	5	5	5	5	5
	3	5	5	4	4	4	4
	4	13	5	5	5	5	5
3.125	1	18	5	5	5	5	5
	2	8	5	5	5	5	5
	3	25	5	4	4	4	4
	4	14	5	5	5	5	5
6.25	1	17	5	4	4	4	4
	2	1	5	5	5	5	5
	3	7	5	5	5	5	5
	4	26	5	5	5	5	5
11.1	1	19	5	5	5	5	5
	2	22	5	4	4	4	4
	3	27	5	5	5	5	5
	4	3	5	5	5	5	5
25	1	16	5	5	5	5	5
	2	9	5	4	4	4	4
	3	20	5	5	5	5	5
	4	11	5	5	5	5	5
50	1	23	5	5	5	5	5
	2	28	5	5	5	5	5
	3	21	5	5	5	5	5
	4	24	5	5	5	5	5
Tech. Initials			[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

Dilution Water Batch #: ASW # 011
Test Chamber: VWR

Comments:

Animal Source: ABS
Date Received: ~~9/27/17~~ 9/1/17
Date of Hatch: 8/23/17

48-Hr, Feeding: ✓

QA Check: [illegible]

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-1-090117
Test # 1709-005
Log-In #: 17-122

Start Date & Time: 9/1/17 1415
End Date & Time: 9/5/17 1400
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	7.2	7.2	6.8	7.4	7.2	7.0	8.15	8.11	8.01	8.05	8.11	8.07

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	29.6	29.7	30.0	29.6	29.4	29.5	19.1	19.7	19.4	19.6	20.0	19.8
Tech. Initials	QT	QT	QT	QT	QT	QT						
Sample Used:	17-122			17-122								

Sample Conc. or %	Rep #	Cont #	Number of Live Organisms 0	24	48	72	96
100	1	10	5	4	4	4	4
	2	4	5	5	5	5	5
	3	6	5	5	5	5	5
	4	12	5	4	4	4	4
	1						
	2						
	3						
	4						
	1						
	2						
	3						
	4						
	1						
	2						
	3						
	4						
	1						
	2						
	3						
	4						
	1						
	2						
	3						
	4						
Tech. Initials			QT	QT	QT	QT	QT

Dilution Water Batch #: ASW #
Test Chamber: VWR

Comments:

Animal Source: ABS
Date Received: 9/21/17
Date of Hatch: 8/23/17

48-Hr, Feeding: ✓

QA Check: QT

Appendix C

Americamysis bahia (mysid shrimp) Chronic Test

Statistical Summaries and Raw Bench Sheets

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

Batch ID:	10-1007-0696	**Test Type:**	Growth-Survival (7d)	**Analyst:**	Eric Tollefson
Start Date:	01 Sep-17 15:20	**Protocol:**	EPA/821/R-02-014 (2002)	**Diluent:**	Laboratory Seawater
Ending Date:	08 Sep-17 15:30	**Species:**	Mysidopsis bahia	**Brine:**	
Duration:	7d 0h	**Source:**	Aquatic Biosystems, CO	**Age:**	7d

Sample ID:	04-0195-9590	**Code:**	17-122	**Client:**	NAVFAC
Sample Date:	01 Sep-17 10:45	**Material:**	Industrial Effluent	**Project:**	
Receive Date:	01 Sep-17 13:00	**Source:**	NAVFAC (WA0002780)		
Sample Age:	5h (5.5 °C)	**Station:**			

Comparison Summary

Analysis ID	Endpoint	NOEL	LOEL	TOEL	PMSD	TU	Method
16-8177-2785	7d Survival Rate	100	>100	NA	15.6%	1	Steel Many-One Rank Sum Test
08-9424-1028	Mean Dry Biomass-mg	100	>100	NA	27.1%	1	Dunnett Multiple Comparison Test
08-2373-8105	Mean Dry Weight-mg	100	>100	NA	20.5%	1	Dunnett Multiple Comparison Test

Point Estimate Summary

Analysis ID	Endpoint	Level	%	95% LCL	95% UCL	TU	Method
17-2009-1710	Mean Dry Biomass-mg	IC5	86.54	23.98	N/A	1.156	Linear Interpolation (ICPIN)
		IC10	>100	N/A	N/A	<1	
		IC15	>100	N/A	N/A	<1	
		IC20	>100	N/A	N/A	<1	
		IC25	>100	N/A	N/A	<1	
		IC40	>100	N/A	N/A	<1	
		IC50	>100	N/A	N/A	<1	
01-8247-2423	Mean Dry Weight-mg	IC5	>100	N/A	N/A	<1	Linear Interpolation (ICPIN)
		IC10	>100	N/A	N/A	<1	
		IC15	>100	N/A	N/A	<1	
		IC20	>100	N/A	N/A	<1	
		IC25	>100	N/A	N/A	<1	
		IC40	>100	N/A	N/A	<1	
		IC50	>100	N/A	N/A	<1	

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	0.925	0.8863	0.9637	0.8	1	0.0366	0.1035	11.19%	0.0%
3.125		8	0.925	0.8863	0.9637	0.8	1	0.0366	0.1035	11.19%	0.0%
6.25		8	0.875	0.8363	0.9137	0.8	1	0.0366	0.1035	11.83%	5.41%
11.1		8	0.9	0.8435	0.9565	0.6	1	0.05345	0.1512	16.8%	2.7%
25		8	0.925	0.8694	0.9806	0.6	1	0.05261	0.1488	16.09%	0.0%
50		8	0.875	0.8363	0.9137	0.8	1	0.0366	0.1035	11.83%	5.41%
100		8	0.875	0.8194	0.9306	0.6	1	0.05261	0.1488	17.01%	5.41%

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	0.2105	0.1942	0.2268	0.136	0.25	0.01543	0.04363	20.73%	0.0%
3.125		8	0.258	0.2357	0.2803	0.164	0.338	0.02112	0.05973	23.15%	-22.57%
6.25		8	0.2675	0.2446	0.2904	0.166	0.352	0.02168	0.06132	22.92%	-27.08%
11.1		8	0.2622	0.2474	0.2771	0.2	0.326	0.01409	0.03985	15.19%	-24.58%
25		8	0.2675	0.2515	0.2835	0.184	0.314	0.01519	0.04297	16.06%	-27.08%
50		8	0.2602	0.2441	0.2764	0.204	0.33	0.01526	0.04315	16.58%	-23.63%
100		8	0.2382	0.2219	0.2546	0.172	0.312	0.01548	0.04378	18.38%	-13.18%

Mean Dry Weight-mg Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Dilution Water	8	0.2261	0.2145	0.2376	0.17	0.2525	0.01096	0.03101	13.72%	0.0%
3.125		8	0.2762	0.2609	0.2915	0.205	0.338	0.01446	0.0409	14.81%	-22.17%
6.25		8	0.3074	0.281	0.3339	0.2075	0.4	0.02502	0.07075	23.01%	-36.0%
11.1		8	0.2944	0.2813	0.3074	0.242	0.3375	0.01232	0.03485	11.84%	-30.21%
25		8	0.2898	0.2839	0.2958	0.268	0.314	0.005609	0.01586	5.47%	-28.21%
50		8	0.2969	0.286	0.3077	0.255	0.34	0.01029	0.02912	9.81%	-31.32%
100		8	0.2736	0.2624	0.2847	0.228	0.312	0.01054	0.02982	10.9%	-21.02%

Mysidopsis 7-d Survival, Growth and Fecundity Test

Rainier Environmental Laboratory

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

Mean Dry Biomass-mg Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
0	Dilution Water	0.25	0.202	0.202	0.248	0.244	0.242	0.136	0.16
3.125		0.338	0.276	0.164	0.282	0.318	0.222	0.268	0.196
6.25		0.32	0.234	0.218	0.352	0.292	0.166	0.25	0.308
11.1		0.262	0.326	0.29	0.284	0.224	0.242	0.2	0.27
25		0.268	0.184	0.286	0.28	0.282	0.302	0.224	0.314
50		0.33	0.25	0.272	0.28	0.204	0.226	0.22	0.3
100		0.172	0.232	0.232	0.208	0.234	0.312	0.228	0.288

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	0.25	0.202	0.2525	0.248	0.244	0.242	0.17	0.2
3.125		0.338	0.276	0.205	0.282	0.318	0.2775	0.268	0.245
6.25		0.4	0.2925	0.218	0.352	0.292	0.2075	0.3125	0.385
11.1		0.262	0.326	0.29	0.284	0.28	0.242	0.3333	0.3375
25		0.268	0.3067	0.286	0.28	0.282	0.302	0.28	0.314
50		0.33	0.3125	0.34	0.28	0.255	0.2825	0.275	0.3
100		0.2867	0.29	0.29	0.26	0.234	0.312	0.228	0.288

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

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

Client: NAVFAC / Kane Environmental
Sample ID: WW-1-090117
Test No: 1709-0008
Rainier Check-In #: 17-122 17-122

Start Date & Time: 9/1/17 1520
Stop Date & Time: 9/8/17 1530
Test species: Americamysis bahia
17-122

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	8.72	8.12	8.58	7.98	8.39	8.05	8.45	8.12	8.46	8.10	8.51	8.08	8.67	8.10
DO (mg/l)	6.6	5.5	6.5	5.2	6.7	5.5	6.6	5.4	6.5	5.2	6.6	5.4	6.7	5.2
Salinity (ppt)	29.0	29.5	29.7	29.3	28.9	29.3	28.7	29.4	28.8	29.0	28.7	29.2	28.6	29.0
Temperature (°C)	25.0	25.2	25.1	25.2	25.2	25.6	25.0	25.2	25.1	25.2	25.2	25.2	25.1	25.1

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	8.66	8.05	8.51	8.01	8.42	8.01	8.47	8.05	8.44	8.08	8.50	8.09	8.67	8.12
DO (mg/l)	6.5	5.4	6.4	5.3	6.7	5.6	6.7	5.2	6.6	5.2	6.6	5.1	6.6	5.7
Salinity (ppt)	29.0	29.2	29.3	29.3	28.9	29.7	28.7	29.5	28.8	28.9	28.7	29.1	29.3	29.5
Temperature (°C)	25.0	25.2	25.2	25.3	25.2	25.6	25.0	25.1	25.1	25.3	25.2	25.1	25.2	25.2

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	8.64	8.08	8.48	7.98	8.45	8.02	8.44	8.03	8.45	8.05	8.50	8.05	8.62	8.03
DO (mg/l)	6.5	5.2	6.4	5.3	6.6	5.2	6.6	5.4	6.6	5.5	6.7	5.2	6.6	5.3
Salinity (ppt)	28.8	29.1	29.1	29.4	28.8	29.2	28.8	29.1	28.9	29.4	28.8	29.5	29.3	29.7
Temperature (°C)	25.0	25.2	25.2	25.3	25.4	25.6	25.1	25.1	25.2	25.3	25.1	25.4	25.0	25.3

11.1	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	8.03	8.50	7.95	8.40	8.02	8.38	8.00	8.37	8.01	8.44	8.04	8.60	8.05
DO (mg/l)	6.7	5.4	6.5	5.4	6.7	5.4	6.6	5.7	6.7	5.1	6.7	5.2	6.6	5.3
Salinity (ppt)	29.0	29.4	29.1	29.2	29.0	29.3	29.1	29.3	29.0	29.3	28.9	29.6	29.5	29.9
Temperature (°C)	25.1	25.3	25.4	25.3	25.4	25.6	25.1	25.1	25.2	25.3	25.1	25.4	25.0	25.3

25	Days													
	0		1		2		3		4		5		6	
	init.	final	init.	final	init.	final	init.	final	init.	final	init.	final	init.	final
pH	8.58	7.98	8.37	7.96	8.36	8.01	8.35	7.98	8.34	7.99	8.42	8.04	8.51	8.07
DO (mg/l)	6.6	5.1	6.5	5.1	6.7	5.5	6.7	5.8	6.7	5.6	6.6	5.2	6.6	5.4
Salinity (ppt)	29.2	29.7	29.2	29.4	28.8	29.5	29.1	29.7	29.3	29.7	29.1	29.7	29.4	29.5
Temperature (°C)	25.2	25.3	25.1	25.2	25.5	25.5	25.2	25.2	25.3	25.4	25.2	25.4	25.1	25.3

50	Days													
	0		1		2		3		4		5		6	
	init.	final	init.	final	init.	final	init.	final	init.	final	init.	final	init.	final
pH	8.38	7.94	8.20	7.94	8.22	7.95	8.31	7.94	8.28	7.99	8.31	8.00	8.40	8.01
DO (mg/l)	6.7	5.2	6.6	5.1	6.7	5.2	6.6	5.4	6.7	5.4	6.6	5.1	6.7	5.5
Salinity (ppt)	29.4	30.1	29.1	29.5	28.6	29.0	29.3	29.5	29.2	29.9	29.3	29.9	29.7	29.8
Temperature (°C)	25.2	25.3	25.4	25.2	25.7	25.6	25.3	25.2	25.5	25.3	25.2	25.4	25.1	25.3
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: Rm. 2
Dilution Water Batch #: ASW #011

QA Check: [illegible]

Sample Description:
Organism Source: ABS
Date Received: 9/1/17
Date of Hatch: 8/25/17

Comments:

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

Client: NAVFAC/Kane Environmental
Sample ID: WW-1-090117
Test No: 1709-008
Rainier Check-In #: 17-122 17-122

Start Date & Time: 9/1/17 1520
Stop Date & Time: 9/8/17 1530
Test species: Americamysis bahia
17-122

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	8.12	7.91	8.07	7.87	8.01	7.92	8.11	7.91	8.14	7.93	8.12	7.97	8.09	7.95
DO (mg/l)	6.7	5.5	6.6	5.0	6.6	5.3	6.7	5.4	6.7	5.4	6.6	5.2	6.7	5.5
Salinity (ppt)	29.6	30.2	28.8	29.1	28.4	28.7	29.6	30.1	30.4	30.8	29.9	30.2	30.2	30.4
Temperature (°C)	25.5	25.3	25.7	25.2	26.0	25.6	25.6	25.5	25.7	25.3	25.4	25.4	25.1	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:	[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: Rm.2
Dilution Water Batch #: ASW #011

QA Check: [illegible]

Sample Description:
Organism Source: ABS
Date Received: 9/1/17
Date of Hatch: 8/25/17

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 Environmental **Test Number:** 1709-808

Sample ID: WW-1-090117

Conc. or %	Cont.	Rep.	Days 0	1	2	3	4	5	6	7	Mean % Survival
CON	16	1	5	5	5	5	5	5	5	5	
	12	2	5	5	5	5	5	5	5	5	
	48	3	5	5	5	4	4	4	4	4	
	46	4	5	5	5	5	5	5	5	5	
	49	5	5	5	5	5	5	5	5	5	
	14	6	5	5	5	5	5	5	5	5	
	26	7	5	5	5	4	4	4	4	4	
	17	8	5	5	5	5	5	4	4	4	
3.125	55	1	5	5	5	5	5	5	5	5	
	40	2	5	5	5	5	5	5	5	5	
	47	3	5	5	5	5	5	4	4	4	
	43	4	5	5	5	5	5	5	5	5	
	29	5	5	5	5	5	5	5	5	5	
	53	6	5	5	4	4	4	4	4	4	
	36	7	5	5	5	5	5	5	5	5	
	22	8	5	5	5	5	5	4	4	4	
6.25	52	1	5	4	4	4	4	4	4	4	
	24	2	5	4	4	4	4	4	4	4	
	11	3	5	5	5	5	5	5	5	5	
	1	4	5	5	5	5	5	5	5	5	
	25	5	5	5	5	5	5	5	5	5	
	33	6	5	5	5	5	5	5	5	4	
	42	7	5	5	5	5	5	4	4	4	
	2	8	5	5	5	5	5	4	4	4	
Technician Initials			[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	

Feeding Times: 0 1600 1 0715 1615 2 0730 1630 3 0715 1600 4 0715 1600 5 0715 1530 6 0715 1545

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 Environmental **Test Number:** 1709-008

Sample ID: WW-1-090117

Conc. or (%)	Cont.	Rep.	Days 0	1	2	3	4	5	6	7	Mean % Survival
11.1	27	1	5	5	5	5	5	5	5	5	
	35	2	5	5	5	5	5	5	5	5	
	23	3	5	5	5	5	5	5	5	5	
	51	4	5	5	5	5	5	5	5	5	
	5	5	5	5	5	5	5	5	4	4	
	45	6	5	5	5	5	5	5	5	5	
	44	7	5	4	4	4	4	4	3	3	
	15	8	5	5	5	5	4	4	4	4	
25	37	1	5	5	5	5	5	5	5	5	
	32	2	5	5	5	4	4	4	4	3	
	10	3	5	5	5	5	5	5	5	5	
	18	4	5	5	5	5	5	5	5	5	
	21	5	5	5	5	5	5	5	5	5	
	28	6	5	5	5	5	5	5	5	5	
	9	7	5	5	5	4	4	4	4	4	
	38	8	5	5	5	5	5	5	5	5	
50	4	1	5	5	5	5	5	5	5	5	
	20	2	5	5	5	5	4	4	4	4	
	7	3	5	5	5	5	5	5	4	4	
	31	4	5	5	5	5	5	5	5	5	
	8	5	5	5	5	5	4	4	4	4	
	19	6	5	5	5	4	4	4	4	4	
	30	7	5	5	5	5	4	4	4	4	
	56	8	5	5	5	5	5	5	5	5	
Technician Initials			ut	ut	ut	ut	ut	ut	ut	ut	

Feeding Times: 0 1600 1 0715 1615 2 0730 1630 3 0715 1600 4 0715 1600 5 0715 1530 6 0715 1545

QA check ut

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 Environmental **Test Number:** 709-008

Sample ID: WW-1-090117

Conc. or %	Cont.	Rep.	Days 0	1	2	3	4	5	6	7	Mean % Survival
100	34	1	5	4	4	3	3	3	3	3	
	6	2	5	5	5	5	4	4	4	4	
	54	3	5	5	5	5	4	4	4	4	
	3	4	5	5	5	5	4	4	4	4	
	39	5	5	5	5	5	5	5	5	5	
	13	6	5	5	5	5	5	5	5	5	
	41	7	5	5	5	5	5	5	5	5	
	50	8	5	5	5	5	5	5	5	5	
		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			ut	ut	ut	ut	ut	ut	ut	ut	

Feeding Times: 0 1600 1 0715 1615 2 0730 1630 3 0715 1600 4 0715 1600 5 0715 1530 6 0715 1545

QA check ut

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 Environmental

Species: *Americamysis bahia*

Sample ID: WW-1-090117

Test Number: 1709-008

Conc. or %	Cont.	Rep.	pan wt. (gm)	pan + mysid (gm)	mysid wt. (mg)	# mysids	avg. per mysid (mg)	avg. per conc.
CON	16	1	0.06653	0.06778		5		
	12	2	0.06138	0.06239		5		
	48	3	0.05476	0.05577		APT ~~5~~ 4		
	46	4	0.06071	0.06195		5		
	49	5	0.05728	~~0.06662~~ ut	0.05850	5		
	14	6	0.06541	~~0.05850~~ ut	0.06662	5		
	26	7	0.05525	0.05593		4		
	17	8	0.07102	0.07182		4		
3.125	55	1	0.06103	0.06272		5		
	40	2	0.06147	0.06285		5		
	47	3	0.06396	0.06478		4		
	43	4	0.05959	0.06100		5		
	29	5	0.05805	0.05964		5		
	53	6	0.06062	0.06173		4		
	36	7	0.05999	0.06133		5		
	22	8	0.06571	0.06669		4		
6.25	52	1	0.06000	0.06160		4		
	24	2	0.06034	0.06151		4		
	11	3	0.05856	0.05965		5		
	1	4	0.05201	0.05377		5		
	25	5	0.06100	0.06246		5		
	33	6	0.05949	0.06032		4		
	42	7	0.06067	0.06192		4		
	2	8	0.05510	0.05664		4		
	Tech Initials:		ut	APT				

Date/Time in: 9/8/17 1530 **Oven temp. (°C):** 62.0 **QA Check:** ut

Date/Time out: 9/10/17 1245 **Oven temp. (°C):** 61.0

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 Environmental

Species: *Americamysis bahia*

Sample ID: WW-1-090117

Test Number: 1709-008

Conc. or (%)	Cont.	Rep.	pan wt. (gm)	pan + mysid (gm)	mysid wt. (mg)	# mysids	avg. per mysid (mg)	avg. per conc.
11.1	27	1	0.05868	0.05999		5		
	35	2	0.06079	0.06242		5		
	23	3	0.05791	0.05936		5		
	51	4	0.05593	0.05735		5		
	5	5	0.05877	0.05989		4		
	45	6	0.06083	0.06204		5		
	44	7	0.06124	0.06224		3		
	15	8	0.06514	0.06649		4		
25	37	1	0.06110	0.06244		5		
	32	2	0.06056	0.06148		3		
	10	3	0.06168	0.06311		5		
	18	4	0.06333	0.06473		5		
	21	5	0.06049	0.06190		5		
	28	6	0.06140	0.06291		5		
	9	7	0.05654	0.05766		4		
	38	8	0.05945	0.06102		5		
50	4	1	0.05749	0.05914		5		
	20	2	0.06586	0.06711		4		
	7	3	0.06059	0.06195		4		
	31	4	0.05843	0.05983		5		
	8	5	0.05807	0.05908		4		
	19	6	0.06083	0.06196		4		
	30	7	0.05965	0.06075		4		
	56	8	0.05960	0.06110		5		
	Tech Initials:		U	APT				

Date/Time in: 9/8/17 1530 **Oven temp. (°C):** 62.0 **QA Check:** U

Date/Time out: 9/10/17 1245 **Oven temp. (°C):** 61.0

Rainier Environmental
Washington Laboratory
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Tacoma, WA 98424

Raw Data Sheet
Mysid Weights
Seven Day Chronic Bioassay

Client: NAVFAC / Kane Environmental

Species: *Americamysis bahia*

Sample ID: WW-1-090117

Test Number: 1709-008

Conc. or (%)	Cont.	Rep.	pan wt. (gm)	pan + mysid (gm)	mysid wt. (mg)	# mysids	avg. per mysid (mg)	avg. per conc.
100	34	1	0.05602	0.05688		3		
	6	2	0.05524	0.05640		4		
	54	3	0.05921	0.06037		4		
	3	4	0.05305	0.05409		4		
	39	5	0.06347	0.06464		5		
	13	6	0.06314	0.06470		5		
	41	7	0.06349	0.06463		5		
	50	8	0.05790	0.05934		5		
		1						
		2						
		3						
		4						
		5						
		6						
		7						
		8						
		1						
		2						
		3						
		4						
		5						
		6						
		7						
		8						
	Tech Initials:		[illegible]	APT				

Date/Time in: 9/8/17 1530 **Oven temp. (°C):** 62.0 **QA Check:** [illegible]

Date/Time out: 9/10/17 1245 **Oven temp. (°C):** 61.0

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:	21-3534-9680	**Test Type:**	Growth-Survival (7d)	**Analyst:**	Eric Tollefson
Start Date:	01 Sep-17 15:00	**Protocol:**	EPA/600/R-95/136 (1995)	**Diluent:**	Laboratory Seawater
Ending Date:	08 Sep-17 15:00	**Species:**	Atherinops affinis	**Brine:**	Crystal Sea
Duration:	7d 0h	**Source:**	Aquatic Biosystems, CO	**Age:**	9d

Sample ID:	04-0195-9590	**Code:**	17-122	**Client:**	NAVFAC
Sample Date:	01 Sep-17 10:45	**Material:**	Industrial Effluent	**Project:**	
Receive Date:	01 Sep-17 13:00	**Source:**	NAVFAC (WA0002780)		
Sample Age:	4h (5.5 °C)	**Station:**			

Comparison Summary

Analysis ID	Endpoint	NOEL	LOEL	TOEL	PMSD	TU	Method
01-5234-3599	7d Survival Rate	100	>100	NA	10.6%	1	Steel Many-One Rank Sum Test
10-6373-3519	Mean Dry Biomass-mg	100	>100	NA	23.4%	1	Dunnett Multiple Comparison Test
11-9754-6976	Mean Dry Weight-mg	100	>100	NA	18.6%	1	Dunnett Multiple Comparison Test

Point Estimate Summary

Analysis ID	Endpoint	Level	%	95% LCL	95% UCL	TU	Method
16-2111-9873	Mean Dry Biomass-mg	IC5	15.7	N/A	30.16	6.367	Linear Interpolation (ICPIN)
		IC10	22.06	N/A	N/A	4.533	
		IC15	35.66	6.754	N/A	2.804	
		IC20	>100	N/A	N/A	<1	
		IC25	>100	N/A	N/A	<1	
		IC40	>100	N/A	N/A	<1	
		IC50	>100	N/A	N/A	<1	
20-4257-3043	Mean Dry Weight-mg	IC5	13.47	N/A	21.44	7.422	Linear Interpolation (ICPIN)
		IC10	18.38	0.1026	39.88	5.44	
		IC15	24.95	12.17	N/A	4.007	
		IC20	>100	N/A	N/A	<1	
		IC25	>100	N/A	N/A	<1	
		IC40	>100	N/A	N/A	<1	
		IC50	>100	N/A	N/A	<1	

Test Acceptability

Analysis ID	Endpoint	Attribute	Test Stat	TAC Limits	Overlap	Decision
01-5234-3599	7d Survival Rate	Control Resp	0.92	0.8 - NL	Yes	Passes Acceptability Criteria
10-6373-3519	Mean Dry Biomass-mg	Control Resp	1.079	0.85 - NL	Yes	Passes Acceptability Criteria
16-2111-9873	Mean Dry Biomass-mg	Control Resp	1.079	0.85 - NL	Yes	Passes Acceptability Criteria
01-5234-3599	7d Survival Rate	PMSD	0.1064	NL - 0.25	No	Passes Acceptability Criteria
10-6373-3519	Mean Dry Biomass-mg	PMSD	0.2339	NL - 0.5	No	Passes Acceptability Criteria

7d Survival Rate Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Dilution Water	5	0.92	0.8791	0.9609	0.8	1	0.04899	0.1095	11.91%	0.0%
3.125		5	1	1	1	1	1	0	0	0.0%	-8.7%
6.25		5	0.96	0.9266	0.9934	0.8	1	0.04	0.08944	9.32%	-4.35%
11.1		5	1	1	1	1	1	0	0	0.0%	-8.7%
25		5	1	1	1	1	1	0	0	0.0%	-8.7%
50		5	0.96	0.9266	0.9934	0.8	1	0.04	0.08944	9.32%	-4.35%
100		5	1	1	1	1	1	0	0	0.0%	-8.7%

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	1.079	1.015	1.143	0.834	1.286	0.07664	0.1714	15.89%	0.0%
3.125		5	1.308	1.225	1.391	1.032	1.568	0.09958	0.2227	17.02%	-21.25%
6.25		5	1.136	1.053	1.218	0.766	1.356	0.09852	0.2203	19.4%	-5.27%
11.1		5	1.257	1.213	1.301	1.128	1.422	0.05289	0.1183	9.41%	-16.54%
25		5	1.053	1.02	1.086	0.918	1.152	0.03928	0.08783	8.34%	2.37%
50		5	0.9168	0.8554	0.9782	0.714	1.138	0.07352	0.1644	17.93%	15.02%
100		5	1.042	0.9951	1.09	0.922	1.23	0.05667	0.1267	12.16%	3.37%

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	1.171	1.131	1.211	1.043	1.286	0.04764	0.1065	9.1%	0.0%
3.125		5	1.308	1.225	1.391	1.032	1.568	0.09958	0.2227	17.02%	-11.7%
6.25		5	1.174	1.12	1.227	0.9575	1.356	0.06399	0.1431	12.19%	-0.25%
11.1		5	1.257	1.213	1.301	1.128	1.422	0.05289	0.1183	9.41%	-7.36%
25		5	1.053	1.02	1.086	0.918	1.152	0.03928	0.08783	8.34%	10.06%
50		5	0.9573	0.899	1.016	0.714	1.138	0.06988	0.1563	16.32%	18.25%
100		5	1.042	0.9951	1.09	0.922	1.23	0.05667	0.1267	12.16%	10.98%

Pacific Topsmelt 7-d Survival and Growth Test

Rainier Environmental Laboratory

7d Survival Rate Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Dilution Water	0.8	1	1	0.8	1
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	0.8	1	1	1
100		1	1	1	1	1

Mean Dry Biomass-mg Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Dilution Water	1.01	1.286	1.178	0.834	1.086
3.125		1.45	1.568	1.13	1.032	1.36
6.25		1.196	0.766	1.206	1.154	1.356
11.1		1.312	1.262	1.128	1.422	1.162
25		1.152	0.918	1.104	1.054	1.038
50		0.924	0.81	0.714	0.998	1.138
100		1.23	0.93	1.044	1.086	0.922

Mean Dry Weight-mg Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Dilution Water	1.263	1.286	1.178	1.043	1.086
3.125		1.45	1.568	1.13	1.032	1.36
6.25		1.196	0.9575	1.206	1.154	1.356
11.1		1.312	1.262	1.128	1.422	1.162
25		1.152	0.918	1.104	1.054	1.038
50		0.924	1.013	0.714	0.998	1.138
100		1.23	0.93	1.044	1.086	0.922

7d Survival Rate Binomials

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

Initial and Final Chemistries

Seven Day Chronic Saltwater Bioassay

Client: NAVFAC/Kane Environmental
Sample ID: WW-1-090117
Test No: 1709-006
Rainier Check-In #: 17-122 17-122

Start Date & Time: 9/1/17 1500
Stop Date & Time: 9/8/17 1500
Test species: Atherinops affinis
17-122

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	8.45	8.13	8.51	8.15	8.45	8.10	8.47	8.05	8.51	8.10	8.49	8.11	8.51	8.15
DO (mg/l)	7.1	6.8	7.2	6.5	7.1	6.5	6.9	6.2	7.0	6.8	7.0	6.9	7.2	6.9
Salinity (ppt)	28.9	29.3	29.0	28.9	28.7	29.0	28.8	29.0	28.7	29.1	28.7	28.6	28.7	29.1
Temperature (°C)	20.2	19.9	20.5	19.7	20.7	19.9	20.4	19.5	20.7	19.8	19.2	19.9	19.4	19.8

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	8.47	8.18	8.50	8.12	8.42	8.11	8.45	8.07	8.50	8.12	8.47	8.07	8.50	8.12
DO (mg/l)	7.0	6.7	7.1	6.2	7.0	6.8	6.8	6.5	7.1	6.9	7.0	7.0	7.1	6.8
Salinity (ppt)	29.0	29.0	29.0	29.0	28.7	28.8	28.8	28.9	28.7	28.8	28.6	28.6	28.7	28.9
Temperature (°C)	20.4	19.8	20.5	19.5	20.6	19.8	20.5	20.1	20.7	19.9	19.2	20.1	19.5	20.0

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	8.44	8.21	8.42	8.12	8.41	8.12	8.45	8.08	8.50	8.10	8.47	8.06	8.45	8.11
DO (mg/l)	7.0	6.7	7.1	6.6	6.8	6.8	6.8	6.7	7.1	6.8	6.9	7.0	7.2	6.8
Salinity (ppt)	29.0	29.1	29.0	29.2	28.9	29.0	28.8	28.9	29.9	29.0	28.6	28.8	28.7	29.1
Temperature (°C)	20.4	19.8	20.4	19.5	20.6	19.8	20.5	20.1	20.6	19.8	19.4	20.0	19.5	20.0

11.1	Days 0		1		2		3		4		5		6	
	init.	final	init.	final	init.	final	init.	final	init.	final	init.	final	init.	final
pH	8.41	8.11	8.38	8.11	8.35	8.14	8.40	8.01	8.47	8.07	8.45	8.08	8.41	8.08
DO (mg/l)	7.0	6.5	7.0	6.5	6.9	6.7	6.9	6.7	7.0	6.7	6.9	7.1	7.1	6.9
Salinity (ppt)	29.0	29.4	29.1	29.2	29.0	29.3	28.8	29.1	29.0	29.2	28.7	29.0	28.7	28.9
Temperature (°C)	20.3	19.9	20.1	19.5	20.4	19.8	20.5	20.2	20.6	19.9	19.5	20.0	19.6	19.9

25	Days 0		1		2		3		4		5		6	
	init.	final	init.	final	init.	final	init.	final	init.	final	init.	final	init.	final
pH	8.28	8.08	8.31	8.10	8.28	8.12	8.37	8.00	8.42	8.05	8.41	8.03	8.41	8.03
DO (mg/l)	7.1	6.8	7.1	6.7	6.9	6.7	6.9	6.6	6.9	6.8	7.0	7.0	7.1	6.9
Salinity (ppt)	28.9	29.0	29.3	29.2	29.1	29.3	28.9	29.1	29.2	29.4	28.9	29.1	28.8	28.9
Temperature (°C)	20.3	19.9	20.1	19.6	20.5	19.8	20.5	20.1	20.4	20.1	19.5	19.9	19.8	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	8.19	7.95	8.22	8.08	8.18	8.07	8.22	7.95	8.30	8.00	8.31	7.94	8.38	7.95
DO (mg/l)	7.1	6.7	7.2	6.8	6.9	6.6	6.8	6.8	6.9	6.8	7.1	7.0	7.0	6.9
Salinity (ppt)	28.7	28.9	29.4	29.5	29.1	29.1	29.0	29.3	29.7	29.9	29.1	29.4	28.9	29.1
Temperature (°C)	20.1	19.8	20.3	19.5	20.4	19.8	20.3	20.1	20.2	20.2	19.7	19.9	20.1	19.8
Tech Initials:	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

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

Test Chamber: VWR
Dilution Water Batch #: ASW# 011

QA Check: [illegible]

Sample Description:
Organism Source: ABS
Date Received: 9/1/17
Date of Hatch: 8/23/17

Comments:

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

Client: NAVFAC / KAUE ENVIRONMENTAL
Sample ID: WW-1-090117
Test No: 1709-006
Rainier Check-In #: 17-122 17-122 17-122

Start Date & Time: 9/1/17 1500
Stop Date & Time: 9/8/17 1500
Test species: Atherinops affinis

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	8.05	7.98	8.08	7.99	8.03	8.01	8.10	7.92	8.13	7.97	8.11	7.91	8.07	7.92
DO (mg/l)	7.3	6.4	7.4	6.7	7.2	6.8	6.9	6.7	7.3	6.9	7.1	7.0	7.3	7.0
Salinity (ppt)	28.4	28.3	29.7	29.5	29.2	29.1	29.2	29.5	30.3	30.5	29.4	29.4	29.1	29.3
Temperature (°C)	19.8	19.8	20.5	19.5	20.2	19.8	20.1	20.1	19.7	20.3	19.8	19.9	20.4	19.9

	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:	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

Rainier Environmental
Washington Laboratory
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Test Chamber: VWR
Dilution Water Batch #: ASW #

QA Check: [illegible]

Sample Description:
Organism Source: ABS
Date Received: 9/1/17
Date of Hatch: 8/23/17

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 ENVIRONMENTAL **Test No.:** 1709-006

Sample ID: WW-1-090117

Conc. or (%)	Cont.	Rep.	Days 0	1	2	3	4	5	6	7	Mean % Survival
CON	3	1	5	4	4	4	4	4	4	4	
	9	2	5	5	5	5	5	5	5	5	
	15	3	5	5	5	5	5	5	5	5	
	4	4	5	5	5	5	4	4	4	4	
	21	5	5	5	5	5	5	5	5	5	
3.125	33	1	5	5	5	5	5	5	5	5	
	18	2	5	5	5	5	5	5	5	5	
	30	3	5	5	5	5	5	5	5	5	
	38	4	5	5	5	5	5	5	5	5	
	35	5	5	5	5	5	5	5	5	5	
6.25	7	1	5	5	5	5	5	5	5	5	
	16	2	5	4	4	4	4	4	4	4	
	1	3	5	5	5	5	5	5	5	5	
	10	4	5	5	5	5	5	5	5	5	
	31	5	5	5	5	5	5	5	5	5	
11.1	12	1	5	5	5	5	5	5	5	5	
	5	2	5	5	5	5	5	5	5	5	
	36	3	5	5	5	5	5	5	5	5	
	19	4	5	5	5	5	5	5	5	5	
	40	5	5	5	5	5	5	5	5	5	
25	29	1	5	5	5	5	5	5	5	5	
	22	2	5	5	5	5	5	5	5	5	
	11	3	5	5	5	5	5	5	5	5	
	6	4	5	5	5	5	5	5	5	5	
	17	5	5	5	5	5	5	5	5	5	
50	32	1	5	5	5	5	5	5	5	5	
	37	2	5	5	4	4	4	4	4	4	
	13	3	5	5	5	5	5	5	5	5	
	28	4	5	5	5	5	5	5	5	5	
	39	5	5	5	5	5	5	5	5	5	
Tech Initials			[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	

Feeding Times: 0 1600 | 1 0715 1615 | 2 0730 1630 | 3 0715 1600 | 4 0715 1600 | 5 0715 1530 | 6 0715 1545

Comments:

QA Check [illegible]

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 ENVIRONMENTAL **Test No.:** 1709-006

Sample ID: WW-1-090117

Conc. or %	Cont.	Rep.	Days 0	1	2	3	4	5	6	7	Mean % Survival
100	14	1	5	5	5	5	5	5	5	5	
	2	2	5	5	5	5	5	5	5	5	
	8	3	5	5	5	5	5	5	5	5	
	20	4	5	5	5	5	5	5	5	5	
	34	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								
		5	5								
		1	5								
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		1	5								
		2	5								
		3	5								
		4	5								
		5	5								
		1	5								
		2	5								
		3	5								
		4	5								
		5	5								
Tech Initials			RT	RT	RT	RT	RT	RT	RT	RT	

Feeding Times: 0 1600 1 0715 1615 2 0730 1630 3 0715 1600 4 0715 1600 5 0715 1530 6 0715 1545

Comments: _____ **QA Check** RT

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

Fish Weights
Seven Day Chronic Bioassay

Client: NAVFAC/KANE ENVIRONMENTAL

Species: *A. affinis*

Sample ID: WW-1-090117

Test No: 1709-006

Conc. or %	cont. #	rep.	pan wt. (gm)	pan + fish (gm)	fish wt. (mg)	# fish	avg. per fish (mg)	avg. per conc. (mg)
CON	3	1	0.06703	0.07208		4		
	9	2	0.05865	0.06508		5		
	15	3	0.06641	0.07230		5		
	4	4	0.06077	0.06494		4		
	21	5	0.06619	0.07162		5		
3.125	33	1	0.06342	0.07067		5		
	18	2	0.06442	0.07226		5		
	30	3	0.06097	0.06662		5		
	38	4	0.06749	0.07265		5		
	35	5	0.06288	0.06968		5		
6.25	7	1	0.06067	0.06665		5		
	16	2	0.06096	0.06479		4		
	1	3	0.05728	0.06331		5		
	10	4	0.05786	0.06363		5		
	31	5	0.05377	0.06055		5		
11.1	12	1	0.06320	0.06976		5		
	5	2	0.05954	0.06585		5		
	36	3	0.05656	0.06220		5		
	19	4	0.05877	0.06588		5		
	40	5	0.06162	0.06743		5		
25	29	1	0.06039	0.06615		5		
	22	2	0.06315	0.06774		5		
	11	3	0.05957	0.06509		5		
	6	4	0.05910	0.06437		5		
	17	5	0.06201	0.06720		5		
50	32	1	0.06062	0.06524		5		
	37	2	0.06214	0.06619		4		
	13	3	0.06223	0.06580		5		
	28	4	0.06428	0.06927		5		
	39	5	0.05886	0.06455		5		
	Tech Initials:		[illegible]	APT				

Date/Time in: 9/8/17 1500 Oven temp. (°C): 61.0 QA check [illegible]

Date/Time out: 9/10/17 1230 Oven temp. (°C): 62.0

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

Fish Weights
Seven Day Chronic Bioassay

Client: NAVFAC/KANE ENVIRONMENTAL

Species: *A. affinis*

Sample ID: WW-1-090117

Test No: 1709-006

Conc. or %	cont. #	rep.	pan wt. (gm)	pan + fish (gm)	fish wt. (mg)	# fish	avg. per fish (mg)	avg. per conc. (mg)
100	14	1	0.06139	0.06759		5		
	2	2	0.05617	0.06082		5		
	8	3	0.06228	0.06750		5		
	20	4	0.05653	0.06196		5		
	34	5	0.05494	0.05955		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:		OT	APP				

Date/Time in: 9/8/17 1500
Date/Time out: 9/10/17 1230

Oven temp. (°C): 61.0
Oven temp. (°C): 62.0

QA check OT

Appendix E
Sample Check-In Sheet

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

Sample Check-In Information

Client: Kane Environmental

Tests Performed: Aa-a; Aa-c; My-a; My-c
Test ID No(s).: 1709-005; 1709-006; 1709-007; 1709-008

Sample ID:	WW-1-090117			
Log-in No. (10-xxxx):	17-122			
Sample Collection Date & Time:	9/1/17 1045			
Sample Receipt Date & Time:	9/1/17 1300			
Check-in Temperature (°C)	5.5			
Temperature OK?	(Y) N	Y N	Y N	Y N
DO (mg/L)	7.3			
pH (units)	8.55			
Conductivity (µS/cm)	21465			
Salinity (ppt)	20.8			
Tit. Vol / Sam. Vol. / Alkalinity (mg/L)*	5.8 / 125 / 232	/ /	/ /	/ /
Tit. Vol. / Sam. Vol. / Hardness (mg/L)* [a]	N/A /	/ /	/ /	/ /
Total Chlorine (mg/L)	<0.03			
Total Ammonia (mg/L)	<1.0			
Technician Initials	(MV)			

* = 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: Aa-a,c My-a,c ART SW NAT SW #011 Alkalinity: 106 Salinity: 29.0

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? 29.0 test type: 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: RA

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 9/1/17 Page 1 of 1

Sample Collection By:

Report to:		Invoice To:	
Company	Kane Environmental	Company	Kane Environmental
Address	3815 Woodland Park Ave N, Ste 102	Address	PO Box 31936
City/State/Zip	Seattle, WA 98103	City/State/Zip	Seattle, WA 98103
Contact	Nate Evenson	Contact	Accounts Payable
Phone	(206)691-0476 x 4	Phone	(206)691-0476
Email	nevenson@kane-environmental.com	Email	ap@kane-environmental.com

ANALYSES REQUIRED

	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 Topsmelt							Receipt Temperature (°C)
1	WW-1-090117	9/1/17	10:45	wastewater	20-L	3	Dilutions: 100, 50, 25, 11.1, 6.25, 3.125, 0	X	X	X	X							5.5
2																		
3																		
4																		
5																		
6																		
7																		
8																		
9																		
10																		

PROJECT INFORMATION		SAMPLE RECEIPT	
Client:	NAVFAC	Total No. of Containers	3
PO No.:	75007	Received Good Condition?	Y
Shipped Via:	Hand delivery	Matches Test Schedule?	Y

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

RELINQUISHED BY (CLIENT)		RELINQUISHED BY (COURIER)	
(Signature)	(Time) 1300	(Signature)	(Time)
(Printed Name) Nathan Evenson	(Date) 9/1/17	(Printed Name)	(Date)
(Company) Kane Environmental		(Company)	

RECEIVED BY (COURIER)		RECEIVED BY (LABORATORY)	
(Signature)	(Time)	(Signature) Eric Tollefson	(Time) 1300
(Printed Name)	(Date)	(Printed Name) ERIC TOLLEFSON	(Date) 9/1/17
(Company)		(Log in #) 17-122	