

Effluent Quality Assessment

Rayonier Performance Fibers, LLC

Nassau County

NPDES #FL0000701

Sampled April 18, 2011

July 2011

Biology Section
Bureau of Laboratories
Division of Environmental Assessment and Restoration

Quality Manual No. 870346G
NELAC Certification No. E31780

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Rayonier Performance Fibers, LLC, Gum Street, Fernandina Beach, Nassau County, Florida, NPDES# FL0000701. Effluent composite samples for biological and chemical analyses for this facility were collected on April 18, 2011.

Introduction

Rayonier Performance Fibers, LLC is a chemical cellulose pulp mill. Treated effluent, with the exception of discharges associated with clear sewer, is intermittently discharged into the Class III Marine waters of the Amelia River during the outgoing tide. (See Appendix F for detailed facility information provided by Heather Webber of FDEP Northeast District.)

Methods

Samples collected from the EFF-2 and EFF-3 NPDES sampling points were flow-proportionally composited and submitted as the EFF-1* sample for this facility's Outfall D-001 by Eesa Ali and Sharon Piltz (FDEP Northeast District) following DEP-SOP-001/01 FS 2400 Wastewater Sampling. All DEP SOPs are available on the web at: http://www.floridadep.org/labs/bars/sas/sop/index.htm.

* EFF-1 represents the combined discharge of treated process water and treated storm water (EFF-3) and the rinse water and regenerate water from the zeolite softening units (EFF-2).

See Appendix A for the completed chain of custody form.

The 96-hour acute definitive toxicity tests and algal growth potential test were performed following internal DEP SOPs TA07_03, TA07_04, and TA08_01 through TA08_09. All internal DEP SOPs are available on the web at: http://www.floridadep.org/labs/cgi-bin/sop/biosop.asp.

The facility's current permit requires that bioassay tests are to be run at the salinity of the receiving water. The receiving water salinity was ~ 35.6 ppth which exceeded the test method salinity requirements for both test species (*A. bahia* test range 5 – 30 ppth ± 10%; *M. beryllina* test range 5 – 32 ppth ± 10%). With the permission of the FDEP Northeast District, the test salinity for both bioassay test species was determined in accordance with draft toxicity language for *Menidia beryllina* as found in the facility's proposed NPDES permit renewal. The bioassay test salinity was calculated as ~15.2 ppth which was the salinity resulting from the mixture of 30% effluent (salinity 3.9 ppth) with 70% artificial seawater (salinity 20 ppth). After salinity adjustment and stabilization, the test salinity was ~15.2 ppth. After the test salinity was determined, effluent and ASW were adjusted to ~15.2 ppth, and the effluent was diluted to a top concentration of 60%.

Crystal Sea® marine mix artificial sea salts was used for the salinity adjustments. The salt control used for each test was prepared by diluting 20 ppth salinity artificial seawater (ASW) with well water to a salinity of approximately 3.9 ppth, then salting this solution with artificial sea salts to match the salinity of the appropriate test solution. The purpose of the salt controls was to confirm that the addition of artificial sea salts did not adversely affect the sample. The *Americamysis bahia* test had 5% mortality in the salt controls and the *Menidia beryllina* test had 10% mortality in the salt controls.

The algal growth potential (AGP) sample was salinity-adjusted with artificial sea salts from an apparent salinity of approximately 2.37 parts per thousand (ppth) to a salinity of approximately 7.5 ppth.

Results and Discussion

- **Toxicity Test Results**

  Tests were performed April 19 - 23, 2011.

Americamysis bahia 96-hour acute definitive bioassay –	LC_{50} = 44.3%, 85%* mortality in 60% † sample at 96 hours

Menidia beryllina 96-hour acute definitive bioassay – LC_{50} > 60%, 10%* mortality in 60% † sample at 96 hours

The bioassay samples were acutely toxic to the *A. bahia* test species; however, the LC50 met the required permit limit of 96-hour LC50 > 30% effluent. The bioassay samples did not show toxicity to the *M. beryllina* test organisms.

†NOTE: The highest concentration of effluent tested was 60%, in accordance with the proposed permit for the facility.

See Appendix B for bioassay bench sheets. See Appendix C for results of the last 20 standard reference toxicant (SRT) tests and the bench sheets and statistical analyses of the SRT tests that correspond to these facility tests. See Appendix D for test organism receipts.

- **Algal Growth Potential**
  The effluent Algal Growth Potential (AGP) was 3.0 U mg dry wt/L of the saltwater species *Dunaliella tertiolecta.* Raschke and Schultz determined that AGP values above 10.0 mg dry weight/L represent a "problem" threshold for marine receiving waters, implying nutrient enrichment (personal communication, Marshall Faircloth, et. al. FDEP, with Ron Raschke USEPA Region 4 1987). The ratio (15.5:1) of total nitrogen to total phosphorus suggests that the effluent is co-limited by both nitrogen and phosphorus, and the ratio (259.4:1) of inorganic nitrogen to orthophosphate suggests that the effluent is limited by orthophosphate (Maloney et al. 1978). To determine actual nutrient limitation, a limiting-nutrient algal growth potential test with associated nutrient chemistry should be performed (Miller et al. 1978).

  See Table 1 for AGP results and qualifiers.

- **Chemistry Results**
  Total residual chlorine was not tested in the bioassay sample in the laboratory due to the tannic color of the sample. Total ammonia (3.24 mg N/L) was detected in the bioassay sample in the laboratory. The total ammonia concentration in the composite sample collected and preserved for chemical analysis was 3.1 mg N/L. Based on the pH, salinity, and temperature of the effluent as measured in the laboratory, the calculated unionized ammonia concentration was 0.03 mg/L.

  Aluminum, arsenic, cadmium, copper, fluoride, iron, lead, nickel, silver, zinc, TSS, and CBOD were detected in the effluent at levels that comply with Class III marine water quality criteria (62-302.530, F.A.C.) or permit conditions (NPDES# FL0000701). Chromium-III, chloride, sodium and sulfate were also detected in the effluent. 2, 4, 6- Trichlorophenol was detected in the effluent between the laboratory method detection limits (MDL) and practical quantitation limits (PQL). Chlorophyll was undetected in the effluent sample.

  See Table 2 for results of analytes detected in the effluent, corresponding limits, and qualifiers. See Appendix E for a complete list of chemical analyses performed. See Appendix B for bioassay lab equipment.

Conclusion

The flow proportional composited effluent samples prepared from effluent collected from the EFF-2 and the EFF-3 NPDES Outfalls for this facility on April 18, 2011, although acutely toxic to the *Americamysis bahia* test organisms during the 96-hour acute definitive bioassays did not exceed unacceptable toxicity (LC50 < 30% effluent) in accordance with the facility's NPDES permit. The bioassay samples were not toxic to the *Menidia beryllina* bioassay test organisms. No growth was detected in the marine AGP test, and therefore, the result did not exceed the threshold for marine receiving waters. Effluent water quality samples collected on April 18, 2011, did not exceed any applicable water quality standards or violate any permit conditions.

Literature Cited

Raschke, R. L. and D. A. Schultz. 1987. The use of the algal growth potential test for data assessment. J. Wat. Poll. Cont. Fed. 59(4): 222-227.

Maloney, T. E., W. E. Miller, and D. T. Specht. 1974. The Marine Algal Assay Procedure: Bottle Test. National Environmental Research Center Office of Research and Development. U. S. EPA, Corvallis, Oregon. 43 p.

Manahan, S. E. 1994. Environmental Chemistry, 6th edition. Lewis Publishers, USA. 811 pp

Miller, W. E., T. E. Maloney, and J. C. Greene. 1978. The *Selenastrum capricornutum* Printz algal assay bottle test. EPA-600/9-78-018. U. S. EPA, Cincinnati, Ohio. 126 p

Table 1. Measured algal growth potential (AGP; mg dry weight/L) of the saltwater species *Dunaliella tertiolecta* and ratios of nitrogen to phosphorus for samples collected from the Rayonier Performance Fibers, LLC plant on April 18, 2011.

Rayonier Performance Fibers, LLC NPDES# FL0000701			
Location	**AGP (measured)**	**Inorganic N:P ratio**	**Total N:P ratio**
Effluent	3.0 U	259.4	15.5

* -Sample salinity adjusted to ~7 ppt

U - Material analyzed for but not detected; value reported is the method detection limit

Table 2. Effluent limits, Class III Criteria for predominantly marine waters and chemical data for samples collected from the Rayonier Performance Fibers, LLC plant on April 18, 2011.

Rayonier Performance Fibers, LLC NPDES# FL0000701	Class III Criteria	Effluent Limits	Effluent	
Organic Constituents (µg/L)				
2,4,6-Trichlorophenol	≤ 6.5 a	-	1.9	I
Metals (µg/L unless otherwise noted)				
Aluminum	≤ 1,500	≤ 3,000 s	1,740	
Arsenic	≤ 50	-	1.05	
Cadmium	≤ 8.8	-	0.35	
Calcium (mg/L)	-	-	396	
Chromium-III	-	-	4.4	
Copper	≤ 3.7	≤ 11.5 s	7.5	
Iron	≤ 300	≤ 2,400 s	1,120	
Lead	≤ 8.5	≤ 27.2 s	1.95	
Magnesium (mg/L)	-	-	49.9	
Nickel	≤ 8.3	≤ 66.4 s	8.71	
Selenium	≤ 71	-	0.2	U
Silver	≤ 2.3	≤ 2.3 s	0.14	
Sodium (mg/L)	-	-	772	
Zinc	≤ 86	≤ 410.0 s	126	
Nutrients (mg/L)				
Ortho-phosphate	-	-	0.012	
Total Phosphorus	-	-	2	
Total Ammonia	-	Report	3.1	
Un-ionized Ammonia	-	Report	0.03	c
Nitrate and Nitrite	-	-	0.013	
Total Kjeldahl Nitrogen	-	-	31	
Organic Nitrogen	-	-	27.9	c
Organic Carbon		-	270	
Total Nitrogen	-	-	31.013	c
General Physical and Chemical Parameters				
Dissolved Oxygen (mg/L)	≥ 4.0	-	6.9	£
pH (SU)	6.5 - 8.5	6.0 - 8.5	7.2	£
Conductivity (µmhos/cm)	-	-	7,080	£
Temperature (°C)	-	Report	25.1	£
Salinity	-	-	3.9	£
Chlorophyll *a* (µg/L) - Corrected	-	-	11	U
Phaeophytin (µg/L)	-	-	8	U
Total Suspended Solids (mg/L)	-	≤ 250.5 p	197	
Color (pt-Co)	-	-	760	
CBOD, 5 day (mg/L), N - inhibited	-	≤ 215.2 p	84	J
Chloride (mg/L)	-	-	850	
Fluoride (mg/L)	≤ 5.0	-	0.69	
Sulfate (mg/L)	-	-	1600	
Flow (MGD)	-	26.31 a	17.2	*
Hardness (mg $CaCO_3$)	-	-	1,194.3	c

Value exceeds the Class III Water Quality Criteria or permit limits

a - Annual average
b - Value is calculated based on hardness
c - Value is calculated
p - 24 hour flow proportioned composite
s - Single sample
I - The reported value is between the laboratory method detection limit and the laboratory practical quantitation limit
J - Estimated value
U - Material analyzed for but not detected; value reported is the method detection limit
£ - measurement taken in the FDEP laboratory
* - Measurments taken from 12/09 - 11/10

Florida Department of Environmental Protection

Central Laboratory Sample Submittal Form

Event ID *

Request Number: RQ-2011-03-07-21
FYI3 for Rayonier, INC.

Requester: ~~Cari Butler~~ Edward Smith
Collected By: E. Ali S. Fultz
Sampling Agency: DEP

Field Report Prepared By: E. Ali
Send Final Report To: Tom Kallemeyn

Customer: NE-DIST
Project ID: FYI3
PMAS: 1143

Lab ID *	Location / Field ID	Matrix (include type e.g. Salt, Fresh, etc)	Temp (C)	pH	Latitude	Longitude	Comp / Grab	Collection (begin) Date	Time	Eastern Central	Collection (end) Date	Time	Eastern Central	Tot Res Chlorine (mg/L)	Diss Oxygen (mg/L)	Storet Station Number	Sample Depth m / ft	Salinity (PPTh)	Sp Conductance (umho/cm)	NPDES Number	Bottle Group(s)**	Comments
	RAYONIER EFF-#2		24.16	7.535	dd / dms	dd / dms	Grab	4-18-11	1134	Eastern Central					7.16		0.38 m / ft	6.25	10137		A	DO 87.9%
	RAYONIER EFF-#3	~~Salt~~, Fresh, etc	27.34	6.945	dd / dms	dd / dms	Grab	4-18-11	1147	Eastern Central					0.20		0.35 m / ft		4423		B	DO % 2.4
	BLANK				dd / dms	dd / dms	Grab	4-18-11	1208	Eastern Central											B	
	Fernandina Boat Ramp	Salt	26.94	7.595	dd / dms	dd / dms	Grab	4/18/11	1108	~~Eastern~~ Central					6.89		1.0 m / ft	53.744	35.56		7	Total Depth 3.4m DO 95% Secchi 1.2m

Relinquished By:	Date/Time	Shipping Method:	Received By:	Date/Time	Relinquished By:	Date/Time	Received By:	Date/Time
E. Ali/S. Fultz	4/19/11 1330	Self		4/19/11 1320				

* Shaded Areas for Lab use only.

** Please see reverse side for Bottle Group information.

last revised October 1, 2003

Florida Department of Environmental Protection

Central Laboratory Sample Submittal Form

Request Number: ~~RQ-2011-01-31-38~~ 2011-03-07-21

SUW B 2 - 3573A - STEINHATCHEE

Event ID *

Requester: Jann Gruentzel Ed Smith

Field Report Prepared By: E. Ali

Customer: NE-DIST

Project ID: SMP

PMAS:

Collected By: E.Ali J.Piltz

Send Final Report To: ~~Lee Banks~~ Tom Kallemeyn

Sampling Agency: DEP

Lab ID *	Location	Comp / Grab	Collection (begin) Date Time Eastern Central	Collection (end) Date Time Eastern Central	Bottle Group(s)**
	Eff-1	☑ Comp ☐ Grab	Date 4/18/11 Time 1134		A
	Field ID	Tot Res Chlorine (mg/L)	Diss Oxygen (mg/L)	Storet Station Number	
	Matrix (include type e.g. Salt, Fresh, etc) / Temp (C) / pH	Sample Depth ☐ m ☐ ft	☐ Salinity (PPTh) ☐ Sp Conductance (umho/cm)	NPDES Number	
	Latitude ☐ dd ☐ dms / Longitude ☐ dd ☐ dms	Comments	Comp of Eff 2+3 @ 2 dilutions of 1:53 to 1:780		

Bottle @ 1030 4/18/11

Lab ID *	Location	Comp / Grab	Collection (begin) Date Time Eastern Central	Collection (end) Date Time Eastern Central	Bottle Group(s)**
		☐ Comp ☐ Grab			
	Field ID	Tot Res Chlorine (mg/L)	Diss Oxygen (mg/L)	Storet Station Number	
	Matrix (include type e.g. Salt, Fresh, etc) / Temp (C) / pH	Sample Depth ☐ m ☐ ft	☐ Salinity (PPTh) ☐ Sp Conductance (umho/cm)	NPDES Number	
	Latitude ☐ dd ☐ dms / Longitude ☐ dd ☐ dms	Comments			

Lab ID *	Location	Comp / Grab	Collection (begin) Date Time Eastern Central	Collection (end) Date Time Eastern Central	Bottle Group(s)**
		☐ Comp ☐ Grab			
	Field ID	Tot Res Chlorine (mg/L)	Diss Oxygen (mg/L)	Storet Station Number	
	Matrix (include type e.g. Salt, Fresh, etc) / Temp (C) / pH	Sample Depth ☐ m ☐ ft	☐ Salinity (PPTh) ☐ Sp Conductance (umho/cm)	NPDES Number	
	Latitude ☐ dd ☐ dms / Longitude ☐ dd ☐ dms	Comments			

Lab ID *	Location	Comp / Grab	Collection (begin) Date Time Eastern Central	Collection (end) Date Time Eastern Central	Bottle Group(s)**
		☐ Comp ☐ Grab			
	Field ID	Tot Res Chlorine (mg/L)	Diss Oxygen (mg/L)	Storet Station Number	
	Matrix (include type e.g. Salt, Fresh, etc) / Temp (C) / pH	Sample Depth ☐ m ☐ ft	☐ Salinity (PPTh) ☐ Sp Conductance (umho/cm)	NPDES Number	
	Latitude ☐ dd ☐ dms / Longitude ☐ dd ☐ dms	Comments	4 biomass Reed in Tox by J.D. 1:40 4.19.11		

Relinquished By	Date/Time	Shipping Method	Received By	Date/Time	Relinquished By	Date/Time	Received By	Date/Time
E.Ali/S.Piltz	4/19/11 1320	Self		4/19/11/1320				

* Shaded Areas for Lab use only.

** Please see reverse side for Bottle Group information.

last revised October 1, 2003

FDEP Biology Laboratory - Acute Bioassay Bench Sheets

Facility: Rayonier Performance Fibres

Address : 10 Gum Street

City: Fernandina Beach **County:** Nassau

Contact/District: Tessa Ali / Northeast

NPDES Permit #: FL 0000701

LIMS Job #: TLH-2011-14-19-73 **LIMS Sample #:** 1345098

Lims Data Entry: 4-26-11 MF Data Entry Verification: 4.26.11 JD

Sample Collection: Date: 4-18-11 Time: 1134

Hold Time Start: Date: 4-18-11 Time: 1134

Comments:
Sample salted with forty Fathoms Sea Salts (artificial) then diluted with ASW to 60% concentration (effluent). Top Concentration is 60% sample MF 4-21-11

(A) Could not be measured. - KC -
Sample chocolate/tannic color MF 4-21-11

Initial sample handling:
Instructions: Check yes or no. If yes is checked, complete blanks

PH adjustment: ☐ yes ☑ no Initial pH: ____ NaOH ____ N HCl ____ N ____ Drops mL Final pH: ____

Aeration: ☑ yes ☐ no Initial DO: ____ mg/L Final DO: ____ mg/L Duration: ____ minutes Rate: ~ ____ bubbles/min

Salinity adjusted (Test 1): ☑ yes ☐ no Initial Salinity: 3.9 Final Salinity: 14.8 (Salts) Hypersaline brine

Salinity adjusted (Test 2): ☑ yes ☐ no Initial Salinity: 3.9 Final Salinity: 14.8 (Salts) Hypersaline brine

Dechlorination: ☐ yes ☑ no ____ mL of 0.025N Sodium Thiosulfate per liter of sample. Final TRC: ____

Sample Validation:
Instructions: Check yes or no. Fill in temperatures.

Temperature: Shipped ≤ 6°C ☑ Yes ☐ No — IF Hand Delivered: Cooling ☐ Yes ☐ No (received ____ °C collected ____ °C)

Holding Time: ≤ 36 Hours ☑ Yes ☐ No (Composite-end of collection; grab-when collected; 4 in 24 - time last sample collected)

Investigators' Signatures:	Initials:
Ben Allen	BA
Kara Coy	KC
Marshall Faircloth	MF
James Daniel	JD

REVIEWER: Liz Miller

Diluent/Control Batch#:				4.19.11					
Water Quality Parameters	20% DMW	Well Water	Moderately Hard Water	Salt Water (ASW) NSW Test 1	Salt Water ASW NSW Test 2	Other:	Original Sample	Measured by	Verified by
Field Total Residual Cl_2 (mg/L):	N/A	N/A	N/A	N/A	N/A	N/A	not measured	n/a	KC
Lab Total Residual Cl_2 (mg/L):				<0.03			(A)	KC	KC
Alkalinity (mg/L as $CaCO_3$):				177			310	KC	KC
Hardness (mg/L as $CaCO_3$):				—			1450	KC	KC
Total Ammonia (mg/L as N):				<0.024			3.24	BA	KC
Conductivity: ☐ µmhos ☑ mmhos				24.2			7.08	JD	KC
Salinity (ppth):				14.8			3.9	JD	KC

V 1.8 1/13/10

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Appendix B. (continued)

[redacted]

FDEP Biology Laboratory - Bioassay Survival Bench Sheet

LIMS Sample # 1345098 SOP#: TA 07 03 Test # 1 of 2

Test Species:
Batch #: 4.19.11 Age: 5 days
- ☐ Ceriodaphnia dubia
- ☐ Cyprinella leedsi
- ☐ Pimephales promelas
- ☐ Menidia beryllina
- ☑ Americamysis bahia
- ☐ Other:

Test Validation
Control Survival ≥ 90%: ☑ Yes ☐ No
Temperature Range ≤ 3° C: ☑ Yes ☐ No

Diluent (Batch # 4.19.11)
☑ ASW ☐ 20% DMW ☐ MHW ☐ Well

Test Type: ☑ Acute ☑ Definitive ☐ Static ☑ Static Renewal ☐ Flow-Through

Test Duration: ☐ 48 hr ☒ 96 hr ☐ ___hr

Test Started: Date 4.19.11 Time 1520

Test Ended: Date 4-23-11 Time 1400

Chamber Size 400 ml
Test Volume: 350 ml

Concentration	Replicate	Chamber #	Test Hour 0 hr	24 hr	48 hr BR	48 hr AR	72 hr	96 hr
ctrl	A	I 1	5	5	5	5	5	5
	B	I 2	5	5	5	5	5	5
	C	I 3	5	5	5	5	5	5
	D	I 4	5	5	5	5	5	5 BA
3.75 %	A	I 5	5	5	5	5	5	5
	B	I 6	5	5	5	5	5	5
	C	I 7	5	5	5	5	5	5
	D	I 8	5	5	5	5	5	5
7.5 %	A	I 9	5	5	5	5	5	5
	B	I 10	5	5	5	5	5	5
	C	I 11	5	5	5	5	5	5
	D	I 12	5	5	4D	4	4	4
15 %	A	I 13	5	5	5	5	5	5
	B	I 14	5	5	5	5	5	5
	C	I 15	5	5	5	5	5	5
	D	I 16	5	5	5	5	5	5
30 %	A	I 17	5	5	5	5	5	5
	B	I 18	5	5	5	5	5	5
	C	I 19	5	5	5	5	5	5
	D	I 20	5	5	5	5	5	4 D
60 %	A	I 21	5	5	1 4D	1	1	1
	B	I 22	5	5	1 4D	1	1	1
	C	I 23	5	5	0 5D	—	—	—
	D	I 24	5	5	1 4D	1	1	1
Salt ctrl	A	K 1	5	5	5	5	5	5
	B	K 2	5	5	5	5	5	5
	C	K 3	5	5	5	5	5	4 D
	D	K 4	5	5	5	5	5	5
Checked or Verified by:			KC	JD	JD	JD	JD	BA

Food
- ☐ YCT Batch#_____
- ☐ P. subcapitata Batch#_____
- ☑ Artemia Lot# 23613

Feeding and Artemia Batch #
- ☑ 0 hr 77-11 ☑ Prior to Test
- ☑ 24 hr 78-11
- ☑ 48 hr 79-11 ☑ Prior to Renewal
- ☑ 72 hr 80-11

Temperature Range (°C)
Incubator # 2 min 25.3 max 27.5 mean —
Incubator # ___ min.____ max.____ mean____
Waterbath # ___ min.____ max.____ mean____
Room B246 min 23.3 max 23.7 mean —
Light intensity (ft. candles): 50-100
Photoperiod (hours): 16 light, 8 dark

Loaded/ Verified by: KC / MF
m = missing, d = dead, BR/AR Before/ After Renewal

Test Results:
Screening Tests: Report LC50 as >100%, =100%, or <100%.
% mortality in 100% sample: 25% LC50: 443 *
Calculated LC50 (Definitive) 95% CI 40.7 Method AK.3

Comments: all concentrations aerated at 48 hours due to DO < 4.0 mg/L, MF 4-21-11
* 60% effluent is highest concentration tested, MF 4-26-11

V. 2.5 1-13-10

Substitute highest test concentration used if other than 100% (example: Ocean outfall tested at 30% concentration)

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Appendix B. (continued)

FDEP Biology Laboratory - Bioassay Survival Bench Sheet

LIMS Sample # 1345098 SOP#: TA 07 04 Test # 2 of 2

Test Species: Batch #: 4.19.11 Age: 13days
- ☐ *Ceriodaphnia dubia*
- ☐ *Cyprinella leedsi*
- ☐ *Pimephales promelas*
- ☑ *Menidia beryllina*
- ☐ *Americamysis bahia*
- ☐ Other:_____

Test Validation
Control Survival ≥ 90%: ☑ Yes ☐ No
Temperature Range ≤ 3° C: ☑ Yes ☐ No

Diluent (Batch # 4.19.11)
☑ ASW ☐ 20% DMW ☐ MHW ☐ Well

Test Type: ☑ Acute ☑ Definitive ☐ Static ☑ Static Renewal ☐ Flow-Through

Test Duration: ☐ 48 hr ☒ 96 hr ☐ ___hr

Test Started: Date 4.19.11 Time 15:15

Test Ended: Date 4.23.11 Time 14:45

Chamber Size 600 ml
Test Volume: 400 ml

Concentration	Replicate	Chamber #	Test Hour 0 hr	24 hr	48 hr BR	48 hr AR	72 hr	96 hr
ctrl	A	H1	10	10	10	10	10	10
	B	H2	10	10	10	10	10	10
3.75 %	A	H3	10	10	10	10	10	10
	B	H4	10	10	10	10	10	10
7.5 %	A	H5	10	10	10	10	10	10
	B	H6	10	10	10	10	10	10
15 %	~~BA~~ A	H7	10	10	10	10	10	10
	B	H8	10	10	10	10	10	10
30 %	A	H9	10	10	10	10	10	10
	B	H10	10	10	10	10	10	10
60 %	A	H11	10	10	10	10	10	10
	B	H12	10	10	10	10	10	8 2D
solv cont	A	H13	10	10	10	10	9 1D	9
	B	H14	10	9 1D	9	9	9	9
Checked or Verified by:			BA	JD	JD	JD	JD	BA

Food
- ☐ YCT Batch#_____
- ☐ P. subcapitata Batch#_____
- ☑ Artemia Lot# 23613

Feeding and Artemia Batch #
- ☑ 0 hr 77-11 ☑ Prior to Test
- KC ☑ 24 hr___
- ☑ 48 hr 79-11 ☑ Prior to Renewal
- ☐ 72 hr___

Temperature Range (°C)
Incubator # 2 min. 25.3 max. 27.5 mean ___
Incubator #___ min.___ max.___ mean___
Waterbath #___ min.___ max.___ mean___
Room B246 min. 23.3 max. 23.7 mean ___
Light Intensity (ft. candles): 50-100
Photoperiod (hours): 16 light, 8 dark

Loaded/ Verified by: BR / MF
m = missing, d = dead, BR/AR Before/ After Renewal

Test Results:
Screening Tests: Report LC50 as >100%, =100%, or <100%.
% mortality in 100% sample: 10% LC50: >60%*
Calculated LC50 (Definitive) 95% CI_____ Method_____

Comments: all concentrations aerated at 48 hours due to DO < 4.0 mg/L MF 4-27-11
* 60% is highest concentration tested, MF 4-26-11

V. 2.5 1-13-10

Substitute highest test concentration used if other than 100% (example: Ocean outfall tested at 30% concentration)

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Appendix B. (continued)

FDEP Biology Laboratory - Bioassay Parameter Sheet

[redacted] LIMS Sample # 1345098 Test # 1 of 2

Test Species:

☐ *Ceriodaphnia dubia* ☐ *Pimephales promelas* ☒ *Americamysis bahia*
☐ *Cyprinella leedsi* ☐ *Menidia beryllina* ☐ Other:_____

Test aerated: (if DO is < 4.0 mg/L) ☑ Yes ☑ No

Concentration	Replicate	Test Hour	pH (SU)	Temperature (°C)	Dissolved Oxygen (mg/L)	Conductivity ☐ µmhos ☒ mmhos	Salinity* (ppth)
Ctrl	A	0 hr	7.9	24.1	7.0	24.2	14.8
	D	24 hr	8.0	24.5	6.9	24.6	14.7
	C	48 hr BR	8.1	25.3	5.4	25.3	15.0
	C	48 hr AR	8.2	24.0	6.8	23.7	14.4
	D	72 hr	8.3	24.3	10.8	24.0	14.5
	A	96 hr	8.3	24.0	5.3	26.0	15.9
3.75	A	0 hr	8.2	24.3	7.2	24.5	15.0
	B	24 hr	8.1	24.4	6.1	24.8	15.0
	C	48 hr BR	8.1	24.4	5.5	25.3	15.2
	C	48 hr AR	8.2	24.3	6.7	24.7	15.1
	D	72 hr	8.3	24.0	6.8	24.6	14.7 KC
	A	96 hr	8.3	24.1	5.4	26.5	16.0
7.5	A	0 hr	8.2	24.3	7.2	24.5	15.0
	B	24 hr	8.1	24.2	6.1	25.0	15.1
	C	48 hr BR	8.0	24.8	5.3	25.4	15.3
	C	48 hr AR	8.1	24.0	6.6	24.3	14.9
	D	72 hr	8.3	24.2	6.9	24.3	14.6
	A	96 hr	8.3	24.6	5.0	26.0	15.9
15	A	0 hr	8.1	24.6	7.2	24.7	15.1
	B	24 hr	8.1	24.6	6.0	25.1	15.2
	C	48 hr BR	7.9	24.7	4.8	25.5	15.4
	C	48 hr AR	8.1	24.0	6.6	24.6	15.0
	D	72 hr	8.3	24.0	6.8	24.4	14.7
	A	96 hr	8.2	24.5	5.7	25.8	15.7
30	A	0 hr	8.0	25.3	7.4	25.4	15.4
	B	24 hr	8.0	24.9	5.1	24.8	15.0
	C	48 hr BR	7.8	24.4	4.5	25.3	15.3
	D	48 hr AR	8.0	24.1	6.5	24.5	15.0
	D	72 hr	8.3	24.1	6.7	24.3	14.6
	A	96 hr	8.2	25.2	4.8	26.0	16.0
60	A	0 hr	7.8	24.6	7.0	24.9	15.2
	B	24 hr	8.0	24.7	4.5	25.4	15.4
	C	48 hr BR	7.7	25.2	3.1	25.3	15.7
	C	48 hr AR	7.6	24.1	4.6	24.7	15.1
	D	72 hr	8.2	24.1	6.7	24.6	14.8
	A	96 hr	8.1	25.2	4.9	26.2	16.0
5.1H Ctrl	A	0 hr	8.3	24.1	7.0	~~25.2~~ 25.1	15.2
	B	24 hr	8.1	24.6	6.7	26.2	15.8
	C	48 hr BR	8.1	24.6	5.4	26.1	15.7
	C	48 hr AR	8.3	24.0	6.4	25.1	15.2
	D	72 hr	8.3	24.1	6.9	25.1	15.3
	A	96 hr 8.3	8.1 8.3	24.10	5.7	27.7	16.9
		0 hr					
		24 hr					
		48 hr BR					
		48 hr AR					
		72 hr					
		96 hr					

*Measure/ record salinity for marine tests

Comments:

Measured By:
0 hr: JD
24 hr: JD
48 hr BR: KC/JD
48 hr AR: JD
72 hr: KC
96 hr: BA

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Appendix B. (continued)

FDEP Biology Laboratory - Bioassay Parameter Sheet

LIMS Sample # 1345098 Test # 2 of 2

Test Species:

☐ Ceriodaphnia dubia ☐ Pimephales promelas ☐ Americamysis bahia
☐ Cyprinella leedsi ☒ Menidia beryllina ☐ Other:_____

Test aerated: (if DO is < 4.0 mg/L) ☑ Yes ☒ No KC

Concentration	Replicate	Test Hour	pH (SU)	Temperature (°C)	Dissolved Oxygen (mg/L)	Conductivity ☐ µmhos ☒ mmhos	Salinity* (ppth)
	A	0 hr	8.2	24.1	6.8	24.7	14.8
	B	24 hr	8.0	25.4	6.1	25.3	15.2
Ctrl	A	48 hr BR	8.2	25.2	5.9	25.4	15.1
	A	48 hr AR	8.2	24.0	6.2	24.9	14.9
	B	72 hr	8.3	25.5	7.0	24.4	15.1
	A	96 hr	8.2	25.7	5.9	25.4	15.4
	A	0 hr	8.2	24.1	7.1	24.8	15.0
75	B	24 hr	8.1	25.1	5.9	25.5	15.4
3.25	A	48 hr BR	8.1	25.2	5.8	25.7	15.5
JD	A	48 hr AR	8.2	24.2	6.7	25.0	15.2
	B	72 hr	8.4	25.6	7.0	24.8	15.2
	A	96 hr	8.2	25.9	5.9	25.4	15.5
	A	0 hr	8.2	24.2	7.1	24.9	15.0
	B	24 hr	8.1	25.9	5.4	25.7	15.5
7.5	A	48 hr BR	8.1	25.5	5.7	25.3	15.2
	A	48 hr AR	8.2	24.0	6.7	24.6	15.0
	B	72 hr	8.3	25.7	6.9	24.9	15.2
	A	96 hr	8.2	26.0	6.0	25.7	~~15.7~~ 15.7
	A	0 hr	8.2	24.4	7.3	25.0	15.1
	B	24 hr	8.1	25.4	4.9	25.4	15.4
15	A	48 hr BR	8.0	25.1	5.5	25.5	15.4
	A	48 hr AR	8.1	24.1	6.7	24.7	15.1
	B	72 hr	8.2	25.8	6.5	24.9	15.2
	A	96 hr	8.2	26.0	6.1	25.5	15.5
	A	0 hr	8.1	25.4	7.5	25.8	15.5
	B	24 hr	8.1	25.4	4.8	25.6	15.4
30	A	48 hr BR	7.9	25.2	5.1	25.5	15.4
	A	48 hr AR	8.0	24.1	6.5	24.7	15.1
	B	72 hr	8.2	25.9	6.5	24.8	15.2
	A	96 hr	8.1	25.7	5.6	25.5	15.5
	A	0 hr	7.9	25.1	7.0	25.3	15.3
	B	24 hr	8.1	25.3	4.2	25.6	15.4
60	A	48 hr BR	7.8	25.7	3.8	25.8	15.6
	A	48 hr AR	7.7	24.2	4.6	25.0	15.2
	B	72 hr	8.2	25.9	6.4	25.3	15.5
	A	96 hr	8.0	25.6	5.5	25.8	15.7
	A	0 hr	8.3	24.0	7.1	~~25.5~~ 24.7	14.9
	B	24 hr	8.0	25.5	6.0	27.2	16.5
S.H	A	48 hr BR	8.2	25.4	6.2	25.1	15.2
Ctrl	A	48 hr AR	8.3	24.1	6.5	24.9	14.9
	B	72 hr	8.3	25.9	6.8	25.1	15.4
	A	96 hr	8.2	25.6	5.9	25.4	15.4
		0 hr					
		24 hr					
		48 hr BR					
		48 hr AR					
		72 hr					
		96 hr					

*Measure/ record salinity for marine tests

Comments:

Measured By:
0 hr: JD
24 hr: JD
48 hr BR: KC/JD
48 hr AR: JD
72 hr: KC
96 hr: BA

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Appendix B. (continued)

Test ID: Rayonier Performance Rivers Dates: 4.19.11 – 4.23.11

METER / DEVICE	ID	SOP	Parameter	Method	v used
YSI Model 58 Dissolved Oxygen Meter	90H018262	TA06_04	Dissolved Oxygen	SM 4500 O G	✓
YSI DO Probe	5905	TA06_04	Dissolved Oxygen	SM 4500 O G	✓
Accumet AR-10 pH Meter	93312105	TA06_23	pH	SM 4500 H+	✓
Mettler-Toledo SevenMulti Conductivity Meter	SN 1225117049 Probe H04257	TA06_25	Conductivity Salinity	SM 2510 B SM 2520 B	✓
Denver Model 225 ISE with ammonia probe	SN K01377	TA06_17	Ammonia	SM 4500 NH3 F	✓
Traceable Thermometer	#1-SN101686412 #2-SN221295527 #3-SN240116020 #4-SN80361795 (#5) SN61990624	TA06_05	Temperature	SM-2530B modified DEP SOP-001/01 FT1400	✓ #5
Hach Pocket Colorimeter II	05050C026378	TA06_22	Total Residual Chlorine	EPA 330.5 SM 4500 CL G	✓
Alkalinity (Hach Kit)	No SN	TA06_08	Alkalinity	SM 2320 B	✓
Hardness (Hach Kit)	No SN	TA06_09	Hardness	SM 2340 C	✓
OHAUS Balance 250D	1125481084	TA06_21 TA06_27	Weight	-	
S-Weights	BIO-S-WEIGHTS-01	NA	Balance check	-	

SM-2530B modified to allow use of electronic and non-mercury filled thermometers.

Insert other device information in blank spaces(if used). Test ID = Facility or SRTs (acute SRT–Chronic SRT)

Kara Cox 4/23/11

V 1.1 9/21/10 MF/jd

000042

Appendix C. SRT Bench Sheets and Statistical Analysis

Florida Department of Environmental Protection
Bureau of Laboratories

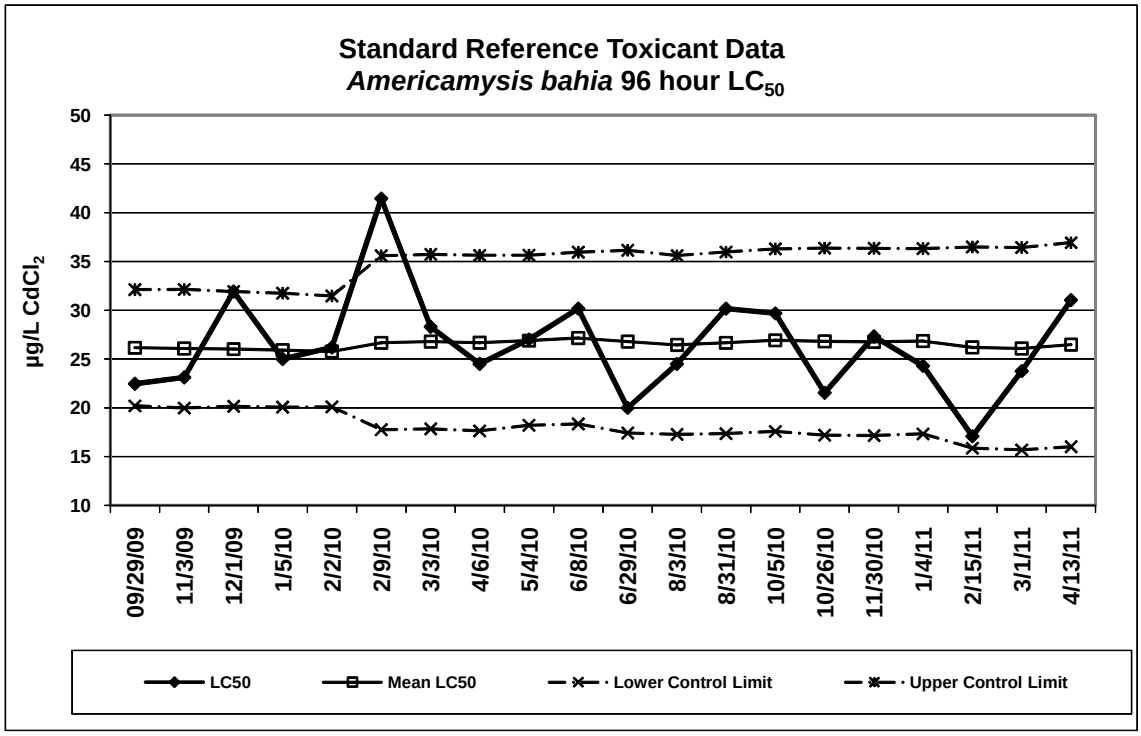
Standard Reference Toxicant (SRT) Test Data - 96-hour Acute Toxicity
Americamysis bahia (mysid shrimp) - Cadmium Chloride ($CdCl_2$)

Date	LC50	Mean LC50	Std Dev	Lower Control Limit	Upper Control Limit
09/29/09	22.46	26.17	2.97	20.22	32.11
11/3/09	23.12	26.08	3.04	20.00	32.15
12/1/09	31.91	26.03	2.94	20.16	31.91
1/5/10	25.00	25.91	2.92	20.06	31.75
2/2/10	26.18	25.77	2.84	20.09	31.46
2/9/10	41.45	26.68	4.46	17.76	35.59
3/3/10	28.31	26.78	4.47	17.84	35.72
4/6/10	24.49	26.66	4.50	17.66	35.65
5/4/10	27.02	26.91	4.36	18.20	35.63
6/8/10	30.17	27.15	4.40	18.34	35.95
6/29/10	20.00	26.78	4.68	17.42	36.15
8/3/10	24.49	26.45	4.59	17.27	35.62
8/31/10	30.17	26.68	4.66	17.37	35.99
10/5/10	29.70	26.94	4.67	17.60	36.29
10/26/10	21.53	26.80	4.80	17.20	36.39
11/30/10	27.31	26.76	4.79	17.18	36.35
1/4/11	24.29	26.83	4.74	17.35	36.32
2/15/11	17.08	26.19	5.15	15.88	36.49
3/1/11	23.78	26.07	5.18	15.71	36.43
4/13/11	31.04	26.48	5.24	16.00	36.95

CV = 19.78

Lower Confidence Limit = mean - 2 * Std Dev
Upper Confidence Limit = mean + 2 * Std Dev

EPA reference 75th quartile CV = 26%



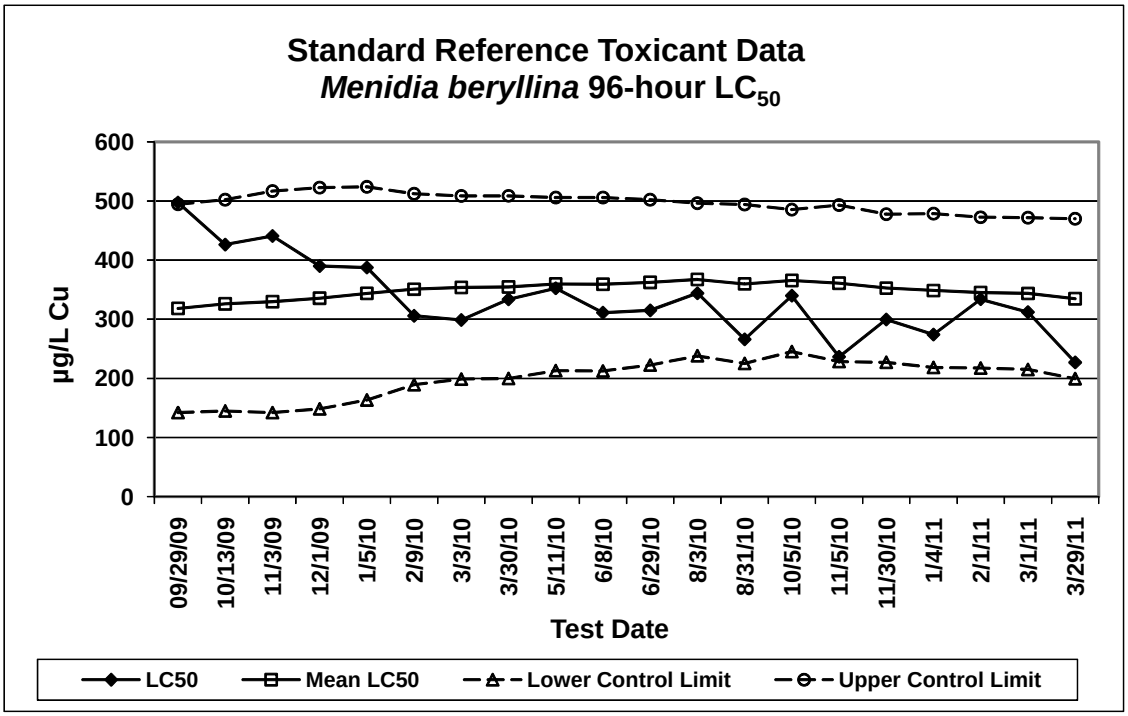
Appendix C. (continued)

Florida Department of Environmental Protection
Bureau of Laboratories

Standard Reference Toxicant (SRT) Test Data - 96-hour Acute Toxicity
Menidia beryllina (inland silverside) - Copper Chloride ($CuCl_2$) as Cu

Date	LC50	Mean LC50	Std Dev	Lower Control Limit	Upper Control Limit
09/29/09	497.5	318.42	88.10	142.21	494.62
10/13/09	426.5	326.12	90.57	144.97	502.27
11/3/09	441.06	329.60	93.69	142.22	516.99
12/1/09	390.28	335.59	93.54	148.51	522.68
1/5/10	387.66	343.92	90.17	163.57	524.26
2/9/10	306.1	350.85	80.73	189.39	512.30
3/3/10	298.9	353.79	77.48	198.82	508.76
3/30/10	333.83	354.48	77.23	200.03	508.94
5/11/10	352.66	359.63	73.21	213.21	506.05
6/8/10	311.45	359.36	73.38	212.59	506.13
6/29/10	315.29	362.43	69.94	222.56	502.31
8/3/10	344.21	367.37	64.53	238.31	496.42
8/31/10	266.23	359.85	67.19	225.46	494.23
10/5/10	340.06	365.40	60.01	245.39	485.42
11/5/10	236.68	360.93	66.11	228.71	493.15
11/30/10	299.75	352.65	62.62	227.41	477.89
1/4/11	274.39	348.59	65.00	218.58	478.60
2/1/11	334.16	345.13	63.77	217.60	472.66
3/1/11	312.31	343.58	64.19	215.20	471.96
3/29/11	227.2	334.81	67.59	199.62	470.00

CV = 20.19
EPA reference 75th quartile CV = 21%



Appendix C. (continued)

FDEP Biology Laboratory - Acute SRT Bench Sheet

Method from EPA-821-R-02-012 except *H. azteca*

Test Organism: (check one) [X] *Americamysis bahia* Method 2007.0 TA07.03; [ ] *Menidia Beryllina* Method 2006.0 TA07.04; [ ] *Hyalella azteca* Method 100.1 EPA-600-R-99-064; [ ] *Ceriodaphnia dubia* Method 2002.0 TA07.01; [ ] *Cyprinella leedsi* Method 2000.0 TA07.02; [ ] *Pimephales promelas* Method 2000.0 TA07.02

Test Type: [ ] non-renewal [X] renewal

Test Page 1 of 2

Diluent/ Batch #: ASW 13.29.11 **Organism Batch:** 4.13.11 **Test Beginning:** Date: 4.13.11 Time: 1300

Toxicant/ Batch#: $ZnCl_2$ 14.12.11 Age: 5days **Test Ending:** Date: 4-17-11 Time: 1135

Water Quality Parameters:	Diluent	SOP	Initials
Total Residual Cl_2 (mg/L):	<0.03	TA06_22	KC
Alkalinity (mg/L as $CaCO_3$):	178	TA06_08	KC
Hardness (mg/L as $CaCO_3$):	—	TA06_09	KC
Total Ammonia (mg/L as N):	<0.034	TA06_17	BA/KC
Conductivity: µmhos (mmhos)	33.8	TA06_25	JD/KC
Salinity (ppth):	21.1	TA06_25	JD/KC

Food:	Batch
[ ] YCT	
[ ] *P. subcapitata*	
[X] Artemia Lot # 236.13	Artemia Batch:

Chamber size: 400 mL

Test volume: 375 mL per replicate

Artemia Batch:	
0 hr:	71-11
24 hr:	72-11
48 hr:	73-11
72 hr:	74-11

Concentrations prepared by: JD

Test Incubated in: Incubator # 5 Waterbath # ___ Temperature Range °C (if used) Incubator # 5 min 24.3 max 24.4 mean —

Light Intensity: 50-100 Ft. candles Waterbath # ___ min ___ max ___ mean ___

Photoperiod: 16 hours Light / 8 hours dark Room B246 min 23.0 max 23.8 mean —

Feeding: √as needed	
✓	Before test
✓	0 hr
✓	24 hr
✓	48 hr
✓	72 hr

all species 2 hrs prior to test

mysids daily

all species except *H. azteca* 2 hr prior to renewal

H. azteca 0 hr and 48 hr

Concentration (mg/L or g/L)	Replicate	Chamber #	Test Hour 0 hr	24 hr	48 hr BR	48 hr AR	72 hr	96 hr
Control	A	J 1	5	5	5	5	5	5
	B	J 2	5	5	5	5	5	5
	C	J 3	5	5	5	5	5	5
	D	J 4	5	5	5	5	5	5
20	A	J 5	5	5	5	5	5	4 1D
	B	J 6	5	5	5	5	5	5
	C	J 7	5	5	4 1D	4	4	4
	D	J 8	5	5	5	5	5	4 1D
30	A	J 9	5	5	5 5	5	3 2D	0 3D
	B	J 10	5	5	5 5	5	4 1D	3 1D
	C	J 11	5	5	5 5	5	3 2D	3
	D	J 12	5	5	5 5	5	3 2D	3
45	A	J 13	5	5	3 2D	3	0 3D	–
	B	J 14	5	5	4 1D	4	0 4D	–
	C	J 15	5	5	2 3D 5	5	3 2D	1 2D
	D	J 16	5	5	2 3D	2	0 2D	–
67	A	J 17	5	3	1 4D	0 1D		
	B	J 18	5	5	0 5D	–		
	C	J 19	5	5	0 5D	–		
	D	J 20	5	5	0 5D	–		
100	A	J 21	5	5	0 5D			
	B	J 22	5	5	0 5D			
	C	J 23	5	4 1D	0 4D			
	D	J 24	5	3 2D	0 3D			
Organisms loaded by: KC		Checked by:	KC	JD	JD	KC	KC	MF

H. azteca		
0 hr	Alk	Hrd
Well		
100%		
96 hr	Alk	Hrd
Well		
100%		

Loading Verified by: JD AR = after renewal

m = missing d = dead BR = before renewal hr = hour

Comments:

Investigators' Signatures

James Daniels JD

Kara Cox

James Daniels

Marshall Faircloth

Bruce Allen

Reviewer: Liz McClellan

Method: TSK

Statistics: LC50	95% confidence intervals Lower	Upper
48 hour: 49.27	44.5	54.17
96 hour: 31.04	27.14	35.51

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Revised 7/15/2008 mf

Appendix C. (continued)

FDEP Biology Laboratory - Acute SRT Bench Sheet
0-96 hour parameters

Methods from EPA-821-R-02-012 except *H. azteca*

Test Page 2 of 2

Test Organism: (check one)
- [X] *Americamysis bahia* Method 2007.0 TA07.03
- [ ] *Menidia Beryllina* Method 2006.0 TA07.04
- [ ] *Hyalella azteca* Method 100.1 EPA-600-R-99-064
- [ ] *Ceriodaphnia dubia* Method 2002.0 TA07.01
- [ ] *Cyprinella leedsi* Method 2000.0 TA07.02
- [ ] *Pimephales promelas* Method 2000.0 TA07.02

Test Beginning: Date: 4.13.11 Time: 1300
Test Ending: Date: 4-17-11 Time: 1135

Test Type: [ ] non-renewal [X] renewal

hr = hour AR = after renewal BR = before renewal

Concentration mg/L g/L	Replicate	Test Hour	pH (SU)	Temperature (°C)	Dissolved Oxygen (mg/L)	Conductivity [ ] µmhos [X] mmhos	Salinity (ppth)
Control	A	0 hr	8.1	24.0	6.1	33.8	21.1
	B	24 hr	7.7	24.3	4.8	34.7	21.7
	C	48 hr BR	7.8	24.4	5.3	35.0	21.9
	C	48 hr AR	7.9	24.0 MF re-JD	6.3	33.8	21.1
	D	72 hr	7.9	25.2	5.9	34.0	21.2
	A	96 hr	7.8	24.6	5.5	36.1	22.5
20	AB JD	0 hr	8.1	24.1	5.8	34.3	21.5
	B	24 hr	7.8	24.1	4.8	34.6	21.6
	C	48 hr BR	7.8	24.4	5.2	34.4	21.4
	C	48 hr AR	8.0	24.0	6.5	33.4	20.9
	D	72 hr	7.9	25.2	5.9	34.7	21.9
	A	96 hr	7.9	24.5	5.6	36.6	22.9
30	A	0 hr	8.1	24.4	6.2	34.6	21.7
	B	24 hr	7.8	24.5	4.9	35.2	22.1
	C	48 hr BR	7.9	25.0	5.8	34.8	21.8
	C	48 hr AR	8.1	24.0	6.7	33.5	21.0
	D	72 hr	8.0	25.2	6.1	34.1	21.5 mL
	A	96 hr	7.8	24.7	5.6	35.8	22.93
45	A	0 hr	8.1	24.8	6.3	35.0	21.9
	B	24 hr	7.9	24.2	5.1	34.8	21.8
	C	48 hr BR	7.9	24.5	5.8	34.5	21.6
	C	48 hr AR	8.0	24.0	6.7	33.7	21.1
	D	72 hr	8.0	25.0	6.2	34.0	21.4
	C	96 hr	7.8	24.6	5.6	35.6	22.3
67	A	0 hr	8.1	25.4	6.3	35.4	22.2
	B	24 hr	7.9	24.2	5.3	34.7	21.7
	C	48 hr BR	7.9	24.9	5.7	34.7	21.7
		48 hr AR				3 KC	
		72 hr					
		96 hr					
100	A	0 hr	8.1	25.4	6.5	35.4	22.5
	B	24 hr	7.9	24.2	5.3	34.4	21.8
	C	48 hr BR	7.9	24.7	5.7	34.8	21.8
		48 hr AR					
		72 hr					
		96 hr					

Investigators Signatures
James Dodd
Marshall Faircloth
Bruce Neely
Kara Kelly

Reviewed By: Lynn Phillips

Measured by:
0 hr: JD
24 hr: JD
48 hr BR: JD
48 hr AR: JD
72 hr: KC
96 hr: MF

Measure/record salinity for marine tests

Comments:

PAGE 2

Revised 07/15/2008 MF

Appendix C. (continued)

FDEP Biology Laboratory - Acute SRT Bench Sheet

Method from EPA-821-R-02-012 except *H. azteca*

Test Organism: (check one)
☐ *Americamysis bahia* Method 2007.0 TA07.03 ☑ *Menidia Beryllina* Method 2006.0 TA07.04 ☐ *Hyalella azteca* Method 100.1 EPA-600-R-99-064
☐ *Ceriodaphnia dubia* Method 2002.0 TA07.01 ☐ *Cyprinella leedsi* Method 2000.0 TA07.02 ☐ *Pimephales promelas* Method 2000.0 TA07.02

Test Type: ☐ non-renewal ☑ renewal
Test Page 1 of 2

Diluent/ Batch #: ASW / 3.14.11 **Organism Batch:** 3.29.11 **Test Beginning:** Date: 3.29.11 Time: 13:00
Toxicant/ Batch#: CoCl2 / 3.29.11 Age: 13 days **Test Ending:** Date: 4.2.11 Time: 12:15

Water Quality Parameters:	Diluent	SOP	Initials
Total Residual Cl_2 (mg/L):	<0.03	TA06_22	KC
Alkalinity (mg/L as $CaCO_3$):	160	TA06_08	KC
Hardness (mg.L as $CaCO_3$):	—	TA06_09	—
Total Ammonia (mg/L as N):	<0.034	TA06_17	MF
Conductivity: µmhos (mmhos)	33.0	TA06_25	KC
Salinity (ppth):	20.3	TA06_25	KC

Food:	Batch
☐ YCT	
☐ *P. subcapitata*	
☑ Artemia Lot # 23613	

Artemia Batch:
0 hr: 59.11
24 hr:
48 hr: 82.11
72 hr:

Chamber size: 1000 mL
Test volume: 400 mL per replicate

Concentrations prepared by: BA
Temperature Range °C:(if used)
Test Incubated in: Incubator # 2 Waterbath # ___ Incubator # 2 min. 26.6 max. 27.4 mean —
Light Intensity: 50-100 Ft. candles Waterbath # ___ min. ___ max. ___ mean ___
Photoperiod: 16 hours Light / 8 hours dark Room B246 min. 22.4 max. 24.4 mean —

Feeding: √ as needed

☑	Before test
☐	0 hr
☐	24 hr
☑	48 hr
☐	72 hr

all species 2 hrs prior to test
mysids daily
all species except *H. azteca* 2 hr prior to renewal
H. azteca 0 hr and 48 hr

H. azteca		
0 hr	Alk	Hrd
Well		
100%		
96 hr	Alk	Hrd
Well		
100%		

Concentration µg/L mg/L g/L	Replicate	Chamber #	Test Hour 0 hr	24 hr	48 hr BR	48 hr AR	72 hr	96 hr
Control	A	B1	10	10	10	10	10	10
	B	B2	10	10	10	10	10	10
100	A	B3	10	10	10	10	10	10
	B	B4	10	10	10	10	10	10
200	A	B5	10	9D	9	9	9	9
	B	B6	10	7D	7	7	7	7
300	A	B7	10	2 8D	1 7 10	1	1	1
	B	B8	10	1 9D	1	1	1	1
400	A	B9	10	0 10D	—	—	—	—
	B	B10	10	0 10D	—	—	—	—
500	A	B11	10	0 10D	—	—	—	—
	B	B12	10	0 10D	—	—	—	—
Organisms loaded by: BA		Checked by:	BA	KC	BA	BA	BA	BA

Loading Verified by: KC AR = after renewal
m = missing d = dead BR = before renewal hr = hour

Investigators' Signatures
Kara Cox
Marshall Faircloth
Becca Alexander
Tiner Dimick

Reviewer: Liz Miller

Comments:

Method: TSK 95% confidence intervals

Statistics: LC50	Lower	Upper
48 hour: 227.2	203.8	253.3
96 hour: 227.2	203.8	253.3

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Revised 7/15/2008 mf

Appendix C. (continued)

FDEP Biology Laboratory - Acute SRT Bench Sheet
0-96 hour parameters

Methods from EPA-821-R-02-012 except *H. azteca*

Test Page 2 of 2

Test Organism: (check one)
- ☐ *Americamysis bahia* Method 2007.0 TA07.03
- ☑ *Menidia Beryllina* Method 2006.0 TA07.04
- ☐ *Hyalella azteca* Method 100.1 EPA-600-R-99-064
- ☐ *Ceriodaphnia dubia* Method 2002.0 TA07.01
- ☐ *Cyprinella leedsi* Method 2000.0 TA07.02
- ☐ *Pimephales promelas* Method 2000.0 TA07.02

Test Beginning: Date: 3.29.11 Time: 1300
Test Ending: Date: 4.2.11 Time: 1215

Test Type: ☐ non-renewal ☑ renewal

hr = hour AR = after renewal BR = before renewal

Concentration (µg/L mg/L g/L)	Replicate	Test Hour	pH (SU)	Temperature (°C)	Dissolved Oxygen (mg/L)	Conductivity ☐ µmhos ☑ mmhos	Salinity (ppth)
Control	A	0 hr	8.2	24.2	6.5	33.0	20.3
	B	24 hr	8.1	25.0	6.3	32.8	20.3
	A	48 hr BR	8.0	25.4	5.4	33.0	20.6
	A	48 hr AR	8.1	24.0	6.5	33.0	20.6
	B	72 hr	8.1	25.1	6.1	33.8	21.2
	A	96 hr	8.0	25.1	6.1	34.0	21.3
100	A	0 hr	8.2	24.7	6.8	33.3	20.6
	B	24 hr	8.1	25.1	6.5	33.2	20.7
	A	48 hr BR	8.0	25.5	5.3	33.6	21.0
	A	48 hr AR	8.1	24.0	6.3	33.3	20.9
	B	72 hr	8.1	25.2	6.0	33.7	21.1
	A	96 hr	8.0	25.7	5.3	34.2	21.5
200	A	0 hr	8.2	24.9	6.8	33.4	20.7
	B	24 hr	8.1	25.3	6.5	33.4	20.9
	A	48 hr BR	8.0	25.3	5.5	33.5	21.0
	A	48 hr AR	8.1	24.0	6.3	33.3	20.8
	B	72 hr	8.1	25.2	6.2	33.7	21.1
	A	96 hr	8.1	25.8	5.9	34.1	21.4
300	A	0 hr	8.2	25.1	6.8	33.6	20.9
	B	24 hr	8.1	25.0	6.5	33.3	20.8
	A	48 hr BR	8.1	25.0	5.5	33.5	20.9
	A	48 hr AR	8.2	24.1	6.4	33.3	20.8
	B	72 hr	8.1	25.2	6.4	33.8	21.3
	A	96 hr	8.1	25.9	6.1	33.7	21.1
400	A	0 hr	8.2	25.2	6.7	33.4	20.7
	B	24 hr	8.1	24.8	6.5	33.2	20.7
		48 hr BR					
		48 hr AR					
		72 hr					
		96 hr					
500	A	0 hr	8.2	25.7	6.8	33.9	21.0
	B	24 hr	8.1	24.9	6.4	33.4	20.9
		48 hr BR					
		48 hr AR					
		72 hr					
		96 hr					

Investigators Signatures
Kate Cox
Marshall Faircloth
Bruce Akerman
Jimmy David

Reviewed By: Liz Miller

Measured by:
0 hr: KC
24 hr: KC
48 hr BR: BA
48 hr AR: BA
72 hr: BA
96 hr: BA

Measure/record salinity for marine tests

Comments:

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Revised 07/15/2008 MF

Appendix C. (continued)

***Americamysis bahia* Acute Standard Reference Toxicant Test**

DATE: 4-13-11 DURATION: 96 h TOXICANT : CdCl2
SPECIES: ***Americamysis bahia***

RAW DATA: Concentration (µg/L)	Number Exposed	Mortalities
.00	20	0
20.00	20	3
30.00	20	8
45.00	20	19
67.00	20	20
100.00	20	20

SPEARMAN-KARBER TRIM: 15.00%

SPEARMAN-KARBER ESTIMATES: LC50: 31.04
95% LOWER CONFIDENCE: 27.14
95% UPPER CONFIDENCE: 35.51

***Menidia beryllina* Acute Standard Reference Toxicant Test**

DATE: 3-29-11 DURATION: 96 h TOXICANT : CuCl2
SPECIES: ***Menidia beryllina***

RAW DATA: Concentration (µg/L)	Number Exposed	Mortalities
.00	20	0
100.00	20	0
200.00	20	4
300.00	20	18
400.00	20	20
500.00	20	20

SPEARMAN-KARBER TRIM: .00%

SPEARMAN-KARBER ESTIMATES: LC50: 227.20
95% LOWER CONFIDENCE: 203.80
95% UPPER CONFIDENCE: 253.30

Appendix D. Test Organism Receipts

MARINCO BIOASSAY LABORATORY
The Aquatic Toxicology Specialists

NELAP Certification # E84191

Shipment Record

State of Florida Aquaculture Certificate Number AQ0668007

Shipping Date: 3/28/11

Ship to: FDEP

P.O. No: _____

Species	Quantity	Age	Brood/Lot Number	Temp. (°C)	pH (S.U.)	Salinity (‰)
Mysidopsis bahia	150 ac	4 DAYS	MS110324	25	8.0	20
Menidia beryllina	150 ac	12 DAYS	SS110316	25	8.0	20
						Hardness mg/L
Cyprinella leedsi	150 ac	11 DAYS	CL110317	25	7.8	80
Pimephales promelas	150 ac ~~250~~	9 DAYS ~~<24HRS~~	FM 110319	25	7.8	80
Ceriodaphnia dubia						
Daphnia magna						
YCT						
P. subcapitata						

Packed by: QM

Shipped Via: Fed Ex

Notes: _____

Thank you for your order.

4569 Samuel Street · Sarasota, FL 34233 · Tel: 941-925-3594 · Fax: 941-922-3874 · Web: www.biologylab.com

Appendix D. (continued)

MARINCO BIOASSAY LABORATORY
The Aquatic Toxicology Specialists

NELAP Certification # E84191

Shipment Record

State of Florida Aquaculture Certificate Number AQ0668007

Shipping Date: 4/12/11

Ship to: FDEP

P.O. No: _____

Species	Quantity	Age	Brood/Lot Number	Temp. (°C)	pH (S.U.)	Salinity (‰)
Mysidopsis bahia	150 ea	4 Days	3S110408	25	7.8	20
Menidia beryllina						
						Hardness mg/L
Cyprinella leedsi						
Pimephales promelas						
Ceriodaphnia dubia						
Daphnia magna						
YCT						
P. subcapitata						

Packed by: MP

Shipped Via: Fedex

Notes: _____

Thank you for your order.

4569 Samuel Street · Sarasota, FL 34233 · Tel: 941-925-3594 · Fax: 941-922-3874 · Web: www.biologylab.com

Appendix D. (continued)

MARINCO BIOASSAY LABORATORY
The Aquatic Toxicology Specialists

NELAP Certification # E84191

Shipment Record

State of Florida Aquaculture Certificate Number AQ0668007

Shipping Date: 4/18/11

Ship to: FDEP

P.O. No: _____

Species	Quantity	Age	Brood/Lot Number	Temp. (°C)	pH (S.U.)	Salinity (‰)
Mysidopsis bahia	200 ac	4 DAYS	MS 110414	25	7.9	20
Menidia beryllina	200 ac	12 DAYS	SS 110406	25	7.9	20
						Hardness mg/L
Cyprinella leedsi						
Pimephales promelas						
Ceriodaphnia dubia						
Daphnia magna						
YCT						
P. subcapitata						

Packed by: PM

Shipped Via: Fed Ex

Notes: _____

Thank you for your order.

4569 Samuel Street · Sarasota, FL 34233 · Tel: 941-925-3594 · Fax: 941-922-3874 · Web: www.biologylab.com

Appendix E. Chemical Analyses performed on the composited effluent from the Rayonier Performance Fibers, LLC, Plant NPDES EFF-2 and EFF-3 sampling points for Outfall D-001, sampled on April 18, 2011.

Date Sampled	Field ID	Analysis Group	Component	Result	Remark	Units	MDL	PQL
4/18/2011 11:34	EFF-1	AGP/LN	Algal Growth Potential	3	U	mg DryWt/L	3	3
4/18/2011 11:34	EFF-1	Chlorophyll/Grain Size/BOD	Phaeophytin-a	8	U	ug/L	8	24
4/18/2011 11:34	EFF-1	Chlorophyll/Grain Size/BOD	Chlorophyll-a, Corrected	11	U	ug/L	11	34
4/18/2011 11:34	EFF-1	Chlorophyll/Grain Size/BOD	BOD-5 Day,N-Inhib	84	J	mg/L	0.2	2
4/18/2011 11:34	EFF-1	Toxicology	BSY-AD-SW-Mysid, LC50	44.3		LC50		
4/18/2011 11:34	EFF-1	Toxicology	BSY-AD-SW-Fish, LC50	60	L	LC50		
4/18/2011 11:34	EFF-1	Metals	Copper	7.5		ug/L	0.5	1
4/18/2011 11:34	EFF-1	Metals	Chromium	4.4		ug/L	0.3	1.2
4/18/2011 11:34	EFF-1	Metals	Nickel	8.71		ug/L	0.25	1
4/18/2011 11:34	EFF-1	Metals	Aluminum	1740		ug/L	15	60
4/18/2011 11:34	EFF-1	Metals	Iron	1120		ug/L	30	120
4/18/2011 11:34	EFF-1	Metals	Calcium	396		mg/L	1.5	6
4/18/2011 11:34	EFF-1	Metals	Silver	0.14		ug/L	0.025	0.1
4/18/2011 11:34	EFF-1	Metals	Selenium	0.2	U	ug/L	0.2	0.8
4/18/2011 11:34	EFF-1	Metals	Cadmium	0.35		ug/L	0.05	0.2
4/18/2011 11:34	EFF-1	Metals	Arsenic	1.05		ug/L	0.25	1
4/18/2011 11:34	EFF-1	Metals	Magnesium	49.9		mg/L	0.04	0.16
4/18/2011 11:34	EFF-1	Metals	Lead	1.95		ug/L	0.2	0.8
4/18/2011 11:34	EFF-1	Metals	Zinc	126		ug/L	5	20
4/18/2011 11:34	EFF-1	Metals	Sodium	772		mg/L	10	40
4/18/2011 11:34	EFF-1	Nutrients	Kjeldahl Nitrogen	31		mg N/L	1.6	4
4/18/2011 11:34	EFF-1	Nutrients	Total-P	2		mg P/L	0.025	0.25
4/18/2011 11:34	EFF-1	Nutrients	O-Phosphate-P	0.012		mg P/L	0.004	0.01
4/18/2011 11:34	EFF-1	Nutrients	TSS	197		mg/L	33	130
4/18/2011 11:34	EFF-1	Nutrients	Chloride	850		mg Cl/L	4	10
4/18/2011 11:34	EFF-1	Nutrients	Alkalinity	140		mg CaCO3/L	0.65	2.5
4/18/2011 11:34	EFF-1	Nutrients	Color (true)	760		PCU	20	60
4/18/2011 11:34	EFF-1	Nutrients	Organic Carbon	270		mg C/L	5	25
4/18/2011 11:34	EFF-1	Nutrients	Sulfate	1600		mg SO4/L	10	25
4/18/2011 11:34	EFF-1	Nutrients	NO2NO3-N	0.013		mg N/L	0.004	0.01
4/18/2011 11:34	EFF-1	Nutrients	Ammonia-N	3.1		mg N/L	0.05	0.1

Appendix E. (continued)

Date Sampled	Field ID	Analysis Group	Component	Result	Remark	Units	MDL	PQL
4/18/2011 11:34	EFF-1	Nutrients	Fluoride	0.69		mg F/L	0.035	0.1
4/18/2011 11:34	EFF-1	Pesticides	Butylate	0.21	UJ	ug/L	0.21	0.84
4/18/2011 11:34	EFF-1	Pesticides	Fonofos	0.11	UJ	ug/L	0.11	0.42
4/18/2011 11:34	EFF-1	Pesticides	Metalaxyl	0.26	U	ug/L	0.26	1.1
4/18/2011 11:34	EFF-1	Pesticides	Metribuzin	0.11	U	ug/L	0.11	0.42
4/18/2011 11:34	EFF-1	Pesticides	Toxaphene	0.79	U	ug/L	0.79	3.2
4/18/2011 11:34	EFF-1	Pesticides	Chlorpyrifos Ethyl	0.053	U	ug/L	0.053	0.21
4/18/2011 11:34	EFF-1	Pesticides	Ethion	0.053	U	ug/L	0.053	0.21
4/18/2011 11:34	EFF-1	Pesticides	Parathion Methyl	0.11	U	ug/L	0.11	0.42
4/18/2011 11:34	EFF-1	Pesticides	Endrin	0.053	U	ug/L	0.053	0.21
4/18/2011 11:34	EFF-1	Pesticides	Alachlor	0.63	U	ug/L	0.63	2.5
4/18/2011 11:34	EFF-1	Pesticides	Chlorpyrifos Methyl	0.11	U	ug/L	0.11	0.42
4/18/2011 11:34	EFF-1	Pesticides	Fenamiphos	0.21	U	ug/L	0.21	0.84
4/18/2011 11:34	EFF-1	Pesticides	Naled	0.84	U	ug/L	0.84	3.4
4/18/2011 11:34	EFF-1	Pesticides	Alpha-BHC	0.011	U	ug/L	0.011	0.042
4/18/2011 11:34	EFF-1	Pesticides	Chlordane	0.21	U	ug/L	0.21	0.84
4/18/2011 11:34	EFF-1	Pesticides	Heptachlor	0.011	U	ug/L	0.011	0.042
4/18/2011 11:34	EFF-1	Pesticides	Atrazine	0.053	U	ug/L	0.053	0.21
4/18/2011 11:34	EFF-1	Pesticides	Hexazinone	0.11	U	ug/L	0.11	0.42
4/18/2011 11:34	EFF-1	Pesticides	Norflurazon	0.16	U	ug/L	0.16	0.63
4/18/2011 11:34	EFF-1	Pesticides	Prometryn	0.16	U	ug/L	0.16	0.63
4/18/2011 11:34	EFF-1	Pesticides	DDT-p,p'	0.032	U	ug/L	0.032	0.13
4/18/2011 11:34	EFF-1	Pesticides	Dieldrin	0.021	U	ug/L	0.021	0.084
4/18/2011 11:34	EFF-1	Pesticides	Methoxychlor	0.053	U	ug/L	0.053	0.21
4/18/2011 11:34	EFF-1	Pesticides	Ametryn	0.053	U	ug/L	0.053	0.21
4/18/2011 11:34	EFF-1	Pesticides	Azinphos Methyl	0.21	U	ug/L	0.21	0.84
4/18/2011 11:34	EFF-1	Pesticides	Diazinon	0.053	UJ	ug/L	0.053	0.21
4/18/2011 11:34	EFF-1	Pesticides	Beta-BHC	0.011	U	ug/L	0.011	0.042
4/18/2011 11:34	EFF-1	Pesticides	Endrin Aldehyde	0.021	U	ug/L	0.021	0.084
4/18/2011 11:34	EFF-1	Pesticides	Mevinphos	0.21	U	ug/L	0.21	0.84
4/18/2011 11:34	EFF-1	Pesticides	Simazine	0.053	U	ug/L	0.053	0.21
4/18/2011 11:34	EFF-1	Pesticides	Endosulfan I	0.021	U	ug/L	0.021	0.084
4/18/2011 11:34	EFF-1	Pesticides	Bromacil	0.21	U	ug/L	0.21	0.84

Appendix E. (continued)

Date Sampled	Field ID	Analysis Group	Component	Result	Remark	Units	MDL	PQL
4/18/2011 11:34	EFF-1	Pesticides	Malathion	0.16	U	ug/L	0.16	0.63
4/18/2011 11:34	EFF-1	Pesticides	Metolachlor	0.53	U	ug/L	0.53	2.1
4/18/2011 11:34	EFF-1	Pesticides	Parathion Ethyl	0.16	UJ	ug/L	0.16	0.63
4/18/2011 11:34	EFF-1	Pesticides	Phorate	0.053	U	ug/L	0.053	0.21
4/18/2011 11:34	EFF-1	Pesticides	DDE-p,p'	0.021	U	ug/L	0.021	0.084
4/18/2011 11:34	EFF-1	Pesticides	Endosulfan II	0.021	U	ug/L	0.021	0.084
4/18/2011 11:34	EFF-1	Pesticides	Gamma-BHC	0.011	U	ug/L	0.011	0.042
4/18/2011 11:34	EFF-1	Pesticides	Heptachlor Epoxide	0.021	U	ug/L	0.021	0.084
4/18/2011 11:34	EFF-1	Pesticides	Ethoprop	0.11	U	ug/L	0.11	0.42
4/18/2011 11:34	EFF-1	Pesticides	Aldrin	0.011	U	ug/L	0.011	0.042
4/18/2011 11:34	EFF-1	Pesticides	DDD-p,p'	0.021	U	ug/L	0.021	0.084
4/18/2011 11:34	EFF-1	Pesticides	Delta-BHC	0.011	U	ug/L	0.011	0.042
4/18/2011 11:34	EFF-1	Pesticides	Endosulfan Sulfate	0.021	U	ug/L	0.021	0.084
4/18/2011 11:34	EFF-1	Priority Organic Pollutants	1,2,4-Trichlorobenzene	1	U	ug/L	1	4.2
4/18/2011 11:34	EFF-1	Priority Organic Pollutants	2,4,6-Trichlorophenol	1.9	I	ug/L	1	4.2
4/18/2011 11:34	EFF-1	Priority Organic Pollutants	Phenol	1	U	ug/L	1	4.2
4/18/2011 11:34	EFF-1	Priority Organic Pollutants	Phenanthrene	0.21	U	ug/L	0.21	0.83
4/18/2011 11:34	EFF-1	Priority Organic Pollutants	Pentachlorophenol	3.1	U	ug/L	3.1	13
4/18/2011 11:34	EFF-1	Priority Organic Pollutants	Naphthalene	0.21	U	ug/L	0.21	0.83
4/18/2011 11:34	EFF-1	Priority Organic Pollutants	Isophorone	1	U	ug/L	1	4.2
4/18/2011 11:34	EFF-1	Priority Organic Pollutants	Hexachlorobutadiene	3.1	U	ug/L	3.1	13
4/18/2011 11:34	EFF-1	Priority Organic Pollutants	4-Bromophenyl phenyl ether	1	U	ug/L	1	4.2
4/18/2011 11:34	EFF-1	Priority Organic Pollutants	Bis(2-ethylhexyl)phthalate	16	U	ug/L	16	63
4/18/2011 11:34	EFF-1	Priority Organic Pollutants	Di-n-octyl phthalate	1	U	ug/L	1	4.2
4/18/2011 11:34	EFF-1	Priority Organic Pollutants	2,4-Dinitrophenol	16	U	ug/L	16	63
4/18/2011 11:34	EFF-1	Priority Organic Pollutants	3,3'-Dichlorobenzidine	42	UJ	ug/L	42	170
4/18/2011 11:34	EFF-1	Priority Organic Pollutants	Acenaphthylene	0.21	U	ug/L	0.21	0.83
4/18/2011 11:34	EFF-1	Priority Organic Pollutants	Benzidine	100	UJ	ug/L	100	420
4/18/2011 11:34	EFF-1	Priority Organic Pollutants	Benzo(a)anthracene	0.21	U	ug/L	0.21	0.83
4/18/2011 11:34	EFF-1	Priority Organic Pollutants	Benzo(b)fluoranthene	0.21	U	ug/L	0.21	0.83
4/18/2011 11:34	EFF-1	Priority Organic Pollutants	Benzo(k)fluoranthene	0.21	U	ug/L	0.21	0.83
4/18/2011 11:34	EFF-1	Priority Organic Pollutants	Bis(2-chloroethyl)ether	1	U	ug/L	1	4.2
4/18/2011 11:34	EFF-1	Priority Organic Pollutants	Dimethyl phthalate	10	U	ug/L	10	42

Appendix E. (continued)

Date Sampled	Field ID	Analysis Group	Component	Result	Remark	Units	MDL	PQL
4/18/2011 11:34	EFF-1	Priority Organic Pollutants	2-Nitrophenol	1	U	ug/L	1	4.2
4/18/2011 11:34	EFF-1	Priority Organic Pollutants	4-Chlorophenyl phenyl ether	2.1	U	ug/L	2.1	8.3
4/18/2011 11:34	EFF-1	Priority Organic Pollutants	Butyl benzyl phthalate	5.2	U	ug/L	5.2	21
4/18/2011 11:34	EFF-1	Priority Organic Pollutants	Fluorene	0.21	U	ug/L	0.21	0.83
4/18/2011 11:34	EFF-1	Priority Organic Pollutants	Hexachloroethane	3.1	UJ	ug/L	3.1	13
4/18/2011 11:34	EFF-1	Priority Organic Pollutants	N-Nitrosodimethylamine	2.1	U	ug/L	2.1	8.3
4/18/2011 11:34	EFF-1	Priority Organic Pollutants	N-Nitrosodiphenylamine/ Diphenylamine	3.1	U	ug/L	3.1	13
4/18/2011 11:34	EFF-1	Priority Organic Pollutants	2,4-Dinitrotoluene	1	U	ug/L	1	4.2
4/18/2011 11:34	EFF-1	Priority Organic Pollutants	2-Chloronaphthalene	1	U	ug/L	1	4.2
4/18/2011 11:34	EFF-1	Priority Organic Pollutants	2-Methyl-4,6-dinitrophenol	3.1	UJ	ug/L	3.1	13
4/18/2011 11:34	EFF-1	Priority Organic Pollutants	Acenaphthene	0.21	U	ug/L	0.21	0.83
4/18/2011 11:34	EFF-1	Priority Organic Pollutants	Chrysene	0.21	U	ug/L	0.21	0.83
4/18/2011 11:34	EFF-1	Priority Organic Pollutants	Di-n-butyl phthalate	5.2	U	ug/L	5.2	21
4/18/2011 11:34	EFF-1	Priority Organic Pollutants	Dibenzo(a,h)anthracene	0.21	UJ	ug/L	0.21	0.83
4/18/2011 11:34	EFF-1	Priority Organic Pollutants	Diethyl phthalate	1	U	ug/L	1	4.2
4/18/2011 11:34	EFF-1	Priority Organic Pollutants	Fluoranthene	0.21	U	ug/L	0.21	0.83
4/18/2011 11:34	EFF-1	Priority Organic Pollutants	2,6-Dinitrotoluene	1	U	ug/L	1	4.2
4/18/2011 11:34	EFF-1	Priority Organic Pollutants	2-Chlorophenol	1	U	ug/L	1	4.2
4/18/2011 11:34	EFF-1	Priority Organic Pollutants	Anthracene	0.21	U	ug/L	0.21	0.83
4/18/2011 11:34	EFF-1	Priority Organic Pollutants	Indeno(1,2,3-cd)pyrene	0.21	UJ	ug/L	0.21	0.83
4/18/2011 11:34	EFF-1	Priority Organic Pollutants	Pyrene	0.21	U	ug/L	0.21	0.83
4/18/2011 11:34	EFF-1	Priority Organic Pollutants	4-Nitrophenol	16	U	ug/L	16	63
4/18/2011 11:34	EFF-1	Priority Organic Pollutants	Bis(2-chloroisopropyl)ether	3.1	U	ug/L	3.1	13
4/18/2011 11:34	EFF-1	Priority Organic Pollutants	Hexachlorocyclopentadiene	3.1	UJ	ug/L	3.1	13
4/18/2011 11:34	EFF-1	Priority Organic Pollutants	N-Nitrosodi-n-propylamine	2.1	U	ug/L	2.1	8.3
4/18/2011 11:34	EFF-1	Priority Organic Pollutants	Nitrobenzene	2.1	U	ug/L	2.1	8.3
4/18/2011 11:34	EFF-1	Priority Organic Pollutants	2,4-Dichlorophenol	1	U	ug/L	1	4.2
4/18/2011 11:34	EFF-1	Priority Organic Pollutants	2,4-Dimethylphenol	10	U	ug/L	10	42
4/18/2011 11:34	EFF-1	Priority Organic Pollutants	4-Chloro-3-methylphenol	1	U	ug/L	1	4.2
4/18/2011 11:34	EFF-1	Priority Organic Pollutants	Benzo(a)pyrene	0.21	U	ug/L	0.21	0.83
4/18/2011 11:34	EFF-1	Priority Organic Pollutants	Bis(2-chloroethoxy)methane	1	U	ug/L	1	4.2
4/18/2011 11:34	EFF-1	Priority Organic Pollutants	Benzo(g,h,i)perylene	0.21	UJ	ug/L	0.21	0.83
4/18/2011 11:34	EFF-1	Priority Organic Pollutants	Hexachlorobenzene	1	U	ug/L	1	4.2

Appendix E. (continued)

Date Sampled	Field ID	Analysis Group	Component	Result	Remark	Units	MDL	PQL
4/18/2011 12:08	BLANK	Metals	Arsenic	0.25	U	ug/L	0.25	1
4/18/2011 12:08	BLANK	Metals	Copper	0.5	U	ug/L	0.5	1
4/18/2011 12:08	BLANK	Metals	Nickel	0.25	U	ug/L	0.25	1
4/18/2011 12:08	BLANK	Metals	Zinc	5	U	ug/L	5	20
4/18/2011 12:08	BLANK	Metals	Cadmium	0.05	U	ug/L	0.05	0.2
4/18/2011 12:08	BLANK	Metals	Chromium	0.3	U	ug/L	0.3	1.2
4/18/2011 12:08	BLANK	Metals	Silver	0.025	U	ug/L	0.025	0.1
4/18/2011 12:08	BLANK	Metals	Lead	0.2	U	ug/L	0.2	0.8
4/18/2011 12:08	BLANK	Metals	Sodium	0.5	U	mg/L	0.5	2
4/18/2011 12:08	BLANK	Metals	Aluminum	5	U	ug/L	5	20
4/18/2011 12:08	BLANK	Metals	Iron	30	U	ug/L	30	120
4/18/2011 12:08	BLANK	Metals	Magnesium	0.04	U	mg/L	0.04	0.16
4/18/2011 12:08	BLANK	Metals	Selenium	0.2	U	ug/L	0.2	0.8
4/18/2011 12:08	BLANK	Metals	Calcium	0.075	U	mg/L	0.075	0.3
4/18/2011 12:08	BLANK	Nutrients	Total-P	0.004	U	mg P/L	0.004	0.01
4/18/2011 12:08	BLANK	Nutrients	Kjeldahl Nitrogen	0.08	U	mg N/L	0.08	0.2
4/18/2011 12:08	BLANK	Nutrients	Organic Carbon	1	U	mg C/L	1	5
4/18/2011 12:08	BLANK	Nutrients	Chloride	0.2	U	mg Cl/L	0.2	0.5
4/18/2011 12:08	BLANK	Nutrients	NO2NO3-N	0.004	U	mg N/L	0.004	0.01
4/18/2011 12:08	BLANK	Nutrients	Sulfate	0.2	U	mg SO4/L	0.2	0.5
4/18/2011 12:08	BLANK	Nutrients	Color (true)	2	U	PCU	2	6
4/18/2011 12:08	BLANK	Nutrients	Fluoride	0.035	U	mg F/L	0.035	0.1
4/18/2011 12:08	BLANK	Nutrients	O-Phosphate-P	0.004	U	mg P/L	0.004	0.01
4/18/2011 12:08	BLANK	Nutrients	Alkalinity	0.65	U	mg CaCO3/L	0.65	2.5
4/18/2011 12:08	BLANK	Nutrients	Ammonia-N	0.01	U	mg N/L	0.01	0.02
4/18/2011 12:08	BLANK	Pesticides	Ethoprop	0.1	U	ug/L	0.1	0.4
4/18/2011 12:08	BLANK	Pesticides	Gamma-BHC	0.01	U	ug/L	0.01	0.04
4/18/2011 12:08	BLANK	Pesticides	Hexazinone	0.1	U	ug/L	0.1	0.4
4/18/2011 12:08	BLANK	Pesticides	Naled	0.8	U	ug/L	0.8	3.2
4/18/2011 12:08	BLANK	Pesticides	Delta-BHC	0.01	U	ug/L	0.01	0.04
4/18/2011 12:08	BLANK	Pesticides	Endrin	0.05	U	ug/L	0.05	0.2
4/18/2011 12:08	BLANK	Pesticides	Methoxychlor	0.05	U	ug/L	0.05	0.2
4/18/2011 12:08	BLANK	Pesticides	Toxaphene	0.75	U	ug/L	0.75	3

Appendix E. (continued)

Date Sampled	Field ID	Analysis Group	Component	Result	Remark	Units	MDL	PQL
4/18/2011 12:08	BLANK	Pesticides	Alachlor	0.6	U	ug/L	0.6	2.4
4/18/2011 12:08	BLANK	Pesticides	Norflurazon	0.15	U	ug/L	0.15	0.6
4/18/2011 12:08	BLANK	Pesticides	Heptachlor Epoxide	0.02	U	ug/L	0.02	0.08
4/18/2011 12:08	BLANK	Pesticides	Ethion	0.05	U	ug/L	0.05	0.2
4/18/2011 12:08	BLANK	Pesticides	Metolachlor	0.5	U	ug/L	0.5	2
4/18/2011 12:08	BLANK	Pesticides	Parathion Methyl	0.1	U	ug/L	0.1	0.4
4/18/2011 12:08	BLANK	Pesticides	Phorate	0.05	U	ug/L	0.05	0.2
4/18/2011 12:08	BLANK	Pesticides	Simazine	0.05	U	ug/L	0.05	0.2
4/18/2011 12:08	BLANK	Pesticides	Endosulfan I	0.02	U	ug/L	0.02	0.08
4/18/2011 12:08	BLANK	Pesticides	Endosulfan II	0.02	U	ug/L	0.02	0.08
4/18/2011 12:08	BLANK	Pesticides	Ametryn	0.05	U	ug/L	0.05	0.2
4/18/2011 12:08	BLANK	Pesticides	Alpha-BHC	0.01	U	ug/L	0.01	0.04
4/18/2011 12:08	BLANK	Pesticides	Beta-BHC	0.01	U	ug/L	0.01	0.04
4/18/2011 12:08	BLANK	Pesticides	Chlordane	0.2	U	ug/L	0.2	0.8
4/18/2011 12:08	BLANK	Pesticides	DDE-p,p'	0.02	U	ug/L	0.02	0.08
4/18/2011 12:08	BLANK	Pesticides	DDT-p,p'	0.03	U	ug/L	0.03	0.12
4/18/2011 12:08	BLANK	Pesticides	Dieldrin	0.02	U	ug/L	0.02	0.08
4/18/2011 12:08	BLANK	Pesticides	Chlorpyrifos Ethyl	0.05	U	ug/L	0.05	0.2
4/18/2011 12:08	BLANK	Pesticides	Chlorpyrifos Methyl	0.1	U	ug/L	0.1	0.4
4/18/2011 12:08	BLANK	Pesticides	Aldrin	0.01	U	ug/L	0.01	0.04
4/18/2011 12:08	BLANK	Pesticides	Endrin Aldehyde	0.02	U	ug/L	0.02	0.08
4/18/2011 12:08	BLANK	Pesticides	Bromacil	0.2	U	ug/L	0.2	0.8
4/18/2011 12:08	BLANK	Pesticides	Parathion Ethyl	0.15	U	ug/L	0.15	0.6
4/18/2011 12:08	BLANK	Pesticides	Endosulfan Sulfate	0.02	U	ug/L	0.02	0.08
4/18/2011 12:08	BLANK	Pesticides	Diazinon	0.05	U	ug/L	0.05	0.2
4/18/2011 12:08	BLANK	Pesticides	Malathion	0.15	U	ug/L	0.15	0.6
4/18/2011 12:08	BLANK	Pesticides	Metalaxyl	0.25	U	ug/L	0.25	1
4/18/2011 12:08	BLANK	Pesticides	Mevinphos	0.2	U	ug/L	0.2	0.8
4/18/2011 12:08	BLANK	Pesticides	Prometryn	0.15	U	ug/L	0.15	0.6
4/18/2011 12:08	BLANK	Pesticides	DDD-p,p'	0.02	U	ug/L	0.02	0.08
4/18/2011 12:08	BLANK	Pesticides	Heptachlor	0.01	U	ug/L	0.01	0.04
4/18/2011 12:08	BLANK	Pesticides	Atrazine	0.05	U	ug/L	0.05	0.2
4/18/2011 12:08	BLANK	Pesticides	Azinphos Methyl	0.2	U	ug/L	0.2	0.8

Appendix E. (continued)

Date Sampled	Field ID	Analysis Group	Component	Result	Remark	Units	MDL	PQL
4/18/2011 12:08	BLANK	Pesticides	Butylate	0.2	U	ug/L	0.2	0.8
4/18/2011 12:08	BLANK	Pesticides	Fonofos	0.1	U	ug/L	0.1	0.4
4/18/2011 12:08	BLANK	Pesticides	Metribuzin	0.1	U	ug/L	0.1	0.4
4/18/2011 12:08	BLANK	Pesticides	Fenamiphos	0.2	U	ug/L	0.2	0.8
4/18/2011 12:08	BLANK	Priority Organic Pollutants	2,4,6-Trichlorophenol	1	U	ug/L	1	4
4/18/2011 12:08	BLANK	Priority Organic Pollutants	2,4-Dichlorophenol	1	U	ug/L	1	4
4/18/2011 12:08	BLANK	Priority Organic Pollutants	4-Chloro-3-methylphenol	1	U	ug/L	1	4
4/18/2011 12:08	BLANK	Priority Organic Pollutants	Butyl benzyl phthalate	5.1	U	ug/L	5.1	20
4/18/2011 12:08	BLANK	Priority Organic Pollutants	Hexachlorocyclopentadiene	3	U	ug/L	3	12
4/18/2011 12:08	BLANK	Priority Organic Pollutants	N-Nitrosodi-n-propylamine	2	U	ug/L	2	8.1
4/18/2011 12:08	BLANK	Priority Organic Pollutants	Phenol	1	U	ug/L	1	4
4/18/2011 12:08	BLANK	Priority Organic Pollutants	3,3'-Dichlorobenzidine	40	UJ	ug/L	40	160
4/18/2011 12:08	BLANK	Priority Organic Pollutants	Acenaphthene	0.2	U	ug/L	0.2	0.81
4/18/2011 12:08	BLANK	Priority Organic Pollutants	Anthracene	0.2	U	ug/L	0.2	0.81
4/18/2011 12:08	BLANK	Priority Organic Pollutants	Benzidine	100	UJ	ug/L	100	400
4/18/2011 12:08	BLANK	Priority Organic Pollutants	Chrysene	0.2	U	ug/L	0.2	0.81
4/18/2011 12:08	BLANK	Priority Organic Pollutants	Di-n-butyl phthalate	5.1	U	ug/L	5.1	20
4/18/2011 12:08	BLANK	Priority Organic Pollutants	Isophorone	1	U	ug/L	1	4
4/18/2011 12:08	BLANK	Priority Organic Pollutants	N-Nitrosodimethylamine	2	U	ug/L	2	8.1
4/18/2011 12:08	BLANK	Priority Organic Pollutants	Pyrene	0.2	U	ug/L	0.2	0.81
4/18/2011 12:08	BLANK	Priority Organic Pollutants	Benzo(g,h,i)perylene	0.2	U	ug/L	0.2	0.81
4/18/2011 12:08	BLANK	Priority Organic Pollutants	Bis(2-chloroethyl)ether	1	U	ug/L	1	4
4/18/2011 12:08	BLANK	Priority Organic Pollutants	Naphthalene	0.2	U	ug/L	0.2	0.81
4/18/2011 12:08	BLANK	Priority Organic Pollutants	2-Chlorophenol	1	U	ug/L	1	4
4/18/2011 12:08	BLANK	Priority Organic Pollutants	2-Methyl-4,6-dinitrophenol	3	U	ug/L	3	12
4/18/2011 12:08	BLANK	Priority Organic Pollutants	Benzo(a)anthracene	0.2	U	ug/L	0.2	0.81
4/18/2011 12:08	BLANK	Priority Organic Pollutants	Diethyl phthalate	1	U	ug/L	1	4
4/18/2011 12:08	BLANK	Priority Organic Pollutants	Nitrobenzene	2	U	ug/L	2	8.1
4/18/2011 12:08	BLANK	Priority Organic Pollutants	2,4-Dinitrophenol	15	U	ug/L	15	61
4/18/2011 12:08	BLANK	Priority Organic Pollutants	2,4-Dinitrotoluene	1	U	ug/L	1	4
4/18/2011 12:08	BLANK	Priority Organic Pollutants	2-Nitrophenol	1	U	ug/L	1	4
4/18/2011 12:08	BLANK	Priority Organic Pollutants	4-Bromophenyl phenyl ether	1	U	ug/L	1	4
4/18/2011 12:08	BLANK	Priority Organic Pollutants	Benzo(k)fluoranthene	0.2	U	ug/L	0.2	0.81

Appendix E. (continued)

Date Sampled	Field ID	Analysis Group	Component	Result	Remark	Units	MDL	PQL
4/18/2011 12:08	BLANK	Priority Organic Pollutants	Bis(2-ethylhexyl)phthalate	15	U	ug/L	15	61
4/18/2011 12:08	BLANK	Priority Organic Pollutants	Di-n-octyl phthalate	1	U	ug/L	1	4
4/18/2011 12:08	BLANK	Priority Organic Pollutants	Fluoranthene	0.2	U	ug/L	0.2	0.81
4/18/2011 12:08	BLANK	Priority Organic Pollutants	Hexachlorobenzene	1	U	ug/L	1	4
4/18/2011 12:08	BLANK	Priority Organic Pollutants	N-Nitrosodiphenylamine/ Diphenylamine	3	U	ug/L	3	12
4/18/2011 12:08	BLANK	Priority Organic Pollutants	2,6-Dinitrotoluene	1	U	ug/L	1	4
4/18/2011 12:08	BLANK	Priority Organic Pollutants	Acenaphthylene	0.2	U	ug/L	0.2	0.81
4/18/2011 12:08	BLANK	Priority Organic Pollutants	Benzo(b)fluoranthene	0.2	U	ug/L	0.2	0.81
4/18/2011 12:08	BLANK	Priority Organic Pollutants	Dimethyl phthalate	10	U	ug/L	10	40
4/18/2011 12:08	BLANK	Priority Organic Pollutants	Fluorene	0.2	U	ug/L	0.2	0.81
4/18/2011 12:08	BLANK	Priority Organic Pollutants	Hexachlorobutadiene	3	U	ug/L	3	12
4/18/2011 12:08	BLANK	Priority Organic Pollutants	1,2,4-Trichlorobenzene	1	U	ug/L	1	4
4/18/2011 12:08	BLANK	Priority Organic Pollutants	4-Nitrophenol	15	U	ug/L	15	61
4/18/2011 12:08	BLANK	Priority Organic Pollutants	Bis(2-chloroisopropyl)ether	3	U	ug/L	3	12
4/18/2011 12:08	BLANK	Priority Organic Pollutants	Dibenzo(a,h)anthracene	0.2	U	ug/L	0.2	0.81
4/18/2011 12:08	BLANK	Priority Organic Pollutants	Hexachloroethane	3	U	ug/L	3	12
4/18/2011 12:08	BLANK	Priority Organic Pollutants	Indeno(1,2,3-cd)pyrene	0.2	U	ug/L	0.2	0.81
4/18/2011 12:08	BLANK	Priority Organic Pollutants	Pentachlorophenol	3	U	ug/L	3	12
4/18/2011 12:08	BLANK	Priority Organic Pollutants	2,4-Dimethylphenol	10	U	ug/L	10	40
4/18/2011 12:08	BLANK	Priority Organic Pollutants	2-Chloronaphthalene	1	U	ug/L	1	4
4/18/2011 12:08	BLANK	Priority Organic Pollutants	4-Chlorophenyl phenyl ether	2	U	ug/L	2	8.1
4/18/2011 12:08	BLANK	Priority Organic Pollutants	Benzo(a)pyrene	0.2	U	ug/L	0.2	0.81
4/18/2011 12:08	BLANK	Priority Organic Pollutants	Bis(2-chloroethoxy)methane	1	U	ug/L	1	4
4/18/2011 12:08	BLANK	Priority Organic Pollutants	Phenanthrene	0.2	U	ug/L	0.2	0.81

Appendix F. Facility Summary, Effluent Limits, and Permit Violations Recorded on Discharge Monitoring Report

State of Florida
Department of Environmental Protection
Facility Introduction & Summary

PART I: Information gathered prior to sampling event	
Prepared By: Heather Webber – 01/26/11	**Contact Number:** 904-256-1622
Facility Name (as it appears on permit): Rayonier Performance Fibers, LLC	**Former Names:** N/A
NPDES Permit Number: FL0000701	**Permit Expiration Date:** November 30, 2009
Physical Address: Gum Street, Fernandina Beach, FL 32035	
District: Northeast	**County:** Nassau
Function of Facility: Chemical cellulose pulp mill	
Facility Type: Industrial	**Permitted Capacity (MGD):** 26.31
Mean Flow for previous 12 months for all EXTERNAL outfalls listed in permit (list date range including months): 12/2009 through 11/2010 – 17.2 MGD mean flow	
If applicable, Mean Flow for previous 12 months for REUSE outfall(s) (list date range including months): N/A	
Description of type of Discharge: ☐ **Continuous** ☒ **Intermittent** ☐ **Seasonal** ☒ **Rainfall Dependent** ☒ **Other, please specify** Discharge is allowed on the ebb tide only with the exception of discharges associated with the clear sewer discharge (rinse water and regenerate water from the water treatment plant zeolite softening units). Discharge shall commence not earlier than 1.5 hours after predicted high tide, based on tide tables published by NOAA, and must cease no later than 6 hours after high tide begins.	
Description of Sampling Location(s) - actual permit designation of permitted sampling point(s): Nearest accessible point after final treatment but prior to the actual discharge to the receiving water. Specifically, EFF-1 represents the combined discharge of treated process wastewater and treated storm water from the secondary treatment system and rinse water and regenerate water from the water treatment plant zeolite softening units. EFF-2 represents the sampling station from the clear sewer discharge. EFF-3 represents the treated process wastewater and treated storm water discharge from the secondary treatment system.	
Description of Permitted Outfall(s): Outfall D-001 discharges to the Amelia River, a Class III marine surface water of the State. Outfall D-001 discharges through a 48 inch diameter pipe, which projects 800 ft and has a 200 ft diffuser.	
Description of Treatment Process (if multiple discharge points, include a detailed map or diagram of facility): Grit removal, neutralization, clarification, and aeration, with effluent discharge through D-001 only on outgoing tides.	

Appendix F. (continued)

PART I: Continued

List current Effluent Limits of Outfall(s) to be Sampled: This should include any AO or CO limits the facility may be under (Leave cell blank if not applicable)

		Effluent Limitations				Monitoring Requirements		
Parameters	Effluent Sampling Location	Other	Daily Max.	Daily Average	Monitoring Frequency	Sample Type	Notes
Flow combined (former D-001 and former D-002), MGD	EFF-1[1]		26.31	Report	Continuous	Calculated	[1]EFF-1 represents the combined discharge of treated process wastewater and treated storm water from the secondary treatment system and rinse water and regenerate water from the water treatment plant zeolite softening units.
Flow (clear sewer discharge, former D-002), MGD	EFF-2[2]		Report	Report	Continuous	Recorder	[2]EFF-2 represents the sampling station from the clear sewer discharge.
Flow (treated process wastewater and treated storm water, former D-001, MGD	EFF-3[3]		Report	Report	Continuous	Recorder	[3]EFF-3 represents the treated process wastewater and treated storm water discharge from the secondary treatment system.
Biochemical Oxygen Demand 5-day (lbs/day)	EFF-1[1]		47,250	27,000	Daily	24-hour composite[4]	[4]The samples tested shall be a composite mixed in the laboratory from separate grab samples collected at EFF-2 and EFF-3 which will represent the flow-proportioned discharge from EFF-1. The laboratory will mix the two samples to yield a flow-proportioned test sample based on the sample day's flow rates measured at EFF-2 and EFF-3.
Total Suspended Solids (lbs/day)	EFF-1[1]		55,000	38,278	Daily	24-hour composite[4]	
pH (S.U.)	EFF-1[1]	6.0[5]	8.5		Continuous	Recorder[4]	[5]Mixing zones apply to these effluent limitations.
Total Ammonia, as N (mg/L)	EFF-1[1]	11.0 annual average, 20.0 monthly average, report daily maximum			1/week	24-hour composite[4]	
Unionized Ammonia, N (mg/L)	EFF-1[1]		Report		1/week	Calculated[4]	
Temperature (°F)	EFF-1[1]		Report		Continuous	Recorder[4]	

PART I: Continued							
List <u>current</u> Effluent Limits of Outfall(s) to be Sampled: This should include any AO or CO limits the facility may be under (Leave cell blank if not applicable)							
		Effluent Limitations				Monitoring Requirements	
Parameters	Effluent Sampling Location	Other	Daily Max.	Daily Average	Monitoring Frequency	Sample Type	Notes
2,3,7,8 – tetrachlorodibenzo-p-dioxin (TCDD), pg/l	EFF-1[1]		0.014[6]		1/quarter	72-hour composite[4]	[6]The sample shall consist of three 24-hour composite samples.
Whole Effluent Toxicity, Acute	EFF-1[1]	The 96-hour LC50 shall not be less than 30% effluent			Semi-annual	Grab[4]	
Silver (µg/L)	EFF-1[1]		2.3		1/month	Grab[4]	
Nickel (µg/L)[7]	EFF-1[1]		66.4[5]		1/month	Grab[4]	[7]Applied based on the total recoverable fraction.
Aluminum (mg/L)	EFF-1[1]		3.0[5]		1/month	Grab[4]	
Copper (µg/L)[7]	EFF-1[1]		11.5[5]		1/month	Grab[4]	
Iron (mg/L)	EFF-1[1]		2.4[5]		1/month	Grab[4]	
Lead (µg/L)[7]	EFF-1[1]		27.2[5]		1/month	Grab[4]	
Zinc (µg/L)[7]	EFF-1[1]		410.0[5]		1/month	Grab[4]	

Appendix F. (continued)

PART I: Continued	
Receiving Waters: Amelia River	**Classification (indicate whether fresh or marine):** Class III marine

Toxicity Test Requirements (routine and/or additional test language, test species, salinity adjustment, etc.):

The maximum concentration of wastes in the mixing zones may exceed the 96 hour LC50. Accordingly, the effluent when diluted to 30% of full strength shall not cause more than 50% mortality in 96 hours (96 hr. LC50) to the bioassay test species.

Acute Whole Effluent Toxicity Monitoring Program

The Permittee shall conduct 96-hour acute definitive, static-renewal, toxicity bioassays on the mysid shrimp, *Americamysis bahia*, and the inland silverside, *Menidia beryllina*, using a flow-proportioned effluent sample composited from grab samples collected at EFF-2 and EFF-3. These multi-concentration tests shall be conducted using 100%, 75%, 50%, 25%, 12.5%, 6.25% effluent and 0% effluent (control water) involving the determination of 96-hour LC50 values with 95% confidence limits, and are referred to as "routine" tests.

The dilution/control water and effluent used will be adjusted to a salinity using artificial sea salts (e.g. Forty Fathoms) similar to the receiving water at the time of sampling as long as the salinity falls within the accepted range for the test organisms. A standard reference toxicant (SRT) quality assurance (QA) test shall be conducted concurrently with each species used in the bioassays and the results submitted with the bioassay report.

a. If control mortality exceeds 10% for either species in any test, the test(s) for the species (including the control) shall be repeated. An acute test will be considered valid only if the control mortality does not exceed 10% for either species.

b. If either species indicates unacceptable acute toxicity (96-hr LC50 < 30% effluent), a minimum of two (2) "additional" 96-hour definitive tests are required. The additional tests are to be conducted within 30 days of the date of the routine tests. The dilution series shall include at least two dilutions above and two dilutions below the target toxicity and a control (0% effluent). For these additional tests, the test acceptability criteria specified in a. above must be met for the tests to be considered valid. Preferably, the first of these additional tests shall be initiated within seven (7) days of a failed acute test. The second test shall be initiated at least seven (7) days after completion of the first additional test. Such tests shall be conducted using the test species that exhibited toxicity in the routine tests.

Administrative or Consent Orders (date executed, specific requirements, interim limit dates-if applicable, etc.):
N/A

Appendix F. (continued)

Facility Mixing Zone Details (if applicable):
The mixing zone extends 175 meters in width southeasterly from the Northwest bank of the Intracoastal Waterway; with the centerline starting 100 meters southerly from the outer end of Rayonier outfall diffuser and extending 615 meters northerly from the outfall for a total centerline length of 715 meters.- This mixing zone contains 125,125 square meters and otherwise complies with the physical requirements of the FAC Rule 62-4.244. The dissolved oxygen standard set forth in FAC Rule 62-4.244(3)(a) shall apply within the mixing zone.

The Permittee is granted mixing zones for Iron, Aluminum, Nickel, Copper, Lead, pH, and Zinc. The Permittee's discharge shall not cause a violation of the Chapter 62-302, FAC, Class III Water Quality Standards of 0.3 mg/L, 1.5 mg/L, 8.3 µg/L, 3.7 µg/L, 8.5 µg/l, 6.5 minimum and 8.5 maximum s.u., and 86 µg/l for Iron, Aluminum, Nickel, Copper, Lead, pH, and Zinc respectively outside the boundaries of the mixing zones described below.

The mixing zone for Iron, Aluminum, Nickel, Copper, Lead, and Zinc shall be the area that is bounded on one side by the length of the diffuser (67 meters) and on the other side by the length in meters (m) immediately downstream from the diffuser which is listed below as follows:

Parameter	Mixing Zone Downstream Length (m)	Mixing Zone Area (sq. m)
Iron	2.5	167.5
Aluminum	1.0	67
Copper	6.0	402
Nickel	2.5	167.5
Lead	2.0	134
Zinc	1.5	100.5
PH	1.5	100.5

Compliance with the mixing zones shall be based on effluent concentrations of Iron, Aluminum, Nickel, Copper, Lead, pH, and Zinc of 2.4 mg/L, 3.0 mg/L, 66.4 ug/L, 11.5 ug/L, 27.2 ug/l, 6.0-8.5 s.u., and 410 ug/l in Outfall 001 respectively.

Permittee shall monitor as set forth below in order to evaluate whether the dissolved oxygen water quality standard is being met:

PARAMETER	SAMPLING LOCATION	MEASURED FREQUENCY	SAMPLE/METHOD TYPE
Dissolved Oxygen (mg/L)	(1)	(2)	Grab
Temperature Water (°C)	(1)	(2)	Grab
Temperature Air (°C)	(1)	(2)	Grab
pH (S.U.)	(1)	(2)	Grab
Secchi depth (meters)	(1)	(2)	Meter
Specific Conductance (umhos/cm)	(1)	(2)	Grab
Cloud cover (%)	(1)	(2)	Estimate
Time of day	(1)	(2)	Observation
Ammonia Total (mg/L)	(1)	(2)	Grab
Un-ionized ammonia (mg/L)	(1)	(2)	Calculation

(1) Ambient sampling stations
(2) Sampling shall occur every two months at each sampling station, at mid-depth, during daylight hours, for a 48-hour period, as follows:
1 hour prior to low tide
1 hour prior to high tide

Appendix F. (continued)

List Permit Violations (DMR data) and plant upsets that occurred at the plant within the last year:			
Date	Parameter and Units	Limit	Result
n/a			

Describe previous FYI and WQBEL study:
April 2009:
Americamysis bahia 96-hr acute definitive bioassay – Not Toxic
Menidia beryllina 96-hr acute definitive bioassay – Not Toxic
The effluent algal growth potential indicated that algal growth inhibition may be an issue.
The effluent fecal coliform count greatly exceeded the Class III Marine waters single sample criterion of 800 CFU/100mls.
No other applicable water quality standards or permit conditions were violated.

Describe previous or current Enforcement Actions (including WLs):
07-0027 CO – issued as a resolution of A06-360 and A06-349 – closed 02/19/07
98-3176 CO – issued for effluent violations – closed 01/15/99
97-1129 CO – closed 01/13/99
97-0611 CO – issued as a resolution of 5 abnormal events – closed 04/21/97
96-0005 WL and 96-1086 CO issued to ensure discharge at outgoing tide – closed 01/02/97

Describe any violations or problems noted in previous inspection:
None – Performance Audit Inspection showed facility was In Compliance on 03/30/10.

Discuss whether DMR trends within previous five years are improving or declining:
No significant trends noted by previous five years of DMRs.

Additional Comments (this should include a trend of the Effluent, i.e. if the facility is now Reuse):
N/A

Appendix F. (continued)

PART II: Sampling Event Information	
Date(s) sample collected:	Sampler(s):
Temperature (Deg C):	pH (SU):
Dissolved Oxygen (mg/L):	Conductivity (umhos/cm):
Total Residual Chlorine (mg/L):	Total Residual Chlorine - after Disinfection (mg/L):
Method of Chlorination:	Method of De-chlorination:
Flow During Sample Collection for each outfall(MGD):	
Mean Flow for each outfall for previous 12 months based on sampling date (If samples are taken on more than one day, indicate Mean Flow for each day):	
Describe Discharge during Sampling Event: ☐ Continuous ☐ Intermittent ☐ Seasonal ☐ Rainfall Dependent ☐ Other, please specify	
Describe any conditions, difficulties or abnormal events that occurred during the sample collection and any other additional comments here:	

Appendix G. EPA End Sheet

The Bioassay of Rayonier Performance Fibers, LLC, plant effluent sampled on April 18, 2011. NPDES# FL0000701.

Fill Out This Section For All Surface Water Discharger Inspections(CEI, CSI, CBI, PAI, XSI-RI Optional)

Transaction Code	NPDES NUMBER	YR/MO/DA	Insp Type	Inspector	Fac Type
1 N 2 5	3 F L 0 0 0 0 7 0 1 11	12 1 1 0 4 1 8	18 B	19 S	20 2

Remarks

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The Priority Pollutants Analysis of Rayonier Performance Fibers, LLC, plant effluent sampled on April 18, 2011. NPDES# FL0000701.

Fill Out This Section For All Surface Water Discharger Inspections(CEI, CSI, CBI, PAI, XSI-RI Optional)

Transaction Code	NPDES NUMBER	YR/MO/DA	Insp Type	Inspector	Fac Type
1 N 2 5	3 F L 0 0 0 0 7 0 1 11	12 1 1 0 4 1 8	18 X	19 S	20 2

Remarks

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Biological Analyses of Rayonier Performance Fibers, LLC, plant effluent sampled on April 18, 2011. NPDES# FL0000701.

Fill Out This Section For All Surface Water Discharger Inspections(CEI, CSI, CBI, PAI, XSI-RI Optional)

Transaction Code	NPDES NUMBER	YR/MO/DA	Insp Type	Inspector	Fac Type
1 N 2 5	3 F L 0 0 0 0 7 0 1 11	12 1 1 0 4 1 8	18 S	19 S	20 2

Remarks

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