

Effluent Quality Assessment

Rayonier Performance Fibers, LLC

Nassau County

NPDES #FL0000701

Sampled April 20, 2009

August 2009

Reissued May 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, 32035. NPDES #FL0000701. Effluent samples for bioassay and chemical analyses for this facility were collected on April 20, 2009.

Introduction

Rayonier Performance Fibers, LLC, is a chemical-cellulose pulp mill which has an industrial wastewater treatment system. (See Appendix G for detailed facility information provided by Heather Webber of FDEP Northeast District.)

Methods

Samples were collected from the EFF-2 and EFF-3 NPDES sampling points for 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/qa/sops.htm.

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 bioassay sample was prepared in the bioassay laboratory by blending effluent collected from the EFF-2 and EFF-3 NPDES sampling points in proportion to the respective flows measured at each sampling point from midnight on April 19th through midnight April 20th (EFF-2 flow 2.006 million gallons per day (MGD), EFF-3 flow 8.496 MGD). The composited sample consisted of 19% effluent from EFF-2 and 81% effluent from EFF-3. The bioassay sample was salinity-adjusted from an apparent salinity of approximately 2.52 parts per thousand (ppth) to a salinity of approximately 20 ppth using 40 Fathoms® artificial sea salts. Salt controls were prepared by diluting 20 ppth artificial seawater (ASW) with well water to a salinity of approximately 2.5 ppth then salting this solution with artificial sea salts to match the salinity of the test solution (approximately 20 ppth). The purpose of the salt controls was to confirm that there was no effect of adding artificial sea salts to the sample. There was 5% mortality in the salt controls of the *Americamysis bahia* test and 10% mortality in the salt controls of the *Menidia beryllina* test.

Results and Discussion

- **Toxicity Test Results**
  Tests were performed April 21 - 25, 2009.

  Americamysis bahia 96-hour acute definitive bioassay – LC_{50} > 100%, 15% mortality in 100% sample at 96 hours 5% mortality in 30% effluent

  Menidia beryllina 96-hour acute definitive bioassay – LC_{50} = 97%, 55% mortality in 100% sample at 96 hours 5% mortality in 30% effluent

  Based on the permit requirement of not greater than 50% mortality in effluent diluted to 30% of full strength, the effluent was not toxic to either test species.

  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 salinity-adjusted effluent AGP was 3.0 U (U - Material was analyzed for but not detected; the report value is the minimum detection limit) mg dry wt/L of the saltwater species *Dunaliella tertiolecta.*

Raschke and Schultz found 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 analytical chemistry suggests that the effluent is phosphorus-limited (Maloney et al. 1978).

The AGP result is more than an order of magnitude less than the predicted AGP values based on the effluent nutrient concentrations, suggesting that algal growth inhibition may be an issue.

The total suspended solids content (385 mg/L) of the effluent sample and the addition of salts to the sample for the salinity adjusted AGP test could very well have bound nutrients and resulted in nutrients being removed during the filtration process. This is one possible explanation for the lack of growth in the algal growth potential test. True algal growth inhibition can only be determined through a combination of chemical analyses and the algal growth inhibition test.

See Table 1 for AGP results. See Table 1b for predicted AGP values.

- **Chemistry Results**
  Total residual chlorine was not measured in the bioassay laboratory due to the extremely dark color of bioassay sample. Total ammonia was detected in the bioassay sample in the laboratory at a concentration of 6.45 mg/L. The total ammonia concentration in the composite sample collected and preserved for chemical analysis was 5.9 mg N/L. Based on the pH, salinity, and temperature of the effluent as collected, the calculated unionized ammonia concentration was 0.03 mg/L.

  Aluminum, cadmium, chromium, copper, iron, lead, nickel, and zinc were detected in the effluent at levels that comply with either Class III fresh water quality criteria (62-302.530, F.A.C.) or the facility’s NPDES permit conditions. Arsenic, selenium, silver and the organic constituents (2,4,6-Trichlorophenol; 2,4-Dichlorophenol; Bis(2-ethylhexyl)phthalate, and Diethyl phthalate) were detected between the laboratory method detection limits (MDL) and practical quantitation limits (PQL). Ortho-phosphate was detected in the equipment blank.

  Fecal coliforms (19,900 colony forming units/100 mls (CFU/100mls) B – Results based on colony counts outside the acceptance range) greatly exceeded the single sample criterion of (800 CFU/100mls (62-302.530(6), F.A.C.)) for fecal coliforms in Class III Marine waters.

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

Conclusion

The composite bioassay sample prepared in the laboratory from flow-proportioned aliquots of effluent collected from the EFF-2 and EFF-3 NPDES sampling points for this facility on April 20, 2009, was not acutely toxic to either test species during the 96-hour acute definitive bioassays based on permitted conditions. The effluent AGP result, although, less than the "problem” threshold for marine receiving waters was more than an order of magnitude less than the predicted AGP values, suggesting algal growth inhibition may be an issue. However, true algal growth inhibition can only be determined by performing the Algal Growth Inhibition Test and associated chemical analyses. The effluent fecal coliform count greatly exceeded the Class III Marine waters single sample criterion of 800 CFU/100mls (62-302.530(6), F.A.C.)). No other applicable water quality standards or permit conditions were violated.

Literature Cited

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.

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, facility on April 20, 2009.

Rayioner Performance Fibers, LLC			
Location	AGP (measured)	Inorganic N:P ratio	Total N:P ratio
Effluent composited*	3 U	NC	28.1

* - sample salinity adjusted to 7ppt
U - Material analyzed for but not detected; value reported is the method detection limit
NC - not calculated due to the ortho-phosphate value being less than the laboratory practical quantitation limit

Table 1b. Nutrient concentrations and predicted algal growth potential for samples collected from the Rayonier Performance Fibers, LLC, facility on April 20, 2009.

Nutrient	Nutrient Concentration µg/L	Predicted Growth mg dry wt /L per µg/L nutrient	Predicted Growth mg dry wt /L based on nutrient concentration
Total Phosphorus	1500	1.08	1620
Total Ammonia	5900	0.08	472
Nitrate Nitrogen Estimated	85	0.03	2.55

Table 2. Effluent limits, Class III Criteria for predominantly marine waters and chemical data for samples collected from the Rayonier Performance Fibers, LLC, facility on April 20, 2009.

Rayioner Performance Fibers, LLC. NPDES# FL0000701	Class III Criteria	Effluent Limits	Effluent composited	Effluent
Organic Constituents (µg/L)				
2,4,6-Trichlorophenol	≤ 7.9	-	3.2 I	-
2,4-Dichlorophenol	< 790	-	1.3 I	-
Bis(2-ethylhexyl)phthalate	-	-	21 I	-
Diethyl phthalate	-	-	1.8 I	-
Metals (µg/L unless otherwise noted)				
Aluminum	≤ 1,500	≤ 3,000 m	-	1,040
Arsenic	≤ 50	-	-	0.97 I
Cadmium	≤ 8.8	-	-	0.36
Calcium (mg/L)	-	-	-	346
Chromium-III	-	-	-	5.3
Copper	≤ 3.7	≤ 11.5 m	-	7
Iron	≤ 300	≤ 2,400 m	-	1,070
Lead	≤ 8.5	≤ 27.2 m	-	2.01
Magnesium (mg/L)	-	-	-	61.7
Nickel	≤ 8.3	≤ 66.4 m	-	12.2
Selenium	≤ 71	-	-	0.23 I
Silver	≤ 2.3	≤ 2.3 m	-	0.097 I
Zinc	≤ 86	≤ 410 m	-	77
Nutrients (mg/L)				
Ortho-phosphate	-		-	0.012 IF
Total Phosphorus	-		1.5 A	1.6
Total Ammonia	-	≤ 11.0 a	5.9	5.5
Un-ionized Ammonia	-	Report	0.03 c	-
Nitrate and Nitrite	-		0.033 J	0.17
Total Kjeldahl Nitrogen	-		45	42
Organic Nitrogen	-		39.1 c	36.5 c
Total Nitrogen	-		45.033 c	42.17 c
General Physical and Chemical Parameters				
Dissolved Oxygen (mg/L)	≥ 4.0	-	0.6	-
pH (SU)	6.5 - 8.5	6.5 - 8.5	6.9	-
Conductivity (µmhos/cm)	-	-	4,242	-
Temperature (°C)	-	Report	26.2	-
Salinity	-	-	2.2 c	-
Sample Depth (m)	-	-	0.3	-
Total Residual Chlorine (mg/L)	≤ 0.01	-	-	-
Chlorophyll *a* (µg/L) - Corrected	-	-	11 U	-
Phaeophytin (µg/L)	-	-	8 U	-
Total Suspended Solids (mg/L)	-	≤174.7* sp	385 sp	-
CBOD, 5 day (mg/L), N - inhibited	-	≤123.2** sp	120 Lsp	-
Flow (MGD)	-	-	≤26.1 a	14.48 a
Hardness (mg $CaCO_3$)	-	-	-	1118.04 c
Microbiology (Number of colony forming units/100ml)				
Fecal Coliforms	≤ 400s #	-	-	19,900 B

Value exceeds the Class III Water Quality Criteria or permit limits

a - Annual average
c - Value is calculated
m - Limit based on mixing zone.
s - Single sample
p - Limit based on 24-hour composite sample
A - Value reported is the mean of two or more determinations
B - Results based on colony counts outside the acceptance range
F - Analyte was detected in both sample and equipment blank (0.005 µg/L I)
I - The reported value is between the laboratory method detection limit and the laboratory practical quantitation limit
J - Estimated value
L - Actual value is known to be greater than value given
U - Material analyzed for but not detected; value reported is the method detection limit
* - Value calculated by dividing 38,278 lbs/day daily average limit by daily maximum flow limit of 26.31 mgd.
**- Value calculated by dividing 27,000 lbs/day daily average limit by daily maximum flow limit of 26.31 mgd.
- If 10 or fewer samples are taken within a month, the single sample limit is 400 CFU (62-302.530(6), F.A.C.)

Florida Department of Environmental Protection

Central Laboratory Sample Submittal Form

Request Number: RQ-2009-03-23-22
Rayonier Incorporated

Event ID *

Requester: Jennifer Paris
Field Report Prepared By: EA
Collected By: EA / SP
Send Final Report To Tom Kallemeyn
Sampling Agency: DEP NE

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

Lab ID *
Location: Eff 3+2 Rayonier
Field ID:
Matrix (Include type e.g. Salt, Fresh, etc):
Temp (C):
pH:
Latitude: o ' " .
Longitude: o ' " .

☑ Comp ☐ Grab
Collection (begin) Eastern Date 4/19/09 Time 1200 Central
Collection (end) Eastern Date 4/20/09 Time 1200 Central
Bottle Group(s)**: A
Tot Res Chlorine (mg/L):
Diss Oxygen (mg/L):
Storet Station Number:
Sample Depth ☐ m ☐ ft
☐ Salinity (PPTh) ☐ Sp Conductance (umho/cm)
NPDES Number: FL0000701
Comments: See attached. Chemistry

Lab ID *
Location: Eff 3 Meter
Field ID:
Matrix (Include type e.g. Salt, Fresh, etc):
Temp (C): 26.17
pH: 6.87
Latitude: o ' " .
Longitude: o ' " .

☐ Comp ☐ Grab
Collection (begin) Eastern Date 4/20 Time 1126 Central
Collection (end) Eastern Date Time Central
Bottle Group(s)**: n/a +
Tot Res Chlorine (mg/L):
Diss Oxygen (mg/L): 0.58
Storet Station Number:
Sample Depth ☑ m ☐ ft: 0.3
2.25 ☐ Salinity (PPTh) 4272 ☑ Sp Conductance (umho/cm)
NPDES Number:
Comments: Just started discharging 5 min prior.

Lab ID *
Location: Eff 2 meter
Field ID:
Matrix (Include type e.g. Salt, Fresh, etc):
Temp (C):
pH: 7.10
Latitude: o ' " .
Longitude: o ' " .

☐ Comp ☑ Grab
Collection (begin) Eastern Date 4/20 Time 1155 Central
Collection (end) Eastern Date Time Central
Bottle Group(s)**: n/a +
Tot Res Chlorine (mg/L):
Diss Oxygen (mg/L): 6.56
Storet Station Number:
Sample Depth ☑ m ☐ ft: 1
13.77 ☐ Salinity (PPTh) 22600 ☐ Sp Conductance (umho/cm)
NPDES Number:
Comments:

Lab ID *
Location: Effluent
Field ID:
Matrix (Include type e.g. Salt, Fresh, etc):
Temp (C):
pH:
Latitude: o ' " .
Longitude: o ' " .

☐ Comp ☐ Grab
Collection (begin) Eastern Date Time Central
Collection (end) Eastern Date Time Central
Bottle Group(s)**: B
Tot Res Chlorine (mg/L):
Diss Oxygen (mg/L):
Storet Station Number:
Sample Depth ☐ m ☐ ft
☐ Salinity (PPTh) ☐ Sp Conductance (umho/cm)
NPDES Number:
Comments: Effluent using auto sampler.

Relinquished By:	Date/Time	Shipping Method:	Received By:	Date/Time	Relinquished By:	Date/Time	Received By:	Date/Time
EA	4/20/09 1120	SELF	[illegible]	4/21/09 10:35				

* Shaded Areas for Lab use only.

** Please see reverse side for Bottle Group information.

last revised October 1, 2003

FDEP Biology Laboratory - Acute Definitive Bioassay Bench Sheets

Facility: Rayonier, Inc

Address: P.O Box 2002

City: Fernandina Beach County: Nassau

Contact/District: Eesa Ali /NED

NPDES Permit #: FL0000701

LIMS Job #: TLH-2009-04-21-82 LIMS Sample #: 118 1313

Lims Data Entry: 4-30-09 MF Data Entry Verification: 4-30-09 BA

Sample Collection: Date: 4-20-09 Time: 2013

Hold Time Start: Date: 4-20-09 BA Time: 2013

Comments: Sample was prepared in the laboratory by compositing two effluent samples based on flow (proportional) information from the facility. 81% Dark and 19% light samples. Samples were salted to 20 ppth salinity by the addition of artificial Sea Salts. A salted control was also prepared by dilution of 20ppth ASW to the Sample Salinity (2.52) then salting to 20 ppth salinity MF 4-24-09

Instructions (for below): Circle appropriate wording. If yes is circled, complete blanks.

Test Type: Definitive

Static / (Static Renewal) / Flow-through

Test Duration: 48 (96) Hours.

Light Intensity : 50 - 100 ft. candles.

Photoperiod : 16 hours light 8 hours dark.

Test 1 validation: **Test 1:** SOP TA 07-03

Control survival ≥90%: (Yes) No

Temperature Range ≤3°C: (Yes) No

Test 2 validation: **Test 2:** SOP TA 07-04

Control survival ≥90%: (Yes) No

Temperature Range ≤3°C: (Yes) No

Initial sample handling:

PH adjustment : yes (no) Initial pH: ____ NaOH N HCl N ____ Drops mL Final pH: ____

Aeration : (yes) no Initial DO: 6.7 mg/L Final DO: 6.0 mg/L Duration: 70 minutes Rate: ~200 bubbles/min

Salinity adjusted (Test 1): (yes) no Initial Salinity: 2.52 Final Salinity: 19.97 (Salts) Hypersaline brine

Salinity adjusted (Test 2): (yes) no Initial Salinity: 2.52 Final Salinity: 19.97 (Salts) Hypersaline brine

Dechlorination: yes (no) ____mL of 0.025N Sodium Thiosulfate per liter of sample. Final TRC: ____

Sample was extremely dark. Very low DO. Smelly (BAD) MF 4/24/09

Temperatures Incubator 2 ; 26.1 – 26.5 Culture Room ; 24.9 – 25.9 Water bath 2 ; 24.1 – 25.6

Both tests were incubated in the waterbath (to facilitate aeration) MF 5-7-09

Sample Validation:

Temperature: Shipped ≤6°C Yes No (Hand Delivered) Cooling (received °C < collected °C) (Yes) No

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

Batch 4-21-09 Salt control

(A) lab TRC not measured Sample Two. Days. MF 4-24-09

Investigators' Signatures

Buzz Alexander

James Daniels

Marshall Faircloth

Chelsea French

Dorothea Wolfe
REVIEWER

Water Quality Parameters	20% DMW	Moderately Hard Water/ Well Water	Salt Water (ASW) NSW Test 1	Salt Water ASW NSW Test 2 (Salt control)	Other:	Original Sample	Method	Measured by	Verified by
Field Total Residual Cl_2 (mg/L):	N/A	N/A	N/A	N/A		~~<0.03~~ N/A (A)	Not measured		MF
Lab Total Residual Cl_2 (mg/L):			<0.03	<0.03		<0.03	HACH	BA	BA
Alkalinity (mg/L as $CaCO_3$):			213	232		259	HACH	BA	MF
Hardness (mg/L as $CaCO_3$):	—	—	—	—	—	—	HACH	—	—
Total Ammonia (mg/L as N):			<0.017	<0.017		6.35	DENVER	MF	BA
Salinity (ppth):			~20	~20		2.52	YSI (Mettler)	MF	BA

V 1.4 9/12/05

Appendix B. (continued)

FDEP Biology Laboratory - Bioassay Survival Bench Sheet

LIMS Sample #: 1181313 Test #: 1/2 SOP#:TA 07 03 Test Started: Date 4.21.09 Time: 15:05
Organism/Batch/Age: Ab4n/4.21.09/5day5 Test Ended: Date 4-25-09 Time: 1045
Chamber/Test Volume: 350 / 330 ml Diluent/ Batch: FSW / 3.30.09
Food/Batch: YCT_____ P.sub_____ Artemia 0hr 57 09 24hr 58 09 48hr 5.09 72hr 6.0 09 Artemia Lot# 38438
Feeding: Prior to Test Prior to Renewal (Daily)

Concentration	Replicate	Chamber #	Test Hour 0 hr	24 hr	48 hr BR	48 hr AR	72 hr	96 hr
Ctrl	A	TOX 25	5	5	5	5	5	5
	B	TOX 26	5	5	5	5	5	5
	C	TOX 27	5	5	5	5	5	5
	D	TOX 28	5	5	5	5	5	5
Salt ctrl	A	TOX 29	5	5	5	5	5	5
	B	TOX 30	5	5	5	5	5	5
	C	TOX 31	5	5	5	5	5	4/D
	D	TOX 32	5	5	5	5	5	5
7.5 %	A	TOX 33	5	5	5	5	5	5
	B	TOX 34	5	5	5	5	5	5
	C	TOX 35	5	5	5	5	5	5
	D	TOX 36	5	5	5	5	5	5
15 %	A	TOX 37	5	5	5	5	5	5
	B	TOX 38	5	5	5	5	5	5
	C	TOX 39	5	5	3 2D	3	3	3
	D	TOX 41	5	5	5	5	5	4/D
30 %	A	TOX 42	5	5	5	5	4 1D	4
	B	TOX 43	5	5	5	5	5	5
	C	TOX 44	5	5	5	5	5	5
	D	TOX 45	5	5	5	5	5	5
60 %	A	TOX 47	5	5	5	5	4 1D	4
	B	TOX 48	5	5	5	5	5	5
	C	TOX 100	5	5	5	5	5	5
	D	TOX 101	5	5	5	5	4 1D	4
100%	A	TOX 102	5	5	5	5	4	4
	B	TOX 104	5	5	5	5	5	5
	C	TOX 105	5	BR3 4D	4	4	3 1D	3
	D	TOX 106	5	5	5	5	5	5
			BS	BR/SD	BR	BA	CF	TS

Loaded/Verified by: BR/ CF Checked by:
m = missing d = dead BR/AR = Before/After Renewal
Test Results:
Screening Tests: Report LC50 as >100%, =100%, or <100%.
% mortality in 100% sample: 15% LC50: >100%
If Calculated: 95% CI_____ Method_____
Substitue highest test concentration used if other than 100% (example: Ocean outfall tested at 30% concentration).

Comments:

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Appendix B. (continued)

FDEP Biology Laboratory - Bioassay Survival Bench Sheet

LIMS Sample #: 118313 Test #: 2/2 SOP#:TA 07 JD 8304 Test Started: Date 4-21-9 Time: 14:30
Organism/Batch/Age: Mysidopsis / 4.21.09 / 13 days Test Ended: Date 4-25-09 Time: 1100
Chamber/Test Volume: 800 / 500 ml Diluent/ Batch: ASW / 3.30.09
Food/Batch: YCT ____ P.sub ____ Artemia 0hr 57-09 24hr ____ 48hr 59-09 72hr ____ Artemia Lot# 38438
Feeding: Prior to Test Prior to Renewal Daily

Concentration	Replicate	Chamber #	Test Hour 0 hr	24 hr	48 hr BR	48 hr AR	72 hr	96 h
Ctrl	A	B1	10	9 D	9	9	9	9
	B	B2	10	10	10	10	10	10
Salt Ctrl	A	B3	10	9 D	9	9	9	9
	B	B4	10	9 D	9	9	9	9
7.5%	A	B5	10	10	10	10	10	10
	B	B6	10	9 D	9	9	9	9
15%	A	B7	10	9 D	8 D	8	8	8
	B	B8	10	9 D	9	9	9	9
30%	A	B9	10	9 D	9	9	9	9
	B	B10	10	10	10	10	10	10
60%	A	B11	10	8 2D	8	8	8	8
	B	B12	10	9 D	9	9	9	9
100%	A	B13	10	5 5D	5	5	4 D	4
	B	B14	10	8 2D	6 2D	6	5 D	5
Loaded/Verified by BA / CF		Checked by:	MF	MF/JD	BA	BA	MF	JD

m = missing d = dead BR/AR = Before/After Renewal
Comments:

Test Results:
Screening Tests: Report LC50 as >100%, =100%, or <100%.
% mortality in 100% sample: 55 ~~54~~ 53 % LC50: 97%
If Calculated: 95% CI 75.12 – 124.87 Method TSK
Substitue highest test concentration used if other than 100% (example: Ocean outfall tested at 30% concentration).

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FDEP Biology Laboratory - Bioassay Parameter Bench Sheet

LIMS Sample # : 1181313 Test #: 1 of 2

TEST SOP #: TA07_ 03 Test Species: *Ceriodaphnia dubia* *Cyprinella leedsi* *Pimephales promelas* (*Americamysis bahia*) *Menidia beryllina* Other:_____

Concentration Ctrl	0 Hr.	24 Hr.	48 Hr. before renewal	48 Hr. after renewal	72 Hr.	96 Hr.
Replicate	A	B	C	C	D	A
pH (S.U.)	8.40	8.2	8.3	8.5	8.4	8.3
Temperature °C	23.4	24.3	24.0	24.0	24.2	24.0
(A) aerated for duration of test Dissolved Oxygen mg/L	7.24	7.0	8.1	6.6	6.7	6.9
Conductivity µmhos (mmhos)	32.0	31.5	31.4	32.3	33.0	33.4
(initials) Measured by:	CF	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
(initials) Recorded by:	CF	CF	CF	[illegible]	[illegible]	[illegible]

Comments: (A) all concentration replicates were aerated from 0 hr - 96 hr test termination MS 5-7-09

Concentration 7.5%	0 Hr.	24 Hr.	48 Hr. before renewal	48 Hr. after renewal	72 Hr.	96 Hr.
Replicate	A	B	C	C	D	A
pH (S.U.)	8.40	8.2	8.3	8.4	8.3	8.2
Temperature °C	23.4	24.1	24.1	24.0	24.2	24.1
aerated (A) Dissolved Oxygen mg/L	7.15	7.1	8.0	6.7	6.9	6.9
Conductivity µmhos (mmhos)	32.0	31.7	31.3	32.7	33.1	33.6
(initials) Measured by:	CF	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
(initials) Recorded by:	CF	CF	CF	[illegible]	[illegible]	[illegible]

Comments:

Concentration 15 %	0 Hr.	24 Hr.	48 Hr. before renewal	48 Hr. after renewal	72 Hr.	96 Hr.
Replicate	A	B	C	C	D	A
pH (S.U.)	8.31	8.3	8.2	8.4	8.3	8.2
Temperature °C	23.4	24.1	24.2	24.0	24.0	24.1
aerated (A) Dissolved Oxygen mg/L	6.98	7.1	7.5	6.7	6.8	6.9
Conductivity µmhos (mmhos)	32.1	31.8	31.3	32.3	32.9	33.1
(initials) Measured by:	CF	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
(initials) Recorded by:	CF	CF	CF	[illegible]	[illegible]	[illegible]

Comments:

Concentration 30 %	0 Hr.	24 Hr.	48 Hr. before renewal	48 Hr. after renewal	72 Hr.	96 Hr.
Replicate	A	B	C	C	D	A
pH (S.U.)	8.21	8.2	8.1	8.3	8.2	8.2
Temperature °C	23.3	24.0	24.0	24.1	24.1	24.0
aerated (A) Dissolved Oxygen mg/L	6.68	7.2	7.3	6.7	7.1	6.9
Conductivity µmhos mmhos	32.0	31.9	31.3	32.5	32.9	33.3
(initials) Measured by:	CF	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
(initials) Recorded by:	CF	CF	CF	[illegible]	[illegible]	[illegible]

Comments:

V 2.0 2/24/04

FDEP Biology Laboratory - Bioassay Parameter Bench Sheet

LIMS Sample # : 1181313 Test #: 1 of 2

TEST SOP #: TA07_03 Test Species: *Ceriodaphnia dubia* *Cyprinella leedsi* *Pimephales promelas* (*Americamysis bahia*) *Menidia beryllina* Other:

Concentration 60 %	0 Hr.	24 Hr.	48 Hr. before renewal	48 Hr. after renewal	72 Hr.	96 Hr.
Replicate	A	B	C	C	D	A
pH (S.U.)	8.12	8.1	8.1	8.0	8.1	8.1
Temperature °C CF	(C) ~~23.2~~	24.0	24.5	24.1	24.4	24.0
(A) see pg 39 Dissolved Oxygen mg/L	5.98	7.2	7.3	6.6	7.2	6.9
Conductivity µmhos (mmhos)	32.1	31.9	31.3	32.2	32.7	32.4
(initials) Measured by:	CF	CF	CF	JD	JD	JD
(initials) Recorded by:	CF	CF	CF	JD	JD	JD

Comments: (C) Transcription error crossout correction MF 5/7/09

Concentration 100 %	0 Hr.	24 Hr.	48 Hr. before renewal	48 Hr. after renewal	72 Hr.	96 Hr.
Replicate	A	B	C	C	D	A
pH (S.U.)	7.94	8.1	8.2	8.2	8.2	8.2
Temperature °C	23.2	24.0	24.0	24.0	24.1	24.1
(A) see page 39 Dissolved Oxygen mg/L	4.84	7.0	7.3	6.0	7.1	6.7
Conductivity µmhos (mmhos)	32.2	31.8	31.7	31.3	31.9	32.3
(initials) Measured by:	CF	JD	CF	JD	JD	JD
(initials) Recorded by:	CF	CF	CF	JD	JD	JD

Comments:

Concentration SALT Ctrl	0 Hr.	24 Hr.	48 Hr. before renewal	48 Hr. after renewal	72 Hr.	96 Hr.
Replicate	A	B	C	C	D	A
pH (S.U.)	8.44	8.4	8.4	8.5	8.4	8.3
Temperature °C	23.1	24.6	24.5	24.0	24.2	24.0
(A) see page 39 Dissolved Oxygen mg/L	7.39	~~6.8~~ 6.8	7.8	6.1	7.2	6.8
Conductivity µmhos (mmhos)	32.0	31.8	31.0	31.0	31.5	32.1
(initials) Measured by:	CF	JD	JD	JD	JD	JD
(initials) Recorded by:	CF	CF	CF	JD	JD	JD

Comments: (A) Transcription error JD by MF 5/7/09 Crossout correction

Concentration	0 Hr.	24 Hr.	48 Hr. before renewal	48 Hr. after renewal	72 Hr.	96 Hr.
Replicate						
pH (S.U.)						
Temperature °C						
Dissolved Oxygen mg/L						
Conductivity µmhos mmhos						
(initials) Measured by:						
(initials) Recorded by:						

Comments:

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FDEP Biology Laboratory - Bioassay Parameter Bench Sheet

LIMS Sample # : 1181313 Test #: 2 of 2

TEST SOP #: TA07_04 Test Species: *Ceriodaphnia dubia* *Cyprinella leedsi* *Pimephales promelas* *Americamysis bahia* (*Menidia beryllina*) Other:

Concentration Ctrl	0 Hr.	24 Hr.	48 Hr. before renewal	48 Hr. after renewal	72 Hr.	96 Hr.
Replicate	A	B	CF B A	A	B	A
pH (S.U.)	8.41	8.3	8.3	8.5	8.4	8.2
Temperature °C	22.8	24.4	24.2	24.0	24.0	24.0
(A) Dissolved Oxygen mg/L	7.20	7.3	8.2	6.9	7.3	7.9
Conductivity µmhos (mmhos)	31.7	31.5	31.8	326	324	327
(initials) Measured by:	CF	JD	CF	JD	JD	JD
(initials) Recorded by:	CF	CF	CF	JD	JD	JD

Comments: (A) all concentration replicates aerated from 0hr - 96 hours MF 5/1/09

Concentration 7.5%	0 Hr.	24 Hr.	48 Hr. before renewal	48 Hr. after renewal	72 Hr.	96 Hr.
Replicate	A	B	A	A	B	A
pH (S.U.)	8.37	8.2	8.3	8.4	8.3	8.3
Temperature °C	22.9	24.3	24.6	24.2	24.0	24.1
(A) Dissolved Oxygen mg/L	7.09	6.9	7.7	6.8	7.7	7.9
Conductivity µmhos (mmhos)	31.7	31.6	32.0	32.8	33.0	33.2
(initials) Measured by:	CF	JD	CF	JD	JD	JD
(initials) Recorded by:	CF	CF	CF	JD	JD	JD

Comments:

Concentration 15%	0 Hr.	24 Hr.	48 Hr. before renewal	48 Hr. after renewal	72 Hr.	96 Hr.
Replicate	A	B	A	A	B	A
pH (S.U.)	8.33	8.3	8.3	8.4	8.3	8.2
Temperature °C	23.0	24.3	24.5	24.2	24.3	24.1
(A) Dissolved Oxygen mg/L	6.90	~~7.0~~ (B)	7.6	6.8	6.9	7.8
Conductivity µmhos (mmhos)	31.6	32.0	31.8	32.7	32.9	33.3
(initials) Measured by:	CF	JD	CF	JD	JD	JD
(initials) Recorded by:	CF	CF	CF	JD	JD	JD

Comments: (A) Transcription error JD

Concentration 30%	0 Hr.	24 Hr.	48 Hr. before renewal	48 Hr. after renewal	72 Hr.	96 Hr.
Replicate	A	B	A	A	B	A
pH (S.U.)	8.26	8.1	8.1	8.3	8.3	8.2
Temperature °C	23.0	24.2	24.5	24.3	24.3	24.1
(A) Dissolved Oxygen mg/L	6.59	6.9	7.5	6.8	6.9	6.8
Conductivity µmhos (mmhos)	31.6	31.7	31.9	32.5	32.7	33.0
(initials) Measured by:	CF	JD	CF	JD	JD	JD
(initials) Recorded by:	CF	CF	CF	JD	JD	JD

Comments:

V 2.0 2/24/04

FDEP Biology Laboratory - Bioassay Parameter Bench Sheet

LIMS Sample # : 1181313 **Test #:** 2 of 2

TEST SOP #: TA07_04 **Test Species:** *Ceriodaphnia dubia* *Cyprinella leedsi* *Pimephales promelas* *Americamysis bahia* ~~*Menidia beryllina*~~ Other:_____

Concentration 60%	0 Hr.	24 Hr.	48 Hr. before renewal	48 Hr. after renewal	72 Hr.	96 Hr.
Replicate	A	B	A	A	B	A
pH (S.U.)	8.11	8.1	8.3	8.1	8.3	8.2
Temperature °C	22.8	24.3	24.4	24.3	24.3	24.1
(A) Dissolved Oxygen mg/L	5.80	6.9	7.5	6.1	6.5	6.7
Conductivity µmhos ~~mmhos~~	31.9	32.0	31.6	32.0	32.5	32.7
(initials) Measured by:	CF	JD	CF	JD	JD	JD
(initials) Recorded by:	CF	CF	CF	JD	JD	JD

Comments: (A) all concentration replicates aerated continuously 0hr-96hrs - MF 5/7/09

Concentration 100%	0 Hr.	24 Hr.	48 Hr. before renewal	48 Hr. after renewal	72 Hr.	96 Hr.
Replicate	A	B	A	A	B	A
pH (S.U.)	7.95	8.0	7.9	8.2	8.0	7.8
Temperature °C	22.7	24.7	24.5	24.7	24.1	24.0
(A) Dissolved Oxygen mg/L	4.85	6.9	6.7	5.9	6.1	5.9
Conductivity µmhos ~~mmhos~~	31.8	31.7	31.6	31.5	31.8	32.3
(initials) Measured by:	CF	JD	CF	JD	JD	JD
(initials) Recorded by:	CF	CF	CF	JD	JD	JD

Comments: (B) transcription error JD (C) MF changed from A to C to prevent confusion MF 5/7/09

Concentration SALT Ctrl	0 Hr.	24 Hr.	48 Hr. before renewal	48 Hr. after renewal	72 Hr.	96 Hr.
Replicate	A	B	A	A	B	A
pH (S.U.)	8.49	8.3	8.4	8.4	8.3	8.1
Temperature °C	22.7	24.2	24.5	24.0	24.0	24.0
(A) Dissolved Oxygen mg/L	7.28	6.6	7.3	5.4	6.5	6.7
Conductivity µmhos ~~mmhos~~	32.3	31.5	30.6	31.6	32.0	32.3
(initials) Measured by:	CF	JD	CF	JD	JD	JD
(initials) Recorded by:	CF	CF	CF	JD	JD	JD

Comments:

Concentration	0 Hr.	24 Hr.	48 Hr. before renewal	48 Hr. after renewal	72 Hr.	96 Hr.
Replicate						
pH (S.U.)						
Temperature °C						
Dissolved Oxygen mg/L						
Conductivity µmhos mmhos						
(initials) Measured by:						
(initials) Recorded by:						

Comments:

V 2.0 2/24/04

Appendix C. SRT Bench Sheets and Statistical Analysis

Florida Department of Environmental Protection
Bureau of Laboratories

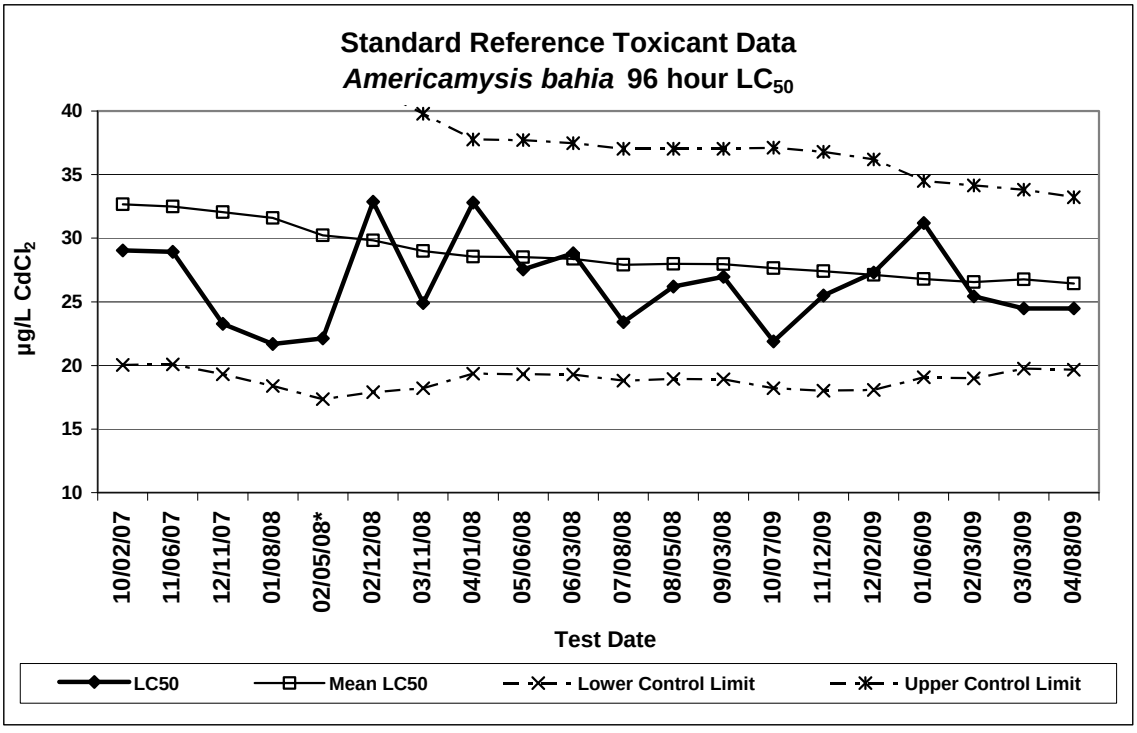
Standard Reference Toxicant (SRT) Test Data - 96-hour Acute Toxicity
Americamysis bahia (mysid shrimp) - Cadmium Chloride ($CdCl_2$)

Date	LC50	Mean LC50	Std Dev	Lower Control Limit	Upper Control Limit
10/02/07	29.04	32.68	6.32	20.04	45.32
11/06/07	28.93	32.50	6.21	20.08	44.91
12/11/07	23.28	32.06	6.38	19.30	44.81
01/08/08	21.69	31.59	6.60	18.38	44.79
02/05/08*	22.13	30.23	6.44	17.35	43.12
02/12/08	32.87	29.83	5.96	17.90	41.76
03/11/08	24.89	29.00	5.39	18.22	39.78
04/01/08	32.81	28.56	4.60	19.36	37.75
05/06/08	27.55	28.52	4.60	19.31	37.72
06/03/08	28.81	28.37	4.54	19.29	37.46
07/08/08	23.40	27.91	4.56	18.80	37.03
08/05/08	26.21	27.98	4.52	18.93	37.03
09/03/08	26.98	27.96	4.53	18.91	37.02
10/07/09	21.89	27.66	4.73	18.21	37.11
11/12/09	25.50	27.40	4.69	18.01	36.78
12/02/09	27.31	27.13	4.53	18.07	36.20
01/06/09	31.20	26.79	3.86	19.07	34.50
02/03/09	25.44	26.56	3.79	18.97	34.15
03/03/09	24.49	26.78	3.52	19.75	33.81
04/08/09	24.49	26.45	3.39	19.66	33.23

CV = 12.82

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

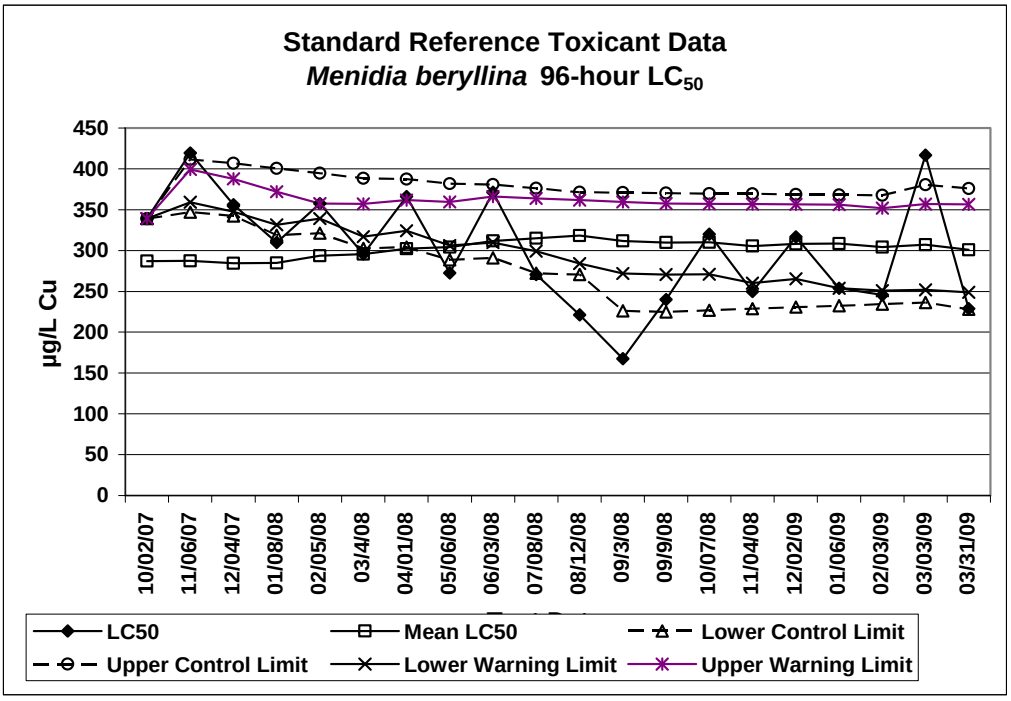
Standard Reference Toxicant (SRT) Test Data - 96-hour Acute Toxicity
Menidia beryllina (inland silverside) - Copper Chloride ($CuCl_2$) as Cu

Date	LC50	Mean LC50	Std Dev	Lower Control Limit	Upper Control Limit	Lower Warning Limit	Upper Warning Limit
10/02/07	338.91	287.06	72.69	338.91	338.91	338.91	338.91
11/06/07	419.55	287.50	73.50	346.97	411.49	359.07	399.39
12/04/07	356.02	284.51	69.07	342.33	406.84	347.47	387.79
01/08/08	309.80	284.71	69.14	318.53	400.49	331.63	371.90
02/05/08	357.47	293.49	66.51	321.44	394.72	338.91	357.47
03/4/08	295.52	295.53	65.88	302.66	388.51	317.08	357.11
04/01/08	365.9	302.28	64.49	304.09	387.36	324.36	361.69
05/06/08	272.5	304.29	63.81	288.61	382.00	306.23	359.58
06/03/08	371.38	311.63	62.59	290.92	381.01	309.80	365.90
07/08/08	270.47	315.01	58.07	272.30	376.20	299.09	363.79
08/12/08	221.17	318.46	49.27	270.47	371.38	284.01	361.69
09/3/08	167.46	311.77	59.70	226.10	370.83	271.99	359.58
09/9/08	240.07	309.81	61.44	224.95	370.28	270.47	357.47
10/07/08	319.95	310.00	61.47	226.84	369.74	270.98	357.11
11/04/08	249.81	305.57	62.50	228.73	369.19	260.14	356.75
12/02/09	316.79	308.13	61.82	230.62	368.64	265.31	356.38
01/06/09	253.83	308.45	61.51	232.51	368.09	253.83	356.02
02/03/09	245.51	304.15	62.80	234.40	367.54	250.82	351.74
03/03/09	416.64	307.01	66.63	236.29	380.43	251.82	356.75
03/31/09	228.94	300.89	67.96	228.16	375.91	248.74	356.38

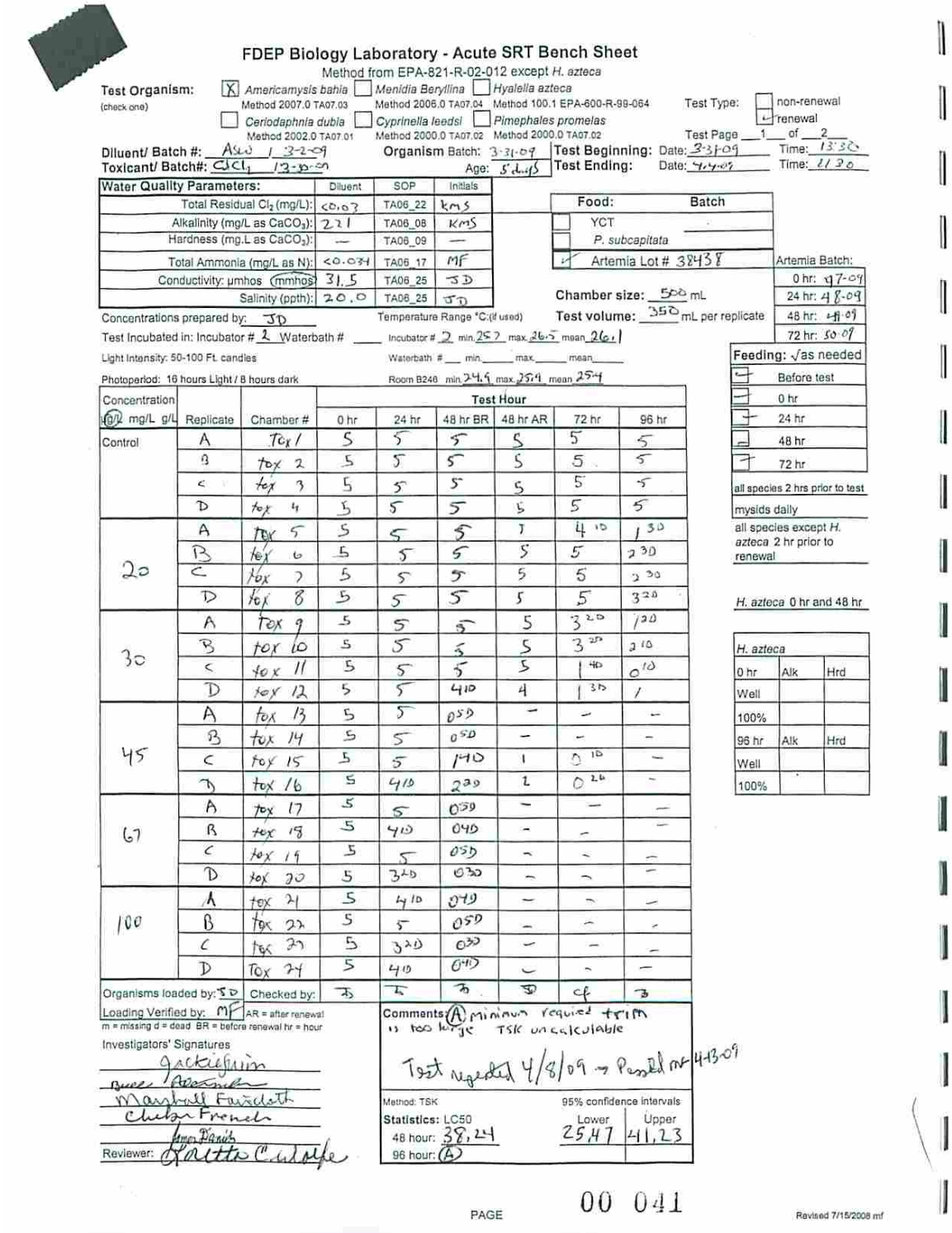
CV = 22.59

EPA reference 75th quartile CV = 21%

Upper warning and control limits are the 75th and 90th percentiles, respectively, of the LC50s.
Lower warning and control limits are the 25th and 10th percentiles, respectively, of the LC50s.



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*; [ ] *Pimephales promelas* Method 2000.0 TA07.02

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

Test Page 1 of 2

Diluent/ Batch #: ASW 1 3-2-09 Organism Batch: 3-31-09 Test Beginning: Date: 3-31-09 Time: 13:30

Toxicant/ Batch#: $CdCl_2$ 1 3-30-09 Age: 5 days Test Ending: Date: 4-4-09 Time: 11:30

Water Quality Parameters:	Diluent	SOP	Initials
Total Residual Cl_2 (mg/L):	<0.03	TA06_22	KMS
Alkalinity (mg/L as $CaCO_3$):	221	TA06_08	KMS
Hardness (mg.L as $CaCO_3$):	—	TA06_09	—
Total Ammonia (mg/L as N):	<0.031	TA06_17	MF
Conductivity: µmhos (mmhos)	31.5	TA06_25	JD
Salinity (ppth):	20.0	TA06_25	JD

Food:	Batch
[ ] YCT	
[ ] *P. subcapitata*	
[✓] Artemia Lot # 38438	

Artemia Batch:

0 hr: 4-7-09

24 hr: 4-8-09

48 hr: 4-9-09

72 hr: 4-10-09

Chamber size: 500 mL

Test volume: 350 mL per replicate

Concentrations prepared by: JD

Temperature Range °C:(if used)

Test Incubated in: Incubator # 2 Waterbath # ____ Incubator # 2 min. 25.7 max. 26.5 mean 26.1

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

Photoperiod: 16 hours Light / 8 hours dark Room B248 min. 24.9 max. 25.9 mean 25.4

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

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

Loading Verified by: MF AR = after renewal

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

Comments: (A) minimum required trim is too large TSK uncalculable

Test Repeated 4/8/09 → Passed MF 4-13-09

Investigators' Signatures

Jackie Quinn

Bruce Alexander

Marshall Faircloth

Chelsea French

Amber Parish

Reviewer: Loretta Cuthrell

Method: TSK

Statistics: LC50	95% confidence intervals Lower	Upper
48 hour: 38,24	25,47	41,23
96 hour: (A)		

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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)
- [Y] *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: 3/31/09 Time: 1330
Test Ending: Date: 4.4.09 Time: 1130
Test Type: [ ] non-renewal [ ] 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	8.3	24.7	7.1	31.5	20.0
	B	24 hr	8.1	24.5	6.1	32.4	20.4
	C	48 hr BR	8.0	24.5	4.9	32.8	20.4
	C	48 hr AR	8.2	24.1	6.5	32.4	20.1
	D	72 hr	8.1	24.5	5.5	32.3	20.8
	A	96 hr	8.1	24.5	5.5	33.1	20.7
20	A	0 hr	8.3	24.8	7.0	32.4	20.3
	B	24 hr	8.2	24.6	5.5	32.3	20.0
	C	48 hr BR	8.0	24.4	5.0	33.7	21.2
	C	48 hr AR	8.3	24.2	6.5	32.4	20.3
	D	72 hr	8.1	24.7	4.7	32.7	20.6
	A	96 hr	8.1	24.5	5.5	33.1	20.5
30	A	0 hr	8.3	24.8	7.0	32.3	20.1
	B	24 hr	8.1	24.6	5.4	32.2	20.2
	C	48 hr BR	8.1	24.2	5.1	32.9	20.5
	C	48 hr AR	8.3	24.3	6.5	32.5	20.3
	D	72 hr	8.1	24.7	4.7	32.9	20.6
	A	96 hr	8.1	24.7	5.7	32.9	20.6
45	A	0 hr	8.3	24.7	6.9	32.3	20.1
	B	24 hr	8.2	24.6	5.3	32.4	19.8
	C	48 hr BR	8.1	24.4	5.0	33.1	20.7
	C	48 hr AR	8.3	24.2	6.5	32.4	20.3
	D	72 hr	8.2	24.5	6.0	33.1	20.7
		96 hr					
67	A	0 hr	8.3	24.6	6.9	32.0	20.0
	B	24 hr	8.2	24.7	5.4	32.0	19.8
	C	48 hr BR	8.1	24.5	5.2	32.3	20.1
	C	48 hr AR	~	~	~	~	~
	~	72 hr	~	~	~	~	~
	~	96 hr	~	~	~	~	~
100	A	0 hr	8.3	24.7	6.9	32.3	20.1
	B	24 hr	8.2	24.8	5.5	32.3	20.2
	C	48 hr BR	8.2	24.6	5.5	32.9	20.5
	~	48 hr AR	~	~	~	~	~
	~	72 hr	~	~	~	~	~
	~	96 hr	~	~	~	~	~

Investigators Signatures
James Daniels
Jacki Shim
Bruce Blanton
Marshall Faircloth
Chelsea Frank
Reviewed By: Loretta C Wolfe

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

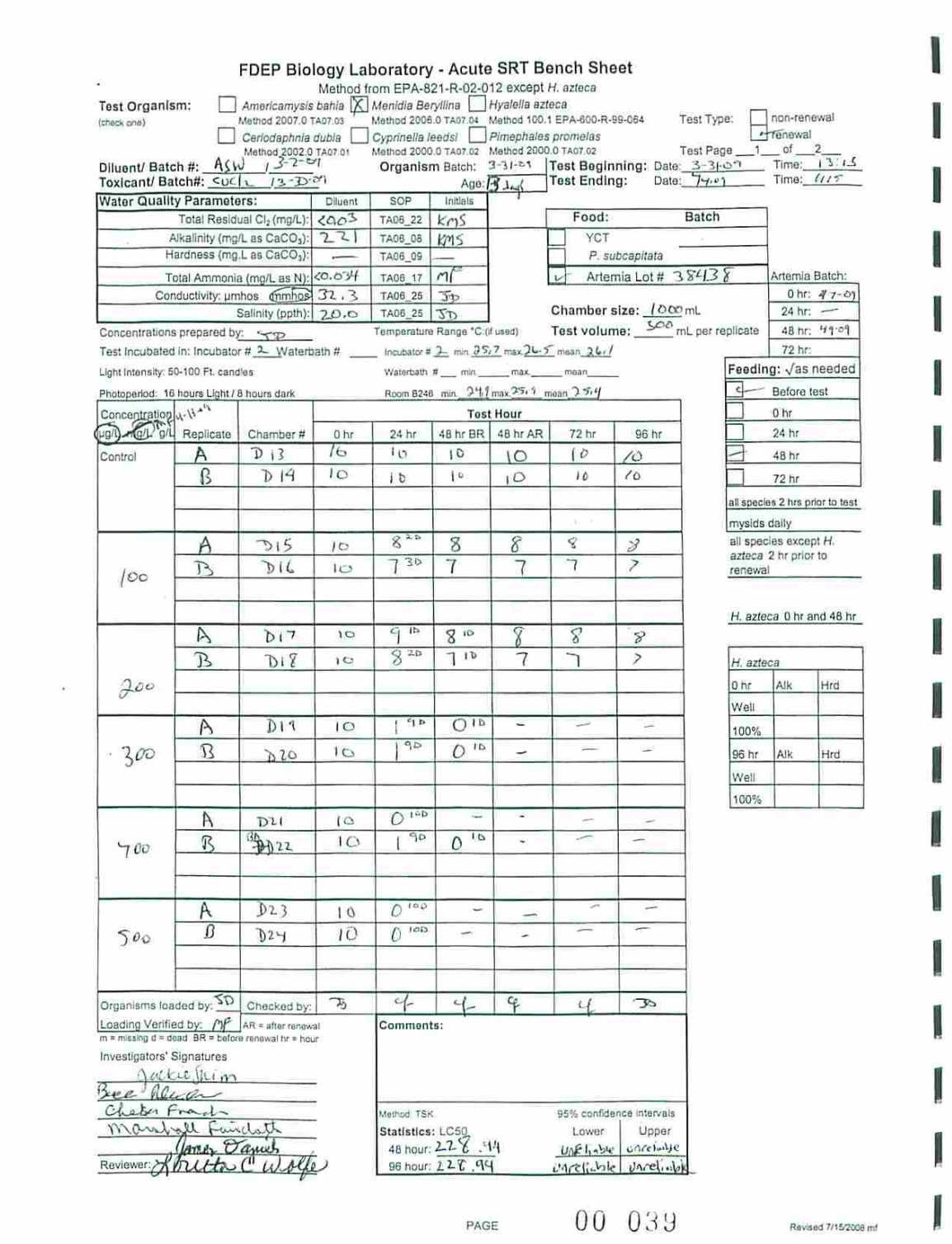
Measure/record salinity for marine tests

Comments:

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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 13-2-01 Organism Batch: 3-31-01 Test Beginning: Date: 3-31-01 Time: 13:15
Toxicant/ Batch#: SUCL 13-3-01 Age: 3 1/2 Test Ending: Date: 4-4-01 Time: 11:15

Water Quality Parameters:	Diluent	SOP	Initials
Total Residual Cl_2 (mg/L):	<003	TA06_22	KMS
Alkalinity (mg/L as $CaCO_3$):	221	TA06_08	KMS
Hardness (mg/L as $CaCO_3$):	—	TA06_09	—
Total Ammonia (mg/L as N):	<0.034	TA06_17	MF
Conductivity: µmhos mmhos	32.3	TA06_25	JD
Salinity (ppth):	20.0	TA06_25	JD

Concentrations prepared by: JD

Test Incubated in: Incubator # 2 Waterbath # ____ Incubator # 2 min 25.7 max 26.5 mean 26.1

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

Photoperiod: 16 hours Light / 8 hours dark Room B248 min 24.9 max 25.9 mean 25.4

Temperature Range °C:(if used)

Food:	Batch
☐ YCT	
☐ *P. subcapitata*	
☑ Artemia Lot # 38438	

Chamber size: 1000 mL
Test volume: 500 mL per replicate

Artemia Batch:
0 hr: 4-7-01
24 hr: —
48 hr: 4-9-01
72 hr:

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 (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	D13	10	10	10	10	10	10
	B	D14	10	10	10	10	10	10
100	A	D15	10	8 2D	8	8	8	8
	B	D16	10	7 3D	7	7	7	7
200	A	D17	10	9 1D	8 1D	8	8	8
	B	D18	10	8 2D	7 1D	7	7	7
300	A	D19	10	1 9D	0 1D	-	—	—
	B	D20	10	1 9D	0 1D	-	—	—
400	A	D21	10	0 10D	—	-	—	—
	B	~~D22~~ BA	10	1 9D	0 1D	-	—	—
500	A	D23	10	0 10D	—	—	—	—
	B	D24	10	0 10D	—	-	—	—
Organisms loaded by: JD		Checked by:	JD	JD	JD	JD	JD	JD
Loading Verified by: MF		AR = after renewal						

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

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

Comments:

Investigators' Signatures
Jackie Shim
Bree Rhodes
Chelsea Frank
Marshall Faircloth
James Daniels
Reviewer: Loretta C Wolfe

Method: TSK

Statistics: LC50	95% confidence intervals Lower	Upper
48 hour: 228.94	Unreliable	unreliable
96 hour: 228.94	unreliable	unreliable

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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

BA 6-11-09
3-31-09

Test Beginning: Date: 4.4.09 Time: 13:15
Test Ending: Date: 4.4.09 Time: 1115

Test Type: ☐ non-renewal ☒ renewal

hr = hour AR = after renewal BR = before renewal

Concentration (µg/L) ng/L g/L	Replicate	Test Hour	pH (SU)	Temperature (° C)	Dissolved Oxygen (mg/L)	Conductivity ☐ µmhos ☒ mmhos	Salinity (ppth)
Control	A	0 hr	8.3	24.8	6.8	32.3	20.0
	B	24 hr	8.1	25.0	5.0	32.5	20.2
	A	48 hr BR	8.1	24.7	5.7	32.6	20.3
	A	48 hr AR	8.3	24.5	6.4	32.4	20.0
	B	72 hr	8.2	24.5	5.3	32.9	20.6
	A	96 hr	8.1	24.3	5.5	33.1	20.4
100	A	0 hr	8.3	24.8	6.8	32.4	20.0
	B	24 hr	8.2	25.0	5.1	32.4	20.2
	A	48 hr BR	8.1	24.8	5.7	32.7	20.4
	A	48 hr AR	8.3	24.5	6.4	32.1	20.1
	B	72 hr	8.2	24.9	5.3	32.7	20.6
	A	96 hr	8.1	24.6	5.6	32.9	20.3
200	A	0 hr	8.3	24.8	6.9	32.2	20.0
	B	24 hr	8.2	24.9	5.2	32.5	20.3
	A	48 hr BR	8.1	24.8	5.6	32.7	20.4
	A	48 hr AR	8.3	24.5	6.5	32.4	20.2
	B	72 hr	8.2	24.4	5.3	32.8	20.6
	A	96 hr	8.1	24.6	5.7	33.1	20.4
300	A	0 hr	8.3	24.6	6.9	32.1	19.9
	B	24 hr	8.2	24.7	5.4	32.3	19.9
	A	48 hr BR	8.2	24.8	5.8	32.5	20.3
	-	48 hr AR	-	-	-	-	-
	-	72 hr	-	-	-	-	-
	-	96 hr	-	-	-	-	-
400	A	0 hr	8.3	24.6	6.9	31.6	19.6
	B	24 hr	8.2	24.5	5.5	31.9	20.1
	B	48 hr BR	8.2	24.8	6.1	32.2	20.0
	-	48 hr AR	-	-	-	-	-
	-	72 hr	-	-	-	-	-
	-	96 hr	-	-	-	-	-
500	A	0 hr	8.3	24.5	7.0	32.0	19.9
	B	24 hr	8.2	24.6	5.6	32.4	20.1
	A	48 hr BR	-	-	-	-	-
	-	48 hr AR	-	-	-	-	-
	-	72 hr	-	-	-	-	-
	-	96 hr	-	-	-	-	-

Investigators Signatures
James Daniel
Jackie Skinn
Brian Pinder
Chuben Freeby
Marshall Faircloth
Reviewed By: Kristin Rudolfe

Measured by:
0 hr: JD
24 hr: JS/BP
48 hr BR: JS/BP
48 hr AR: JS/BP
72 hr: JS/BP
96 hr: JD

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: 4-8-09 DURATION: 96 hr TOXICANT: $CdCl_2$
SPECIES: *Americamysis bahia*

RAW DATA: Concentration (ug/L)	Number Exposed	Mortalities
.00	20	0
20.00	20	4
30.00	20	16
45.00	20	20
67.00	20	20
100.00	20	20

SPEARMAN-KARBER TRIM: 20.00%

SPEARMAN-KARBER ESTIMATES: LC50: 24.49
95% LOWER CONFIDENCE: 22.49
95% UPPER CONFIDENCE: 26.68

Menidia beryllina **Acute Standard Reference Toxicant Test**

DATE: 3-31-09 DURATION: 96 hr TOXICANT: $CdCl_2$
SPECIES: *Menidia beryllina*

RAW DATA: Concentration (ug/L)	Number Exposed	Mortalities
.00	20	0
100.00	20	5
200.00	20	5
300.00	20	20
400.00	20	20
500.00	20	20

SPEARMAN-KARBER TRIM: 25.00%

SPEARMAN-KARBER ESTIMATES: LC50: 228.94
95% CONFIDENCE LIMITS ARE NOT RELIABLE.

Appendix D. Test Organism Receipts

MARINCO BIOASSAY LABORATORY
The Aquatic Toxicology Specialists

NELAP Certification # E84191

Organism Shipment Record

State of Florida Aquaculture Certificate Number AQ0668007

Date: 3/30/06

Shipped to: FDEP

P.O. No:

Species	Quantity	Age	Brood Number	Temp.	pH	Salinity
Mysidopsis bahia	150	4 DAYS	M5090326	25°C	7.9	20‰
Menidia beryllina						
						Hardness
Cyprinella leedsi	150	12DAYS	CL090328	25°C	7.8	80mg/L
Pimephales promelas	150	8DAYS	FM090322	25°C	7.8	80mg/L

Packed by:

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

Organism Shipment Record

State of Florida Aquaculture Certificate Number AQ0668007

Date: 3/30/09

Shipped to: FDEP

P.O. No: _____

Species	Quantity	Age	Brood Number	Temp.	pH	Salinity
Mysidopsis bahia						
Menidia beryllina	150	12 DAYS	SS090318	25°C	7.9	20‰
						Hardness
Cyprinella leedsi						
Pimephales promelas						

Packed by: _____

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

Organism Shipment Record

State of Florida Aquaculture Certificate Number AQ0668007

Date: 4/20/09

Shipped to: FDEP

P.O. No:

Species	Quantity	Age	Brood Number	Temp.	pH	Salinity
Mysidopsis bahia	200	4 DAYS	MS090416	25°C	8.0	20‰
Menidia beryllina	200	12 DAYS	SS090408	25°C	8.0	20‰
						Hardness
Cyprinella leedsi	150	10 DAYS	CL090410	25°C	7.8	80mg/L
Pimephales promelas						

Packed by:

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 E. Chemical Analyses performed on the effluent from the Rayonier Performance Fibers, LLC, facility's NPDES sampling points for Outfall D-001, sampled on April 20, 2009.

Date Sampled	Field ID	Analysis	Component	Result	Remark	Units	MDL	PQL
4/20/2009 12:00	Effluent composited	AGP/LN	Algal Growth Potential	3	U	mg DryWt/L	3	3
4/20/2009 12:00	Effluent composited	Chlorophyll/Grain Size/BOD	Phaeophytin-a	8	U	ug/L	8	24
4/20/2009 12:00	Effluent composited	Chlorophyll/Grain Size/BOD	Biochemical Oxygen Demand-5 Day,N-Inhib	120	L	mg/L	0.2	2
4/20/2009 12:00	Effluent composited	Chlorophyll/Grain Size/BOD	Chlorophyll-a, Corrected	11	U	ug/L	11	34
4/20/2009 12:00	Effluent composited	Overflow	Fecal Coliforms-Membrane Filter	19900	B	#/100 mL	100	
4/20/2009 12:00	Effluent composited	Nutrients	Kjeldahl Nitrogen	45		mg N/L	1.6	4
4/20/2009 12:00	Effluent composited	Nutrients	Total-P	1.5	A	mg P/L	0.02	0.05
4/20/2009 12:00	Effluent composited	Nutrients	TSS	385		mg/L	50	200
4/20/2009 12:00	Effluent composited	Nutrients	Ammonia-N	5.9		mg N/L	0.2	0.4
4/20/2009 12:00	Effluent composited	Nutrients	NO2NO3-N	0.033	J	mg N/L	0.004	0.01
4/20/2009 12:00	Effluent composited	Pesticides	Hexazinone	0.1	U	ug/L	0.1	0.4
4/20/2009 12:00	Effluent composited	Pesticides	Simazine	0.052	U	ug/L	0.052	0.21
4/20/2009 12:00	Effluent composited	Pesticides	Chlordane	0.21	U	ug/L	0.21	0.84
4/20/2009 12:00	Effluent composited	Pesticides	DDT-p,p'	0.031	U	ug/L	0.031	0.12
4/20/2009 12:00	Effluent composited	Pesticides	Methoxychlor	0.052	UJ	ug/L	0.052	0.21
4/20/2009 12:00	Effluent composited	Pesticides	Fenamiphos	0.21	UJ	ug/L	0.21	0.84
4/20/2009 12:00	Effluent composited	Pesticides	Metalaxyl	0.26	U	ug/L	0.26	1
4/20/2009 12:00	Effluent composited	Pesticides	Parathion Ethyl	0.16	U	ug/L	0.16	0.64
4/20/2009 12:00	Effluent composited	Pesticides	Phorate	0.052	U	ug/L	0.052	0.21
4/20/2009 12:00	Effluent composited	Pesticides	Endosulfan I	0.021	U	ug/L	0.021	0.084
4/20/2009 12:00	Effluent composited	Pesticides	Endosulfan II	0.021	U	ug/L	0.021	0.084
4/20/2009 12:00	Effluent composited	Pesticides	Alachlor	0.63	U	ug/L	0.63	2.5
4/20/2009 12:00	Effluent composited	Pesticides	Gamma-BHC	0.01	U	ug/L	0.01	0.04
4/20/2009 12:00	Effluent composited	Pesticides	Diazinon	0.052	U	ug/L	0.052	0.21
4/20/2009 12:00	Effluent composited	Pesticides	Metolachlor	0.52	U	ug/L	0.52	2.1
4/20/2009 12:00	Effluent composited	Pesticides	Metribuzin	0.1	U	ug/L	0.1	0.4
4/20/2009 12:00	Effluent composited	Pesticides	Mevinphos	0.21	U	ug/L	0.21	0.84
4/20/2009 12:00	Effluent composited	Pesticides	Norflurazon	0.16	U	ug/L	0.16	0.64
4/20/2009 12:00	Effluent composited	Pesticides	DDD-p,p'	0.021	U	ug/L	0.021	0.084
4/20/2009 12:00	Effluent composited	Pesticides	Heptachlor Epoxide	0.021	U	ug/L	0.021	0.084
4/20/2009 12:00	Effluent composited	Pesticides	Azinphos Methyl	0.21	UJ	ug/L	0.21	0.84
4/20/2009 12:00	Effluent composited	Pesticides	Butylate	0.21	UJ	ug/L	0.21	0.84
4/20/2009 12:00	Effluent composited	Pesticides	Chlorpyrifos Ethyl	0.052	U	ug/L	0.052	0.21

Appendix E. (continued)

Date Sampled	Field ID	Analysis	Component	Result	Remark	Units	MDL	PQL
4/20/2009 12:00	Effluent composited	Pesticides	Ethoprop	0.1	U	ug/L	0.1	0.4
4/20/2009 12:00	Effluent composited	Pesticides	Malathion	0.16	U	ug/L	0.16	0.64
4/20/2009 12:00	Effluent composited	Pesticides	Parathion Methyl	0.1	U	ug/L	0.1	0.4
4/20/2009 12:00	Effluent composited	Pesticides	Endrin	0.052	U	ug/L	0.052	0.21
4/20/2009 12:00	Effluent composited	Pesticides	Naled	0.84	U	ug/L	0.84	3.4
4/20/2009 12:00	Effluent composited	Pesticides	Alpha-BHC	0.01	U	ug/L	0.01	0.04
4/20/2009 12:00	Effluent composited	Pesticides	DDE-p,p'	0.021	U	ug/L	0.021	0.084
4/20/2009 12:00	Effluent composited	Pesticides	Endrin Aldehyde	0.021	U	ug/L	0.021	0.084
4/20/2009 12:00	Effluent composited	Pesticides	Heptachlor	0.01	U	ug/L	0.01	0.04
4/20/2009 12:00	Effluent composited	Pesticides	Aldrin	0.01	U	ug/L	0.01	0.04
4/20/2009 12:00	Effluent composited	Pesticides	Endosulfan Sulfate	0.021	U	ug/L	0.021	0.084
4/20/2009 12:00	Effluent composited	Pesticides	Toxaphene	0.78	U	ug/L	0.78	3.1
4/20/2009 12:00	Effluent composited	Pesticides	Atrazine	0.052	U	ug/L	0.052	0.21
4/20/2009 12:00	Effluent composited	Pesticides	Chlorpyrifos Methyl	0.1	U	ug/L	0.1	0.4
4/20/2009 12:00	Effluent composited	Pesticides	Prometryn	0.16	U	ug/L	0.16	0.64
4/20/2009 12:00	Effluent composited	Pesticides	Beta-BHC	0.01	U	ug/L	0.01	0.04
4/20/2009 12:00	Effluent composited	Pesticides	Delta-BHC	0.01	U	ug/L	0.01	0.04
4/20/2009 12:00	Effluent composited	Pesticides	Dieldrin	0.021	U	ug/L	0.021	0.084
4/20/2009 12:00	Effluent composited	Pesticides	Ametryn	0.052	U	ug/L	0.052	0.21
4/20/2009 12:00	Effluent composited	Pesticides	Bromacil	0.21	U	ug/L	0.21	0.84
4/20/2009 12:00	Effluent composited	Pesticides	Ethion	0.052	U	ug/L	0.052	0.21
4/20/2009 12:00	Effluent composited	Pesticides	Fonofos	0.1	U	ug/L	0.1	0.4
4/20/2009 12:00	Effluent composited	Priority Organic Pollutants	2,4-Dichlorophenol	1.3	I	ug/L	1.1	4.3
4/20/2009 12:00	Effluent composited	Priority Organic Pollutants	Naphthalene	1.1	U	ug/L	1.1	4.3
4/20/2009 12:00	Effluent composited	Priority Organic Pollutants	Acenaphthene	1.1	U	ug/L	1.1	4.3
4/20/2009 12:00	Effluent composited	Priority Organic Pollutants	Benzidine	110	U	ug/L	110	430
4/20/2009 12:00	Effluent composited	Priority Organic Pollutants	Hexachloroethane	3.2	U	ug/L	3.2	13
4/20/2009 12:00	Effluent composited	Priority Organic Pollutants	2,4,6-Trichlorophenol	3.2	I	ug/L	1.1	4.3
4/20/2009 12:00	Effluent composited	Priority Organic Pollutants	2,4-Dinitrotoluene	1.1	U	ug/L	1.1	4.3
4/20/2009 12:00	Effluent composited	Priority Organic Pollutants	4-Chlorophenyl phenyl ether	2.2	U	ug/L	2.2	8.6
4/20/2009 12:00	Effluent composited	Priority Organic Pollutants	4-Nitrophenol	16	U	ug/L	16	65
4/20/2009 12:00	Effluent composited	Priority Organic Pollutants	Benzo(k)fluoranthene	1.1	U	ug/L	1.1	4.3
4/20/2009 12:00	Effluent composited	Priority Organic Pollutants	Chrysene	1.1	U	ug/L	1.1	4.3
4/20/2009 12:00	Effluent composited	Priority Organic Pollutants	Di-n-butyl phthalate	5.4	U	ug/L	5.4	22

Appendix E. (continued)

Date Sampled	Field ID	Analysis	Component	Result	Remark	Units	MDL	PQL
4/20/2009 12:00	Effluent composited	Priority Organic Pollutants	Di-n-octyl phthalate	1.1	U	ug/L	1.1	4.3
4/20/2009 12:00	Effluent composited	Priority Organic Pollutants	Dimethyl phthalate	11	U	ug/L	11	43
4/20/2009 12:00	Effluent composited	Priority Organic Pollutants	Hexachlorobenzene	1.1	U	ug/L	1.1	4.3
4/20/2009 12:00	Effluent composited	Priority Organic Pollutants	Indeno(1,2,3-cd)pyrene	1.1	U	ug/L	1.1	4.3
4/20/2009 12:00	Effluent composited	Priority Organic Pollutants	Pyrene	1.1	U	ug/L	1.1	4.3
4/20/2009 12:00	Effluent composited	Priority Organic Pollutants	Phenanthrene	1.1	U	ug/L	1.1	4.3
4/20/2009 12:00	Effluent composited	Priority Organic Pollutants	2,6-Dinitrotoluene	1.1	U	ug/L	1.1	4.3
4/20/2009 12:00	Effluent composited	Priority Organic Pollutants	Benzo(a)pyrene	1.1	U	ug/L	1.1	4.3
4/20/2009 12:00	Effluent composited	Priority Organic Pollutants	Hexachlorocyclopentadiene	3.2	U	ug/L	3.2	13
4/20/2009 12:00	Effluent composited	Priority Organic Pollutants	N-Nitrosodi-n-propylamine	2.2	U	ug/L	2.2	8.6
4/20/2009 12:00	Effluent composited	Priority Organic Pollutants	Nitrobenzene	2.2	U	ug/L	2.2	8.6
4/20/2009 12:00	Effluent composited	Priority Organic Pollutants	Pentachlorophenol	3.2	U	ug/L	3.2	13
4/20/2009 12:00	Effluent composited	Priority Organic Pollutants	2-Methyl-4,6-dinitrophenol	3.2	U	ug/L	3.2	13
4/20/2009 12:00	Effluent composited	Priority Organic Pollutants	3,3'-Dichlorobenzidine	43	U	ug/L	43	170
4/20/2009 12:00	Effluent composited	Priority Organic Pollutants	Benzo(b)fluoranthene	1.1	U	ug/L	1.1	4.3
4/20/2009 12:00	Effluent composited	Priority Organic Pollutants	Diethyl phthalate	1.8	I	ug/L	1.1	4.3
4/20/2009 12:00	Effluent composited	Priority Organic Pollutants	2,4-Dimethylphenol	11	U	ug/L	11	43
4/20/2009 12:00	Effluent composited	Priority Organic Pollutants	2-Nitrophenol	1.1	U	ug/L	1.1	4.3
4/20/2009 12:00	Effluent composited	Priority Organic Pollutants	Acenaphthylene	1.1	U	ug/L	1.1	4.3
4/20/2009 12:00	Effluent composited	Priority Organic Pollutants	Bis(2-ethylhexyl)phthalate	21	I	ug/L	16	65
4/20/2009 12:00	Effluent composited	Priority Organic Pollutants	Fluorene	1.1	U	ug/L	1.1	4.3
4/20/2009 12:00	Effluent composited	Priority Organic Pollutants	Isophorone	1.1	U	ug/L	1.1	4.3
4/20/2009 12:00	Effluent composited	Priority Organic Pollutants	N-Nitrosodimethylamine	2.2	U	ug/L	2.2	8.6
4/20/2009 12:00	Effluent composited	Priority Organic Pollutants	N-Nitrosodiphenylamine/ Diphenylamine	3.2	U	ug/L	3.2	13
4/20/2009 12:00	Effluent composited	Priority Organic Pollutants	1,2,4-Trichlorobenzene	1.1	U	ug/L	1.1	4.3
4/20/2009 12:00	Effluent composited	Priority Organic Pollutants	2,4-Dinitrophenol	16	U	ug/L	16	65
4/20/2009 12:00	Effluent composited	Priority Organic Pollutants	2-Chlorophenol	1.1	U	ug/L	1.1	4.3
4/20/2009 12:00	Effluent composited	Priority Organic Pollutants	Bis(2-chloroethyl)ether	1.1	U	ug/L	1.1	4.3
4/20/2009 12:00	Effluent composited	Priority Organic Pollutants	Hexachlorobutadiene	3.2	U	ug/L	3.2	13
4/20/2009 12:00	Effluent composited	Priority Organic Pollutants	Phenol	1.1	U	ug/L	1.1	4.3
4/20/2009 12:00	Effluent composited	Priority Organic Pollutants	2-Chloronaphthalene	1.1	U	ug/L	1.1	4.3
4/20/2009 12:00	Effluent composited	Priority Organic Pollutants	4-Bromophenyl phenyl ether	1.1	U	ug/L	1.1	4.3
4/20/2009 12:00	Effluent composited	Priority Organic Pollutants	Anthracene	1.1	U	ug/L	1.1	4.3
4/20/2009 12:00	Effluent composited	Priority Organic Pollutants	Benzo(a)anthracene	1.1	U	ug/L	1.1	4.3

Appendix E. (continued)

Date Sampled	Field ID	Analysis	Component	Result	Remark	Units	MDL	PQL
4/20/2009 12:00	Effluent composited	Priority Organic Pollutants	Benzo(g,h,i)perylene	1.1	U	ug/L	1.1	4.3
4/20/2009 12:00	Effluent composited	Priority Organic Pollutants	Bis(2-chloroethoxy)methane	1.1	U	ug/L	1.1	4.3
4/20/2009 12:00	Effluent composited	Priority Organic Pollutants	Bis(2-chloroisopropyl)ether	3.2	U	ug/L	3.2	13
4/20/2009 12:00	Effluent composited	Priority Organic Pollutants	Butyl benzyl phthalate	5.4	U	ug/L	5.4	22
4/20/2009 12:00	Effluent composited	Priority Organic Pollutants	Dibenzo(a,h)anthracene	1.1	U	ug/L	1.1	4.3
4/20/2009 12:00	Effluent composited	Priority Organic Pollutants	Fluoranthene	1.1	U	ug/L	1.1	4.3
4/20/2009 12:00	Effluent composited	Priority Organic Pollutants	4-Chloro-3-methylphenol	1.1	U	ug/L	1.1	4.3
4/20/2009 12:00	Effluent composited	Field Parameter	Temperature	26.17		C		
4/20/2009 12:00	Effluent composited	Field Parameter	Specific Conductance	4242		umhos/cm		
4/20/2009 12:00	Effluent composited	Field Parameter	pH	6.87				
4/20/2009 12:00	Effluent composited	Field Parameter	Sample Depth	0.3		m		
4/20/2009 12:00	Effluent composited	Field Parameter	Dissolved Oxygen	0.58		mg/L		
4/20/2009 12:50	Effluent	Toxicology	Bioassay-Acute-Def-SW-Mysid, LC50	100	L	LC50		
4/20/2009 12:50	Effluent	Toxicology	Bioassay-Acute-Def-SW-Fish, LC50	97		LC50		
4/20/2009 12:50	Effluent	Metals	Arsenic	0.97	I	ug/L	0.25	1
4/20/2009 12:50	Effluent	Metals	Chromium	5.3		ug/L	0.3	1.2
4/20/2009 12:50	Effluent	Metals	Lead	2.01		ug/L	0.2	0.8
4/20/2009 12:50	Effluent	Metals	Magnesium	61.7		mg/L	0.04	0.16
4/20/2009 12:50	Effluent	Metals	Aluminum	1040		ug/L	60	240
4/20/2009 12:50	Effluent	Metals	Zinc	77		ug/L	5	20
4/20/2009 12:50	Effluent	Metals	Calcium	346		mg/L	0.15	0.6
4/20/2009 12:50	Effluent	Metals	Nickel	12.2		ug/L	0.25	1
4/20/2009 12:50	Effluent	Metals	Selenium	0.23	I	ug/L	0.2	0.8
4/20/2009 12:50	Effluent	Metals	Copper	7		ug/L	0.5	0.5
4/20/2009 12:50	Effluent	Metals	Cadmium	0.36		ug/L	0.03	0.12
4/20/2009 12:50	Effluent	Metals	Iron	1070		ug/L	30	120
4/20/2009 12:50	Effluent	Metals	Silver	0.097	I	ug/L	0.025	0.1
4/20/2009 12:50	Effluent	Nutrients	Total-P	1.6		mg P/L	0.02	0.05
4/20/2009 12:50	Effluent	Nutrients	O-Phosphate-P	0.012	I	mg P/L	0.008	0.02
4/20/2009 12:50	Effluent	Nutrients	Kjeldahl Nitrogen	42		mg N/L	1.6	4
4/20/2009 12:50	Effluent	Nutrients	Ammonia-N	5.5		mg N/L	0.2	0.4
4/20/2009 12:50	Effluent	Nutrients	NO2NO3-N	0.17		mg N/L	0.004	0.01
4/20/2009 11:55	Equipment Blank	Metals	Copper	0.5	U	ug/L	0.5	0.5
4/20/2009 11:55	Equipment Blank	Metals	Magnesium	0.04	U	mg/L	0.04	0.16

Appendix E. (continued)

Date Sampled	Field ID	Analysis	Component	Result	Remark	Units	MDL	PQL
4/20/2009 11:55	Equipment Blank	Metals	Arsenic	0.25	U	ug/L	0.25	1
4/20/2009 11:55	Equipment Blank	Metals	Calcium	0.075	U	mg/L	0.075	0.3
4/20/2009 11:55	Equipment Blank	Metals	Zinc	5	U	ug/L	5	20
4/20/2009 11:55	Equipment Blank	Metals	Nickel	0.25	U	ug/L	0.25	1
4/20/2009 11:55	Equipment Blank	Metals	Silver	0.025	U	ug/L	0.025	0.1
4/20/2009 11:55	Equipment Blank	Metals	Selenium	0.2	U	ug/L	0.2	0.8
4/20/2009 11:55	Equipment Blank	Metals	Iron	30	U	ug/L	30	120
4/20/2009 11:55	Equipment Blank	Metals	Lead	0.2	U	ug/L	0.2	0.8
4/20/2009 11:55	Equipment Blank	Metals	Aluminum	60	U	ug/L	60	240
4/20/2009 11:55	Equipment Blank	Metals	Chromium	0.3	U	ug/L	0.3	1.2
4/20/2009 11:55	Equipment Blank	Metals	Cadmium	0.03	U	ug/L	0.03	0.12
4/20/2009 11:55	Equipment Blank	Nutrients	Total-P	0.004	U	mg P/L	0.004	0.01
4/20/2009 11:55	Equipment Blank	Nutrients	Kjeldahl Nitrogen	0.08	U	mg N/L	0.08	0.2
4/20/2009 11:55	Equipment Blank	Nutrients	O-Phosphate-P	0.005	I	mg P/L	0.004	0.01
4/20/2009 11:55	Equipment Blank	Nutrients	NO2NO3-N	0.004	U	mg N/L	0.004	0.01
4/20/2009 11:55	Equipment Blank	Nutrients	Ammonia-N	0.01	U	mg N/L	0.01	0.02
4/20/2009 11:55	Equipment Blank	Pesticides	Beta-BHC	0.01	U	ug/L	0.01	0.04
4/20/2009 11:55	Equipment Blank	Pesticides	DDE-p,p'	0.02	U	ug/L	0.02	0.08
4/20/2009 11:55	Equipment Blank	Pesticides	DDT-p,p'	0.03	U	ug/L	0.03	0.12
4/20/2009 11:55	Equipment Blank	Pesticides	Endosulfan II	0.02	U	ug/L	0.02	0.08
4/20/2009 11:55	Equipment Blank	Pesticides	Toxaphene	0.75	U	ug/L	0.75	3
4/20/2009 11:55	Equipment Blank	Pesticides	Azinphos Methyl	0.2	UJ	ug/L	0.2	0.8
4/20/2009 11:55	Equipment Blank	Pesticides	Chlorpyrifos Ethyl	0.05	U	ug/L	0.05	0.2
4/20/2009 11:55	Equipment Blank	Pesticides	Metolachlor	0.5	U	ug/L	0.5	2
4/20/2009 11:55	Equipment Blank	Pesticides	Phorate	0.05	U	ug/L	0.05	0.2
4/20/2009 11:55	Equipment Blank	Pesticides	Aldrin	0.01	U	ug/L	0.01	0.04
4/20/2009 11:55	Equipment Blank	Pesticides	Heptachlor Epoxide	0.02	U	ug/L	0.02	0.08
4/20/2009 11:55	Equipment Blank	Pesticides	Prometryn	0.15	U	ug/L	0.15	0.6
4/20/2009 11:55	Equipment Blank	Pesticides	Metribuzin	0.1	U	ug/L	0.1	0.4
4/20/2009 11:55	Equipment Blank	Pesticides	Mevinphos	0.2	U	ug/L	0.2	0.8
4/20/2009 11:55	Equipment Blank	Pesticides	Alpha-BHC	0.01	U	ug/L	0.01	0.04
4/20/2009 11:55	Equipment Blank	Pesticides	Chlordane	0.2	U	ug/L	0.2	0.8
4/20/2009 11:55	Equipment Blank	Pesticides	Ethion	0.05	U	ug/L	0.05	0.2
4/20/2009 11:55	Equipment Blank	Pesticides	Fenamiphos	0.2	UJ	ug/L	0.2	0.8

Appendix E. (continued)

Date Sampled	Field ID	Analysis	Component	Result	Remark	Units	MDL	PQL
4/20/2009 11:55	Equipment Blank	Pesticides	Malathion	0.15	U	ug/L	0.15	0.6
4/20/2009 11:55	Equipment Blank	Pesticides	Delta-BHC	0.01	U	ug/L	0.01	0.04
4/20/2009 11:55	Equipment Blank	Pesticides	Heptachlor	0.01	U	ug/L	0.01	0.04
4/20/2009 11:55	Equipment Blank	Pesticides	Ametryn	0.05	U	ug/L	0.05	0.2
4/20/2009 11:55	Equipment Blank	Pesticides	Atrazine	0.05	U	ug/L	0.05	0.2
4/20/2009 11:55	Equipment Blank	Pesticides	Butylate	0.2	UJ	ug/L	0.2	0.8
4/20/2009 11:55	Equipment Blank	Pesticides	Hexazinone	0.1	U	ug/L	0.1	0.4
4/20/2009 11:55	Equipment Blank	Pesticides	Parathion Ethyl	0.15	U	ug/L	0.15	0.6
4/20/2009 11:55	Equipment Blank	Pesticides	Simazine	0.05	U	ug/L	0.05	0.2
4/20/2009 11:55	Equipment Blank	Pesticides	Parathion Methyl	0.1	U	ug/L	0.1	0.4
4/20/2009 11:55	Equipment Blank	Pesticides	Norflurazon	0.15	U	ug/L	0.15	0.6
4/20/2009 11:55	Equipment Blank	Pesticides	Fonofos	0.1	U	ug/L	0.1	0.4
4/20/2009 11:55	Equipment Blank	Pesticides	Ethoprop	0.1	U	ug/L	0.1	0.4
4/20/2009 11:55	Equipment Blank	Pesticides	Endrin Aldehyde	0.02	U	ug/L	0.02	0.08
4/20/2009 11:55	Equipment Blank	Pesticides	Endosulfan Sulfate	0.02	U	ug/L	0.02	0.08
4/20/2009 11:55	Equipment Blank	Pesticides	Endosulfan I	0.02	U	ug/L	0.02	0.08
4/20/2009 11:55	Equipment Blank	Pesticides	DDD-p,p'	0.02	U	ug/L	0.02	0.08
4/20/2009 11:55	Equipment Blank	Pesticides	Metalaxyl	0.25	U	ug/L	0.25	1
4/20/2009 11:55	Equipment Blank	Pesticides	Diazinon	0.05	U	ug/L	0.05	0.2
4/20/2009 11:55	Equipment Blank	Pesticides	Chlorpyrifos Methyl	0.1	U	ug/L	0.1	0.4
4/20/2009 11:55	Equipment Blank	Pesticides	Alachlor	0.6	U	ug/L	0.6	2.4
4/20/2009 11:55	Equipment Blank	Pesticides	Methoxychlor	0.05	UJ	ug/L	0.05	0.2
4/20/2009 11:55	Equipment Blank	Pesticides	Gamma-BHC	0.01	U	ug/L	0.01	0.04
4/20/2009 11:55	Equipment Blank	Pesticides	Endrin	0.05	U	ug/L	0.05	0.2
4/20/2009 11:55	Equipment Blank	Pesticides	Dieldrin	0.02	U	ug/L	0.02	0.08
4/20/2009 11:55	Equipment Blank	Pesticides	Bromacil	0.2	U	ug/L	0.2	0.8
4/20/2009 11:55	Equipment Blank	Pesticides	Naled	0.8	U	ug/L	0.8	3.2
4/20/2009 11:55	Equipment Blank	Priority Organic Pollutants	2-Chlorophenol	1	U	ug/L	1	4.2
4/20/2009 11:55	Equipment Blank	Priority Organic Pollutants	Benzo(b)fluoranthene	1	U	ug/L	1	4.2
4/20/2009 11:55	Equipment Blank	Priority Organic Pollutants	Bis(2-chloroethoxy)methane	1	U	ug/L	1	4.2
4/20/2009 11:55	Equipment Blank	Priority Organic Pollutants	Dibenzo(a,h)anthracene	1	U	ug/L	1	4.2
4/20/2009 11:55	Equipment Blank	Priority Organic Pollutants	Indeno(1,2,3-cd)pyrene	1	U	ug/L	1	4.2
4/20/2009 11:55	Equipment Blank	Priority Organic Pollutants	2,4-Dinitrotoluene	1	U	ug/L	1	4.2
4/20/2009 11:55	Equipment Blank	Priority Organic Pollutants	4-Chlorophenyl phenyl ether	2.1	U	ug/L	2.1	8.3

Appendix E. (continued)

Date Sampled	Field ID	Analysis	Component	Result	Remark	Units	MDL	PQL
4/20/2009 11:55	Equipment Blank	Priority Organic Pollutants	Benzo(a)anthracene	1	U	ug/L	1	4.2
4/20/2009 11:55	Equipment Blank	Priority Organic Pollutants	Benzo(k)fluoranthene	1	U	ug/L	1	4.2
4/20/2009 11:55	Equipment Blank	Priority Organic Pollutants	Bis(2-chloroisopropyl)ether	3.1	U	ug/L	3.1	12
4/20/2009 11:55	Equipment Blank	Priority Organic Pollutants	Fluoranthene	1	U	ug/L	1	4.2
4/20/2009 11:55	Equipment Blank	Priority Organic Pollutants	N-Nitrosodi-n-propylamine	2.1	U	ug/L	2.1	8.3
4/20/2009 11:55	Equipment Blank	Priority Organic Pollutants	2,4-Dimethylphenol	10	U	ug/L	10	42
4/20/2009 11:55	Equipment Blank	Priority Organic Pollutants	2-Nitrophenol	1	U	ug/L	1	4.2
4/20/2009 11:55	Equipment Blank	Priority Organic Pollutants	Anthracene	1	U	ug/L	1	4.2
4/20/2009 11:55	Equipment Blank	Priority Organic Pollutants	Bis(2-ethylhexyl)phthalate	16	U	ug/L	16	62
4/20/2009 11:55	Equipment Blank	Priority Organic Pollutants	Di-n-butyl phthalate	5.2	U	ug/L	5.2	21
4/20/2009 11:55	Equipment Blank	Priority Organic Pollutants	Di-n-octyl phthalate	1	U	ug/L	1	4.2
4/20/2009 11:55	Equipment Blank	Priority Organic Pollutants	Dimethyl phthalate	10	U	ug/L	10	42
4/20/2009 11:55	Equipment Blank	Priority Organic Pollutants	Phenol	1	U	ug/L	1	4.2
4/20/2009 11:55	Equipment Blank	Priority Organic Pollutants	4-Bromophenyl phenyl ether	1	U	ug/L	1	4.2
4/20/2009 11:55	Equipment Blank	Priority Organic Pollutants	4-Chloro-3-methylphenol	1	U	ug/L	1	4.2
4/20/2009 11:55	Equipment Blank	Priority Organic Pollutants	Acenaphthylene	1	U	ug/L	1	4.2
4/20/2009 11:55	Equipment Blank	Priority Organic Pollutants	Benzo(a)pyrene	1	U	ug/L	1	4.2
4/20/2009 11:55	Equipment Blank	Priority Organic Pollutants	Butyl benzyl phthalate	5.2	U	ug/L	5.2	21
4/20/2009 11:55	Equipment Blank	Priority Organic Pollutants	Chrysene	1	U	ug/L	1	4.2
4/20/2009 11:55	Equipment Blank	Priority Organic Pollutants	N-Nitrosodimethylamine	2.1	U	ug/L	2.1	8.3
4/20/2009 11:55	Equipment Blank	Priority Organic Pollutants	Nitrobenzene	2.1	U	ug/L	2.1	8.3
4/20/2009 11:55	Equipment Blank	Priority Organic Pollutants	Pentachlorophenol	3.1	U	ug/L	3.1	12
4/20/2009 11:55	Equipment Blank	Priority Organic Pollutants	Phenanthrene	1	U	ug/L	1	4.2
4/20/2009 11:55	Equipment Blank	Priority Organic Pollutants	2,4-Dichlorophenol	1	U	ug/L	1	4.2
4/20/2009 11:55	Equipment Blank	Priority Organic Pollutants	2,6-Dinitrotoluene	1	U	ug/L	1	4.2
4/20/2009 11:55	Equipment Blank	Priority Organic Pollutants	Benzidine	100	U	ug/L	100	420
4/20/2009 11:55	Equipment Blank	Priority Organic Pollutants	Diethyl phthalate	1	U	ug/L	1	4.2
4/20/2009 11:55	Equipment Blank	Priority Organic Pollutants	Hexachloroethane	3.1	U	ug/L	3.1	12
4/20/2009 11:55	Equipment Blank	Priority Organic Pollutants	N-Nitrosodiphenylamine/ Diphenylamine	3.1	U	ug/L	3.1	12
4/20/2009 11:55	Equipment Blank	Priority Organic Pollutants	1,2,4-Trichlorobenzene	1	U	ug/L	1	4.2
4/20/2009 11:55	Equipment Blank	Priority Organic Pollutants	Acenaphthene	1	U	ug/L	1	4.2
4/20/2009 11:55	Equipment Blank	Priority Organic Pollutants	Benzo(g,h,i)perylene	1	U	ug/L	1	4.2
4/20/2009 11:55	Equipment Blank	Priority Organic Pollutants	Fluorene	1	U	ug/L	1	4.2
4/20/2009 11:55	Equipment Blank	Priority Organic Pollutants	Hexachlorobutadiene	3.1	U	ug/L	3.1	12

Appendix E. (continued)

Date Sampled	Field ID	Analysis	Component	Result	Remark	Units	MDL	PQL
4/20/2009 11:55	Equipment Blank	Priority Organic Pollutants	Hexachlorocyclopentadiene	3.1	U	ug/L	3.1	12
4/20/2009 11:55	Equipment Blank	Priority Organic Pollutants	2-Chloronaphthalene	1	U	ug/L	1	4.2
4/20/2009 11:55	Equipment Blank	Priority Organic Pollutants	2-Methyl-4,6-dinitrophenol	3.1	U	ug/L	3.1	12
4/20/2009 11:55	Equipment Blank	Priority Organic Pollutants	3,3'-Dichlorobenzidine	42	U	ug/L	42	170
4/20/2009 11:55	Equipment Blank	Priority Organic Pollutants	4-Nitrophenol	16	U	ug/L	16	62
4/20/2009 11:55	Equipment Blank	Priority Organic Pollutants	Bis(2-chloroethyl)ether	1	U	ug/L	1	4.2
4/20/2009 11:55	Equipment Blank	Priority Organic Pollutants	Isophorone	1	U	ug/L	1	4.2
4/20/2009 11:55	Equipment Blank	Priority Organic Pollutants	Naphthalene	1	U	ug/L	1	4.2
4/20/2009 11:55	Equipment Blank	Priority Organic Pollutants	Pyrene	1	U	ug/L	1	4.2
4/20/2009 11:55	Equipment Blank	Priority Organic Pollutants	2,4,6-Trichlorophenol	1	U	ug/L	1	4.2
4/20/2009 11:55	Equipment Blank	Priority Organic Pollutants	2,4-Dinitrophenol	16	U	ug/L	16	62
4/20/2009 11:55	Equipment Blank	Priority Organic Pollutants	Hexachlorobenzene	1	U	ug/L	1	4.2

Appendix F. Bioassay Instruments

FDEP Biology Laboratory - Bioassay Instrument Identification

Test Dates: April 21 - 25, 2009

Test ID: Rayonier Performance Fibers, LLC SRT Dates: March 31 - April 4 and April 8 -12, 2009

METER / DEVICE	ID	SOP	Parameter	Method	√ used
YSI Model 58 Dissolved Oxygen Meter	90H018262	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	SM 2510 B	√
			Salinity	SM 2520 B	√
Denver Model 225 ISE with ammonia probe	SN K01377	TA06_17	Ammonia	SM 4500 NH3 F	√
Thermometer (DO probe)	YSI 5750 SN 05J1720	TA06_05	Temperature	SM-2530B modified DEP SOP-001/01 FT1400	√
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 electronic and non-mercury filled thermometers.
Insert other device information in blank spaces(if used). Test ID = Facility or SRTs (acute SRT--Chronic SRT)

Comments: Entered by M. Faircloth 7/6/09

V 1.4 8/21/08 BA

Appendix G. Facility Summary

State of Florida
Department of Environmental Protection
Facility Introduction & Summary

PART I: Information gathered prior to sampling event	
Prepared By: Heather Webber – March 2009	**Contact Number:** 904-807-3316
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): 01/2008 through 12/2008 - 14.48 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).	
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 during outgoing tides.	

Appendix G. (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			
Parameter	Units	Max/Min	Annual Average	Monthly Average	Weekly Average	Single Sample	Monitoring Frequency	Sample Type	Monitoring Location Site Number	Notes
Flow combined (former D-001 and former D-002)	MGD	26.31 Daily Max.				Report Daily Avg.	Continuous	Calculated	EFF-1	
Flow (clear sewer discharge, former D-002)	MGD	Report Daily Max.				Report Daily Avg.	Continuous	Recorder	EFF-2	
Flow (treated process wastewater and treated storm water, former D-001	MGD	Report Daily Max.				Report Daily Avg.	Continuous	Recorder	EFF-3	
BOD, Carbonaceous 5 day, 20C	lbs/day	47,250 Daily Max.				27,000 Daily Avg.	Daily	24-hour composite	EFF-1	
Solids, Total Suspended	lbs/day	55,000 Daily Max.				38,278 Daily Avg.	Daily	24-hour composite	EFF-1	
pH		6.0 Daily Min. 8.5 Daily Max.					Continuous	Recorder	EFF-1	
Length of Longest pH Excursion	minutes	60 Daily Max.					Monthly	Calculated	EFF-1	
% of Time Exceeding pH Limits	percent	1 Daily Max.					Monthly	Calculated	EFF-1	
Nitrogen, Ammonia, Total (as N)	mg/L	Report Daily Max.	11.0	20.0			Weekly	24-hour composite	EFF-1	
Ammonia, Unionized	mg/L	Report Daily Max.					Weekly	Calculated	EFF-1	
Temperature (F), Water	degree F	Report Daily Max.					Continuous	Recorder	EFF-1	
Silver, Total Recoverable	µg/L	2.3 Daily Max.					Monthly	Grab	EFF-1	
Nickel, Total Recoverable	µg/L	66.4 Daily Max.					Monthly	Grab	EFF-1	
Aluminum, Total Recoverable	mg/L	3.0 Daily Max.					Monthly	Grab	EFF-1	
Copper, Total Recoverable	µg/L	11.5 Daily Max.					Monthly	Grab	EFF-1	
Iron, Total Recoverable	mg/L	2.4 Daily Max.					Monthly	Grab	EFF-1	
Lead, Total Recoverable	µg/L	27.2 Daily Max.					Monthly	Grab	EFF-1	
Zinc, Total Recoverable	µg/L	410.0 Daily Max.					Monthly	Grab	EFF-1	

Appendix G. (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.):

D. Toxicity Monitoring Program

1. The maximum concentration of wastes in the mixing zones established in Part I.E.2 and 3 may exceed the 96 hour LC50 in accordance with FAC Rule 62-4.244(3)(b). 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 pursuant to Rule 62-4.244(3)(b)(4), FAC. Toxicity testing shall be performed in accordance with Specific Condition I.D.2 of this permit.

   Acute Whole Effluent Toxicity Monitoring Program

2. As required by Specific Condition I.A.1. of this permit, the Permittee shall continue the series of tests described below 90 days from the most recent quarterly test, and then quarterly thereafter, to evaluate acute whole effluent toxicity of the effluent from Outfall D-001. The sampling frequency may be reduced to once every six months after 3 sets of valid quarterly toxicity bioassay tests have demonstrated 96-hour LC50 not less than 30% effluent as described in Part I.D.1.

   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, as stated in I.A.8. 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 results of each routine toxicity test shall be submitted within forty-five (45) days of test termination to the FDEP Northeast District Office in accordance with Part I.E.8. Results from the test(s), required due to unacceptable acute toxicity (96-hr LC50 < 30% effluent) in the additional tests, shall be submitted within thirty (30) days of completion of the additional definitive toxicity test(s).

   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 as described in EPA/600/4-90/027F, Section 9 (or the most recent edition). 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. Alternatively, if monthly SRT QA tests are conducted, these results must be submitted. All test procedures and quality assurance criteria used shall be in accordance with Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Fresh Water and Marine Organisms, 4th Edition, EPA 600/4-90/027F (August 1993 or the most current edition). Any deviation from the bioassay procedures outlined herein shall be submitted in writing to the Department for review and approval prior to use.

   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.
   c. Should any valid additional definitive test(s) indicate the characteristic of unacceptable toxicity, the Permittee shall prepare a plan of study (POS) to evaluate the cause(s) or source(s) of toxicity of the effluent and evaluate feasible methodologies to reduce or eliminate the toxicity. The POS must include a chemical analysis of the effluent including priority pollutants and non-priority peaks, along with total and unionized ammonia.
   d. The Permittee shall submit the POS to the Department for review within sixty (60) days of determination of toxicity by the valid definitive test(s) in accordance with Part I.E.8. The Permittee shall meet with the Department within thirty (30) days of POS submittal to identify a schedule of corrective actions necessary to remedy the toxicity.
   e. Results from the additional set of tests, required due to unacceptable acute toxicity in the routine test, shall be submitted in a single report prepared according to EPA 600/4-90/027F, Section 12, Report Preparation (or the most current edition) and submitted within thirty (30) days of completion of the additional set of valid tests.

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

Appendix G. (continued)

Facility Mixing Zone Details (if applicable):

Mixing Zones

2. Pursuant to FAC Rule 62-4.244, the Permittee is hereby granted a mixing zone, for dissolved oxygen for the effluent discharge from Outfall 001 into the Amelia River. The Permittee's discharge shall not cause a violation of the Chapter 62-302, FAC, Class III Water Quality Standards outside the boundaries of the mixing zone described below.

   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. In addition, outside the boundaries of the established mixing zone, all Chapter 62-302, FAC, Class III Water Quality standards, as modified by the SSAC granted on June 22, 1985, shall apply.

3. The Permittee is granted mixing zones for Iron, Aluminum, Nickel, Copper, Lead, pH, and Zinc pursuant to FAC Rule 62-4.244 for the effluent discharge from Outfall 001 into Amelia River. 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 ug/L, 3.7 ug/L, 8.5 ug/l, 6.5 minimum and 8.5 maximum s.u.., and 86 ug/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.

4. 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 specified in Figure I

(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

List Permit Violations (DMR data) and plant upsets that occurred at the plant within the last year:

Appendix G. (continued)

Date	Parameter and Units	Limit	Result
N/A			

Describe previous FYI and WQBEL study:
Americamysis bahia 48-hr acute screen – Not Toxic
Menidia beryllina 48-hr acute screen – Not Toxic
Total residual chlorine was not detected in the bioassay sample in the laboratory.
Total ammonia and unionized ammonia were detected at concentrations of 1.19 mg/L and 0.102 mg/L, respectively, in the bioassay sample.
The metals copper, iron, and nickel were detected at concentrations above the Criteria for Surface Water Quality Classifications (FAC 62-302.530), however the concentrations were in compliance with allowable mixing zone concentrations.
The salinity-adjusted sample of effluent collected from this facility on June 3, 2002 did not show acute toxicity to either test species during the 48-hour bioassay tests.

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 – In Compliance on 03/14/08

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

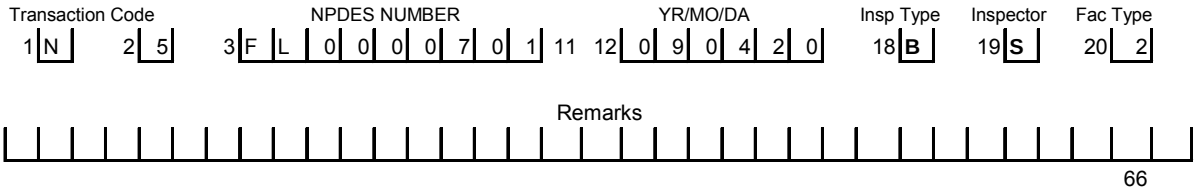
Appendix G. (continued)

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 H. EPA End Sheet

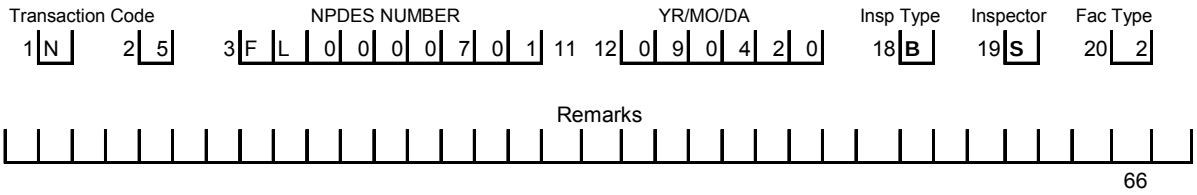
The Bioassay of the Rayonier Performance Fibers, LLC facility effluent sampled on April 20, 2009. NPDES #FL0000701.

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



The Priority Pollutants Analysis of the Rayonier Performance Fibers, LLC facility effluent sampled on April 20, 2009. NPDES #FL0000701.

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



Biological Analyses of the Rayonier Performance Fibers, LLC facility effluent sampled on April 20, 2009. NPDES #FL0000701.

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

